



**Land Use Permit Application
and Support Documentation**

for

**Deep Water Lake New Access Road
and Truckfill Station**

prepared for:

**Municipal and Community Affairs
Inuvik, Northwest Territories
X0E 0T0**

prepared by:

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FSC Project No. 2000-0220

August 15, 2000



Information In Support Of An Application For A Land Use Permit

Deep Water Lake New Access Road and Truckfill

New Application

1. Applicant's name and mailing address

Government of the Northwest Territories

Municipal and Community Affairs

Inuvik, NT X0E 0T0

c/o Spencer Philippo, Senior Capital Programs Officer

Telephone no. 777 7320

Fax no. 777-7352

2. Head office address

Not applicable.

3. Other personnel (subcontractor, contractors, company, staff, etc.)

Total number of persons on site:



GNWT/Department of Transportation is to be responsible for the design and construction of the access road and truckfill station pad.

Others to be on site for construction of truckfill/pumphouse not determined at this time, a tender is to be let.

4. Eligibility 18(a)(iii)

5. a) Summary of operation

New Water Supply Source for Fort McPherson, NWT

The Department of Municipal and Community Affairs has asked the Department of Public Works and Services to manage a project in Fort McPherson, NWT to relocate their source water supply from their existing source, known as “Water Lake” to the new source, Deep Water Lake.

Deep Water Lake is located alongside the Dempster Highway at approximately Kilometre 108.1. A bathymetric survey of this lake revealed the depths of up to approximately 20 metres. Due to the distance from Fort McPherson, a trucked water supply system would have to be developed, with the provision of raw water storage at the treatment plant. To this end, a second planning study for Deep Water Lake was completed by the Department of Municipal and Community Affairs, to identify the water quantities required over the long term, the raw water storage requirements, and the development of options for the location of the all-weather intake and raw water truckfill pumping station at Deep Water Lake.



The location of the proposed raw water truckfill station is approximately 24 kms from Fort McPherson at KM 110.1 on the Dempster Highway. The RCPL Report, “Deep Water Lake Planning Study May 2000”, provides additional details.

The Department of Transportation will be completing a Dempster Highway Road Widening Project during Summer 2000. Because heavy road construction equipment, and access to granular supplies will be readily available close to Deep Water Lake, an agreement has been made for the access road to be built by the Department of Transportation, on behalf of the Department of Public Works and Services.

The proposed system in general shall include the following major components: (refer to “Deep Water Lake Planning Study - June, 1999” by RCPL)

Intakes, pumphouse and truckfill facility

- The intake pipe will be an incline shaft type intake with screens.
- Station design to enable filling of tanker trucks at a fast rate. Each tanker truck has a capacity of approximately 36,000 Litres.
- Tanker truck turnaround, truckfill arm and pump control panel would be located at the pump station, close to shore.
- Truckfill station building would be powered by generators. Continuous power would be required for the following: light at the truck turnaround area, electric heat for the building, heat trace cables on the intake during winter months only, and both exterior and interior building lighting. Power for the pumping of water would be, intermittent, on demand.
 - Backup power – to ensure an uninterrupted power supply to the system, proposals should include contingency provisions.

Control Equipment

- Controllers for electrical heat trace cables if required.



- Controller for the truckfill pumping system.

Metering Equipment

- Truckfill flow rate indicator, totalizer, and chart recorder or other recording device.
- Water temperature and pressure indicators and flow meters.

Alarm System

- Such as truck high water level, high/low truckfill building temperature, low flow and low temperature in the intake line, no power, and other critical alarms. The alarm signal would be transmitted to the Water Treatment Plant in Fort McPherson. Note there are no telephone lines in the area.

Heating Requirement

- Building heat to a minimal 10C only, as well as water tempering capability for freeze protection.

This Application for a Land Use Permit is for the intakes and truckfill station, access road and truck turnaround.

Use of the Deep Water Lake source and modifications to the Water Treatment Plant in Fort McPherson will be completed under a modification to the existing water licence.

b) Indicate if a camp is to be set up (Provide details on a separate page, if necessary.)

No camp is planned at this time.

