Hamlet of Paulatuk
Water License Renewal Application

Submitted to the Hamlet of Paulatuk

October 13, 2009

Hamlet of Paulatuk
Water License Renewal Application

09-1482-1000

Colin Joyal - Project Manager

Submitted by
Dillon Consulting Limited
303 4920 – 47th Street
Yellowknife, NT X1A 2P1
Ph: (867) 920-4555
Fax: (867)873-3328

October 13, 2009

P.O. Box 1326
5114 - 49 Street, CJCD Building
Yellowknife, NT X1A 2N9

Attention: Liz Castaneda

RE: Application for Water License Renewal, Hamlet of Paulatuk

Dear Ms. Castoneda:

This letter is to advise you that Dillon Consulting Limited has prepared the attached application for the renewal of Water License #N7L3-1619, on behalf of and in cooperation with the Hamlet of Paulatuk.

A fax of the signed application is attached along with the renewal application. An original of the signed application and a cheque for the application fee will be submitted to you separately by the Hamlet.

Please do not hesitate to contact us with any questions.

Yours Truly,

Dillon Consulting Limited

Colin Joyal, P. Eng.
Project Manager

cc: Debbie Gordon-Ruben, Senior Administrative Officer, Hamlet of Paulatuk

attachments: Schedule III application (7 paper copies + 1 electronic copy)
Fax of signed application

DILLON CONSULTING

4920
47th Street
Suite 303
Box 1409
Yellowknife
Northwest Territories
Canada
X1A 2P1
Telephone
(867) 920-4555
Fax
(867) 873-3328

TABLE OF CONTENTS

FIGURES (APPENDIX C)

TABLES

APPENDICES

1 NAME AND MAILING ADDRESS OF APPLICANT

Hamlet of Paulatuk
P.O. Box 98
Paulatuk, NT
X0E 1N0

(867) 580-3531 (telephone)
(867) 580-3703 (fax)

Contact:
Ms. Debbie Gordon-Ruben
Senior Administrative Officer

2 ADDRESS OF HEAD OFFICE IN CANADA IF INCORPORATED

Same as above

3 LOCATION OF UNDERTAKING

Geographic Location:

Latitude: 69º21' N

Longitude: 124º04' W

Community Background

The community of Paulatuk, Northwest Territories is located at the south end of Darnley Bay on the Arctic Coast. It is located approximately 400 km east of Inuvik and 855 km northwest of Yellowknife. The mean daily temperature is 6.2°C in July and -27.7°C in January. Precipitation in the community averages 157 mm annually. Paulatuk is located in an area of continuous permafrost with soils that are predominantly sandy, glacial till and marine sands and silts. The community has an airport, but no road access. Supplies are shipped in annually via barge on the ocean, or by plane.

4 DESCRIPTION OF UNDERTAKING

The Hamlet of Paulatuk is applying for Renewal of Water License #N7L3-1619, which expires on November 30, 2009, for providing water delivery, sewage collection/disposal and solid waste management services to community residents. Water is drawn from New Water Lake for drinking water, sewage is deposited into the lagoons locate approximately 2 km southwest from the town site, and solid waste is deposited at the community waste disposal site, located adjacent to the sewage lagoons. Further details are provided in the following sections.

4.1 WATER SUPPLY, TREATMENT AND DISTRIBUTION

4.1.1 Raw Water Source, Intake and Quality

Raw water is withdrawn from New Water Lake, approximately 2.2 km from the community. The lake is contained within a drainage basin approximately 140 hectares in size. New Water Lake is approximately 18m deep, and roughly 450 m x 350 m across. Information on the volume of New Water Lake is not available but it is estimated to be roughly 742,000 m^3. New Water Lake recharges naturally due to precipitation. The water level drops a small amount during the summer, and recharges a significant amount during the spring thaw. With approval of the NWT Water Board, and in an emergency, Old Water Lake may be considered as an alternative source for the Hamlet's water supply.

The Paulatuk Water Treatment Plant (truckfill station) is located at New Water Lake. The intake line is approximately 50 m long and consists of 350 mm Schd 40 HDPE piping with 50 mm urethane insulation. Most of the casing is trenched into the lake bed, and the upper portion is covered with granular material to protect against ice scour and heat loss. An intake screen at the end of the casing is stainless steel, with 3 mm openings. A submersible pump (a Myers 64C3225 3-hp submersible turbine pump) at a depth of approximately 5 m draws water from the lake. The line is pulled periodically to check its' condition. See Appendix D for drawings of the facility and components.

Withdrawal varies, depending on demands of the community and time of year. Annual withdrawal from New Water Lake is discussed in Section 7. Approximate average withdrawal, based on 2008 volumes is 10,500 m^3/yr, or approximately 41 m^3/week (based on 5 days/week). The truck fill rate is approximately 1000 L per minute.

Water is withdrawn Monday to Friday, generally. Water is withdrawn continuously throughout the year, as there is no water storage facility.

Raw water is generally of high quality, meeting the criteria set out in the Guidelines for Canadian Drinking Water Quality, published by Health Canada. The most recent raw water chemical test results available are from 2002. More recent bacteriological test results from November 2008 show no *E. coli* and no total coliforms present, but results form September 2008 show that total coliforms are present. A summary of these raw water analytical results is located in Appendix A.

4.1.2 Water Treatment

4.1.2.1 Method of water treatment

Chlorine disinfection is the only means of water treatment. The Hamlet is currently using powdered calcium hypochlorite as per the original design. The disinfection system consists of a chlorine mixing tank, electric mixer, solution tank and chlorine injection pump. A batch of chlorine solution is prepared twice a week, and then left to sit for 24 hours before being added to the solution tank.

The submersible pump draws water into and through the truckfill station, to the truckfill arm and into the water trucks. The truck driver activates the submersible pump from a control panel on the outside of the building. A flow switch on the discharge arm senses water flow and automatically activates a chlorine injection pump, which delivers the chlorine solution to the water as it passes through the pipe. Chlorine levels in the truck are checked daily, and the chlorine injection rate is adjusted as needed.

4.1.2.2 Recent Analyses of Treated Water

A summary of recent analyses of the treated water is available in Appendix B. Chemical results are included from 2007 and 2008 and bacterial results are included from October 2008 to February 2008. Bacteriological results are taken from several locations in the distribution system. Further results are found in the GNWT Public Works and Services Water Quality Database (http://www.maca.gov.nt.ca/operations/water/WaterQ_Main_MenuSQL.asp).

4.1.3 Water Storage and Distribution

There is no water storage; water is pumped directly from New Water Lake into the water truck. Water distribution is by truck delivery, operated by local contractor Andy Thrasher and Sons.

There are two water trucks in Paulatuk, each in good condition, with a capacity of 1600 gallons (6056 L). The trucks are owned by the contractor.

4.2 SEWAGE DISPOSAL

The community sewage lagoon is a natural lake (locally referred to as ‘Dead Lake’ or ‘Lake “A’) located approximately 2 km from the Hamlet. The lagoon is approximately 250 m by 350 m, and is not connected to the drainage basin that the water supply (New Water Lake) is located within. The community has used this particular lake for the treatment of its’ municipal sewage since the early 1990’s.

Sewage is collected from the community by vacuum truck five days a week and disposed at the sewage lagoon. The trucks discharge the sewage using the chute at the facility.

Inspection reports have noted that the chute requires upgrades. Sewage is bypassing the front of the sewage discharge chute and causing erosion all around the chute. Materials for this have been ordered by the community, and upgrades will occur during the summer of 2009, following arrival of the sealift.

4.2.1 Level of treatment the sewage will be receiving

Sewage is pumped to the lagoon for primary treatment. The lagoon is locally referred to as "Dead Lake". There is a continuous natural outflow through a large vegetated wetland area, approximately 500 m long between the lake and Darnley Bay.

The community has one sewage collection truck with a capacity of 2000 gallons (7570 L), and a second, older vacuum truck used as a back-up. Paulatuk currently has no residences that use honey bags.

The community has not been collecting samples from their lagoon. The following sample results are based on samples collected by INAC, Water Resources Division, for research purposes.

Table 4-1: Summary of Results of Samples taken from Lagoon Discharge

Parameter	Units	Discharge from lagoon	Discharge path, immediately before discharge to ocean	License Requirement
		October 15, 2008	October 15, 2008	
Fecal coliforms	CFU/100mL	-	-	
pH		8.45	7.79	6 – 9
BOD_5	mg/L	27	16	360 mg/L
Ammonia nitrogen	mg/L	1.86	0.024	
Total suspended solids	mg/L	78	64	300 mg/L
Oil and grease		-	-	No visible sheen

Full analytical results are available in Appendix E. Based on these results, the lagoon system appears to be meeting treatment requirements.

4.2.2 Capacity of the sewage treatment facility (m^3)

Dead Lake is approximately 250 m x 350 m in size, and approximately 4 to 5m deep. The capacity of the lake is estimated to be 103,000 m^3. The natural freeboard of the lake is estimated to be 1 m.

The lagoon does overflow at times. This occurs every spring, occasionally in the summer, after a rain storm and in the fall, due to increased precipitation. There are natural holes/tunnels in the berms that the sewage flows through during these times. According to the Hamlet Foreman, the berms could be upgraded to fix this problem. No control structure is located at this point.

4.3 SOLID WASTE DISPOSAL

There is one cell currently in use for solid waste disposal. It is approximately 50 m by 15 m, with a depth of approximately 4.5 m. Taking into account the slope of the sides of the cells, total capacity for the cell is therefore approximately 1700 m^3.

Two cells have already been filled and capped. When the current cell is full, it will be capped, and another cell created. There is ample space at the site for more cells.

Solid waste is collected from the community by a truck twice weekly, with increased pickup as required during peak times such as near Christmas holidays. The waste is transported to the solid waste disposal site; there is one public access road to the disposal site. Separate disposal areas are used for refuse, hazardous materials, and bulky metal waste. The bulky waste area is somewhat segregated (i.e. white goods are placed towards one end, with other large items at the other end), but areas overlap and no signs are present. Refuse is disposed of in cells (trenches) and covered with overburden as required.

There is no fence around the solid waste disposal site. At one time, there was a plastic snow fence, but it is no longer in place. As a result, solid waste also tends to blow around the area.

4.3.1 Bulky Wastes

Large non-combustible items such as white goods, automobiles, snowmobiles, etc. are placed in the bulky metal waste disposal area. It is located across the access road from the regular waste disposal area. (See Appendix A, Figure 8).

4.3.2 Hazardous Waste Management

The Hamlet of Paulatuk is currently not registered as a Hazardous Waste Generator, with the Department of Environment and Natural Resources (ENR) Environmental Protection Service in the GNWT. However, an employee (Apprentice Mechanic) is trained in the Transportation of Dangerous Goods Act and Regulations. Hazardous wastes generated by the community are mainly paint cans and waste automobile batteries.

An area in the landfill is designated for hazardous waste. Materials such as paint, household hazardous wastes and old fuel drums are disposed of in this area. It is located near the bulky metal waste area. Waste oil generated by the Hamlet is stored in sealed drums until such time that it may be transported out of the community on the barge. Other generators of waste oil generally ship theirs out as well.

According to the Hazardous Materials Spill Database maintained by the Environmental Protection Service of the NWT, 6 spills have occurred since 2004. Two of these spills were glycol, 2 were fuel, 1 was mercury and 1 was unknown. See Appendix D for a recent report of the NWT Spills Database for Paulatuk.

4.3.3 Recycling Program

There is no formal recycling/salvaging area at the SWF. Although not sign-posted, re-usable wastes are being separated into item specific locations within the waste disposal area. As the site is not fenced, residents are free to come and recover items from the site.

4.3.4 Contaminated Soils

Contaminated soils are stored at the solid waste disposal facility. According to the report entitled "Soil Treatment at the Paulatuk Landfill following Environmental Remediation at the dispenser Cabinet" (February 2009), approximately 550 m^3 of soil was placed at the landfill site following remediation activities in 2005 and 2007. It is not known if this is the only source of impacted soil, or whether there have been additional sources. No containment is present.

Nutrient addition and sample collection were conducted by Biogenie S.R.D.C. Inc. in 2008, under contract with the GNWT, Petroleum Products Division. Soils were not below criteria stated in the *Environmental Guideline for Contaminated Site Remediation* (GNWT, 2003). Further activities may be planned in future years.

Personnel from Environment Canada visited the site in July 2009. They indicated that there were two piles of soil located adjacent to the access road; one containing hydrocarbon-contaminated or impacted soil, and a second pile of remediated soil. This second pile is used by the Hamlet as cover material.

4.3.5 Current Lifespan

The current lifespan of the facility is unknown. The current cell is about ¼ full, leaving approximately 1200 m^3 of space available for solid waste. However, once this cell is full, there is ample space available to create new cells.

