TRANSMOUNTAIN

BUILDING A PIPELINE

Step by Step

Surveying and Staking: After finalizing a route, crews survey and stake the right-of-way and any temporary workspace needed for construction.

Clearing: Trees and vegetation are removed from the right-of-way.

Grading: Area is cleared and graded. The topsoil is removed and stockpiled for replacement and future reclamation.

Stringing: Individual lengths of pipe ranging from 12 to 24 metres long are laid out end-to-end along the right-of-way.

Bending: Individual joints of pipe are bent using a hydraulic bending machine for directional changes and to fit the terrain.

Joining: Welders join the pipes together with either manual or automated welding processes. All welds are tested using high-tech methods such as X-ray or ultrasound.

Coating: The pipeline coating protects against corrosion. The pipeline is delivered to the right-of-way pre-coated. Field application coating is applied to welded joints.

Trenching: Excavators dig the trench to the required depth. Pipelines are buried in trenches that are generally a minimum of 0.9 metres deep, depending on sub-surface conditions.

Lowering In: The welded pipeline is lowered into the trench with heavy lifting machines called side booms.

Valves and Fittings: Valves and other fittings are installed at intermediate locations as required by the Canadian Standards Association pipeline code. The valves are used once the line is operational to isolate the pipeline for maintenance or in the event of an emergency.

Backfilling: Soils are replaced in the order in which they were removed.

Pressure Testing: Pipelines are hydrostatically tested to 125 per cent of the anticipated operating pressure.

Cleanup: The pipeline right-of-way is reclaimed. Temporary facilities are removed. The land is re-contoured and re-seeded as part of restoration.

