

Coastal GasLink

Crossing water safely



At Coastal GasLink, we are committed to achieving the highest standards of environmental protection during construction, and for the life of the project. We recognize that how we navigate water crossings matters to you, and it matters to us too. That's why we utilize advanced engineering methods to safely construct around and across water bodies.

Protecting water bodies

At Coastal GasLink, we know that water is a highly valued resource. The protection of water is of the utmost importance to both the environment and the communities around us. Our project's 670-kilometre right-of-way crosses many bodies of water and we approach each one with the utmost care to prevent adverse impacts on the environment. Prior to construction, information was collected about water bodies along the route, including environmental and technical assessments.

Environmental assessments included studies of the aquatic environment – such as water flow, bank stability, the quantity and quality of fish habitat, wildlife and vegetation.

Information gathered through the assessments, along with regulatory requirements, industry best practices, constructability considerations and economic feasibility was used to select the appropriate water body crossing method.





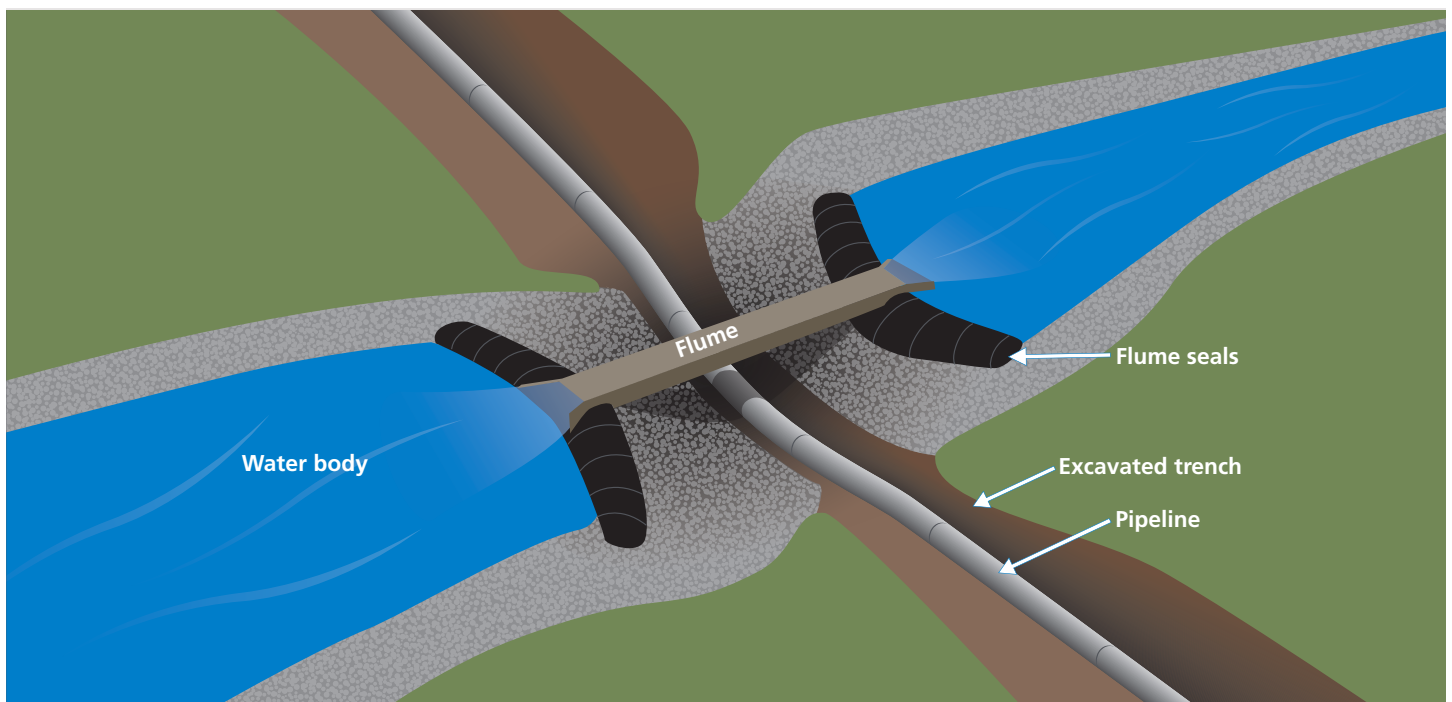
Types of water body crossings

Coastal GasLink takes extra precaution around water bodies. Pipelines can be installed at water bodies through trenched or trenchless crossing techniques.

Trenched crossings

A trenched crossing technique involves excavating a trench to install the pipeline. Coastal GasLink is employing two types of trenched crossings, isolated open-cut and open-cut.

- An **isolated open-cut** is generally used for water bodies with open water or under-ice flow that can be managed by isolation equipment such as dams and pumps or flumes. Flow is diverted around or across the construction area where the pipeline will be installed.
- **Open-cut methods** are used when the stream or water body is seasonally dry or completely frozen to the bottom; we excavate a trench across a water body, lay the pipeline into the trench and then bury it.



