
	ENMAX CORPORATION		
	GROUND DISTURBANCE GUIDELINES		
	Verify revision is current prior to use.	Effective Date: August 19, 2024	Page 1 of 20



Scan the above QR Code to obtain the most current version.

	NOTE: FOR ALL EMERGENCIES IMMEDIATELY STOP AND CONTACT 9-1-1
-------------------------------------------------------------------------------------	---------------------------------------------------------------------

Approved By:	Title	Date Approved
Chris Smith	Director, Safety and Environment	December 18, 2023
Dean Battershill	Manager, Operational Safety	December 18, 2023





	GROUND DISTURBANCE GUIDELINES	
	If using a printed version, verify it is the most current version prior to use.	SAFETY COUNCIL EFFECTIVE DATE: 2024-Aug-19

Table of Contents


1.0	INTRODUCTION	3
1.1	PURPOSE	3
1.2	KEY CONTACTS	3
1.3	REFERENCES	3
1.4	GLOSSARY	4
2.0	GROUND DISTURBANCE PROCESS	5
2.1	LOCATES	5
2.2	BUFFER ZONE	5
2.3	ENMAX PERMISSION LETTER	6
2.4	NOTIFICATIONS FOR EXCAVATION ACTIVITIES	6
2.5	COMPLETE GROUND DISTURBANCE	6
2.6	BACKFILL	7
2.7	PROCEDURE – IF DAMAGE OCCURS.....	8
2.8	GROUND DISTURBANCE PROCESS FLOWCHART	9
	APPENDIX A – SAFE WORK PRACTICES	10
	APPENDIX B – CONFLICT ZONE	11
	APPENDIX C – EXCAVATION METHODS	12
	APPENDIX D – ENGINEERED SUPPORT REQUIREMENTS.....	15
	APPENDIX E - REVISION HISTORY	19

	GROUND DISTURBANCE GUIDELINES	
	If using a printed version, verify it is the most current version prior to use.	SAFETY COUNCIL EFFECTIVE DATE: 2024-Aug-19


1.0 INTRODUCTION

1.1 PURPOSE

Ground disturbance, or excavations, poses significant hazards to workers, the public, and the environment. This document provides requirements companies and individuals **MUST** comply with when exposing buried ENMAX facilities. Other sources to comply with include provincial legislation, codes, bylaws, and other utility requirements.



WARNING: Use extreme caution when working near energized cables; consider ALL power cables energized. Contact with cables may cause injury or death; therefore, excavators **MUST** contact their project inspector or access the [Temporary Disconnect/Reconnect Form](#) to schedule switching and isolation of energized cables if cable support is needed.



NOTE: If energized cables cannot be isolated and grounded, companies must adhere to their own hand exposure and hydrovac safe work practices.

1.2 KEY CONTACTS

The following must be readily available when conducting ground disturbance near ENMAX facilities.



Key Contacts	Contact	Phone Number	Email
	Utility Safety Partners	1-800-242-3447	www.utilitysafety.ca
	ENMAX Customer Projects		getconnected@enmax.com
	ENMAX Field Services (MSO, and anchor and guy removal)		EPCFieldServicesMSOs@enmax.com
	ENMAX Hot Digs		HotDigs@enmax.com
	ENMAX Line Inspection		lineinspection@enmax.com
	ENMAX Transmission	403-514-3679	
	ENMAX Trouble Dispatch	403-514-6100	

NOTE	The Temporary Disconnect/Reconnect Form must also be readily available.
-------------	-----------------------------------------------------------------------------------------

1.3 REFERENCES

All work must be carried out in accordance with the following:

Legislation	Alberta Occupational Health and Safety Code <ul style="list-style-type: none"> Part 17 Overhead Power Lines Part 18 Personal Protective Equipment Part 32 Excavating and Tunneling Alberta Electrical Utility Code <ul style="list-style-type: none"> Section 2- 014 Activities near Overhead Power Lines Section 2- 018 Moving Equipment or Buildings Section 2- 020 Excavation Activities in the Vicinity of Underground Power Lines CAN/CSA Standard C22.3 No. 7-10 Underground Systems CAN/ULC-S801-(7.15.6) Standard on Electric Utility Workplace Electrical Safety
ENMAX form	Temporary Disconnect/Reconnect Form
ENMAX Resources	ENMAX Hazardous Electrical Awareness Tutorial NOTE: Available upon request at hotdigs@enmax.com or safety@enmax.com .
Other resources	<ul style="list-style-type: none"> Canadian Common Ground Alliance Utility Safety Partners

	GROUND DISTURBANCE GUIDELINES	
	If using a printed version, verify it is the most current version prior to use.	SAFETY COUNCIL EFFECTIVE DATE: 2024-Aug-19



1.4 GLOSSARY

Acronyms

AEUC	Alberta Electrical Utility Code	MSO	Minor Service Order
CSA	Canadian Standards Association	PPE	Personal protective equipment
HRC	Hazard Risk Category	QUE	Qualified Utility Employee
LOA	Limits of Approach (Safety Code)	SWP	Safe Work Practice

