Aboriginal Affairs and Northern Development Canada
Affaires autochtones et Développement du Nord Canada

Water Resources Division
Nunavut Regional Office
Iqaluit, NU X0A 0H0

Your file - Votre référence
1BR-IIA----

June 8, 2015

Our file - Notre référence
920674

Phyllis Beaulieu
Manager of Licensing
Nunavut Water Board
Gjoa Haven, NU X0E 1J0

Re: Aboriginal Affairs and Northern Development Canada's (AANDC) Review of Arctic Infrastructure Limited Partnership's New Application for a Water Licence – #1BR-IIA---- – Iqaluit International Airport Improvement Project

Dear Ms. Beaulieu,

Thank-you for the email notice received on May 8, 2015 regarding the above mentioned application.

AANDC reviewed the application and the results of our review are provided in the enclosed memorandum for the Nunavut Water Board's consideration. Comments have been provided pursuant to the Department's mandated responsibilities under the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Department of Indian Affairs and Northern Development Act*.

Please do not hesitate to contact me at 867-975-3876 or Sarah.Forte@aandc-aadnc.gc.ca for any additional information.

Regards,

Sarah Forté
Water Management Coordinator

c.c.: Andrew Keim, Acting Manager of Water Resources, AANDC Nunavut
Erik Allain, Manager of Field Operations, AANDC Nunavut

Canada

Technical Review Memorandum

To: Phyllis Beaulieu, Manager of Licensing, NWB

From: Sarah Forté, Water Management Coordinator, AANDC

Date: June 8, 2015

Re: Water Licence Application, #1BR-IIA----

Applicant: Arctic Infrastructure Limited Partnership
Project: Industrial Project
Region: Qikiqtani

A. BACKGROUND

On May 8, 2015 the Nunavut Water Board (Board or NWB) provided notification to interested parties that Arctic Infrastructure Limited Partnership (the applicant) had completed submission of an application for a Type 'B' water licence # 1BR-IIA---- for their Iqaluit International Airport Improvement Project.

The licence is for water use associated with a construction project to improve the infrastructure at Iqaluit's airport. The project includes milling and resurfacing of the apron and runway, displacement of contaminated soil to an on-site containment cell, construction of pads for taxiway, new buildings and parking lot, ditch realignment and culvert installation. The licence application requests permission for the use of 100 m^3 of water per day for a 10 year term.

Interested parties were asked to review the information and provide comments by June 8, 2015

B. RESULTS OF REVIEW

The following comments and recommendations are provided:

1. Water use for camp purposes

Reference:

- General Water Licence Application – Iqaluit International Airport Improvement Project, April 21, 2015 >> boxes 12 & 13

Comment:
The application states that 6 m^3/day of water will be used for camp purposes and supplied by the city of Iqaluit.

Recommendation:
Aboriginal Affairs and Northern Development Canada (AANDC) recommends that this water quantity not be included in the water licence as it is provided from another source.

Additionally, if water is to be obtained from an outside licensed source, confirmation regarding this agreement should be submitted to the Board and AANDC Water Resource Officers prior to undertaking this activity.

2. Water source

Reference:

- General Water Licence Application – Iqaluit International Airport Improvement Project, April 21, 2015 >> box 13
- Soil and Groundwater Management Plan – Appendix E: Water Management Plan, March 2015
- Soil and Groundwater Management Plan – Appendix D: Location of Contaminated Water Holding Basins to be Constructed, Water Discharge Points and Hazardous Waste Storage Map, Drawing # IIAIP-CA-EXT-STA-PLN-CC-115-5, July 17, 2014

Comment:
The water source for dust suppression and spraying of aggregates identified in the application is named “inner-field drainage feature” and the water use is estimated at 94 m^3/day.

It is AANDC’s understanding that meltwater ponds in the inner field until drainage culverts thaw in mid-June, at which time the whole field drains. It is not clear where the applicant proposes to draw water in July, August and September after the field drains or if they plan on altering the drainage in order to keep water in the inner field. If the five holding basins drawn in the inner field on the map in appendix D are to be used to retain water, it does not appear in the text of the application.

The Water Management Plan states that before using the proposed water source:

> *“Water will be visually inspected at the beginning of each work season to ensure that it is free of contaminants. Should the water be found contaminated, sources will be tested in the area, until a new source of water can be found.”*

Water ponding in the inner field likely contains chemicals from deicing fluids as well as remnants of any spills that may have occurred over the winter. A visual inspection would not be sufficient to determine if it is contaminated. The other sources to be tested in the area have not been identified.

Recommendation:
AANDC recommends requiring the applicant test the inner-field water before using it to ensure that it meets CCME standards. These tests should include petroleum hydrocarbons (PHC), bezene, toluene, ethylbenzene and xylenes (BTEX), ethylene glycol and propylene glycol. Dust suppression and spraying of aggregates should not be undertaken until test results come back below the CCME standards.

AANDC also recommends requesting clarifications from the applicant as to where they propose to draw their water from once the inner-field has drained and what new water sources they would consider.

