KGS GROUP
CONSULTING ENGINEERS

THE MANITOBA WATER SERVICES BOARD

NELSON HOUSE WASTEWATER TREATMENT LAGOON

MANITOBA ENVIRONMENT ACT PROPOSAL

FINAL

KGS Group 16-0429-008
February 2017

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February 16, 2017 File No. 16-0429-008

Environmental Approvals Branch
Manitoba Sustainable Development
Suite 160, 123 Main Street
Winnipeg, Manitoba
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ATTENTION: Ms. Tracey Braun, M.Sc.
Director

RE: Environment Act Proposal
Incorporated Community of Nelson House Wastewater Treatment Lagoon

Dear Ms. Braun:

On behalf of the Manitoba Water Services Board and the community of Nelson House, KGS Group is pleased to submit four (4) paper and one (1) electronic copy of the final Environmental Assessment Report to obtain a licence for construction of a wastewater lagoon in the community of Nelson House. Although a low pressure sewage system was constructed in the community, at present, household wastewater holding tanks are used and the wastewater is hauled tof treatment at the Nisichawaysihk Cree Nation (NCN) aerated lagoon. Nelson House intends to connect their low pressure sewage system to the new wastewater treatment facility. The proposed wastewater treatment lagoon site will be located across a small bay on the north shore of Footprint Lake, immediately northeast of Nelson House, in NE ¼ 7-79-9 W.P.M. An EAP is required as the project is considered a Class 2 Development under Manitoba Regulation 164/88.

As part of the licensing process, a Manitoba Sustainable Development Environment Act Proposal Form with the $7,500.00 application fee has been included with the Environmental Assessment report.

Please do not hesitate to contact the undersigned if you have any questions or require additional information.

Yours truly,

Gene Senior, M.A.
Environmental Scientist

GS/jr
Enclosure

cc: Travis Parsons, Chief Engineer, Manitoba Water Services Board

EXECUTIVE SUMMARY

Kontzamanis Graumann Smith MacMillan, Inc. was retained by the Manitoba Water Services Board (MWSB) for design and construction engineering of a two-celled facultative wastewater lagoon and related infrastructure (access road, lift station and forcemain) and to conduct and submit an Environment Act Proposal application for the required Environment Act Licence for the proposed wastewater lagoon for the Incorporated Community of Nelson House (Nelson House), Manitoba.

Currently, household holding tanks are pumped out and hauled to the Nisichawaysihk Cree Nation (NCN) aerated lagoon under a service agreement between Nelson House and NCN. Nelson House intends to connect their low pressure sewage system to the new wastewater treatment facility which will service their community. The proposed wastewater treatment lagoon site will be located across a small bay on the north shore of Footprint Lake, immediately northeast of Nelson House, in NE ¼ 7-79-9 W.P.M.

Project-environmental interactions were assessed to identify potential environmental effects associated with the on-going operation of the development. Although the proposed lagoon site is a previously undeveloped greenfield location, the environmental assessment indicated that there are no major environmental constraints, such as rare species or heritage resources on the site. Construction of the lagoon will provide short term employment and related benefits to the local economy and will reduce the community's reliance on trucks to haul their sewage, thereby reducing greenhouse emissions.

Environmental components considered in the assessment included air quality, soils, ground and surface water, wildlife and vegetation, human health and well-being, and worker safety. Based on the information available, the assessment of environmental effects outlined in this report and the application of existing and proposed mitigation measures and the conduct of required follow-up, the environmental assessment concludes that the proposed project will not likely result in any significant residual adverse environmental effects.

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1.0 INTRODUCTION

Kontzamanis Graumann Smith MacMillan Inc. (KGS Group) was retained by the Manitoba Water Services Board (MWSB) and Manitoba Indigenous and Municipal Relations (MIMR) for design and construction engineering of a two-celled facultative wastewater lagoon and related infrastructure and to conduct and submit an Environment Act Proposal (EAP) application for the required Environment Act Licence for the proposed wastewater lagoon for the Incorporated Community of Nelson House (Nelson House), Manitoba.

In 1999, a low pressure sewer system (LPSS) was installed but is not in operation as household holding tanks are pumped out and hauled to the Nisichawaysihk Cree Nation (NCN) aerated lagoon under a service agreement between Nelson House and NCN. Nelson House intends to connect their LPSS system to the new wastewater treatment facility which will service their community.

The proposed wastewater treatment lagoon site is located immediately northeast of Nelson House, Manitoba, on the north shores of Footprint Lake, in NE ¼ 7-79-9 W.P.M.

2.0 DESCRIPTION OF DEVELOPMENT

The following sections have been structured to address the requirements of the Description of Development as outlined in the Environment Act Proposal Form.

2.1 STATUS OF TITLE

The proposed development will be, within the limits of land belonging to the Incorporated Community of Nelson House described on the Crown Lands Registry System Encumbrance List as "All those portions of unsubdivided Township 79, Range 9 W.P.M. contained within the limits shown bordered hatched on a plan filed in the Director of Surveys Office at Winnipeg as No. 18763" including: Part Northwest 5, East 7 East of Road, West & Part East 8, Part South 17, Part Southeast 18 East Of Road. Except Waters (Appendix A).

2.2 MINERAL RIGHTS

The owner of mineral rights beneath the project site is not explicitly noted on the Encumbrance List and therefore, is assumed to be the same as the land owner.

2.3 EXISTING AND ADJACENT LAND USE

The proposed wastewater treatment lagoon site is located immediately northeast of the community on the north shore of Footprint Lake. The proposed lagoon site is presently forest covered (Appendix B: Photo 1) and situated on a plateau with the land to the north of the lagoon rising sharply and the area to the south of the proposed lagoon site dropping sharply to the lake's edge. The ground surface generally slopes from the northeast to the southwest. Land use adjacent to the proposed site is as follows:

- West – Undeveloped forest. The access road connecting Nelson House to PR 391 is approximately 500 m west of the lagoon site (Photo 2).
- North – Undeveloped forest.
- East – Footprint Lake.
- South – Footprint Lake.

2.4 LAND USE DESIGNATION AND ZONING

The area where the lagoon site will be developed is designated as a Limited Development District per the Nelson House Incorporated Community Development Plan By-Law Number 01-2005.

2.5 PREVIOUS STUDIES AND ACTIVITIES

A report titled, *Geotechnical Report Proposed Nelson House WWSP Nelson House, Manitoba* was completed by Cochrane Engineering in May of 2001. The report assessed the topographical and geotechnical conditions of the proposed site at NE ¼ 7-79-9 W.P.M. (including subsurface soil conditions and laboratory testing), provided lagoon design considerations (including projected population, size and configuration, access road, and wastewater pumping) and a cost estimate of the works.

A second report titled, *The Department of Northern Affairs Capital Project Application Incorporated Community of Nelson House Sewage System* was completed by Nelson House in April, 2007. The report makes a request for funding from the Department of Aboriginal and Northern Affairs for the construction of a Dalco WWS Inc. packaged sewage treatment plant, access road, forcemain and lift station, as well as operating costs of the current (at the time) sewage system and anticipated operating costs of the proposed sewage treatment system.

2.6 PROPOSED DEVELOPMENT

The proposed wastewater treatment lagoon site is located immediately northeast of Nelson House, on the north shore of Footprint Lake, in NE ¼ 7-79-9 W.P.M. The proposed site is within the community boundary. The proposed project would require that approximately 6 ha of trees be cleared to make way for the lagoon and associated infrastructure including the access road and forcemain. Drawings are provided in Appendix C.

2.6.1 Schedule

Construction is proposed to be completed before the ground begins to freeze in early October 2017. It is anticipated that the project will be completed by March 2018 to ensure that the funding arrangements are met.

2.6.2 Current and Projected Year 20 Population

The current population of Nelson House is estimated to be approximately 80 persons living in 18 dwellings [(1)] and there are 36 surveyed legal lots within the community proper. The community has a community hall, fire hall and water treatment plant. Plans were previously conceptualized for the construction of a new commercial multiplex consisting of a beer vendor, convenience store, fast food take-out restaurant and motel.

It is not anticipated by the MWSB or MIMR that any additional legal lots will be developed over the next 20 years, and there are no schools, bussed in students or rural residences that are expected to contribute additional wastewater to the proposed lagoon.

Since 1985, the population of Nelson House has ranged from a low of 54 in 2001 to a high of 109 in 2006. The statistics shown in Table 1 do not indicate either steady population growth or decline.

TABLE 1
NELSON HOUSE POPULATION STATISTICS [(1)]

Year	Population
1985	108
1991	78
1996	77
2001	54
2006	109

Based on the information presented, establishing a relatively consistent annual growth or decline rate does not appear practical for Nelson House. As such, KGS Group proposes a Year

20 design population shown in Table 2, based on a combination of a fully built-out community, and equivalent persons for the community hall, fire hall and the potential commercial multiplex as follows:

TABLE 2
YEAR 20 (2037) POPULATION ESTIMATE

SOURCE	PERSONS
35 residential lots @ 4.5 persons per residence	158 persons
Fire Hall	4 persons
Community Hall	10 persons
Commercial Multiplex	
Beer Vendor	3 persons
Convenience Store	3 persons
Fast Food Take Out	6 persons
Motel (9 Beds @ 2 persons per bed)	18 persons
TOTAL YEAR 20 POPULATION	**202 persons**

2.6.3 Lagoon Hydraulic Loading

There are no previous studies or investigations for the community that review or address water consumption rates or wastewater discharge rates. Information from the Nelson House water treatment plant identified a current average production of 15,000L/day. Based on the current population of approximately 80 people; an average daily use of 188L/person/day is calculated. Typical wastewater flows in the range of 300L/person/day are typically used as flow parameters in wastewater treatment lagoon design for projects within Manitoba. Although this flow rate is higher than that observed for the community, a conservative value is preferred in order to account for changes in population dynamics and potential increased demand.

Backwash generated by the water treatment plant is currently sent untreated to Footprint Lake, however, the project proposes to have the water treated in the lagoon prior to discharge. Based on existing backwash flows and estimated future population, the backwash from the water treatment plant under a conservative design is estimated to be 5.17 m^3.

In addition to the wastewater generated from the homes and the water treatment plant, an additional 15% of the per capita daily water demand (45 L/person/day) is added to account for general system infiltration as shown in Table 3. The anticipated storage requirements for the lagoon are approximately 230 days (November 1 to June 15).

TABLE 3
PROJECTED YEAR 20 TOTAL DAILY HYDRAULIC LOADING

LOADING SOURCE	AMOUNT
Average Daily Use	60.6 m^3/day (202 persons@ 300L/person/day)
Backwash & Rinse Water	5.17 m^3/day (backwash from the Water Treatment Plant)
General Infiltration	9.0 m^3/day (202 persons@ 45L/person/day)
Total Year 20, 230-day Storage Requirements	17,197 m^3

2.7 DESIGN CRITERIA

New or expanded wastewater treatment lagoons are required to meet the Manitoba Water Quality Standards, Objectives and Guidelines (MWQSOG) – Tier 1 Water Quality Standards for discharge effluent. These include a limit of 200 fecal coliform (*E.Coli*) per 100 mL, 25 mg/L biochemical oxygen demand (BOD) or carbonaceous BOD (CBOD), 25 mg/L total suspended solids (TSS), 1 mg/L total phosphorus (TP) and a site-specific total ammonia limit derived from the Manitoba Water Quality Objectives. Small wastewater treatment facilities that serve less than 2,000 people, such as the one proposed for Nelson House, have the option of implementing a demonstrated nutrient reduction strategy instead of meeting the 1 mg/L phosphorus limit. Additionally, the facility will adhere to the provisions of the Wastewater Systems Effluent Regulations (SOR/2012-139) for an intermittently discharging wastewater facility (hydraulic retention time ≥90 days with discharge less than four times per year, with at least seven days between discharges). The effluent quality standards that apply to the Nelson House lagoon are provided in Table 4.

TABLE 4
EFFLUENT QUALITY STANDARDS

WATER QUALITY PARAMETER	MAXIMUM CONCENTRATION
Total Phosphorous	1 mg/L
Carbonaceous Biochemical Oxygen Demand (CBOD)	25 mg/L
Total Suspended Solids	25 mg/L
Total fecal coliform	200 fecal coliform organisms / 100 mL
E.Coli	200 *Escherichia coli* organisms / 100 mL
Total Ammonia	Site specific

2.7.1 Lagoon Organic Loading

The current wastewater system in Nelson House is unique in that a LPSS is present, however, is not currently operational, and residences are serviced with holding tanks. The intent of the project is to convert the holding tanks into septic tanks with effluent pumps that will pump through the LPSS to the new sewage lift station, and subsequently to the new lagoon.

The organic loading calculation is based upon the organics in typical residential wastewater. A value of 0.076 kg BOD_5/person/day is used to estimate the organic loading from residences that are or will be connected to the existing LPSS and for residences serviced with holding tanks.

An estimated BOD_5 loading to the proposed lagoon was calculated and based on daily residential wastewater effluent flow from the septic tanks and the truck-pumped organic solids from the septic tanks. The organic strength of BOD is estimated to be 7.0 kg BOD_5/m^3. This based upon a typical septage contribution rate of 200L/person/year, during the summer period of 135 days.

Aside from the sources described above, there should be no additional inputs that would increase the BOD_5 over the next 20 years.

TABLE 5
THEORETICAL DESIGN YEAR 20 BOD_5 DAILY ORGANIC LOADING RATE

LOAD SOURCE	LOADING RATE
Low Pressure Sewer System	15.35 kg BOD_5/day (202 persons @ 0.076 kg BOD_5/person/day)
Truck-hauled from Septic Tanks	2.10 kg BOD_5/day (200L/person/year x 202 persons / 135 days x 7/1000)
Total 20 year organic loading	Approximately 17.45 kg BOD_5/day

2.8 FIELD INVESTIGATIONS AND LABORATORY RESULTS

A field investigation was completed between November 21 and 23, 2016 to determine the suitability of the proposed site for construction of the new lagoon.

Preliminary reviews undertaken by KGS Group's Geotechnical Department indicate that the *in-situ* clay found during test-pitting in the vicinity of the proposed lagoon site is a mixture of plastic clays; with sufficient reworking, the clay material is expected to meet the provincially required hydraulic conductivity of 1×10^{-7} cm/sec. Should reworking and compaction of the clay material not be sufficient to produce the required hydraulic conductivity, a 1.5 mm textured high density polyethylene (HDPE) synthetic geomembrane will be installed and covered with a minimum 0.3 m of soil.

A Geotechnical Investigation Report complete with test hole logs will be submitted to the MWSB and MIMR following laboratory hydraulic conductivity testing, completed during the detailed design phase of the project.