Terms

Air excavation / hydrovac equipment	A non-destructive process using pressurized water or air and a vacuum truck to remove earth cover (soil, gravel, stones, rubble, mud).
Competent worker	A worker who is adequately qualified, suitably trained, and with sufficient experience to safely perform work without supervision or with only a minimal degree of supervision.
Conflict zone	At risk locations within the work area for any of the following: <ul style="list-style-type: none"> • Listed on the locate slip by the Locator • Within 1 m (3'-3") of any locate marks • Within 2 m (6'-6") of any ENMAX at-grade facility • Within 5 m of any ENMAX Underground Transmission 69-kV or 138-kV cables • As described in Appendix B - Conflict Zone
Destructive excavation	An operation using equipment or explosives to move earth, rock, or other material below existing grade.
ENMAX facilities	ENMAX facilities include: <ul style="list-style-type: none"> <li style="width: 33%;">• Cables and ducts <li style="width: 33%;">• Poles <li style="width: 33%;">• Transformers <li style="width: 33%;">• Concrete duct banks <li style="width: 33%;">• Pull boxes <li style="width: 33%;">• Transformer vault <li style="width: 33%;">• Guy wire w/pole anchors <li style="width: 33%;">• Switches <li style="width: 33%;">• Transmission infrastructure <li style="width: 33%;">• Manholes <li style="width: 33%;">• Secondary pedestals and tubs
Excavator	Any contractor, developer, property owner, or other individual performing any work, operation or activity that results in a disturbance of the ground, regardless of depth.
Ground disturbance	Any work, operation, or activity that results in a disturbance of the ground, regardless of depth.
Hot dig	Process of exposing energized cables and facilities using non-destructive methods.
Locate marks	Temporary markings to identify the approximate location of underground infrastructure (buried facility). Examples include pin flags, coloured paint, stake chasers, coloured chalk, chevron.
Non-destructive buffer zone	One (1) metre (3'-3") from either side of the locate marks or flags
Non-destructive excavation	Hand exposure (provided there is a non-conductive handle on shovel), air vacuum or hydrovac equipment.
Qualified Utility Employee (QUE)	A power line or station utility employee trained and experienced to work safely on energized electrical equipment or lines.

	GROUND DISTURBANCE GUIDELINES	
	If using a printed version, verify it is the most current version prior to use.	SAFETY COUNCIL
		EFFECTIVE DATE: 2024-Aug-19

2.0 GROUND DISTURBANCE PROCESS

2.1 LOCATES

ENMAX underground facilities

Submit an online locate request at [Utility Safety Partners](#) **PRIOR** to any ground disturbance near ENMAX facilities.

Call Utility Safety Partners directly at **1-800-242-3447** for the following:

- Request emergency locates
- Provide damage information



NOTE: Inside property-private owners; includes commercial lots, multi-dwelling, provincial highways/roadways, and utility corridors (streetlighting and fibre) must obtain locates for secondary conductors via private utility locating service provider of choice.

At grade facilities

System ground wires and ground rods are not locatable. They are typically buried below the final grade and encompass a **1 m (3'-3")** area around or adjacent to ENMAX facilities.



CAUTION: Contacting the ground system may cause damage to the adjacent structures or equipment and/or personal injury or death. Only Non-destructive excavation in accordance with this Guideline may be performed when disturbing the ground within **2 m (6'-6")** of equipment.

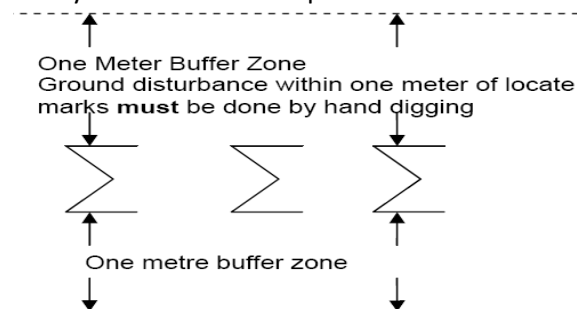
2.2 BUFFER ZONE

Within the buffer zone

Locate marks (chevron), shown below, depict the location of underground facilities.

The buffer zone (non-destructive) extends **1 m (3'-3")** beyond the locate marks.

Contact information for **OTHER facility owners** can be found on the **back of the locate slip** provided by the locate service provider.



NOTE: Locate marks are valid for **60 days** from the date provided unless otherwise specified.

Outside the buffer zone

If the ground disturbance occurs **OUTSIDE** the buffer zone, ENMAX has no restrictions on the ground disturbance. Excavation may proceed (subject to requirements of provincial legislation, codes, bylaws, and other utilities).

2.3 ENMAX PERMISSION LETTER

Permission Letter Obtain an ENMAX Permission Letter PRIOR to performing ground disturbance near ENMAX facilities. The Letter MUST remain on site while exposing ENMAX facilities. Email HotDigs@enmax.com to obtain an ENMAX Permission Letter.

Excavator requirements Excavators MUST comply with the following requirements:

- Create and adhere to own SWPs for ground disturbance (reference [Appendix A – Safe Work Practices](#) for minimum requirements)
- Ensure all personnel involved in any ground disturbance are competent workers
- Ensure SWP and procedures comply with this guideline, legislation, bylaws, codes
- Ensure a cell phone or other means of contacting ENMAX Trouble Dispatch is always available while at the worksite
- Comply with all requirements contained in the ENMAX Permission Letter

2.4 NOTIFICATIONS FOR EXCAVATION ACTIVITIES

ENMAX Projects – Contract in Place Contact the ENMAX Project Inspector when performing work for ENMAX and a contract exists between ENMAX and the contractor.

Non-ENMAX projects Notifications for non-ENMAX projects are outlined below.

If...	Then...
Damage to ENMAX Infrastructure	Call Trouble Dispatch at 403-514-6100 or Project Inspector Reference Section 2.7 Procedure - If Damage Occurs .
Engineering supports are required for pull boxes, transformers, duct banks, cables, and cables in duct of 1.2 m and longer	Submit stamped engineering drawings to hotdigs@enmax.com a minimum of 14 days prior to planned excavation facility support approval. Reference Appendix D
Work is within 2 m (6'-6") of ENMAX facilities	Complete the steps below a minimum of 5 days prior to planned excavation. <ol style="list-style-type: none"> Notify lineinspection@enmax.com for intent to excavate. If deemed necessary, complete the ENMAX Temporary Disconnect/Reconnect Form for ground grid protection around transformers, rigging and slinging of cables, or isolation and grounding where practicable. If required, request a Minor Service order to schedule ENMAX personnel to complete the request.
Anchor and guy removal	Request a Minor Service Order (MSO) to schedule ENMAX personnel to complete the request. Email the following: <ul style="list-style-type: none"> • lineinspection@enmax.com • EPCFieldServicesMSOs@enmax.com
Backfill inspection	Follow the process in Section 2.6 Backfill .