6. Summary of potential environmental and resource impacts

Watershed Setting Taiga Plains, Fort McPherson Plain, 53

Deep Water Lake is located in the Taiga Plains Ecoregion. This ecoregion spans the Yukon and Northwest Territories border and extends from Fort McPherson to the Mackenzie and Ramparts rivers. The ecoregion is marked by long, very cold winters and short cool summers. The mean annual temperature is approximately -8 °C. The mean annual summer temperature is 9.5 °C and the mean winter temperature is -25 °C. The mean annual precipitation ranges from 250mm in the east portion to 350mm in the west. The ecoregion is classified as having a high subarctic ecoclimate.

The predominate vegetation consists of open, very stunted stands of black spruce and tamarack with secondary quantities of white spruce, and a ground cover of dwarf birch, willow, ericaceous shrubs, cotton grass, lichen, and moss. Poorly drained sites usually support tussocks of sedge, cotton grass, and sphagnum moss. Low shrub tundra, consisting of dwarf birch and willow, is also common.

Topography and Soils

This ecoregion is underlain by Cretaceous shale, and incorporates a broad, shallow basin in its southwestern section at about 120 masl. In the northeast, isolated hills rise to about 460 masl, where it consists of Palaeozoic carbonate rocks. Both the Arctic Red and the Ontonagon rivers follow deeply incised valleys through this ecoregion to the Mackenzie River.

Permafrost is continuous, and characterized by sparse ice wedges. Turbic and Organic Cryosols with some Static Cryosols developed on level undulating morainal and organic deposits are the dominant soils. Unfrozen Dystric and Eutric Brunisolic. Soils also occur. Wetlands are present on over 25% of the ecoregion in the north, 50% in southern areas.

Hydrology

The design volume planned for withdrawal from Deep Water Lake is 72,100 cubic metres per year based on a design population of 1491 (FSC, 1997).

The total catchment area of the Deep Water Lake watershed is approximately 31.65 km², of which Deep Water Lake itself constitutes 5.90 km², or 19 percent. An additional 5.36 km² is taken up by smaller tributary lakes, thus the total land surface amounts to only 64 percent of the total watershed area.

Deep Water Lake – Water Balance Analysis Summary

Case	Annual Precipitation (mm)	Winter Drawdown (mm)	Lake Outflow		Maximum Water Level Change (mm)
			Discharge Volume (dam ³)	Equivalent Watershed Depth (mm)	
Average Year – Natural	325.3	0	3,360	106.2	+ 136
Average Year	325.3	7.1	3,288	103.9	N/A
Dry Year	133.0	7.1	0	0	- 132
Wet Year	579.2	7.1	11 940	377.2	N/A

Total outflow for the Deep Water Lake averages 3,360,000 m³ annually.



The results show that the effect of the proposed withdrawals for drinking water is very small and within the natural variability of the lake. The total withdrawal over the winter period from October through April amounts to a loss in lake storage of 42.0 dam³ or 42 000 m³, which is equivalent to only a 7.1 mm drop in lake water level.

The total volume of withdrawal of 72.1 dam³ over a one year period represents a reduction in the annual outflow volume of only two percent, for an average year, and less than one percent for a wet year. During dry years, the outflow under natural conditions is estimated to be zero. Withdrawals for dry conditions will, therefore, not affect outflows; however, the lake water level would drop an additional 12.2 mm due to withdrawals.

Water Quality

There have been ten water samples analyzed from Deep Water Lake, since July 1998. Seven of these samples contained similar results, which did not change dramatically between sample locations or dates. For these seven samples, the water is generally considered to be very soft, poorly buffered, and moderately aggressive.

For these results, the water quality of Deep Water Lake appears to meet the *Drinking Water Regulations* for both chemical and aesthetic parameters. The THM formation potential exceeds 0.100 mg/l, the IMAC in the *Regulations*. THMs are being dealt with as discussed previously. All other general comments regarding Deep Water Lake show that should be an acceptable drinking water source based on chemical water quality.

The project will not affect water quality, in fact, relies on the continued good quality of Deep Water Lake.

Aquatic Resources

Stewart (1996) reports that the lake is fished by residents of Fort McPherson for sport and subsistence through the ice from mid-April to mid-June for lake trout and whitefish. No harvesting licences have been issued for Deep Water Lake. Local antidotal information



suggests that sport fishing for lake trout occurs during open water. The lake apparently supports lake trout, two species of whitefish, and northern pike. The project will incorporate approved screens on the water intake to prevent entrainment of fish,

Wildlife

Characteristic wildlife include: caribou, moose, grizzly and black bear, wolf, red fox, snowshoe hare, and beaver. Common birds include: raven, osprey, spruce grouse, and water fowl. Land use activities include: trapping, hunting, fishing, recreation and tourism.

