Excavation and trenching requirements

General excavation requirements

Purpose

The purpose of these requirements are to:

- **Reduce** the risk of excavation and trenching work.
- **Provide** COPA supplemental requirements to the ASH ACWR standard.

Scope

The following is in and out of scope.

In scope	Out of scope
• Excavations. • All COPA operated equipment and facilities.	• ASH Snow Removal Standard. • ASH Confined Space Entry Standard. • Contaminated soil disposal (Red Book).

Excavations 4’ or more in depth

Excavations 4’ or more in depth must be evaluated by a COPA Safety Representative to determine confined space eligibility.

Excavations deeper than 20’0”

Excavations deeper than 20’0” must be designed by a Registered Professional Engineer (RPE).

Soil classification requirements

All excavations are classified as Type C soil by the competent person unless the excavation is designed by an RPE.

Safety practices during excavation

All workers should utilize safety practices during excavations.

- **Keep** any uncovered line visible to the equipment operator.
- **Do not undermine** sidewalks, pavements, or structures.
- **Consider** surrounding infrastructure (Buried pipeline, VSM's, wells, etc.) that may radiate heat or cause vibrations.

Emergency services notification

Emergency Services must be notified of any excavation which may impede access to facilities or drill sites, etc. Alternate traffic routing must be provided where possible.

Excavating below a foundation or retaining wall	If excavating below the level of the base or footing of any foundation or retaining wall complete all the following: • **Use** a support system to help ensure stability. • **Ensure** the excavation is in stable rock. • A registered professional engineer must determine the structure to be unaffected by the excavation activity
Line strike during excavation	**Follow** local emergency action plan if a line strike occurs during excavation.
Be aware for hydrocarbon or other soil contamination	Be aware for hydrocarbon or other soil contamination. If any is observed or smelled: • **Stop** excavation. • **Notify** Environmental Coordinator.
Documentation and recordkeeping	All documentation and excavation inspection records must be retained at least until the excavation is closed.

Protective systems

Sloping and benching in excavations

Competent person must ensure adequate sloping and benching in the excavation.

Sloping and benching	**Slope** excavations at an angle not steeper than 1-1/2 horizontal to 1 vertical unless designed by a RPE and protective systems are in place.

Shield system requirements

Competent person must not allow workers inside shields when shields are being installed, removed, or moved and ensure shield systems meet the following requirements.

Shielding	• **Install** to restrict lateral or other movement in the event of sudden lateral loads. • **Protect** workers from cave-in when entering or exiting • **Only permit** excavations to a level greater than 2-feet below the bottom of a shield if the shield is designed to resist the forces calculated for the full depth of the trench.

Design of support or shoring systems

Shoring or support systems must meet the following requirements.

Shoring.	• **Use** timbers or aluminum hydraulic shoring based on soil classification and OSHA data. • **Provide** support systems if excavation compromises the stability of adjoining walls, or structures. • **Use** other designs based on manufacturer's data. • A system designed by a registered professional engineer.

Storing materials and equipment

When storing materials and equipment used for protective systems:

- **Evaluate** the materials or equipment for damage before use.
- **Follow** manufacturer recommendations.

Working in and around excavations

Access and egress requirements	Stable access and egress is required for personnel working at any depth. Examples are not limited to: • Ladder, • Stairway Ramp, • Benched steps, • Additional sloping. Provide a means of egress for all trench excavations that are 4-feet or more in depth and within 25-feet of lateral travel.
Ladders in excavation	Ladders in the excavation must meet the following requirements. • Ensure the base is a distance from the support point that is equal to one-fourth the working length of the ladder. • Extend ladders at least 3-feet above the top of the trench. Secure if means are available.
Safety practices when working around excavations	Workers must follow safety practices when working around excavations: • **Establish** adequate barriers and signage around excavations. • **Provide** perimeter barricades, guardrail systems, or covers for excavations greater than 4-feet in depth. • **Cover** open drill holes with plywood at least 1-1/8 inches thick with handles, cones, and appropriate warning markings. • **Restrict** any excavated materials, tools, or equipment from being placed closer than 2-feet from the excavation's edge. • **Provide** retaining devices that help prevent materials or equipment from rolling or falling into excavations. • **Restrict** work on the faces of sloped or benched excavations unless personnel working below are protected.
Requirements for excavations around well head cellars	Excavations around well head cellars have the following requirements: • **Provide** adequate footing at floor level where work is being done • **Cover or fill** wellhead cellars upon completion of work to prevent personnel, equipment, or animals from falling into the cellar