The only concern at this time is that as the community gets bigger and the number of vehicles etc. increase in number, there is a resulting increase in bulky metal waste. Drums make up a large part of this type of waste. At one time, the Hamlet had a crusher that could be used to reduce the bulk of this waste – this crusher was sent to another community. At this point, some bulky metal waste is shipped periodically out on barges to Hay River and then Edmonton for disposal.

5 TYPE OF UNDERTAKING

3 – Municipal

6 WATER USE

To obtain Water; and

To Dispose of Wastewater and Solid Waste.

7 QUANTITY OF WATER INVOLVED

The most recent information for population, available from the NWT Bureau of Statistics, is from 2007. There were approximately 324 people on the water distribution system at that time. Historical water usage figures obtained from past annual reports are shown below:

Table 7-1: Historical Water Use

Year	Population	Volume (m^3/yr)	Daily Rate (m^3/p/d)
2008	327*	10,534	0.088
2007	324	10,468	0.089
2006	321	?	-
2005	315	9,298	0.081
2004	311	8,033	0.071

*Value estimated, based on 0.08% population growth (NWT Bureau of Statistics)

The volume of water used in Paulatuk has increased in recent years. The estimated population of Paulatuk in 2007 was 324 (NWT Bureau of Statistics), and projected water volumes are directly correlated to population. The Government of the Northwest Territories (Municipal and Community Affairs) Water and Sanitation Standards suggest that, in communities such as Paulatuk, the residential mean water usage is 90 L/p/d. In Paulatuk, the mean actual water usage for 2008 was 88 L/p/d. This figure, plus an uncertainty factor of 5% was taken into account in Table 3, indicating Projected Water Use. In ten years, Paulatuk is predicted to require almost 12,000 m^3 of water per year. These population projection numbers are based on an average annual growth rate of 0.8%.

Table 7-2: Projected Water Use in Paulatuk

Planning Year	Calendar Year	Total Population	Daily Rate (m^3/d)	Annual Rate (m^3/yr)	Cumulative Water Volume (m^3)
1	2009	329	30.3	11,055	11,055
2	2010	332	30.5	11,143	22,198
3	2011	334	30.8	11,232	33,430
4	2012	337	31.0	11,322	44,752
5	2013	340	31.3	11,413	56,165
6	2014	343	31.5	11,504	67,669
7	2015	345	31.8	11,596	79,265
8	2016	348	32.0	11,689	90,954
9	2017	351	32.3	11,782	102,736
10	2018	354	32.5	11,877	114,613
11	2019	357	32.8	11,972	126,584
12	2020	359	33.1	12,067	138,652
13	2021	362	33.3	12,164	150,816
14	2022	365	33.6	12,261	163,077
15	2023	368	33.9	12,359	175,436
16	2024	371	34.1	12,458	187,894
17	2025	374	34.4	12,558	200,452
18	2026	377	34.7	12,658	213,110
19	2027	380	35.0	12,760	225,870
20	2028	383	35.2	12,861	238,731

The current maximum quantity of water to be withdrawn is 11,000 m^3/year. Considering the above analysis, which makes use of an uncertainty factor of five percent, it is requested that this maximum quantity be reconsidered. The amount of increase will depend on the expiry date of the new license. For example, if the new licence has a 10 year term, a maximum quantity of water to be withdrawn should be no less than 13,000 m^3, as the annual consumption is estimated to be just less than 12,000 m^3 in 2019.

8 WASTE DEPOSITED

8.1 Wastewater

The volume of sewage deposited into the lagoons is not tracked by the Hamlet. It can be estimated to be equal to the quantity of water delivered. The value of 0.088 m^3/p/d, with a 5% uncertainty factor, is used in the following projection:

Table 8-1: Sewage Projection Rates for Paulatuk

Planning Year	Calendar Year	Total Population	Annual rate (m^3/yr)	Cumulative Sewage Volume (m^3)
1	2009	329	11,055	11,055
2	2010	332	11,143	22,198
3	2011	334	11,232	33,430
4	2012	337	11,322	44,752
5	2013	340	11,413	56,165
6	2014	343	11,504	67,669
7	2015	345	11,596	79,265
8	2016	348	11,689	90,954
9	2017	351	11,782	102,736
10	2018	354	11,877	114,613
11	2019	357	11,972	126,584
12	2020	359	12,067	138,652
13	2021	362	12,164	150,816
14	2022	365	12,261	163,077
15	2023	368	12,359	175,436
16	2024	371	12,458	187,894
17	2025	374	12,558	200,452
18	2026	377	12,658	213,110
19	2027	380	12,760	225,870
20	2028	383	12,861	238,731

Therefore in 10 years, just less than 12,000 m^3 of sewage will be deposited in the lagoon each year. This volume translates to 33 m^3 per day by 2019. It should be noted that this value is derived using an average annual population growth rate of 0.8% per annum. The current lagoon system has a total estimated volume of 103,000 m^3, which should be sufficient for future flow volumes. As the current system overflows annually, some maintenance or operational changes are required to provide adequate treatment.

8.2 Solid Waste

The information in Table 8-2 is an estimate or projected waste generation. Some uncertainty is present in the actual population and volume projections and the results are intended to present an order of magnitude projection rather that an exact figure. Being that there is currently no published information on waste volumes in Paulatuk, we must rely on data from other communities in this region.

Table 8-2: Solid Waste Projections for Paulatuk

Planning Year	Calendar Year	Total Population	Projected Daily Rate (m^3/p/day)	Projected Daily Volume (m^3/day)	Projected Daily Weight (tonnes/d)	Projected Annual Volume (m^3/year)	Projected Annual Weight (tonnes/y)	Cumulative Volume (m^3)
1	2009	329	0.018	6.0	0.6	2177	216	2,177
2	2010	332	0.018	6.1	0.6	2217	219	4,394
3	2011	334	0.018	6.2	0.6	2257	223	6,651
4	2012	337	0.019	6.3	0.6	2298	227	8,949
5	2013	340	0.019	6.4	0.6	2339	232	11,288
6	2014	343	0.019	6.5	0.6	2382	236	13,670
7	2015	345	0.019	6.6	0.7	2425	240	16,095
8	2016	348	0.019	6.8	0.7	2468	244	18,563
9	2017	351	0.020	6.9	0.7	2513	249	21,076
10	2018	354	0.020	7.0	0.7	2559	253	23,635
11	2019	357	0.020	7.1	0.7	2605	258	26,239
12	2020	359	0.020	7.3	0.7	2652	263	28,891
13	2021	362	0.020	7.4	0.7	2700	267	31,591
14	2022	365	0.021	7.5	0.7	2749	272	34,340
15	2023	368	0.021	7.7	0.8	2798	277	37,138
16	2024	371	0.021	7.8	0.8	2849	282	39,987
17	2025	374	0.021	7.9	0.8	2900	287	42,888
18	2026	377	0.021	8.1	0.8	2953	292	45,841
19	2027	380	0.022	8.2	0.8	3006	298	48,847
20	2028	383	0.022	8.4	0.8	3061	303	51,907

Table 8-2 presents an estimation of solid waste volumes and makes the following assumptions in doing so.

- Per capita volume (Heinke and Wong, 1990) has been increasing at a rate of 1 % per year, and estimated at 0.015 m^3/p/day in 1990;
- The average annual growth rate of the Hamlet of Paulatuk is estimated to be 0.8% per year
- The waste density is 0.099 tonnes/m^3 (Bryant et al., 1996)

The table indicates that the hamlet currently produces approximately 2200 m^3/year (216 tonnes/year) of solid waste. In 10 years, the community will produce approximately 2600 m^3/year (258 tonnes/year) of solid waste.

9 OTHER PERSONS OR PROPERTIES AFFECTED

No community consultation has been conducted at this time.

10 PREDICTED ENVIRONMENTAL IMPACTS AND PROPOSED MITIGATION

10.1 Potential Environmental Impacts

Operation and Maintenance of Water Treatment Facility and Truckfill Station

IMPACT	MITIGATION
Vegetation disruption	• Reclaim area upon decommissioning of water treatment facility
Chlorine spills	• Operators are trained in proper handling of chemicals • Seal containers when not in use
Aerial emissions from vehicles	• Use of trucks will be kept to a minimum, and they will be turned off when not in use
Fuel spills from trucks, pumps	• Trucks and pumps will be serviced regularly, to ensure they are in proper working order • Operators are trained in spill clean-up procedures

Operation and Maintenance of Sewage Disposal Facility

IMPACT	MITIGATION
Use of sewage disposal lagoon	• Environmental impacts are unknown
Aerial emissions from vehicles	• Use of trucks will be kept to a minimum, however this is an integral step in sewage collection and cannot be avoided • Trucks will be kept in good condition, to reduce emissions
Fuel spills from trucks	• Trucks will be serviced regularly, to ensure they are in proper working order

Operation and Maintenance of Solid Waste Disposal Facility

IMPACT	MITIGATION
Using valuable landfill space	• Bulky wastes are segregated
Potential for leachate generation	• Place cover material once cell is full
Litter blowing into surrounding environment	• Fence should be installed around solid waste facility

IMPACT	MITIGATION
Inappropriate disposal of hazardous materials	• There is a separate area for hazardous wastes • Signs will be posted to discourage deposit of unauthorized waste in disposal cell
Soil excavation and erosion	• Contain excavations to designated areas • Excavated soils will be stockpiled for re-use • Excavation will not occur during excessively wet conditions
Aerial emissions from vehicles	• Use of trucks will be kept to a minimum, however this is an integral step in solid waste collection and cannot be avoided • Trucks will be kept in good, working condition,
Fuel spills from trucks	• Trucks will be serviced regularly, to ensure they are in proper working order

10.2 Potential Cumulative Effects

- Waste Accumulation: Wastes will accumulate at the current site, until the new site has been constructed. At that point, waste will be placed in the new site and the current site will be closed. This is a necessary consequence for the community. Adverse effects will be reduced through proper management of the waste disposal facilities, consistent with current regulatory requirements and standards.

- Habitat Reduction: Continued operation of the current water treatment facility and the waste disposal facility (sewage lagoon and solid waste site) will have little effect on natural habitat reduction. When the current sites reach capacity, new sites will need to be chosen, and the current sites will be closed. Continual monitoring, responsible operation of the site and increased recycling efforts will lessen the need for site expansion.

- Wildlife: Animals are attracted to the waste disposal site due to the smell. In particular:

    - Caribou
    - Grizzly bears
    - Weasels
    - Rabbits
    - Wolves
    - Fox
    - Other birds (summer nesting)

Business and Employment Opportunities

The operation of the both the water treatment facility and the waste disposal facility create jobs for community members. Positions such as the following are required:

- Maintenance Foreman
- Water Treatment Operator
- Works Foreman
- Truck drivers (water, sewage and solid waste)

These positions are currently held by community members. No new jobs will be created; however, there may be opportunities for community members to receive further training to help with their jobs. As an example, training to upgrade mathematical skills or training for a Small Systems Certification course. These types of educational opportunities provide benefits that extend beyond the immediate job situation and benefit others in the community as well.

Due to the small scale, non-industrial nature of the operation in Paulatuk, the water supply facility and waste disposal sites do not result in other potential social effects such as health effects. It is unlikely that there will be any effects on traditional land uses, though during seasons when residents are out on the land it means a less busy time for operators of the facilities mentioned.

Public consultation regarding potential changes to the water supply system or the waste disposal system may need to occur occasionally due to legislative requirements, Water Board Hearings (if requested) or due to community concern regarding a particular issue. If it takes place, this consultation may provide an opportunity for residents to voice opinions or concerns in a meaningful way and to interact with regulators or other agencies that may not always hear community feedback. This may also foster a sense of empowerment within the community.

Similarly, information such as Traditional Knowledge may be required to make decisions regarding changes to any of the water or waste facilities. If this were the case, the sharing of this knowledge would provide excellent, valuable insight into the decision-making process and would recognize the contribution of local community members while giving them a chance to be a part of a solution or change.

11 CONTRACTORS AND SUB-CONTRACTORS

Water Delivery:

Andy Thrasher and Sons,
Paulatuk, NT X0E 1N0

Bacteriological Testing:

Inuvik Hospital (IRHSSA) Laboratory
Bag #2
Inuvik, NT X0E 0T0

Chemical Testing:

Taiga Environmental Laboratory
Indian and Northern Affairs Canada
4601 - 52nd Avenue, P.O. Box 1500
Yellowknife, NT X1A 3M9

12 STUDIES UNDERTAKEN TO DATE

INAC Inspections, conducted by Jan Davies, as well as:

Biogenie S.R.D.C. Inc., *Soil Treatment at the Paulatuk Landfill following Environmental Remediation at the Dispenser Cabinet – Progress Report*, produced for the Petroleum Products Division of the Government of the Northwest Territories, February 2009.

