# Standard

## Ground Disturbance

**Effective Date:** 2023-02-21
**Version #:** 3.2
**Version Date:** 2025-02-07
**Document Owner:** Shane Cleet

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## Document Version Register

| Version Number | Version Date | Approved By | Section Number and Title | Details of Version |
|---|---|---|---|---|
| 1.0 | 2019-03-30 | Sean Evans | Whole Document (New Standard) | This is the new H&S Standard that was developed as part of the LP \| MP Safety Manual Transition Project |
| 1.1 | 2019-10-31 | Sean Evans | See Change Log | |
| 1.2 | 2019-12-31 | Sean Evans | See Change Log | Removed reference to Book 3, documents 08-03-09 and/or 04-02-02 |
| 1.3 | 2020-06-01 | Sean Evans | 2.0 | Alignment with Contractor Safety Specifications |
| 2.0 | 2021-10-25 | Shane Cleet | 9.0, 6.4.4 | Updated section 9.0 and added new section 6.4.4 |
| 2.1 | 2021-12-15 | Shane Cleet | Change to Document Owner | Change to Document Owner |
| 2.2 | 2022-03-09 | Shane Cleet | Editorial Changes | Updated name of PI-95 |
| 3.0 | 2023-02-21 | Shane Cleet | See Change Log | Multiple changes to address program gaps or clarify requirements |
| 3.1 | 2024-09-27 | Shane Cleet | See Change Log | Multiple changes to clarify requirements |
| 3.2 | 2025-02-07 | Shane Cleet | See Change Log | Multiple changes to address program gaps or clarify requirements |
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## 1.0 PURPOSE

This standard outlines the minimum requirements for planning and conducting company ground disturbance activities.

## 2.0 SCOPE

This standard applies to all LP First and Second parties conducting Ground Disturbance on behalf of Enbridge. This standard meets or exceeds Common Ground Alliance and Canadian Common Ground Alliance best practices pertaining to Ground Disturbance.

Contractors and Subcontractors shall comply with Enbridge health and safety requirements set out in this standard, as articulated within applicable Contractor safety specifications. If a Contractor or Subcontractor has a health and safety standard or policy materially different from Enbridge's, the Contractor/Subcontractor shall follow the most stringent requirement. Contractors and Subcontractors are still obligated to meet the requirements of all applicable laws related to this standard.

In the event a Contractor's or Subcontractor's standard exceeds the requirements of this standard, Enbridge may, in its sole discretion, choose to adopt the Contractor's or Subcontractor's standard for any given contract or work order.

## 3.0 PREREQUISITES

Hazard Assessment Standard

Powered Mobile Equipment Standard

Safe Work Permit & Work Authorization Standard

Tools & Equipment Standard

Vehicles Standard

## 4.0 DEFINITIONS & ACRONYMS

*AER* – Alberta Energy Regulator

*Alignment* – Route of the pipeline.

*Adverse Ground Conditions* – Ground conditions that make safe positive identification extremely difficult or where there is an unremovable permanent barrier in place. Examples include, but are not limited to, swamps, marshes, roads, railroad tracks. High water table, granite or solid rock, large boulders, unstable soil, and adjacent building foundations.

*Augering* – Can be done vertically or horizontally and does not typically have a casing.

*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.

*Brownfield* – Any construction site or activities inside or adjacent, within 3 m (10 ft.), to existing Enbridge facilities. If Hot Work is performed in a Hazardous or Restricted Area, it is considered

Brownfield, e.g. construction work inside a facility or beside an exposed operating pipeline that does not have an identified boundary.

*Caisson Holes* – Are created for a reinforced concrete pile or post that transfers the load to bedrock or acceptable soil.

*Competent Worker* – One who is capable of identifying existing and predictable hazards in the surroundings or identifying working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

*Enbridge Locations* – All Enbridge sites, workplaces, worksites, facilities, terminals, stations and administrative and project offices.

*Enbridge Representative* – Employee or third party hire representing Enbridge for specific Contractor work or project.

*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 employees that are completing work on behalf of Enbridge

*Foreign Below Grade Facility* – A Below Grade Facility that is not owned or operated by Enbridge

*Greenfield* – Areas within the confines of project boundaries that contain no above or below ground facilities.

*Ground Disturbance (GD)* – Any work, operation or activity that results in the penetration of the ground to any depth.

*Ground Disturbance Permit (GDP)* – A special permit issued in addition to a Safe Work Permit for most Ground Disturbance activities.

*Ground Disturber (synonymous with "excavator")* – The company or entity directing and Overseeing the Ground Disturbance work.

*Horizontal Auger Boring (HAB)* – A method of trenchless excavation that uses a rotating auger to extract soil while advancing along a more or less level line. The auger removes the spoil left behind as the operation progresses. Once the boring reaches its endpoint, the auger is removed, leaving only the casing. This method requires a launch pit for the equipment and a receiving pit. Auger boring is commonly referred to as the Jack and Bore method.

*Horizontal Directional Boring (HDB)* – A trenchless crossing technique that uses a horizontal drilling rig to steer, drill, and ream a bore under a crossing where the designed profile of the crossing meets the following requirements:

- A straight alignment in the horizontal plane.
- Does not employ a drilling fluid recirculating and cleaning system.
- The casing or facility size being installed is typically a similar size to the rods used by the drilling rig.

*Horizontal Directional Drilling (HDD)* – A slurry-based drilling process using a horizontal drilling rig completing four stages to prepare bore hole for pipe pull: pilot hole, reaming, swabbing, and pipe pullback. Third party HDDs require engineering drawings that are stamped by a professional engineer which are reviewed through the crossing application process.

- Pilot Hole: A pilot hole uses a borehole assembly (BHA) like a mud motor or jetting assembly with an asymmetrical leading edge to steer through a predetermined HDD design profile with entry and exit pit locations.
- Reamer: Once the pilot hole has been completed, the drill string comes out of the exit pit, and a reamer will replace the BHA to enlarge the previously drilled pilot hole.
- Swab: After the completion of the final ream, the swab pass will be completed to evaluate the condition of the hole free of any debris before installing the pipe.
- Pipe Pullback: When the borehole is ready for the pipe installation, the pipe pullback assembly consists of a prefabricated pull head welded onto the pulling section's leading end, a swivel, and a reaming tool will be ready on the exit side to pull pipe in the borehole.

*Initial Locate* – Also known as the Utility Locate, is the minimum locating requirement for all Ground Disturbance activities, completed by One Call Members to determine the location of Below Grade Facilities inside the area defined by the One-Call ticket. The Initial Locate satisfies local legislative requirements (Local Regulations).

*JHA* – Job Hazard Assessment

*Locate Boundary* – Area in which all Below Grade Facilities shall be surface located within the Excavation perimeter and extending 30m (100ft.) from that perimeter. Constraints may be made on this perimeter and the lessened area shall be marked by multiple white markers identifying all of the corners of the Locate Boundary area.

*Locator* – A Qualified worker who completes line locates.

*Multi-Angle Inductive Sweep Search* – Also known the Four Way Sweep, this method is used after all known lines have been located and is designed to locate unknown facilities by completing Inductive Sweeps at a minimum of four separate angles.

*OQ* – Operator Qualifications

*OSHA* – Occupational Safety & Health Administration

*Overseeing* – To watch over, observe and manage Enbridge requirements of the Contractor.

*Positive Identification* – To visually locate (daylight) the location, depth and size of Below Grade Facility by using either vacuum excavating or hand digging. This includes elevation or alignment changes that can alter the depth/direction of the pipe (i.e. 90 and 45 degree elbows, fittings, plugs, weld-o-lets, flanges, branch piping, known abandoned facilities, etc.).

*PPE* – Personal Protective Equipment

*Qualified* – A worker who, by possession of a recognized degree, certificate or professional standing or who by extensive knowledge, training and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.

*ROW* – Right of Way

*Second Party* – Contractors hired to complete work on behalf of Enbridge.

*SWP* – Safe Work Permit

*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.

*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 ins, and/or collapses; examples include, but are not limited to: trench boxes, shoring, bracing, piles, timbers and cages.

*Third Party* – External parties completing work on behalf of themselves or another entity besides Enbridge on assets not owned or operated by Enbridge.

*TriView Marker* – A triangular pipeline marker that is able to rebound from impacts without causing damage to the marker or to the equipment that caused the impact.

*Vacuum Excavation* – Use of pressurized water or air to loosen soil, then the use of a vacuum to extract the loosened soil. This includes all activities performed by a vacuum truck including but not limited to “hydro-vac,” “air-vac”, “shot gunning,” “day lighting,” “potholing,” “water washing”.

*Verification Locate* – An additional measure completed by a Contractor that is designed to verify all Below Grade Facilities are surface located and marked. Typically, completed in conjunction with Initial Locates using Multi-Angle Inductive Sweep Search or other advanced locate techniques, a verification locate produces a sweep map to illustrate all below grade facilities in the established Locate Boundary.

*Working Excavation* – An Excavation that will be entered by workers.

