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SUPPLEMENTAL SUPPORTING APPLICATION INFORMATION

1 Project Name

Geotechnical and Environmental Baseline Studies – Iqaluit Port Development

2 Proponent Name

Government of Nunavut

3 Contact person(s)

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4 Schedule (start and end dates; operation type i.e. seasonal/year-round)

The geotechnical and environmental baseline studies will commence in summer 2016 and will conclude in summer 2017.

- The summer/fall 2016 environmental baseline studies are anticipated to last approximately six weeks.
- The summer 2016/2017 geotechnical studies will be conducted between July and September 2016 or 2017 and are anticipated to last approximately two weeks.
- The winter/spring geotechnical studies will be conducted between March and May 2017 and are anticipated to last approximately three weeks.
- Additional environmental baseline studies may be conducted in summer/fall 2017, as required by the Environmental Assessment (EA) and permitting process.



5 Project Description (e.g. coordinates; distance to nearest communities; brief history of site; objectives of the project; etc.)

Geotechnical and environmental baseline studies are required to support the design of a proposed deep water port and upgrades to an existing municipal breakwater and boat ramp in Iqaluit. These baseline studies will support engineering design, preparation of an EA, as per Article 12, Part 4 of the *Nunavut Land Claims Agreement*, and post-EA permitting.

Site coordinates for the municipal breakwater and boat ramp are approximately 68°30'41.45" W and 63°44'24.67" N. The site coordinates for the proposed deepwater port are approximately 68°31'29.07" W and 63°43'26.82" N.

Geotechnical and environmental baseline studies to be conducted include the following:

- Water and sediment quality
- Oceanographic studies
- Fish and fish habitat
- Migratory and marine birds
- Terrestrial vegetation and rare plants
- Terrestrial landforms, soil and permafrost
- Traditional Knowledge (Inuit Qaujimagatuqangit)
- Geotechnical investigations – borehole drilling, Cone Penetration Tests (CPTs), and vibrocores

6 Persons (number of people on site)

A maximum crew of 20 is anticipated to be at the project site for the geotechnical and environmental baseline studies at any given time.

7 Days (number of days on site)

The geotechnical and environmental baseline studies will commence in summer 2016 and will conclude in summer 2017.

Summer/fall 2016 Environmental – approximately 40 days



Summer 2016/2017 Geotechnical – approximately 14 days

Winter/spring 2017 Geotechnical – approximately 21 days

8 Project Map

Please see the attached Study Area.

9 Planning region

N/A. Site is in area with no approved regional land use plan.

10 Affected Areas and Land Types

Geotechnical and environmental baseline studies will focus on the areas surrounding the proposed deep water port site, municipal breakwater and boat ramp. The study area includes marine pelagic and benthic habitat, and coastal tundra.

The study area encompasses Crown, Municipal, and Commissioner's Lands.

11 Project land use (e.g. winter access; site cleanup/remediation; scientific research and geotechnical investigations etc.)

Field-based geotechnical and environmental baseline studies

12 Licencing agencies (e.g. NIRB, INAC, NWB, KitIA, etc.)

Licensing agencies include Nunavut Research Institute (NRI), Nunavut Impact Review Board (NIRB), Indigenous and Northern Affairs Canada (INAC), Nunavut Water Board (NWB), and Fisheries and Oceans Canada (DFO).

13 Other Licencing Requirements (Class A Land Use Permit etc.)

- Class "A" Land Use Permit from INAC – expected September 1st, 2016
- Registration Certificate from NRI – Date of Issuance 8/8/16; Expiration Date 12/31/16



- Licence to Fish for Scientific Purposes from DFO – Date of Issuance 7/26/16; Expiration Date 7/26/17

14 Material use (equipment; tools; vehicles/machinery; fuel use [diesel/gasoline]; hazardous materials and chemical use [litres approx.]; water consumption [daily amount in cubic metres]; water retrieval method [e.g. to be provided by successful contractor]; retrieval location [to be provided by successful contractor]

