



Specification

GTM Ground Disturbance Specification - Projects

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1.0	2022-07-06	Ian Ross	New document
2.0	2023-07-01	Ian Ross	Updates to Section 15
3.0	2023-05-29	Ian Ross	-Updates to multiple sections including Ground Disturbance Requirements, Location Requirements, Mechanical Clearance, -Updates to Terms & Definitions
3.1	2023-06-27	Ian Ross	Corrected wording in Section 14.6 Verification Locate (Required for Contracted Disturber)
4.0	2023-09-11	Andy Reimer	-Changed the excavation area from 16 ft. (5 m) beyond the excavation perimeter to 10 ft. (3m) beyond excavation perimeter or 16 ft. (5 m) from the edge of the pipeline (whichever is greater). -The Ground Disturbance Coordinator (Enbridge Representative) will verify criteria to go to within the 2ft tolerance zone during mechanical excavation. -Contractors will not have to locate any non-energized Cathodic Protection cables prior to mechanical GD and will not be considered a Line Strike if contacted.
4.1	2024-02-22	Andy Reimer	-Added to Training Section 8 - exemption for Indigenous participants -Edits to Section 14.1 Location, Section 14.3 Locate Constraints, Section 14.6 Verification Locate -Edits to Section 15.5 Vacuum Excavations Requirements, Section 15.7 Marking Exposure -Edits to Section 21 Mechanical Clearance
5.0	2025-03-01	Julia McElroy	Section 11.2 GD Package Requirements – updated Section 15.0 Positive Identification of Below Grate Facilities Section 15.10 Excavation exception updated Section 21 Mechanical Clearance updated Section 27 Calculation for Temp. Crossing Facilities

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1. Purpose

The Gas Transmission and Midstream (GTM) Ground Disturbance Specification outlines the minimum requirements for planning, conducting and documenting company-directed Ground Disturbance activities to keep our workforce safe, protect the public and the environment from harm, and ensure safe and reliable operations of our GTM assets.

2. Scope


This specification applies to GTM Operations and Projects being completed for GTM by first and second parties (contractors and subcontractors working on behalf of Enbridge). U.S. segments of the Vector Pipeline will follow the Liquid Pipelines Damage Prevention Program.

Contractors and subcontractors shall comply with all Company requirements set out in this specification. If a contractor or subcontractor has a health and safety Specification or policy materially different from the Company's, the contractor/subcontractor shall follow the more stringent requirement. Contractors and subcontractors are still obligated to meet the requirements of all applicable laws, regulations, codes and industry best practices related to this Specification.

In the event a contractor's or subcontractor's Specification exceeds the requirements of this specification, Company may, in its sole discretion, choose to adopt the contractor's or subcontractor's Specification for any given contract or work order.

3. Terms and Definitions

3.1. Terms

Term	Definition
Alignment	Route of the pipeline.
Below Grade Facility (Facility)	Any pipes, cables, lines, etc. existing underground that could be damaged or adversely affected by Ground Disturbance activities and shall be identified before starting Ground Disturbance work
Boring Operations	Types of trenchless technologies used for subsurface construction work that require few trenches or no continuous trenches. It can be defined as a family of methods, materials, and equipment capable of being used for the installation of new, replacement or rehabilitation of existing underground infrastructure with minimal disruption to surface traffic, business, and other activities. These technologies include horizontal directional drilling (HDD), direct pipe, micro tunnel, auger bore/slip bore, pipe ramming, etc.
Caisson Holes	Holes created for a reinforced concrete pile or post that transfers the load to bedrock or acceptable soil.
Company	The Party entering an Agreement as set forth in the introduction to the Terms and Conditions and its respective affiliates, directors, officers, employees, servants and/or agents (Enbridge).
Competent Person (OSHA)	 One who can identify existing and potential hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective actions to eliminate them as defined in Title 29 CFR Part 1926, Subpart P. The individual designated as the Competent Person shall have the required knowledge and skills and understand the importance and duties of the Competent Person while performing or supervising excavation work.
Confined Space	An enclosed or partially enclosed area that meets all the following: is not designed or intended for continuous Worker occupancy (e.g., tanks, pipes) has restricted means of entry and exit that may compromise the provision of first aid, evacuation, rescue, or other emergency response (e.g., manholes, electrical vaults, boreholes, pits, sump tanks, vertical and horizontal culverts) and is large enough so that a Worker's entire body can enter the space.

Term	Definition
Contractor	A legal entity with whom Enbridge may enter into an agreement for the provision of labor, materials and/or equipment by the Contractor in the delivery of a specified scope.
Confined Space Entry	Occurs when any part of a Worker's body enters a Confined Space.
Enbridge/Company Representative	Employee or second-party hire representing the Company for specific contractor work or a project, (e.g., pipeline specialist/technician, construction inspector).
Excavation	Any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal.
Excavation Area	The perimeter and the area in which any type of Ground Disturbance is expected to occur.
First Party	Enbridge GTM
Foreign Facility	Any pipeline, utility or facility not owned or operated by Enbridge GTM.
Geohazard Feature	An attribute or aspect of a known or possible geohazard. Includes scarps, cracks, leaning trees, displaced soil or other phenomena that compose a part of a geohazard or have been caused by a geohazard.
Ground Disturbance (GD)	<p>Any work, operation or activity that results in the penetration of the ground to any depth.</p> <p>The following Ground Disturbance activities require a Ground Disturbance Permit: Any activity within a fenced facility Vacuum excavating Mechanical excavation Right-of-Way (ROW) disturbance greater than 12in. (30cm) in depth and/or if the depth of cover is not known. Backfilling Blasting</p> <p>The following Ground Disturbance activities do not require a Ground Disturbance Permit: Hand digging with a shovel via non-mechanical means (e.g., not electric, not motorized, not pneumatic, not hydraulic), provided it is not part of a larger ground disturbance activity Probing Survey staking and line locate surface markings Non-mechanical environmental survey activities Non-mechanical ROW disturbance 12 in. (30cm) in depth or less provided the locations and depths of cover for all facilities are known.</p>
Ground Disturber	The company or entity directing and overseeing the Ground Disturbance work. May also be referred as Excavator.
Hot Work	Any process that can be a source of ignition when flammable material is present or can be a fire hazard regardless of the presence of flammable material.
Initial Locate	Done to determine the location of Below Grade Facilities by One-Call members (owner/operators) inside of the area defined by the One-Call ticket or the Locate Boundary Area as prescribed by the Ground Disturbance Specification. The Initial Locate satisfies local legislative requirements (Local Regulations).
Job Hazard Analysis (JHA)	Process to systematically identify, control, or eliminate potential or actual hazards associated with a job task, as part of the larger hazard identification, assessment, and control requirements. May also be referred as Job Safety Hazard Analysis (JSHA) or Job Safety Analysis (JSA).
One-Call	A notice given to a local One-Call Center/authority that an excavation will be taking place. Legislation varies by location, but anyone performing an excavation is typically legally obligated to contact the One-Call Centre/authority 2-5 days prior to commencing excavation; confirm provincial/state requirements. The One-Call Centre/authority notifies its members (owner/operators) that their Below Grade Facilities are near the excavation. May also be referred to as First Call.
One-Call Member	A Facility Owner/operator who subscribes to the One-Call Centre/authority and is notified when a One-Call is placed if the Excavation Area is near the members Below Grade Facilities.

Term	Definition
Operator Qualification (OQ)	GTM Technical Training Group manages OQ compliance in accordance with GTM's Operator Qualification Plan. Individuals performing activities on regulated pipe or pipeline components shall possess the appropriate Operator Qualification for the applicable covered task(s). Refer to the GTM OQ Plan for a complete list of GTM OQ covered tasks.
Oversee	To watch over, observe and manage Company requirements of the contractor.
Person-in-Charge (PIC)	Provides contractor performance management, which includes oversight, monitoring of activities, quality of work, and contractor evaluation/feedback has Stop Work Authority.
Pipeline	All parts of physical facilities through which a hazardous liquid or gas moves in transportation, including pipe, valves and other appurtenances attached to pipe, compressor units, meter stations, regulator stations, delivery stations, holders, and fabricated assemblies.
Positive Identification	To visually locate (daylight) the location, depth, and size of Below Grade Facility by using either vacuum excavating, hand digging, or using the Probe and Dig Method. This includes elevation or alignment changes that can alter the depth/direction of the pipe (i.e., elbows, fittings, plugs, weldolets, flanges, branch piping, known abandoned facilities etc.)
Potholing	Positive Identification method involving minimal exposure of the pipeline or facility to visually confirm its location, achieved by soft digging methods – either digging with hand tools or with vacuum excavation (air or hydro vac). Sometimes referred to as daylighting.
Qualified Individual	A person who has been evaluated and deemed able to: (a) perform assigned covered tasks; (b) recognize and reach to abnormal operating conditions, and (c) maintains current qualification.
Right-of-Way (ROW)	A strip of land legally acquired by a pipeline company for which it has obtained the rights for the construction, operation, and maintenance of the pipeline. Rights-of-Way can include lakes, rivers, sea bottoms and easements in which the Work is constructed, including all permanent access roads and pipeline routes.
Safe Work Permit (SWP)	An agreement between the Permit Issuer and Receiver that is used to authorize work for a specific time and location and to ensure a safe area of work for the working group.
Second-Party	A contractor performing work on behalf of the First Party (i.e., Enbridge GTM)
Shoring	A temporary installation that “shores” up or supports trench or excavation walls to prevent movement of soil, underground utilities, roadways, and foundations.
Site	The area that can be described as any of the following: The ROW Property that will be used for the Work in which Company possesses any property right All staging areas and storage yards located outside the ROW that will be used for the Work All temporary workspace and temporary access roads that will be used for the Work May also be referred as Work Site
Sloping	A method of preventing cave-ins of excavation and trench walls by cutting them back on an incline away from the excavation or trench. The angle of incline shall vary with differences in such factors as the soil types, environmental conditions of exposure and application of soil overloads due to spoil piles, equipment placement or traffic nearby.
Spoil Pile	A pile of material that was removed from an excavation, trench, or borehole.
Spotter/Signaler	A competent Worker that looks for, locates, guides, signals, and reports hazards – as well as one who will stop unsafe activities – in relation to movement of vehicles and heavy equipment. This person shall have the ability to clearly communicate to the Workers under their care and site supervision as required.
Subcontractor	A person who is hired by a general contractor (or prime contractor or main contractor) to perform a specific task as part of the overall project and is normally paid for services provided to the project by the originating general contractor.
Subject Matter Expert (SME)	A person with experience or expertise in a specific aspect or topic, (e.g., a Process Safety Engineer).
Temporary Protective Structure	A structure or device designed to provide protection to workers, adjacent structures, excavations, tunnels and/or underground shafts from sliding or rolling materials, cave

Term	Definition
	ins, and/or collapses; examples include, but are not limited to, trench boxes, shoring, bracing, piles, timbers, and cages.
Third Party	An organization that is not working on behalf of Enbridge GTM
Tolerance Zone	<p>An established area around a pipeline where mechanical excavation is prohibited. For onshore pipelines, this is defined as an area comprised of the width of the pipeline or facility plus a minimum of 24 in. (61 cm) on either side of the outside edge of the pipeline or facility on a horizontal plane.</p> <ul style="list-style-type: none"> ● Company must follow state/federal damage prevention laws/rules for Tolerance Zone if they are more stringent ● The Tolerance Zone for excavation by third-party personnel is 3 m until the pipeline is positively identified <p>For submerged pipelines and pipelines in underwater areas, the Tolerance Zone is the width of the pipeline or facility plus a minimum of 75 ft (23 m) on either side of the outside edge of the pipeline or facility on a horizontal plane</p>
Trench	An elongated excavated area of ground whose depth exceeds its width at the bottom.
Trench Box	A self-contained steel structure placed in an excavation that is designed to withstand soil pressures and protect Workers against cave-ins.
Vacuum Excavation	The use of pressurized water or air to loosen soil, followed by using a vacuum to extract the loosened soil. This includes all activities performed by a vacuum truck including but not limited to “hydrovacating,” “air-vacating,” “shot gunning,” “day lighting,” “potholing” and “water washing”.
Verification Locate	An additional measure completed by the Contractor, to verify that all Below Grade Facilities are surface located and marked. Typically, the Verification Locate will implement sweep or scan techniques to ensure there are no discrepancies with the Initial Locate. Because this is an independent locate, it can occur before the Initial Locate (One Call Locate.)
Working Excavation	An excavation in which personnel must enter to perform work. A Competent Person/Working Excavation Checklist must be completed prior to workers entering the excavation.