Stopping excavation operations	Stop excavation operations and remove workers when: • There is evidence of possible cave in, • Protective systems fail, • Oxygen-deficient or hazardous atmosphere, • Other hazardous conditions occur. Only allow re-entry when conditions are safe for workers.
Prevent entry into excavation during mechanical digging	Equipment operator/Competent person must ensure workers do not enter excavation during mechanical digging.
Monitor depth of excavation	Equipment operator/Competent person must monitor depth when excavating down to an underground installation.
Excavations within a 3-foot radius of energized lines	The excavation equipment operator/competent person must ensure hand-digging tools, Hydro-Vac, or Non-Mechanical means are used in all directions within a 3-foot radius of energized lines. Energized lines include but may not be limited to: • Electrical Line/Cable, • Utility Line, • Communication Line, • Pipeline, • Pit/Curtain Line, etc. Once the line is de-energized, mechanical means may be used provided it is first located by non-mechanical means.

Excavation Inspections

Inspection requirements

Excavation inspections must:

- Be conducted at least daily by the Competent Person.
- Include the excavation, adjacent area, and protective systems.
- Be conducted after rainstorm/snowstorm and other hazard-increasing occurrences.
- Be conducted if there is any indication of thawing conditions in permafrost soils.
- Be documented on the Guide for Daily Inspection of Trenches and Excavations Form.
- Be stored on location in a weather resistant location for reference by all crews. Remove and file the previous day's inspection until the excavation is closed.

Inspections are valid for 24 hours unless conditions change.

NOTE: For excavations 4 feet or less the Competent Person must conduct and document a risk assessment to evaluate the need for a daily inspection.

Excavation atmosphere requirements

Prevent worker exposure

Prevent worker exposure to the following hazards.

Oxygen	LEL	CO	H2S	Benzene
Less than 19.5% or greater than 23.5%	Above 10% LEL	Above 25 ppm	Above 10 ppm	Above 0.25 ppm

Ventilation

Provide proper ventilation for the excavation.

Atmospheric testing

Conduct atmospheric testing as often as necessary. Follow ASH Confined Space Standard before allowing workers to enter any excavation or trench if testing indicates hazardous atmosphere conditions.

Water hazards in excavations

Water accumulating in excavation	Only allow workers in an excavation with water accumulating if the precautions are taken. Examples of precautions include: • Special support or shield systems designed by a qualified person to protect personnel from cave-ins • Water removal equipment; and • Monitoring water removal equipment and its operation throughout entry. Soil is usually classified as Type C when there is water accumulation.

Leaks and contaminated soil

Excavations with spilled product or contaminated soil	Make every attempt to remove spilled product or other hazardous material from the work site before excavation begins. Only allow personnel and equipment in the excavation after the contaminated area has been clearly defined. • **Conduct** risk evaluation before entry. • **Provide** appropriate PPE and ventilation before entry • **Dispose** of contaminated soil in compliance with the Alaska Waste Disposal and Reuse Guide (Red Book). Contact FEC with questions.

Backfilling and cleanup requirements

Requirements prior to backfilling	Contact the surveying contractor prior to backfilling a trench or excavation where new utilities or items are installed. • The trench must be as-built showing location, depth and description of buried items before backfilling. • Consider use of identification marking above buried items.
Tamp and level backfill after excavation completion	Tamp and level backfill excavation after completion to eliminate safety hazards.

Conventional snow excavations and water washing for worker entry

Snow excavation/water washing in north slope operations

OSHA regulations do not fully address snow excavation or water washing that are used in north slope operations. Criteria and mitigations have been developed by an RPE. Additional details are found in this white paper.

October 15th – April 1st effective dates

The slope and setback requirements in this section are effective between October 15th to April 1st.

Required risk assessment

Water washing excavations require a risk assessment based on depth.

Less than 4-feet in depth	4-feet in depth or deeper
• **Conduct** a risk assessment. • **Specifically evaluate and document** the need for a daily inspection by Competent Person.	• Competent Person must **inspect** and **approve** before allowing workers to enter it. • **Include** verification that any water-washed walls are frozen.