KINDER MORGAN CANADA

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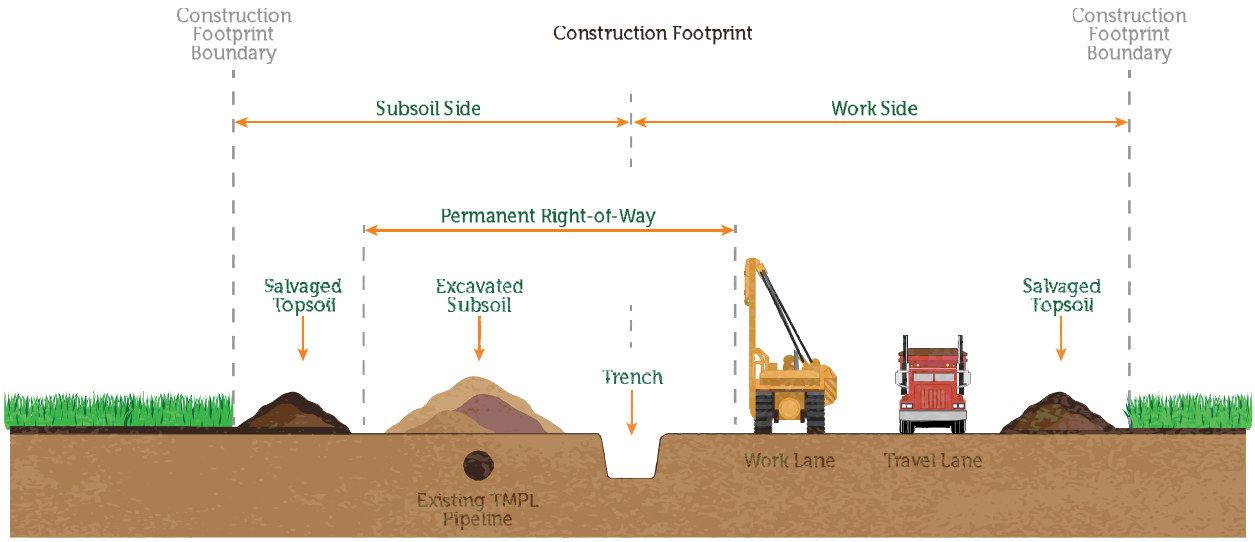
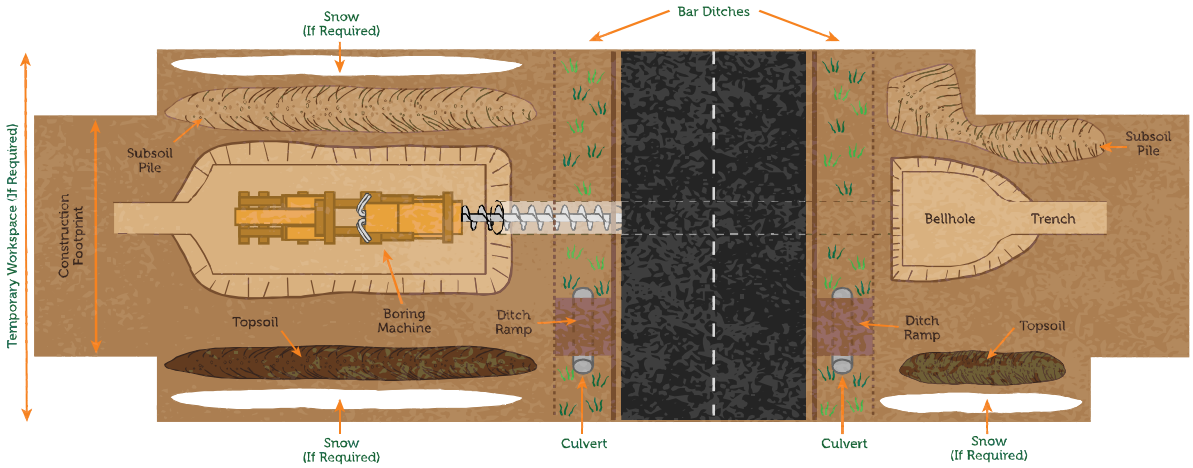
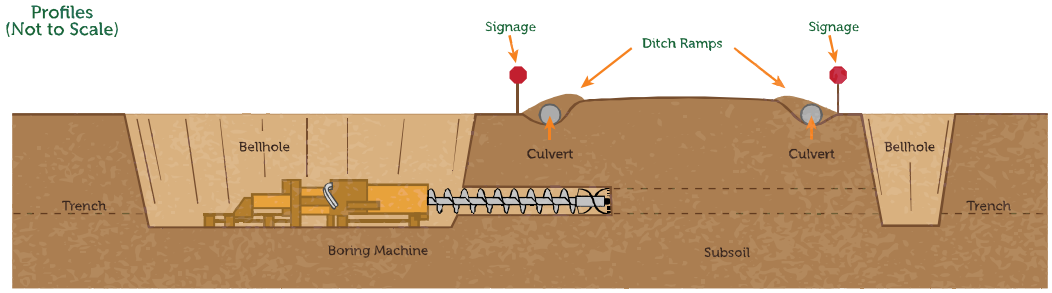
PIPELINE CONSTRUCTION METHODS