2.5 COMPLETE GROUND DISTURBANCE

Perform ground disturbance Complete ground disturbance in accordance with this Guideline; requirements include:

- [Appendix A – Safe Work Practices](#)
- [Appendix B – Conflict Zone](#)
- [Appendix C – Excavation Methods](#)
- ENMAX Permission Letter - instructions and restrictions conveyed by ENMAX

Approved By:	Title	Date Approved
Chris Smith	Director, Safety and Environment	December 18, 2023
Dean Battershill	Manager, Operational Safety	December 18, 2023

2.6 BACKFILL

Notifications

Notify the following PRIOR to backfilling the site.

If work is for		Then contact the following PRIOR to backfilling...	
ENMAX		Project Inspector to arrange for inspection	
Other	MON-FRI between 06:00 and 16:00	Damage Prevention Dept. at LineInspection@enmax.com	
		After hours	Trouble Dispatch at 403-514-6100 to arrange inspection

Specifications

Material	Requirements
Bedding sand	Covers the facilities to a minimum depth of 200 mm (8"), and free from: <ul style="list-style-type: none"> • Snow and ice • Organic material • Loam • Stones larger than 5 mm (1/5") NOTE: Excavators are required to provide compaction test results to ENMAX, if requested.
Common backfill	Placed on top of the bedding sand. Material must be free from: <ul style="list-style-type: none"> • Snow and ice • Organic material • Loam • Boulders larger than 200 mm (8") NOTE: Common backfill compaction must comply with The City of Calgary specifications to a minimum of 95% proctor dry density.



NOTE: Restore final grade to ensure the burial depth of ENMAX cables has not changed. Contact your ENMAX Inspector if a rise or fall in the final grade exists **PRIOR** to excavation and backfill to record the new grade. For all others, call 403-514-6100

Spacing

Backfill requirements for cables and ducts are shown below. See [APPENDIX D](#) for NOTES referenced below.

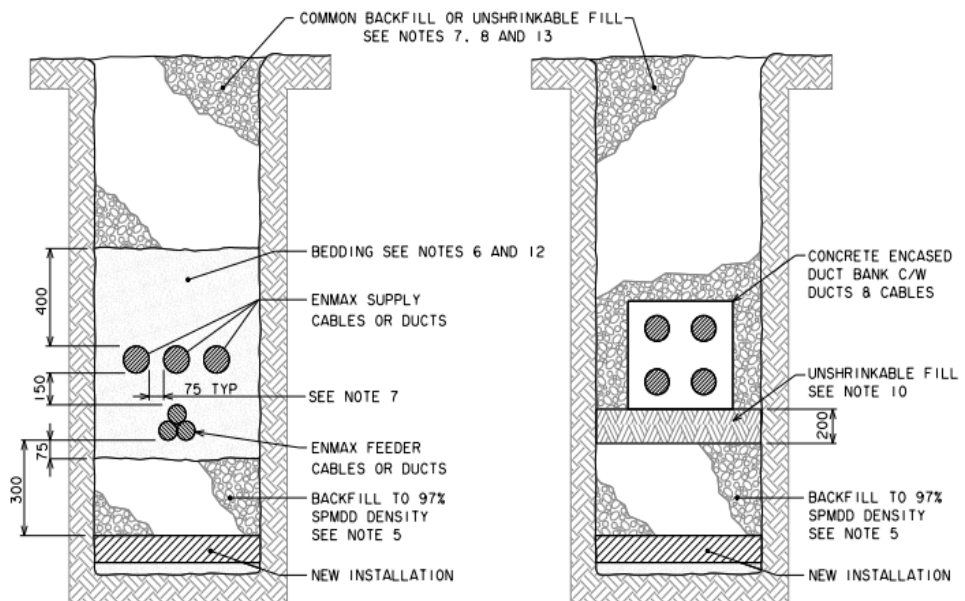




FIGURE 2
BACKFILL REQUIREMENTS FOR
CABLES AND DUCTS

FIGURE 3
BACKFILL REQUIREMENTS FOR
CONCRETE ENCASED DUCT BANK

NOTE: ALL DIMENSIONS ARE
MINIMUM REQUIREMENTS

Approved By:	Title	Date Approved
Chris Smith	Director, Safety and Environment	December 18, 2023
Dean Battershill	Manager, Operational Safety	December 18, 2023

	GROUND DISTURBANCE GUIDELINES	
	If using a printed version, verify it is the most current version prior to use.	SAFETY COUNCIL EFFECTIVE DATE: 2024-Aug-19

NOTES:


1. Backfill material over new installation shall be compacted to 97% SPMDD
2. When gravel is used as backfill over the new installation. Filter fabric shall be placed over the gravel providing separation between gravel and sand bedding.
3. Sand shall be compacted to 97% SPMDD or 70% relative density as per ASTM D2922 or D4254 respectively.
4. Unshrinkable fill may be used as a substitute for common fill but must meet the following requirements:
 - i. Maximum 28 day strength 0.5 MPA (70 PSI)
 - ii. 5% air entrainment +/- 1%
 - iii. Slump – 175 mm +/- 25 mm
 - iv. Maximum set time – three hours (before additional backfill and compactions).
 - v. Unshrinkable fill temperature shall be maintained between 10 C and 25 C for a period of three hours after placement.
5. Sand bedding is not required around concrete encased duct banks
6. Common fill shall be compacted to 97% SPMDD in uniform layers not exceeding 300 mm when compacting with hand tamping equipment and 600 mm when using hydraulic equipment.
7. Minimum bedding cover and separation between direct buried cables shall be maintained in accordance with Figure 2.
8. Sand shall be compacted in layers not exceeding 300 mm.