## 5.0 ROLES & RESPONSIBILITIES

The following roles shall be appointed before starting Ground Disturbance Activities. Within these structures, it is possible for an individual to take on more than one role.

| Internal Ground Disturber (Operations) | Contracted Ground Disturber | Large Scale Projects (Contracted Major Projects) |
|---|---|---|
| Equipment Operator | Equipment Operator | Equipment Operator |
| Equipment Spotter | Equipment Spotter | Equipment Spotter |
| Ground Disturbance Supervisor (Competent Person) | Ground Disturbance Supervisor (Competent Person) | Ground Disturbance Supervisor (Competent Person) |
| Locator (Initial only) | Locator (Initial and Verification) | Locator (Initial and 2 Verification) |
| Enbridge Representative | Enbridge Representative) | Enbridge Representative |
| | | Ground Disturbance Coordinator (Enbridge Representative) as required. |

*Note: A project team may choose to adopt the large-scale project model.*

Enbridge Representatives shall:

- Ensure all parties involved in GD activities have met the training requirements,
- Issue SWP,
- Issue the Ground Disturbance Permit,
- Ensure compliance with the crossing written approval or other relevant approvals that are in place,
- Oversee Contractor work,
- Ensure the pipe inspection report is completed and documented prior to backfilling
- Ensure that Working Excavation Checklist 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, and
- Be present for all mechanical Ground Disturbance activities within 5 m (16 ft.) from any Below Grade Facilities.
- Determine contents for the Ground Disturbance Package in collaboration with the Ground Disturbance Supervisor

Ground Disturber shall:

- Receive SWP (lead the hazard assessment portion of this process),
- Collect and compile documents for Ground Disturbance Package,
- Provide training records to Enbridge Representative (when applicable),
- Receive Ground Disturbance Permit,
- Oversee Subcontractors' Ground Disturbance Permit
- Conduct the Ground Disturbance activity,
- Assign the Qualified Ground Disturbance Supervisor, and
- Responsible for making the one call notification per local legislative requirements
- Make all efforts to contact the facility owner when an unknown facility is identified.

Ground Disturbance Coordinator (Enbridge Representative) shall:

- Ensure the Locator has received all applicable documents to perform the Verification Locates, and
- Coordinate the Ground Disturbance activities and acts as a liaison between Enbridge and Contractors.

Qualified Ground Disturbance Supervisor shall:

- Provide required information to the appropriate parties,
- Overseeing work in adherence to the SWP, GD permit and standard,
- Manage Ground Disturbance package,
- Facilitate Pre-Ground Disturbance Meeting, and
- Ensure discrepancies have been resolved.

Equipment Operator shall:

- Understand and sign off on requirements outlined in Ground Disturbance Permit,
- Review and understand the Ground Disturbance Package,
- Ensure all hand signals are agreed upon, and
- Adhere to the mechanical clearance requirements.

Equipment Spotter shall:

- 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, and
- Assist the operator in maintaining required clearances and depth of cuts.

Locator shall:

- Search for utilities using Enbridge 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 search or confirm
- Complete the Verification Locate as required
- Communicate contents of the diagram(s) and any areas of concern to the Enbridge Representative and Ground Disturber

# 6.0 STANDARD-SPECIFIC REQUIREMENTS

## 6.1 SAFE WORK PERMIT

A SWP shall be issued by the Enbridge Representative to the Ground Disturber in accordance with the Safe Work Permit & Work Authorization Standard.

## 6.2 GROUND DISTURBANCE PLANNING

For Ground Disturbance planning, the Ground Disturber shall follow these requirements:

- Request a One-Call per local legislation 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 Enbridge Ground Disturbance activities (a Ground Disturbance Permit is only valid for the time stated on the permit to a maximum of 12 hours, as long as the One-Call locate remains valid),
- Provide training records to Enbridge Representative (when applicable),
- Ensure all parties involved in Ground Disturbance activities have met the training requirements,
- Determine and mark the Excavation Area using Enbridge specific flagging (see Appendix B), and
- Ensure that all locating requirements are complete and any discrepancies are remedied before mechanical Excavation activities begin.
- Ensure an Environmental Clearance has been issued by the Regional Environmental Advisor in accordance with OMM B8 01-02-18 prior to undertaking any Ground Disturbance activities.
- If Ground Disturbance activity is at or near a cathodic protection system or AC mitigation

system, contact Pipeline Integrity External Corrosion Prevention for any available record drawings and / or guidance on the location and configuration of buried facilities. Note: the location of cathodic protection rectifiers and AC mitigation junction boxes are shown in the EMap Pipeline Integrity PCS app.

### 6.2.1 WORK AROUND OPERATING MAINLINE

If digging above or adjacent to an Enbridge operating mainline the Project Engineer must complete a Second and Third Party Initiated Integrity Review Dig Template. Template must be submitted to Pipeline Integrity (PI) a minimum of one month prior to exposure. Project Engineer must wait for a documented response from PI which will include the review finding and recommendations associated with the proposed Excavation.

The Project Engineer must review the results from PI's finding and implement recommendation into the project execution plan. Communicate the risks identified by PI to the Ground Disturber and required mitigation (Safe Excavation Pressure (SEP) requirements and/or other integrity recommendations).

For work around operating mainline, reference OMM B10 01-02-03 Excavating and PI-95 Pipeline Integrity Review of Second and Third Party Initiated Requests.

### 6.2.2 GROUND DISTURBANCE PACKAGE REQUIREMENTS

Prior to Ground Disturbance activities, the Ground Disturber shall collect and compile Ground Disturbance Package documents, which may include documents from the Ground Disturbance Coordinator (if applicable). The Qualified Ground Disturbance Supervisor 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.

The documents required for the Ground Disturbance Package should include but are not limited to the following:

- Construction Drawings
- Alignment Sheets
- Station Piping/ Instrument Drawings
- Site Photos
- Line Locate Diagrams
- Crossing Written Approvals
- Site Plot Plan
- As-builts/ Red Lines
- Route Sheets
- Exposure hole Log
- One-Call with All Clear responses
- Tool Run Reports

The Ground Disturbance Package shall be retained in accordance with the Enbridge Record Retention Policy and Schedule.

## 6.3 LOCATE PHASE

Enbridge requires that all buried facilities are properly located prior to Ground Disturbance activities to avoid damage.

### 6.3.1. LOCATE REQUIREMENTS

Locates can be performed by Qualified Enbridge employees or Qualified locating Contractors. Locates shall be completed in accordance with the Line Locate Procedure.

An Enbridge Representative must provide company drawings to workers performing locates. Upon receiving a locate request, Locator(s) must:

- Communicate with Ground Disturber to confirm scope of work,
- Surface-mark all locatable known underground facilities within the Locate Boundary,
- Search for and surface mark discovered unknown underground facilities within the Locate Boundary.
- Compare surface markings to company drawings and communicate any discrepancies to Ground Disturber and a designated Enbridge Representative, and
- Communicate presence of any known non-locatable underground facilities to Ground Disturber.

If an unmarked foreign underground facility is discovered, the Ground Disturber 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.

#### 6.3.1.1 Establishing Locate Boundary

The Ground Disturber shall determine the Locate Boundary and ensure the Locator marks the Locate Boundary with white flagging. This shall include the Excavation Area and extend 30 m (100 ft.) from the proposed Excavation perimeter with the following exceptions:

- When in snow conditions, use visible markings other than white flagging, and
- 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, and/or
- Storage area for spoil, equipment, and/or materials.

#### 6.3.1.2 Locate Constraints

If it is not possible 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, One-Call services, or visual searches. The Locator shall note the limitation(s) on the line locate diagrams (sweep map) and advise Enbridge Representative of the limitation(s).

### 6.3.2 INITIAL LOCATE

The Initial Locate, also referred to as the Utility Locate or One Call Locates, satisfies local legislative requirements. One Call locates are performed by One Call Members for areas not considered private property. One Call members will either locate their own facilities or provide a Qualified Locator to complete locates on their behalf.

#### 6.3.2.1 Placing One-Call Locate Requests

Ground Disturber must place a One-Call locate request and provide sufficient time to locate before starting any below grade activity. One Call locate requests should be placed online instead of by phone. Where practical, supplemental documentation clarifying the scope of the work and the dig area should be attached to the One Call locate request. Emergency One Call locate requests may still 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, follow local legislation to be renewed,
- If a new Contractor or Subcontractors is retained to conduct Ground Disturbance work in the area, as there shall be no transfer (piggybacking) of existing tickets, and/or
- If there is a change in the scope of work (i.e., change in the Excavation Area or duration of project.).

Note: Additional locates beyond the Locate Boundary may be required to verify Alignment or location of Below Grade Facilities.

#### 6.3.2.2 Enbridge-Owned Below Grade Facilities

When Enbridge is responsible to conduct an Initial Locate/ One-Call (surface locate) on Enbridge-owned Below Grade Facilities, the Enbridge Representative shall make all reasonable attempts to collect and compare all available records, drawings and documentation, and conduct a visual check to confirm that all locates accurately reflect the location of all Below Grade Facilities within the Locate Boundary.

Enbridge reserves the right on Private Property (Enbridge Owned), and depending on project complexity, to clear an Initial Locates after the Contractor Verification Locate. Regardless on order of completion Ground Disturbance activities cannot begin without surface markings in place.

### 6.3.3 VERIFICATION LOCATE (REQUIRED FOR CONTRACTED GROUND DISTURBER)

The Enbridge Representative and Ground Disturber shall provide all appropriate records, drawings and documentation to the party performing the Verification Locate.

The Enbridge Representative and Ground Disturber 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 Ground Disturbances:

- that only employ hand digging,
- vacuum excavating,
- probing,
- for non-mechanical environmental surveying activities.

Within the entire Locate Boundary, the verification Locator shall:

- Mark all located Below Grade Facilities in accordance with the Enbridge surface marking requirements.
- Produce a line locate diagram and provide to the Enbridge Representative and Ground Disturber within 2 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, and
- Confirm accuracy of locates and highlight discrepancies between drawings and actual positions of underground facilities in the line locate diagram.

The Enbridge Representative and Ground Disturber shall investigate and resolve any reported discrepancies, which may require additional locates.

