



▷ᵒᶜ▷ᵐᶜ: 204-984-1102, ᵑᵇᶜᵈᶜ:

$\epsilon_b \Delta^c \dot{\bar{O}}_0 \sigma^b \quad \Lambda_{\text{C-N}} \Delta^c \epsilon_b \epsilon_\sigma \Delta_{\text{N-L}} \Delta^a \bar{L}^a \sigma^b$

NON-TECHNICAL SUMMARYProject NameClyde River Small Craft Harbour Geotechnical and Environmental Assessment Sampling ProgramIntroductionCanadrill-CBCL Joint Venture (Canadrill-CBCL) has been retained by Public Services and Procurement Canada (PSPC) on behalf of Fisheries and Oceans Canada – Small Craft Harbours (DFO-SCH) to design a small craft harbour (SCH) in Clyde River, Nunavut. To support the design, Canadrill-CBCL proposes to carry out a geotechnical drilling and environmental assessment sampling program in March/April 2021 to assess the proposed harbour area. The purpose of the geotechnical drilling and environmental sampling program is to evaluate the ocean bottom sediments in the harbour area, obtain sediment samples for physical and chemical analysis, and obtain bedrock core (if encountered). The information obtained will be used to design the small craft harbour facility, to evaluate the environmental risks, and to obtain the necessary permits to construct the small craft harbour. Project LocationThe sampling program will be carried out in Clyde River, on the shore and ice of Patricia Bay, in the Qikiqtaaluk Region, North Baffin Island. Project DescriptionDrilling will be conducted in the nearshore harbour area, working on top of the established ice-sheet, and in the onshore area. A total of 25 boreholes will be drilled, including 7 on land at the harbour and 18 in the harbour area through the sea-ice. Drilling will occur from within a heated shack setup onsite over each drilling location. The drill and drill shack will be mounted on a skid and dragged to the drill location using a front-end loader, which will also be used to move the drill set-up to and from each borehole location. All equipment and materials will be removed from the harbour area after the drilling program is completed.Project ScheduleThe geotechnical field program is scheduled to be carried out 24-hours-a-day over approximately 15 days in March/April 2021. The field program is dependent on weather conditions with sufficient ice thickness to support personnel and equipment to drill through the ice in the nearshore area. PersonnelThe field team for the geotechnical and environmental assessment program will consist of approximately 11 people. The team will consist of personnel from Canadrill and CBCL with local support.

▷ΔΛΠΩ^c: N/A for North Baffin

[illegible]

Operations Phase: from 2021-03-16 to 2021-04-03

$\Lambda \subset \mathbb{N} \triangleleft \mathbb{N} \hookrightarrow \mathbb{D} \sigma \triangleleft^{\mathfrak{q}_b} \mathbb{D}^c$

ᐱᓯ	ᖃᓄᐃᑦᑐᒥᑦ ᐱᑕᓚᐊᖃᖅᐊᖃᑦ<	ᑭᑦᐃᑦ ᓄᐱᖅᐇᑦ	ᑐᔨᐅᐤᖃᖅ ᓄᐱᐅᑦ ᖃᓄᖃᖅ ᐊᑐᐤᐅᑕᐅᖃᖅ ᓯᐤᖃᓚᐊᖃᖅᓴᓂᖅ	ᐃᑦᔨᖅᑕᖃᖅᐱᐅᑕᑕᐅᖃᑦ< ᐃᓄᖃᓄᑦ ᐱᔨᖃᑕᐅᖃᖅᑕᖅᐇᑦᐅᑦ ᑕᐃᑦᓯᐤᓂᑐᖃᐅᑕᖃᖅᑐᖃᖅ	ᖃᓂᓂᓂᖃᑦᑕᖃᖅ ᓄᐱᑕᒥᖃᐅᔨᔨᖃᖅ ᐊᓯᐤᐤ ᔨᑐᓯᒥᖅᓯᐱᐅᑕᑦ ᓯᓄᓄᑦ
Clyde River Harbour - Uplands Area	Drilling	Commissioners	The harbour area has been used for fishing, harvesting, transportation of goods for at least 60 years since the community of Clyde River was established in it's current location.	An archaeological Impact Assessment (AIA) was completed by Lifeways of Canada Limited in 2019. The AIA results state that there are no known archaeological or paleontological sites in the project area.	The closest community is Clyde River, which is located within 100 m of the Project area. The closest protected area is Isabella Bay, which is approximately 80 km southwest of the Project area.
Clyde River Harbour - Marine Area	Drilling	Crown	The harbour area has been used for fishing, harvesting, transportation of goods for at least 60 years since the community of Clyde River was established in it's current location.	An archaeological Impact Assessment (AIA) was completed by Lifeways of Canada Limited in 2019. The AIA results state that there are no known archaeological or paleontological sites in the project area.	The closest community is Clyde River, which is located within 100 m of the Project area. The closest protected area is Ninginganiq National Wildlife Area in Isabella Bay, which is approximately 80 km southwest of the Project area.

