



Dempster Fibre Project

Reliable internet service for the Yukon and the North
2022 annual report



DEMPSTER
FIBRE LINE



Executive summary



I am pleased to provide an update on the Dempster Fibre Project, which has made significant progress over the past two construction seasons. This infrastructure project is critical to the Yukon and the North and is poised to benefit future generations. The reliability of telecommunications is vital to our society, community, and economy, and this project is designed to ensure that this essential need is met.

This project involves the installation of a fibre optic line along the Klondike and the Dempster highways, connecting Dawson City, Yukon, and Inuvik, Northwest Territories. This project represents a bold and ambitious step forward in multiple areas, and we are committed to ensuring its successful completion.

Prior to the start of construction, we engaged closely with First Nation and Indigenous partners, both in the Yukon and the Northwest Territories. We collected input and feedback from Citizens, through numerous open house information sessions held in various communities and another series of meetings with leadership. This input was critical in the design and planning of this project. As the project moves forward, engagement and information sharing activities continue to occur. Respectful and meaningful relationships with our partners is the first pillar of this project.

Environmental stewardship is another critical pillar of this project. We underwent two separate environmental approval processes, assessing multiple values for flora, fauna, water bodies and the land. We put in place appropriate mitigation measures based on a combination of traditional and cultural knowledge, which we were fortunate to have access to, in addition to western scientific knowledge.

We also committed to the localization of economic opportunities, which represents the third pillar of this project. We adopted an innovative and unique procurement model for this project, called the “First Nations and Indigenous Participation Plan”, to ensure that the economic benefits of this project are shared with First Nations and Indigenous Groups along the line’s route.

Finally, the fourth and final pillar of this project is strategic infrastructure. We are building infrastructure that is resilient, sustainable and bridges an important gap for Yukoners and Northerners.

I am extremely proud of the work that the project team in Highways and Public Works has done with numerous partners – public, private, Yukon First Nations and NWT Indigenous. Without the contribution of multiple departments, agencies, consultants and contractors, this work would not have been possible.

Priyank Thatté
Project Director
Highways and Public Works



About the project

The Dempster Fibre Line, once complete, will stretch an impressive 800 kilometres along the scenic Klondike and Dempster highways from Dawson City, Yukon, to Inuvik, Northwest Territories.

This crucial infrastructure project will connect to the existing Mackenzie Valley Fibre Link in Inuvik, completing an expansive 4,000-kilometre network aptly called the Canada North Fibre Loop (CNFL).

This network will serve as a valuable backup line in the event of service disruption. It will provide a host of communities along the route with reliable internet and cell phone services, ensuring the uninterrupted flow of vital communication in these northern regions.

Contributing partners

The Dempster Fibre Line is jointly funded by the governments of Canada and the Yukon.

The Government of Yukon will own the fibre line, and NorthwesTel will lease and operate the line for a period of 20 years.

Since January 2019, the government has worked closely, through consultation and engagement, with the eight First Nations and Indigenous groups whose Traditional Territory the fibre line will cross here in the Yukon and the Northwest Territories.

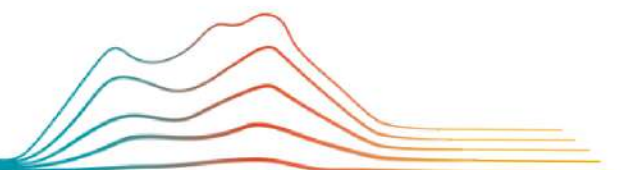
This engagement has occurred at all stages of project development, from inception to project design and from procurement methods to job opportunities.

The fibre line, once complete, will traverse the Traditional Territories of:

- Tr'ondëk Hwëch'in;
- the Vuntut Gwich'in First Nation;
- Gwichya Gwich'in Council;
- Nihtat Gwich'in Council; and
- Gwich'in Tribal Council.
- the First Nation of Na-Cho Nyäk Dun;
- Ehdiiat Gwich'in Council;
- Tetlit Gwich'in Council;



- Dempster Fibre Line
- Mackenzie Valley Fibre Link
- Existing NorthwesTel Fibre



Project updates

Procurement

The Dempster Fibre Project followed a very ambitious procurement plan. It contained many firsts for the Yukon.

The project's approach – to focus on First Nations involvement – resulted in a procurement process that was:

- custom-tailored to the project; and
- focused on building relationships with First Nation governments, Citizens, businesses and contractors.

The resulting First Nations and Indigenous Participation Plan sees 20 per cent of the construction cost flowing as benefits directly to the communities affected by the project. These benefits include opportunities for businesses, subcontracting, training, employment and capacity development.

These benefits include provisions for both Yukon

First Nations and Northwest Territories Indigenous groups with Traditional Territory along the route.

As of the end of the 2022 construction season, over \$9 million in benefits have been realized through the Yukon First Nations and Indigenous Participation Plan.

We also recorded that over 12,000 employment hours have been provided by Yukon First Nations and Indigenous Peoples. Some of these positions included environmental monitor graduates from the earlier certification courses the project sponsored, as well as GPS technicians that were trained on-the-job.



Installation of fibre optic conduit using a low-pressure vehicle called a Rolligon plow. This ensures that the delicate tundra habitat is minimally disturbed.