An Enbridge 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 Enbridge include:

- All Scan,
- Passive Scan,
- Direct Connect method, and
- Alternative Method Perimeter vacuum excavating (See section 6.4.3.1).

#### 6.3.3.1 Major Projects Verification Locate

In addition to the Contractor Verification Locate, an Enbridge-initiated independent third-party Verification Locate shall surface locate all Below Grade Facilities within 30 m (100 ft.) of the proposed Excavation.

### 6.3.4 SURFACE MARKINGS

Enbridge requires that all Below Grade Facilities are marked to ensure that the Ground Disturber has a thorough understanding of the facilities below grade to perform safe Ground Disturbance activities.

The Ground Disturber and Locator shall ensure the following requirements:

General Surface Marking Requirements

- Surface markings are in accordance with the American Public Works Association (APWA) uniform (See Appendix B for color code requirements),
- 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 3 m (10 ft.) 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 10 m (33 ft.) unless another reasonable interval is appropriate to ensure there is a clear line of vision between markers used to identify a particular facility location,
    - in Texas only, the distance between any two marks indicating the same line shall not exceed 6 m (20 ft) and must clearly indicate the nominal outside diameter of an underground pipeline, in inches, at every other mark when the nominal outside diameter is greater than 6 inches
    - in Minnesota only, ensure surface markers clearly indicate the nominal outside diameter (width) of the underground facility if it is greater than 8 inches
- 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 Enbridge Representative, and
- When conducting maintenance activities, the adjacent parallel pipeline(s) shall be located and marked at approximately 10 m (33 ft.).

Additional Requirements for Major Projects Mainline Construction:

- For Major Projects Mainline Construction, the adjacent parallel pipeline(s) shall be marked at 50 m (164 ft.) (maximum) to ensure that construction crews can readily identify the location and/or any deviation of the existing parallel pipeline(s), and
- All existing Below Grade Facilities are surface marked a minimum of 400 m (¼ mile) in advance of any Major Projects Mainline construction work.

## 6.4 POSITIVE IDENTIFICATION OF BELOW GRADE FACILITIES

The Positive Identification specifications in the following sections are the minimum requirements for exposing facilities at Enbridge locations. Additional Positive Identification may be required based on the hazard assessment.

### 6.4.1 FACILITY IDENTIFICATION

The Ground Disturber shall ensure that prior to initiating any permit-required Ground Disturbance activity, the location of Below Grade Facilities are positively identified by one or more of the following:

- Hand digging, and/or
- Vacuum excavating (air-vacing or hydro-vacing).

The Ground Disturber shall ensure that:

- Before Positive Identification begins, facility identification markings shall be reviewed to determine if additional Positive Identification is required,
- Positive Identification is to a sufficient width to visually identify (positively identify) 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 5 m (16 ft.) beyond the Excavation perimeter,
- All bends at a minimum are positively identified at the beginning, center, and end of the bend to ensure that the profile is accurately identified (See Appendix A). Some bends may require additional exposure holes,
- Smaller diameter non-metallic pipelines (4 inches or less) (for example 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.
- A minimum of three exposure holes are used for 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-inch nominal or greater,
    - The proposed Excavation is not located within a Station/Terminal
    - Exposure holes from center to center are spaced no greater than 23 m (75 ft.) apart.

#### 6.4.1.1 Adjacent Pipelines

The following general requirements shall be adhered to when working around adjacent pipelines:

- Locate and expose all adjacent facilities within 5 m (16 ft.) of Ground Disturbance and at any other locations requested by the facility Owner and/or Enbridge Representative,
    - If the Owner does not allow line exposure, then document, and
- 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 5m (16 ft.) of Ground Disturbance.

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

- When allowed by applicable legislation (not in AER regulated areas), only the most adjacent pipeline outside the Excavation perimeter needs to be positively identified as long as all surface markings have been completed within the Locate Boundary,
- If all the criteria below is met, only two Positive Identification points will be required:
    - The facility is owned and operated by Enbridge,
    - The facility diameter of the target joint is 6-inch nominal or greater,
    - The proposed Excavation is not located within a Station/Terminal, and
    - Positive Identification points from center to center are spaced no greater than 23m (75 ft.) apart.
- If a located-below-grade facility is within the 5m (16ft.) area beyond and does not intersect the Excavation, two exposure holes can be used to determine location unless they are cables (electrical, communication, etc.).

### Major Projects Mainline Construction Requirements

For Major Projects Mainline construction, the following additional requirements for adjacent pipelines shall be adhered to:

- Where the separation between Ground Disturbance activities (e.g., stripping, grading, ditch line, etc.) and an existing adjacent pipeline is greater than 10m (32ft.), Enbridge's Construction Management Team shall determine 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 5 m (16 ft.) but less than 10 m (33 ft.), exposure holes shall be no further than 1000m (3280 ft.) apart to ensure that line locating equipment remains consistent with actual Blow Grade Facility locations,
- Where the separation between Ground Disturbance activities (e.g., stripping, grading, ditch line, etc.) and an existing adjacent pipeline is between 3 to 5 m (10 to 16 ft.), exposure holes will generally be no further apart than 400 m (1310 ft.) maximum, and

- When stripping, grading, or continuous Excavation is required within 3 m (10 ft.) of an existing pipeline, exposure holes shall be no further apart than 100 m (328 ft.).

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

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

If the proposed ditch line is greater than 5 m (16 ft.) from the nearest adjacent line, locate and expose all adjacent facilities within 5m (16 ft.) 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.

### 6.4.2 PROBING

Probing for Positive Identification is not permitted unless approved by regional management (director or designate) based on ground conditions. Approval to probe shall be documented on the hazard assessment and work authorization when applicable.

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

Probing is acceptable without regional management approval 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, and
- For other situations that do not involve Positive Identification.

### 6.4.3 VACUUM EXCAVATING REQUIREMENTS

Vacuum excavating activities contain inherent risks, and the appropriate controls must be followed to avoid damage to facilities and ensure the safety of personnel. See *Tools & Equipment Standard* for PPE requirements.

For all vacuum excavating activities these requirements shall be followed:

- Use a neoprene or equivalent lip on the vacuum end to eliminate the possibility of damage to the facility,
- Establish a 5 m (16 ft.) safe zone to prevent non-essential personnel from entering the vacuum excavating operation to reduce risk to nearby workers, and
- Remove any loose rock embedded in the sides of the Excavation that could fall on the facility when the Vacuum Excavation activity is complete.

For Hydro vacuum excavating (hydro-vac) activities these requirements shall be followed in addition to the above:

- Ensure working water pressure does not exceed 17,250 kPa (2500 psi),
- Reduced pressure to less than 10,350 kPa (1500 psi) and limit water temperature to 38º C (100º F) when excavating within 0.3 m (1 ft.) of known or suspected underground facilities, and
- Ensure the underground facility is not continually contacted by direct spray once it has been sighted/exposed.

#### 6.4.3.1 Perimeter Vacuum Excavation

When the Excavation Area is congested with Below Grade Facilities or where below grade facilities are extremely deep, a perimeter Vacuum Excavation (slot trenching) may be completed. It shall be dug at a minimum of 1 m (3 ft.) outside the Excavation perimeter to a depth of 60cm (2 ft.) deeper than the planned Excavation.

When the perimeter Vacuum Excavation method is used, follow these requirements:

- If a Below Grade Facility passes through the perimeter Vacuum Excavation, an exposure hole within Excavation Area shall be performed to ensure depth, Alignment, and size, and
- If Below Grade Facility(ies) enter the Excavation Area and no exit is identified, then the entire line(s) shall be identified through the Excavation Area for termination point.

#### 6.4.3.2 Marking Exposure Holes

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

- Exposure hole(s) remains open and visible to all traffic,
- When using T Posts to support fencings, spades on the bottom of the posts will be driven in until covered with soil or removed,
- Exposure holes are fenced at the same time the hazard is created to guard against persons, livestock, or wildlife from falling into the open Excavation, and
- Exposure holes cannot be left unattended unless fenced, covered or backfilled.

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 pothole markers in the backfilled 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 non-compact material,
- Must be tracked on Contractor exposure hole log (including facility owner, facility type, location, and depth), and
- For existing Enbridge Pipelines, Potholing for Positive Confirmation Coating report shall be completed by a Qualified person prior to backfill.
- When hollow pothole markers are used additionally as siteholes where workers are able to verify depth, TriView pothole markers must be used. Triview markers may be installed within direct proximity to the top of the pipe. PVC, lumber and other rigid products may not be used for this purpose as these may lead to coating damage to the pipeline.
- If pothole markers are temporary and do not need to also function as a siteholes, lumber or fiberglass poles with flags may be used with the following requirements:
    - When used, lumber or fiberglass poles with flags shall be installed with at least 30 cm (1ft) of separation between the top of the pipe and the bottom pothole marker.
    - Must be removed when the work is complete.

### 6.4.3.3 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 2 m (6 ft.) 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 2 m (6 ft.) 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 free from accumulated water at all times 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 2 m (6 ft.), and
- 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,” and

- Be of size that adequately covers the hole and extends a safe distance for inspection of the hole and removal of the cover.

#### 6.4.3.4 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).

- Where possible, based on the hazard assessment, use staking and appropriate flagging to establish a minimum 3 m (10 ft.) safety buffer zone alongside any existing adjacent parallel pipeline.

At all roadway, highway, and railway crossings, establish a minimum 3 m (10 ft.) 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 in order to prevent parking or moving equipment on top of the existing pipelines. Only equipment listed within the crossing written approval or approved by Lands & ROW Department are allowed to cross existing lines.