[illegible]

ᑭᓇᑦᑦᑭᑦ	ᐱᑦ	ᑲᐱᑦᑭᑦᑭᑦᑭᑦᑭᑦ	ᑦᑭᑦᑭᑦ ᑭᑦᑭᑦᑭᑦᑭᑦᑭᑦᑭᑦᑭᑦ
Clyde River	James Arreak (SAO) and other council members	Hamlet Council	2020-02-24
Clyde River	Jerry Natanine (Mayor)	Hamlet Council	2020-02-24
Clyde River	James Arreak (SAO) and	Hamlet Council	2020-02-26

	other council members		
Clyde River	Jerry Natanine (Mayor)	Hamlet Council	2020-02-26
Clyde River	Mike Jaypoody - Director, and other members	Community QIA	2020-02-24
Clyde River	Mike Jaypoody - Director and other members	Community QIA	2020-02-26
Clyde River	Joamie Apala - HTA Director, other HTA memeber	Nangmautaq HTA	2020-09-29
Clyde River	Gary Aipeelee - HTA Manager	Nangmautaq HTA	2020-09-29
Clyde River	James Arreak (SAO) and other council members	Hamlet Council	2020-09-29
Clyde River	Silas Natanine - Crew Lead	Guardians	2020-09-29
Clyde River	Joavie Ettuangat - Director	Guardians	2020-09-29
Clyde River	James Arreak - SAO Hamlet Coucil	Hamlet Council	2019-11-04
Clyde River	Gary Aipellee and HTA Members	Nangmautaq HTA	2019-11-04

[illegible]

$a^b r^c \wedge c d e f g h i j k l m n o p q r s t u v w x y z$

North Baffin

[illegible][illegible]

Project transportation types

Transportation Type	How the Equipment will be Mobilized to the Project	Length of Use
Air	Geotechnical Drill Rig will be mobilized to Clyde River via air using the existing airport, crew will arrive to Clyde River by air at the existing airport	

Project accomodation types

005179

Λ⁹δ^c Δ⁹ρ²Δ⁹ Δ⁹CDσ⁹Δ⁹Δ⁹ Δ⁹Δ⁹ρ⁹Δ⁹Δ⁹Δ⁹ Δ⁹Δ⁹Δ⁹, Γ⁹Δ⁹Δ⁹Δ⁹, Δ⁹Δ⁹Δ⁹Δ⁹, Δ⁹Δ⁹Δ⁹ Δ⁹Δ⁹Δ⁹Δ⁹

በበፍጥረቱ ሂደት ውስጥ የሚከሰቱትን ለውጦች ለመቆጣጠር የሚያስፈልጉትን ምርመራዎችን ማድረግ ይቻላል።

ΔL⁹⁶ ΔD⁹⁶ CD⁹⁶ ΔL⁹⁶ ΔD⁹⁶

$\mathcal{D}^c \rightarrow \mathcal{C} \dot{\mathcal{I}}^{\mathfrak{q}_b} \mathcal{A} \mathcal{D}^{\mathfrak{q}_b} \mathcal{C} \mathcal{D}^{\sigma} \mathcal{A}^{\mathfrak{q}_b} \mathcal{D}^{\mathfrak{q}_b}$	$\mathfrak{q}_b \mathfrak{q}_b \Delta \Gamma^{\mathfrak{q}_b} \mathcal{C}^{\mathfrak{q}_b} \mathcal{C}^{\mathfrak{q}_b} \sigma \mathcal{A}^{\mathfrak{q}_b} <^c$	$\mathfrak{a} \mathcal{P}^c \Delta \Gamma^{\mathfrak{q}_b} \mathcal{C}^{\mathfrak{q}_b} \mathcal{C}^{\mathfrak{q}_b} \sigma \mathcal{A}^{\mathfrak{q}_b} <^c$
--	--	---