Conventional Pipeline Construction



Trenchless Technique for Crossing Roads and Railways



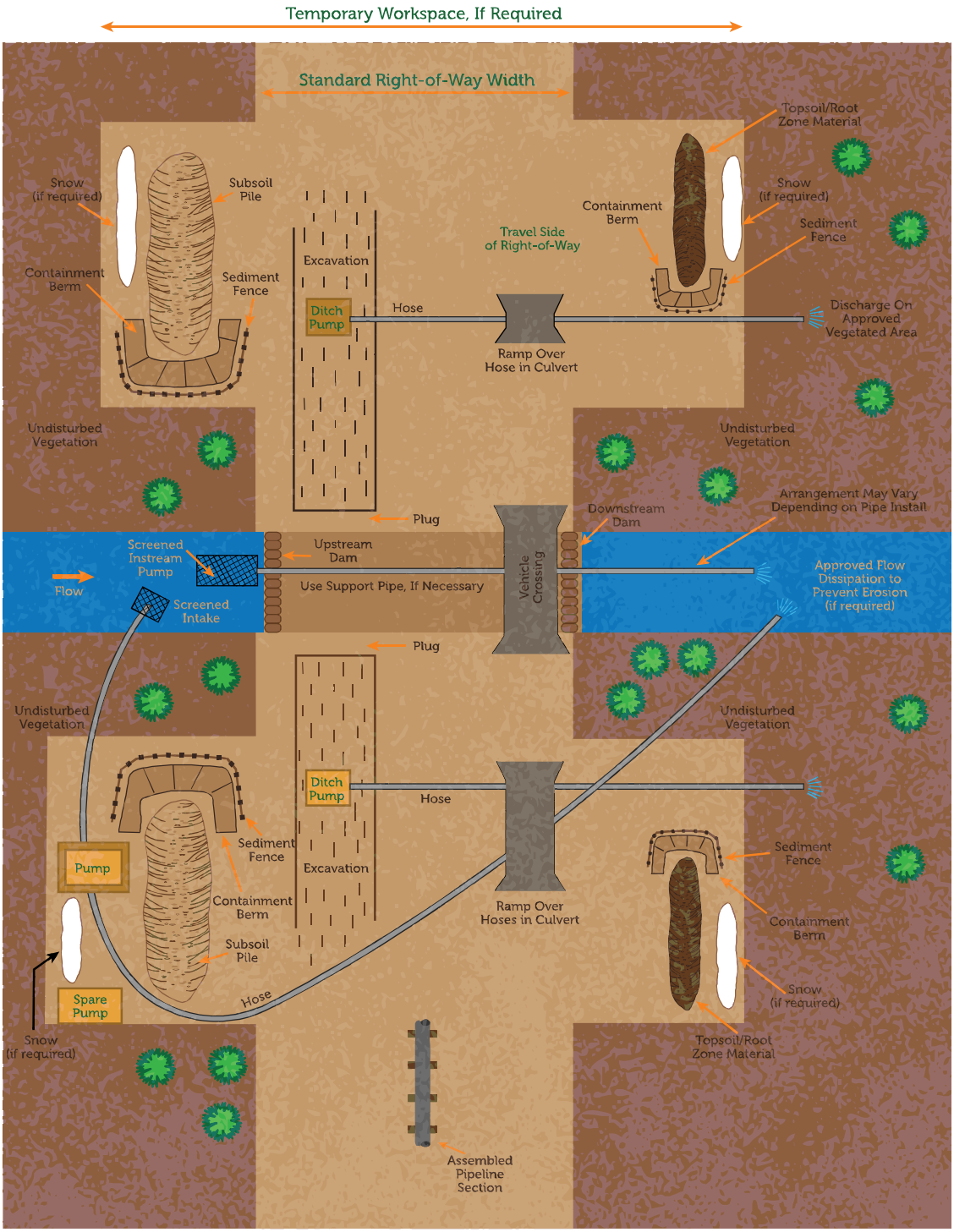


These are representations of standard pipeline construction techniques. Trans Mountain will use the most appropriate technique for each specific location.

KINDER MORGAN CANADA

RIVER AND WATERCOURSE CROSSING CONSTRUCTION TECHNIQUE

Stream Isolation: Dam and Pump Technique



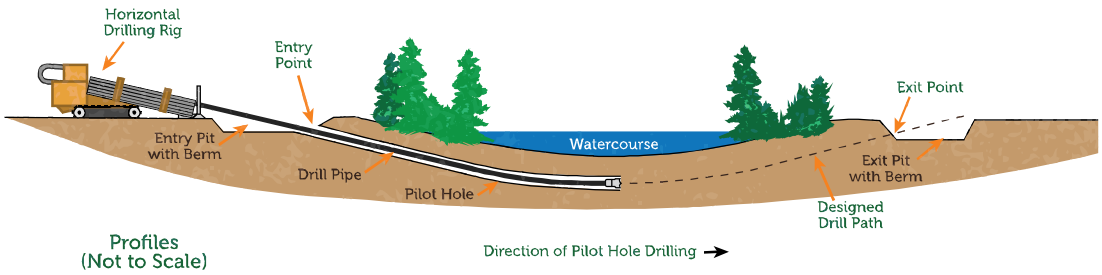
Plan View
(Not to Scale)

The river and watercourse crossing construction technique may be refined during the detailed engineering and design phase.