#### 6.4.3.5 Temporary Deviations

In the event that the scope of work or site conditions make Positively Identifying Buried Facilities impossible, approval for proceeding without Positive Identification may been obtained through a consensus of documentation/engineering review by Operations Engineering, Region Management, LP Damage Prevention, and other applicable stakeholders. This approval shall be clearly documented on the approved OHSMS Deviation Form and communicated to all impacted workers.

### 6.4.4 PERMANENT DEVIATIONS

When temporary deviations regarding Positive Identification are proven to be effective at protecting below grade facilities with long term results, permanent deviations regarding Positive Identification may be accepted if all of the following are met:

- Minimum completion of one year as an authorized temporary deviation.
- Proven documented results of protecting below grade facilities with zero damages specifically related to the altered requirements within the deviation while using the temporary deviation
- Reviewed and approved by LP Damage Prevention. After initial approval, any revisions must also be approved by LP Damage Prevention.
- Reviewed and approved at VP level from the Business Unit proposing the permanent deviation
- Permanent deviation must be stored on the GDL and must be managed in accordance with the Document Control Management Process
- When the permanent deviation is utilized, it must be documented on the GD permit and properly communicated to all impacted personnel on site

- All personnel involved in work must complete training for the deviation prior to it being used. Either the Enbridge Representative or the Ground Disturbance Supervisor shall verify training requirements have been met.
- Site conditions must meet all requirements listed in the deviation

Note: LP Damage Prevention is accountable for maintaining a current list of permanent deviations on the LP Damage Prevention SharePoint site.

### 6.4.5 PROTECTION OF PIPE

During Ground Disturbance activities (including installation and removal of trench boxes, piling or anything that has the potential to cause damage) protection of the above and below ground assets must be carefully considered. The method of mitigation used must be reviewed and documented prior to execution with a Company Representative.

## 6.5 MECHANICAL CLEARANCE

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

- No mechanical Excavation shall occur within 60 cm (2 ft.) of a foreign Below Grade Facility and its appurtenances, including protruding material that extends outside the bucket (e.g. frozen material, rocks, concrete, etc.),
- No mechanical Excavation shall occur within 60 cm (2 ft.) of an Enbridge Below Grade Facility unless all of the following conditions are met:
    - Below Grade Facility is exposed on the top and sides at locations sufficient to confirm Alignment,
    - Regional manager or designate approval of the reduced clearance is acquired,
    - An Enbridge Representative directly observes the excavating activities,
    - A Qualified Operator and Spotter are used for the activity,
    - Mechanical clearance does not encroach within 30cm (1 ft.) of an Enbridge Below Grade Facility. (The final 30 cm (1 ft.) of soil around a facility shall be removed by hand digging, vacuum excavating or other non-mechanical means.), and
    - Mechanical clearance is adjusted if the crossing written approval or applicable legislation is more stringent,
- Manually operated jack hammers or hoes equipped with jack hammers are prohibited from working directly over a Below Grade Facility.

## 6.6 TEMPORARY CROSSING RAMPS

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.

All company facilities shall be protected by temporary crossing ramps when the following conditions are encountered:

- Total circumferential stress exceeds 90% when calculated using the *Vehicle Screening Tool* (Book 3, Document 04-02-02) (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, and/or
- Crossing lies in a wetland area (e.g., marsh, swamp, peat bog, etc.).

The Ground Disturbance Coordinator or Project Team shall:

- Contact the Lands & ROW Department to identify Enbridge's requirements before constructing any temporary crossing ramp.

The Ground Disturber shall:

- Maintain crossing ramps so that rutting or degradation of the ramps does not reduce the required minimum depth of cover, and
- Remove all ramps prior to demobilization unless otherwise approved in writing by Enbridge.

## 6.7 PILE DRIVING AND AUGERING

In addition to the requirements set out in this standard, the following requirements shall be met when performing these activities.

### 6.7.1 PILE DRIVING

Prior to commencing pile driving activities, the project manager, construction manager, or regional supervisor in consultation with the Ground Disturber will determine areas whether pilot holes will be required based on area conditions (i.e., for congested Below Grade Facilities or high-risk areas with a potential for damage to Below Grade Facilities).

For any areas deemed a high-risk potential for damage to Below Grade Facilities, vacuum excavate a pilot hole to a minimum depth of 3 m (10 ft.) and to a diameter equal to that of the pile.

### 6.7.2 AUGERING

Augering activities should be carefully planned to ensure no potential damage to above or Below Grade Facilities occurs and to mitigate personnel exposure to hazards associated with these activities.

Only Equipment Operators designated by the Ground Disturber as being acceptable for this type

of work shall be allowed to auger within 5 m (16 ft.) of Below Grade Facilities.

For any areas deemed a high-risk potential for damage to Below Grade Facilities, vacuum excavate a pilot hole to a minimum depth of 2' deeper than the deepest facility within 16' and to a diameter equal to that of the auger (Caisson).

Employees must remain a safe distance (minimum of 3 m (10 ft.)) from the auger at all times.

## 6.8 BORING OPERATIONS

For Boring Operations, all Ground Disturbance requirements and practices set out in this standard and any associated procedures shall be met when performing these activities.

### 6.8.1 BORING OPERATIONS GENERAL REQUIREMENTS

Maintain the following minimum separations for all facility crossings (unless otherwise specified in the crossing written approvals):

- underground facilities (open cut crossings) – 60 cm (2 ft.)
- underground facilities (bored/tunneled crossings) – 1 m (3 ft.)
- underground facilities (HDD crossings) – 3 m (10 ft.)

Prior to commencing operations these requirements shall be adhered to:

- A boring plan and design created in accordance with construction specifications is available,
- All required warning signs are posted,
- Daily/shift equipment inspections are conducted on equipment and components as per manufacturer recommendations and with maintained written records, and
- Boring equipment is secured/anchored to prevent movement.

During Operations the following requirements shall be adhered to:

- 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 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, and
- 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).

## 6.9 GROUND DISTURBANCE PERMIT REQUIREMENTS

### 6.9.1 PERMIT REQUIRED ACTIVITIES

Ground Disturbance activities that require a Ground Disturbance Permit include:

- Any Ground Disturbance activity within a fenced facility (with the exception of the activities not requiring a Ground Disturbance permit)
- mechanical activities
- vacuum excavating
- ROW disturbance greater than 30 cm (12 in.) and/or if the depth of cover is not known.

### 6.9.2 PERMIT NOT REQUIRED ACTIVITIES

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

- Probing,
- Hand digging using a shovel,
- Survey staking and line locate surface marking,
- Environmental survey/sample activities, and/or
- Disturbing the ROW less than 30 cm (12 in.) in depth via non-mechanical means provided the locations and depths of cover for all facilities are known.

The Ground Disturbance Permit shall be used in conjunction with a safe work permit and hazard assessment.

The Ground Disturbance Permit shall:

- Be completed by an Enbridge Representative,
- Be reviewed and received by the Ground Disturber and all parties involved in Ground Disturbance activities,
- Be issued 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.), and
- Be valid for no more than 12-hours.

A new permit is needed when there is a significant change to the scope of work. All permits are suspended during emergencies and must be re-validated prior to returning to work.

Permit Receiver (Ground Disturber) shall:

- Submit hazard assessment and Ground Disturbance Package, specific to the work, to the permit issuer,
- Review the permit, hazard assessment and Ground Disturbance Package with the workers directly involved in Ground Disturbance activities,

- Adhere to the permit requirements,
- Request a new Ground Disturbance Permit when work scope changes, and
- Return and sign off the permit upon expiry or completion of the work.

Permit Issuer (Enbridge Representative) shall:

- Review the written hazard assessment and Ground Disturbance Package submitted by the permit receiver,
- Complete and issue the permit,
- Monitor the Ground Disturbance activities for compliance with the permit,
- Suspend the work permit if he/she believes an unsafe condition exists, and
- Accept the returned permit from the permit receiver and file in accordance with Enbridge's records retention requirements.

## 6.10 PRE-GROUND DISTURBANCE MEETING

Before Ground Disturbance activities begin for the shift, the Ground Disturber shall conduct a Pre-ground Disturbance Meeting at the work location and review site conditions with the Equipment Operator(s), Spotter(s) and workers involved in the Ground Disturbance activities or adjacent work area(s).

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, and
- Markings and potholes in the field.

## 6.11 EQUIPMENT ATTACHMENTS WITH TEETH

On all Enbridge worksites, use only buckets without teeth or buckets with teeth protected by a flat bar.

Buckets with teeth and dozers with ripper teeth can only be used upon completion of *Approval for Equipment with Teeth Form* with documented approval by the project director (Greenfield sites) or regional management if the following conditions are met:

- Use of buckets with teeth shall be limited to the removal of rock, concrete, asphalt, or frozen soil, no closer than 60 cm (2 ft.) from any Below Grade Facility,
- The Enbridge Representative shall be on-site at all times during all activities where teeth are required,
- Safe work procedure or job hazard assessment is provided by the Ground Disturber,
- Enbridge Representative shall ensure that all *Ground Disturbance Standard* requirements and the approved conditions are met, and

- Documentation of the approval to use buckets with teeth or dozers with ripper teeth must accompany the Safe Work Permit, and
- All Approval for *Equipment with Teeth Form* submissions shall be accompanied by a line locate diagram and mapping of the location where equipment with teeth will be used.