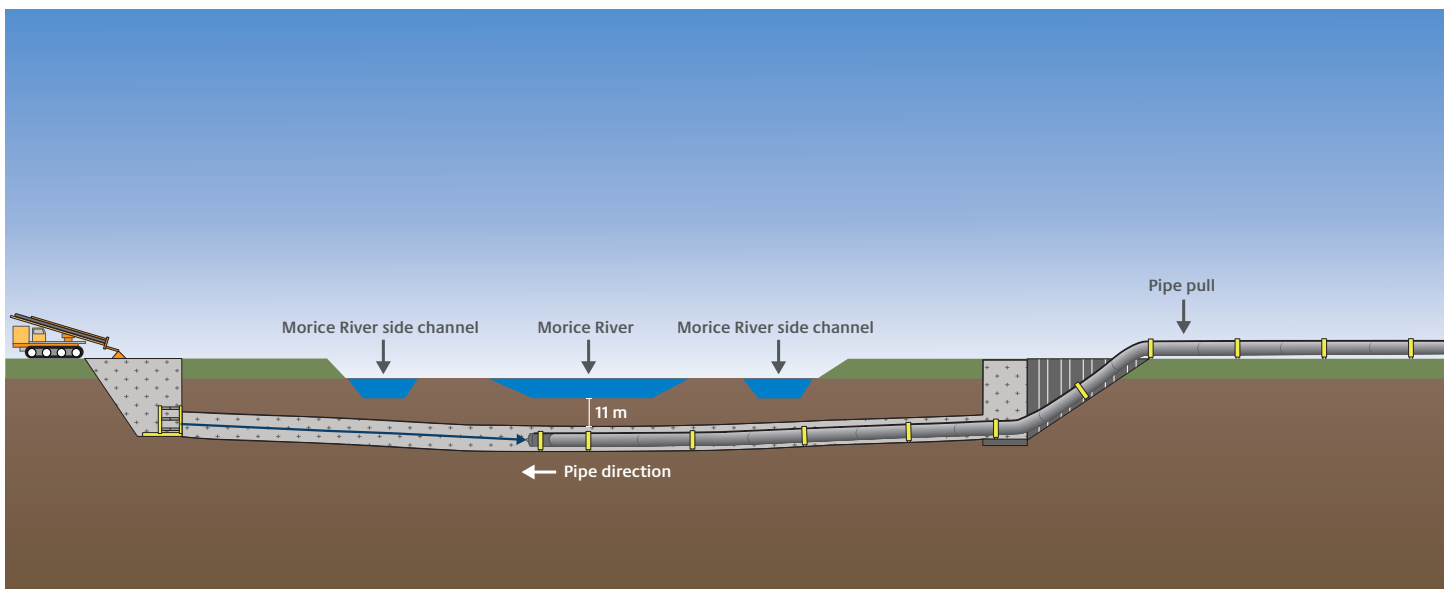
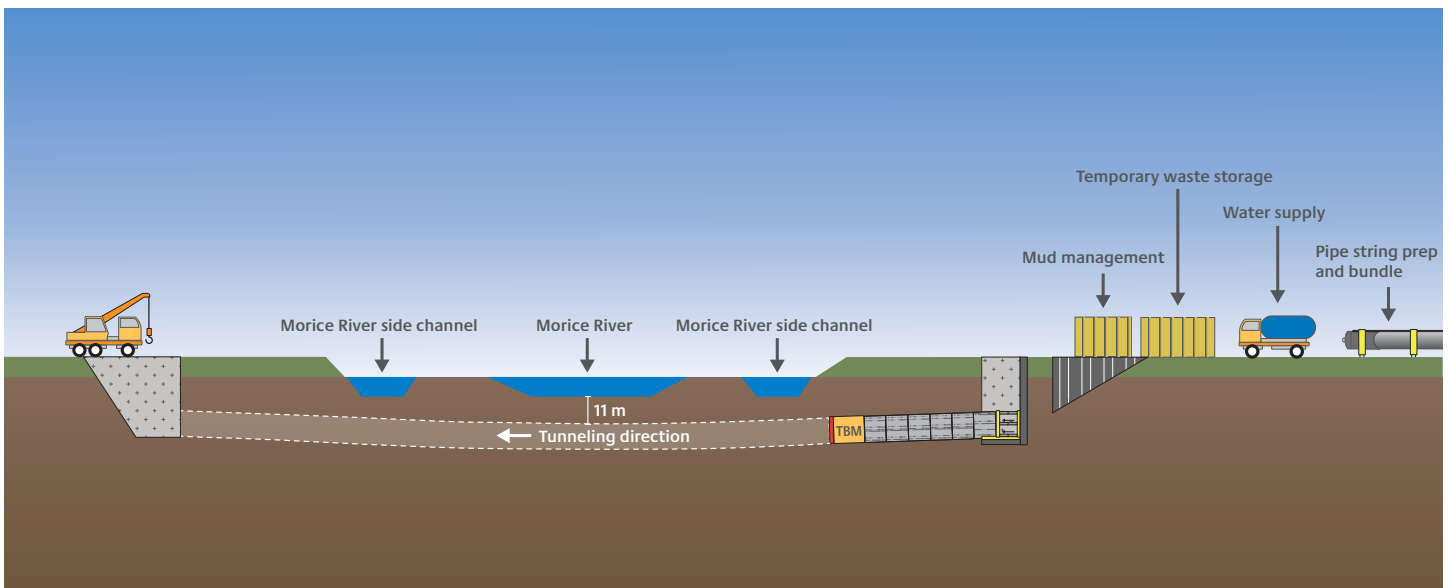
Trenched crossings, like an isolated open-cut shown above, involves excavating a trench to install the pipeline.