Government of the Northwest Territories, Department of Public Works and Services, *Review of Community Water Management and Water System Infrastructure, Paulatuk, NT*, April 2005.

Level 1 Environmental Screening by INAC (1994), on behalf of the NWT Water Board.

13 PROPOSED TIME SCHEDULE

The solid waste, sewage treatment, and water supply systems of the Hamlet of Paulatuk are currently in operation. The current license expires on November 30, 2009. The new term of Paulatuk's water license shall begin on December 1, 2009 and expire up to 10 years later. The current lifecycle for the water treatment facility is unknown. However, as there are no holding tanks, and only chlorine disinfection for treatment, the lifespan is dependent on the pumps and piping at the water treatment plant. The lifespan for the sewage lagoon is unknown, but the capacity of the lagoon is adequate, provided some maintenance or operational changes are implemented. The lifespan of the solid waste facility is unknown, but ample space is available for the addition of new cells.

14 ADDITIONAL INFORMATION

There is no additional information at this time.

15 REFERECNCES

Heinke, G.W., Smith D.W., Finch G.R., 1988. Guidelines for the Planning, Design, Operation and Maintenance of Wastewater Lagoon Systems in the Northwest Territories, Vol. 1 and 2. Prepared for the Department of Municipal and Community Affairs, Government of the NWT, Yellowknife, NWT.

Kent, R., Marshall, P., Hawke, L., 2003. Guidelines for the Planning, Design, Operations and Maintenance of Modified Solid Waste Sites in the Northwest Territories. Prepared for the Department of Municipal and Community Affairs, Government of the NWT, Yellowknife, NWT.

Appendix A

Raw Water Quality Analyses

About MACA
Resources
Local & Regional Governments
Community Operations
- Consumer Affairs
- Municipal Rural Infrastructure Fund
- Gas Tax Agreement
- Public Transit Fund
- Drinking Water Quality
  - Home - Water Database
  - View Data
  - What We Measure
  - When We Measure
  - Canadian Drinking Water Guidelines
  - Community Water Systems
  - Frequently Asked Questions
  - Definitions
  - Contacts
  - Related Links
  - Operators' Corner

Lands Administration
Emergency Management
Office of the Fire Marshal
School of Community Government
Sport, Recreation, Youth and Volunteerism
Pipeline Readiness / Resource Development
Community Government Toolkit

Northwest Territories Drinking Water Quality Database

Raw Water Test Results - Paulatuk

Sample Source:	**New Water Lake**	**Sample ID:**	**818**
Sample Location:	**Water Treatment Plant**	**Sample Date (m/d/y):**	**11/21/2008**
Location Detail:		**Laboratory:**	**Inuvik Regional Hospital Laboratory**

Ecoli Present (Yes/No)	No
Total Coliforms Present (Yes/No)	No

Public Drinking Water Supply Systems

1. No sample should contain Escherichia coli. E. coli indicates recent faecal contamination and the possible presence of enteric pathogens that may adversly affect human health. If E. coli is confirmed, the appropriate agencies should be notified, a boil water advisory should be issued, and corrective actions taken.

2. No consecutive samples from the same site or not more than 10% of samples from the distribution system in a given calendar month should show the presence of total coliform bacteria. The ability of total coliforms to indicate the presence of faecal pollution is less reliable than E. coli. However, this group of bacteria is a good indicator of quality control. The presence of total coliforms does not necessarily require the issuance of a boil water advisory but corrective actions should be taken.

For more information please visit the GCDWQ website.

About MACA
Resources
Local & Regional Governments
Community Operations
- Consumer Affairs
- Municipal Rural Infrastructure Fund
- Gas Tax Agreement
- Public Transit Fund
- Drinking Water Quality
  - Home - Water Database
  - View Data
  - What We Measure
  - When We Measure
  - Canadian Drinking Water Guidelines
  - Community Water Systems
  - Frequently Asked Questions
  - Definitions
  - Contacts
  - Related Links
  - Operators' Corner

Lands Administration
Emergency Management
Office of the Fire Marshal
School of Community Government
Sport, Recreation, Youth and Volunteerism
Pipeline Readiness / Resource Development
Community Government Toolkit

Northwest Territories Drinking Water Quality Database

Raw Water Test Results - Paulatuk

Sample Source:	**New Water Lake**	**Sample ID:**	**694**
Sample Location:	**Water Treatment Plant**	**Sample Date (m/d/y):**	**9/18/2008**
Location Detail:		**Laboratory:**	**Inuvik Regional Hospital Laboratory**

Ecoli Present (Yes/No)	No
Total Coliforms Present (Yes/No)	Yes

Public Drinking Water Supply Systems

1. No sample should contain Escherichia coli. E. coli indicates recent faecal contamination and the possible presence of enteric pathogens that may adversly affect human health. If E. coli is confirmed, the appropriate agencies should be notified, a boil water advisory should be issued, and corrective actions taken.

2. No consecutive samples from the same site or not more than 10% of samples from the distribution system in a given calendar month should show the presence of total coliform bacteria. The ability of total coliforms to indicate the presence of faecal pollution is less reliable than E. coli. However, this group of bacteria is a good indicator of quality control. The presence of total coliforms does not necessarily require the issuance of a boil water advisory but corrective actions should be taken.

For more information please visit the GCDWQ website.

Government of the Northwest Territories
Municipal and Community Affairs

About MACA
Resources
Local & Regional Governments
Community Operations
- Consumer Affairs
- Municipal Rural Infrastructure Fund
- Gas Tax Agreement
- Public Transit Fund
- Drinking Water Quality
  - Home - Water Database
  - View Data
  - What We Measure
  - When We Measure
  - Canadian Drinking Water Guidelines
  - Community Water Systems
  - Frequently Asked Questions
  - Definitions
  - Contacts
  - Related Links
  - Operators' Corner

Lands Administration
Emergency Management
Office of the Fire Marshal
School of Community Government
Sport, Recreation, Youth and Volunteerism
Pipeline Readiness / Resource Development
Community Government Toolkit

Northwest Territories Drinking Water Quality Database

Raw Water Test Results - Paulatuk

Sample Source:	**New Water Lake**	**Sample ID:**	**222448**
Sample Location:	**Lake**	**Sample Date (m/d/y):**	**8/19/2002**
Location Detail:	**SNP 1619-1**	**Laboratory:**	**Taiga Environmental Laboratory (Yellowknife)**

Back

Physicals	Value	Units	GCDWQ MAC	GCDWQ IMAC	GCDWQ AO
* Colour	10	TCU			<=15
Conductivity	351	umhos/cm	ND		
* pH	8.19				6.5 - 8.5
* Turbidity	0.3	NTU	1		<=5

Nutrients	Value	Units	GCDWQ MAC	GCDWQ IMAC	GCDWQ AO
Ammonia	0.005	mg/L	ND		
Nitrate + Nitrite as N	0.008	mg/L			
Phosphorous	0.006	mg/L	ND		
* Total Dissolved Solids	254	mg/L			
Total Suspended Solids	4	mg/L			

Major Ions	Value	Units	GCDWQ MAC	GCDWQ IMAC	GCDWQ AO
Calcium	36.5	mg/L	ND		
* Chloride	5.6	mg/L			<=250
* Fluoride	0.04	mg/L	1.5		
Magnesium	21.6	mg/L	ND		
Potassium	0.43	mg/L	ND		
* Sodium	3.07	mg/L			<=200
* Sulphate	60	mg/L			<=500
Total Hardness	180	mg/L	ND		

Metals - Total	Value	Units	GCDWQ MAC	GCDWQ IMAC	GCDWQ AO
* Aluminum	0.03	mg/L	ND		
* Arsenic	0.001	mg/L		0.025	
* Cadmium	0.0003	mg/L	0.005		
* Chromium	0.003	mg/L	0.05		
Cobalt	0.001	mg/L	ND		
* Copper	0.002	mg/L			<=1.0
* Lead	0.001	mg/L	0.010		
* Manganese	0.004	mg/L			<=0.05
* Mercury	.00005	mg/L	0.001		
Nickel	0.001	mg/L	ND		
* Zinc	0.01	mg/L			<=5.0

GCDWQ - Guidelines for Canadian Drinking Water Quality
MAC - Maximum Acceptable Concentration
IMAC - Interim Maximum Acceptable Concentration

AO - Aesthetic Objective
ND - Not Defined

Appendix B

Treated Water Quality Analyses

About MACA
Resources
Local & Regional Governments
Community Operations
- Consumer Affairs
- Municipal Rural Infrastructure Fund
- Gas Tax Agreement
- Public Transit Fund
- Drinking Water Quality
  - Home - Water Database
  - View Data
  - What We Measure
  - When We Measure
  - Canadian Drinking Water Guidelines
  - Community Water Systems
  - Frequently Asked Questions
  - Definitions
  - Contacts
  - Related Links
  - Operators' Corner

Lands Administration
Emergency Management
Office of the Fire Marshal
School of Community Government
Sport, Recreation, Youth and Volunteerism
Pipeline Readiness / Resource Development
Community Government Toolkit

Northwest Territories Drinking Water Quality Database

Treated Water Test Results - Paulatuk

Sample Source:	**New Water Lake**	**Sample ID:**	**975**
Sample Location:	**Residence**	**Sample Date (m/d/y):**	**2/3/2009**
Location Detail:	**Hamlet housing-Brian Kudiak kitchen tap**	**Laboratory:**	**Inuvik Regional Hospital Laboratory**

Total Coliforms Present (Yes/No) No

Public Drinking Water Supply Systems

1. No sample should contain Escherichia coli. E. coli indicates recent faecal contamination and the possible presence of enteric pathogens that may adversly affect human health. If E. coli is confirmed, the appropriate agencies should be notified, a boil water advisory should be issued, and corrective actions taken.

2. No consecutive samples from the same site or not more than 10% of samples from the distribution system in a given calendar month should show the presence of total coliform bacteria. The ability of total coliforms to indicate the presence of faecal pollution is less reliable than E. coli. However, this group of bacteria is a good indicator of quality control. The presence of total coliforms does not necessarily require the issuance of a boil water advisory but corrective actions should be taken.

For more information please visit the GCDWQ website.

About MACA
Resources
Local & Regional Governments
Community Operations
- Consumer Affairs
- Municipal Rural Infrastructure Fund
- Gas Tax Agreement
- Public Transit Fund
- Drinking Water Quality
  - Home - Water Database
  - View Data
  - What We Measure
  - When We Measure
  - Canadian Drinking Water Guidelines
  - Community Water Systems
  - Frequently Asked Questions
  - Definitions
  - Contacts
  - Related Links
  - Operators' Corner

Lands Administration
Emergency Management
Office of the Fire Marshal
School of Community Government
Sport, Recreation, Youth and Volunteerism
Pipeline Readiness / Resource Development
Community Government Toolkit

Northwest Territories Drinking Water Quality Database

Treated Water Test Results - Paulatuk

Sample Source:	**New Water Lake**	**Sample ID:**	**942**
Sample Location:	**Water Truck**	**Sample Date (m/d/y):**	**1/2/2009**
Location Detail:		**Laboratory:**	**Inuvik Regional Hospital Laboratory**

Ecoli Present (Yes/No)	No
Total Coliforms Present (Yes/No)	No

Public Drinking Water Supply Systems

1. No sample should contain Escherichia coli. E. coli indicates recent faecal contamination and the possible presence of enteric pathogens that may adversly affect human health. If E. coli is confirmed, the appropriate agencies should be notified, a boil water advisory should be issued, and corrective actions taken.

2. No consecutive samples from the same site or not more than 10% of samples from the distribution system in a given calendar month should show the presence of total coliform bacteria. The ability of total coliforms to indicate the presence of faecal pollution is less reliable than E. coli. However, this group of bacteria is a good indicator of quality control. The presence of total coliforms does not necessarily require the issuance of a boil water advisory but corrective actions should be taken.

For more information please visit the GCDWQ website.

About MACA
Resources
Local & Regional Governments
Community Operations
- Consumer Affairs
- Municipal Rural Infrastructure Fund
- Gas Tax Agreement
- Public Transit Fund
- Drinking Water Quality
  - Home - Water Database
  - View Data
  - What We Measure
  - When We Measure
  - Canadian Drinking Water Guidelines
  - Community Water Systems
  - Frequently Asked Questions
  - Definitions
  - Contacts
  - Related Links
  - Operators' Corner

Lands Administration
Emergency Management
Office of the Fire Marshal
School of Community Government
Sport, Recreation, Youth and Volunteerism
Pipeline Readiness / Resource Development
Community Government Toolkit

Northwest Territories Drinking Water Quality Database

Treated Water Test Results - Paulatuk

Sample Source:	**New Water Lake**	**Sample ID:**	**941**
Sample Location:	**Health Center/Hospital**	**Sample Date (m/d/y):**	**1/21/2009**
Location Detail:		**Laboratory:**	**Inuvik Regional Hospital Laboratory**

Ecoli Present (Yes/No)	No
Total Coliforms Present (Yes/No)	No

Public Drinking Water Supply Systems

1. No sample should contain Escherichia coli. E. coli indicates recent faecal contamination and the possible presence of enteric pathogens that may adversly affect human health. If E. coli is confirmed, the appropriate agencies should be notified, a boil water advisory should be issued, and corrective actions taken.

