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**PETRONAS**

# **GROUND DISTURBANCE TECHNICAL STANDARD**

**PETRONAS ENERGY CANADA LTD.**

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### Proprietary Information

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## 1. Summary Statement

This technical standard supports the implementation of the Health, Safety, and Environmental (HSE) management system. Ground Disturbance is a critical work scope and this technical standard supplements Worksite Management Framework requirements to plan and execute work.

## 2. Objectives

The objective of this Ground Disturbance Technical Standard is to define consistent requirements for PETRONAS Canada stakeholders to plan, assess and manage risk and safely execute and ground disturbance work. This includes detailed requirements to:

- Identify, locate and mark all buried facilities
- Perform appropriate notifications to owners and regulators
- Plan, hand expose and perform ground disturbance safely
- Backfill and close-out of work

## 3. Scope

This technical standard applies to all work performed on PETRONAS Canada sites, on behalf of PETRONAS Canada, or by PETRONAS Canada personnel.

For the purposes of this document, ground disturbance does not include:

- Routine, minor road maintenance
- Agricultural cultivation that does not exceed forty-five centimeters (45 cm) depth
- Digging to a depth of no more than thirty centimeters (30 cm) below the ground surface to temporarily remove ground cover

## 4. Definitions

Term	Description
BC 1 Call	The communication link between the ground disturbance community and the owner/operator of underground facilities who are registered members of BC 1 Call (Note: Not all utility companies and owners are members of BC 1 Call)
Daylighting	See 'Hand Exposure' definition
Department Project Manager	Individual who initiates ground disturbance planning, typically from Facilities, Decommissioning, Abandonment, Reclamation and Remediation (DARR), Construction, Field Regulatory and Environmental or Integrity departments
Excavation	A type of ground disturbance that includes any cut, cavity, trench or depression in the earth's surface resulting from rock or soil removal <sup>1</sup>
Ground Disturbance (GD)	Any work, operation or activity, on or under the ground surface, resulting in a disturbance or displacement of the soil or ground cover
Ground Disturbance Package	Includes Ground Disturbance Form and supporting documents which may include: previous ground disturbance(s) documentation, plot plans, location of


Term	Description
	emergency shutdowns, survey maps, crossing agreements, line locate, BC 1 Call ticket #, Owner communication, etc.)
Hand Exposure	A safe means of locating (horizontal orientation and depth of cover) and exposing by hydrovac (non-destructive method) or hand shovel, a buried facility or underground utility line, whose location has been marked. Also known as daylighting.
Owner Representative	Owner or the owner’s designate of a pipeline that is within 30 meters of the work site or any other buried or concrete embedded facility that may be affected by the ground disturbance or removal of existing concrete
Qualified Registered Professional	A professional engineer or professional geoscientist (WorkSafeBC)

## 5. Requirements

This section includes requirements for planning, safe execution and close-out of ground disturbance activities.



### 5.1. Identify, Locate and Mark

#	Requirement	Responsible	References
<b>5.1.1 Identify Buried Facilities</b>	 <b>NOTE:</b> Not all buried facilities are registered with BC 1 Call		
	<ol style="list-style-type: none"> <li>1. Define scope of ground disturbance and notify Worksite Owner and Ground Disturbance (GD) Supervisor</li> <li>2. Identify all buried facilities within thirty meters (30 m) of; pipelines or the limits of disturbance for other facilities by:                         <ol style="list-style-type: none"> <li>a. Contacting BC 1 Call center for information, and,</li> <li>b. Reviewing all GD information sources (see list on GD Form)</li> </ol> </li> <li>3. Consult with stakeholders that may be impacted by job scope including:                         <ol style="list-style-type: none"> <li>a. Landowners</li> <li>b. Right of Way holders</li> <li>c. Underground and surface facility owners</li> </ol> </li> </ol>	Project Manager or Delegate	GD Form












#	Requirement	Responsible	References
	<ul style="list-style-type: none"> <li>b. An excavation, other than a trench, over 1.2 m deep</li> <li>3. Confirm CER regulated pipeline owners are notified, prior to any excavation, construction or crossing                             <ul style="list-style-type: none"> <li>a. Determine with owner(s) if they must supervise, witness, or consent to ground disturbance</li> </ul> </li> <li>4. Provide notification confirmation to Ground Disturbance Supervisor</li> </ul>	Project Manager	