2.9 SYSTEM COMPONENTS

The information provided below is based upon a pre-design report submitted to MWSB and MIMR in December 2016 and does not represent final design. The existing ground at the proposed lagoon site is moderately flat with some higher lying areas surrounding the site. The proposed lagoon site is situated on a plateau with the land to the north of the lagoon rising sharply and the area to the south of the proposed lagoon site dropping sharply to the lake's

edge. The ground surface generally slopes from the northeast to the southwest varying approximately 2.9 m over the length of the lagoon. Approximately 6 ha of tree clearing will be required to accommodate the lagoon (Appendix C: Drawing C01) and other infrastructure.

2.9.1 Primary Cell

The Primary Cell will be designed with 4:1 side slopes and a hydraulic storage capacity in the top portion of the cell of 2,607 m^3. This will provide a minimum organic loading capacity of 17.45 kg BOD_5/day at an organic treatment rate of 56 kg BOD_5/ha/day. To achieve the required organic loading capacity the Primary Cell will be constructed with a flat bottom area of 2,450 m^2 and a berm height 0.75 m above the water surface and a minimum surface area of 3,116 m^2 (Drawing C02). Both the Primary and Secondary cells will have clay liners constructed of compacted *in-situ* clay material with a minimum thickness of 1.0 m and hydraulic conductivity of 1.0 x 10^{-7} cm/sec.

2.9.2 Secondary Cell

The Secondary Cell will be constructed east of the Primary Cell with 4:1 side slopes, a flat bottom area of 70 m x 151 m and a hydraulic storage capacity of 14,655 m^3. The combined hydraulic storage of the Primary and Secondary cells will total 17,262 m^3.

2.9.3 Lagoon Access Road

The lagoon access road (Drawing C01) will follow an existing bush trail on the north side of the abandoned quarry (Photo 3) eastward before turning south to the proposed lagoon. A 16.0 m wide right-of-way will be cleared along the entire length to provide appropriate cross-section design for the road. The lagoon access road will feature a 5.0 m wide graveled surface. Side and back slopes consisting of a 3:1 profile and a 1.0 m wide ditch bottom will complete the width of the cleared right-of-way.

2.9.4 Sewage Lift Station

Due to the distance from Nelson House to the new lagoon and the approximately 19.0 m vertical distance from the existing LPSS to the proposed lagoon, a dedicated sewage lift station is required to pump the wastewater. The sewage lift station will be located in the northwest corner of Footprint Lake behind the residences (Photos 4 and 5) and close to the tree line (Drawing C01). The sewage lift station will be a reinforced pre-cast concrete manhole complete with a duplex pumping system. A discharge line will be installed from the existing LPSS to the new sewage lift station and a dedicated forcemain will be installed from the new sewage lift station to the new lagoon.

The sewage lift station's pumps will be electrically powered from the adjacent Manitoba Hydro power supply and will feature high level alarms to alert the community of pumping issues. The internal process piping and appurtenances will be fabricated from a combination of polyvinyl chloride (PVC), aluminum and stainless steel materials, to prevent and minimize corrosion, rust and mechanical failures.

The pumps will be sized to accommodate the peak hour flows, as well as, the vertical head (composed of the vertical distance from the pump discharge line to the lagoon floor and the friction losses in the forcemain).

2.9.5 Forcemain

A 700 m x 150 mm forcemain will be constructed from the new sewage lift station north through the bush, beneath Footprint Lake and up to the new lagoon. The forcemain will be buried with a minimum 2.75 m of cover to protect against frost, and in areas where 2.75 m of cover is not possible (due to bedrock), the forcemain will be insulated.

It is anticipated that the forcemain will be installed via open-cut methods, except for the crossing beneath the unnamed stream or Footprint Lake. In accordance with anticipated Department of Fisheries and Oceans requirements, the forcemain will be directionally drilled from the shoreline (based on the needs of the driller to attain the required depths) and installed to maintain a minimum 2.0 m of cover beneath the lake bed before returning to normal grade on the opposite

shore. Due to the nature of the installation, High Density Polyethylene (HDPE) DR11 heavy-walled pipe will be used for the forcemain. It is being contemplated that the forcemain may be encased within a larger pipe to further protect against potential rupture. This will be determined during final design.

2.9.6 Proposed Effluent Discharge Route

The drainage route for the proposed lagoon effluent will flow from the Secondary Cell outlet (Drawing C02) southwest along a new drainage ditch approximately 590 m toward Footprint Lake. The ditch will outlet into an unnamed creek that drains Footprint Lake toward the west (Photos 6 and 7).

2.9.7 Residential Holding / Septic Tanks

Currently, wastewater from residences and community buildings is collected in individual holding tanks. The tanks are not connected to the existing LPSS and will require a combination of system upgrades to have a fully functioning and operable system. These system upgrades will include but are not limited to:

- Converting / replacing existing holding tanks into dual chamber septic tanks.
- Installing effluent pumps in the converted / replaced septic tanks.
- Installing 32 mm low density polyethylene (LDPE) sewage service lines from the converted / replaced septic tanks to the existing LPSS at the property line.

As part of the November 2016 site visit by KGS Group, an attempt was made to review the condition of the tanks to confirm the level of system upgrades required. Due to the amount of snow cover, the cold and minimal visibility, KGS Group was unable to confirm the type of tanks (holding versus septic) installed and if any effluent pumps were installed.

It is assumed for the pre-design report that all existing tanks are single chamber holding tanks with no connection to the existing LPSS and will require conversion / replacement, installation of effluent pumps and installation of 32 mm LDPE sewage service lines to the existing LPSS.

2.9.8 Operation and Maintenance

Effluent Discharge Operations

Discharge will occur twice per year between the allowable discharge dates of June 15th and November 1st of any given year, typically once during the early summer and once during the late fall. Water quality samples will be collected and submitted to a laboratory to determine if the quality is acceptable for effluent discharge. The following steps are required for effluent discharge:

- Collect effluent samples from the Secondary Cell and submit for laboratory analysis;
- Based on water quality analysis, determine a discharge schedule;
- Close the transfer pipe valve between the Primary and Secondary cells;
- Open the effluent discharge valve of the Secondary Cell in a controlled manner to ensure manageable discharge rate into the receiving discharge ditch;
- Lower the level of effluent in the Secondary Cell until the effluent level reaches approximately 30 cm above the cell floor (or the invert of the discharge pipe); and
- Open the intercell valve between the Primary and Secondary cells and allow effluent to equalize between cells.

The Operator should keep records of:

- Amount of alum dispersed into the Secondary Cell for phosphorus reduction and the settling time required to meet the 1 mg/L concentration limit;
- Water quality analyses;
- When discharge occurred;
- The amount of effluent discharged (m^3);
- Any colour and odours observed for the discharge water;
- Water levels in both cells prior to and after discharge; and
- Sludge levels in both cells after discharge.

Cell Maintenance

Periodic maintenance (annually) of the lagoon cells must be conducted. Monitoring and maintenance includes:

- Erosion – check for erosion of the banks due to rainfall/snowmelt or waves. Re-grading of the banks, or adding rip rap can help mitigate erosion.
- Vegetation – maintaining grass cover on dikes or sideslopes through cutting and mowing.
- Animals – maintain a program to prevent burrowing animals.

Fence and Gates

Periodic inspection and maintenance (twice annually) of the fence and gates must be conducted to ensure unauthorized persons do not enter the site. The gates and access roads will be wide enough to accommodate winter snow removal and the turning radius of large vehicles.

Lagoon Access Road

The Lagoon Access Road must be maintained throughout the year to ensure safe hauling of wastes to the lagoon and allow for ease of access and turn-around for the truck operators.

Other Operational Records

Additional records for operation of the lagoon include:

- Annual record of wastewater / waste solids hauled to the lagoon.

General Safety Considerations

Consideration of the hazards presented at the site requires the Lagoon Operator to follow some general safety guidelines:

- Personal hygiene: discuss immunizations with a doctor, do not wear dirty clothes home, frequently clean safety equipment and tools after usage, wear rubber gloves when working on equipment that has had contact with wastewater, see a doctor if injured on the job-site.
- No smoking on-site.
- Ensure all persons with access to the site are aware of the health and safety hazards on the site.
- Properly trained and aware of the dangers of working on or near water.
- Stay off the ice in winter. Ice thickness may be highly variable, particularly in areas of flow from one cell to another.

2.10 FUNDING

This project has been approved for cost sharing between Nelson House and the governments of Manitoba and Canada under the Clean Water and Wastewater Fund, subject to approvals.

2.11 STORAGE OF GASOLINE AND ASSOCIATED PRODUCTS

Gasoline and associated petroleum products may be temporarily used and stored at the site during construction of the proposed lagoon upgrades. However, there is no requirement for these products to be used or stored at the site during operation.

3.0 PHYSICAL ENVIRONMENT

3.1 LOCATION, PHYSIOGRAPHIC SETTING AND CLIMATE

Nelson House, Manitoba is a non-treaty community adjacent to NCN, approximately 75 km northwest of Thompson on a bay along the north shore of Footprint Lake (Photo 8). The community has year round highway access via Provincial Road 391 and a community access road which connect the community to Thompson and Leaf Rapids.

The project area is located in the Three Point Lake Ecodistrict, within the Churchill River Upland Ecoregion of the Boreal Shield Ecozone. The ecoregion is located along the southern edge of the Precambrian Shield in north-central Saskatchewan and Manitoba. In Manitoba, it extends westward from the Grass River to the Saskatchewan border [(2)]. The climate of the Churchill River Upland ecoregion is marked by short, cool summers and long, very cold winters and the mean annual air temperature ranges from -0.9°C to -3.5°C. Based on climate data from the Thompson Airport, for 1981 to 2010 the mean daily temperature ranged from 16.2°C in July to -23.9°C in January with an annual mean of -2.9°C [(3)]. The mean annual precipitation at the Thompson Airport is approximately 509 mm, of which about one-third falls as snow. Precipitation varies greatly from year to year, but is highest from spring through early summer [(2)].

3.2 REGIONAL GEOLOGY AND HYDROGEOLOGY

The Churchill River Upland ecoregion occupies a portion of the Kazan Upland and is underlain by massive crystalline Precambrian (Proterozoic) rocks that form broad sloping uplands and lowlands. Elevations range from 450 metres above sea level (masl) in the Reindeer Lake area near the Saskatchewan border to 150 masl along its eastern boundary near Grass River [(2)].

The study area is located within the Precambrian Shield physiographic region of Manitoba, noted for uneven and hummocky terrain [(4)]. The bedrock consists of complexes of metasedimentary and granitic rocks, the heavily eroded remains of a mountain system known as the Trans-Hudson Orogen. The bedrock in the area is generally shallow, with many bedrock

outcrops [5]. The bedrock surface has been glacially scoured resulting in an irregular surface with high local relief [6].

The overburden consists of discontinuous glacial tills and interglacial sedimentary deposits, typically infilling the bedrock lows [6].

One provincial well log was available for the area, which demonstrated an overburden layer of 7.6 m overlying granite bedrock [7]. Overburden and granitic zones are typically low permeability and are not utilized as a groundwater supplies.

3.3 SURFACE WATER

The Three Point Lake Ecodistrict is part of the Nelson River drainage system which includes portions of the Burntwood and Grass rivers. Flow is generally eastward over terrain that has a change in elevation of about 0.6 m to 1.0 m per km [2]. The closest surface water body to the project site is Footprint Lake. The lake level is controlled by Manitoba Hydro and lake levels are monitored and published through the Water Survey of Canada Station 05TF001 located at Nelson House. As the level is controlled by Manitoba Hydro, it is fairly constant. For the 10 year period 2006 through 2015, the minimum average monthly level at Station 05TF001 was 241.26 m the maximum average monthly level was 243.74 m and the mean monthly level was 243.07 m.

Water quality data for Footprint Lake as collected by Manitoba Sustainable Development (MSD), Water Quality Management Section from 2006 through 2016 at Nelson House (Station MB05TFS010) is provided in Appendix D [8]. The Footprint Lake water quality data was compared to the Canadian Council of Ministers of the Environment (CCME) Canada-Wide Strategy for the Management of Municipal Wastewater Effluent, Effluent Quality Standards and the MWQSOG for the Protection of Freshwater Aquatic Life and Tier 1 Water Quality Standards for Municipal Wastewater Effluent. The following conclusions were noted:

- A total of 32 samples were lab analyzed for their NH_3 concentrations. Twenty seven (27) of the samples had concentrations that were below the lab detection limit. Those samples that had NH_3 concentrations above the lab detection limit ranged from 0.011 mg/L to 0.028 mg/L. All of the measured concentrations were below the Effluent Quality Standard (1.25 mg/L).

- Of the six samples submitted for lab analysis, the BOD concentrations ranged from 1.0 mg/L to 1.6 mg/L with one sample being below the lab detection limit. All of the measured concentrations were below the Effluent Quality Standard for CBOD (25mg/L) and the MWQSOG for BOD (25 mg/L).

- Of the 46 samples analyzed for TSS concentrations, 14 were below the lab detection limit of 5 mg/L. Those that were above the lab detection limit ranged from 2.0 mg/L to 12.0 mg/L. None of the samples analyzed exceeded the Effluent Quality Standard or the MWQSOG (25 mg/L).

- A total of 30 samples were analyzed for *E.Coli* concentrations and three samples were above the lab detection limit measured 1, 10 and 40 CFU/100 mL. The remaining 27 samples were below the lab detection limits. None of the measured concentrations exceeded the MWQSOG (200 CFU/100 mL).

- Forty six (46) samples were analyzed for total phosphorus concentrations which ranged from 0.0099 mg/L to 0.064 mg/L with an average of 0.0257 mg/L. All of the measured concentrations were below the MWQSOG (1 mg/L).

- The analyzed water from 46 samples had pH values that ranged from 7.6 to 8.45 pH units with an average of 8.19 pH units. All pH values were within the MWQSOG (6.5 to 9 pH units).

3.4 WILDLIFE, HABITAT AND VEGETATION

The Churchill River Upland ecoregion provides habitat for moose, woodland caribou, black bear, lynx, wolf, beaver, muskrat and snowshoe hare as well as winter range for barren-ground caribou. Besides sandhill crane, grouse and waterfowl, such as ducks, geese and pelicans, many other birds use the ecoregion [(2)].

The vegetation at the proposed lagoon site is typical of the Boreal forest region where the short growing season and low soil temperature limits forest productivity. Black spruce with an under-storey of mosses and ericaceous shrubs is the dominant forest type at upland sites. However, due to the influence of frequent forest fires, jack pine is commonly part of younger stands and also occurs as pure stands. Trembling aspen with an under-storey of alder is widespread, especially in the more southern sectors. Balsam fir and white spruce are common, especially along lakes and rivers. With the prevalence of peatlands, forest cover is generally stunted. Peat plateau bogs have stunted black spruce, sphagnum moss and ericaceous shrub cover, while fens are covered with either sedge and brown moss, or support tamarack, dwarf birch and a mixture of sedges and herbs [(2)].

Mr. Chris Friesen of MSD, Conservation Data Centre completed a search of the rare species database and found no occurrences at this time for the project area (Appendix D) [9].

