

Dempster Fibre Project

Installation Methods Overview

Project Values – What is considered in making decisions?

The Project’s environmental assessments and engineering works were based on valued ecological, social, cultural and economic components identified early on. These components were selected based on the results of environmental, archaeological field studies, literature reviews, consultation with First Nations, and professional expertise.

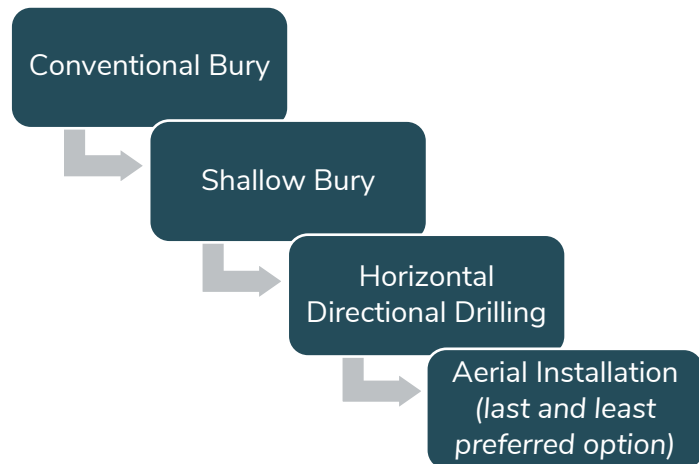
The key values are listed here for reference. Further details on both key and other values can be found in the YESAB Project Proposal available on <https://yesabregistry.ca/>.

- permafrost
- fish and fish habitat
- wildlife and wildlife habitat
- vegetation and wetlands
- heritage resources

Installation methods – How are the different techniques prioritized?

The method of installation is carefully chosen and depends on the terrain and environmental considerations such as the Values listed above.

A multi-disciplinary team with technical consultants, geotech and permafrost experts, construction professionals, and others work through a decision matrix illustrated here. The team conducts studies and assessments to choose an installation method, only moving onto the next option when the previous one is not practical or will conflict with a project value.



Decision matrix - installation method is carefully chosen to maximize environmental protection.

Buried cable – conventional bury

The most desirable method of installation is plowing the cable into the ground. This method:

- provides the greatest protection to the cable; and
- ensures the installation is kept out of sight, helping to maintain the pristine views of the northern Yukon.

This method is commonly used in fibre optic installations throughout the world and was used to install the line between Stewart Crossing and Dawson City. On this project, it is utilized in areas where the permafrost layer is at a depth greater than 1m, such as the Klondike Highway and the Southern sections of the Dempster Highway.



Conventional bury for areas with non-sensitive ground conditions. Generally involves two bulldozers cabled together.



Buried cable – shallow bury

A shallower burial depth than the conventional bury method, this still provides the cable with a high level of protection while focusing on protecting the environment.

- provides a high level of protection to the cable; and
- ensures the installation is kept out of sight, helping to maintain the pristine views of the northern Yukon.

We have specialized equipment to install the cable in the ground. This is because of permafrost and sensitive environmental conditions in the region.

Ground Pressure	Source
1.75 psi (12 kPa)	Rolligon – used on this project
15.00 psi (105 kPa)	M1 Abrams Tank
16.00 psi (110 kPa)	A walking human
30.00 psi (210 kPa)	Car
40.00 psi (275 kPa)	Mountain Bike



The Rolligon, pictured on the Dempster Highway in the Traditional Territory of Tr’ondëk Hwëch’in and the First Nation of Na-Cho Nyäk Dun.

Buried cable – horizontal directional drilling

We use a horizontal directional drill in areas where the Rolligon isn’t able to plow the conduit, such as under roadways, rivers, wetlands, and sensitive areas. This ensures that the environmental values are undisturbed and protected.

This unit drills a small diameter hole – measuring approximately 75mm – below the surface where the fibre conduit is placed.



Horizontal directional drill and drill pad.

Last Resort - Aerial Installation

Installing the line above ground on poles is the least preferred option. We use this method only when all other options have failed:

- the Rolligon isn't able to plow in the conduit; and
- horizontal directional drilling isn't possible.

The most common ground conditions that prevent drilling are:

- hard rock which risks destabilizing the area; or
- clay-like soil that cause the hole to collapse on itself.

Aerial installations are more expensive to install and maintain, and the objective is to minimize this method. However, it does provide an alternative when more preferred methods aren’t possible.

As of 2023, we estimate about 5km of aerial installations along the Dempster highway.



Photo of a new and used drill bit after encountering hard rock