Required excavation plan

Develop an excavation plan that addresses:

- Depth/size to complete work,
- limits,
- entry/exit locations and access,
- side slopes,
- clearances,
- locations of all structures,
- excavation method.

Ladders in excavation

Position any ladders to allow access and egress no more than 25-feet from workers in the excavation.

Water washing to remove snow

When water washing to remove snow

- **Complete** THA before beginning work
- **Ensure** Operator is at a safe location
- **Allow** at least 12 hours for water-washed snow to re-freeze
- **Place** barricades around perimeter or use other measures to delineate the excavation.

Excavation walls - clearances and maximum slopes

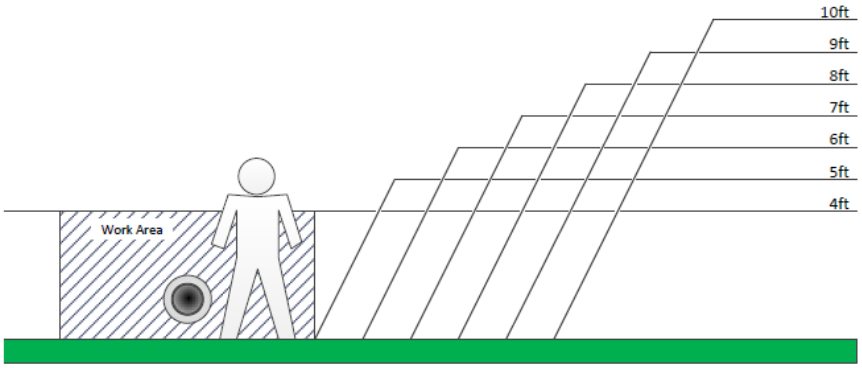
Slope excavation walls and provide clearance.

Excavation less than 4-feet deep	Excavation 4-feet or deeper
• **Slope** walls or make vertical. • **Locate** walls where required.	• **Slope** walls at 1/2:1 or less • **Locate** walls to provide clearance, as specified in the below, between each wall and the work area.

Excavations 4' or more in depth must be evaluated by a COPA Safety Representative to determine confined space eligibility.

Excavation clearance table

Follow this table for excavation depth and required clearance.

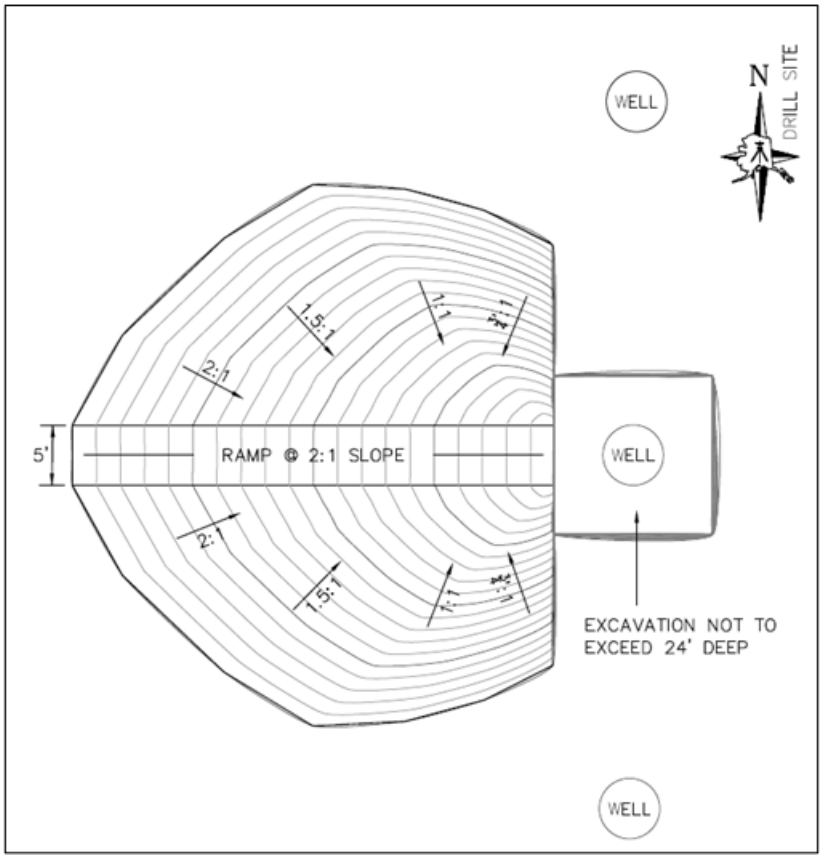


Depth of Excavation (Feet)	*Required Clearance (Feet)*
Less than 4	0
4-5	1.5
5-6	3
6-7	4.5
7-8	6
8-9	7.5
9-10	9
Greater than 10	RPE approval required.