3.5 FISH AND FISH HABITAT

A list of fishes in the Nelson River watershed was obtained from the Freshwater Fishes of Manitoba [10]. Native species include silver lamprey, lake sturgeon, mooneye, lake chub, pearl dace, emerald shiner, blacknose shiner, spottail shiner, fathead minnow, longnose dace, longnose sucker, white sucker, shorthead redhorse, northern pike, lake whitefish, lake trout, troutperch, burbot, brook stickleback, ninespine stickleback, slimy sculpin, johnny darter, yellow perch, river darter, sauger, walleye and freshwater drum. Channel catfish are known to exist within the watershed however they are uncommon in the area. Introduced freshwater species in the watershed include rainbow trout and carp. None of the species identified above are listed under the federal *Species At Risk Act* or *The Endangered Species and Ecosystems Act (*Manitoba).

3.6 SOCIOECONOMIC

The community was built at its present location as a result of the Churchill River Diversion through the Rat River. Residents previously lived on the reserve, but established the community as adjustments to the diversion plans were taking place. The community was recognized by the federal department of Northern Affairs in July 1974, and was incorporated into the Incorporated Community of Nelson House in May 2004. The community is governed by a mayor and council under *The Northern Affairs Act* [11]. The community also employs a public works employee and a volunteer Fire Chief. The population of Nelson House is approximately 80 people living in 18 homes.

Water for the community is pumped from Footprint Lake to the Water Treatment Plant where it is filtered and chlorinated. Distribution is through a piped water distribution system. A solid-waste disposal site is located on the reserve. Solid-waste is picked up weekly and delivered to the solid-waste site. Wastewater is presently collected from holding tanks and hauled to the NCN wastewater lagoon.

Firefighting capability is based on a small "fast-attack" vehicle which has limited water supply, hoses and equipment. Additional portable forestry-style equipment is available for grass and brush fires. Police response is from the Thompson RCMP detachment. Medical support in the community comes from the federal nursing station on the nearby reserve, which has two nurses, two community health workers, a weekly doctor's clinic and a monthly dental clinic. The nearest hospital is in Thompson. Education for children in the community is provided at the Nelson House Reserve School. There is an agreement between Frontier School Division and the reserve to cover costs of bus transportation.

Economic activity in Nelson House is based on fishing and trapping. Fishers at Nelson House have their catch transported to either Leaf Rapids or Wabowden Rapids fish stations. Trapping is carried out in the Nelson House Registered Trap Line Zone.

3.7 HERITAGE RESOURCES

Ms. Heather McClean of Manitoba Sport, Culture and Heritage, Historic Resources Branch, examined the project location in conjunction with Branch records for areas of potential concern and reported that there are no known heritage resources located within the study area (Appendix D) [(12)].

4.0 POTENTIAL ENVIRONMENTAL EFFECTS ASSESSMENT

An environmental effect includes any change that the project may cause to the environment (biological, physical, social and/or economic). Environmental effects were identified from interactions between project activities and environmental components. The lagoon site is a greenfield site that has not been previously developed. It is anticipated that the construction of the sewage lagoon will have a positive effect on the Nelson House community. Mitigation measures and follow-up activities were identified for environmental effects determined to be adverse.

4.1 AIR QUALITY

Construction of the new lagoon may result in temporary increased fugitive dust levels in the local area. Dust may be generated during construction activities such as placing and shaping fill to create the lagoon cells and sludge drying beds, as well as, from vehicle and construction equipment on the gravel access road. It is unlikely that Manitoba's air quality guidelines would be exceeded during construction, and any effects would be very short term. Therefore, the potential adverse effects on air quality were assessed to be minor and short term. The effects may be mitigated by using an approved dust suppressant such as water, controlling construction vehicle speeds, limiting construction activities during high wind events, and re-establishing vegetation on disturbed areas.

Increased volatile organic carbon levels may result from fuels and other hazardous substances used during construction activities. During construction, it is anticipated that the contractor will transport fuel to the site using a fueling truck in order to fuel equipment on-site. As trucks will no longer be required to haul sewage from many of the homes in Nelson House, there will be a reduction in greenhouse gas emissions as a result of the project. The potential adverse effects on air quality in the local area were assessed to be minor and short term in duration. Proposed mitigation measures include requiring a high standard of maintenance for construction equipment and vehicles, limiting unnecessary long-term idling, using low sulphur-containing fuels, using appropriate dispensing equipment and only fueling of vehicles and equipment when necessary.

Lagoon operation has the potential to generate odours. A non-aerated lagoon will typically freeze during the winter period and the ice cover largely prevents free oxygen from entering the water. This leads to the production of hydrogen sulphide gas by bacteria that do not require free oxygen. After the ice melts, the gas will quickly dissipate resulting in a short term release of odours in the local area. For the remainder of the year, odours are anticipated to be minimal as the lagoon will be aerobic and hydrogen sulphide gas generation is not anticipated. The nearest residence is over 500 m south of the lagoon and since the odour release is short term the effect was assessed as minor. No additional mitigation is proposed.

4.2 SOILS

Soils in the project area may become impacted during construction from leaks and accidental spills or releases of fuels or other hazardous substances and waste. The potential adverse effects on soil quality were assessed to be minor to moderate. Proposed mitigation includes preventing leaks, spills and releases by providing secondary containment for fuel storage, requiring drip trays for equipment, providing fuel handling training for operators, providing spill clean-up equipment and materials, complying with provincial fuel storage and dispensing regulations, storing hazardous materials in approved containers, providing an emergency (spill) response plan and periodic inspection for leaks, spills and releases. If a spill over a certain quantity should occur, the contractor would be responsible to notify the MSD Emergency Response Program (204-944-4888), and the appropriate clean-up would be determined according to the size of spill and quantity of contamination. Small spills could be treated on site with regular working of the soil to aerate. Larger spills, however, would be assessed and delineated following Phase III Environmental Site Assessment standards and a remediation program would be developed to ensure that the site is cleaned to meet MSD soil remediation criteria.

Soils in the area may become impacted during operation of the lagoon from leaks or releases of sewage. Based on geotechnical investigations at the site, the *in-situ* material used for construction of the berms will have a permeability of the required 1.0×10^{-7} cm/s which is sufficient to prevent leaks. Should it not be possible to meet provincial permeability requirements, a 1.5 mm textured high density polyethylene (HDPE) synthetic geomembrane will be installed and covered with a minimum 0.3 m of soil. As such, the potential effect from leaks

was assessed as minor and no further mitigation measures, besides the 1.0 m thick compacted clay liner, are required.

4.3 GROUNDWATER

Groundwater in the project area may become impacted during site preparation and construction from leaks, accidental spills, or releases of fuels or other hazardous substances. Groundwater quality at the site has not been tested for hydrocarbons. The potential adverse effects on groundwater quality were assessed to be minor. Proposed mitigation includes preventing leaks, spills and releases by providing secondary containment for fuel storage, requiring drip trays for equipment, providing fuel handling training for operators, providing spill clean-up equipment and materials, complying with provincial fuel storage and dispensing regulations, storing hazardous materials in approved containers, providing an emergency (spill) response plan and periodic inspection for leaks, spills and releases.

No seepage from the lagoon to groundwater is expected to occur. The compacted clay liner of the cells will be a minimum of 1.0 m thick. The liner will meet all testing requirements set forth by MSD. The proposed project will have a negligible effect on groundwater and groundwater contamination from seepage is not expected to occur: no further mitigation measures are required.

4.4 SURFACE WATER

Surface water in the project area may become impacted during construction from leaks and accidental spills or releases of fuels or other hazardous substances. The potential adverse effects on water quality were assessed to be minor to moderate. Proposed mitigation includes preventing leaks, spills and releases by providing secondary containment for fuel storage, requiring drip trays for equipment, providing fuel handling training for operators, providing spill clean-up equipment and materials, complying with provincial fuel storage and dispensing regulations, storing hazardous materials in approved containers, providing an emergency (spill) response plan and periodic inspection for leaks, spills and releases.

Surface water may become impacted during operation of the lagoon from leaks (seepage) or uncontrolled releases of sewage. As previously noted, the compacted clay liner of the cells will

be a minimum of 1.0 m thick, have a permeability not exceeding 1.0 x 10^{-7} cm/sec and meet all testing requirements set forth by MSD. Should it not be possible to meet provincial permeability requirements, a 1.5 mm textured high density polyethylene (HDPE) synthetic geomembrane will be installed and covered with a minimum 0.3 m of soil. Prior to effluent discharge, water quality samples will be collected and submitted to the laboratory to determine if the quality is acceptable for discharge. The effluent being discharged will meet the CCME Canada-Wide Strategy for the Management of Municipal Wastewater Effluent, Effluent Quality Standards and the MWQSOG Tier 1 Water Quality Standards for Municipal Wastewater Effluent. Therefore, the potential effect of the project on surface water was assessed as negligible. Proposed mitigation includes requiring regular maintenance of the system during operation and regular inspections for seepage.

4.5 WILDLIFE, HABITAT AND VEGETATION

Construction of the proposed lagoon will result in the minor loss and disturbance of vegetation and wildlife habitat. Approximately 6 ha of tree clearing will be required to accommodate the lagoon and other infrastructure. The amount of vegetation clearing and disturbance is very small relative to the abundant high quality habitat surrounding the project area. The Manitoba Conservation Data Centre was contacted and found no occurrences of rare or endangered plant and wildlife species at the project area [(9)]. As such, effects on wildlife, habitat and vegetation, as a result of the project, are expected to be minor. Mitigation measures to implement include: minimizing loss and disturbance of vegetation and wildlife habitat by limiting the area cleared, limiting construction activities to designated and previously disturbed areas and re-vegetating disturbed areas after construction.

4.6 FISH AND FISH HABITAT

Construction activities, such as placing and shaping fill to create the lagoon cells can result in wind-carried dust and exposed soils that are more easily carried away with surface water run-off, which may increase sedimentation to nearby water bodies. Construction activities associated with the proposed project will be occurring within approximately 100 m of Footprint Lake and the unnamed creek west of the lagoon. As such, suspended sediment levels may become temporarily elevated if exposed soil is carried into the lake with surface water runoff,

particularly after major precipitation events. Elevated levels of suspended sediment can reduce water quality, which may interfere with fish spawning, navigation, and the ability to locate food and escape predators. When suspended particles settle, they can potentially smother and kill fish eggs or larvae. As the construction phase is short and is temporary, the potential adverse effects were assessed to be minor. Proposed mitigation includes minimizing dust levels during construction by using an approved dust suppressant such as water, directing runoff so that it does not enter Footprint Lake and minimizing disturbance to the riparian vegetation along Footprint Lake which will act as a buffer to prevent sediment run-off.

Effluent will be discharged from the lagoon to the unnamed creek to the west of the lagoon and not directly to Footprint Lake. As such, there is expected to be no effect from project operation on the water chemistry. The Secondary Cell of the proposed project will have a retention time of approximately 230 days and treatment in both the Primary and Secondary cells will enable bacteria to convert the waste into carbon dioxide, water, and inert ash prior to effluent discharge. Effluent discharged from the project will meet the CCME Canada-Wide Strategy for the Management of Municipal Wastewater Effluent, Effluent Quality Standards and the MWQSOG Tier 1 Water Quality Standards for Municipal Wastewater Effluent. As such, no further mitigation measures are required.

4.7 EMPLOYMENT / ECONOMY

The proposed sewage lagoon project will create temporary construction employment opportunities and increase the economy in the local and surrounding areas associated with purchase of construction materials, fuel, supplies and lodgings. Additionally, the facility will have operational requirements which will require employment of a certified operator. The potential effects of the project on employment and economy were assessed as positive. No mitigation or follow-up has been proposed.

4.8 HUMAN HEALTH AND WELL BEING

Soil, surface water and groundwater in the project area may become impacted during construction activities, as previously noted, from leaks and accidental spills or releases of fuels or other hazardous substances, which could adversely affect human health. The potential

adverse effects of the project on human health were assessed to be minor. Proposed mitigation measures include preventing leaks, spills and releases by providing secondary containment for fuel storage, requiring drip trays for equipment, providing spill clean-up equipment and materials, providing fuel handling training for operators, complying with provincial fuel storage and dispensing regulations, storing hazardous materials in approved containers, and providing an emergency (spill) response plan.

4.9 PUBLIC AND WORKER SAFETY

Handling and storage of fuels and hazardous materials, such as greases and lubricants, may pose a threat to worker health and safety during construction. Operational activities will typically not require the use of fuels or hazardous materials. The potential hazard to worker safety will therefore, only be for a short period and was assessed as minor. Proposed mitigation includes providing fuel handling training for operators, complying with provincial fuel storage and dispensing regulations, storing hazardous materials in approved containers, complying with Manitoba Workplace Safety and Health regulations, conducting safety briefings with workers and providing employee training.

The completed lagoon will be fenced in accordance with provincial guidelines and have a lockable gate to discourage trespassing and prevent the public from coming into contact with disease-causing germs that may be present in wastewater. Therefore the potential hazard to public safety was assessed as negligible. No additional mitigation is proposed.

4.10 HERITAGE RESOURCES

Ms. Heather McClean of Manitoba Sport, Culture and Heritage, Historic Resources Branch examined the project location in conjunction with Branch records and indicated that there are no known heritage or archaeological resources located within the study area [(12)] (Appendix D). Therefore the potential for the project to impact archaeological or heritage resources is considered negligible and no specific mitigation measures or follow-up are proposed. If any archaeological or heritage artifacts are uncovered during the project, the proponent will contact the Branch.

5.0 ENVIRONMENTAL MANAGEMENT PRACTICES

Environmental management practices proposed to be employed to prevent or mitigate environmental effects that were determined to be adverse, as described in Section 4.0, are summarized in the following sections. Mitigation is defined under the *Canadian Environmental Assessment Act* as the elimination, reduction and control of the adverse effects of a project and includes restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means. Mitigation measures must be technically and economically feasible, and implemented.

5.1 AIR QUALITY

Applying an approved dust suppressant such as water, controlling construction vehicle speeds, limiting construction activities during high wind events, and re-establishing vegetation on disturbed areas can mitigate increased fugitive dust levels generated during construction of the lagoon. By controlling fugitive dust levels it is unlikely that Manitoba's air quality guidelines would be exceeded during construction activities.

Requiring a high standard of maintenance for construction equipment and vehicles, limiting unnecessary long-term idling, using low sulfur-containing fuels, using appropriate dispensing equipment and only fueling equipment and vehicles when necessary, can mitigate increased levels of greenhouse gases and vehicle emissions from equipment and increased volatile organic compound levels from fuels and other substances during construction activities.

5.2 SOILS

Preventing leaks, spills and releases by providing secondary containment for fuel storage, requiring drip trays for equipment, providing fuel handling training for operators, providing spill clean-up equipment and materials, complying with provincial fuel storage and dispensing regulations, storing hazardous materials in approved containers, providing an emergency (spill) response plan and periodic inspection for leaks, spills and releases can mitigate potential soil contamination from leaks and accidental spills during construction.

