

## Public Registry - Project Proposals

NPC 150616: Resolute Bay Geothermal Potential

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Proposal Status: Conformity Determination Issued

Overview Documents

Project Overview

Type of application: New

Proponent name: Stephen Grasby

Proponent company: Geological Survey of Canada - Natural Resources

<https://lupit.nunavut.ca/portal/pportal.php#MyProjectsCanada>

### Project Description:

Geothermal resources could provide significant benefit to northern communities. For instance, some have estimated that geothermal heating in greenhouses at Resolute Bay can yield fresh produce with an average cost that is 50% lower than having to ship them to the community, supporting food security and nutrition. In 2018 Qulliq Energy conducted a prefeasibility study of geothermal energy in Nunavut, results of which highlighted the community of Resolute Bay, on Cornwallis Island, as one of three areas of interest worthy of further investigation. Following the initial study, Qulliq Energy contracted geophysical surveys by University of Alberta (magnetotelluric/ gravity) around the town of Resolute Bay in 2022/23 to identify potential subsurface reservoirs. Interpretation of these geophysical results requires geoscience knowledge on physical/geochemical properties of rock units in the subsurface. The community of Resolute Bay is underlain by over 4 km of sedimentary rocks. Previous work suggests that a rock units known as the Eleanor Bay Formation, > 3 km deep, could potentially form a geothermal reservoir. Knowledge of the rock properties is limited, however, and there are only two old petroleum wells drilled on the island with subsurface data. To understand the reservoir rocks that currently lie >3 km depth below Resolute Bay, we can examine them where they are exposed, in a geological feature known as the Central Dome, in the centre of Cornwallis Island. Rocks of the Eleanor Bay Formation are well exposed along river channels in the Central Dome but remain poorly described. A second location is a site at Lyall River on Devon Island. To assess the total potential energy production from a rock unit, several physical properties are required to develop models for both heat conduction (heat transfer to the fluid) as well as hydrogeologic (water movement through the rock mass). Basic examination of the rock outcrops are required to understand lateral and vertical heterogeneities of these properties. Equally important is characterisation of rocks that form seals above the reservoir, which limit upward movement of reinjected fluids (i.e. leakage to surface). All of these properties are currently unknown for the units of interest. Study of the research sites would allow characterisation of both the rock units that could form productive reservoirs of geothermal fluids in the subsurface, as well as cap rocks that would form seals. We wish to conduct focused field work by establishing small 5 person tent camps for the first 2 weeks in July, 2025, including a wildlife monitor hired from Resolute Bay. Small individual tents will be used, one per person, plus an

additional cooking/eating tent. All materials and food will be brought in and removed at the end. No fuel caches are required. The field team will have appropriate safety training including wildlife awareness. All efforts will be made to minimize wildlife encounters. Access to the field site will be by helicopter from Resolute Bay and then by foot while on site. Measurements will be made by handheld devices and small hand size rock samples will also be collected for detailed study in laboratories. These will be curated and stored at the Geological Survey of Canada in Calgary. No more than 100 kg of rocks in total will be collected. There will be no collection of fossils. One site we wish to visit is on Inuit owned land. This would be a day trip by helicopter to examine rock exposures. We are applying for a land use permit but if this component is not approved it will be dropped from the overall workplan. All results and data will be made publicly available through online publication of Geological Survey of Canada Open File reports. Results will also be used in scientific publications. After completion of study, the lead researcher will travel to Resolute Bay and Iqaluit to make in person presentations of results. The timing will be determined through consultation as to when is best (e.g. to link to any planned science events).

#### Project Schedule

Start Date: 2025-07-01

End Date: 2025-07-15

#### Project Map

List of project geometries:

Id	Geometry	Location Name
15952	point	Burrow Harbour camp site, at old twin strip on previously disturbed land
15954	point	Lyall River field location, rock outcrops examined during day trips
15955	point	Cape Manning field location, rock outcrops examined during day trips
15956	point	Eleanor Lake field location, rock outcrops examined during day trips
15957	point	Central Dome, field camp location, and examination of rock outcrops within walking distance

NPC Planning regions:

North Baffin

#### Project Land Use and Authorizations

Project Land Use:

Scientific Research

Licensing Agencies:

Nunavut Research Institute

Nunavut Water Board

## Qikiqtani Inuit Association

### Material Use

#### Equipment:

Type	Quantity	Type	Use
Aircraft 1	A star	Helicopter from PCSP at Resolute Bay	to access field sites

#### Fuel Use:

Type	Container	Capacity	Use
Aviation fuel	10	55	fuel for helicopter, fueled at Resolute Bay airstrip

#### Hazardous Material and Chemical Use:

Type	Container	Capacity	Use
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No data found

#### Water Consumption:

Daily Amount (m2)	Retrieval Method	Retrieval Location
0	adjacent to field camp	extraction from stream or snow melt

### Waste and Impacts

#### Environmental Impacts:

Environmental impact will be minimal. We will remove all material brought in for the field camp. No permanent structures will be made and the sites will be returned to a natural looking state. We will collect rock samples for study in laboratory but these will be minimal and hand size samples. We estimate 100 kg at maximum. Efforts will be made to avoid collection from any obvious locations such that outcrops will maintain a natural look. Given the small camp size we propose to dig a latrine for human waste. We would dig a greywater pit and screen any organics before disposal. Pits will be backfilled and leveled at the end of the camp. All garbage will be returned to Resolute Bay for disposal.

#### Waste Management:

Waste Type	Quantity Generated	Treatment Method	Disposal Method
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No data found