
NUKIK CORPORATION

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KIVALLIQ
HYDRO-FIBRE
LINK

Photo from Nukik Corporation

Connecting the Arctic

Inuit-lead Submarine Cable Routing & Feasibility Study

October 25/26, 2023

HDR

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Agenda

01 | Introductions

02 | What is the KHFL?

03 | Pre-Feasibility Goals & Study Overview

04 | Opportunities & Constraints

05 | Data Collection, Gaps, Challenges

06 | Permitting Review

Introductions

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What is the Kivalliq Hydro-Fibre Link?

The Kivalliq Hydro-Fibre Link (KHFL) is a **100% Inuit-owned and Inuit-led inter-tie project** that will be Nunavut's first infrastructure link to Southern Canada, providing clean, renewable power and fibre-optic internet capacity.

- ✓ Connecting Manitoba's grid into the Kivalliq region of Nunavut
- ✓ Reduce reliance on diesel and associated emissions.
- ✓ Provide homes, businesses and mines with renewable, cost-effective power and reliable high-speed internet
- ✓ Unlock future renewable energy generation in the North that in turn can be shared with southern Canada.
- ✓ Multi-generational socio-economic benefits for communities of Arviat, Baker Lake, Chesterfield Inlet, Rankin Inlet and Whale Cove.
- ✓ Protect marine environment by reducing shipping of diesel in the Arctic.
- ✓ Benefit Canada's sovereignty in the high Arctic

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Goals of the Submarine Pre-Feasibility Study

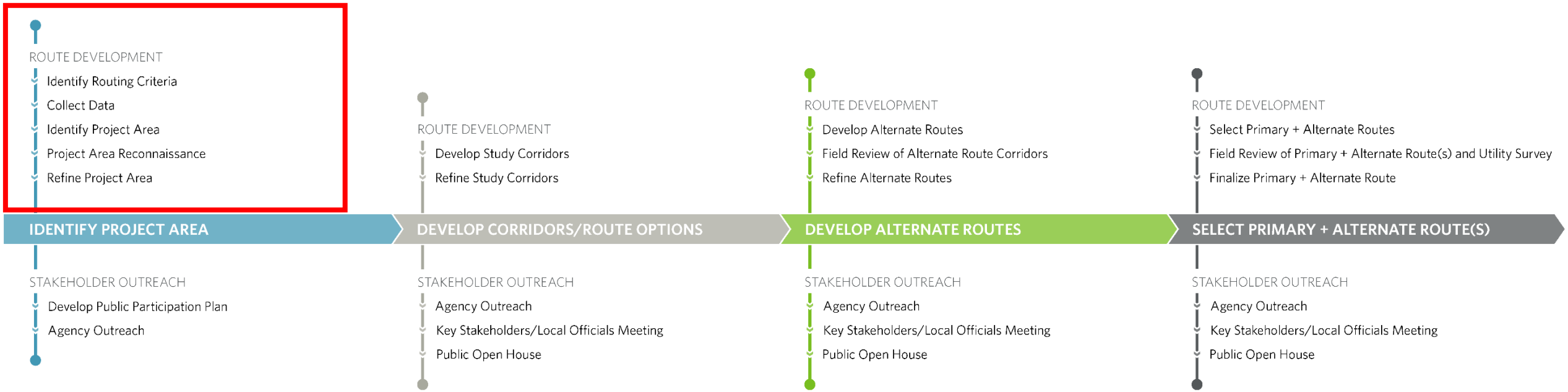
Nukik reviewing possible alternative routes and options including land and submarine routes. Pre-feasibility focused on potential alternative submarine option.