2.7 PROCEDURE – IF DAMAGE OCCURS



Procedure

If damage occurs complete the following steps:

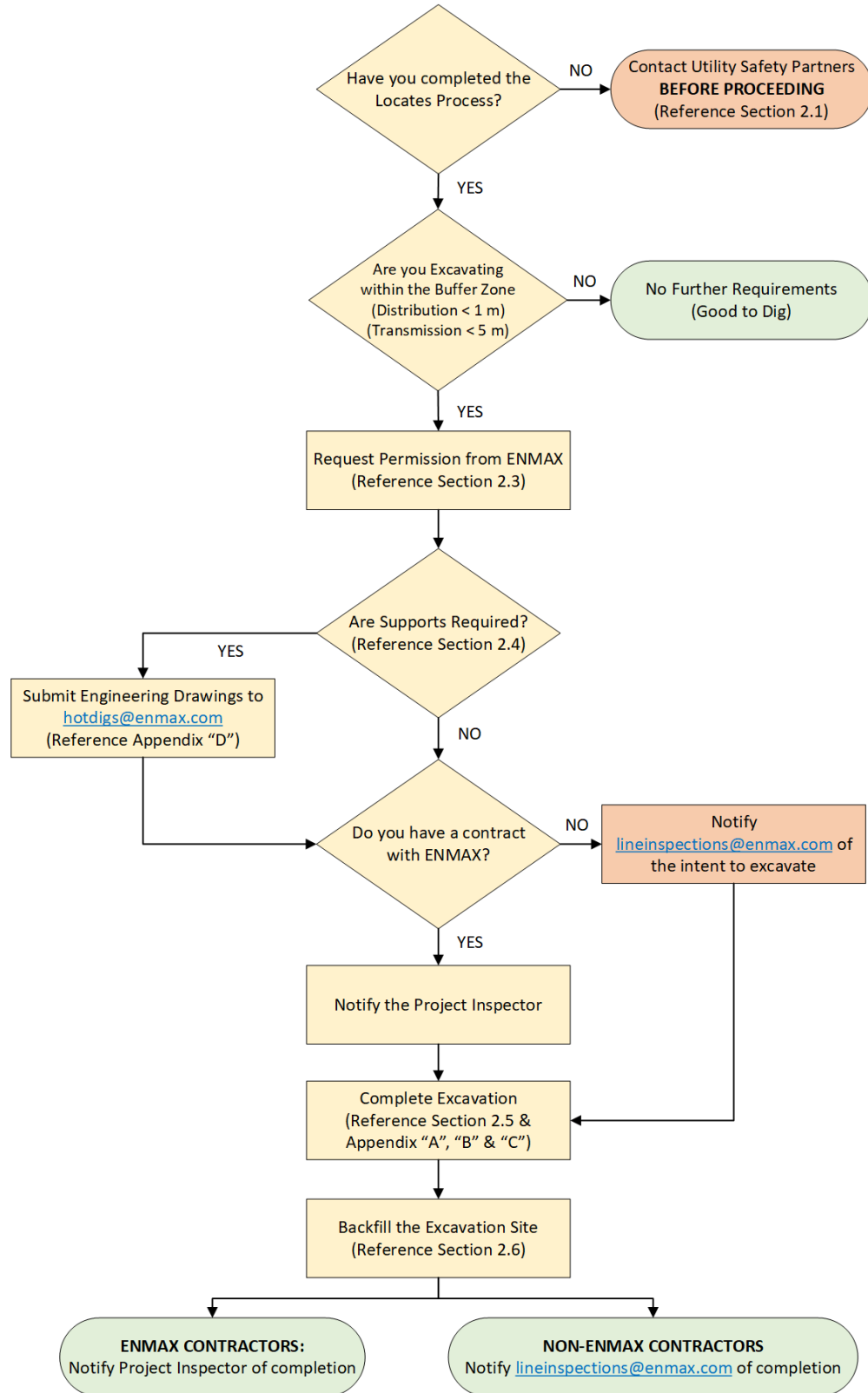
Step	Action
1.	STOP WORK!
2.	Exit the work site immediately.
3.	Call 911 if an injury has occurred.
4.	Secure the site; use appropriate signs, barriers, or barricades.
5.	Contact ENMAX Trouble Dispatch at 403-514-6100, and the Project Inspector if required.
6.	Call 1-800-242-3447 to submit a damage ticket and complete online reporting via Utility Safety - Damage Reporting





WARNING: Do **NOT** re-enter the excavation site until clearance has been given and repairs have been completed by an ENMAX QUE.
 Repairs can **ONLY** be completed by ENMAX personnel and approved ENMAX contractors.

	GROUND DISTURBANCE GUIDELINES	
	If using a printed version, verify it is the most current version prior to use.	SAFETY COUNCIL
		EFFECTIVE DATE: 2024-Aug-19

2.8 GROUND DISTURBANCE PROCESS FLOWCHART



	GROUND DISTURBANCE GUIDELINES	
	If using a printed version, verify it is the most current version prior to use.	SAFETY COUNCIL
		EFFECTIVE DATE: 2024-Aug-19

APPENDIX A – SAFE WORK PRACTICES

Barriers and barricades


Excavators are responsible for the following:

- **Prevent** exposed energized equipment and cables from public contact
- **Restrict** access to all open excavations during periods of inactivity (unsupervised); may include a cover, barricade, **1.8 m (6') rigid fence**

Personal protective equipment (PPE)

A minimum of the following PPE is required for all ground disturbance activities within the buffer zone; for hand exposing only.

Reference AB OH&S Part 18.


Protective clothing	Fire resistant outer layer clothing, ankle to cuff NOTE: HRC 2 (8 Cal/ cm ²) minimum
Safety glasses	CSA Z94.3 Eye and Face Protectors with a minimum IR rating of 1.7
Rubber gloves	Tested - Class 3 high voltage rubber insulated gloves (rated at 30,000 volts) with outside leather protectors.
Head protection	CSA Approved Class E Hard Hat
Hearing protection	CSA approved hearing protection (if required)
Footwear	CSA approved dielectric footwear with the following symbols: 



Warning signs

If the job site and equipment are left unsupervised, signs in accordance with the excavator's procedures **MUST** be visible. Minimum information to include:

- Caution or Warning of open excavation
- Name of ground disturber
- Emergency contact number

“**DANGER HIGH VOLTAGE**” sign must be located a minimum of **3 m (9'-10")** from the truck to reduce the risk of injury from step and/or touch potential.

