Crossing rivers and streams: Minimizing the impact

At Enbridge, we make every effort to avoid environmentally or culturally sensitive areas, especially rivers and streams.

In each case, we take great care to protect natural resources and limit the impact we have on the environment—carefully following federal and state regulations, and then using the best methods to protect the waterway.

Crossing Methods

There are four basic methods for crossing bodies of water. The techniques for each are site-specific.

Open-Cut Wet-Ditch

This involves digging an open trench in the stream bottom, laying the prefabricated length of pipe necessary to reach bank to bank, and then backfilling.

Open-Cut Dry-Ditch

This involves the use of flume pipe(s) to direct the stream through the disturbed area, which allows trenching to be done in drier conditions. Small sandbag dams are constructed both upstream and downstream around the work area across the stream channel.

Stream flow is then diverted through the flume pipe allowing the excavation to occur in the dry, under the flume pipe.

Dam and Pump-Around

A potential substitute to the open-cut dry-ditch method, this may be employed on small, low-flow streams where the dry-ditch method cannot be employed because of site-specific conditions.

Small sandbag dams are constructed both upstream and downstream around the work area across the stream channel. Stream flow is then diverted around the work area using pumps and hoses.

Horizontal Directional Drilling

This is a minimal-impact trenchless approach to install underground pipe, with a shallow arc drilled under a water body or other crossing using a land-based drilling rig.

Depending on geological conditions and other factors, HDD construction is considered suitable for large river crossings, extreme congestion (such as rail yards), sensitive crossings or other unique site-specific situations because it minimizes change to the surface area above the drill.

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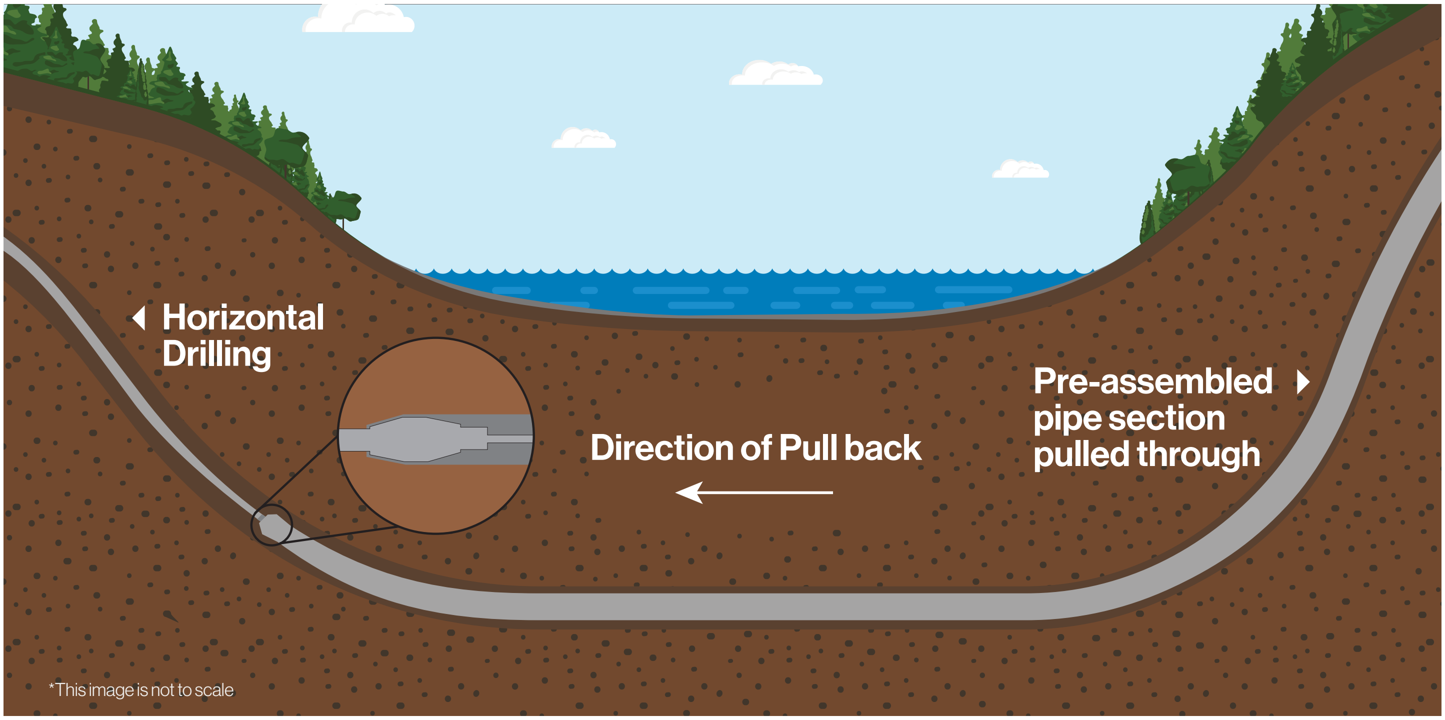

How does the HDD process work?

An underground tunnel created via the HDD process follows an arc line from the entry point, down under the crossing area, and then resurfaces on the opposite side. Using advanced technology and highly trained technicians, a drill head guides the drilling pipe electronically to ensure the angle, depth, and exit point adhere to carefully designed engineering plans.

The first stage consists of drilling a small-diameter pilot hole along a designed directional path. The path of the drilling string is tracked and directed using surface monitoring systems.

The surface monitoring system determines the location of the drill bit in the hole by taking measurements from a grid or point on the surface. This allows the operator to follow the designed directional path.

Next, the pilot hole is enlarged, or reamed, to a diameter that will accommodate the pipeline. The enlargement process involves cutting with drill bits and jet nozzles and hydraulic motors (also called "mud motors") used to cut harder soils.

It can take several passes to enlarge the hole to the required diameter, which is typically 12 inches larger than the pipeline being installed.

Finally, once the pilot hole is large enough, the welded pipeline segment can be pulled through the underground arched tunnel from one end to the other end.

Throughout the drilling process, the tunnel may be kept open and lubricated by circulating a watery mud-slurry mixture, typically composed of about 95 percent water and 5 percent bentonite clay—a natural, non-toxic substance.

The drilling mud also helps coat the walls of the tunnel and remove drill cuttings.

What should I expect?

Drilling equipment creates noise during operations. Construction crews may reduce noise by using structures on the drill site that are designed to buffer and reduce surrounding sound levels.

The length of time needed for drilling depends on the distance of the underground drill, the geology, the pipeline's diameter, and the progress of drilling operations.

Is this a regulated process?

The pipeline design and construction process is governed by the U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA) and the Federal Energy Regulatory Commission (FERC).

Detailed geotechnical investigations and engineering surveys are prepared in advance of any crossing procedure. Depending on the location of the procedure, some state or federal authorizations or permits may also be required.

Classification of water bodies

FERC defines three categories for water bodies. They are:

Minor—Includes all streams less than or equal to 10 feet wide at the water's edge at the time of construction.

Intermediate—Perennial stream crossings greater than 10 feet but less than 100 feet wide at the water's edge at the time of construction.

Major—Includes crossings of more than 100 feet at the water's edge at the time of construction.