- Identify and review key opportunities and constraints
- Develop potential route corridor(s) for consideration
- Identify data gaps and needs along the route corridor(s)
- Identify and offer recommendations regarding environmental and regulatory requirements and constraints
- Identify risks and potential mitigation measures for constructability
- Develop Pre-Feasibility Report

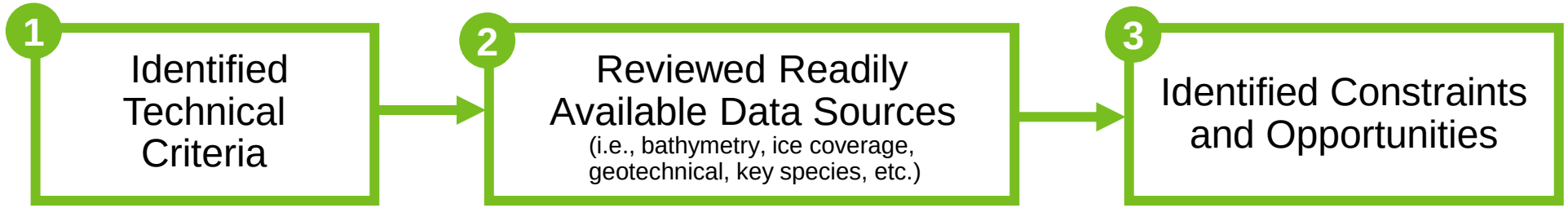
Routing and Siting

- Integrated routing and siting team

- Documented and justifiable process meeting regulatory requirements (e.g., Federal and Provincial)