	WARNING: Do NOT touch any vehicles while excavating is in progress to avoid touch potential (electrocution may occur).
-------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------

	GROUND DISTURBANCE GUIDELINES	
	If using a printed version, verify it is the most current version prior to use.	SAFETY COUNCIL
		EFFECTIVE DATE: 2024-Aug-19

APPENDIX B – CONFLICT ZONE

Shallow primary and secondary cables



Mechanical excavation is **NOT** permitted within the **1 m (3'-3")** buffer zone until the underground facilities have been fully exposed to sight and a minimum of **600 mm (24")** separation above, below, and parallel to the facility or desired depth using non-destructive excavation techniques.



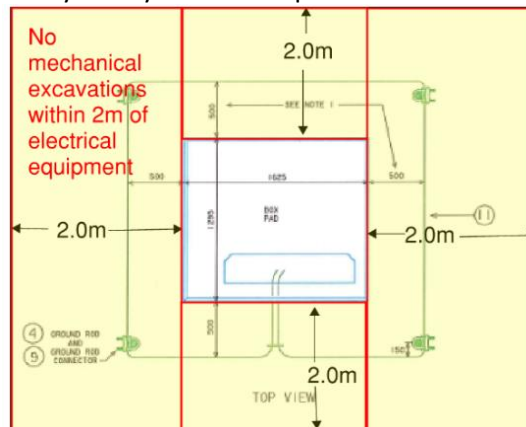
WARNING: Shallow electrical facilities may exist directly underneath the asphalt or concrete sidewalks; therefore, asphalt and concrete cutting and removal directly over a marked facility is **NOT PERMITTED** until the depth of the facility is exposed to sight. Confirm the depth and position under the asphalt **PRIOR** to saw cutting across the facility. See [2.1 Asphalt Removal](#).

Underground transmission equipment and cables

If an ENMAX “**NO CLEARANCE TO DIG**” sticker exists on the locate slip, then mechanical excavation work is **NOT** permitted within **5 m (16'-5")** on either side of the locate mark. Contact **ENMAX Transmission Inspector at 403-514-3679**. Reference ENMAX note located on the back of the Utility Safety Partners ticket for direction.

Above Grade facilities

Mechanical excavation is **NOT** permitted within **2 m (6'-6")** of any ENMAX facilities; use non-destructive methods **ONLY**. Reference ENMAX note located on the back of the Utility Safety Partners slip for direction and notification. Refer to [2.4](#).



Overhead electrical lines

Ground disturbance may occur near overhead electrical lines. The excavator must ensure safe distances to electrical lines and equipment are adhered to; reference [AEUC Table 1 - Safe Limits of Approach Distances from Overhead Power Lines for Persons and Equipment](#) for additional information. This table is also referenced in the following:



- AB OH&S Code - Schedule 4
- AB OH&S Code - Part 17 Overhead Power Lines



NOTE: Personnel and equipment must stay a minimum of **7 m (~23')** from all overhead lines.

Contact one of the following if work is required closer than **7 m (~23')** for LOA:

If...	Then contact the following to arrange an inspection
ENMAX Project	Project Inspector
Mon thru Fri 6 AM to 4 PM	Damage Prevention - LineInspection@enmax.com
After hours/weekends	Trouble Dispatch at 403-514-6100

	GROUND DISTURBANCE GUIDELINES	
	If using a printed version, verify it is the most current version prior to use.	SAFETY COUNCIL
		EFFECTIVE DATE: 2024-Aug-19

APPENDIX C – EXCAVATION METHODS

1. AIR EXCAVATION METHOD

Minimum equipment specifications

Air excavation uses pressurized air that is used to slough away soil and is subsequently collected by a vacuum tool such as an Air Spade.

At a minimum, when using air excavation ensure that:

- Air pressure does **NOT exceed 100 psi**
- Vacuum dig tube end has a neoprene lip or equivalent
- Non-conductive wand, tube, and hose extensions



CAUTION: Any air pressure above the listed values is considered a destructive means of excavating.

Potential risks to facilities

Cable damage may occur if falling rocks or sloughing material contact exposed cables or ducts. If damage is suspected, reference [Section 2.7 Procedure - If Damage Occurs](#).

Minimum safety precautions

Ensure the following minimum safety precautions when exposing cables using air excavation:

- Do **NOT** allow the wand to become stationary
- Make a sweeping motion during use perpendicular to the cables (vs. lengthways); this eliminates stationary contact with the cable at the end of each sweep
- After the buried facility is exposed, maintain a minimum distance of **175 mm (7")** between the cable and the wand nozzle
- Avoid positioning the vacuum tube directly over exposed facilities



WARNING: The air wand and vacuum pipe may become energized if faulted conditions exist.

2. HAND EXPOSURE METHOD

Minimum equipment specifications

Ensure the following **minimum** requirements when using shovels to hand expose underground cables:

- Shovels have dry, non-conductive handle
- Pointed probes that may pierce the cables are not used

Potential risks to facilities

Cable damage may occur if the shovel hits the cable. If damage is suspected, reference [Section 2.7 Procedure - If Damage Occurs](#).



Minimum safety precautions

Ensure the following minimum safety precautions when exposing cables with a shovel:

- Use PPE as per [APPENDIX A](#)
- Expose cables to sight at regular intervals (minimum of 5 m)
- No mechanical means within 600 mm (24") once line is exposed
- Use extreme caution when working within **1.5 m (~5')** of any cable splices.
- During business hours notify lineinspection@enmax.com or Project Inspector to arrange for inspection prior to backfilling.
- After hours contact ENMAX Trouble Dispatch at **403-514-6100**.



WARNING: Do not move, walk on, or disturb cable splices while hand exposing cables.