2. No consecutive samples from the same site or not more than 10% of samples from the distribution system in a given calendar month should show the presence of total coliform bacteria. The ability of total coliforms to indicate the presence of faecal pollution is less reliable than E. coli. However, this group of bacteria is a good indicator of quality control. The presence of total coliforms does not necessarily require the issuance of a boil water advisory but corrective actions should be taken.

For more information please visit the GCDWQ website.

About MACA
Resources
Local & Regional Governments
Community Operations
- Consumer Affairs
- Municipal Rural Infrastructure Fund
- Gas Tax Agreement
- Public Transit Fund
- Drinking Water Quality
  - Home - Water Database
  - View Data
  - What We Measure
  - When We Measure
  - Canadian Drinking Water Guidelines
  - Community Water Systems
  - Frequently Asked Questions
  - Definitions
  - Contacts
  - Related Links
  - Operators' Corner

Lands Administration
Emergency Management
Office of the Fire Marshal
School of Community Government
Sport, Recreation, Youth and Volunteerism
Pipeline Readiness / Resource Development
Community Government Toolkit

Northwest Territories Drinking Water Quality Database

Treated Water Test Results - Paulatuk

Sample Source:	**New Water Lake**	**Sample ID:**	**841**
Sample Location:	**School**	**Sample Date (m/d/y):**	**12/3/2008**
Location Detail:		**Laboratory:**	**Inuvik Regional Hospital Laboratory**

Ecoli Present (Yes/No)	No
Total Coliforms Present (Yes/No)	No

Public Drinking Water Supply Systems

1. No sample should contain Escherichia coli. E. coli indicates recent faecal contamination and the possible presence of enteric pathogens that may adversly affect human health. If E. coli is confirmed, the appropriate agencies should be notified, a boil water advisory should be issued, and corrective actions taken.

2. No consecutive samples from the same site or not more than 10% of samples from the distribution system in a given calendar month should show the presence of total coliform bacteria. The ability of total coliforms to indicate the presence of faecal pollution is less reliable than E. coli. However, this group of bacteria is a good indicator of quality control. The presence of total coliforms does not necessarily require the issuance of a boil water advisory but corrective actions should be taken.

For more information please visit the GCDWQ website.

About MACA
Resources
Local & Regional Governments
Community Operations
- Consumer Affairs
- Municipal Rural Infrastructure Fund
- Gas Tax Agreement
- Public Transit Fund
- Drinking Water Quality
  - Home - Water Database
  - View Data
  - What We Measure
  - When We Measure
  - Canadian Drinking Water Guidelines
  - Community Water Systems
  - Frequently Asked Questions
  - Definitions
  - Contacts
  - Related Links
  - Operators' Corner

Lands Administration
Emergency Management
Office of the Fire Marshal
School of Community Government
Sport, Recreation, Youth and Volunteerism
Pipeline Readiness / Resource Development
Community Government Toolkit

Northwest Territories Drinking Water Quality Database

Treated Water Test Results - Paulatuk

Sample Source:	**New Water Lake**	**Sample ID:**	**741**
Sample Location:	**Health Center/Hospital**	**Sample Date (m/d/y):**	**10/15/2008**
Location Detail:		**Laboratory:**	**Inuvik Regional Hospital Laboratory**

Ecoli Present (Yes/No)	No
Total Coliforms Present (Yes/No)	No

Public Drinking Water Supply Systems

1. No sample should contain Escherichia coli. E. coli indicates recent faecal contamination and the possible presence of enteric pathogens that may adversly affect human health. If E. coli is confirmed, the appropriate agencies should be notified, a boil water advisory should be issued, and corrective actions taken.

2. No consecutive samples from the same site or not more than 10% of samples from the distribution system in a given calendar month should show the presence of total coliform bacteria. The ability of total coliforms to indicate the presence of faecal pollution is less reliable than E. coli. However, this group of bacteria is a good indicator of quality control. The presence of total coliforms does not necessarily require the issuance of a boil water advisory but corrective actions should be taken.

For more information please visit the GCDWQ website.

About MACA
Resources
Local & Regional Governments
Community Operations
- Consumer Affairs
- Municipal Rural Infrastructure Fund
- Gas Tax Agreement
- Public Transit Fund
- Drinking Water Quality
  - Home - Water Database
  - View Data
  - What We Measure
  - When We Measure
  - Canadian Drinking Water Guidelines
  - Community Water Systems
  - Frequently Asked Questions
  - Definitions
  - Contacts
  - Related Links
  - Operators' Corner

Lands Administration
Emergency Management
Office of the Fire Marshal
School of Community Government
Sport, Recreation, Youth and Volunteerism
Pipeline Readiness / Resource Development
Community Government Toolkit

Northwest Territories Drinking Water Quality Database

Treated Water Test Results - Paulatuk

Sample Source:	**New Water Lake**	**Sample ID:**	**L648582-1**
Sample Location:	**Water Treatment Plant**	**Sample Date (m/d/y):**	**6/24/2008**
Location Detail:		**Laboratory:**	**ALS Laboratory (Edmonton)**

Back

Physicals	Value	Units	MAC	GCDWQ IMAC	GCDWQ AO
* Colour	4	TCU			<=15
* pH	8.2				6.5 - 8.5
* Turbidity	0.20	NTU	1		<=5

Nutrients	Value	Units	MAC	GCDWQ IMAC	GCDWQ AO
* Nitrate-N	<0.05	mg/L	45		
* Total Dissolved Solids	211	mg/L			

Organics	Value	Units	MAC	GCDWQ IMAC	GCDWQ AO
* Cyanide	<0.002	mg/L	0.20		
* THM-Bromodichloromethane	<0.001	mg/L			0.016
* Total Trihalomethanes (THM's)	<0.005	mg/L		0.100	

Major Ions	Value	Units	MAC	GCDWQ IMAC	GCDWQ AO
* Chloride	6	mg/L			<=250
* Fluoride	<0.05	mg/L	1.5		
* Sodium	3	mg/L			<=200
* Sulphate	56.8	mg/L			<=500

Metals - Total	Value	Units	MAC	GCDWQ IMAC	GCDWQ AO
* Aluminum	<0.01	mg/L	ND		
* Arsenic	<0.0004	mg/L		0.025	
* Barium	0.0460	mg/L	1.0		
* Cadmium	<0.0001	mg/L	0.005		
* Chromium	<0.0004	mg/L	0.05		
* Copper	0.0126	mg/L			<=1.0
* Iron	0.025	mg/L			<=0.3
* Lead	0.0001	mg/L	0.010		
* Manganese	0.002	mg/L			<=0.05
* Mercury	<0.00010	mg/L	0.001		
* Selenium	<0.0004	mg/L	0.01		
* Uranium	<0.0001	mg/L		0.02	
* Zinc	0.014	mg/L			<=5.0

GCDWQ - Guidelines for Canadian Drinking Water Quality
MAC - Maximum Acceptable Concentration

IMAC - Interim Maximum Acceptable Concentration
AO - Aesthetic Objective
ND - Not Defined

Government of the Northwest Territories
Municipal and Community Affairs

Northwest Territories Drinking Water Quality Database

About MACA
Resources
Local & Regional Governments
Community Operations
- Consumer Affairs
- Municipal Rural Infrastructure Fund
- Gas Tax Agreement
- Public Transit Fund
- Drinking Water Quality
  - Home - Water Database
  - View Data
  - What We Measure
  - When We Measure
  - Canadian Drinking Water Guidelines
  - Community Water Systems
  - Frequently Asked Questions
  - Definitions
  - Contacts
  - Related Links
  - Operators' Corner

Lands Administration
Emergency Management
Office of the Fire Marshal
School of Community Government
Sport, Recreation, Youth and Volunteerism
Pipeline Readiness / Resource Development
Community Government Toolkit

Treated Water Test Results - Paulatuk

Sample Source:	**New Water Lake**	**Sample ID:**	**L551328-1**
Sample Location:	**Other**	**Sample Date (m/d/y):**	**9/5/2007**
Location Detail:	**Health Center**	**Laboratory:**	**ALS Laboratory (Edmonton)**

Back

Physicals	Value	Units	MAC	GCDWQ IMAC	GCDWQ AO
* Colour	3	TCU			<=15
* pH	8.3				6.5 - 8.5
* Turbidity	0.25	NTU	1		<=5

Nutrients	Value	Units	MAC	GCDWQ IMAC	GCDWQ AO
* Nitrate-N	<0.05	mg/L	45		
* Total Dissolved Solids	215	mg/L			

Organics	Value	Units	MAC	GCDWQ IMAC	GCDWQ AO
* Cyanide	>0.002	mg/L	0.20		
* Total Trihalomethanes (THM's)	0.018	mg/L		0.100	

Major Ions	Value	Units	MAC	GCDWQ IMAC	GCDWQ AO
* Chloride	6	mg/L			<=250
* Fluoride		mg/L	1.5		
* Sodium	3	mg/L			<=200
* Sulphate	<0.003	mg/L			<=500

Metals - Total	Value	Units	MAC	GCDWQ IMAC	GCDWQ AO
* Aluminum	<0.01	mg/L	ND		
* Arsenic	<0.0004	mg/L		0.025	
* Barium	0.0438	mg/L	1.0		
* Cadmium	<0.0001	mg/L	0.005		
* Chromium	0.0015	mg/L	0.05		
* Copper	0.215	mg/L			<=1.0
* Iron	0.012	mg/L			<=0.3
* Lead	0.013	mg/L	0.010		
* Manganese	0.004	mg/L			<=0.05
* Mercury	<0.0002	mg/L	0.001		
* Selenium	0.0006	mg/L	0.01		
* Uranium	<0.0001	mg/L		0.02	
* Zinc	0.012	mg/L			<=5.0

GCDWQ - Guidelines for Canadian Drinking Water Quality
MAC - Maximum Acceptable Concentration
IMAC - Interim Maximum Acceptable Concentration
AO - Aesthetic Objective
ND - Not Defined

Appendix C

Figures

100m 0 200m
APPROXIMATE SCALE 1:10,000

DRAWING REDUCED NOT TO SCALE

Abandoned Sewage/ Solid Waste Disposal Site

Solid Waste Disposal Cells

Sewage Lagoon

Truckfill Station

New Water Lake

EDIT DATE: 07/16/04 ACAD FILE: 41tpw g:\cad\043332\paulatuk.dwg

DILLON CONSULTING

PROJECT	Hamlet of Paulatuk Current & Abandoned Water Supply Facilities and Waste Disposal Sites
TITLE	Site Plan
PROJECT NUMBER	043332
DATE	July 2004
FIGURE NUMBER	FIG 1