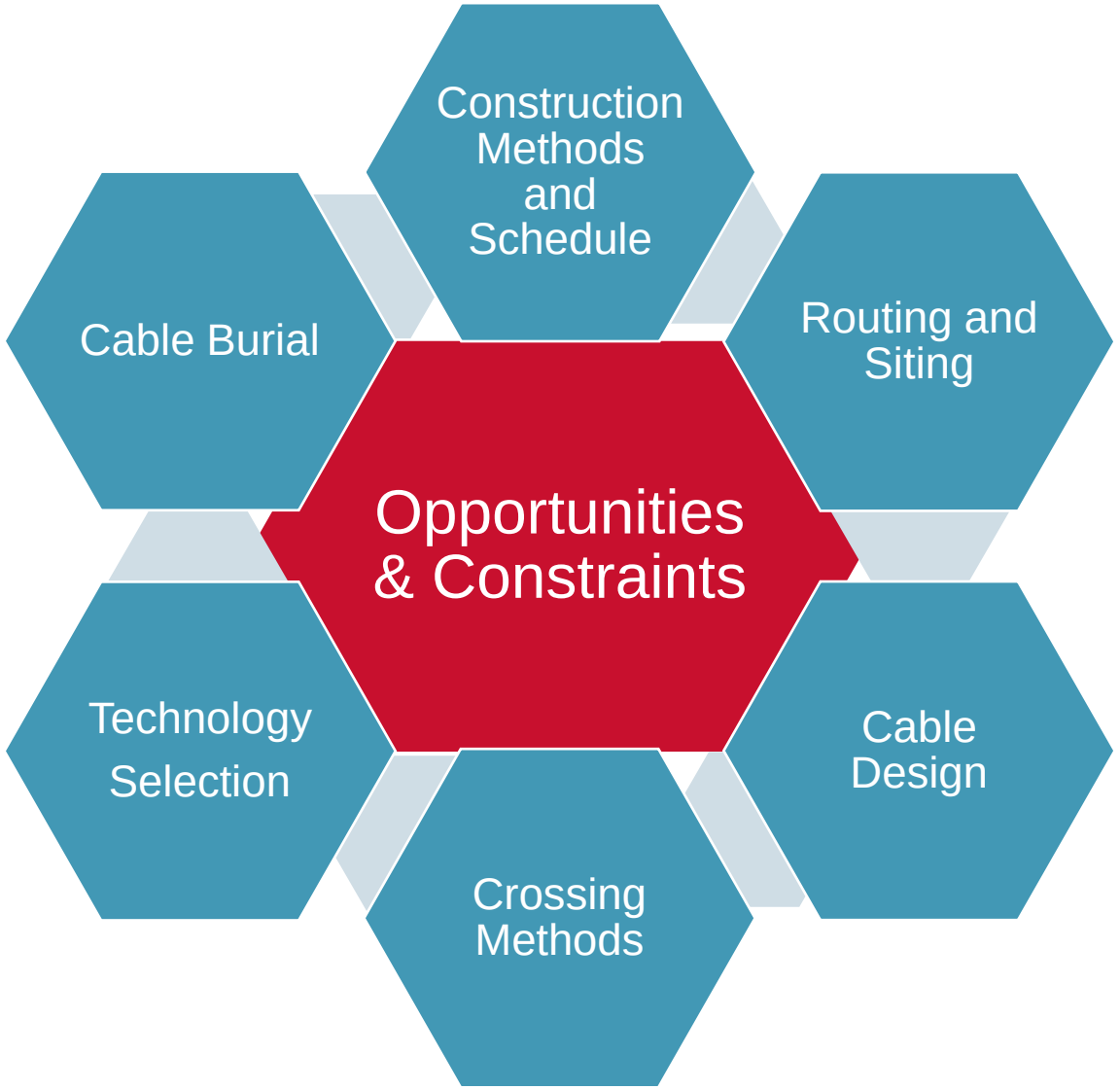


Desktop Assessment Approach



Project Segment	Criteria
Landfall Locations	• Avoidance of critical environmental features • Proximity to the HVDC transmission cable route to minimize environmental impacts, neighborhood disruption (i.e., disturbances, interruptions, or changes), and costs associated with the cable connections to the converter station. • Constructability and cost. • Minimization of cable route lengths. • Availability of suitable landfall locations (i.e., those that minimize environmental impacts and are within 5 miles of the substation). • Use of existing rights-of-way when a landfall location was not adjacent to the water.
Underwater Route	• Minimizes extreme changes in slope and water depths. • Target fine to coarse grain sediments that are sufficient depth to meet target cable burial depths while avoiding pockets of contaminated sediments and organic sediments. • Avoids and limits crossing navigation channels and anchorage areas where there is increased potential for anchor drag. • Avoid known submerged shipwrecks and other cultural resources. • Avoid mining and or dredge spoil areas. • Minimize number of infrastructure crossings. • Minimize the overall length of the route to minimize impacts to aquatic communities and avoid sensitive habitats.