5.3 GROUNDWATER

The mitigation measures outlined in Section 5.2 above for soil contamination will also mitigate groundwater contamination from leaks, spills and releases.

5.4 SURFACE WATER

The mitigation measures outlined in Section 5.2 above for soil contamination will also mitigate surface water contamination from leaks, spills and releases.

5.5 HUMAN HEALTH AND WELL-BEING

The mitigation measures outlined in Section 5.2 above for soil contamination will also mitigate human health and well-being concerns related to soil, surface water and groundwater contamination from leaks, spills and releases.

5.6 PUBLIC AND WORKER SAFETY

Providing fuel handling training for operators, complying with provincial fuel storage and dispensing regulations, storing hazardous materials in approved containers, complying with Manitoba Workplace Safety and Health regulations, conducting safety briefings with workers and providing employee training can mitigate the threat to worker health and safety during construction.

6.0 RESIDUAL ENVIRONMENTAL EFFECTS

The significance of residual environmental effects, the effects remaining after the implementation of mitigation measures, was evaluated following procedures outlined in the Canadian Environmental Assessment Agency, Operation Policy Statement "Determining Whether a Designated Project is Likely to Cause Significant Adverse Environmental Effects under the *Canadian Environmental Assessment Act*, 2012 [(13)]. The degree of change from the existing conditions and the value of the environmental components being affected determine the significance of an adverse effect. Criterion for this determination include:

- **Societal value** of the affected environmental components – includes nature and degree of protection provided
- **Ecological value** – includes rarity and uniqueness, fragility, importance within ecosystem, importance to scientific studies
- **Duration** – length of time the project activity will last
- **Frequency** – rate of reoccurrence of the project activity causing the effect
- **Geographic extent** – area over which the effect will occur
- **Magnitude** – predicted disturbance compared to existing conditions
- **Reversibility** – time the environmental component will take to recover after the source of the effect ceases

Based on the project and environmental information available, the assessment of environmental effects outlined in this environmental assessment report, and the application of proposed mitigation measures and the conduct of required follow-up, the construction of the wastewater lagoon will not likely result in any significant residual adverse environmental effects.

7.0 FOLLOW-UP ACTIVITIES

Follow-up is defined under the *Canadian Environmental Assessment Act* as a program to verify the accuracy of the environmental assessment of a project and determine the effectiveness of measures taken to mitigate the adverse environmental effects of the project. Follow-up activities include monitoring, surveillance, inspection, and may include data collection, analysis, evaluation, and reporting. Monitoring of the implementation of mitigation measures for potential adverse effects identified in Section 4.0 is described in the following sections.

7.1 SOILS

Follow-up proposed during operation includes periodic inspections of equipment and storage containers for leaks, spills and releases, periodic observation for potential soil impacts.

7.2 GROUNDWATER

Follow-up proposed includes periodic inspection for leaks, spills and releases during operation, as per section 7.1 above.

7.3 SURFACE WATER

Follow-up proposed includes periodic inspection for leaks, spills and releases during operation, as per section 7.1 above.

7.4 HUMAN HEALTH AND WELL BEING

Follow-up proposed during operation includes periodic inspections of equipment and storage containers for leaks, spills and releases, periodic observation for potential soil or surface water contamination and monitoring of soil or surface water quality, as required.

7.5 PUBLIC AND WORKER SAFETY

Follow-up proposed includes recording any occurrence of workplace accidents, ensuring proper Personal Protective Equipment is being used by workers, maintaining records of hazardous materials used on site, confirming compliance with provincial hazardous waste handling and disposal regulations and updating health and safety training, as required.

8.0 STATEMENT OF LIMITATIONS

8.1 THIRD PARTY USE OF REPORT

This report has been prepared for the Manitoba Water Services Board and any use a third party makes of this report, or any reliance on or decisions made based on it, are the responsibility of such third parties. KGS Group accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions undertaken based on this report.

8.2 ENVIRONMENTAL STATEMENT OF LIMITATIONS

KGS Group prepared the environmental conclusions and recommendations for this report in a professional manner using the degree of skill and care exercised for similar projects under similar conditions by reputable and competent environmental consultants. The information contained in this report is based on the information that was made available to KGS Group during the investigation and upon the services described which were performed within the time and budgetary requirements of the Manitoba Water Services Board. As the report is based on the available information, some of its conclusions could be different if the information upon which it is based is determined to be false, inaccurate or contradicted by additional information. KGS Group makes no representation concerning the legal significance of its findings or the value of the property investigated.

9.0 REFERENCES

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APPENDIX A

CROWN LANDS REGISTRY SYSTEM ENCUMBRANCE LIST

CBDY NELSONH **COMMUNITY BOUNDARY** **ID: 00000295**

Agency: NA **Admin Act:** NAA **Specified Use:**
Status: RESERVATION
Stated...

Area: 0.000 Acres **Land Value:** **Tenancy:**
Volume: **Start:** 1988-Feb-16 **Cert. of Title:**
Length: **Expire:** 9999-Dec-31 **Dept.Region:** (MB Cons.)Northeastern
Width: **Office Region:**

NELSON HOUSE COMMUNITY BOUNDARY
- BOUNDARY OF LOCAL COMMITTEE
UNDER THE NORTHERN AFFAIRS ACT (CCSM C. N100)
BOUNDARY OF THE LOCAL COMMITTEE AS AUTHORIZED UNDER MAN
REG 128/88 FILED 16 FEBRUARY, 1988, ALL THOSE PORTIONS
OF UNSUBDIVIDED TOWNSHIP 79, RANGE 9 WPM CONTAINED
WITHIN THE LIMITS SHOWN BORDERED HATCHED ON A PLAN
FILED IN THE DIRECTOR OF SURVEYS OFFICE AT WINNIPEG
AS NO. 18763.
TOWNSHIP 79, RANGE 9 WPM
- PART NW 5, E 7 EAST OF ROAD, W & PT E 8,
- PART S 17, PT SE 18 EAST OF ROAD. EXCEPT WATERS.

Clients

ID: 00000024 ABORIGINAL & NORTHERN AFFAIRS

Corporation/Registered as (Primary Client)
ATTENTION: KAREN BARKER
LOCAL GOV. SERVICES BRANCH
27 - 2ND AVENUE SW
DAUPHIN
MANITOBA
CANADA
R7N 0G1

Parcels

ID: 00324810 700 NORTHERN AFFAIRS **Source:** CLIS
ALL 05-079-09 W 0.000 Acres
Lot: Block: Plan:

ID: 00363957 700 NORTHERN AFFAIRS **Source:** CLIS
PN 07-079-09 W 0.000 Acres
Lot: Block: Plan: NLTO 7730 - PL OF PUBLIC RD, NELSON HOUSE ACCESS ROAD IN UNSUR

ID: 00431628 700 NORTHERN AFFAIRS **Source:** CLIS
BNE 07-079-09 W
Lot: Block: Plan:

ID: 00431634 700 NORTHERN AFFAIRS **Source:** CLIS
PSE 07-079-09 W
Lot: B **Block: Plan:** WLTO 0336/2008 - POFS OF PT SE 7-79-9 WPM

ID: 00363958 700 NORTHERN AFFAIRS **Source:** CLIS
PSE 07-079-09 W 0.000 Acres
Lot: Block: Plan: NLTO 7730 - PL OF PUBLIC RD, NELSON HOUSE ACCESS ROAD IN UNSUR

ID: 00431635 700 NORTHERN AFFAIRS **Source:** CLIS
PSE 07-079-09 W
Lot: C **Block: Plan:** WLTO 0336/2008 - POFS OF PT SE 7-79-9 WPM

ID: 00416420 700 NORTHERN AFFAIRS **Source:** CLIS
PSE 07-079-09 W
Lot: Block: Plan: PLTO 46911 - PLAN OF PUBLIC ROAD ACROSS PT OF SE 7-79-9 WPM

ID: 00431637 700 NORTHERN AFFAIRS **Source:** CLIS
PSE 07-079-09 W
Lot: E **Block: Plan:** WLTO 0336/2008 - POFS OF PT SE 7-79-9 WPM

Parcels

ID: 00431636 700 NORTHERN AFFAIRS **Source:** CLIS
PSE 07-079-09 W
Lot: D **Block: Plan:** WLTO 0336/2008 - POFS OF PT SE 7-79-9 WPM

ID: 00431633 700 NORTHERN AFFAIRS **Source:** CLIS
PSE 07-079-09 W
Lot: A **Block: Plan:** WLTO 0336/2008 - POFS OF PT SE 7-79-9 WPM

ID: 00431632 700 NORTHERN AFFAIRS **Source:** CLIS
PSE 07-079-09 W
Lot: Block: Plan:

ID: 00324813 700 NORTHERN AFFAIRS **Source:** CLIS
ALL 08-079-09 W 0.000 Acres
Lot: Block: Plan:

ID: 00324818 700 NORTHERN AFFAIRS **Source:** CLIS
B 17-079-09 W 0.000 Acres
Lot: Block: Plan:

ID: 00363959 700 NORTHERN AFFAIRS **Source:** CLIS
PNW 17-079-09 W 0.000 Acres
Lot: Block: Plan: NLTO 7730 - PL OF PUBLIC RD, NELSON HOUSE ACCESS ROAD IN UNSUR

ID: 00324819 700 NORTHERN AFFAIRS **Source:** CLIS
B 18-079-09 W 0.000 Acres
Lot: Block: Plan:

ID: 00363960 700 NORTHERN AFFAIRS **Source:** CLIS
PNE 18-079-09 W 0.000 Acres
Lot: Block: Plan: NLTO 7730 - PL OF PUBLIC RD, NELSON HOUSE ACCESS ROAD IN UNSUR

ID: 00363961 700 NORTHERN AFFAIRS **Source:** CLIS
PSE 18-079-09 W 0.000 Acres
Lot: Block: Plan: NLTO 7730 - PL OF PUBLIC RD, NELSON HOUSE ACCESS ROAD IN UNSUR

APPENDIX B

SITE PHOTOGRAPHS

Photo 1: Typical forest-cover found at lagoon site.

Photo 2: Community access road near abandoned quarry (view: south).

Photo 3: Top of access road near quarry (view: east).

Photo 4: Proposed lift station area.

Photo 5: Proposed lift station area.

Photo 6: Unnamed creek looking east from community access road toward proposed wastewater drainage ditch outfall.

Photo 7: Unnamed creek and wetland looking west from community access road.

Photo 8: Lagoon site on far side of Footprint Lake.

APPENDIX C

DRAWINGS

SITE PLAN
SCALE: HOR 1:4000

0 100.0 200.0 300.0m
SCALE: 1:4000m (24"x36")

KEYPLAN (IF REQUIRED)

PROPERTY LIMITS DELINEATION

DELINEATION OF PROPERTY LIMITS AS SHOWN ON THIS DWG DOES NOT REPRESENT A "LEGAL SURVEY". KGS GROUP MAKES NO REPRESENTATION OR WARRANTY AS TO THE ACCURACY OF PROPERTY LIMITS DELINEATED ON THIS DWG, NOR ON THE DIMENSIONAL ACCURACY OF DWG FEATURES RELATIVE TO THOSE PROPERTY LIMITS.

NOTE:
LOCATION OF UNDERGROUND STRUCTURES AS SHOWN ARE BASED ON THE BEST INFORMATION AVAILABLE BUT NO GUARANTEE IS GIVEN THAT ALL EXISTING UTILITIES ARE SHOWN OR THAT THE GIVEN LOCATIONS ARE EXACT. CONFIRMATION OF EXISTENCE AND EXACT LOCATION OF ALL SERVICES MUST BE OBTAINED FROM THE INDIVIDUAL UTILITIES BEFORE PROCEEDING WITH CONSTRUCTION.

WARNING

1. NOTIFY THE GAS COMPANY OF THE PROPOSED LOCATION OF EXCAVATION.
2. TAKE PRECAUTION TO AVOID DAMAGE TO GAS COMPANY INSTALLATIONS.
3. SEE PROVINCIAL REGULATION 210/72 FOR DETAILS.

METRIC

WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES

NOTES:
1. NOTE
2. NOTE

LEGEND:

(SYMBOL) DESCRIPTION OF SYMBOL
(SYMBOL) DESCRIPTION OF SYMBOL

NO.	YY/MM/DD	DESCRIPTION	DESIGN BY	DESIGN CHECK
A	17/01/04	ISSUED FOR REVIEW		

REVISIONS / ISSUE

CLIENT: MANITOBA WATER SERVICES BOARD

PROJECT:
INCORPORATED COMMUNITY OF NELSON HOUSE WASTEWATER TREATMENT LAGOON

DWG. DESCRIPTION:
SITE PLAN

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

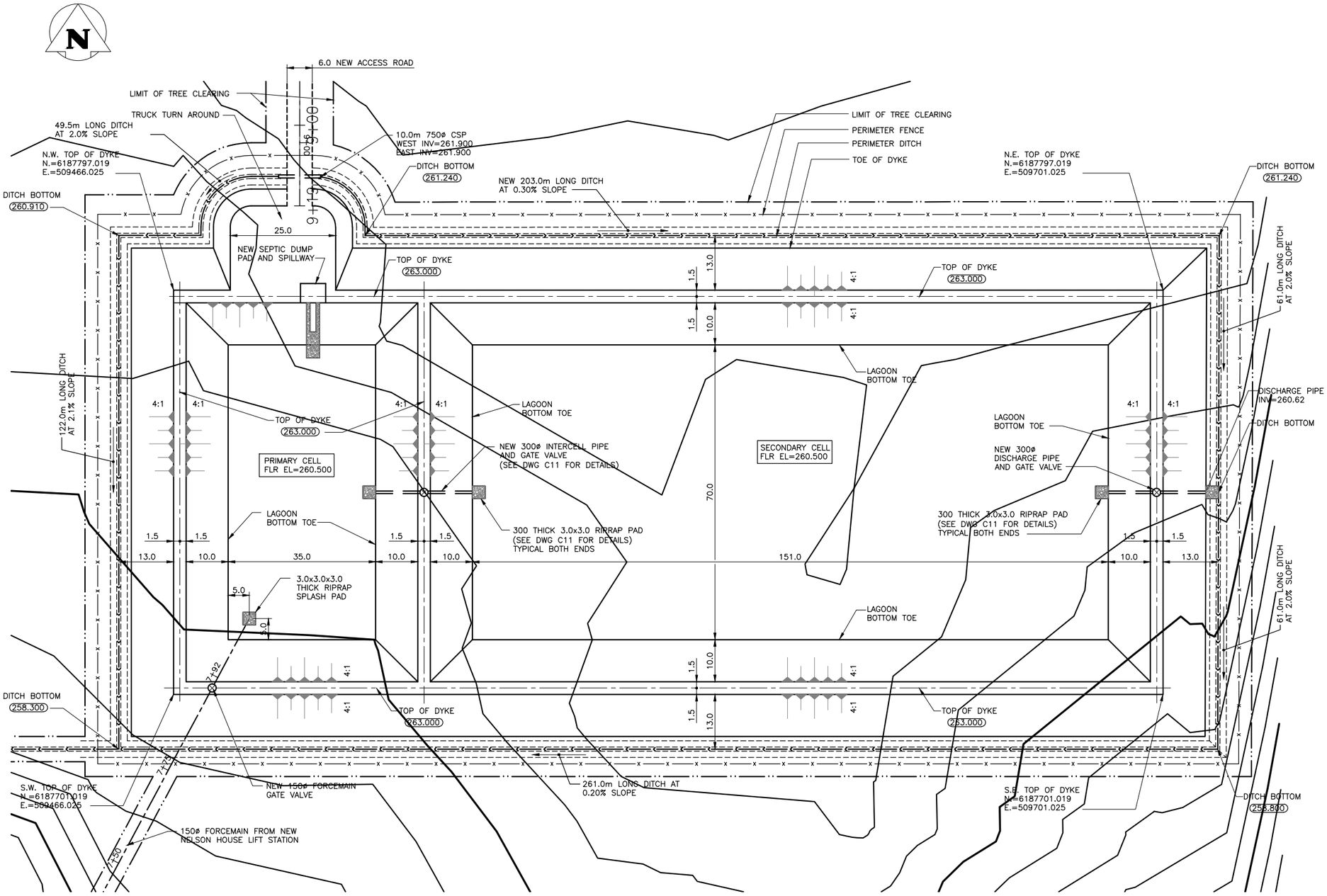
APEGM Certificate of Authorization KGS Group No. 245