### 5.3.Hand Exposure and Verify Plans

#	Requirement	Responsible	References
5.3.1 Expose	 <b>WARNING:</b> All buried facilities must be hand exposed prior to using any mechanical excavation equipment		
	 <b>CAUTION:</b> Avoid the use of probes to protect line coatings		
	 <b>NOTE:</b> All ground disturbance activities including hand exposure must follow Worksite Management Framework requirements and require a Permit to Work		
	<ul style="list-style-type: none"> <li>1. Verify all GD Form and package documentation including:                             <ul style="list-style-type: none"> <li>a. BC 1 Call ticket number</li> <li>b. Locate records</li> <li>c. Approvals and agreements</li> <li>d. Hand Exposure plan</li> <li>e. Notice of Project (if applicable)</li> </ul> </li> <li>2. Follow all Worksite Management and Permit to Work requirements including review of Procedure or JHA                             <ul style="list-style-type: none"> <li>a. GD Supervisor must be on site</li> </ul> </li> <li>3. Hand expose buried facilities (as identified on the daylight plan), using non-powered and non-pointed tools and equipment until:                             <ul style="list-style-type: none"> <li>a. All buried facilities are clearly visible and</li> <li>b. Both parties are satisfied</li> </ul> </li> <li>4. Update drawings with hand exposure locations and document discrepancies</li> </ul>	GD Supervisor	GD Form  Worksite Management Framework  GD Form

#	Requirement	Responsible	References
<b>5.3.2 Verify Excavation Plans</b>	<ol style="list-style-type: none"> <li>Confirm that all GD requirements are met and ensure supporting documentation is complete and available.</li> <li>Conduct a Pre-Job meeting with all involved parties to review and verify the GD Form and supporting documents for completeness and accuracy.</li> <li>Ensure GD begins within fourteen (14) days of line locate</li> </ol>	GD Supervisor	GD Form  Appendix B
	 <b>WARNING:</b> If excavation will require worker entry, ensure sloping and shoring meets regulatory requirements		
<b>5.3.3 Extend Locates (if required)</b>	<ol style="list-style-type: none"> <li>Extend line locate from fourteen (14) to thirty (30) days                             <ol style="list-style-type: none"> <li>If work not started but site has remained under the care and control of the Person in Charge AND:</li> <li>Line markers are visible (or lines have been exposed)</li> </ol> </li> <li>Extend line locate beyond thirty (30) days if care and control of site has been retained, by:                             <ol style="list-style-type: none"> <li>Contacting BC 1 Call to notify operators of buried facilities and</li> <li>Documenting that owners agree to renew and formally extend line locate</li> </ol> </li> </ol>	GD Supervisor	


**5.4. Excavate Safely**

#	Requirement	Responsible	References
<b>5.4.1 Safely Excavate</b>	 <b>WARNING:</b> The owner's representative must directly supervise use of mechanical excavation equipment within 60 centimeters (60 cm) of a located pipeline or a live line, OR provide written confirmation in prior to exposure, that it does not need a representative to be present and the reason for this decision		
	<ol style="list-style-type: none"> <li>Ensure owner's representative is present or written consent in place</li> <li>Follow all Worksite Management and Permit to Work requirements</li> <li>GD Supervisor must be on site for mechanical excavation</li> <li>Excavate following all crossing/proximity agreements, agreed to excavation procedures and:</li> </ol>	GD Supervisor	GD Form

#	Requirement	Responsible	References
	<ul style="list-style-type: none"> <li>a. Ensure mechanical teeth are removed or covered</li> <li>b. No mechanical equipment within five meters (5 m) of line</li> <li>c. Control work area / trench access</li> </ul> <p>5. Stop work immediately if contact is made with any underground facility and,</p> <ul style="list-style-type: none"> <li>a. Notify the following without delay:                             <ul style="list-style-type: none"> <li>i. The Person-In-Charge</li> <li>ii. The PETRONAS 24-Hour Reporting Line</li> <li>iii. Any impacted facility owners</li> </ul> </li> </ul>	GD Supervisor	Incident Management Framework
	 <b>Note:</b> All regulatory notifications will be completed by the PETRONAS Regulatory Team.		
	<ul style="list-style-type: none"> <li>b. Do not resume work until approval is received from:                             <ul style="list-style-type: none"> <li>i. Applicable regulator(s)</li> <li>ii. Integrity Specialist</li> </ul> </li> </ul> <p>6. Report any incidents, near misses, and unsafe acts/conditions as per Incident Management Framework</p>	GD Supervisor	Incident Management Framework

### 5.5.Backfill and Close-Out Work

#	Requirement	Responsible	References
<b>5.5.1 Backfill</b>	<ul style="list-style-type: none"> <li>1. Notify underground facility owners at least twenty-four hours (24 hr) prior to backfill</li> <li>2. Ensure facility owner inspects backfill of the buried facility                             <ul style="list-style-type: none"> <li>a. If unable to obtain an inspection from the facility owner, consult the regulator and ensure the conditions during backfilling are documented with a report and photographs</li> </ul> </li> <li>3. Complete backfill and document on Backfill Inspection Report Form</li> </ul>	GD Supervisor	Backfill Inspection Report Form