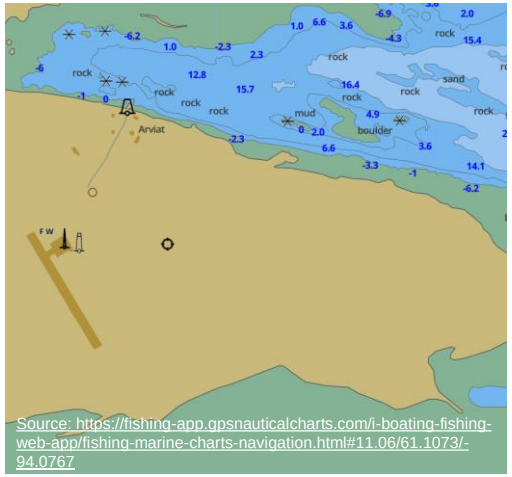
Opportunities & Constraints

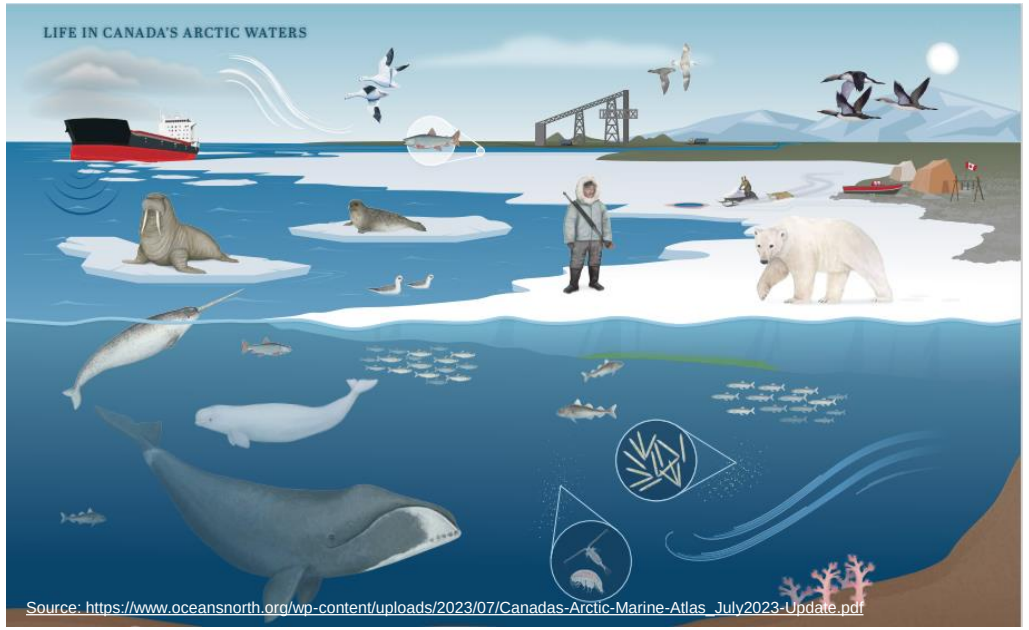


Data Collection

- Key and relevant data search and collection (pre-feasibility assessment)
  - Bathymetry
  - Geotechnical (surface / subsurface)
  - Sediment type and quality
  - Ice scour
  - Protected areas
  - Shipping routes
  - Land use and community development plans
  - Data format (e.g., Digital, GIS, Non-digital / paper hard copy)
- Digital and Non-digital sources
- GIS inputs and Mapper