	GROUND DISTURBANCE GUIDELINES	
	If using a printed version, verify it is the most current version prior to use.	SAFETY COUNCIL EFFECTIVE DATE: 2024-Aug-19

3. HYDROVAC METHOD

Minimum equipment specifications

At a minimum, when using hydrovac, ensure:

- Water pressure does **not exceed 1500 psi**
- Water temperature does **not exceed 37.8 ° C (100 ° F)**
- Vacuum pipe end has a neoprene lip or equivalent to protect the cable/facilities
- There is a single oscillating tip nozzle
- The wand is always moving



CAUTION: Any pressure or temperature variances above the listed values is considered a destructive means of excavating.


Potential risks to facilities

A combination of the water temperature and pressure may damage cables. Damage may appear as a slice in the cable sheath of an unknown depth, or as though the outer sheath has been torn and pulled outward. If damage is suspected, reference [Section 2.7 Procedure - If Damage Occurs](#).



Minimum safety precautions

Ensure the following minimum safety precautions when exposing cables with hydrovac:

- Expose cables to sight at a minimum of **5 m (~16')** intervals to verify line orientation and depth consistency
- Direct the high-pressure nozzles in a circular motion
- Do NOT allow the wand to become stationary
- Make a sweeping motion during use perpendicular to the cables (vs. lengthways); this eliminates stationary contact with the cable at the end of each sweep
- After the buried facility has been exposed, maintain a distance of at least **175 mm (7")** between the cable and the oscillating head of the water wand
- Avoid positioning the vacuum tube directly over exposed facilities
- Avoid leaving excess water in the trench



WARNING: The water, wand, and vacuum pipe may become energized if faulted conditions exist.

	GROUND DISTURBANCE GUIDELINES	
	If using a printed version, verify it is the most current version prior to use.	SAFETY COUNCIL
		EFFECTIVE DATE: 2024-Aug-19

4. DESTRUCTIVE EXCAVATION AND DIRECTIONAL CORING


Equipment

Includes the following equipment after a facility has been exposed to sight:

- Auger
- Directional drills
- Ditch witch
- Dozer, grader
- Hammer (electric, hydraulic)
- Plows
- Pneumatic jack hammers
- Post pounders
- Saw (asphalt, concrete)
- Scrapers
- Skid steers
- Track or rubber tire hoe

Potential risks to facilities

Destructive excavation methods have the potential to damage underground equipment and buried facilities. If damage is suspected, reference [Section 2.7 Procedure](#).



WARNING: If any part of the equipment contacts an energized cable, the equipment operator **MUST** remain on the machine (if safe to do so) until given a clearance from an ENMAX QUE.


Minimum safety precautions

Ensure the following minimum safety precautions when directional coring or using other destructive excavation methods:



- Observe the payload when pulling back through the excavation
- Maintain **1 meter** of separation / clearance above, below, and parallel to the cable / facility
- Expose cables to sight at sufficient intervals to maintain separation (typically every 5 m but it may vary based on site specific conditions)
- Spotters **MUST** always be present when using excavation equipment
- Calibrate all tools and ensure strike indicator is operational



Shallow Cables in Downtown Network



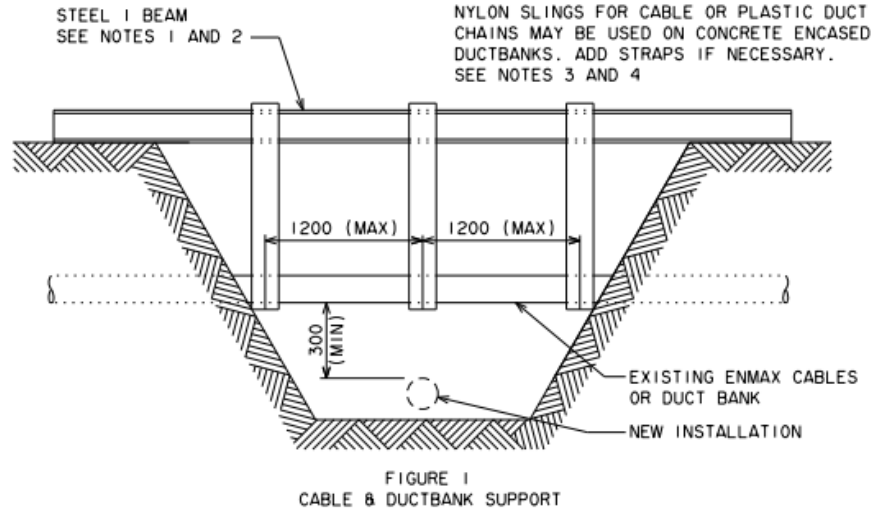
CAUTION: When crossing all facilities expose the facilities to sight **AND** a minimum of **1 m (3'-3")** exposed on the drill side **PRIOR** to mechanical excavation or drilling. This allows the operator time to stop the task if the drill head approaches the cable/duct.

	GROUND DISTURBANCE GUIDELINES	
	If using a printed version, verify it is the most current version prior to use.	SAFETY COUNCIL
		EFFECTIVE DATE: 2024-Aug-19

APPENDIX D – ENGINEERED SUPPORT REQUIREMENTS



Cable/duct bank support

SUPPORT SYSTEM REQUIREMENTS FOR ENMAX CABLES is available here. See NOTES below:



NOTES:

1. The actual size of support beams and slings shall be the responsibility of the contractor. The support system shall be designed to prevent sag, bending or deflection in cables or duct banks.
2. The contractor shall be responsible for ensuring no damage to cables, ducts or duct banks takes place while employing the support system. Any damage shall be reported to the ENMAX inspector immediately. Work will not continue until the ENMAX inspector has given approval.
3. The beam shall be in the form of a steel "I" beam set across the excavation running parallel with ENMAX cables or ducts. The beam must adequately support the cable or duct bank.
4. The contractor shall be responsible for supplying all material. Labour and equipment required to implement an adequate support system.



