

# STANDARD OPERATING PROCEDURE

**Digging and Design of Trenches and Excavations**

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Revision Number: 4

Page 1 of 5


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## DIGGING AND DESIGN OF TRENCHES AND EXCAVATIONS

						
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*The following is a step-by-step procedure on how to complete a specific task or meet a facility specific requirement. Standard Operating Procedures (SOPs) are written for all identified critical tasks. By virtue of the hazard or complexity associated with critical tasks it is paramount that the SOP be followed as written. SOPs contain a listing of high-level hazards associated with the task, for detailed hazard analysis reference the applicable Task Hazard Assessments. SOPs do not replace the requirements contained in the company Standards, Codes, and Processes nor does it replace the need to comply with required legislation. Section 8.0 references documentation that the worker shall understand before work commences.*

## 1.0 PURPOSE

- To establish a company standard to safely and effectively carry out work as it applies to digging and designing trenches and excavations.

## 2.0 SCOPE AND APPLICATION

- This document applies to all Heavy Construction and Mining operations. Ensure all site-specific requirements are being met or exceeded before performing the task.

## 3.0 HAZARDS AND CONTROLS

- Unstable ground conditions leading to personal injury or equipment damage.
  - Trenches and excavations will be designed as per NACG 950C-C-014 Excavations and Trenching Code and in compliance with area legislation.
  - Soils will be stabilized using shoring or cut backs.
  - Cut backs will be designed as per soil type classification when workers are working in trenches greater than 1.2 metres deep.
  - Classification of soil types will be consistent with 950C-C-014 Excavations and Trenching Code and will follow the authority of the jurisdiction for the area the work is being conducted in.
  - Temporary protective structures and shoring will be designed as per 950C-C-014 Excavations and Trenching Code. Temporary protective structures greater than 3 m deep will require design, construction and installation in accordance with the specifications of a professional engineer.
  - Spoil piles will be placed so the leading edge of the pile is at least 1 metre from the edge of the excavation/trench with the slope of the pile no greater than 45 degrees and all loose materials are scaled/trimmed from the spoil pile i.e. rock, lumps.
  - Loose materials will be scaled and trimmed from the sides of excavations or trenches if workers may be on or near the sides.
  - Safe entry and exit points for trenches and excavations will be established. Trenches greater than 1.2 m deep will have entry and exit points located within 8 metres from worker(s).
  - When trenching or excavation work is conducted in the vicinity of power poles, precautions will be taken so as not to reduce the original support provided for the power pole.
- Inadequate guards or barricades causing personal injury or equipment damage.
  - Open trenches or excavations will be sufficiently marked using flagging, barricades, signage, or other appropriate safeguards.

# STANDARD OPERATING PROCEDURE

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Document Number: 962C-SOP-022

Original Approval Date: Oct 10, 2012

Revision Number: 4

Page 3 of 5

Latest Revision Date: June 15, 2022

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- Safe means of access for powered mobile equipment to gain access to the trench/excavation is provided including barricades or barriers high enough to prevent equipment from rolling or sliding into the excavation.
- Unidentified underground utilities causing personal injury or equipment damage.
  - Ensure as-built drawings are current and available. Review drawings with crew prior to work.
  - Where required, secure ground disturbance permits prior to commencing earthwork.
  - Clearly mark all known buried facilities prior to commencement of earthwork.
  - No mechanical excavation equipment will be used within the “hand exposure zone” of a buried facility until the buried facility has been exposed to sight.
  - Spotters will be utilized at all times when working in the vicinity of buried facilities.
  - If a buried facility is encountered during the course of excavation operations, the operator will cease work immediately and contact a supervisor.
  - If equipment comes in contact with a live electrical facility, the operator will remain in the cab until the electrical facility has been de-energized and it is deemed safe to exit the cab.
- Working in a restricted or confined space causing personal injury.
  - Restricted or confined space hazards apply to equipment and personnel working in trenches or excavations.
  - Trenches may be considered a restricted space due to limited access and egress.
  - Excavations and trenches may be considered confined spaces if hazards, in addition to limited access/egress, are identified. These hazards can include, but are not limited to, a hazardous atmosphere.
  - Review and follow 950C-C-029 Hazardous Space Entry Code & 962C-SOP-024 Working in Trenches or Open Excavations to ensure adequate controls are put in place.
  - Where required, conduct initial or continuous atmosphere testing to determine air quality as well as explosive atmosphere conditions. Ensure appropriate confined space permits are put in place prior to workers entering the trench or excavation.
- Hazardous atmosphere causing personal injury and equipment damage.
  - Conduct initial or continuous atmosphere testing to determine air quality and explosive atmosphere conditions as required.
- Working in congested areas causing personal injury or equipment damage
  - Excavators will follow 962C-SOP-023 Excavators Working in Congested Areas.
  - Operators will perform an equipment walk around at the start of shift, after breaks, following repositioning and anytime operator is unsure of proximity of people, equipment or obstacles.
  - Operators will swing to “good side” whenever possible to enhance visibility.
  - Operators will flag swing radius when operating in close proximity to people, other equipment or in high traffic areas.
  - Operators will ground equipment implements when not in operation.