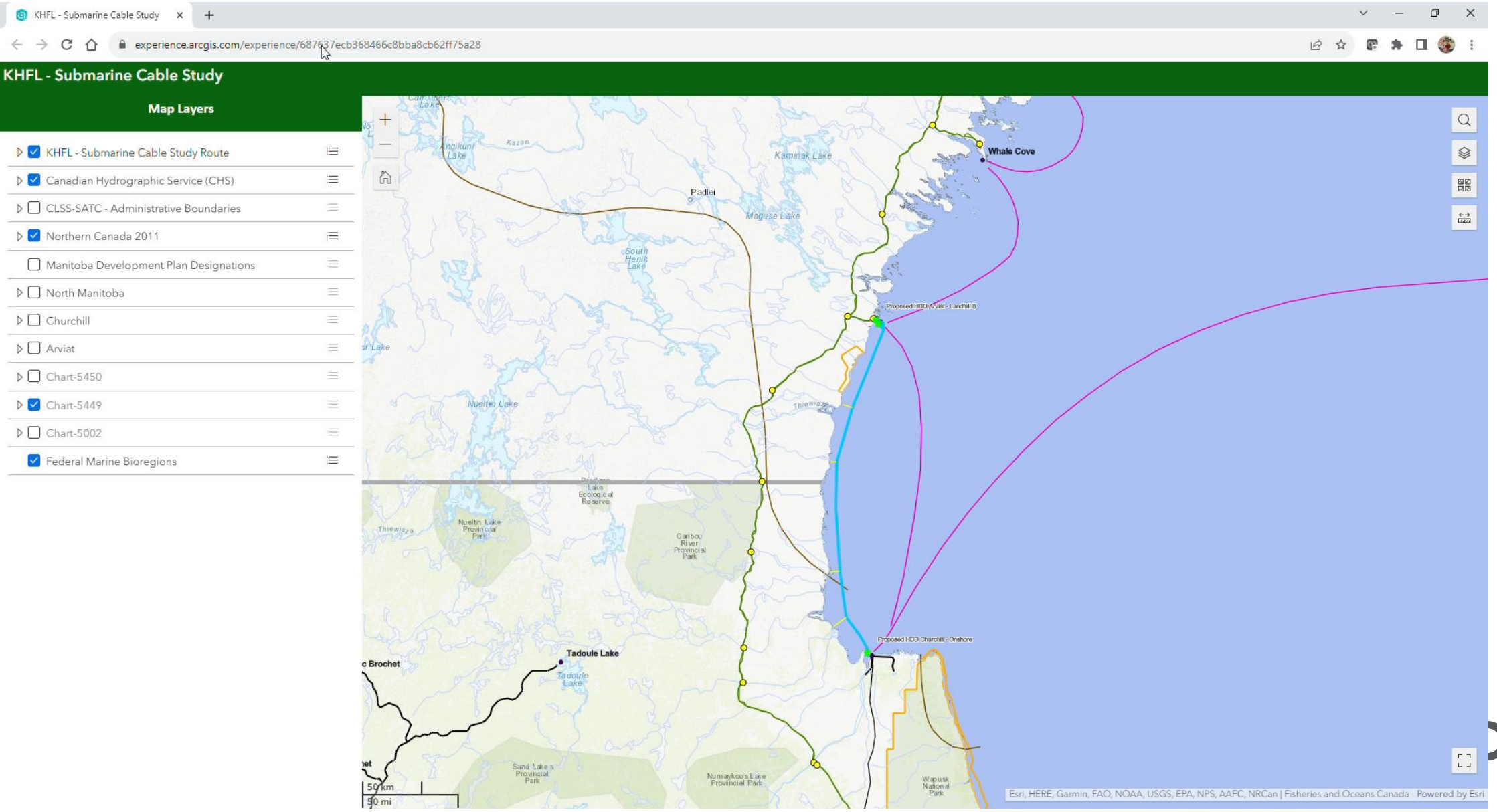
Photo source: Google Maps, 2022


Source: https://fishing-app.gpsnauticalcharts.com/i-boating-fishing-web-app/fishing-marine-charts-navigation.html#11.06/61.1073/-94.0767