3.2. Acronyms

Acronym	Definition
ABCGA	Alberta Common Ground Alliance
APWA	American Public Works Association
CER	Canada Energy Regulator
CFR	Code of Federal Regulations
DP	Damage Prevention
DPR-A	Damage Prevention Regulations - Authorizations
FLHA	Field Level Hazard Assessment
GD	Ground Disturbance
GTM	Gas Transmission and Midstream
HDD	Horizontal Directional Drilling
JHA	Job Hazard Analysis
JSA	Job Safety Analysis
JSJA	Job Safety Hazard Analysis
OD	Outside Diameter

Acronym	Definition
OHS	Occupational Health and Safety
OSHA	Occupational Safety and Health Administration
PAIR	Pipeline Anomaly Investigation and Repair
PHMSA	Pipeline and Hazardous Materials Safety Administration
PI	Pipeline Integrity
PIC	Person-in-Charge
PPE	Personal Protective Equipment
PVC	Polyvinyl Chloride
ROW	Right-of-Way
SEP	Safe Excavation Pressure
SME	Subject Matter Expert
SMYS	Specified Minimum Yield Strength
SWP	Safe Work Permit

4. Roles and Responsibilities

In the event projects involving the installation, maintenance, or replacement of cathodic protection test posts or pipeline markers are to be conducted by a single party (only Enbridge personnel or a second-party Contractor), the Enbridge Representative may coordinate ground disturbance activities (e.g., issuing SWP, Ground Disturbance Permit) remotely and may be exempt from being onsite during these activities.

Roles / Titles	Responsibilities
Company Representative(s) or Designate	<ul style="list-style-type: none"> • Ensure all parties involved in Ground Disturbance activities have met the training requirements • May issue the Safe Work Permit (SWP) if it has not already been issued by another group or person • Issue the Ground Disturbance Permit • Manage Ground Disturbance Package • Ensure compliance with the crossing written approval or other relevant approvals that are in place • Oversee contractor work • Ensure the Internal/External Pipe Inspection Report is completed prior to backfilling • Ensure the “GTM Working Excavation Checklist,” (Appendix B) or contractor version of Excavation Checklist/Competent Person Form has been completed if the ground disturbance activity/scope involves a Working Excavation • Ensure that construction specifications are followed • Ensure the Locator has received all applicable documents to perform the required locates • Be present for all mechanical ground disturbance activities within 16 ft. (5 m) of any Below Grade Facilities • May be designated as the PIC
Ground Disturber or Excavator (Contractor)	<ul style="list-style-type: none"> • Complete One-Call notification prior to start of activities • Ensure that a third-party sweep has been completed prior to start of activities • Collect and compile documents for ground disturbance package • Provide training records to Company Representative, when applicable • Receive Ground Disturbance Permit (Received by Qualified Disturbance Supervisor)

Roles / Titles	Responsibilities
	<ul style="list-style-type: none"> • Oversee Subcontractors' Ground Disturbance Permit • Conduct the ground disturbance activity • Assign the qualified ground disturbance supervisor • Make all efforts to contact the facility owner when an unknown facility is identified
Ground Disturbance Coordinator (Company Representative)	<ul style="list-style-type: none"> • Ensure the Locator has received all applicable documents to perform the Verification Locates • Coordinate the Ground Disturbance activities and acts as a liaison between Company and Contractor • Responsibilities may be absorbed by the Company Representative if a GD Coordinator is not named
Qualified Ground Disturbance Supervisor (Contractor)	<ul style="list-style-type: none"> • Receive SWP on behalf of the Ground Disturber (Contractor) and lead the Job Hazard Analysis (JHA)/Job Safety Analysis (JSA) portion of this process • Receive Ground Disturbance Permit on behalf of the Ground Disturber (Contractor) • Be present for the duration of all ground disturbance activities • Obtain and maintain regulatory approved training • Provide required information to the appropriate parties • Oversee work in adherence to the SWP, Ground Disturbance Permit and Standard, including work of subcontractors • Manage ground disturbance package • Facilitate pre-ground disturbance meeting • Ensure discrepancies have been resolved`
Equipment Operator	<ul style="list-style-type: none"> • Understand and sign off on requirements outlined in the Ground Disturbance Permit • Review and understand the ground disturbance package • Ensure all hand signals are agreed upon • Adhere to the mechanical clearance requirements
Equipment Spotter	<ul style="list-style-type: none"> • Use hand signals as directed by equipment operator • Stop Excavation activity if imminent danger exists, if Positive Identification of Below Grade Facility has been lost or if unknown facility is exposed • Know the locations of all Below Grade Facilities in the work area • Assist the operator in maintaining required clearances and depth of cover
Locator	<ul style="list-style-type: none"> • Search for utilities using Company approved locate methods • Locate and surface mark underground facilities • Surface mark all potential utilities found in search process • Produce line locate diagram(s) that reflect the surface markings and identify areas unable to be searched or confirmed • Communicate contents of the diagram(s) and any areas of concern to the Enbridge Representative and Ground Disturber

5. Deviation of Specification

If there is a need to deviate from the contents of this Standard, Form 7T-295, "Procedure Waiver Form" is required. Deviations may be approved by the Manager of Technical Operations - Region (or designee). GTM Damage Prevention must be notified of any deviation requests.

6. Compliance

The GTM Ground Disturbance Specification shall be followed in accordance with the following regulations:

- Pipeline and Hazardous Material Safety Administration (PHMSA) Code of Federal Regulations (CFR) Title 49: Transportation, Subtitle B, Chapter I, Subchapter D –
- Pipeline Safety: Part 192 –Transportation of Natural and Other Gas by Pipeline Minimum Federal Safety Specifications
- Pipeline and Hazardous Material Safety Administration (PHMSA) Code of Federal Regulations (CFR) Title 49: Transportation, Subtitle B, Chapter I, Subchapter D – Pipeline Safety: Part 193 – Liquefied Natural Gas Facilities: Federal Safety Standards
- Pipeline and Hazardous Material Safety Administration (PHMSA) Code of Federal Regulations CFR Title 49: Transportation, Subtitle B, Chapter I, Subchapter D – Pipeline Safety: Part 195 – Transportation of Hazardous Liquids by Pipeline
- Canadian Energy Regulator (CER) Onshore Pipeline Regulations SOR/99- 294
- Canadian Energy Regulator (CER) Damage Prevention Regulations – Authorizations (DPR-A) SOR/2016-124
- Canadian Energy Regulator (CER) Damage Prevention Regulations – Obligations (DPR-O) of Pipeline Companies SOR-2016-133

7. Ground Disturbance Requirements

A "Ground Disturbance Permit," (Appendix A) is required for ground disturbance activities within a fenced facility and all mechanical activities including vacuum excavating, backfilling, blasting or ROW disturbance greater than 12 in. (30 cm) and/or if the depth of cover is not known.

Ground Disturbance activities that would not require a Ground Disturbance Permit include:

- Probing
- Hand digging using a shovel via non-mechanical means (e.g., not electric, not motorized, not pneumatic, not hydraulic) that is not part of a larger ground disturbance activity
- Survey staking and line locate surface marking
- Environmental survey activities
- Disturbing the ROW less than 12 in. (30 cm) in depth provided the locations and depths of cover for all facilities are known.
- Agricultural cultivation to a depth of less than 45 cm below the ground surface

The Ground Disturbance Permit shall be used in conjunction with a Safe Work Permit (SWP) and a JHA/JSA. The Ground Disturbance Permit shall:

- Be completed by a Company Representative
- Be reviewed and received by the Ground Disturber (Contractor) and all parties involved in ground disturbance activities

- Be issued by a Company Representative for specific ground disturber work area in which ground disturbance will take place for that work shift (e.g., mile post to mile post, specific Excavation site, controlled area, etc.)


Each Ground Disturbance Permit expires after 12 hours and is needed for each day during which ground disturbance activities take place, including backfilling. A new “Ground Disturbance Permit (Appendix A),” is required when there is a significant change to the scope of work, including a change in the Permit Issuer or Permit Receiver. All Permits and Checklists are suspended during emergencies and must be re-validated prior to returning to work. If multiple ground disturbances are set to take place on a project site, a Ground Disturbance Permit is required for each ground disturbance event (including vacuum excavation). If no ground disturbance activities are set to take place on a given day (e.g., only pipe repair or maintenance activities are taking place), then a Ground Disturbance Permit is not needed.

Ground Disturbance Permit Issuer (Company Representative or designate) shall:

- Review the written hazard assessment and ground disturbance package submitted by the Permit receiver
- Ensure the GD Permit Receiver, Excavator, Spotter and all parties attending the ground disturbance have current and valid certifications
- Complete and Issue the Permit
- Monitor the ground disturbance activities for compliance with the Permit
- Suspend the work permit if they believe an unsafe condition exists
- Accept the returned permit from the permit receiver and file in accordance with Company records retention requirements

Ground Disturbance Permit Receiver (Qualified Ground Disturbance Supervisor [Contractor]) shall:

- Submit hazard assessment and ground disturbance package, specific to the work, to the permit issuer
- Review the GD Permit, hazard assessment and ground disturbance package with the workers directly involved in ground disturbance activities
- Adhere to all ground disturbance permit requirements
- Stop work immediately and request a new ground disturbance permit if the work scope changes
- Return and sign off the on the permit upon expiry or completion of the work

 Canada Energy Regulator (CER) - Authorizations (DPR-A) Section 10(3) outlines these additional measures required for any Ground Disturbance:

- Ensure that the activity is carried out in accordance with the technical details that are set out in the Ground Disturber’s request for consent and that have been accepted by the pipeline company, as well as with the conditions set out in the pipeline company’s consent, including the conditions respecting directional drilling or the use of explosives.
- Ensure that the activity is completed within two years after the day on which the consent was obtained, unless the pipeline company and the Ground Disturber agree on another time period that is set out in the consent.
- Do not undertake mechanical excavation that would cause a Ground Disturbance within the prescribed area within 3 m of a pipe, unless:

- The excavation runs parallel to the pipe, the pipe has been exposed by hand at sufficient intervals to confirm the pipe's location or the pipeline company has used a method that would permit it to confirm the pipe's exact location and has informed the person of that location.
- The excavation crosses the pipe, the pipe has been exposed by hand at the point of crossing or the pipeline company has used a method that would permit it to confirm the pipe's exact location, has informed the person of that location and has confirmed that the pipe is at least 60 cm deeper than the proposed excavation.
- Ground conditions render it impractical to locate the pipe using any of the methods set out in subparagraphs (i) and (ii), the pipeline company directly supervises any excavation.
- Comply with the instructions of the pipeline company's authorized field representative regarding the procedures that are to be followed during the activity and that relate to the pipeline's safety and security.
- If interference with or alteration of a pipe becomes necessary, obtain the pipeline company's written consent to interfere with or alter the pipe.
- Carry out any activity that involves the interference with or alteration of a pipe under the pipeline company's supervision.
- Immediately notify the pipeline company of any contact with a pipe or its coating during the activity.
- Unless otherwise agreed on by the pipeline company and the person that is engaged in the activity, notify the pipeline company at least 24 hours before backfilling over a pipe.
- If the consent is suspended by the Commission or by the pipeline company in accordance with subsection 10(1) of the Canadian Energy Regulator Pipeline Damage Prevention Regulations – Obligations (DPR-O) of Pipeline Companies, the authorization is suspended, and the activity must cease for the duration of the suspension of the consent.