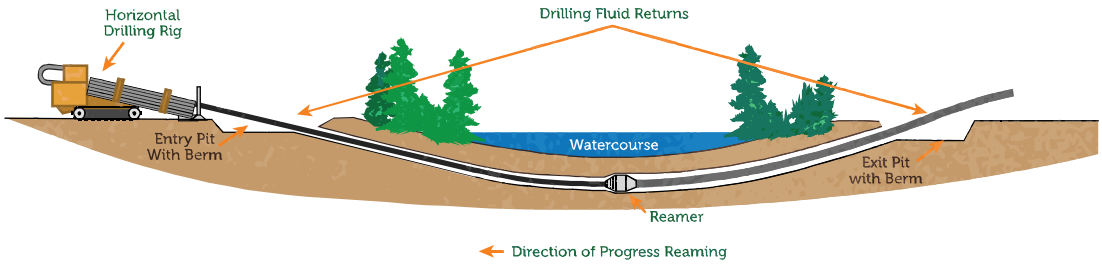
RIVER AND WATERCOURSE CROSSING CONSTRUCTION TECHNIQUE

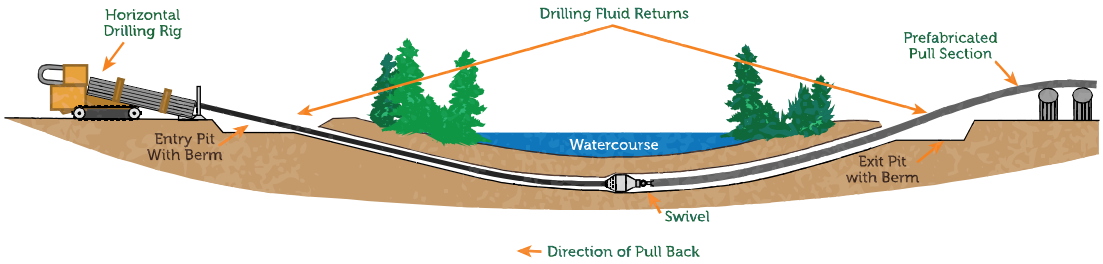
Horizontal Direction Drill (HDD)

Stage 1: Pilot Hole Directional Drilling



Stage 2: Reaming and Pulling Back





The river and watercourse crossing construction technique may be refined during the detailed engineering and design phase.

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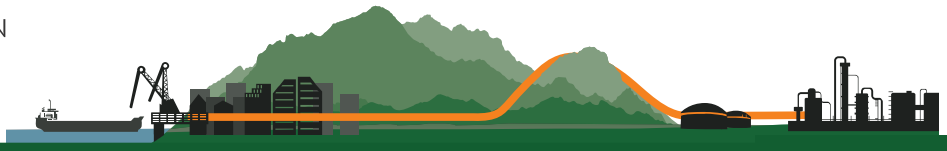

Community Construction Schedule

Key Pipeline Construction Activities

2017

- Infrastructure – laydowns
- Construction yards
- Camp site preparation
- Clearing
- Select river crossing HDDs
- Start of grading in select areas

2018

- Clearing continues
- HDDs continue
- Pipeline construction:
  - Grading
  - Stringing
  - Welding
  - Trenching
  - Lowering in
  - Backfill
  - Cleanup

2019

- Pipeline construction continues
- Hydrostatic testing
- Leave to open
- Commissioning
- Cleanup
- Restoration