## 6.12 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 shall ensure:

- All Backfilling is completed in accordance with OMM B10 01-02-07 Backfilling.
- 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,
- 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 requirement outlined in mechanical clearance section, and
    - Small piping (less than 50.8 mm [2 in.] diameter), electrical conduit, and/or cable being buried has mechanical protection and plastic warning tape/ribbon installed in accordance with the appropriate backfill procedure,
- Enbridge Representative or facility owner is onsite for all backfilling activities unless otherwise specified in the crossing written approval,
- Backfill material fills the void beneath the pipe,
- Drawings are updated and redlines capture any changes, and
- Completion and documentation of pipe inspection.

## 6.13 EXCAVATION SAFETY

### 6.13.1 SAFE ENTRY INTO AN EXCAVATION

Before any personnel enter a Working Excavation, a *Working Excavation Checklist* that meets or exceeds the attached (see Appendix E) and shall be completed:

- By a competent person, and
- Each day or at the beginning of each shift and as conditions change.

Completed Excavation checklists shall be retained in accordance with the *Enbridge Records*

*Retention Policy and Schedule*.

When Working Excavations meet the criteria for confined space, the Working Excavation shall be treated as a confined space (See *Confined Space Standard*).

### 6.13.2 CLASSIFICATION OF SOIL AND ROCK

For Working Excavations, a Competent Worker shall classify each soil and rock deposit and document the results. Soil types will be classified as per the OSHA soil type definitions:

- Stable rock means natural solid mineral matter that can be excavated with vertical sides and remain intact while exposed.
- Type A: Hard and Compact e.g., clay and cemented soils (equivalent to Type 1/Type 2 in Ontario and Saskatchewan).
- Type B: Likely to crack or crumble, e.g., angular gravel, silt loam, crushed rock (equivalent to Type 3 in Ontario and Saskatchewan).
- Type C: Soft, sandy or loose soil, e.g., gravel, sand, submerged soil (equivalent to Type 4 in Ontario and Saskatchewan).

Soil cannot be classified as Type A/Type 1/Type 2if it is fissured, previously disturbed, has water seeping through it, or has been subjected to vibration.

The determination of the soil classification will depend on site-specific soil characteristics and applicable legislation for that area.

A Competent Worker shall classify soil types using the following methods:

- A visual test to determine the following:
  - Qualitative information regarding the Excavation site in general,
  - Soil properties next to the Excavation,
  - Soil properties forming the sides of the Excavation, and
  - Soil properties taken as samples from excavated material.
- Manual tests to determine quantitative as well as qualitative properties of soil and to provide more information for classifying soil properly.

Manual tests include the following:

- Plasticity test,
- Dry strength,
- Thumb penetration, and
- Other strength tests (e.g., pocket penetrometer or shear vane).

For classification and testing, treat frozen soil conditions the same as unfrozen soil conditions.

### 6.13.3 SLOPING AND TEMPORARY PROTECTIVE STRUCTURES

Sloping and/or Temporary Protective Structures are required on Excavations deeper than 1.2 m (4 ft.) and shall adhere to sloping and Temporary Protective Structure regulatory requirements.

### 6.13.4 SLOPING

The walls of the Excavation shall be sloped when the Excavation is greater than 1.2 m (4 ft.) deep and shoring or a trench box is not used.

Have a Competent Worker classify the soil using manual and visual tests. If the maximum slope angle of applicable legislative requirements cannot be achieved, then shoring or a trench box is required. Benching is not permitted in Type C/ Type 4 soil.

Ensure a maximum slope per soil type as follows (additional guidance drawings in Appendix C):

| | AB/ BC/ QC | SK/ ON | MB | USA |
|---|---|---|---|---|
| Type A<br>(cohesive soils, e.g., clay, silty clay, sandy clay, clay loam) | 45°(1:1) | | | 45°(1:1) |
| Type B<br>（Granular cohesion-less soils including: angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases, silty clay<br>loam and sandy clay loam.） | 45°(1:1) | | | 45°(1:1) |
| Type C<br>(Granular soils including gravel, sand, and loamy sand) | 34°(1½:1) | | | 34°(1½:1) |
| Type 1 (Hard and Compact) | | 45°(1:1) | 45°(1:1) | |
| Type 2<br>(Hard and Compact) | | 45°(1:1) | 45°(1:1) | |
| Type 3<br>(Likely to crack or crumble) | | 45°(1:1) | 45°(1:1) | |
| Type 4<br>(Soft, sandy, or loose soil) | | 19°(1:3) | 34°(1½:1) | |

*Note: Benching is not permitted in Manitoba*

### 6.13.5 TEMPORARY PROTECTIVE STRUCTURES

Engineered Temporary Protective Structures are used as a means of protecting workers' safety and adjacent foundations. A professional engineer shall design any support system used in an Excavation as required by applicable legislation.

Engineered Temporary Protective Structure installation requires a detailed procedure and hazard assessment. Contractors must submit the procedure and hazard assessment to Enbridge a minimum of 48 hours before work commences.

#### 6.13.5.1 Adjacent Structure or Foundation Protection

A professional engineer shall be consulted to review the stability of any structure or foundation that may be affected by an Excavation or trench. If required, a Temporary Protective Structure shall be

designed, constructed, and installed to support the structure or foundation in accordance with the specifications of a professional engineer.

#### 6.13.5.2 Shoring and Trench Boxes

Shoring and trench boxes shall extend a minimum of 40 cm (18 in.) above the surface of the ground or vertical trench walls.

All shoring and trench boxes shall be installed and removed as per manufacturers' specifications and in accordance with applicable legislation.

Before a trench box is installed, a copy of the engineering certificate or a stamped engineering drawing, including assemble and disassemble instructions, shall be available at the worksite and shall be identifiable to that trench box. Trench boxes stacked in deep Excavations shall be adequately secured to one another in accordance with the engineered design.

Only professionally engineered hoisting points and hoisting connectors or manufacturer approved lifting methods shall be used to lift trench boxes.

Workers working in trench boxes shall:

- Remain inside the box as long as they are in the Working Excavation, and
- Exit the Excavation if the trench box is to be moved.

The space between the trench box and the Excavation wall shall be backfilled to allow safe access to the top of the trench box and to limit soil movement in the event of a cave-in.

## 6.14 MATERIAL STORAGE

All materials (including spoil piles), tools, vehicles, and equipment shall:

- Be stored at least 1 m (3 ft.) from the edge of a Working Excavation,
- Not have a spoil pile slope greater than 45° from the horizontal when next to a Working Excavation, and
- Not be stored above any pipelines and facilities without owner approval.

When parallel Excavations occur within 3 m (10 ft.) of an adjacent Enbridge operating pipeline, storage of excess surplus spoil materials above the operating adjacent pipeline(s) shall be allowed based on the completion of hoop stress calculations completed by a registered engineer and approved by LP Operations.

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

## 6.15 FENCES AND BARRICADES – EXCAVATION

Unattended Excavations, trenches, potholes, and boreholes shall be barricaded or fenced off as appropriate, depending on conditions.

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

Working Excavations shall:

- Use warning signs attached to barricades or ropes, or other appropriate methods to prevent workers from entering the portion of the Excavation where the vertical wall is greater than 1.2 m (4 ft.),
- Erect barricades or fences a minimum of 1 m (3 ft.) from the Excavation edge, and
- Have barricades and fences a minimum of 1.1 m (42 in.) tall adequately supported.
- When using T Posts to support fencings, spades on the bottom of the posts will be driven in until covered with soil or removed,

Unattended Excavations shall:

- Be guarded from unintentional entry by using highly visible material (e.g. fencing, flagging, placing berms, stringing pipe along the ROW, and/or topsoil piles for long Excavations), and
- Have adequate fencing where livestock are present.

## 6.16 EXCAVATION ACCESS/EGRESS

Ensure sufficient space is provided in Working Excavations to perform all required tasks including adequate clearance under and between facilities and walls.

Working Excavations shall have:

- Two access/egress points on each side of the pipe when required,
- A safe point of access/egress no more than 8 m (25 ft.) from any worker,
  - For the province of Manitoba, a safe point of access/egress no more than 3 m (10 ft.) from any worker,
- Soil ramp access and egress built with a maximum slope of 1(vertical):3 (horizontal) for safe access/ egress (if used), and
- Access/egress ladders placed inside the trench box.

Stairs may be constructed with slopes at an angle between 30 and 50 degrees to the horizontal plane.

## 7.0 TRAINING

Personnel working in the field must be knowledgeable in this Standard and may be assigned applicable training as driven by the LP Technical Training Program and/or LP Health and Safety Training Matrix utilizing the Safety Training Selection Tool. Ground Disturbance Training will be available and required by all individuals involved in Ground Disturbance activities.

Enbridge employees' and provisioned contractors' training requirements are mapped according to the Learning Program associated with their assigned competencies. Employees and provisioned contractors should reference the LP Technical Training Program and the LP Technical Training Course Catalogue for further information and training re-certification requirements which can be found within Field Operations and Maintenance on the LP Governance Documents Library. The primary courses for Ground Disturbance are SR: Ground Disturbance Awareness which is a required training for all employees / provisioned contractors involved in Ground Disturbance and LP TS: Supervisory Level Ground Disturbance which is required for all employees / provisioned contractors overseeing Ground Disturbance Activities.

Contractors performing work on behalf of Enbridge in Canada will follow Ground Disturbance Level II or any course aligned with the Utility Safety Partner's Ground Disturbance Standard 201.

Contractors performing work on behalf of Enbridge in the US will follow OQ requirements. All personnel must be qualified in the task they are performing. OQ requirements are further outlined in the Liquid Pipelines Operator Qualification Plan.

Depending on their role in the Ground Disturbance process, personnel may be required to take additional training including, but not limited to, Safety Orientation Training, Transmission Advanced Line Locating, OSHA 10, OSHA 30, API 1169, or other training specified by Enbridge or which is communicated by the Enbridge Representative accountable for work being performed.