Caribou Harvest Data from 1986 and 1993 showed an average of 867 caribou of the Porcupine Herd were taken each year 62.8% of which were bulls. The project will not impact on wildlife.

Wetlands

Air photos of the area suggest numerous wetland areas. There are no wetlands documented for Deep Water Lake or its watershed.

7. Proposed restoration plans

The project is intended to last for more than twenty years. Although no plans are foreseen, if restoration is required, all infrastructure will be removed. All cleared areas will be scarified, and seeded with native grasses. Culverts and other civil works will be removed.

8. Other rights, licences or permits related to this permit application (mineral rights,

timber permits, water licences, etc.)

Approval by the Gwich'in Tribal Council.

Highway Access Permit from DOT/GNWT.

An amendment to the existing water licence will be required.

Roads:

Is this to be a pioneering road? No

Has the route been laid out or ground truthed? Yes.

9. Proposed disposal methods

- a) Garbage: during construction, garbage will be maintained in approved containers and transported as required, usually weekly, to the Fort McPherson Solid Waste Management Site.
- b) Sewage (sanitary and grey water): During construction a portable toilet will be used. Toilet wastes will be disposed at the Fort McPherson Solid Waste Management Site. There will be no grey water. If there is any, it will be discharged to the overburden a minimum of 30 metres away from the lake..
- c) Brush and trees: Trees of suitable size will be taken to Fort McPherson and donated as firewood. Other trees and brush will be burned under supervision of a Renewable Resource Officer.
- d) Over burden (organic soils, waste material, etc.) Will be stocked piled to use in landscaping the project. Any remaining will be

10. Equipment (includes, drills, pumps, etc.)

Generally, construction of the access road and pad will require a dozer, dumps trucks, and graders. Construction of the truck fill will require transport trucks, and pick up trucks..

11. Fuels

Fuels used during contraction are unknown at this time and will not be stored on site.

During operation, the truckfill station will use Diesel fuel to generate electricity for the pumps. It will be stored in approved, double walled fuel tanks located on site.

12. Containment fuel spill contingency plans.

During construction fuel spill contingency will be the responsibility of the contractor.

For operation, a fuel spill contingency plan will be filed as part of the water licence.

13. Methods of fuel transfer (to other tanks, vehicles, etc.)

Not applicable during construction.



During operation, fuel will be piped from storage to the building.

14. Period of operation (includes time to cover all phases of project work applied for, including restoration.)

The Department of Transportation will be completing a Dempster Highway Road Widening Project during Summer 2000. The access road and truckfill turnaround to Deep Water Lake will be constructed at that time.

The Deep Water Lake Truckfill Station and in-town raw water storage system should be fully operational by March 31, 2001. This includes construction of the intakes and all-weather truckfill station, as well as the manufacture, delivery, and installation of the raw water storage tanks to be located adjacent to the existing water treatment plant in Fort McPherson.

15. Period of permit (up to five years, with maximum of two yeas of extension)

Start Date: August 2000

Completion date: August 2002, after which time a land lease will be sought.

16. Location of activities by map co-ordinates (attach maps and sketches)

Minimum latitude (67° 23') Maximum latitude (67° 25')

Minimum longitude (134° 26') Maximum longitude (134° 30')

Map sheet no.106M/8



17. Consultation to Date

Date of Meeting: February 15, 2000; 4pm

Subject of meeting: Deep Water Lake as New Water Source

Location of Meeting: Hamlet Office, Fort McPherson, N.W.T.

Attendees: His Worship Mayor William Koe (WK) and the Hamlet Council Members (CM); Chief Abe Wilson (AW); Robert Alexie (RA) (Gwich'in Land and Water Board); Elders, GNWT Municipal and Community Affairs – Vern Christensen (VC), Deputy Minister, John Picek (JP), Regional Superintendent, Spencer Philippo (SP), Senior Capital Projects Officer; GNWT Public Works and Services – Brian Lemax (BL), Regional Superintendent, Pervez Sunderani (PS), Project Officer.