AUTHENTICATION FOR CURRENT REVISION
ENG. STAMP

KGS GROUP CONSULTING ENGINEERS

DESIGN BY:	PKP	DATE (YY/MM/DD):	16/11/24
DESIGN CHECK:		DATE:	YY/MM/DD
DRAWN BY:	DMW	DATE:	16/11/24
DWG CHECK:		DATE:	YY/MM/DD

DWG. NO. 16-0429-008 C01 REV: A



0 10.0 20.0 30.0 40.0m
SCALE: 1:500m (24"x36")

KEYPLAN (IF REQUIRED)

PROPERTY LIMITS DELINEATION

DELINEATION OF PROPERTY LIMITS AS SHOWN ON THIS DWG DOES NOT REPRESENT A "LEGAL SURVEY". KGS GROUP MAKES NO REPRESENTATION OR WARRANTY AS TO THE ACCURACY OF PROPERTY LIMITS DELINEATED ON THIS DWG, NOR ON THE DIMENSIONAL ACCURACY OF DWG FEATURES RELATIVE TO THOSE PROPERTY LIMITS.

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WARNING

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2. TAKE PRECAUTION TO AVOID DAMAGE TO GAS COMPANY INSTALLATIONS.
3. SEE PROVINCIAL REGULATION 210/72 FOR DETAILS.

METRIC

WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES

NOTES:

1. NOTE
   TEXT
2. NOTE

LEGEND:

(SYMBOL) DESCRIPTION OF SYMBOL

(SYMBOL) DESCRIPTION OF SYMBOL

NO.	YY/MM/DD	DESCRIPTION	DESIGN BY	DESIGN CHECK
A	17/01/04	ISSUED FOR REVIEW		

REVISIONS / ISSUE

CLIENT: MANITOBA WATER SERVICES BOARD

PROJECT:
INCORPORATED COMMUNITY OF NELSON HOUSE WASTEWATER TREATMENT LAGOON

DWG. DESCRIPTION:
WASTEWATER TREATMENT LAGOON PLAN

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

APEGM Certificate of Authorization KGS Group No. 245

AUTHENTICATION FOR CURRENT REVISION
ENG. STAMP

KGS GROUP CONSULTING ENGINEERS

DESIGN BY:	PKP	DATE (YY/MM/DD):	16/11/24
DESIGN CHECK:		DATE:	YY/MM/DD
DRAWN BY:	DMW	DATE:	16/11/24
DWG CHECK:		DATE:	YY/MM/DD

DWG. NO. 16-0429-008 C02 REV: A

Filename: U:\PMS\16-0429-008\16-0429-008_CALL - Tab:C02 Plotted By: dweber 17/01/04 [Wed 3:58pm]
24"x36"/PLOT SCALE: 1:1

APPENDIX D

GOVERNMENT CORRESPONDENCE

Gene Senior

From: Jacobs, Kevin (SD) <Kevin.Jacobs@gov.mb.ca>
Sent: December-08-16 3:24 PM
To: Gene Senior
Subject: RE: Water Quality Data request - Community of Nelson House Sewage Lagoon - Burntwood, Footprint and Rat Rivers
Attachments: Foot Print Lake & Burntwood River December 2016.xlsx; Data Request Response Letter-KGS Nelson House December 2016.pdf

Hello Gene,

Please find enclosed the information you requested.

Regards,

Kevin Jacobs, M.Sc.
Senior Water Protection Officer
Water Science and Management Branch
Manitoba Department of Sustainable Development
200 Saulteaux Crescent Box 14
Winnipeg, Manitoba R3J 3W3
Phone: 204 945 4304
Fax: 204 948 2357

From: Gene Senior [mailto:GSenior@kgsgroup.com]
Sent: December-07-16 3:51 PM
To: Jacobs, Kevin (SD)
Subject: Water Quality Data request - Community of Nelson House Sewage Lagoon - Burntwood, Footprint and Rat Rivers

Kevin:

KGS Group is conducting engineering design and an Environment Act Proposal for construction of a new sewage lagoon for the community of Nelson House.

The coordinates of the center of the lagoon are:

Northing: 6187719.495
Easting: 509595.330
UTM Zone 14

I have attached a zipfile of the shp for your use as well as a screenshot showing the site and proposed infrastructure locations.

We are requesting available water quality data for the Burntwood, Footprint and Rat Rivers, preferably within the last 10 years (2005 to 2015). The information obtained will be used to describe the existing environment in the project area and to assess potential project effects. If you have any questions or need clarification don't hesitate to contact me, thanks.

Gene Senior <gsenior@kgsgroup.com>
Environmental Scientist

KGS GROUP CONSULTING ENGINEERS

865 Waverley Street
Winnipeg, Manitoba R3T 5P4
p. 204.896.1209 ext. 357
c. 204.218.3285
f. 204.896.0754
http://www.kgsgroup.com

Go Green:
Think before you print

WATER QUALITY IN FOOTPRINT LAKE AND BURNTWOOD RIVER AT NELSON HOUSE (STATION NO. MB05TFS010)