38	No freshwater use. Marine water from Patricia Bay to be used for drilling and circulated back into Patricia Bay (temporary use). Approximately 38m ³ /day water use via 1.5 water intake pump.	no freshwater use - marine water from Patricia Bay to be used for drilling and circulated back into Patricia Bay (temporary use) via 1.5 intake pump.
----	---	---

ᐃᑦᐸᑦ

ᐃᑦᐸᑦ ᐸᑦᐸᑦ

ᐸᑦᐸᑦ ᐸᑦᐸᑦ ᐸᑦᐸᑦ	ᐸᑦᐸᑦ ᐸᑦᐸᑦ	ᐸᑦᐸᑦ ᐸᑦᐸᑦ	ᐸᑦᐸᑦ ᐸᑦᐸᑦ	ᐸᑦᐸᑦ ᐸᑦᐸᑦ
Drilling	ᐸᑦᐸᑦ ᐸᑦᐸᑦ	as listed in materials section	All hazardous waste will be packaged securely in original containers and transported south for disposal at a certified facility	n/a
Drilling	ᐸᑦᐸᑦ ᐸᑦᐸᑦ	15 Garbage Bags	municipal waste disposal site	n/a

ᐸᑦᐸᑦ ᐸᑦᐸᑦ

Wildlife may be disturbed and move away from or be attracted to drilling activities. Local field assistants will accompany the geotechnical field program personnel to monitor for disturbance to marine and terrestrial wildlife and their habitat. If marine mammals are observed within 500 m of the drilling location, drilling activities will cease until the marine mammal has left the area. Disruption of fish habitat through direct alteration of the seabed, increased turbidity, or accidental spills. Fish could be drawn into water intake while pumping water from Patricia Bay. Shellfish mortality may occur where sedentary species are in the direct path of the drill head. A screen will be used for water intake to prevent fish entrainment, and the drill head will be advanced slowly to allow mobile species to escape. The alteration of the seabed is temporary and limited to the small area occupied by each borehole. A low magnitude increase in suspended sediment will be temporary and limited to the area surrounding each in-water borehole. The amount of fuel and drilling additive will be limited to that required to complete the drilling for each day. A non-toxic, biodegradable drilling additive will be used, if required. Secondary containment will be in place under the drill rig motor. A spill response plan and spill response kit adequate to contain the potential volume of fuel in the equipment will be maintained on-site and implemented in the event of a spill. Although the geotechnical program is in marine waters, DFO's Interim code of practice: End-of-pipe fish protection screens for small water intakes in freshwater will be followed.

Additional Information

SECTION A1: Project Info

SECTION A2: Allweather Road

SECTION A3: Winter Road

SECTION B1: Project Info

SECTION B2: Exploration Activity

SECTION B3: Geosciences

SECTION B4: Drilling

SECTION B5: Stripping

SECTION B6: Underground Activity

SECTION B7: Waste Rock

SECTION B8: Stockpiles

SECTION B9: Mine Development

SECTION B10: Geology

SECTION B11: Mine

SECTION B12: Mill

SECTION C1: Pits

SECTION D1: Facility

SECTION D2: Facility Construction

SECTION D3: Facility Operation

SECTION D4: Vessel Use

SECTION E1: Offshore Survey

SECTION E2: Nearshore Survey

SECTION E3: Vessel Use

SECTION F1: Site Cleanup

SECTION G1: Well Authorization

SECTION G2: Onland Exploration

SECTION G3: Offshore Exploration

SECTION G4: Rig

SECTION H1: Vessel Use

SECTION H2: Disposal At Sea

SECTION 11: Municipal Development

[illegible]