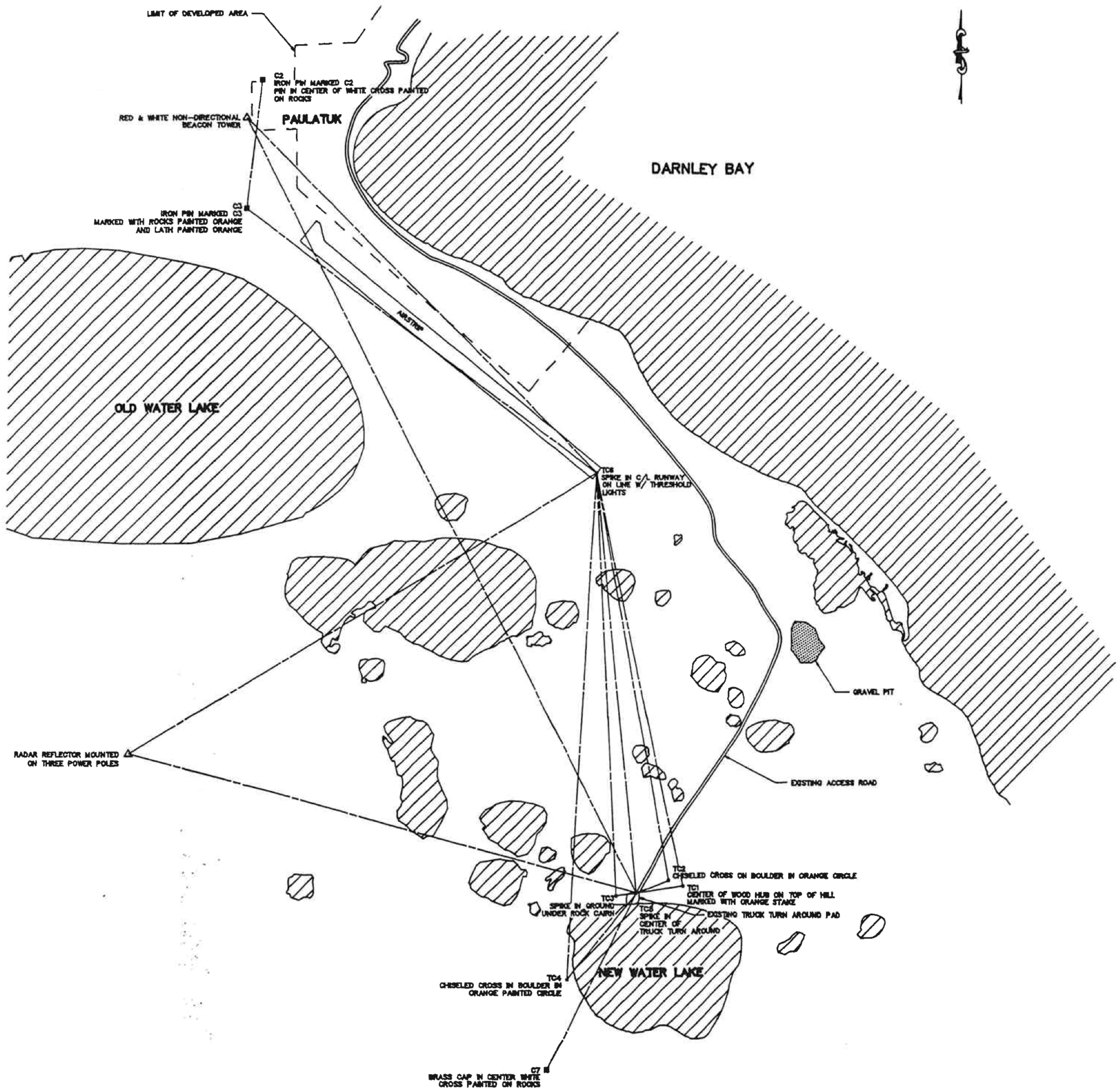


TABLE OF COORDINATES

STA	NORTHING	EASTING	ELEV
C2	10 048.919	9 787.472	4.771
C3	9 763.845	9 717.878	4.831
C7	7 448.834	10 593.834	46.389
TC1	7 929.369	10 890.379	20.39
TC2	7 943.314	10 824.578	13.87
TC3	7 952.460	10 887.142	11.89
TC4	7 854.963	10 584.998	22.07
TC5	7 919.678	10 746.496	11.04
TC6	8 016.899	10 836.813	

TABLE OF OBSERVATIONS

STA	TO	DIRECTION	DISTANCE
C3	C2	8°44'05"	336.349
	TC6	127°02'30"	1148.348
TC6	C3	307°02'30"	1148.348
	TC1	169°14'30"	
	TC2	168°55'10"	
	TC3	177°18'30"	
	TC4	183°27'10"	
	TC5	174°31'30"	1104.937
	RADAR REF	236°49'34"	
	NDB	215°34'30"	
TC5	C3	336°46'06"	
	C7	257°09'30"	919.399
	TC1	8°39'30"	121.322
	TC2	66°48'30"	86.398
	TC3	291°16'40"	83.972
	TC4	219°26'09"	392.599
	TC6	354°31'30"	1104.941
	RADAR REF	268°22'30"	
	NDB	333°16'30"	

100 50 0 100 200 300

DRAWING REDUCED NOT TO SCALE

LEGEND

- CLS 88 POSTS FROM PHOTO C SURVEY. GNWT PLAN 88
- TEMPORARY CONTROL STATIONS ESTABLISHED DURING CONTROL
- TRIANGULATION STATION

NOTES:

1. LOCATION & ELEV DATA FOR EX SURVEY CONTROL POINTS FROM PHOTO CONTROL SURVEY PLAN AUGUST 21,1989
2. FOR CONSTRUCTION REFERENCE
3. CO-ORDINATES BASED ON 10,000 N 10,000 E AT MONUM 1L1 AS SHOWN ON PHOTO CONTR SURVEY, GNWT PLAN 86
4. FEATURES DIGITIZED FROM EXIST 1:2000 TOPO MAP

91181

Northwest Territories Canada

DEPARTMENT OF PUBLIC WORKS

No.	REVISION	DATE
3	CONSTRUCTION RECORD	93-01
2	CONSTRUCTION RECORD	91-11
1	TENDER ISSUE	91-0

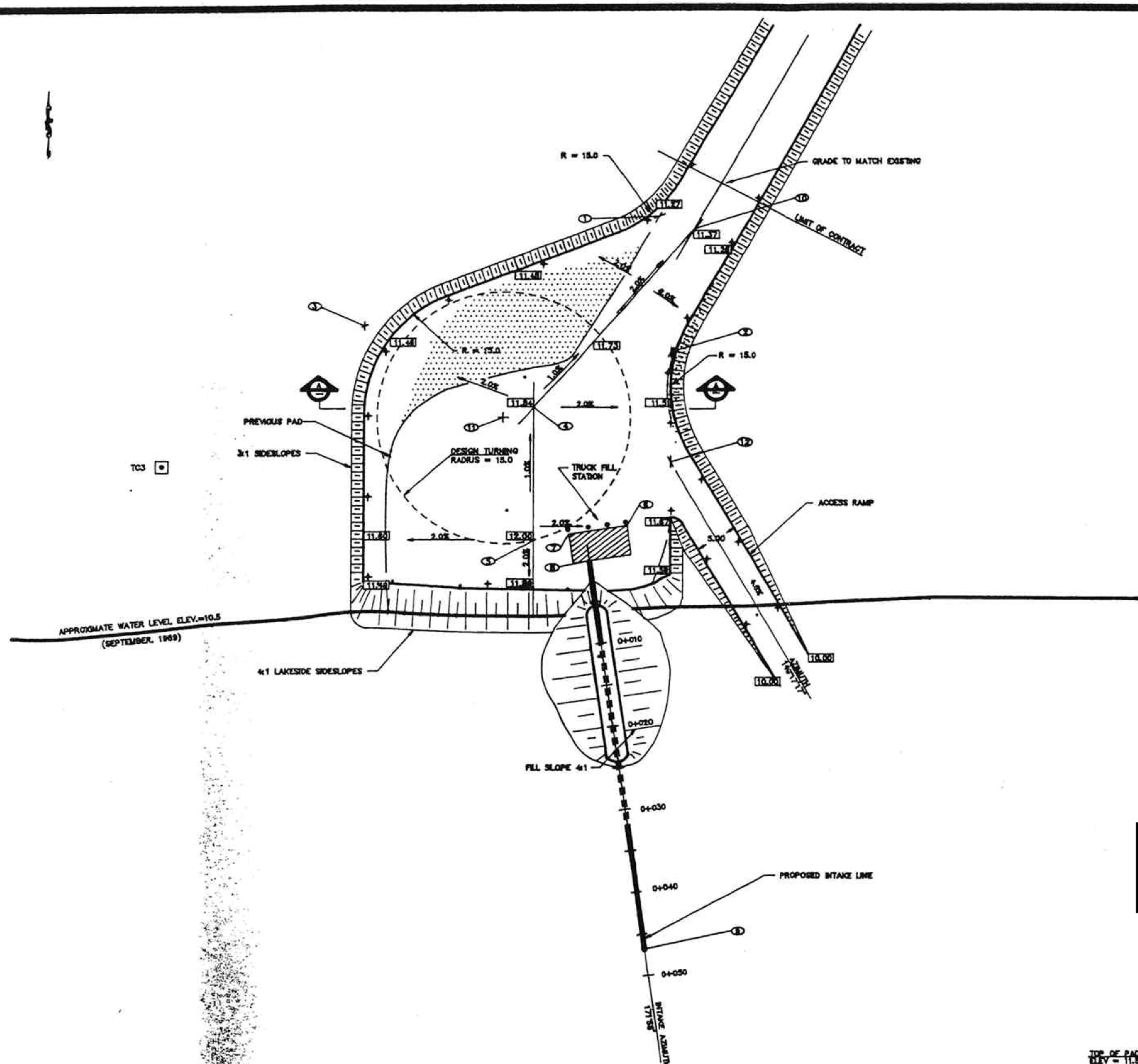
CONSULTING ENGINEERS & ARCHITECT

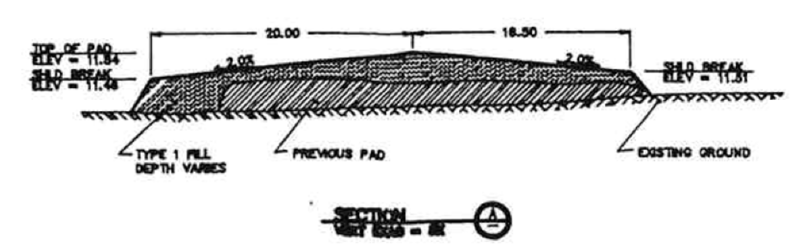
WATER SUPPLY IMPROVEMENTS

PAULATUK, N.W.T.

CONTROL SURVEY FIELD NOTES

VGM	1:5000
RM	NOV. 1991
	DPW 87-3046
1 - 17	91181C





LEGEND:

- TC1 ⊡ TEMPORARY SURVEY CONTROL MONUMENT
- FILL SLOPE
- EXISTING GRADE CONTOUR
- 11.28 FINISHED GRADE ELEVATION AT NODE
- SITING COORDINATE
- • BOLLARD
- + MARKER POST

NOTES:

1. REFER TO STRUCTURAL DRAWINGS FOR BOLLARD DETAIL

SITING COORDINATE TABLE

POINT	NORTHING	EASTING	ELEV
TC1	7 929.328	10 880.370	20.30
TC2	7 943.314	10 824.876	13.57
TC3	7 902.480	10 687.142	11.00
1	7 932.48	10 748.33	
2	7 918.32	10 747.83	
3	7 919.41	10 711.372	
4	7 909.74	10 731.48	
5	7 893.94	10 731.51	
6	7 897.06	10 740.58	
7	7 893.48	10 734.51	
8	7 891.51	10 738.08	
9	7 851.28	10 761.98	
10	7 930.93	10 750.57	
11	7 908.80	10 750.57	
12	7 903.25	10 747.83	

DRAWING REDUCED NOT TO SCALE

91184 C191184

Northwest Territories Canada

DEPARTMENT OF PUBLIC WORKS

3	CONSTRUCTION RECORD	91-11	YM
2	RE TENDER ISSUE	91/08	YM
1	TENDER ISSUE	91/08	

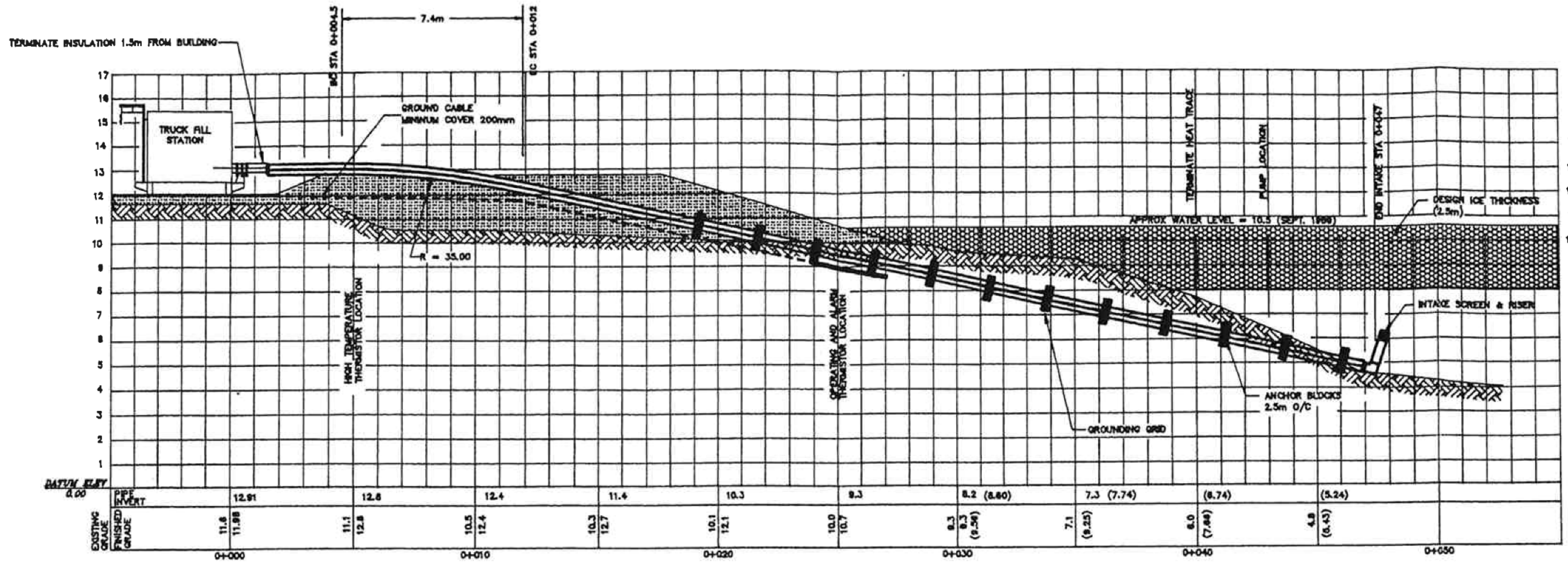
consulting engineers & architects

WATER SUPPLY IMPROVEMENTS

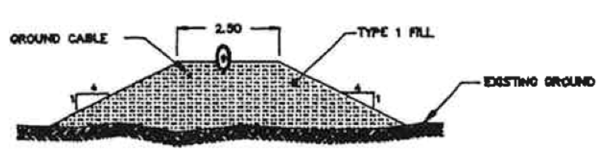
PAULATUK, N.W.T.