SAMPLE_NO	STATION_NO	STATION_NAME	SAMPLE_DATE	ALKALINITY TOTAL CACO3	ALUMINUM TOTAL	AMMONIA (NH3)	ANTIMONY TOTAL	ARSENIC TOTAL	BARIUM TOTAL	BERYLLIUM TOTAL	BISMUTH TOTAL	BORON TOTAL	CADMIUM TOTAL	CALCIUM TOTAL	CARBON TOTAL	CESIUM TOTAL	CHLORIDE (CL)	CHLORIDE DISSOLVED	CHLOROPHYLL A	CHROMIUM TOTAL (CR)	COBALT TOTAL	COLIFORMS TOTAL	COLOUR TRUE	CONDUCTIVITY (AT 25C)	COPPER TOTAL (CU)	ESCHERICHIA, COLI	FLUORIDE	HARDNESS TOTAL (CALCD_) CACO3	IRON TOTAL (FE)	LEAD TOTAL	LITHIUM TOTAL	MAGNESIUM TOTAL	MANGANESE TOTAL (MN)	MERCURY TOTAL	MOLYBDENUM TOTAL	NICKEL TOTAL	NITRATE (NO3-N)
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	MG/L	mg/L	ug/L	mg/L	mg/L	MPN/100ML	CU	uS/cm	mg/L	CFU/100 mL	MG/L	MG/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	MG/L
0606CH1003	MB05TFS010	FOOTPRINT LAKE	20-Jun-2006	92	0.28		0.0003	0.0004	0.014	L0.0002	L0.0002	0.05	L0.00004	22	35	L0.0001		1.1		0.0005	L0.0002		18	179	0.0017	L10		77	0.23	0.0006	0.0031	5.24	0.0068		L0.0002	0.0009	
0607CH1003	MB05TFS010	FOOTPRINT LAKE	25-Jul-2006	84	0.31		0.0004	0.0004	0.012	L0.0002	L0.0002	L0.01	L0.00004	20.7	28	L0.0001		2.39		0.0006	L0.0002		31	166	0.0013	L10		73	0.33	L0.0002	0.0024	5.08	0.0073		L0.0002	0.0008	
0609CH1003	MB05TFS010	FOOTPRINT LAKE	12-Sep-2006	93	0.17		0.0004	0.0005	0.011	L0.0002	L0.0002	L0.01	L0.00004	23.4	32	L0.0001		0.96		0.0003	L0.0002		16	182	0.0011	L10		80	0.2	L0.0002	0.0025	5.15	0.012		L0.0002	0.0007	
0706CH1003	MB05TFS010	FOOTPRINT LAKE	26-Jun-2007	96	0.33		0.0003	0.0004	0.011	L0.0002	L0.0002	0.03	0.00009	24.6	31	L0.0001		1.09		0.0007	L0.0002	201	20	186	0.0015			85	0.35	0.0009	0.003	5.62	0.014		L0.0002	0.0011	
0708CH1003	MB05TFS010	FOOTPRINT LAKE	8-Aug-2007	82.8	0.5		0.0004	0.0005	0.016	L0.0002	L0.0002	L0.01	L0.00004	23.7	29	L0.0001		0.99		0.0008	0.0002		19	170	0.0015			83	0.52	0.0003	0.003	5.69	0.016		L0.0002	0.0012	
0709CH1003	MB05TFS010	FOOTPRINT LAKE	13-Sep-2007	91.8	0.47		0.0003	0.0006	0.014	L0.0002	L0.0002	L0.01	L0.00004	25.6	32	L0.0001		0.88		0.0007	0.0002		18	181	0.0016	40		88	0.43	0.0002	0.0031	5.85	0.019		L0.0002	0.0012	
0806CHC003	MB05TFS010	FOOTPRINT LAKE	26-Jun-2008																							L10											
0806CH1003	MB05TFS010	FOOTPRINT LAKE	26-Jun-2008	103	0.33		0.0005	0.0004	0.014	L0.0002	L0.0002	L0.01	L0.00004	30.2	30	L0.0001		1.14	5.98	0.0006	L0.0002		22	201	0.0017			105	0.3	L0.0002	0.0027	7.13	0.008		0.0003	0.0013	
0808CH1003	MB05TFS010	FOOTPRINT LAKE	14-Aug-2008	104	0.1		0.0004	0.0005	0.012	L0.0002	L0.0002	L0.01	L0.00004	31.7	36	L0.0001		1.1		0.0003	L0.0002		18	205	0.0016			109	0.13	L0.0002	0.0026	7.12	0.0067		L0.0002	0.0006	
0808CH1012	MB05TFS010	FOOTPRINT LAKE	14-Aug-2008																5.98																		
0809CHC003	MB05TFS010	FOOTPRINT LAKE	17-Sep-2008																							L10											
0809CH1003	MB05TFS010	FOOTPRINT LAKE	17-Sep-2008	83.3	0.48		0.0003	0.0006	0.015	L0.0002	L0.0002	L0.01	L0.00004	23.7	31	L0.0001		1.05	5.98	0.0009	0.0002		43	168	0.0016			84	0.53	0.0003	0.0035	5.95	0.018		L0.0002	0.0013	
0906JH0974	MB05TFS010	FOOTPRINT LAKE	24-Jun-2009																							L10											
0906JH0955	MB05TFS010	FOOTPRINT LAKE	24-Jun-2009	89.3	0.175		L0.0002	0.00037	0.0105	L0.0002	L0.0002	L0.01	0.00003	24.7	30.8	L0.0001		L9		L0.001	0.0008			173	0.0018			86.4	0.23	0.0005	0.0023	6	0.0218		L0.0002	L0.002	
0906JH0965	MB05TFS010	FOOTPRINT LAKE	24-Jun-2009																5																		
0908JH1446	MB05TFS010	FOOTPRINT LAKE	12-Aug-2009																							L10											
0908JH1427	MB05TFS010	FOOTPRINT LAKE	12-Aug-2009	94.1	0.225		L0.0002	0.00045	0.0133	L0.0002	L0.0002	L0.01	L0.00001	28.2	30.2	L0.0001		L9		L0.001	L0.0002			173	0.0014			98.8	0.128	0.00016	0.0033	6.9	0.0077		L0.0002	L0.002	
0908JH1437	MB05TFS010	FOOTPRINT LAKE	12-Aug-2009																8.02																		
0909JH1671	MB05TFS010	FOOTPRINT LAKE	16-Sep-2009																							L10											
0909JH1652	MB05TFS010	FOOTPRINT LAKE	16-Sep-2009	98.6	0.247		L0.0002	0.00048	0.0136	L0.0002	L0.0002	L0.01	L0.00001	26.6	34.2	L0.0001		1.18	19.9	L0.001	L0.0002			191	0.0014			91.4	0.175	0.00015	0.0033	6.07	0.0118		0.0002	L0.002	
1006JH0796	MB05TFS010	FOOTPRINT LAKE	23-Jun-2010	86.1	0.325	L0.005	L0.0002	0.0004	0.0127	L0.0002	L0.0002	L0.01	L0.00001	25.3	27.4	L0.0001		1.19		L0.001	L0.0002			176	0.00149			88	0.172	0.00014	0.0036	6.01	0.00651		L0.0002	L0.002	
1006JH0806	MB05TFS010	FOOTPRINT LAKE	23-Jun-2010																2.1																		
1006JH0829	MB05TFS010	FOOTPRINT LAKE	23-Jun-2010	86.1	0.305		L0.0002	0.00039	0.0125	L0.0002	L0.0002	0.01	L0.00001	26.2		L0.0001		1.1		L0.001	L0.0002			175	0.00141	L1		90.9	0.142	0.00014	0.0033	6.18	0.00479	L0.00005	0.0002	L0.002	
1006JH0843	MB05TFS010	FOOTPRINT LAKE	23-Jun-2010	86.3	0.202		L0.0002	0.00037	0.011	L0.0002	L0.0002	L0.01	L0.00001	25.3		L0.0001		1.17		L0.001	L0.0002			177	0.0012			87.2	0.091	0.0001	L0.002	5.82	0.00481	L0.00005	L0.0002	L0.002	
1006JH0853	MB05TFS010	FOOTPRINT LAKE	23-Jun-2010																1.55																		
1008JS1400	MB05TFS010	FOOTPRINT LAKE	17-Aug-2010	97.2	0.446	0.0121	L0.0002	0.0006	0.0145	L0.0002	L0.0002	L0.01	0.00002	29.1	30.6	L0.0001		1.23		L0.001	L0.0002			192	0.00158			99.6	0.281	0.00017	L0.005	6.54	0.0226		0.0002	L0.002	
1008JS1410	MB05TFS010	FOOTPRINT LAKE	17-Aug-2010																4.39																		
1008JS1419	MB05TFS010	FOOTPRINT LAKE	17-Aug-2010																							L10											
1008JS1434	MB05TFS010	FOOTPRINT LAKE	17-Aug-2010	97.3	0.441	0.028	L0.0002	0.00059	0.0151	L0.0002	L0.0002	L0.01	L0.00001	29.9		L0.0001	0.95			L0.001	L0.0002		13.3	192	0.00157	L1		102	0.284	0.00017	L0.002	6.61	0.0221	L0.00005	0.0002	L0.002	0.0045
1008JS1458	MB05TFS010	FOOTPRINT LAKE	17-Aug-2010																4.6																		
1009JS1622	MB05TFS010	FOOTPRINT LAKE	15-Sep-2010	84.3	0.386	L0.005	L0.0002	0.00057	0.0138	L0.0002	L0.0002	L0.01	L0.00001	26.6	30.3	L0.0001		1.11		L0.001	L0.0002			170	0.0015			89.9	0.269	0.00019	0.0036	5.68	0.0131		L0.0002	L0.002	
1009JS1632	MB05TFS010	FOOTPRINT LAKE	15-Sep-2010																13.6																		
1009JS1641	MB05TFS010	FOOTPRINT LAKE	15-Sep-2010																							L10											
1009JS1656	MB05TFS010	FOOTPRINT LAKE	15-Sep-2010	84.6	0.339	L0.01	L0.0002	0.00062	0.0139	L0.0002	L0.0002	L0.01	L0.00001	24.6		L0.0001	0.92			L0.001	L0.0002		17.8	169	0.00147	1		84.2	0.258	0.00017	0.0032	5.5	0.013	L0.00005	L0.0002	L0.002	L0.001
1009JS1680	MB05TFS010	FOOTPRINT LAKE	15-Sep-2010																3.83																		
1102CL0190	MB05TFS010	FOOTPRINT LAKE	26-Feb-2011	66.6	1.27	L0.01	L0.0002	0.00045	0.0222	L0.0002	L0.0002	0.012	0.00001	16.7		0.00012	0.87		L0.6	0.0017	0.00036		15.9	134	0.00179	L1		62.6	0.92	0.00038	0.0045	5.1	0.0119	L0.00005	0.00021	L0.002	0.0582
1107CL0194	MB05TFS010	FOOTPRINT LAKE	6-Jul-2011	99.1	0.337	L0.01	L0.0002	0.00045	0.0138	L0.0002	L0.0002	L0.01	L0.00001	32.8	31	L0.0001	1.14			L0.001	L0.0002		13.4	188	0.0205			112	0.16	0.00012	0.003	7.24	0.00688		0.00021	L0.002	L0.01
1107CL0203	MB05TFS010	FOOTPRINT LAKE	6-Jul-2011																9.36																		
1107CL0211	MB05TFS010	FOOTPRINT LAKE	6-Jul-2011																							L10											
1108CL0171	MB05TFS010	FOOTPRINT LAKE	9-Aug-2011	97.3	0.265	L0.01	L0.0002	0.00053	0.0135	L0.0002	L0.0002	L0.01	L0.00001	30.6	28.7	L0.0001	1.11			L0.001	L0.0002		14.7	185	0.00156			102	0.13	0.0001	0.0024	6.32	0.00896		L0.0002	L0.002	L0.01
1108CL0180	MB05TFS010	FOOTPRINT LAKE	9-Aug-2011																12.2																		
1108CL0188	MB05TFS010	FOOTPRINT LAKE	9-Aug-2011																							L10											
1109EW0041	MB05TFS010	FOOTPRINT LAKE	14-Sep-2011	101	0.389	L0.01	L0.0002	0.00079	0.0152	L0.0002	L0.0002	L0.01	L0.00001	30.6	32.8	L0.0001	1.08			L0.001	L0.0002		16.2	179	0.00153			106	0.22	0.00014	0.0033	7.12	0.0246		0.00022	L0.002	L0.01
1109EW0050	MB05TFS010	FOOTPRINT LAKE	14-Sep-2011																18.1																		
1109EW0058	MB05TFS010	FOOTPRINT LAKE	14-Sep-2011																							L10											
1206EW0003	MB05TFS010	FOOTPRINT LAKE	20-Jun-2012	91	0.239	L0.01	L0.0002	0.00051	0.0143	L0.0002	L0.0002		L0.00001	26.3	29.9	L0.0001	1.22			L0.001	L0.0002		12	182	0.00131	L10		87.2	0.19	0.00013	0.0026	5.24	0.00738		L0.0002	L0.002	L0.01
1206EW0012	MB05TFS010	FOOTPRINT LAKE	20-Jun-2012																3.21																		
1208EW0071	MB05TFS010	FOOTPRINT LAKE	14-Aug-2012	99	0.354	L0.01	L0.0002	0.00053	0.015	L0.0002	L0.0002		L0.00001	30.8	29.4	L0.0001	1.15			L0.001	L0.0002		14.7	178	0.00141	L10		101	0.19	0.00012	0.0032	5.83	0.0111		0.00021	L0.002	L0.01
1208EW0080	MB05TFS010	FOOTPRINT LAKE	14-Aug-2012																4.8																		
1209EW0028	MB05TFS010	FOOTPRINT LAKE	18-Sep-2012	103	0.471	L0.01	L0.0002	0.00074	0.0169	L0.0002	L0.0002		L0.00001	31.3	31.8	L0.0001	1.14			L0.001	L0.0002		10.7	198	0.00148	10		107	0.34	0.00012	0.0031	6.89	0.0194		0.00022	L0.002	L0.01
1209EW0037	MB05TFS010	FOOTPRINT LAKE	18-Sep-2012																13.9																		
1306EW2003	MB05TFS010	FOOTPRINT LAKE	27-Jun-2013	102	0.238	L0.01	L0.0002	0.00046	0.0128	L0.0002	L0.0002		0.00002	27.7	30.6	L0.0001	1.19			L0.001	L0.0002		8.9	196	0.00123	L10		96.8	0.19	0.00011	0.0034	6.71	0.00839		L0.0002	L0.002	0.01
1306EW2012	MB05TFS010	FOOTPRINT LAKE	27-Jun-2013																4.6																		
1306EW3010	MB05TFS010	FOOTPRINT LAKE	27-Jun-2013	102	0.331	L0.01	L0.0002	0.00049	0.0138	L0.0002	L0.0002	L0.01	L0.00001	30.9		L0.0001	1.19			L0.001	L0.0002		12.1	196	0.00142	L1	0.078	106	0.22	0.00011	0.003	6.97	0.00823	L0.00002	L0.0002	L0.002	L0.005
1306EW3021	MB05TFS010	FOOTPRINT LAKE	27-Jun-2013																4.39																		
1306EW3031	MB05TFS010	FOOTPRINT LAKE	27-Jun-2013	102	0.283	0.013	L0.0002	0.00047	0.0126	L0.0002	L0.0002	L0.01	L0.00001	29.4		L0.0001	1.2			L0.001	L0.0002		11	196	0.00223		0.083	101	0.18	0.00026	0.0029	6.71	0.00741	L0.00002	L0.0002	L0.002	L0.005
1308EW2003	MB05TFS010	FOOTPRINT LAKE	14-Aug-2013	108	0.252	L0.01	L0.0002	0.00058	0.0138	L0.0002	L0.0002		L0.00001	33.9	31.7	L0.0001	1.17			L0.001	L0.0002		10.8	205	0.00143	L10		115	0.12	L0.00009	0.0039	7.39	0.0104		0.00022	L0.002	L0.01
1308EW2012	MB05TFS010	FOOTPRINT LAKE	14-Aug-2013																11.8																		
1308EW3010	MB05TFS010	FOOTPRINT LAKE	14-Aug-2013	109	0.245	L0.01	L0.0002	0.00055	0.0134	L0.0002	L0.0002	L0.01	0.00004	29.8		L0.0001	1.16			L0.001	L0.0002		10.6	205	0.0014	L1	0.08	103	0.13	0.0001	0.0029	6.88	0.0188		0.00025	L0.002	0.0756
1308EW3021	MB05TFS010	FOOTPRINT LAKE	14-Aug-2013																11.6																		
1309EW3010	MB05TFS010	FOOTPRINT LAKE	2-Oct-2013	91	0.271	L0.01	L0.0002	0.00064	0.0131	L0.0002	L0.0002	L0.01	0.00001	28.7		L0.0001	1.14			L0.001	L0.0002		8.6	177	0.00157	L1	0.086	101	0.21	0.00021	0.0036	7.02	0.0168		L0.0002	L0.002	L0.005
1309EW3021	MB05TFS010	FOOTPRINT LAKE	2-Oct-2013																8.97																		
1309EWC010	MB05TFS010	FOOTPRINT LAKE	2-Oct-2013	92	0.434	L0.01	L0.0002	0.00051	0.0135	L0.0002	L0.0002		0.00001	26.9	30.3	L0.0001	1.18		9.93	L0.001	L0.0002		9.2	178	0.0014			94.6	0.31	0.00014	0.0037	6.66	0.019		0.00026	L0.002	L0.01
1402EW1019	MB05TFS010	FOOTPRINT LAKE	6-Mar-2014	72	0.463	L0.01	0.00073	0.00058	0.0172	L0.0002	0.00067	0.02	0.00001	18.2		L0.0001	1.31	L0.6		L0.001	L0.0002		18.2	174	0.00133	L1	0.091	69.9	0.37	0.00038	0.004	5.92	0.00753		0.00026	L0.002	0.081
1407EW2003	MB05TFS010	FOOTPRINT LAKE	9-Jul-2014	98	0.462	L0.01	L0.0002	0.00052	0.0145	L0.0002	L0.0002		L0.00001	26.4	29.7	L0.0001	1.14			L0.001	L0.0002		22.8	193	0.00142	L1		93	0.34	0.00016	0.0039	6.59	0.0112		0.0002	L0.002	
1407EW2012	MB05TFS010	FOOTPRINT LAKE	9-Jul-2014																4.01																		
1408EW2003	MB05TFS010	FOOTPRINT LAKE	12-Aug-2014	102	0.43	L0.01	L0.0002	0.00058	0.0143	L0.0002	L0.0002		L0.00001	26.9	32.7	L0.0001	1.11			L0.001	L0.0002		19.4	196	0.00143	L1		94	0.29	0.00015	0.0028	6.54	0.019		0.0002	L0.002	
1408EW2012	MB05TFS010	FOOTPRINT LAKE	12-Aug-2014																9.6																		
1409EW2003	MB05TFS010	FOOTPRINT LAKE	16-Sep-2014	105	0.469	L0.01	L0.0002	0.00079	0.0152	L0.0002	L0.0002		0.00007	30.1	33.4	L0.0001	1.1			L0.001	L0.0002		17.7	204	0.00167	L10		105	0.27	0.00039	0.0033	7.22	0.0178		0.00026	L0.002	
1409EW2012	MB05TFS010	FOOTPRINT LAKE	16-Sep-2014																21.1																		
1506JK0085	MB05TFS010	FOOTPRINT LAKE	9-Jun-2015	97.8	0.285	L0.01	L0.0002	0.00046	0.0137	L0.0002	L0.0002		0.00002	27.5	29.7	L0.0001	1.21			0.00033	L0.0002		14.5	183	0.00136			94.7	0.201	0.00011	0.0059	6.32	0.0296		0.00024	0.00079	
1506JK0094	MB05TFS010	FOOTPRINT LAKE	9-Jun-2015																4.01																		
1508JK0039	MB05TFS010	FOOTPRINT LAKE	11-Aug-2015	95	0.526	L0.01	L0.0002	0.00054	0.0164	L0.0002	L0.0002		0.00002	27.2	30.3	L0.0001	1.2			0.0007	L0.0002		19.5	187	0.00149			96.6	0.372	0.0002	0.0031	6.96	0.0139		0.0002	0.00094	
1508JK0048	MB05TFS010	FOOTPRINT LAKE	11-Aug-2015																5.92																		
1509JK0039	MB05TFS010	FOOTPRINT LAKE	16-Sep-2015	104	0.385	L0.01	L0.0002	0.00069	0.0129	L0.0002	L0.0002		L0.00001	29.2	32.1	L0.0001	1.14			0.00052	L0.0002		21.8	182	0.0014			99.8	0.288	0.00016	0.0031	6.55	0.0281		0.00024	0.00082	
1606JK0306	MB05TFS010	FOOTPRINT LAKE	21-Jun-2016	92.4	0.461	L0.01	L0.0002	0.00049	0.0155	L0.0002	L0.0002	L0.01	0.00049	32.3	32.4	L0.0001	1.22			L0.001	L0.0002	9	24.8	185	0.00154		0.072	110	0.317	0.00021	0.0038	7.22	0.0188		L0.0002	L0.002	L0.005
1606JK0311	MB05TFS010	FOOTPRINT LAKE	21-Jun-2016																																		
1606JK0318	MB05TFS010	FOOTPRINT LAKE	21-Jun-2016																3.25																		
1606JK0343	MB05TFS010	FOOTPRINT LAKE	21-Jun-2016	93.3	0.412	L0.01	L0.0002	0.00043	0.0148	L0.0002	L0.0002		0.00002	32.5	31.9	L0.0001	1.13			0.0005	L0.0002		22.3	184	0.00139			111	0.276	0.00019	0.0035	7.13	0.016		L0.0002	0.00095	
1606JK0352	MB05TFS010	FOOTPRINT LAKE	21-Jun-2016																3.63																		
1608JK0306	MB05TFS010	FOOTPRINT LAKE	9-Aug-2016	86.3	0.587	0.011	L0.0002	0.00052	0.0158	L0.0002	L0.0002	L0.01	0.00002	25.3	28.3	L0.0001	1.13			L0.001	L0.0002		21.6	164	0.00153		0.074	88.1	0.401	0.00023	0.0031	6.03	0.0121		L0.0002	L0.002	0.0079
1608JK0318	MB05TFS010	FOOTPRINT LAKE	9-Aug-2016																8.97																		
1608JK0343	MB05TFS010	FOOTPRINT LAKE	9-Aug-2016	83.6	0.593	0.015	L0.0002	0.00048	0.0165	L0.0002	L0.0002		0.00006	27.4	25.7	L0.0001	1.14			0.00081	L0.0002		19.7	164	0.0015			93.8	0.411	0.00022	0.0036	6.17	0.0126		0.00021	0.001	
1608JK0352	MB05TFS010	FOOTPRINT LAKE	9-Aug-2016																11.6																		
1609JK0306	MB05TFS010	FOOTPRINT LAKE	21-Sep-2016	89.9	0.33	L0.01	L0.0002	0.00061	0.0137	L0.0002	L0.0002	L0.01	0.00008	25.5	27.3	L0.0001	1.12			L0.001	L0.0002	41	20.3	167	0.00149		0.067	88.7	0.21	0.0029	0.0033	6.1	0.00994		0.00028	L0.002	L0.005
1609JK0318	MB05TFS010	FOOTPRINT LAKE	21-Sep-2016																11.3																		
1609JK0343	MB05TFS010	FOOTPRINT LAKE	21-Sep-2016	91	0.456	L0.01	L0.0002	0.00066	0.0146	L0.0002	L0.0002		0.00002	25.7	26.8	L0.0001	1.13			0.00049	L0.0002		23.4	168	0.00144			89.9	0.252	0.00017	0.0032	6.22	0.0102	L0.00002	L0.0002	0.00075	
1609JK0352	MB05TFS010	FOOTPRINT LAKE	21-Sep-2016																11.5																		

