




Clyde River Small Craft Harbour Development

Nunavut Research Institute Field Survey Summary Report

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Report: 200235-RE-001-Nunavut Research Institute Summary Report

February 24, 2021

Mr. Mosha Cote, Manager, Research Liaison
Nunavut Research Institute
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Box 1720, Iqaluit, NU XOA OHO

Dear Mr. Cote:

RE: Draft - Clyde River Small Craft Harbour Development – Nunavut Research Institute Field Survey Summary Report

Please see attached our Draft report for a brief summary of field programs completed in the summer and fall of 2020 as part of the Clyde River Small Craft Harbour Development Project.

If after your review you have any questions, please contact us at your convenience.

Yours very truly,

Canadrill-CBCL

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Chapter 1 Summary of Field Surveys

The Canadrill-CBCL Joint Venture was retained by Public Services and Procurement Canada (PSPC) on behalf of Fisheries and Oceans Canada (DFO) to design a proposed small craft harbour (SCH) development in Clyde River, Nunavut (the Project). To inform the feasibility study, carried out by Advisian in 2019, and the design, a field program was conducted in 2019 by Advisian and in 2020 by Canadrill-CBCL Joint Venture on behalf of DFO-SCH. A permit for the 2019 field program was received from the Nunavut Research Institute and was extended to 2020 (Scientific Research License 02 061 20R-M).

This summary report presents a brief overview of field surveys completed in Clyde River in the summer and fall of 2020. The field surveys are briefly described in the following subsections.

1.1 Marine Fish and Fish Habitat Survey

Fish and fish habitat surveys were completed in the marine environment in Clyde River between September 19 and 23, 2020. Surveys completed include:

- Underwater benthic habitat surveys (UBHS)
 - Eight intertidal benthic habitat transects
 - Fifty-three subtidal benthic habitat transects
- Benthic invertebrate community sampling
 - Six benthic invertebrates community samples
- Pelagic plankton community sampling
 - Three horizontal plankton samples
 - Three vertical plankton samples

The results of the marine fish and fish habitat surveys characterize the existing environmental conditions in the intertidal and subtidal areas of the proposed SCH facility, subtidal habitat and seabed conditions in the proposed disposal at sea (DAS) area, and the pelagic and benthic invertebrate food sources in Clyde Inlet at the time of the survey.

1.2 Marine Bird Survey

Marine bird surveys were completed between September 23 and 24, 2020. Two rounds of bird surveys were conducted at six different survey locations along the shoreline in Clyde River. During each round, a single-observer completed an unlimited-radius bird survey ranging in duration from 15 to 30 minutes using binoculars and a spotting scope. Marine and terrestrial birds were identified to species, where possible, and any birds observed

outside of the survey periods were recorded as incidentals. Birds observed in the harbour area were primarily glaucous gulls (*Larus hyperboreus*), and common raven (*Corvus cora*).

1.3 Marine Sediment Sampling Program

A marine sediment sampling program (MSSP) was completed on September 20, 2020 in the area of the proposed DAS location. Field personnel collected sediment using a 25lb petite ponar sediment grab on a small landing craft. Six samples were collected and submitted for laboratory analysis to characterize the potential environmental effects of DAS and provide a baseline for post-disposal monitoring. The analytical results of the sediment samples collected from the Clyde River DAS location indicated that the sediment is primarily uncontaminated sand with no reported exceedances of relevant DAS Regulations and Canadian Council of Ministers of the Environment (CCME) sediment and soil quality guidelines.

1.4 Bathymetric Field Survey

Bathymetric field surveys were undertaken in the marine environment in Clyde. The harbour area was surveyed using single-beam between October 4 and 6, 2020. The single-beam survey was tested for quality control in the field using tape-measured depth soundings and a measurement of water level using real-time kinematic (RTK) positioning using global navigation satellite systems (GNSS). The soundings matched well and the estimated vertical and horizontal accuracy of the depth soundings relative to the chart benchmark was approximately 0.1 metre. The survey also collected tide gauge position and pressure data for tidal corrections and confirmed bathymetric survey data against known elevations on October 7, 2020.

1.5 Topographic Field Survey

Topographic field surveys were undertaken in the harbour area, the haul road to the rock quarry, and throughout the footprint of the quarry using RTK positioning and GNSS between September 10 and 20, 2020. The topographic survey was completed to the limits of the harbour area including coverage of the upland limit and water limit of the harbour area. The topographic survey was extended below the low water mark in an effort to close the gap of coverage between the topographic and bathymetric surveys, since the bathymetric survey vessel could not access the shallow, boulder-strewn waters along the shoreline. The surveyor used chest waders to wade out and survey shallow waters in the harbour at low tide.

There are two roads leading to the quarry, one to the east and one to the west. These two roads merge about 500 metres from the quarry and both cross Clyde River. The west road has a bridge crossing, whereas the east road has a ford crossing. The roads and river crossings were surveyed to confirm their grade, width, and elevation. The rock quarry itself

was surveyed to facilitate the calculate of quantities of rock available for the harbour project.

Canadrill also surveyed and installed two new brass plug style benchmarks in the upland harbour area. DFO requested the installation of two new benchmarks since two of four existing benchmarks will be destroyed during the construction of the new SCH.

1.6 Legal Land Survey

The legal land survey was completed in Lots 278 and 279 in Clyde River using RTK positioning and GNSS between September 10 and 18, 2020. The boundary between Lot 278 (upland harbour) and Lot 279 (waterlot) is delineated by the ordinary high-water mark (OHWM). The location of the OHWM was determined by measuring the shoreline at the average elevation of successive high tide water levels on September 21, 2020 using RTK positioning and GNSS. The location of the OHWM was confirmed by the slight discolouration of rocks in the area.

1.7 Geotechnical Field Survey

The geotechnical field survey was completed between September 5 and October 14, 2020, in three general survey areas:

- The upland harbour parking area at the existing community sealift and boat launch
- The bridge and ford crossing Clyde River
- The community rock quarry

Four boreholes were drilled in the upland harbour parking area. Sediment encountered in the upland area consisted primarily of silty sand. A multibead thermistor temperature sensor was installed in two of the four boreholes in the upland area. Four boreholes were drilled on the banks of Clyde River at the bridge and ford crossing. Sediments primarily consisted of sand with silt and gravel. Temperature sensors were also installed in two of the four river bank boreholes. Ten boreholes were drilled in and around the community rock quarry and sediments consisted entirely of bedrock; a few locations contained a thin layer of sediment and vegetation over bedrock.



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