#	Requirement	Responsible	References
<b>5.5.2 Complete and Close out Work</b>	1. Complete and close out work as per Worksite Management Framework	GD Supervisor	Worksite Management Framework
	2. Retain the following records: <ul style="list-style-type: none"> <li>a. GD Form and package contents</li> <li>b. Backfill Inspection Report including photos</li> <li>c. Redlined plot plan (if applicable)</li> </ul>	Worksite Owners	
		<b>NOTE:</b> Submit red line drawings in accordance with Facilities Delivery Framework and Drawing Technical Standard to ensure records are updated	

### 5.6. Roles and Responsibilities

Ground Disturbance-specific roles and responsibilities are described below. Refer to Worksite Management Framework and Work Authorization and Permit to Work Technical Standard for additional roles and responsibilities.

#### 5.6.1. Worksite Owner

- Trained as a Ground Disturbance Awareness
- Retain the close out GD Form and supporting documents

#### 5.6.2. Ground Disturbance Supervisor

- B.C. approved Ground Disturbance Level 2 Supervisor training certificate
- Schedule all line locates
- Share all relevant records with locators
- Review line locate markings and line locate drawings
- Document and resolve discrepancies in line locate information
- Conduct Pre-Job Kick off with Contract GD Supervisor and review GD Information
- Extend Line Locates (if required)
- Be onsite to supervise excavation
- Stop Work immediately if contact with underground facility is made and complete appropriate notifications
- Notify underground facility owners prior to backfill and complete backfill inspection form
- Close out GD Work

#### 5.6.3. Project Manager

- Trained in Ground Disturbance Awareness
- Define the scope of ground disturbance

- Notify the Worksite Owner and Ground Disturbance Supervisor
- Identify all buried facilities within 30 meters of pipelines or disturbance limits
- Consult with impacted stakeholders
- Obtain crossing agreements

#### **5.6.4. Integrity Specialist**

- Trained in Ground Disturbance Awareness
- Support review of GD Plans
- Confirm safe to continue work post incident

## **6. Training**

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All personnel will receive training appropriate to the role, as defined by the HSE Training Matrix.

## **7. References**

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- American Public Works Association
- WorkSafeBC OHS Regulation Part 20: Construction, Excavation and Demolition
- PETRONAS Canada Regulatory Management Policy
- PETRONAS Canada Surface Land Management Policy,
- PETRONAS Canada External Communication Policy
- PETRONAS Canada Surface Land Management Technical Standard
- Worksite Management Framework
- WorkSafeBC OHS Regulation Part 20.81 Sloping and Shoring Requirements
- Incident Management Framework
- Ground Disturbance Form
- Request for Locate Form (Non-registered buried facility)
- Backfill inspection Report Form (G0801-052-000- 002)
- Prevention of Damage to Buried Facilities in B.C. WorkSafeBC. May 2013.
- Damage Prevention Process in Alberta V.7.0. Utility Safety Partners. February 2024.

## Appendix A: Color Code for Marking Underground Utility Lines

**Table 1.** Color code for marking underground utility lines (universal standard)

Electrical power lines, cables, conduits and ducts, or lighting wires and cables	Red
Gas, oil, petroleum, steam or gaseous material	Yellow
Telephone, communication, cable TV, alarm/signal lines, wires, cable, conduit, or ducts	Orange
Water lines or pipes	Blue
Sanitary Sewer, storm sewer, culvert, or drain lines	Green
Temporary survey markings	Pink
Limits of proposed excavation	White
Irrigation, reclaimed water, or slurry lines or pipes	Purple