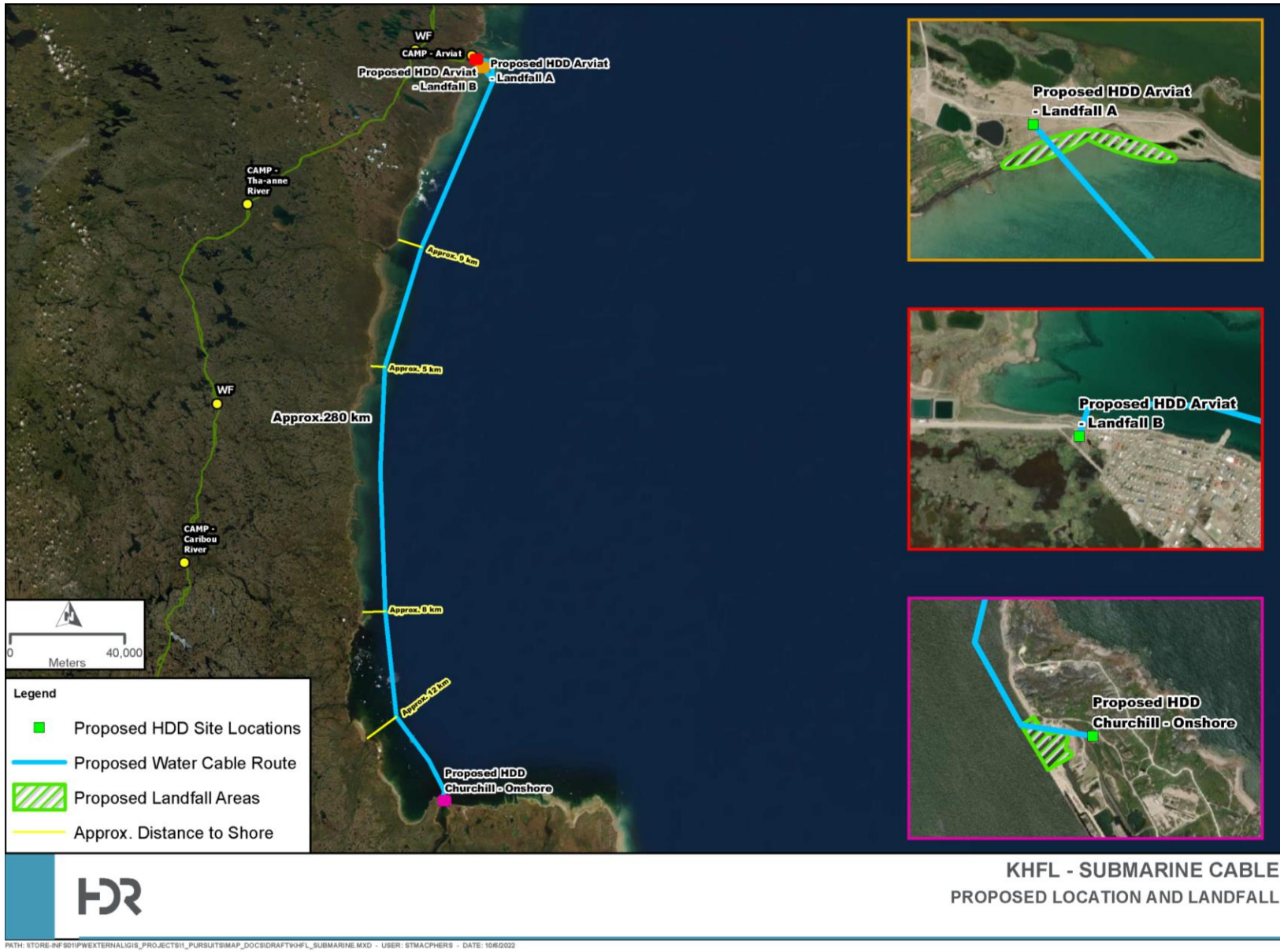


Source: https://www.oceansnorth.org/wp-content/uploads/2023/07/Canadas-Arctic-Marine-Atlas_July2023-Update.pdf