## 8.0 RELATED DOCUMENTS

| Operating & Maintenance Manual – Book 10 | Document Number |
|---|---|
| Backfilling | 01-02-07 |
| Class Location Assessment Area - CAN | 03-02-05 |
| Ground Disturbance | 01-02-01 |
| One Call and Line Locates | 01-02-02 |
| Unauthorized Activity | 03-02-08 |
| Depth of Cover Monitoring | 03-02-06 |
| Excavating | 01-02-03 |
| Facility Signs & Markers | 03-02-04 |

| | |
|---|---|
| Pipe Support | 01-02-06 |
| Right-Of-Way Monitoring | 03-02-01 |
| Right-of-Way Signs & Markers | 03-02-03 |
| Vacuum Excavating | 01-02-04 |

**Other Documents**

Line Locate Procedure

PI-95 Pipeline Integrity Review of Second and Third Party Initiated Request

## 9.0 STANDARD REVIEW

A subject matter expert (SME) will perform a technical review of this standard every two years to determine the accuracy of the content/information. The SME shall solicit input from applicable stakeholders to ensure the effectiveness of the standard. Any suggested changes must be reviewed and approved by the designated document owner.

## 10.0 REFERENCES (REGULATION)

Alberta Regulation 125/2023 - Pipeline Rules

Part 4 - Ground Disturbance

CSA Z662-23 - Oil and Gas Pipeline System

10.5.5 Ground Disturbance

Ontario O. Reg. 210/01 - Oil and Gas Pipeline Systems

09 Ascertaining Pipeline Locations

10 No Interference with Pipeline

R.S.A. 2000 c. P-15 - Pipeline Act

32 Ground disturbance

42 Approval to undertake ground disturbance

45 Repair of damage

S.C. 2019, c. 28, s. 10 - Canadian Energy Regulator Act

180 Operation of pipeline

SOR/2016-124 - Canadian Energy Regulator Pipeline Damage Prevention Regulations - Authorizations

03 Locate Request

04 Duty to Inform

05 Designation of Temporary Prohibition Area

06 Authorization Under the Act - Pipeline Company

07 Facility Authorization - of Construction

10 Authorization - Ground Disturbance Activity

11 Authorization — Activity Required for Maintenance of Facility

12 Authorization – Operation Across Pipeline

17 Transitional Provisions - Excavation

SOR/2016-133 - Canadian Energy Regulator Pipeline Damage Prevention Regulations - Obligations of Pipeline Companies

02 One-call Centre

06 Obligations Following Request to Locate

08 Inspections and Field Observations

09 Inspections – Deterioration

11 Obligation to Report

12 Records

16 Damage Prevention Program

SOR/2019-347 - International and Interprovincial Power Line Damage Prevention Regulations — Authorizations

05 General Provisions Locate request, Emergency, One-call Centre

06 General Provisions Duty to Inform

07 Authorizations Construction of facility

08 Authorizations Ground disturbance activity

09 Authorizations Operation across a power line

SOR/86-304 - Canada Occupational Health and Safety Regulations

03.12 Temporary Structures and Excavations – Excavation

SOR/99-294 - Canadian Energy Regulator Onshore Pipeline Regulations

21 Right-of-way and Temporary Work Areas

22 Crossing a Utility or Private Road

Title 49 CFR, Chapter 1, Subchapter D, Part 195 - Title 49 CFR - Transportation, Chapter 1 - Pipeline and Hazardous Materials Safety Administration, Department of Transportation, Subchapter D - Pipeline Safety, Part 195 - Transportation of Hazardous Liquids by Pipeline

195.252 Backfilling

195.440 Public awareness

195.442 Damage prevention program

Title 49 CFR, Chapter 1, Subchapter D, Part 196 - Title 49 CFR - Transportation, Chapter 196 - Pipeline and Hazardous Materials Safety Administration, Department of Transportation, Subchapter D - Pipeline Safety, Part 196 - Protection of Underground Pipelines from Excavation Activity

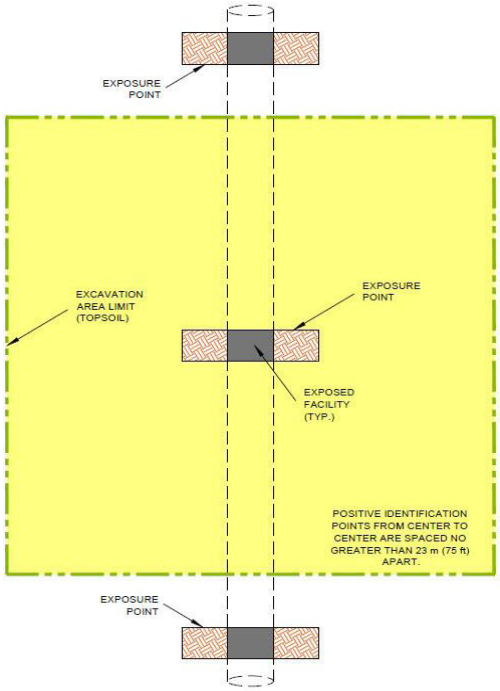
196.103 What must an excavator do to protect underground pipelines from excavation-related damage?

196.107 What must an excavator do if a pipeline is damaged by excavation activity?

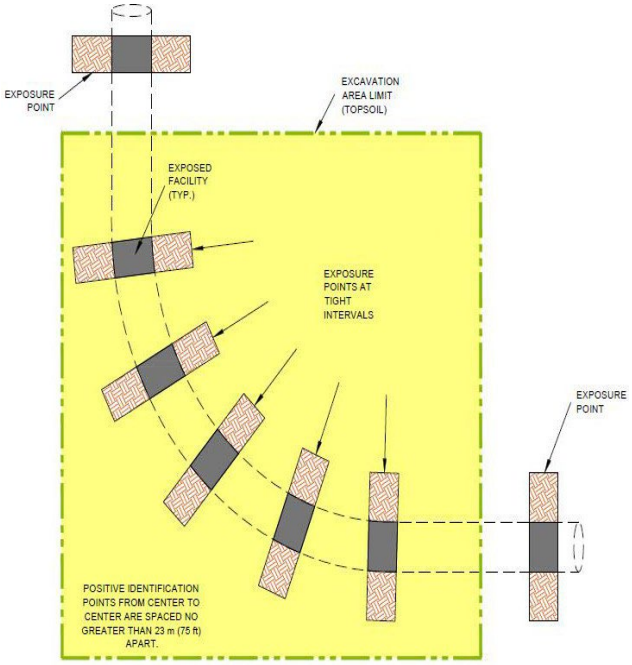
196.109 What must an excavator do if damage to a pipeline from excavation activity causes a leak where product is released from the pipeline?