SITE LAYOUT AND GRADING PLAN

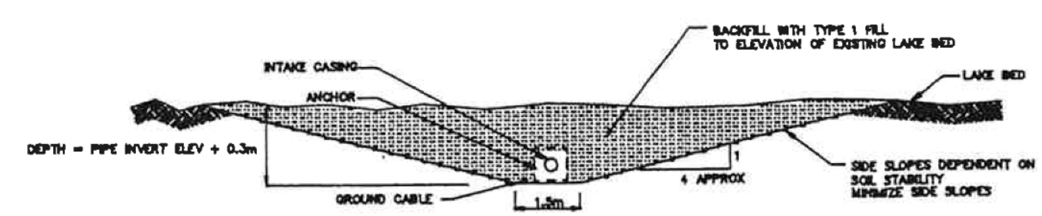
YM	1:250
YM	NOV. 1991
	DPW 87-3046
2 - 17	91181C2



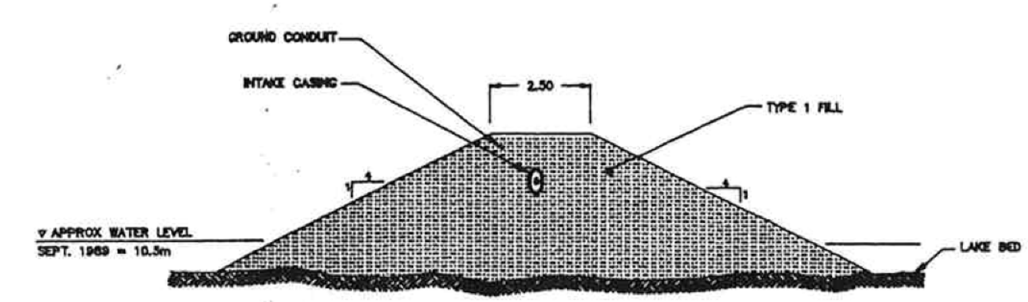
INTAKE & BERM PROFILE
SCALE 1:100



SECTION STA 0+006
NTS 2X VERT EXAG



SECTION STA 0+029
NTS



SECTION STA 0+014
NTS 2X VERT EXAG

DRAWING REDUCED NOT TO SCALE

91184 C391184

Northwest Territories Canada
DEPARTMENT OF PUBLIC WORKS

3	CONSTRUCTION RECORD	VM
2	RETENDER ISSUE	VM
1	TENDER ISSUE	

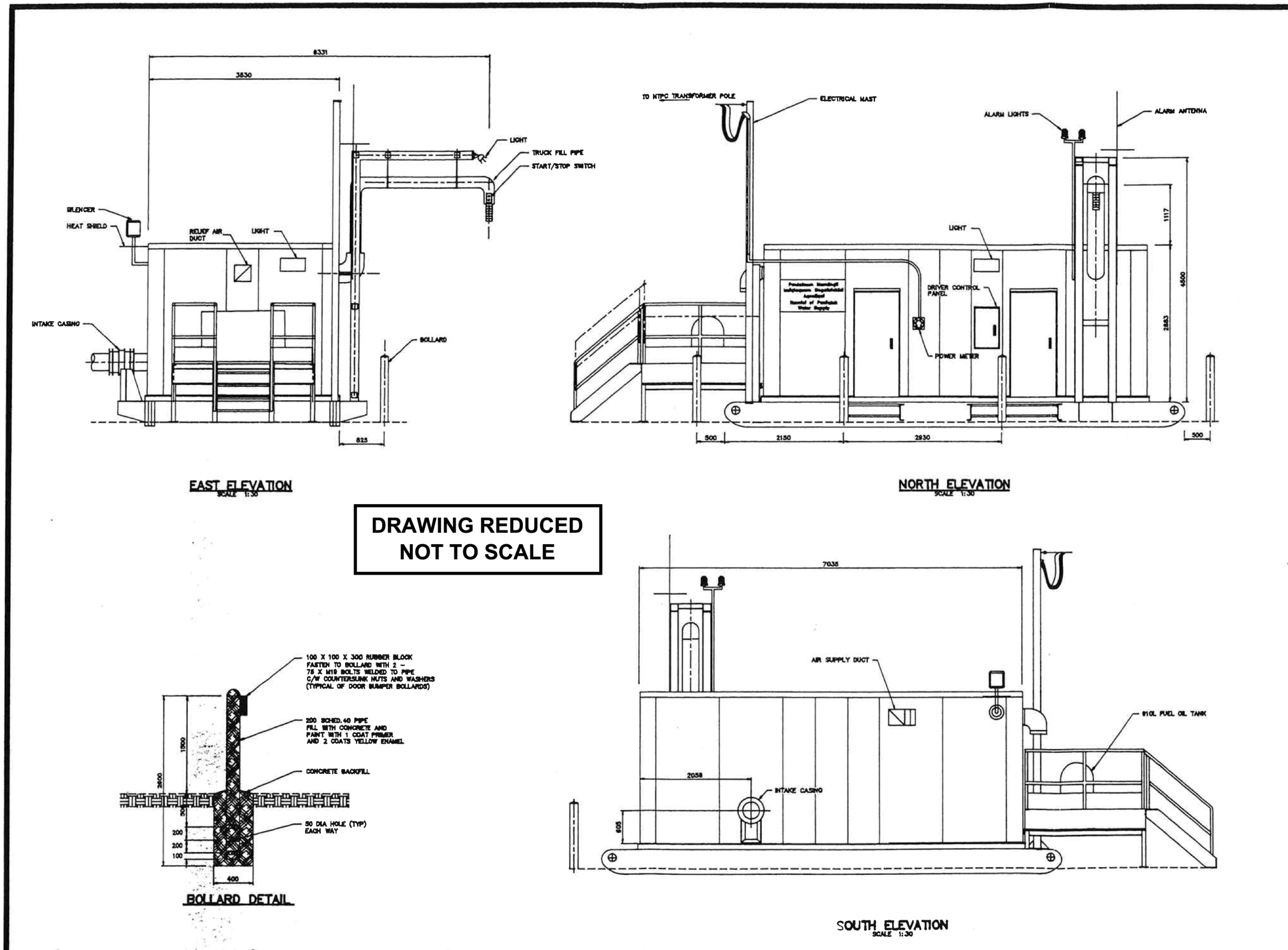
FERGUSON, SIMEK, CLARK
CONSULTING ENGINEERS & ARCHITECTS

WATER SUPPLY IMPROVEMENTS

PAULATUK, NWT

WATER INTAKE & BERM PROFILE & SECTIONS

VM	AS NOTED
VM	NOV. 1991
	87-3046
3 of 17	91181C3



91184 | 9191184

Northwest Territories Canada

DEPARTMENT OF PUBLIC WORKS

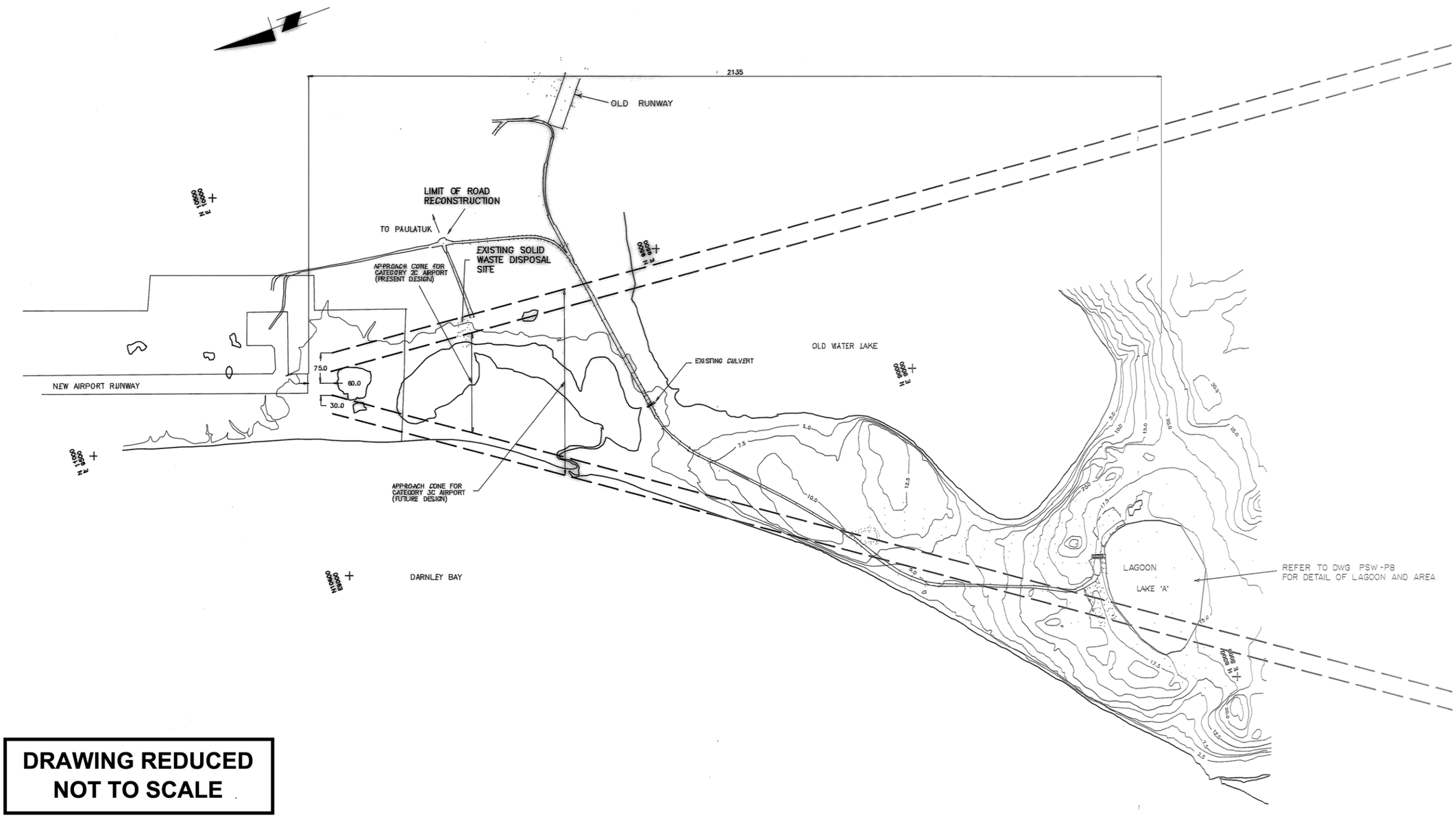
2	CONSTRUCTION RECORD"	91-11	VM
1	TENDER ISSUE	91-2	

WATER SUPPLY IMPROVEMENTS

PAULATUK, N.W.T.

BUILDING ELEVATIONS

JO	AS SHOWN
RM	NOV. 1991
	DPW 87-3046
5 - 17	91181S1



DRAWING REDUCED NOT TO SCALE

NO.	DATE	DESCRIPTION	BY	APPROVED
6				
5				
4				
3				
2				
1				

REVISIONS

NO.	DESCRIPTION	DATE	APPROVED
6	MICROFILMED		
5	PLAN OF RECORD		
4	APPROVAL FOR CONSTRUCTION		
3	FOR TENDER		
2	FOR APPROVAL		
1	PRELIMINARY		

DRAWING STATUS

PERMIT

THE ASSOCIATION OF PROFESSIONAL ENGINEERS, GEOLOGISTS and GEOPHYSICISTS OF THE NORTHWEST TERRITORIES
PERMIT NUMBER
L 1493

SEAL

LEE MAHER
ENGINEERING ASSOCIATES LTD.