Borehole Drilling / CPTs – Deep Sea Port

- Scope – Up to 8 test locations (Boreholes and / or CPTs) – up to 20 metres below seabed – borehole up to 0.1 metre diameter
- Equipment – Heli-portable / skid-mounted drill rig or track-mounted drill rig
- Drilling Methodology – Water and / or mud rotary and diamond drilling with a potential for air rotary drilling
- Sampling – CPTs, Standard Penetration Tests and Downhole Vane Shear Tests
- Support Equipment – Support vehicle, maintenance supplies
- Fuel Use – Drill rig (diesel) and additional support equipment
- Hazardous Materials – Likely limited to fuels such as petrol and diesel, and hydraulic oil
- Chemical Use – Anti-freeze, drill grease, drill mud, cleaning supplies
- Water Consumption – Approximately 2 cubic metres per day
- Water Retrieval Method – Drill water sourced from the municipality and / or pumped from sea – Fisheries and Oceans Canada's Freshwater Intake End-of-Pipe Fish Screen Guideline followed
- Sample Retrieval Method – Drill casings lowered to sea bed and advanced to rock (if required) – drilling muds/cuttings recirculated or released at the seabed



Drilling/CPTs – Quarry

- Scope – Up to 2 test locations (boreholes); up to 15 metres below grade; borehole up to 0.1 metre diameter
- Equipment – Heli-portable / skid mounted drill rig or track mounted drill rig
- Drilling Methodology – Diamond drilling
- Support Equipment – Support vehicle, maintenance supplies
- Fuel Use – Drill rig (diesel) and additional support equipment
- Hazardous Materials – Likely limited to fuels such as petrol and diesel, and hydraulic oil
- Chemical Use – Anti-freeze, drill grease, drilling mud, cleaning supplies
- Water Consumption – Approximately 2 cubic metres per day
- Water Retrieval Method – Drill water sourced from the municipality
- Sample Retrieval Method – Drill casings lowered to ground surface/advanced to bedrock (if required) – drilling muds/cuttings either recirculated or disposed of in a sump on land

Vibrocore – Deep Sea Port

- Scope – Up to 10 test locations (vibrocore); up to 7 metres below grade; borehole up to 0.1 metre diameter
- Equipment – Vibrocore / auger
- Support Equipment – Support vehicle, maintenance supplies
- Fuel Use – Vibrocore – small diesel-powered motor
- Hazardous Materials – N/A
- Chemical Use – N/A
- Water Consumption – N/A

Vibrocore – Municipal Wharf

- Scope – Up to 10 test locations (vibrocore); up to 7 metres below grade; borehole up to 0.1 metre diameter
- Equipment – Vibrocore / auger
- Support Equipment – Support vehicle, maintenance supplies



- Fuel Use – Vibrocore – small diesel-powered motor
- Hazardous Materials – N/A
- Chemical Use – N/A
- Water Consumption – N/A

Environmental Baseline Studies

Scope – Environmental baseline studies to obtain data to support engineering design and regulatory permitting

Equipment

Fish and fish habitat studies

- Towed video surveys with an underwater camera and benthic invertebrate community sampling.

Water and sediment quality studies

- Water quality sampling using grab and Niskin-type bottle sampling, grab sediment and vibrocore sampling.

Oceanographic studies

- Surface current speed and direction data will be collected by deploying surface drogues in the marine environment.

Migratory and marine bird studies

- Visual observation along terrestrial and marine transects using optical viewing equipment such as binoculars.

Terrestrial vegetation and rare plants studies

- A single ecosystem mapping and rare plant survey will be conducted using the meander search approach followed by reconnaissance surveys in complex terrain.

Support Equipment – Environmental baseline studies will be conducted largely on foot. Boat will be used for marine-based studies.

Fuel use – Fuel for boat and crew vehicle; refueling would be performed in accordance with an environmental management plan.