The Project area is a community fishing harbour. The closest protected area is Ninginganiq National Wildlife Area in Isabella Bay, which is approximately 80 km southwest of the Project area. The onshore harbour area is part of the terrestrial environment and consists of a relatively flat, compacted sand parking area for the existing community sealift and boat launch. The parking area also functions as a temporary storage and stockpiling location for equipment, building supplies, and shipping containers. The intertidal shoreline is part of the marine environment and primarily consists of a shallow sloped sandy beach with occasional patches of mixed gravel, cobble, and boulders in the Project area. The upper and mid-intertidal zones consist primarily of coarse sand and limited algal wrack, whereas substrate in the lower intertidal and shallow subtidal areas are coarse sand with patches and narrow bands of gravel, cobble and boulder. A low boulder wall runs parallel to shore along the beach from west to east through the lower intertidal zone. Benthic substrate in the subtidal Project area is generally flat with little relief and primarily consisted of sand with small, patchy clusters of gravel, cobble and boulders in the area. Boulders are also present in a low wall running parallel to shore through the lower intertidal / shallow subtidal zone. Sediment samples collected from the Project area indicated that no exceedances were reported with respect to Disposal at Sea Regulations, CCME sediment quality guidelines and CCME soil quality guidelines. Marine water samples in the Project area indicated that no exceedances were reported with respect to CCME marine water quality guidelines. The nearshore area is ice-covered in the winter season, when this Project is scheduled to be completed. Noise levels are expected to be low.

ᐱᓪᓇ ᐱᑦᐅᐅᑦ ᑭᓪᓂᐱᑦᐅᑦ ᑕᓪᓂᐅᑦᓴᑦ: ᐅᐱᑭᑦᑕᑭᑦᑦᓴᑦ

Terrestrial fauna observed during field surveys in the parking area consisted of common Arctic bird species (seagulls, ravens, etc.) which temporarily occupied the area while foraging. Terrestrial mammals likely migrate through the open parking area; however, they were not observed during field surveys. Terrestrial mammals and birds are not anticipated to be present in the area at the time of the survey. Terrestrial flora is absent from the area. Marine flora and fauna are largely absent from the intertidal and foreshore harbour area during the winter period. The shallow nearshore area is also likely within the ice scour zone, therefore flora and motile fauna are anticipated to be largely absent from the area. Infauna, such as the truncate softshell clam (*Mya truncata*), may be present below the surface of fine sediment in the subtidal portion of the harbour. One species at risk, Polar Bear, may occur in or near the Project area during the winter when the project will be carried out.

[illegible]

The closest community is Clyde River, which is located within 100 m of the Project area. The closest protected area is Ninginganiq National Wildlife Area in Isabella Bay, which is approximately 80 km southwest of the Project area. An archaeological Impact Assessment (AIA) was completed by Lifeways of Canada Limited in 2019. The AIA results state that there are no known archaeological or paleontological sites in the project area. Infrastructure constructed in the intertidal shoreline is limited and consists of the existing community sealift and boat launch, as a small sheltered area for landing boats.

Miscellaneous Project Information

[illegible]

Disturbance or Injury Due to Underwater SoundThe use of an underwater borehole drill has the potential to temporarily increase underwater sound levels in the harbour for the duration of the Project. Underwater noise generated by geotechnical drilling can temporarily increase the risk of injury and behavioural changes in fish. Impacts to fish are generally short in duration, and related to temporary hearing loss in the immediate vicinity of the drill, and behavioural changes. Behavioural changes include area avoidance, reduced foraging success, altered predator-prey interactions, increased concentrations of stress hormones, and decreased growth rates (Wenger et al. 2017). Underwater noise generated by the borehole drill is not expected to reach levels that are likely to disturb marine mammals. Further, the Project is being carried out in late winter when the harbour is ice-covered, therefore air breathing marine mammals are not expected to be present in the vicinity of the drill.

Sediment and Water QualityBorehole drilling has the potential to temporarily resuspend a minute quantity of marine sediment into the water column near the borehole, which could potentially affect water quality and temporarily increase suspended sediment near the boreholes during the Project. Marine water will be pumped into the borehole and later returned to the harbour, and contains a moderate quantity of suspended sediment. Temporary impacts associated with increased levels of suspended sediments in the water column may include decreased visibility, avoidance of the Project Area, gill abrasion and potential stress increases, and accidental mortality (Cairns, 2002). Suspended sediment has the potential to contain contaminants; however, none of the sediment collected and analyzed from the harbour as part of the 2019 and 2020 field programs had concentrations that exceeded the Canadian Council of Ministers of the Environment (CCME) probable effect levels (PEL) for marine sediment (Advisian, 2020; CBCL, 2020a; CCME, 2014).