3. Water quality monitoring

Reference:

- Soil and Groundwater Management Plan – Appendix E: Environmental Impacts of Installation of Culverts, Construction or Modification of Drainage Ditches and Creation of Fish Habitat, October 2014
- Soil and Groundwater Management Plan – Appendix E: Erosion and Sediment Control Plan, July 7, 2014
- Soil and Groundwater Management Plan – Appendix E: Contaminated Soil Management Long Term Monitoring Plan, March April 2, 2015
- Soil and Groundwater Management Plan, August 2014

Comments:
Both the Environmental Impacts document and the Erosion and Sediment Control Plan describe measures to prevent or mitigate the release of sediment into the water. These include the installation of silt fences, construction of sedimentation traps/bassins, temporary ditch construction to direct water towards sedimentation traps and geotextile installation at the bottom of realigned ditch. No method of evaluating the effectiveness of the proposed measures is included in the Plans.

Groundwater quality monitoring around the containment cell is included in the Long Term Monitoring Plan, but surface water quality is not mentioned in this plan or another. Construction and contaminated soil displacement activities have the potential to mobilise contaminants so surface water quality should be monitored during these activities to ensure no contaminants are transported off-site in the surface water.

The Soil and Groundwater Management Plan states that "*groundwater is not continuous at the site and there is a low risk of soil and groundwater impacts migrating off site via groundwater transport*" (page 11), therefore surface water monitoring alone is likely sufficient to measure any potential contaminants leaving the site through water.

Recommendation:
AANDC recommends requesting the applicant propose a new plan or modify an existing one to ensure that surface water quality is not degraded by construction and

contaminated soil displacement activities. Parameters monitored should include PHC, BTEX, arsenic, biological oxygen demand and total suspended solids.

4. Spill Contingency Plan

Reference:

- Soil and Groundwater Management Plan – Appendix E: Spill Contingency Plan – Iqaluit International Improvement Project, April 2, 2015

Comments:

Refuelling operations are mentioned on page 6 for the transport of gasoline and diesel, and on pages 17-20 for the potential spill analysis of a fuel truck accident. The text on page 18 reads:

> *"Heavy equipment works at least 30 meters away from any body of water. Therefore the fuel delivery should not ever get closer than 30 meters from the bodies of water (unless crossing over a culvert or a bridge)."*

Given that ditch re-alignment and the installation of culverts are an important part of this application, it seems improbable that the work can be done whilst keeping heavy machinery 30 m from the ditch.

Table 2 on page 7 has the title and name of several people referred to in the Plan but does not include their phone numbers or a method of contacting them. Additionally, there are two Site Superintendents in the table (one for SINTRA and another for Bouygues Building Canada) and when the document refers to the Site Superintendent's role, it is does not specify which Superintendent.

The spill response procedures (section 8, page 12) include reporting the spill, with a reference to section 8 of the plan, a circular reference. The reporting requirements (section 10, page 20) include contact numbers for the 24-hour spill report line. The phone number is correct but the fax number is not. Reporting the spill to AANDC is not included as a requirement.

The Plan contains no mention of alerting airport staff and as some of the work will be done near the runway and apron during airport operation, it seems possible that a spill and spill response may impact airport operations.

Recommendation:

AANDC recommends that the applicant be requested to modify the Spill Contingency Plan to do the following:

- Include the use of drip-trays or secondary containment for refuelling of all equipment.
- Clarify that refuelling by the fuel delivery truck will not occur closer than 31 m from a water body, which includes ditches.
- Include a method of contacting those people listed in Table 2.

- Specify which Site Superintendent is responsible for acting as incident commander.
- Correct the reference on page 12 for reporting procedures to section 10 (reporting requirements) instead of section 8 (spill response procedures).
- Correct the fax number for the 24-hour spill report line to (867) 873-6924.
- Specify that spills should be reported to both the 24-hour spill reporting line and AANDC, adding Erik Allain, Manager of Field Operations, as the primary AANDC contact. The manager can be reached by telephone at (867) 975-4295 and by fax at (867) 975-6445.
- Include alerting airport authorities in event of a spill that will impact their operations.

5. Hazardous waste containment area

Reference:

- Soil and Groundwater Management Plan – Appendix D: Location of Contaminated Water Holding Basins to be Constructed, Water Discharge Points and Hazardous Waste Storage Map, Drawing # IIAIP-CA-EXT-STA-PLN-CC-115-5, July 17, 2014
- Soil and Groundwater Management Plan – Appendix E: Hazardous Waste Materials Management Plan, March 2015
- Environmental Guideline for General Management of Hazardous Waste, Department of Environment, Government of Nunavut, October 2010

Comments:

The Hazardous Waste Materials Management Plan provides the location of Hazardous Waste Storage Areas and the Bitumen Drum Storage. The ditch trajectory is not clear on the map but it appears as if the Bitumen Drum Storage Area may be less than 31 meters away.