Trenchless crossings

Trenchless crossings are a proven technique that allow pipe to be installed under the water body without ever affecting the flow of the river or stream; however, this method requires a larger footprint of activity on either side of the water body.

Trenchless crossings are used in cases where typical methods are not practical due to constructability, terrain, feature or environment drivers. Trenchless crossing methods include Horizontal Directional Drilling (HDD), Direct Pipe Installation (DPI), and micro-tunneling.

- **HDD** uses a specialized drilling rig to bore a path under the water body, progressively enlarging the bore hole until the pipeline is pulled through to the other side. Pipeline stress calculations are done to ensure appropriate bend and tension are used when installing the pipeline.
- **DPI** involves both digging the tunnel and installing the pipe at the same time. For this reason, it is considered the best method when sub-surface ground conditions are soft as the pipe itself holds up the tunnel so there is no chance of collapse. With DPI, a tunneling machine excavates the ground while a pipe thruster simultaneously advances the pipe forward to match.
- **Micro-tunneling** uses hydraulic jacks and a tunnel boring machine (TBM) to push concrete casing segments through the soil under water bodies in a way that minimizes overall risk and disposal volume. The pipeline is then pulled through the tunnel created by the concrete casing. Micro-tunneling is a remote-controlled excavation method that results in limited environmental, economic, or social disturbances.



Trenchless crossings, like micro-tunneling shown above, allow the pipeline to be installed under the water body.

Ongoing monitoring

At Coastal GasLink, we are committed to preserving our water bodies and environment today, and well beyond the life of the project.

Once the Coastal GasLink project is completed and operational, our Operation Control Centre monitors it 24 hours a day, 365 days a year. Highly trained control centre operators manage sophisticated pipeline monitoring equipment and technology to ensure that the pipeline continues to operate safely and efficiently. At the first sign of a potential leak, the valves are shut automatically, stopping the flow of natural gas immediately. In addition, Coastal GasLink will regularly monitor the pipeline by aerial patrol, ground and underwater inspection surveys.

Questions and answers

How do you determine which approach to use?

Our approach to water crossings is a multi-faceted process that involves rigorous evaluation of the best available crossing methods to ensure each water body and habitat receives the appropriate protections. Our integrated multi-disciplinary field teams, which include fisheries biologists, conduct an initial site assessment to gain an understanding of the site's underlying conditions. The technical feasibility of potential crossing methods is then determined based on site conditions, available workspace considerations, and environmental, geotechnical and geophysical data, input from engagement, and regulatory requirements.

What happens to the rivers and streams during construction?

During construction, we monitor fishbearing rivers and streams to make sure our plans are effective. This means monitoring both the stream and the surrounding riverbanks to understand if the measures we've put in place to reduce impacts are working, and to determine if changes are needed. We compare downstream measurements

to upstream measurements to monitor the quality of the water, and to make adjustments when needed. If the monitoring shows any unusual results, we'll correct it. This could mean installing erosion/sediment control barriers; temporarily stopping work until the water quality returns to acceptable levels; or rescheduling work until conditions are more favourable.

How are fish protected during construction?

We recognize the importance of fish and fish habitat to the communities upstream and downstream of where we conduct water crossings. That's why we have implemented stringent measures that comply with regulatory requirements and are outlined in our Environmental Management Plan to protect fish and fish habitat during construction. These may include:

- Avoiding disturbance of or blocking access to important habitats during key times, such as spawning areas, migration routes and rearing areas.
- Constructing when watercourses are dry or frozen as much as we can, or isolating stream flows so work can occur during periods of reduced flow or in areas isolated from the flow.

- Relocating fish downstream from the work site during construction by qualified professionals.
- Replacing appropriate material to the streambed such as clean gravel as part of restoration.
- Re-grading, stabilizing, and seeding or planting approach slopes to grow vegetation to restore habitat along the river bank and minimize potential for erosion.

What happens after construction?

At all of our construction sites, we strive to restore the land to the way we found it. As such, our post-construction reclamation and monitoring includes a variety of assessments of parameters such as terrain stability, erosion sediment controls, soil, landscape and vegetation to evaluate and facilitate the re-establishment of equivalent land capability after construction. By monitoring the rivers and streams after construction, we can establish safe and reliable operations and monitor mitigation and reclamation progress.

Answers to other frequently asked questions can be found at CoastalGasLink.com

Coastal GasLink



We'd like to hear from you

If you have any questions or comments about the project, please reach out.

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