	GROUND DISTURBANCE GUIDELINES	
	If using a printed version, verify it is the most current version prior to use.	SAFETY COUNCIL EFFECTIVE DATE: 2024-Aug-19

Underground facilities

Excavators supply the following to support cables, duct banks, transformers, switches, manholes, vaults and pull boxes in underground facilities subject to ENMAX's approval.


Supports	Requirements
Beams and poles	<ul style="list-style-type: none"> Steel "I" beam (excavator to determine the size) <p>NOTE: Submit stamped engineering drawings to Hotdigs@enmax.com</p> <ul style="list-style-type: none"> Place across the excavation parallel with the undermined facility Design to prevent sag, bending, and deflection Sufficient length to reach a minimum of 3 m (9'-10") beyond the edge of the excavation (on both sides) Supporting structure will not slough into the excavation due to unstable soil conditions
Chains	<ul style="list-style-type: none"> Support concrete encased duct banks
Slings	<ul style="list-style-type: none"> Direct buried cable or ducts must be supported by nylon slings Must be properly rated to hold the structure
Transformers, switches, manholes, vaults and pull boxes	<ul style="list-style-type: none"> Must NOT be undermined and must be supported Contact lineinspection@enmax.com to determine next steps. Engineered support system may be required as a submission to brace / support



	GROUND DISTURBANCE GUIDELINES	
	If using a printed version, verify it is the most current version prior to use.	SAFETY COUNCIL
		EFFECTIVE DATE: 2024-Aug-19

Power poles

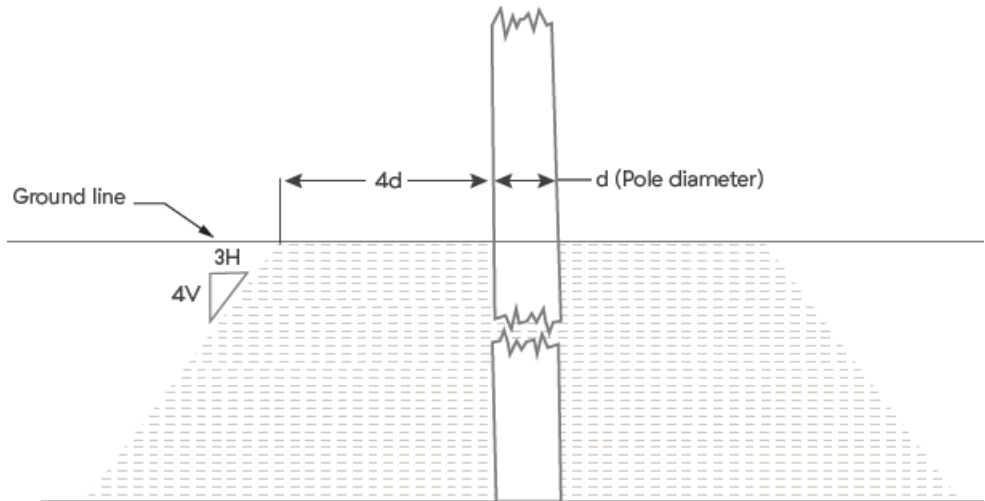
ENMAX requires excavators to stabilize poles and associated equipment, where required below, prior to any ground disturbance.




WARNING: The collapse of a power pole could expose individuals to a crush hazard or electrocution.

Poles must be supported if:

- The soil is not firm
- Excavation occurs within the **shaded protected zone** shown in the illustration below







NOTE: The **shaded protected zone** encompasses the following area:

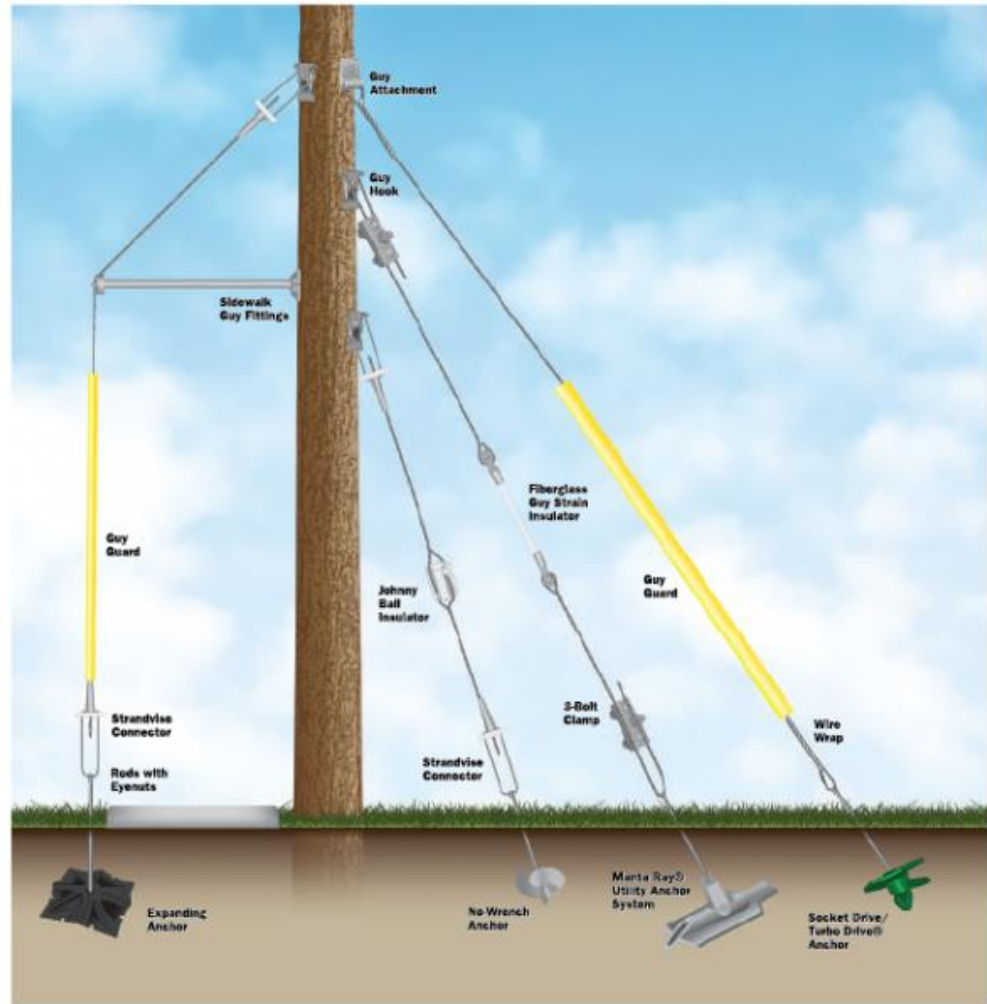
- At grade: 4d (4 times the pole diameter) away from the pole
- Below grade (cut angle): **3 m (9'-10")** horizontal to every **4 m (~13')** depth