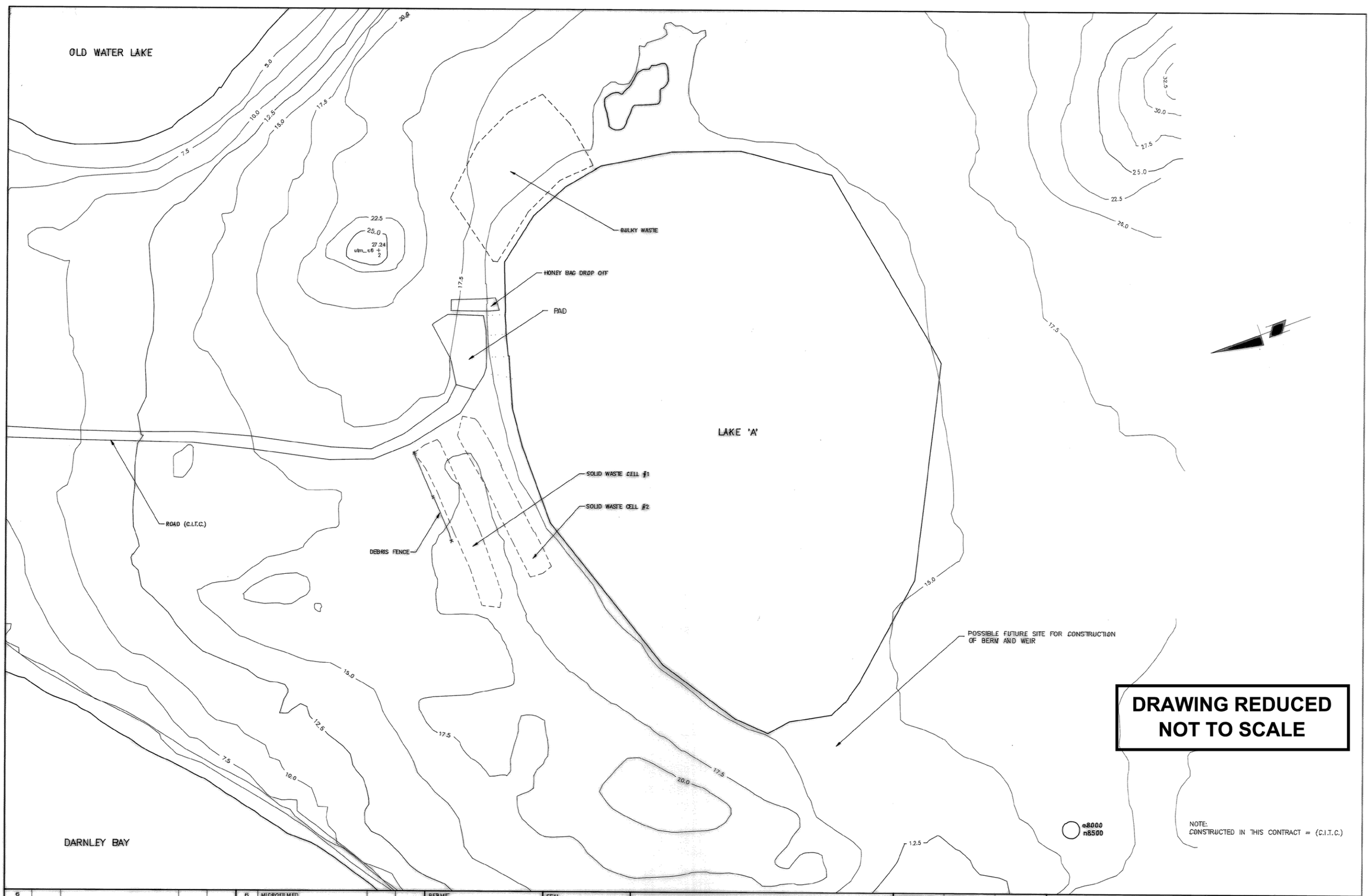
DESIGNED BY	DRAWN BY	CHECKED BY
	RDC	

SCALE: 1:5000

CLIENT: DEPARTMENT of PUBLIC WORKS, INUVIK

TITLE: PAULATUK SOLID WASTE DISPOSAL SITE AND SEWAGE LAGOON LOCATION PLAN

DATE: Mar 15/94
SHEET NO. 1 OF 9
METRIC
ALL DIMENSIONS ARE METERS UNLESS OTHERWISE NOTED
JOB NO. 349-01-1
DRAWING NO. PSW-P1



DRAWING REDUCED NOT TO SCALE

NOTE:
CONSTRUCTED IN THIS CONTRACT = (C.I.T.C.)

NO.	DATE	DESCRIPTION	BY	APPROVED
6				
5				
4				
3				
2				
1				

REVISIONS

NO.	DESCRIPTION	DATE	APPROVED
6	MICROFILMED		
5	PLAN OF RECORD		
4	APPROVAL FOR CONSTRUCTION		
3	FOR TENDER		
2	FOR APPROVAL		
1	PRELIMINARY		

DRAWING STATUS

PERMIT

THE ASSOCIATION OF PROFESSIONAL ENGINEERS, GEOLOGISTS and GEOPHYSICISTS OF THE NORTHWEST TERRITORIES

SEAL

LEE MAHER
ENGINEERING ASSOCIATES LTD.

DESIGNED BY	DRAWN BY	CHECKED BY
	RDC	

SCALE: 1:1000

CLIENT: DEPARTMENT OF PUBLIC WORKS, INUVIK

TITLE: PAULATUK SOLID WASTE DISPOSAL SITE AND SEWAGE LAGOON LAGOON

DATE: Mar 11/94
SHEET NO. 8 OF 9
METRIC
ALL DIMENSIONS ARE METERS UNLESS OTHERWISE NOTED
JOB NO. 349-01-1
DRAWING NO: PSW - P8

4920 47TH STREET, YELLOWKNIFE NT, X1A 2P1, PHONE 867.920.4555

FileName: 41tpw g:\cad\091482\1000\sitearea.dwg 8/12/2009

DILLON CONSULTING

DATE
August 2009

PROJECT
Water License Renewal Application
Paulatuk, Northwest Territories

PROJECT NO.
091482-1000

TITLE
Sewage Lagoon And Solid Waste Disposal Area

FIGURE NO.
Figure 8

Appendix D

NWT Hazardous Material Spills Database Results

Hazardous Materials Spill Database

Environment Division of ENR
Scotia 6, 5102-50th Avenue; Yellowknife, NT X1A 3S8
Phone: (867) 873-7654 Fax: (867) 873-0221

Sorted By: SpillNo for the year(s): 2009

Spill No.	Date	Region	Location	Site Description	Commodity	Quantity	Party	Source	Agency
2004126	3/2/2004	INU	Paulatuk	Power Plant	Glycol	15 L	NWTPC	PL	GNWT
2004368	6/10/2004	INU	Paulatuk	Airport	Aviation Gasoline	0 L	Resources, Wildlife & Economic Development	DRUM	GNWT
2006310	8/7/2006	INU	Paulatuk	Residence Unit 22	Mercury	0 L	Norma Wolkie	OTH	GNWT
2007235	6/4/2007	INU	Paulatuk	311 Paulatuk in Power Plant	Glycol	205 L	NWTPC	PL	GNWT
2007327	7/4/2007	INU	Paulatuk	West of Paulatuk at Argo Bay	Unknown	0 L	Unknown	UK	CCG
2008201	5/14/2008	INU	Paulatuk	Paulatuk Airport	Jet A	10 L	Adco North	PL	GNWT

Total Spills on this Report: 6

This report contains information regarding spills that were reported to the NWT 24-Hour Spill Line. The absence of information on any particular location in no way guarantees that contamination has not occurred at that location.

LEGEND

Region:
BAF - Baffin
DEH - Deh Cho
INU - Inuvik
KEE - Keewatin
KIT - Kitikmeot
NSL - North Slave
SAH - Sahtu
SSL - South Slave

Source:
AIR - Aircraft
DRUM - Drum or Barrel
MV - Marine Vessel
NS - Natural Seepage
OTH - Other Transportation
PL - Pipe or Line
RT - Rail Train
SL - Sewage Lagoon
ST< - Storage Tank <4000 litres
ST> - Storage Tank >4000 litres
TP - Tailings Pond
TRU - Truck
UK - Unkown
WELL - Wet Wells, Flaring
Boom

Agency:
CCG - Canadian Coast Guard
EP - Environment Canada
GN - Government of Nunavut
GNWT - Government of Northwest Territories
ILA - Inuvialiut Land Administration
INAC - Indian and Northern Affairs Canada
NEB - National Energy Board

Appendix E

Results of Analyses

Taiga Environmental Laboratory
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.: 280694

- FINAL REPORT -

Prepared For: Water Resources Division
DIAND

Address: Box 1500
Yellowknife, NT
X1A 2R3

Attn: Catherine Mallet

Facsimile: (867) 669-2716

Final report has been reviewed and approved by:

Angelique Ruzindana
Quality Assurance Officer

NOTES:

- Test methods and data are validated by the laboratory's Quality Assurance Program. Taiga Environmental Laboratory is accredited by the Canadian Association of Environmental Analytical Laboratories (CAEAL) as a testing laboratory for specific tests registered with CAEAL.
- Routine methods are based on recognized procedures from sources such as
  - Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF;
  - Environment Canada
  - USEPA
- Samples shall be kept for thirty (30) days after the final report is issued. All microbiological samples shall be disposed of immediately upon completion of analysis to minimize biohazardous risks to laboratory personnel. Please contact the laboratory if you have any special requirements.
- Final results are based on the specific tests at the time of analysis and do not represent the conditions during sampling.

ReportDate: Monday, November 03, 2008
Print Date: Monday, November 03, 2008

Taiga Environmental Laboratory
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.: 280694

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PA08-1

Taiga Sample ID: 001

Client Project: MWWE
Sample Type: Wastewater
Received Date: 17-Oct-08
Sampling Date: 15-Oct-08
Sampling Time: 15:00
Location: Paulatuk
Report Status: Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	385	0.4	mg/L	17-Oct-08	SM2320:B	
Conductivity, Specific (@ 25°C)	1250	0.4	µS/cm	17-Oct-08	SM2510:B	
pH	8.45		pH units	17-Oct-08	SM4500-H:B	
Solids, Total Suspended	78	3	mg/L	28-Oct-08	SM2540:D	
Inorganics - Nutrients						
Ammonia as Nitrogen	1.86	0.005	mg/L	21-Oct-08	SM4500-NH3:	
Biochemical Oxygen Demand	27	2	mg/L	17-Oct-08	SM5210:B	
Organic Carbon, Total	68.9	0.5	mg/L	23-Oct-08	SM5310:B	
Phosphorous, Total	3.85	0.01	mg/L	31-Oct-08	SM4500-P:D	
Subcontracted Nutrients						
Nitrogen, Total	14.5	0.06	mg/L	24-Oct-08	ISO/TR 11905	
Major Ions						
Calcium	97.7	0.1	mg/L	17-Oct-08	SM4110:B	
Chloride	87.5	0.7	mg/L	17-Oct-08	SM4110:B	

ReportDate: Monday, November 03, 2008
Print Date: Monday, November 03, 2008

Taiga Environmental Laboratory
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.: 280694

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PA08-1

Taiga Sample ID: 001

Fluoride	< 0.1	0.1	mg/L	17-Oct-08	SM4110:B	
Hardness	627	0.7	mg/L	17-Oct-08	SM2340:B	
Magnesium	93.1	0.1	mg/L	17-Oct-08	SM4110:B	
Nitrate as Nitrogen	0.10	0.01	mg/L	17-Oct-08	SM4110:B	
Nitrite as Nitrogen	0.04	0.01	mg/L	17-Oct-08	SM4110:B	
Potassium	13.6	0.1	mg/L	17-Oct-08	SM4110:B	
Sodium	63.7	0.1	mg/L	17-Oct-08	SM4110:B	
Sulphate	193	1	mg/L	17-Oct-08	SM4110:B	
Microbiology						
Coliforms, Fecal			CFU/100mL		SM9222:D	105
Coliforms, Total			MPN/100mL		SM9223:B	105
Escherichia coli			MPN/100mL		SM9223:B	105
Organics						
Chlorophyll a	0.475	0.001	mg/L	03-Nov-08	SM10200:H	
Trace Metals, Total						
Aluminum	37	5	µg/L	23-Oct-08	EPA200.8	
Antimony	0.8	0.1	µg/L	23-Oct-08	EPA200.8	
Arsenic	10.3	0.2	µg/L	23-Oct-08	EPA200.8	
Barium	23.7	0.1	µg/L	23-Oct-08	EPA200.8	
Beryllium	< 0.1	0.1	µg/L	23-Oct-08	EPA200.8	
Cadmium	< 0.1	0.1	µg/L	23-Oct-08	EPA200.8	
Cesium	< 0.1	0.1	µg/L	23-Oct-08	EPA200.8	
Chromium	0.2	0.1	µg/L	23-Oct-08	EPA200.8	
Cobalt	< 0.1	0.1	µg/L	23-Oct-08	EPA200.8	