# 11.0 APPENDIX

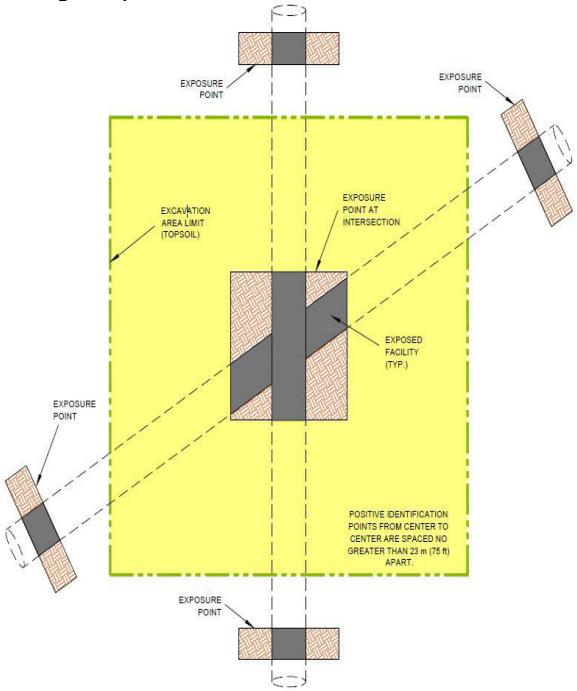
## 11.1 APPENDIX A – LOCATE METHODS




*Straight Pipeline Positive Identification*




*Pipeline with Bends Positive Identification*



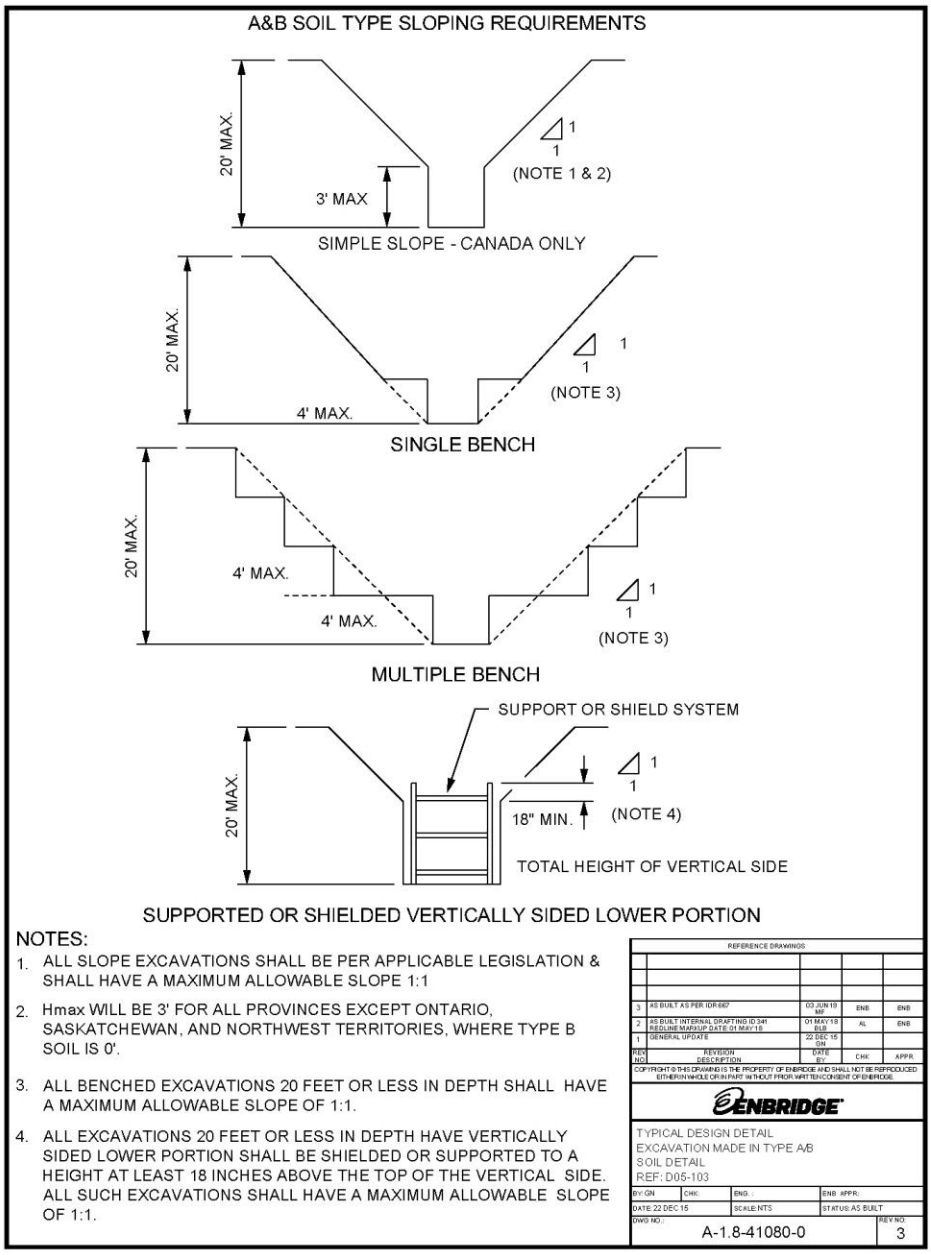

*Intersecting Facility Positive Identification*

## 11.2 APPENDIX B – COLOR CODING

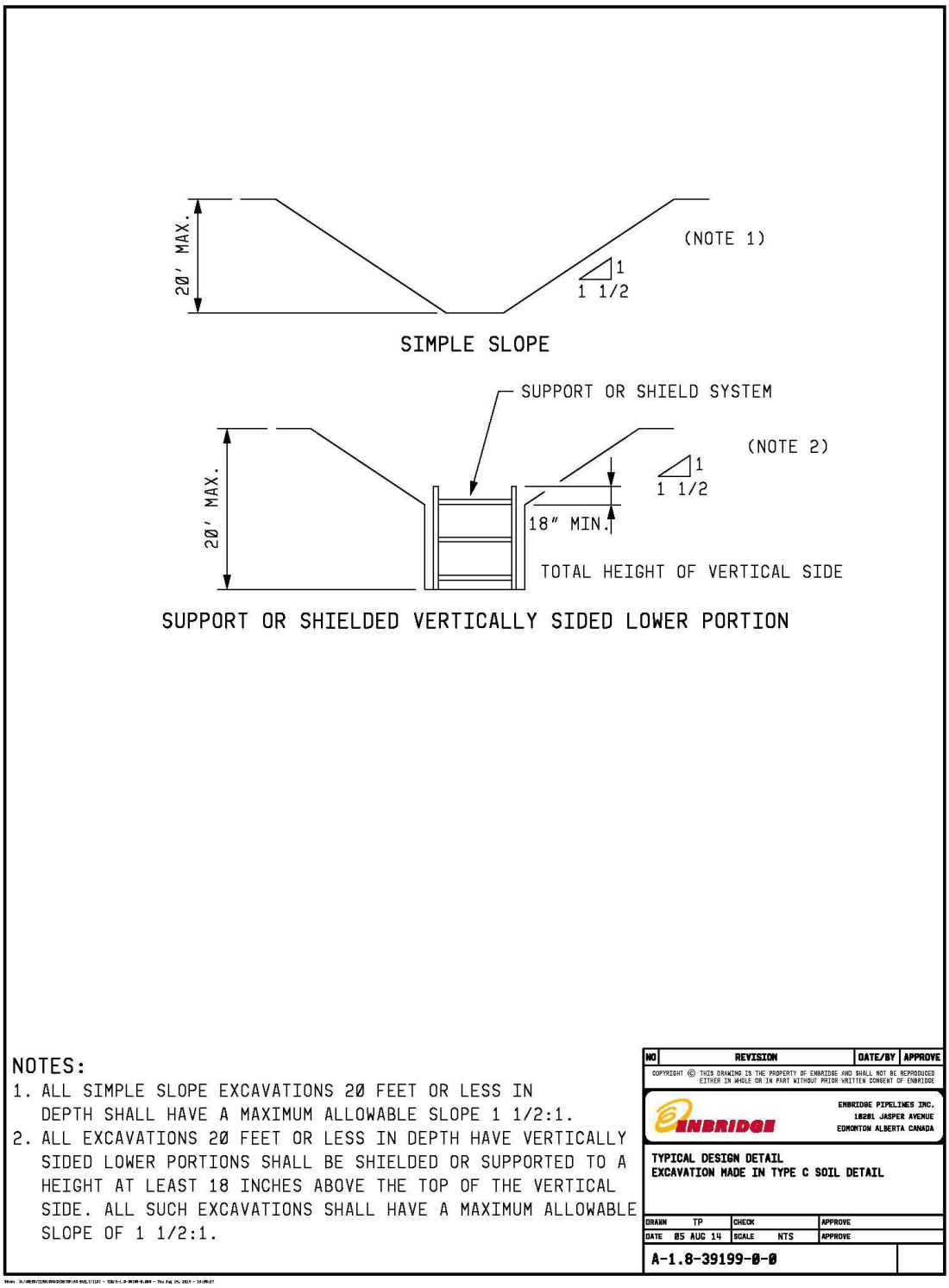
Color Coding

## 11.3 APPENDIX C – SLOPING REQUIREMENTS

### SLOPING – A&B SOIL TYPE



## SLOPING – C TYPE SOIL



## 11.4 APPENDIX D – GROUND DISTURBANCE PERMIT

ENBRIDGE

**Ground Disturbance Permit**

| PROJECT INFORMATION | | |
|---|---|---|
| Date: | Time Issued: | Time Expired: (Max 12 hrs.) |
| Project Name: | AFE #: | Contractor: |
| Facility Owner(s): | Site Location: Lat Long | Station/Spread/KP or MP: |
| Safe work Permit # | Excavation Depth: | One call Ticket# (include subcontractor if applicable) (Start Time/Date)_____ (Start Time/Date)_____ |
| Work Description and Extent of Ground Disturbance: | | |
| Hazards/Special Conditions: | | |

- "Written Agreements" makes reference 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, change to the job description or scope, or if the Company site Representative or the Contractor competent person is replaced by someone else.
- No answers for questions 1-10 require escalation for approval to proceed and an explanation in the comment section

| GROUND DISTURBANCE PACKAGE VERIFICATION (Planning Phase) | YES | NO | N/A |
|---|---|---|---|
| 1. Does each contractor performing ground disturbance have a valid one call ticket covering the entire locate boundary, including worksite access for the ground disturbance work that is being performed? | ☐ | ☐ | ☐ |
| 2. Have all owner companies on the one call ticket responded to the one call, with either markings or all clear notices (All clear notices shall be documented and retained in Ground Disturbance Package) | ☐ | ☐ | ☐ |
| 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. | ☐ | ☐ | ☐ |
| 4. If applicable, have all completed verification sweep diagrams been provided identifying all known and unknown facilities? | ☐ | ☐ | ☐ |
| 5. If applicable, have all required Written Agreements with foreign owners been obtained and available on site for reference? | ☐ | ☐ | ☐ |
| 6. Have all available records been compared, discrepancies resolved, and documents retained? (e.g., line locate diagrams, drawings, alignment sheets, blueprints, redlines, as-builts, site photos, discrepancy decision record) | ☐ | ☐ | ☐ |
| 7. Are all underground pipelines, cathodic, cables, or conduits on the drawing(s) are surface located and staked within the proposed excavation and the Locate Boundary Area (normally 30m or 100ft beyond the Excavation perimeter)? | ☐ | ☐ | ☐ |
| 8. If applicable, has an Exposure Hole log been retained and reviewed which notes the location, depth, size, and type of underground facilities that have been positively identified? (Required when exposure holes are backfilled with markers in place) | ☐ | ☐ | ☐ |
| 9. If applicable, have all required pipelines been depressurized or operated at a reduced pressure (Work on Enbridge Pipelines generally require Pipeline Integrity complete a review to establish Safe Excavating Pressures) | ☐ | ☐ | ☐ |
| 10. Has the Ground Disturbance Package been reviewed with all parties involved in the ground disturbance activity during the pre-dig meeting, and is readily available for review? | ☐ | ☐ | ☐ |
| Comments: | | | |