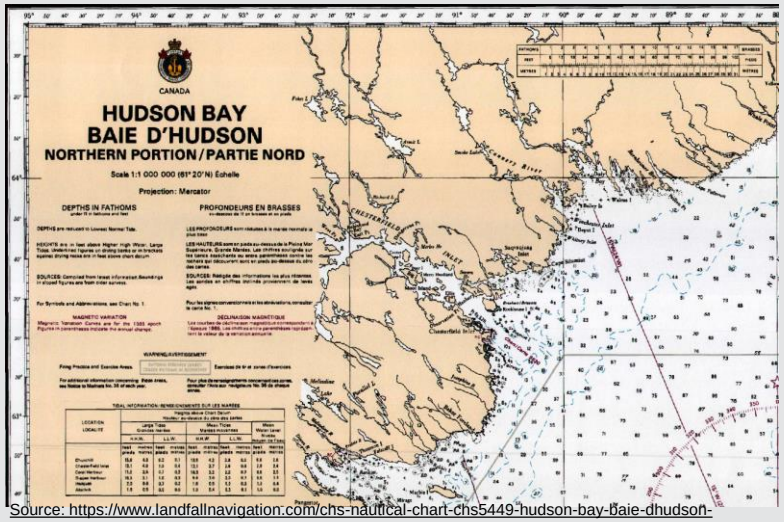
GIS Mapper Example



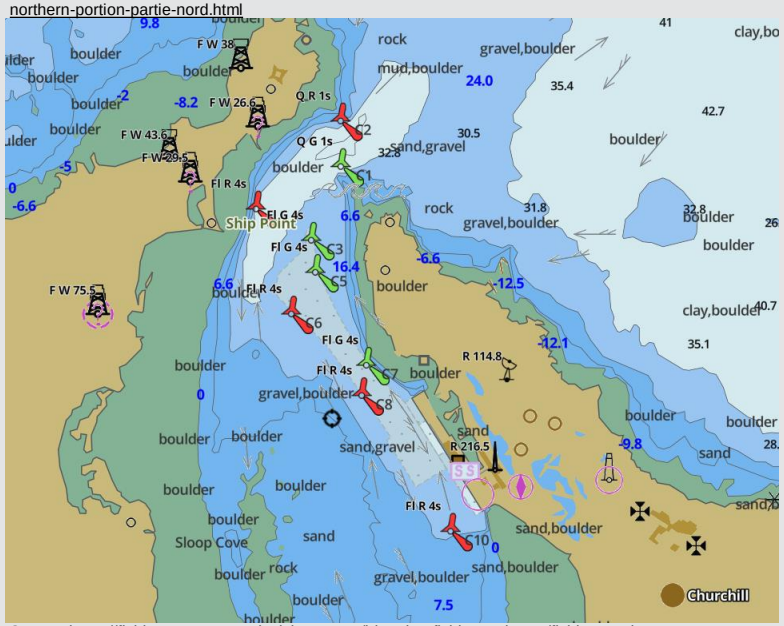
Submarine Cable Corridor



Submarine Cable Advantages/Opportunities



Source: https://www.landfallnavigation.com/chs-nautical-chart-chs5449-hudson-bay-baie-dhudson-northern-portion-partie-nord.html