ReportDate: Monday, November 03, 2008
Print Date: Monday, November 03, 2008

Taiga Environmental Laboratory
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.: 280694

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PA08-1 Taiga Sample ID: 001

Copper	5.3	0.2	µg/L	23-Oct-08	EPA200.8
Iron	166	5	µg/L	23-Oct-08	EPA200.8
Lead	0.3	0.1	µg/L	23-Oct-08	EPA200.8
Lithium	9.0	0.2	µg/L	23-Oct-08	EPA200.8
Manganese	175	0.1	µg/L	23-Oct-08	EPA200.8
Molybdenum	< 0.1	0.1	µg/L	23-Oct-08	EPA200.8
Nickel	2.3	0.1	µg/L	23-Oct-08	EPA200.8
Rubidium	10.6	0.1	µg/L	23-Oct-08	EPA200.8
Selenium	< 0.5	0.5	µg/L	23-Oct-08	EPA200.8
Silver	< 0.1	0.1	µg/L	23-Oct-08	EPA200.8
Strontium	72.0	0.1	µg/L	23-Oct-08	EPA200.8
Thallium	< 0.1	0.1	µg/L	23-Oct-08	EPA200.8
Titanium	3.9	0.1	µg/L	23-Oct-08	EPA200.8
Uranium	0.1	0.1	µg/L	23-Oct-08	EPA200.8
Vanadium	0.8	0.1	µg/L	23-Oct-08	EPA200.8
Zinc	7	5	µg/L	23-Oct-08	EPA200.8
Subcontracted Organics					
Phenols, Total	0.020	0.001	mg/L	28-Oct-08	APHA 5530D

ReportDate: Monday, November 03, 2008
Print Date: Monday, November 03, 2008

Taiga Environmental Laboratory
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.: 280694

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PA08-2

Taiga Sample ID: 002

Client Project: MWWE
Sample Type: Wastewater
Received Date: 17-Oct-08
Sampling Date: 15-Oct-08
Sampling Time: 15:00
Location: Paulatuk
Report Status: Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	385	0.4	mg/L	17-Oct-08	SM2320:B	
Conductivity, Specific (@ 25°C)	1250	0.4	µS/cm	17-Oct-08	SM2510:B	
pH	8.40		pH units	17-Oct-08	SM4500-H:B	
Solids, Total Suspended	46	3	mg/L	28-Oct-08	SM2540:D	
Inorganics - Nutrients						
Ammonia as Nitrogen	2.40	0.005	mg/L	21-Oct-08	SM4500-NH3:	
Biochemical Oxygen Demand	24	2	mg/L	17-Oct-08	SM5210:B	
Organic Carbon, Total	71.8	0.5	mg/L	23-Oct-08	SM5310:B	
Phosphorous, Total	3.85	0.01	mg/L	31-Oct-08	SM4500-P:D	
Subcontracted Nutrients						
Nitrogen, Total	14.6	0.06	mg/L	24-Oct-08	ISO/TR 11905	
Major Ions						
Calcium	90.5	0.1	mg/L	17-Oct-08	SM4110:B	
Chloride	88.0	0.7	mg/L	17-Oct-08	SM4110:B	

ReportDate: Monday, November 03, 2008
Print Date: Monday, November 03, 2008

Taiga Environmental Laboratory
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.: 280694

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PA08-2 Taiga Sample ID: 002

Fluoride	< 0.1	0.1	mg/L	17-Oct-08	SM4110:B	
Hardness	624	0.7	mg/L	17-Oct-08	SM2340:B	
Magnesium	96.6	0.1	mg/L	17-Oct-08	SM4110:B	
Nitrate as Nitrogen	0.14	0.01	mg/L	17-Oct-08	SM4110:B	
Nitrite as Nitrogen	0.04	0.01	mg/L	17-Oct-08	SM4110:B	
Potassium	14.2	0.1	mg/L	17-Oct-08	SM4110:B	
Sodium	68.8	0.1	mg/L	17-Oct-08	SM4110:B	
Sulphate	193	1	mg/L	17-Oct-08	SM4110:B	
Microbiology						
Coliforms, Fecal			CFU/100mL		SM9222:D	105
Coliforms, Total			MPN/100mL		SM9223:B	105
Escherichia coli			MPN/100mL		SM9223:B	105
Organics						
Chlorophyll a	0.183	0.001	mg/L	03-Nov-08	SM10200:H	
Trace Metals, Total						
Aluminum	28	5	µg/L	23-Oct-08	EPA200.8	
Antimony	0.9	0.1	µg/L	23-Oct-08	EPA200.8	
Arsenic	9.8	0.2	µg/L	23-Oct-08	EPA200.8	
Barium	23.7	0.1	µg/L	23-Oct-08	EPA200.8	
Beryllium	< 0.1	0.1	µg/L	23-Oct-08	EPA200.8	
Cadmium	< 0.1	0.1	µg/L	23-Oct-08	EPA200.8	
Cesium	< 0.1	0.1	µg/L	23-Oct-08	EPA200.8	
Chromium	0.4	0.1	µg/L	23-Oct-08	EPA200.8	
Cobalt	< 0.1	0.1	µg/L	23-Oct-08	EPA200.8	

ReportDate: Monday, November 03, 2008
Print Date: Monday, November 03, 2008

Taiga Environmental Laboratory
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.: 280694

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PA08-2

Taiga Sample ID: 002

Copper	5.1	0.2	µg/L	23-Oct-08	EPA200.8
Iron	149	5	µg/L	23-Oct-08	EPA200.8
Lead	1.1	0.1	µg/L	23-Oct-08	EPA200.8
Lithium	9.0	0.2	µg/L	23-Oct-08	EPA200.8
Manganese	168	0.1	µg/L	23-Oct-08	EPA200.8
Molybdenum	< 0.1	0.1	µg/L	23-Oct-08	EPA200.8
Nickel	2.2	0.1	µg/L	23-Oct-08	EPA200.8
Rubidium	10.9	0.1	µg/L	23-Oct-08	EPA200.8
Selenium	< 0.5	0.5	µg/L	23-Oct-08	EPA200.8
Silver	0.1	0.1	µg/L	23-Oct-08	EPA200.8
Strontium	73.1	0.1	µg/L	23-Oct-08	EPA200.8
Thallium	< 0.1	0.1	µg/L	23-Oct-08	EPA200.8
Titanium	3.5	0.1	µg/L	23-Oct-08	EPA200.8
Uranium	0.1	0.1	µg/L	23-Oct-08	EPA200.8
Vanadium	0.8	0.1	µg/L	23-Oct-08	EPA200.8
Zinc	8	5	µg/L	23-Oct-08	EPA200.8
Subcontracted Organics					
Phenols, Total	0.020	0.001	mg/L	28-Oct-08	APHA 5530D

ReportDate: Monday, November 03, 2008
Print Date: Monday, November 03, 2008

Taiga Environmental Laboratory
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.: 280694

- CERTIFICATE OF ANALYSIS -

Client Sample ID: **PA08-3**

Taiga Sample ID: 003

Client Project: MWWE
Sample Type: Wastewater
Received Date: 17-Oct-08
Sampling Date: 15-Oct-08
Sampling Time: 15:00
Location: Paulatuk
Report Status: Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	400	0.4	mg/L	17-Oct-08	SM2320:B	
Conductivity, Specific (@ 25°C)	1300	0.4	µS/cm	17-Oct-08	SM2510:B	
pH	7.79		pH units	17-Oct-08	SM4500-H:B	
Solids, Total Suspended	64	3	mg/L	28-Oct-08	SM2540:D	
Inorganics - Nutrients						
Ammonia as Nitrogen	0.024	0.005	mg/L	21-Oct-08	SM4500-NH3:	
Biochemical Oxygen Demand	16	2	mg/L	17-Oct-08	SM5210:B	
Organic Carbon, Total	68.2	0.5	mg/L	23-Oct-08	SM5310:B	
Phosphorous, Total	1.47	0.01	mg/L	31-Oct-08	SM4500-P:D	
Subcontracted Nutrients						
Nitrogen, Total	7.30	0.06	mg/L	24-Oct-08	ISO/TR 11905	
Major Ions						
Calcium	111	0.1	mg/L	17-Oct-08	SM4110:B	
Chloride	84.2	0.7	mg/L	17-Oct-08	SM4110:B	

ReportDate: Monday, November 03, 2008
Print Date: Monday, November 03, 2008

Taiga Environmental Laboratory
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.: 280694

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PA08-3 Taiga Sample ID: 003

Fluoride	< 0.1	0.1	mg/L	17-Oct-08	SM4110:B
Hardness	675	0.7	mg/L	17-Oct-08	SM2340:B
Magnesium	96.5	0.1	mg/L	17-Oct-08	SM4110:B
Nitrate as Nitrogen	0.17	0.01	mg/L	17-Oct-08	SM4110:B
Nitrite as Nitrogen	< 0.01	0.01	mg/L	17-Oct-08	SM4110:B
Potassium	10.2	0.1	mg/L	17-Oct-08	SM4110:B
Sodium	62.6	0.1	mg/L	17-Oct-08	SM4110:B
Sulphate	201	1	mg/L	17-Oct-08	SM4110:B
Microbiology					
Coliforms, Fecal			CFU/100mL		SM9222:D 105
Coliforms, Total			MPN/100mL		SM9223:B 105
Escherichia coli			MPN/100mL		SM9223:B 105
Organics					
Chlorophyll a	0.400	0.001	mg/L	03-Nov-08	SM10200:H
Trace Metals, Total					
Aluminum	34	5	µg/L	23-Oct-08	EPA200.8
Antimony	0.2	0.1	µg/L	23-Oct-08	EPA200.8
Arsenic	3.1	0.2	µg/L	23-Oct-08	EPA200.8
Barium	29.0	0.1	µg/L	23-Oct-08	EPA200.8
Beryllium	< 0.1	0.1	µg/L	23-Oct-08	EPA200.8
Cadmium	< 0.1	0.1	µg/L	23-Oct-08	EPA200.8
Cesium	< 0.1	0.1	µg/L	23-Oct-08	EPA200.8
Chromium	1.1	0.1	µg/L	23-Oct-08	EPA200.8
Cobalt	< 0.1	0.1	µg/L	23-Oct-08	EPA200.8

ReportDate: Monday, November 03, 2008
Print Date: Monday, November 03, 2008

Taiga Environmental Laboratory
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.: 280694

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PA08-3 Taiga Sample ID: 003

Copper	2.1	0.2	µg/L	23-Oct-08	EPA200.8
Iron	215	5	µg/L	23-Oct-08	EPA200.8
Lead	3.3	0.1	µg/L	23-Oct-08	EPA200.8
Lithium	8.7	0.2	µg/L	23-Oct-08	EPA200.8
Manganese	46.8	0.1	µg/L	23-Oct-08	EPA200.8
Molybdenum	< 0.1	0.1	µg/L	23-Oct-08	EPA200.8
Nickel	2.3	0.1	µg/L	23-Oct-08	EPA200.8
Rubidium	4.8	0.1	µg/L	23-Oct-08	EPA200.8
Selenium	< 0.5	0.5	µg/L	23-Oct-08	EPA200.8
Silver	< 0.1	0.1	µg/L	23-Oct-08	EPA200.8
Strontium	67.2	0.1	µg/L	23-Oct-08	EPA200.8
Thallium	< 0.1	0.1	µg/L	23-Oct-08	EPA200.8
Titanium	2.7	0.1	µg/L	23-Oct-08	EPA200.8
Uranium	0.1	0.1	µg/L	23-Oct-08	EPA200.8
Vanadium	0.2	0.1	µg/L	23-Oct-08	EPA200.8
Zinc	20	5	µg/L	23-Oct-08	EPA200.8
Subcontracted Organics					
Phenols, Total	0.020	0.001	mg/L	28-Oct-08	APHA 5530D

ReportDate: Monday, November 03, 2008
Print Date: Monday, November 03, 2008

Taiga Environmental Laboratory
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.: 280694

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PA08-3

Taiga Sample ID: 003

- DATA QUALIFERS -

Data Qualifier Descriptions:

105 *Samples received past hold time; analysis not possible.*

* Taiga analytical methods are based on the following standard analytical methods
SM - Standard Methods for the Examination of Water and Wastewater
EPA - United States Environmental Protection Agency

ReportDate: Monday, November 03, 2008
Print Date: Monday, November 03, 2008