WATER QUALITY IN FOOTPRINT LAKE AND BURNTWOOD RIVER AT NELSON HOUSE (STATION NO. MB05TFS010)

SAMPLE_NO	STATION_NO	STATION_NAME	SAMPLE_DATE	NITRATE/ NITRITE	NITRITE (NO2-N)	NITROGEN DISSOLVED NO3 & NO2	NITROGEN TOTAL (CALCD_)	NITROGEN TOTAL KJELDAHL (TKN)	ODB/ODA (CHLOROPHYLL-A / PHEOPHYTIN-A RATIO)	OXYGEN BIOCHEMICAL DEMAND	OXYGEN DISSOLVED	PHEOPHYTIN A	PHOSPHORUS TOTAL (P)	PH	POTASSIUM TOTAL	RUBIDIUM TOTAL	SELENIUM TOTAL	SILICON TOTAL	SILVER TOTAL	SODIUM TOTAL	STRONTIUM TOTAL	SULPHATE (S04)	SULPHATE DISSOLVED	TELLURIUM TOTAL	TEMPERATURE WATER (FIELD)	THALLIUM TOTAL	THORIUM TOTAL	TIN TOTAL	TITANIUM TOTAL	TOTAL DISSOLVED SOLIDS	TOTAL SUSPENDED SOLIDS	TUNGSTEN TOTAL	TURBIDITY	URANIUM TOTAL	VANADIUM TOTAL	ZINC TOTAL (ZN)	ZIRCONIUM TOTAL
				mg/L	MG/L	mg/L	mg/L	mg/L	NO UNITS	mg/L	mg/L	ug/L	mg/L	pH units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	MG/L	mg/L	mg/L	Deg C	mg/L	MG/L	mg/L	mg/L	MG/L @180C	mg/L	mg/L	Ntu	mg/L	mg/L	mg/L	mg/L	mg/L
0606CH1003	MB05TFS010	FOOTPRINT LAKE	20-Jun-2006			L0.01		0.6			8.8		0.02	7.82	0.96	0.001	L0.0004	1.66	0.00005	2.7	0.036		2.4	L0.0002	19.5	L0.00002	0.0001	0.0004	0.0083	135	3		5.8	0.0003	0.0007	0.002	L0.002
0607CH1003	MB05TFS010	FOOTPRINT LAKE	25-Jul-2006			L0.01		0.6			8.8		0.015	8.2	1.02	0.0014	L0.0004	1.85	L0.00002	2.7	0.039		2.39	L0.0002	20	L0.00002	0.0002	L0.0002	0.016	105	6		11.4	0.0002	0.0009	0.001	L0.002
0609CH1003	MB05TFS010	FOOTPRINT LAKE	12-Sep-2006			L0.01		0.7			8.9		0.046	8.02	1.01	0.001	L0.0004	1.71	L0.00002	2.5	0.04		2.29	L0.0002	16	L0.00002	L0.0001	L0.0002	0.0068	104	6		6.4	0.0003	0.0007	L0.001	L0.002
0706CH1003	MB05TFS010	FOOTPRINT LAKE	26-Jun-2007			L0.01		0.3			8.7		0.04	7.75	0.96	0.0012	L0.0004	1.53	0.00006	2.5	0.027		2	L0.0002	13	L0.00002	0.0002	0.0012	0.015	126	9		12.5	0.0003	0.0007	0.005	L0.002
0708CH1003	MB05TFS010	FOOTPRINT LAKE	8-Aug-2007			L0.01	L0.2				8.9		0.035	7.92	1.27	0.002	L0.0004	1.85	L0.00002	2.4	0.029		2.08	L0.0002	21	L0.00002	0.0003	L0.0002	0.024	110	8		17.9	0.0003	0.0012	0.002	L0.002
0709CH1003	MB05TFS010	FOOTPRINT LAKE	13-Sep-2007		0.01		0.5				8.8		0.04	7.93	1.19	0.0017	L0.0004	1.92	L0.00002	2.9	0.028		2.04	L0.0002	13	L0.00002	0.0001	L0.0002	0.019	111	12		13.7	0.0003	0.0012	0.003	L0.002
0806CHC003	MB05TFS010	FOOTPRINT LAKE	26-Jun-2008																																		
0806CH1003	MB05TFS010	FOOTPRINT LAKE	26-Jun-2008			0.01		0.7			8.8	L0.5	0.027	7.95	1.2	0.0013	L0.0004	2.12	L0.00002	3	0.052		2.1	L0.0002	15.6	L0.00002	0.0001	0.001	0.013	131	4		7.2	0.0003	0.0007	0.003	L0.002
0808CH1003	MB05TFS010	FOOTPRINT LAKE	14-Aug-2008			L0.01		0.6			8.5		0.025	8.23	1.07	0.001	L0.0004	2.21	L0.00002	2.6	0.051		2.22	L0.0002	21.7	L0.00002	L0.0001	L0.0002	0.0062	128	4		5	0.0003	0.0008	0.001	L0.002
0808CH1012	MB05TFS010	FOOTPRINT LAKE	14-Aug-2008									L0.5																									
0809CHC003	MB05TFS010	FOOTPRINT LAKE	17-Sep-2008																																		
0809CH1003	MB05TFS010	FOOTPRINT LAKE	17-Sep-2008			0.03		0.3			8.6	L0.5	0.064	8.08	1.22	0.0022	L0.0004	2.47	L0.00002	3	0.045		2.23	L0.0002	13	L0.00002	0.0001	L0.0002	0.024	134	4		16.9	0.0002	0.0014	0.003	L0.002
0906JH0974	MB05TFS010	FOOTPRINT LAKE	24-Jun-2009																																		
0906JH0955	MB05TFS010	FOOTPRINT LAKE	24-Jun-2009			L0.005		0.43			5.5		0.0279	8.22	1.15	0.0011	L0.001	1.94	L0.0001	2.86	0.0412		10.8	L0.0002		L0.0001	L0.0001	L0.0006	0.00842	120	12	L0.0002	7.5	0.00026	0.00076	L0.005	0.00044
0906JH0965	MB05TFS010	FOOTPRINT LAKE	24-Jun-2009																																		
0908JH1446	MB05TFS010	FOOTPRINT LAKE	12-Aug-2009																																		
0908JH1427	MB05TFS010	FOOTPRINT LAKE	12-Aug-2009			L0.005		0.61			8.9		0.0136	8.38	1.16	0.00108	L0.001	2.22	L0.0001	3.06	0.0463		5.4	L0.0002	19.6	L0.0001	L0.0001	L0.0006	0.00625	124	L5	L0.0002	4	0.00029	0.00094	L0.005	0.00043
0908JH1437	MB05TFS010	FOOTPRINT LAKE	12-Aug-2009																																		
0909JH1671	MB05TFS010	FOOTPRINT LAKE	16-Sep-2009																							16.9											
0909JH1652	MB05TFS010	FOOTPRINT LAKE	16-Sep-2009			0.005		0.49	1.6		9.2	2.06	0.0167	8.45	1.05	0.00128	L0.001	2.66	L0.0001	2.64	0.0484		4.9	L0.0002	16.9	L0.0001	0.00013	L0.0006	0.00855	138	L5	L0.0002	9.1	0.00032	0.00101	L0.005	0.00051
1006JH0796	MB05TFS010	FOOTPRINT LAKE	23-Jun-2010			L0.006		0.48		1	8.1		0.0195	8.37	1.23	0.00121	L0.001		L0.0001	2.88	0.0413		4.8	L0.0002	17.36	L0.0001	0.00012	L0.0002	0.0101	110	5	L0.001	7.46	0.00023	0.00069	L0.005	0.00041
1006JH0806	MB05TFS010	FOOTPRINT LAKE	23-Jun-2010						1.6			L0.6																									
1006JH0829	MB05TFS010	FOOTPRINT LAKE	23-Jun-2010			L0.05		0.97					0.0099	8.37	1.21	0.00118	L0.001	2.25	L0.0001	2.96	0.0438		4.8	L0.0002	17.36	L0.0001	0.00011	L0.0002	0.00911	116	5.6	L0.001	5.7	0.00023	0.00065	L0.005	0.00045
1006JH0843	MB05TFS010	FOOTPRINT LAKE	23-Jun-2010			L0.05		0.42					0.0132	8.36	1.15	0.00096	L0.001	2.36	L0.0001	2.82	0.0418		4.5	L0.0002	17.36	L0.0001	L0.0001	L0.0002	0.00527	118	5.6	L0.001	10.2	0.00022	0.00053	L0.005	L0.0004
1006JH0853	MB05TFS010	FOOTPRINT LAKE	23-Jun-2010									0.337														17.35											
1008JS1400	MB05TFS010	FOOTPRINT LAKE	17-Aug-2010			0.01		0.42		L1	8.1		0.0344	8.29	1.26	0.0015	L0.001		L0.0001	2.99	0.0466		4.6	L0.0002	16.74	L0.0001	0.00015	L0.0002	0.0159	120	6	L0.001	7.75	0.00032	0.00131	L0.005	0.00057
1008JS1410	MB05TFS010	FOOTPRINT LAKE	17-Aug-2010						1.6			1.09																									
1008JS1419	MB05TFS010	FOOTPRINT LAKE	17-Aug-2010																																		
1008JS1434	MB05TFS010	FOOTPRINT LAKE	17-Aug-2010	L0.005	L0.001			0.43					0.0352	8.3	1.24	0.00162	L0.001	2.94	L0.0001	2.95	0.0483	2.12		L0.0002	16.74	L0.0001	0.00013	L0.0002	0.016	118	7	L0.001	7.96	0.00028	0.00124	L0.005	0.00057
1008JS1458	MB05TFS010	FOOTPRINT LAKE	17-Aug-2010									1.23																									
1009JS1622	MB05TFS010	FOOTPRINT LAKE	15-Sep-2010			L0.006		0.4		1.2	9.7		0.0248	8.23	1.19	0.00149	L0.001		L0.0001	2.79	0.0462		5.9	L0.0002		L0.0001	0.00015	L0.0002	0.0126	104	L5	L0.001	8.47	0.00025	0.0011	L0.005	0.00051
1009JS1632	MB05TFS010	FOOTPRINT LAKE	15-Sep-2010																																		
1009JS1641	MB05TFS010	FOOTPRINT LAKE	15-Sep-2010																																		
1009JS1656	MB05TFS010	FOOTPRINT LAKE	15-Sep-2010	L0.005	L0.001			0.39					0.0317	8.35	1.2	0.00151	L0.001	2.41	L0.0001	2.74	0.0436	2		L0.0002	13.08	L0.0001	0.00011	L0.0002	0.0116	110	6.8	L0.001	7.75	0.00025	0.00119	L0.005	0.00046
1009JS1680	MB05TFS010	FOOTPRINT LAKE	15-Sep-2010									0.563																									
1102CL0190	MB05TFS010	FOOTPRINT LAKE	26-Feb-2011	0.0582	L0.001			0.28	1.3			L0.6	0.029	8	1.62	0.00389	L0.001	5.33	L0.0001	3.28	0.043	2.18		L0.0002	0.36	L0.0001	0.00048	0.00076	0.0464	104	2.4	L0.001	15.1	0.00025	0.00212	L0.005	0.00171
1107CL0194	MB05TFS010	FOOTPRINT LAKE	6-Jul-2011			L0.05		0.34		1.3	9.1		0.03	8.32	1.38	0.00122	L0.001		L0.0001	3.31	0.0503	2.13		L0.0002		L0.0001	L0.0001	0.00024	0.00988	114	L5	L0.001	6.44	0.00033	0.00087	0.0174	0.0004
1107CL0203	MB05TFS010	FOOTPRINT LAKE	6-Jul-2011						1.7			L0.6																									
1107CL0211	MB05TFS010	FOOTPRINT LAKE	6-Jul-2011																																		
1108CL0171	MB05TFS010	FOOTPRINT LAKE	9-Aug-2011			L0.05		0.5		1.6	8.9		0.0215	8.39	1.12	0.00108	L0.001		L0.0001	3	0.0485	2.16		L0.0002		L0.0001	L0.0001	L0.0002	0.00743	122	L5	L0.001	6.2	0.0003	0.00103	L0.005	L0.0004
1108CL0180	MB05TFS010	FOOTPRINT LAKE	9-Aug-2011																																		
1108CL0188	MB05TFS010	FOOTPRINT LAKE	9-Aug-2011																																		
1109EW0041	MB05TFS010	FOOTPRINT LAKE	14-Sep-2011			L0.05		6.94		1.5	9.1		0.024	8.43	1.22	0.00154	L0.001		L0.0001	3.21	0.054	2.07		L0.0002	13.8	L0.0001	0.0001	L0.0002	0.0136	120	7	L0.001	8.48	0.00034	0.00137	L0.005	0.00053
1109EW0050	MB05TFS010	FOOTPRINT LAKE	14-Sep-2011						1.6			2.44																									
1109EW0058	MB05TFS010	FOOTPRINT LAKE	14-Sep-2011																																		
1206EW0003	MB05TFS010	FOOTPRINT LAKE	20-Jun-2012					0.34			9.9		0.016	8.13	1.11					2.54	0.0478	2.02		L0.0002	16.7	L0.0001	0.0001	L0.0002	0.00961	124	L5		6.9	0.00029	0.00061		L0.0004
1206EW0012	MB05TFS010	FOOTPRINT LAKE	20-Jun-2012									0.54														16.7											
1208EW0071	MB05TFS010	FOOTPRINT LAKE	14-Aug-2012	L0.01	L0.002			0.32			8.2		0.016	8.29	1.3					3.42	0.0507	1.91		L0.0002	19.65	L0.0001	0.00011	L0.0002	0.0113	100	L5		6.99	0.00034	0.00086		0.00061
1208EW0080	MB05TFS010	FOOTPRINT LAKE	14-Aug-2012																							19.65											
1209EW0028	MB05TFS010	FOOTPRINT LAKE	18-Sep-2012	L0.01	L0.002			0.46					0.021	8.27	1.42					3.47	0.0544	1.89		L0.0002	13.87	L0.0001	0.00015	L0.0002	0.0168	136	L5		9.17	0.00033	0.00117		0.00061
1209EW0037	MB05TFS010	FOOTPRINT LAKE	18-Sep-2012																																		
1306EW2003	MB05TFS010	FOOTPRINT LAKE	27-Jun-2013	0.01	L0.002	L0.05		0.26			8.4		0.019	8.23	1.22					3.12	0.0495	2.02		L0.0002	17.2	L0.0001	L0.0001	L0.0002	0.00835	131	L5		5.97	0.00032	0.00068	L0.002	0.0004
1306EW2012	MB05TFS010	FOOTPRINT LAKE	27-Jun-2013																							17.2											
1306EW3010	MB05TFS010	FOOTPRINT LAKE	27-Jun-2013	L0.0051	L0.001			0.29					0.018	8.25	1.29	0.0014	L0.001	2.67	L0.0001	3.36	0.0561	1.99		L0.0002	17.23	L0.0001	0.0001	L0.0002	0.00984	135	5	L0.0001	5.73	0.00033	0.00078	L0.002	0.00043
1306EW3021	MB05TFS010	FOOTPRINT LAKE	27-Jun-2013						1.7			L0.6													17.24											
1306EW3031	MB05TFS010	FOOTPRINT LAKE	27-Jun-2013	L0.0051	L0.001			0.29					0.017	8.25	1.25	0.00134	L0.001	2.43	L0.0001	3.1	0.0538	2.16		L0.0002	7.81	L0.0001	L0.0001	L0.0002	0.00934	132	3.5	L0.0001	5.4	0.00032	0.00071	L0.002	L0.0004
1308EW2003	MB05TFS010	FOOTPRINT LAKE	14-Aug-2013	L0.01	L0.002			0.4			9.2		0.012	8.45	1.33					3.28	0.0563	1.99		L0.0002	17.94	L0.0001	L0.0001	L0.0002	0.00727	137	L5		5.99	0.00034	0.00086	L0.002	L0.0004
1308EW2012	MB05TFS010	FOOTPRINT LAKE	14-Aug-2013																							17.9											
1308EW3010	MB05TFS010	FOOTPRINT LAKE	14-Aug-2013	0.0756	L0.001			0.45					0.014	8.43	1.21	0.0012	L0.001	2.61	L0.0001	3.18	0.0525	2.08		L0.0002	17.94	L0.0001	L0.0001	L0.0002	0.00701	139	4	L0.0001	5.83	0.00035	0.0008	L0.002	L0.0004
1308EW3021	MB05TFS010	FOOTPRINT LAKE	14-Aug-2013						1.6			2.12													17.9											
1309EW3010	MB05TFS010	FOOTPRINT LAKE	2-Oct-2013	L0.0051	L0.001			0.3					0.024	8.23	1.41	0.00147	L0.001	1.81	L0.0001	3.47	0.0511	1.99		L0.0002	12.91	L0.0001	L0.0001	L0.0002	0.0117	127	6.4	L0.0001	8.03	0.00027	0.00099	L0.002	0.00042
1309EW3021	MB05TFS010	FOOTPRINT LAKE	2-Oct-2013						1.6			2.12													12.93											
1309EWC010	MB05TFS010	FOOTPRINT LAKE	2-Oct-2013	L0.01	L0.002			0.35	1.7			L0.6	0.025	8.18	1.36					3.24	0.0513	2.07		L0.0002	17.94	L0.0001	0.00015	L0.0002	0.0139	137	8		8.61	0.00027	L0.0002	0.0084	0.00043
1402EW1019	MB05TFS010	FOOTPRINT LAKE	6-Mar-2014	0.081	L0.001			0.4	1			L0.6	0.027	7.6	1.49	0.00222	L0.001	3.11	L0.0001	4.15	0.0488	2.36		L0.0002	0.52	0.00032	0.0002	0.00024	0.0166	104	2	L0.0001	10.7	0.00022	0.00108	0.002	0.00069
1407EW2003	MB05TFS010	FOOTPRINT LAKE	9-Jul-2014	0.014				0.68			8.4		0.0217	8.22	1.17					3.04	0.045	1.87		L0.0002	18.29	L0.0001	0.00017	L0.0002	0.0162	106	8		9.6	0.00032	0.00108	0.0025	0.00062
1407EW2012	MB05TFS010	FOOTPRINT LAKE	9-Jul-2014						1.6			0.67													18.29											
1408EW2003	MB05TFS010	FOOTPRINT LAKE	12-Aug-2014	0.018				0.37			7.8		0.023	8.35	1.19					2.99	0.049	1.76		L0.0002	20.73	L0.0001	0.00015	L0.0002	0.0151	144	6		9.9	0.00037	0.00121	L0.002	0.00055
1408EW2012	MB05TFS010	FOOTPRINT LAKE	12-Aug-2014						1.6			1.4													20.73											
1409EW2003	MB05TFS010	FOOTPRINT LAKE	16-Sep-2014	L0.01				0.92			10		0.037	8.14	1.14					3.21	0.0539	1.79		L0.0002	12.39	L0.0001	0.00014	L0.0002	0.0152	136	12		12.2	0.00038	0.00131	0.0022	0.00069
1409EW2012	MB05TFS010	FOOTPRINT LAKE	16-Sep-2014						1.6			2.1													12.39											
1506JK0085	MB05TFS010	FOOTPRINT LAKE	9-Jun-2015	0.013			0.41	0.4			7.1		0.021	8.13	1.1					2.92	0.0448	1.91		L0.0002	12.7	L0.0001	0.0001	L0.0002	0.0085	118	L5		6.5	0.0003	0.00066	L0.001	L0.0004
1506JK0094	MB05TFS010	FOOTPRINT LAKE	9-Jun-2015						1.6			0.67																									
1508JK0039	MB05TFS010	FOOTPRINT LAKE	11-Aug-2015	L0.01			0.46	0.46			7.8		0.026	8.25	1.21					3.15	0.0504	1.89		L0.0002	19.2	L0.0001	0.00018	L0.0002	0.0163	129	L5		11.1	0.00035	0.00107	0.0012	0.00057
1508JK0048	MB05TFS010	FOOTPRINT LAKE	11-Aug-2015						1.6			0.9																									
1509JK0039	MB05TFS010	FOOTPRINT LAKE	16-Sep-2015	0.013			0.46	0.45			8.7		0.028	8.12	1.07					2.92	0.0512	1.78		L0.0002	14.1	L0.0001	0.00015	L0.0002	0.0124	109	7		8.9	0.00033	0.00105	0.0057	0.00048
1606JK0306	MB05TFS010	FOOTPRINT LAKE	21-Jun-2016	L0.0051	L0.001			0.54					0.0259	8.01	1.25	0.00151	L0.001	2.81	L0.0001	3.17	0.0493	1.81		L0.0002	15.43	L0.0001	0.00016	L0.0002	0.0147	135	4.4	L0.0001	6.97	0.00042	0.00091	L0.002	0.00054
1606JK0311	MB05TFS010	FOOTPRINT LAKE	21-Jun-2016								9.5																									
1606JK0318	MB05TFS010	FOOTPRINT LAKE	21-Jun-2016						1.6			0.63																									
1606JK0343	MB05TFS010	FOOTPRINT LAKE	21-Jun-2016	L0.01			0.77	0.77			9.56		0.04	7.99	1.19					3.01	0.0523	1.75		L0.0002	15.4	L0.0001	0.00016	L0.0002	0.013	132	L5		6.96	0.00045	0.00085	L0.001	0.00065
1606JK0352	MB05TFS010	FOOTPRINT LAKE	21-Jun-2016						1.6			0.65																									
1608JK0306	MB05TFS010	FOOTPRINT LAKE	9-Aug-2016	0.0096	0.0017			0.51					0.0287	8.15	1.25	0.00201	L0.001	3.18	L0.0001	3.16	0.047	1.99		L0.0002	19.26	L0.0001	0.00023	L0.0002	0.0178	116	4.8	L0.0001	11.5	0.00032	0.00112	0.0025	0.00065
1608JK0318	MB05TFS010	FOOTPRINT LAKE	9-Aug-2016						1.6			1.18																									
1608JK0343	MB05TFS010	FOOTPRINT LAKE	9-Aug-2016	L0.01			0.48	0.48			8.67		0.028	8.16	1.31					3.19	0.0481	2.04		L0.0002	19	L0.0001	0.00023	L0.0002	0.0191	94	L5		0.14	0.00032	0.00126	0.0019	0.00077
1608JK0352	MB05TFS010	FOOTPRINT LAKE	9-Aug-2016						1.6			1.32																									
1609JK0306	MB05TFS010	FOOTPRINT LAKE	21-Sep-2016	L0.0051	0.0011			0.5					0.0264	8.22	1.23	0.0015	L0.001	2.77	L0.0001	2.99	0.0444	2.02		L0.0002	14.95	L0.0001	0.0001	L0.0002	0.00962	116	5.6	L0.0001	8.22	0.00028	0.00097	0.005	L0.0004
1609JK0318	MB05TFS010	FOOTPRINT LAKE	21-Sep-2016						1.7			L0.6																									
1609JK0343	MB05TFS010	FOOTPRINT LAKE	21-Sep-2016	L0.01			0.46	0.46			9.7		0.025	8.24	1.3					3.13	0.045	2.01		L0.0002	14.95	L0.0001	0.00013	L0.0002	0.0113	116	5		9.47	0.0003	0.00106	0.0018	0.00045
1609JK0352	MB05TFS010	FOOTPRINT LAKE	21-Sep-2016						1.7			L0.6																									