The list of applicable Nunavut Territorial Legislation and Guidelines on page 2 does not include the government of Nunavut's Environmental Guideline for General Management of Hazardous Waste. The following general points from page 14 in the Guideline are to be considered when establishing a storage facility and do not seem to be included in the Hazardous Waste Materials Management Plan:

- The facility should be secure.
- Drainage into and from the storage facility site should be controlled to prevent spills or leaks from leaving the site to prevent run-off from entering the site.
- All waste should be stored on a firm working surface that is impervious to leaks.

Recommendation:

AANDC recommends that the applicant clarify if the Bitumen Drum Storage Area is within 31 m of the ditch and move it further away if it is. As well, the applicant should be required to modify their Hazardous Waste Materials Management Plan so that it follows Nunavut's Guideline with regards to storage facilities.

6. Monitoring well installations next to containment cell

Reference:

- Soil and Groundwater Management Plan – Appendix E: Contaminated Soil Management Long Term Monitoring Plan, April 2, 2015

Comment:

In the drawing for well installations when bedrock is < 7 m, the individual minimum segment lengths add up to more than the maximum total length. Additionally, depending on the depth to bedrock, the screened interval could be entirely in bedrock.

Recommendation:

AANDC recommends requesting that where feasible, the applicant install monitoring wells so that at least part of the screened interval is in the sediment overlying the bedrock.

7. Contaminated groundwater in area near planned arched culvert

Reference:

- Pre-existing Environmental Contamination Management Plan, May 2014
- Soil and Groundwater Management Plan – Appendix A: Phase III Environmental Site Assessment, June 26, 2014

Comment:

During the field work for the Pre-existing Environmental Contamination Management Plan, PAH contaminated groundwater was found in TP6 near the planned arched culvert. This area was investigated further in the Phase III Environmental Site Assessment by digging six trenches to collect groundwater samples. Four of the six samples were found to contain PAH concentrations above CCME guidelines. During the field work it was noted that "*Most of the water in the trenches seemed to be entering from the northeastern side*." The trenches are near the site boundary and a Nunavut Arctic College building is situated to the northeast.

A site cannot be properly remediated if groundwater flowing through it is contaminated by an upstream source which has not yet been remediated. Determining the groundwater flow direction should be the first step in localising the contaminant source.

Recommendation:

AANDC recommends the installation of piezometers to confirm the groundwater flow direction.

8. Term of licence

Reference:

- General Water Licence Application – Iqaluit International Airport Improvement Project, April 21, 2015 >> box 25

Comment:
The application requests a 10 year term for the licence.

Recommendation:
AANDC recommends a 2 year licence term given that the construction activities are planned until 2017. Presumably, following this period water abstraction will no longer be necessary for construction purposes and the licence should be amended.

9. Scope of licence / airport operations

Reference:

- General Water Licence Application – Iqaluit International Airport Improvement Project, April 21, 2015 >> box 9
- Natural, Cost-Effective and Sustainable Alternatives for Treatment of Aircraft Deicing Fluid Waste, Castro et al., Environmental Progress vol. 24 no.1, April 2005
- Water Quality Guidelines for the Protection of Aquatic Life, Canadian Council of Ministers of the Environment (CCME)
- Soil and Groundwater Management Plan – Appendix D: Location of Contaminated Water Holding Basins to be Constructed, Water Discharge Points and Hazardous Waste Storage Map, Drawing # IIAIP-CA-EXT-STA-PLN-CC-115-5, July 17, 2014

Comment:
It is not clear if this application is also trying to include airport operations given the 10 year term requested and the following statement in the application:

> *"In addition, the Private Partner, Arctic Infrastructure Partnership Limited will operate and maintain the existing Airport during construction of the new facilities and for 30 years after the construction is completed."*

To our knowledge, airports in Nunavut do not have a water licence for operations. However, there is deposit of waste to water because of the use of deicing fluids and there is also the potential for spills during aircraft refuelling operations.

There is extensive scientific literature detailing surface and ground water contamination problems from deicing fluids at airports. The following quote is from the abstract of an article by Castro et al. (2005):

> "*The waste generated by aircraft deicing operations represents a threat to the environment arising from the high biological oxygen demand of propylene and ethylene glycols and the toxicity associated with some of the additives, such as the corrosion inhibitor benzotriazole."*

The CCME's Water Quality Guidelines for the Protection of Aquatic Life include maximum concentrations for both ethylene glycol and propylene glycol. The CCME's Soil Quality Guidelines for the Protection of Environmental and Human Health include a maximum concentration for ethylene glycol. The guidelines do not contain a maximum concentration for benzotriazole.

The map provided has a deicing area labelled on the apron and a deicing fluid containment tank but no other information has been provided. AANDC believes that appropriate measures for managing deicing fluids are necessary in order to protect water quality.

Recommendation:
AANDC recommends that airport operations be excluded from this water licence because insufficient information has been provided regarding operations. However, AANDC recommends requiring a licence for airport operations so that Nunavut waters can be protected through the Nunavut Water Board's licensing process by ensuring adequate plans are in place.

C. CONCLUSION

AANDC considers that important significant questions are not answered by the application and should be addressed before the issuance of a licence. These include the water source and water quality monitoring.

The source of contaminated water in the area of the arched culvert is another important question that may require participation of the neighbouring landowner.