More information on CER requirements can be found in the Canadian Energy Regulator Pipeline Damage Prevention Regulations – Authorizations (DPR-A) (SOR/2016-124) and Canadian Energy Regulator Pipeline Damage Prevention Regulations – Obligations (DPR-O) of Pipeline Companies (SOR/2016-133).

NOTE: If a Ground Disturbance is planned to take place in a Geohazard Area, please consult the GTM Geohazard Team for guidance.

8. Training

Contractor shall ensure personnel involved in Ground Disturbance activities are trained to ensure competency in the specific roles they are assigned or authorized to fulfill during Ground Disturbance activities. Company reserves the right to review Contractor Ground Disturbance training programs and records and may request adjustments to program prior to accepting Contractor's Ground Disturbance training program. Company also reserves the specific Ground Disturbance requirements where this is deemed necessary. Ground Disturbance Training will be available and required by all individuals involved in Ground Disturbance activities.



For Canada, Contractor personnel involved in Ground Disturbance Activities must have completed a valid Ground Disturbance Level II or any Alberta Common Ground Alliance (ABCGA) Ground Disturbance Standard 201 certification course.

8.1. Ground Disturbance Training Exemption for Indigenous Participants Supporting Archaeological Work on GTM Assets within the Province of British Columbia

Indigenous community members within the province of British Columbia may participate in archaeological field studies without completing Ground Disturbance Level II (8 hour) training, provided the following

conditions are met. Full ground disturbance training is required if any of the following conditions cannot be achieved.

- All subsurface infrastructure must be identified, located, and (if needed) exposed, as outlined in the GTM Damage Prevention Program
- The work is only in support of archaeological studies.
- All work is completed with a shovel or similar implement in unfrozen conditions hand augers, picks, or mechanical excavation are prohibited.
- Excavation depth is restricted to the depth of topsoil, but is not to exceed 2 ft.
- The work term does not exceed 3 consecutive weeks.
- Work is overseen by a fully trained ground disturbance supervisor.
- The span of control does not exceed 3 participants for every ground disturbance (aka someone who has taken Ground Disturbance Level II training).
- Each excavation location is reviewed and accepted by the ground disturbance supervisor.
- All participants have completed a ground disturbance safety orientation (NTD this orientation will be developed by company).

9. Operator Qualification

Individuals performing activities on regulated pipe or pipeline components shall possess the appropriate Operator Qualification for the applicable covered task(s).

The following table provides the Operator Qualification (OQ) covered tasks related to this Specification:

Table 9.1 Operator Qualification Covered Tasks

CONTRACTOR GTM TASK ID	TASK DESCRIPTION
607	Damage Prevention: Observation of Excavating and Backfilling
608	Damage Prevention for Blasting Near a Pipeline
619	Damage Prevention During Vacuum Excavation


10. Safe Work Permit

All ground disturbance activities, including those receiving a ground disturbance permit, require a Safe Work Permit (SWP) with applicable accompanying JHA and FLHA prior to work commencing.

11. Ground Disturbance Planning

For Ground Disturbance planning, the Ground Disturber (Contractor) shall follow these minimum requirements and any additional requirements outlined by the Permit/SWP issuer:

- Request a One-Call and obtain a locate ticket prior to any ground disturbance activities.
- Ensure that all One-Call members on the ticket have responded.
- Ensure the Ground Disturbance package is completed for all Ground Disturbance activities as per the requirements outlined in ground disturbance package requirements section.


- Obtain all required permits for all Company ground disturbance activities.
- Provide training records to Company Representative, when applicable.
- Ensure all parties involved in Ground Disturbance activities have met the training requirements.
- Determine and mark the Excavation Area using Company specific flagging and marking requirements.
- Ensure that all locating requirements are complete and any discrepancies are remedied before mechanical excavation activities begin.
- If the Ground Disturbance activity is to take place within or near an environmentally sensitive area, notify Safety and Reliability – Environment Projects to obtain clearance as soon as the project is known; it may take four to six months to receive environmental permitting.
-  Ensure that Canada Energy Regulator (CER) is notified if Ground Disturbance takes place within 30 m of a stream or waterway


11.1. Working Around Operating Mainline

If digging above or adjacent to an Enbridge operating mainline, the Company Representative will receive recommendations from the Company Pipeline Integrity organization.

11.2. Ground Disturbance Package Requirements

Prior to ground disturbance activities, the Ground Disturber (Contractor) shall collect and compile ground disturbance package documents, which may include documents from the Ground Disturbance Coordinator (Company), if applicable. The qualified Ground Disturbance Supervisor (Contractor) must complete the supporting documentation and maintain it as part of the ground disturbance package. All documents shall be reviewed before ground disturbance activities commence. This package shall be readily available for review by the workers prior to and while ground disturbance activities are taking place.

 US GTM Projects and Operations has established ground disturbance package documents shall only include the Ground Disturbance Permit, One Calls with all clear responses, and Working Excavation Checklist.

 For Canada, the documents that make up the ground disturbance package shall include the following if applicable, but are not limited to:

- Working Excavation Checklists
- Safe Work Permits
- Hazard Assessments
- Construction Drawings
- Site Plot Plan
- Alignment Sheets
- As-builts/Red Lines
- PAIR Reports
- Station Piping/Instrument Drawings
- Route Sheets

- Site Photos
- Exposure Hole Log
- Line Locate Diagrams
- Procedure Waiver Forms
- One-Call with All Clear Responses
- Crossing or Encroachment Consents
- Tool Run Reports for the target line/pipeline to be excavated
- Emergency Procedures

12. Pre-Ground Disturbance Meeting

Before ground disturbance activities begin for the shift, the Ground Disturber (Contractor) shall conduct a pre-ground disturbance meeting at the work location with Contractor and Contractor/ Subcontractor personnel to review site conditions with the equipment operator(s), spotter(s) and workers involved in the ground disturbance activities or adjacent work area(s). This meeting does not replace a pre-job safety meeting but can be viewed as a supplement to the safety discussion that includes detailed information about the work tasks of the shift.

The meeting shall review:

- Location, direction, alignment, depth, size and type of all Below Grade Facilities
- Roles and responsibilities
- Contents of the ground disturbance package to ensure it is up to date and accurate
- Markings and potholes in the field
- Emergency procedures and Stop Work Authority (refer to the GTM Safety Manual for additional information)

13. Pressure Reductions

Prior to any facility excavation activities, a Safe Excavation Pressure (SEP) must be determined. Company Area Management in consultation with the Company Pipeline Integrity organization will determine pressure reduction requirements prior to excavation activities after considering the following factors:




- Known or suspected defects,
- Defect type, size, severity, and circumferential location
- Operating and construction history of the pipeline
- History of severe integrity threats
- Type of work to be done
- Percentage of specified minimum yield strength (SMYS) at which the pipeline operates
- Class location
- Unstable soils
- Poor site conditions

14. Locate Phase

Enbridge requires that all buried pipelines and foreign facilities (pipelines, utilities, underground structures, etc.) in the area are properly located prior to Ground Disturbance activities to avoid damage to facilities.

14.1. Location Requirements

Locates must be performed by a qualified individual. It is recommended that a Company Representative review company drawings with workers performing locates to determine the general location and direction of all facilities within the Ground Disturbance and work area. Owners of any foreign underground facilities must be requested to locate and mark their facilities and are encouraged to be present during excavation and backfilling activities. Upon receiving a locate request, Locator(s) must do the following:

- Communicate with Ground Disturber (contractor) to confirm scope of work
- Review ground/surface for abnormal conditions including but not limited to dead vegetation, soil erosion, washouts, and ROW encroachment
 - If abnormal conditions are identified, communicate with the Ground Disturber (contractor) and Company Representative to determine if a leak survey should be conducted before starting excavation activities
- Surface-mark all locatable known underground facilities within the locate boundary
- Search for and surface mark discovered unknown underground facilities within the locate boundary. This search should be performed after the facility owner listed on the locate request has responded
- Compare surface markings to company drawings and communicate any discrepancies to Ground Disturber (Contractor) and a designated Company Representative
- Communicate presence of any known non-locatable underground facilities to Ground Disturber (Contractor) and a designated Company Representative
-  Inform the Ground Disturber, in writing, of safety practices to be followed while working in the vicinity of its pipes and, in case of a ground disturbance, within the prescribed area
-  Mark the location of its pipes in the vicinity of the proposed facility or the prescribed area at maximum intervals of 10 m along each pipe using markings that are clearly visible and distinct from any other markings that may be in the vicinity of the proposed facility or the prescribed area [CER DPR-O, Section 6(b).]
-  Provide information to the Ground Disturber that clearly explains the significance of the markings [CER DPR-O, Section 6(b).]

If an unmarked foreign underground facility is discovered, the Ground Disturber (Contractor) shall make every reasonable effort to identify and notify the facility owner. If the owner cannot be identified, locate and surface mark the unknown foreign facility and document the steps taken to identify the owner and retain a copy in the ground disturbance package.

Locating and temporary marking of the general location of pipelines can be accomplished without need for further visual confirmation of Enbridge pipelines if the following are true:

- Soft digging /non-mechanical methods are used
- Enbridge pipeline(s) will not be exposed
- Enbridge pipeline(s) are not crossed by foreign facilities
- It appears reasonable that Enbridge pipeline(s) will not be damaged by this activity

14.2. Establishing Excavation Area

The Ground Disturber (Contractor) shall mark the excavation area with white lining as required by federal, state, and local damage prevention laws. Facilities shall be located inside the excavation area and extend 100 ft. (30 m) from the proposed excavation perimeter with the following exceptions:

- When in snow conditions, use visible markings other than white flagging
- Where access permission is not granted outside of the right-of-way (ROW), the ROW shall be used as the locate boundary

If there is additional temporary workspace(s) and/or non-public access roads an Initial Locate shall be completed within these areas. Extra workspace or access may be used for such purposes as:

- Heavy equipment traffic as part of the excavation work
- Storage area for spoil, equipment, and/or materials

14.3. Locate Constraints

If a signal cannot be qualified or it is impossible to perform a locate due to physical limitations (railroads, access permissions not granted, permanent structures, highways, fence lines, berms, roadways, buffer zones, etc.), Below Grade Facilities shall be identified through other means, such as historical records, ground-penetrating radar (GPR), One-Call services, or visual searches. The Locator shall note the limitation(s) on the line locate diagrams (sweep map) and advise Company Representative and the Ground Disturber (Contractor) of the limitation(s). If the facility being located is owned by a third party, then the Locator working on behalf of the third party is responsible for noting any limitations.

14.4. One-Call Locates

One-Call Locates satisfy local legislative requirements. One-Call locates are performed by One-Call Members for areas not considered private property. Locates may be performed on private property if it is required to access the ROW. One- Call members will either locate their own facilities or provide a qualified Locator to complete locates on their behalf.