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Original Approval Date: Oct 10, 2012	Revision Number: 4	Page 4 of 5
Latest Revision Date: June 15, 2022	Next Revision Date: June 15, 2025	Document Approval Level: 4

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**Note: If at any time the worker is unsure** about the effectiveness of a control or needs assistance implementing a control, the worker will **contact a supervisor prior to commencing work activities**.

## 4.0 CHECKLIST

- Attend all preparatory meetings (IE: daily PSI; job scope; review of JSA's and SOP's for the job)
- Complete FLRA cards before starting the work.
- Ensure all personnel involved in the task are aware of the hazards and the controls to be used, as identified in the SOP's; JSA's; and FLRA's
- Conduct a pre-job inspection of all equipment to be worked on and tools to be used.
- Standard of Training required for working on this job: On-the job training.**

## 5.0 DEFINITIONS

### 5.1 Company

Means North American Construction Group Ltd. (NACG) and all directly or indirectly owned subsidiary companies, including joint ventures.

### 5.2 Company Personnel

Includes the Company's employees, officers, directors, agents, associates, consultants/contractors, temporary employees, and third-party processors.

### 5.3 HSE

Refers to the Health, Safety & Environment department

### 5.4 Trench

Long narrow dug out area of ground that is deeper than its width at the bottom.

### 5.5 Excavation

Dug out area of ground; does not include tunnel, underground shaft or open pit mine.

## 6.0 PROCEDURE

- 1) Review as built drawings and ensure all known buried facilities have been located and identified.
- 2) Determine scope of work and develop JSA prior to excavating.
- 3) Determine if work area will be deemed a restricted space, confined space or neither.
- 4) Obtain permits as required (ground disturbance, confined space, etc.).
- 5) Identify soil type classification. Disturbed soil will be stabilized as per 950C-C-014 Excavations and Trenching Code (sloping, shoring, cutbacks, temporary protective structures, etc.).
- 6) Operators will review JSA and complete an FLRA prior to commencing excavating activities.
- 7) Operators will conduct a pre-operation inspection of equipment prior to commencement of work.
- 8) Operators will conduct a walk around inspection of equipment at the beginning of shift, after breaks, when repositioning equipment and anytime equipment operator is unsure of proximity to people, other equipment or obstacles.

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<b>Digging and Design of Trenches and Excavations</b>		Document Number: 962C-SOP-022
Original Approval Date: Oct 10, 2012	Revision Number: 4	Page 5 of 5
Latest Revision Date: June 15, 2022	Next Revision Date: June 15, 2025	Document Approval Level: 4

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- 9) Flag swing radius of equipment when working in close proximity to people, other equipment or high traffic areas. Use spotters in areas of limited visibility. Swing to the good side where possible.
- 10) Mark trenches and open excavations with signage, barricades, flagging.
- 11) Establish safe entry and exit points for personnel and equipment.
- 12) Place spoil piles a minimum of 1 metre from the trench or excavation. Piles will not exceed a 45 degree angle from the horizontal.
- 13) Conduct atmosphere testing and monitoring as required.

## 7.0 NOTES

If this task is to be done by a method different than described in this SOP, the work must **STOP** and the alternate method must be **DOCUMENTED** with an adequate hazard assessment tool such as a JSA. The document must be **APPROVED** by a supervisor before such procedures are implemented.

## 8.0 REFERENCES

- Alberta Occupational Health and Safety Act, Regulation and Code – Part 32, Excavating and Tunneling
- 950C-C-014 Excavations and Trenches Code
- 950C-C-029 Hazardous Space Entry Code
- 962C-SOP-023 Excavators Working in Congested Areas
- 962C-SOP-024 Working in Trenches or Open Excavations

## 9.0 APPENDICES

- No appendices.