Project updates

Training

In 2021, we offered four training sessions in environmental and wildlife monitoring through Aurora College. These sessions were offered to First Nations and Indigenous Citizens whose Traditional Territory the line passes through.

A total of 26 people attained certification, which is recognized by the Environmental Careers Organization of Canada. It provides the graduates with employment opportunities, both during the construction of the optic line and in their future careers.

The individuals that received certification through this training have been invaluable to the project. As the project progresses, there will be continued opportunities for environmental monitoring positions on the project.

As a direct result of the first training sessions' success, we will be offering another round of environmental monitor training. Course delivery will take place in Inuvik, NWT, and Dawson City, Yukon, in spring 2023.



A ROHL employee confirming GPS location of conduit that's been installed by horizontal directional drilling.



Construction

Most construction activities occur within the existing rights-of-way of the Klondike and Dempster highways, which run parallel to the roadway on both sides.

This land is already developed and subject to ongoing highway-related activities, resulting in minimal new environmental impacts from construction operations.

In preparation for the installation of fibre optic cable, the placement of cable conduit is necessary.

The conduit, which is orange tubing, is installed using low-impact techniques. For example, we used a plow to create a shallow trench, then immediately placed the conduit. The fibre optic cable is installed inside the conduit afterwards.



A conventional plow installing conduit.

Five crews were employed during the 2022 summer construction season to install conduit and fibre optic cable at several locations along the route.

To date, we have installed over 375 kilometres of conduit and 85 kilometres of fibre optic cable.

Left: a rock drill creating a shallow trench for conduit placement.



Installing conduit

An important part of this project is to minimize ground impacts. Operators and equipment follow the conduit install. They cover and clean up the ground surface. The installed conduit leaves little evidence of recent construction work.

This method of installation will protect the cable for low maintenance throughout its lifetime and promote regrowth of impacted vegetation.

Project operations include special consideration for the protection of permafrost, wetlands, caribou and nesting birds.

Most of the project's construction activities are planned for summer and autumn. This way, we can determine accurate permafrost depths and adjust construction methods to preserve the natural environment.

Avoiding contact with the permafrost layer helps to protect the structural integrity of the ground. It also reduces potential impacts, such as water flow pattern changes and associated erosion, and water body sedimentation risks.

This shallower burial depth is a more environmentally friendly installation method. However, it:

- provides less protection for the fibre optic cable; and
- makes it more vulnerable to damage from surface impacts, such as equipment and all-terrain vehicles.



Conduit placed in a shallow trench, ready to be buried.

To minimize the risk, orange conduit is buried to add mechanical protection for the fibre optic cable. Additionally, in the areas with shallow installation, the cable we're using is classified as an armoured cable. It has protective metal running through it that protects the fibre optic glass from damage.



Protecting the delicate tundra environment



We use a Rolligon plow vehicle to install conduit through tundra habitat and vegetation.

The plow is outfitted with low pressure, balloon-like tires. These tires minimize disturbance to the groundcover. The pressure exerted per square centimetre of ground contact is 15 times less than that of a human foot.



Ground pressure	Source
1.75 psi	Rolligon
15 psi	M1 Abrams tank
16 psi	Average ground pressure from a walking human
30 psi	Car
40 psi	Mountain bike

Top left: the Rolligon plow as it moves across the tundra.

Middle left: the Rolligon plow in action as it cuts a trench and buries the orange conduit. Minimal impacts to the terrain are visible.

Bottom right: a close-up of the plow blade as it cuts ground.



Crossing rivers and wetlands

Horizontal directional drilling (HDD) is one of the installation methods we have used on this project. HDD allows fibre optic cable to cross under rivers and wetlands while:

- maintaining fish habitat and flow; and
- avoiding other adverse environmental impacts.

In the 2022 construction season, we used HDD to successfully cross the Arctic Red, Peel and Mackenzie rivers, which span 300, 500 and 1,200 metres respectively. The Mackenzie River crossing is one of the longest drill shots ever completed in North America. Its length is equivalent to 15 of Whitehorse's Riverdale bridge laid end to end .



The photo on the left shows the plan for horizontal directional drilling under one of the Dempster Fibre Line's three river crossings. The photo on the right is the plan in action.

Data points are input to map how conduit can cross under the riverbed without disturbing the river itself. A pilot hole is bored out and then the conduit is installed. The fibre optic cable will be housed inside the conduit.





What's next

We continue to engage with impacted First Nations along the line's route. We do this to:

- gain planning input on topics including permafrost and heritage resources; and
- provide work schedule updates and environmental reports.

As part of our commitment to impacted communities, we'll be holding community job fairs in seven communities along the route in early spring 2023. We'll also be providing training for wildlife and environmental monitors in Inuvik and Dawson City in April and May 2023.

Field work will take up again in late spring 2023, with a focus on wildlife and environmental activities. These include identification of wolf dens and invasive species, as well as observations of nesting birds.

Construction work on the Dempster Fibre Line project is set to begin in late May, with a focus on the summer and early fall months to best protect permafrost.

This project is built on a framework of continuous improvement and creating ongoing value. We look forward to continuing work on this important infrastructure that will provide northern communities with reliable digital services that meet their needs.

Contact us by email at HPW-DempsterFibre@yukon.ca or visit our website at www.Yukon.ca/DempsterFibreProject.