Well bonded frozen soil excavations for casing repairs and plug & abandonment work

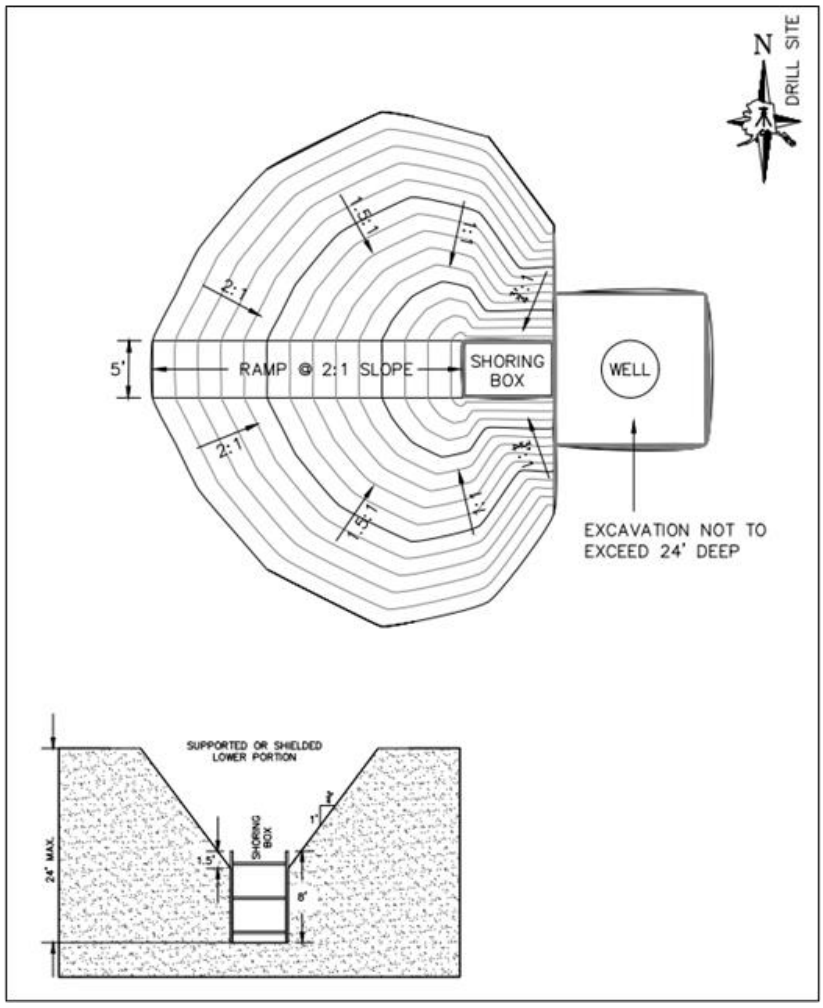
Classifying well bonded frozen soils	A registered professional engineer (RPE) has developed conditions linked here to classify well bonded frozen soil as type A from October 15th to April 1st for excavations less than 24 feet in depth.
Excavations around the well head	Use RPE certified protective systems for excavations around the well head.
Excavation access/egress point figure 1	Excavation access/egress point must have an engineered protective system as shown below in Figure 1 or meet the requirements in Figure 2 on the next page.

Figure 1



Excavation access/egress point figure 2

Figure 2



Inspection and documentation by Competent person

Competent person must perform classification and inspection for each excavation location.

- **Inspect** excavations up to 24 feet in depth at each 1-foot vertical layer to determine that each layer is frozen and will stand vertical under the excavated conditions.
- **Test** each 4-foot vertical layer for compression and chipping to determine that there are no layers of weaker underlying soils. This test must be documented in a soils excavation log and depth chart specific to the location.
- **Document** each excavation location in a separate soils log and depth chart.