Copies To: Attendees; Richard Nerysoo, Dave Jones, John Bainbridge, Gwich'in Tribal Council, Public Works and Services – Karen Henry, Vincent Tam, Sukhi Cheema, Joe Auge; Bill Wrathall, Senior Environmental Health Officer, HSS, Inuvik

Date Of Meeting: March 15, 2000; 7 pm

Subject Of Meeting: Developing Deep Water Lake As A New Water Source

Location Of Meeting: Hamlet Council Chambers, Fort Mcpherson, N.W.T.

Attendees: Deputy Mayor Rebecca Keevik, Chair

Hamlet Council Members

Band: Chief Abe Wilson

Gwich'in Land And Water Board: Robert Alexie

1.1 Elders

GNWT Municipal And Community Affairs:



Vern Christensen (VC), Deputy Minister, HQ MACA

John Picek (JP), Regional Superintendent, MACA

1.1.1 Spencer Philippo (SP), Senior Capital Projects Officer, MACA

1.1.2 Alan Shevkenek, Manager Of Capital, HQ MACA

GNWT Public Works & Services:

Brian Lemax, Regional Superintendent

Health & Social Services:

Ray Scott, Chief Executive Officer

Gwich'in Tribal Council:

Joe Benoit, Lands Administrator, Gwich'in Lands Administration

Gwich'in Land & Water Board:

Dwayne Semple, Land And Water Technician

Copies To: Attendees; President, Gwich'in Tribal Council, Deputy Minister, MACA, Deputy Minister, PW&S; Senior Environmental Health Officer, HSS, Inuvik; Deputy Minister, Department of Transportation (DOT); Regional Superintendent, DOT

Date of Meeting: April 4, 2000 10am

Subject of meeting: Regulatory requirements for Deep Water Lake as a new water source.

Location of meeting: GL&WB Office , Inuvik

Attendees: Robert Alexie, Dwayne Semple, Deena Clayton, Spencer Philippo, Ron Kent.

Date of Meeting: April 4, 2000 2pm

Subject of meeting: Regulatory requirements for Deep Water Lake as a new water source.

Location of meeting: GTC Office , Inuvik



Attendees: Dave Jones, Spencer Philippo, Ron Kent

Date of Meeting: April 7, 2000; 7 pm

Subject of meeting: Deep Water Lake Update to the Hamlet of Fort McPherson

Location of Meeting: Hamlet Office, Fort McPherson, N.W.T.

Attendees: His Worship Mayor William Koe (WK) and the Hamlet Council Members
Spencer Philippo, Ron Kent, Elders

Date of Meeting: April 17, 2000; 7 pm

Subject of meeting: Deep Water Lake as New Water Source to update the Hamlet of
Fort McPherson on developments on the Deep Water Lake Project

Location of Meeting: Hamlet Office, Fort McPherson, N.W.T.

Attendees: His Worship Mayor William Koe (WK) and the Hamlet Council Members
(CM); Robert Alexie (RA), Elders, GNWT Municipal and Community
Affairs – John Picek (JP), Regional Superintendent, Spencer Philippo (SP),
Senior Capital Programs Officer; GNWT Public Works and Services –
Brian Lemax (BL), Regional Superintendent, Pervez Sunderani (PS),
Project Officer.

Copies To: Attendees; Richard Nerysoo, Dave Jones, John Bainbridge, Gwich'in
Tribal Council, Public Works and Services – Karen Henry, Vincent Tam;
Bill Wrathall, Senior Environmental Health Officer, HSS, Inuvik

Individual Consultation

Person	Date	Interviewed by:	Status
William Koe	April 6, 2000	Ron Kent	Major of Fort McPherson



Wilbert Firth	April 6, 2000	Ron Kent	VP of GTC
Brian Alexie	April 6, 2000	Ron Kent	Recreational User
J. B. Firth	April 18, 2000	Ron Kent	Cabin Owner
Betty Firth	April 19, 2000	Ron Kent	Cabin Owner
Robert Walker	April 19, 2000	Ron Kent	DIAND Inspector
Wally Firth	April 19, 2000	Ron Kent	Elder
James Nerysoo	April 19, 2000	Ron Kent	Cabin Owner

17. Applicant

Municipal and Community Affairs.

Signature

Date

18. Fees n/a



Photo 1: Right of way for MACA's proposed Deep Water Lake access road, August 24, 2000.



Photo 2: Turn around pad area, Deep Water Lake in the background, August 24, 2000.