Fish MortalityFish could be drawn into water intakes while pumping water from Patricia Bay for use during drilling. Fish mortality in the harbour may temporarily increase during the Project if fish that become impinged on water intake screens or entrained in the water pumping system. Motile species are expected to temporarily relocate to other areas in the harbour and nearby suitable habitats. These species are expected to return to the Project area soon after completion of the Project.

Alteration and Destruction of Fish HabitatDisruption of fish habitat can occur through direct alteration of the seabed, increased turbidity, or accidental spills. The alteration of the seabed due to borehole drilling is temporary and limited to the small area occupied by each borehole. A low magnitude increase in suspended sediment will be temporary and limited to the area surrounding each in-water borehole.

Risk of Spills and Environmental PollutionHazardous materials such as diesel fuel, oil, and lubricants are common on geotechnical worksites as part of the operation and maintenance of drilling equipment. Proper transportation, storage, and handling of these materials must conform to territorial regulations and guidelines. Suppliers of these materials have recommendations for the appropriate transportation, storage, and handling of these materials, and these will be used in conjunction with best management practices.

6.7 Disruption of Traditional UseTraditional use of the Project area is not anticipated to be affected during the completion of the Project.

Cumulative Effects

There are no residual effects of the Project that will result in cumulative environmental effects.

Impacts

$\omega_{\Delta} \Delta^{\frac{1}{2}} C D \sigma^{\frac{1}{2}} \Gamma^C$
 $\Delta \Gamma C D \sigma^{\frac{1}{2}} \Gamma^C$
 $\Delta^{\frac{1}{2}} \Delta^{\frac{1}{2}} C D \Gamma L \Gamma^C$

PHYSICAL															
Designated environmental areas															
Ground stability															
Permafrost															
Hydrology / Limnology															
Water quality															
Climate conditions															
Eskers and other unique or fragile landscapes															
Surface and bedrock geology															
Sediment and soil quality															
Tidal processes and bathymetry															
Air quality															
Noise levels															
BIOLOGICAL															
Vegetation															
Wildlife, including habitat and migration patterns															
Birds, including habitat and migration patterns															
Aquatic species, incl. habitat and migration/spawning															
Wildlife protected areas															
SOCIO - ECONOMIC															
Archaeological and cultural historic sites															
Employment															
Community wellness															
Community infrastructure															
Human health															

$$(P = \langle \text{b b d} \underline{\text{a}} \text{p n r}^{\text{a}} \underline{\text{a}}^{\text{b}} \rangle^{\text{c}}, N = \langle \text{b d}^{\text{b}} \text{r}^{\text{b}} \text{r}^{\text{c}} \text{d} \text{r}^{\text{a}} \underline{\text{a}}^{\text{b}} \rangle^{\text{c}} \langle \text{c d} \text{r}^{\text{b}} \text{r}^{\text{b}} \rangle^{\text{b}} \text{c d} \text{r}^{\text{a}} \underline{\text{a}}^{\text{b}} \text{r}^{\text{c}} \rangle^{\text{c}}, M = \langle \text{b d}^{\text{b}} \text{r}^{\text{b}} \text{r}^{\text{c}} \text{d} \text{r}^{\text{a}} \underline{\text{a}}^{\text{b}} \rangle^{\text{c}} \langle \text{c d} \text{r}^{\text{b}} \text{r}^{\text{b}} \rangle^{\text{b}} \text{c d} \text{r}^{\text{a}} \underline{\text{a}}^{\text{b}} \rangle^{\text{c}}, U = \text{r}^{\text{b}} \text{d} \text{r}^{\text{a}} \underline{\text{a}}^{\text{b}} \text{r}^{\text{c}} \rangle^{\text{b}})$$

1	point	Clyde River Harbour - Marine Area
2	point	Clyde River Harbour - Uplands Area

- | | | |
|---|-------|------------------------------------|
| 1 | point | Clyde River Harbour - Marine Area |
| 2 | point | Clyde River Harbour - Uplands Area |