14.5. Placing One Call Locate Requirements

Ground Disturber (Contractor) must place a One-Call locate request and provide enough time to locate before starting any below grade activity. If available, One-Call locate requests may be placed online instead of by phone. Emergency One- Call locate requests are to be placed by phone. The area to be located by the One-Call system shall match the locate boundary area. Placing a new locate request is required in the following situations:

- When surface markings become dislodged, removed, or unrecognizable
- If the One-Call ticket expires; project duration change that does not go beyond ticket expiration date is still in compliance
- If a new contractor or subcontractor is retained to conduct ground disturbance work in the area, as there shall be no transfer (piggybacking) of existing tickets
- If there is a change in the scope of work stated on the one call ticket (i.e., change in the excavation area, change in the type of work/repair performed or duration of project)

NOTE: Additional locates beyond the locate boundary may be required to verify alignment or location of Below Grade Facilities.

When more than one Excavator/Contractor is performing their activities in the vicinity of a Company site, each Excavator's Competent Person should be able to produce a copy of a separate One-Call reference number for their activity.

14.6. Verification Locate (Required for Contracted Ground Disturber)

The Company Representative and Ground Disturber (Contractor) shall provide all appropriate records, drawings and documentation to the party performing the Verification Locate. The Company Representative and Ground Disturber (Contractor) will ensure the Verification Locate is performed by a qualified locator other than the locator who performed the Initial Locate (surface locate) and will determine the appropriate type(s) of Verification Locate(s) required. A Verification Locate is not required for first party Ground Disturbances or Ground Disturbances that only employ hand digging, vacuum excavating, probing, or for non-mechanical environmental surveying activities. Within the entire locate boundary, the verification locator shall:

- Confirm the accuracy of all initial surface locates
- Produce a line locate diagram and provide to the Company Representative and Ground Disturber (Contractor) within two working days of completion of the locate to be included in Ground Disturbance Package
- Record unknown or undocumented facilities on the line locate diagram that were identified during the Initial Locate/Verification Locate
- Notify the applicable One-Call center and/or other underground facility operators if any unidentified facilities are discovered or if facilities (or their locations) are found to be marked improperly
- Highlight discrepancies between drawings and actual positions of underground facilities in the line locate diagram. The Company Representative and Ground Disturber (Contractor) shall investigate and resolve any reported discrepancies, which may require additional locates or the use of alternative methods (e.g., ground penetrating radar). A Company Representative may request one locate method, or a combination of multiple Verification Locate methods, depending on the characteristics of the locate boundary area. In addition to four-way sweeps, other types of Verification Locates approved by Company include:
 - All Scan
 - Passive Scan
 - Direct connect method
 - Alternative method perimeter vacuum excavating

14.7. Surface Markings

Company requires that all Below Grade Facilities are marked to ensure that the Ground Disturber (Contractor) has a thorough understanding of the facilities below grade to perform safe ground disturbance activities. The Ground Disturber (Contractor) and locator shall ensure the following requirements:

General Surface Marking Requirements

- Surface markings are in accordance with the American Public Works Association (APWA) uniform color code which applies to both US and Canada.
- Surface markings are highly visible to equipment operators
- Markings clearly indicate change in direction where applicable
- Temporary surface markings are removed upon completion of the work, as requested
- Permanent markings removed shall be replaced by a qualified worker
- Inside a fenced station/terminal, surface markings are spaced no more than 10 ft. (3 m) apart, directly over the centerline of the Below Grade Facility

- On the ROW for all facility crossings, the surface markings shall be placed directly over the centerline of the Below Grade Facility at maximum intervals of 32 ft. (10 m) unless another reasonable interval is appropriate to ensure there is a clear line of vision between markers used to identify a particular facility location
- Surface markings remain in place for the duration of the work activities. If any surface markings are removed, become dislodged or become unrecognizable, immediately notify the Company Representative
- When conducting maintenance activities, the adjacent parallel pipeline(s) shall be located and marked at approximately 32 ft. (10 m) intervals
- For One-Call tickets where the Company Pipeline facilities have been located and marked but where a firm date has not been set for when activities might occur (e.g., when a Crossing Agreement is being executed), the Company Field Representative may make random site checks to verify the markings are intact and to ensure encroachment has not occurred.

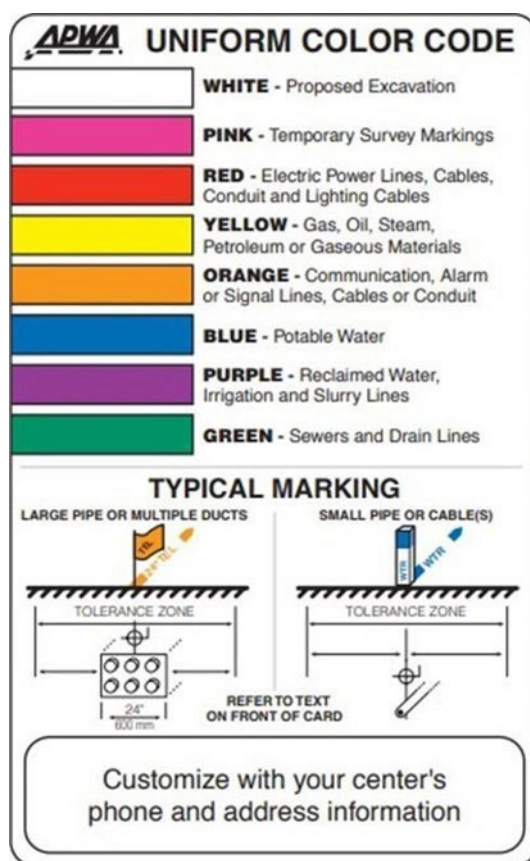


Figure 14.1: Uniform Color Code

14.8. Additional Requirements for Mainline Construction

For Mainline construction, the adjacent parallel pipeline(s) shall be marked at least every 164 ft. (50 m) maximum to ensure that construction crews can readily identify the location and/or any deviation of the existing parallel pipeline(s)

All existing Below Grade Facilities is surface marked a minimum of ¼ mile (400 m) in advance of any Mainline construction work

15. Positive Identification of Below Grade Facilities

15.1. Facility Identification

The Ground Disturber (Contractor) shall ensure that prior to initiating any permit-required ground disturbance activity, the locations of all Below Grade Facilities are positively identified. Positive Identification can be achieved by:

- Potholing – Exposing the underground facility by hand digging, vacuum excavating (hydrovac or air vacuum) or other soft-digging techniques. or a combination of either method.
- Facility must be sufficiently exposed for positive identification (e.g., at minimum all of the top half of a pipeline to determine center, diameter, and direction)
- Probe and Dig Method – Using a probe bar with rounded or blunt tips to prevent damage to Below Grade Facilities and electronic line locator to help determine the depth to which mechanical equipment is safely allowed to dig. This is achieved by continually using an electronic pipe locator to verify pipe location and depth. Probe to a pre-determined depth at an interval of one-half ($\frac{1}{2}$) the pipe diameter for a distance of $1\frac{1}{2}$ pipe diameters (for pipe outside diameter (OD) ≥ 20 in.) or 2 ft. (0.6 m) (for pipe OD < 20 in.) on each side of the centerline. If no obstructions are encountered, mechanically remove cover to $\frac{1}{3}$ of the probed or hand dug depth. Repeat electronic pipe locating and pipe probing or hand digging. Continue mechanically removing $\frac{1}{3}$ of probed or hand dug depth followed by pipe probing until the top and sides of the pipe can be probed, or hand dug. Hand excavation is to be used once the Tolerance Zone is reached. This method is to be used with the intent of positively identifying below grade facilities and shall not be used to prove the absence of facilities to the desired excavation depth. Do not begin Probe and Dig with the intent of stopping short of visually confirming the below ground facilities.
- Positive identification of company-owned cathodic protection cables (non-energized lines) prior to mechanical ground disturbance is not required. Identify the location of these facilities by contacting Company and utilizing any available information. Consult company with questions about any required repairs.

NOTE: Potholing and Probe and Dig positive identification methods are exceptions to the rule restricting ground disturbance activities involving mechanical excavation until all facilities have been positively identified.

- If existing facilities are known to be present but cannot be potholed as a result of local conditions, the Enbridge Representative and Ground Disturber shall discuss how to safely proceed with the excavation. This could include but is not limited to pipelines installed via HDD.
- If coating damage, corrosion, or an anomaly was discovered during positive identification that was previously not indicated by PI mitigation, the project team must fill out a PAIR Report. Contact the Regional Corrosion group if assistance is required to complete the PAIR Report. Note that the process of potholing or daylighting the pipeline does not necessitate the start of the PAIR Report process if no damage was discovered or suspected.
- Positive identification of Enbridge-owned cathodic protection cables (non-energized lines) prior to mechanical ground disturbance is not required. Identify the location of these facilities by contacting Regional Corrosion and utilizing any available information. Consult Regional Corrosion with questions about any required repairs.
- When digging in close proximity to anode beds, contact Regional Corrosion to discuss any necessary safety precautions, including temporary de-energization of the cathodic protection system.
- For any special permit segments containing SmartPipe, Enbridge must hand, or shovel dig whenever excavation operations are within 2 ft. of the pipeline and associated monitoring devices' communication lines.

The Ground Disturber (Contractor) shall ensure that:

- Before Positive Identification begins, facility identification markings shall be reviewed to determine if additional Positive Identification is required
- Positive Identification is enough to provide visual confirmation of the location, direction/Alignment, depth, size, and type of all Below Grade Facilities
- All known appurtenances are positively identified prior to Ground Disturbance activities
- All known pipe weights and screw anchors are located and marked
- Positive Identification is completed within the excavation area and extending 10 ft. (3 m) beyond the excavation perimeter OR 16 ft. (5 m) from the edge of the pipeline (whichever is greater), or up to the ROW boundary or work area limits
- All bends and changes in pipe direction are, at a minimum, positively identified at the beginning, center and end of the bend to ensure that the profile is accurately identified. Some bends may require additional exposure holes
- Smaller diameter non-metallic pipelines (4 in. or less) (for example polyvinyl chloride (PVC), polyethylene or other synthetic compounds) and all known cables (electrical, communication, etc.) are exposed by hand digging or vacuum excavating across the full width of the proposed trench or Excavation. This is not applicable to bundled cables in a common trench with safeguards such as: boards, conduit, duct bank, etc. or if location is unknown
- A minimum of three exposure holes are required for the Positive Identification of a facility or a minimum of two exposure holes providing the following criteria is met:
 - The facility is owned and operated by Enbridge
 - The facility diameter of the target joint is 6 in. (152.4 mm) nominal or greater
 - The proposed Excavation is not located within a Station/Terminal exposure holes from center to center are spaced a maximum of 75 ft. (23 m) apart.
- The spacing between exposure holes for Positive Identification may be reduced from 75 ft. (23 m) at the discretion of the Ground Disturbance Supervisor (Contractor) in situations including but not limited to the following:
 - concerns over congestion of below-ground facilities,
 - an Excavation less than 75 ft. (23 m) in length, and
 - the presence of bends/points of inflection or
 - changes in elevation.