Hazardous Materials – Sample preservatives (less than 1 millilitre of acid per sample bottle), ethanol for benthic invertebrate preservation, fuel for support vehicles

Chemical Use – Sample preservatives (less than 1 millilitre of acid per sample bottle), ethanol for benthic invertebrate preservation



Water Consumption – No water use anticipated for environmental baseline studies.

Water Retrieval Method – No water use anticipated for environmental baseline studies.

15 Environmental Impacts (e.g. the predicted environmental impacts of this project and the proposed mitigations are contained in the attached Environmental Screening Report. Once the mitigations are applied, the residual effects of the project on local economy, traditional land use, human health an archaeological and heritage resources are predicted to be none or negligible in magnitude)

Potential Environmental Effects

Potential environmental impacts that may occur during the studies include the following:

- Accidental leaks and spillages of substances such as fuel or petroleum-based lubricants to the environment
- Disturbance of terrestrial and marine habitat and wildlife
- Noise and vibration effects from drilling activities
- Temporary sediment suspension
- Drill cuttings disposal
- Disturbance of heritage resources
- Disruption of traditional use of proposed study area
- Increased overall anthropogenic presence within study areas

Impacts of the proposed geotechnical sediment sampling and drilling activities on the marine environment are anticipated to be minimal. Some minor, temporary sediment suspension is expected as a result of drilling activities; however, suspended sediments are expected to quickly settle back to the seabed with no significant impact to aquatic habitats. Studies are not expected to result in impacts to *Species at Risk Act* (SARA) species or aquatic and terrestrial environments provided mitigation measures are adhered to.



Mitigation Measures

Environmental management plans will be implemented for the studies to mitigate potential effects of the field activities on the environment.

The environmental management plan will include:

- Spill Prevention
- Waste Management
- Wildlife Mitigation and Monitoring
- Abandonment and Restoration

Mitigation measures will be detailed in the environmental management plan.

16 Waste Management (e.g. hazardous waste [quantity generated/treatment method/disposal method]; sewage/human waste [quantity generated/treatment method/disposal method]; greywater [quantity generated/treatment method/disposal method]; combustible wastes [quantity generated/treatment method/disposal method]; Non-combustible wastes [quantity generated/treatment method/disposal method]; Overburden (organic soil, waste material, tailings);

Potentially hazardous materials including diesel fuels, gasoline, hydraulic and lubricating oils, and engine coolants will be used during borehole drilling activities. The release of these hazardous materials onsite may result in impacts to the surrounding terrestrial and marine environment. The following sections identify predicted waste for the proposed works and present management practices and procedures to be implemented to avoid or minimize adverse environmental impacts. This will be expanded and more detailed in the environmental management plan.

Drilling/CPTs – Deep Sea Port

- Waste Management – Environmentally friendly drilling muds (such as Envirogrout, Guargum, etc.) will be used; the specific type of environmentally friendly drilling mud(s) will be confirmed by successful contractor.



- Sewage / Human Waste – There will likely to be a portable toilet on site.
- Overburden – Drill cuttings (including drilling muds) generated in the marine area will be pumped down borehole on completion or will be released at the seabed during drilling.

Drilling/CPTs – Quarry

- Waste Management – Environmentally friendly drilling muds (such as Envirogrout, Guargum, etc.) will be used; the specific type of environmentally friendly drilling mud(s) will be confirmed by successful contractor.
- Sewage / Human Waste – To be confirmed however there will likely be a portable toilet onsite.
- Overburden – Drill cuttings (including drill muds) will be spread on land at the site.

Vibrocore – Deep Sea Port

- Waste Management – NA
- Sewage / Human Waste – NA

Vibrocore – Municipal Wharf

- Waste Management – NA
- Sewage / Human Waste – NA

Environmental Baseline Studies

- Waste Management – Environmental baseline studies will employ a 'pack in, pack out' policy in terms of waste management. Bulk waste is not anticipated during these studies. Some non-combustible waste will be created from consumables during sampling (bottles, bags, gloves, etc.).
- Sewage / Human Waste – There will likely be a portable toilet on site or facilities in the community.
- Overburden – Overburden is not expected to be generated during the environmental baseline studies.