Gene Senior

From: Friesen, Chris (SD) <Chris.Friesen@gov.mb.ca>
Sent: December-19-16 8:59 AM
To: 'Gene Senior'
Subject: RE: CDC data request: Nelson House

Gene

Thank you for your information request. I completed a search of the Manitoba Conservation Data Centre's rare species database and found no occurrences at this time for your area of interest.

The information provided in this letter is based on existing data known to the Manitoba Conservation Data Centre at the time of the request. These data are dependent on the research and observations of CDC staff and others who have shared their data, and reflect our current state of knowledge. **An absence of data in any particular geographic area does not necessarily mean that species or ecological communities of concern are not present**; in many areas, comprehensive surveys have never been completed. Therefore, this information should be regarded neither as a final statement on the occurrence of any species of concern, nor as a substitute for on-site surveys for species as part of environmental assessments.

Because the Manitoba CDC's Biotics database is continually updated and because information requests are evaluated by type of action, any given response is only appropriate for its respective request. Please contact the Manitoba CDC for an update on this natural heritage information if more than six months pass before it is utilized.

Third party requests for products wholly or partially derived from Biotics must be approved by the Manitoba CDC before information is released. Once approved, the primary user will identify the Manitoba CDC as data contributors on any map or publication using Biotics data, as follows as: Data developed by the Manitoba Conservation Data Centre; Wildlife & Fisheries Branch, Manitoba Sustainable Development.

This letter is for information purposes only - it does not constitute consent or approval of the proposed project or activity, nor does it negate the need for any permits or approvals required by the Province of Manitoba.

We would be interested in receiving a copy of the results of any field surveys that you may undertake, to update our database with the most current knowledge of the area.

If you have any questions or require further information please contact me directly at (204) 945-7747.

Chris Friesen
Coordinator
Manitoba Conservation Data Centre
204-945-7747
chris.friesen@gov.mb.ca
http://www.manitoba.ca/conservation/cdc/

From: Gene Senior [mailto:GSenior@kgsgroup.com]
Sent: December-07-16 3:51 PM
To: Friesen, Chris (SD)
Subject: CDC data request: Nelson House

Chris:

KGS Group is completing engineering design and an environment act proposal for a new sewage lagoon for the community of Nelson House.

We are requesting information regarding the locations of any plant, wildlife or aquatic Species at Risk occurrences on or near the project land. The information will be used to assess potential project impacts on species at risk and their habitat (if any) and to develop appropriate mitigation measures and follow-up.

The coordinates of the center of the lagoon are:

Northing: 6187719.495
Easting: 509595.330
UTM Zone 14

I have attached a zipfile of the shp for your use as well as a screenshot showing the site and proposed infrastructure locations.

Our preference is to receive the data by email and for the data to be presented in Microsoft Excel Spreadsheet (providing the location of each occurrence).

Thanks!

Gene Senior <gsenior@kgsgroup.com>
Environmental Scientist

KGS GROUP CONSULTING ENGINEERS

865 Waverley Street
Winnipeg, Manitoba R3T 5P4
p. 204.896.1209 ext. 357
c. 204.218.3285
f. 204.896.0754
http://www.kgsgroup.com

Go Green:
Think before you print

Gene Senior

From: McClean, Heather (SCH) <Heather.McClean@gov.mb.ca>
Sent: January-10-17 2:56 PM
To: 'Gene Senior'
Subject: RE: Heritage data request: community of Nelson House sewage lagoon

Gene – a search of the database reveals that there are no KNOWN heritage or archaeological resources located within the study area.

Thank you.

Heather McClean
Heritage Resources Registrar
Historical Assessment Services
Historic Resources Branch
Main Floor, 213 Notre Dame Avenue
Winnipeg MB R3B 1N3
Heather.McClean@gov.mb.ca
Phone: (204) 945-7146
Fax: (204) 948-2384

From: Gene Senior [mailto:GSenior@kgsgroup.com]
Sent: January-10-17 2:38 PM
To: McClean, Heather (SCH)
Subject: FW: Heritage data request: community of Nelson House sewage lagoon

Heather,
Can you please check the heritage database for the occurrence of known heritage or archaeological resources located within the study area.
Thanks,
Gene

From: Gene Senior [mailto:GSenior@kgsgroup.com]
Sent: December-07-16 3:52 PM
To: 'Nesbitt, Christina (TCHSCP)' (Christina.Nesbitt@gov.mb.ca)
Subject: Heritage data request: community of Nelson House sewage lagoon

Christina,

KGS Group is completing engineering design and an environment act proposal for a new sewage lagoon for the community of Nelson House.

We are requesting a location and description of any known heritage or archaeological resources located on or near the project land. The information will be used to assess potential project impacts on heritage and archaeological resources (if any) and to develop appropriate mitigation measures and follow-up.

The coordinates of the center of the lagoon are:

Northing: 6187719.495
Easting: 509595.330

UTM Zone 14

I have attached a zipfile of the shp for your use as well as a screenshot showing the site and proposed infrastructure locations.

Our preference is to receive the data by email and for the data to be in Excel or ArcView format (or PDF mapsheet).

If you have any questions don't hesitate to contact me, thanks.

Gene Senior <gsenior@kgsgroup.com>
Environmental Scientist

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