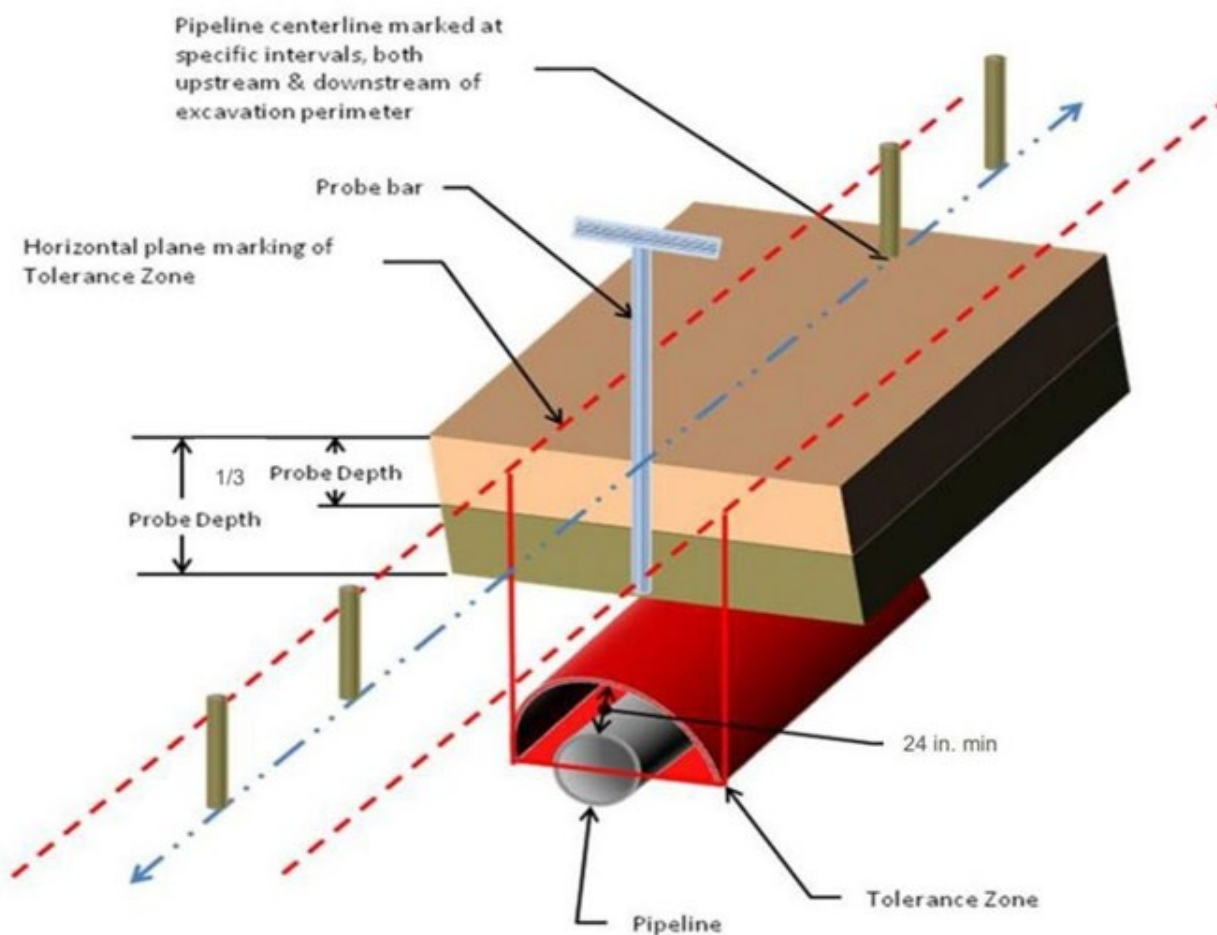


Figure 15.1: Probe and Dig Method

15.2. Adjacent/Parallel Pipelines

The following general requirements shall be adhered to when working around adjacent pipelines or parallel pipelines that run in the same general direction as the target pipeline.

- Locate and expose all adjacent facilities within 16 ft. (5 m) of ground disturbance and at any other locations requested by the facility Owner and/or Enbridge Representative
- If the Adjacent Pipeline Owner does not allow line exposure, then document and keep record of the interaction.
- At equipment crossing locations, identify depth and ensure that adequate protective measures are in place prior to any equipment crossing. Locate and expose all adjacent pipelines within 16 ft. (5 m) of ground disturbance.

For pipeline maintenance activities on the ROW, the following exceptions to the adjacent pipelines general requirements can be made:

- When allowed by applicable legislation (i.e., not in AER-regulated areas) and if multiple parallel pipelines exist, only the most adjacent pipeline outside the excavation perimeter needs to be positively identified if all surface markings have been completed within the locate boundary

- If all the criteria below are met, only two Positive Identification points are required:
 - The facility is owned and operated by Enbridge
 - The nominal diameter of the facility target joint is 6 in. (152.4 mm) or greater
 - The proposed Excavation Area is not located within a Station/Terminal
 - Positive Identification points from center to center are spaced a maximum of 75 ft. (23 m) apart
 - If a located below-grade facility is within the 16 ft. (5 m) area beyond and does not intersect the Excavation, two exposure holes can be used to determine location unless they are cables (electrical, communication, etc.).

15.3. Mainline Construction Requirements

For Mainline construction, the following additional requirements for adjacent pipelines must be followed:

- Where the separation between Ground Disturbance activities (e.g., stripping, grading, ditch line) and an existing adjacent pipeline is greater than 33 ft. (10m), Company construction management in coordination with Pipeline Integrity organization shall determine and communicate to the Contractor the spacing and frequency of exposure holes needed
- Where the separation between ground disturbance activities (e.g., stripping, grading, ditch line, etc.) and an existing adjacent pipeline is greater than 16 ft. (5 m) but less than 33 ft. (10 m), exposure holes shall be no further than 3,280 ft. (1 km) apart to ensure that line locating equipment remains consistent with actual Below Grade Facility locations
- Where the separation between ground disturbance activities (e.g., stripping, grading, ditch line, etc.) and an existing adjacent pipeline is between 10 ft. and 16 ft. (3 m and 5 m), exposure holes will generally be no further apart than 1,310 ft. (400 m) maximum
- When stripping, grading or continuous excavation is required within 10 ft. (3 m) of an existing pipeline, exposure holes shall be no more than 328 ft. (100 m) apart.

When the Ground Disturbance is near wet areas, sloughs, etc., locate and expose all adjacent facilities within 16 ft. (5 m) on each side.

When the Ground Disturbance is near a road, highway, railroad or other crossings, locate and expose all adjacent parallel facilities on each side within 16 ft. (5 m) of at no more than 50 ft. (15 m) intervals for a minimum distance of 245 ft. (75 m) from easement edge.

If the proposed ditch line is greater than 16 ft. (5 m) from the nearest adjacent line, locate and expose all adjacent facilities within 16 ft. (5 m) of Ground Disturbance on each side of road, highway, railroad, or other crossings at easement edge to confirm depth and location. The minimum required interval of exposures shall be determined as indicated above for adjacent facilities.

15.4. Probing

Probing as sole means for Positive Identification is not permitted unless specifically approved in writing by Company. This is not to be confused with the Probe and Dig method outlined in this document. Approval for the probe method shall be documented on the JHA/JSA and Work Authorization Form when applicable.

When the use of probes is approved, probes shall have rounded or blunt tips to prevent damage to Below Grade Facilities.

Probing (for reasons other than Positive Identification) is acceptable in the following situations for non-electrical facilities:

- For maintaining mechanical clearance (provided Positive Identification has been performed and is maintained)
- For determining depth of cover
- For preliminary probe reports for crossings
- For other situations that do not involve Positive Identification
- Vacuum Excavating Requirements

15.5. Vacuum Excavating Requirements

Vacuum excavating activities, while not considered to be mechanical excavating activities, contain inherent risks and appropriate controls must be followed to avoid damage to facilities and ensure the safety of personnel. When vacuum excavating activities are taking place, the company representative or designate shall be in the vicinity to monitor the activities but must be present at the specific vacuum excavating location when the initial visual of the below ground facility is achieved to monitor the process and determine the course forward. For all vacuum excavating activities these requirements shall be followed:

- Procedures for hydrovac or air vacuum operations shall be approved by the Operator. The procedure shall document, as a minimum, wand tip styles, and limits on fluid pressure and temperature
- Use a neoprene or equivalent lip on the vacuum end to eliminate the possibility of damage to the facility
- Establish a 16 ft. (5 m) safe zone to prevent non-essential personnel from entering the vacuum excavating operation to reduce risk to nearby workers
- Remove any loose rock embedded in the sides of the Excavation that could fall on the facility when the Vacuum Excavation activity is complete
- Avoid direct contact of the pipeline with the pressure nozzle on the wand

For hydro vacuum excavating (hydrovac) activities, in addition to the above, these requirements shall be followed:

- Ensure working water pressure does not exceed 2,000 psi (approximately 13,775 kPa)
- Reduce pressure to less than 1,500 psi (approximately 10,340 kPa) and limit water temperature to 100° F (38° C) when excavating within 1 ft. (0.3 m) of known or suspected underground facilities
- Ensure the underground facility is not continually contacted by direct spray once it has been sighted/exposed

15.6. Perimeter Vacuum Excavation

When the Excavation Area is congested with several Below Grade Facilities or when it is suspected that unknown facilities may be present, a Perimeter Vacuum Excavation (slit trenching) may be completed. It shall be dug at a minimum of 3 ft. (1 m) outside the Excavation Area perimeter to a depth of 1 ft. (0.3 m) deeper than the planned Excavation. When the Perimeter Vacuum Excavation method is used, follow these requirements:

- If a Below Grade Facility or Facilities pass through the Perimeter Vacuum Excavation, an exposure hole within Excavation Area shall be utilized to ensure depth, alignment, and size
- If a Below Grade Facility or Facilities enter the Excavation Area and no exit is identified, then the entire line(s) shall be identified for the entire length of the Excavation Area until reaching the termination point

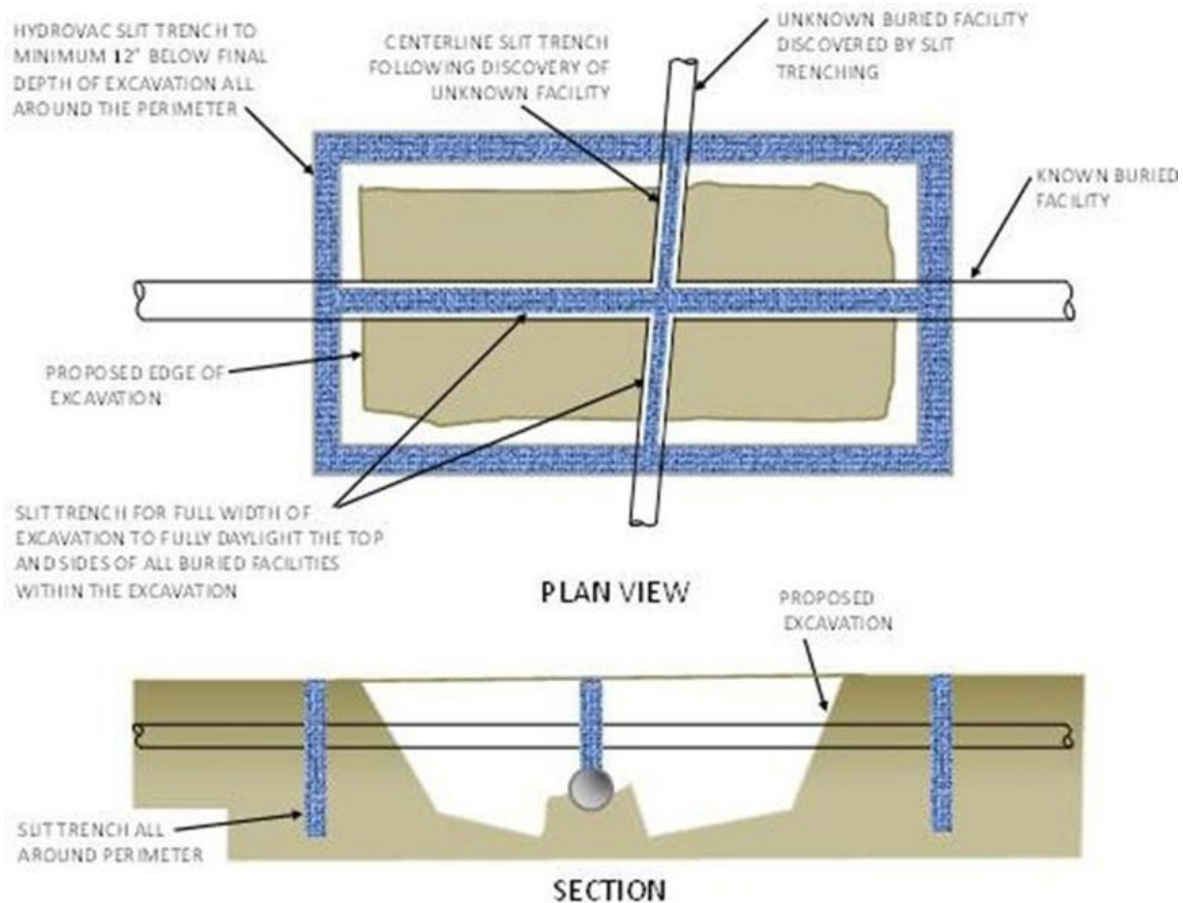


Figure 15.2: Slit Trenching Diagram

15.7. Marking Exposure Holes

Once exposure holes are created for Positive Identification, the Ground Disturber (Contractor) shall protect open holes by ensuring:

- Exposure hole(s) remains open and visible to all traffic
- Exposure holes are fenced at the same time the hazard is created to guard against persons, livestock, or wildlife from entering the Excavation Area
- Exposure holes cannot be left unattended unless fenced, covered, or backfilled in accordance with Section 18 - Fences and Barricades

Or, where practical and as determined by Facility Owner, such exposure holes may then be backfilled with the markers in place and fencing removed when following conditions have been met:

All underground facilities have markers (e.g., 1×4 in. or 2×4 in., or fiberglass pole with flag) in the exposure holes

- Markers are clearly visible to construction traffic

- Markers are alongside and on the working side of the adjacent facilities
- Markers note the facility owner, depth, size, and type of facility
- Approved clean, dry material is used for fill to eliminate subsidence from frozen or noncompact material
- Must be tracked on Contractor exposure hole log (including facility owner, facility type, location, and depth)
- For existing Company pipelines, if damage is noted, a Company representative must complete a Pipeline Anomaly Investigation and Repair (PAIR) report prior to backfilling.

15.8. Safety Considerations Around Open Holes

Barricades shall be erected to prevent workers from entering an area with any holes – open or covered.

All workers working within the barricade and exposed to open holes with depths greater than 6 ft. (2 m) and a diameter wide enough for a worker to fall into shall be qualified and equipped with fall arrest system.

Only a Competent Worker shall remove, or place hole covers for holes greater than 6 ft. (2 m) in depth.

Prior to working within a barricaded area with exposure to caisson holes, a competent person shall inspect each hole for accumulated water and other hazardous conditions and ensuring:

- Caisson holes are always free from accumulated water if work is taking place within the barricaded area
- Specifically designed fall restraint systems are implemented when caisson holes are drilled to depths greater than 6 ft. (2 m)
- Hole coverings shall:
 - Be placed when hole is complete and not in use
 - Be capable of supporting at least twice the weight of employees, materials or equipment that is supported or held by the cover at any time
 - Be secured to prevent accidental displacement by wind, equipment, or employees
 - Be distinguishable and not to be confused with other area materials and labeled as "Hole"
 - Be of size that adequately covers the hole and extends a safe distance for inspection of the hole and removal of the cover

15.9. Buffer Zones

Enbridge requires that safe clearances are established and clearly understood by workers for the prevention of encroachment (a gradual advance beyond acceptable limits). The Ground Disturber (Contractor) shall:

- Based on the JHA/JSA, use staking and appropriate flagging to establish a safety buffer zone of at least 10 ft. (3 m) alongside any existing adjacent parallel pipeline where possible, or at the maximum distance possible if adjacent parallel pipelines are spaced closer than 10 ft. (3 m).
- At all roadways, highway, and railway crossings, establish a minimum 10 ft. (3 m) safety buffer along the working side of any existing parallel pipeline(s). Do this by installing an appropriate amount of barricade parallel to the adjacent pipeline to prevent parking or moving equipment on top of the existing pipelines. Only equipment listed within the Crossing Agreement(s) or approved by Lands Services Department is allowed to cross existing lines

15.10. Excavation Exception

● For Projects and Operations on the pipeline ROW the frequency of exposure holes for Positive Identification can be further reduced to a singular point at the discretion of the Ground Disturbance Supervisor provided

- Mechanical excavation within the tolerance zone shall begin from a point of positive identification. Probing rods or soft digging techniques shall be used to confirm pipe location and ensure the 2-foot tolerance zone is not encroached.
- Visual identification is required for bends suspected to exceed 10 degrees and any appurtenances not found during initial locate.
- Pipelines outside the excavation area must be electronically located within the work area (excluding access roads), but no visual verification is required.
- Mechanical excavation must stop before reaching the 2-foot Tolerance Zone.

16. Damage Prevention During Excavation Activities

16.1. Safe Excavation for Leak Repair

Prior to excavating a leak defect, Regional Technical Staff and Area Management must develop a leak-specific excavation plan. This plan must be discussed thoroughly at the Pre-Job Safety Meeting, and all issues that may impact safety of the excavation must be addressed prior to excavation.

Prior to excavation, the line segment with the leak must be blown down to the established Safe Excavation Pressure (SEP). Once the SEP is reached, a hot work permit should be issued prior to moving any non-intrinsically safe devices or equipment into the work area.

16.2. Support Systems

Support systems – such as shoring, bracing, or underpinning – must be used to assure the stability of structures and the protection of workers where excavation operations could affect the stability of adjoining buildings, walls, or other structures.

17. Material Storage

Contractor shall take practicable steps to protect pipeline segments from unstable soil or landslides that may cause the pipeline to move from abnormal loads at excavation locations. Contractor, during excavations in Geohazard Areas, shall consider the placement of the excavation soil (spoil pile) and other material storage off the pipeline ROW to reduce loading and/or possible earth movement. To avoid triggering earth movement at these excavation locations, material storage (including spoil placement) shall be carefully planned to minimize potential damage to Below Ground Facilities.

When parallel Excavations occur within 10 ft. (3 m) of an adjacent Company operating pipeline, storage of excess surplus spoil materials above the operating adjacent pipeline(s) is not permitted unless approved by the Company. It shall be allowed based on the completion of hoop stress calculations completed by a geotechnical/geohazard SME and the approval by GTM Operations.

Pressurized cylinders used for heating, cutting, and welding, shall remain outside of the Excavation.

18. Fences and Barricades - Excavation

Contractor shall ensure unattended excavations, trenches, potholes, and boreholes shall be barricaded or fenced off as appropriate, depending on conditions. Highly visible material (e.g., fencing, flagging, berms, stringing along ROW) shall be used to protect against unintentional entry of unattended Excavations.

Adequate fencing shall be used around unattended Excavations in the presence of livestock.

Suitable warning devices shall be provided to ensure advance warning of Excavations, trenches or boreholes that may present a hazard to traffic.

19. Excavation Access/Egress

Contractor shall ensure sufficient space is provided in working excavations to perform all required tasks including adequate clearance under and between facilities and walls. Access and Egress must be provided by stairs, ladders, or ramps where workers are required to enter trench excavations that are 4 ft. (1.2 m) or more in depth.

20. Protection of Exposed Pipeline During Excavation

The Contractor must use a protective barrier for protection from falling rocks/debris or when rocks or other obstructions could cause the mechanical equipment to deflect and contact the pipeline. The protective barrier is required on the exposed pipeline in the area affected by this activity and should be positioned along the exposed pipeline as the work location moves in the ditch. Protective measures may include but are not limited to wooden safety mat, manufactured pipeline safety wrap, plywood, steel road plates, timber, and corrugated plastic pipe.

21. Mechanical Clearance

When working around Below Grade Facilities, the following requirements have been established to ensure the Ground Disturber (Contractor) maintains these clearances:

No mechanical Excavation shall occur within 2 ft. (0.6 m) of a foreign Below Grade Facility and its appurtenances (i.e., the Tolerance Zone), including protruding material that extends outside the bucket (e.g., frozen material, rock, concrete, etc.)

No mechanical Excavation shall occur within 2 ft. (0.6 m) of an Enbridge Below Grade Facility (i.e. the Tolerance Zone) unless all the following conditions are met:

- A Field Level Hazard Assessment (FLHA) shall be performed prior to excavation to address working mechanically within the tolerance zone
- Dig/construction/work package must be reviewed by the Enbridge Representative and the Ground Disturbance Supervisor
- It must be confirmed that there are no appurtenances in the encroachment area and the sides of pipeline that is being uncovered are visible
- Any discrepancies observed between site conditions and plans shall be resolved prior to initiating ground disturbance
- Mechanical clearance distance from pipe does not conflict with a crossing written approval or applicable legislation that is more stringent
- Below grade facility is exposed on the top and sides at locations sufficient to confirm alignment before encroaching inside of 2 ft
- Qualified Ground Disturbance Supervisor (Contractor) and/or Ground Disturbance Coordinator (Enbridge Representative) directly observes the excavating activities
- A qualified operator and spotter are used for the activity

For supplier Excavations, ensure the Ground Disturbance Coordinator (Enbridge Representative) is present at the side of the Excavation for any Mechanical Excavation or activity with potential for damage and ensure the appropriate parts of the Ground Disturbance Package are reviewed with the supplier

Ground Disturbance Coordinator (Enbridge Representative) will verify criteria to go to 1 ft has been met prior to proceeding with mechanical excavation within the 2 ft zone

- Mechanical clearance shall not encroach within 12 in. (30 cm) of an Enbridge Below Grade Facility. The final 12 in. (30 cm) of soil around a facility shall be removed by hand digging, vacuum excavating or other non-mechanical means
- Manager, Technical Operations or project/work owner approval is required for excavation within the 2 ft tolerance zone that are classified as high-risk due to any of the following characteristics:
 - Within any road easement
 - Within 250 ft. (76 m) of any residential structure
 - Alignment sheet or tool run data (ILI data) indicates a 5-degree pipe bend or greater (right/left) or appurtenances protruding more than 3 in. (7 cm) within 100 ft. (30 m) of the excavation area or pipeline crossovers
- A foreign utility parallels or crosses an Enbridge line within 10 ft. (3 m) of the excavation area
- ☉ In soil conditions not conducive to probing [such as rocky conditions, frost depths greater than 3 in. (7 cm)]
- ☉ For Projects and Operations (US GTM) (CORE PROGRAMS-P & O-PDR-OS-11820) has established Manager, Technical Operations or project/work owner approval is not required for excavation within the 2 ft tolerance zone that are classified as high-risk for the following characteristic:
 - In soil conditions not conducive to probing [such as rocky conditions, frost depths greater than 3 in. (7 cm)]

Once the top and sides of the pipeline are exposed at locations sufficient to confirm alignment, mechanical excavation may proceed up to 1 ft.

- Inside a station or valve site fence, all mechanical excavation inside of the 2 ft Tolerance Zone must be approved by the Manager, Technical Operations – Region (or designee).
- Manually operated jack hammers, picks or hoes equipped with jack hammers are prohibited from working directly over a Below Grade Facility and must use blunt tips or similar ends that will not scratch or damage the pipe.
- The use of hydraulic rock picks and hammer hoes shall not be used within the defined Tolerance Zone without the use of additional protection on the pipeline and only after the top and sides of the pipeline have been exposed. The excavator must be positioned in a manner that forces applied are not in the direction of the pipeline. Additionally, one or more of the following actions shall be taken prior to the use of this equipment in areas of rocky soil:
 - Reduce line pressure.
 - Provide a protective barrier (steel pipe cover or sleeve, corrugated plastic pipe, safety wrap) in accordance with this Specification
 - When using hydraulic jack picks the excavating equipment shall be located such that the boom does not require full extension to reach the work area.
 - The use of handheld pneumatic devices with a blunt tip or clay spade may be used within the defined Tolerance Zone to gain clearance only after the pipeline is exposed.
- For any special permit segments containing SmartPipe, only digging by hand with a shovel is allowed within the 2 ft. Tolerance Zone of the pipeline or any associated monitoring devices' communication lines.