| GROUND DISTURBANCE (Execution Phase) | YES | NO | N/A |
|---|---|---|---|
| 11. Have all applicable facility owners been given proper notification as required by regulations and the written agreements? | ☐ | ☐ | ☐ |
| 12. Have all buried facilities within 16ft (5m) of the excavation site been Positively Identified and maintained in accordance with company standard, written agreements and regulations? | ☐ | ☐ | ☐ |
| 13. Has the Excavation Area (see defined terms) been clearly established for the operator and spotter and all required personnel? | ☐ | ☐ | ☐ |
| 14. Are temporary crossing ramps required and installed in accordance with the written agreements? | ☐ | ☐ | ☐ |
| 15. Has the Ground Disturbance training/ certification been verified for members of the work crew and the Ground Disturbance Supervisor? | ☐ | ☐ | ☐ |
| 16. Have the equipment operators been designated as competent or (OQ for US only)? | ☐ | ☐ | ☐ |
| 17. Are all required below grade facility owner representative(s) on site for the Ground Disturbance Work? | ☐ | ☐ | ☐ |
| 18. For ground disturbance requiring buckets with teeth, have the requirements and written approval been obtained and available? | ☐ | ☐ | ☐ |
| 19. Are existing below grade facilities protected from inadvertent contact and supported in accordance with Owners requirements (Maximum of 20ft (6m) for Enbridge regardless of pipe length or diameter) when excavation is in progress? | ☐ | ☐ | ☐ |
| 20. Are spoils (with proper sloping), materials and equipment set back at least 1m (3 ft.) from the edge of excavation? | ☐ | ☐ | ☐ |
| 21. Are workers and facilities protected from loose rock, soil, or other objects that could pose a hazard by falling or rolling into the excavation or from the bucket? | ☐ | ☐ | ☐ |
| 22. Are above ground facilities identified and hazard controls (i.e. signs, physical barriers, goal post, etc.) established to prevent contact and to maintain a safe clearance? | ☐ | ☐ | ☐ |
| 23. Have Mechanical Clearances been established in accordance with the written agreements and/or owner requirements? Required Mechanical Clearance? _____ | ☐ | ☐ | ☐ |

| RESTORE/BACKFILL (Restoration Phase) | YES | NO | N/A |
|---|---|---|---|
| 24. Have all newly installed facilities been redlined (as-built) and copies retained in the Ground Disturbance Package for future reference? | ☐ | ☐ | ☐ |
| 25. Have facility owners been notified prior to the proposed backfill work, in accordance with the written agreements? | ☐ | ☐ | ☐ |
| 26. Will the facility owner representatives inspect their facilities prior to the proposed backfill work? (Rep. Name)_____ Owner representative declined / exempted to be on site. (Rep. Name)_____ /Phone) _____ | ☐ | ☐ | ☐ |
| 27. Have the required backfill clearances been established in accordance with company standards and communicated with all workers? | ☐ | ☐ | ☐ |
| 28. Has an external corrosion control inspection report been completed prior to backfill by a qualified worker? (Required for Enbridge pipelines) | ☐ | ☐ | ☐ |
| 29. Will warning measures (boards, caution tape, etc.) be buried with the installation of the facility to alert future excavators of installed facilities where required? | ☐ | ☐ | ☐ |
| 30. Have Open Excavations been appropriately safety guarded? | ☐ | ☐ | ☐ |

**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 (inspector or designate) | (Print) | (Sign) |
| Permit Receiver (Contractor, Supervisor / Foreman) | (Print) | (Sign) |
| Sub-Contractor when applicable (Supervisor/Foreman) | (Print) | (Sign) |

**GROUND DISTURBANCE PERMIT CLOSURE**

By checking this box, all parties acknowledge that work has been completed or suspended and all personnel have been informed. ☐

Comments:

Distribution: White – Permit Receiver, Gold – Permit Issuer Retain white copy VERSION 3 (February 21, 2023) ENB-FRM-0040

## 11.5 APPENDIX E – WORKING EXCAVATION CHECKLIST

ENBRIDGE

**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 (circle):** **Type A, Type B, Type C** **Excavation depth:**

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

***In order to continue with safe work, all questions must be answered with yes or N/A. If N/A, explain the reasoning in the comment section below**



**Note: This checklist will be regarded as void and must be reissued if there is a change of the job description or scope changes, or if the Company Site Representative or the Contractor competent person is replaced.**

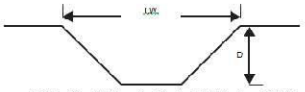
**The classification of the deposits shall be made based on the results of at least one Visual and at least one Manual Analysis**

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 |
| | Porous soil | | Fissured Type A | | Type of soil (circle one): Clay, Sandy Clay, Clay Loam, Caliche, Stable Rock |
| | Vibration | | Subject to vibration Type A | | |
| | Water (seeping) | | Type A rock not stable | | |
| | Submerged soil | | Accumulated Water | | |
| | Previously disturbed soil | | Type of soil (circle one): Silt, Silty Loam, Sandy Loam, Crushed Rock | | |
| | Type of soil (circle one): Gravel, Sand, Loamy Sand | | | | |
| | 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.

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




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

*Comments:

| | Print Name | Sign | Date and Time |
|---|---|---|---|
| COMPETENT PERSON: | | | |
| SUPERVISOR SIGN OFF | | | |

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## 11.6 APPENDIX F – BUCKETS WITH TEETH APPROVAL FORM

ENBRIDGE

Version 2.0
May 7, 2018

### Approval for Equipment with Teeth

This form is required to be completed by the Contractor and submitted to the Project Team when seeking permission for the use of teeth on excavation equipment (buckets with teeth/dozers with ripper teeth). The Project Team will request written approval from the Project Director (or designate) for Greenfield Sites and/or the regional management for Brownfield Sites.
This approval only applies to a specific project and does not create policy and will be applicable for the specific time frame identified.

| |
|---|
| Effective Date: |
| Project/ AFE/CWP: |
| Location (Terminal/ ROW/Spread): |
| Contractor: |
| Date Requested: |

All Ground Disturbance requirements must be met in the current Ground Disturbance Standard. When the use of buckets with teeth has been approved, the Inspector shall be on-site at all times, during activities where teeth are required.
In addition, the following requirements shall be met:

- Use of equipment shall be limited to the removal of rock, concrete, asphalt, or frozen soil, no closer than 2' from any below grade facility.
- A hazard assessment is completed by the Ground Disturber and approved by the Project Team. The following documents should be included upon submitting this request.
  - Line Locate Diagrams
  - Job Hazard Assessment
  - Updated Drawings of any below grade facilities impacted
  - Map showing exact location the Ground Disturber will use buckets with teeth
- Before the task is carried out, a pre-job meeting shall be conducted with the crew to review Hazards and processes anticipated for the Ground Disturbance activities.
- All below grade facilities have been surface located within 100'and positively identified within 16'.
- When passing or swinging the bucket over facilities, the operator shall maintain safe clearances, keeping the bucket curled and teeth pointed up.
- Once the approved activities are complete, buckets without teeth shall be used for all other activities, or the bucket teeth shall be protected by a flat bar.

| Signatures | | |
|---|---|---|
| Ground Disturbance Supervisor: | | |
| Click here to enter text. | | Click here to enter text. |
| Print Name | Signature | Date |
| Project Safety Coordinator/ Ground Disturbance Coordinator (if applicable): | | |
| Click here to enter text. | | Click here to enter text. |
| Print Name | Signature | Date |
| Project Director or designate (Greenfield Sites): | | |
| Click here to enter text. | | Click here to enter text. |
| Print Name | Signature | Date |
| Regional Management (Brownfield Sites): | | |
| Click here to enter text. | | Click here to enter text. |
| Print Name | Signature | Date |

This form shall be kept at the regional, project or department office until the approval expires, and then kept according to the document retention policy.

## CHANGE LOG

| Section | Version 1.2 | Version 1.3 |
|---|---|---|
| 2.0 | Contractors and Subcontractors shall comply with Enbridge health and safety requirements set out in this standard. | Contractors and Subcontractors shall comply with Enbridge health and safety requirements set out in this standard, as articulated within applicable contractor safety specifications. |
| 5.0 | Ensure the Internal/External Pipe Inspection Report is completed prior to backfilling | |
| | **Version 1.3** | **Version 2.0** |
| 6.4.4 | | Added Permanent Deviation Section |
| 9.0 | This standard shall be reviewed by a designated owner annually and a technical review committee every two years.<br>Technical reviews shall solicit input from non-managerial field employees to ensure the effectiveness of the standard. | A subject matter expert (SME) will perform a technical review of this standard every two years to determine the accuracy of the content/information. The SME shall solicit input from applicable stakeholders to ensure the effectiveness of the standard. Any suggested changes must be reviewed and approved by the designated document owner. |
| | **Version 3.0** | |
| | Multiple changes including clarification of purpose; added definitions; clarification regarding Initial vs Verification Locates; added Cathodic Protection considerations for GD Planning; formatting changes for added clarity; additional requirements for pothole markers; addition of instructions for temporary deviation requests; and added protection of pipe section, reference to Line Locate Procedure, and more. | |
| | **Version 3.1** | |
| | Added definitions for Brownfield, Greenfield, Horizontal Auger Boring (HAB), Horizontal Directional Boring (HDB), and Horizontal Directional Drilling (HDD); revised Section 7.0 Training; included all applicable Regulations; made other minor changes to improve clarity of requirements. | |
| | **Version 3.2** | |
| 6.3.4 | Update to include Texas and Minnesota specific requirements related to surface markings. Update to include references to Book 10 OMMs, replacing old Book 3 numbering. | |

<End of Document>