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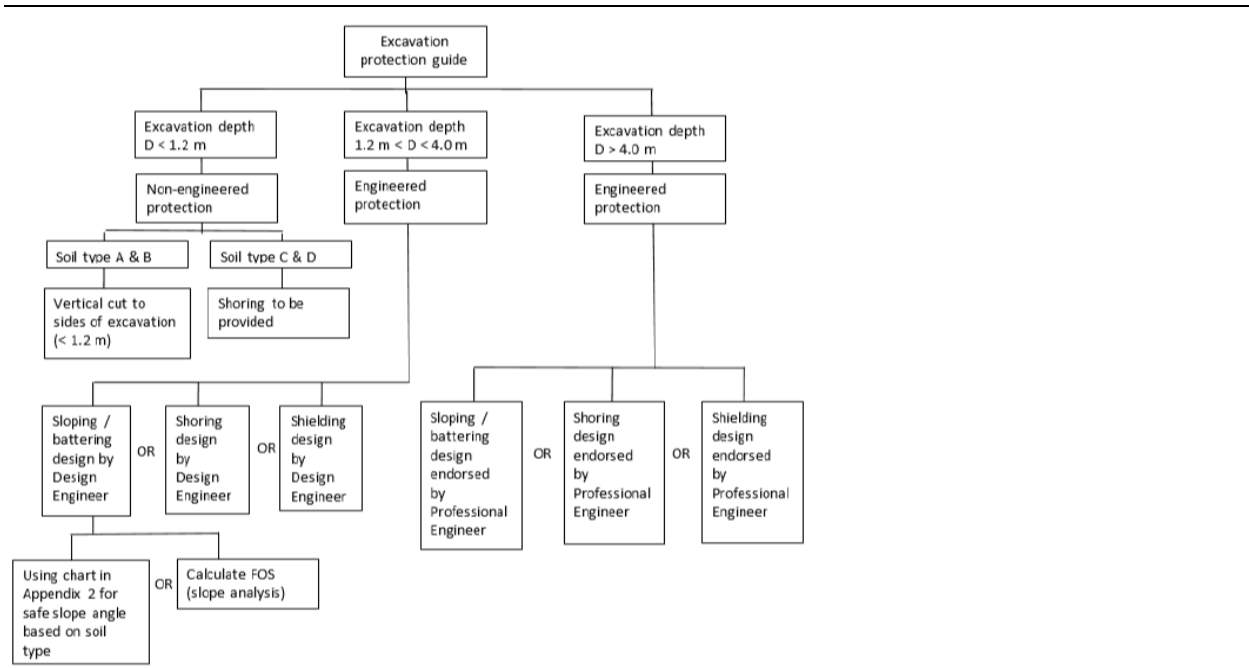
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Prepared By		
Name	Position	Date & Time
Jordan Rennie	Sr. HSE Advisor, Contractor Safety & Assurance	17/12/2025 07:00AM

Reviewed By		
Name	Position	Date & Time
Naureen Badmus	Project Coordinator	18/12/2025 12:58PM

Approved By		
Name	Position	Date & Time
Amber Vanderplas	Director, Health, Safety & Environment	07/01/2026 12:40PM

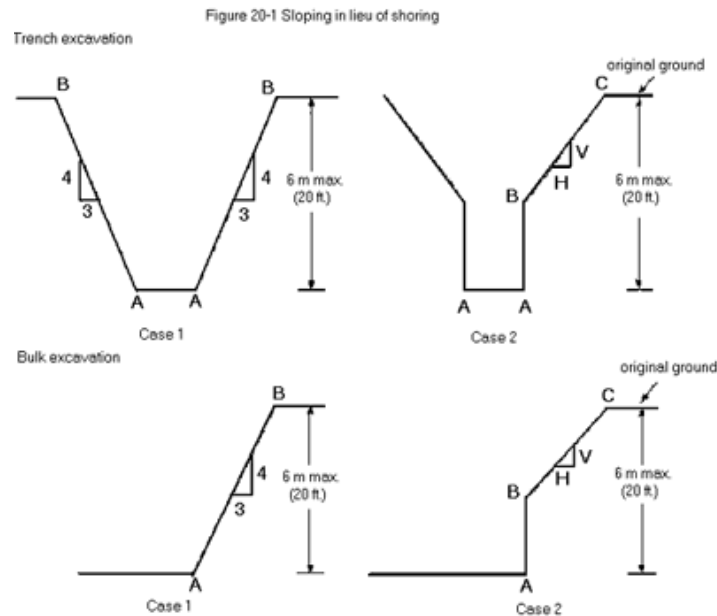
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## Appendix B: Sloping and Benching

Sloping in Lieu of Shoring taken from: [WorkSafeBC Regulation](#) Part 20 Figure 20-1:



- Case 1 (trench or bulk excavation) - maximum slope of excavated face, shown as line AB, in hard and solid soil is 3 horizontal to 4 vertical.
- Case 2 (trench or bulk excavation), maximum height of vertical portion, shown as line AB is 1.2 metres (4 feet).
- For Case 2 (trench or bulk excavation), the maximum permissible slope of the excavated face BC for the corresponding height of the lower vertical cut AB is as follows:

Height of line AB		Maximum slope of line BC (in hard and solid soil)
centimetres	feet	
up to 30	up to 1	1 horizontal (H) to 1 vertical (V)
30 to 60	1 to 2	3H to 2V
60 to 90	2 to 3	2H to 1V
90 to 120	3 to 4	3H to 1V

Benching in Lieu of Shoring taken from: [WorkSafeBC Regulation](#) Part 20 Figure 20-2:

Figure 20-2: Benching in lieu of shoring