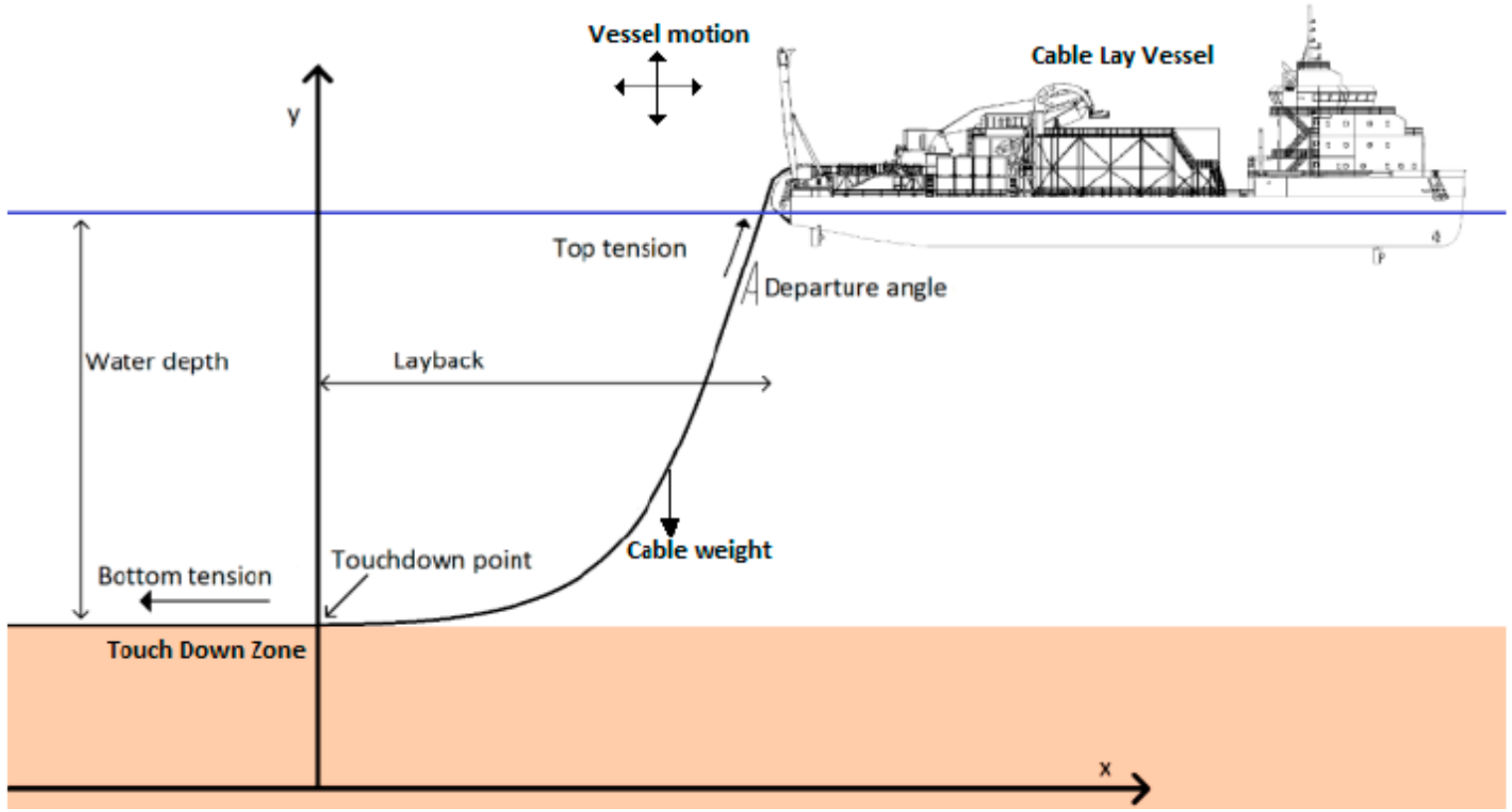


Source: https://fishing-app.gpsnauticalcharts.com/i-boating-fishing-web-app/fishing-marine-charts-navigation.html#11.06/61.1073/-94.0767

- Low bottom fishing activities
- No existing cable or infrastructure crossings
- Low navigation and shipping anchorage areas
- Low risk of seismic activity
- Low risk of interactions with terrestrial wildlife and other terrestrial natural environment features and associated potential impacts
- Reduced permitting complexity

Construction Methodologies

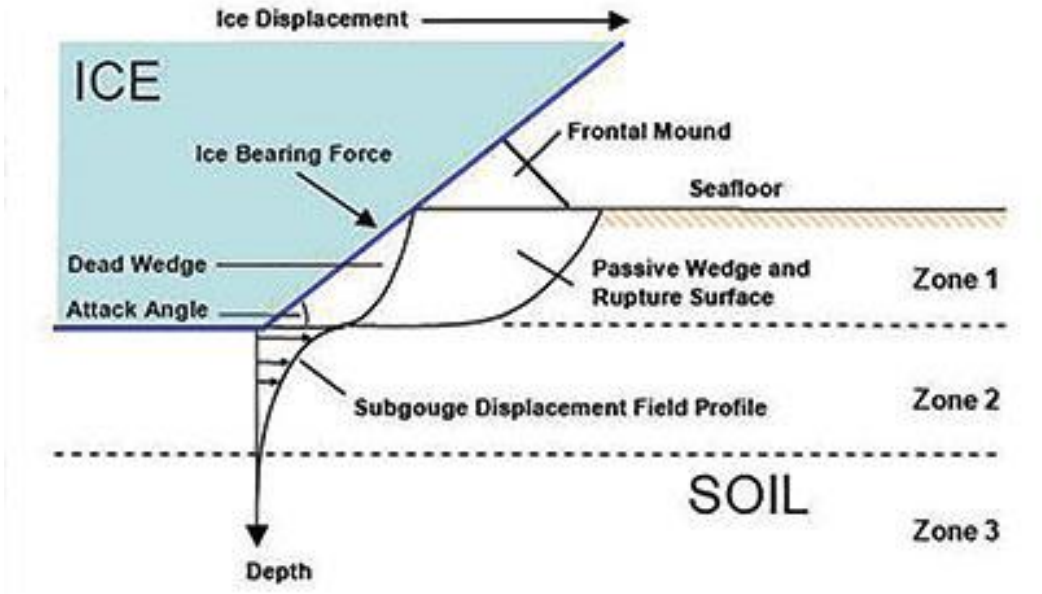
- Jetting Technology
- Trenchless Technology at Landfall
  - HDD considerations
    - HDPE fabrication
    - Drill duration



Source: https://doi.org/10.3390/jmse8010048

Key Constructability Risks

https://asmeiitr.medium.com/google-and-jio-to-build-largest-undersea-internet-cables-how-the-internet-works-3a7f3926a242



Submarine Cable Availability

Ice & Ice Scour

Geotechnical Conditions

Permitting Considerations

- Identification of applicable permits and requirements
  - Federal, provincial/territorial (Manitoba/Nunavut), municipal/local
  - Permitting matrix and ‘triggers’
- Federal and Provincial/Territorial Coordination
- Agency, Stakeholder, and Indigenous engagement and coordination including early outreach and engagement (e.g., workplans, surveys, etc)
- Seasonal Timing Restrictions (species specific)
- Regulatory complexity

Questions?