All excavations and slope cuts must be in accordance with the following AB OH&S Code:

- Part 17 Limits of Approach
- Part 32 Pole Support

	GROUND DISTURBANCE GUIDELINES	
	If using a printed version, verify it is the most current version prior to use.	SAFETY COUNCIL
		EFFECTIVE DATE: 2024-Aug-19

Guy Wires and Anchors



- Guys and/or anchors need to be temporarily removed and replaced (contact lineinspection@enmax.com)

Requirements

Excavators must contact the following:



- ENMAX approved pole tie back vendor for availability and cost
- Damage Prevention Dept. at Lineinspection@enmax.com during business hours
- For after hours - Trouble Dispatch at **403-514-6100** if questions/concerns arise

NOTE: A QUE must complete all pole tie backs.

Pole tie back vendors

ENMAX approved pole tie back vendors with an ENMAX approved QUE are listed below.



Tie-back Vendor	Phone Number	Email
Iconic Power Systems	403-899-8318 403-542-4670	info@iconicpowersystems.ca ; jmackay@iconicpowersystems.com
Primary Engineering	403-333-7099	RCoulter@primaryeng.com
Valard Construction	403-700-0982 403-710-7099	KRyan@Valard.com ; mchappell@valard.com

	GROUND DISTURBANCE GUIDELINES	
	If using a printed version, verify it is the most current version prior to use.	SAFETY COUNCIL EFFECTIVE DATE: 2024-Aug-19

APPENDIX E - REVISION HISTORY

This document is reviewed a minimum of **every year** or as required.

Rev.	Date	Revision History
1.0	October 11, 2017	New document
2.0	March 30, 2020	Reviewed by stakeholders; updated format
3.0	January 15, 2021	<ul style="list-style-type: none"> • Added reference to Primary Switch Disconnect Reconnect Form • Minor edits
3.1	June 15, 2021	<ul style="list-style-type: none"> • Updated Section 2.5 • Replaced Senior Line Inspector with Damage Prevention Dept. • Added QR Code • Updated “Pole tie-back vendors”
4.0	February 1, 2022	<ul style="list-style-type: none"> • Updated references in Appendix B section “Overhead electrical lines” • Added a link to AEUC
5.0	December 22, 2022	<ul style="list-style-type: none"> • Stakeholder review November 10th, 2022 • Updated Alberta One-call to Utility Safety Partners • Updated the term Conflict zone to include “...of any ENMAX Underground Transmission 69-kV or 138-kV cables” • Updated the Primary Switch Disconnect Reconnect Form to Temporary Disconnect/Reconnect Form • Updated NOTE in Section 2.1. • Updated CAUTION in Section 2.1. • Added Step i to Section 2.4 to notify lineinspection@enmax.com • Added Step #6 to 2.7 PROCEDURE – IF DAMAGE OCCURS • Added a requirement to safety glasses - minimum IR rating of 1.7 • Updated WARNING in Appendix B Conflict Zones • Removed Altec from the Pole tie back vendors list • Added APPENDIX E - ENMAX CONSTRUCTION STANDARDS
5.1	February 2, 2023	<ul style="list-style-type: none"> • Updated Section 2.4 (shown highlighted for this revision only) • Updated Section 2.6 replaced “During business hours” with specific days and hours
5.2	June 15, 2023	<ul style="list-style-type: none"> • Removed Liam Preston & added new contact for Iconic Pole tie back
5.3	Oct 2023	<ul style="list-style-type: none"> • Added photos in Appendices B, C and D • Added, “to verify line orientation and depth consistency” in minimum Safety precautions. • Added, “of 1.2 m and longer” to Section 2.4 Notification for Excavation Activities • Appendix B- changed Distribution Facilities to Above Grade facilities • Changed Appendix E from Engineered Supports to Engineered Requirements. • In 4. DESTRUCTIVE EXCAVATION AND DIRECTIONAL CORING changed to “Maintain 1 metre of separation / clearance above, below, and parallel to the cable / facility” as well as changed to “Expose

	GROUND DISTURBANCE GUIDELINES	
	If using a printed version, verify it is the most current version prior to use.	SAFETY COUNCIL

EFFECTIVE DATE:
2024-Aug-19

		cables to sight at sufficient intervals to maintain separation (typically every 5 m but it may vary based on site specific conditions) “ to allow for leeway on expensive driveways
	Dec 18, 2023	<ul style="list-style-type: none"> • Added “unless otherwise specified” to the end of the NOTE in Section 2.2 • Updated Flowchart for Section 2.8 • Highlight in Grey- Section 2.4 ENMAX Projects- Contract in Place • Moved plan revision history to updated Appendix E. • Moved information note: re – contacting 911 for emergencies to front cover. • Updated support requirements for ducts and duct banks with notes. • Updated backfill requirements with notes. • Added Anchor and Guy Wire diagram to Appendix D. • Updated procedure in section 2.7 – step #6
6.0	August 19, 2024	<ul style="list-style-type: none"> • Updated supplier list for Pole Tie Back Vendors