For dredging and marine activities, the Tolerance Zone should be marked at 75 ft. (23 m) on either side of the submerged pipeline. When working inside of the Tolerance Zone, an Enbridge Representative must be present during the excavation.

Suspected or confirmed contact with the pipeline by mechanical equipment shall warrant immediate action. Discontinue excavation and backfilling activities, remove all personnel from the excavation, and notify Area Management and the Manager, Technical Operations – Region or designee as soon as possible (within three hours) for further guidance. Regional Operations will send preliminary report to Damage Prevention at GTMDamagePrevention@enbridge.com within 12 hours of discovery. Review DP-50.300, “Unauthorized Activity Reporting Procedure,” for more information.

22. Equipment Attachments with Teeth and Side Cutters

On all Enbridge worksites, equipment attachments with teeth and dozers with ripper teeth are prohibited. Only buckets with straight/smooth edges or buckets with teeth that have been protected by a bar welded across the full width of the bucket are permitted but note that the modification of equipment may not be permitted in all jurisdictions. Use of side cutters is prohibited during all pipeline operating and maintenance Ground Disturbance work.

Any exceptions will be provided in the form of a written approval from the Company.

23. Backfilling

Backfilling is considered ground disturbance, and the Ground Disturber shall adhere to the ground disturbance requirements. In addition to the ground disturbance requirements, the following shall be adhered to while backfilling operations take place:

The Ground Disturber (Contractor) shall ensure:

- All below-grade facilities are clearly identified, and clearances are maintained during backfilling
- The facility owner(s) has been notified as stated in the crossing written approval prior to backfilling of any existing Below Grade Facility
- For existing Company pipelines, the Contractor shall not backfill until authorized to do so to allow the Company to complete a Pipeline Anomaly Investigation and Repair (PAIR) report.
- Appropriate measures are in place to ensure that facilities are not damaged during backfilling operations
- All engineering precautions shall be followed including but not limited to the following:
 - Mechanical equipment adheres to the requirements outlined in this Specification.
 - Small piping (less than 2 in/50.8mm diameter), electrical conduit, and/or cable being buried has mechanical protection and plastic warning tape/ribbon installed in accordance with the appropriate backfill procedure
- Company Representative and facility owner are onsite for all backfilling activities unless otherwise specified in the crossing written approval
- Probe marks and damaged coating shall be repaired in accordance with Company “Pipeline Coating Repair Procedure.” Manufacturer’s recommended cure time shall be followed prior to backfill operations
- The pipeline shall rest on the bottom of the ditch. If the pipeline cannot be supported directly by the bottom of the ditch. The Company representative shall ensure the absence of voids around and under the pipeline when backfilling a pipeline segment supported by sandbags. Support should also be provided for branch connections.

- Backfill material fills the void beneath the pipe
- Drawings are updated and redlines capture any changes
- Completion of internal/external pipe inspection report or potholing for positive confirmation coating report

23.1. Backfilling in Areas of Rock

When backfilling in areas of rock, the pipeline shall be protected from damage by either:

- Laying piping on an 8 in. (20 cm) deep bed of padding material
- Laying piping on sacks filled with padding material or foam pillows (preferably at girth welds if they can be easily located) spaced at 15 ft. (4.5 m) centers that suspend the piping a minimum of 8 in. (20 cm) above the trench bottom and backfilling the piping with padding material so that the padding material fills all voids under the piping between the sacks or foam pillows. In areas of acid rock, consider the need to backfill with impermeable clay to protect the pipeline from exposure to an acidic environment and to address potential environmental concerns.
- Additional pad dirt shall be placed around the pipeline to a minimum elevation of 8 in. (20 cm) above the top of the pipeline.
- Rocky backfills material may be used following the application of the dirt cushion. However, care must be exercised in backfilling to assure that rocks larger than 12 in. (30 cm) are not backfilled immediately on top of the padding. No rock greater than approximately 12 in. (30 cm) in any dimension shall be placed in the trench within 12 in. (30 cm) of the pipeline and no rock greater than 24 in. (60 cm) in any dimension shall be placed in the trench within 24 in. (60 cm) of the pipeline. Any waiving of these requirements (e.g., rock jacket coating or approved rock shield is used) requires written approval from the Company.

23.2. Backfilling Cultivated Lands

When backfilling cultivated lands, replace at least the original depth of topsoil during the backfill. If the space between the 8 in. (20 cm) layer of padding over the pipeline and the point at which the topsoil must be used is not sufficient to hold all the material excavated from the ditch, the surplus material must be hauled away from the site unless other arrangements have been made with the landowner by the Company.

23.3. Excluding Foreign Material from the Backfill

The Company representative shall check to ensure that no foreign or refuse material is included in the backfill. All such materials shall be removed from the job site. These materials include, but are not limited to, skids, welding rods, pipe rings, trash, trees, stumps, and shrubby limbs.

23.4. Final Grading After Construction

Upon completion of construction activities, the right-of-way shall be graded to a smooth natural appearance. All fences, culverts or markers shall be replaced or restored to their original condition or better. Any excess soil which was excavated during construction shall be spread evenly onto the cleared areas or removed from the site. The topsoil shall be graded to conform to the adjacent terrain, except for erosion control measures.

Soil compaction (where required) or crowning shall be used to offset the natural settlement of the soil. Consult with Company Representative for additional information.

23.5. Removal of Excess Materials and Debris

Excess construction material and other debris shall be removed from the right-of-way or otherwise disposed of properly. Any remaining rock brought to the surface by excavation after backfilling shall be removed from the property unless approved by Company.

23.6. Restoration of the Right-of-Way

Restore the right-of-way by seeding and fertilizing, if applicable, or otherwise returned to its approximate original condition. For site-specific restoration requirements consult company representative.

23.7. Restoration of Water Crossings

The restoration of water crossings shall include the replacement of earth adjacent to the crossings at slopes equal to or less than the normal slope angle for the soil type involved. Sandbagging, seeding, or other methods of soil stabilization shall be accomplished without undue delay. Consult with Company Representative for additional information.

23.8. Landowner Requests

Any special considerations requested by the landowner regarding clearing and restoration activities shall be approved by the Company.

23.9. Additional Requirements for Roads and Railroads

Consult with Company Representative for additional details concerning backfilling requirements that may apply for roads and railroad crossings.

24. Blasting

Any blasting operation in the vicinity of an in-service Company pipeline must be reviewed and approved by the Company.

24.1. Obtaining a Blasting Plan

Contractor must complete the blasting plan form provided by the Company and submit for approval. Contractor should complete the blasting plan at least three days in advance to allow for Company evaluation and approval.

24.2. Safety Measures

Contractor may be requested to engage in and/or facilitate the additional company safety measures during and after the blasting. (e.g., manning valves bracketing the section, reducing operating pressure, conducting a leak survey).

A leakage survey is required prior to blasting operations. If blasting-related damage to pipeline facilities is suspected, a leakage survey must be completed in accordance with Right-of-Way Gas Leakage Survey Procedure. A leakage survey is required if the predicted effect of the proposed blasting is sufficient that deviation from the approved blasting plan could result in a cracked weld.

25. Boring Operations

For Boring Operations, all ground disturbance requirements and practices set out in this Specification and any associated procedures shall be met when performing these activities. The Contractor shall:

- Maintain the following minimum separations for all facility crossings (unless otherwise specified in the crossing written approvals):
 - Underground facilities (open cut crossings) – 2 ft. (0.6 m)
 - Underground facilities (bored/tunneled crossings) – 3 ft. (1 m)

- Underground facilities (HDD crossings) – 10 ft. (3 m)
- Complete the following prior to commencing operations:
 - Ensure a boring plan and design created in accordance with construction specifications is available
 - Post all required warning signs
 - Ensure fire extinguishers are supplied in accordance with the Enbridge requirements and applicable legislations
 - Ensure applicable pre-use inspections are completed and retained
 - Secure/anchor boring equipment to prevent movement
- Complete the following during Operations:
 - Continuously confirm the depth and alignment during the advancement of Boring Operations including the reamed path or pilot hole
 - Guard the mechanical and rotating equipment
 - Identify and maintain exclusion zones to protect equipment, personnel, and assets from entering
 - Complete daily/shift equipment inspections as per manufacturer recommendations and maintain inspection records
 - Complete Inspections for tooling and steering equipment prior to use and each time the tool is reintroduced into the bore path, when applicable for the boring type
 - Use specialized mechanical equipment (e.g., hydraulic style tongs) to break the drill strings (when applicable for the boring type). Use of manual tongs and/or excavator buckets is prohibited
 - Ensure all cables used to lift drill stems are inspected, in good condition, rated for the required load and free of knots, when applicable for the boring type

26. Temporary Crossing Over Facilities

This section applies to all vehicle crossings, including first- and second-party vehicle crossings. All existing facilities shall be crossed in accordance with the terms of the facility crossing written approval (or as directed by the facility Owner) and any letters of agreement. Company may require temporary crossing mitigation methods when deemed necessary, including but not limited to the following conditions:

- Calculated total circumferential stress exceeds the maximum value; contact the Company Regional Engineer for this calculation
- Ruts are likely to develop at the crossing
- Vehicle(s) crossing (e.g., logging trucks)
- Pipeline to be crossed has been installed less than one year prior to crossing
- Crossing lies in a wetland area (e.g., marsh, swamp, peat bog, etc.)

The Ground Disturber (Contractor) shall:

- Maintain crossings so that rutting, or degradation of the ramps does not reduce the required minimum depth of cover

- Remove all equipment used for mitigation prior to demobilization unless otherwise approved in writing by Company Consult Company representative for additional information on temporary crossings

27. Calculations for Temporary Crossings Over Facilities

This section applies to all vehicle crossings, including first- and second-party vehicle crossings. Crossings shall be evaluated according to DS-RXA1, "Road Crossing and Surface Loading Assessment Specification" or a crossings calculator or tool deemed appropriate by the Regional Technical Staff or suitable SME. Calculations or output of results from calculation tools shall be included in the Ground Disturbance Package and maintained in the appropriate Work Management System. Regional Technical Staff or suitable SME shall be notified to evaluate the crossing, including determining the party responsible for and method of performing the calculations.

Pending the results of analysis, Company facilities shall be protected by temporary crossing mitigation methods when deemed necessary, including but not limited to the following conditions:

Calculated total circumferential stress exceeds the maximum value; contact the Regional Engineer for this calculation.

- Ruts are likely to develop at the crossing.
- Vehicle(s) crossing (e.g., logging trucks).
- Pipeline to be crossed has been installed less than one year prior to crossing.
- Crossing lies in a wetland area (e.g., marsh, swamp, peat bog).

The Ground Disturbance Coordinator or Project Team shall:

- Contact the Land Services Department to identify Enbridge's requirements before constructing any temporary crossing structure.

The Ground Disturber shall:

- Maintain crossings so that rutting or degradation of the ramps does not reduce the required minimum depth of cover.
- Remove all equipment used for mitigation prior to demobilization unless otherwise approved in writing by Enbridge.

Refer to the Crossing and Encroachment Guide and Requirements – US and the Crossing and Encroachment Guide and Requirements – Canada for additional information on temporary crossings for third party vehicle crossings.

28. Unauthorized Ground Disturbance

Contractor shall inform their Company representative if any unauthorized Ground Disturbance is discovered.

29. Related Documents

N/A

30. References

N/A



Appendix A – Ground Disturbance Permit

Ground Disturbance Permit

PROJECT INFORMATION					
Date:	Time Issued:	Time Expired:	(Max 12 hrs. or end of day's shift)		
Project Name:	Cost Code # (AFE, WBS, etc.):	Contractor:			
Facility Owner(s):	Site Location:	Station/Spread/KP or MP:			
Safe Work Permit #:	Excavation Depth:	One Call Ticket #:	Start Time/Date:		
Work Description and Extent of Ground Disturbance:					
Hazards/Preval Conditions:					
<ul style="list-style-type: none"> > "Written Agreements" refers to Crossing, Construction, Road Use, Road Crossing, Proximity, Encroachment, Parallel and Right-of-Way Agreements > All permits are void during an emergency situation. Permits must be re-issued or re-validated after an emergency, after changes to the job description or scope, or if the Enbridge Representative or the Contractor competent person is replaced. > No and N/A (Not Applicable) answers require explanation in Comment section. > Copy of this Permit shall be kept on site during Ground Disturbance Activities. 					
GROUND DISTURBANCE PACKAGE VERIFICATION			YES	NO	N/A
1. Does the One Call ticket cover the entire locate boundary, including worksite access for the ground disturbance work that is being performed? (All clear notices shall be documented and retained in Ground Disturbance Package.)			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Has the area been checked for evidence of previous construction activity that may indicate other possible buried facilities are present? Evidence such as cathodic and telephone pedestals, ground slumping, signage, cut lines, lack of tree/shrub growth due to previous right-of-way, etc.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Have all completed verification sweep diagrams been provided identifying all known and unknown facilities?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Have all required Written Agreements with foreign facility owners been obtained and available on site for reference?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Have all available records been compared, discrepancies resolved, and documents retained? (e.g., line locate diagrams, drawings, alignment sheets, blueprints, as-builts, site photos, discrepancy decision record)			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Have all underground pipelines, cathodic protection cables, and/or conduits on the drawing(s) been surface located and staked within the proposed excavation and the Locate Boundary Area (normally 100 ft or 30 m beyond the Excavation perimeter)?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Has an Exposure Hole log been retained and reviewed that notes the location, depth, size, and type of underground facilities that have been positively identified?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Have all newly installed lines been redlined with copies retained in the Ground Disturbance Package for reference?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Has the Ground Disturbance Package been reviewed and made available on site?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GROUND DISTURBANCE			YES	NO	N/A
11. Have all applicable facility owners been given proper notification as required by regulations and the written agreements? If yes, list facility owners:			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Have all buried facilities within 10 ft (3 m) of the ground disturbance OR 16 ft (5 m) of the pipeline (whichever is greater) been Positively Identified and maintained in accordance with Enbridge Standards, Line Locating Procedure , written agreements and regulations?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Has the Excavation Area (see defined terms) been clearly established for the operator and spotter and all required personnel?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Have the Hazard Assessment, site walk around, and Ground Disturbance Package been reviewed with all parties involved in the ground disturbance?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Has Ground Disturbance training/certification been verified for members of the work crew and the Ground Disturbance Supervisor?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Have the equipment operators been designated as competent or qualified (OQ for US only)?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Are all required below grade facility owner representative(s) on site for the Ground Disturbance Work?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Do buckets have smooth edges or teeth that have been protected by a bar welded across the full width? Use of teeth and side cutters are prohibited.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Are above ground facilities identified with signs and hazard controls established to prevent contact and to maintain a safe clearance?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Has a Working Excavation Checklist been completed when applicable? (Required prior to workers entering a Working Excavation)			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Have all required pipelines been depressurized or has the pressure been reduced to Safe Working Pressure?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Has the Ground Disturbance been conducted in accordance with the GD Standard and regulatory requirements (GER, DPR-A and DPR-O, PHMSA, etc)?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RESTORE/BACKFILL			YES	NO	N/A
23. Have owners of foreign facilities been notified prior to the proposed backfill work, in accordance with the written agreements?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Owner representative declined / exempted to be on site. (Rep. Name) _____ (Phone) _____			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Have the facility owner representatives inspected their facilities prior to the proposed backfill work? (Rep. Name) _____			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Have the required backfill clearances (tolerance zone, pipe clearances, etc.) been established in accordance with company standards and communicated with all workers?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Has a corrosion control inspection report (PAIR) been completed prior to backfill by a qualified Inspector for Enbridge pipelines?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Have warning measures (boards, caution tape, etc.) been buried with the installation of the facility to alert future excavators of installed facilities where required?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Is right-of-way signage being installed or replaced as required?			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:					
GROUND DISTURBANCE PERMIT AUTHORIZATION					
By signing this permit, all parties acknowledge that the Ground Disturbance requirements have been met, and are understood by everyone involved.					
Permit Issuer (Enbridge Rep., Inspector or Designate)	(Print)	(Sign) <input type="text"/>			
Permit Receiver (Contractor Supervisor/Ground Disturbance or Designate)	(Print)	(Sign) <input type="text"/>			
Sub-Contractor when applicable (Supervisor/Foreman)	(Print)	(Sign) <input type="text"/>			
OPERATORS AND SPOTTERS SIGN OFF (ALL OTHER WORKERS MUST BE INCLUDED ON ASSOCIATED FLHA, JHA/JSA, AND/OR SWP)					
(Print Name)	(Position)	(Sign) <input type="text"/>			
(Print Name)	(Position)	(Sign) <input type="text"/>			
(Print Name)	(Position)	(Sign) <input type="text"/>			
GROUND DISTURBANCE PERMIT SIGN OFF					
By signing off this permit, all parties acknowledge that work has been completed or suspended and all personnel have been informed.					
Permit Issuer (Enbridge Rep., Inspector or Designate)	(Print)	(Sign) <input type="text"/>			
Permit Receiver (Contractor Supervisor/Ground Disturbance or Designate)	(Print)	(Sign) <input type="text"/>			
Sub-Contractor when applicable (Supervisor/Foreman)	(Print)	(Sign) <input type="text"/>			
Operator and Spotter signatures may be captured on an associated form (FLHA, SWP, etc.), but the form must be noted on this Permit daily and included in the Ground Disturbance Package.					
Distribution: White – Permit Receiver		Gold – Permit Issuer retain white copy			
Replaces ENB-FRM-0040					
Last Revised: 2023-08-21 V 2.0		Confidential Business Information. Uncontrolled Document if Printed.		Page 1 of 1	

Appendix B – GTM Working Excavation Checklist

DP-50.904

GTM Working Excavation Checklist

(To be completed daily by "A Competent Person" for each excavation being entered)

Site location: _____ Company: _____

Describe purpose and intent of excavation: _____

Soil classification: Type A Type B Type C Excavation depth: _____

GENERAL EXCAVATION RULES:		Yes	N/A
1.	Have existing excavations, adjacent areas, and protection systems for above grade facilities been inspected by a competent worker daily before starting work and will they be assessed as needed throughout the shift?	<input type="checkbox"/>	<input type="checkbox"/>
2.	Has the Safe Excavation Pressure (SEP) been implemented (if required)?	<input type="checkbox"/>	<input type="checkbox"/>
3.	Are workers protected from loose rock or soil that could pose a hazard by falling or rolling into the excavation?	<input type="checkbox"/>	<input type="checkbox"/>
4.	Have spoil piles, materials, and equipment been set back a minimum 3 ft (1 m) from the edge of the excavation?	<input type="checkbox"/>	<input type="checkbox"/>
5.	Have the slopes of cutback and height of vertical wall been determined as per applicable regulations and Enbridge standards based on soil classification?	<input type="checkbox"/>	<input type="checkbox"/>
6.	Is there a means of egress within 25 ft (7.6 m) of each worker in the excavation (e.g. sloped walkways, stairs, or ladder)?	<input type="checkbox"/>	<input type="checkbox"/>
7.	Are there a minimum of 2 egress points in each excavation?	<input type="checkbox"/>	<input type="checkbox"/>
8.	Are there emergency exits on each side of the pipe if workers are working on both sides?	<input type="checkbox"/>	<input type="checkbox"/>
9.	Have exposed piping and other facilities been properly supported in accordance with Enbridge requirements (Maximum of 20 ft (6m) regardless of pipe length or diameter)?	<input type="checkbox"/>	<input type="checkbox"/>
10.	Has the excavation been classified as a confined space as defined by Enbridge and by the local area authority?	<input type="checkbox"/>	<input type="checkbox"/>
11.	Have adequate precautions been taken to protect employees from hazards posed by water accumulation?	<input type="checkbox"/>	<input type="checkbox"/>
12.	Are adjacent structures effectively supported?	<input type="checkbox"/>	<input type="checkbox"/>
13.	Are guardrails, fences, or barricades in place and do they provide required protection?	<input type="checkbox"/>	<input type="checkbox"/>
14.	Are shoring / trench boxes being used designed by a professional engineer and meet the required legislation?	<input type="checkbox"/>	<input type="checkbox"/>
15.	If applicable, is there a copy of the engineered stamped drawing of the shoring or trench box?	<input type="checkbox"/>	<input type="checkbox"/>
16.	Is there adequate space in the excavation for the workers to perform their task(s)?	<input type="checkbox"/>	<input type="checkbox"/>
17.	Will the atmosphere in the excavation be tested prior to employees entering or reentering where continuous air monitoring has been interrupted?	<input type="checkbox"/>	<input type="checkbox"/>
18.	Will there be continuous air monitoring of the excavation?	<input type="checkbox"/>	<input type="checkbox"/>

***To continue with safe work, all questions must be answered with Yes or N/A (Not Applicable). If N/A, explain the reasoning in the comments section below. Based on this reasoning, the Competent person and Ground Disturbance Supervisor must agree in determining if it is safe for work to proceed.**

Note: This checklist will be regarded as VOID and must be reissued if there are changes to the job description, scope changes, or if the Enbridge Representative or the Contractor competent person is replaced.

The classification of the deposits shall be made based on the results of at least one Visual and at least one Manual Analysis.

Manual Soil Test Method(s) used: Pocket Penetrometer Shear Torvane Thumb Penetration

SOILS REFERENCE (Check if present on site)			
Type C (1½:1)	Type B (1:1)	Type A (1:1)	
Fissures	Previously disturbed Type A or B	Undisturbed	<input type="checkbox"/>
Porous soil	Fissured Type A	Type of soil:	<input type="checkbox"/>
Vibration	Subject to vibration Type A	Clay	<input type="checkbox"/>
Water (seeping)	Type A rock not stable	Sandy Clay	<input type="checkbox"/>
Submerged soil	Accumulated	Clay Loam	<input type="checkbox"/>
Previously disturbed soil	Water Type of soil:	Caliche	<input type="checkbox"/>
Type of soil:	Silt	Stable Rock	<input type="checkbox"/>
Gravel	Silty Loam		<input type="checkbox"/>
Sand	Sandy Loam		<input type="checkbox"/>
Loamy Sand	Crushed Rock		<input type="checkbox"/>
Compressive strength ≤ 0.5 tsf	Compressive strength > 0.5 tsf, but ≤ 1.5tsf	Compressive strength ≥ 1.5 tsf	

*Competent person responsible for the soil classification must reference the soil classification types defined by that area's regulatory agency.
In lieu of performing soil classification, assume weakest soil (Type C or equivalent) OR attach geotechnical report with soil classification and include it in Ground Disturbance Package.

Specify dimensions of the excavation on the drawing below.
Use the space provided for calculations or to add additional information

T.W. – Top Width D – Depth B.W. – Bottom Width

*Comments: _____

	Print Name	Sign	Date	Time
COMPETENT PERSON:	_____		_____	_____
SUPERVISOR SIGN OFF	_____		_____	_____

Last Revised: 2023-02-15 Confidential business information. Uncontrolled Document if Printed. Page 1 of 1