
 Marathon Petroleum Company LP		REFINERY-WIDE		R-11-013
ANACORTES REFINERY		Excavation, Trenching, and Shoring		Page 1 of 12
RESPONSIBLE DEPT.	CONTENT CUSTODIAN	APPROVED BY	LEGACY NUMBER:	
HES&S	Zac Nightingale	Mike McClure	SR-17	
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1.0 INTRODUCTION

1.1 Purpose

This document establishes procedures to protect personnel, utilities, and the environment during excavation operations in alignment with Tesoro Corporate Regulation TSHS-005. Washington Administrative Code (WAC) 296-155, Part N sets the criteria for this document and should be consulted whenever a question arises. A copy of the WAC may be obtained from the Safety group.

1.2 Scope

- This document applies to all excavations (see definition), whether or not personnel entry is involved.
- This document applies to concrete penetrations where utilities may be embedded.
- This document does not cover underwater excavations.
- Contractor companies are required to have a management system to show compliance with Anacortes site policies for excavation, trenching and shoring. This system must have provisions to allow for auditing.

2.0 DEFINITIONS

The following definitions are applicable to this procedure.

Table 1 Definitions

Term	Description
Affected Person	Affected by the work being done; may be an employee, contractor or an outside person.
Benching	This is a method of protecting employees from cave-ins by shaping the sides of an excavation to form one or a series of horizontal levels or steps, usually with near-vertical surfaces between levels.
Competent Person	One who has had specific training in and is knowledgeable about, soil analysis, the use of protective systems and requirements of the standard. He/she must also be capable of identifying existing and predictable hazards in the surroundings or working conditions that are hazardous, unsanitary, or dangerous to employees, and must have the authority to take prompt corrective measures to eliminate them. This may be same as the responsible person.
Cribbing	A box-shaped framework constructed with layers of overlapping horizontal timbers.
Entry: Confined Space	Action which may require a person to place their head below the plane of the excavation and/or the body to pass through an opening into a confined space. Entry includes work activity in the confined space and occurs as soon as the head or body breaks the plane of the opening.

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Table 1 Definitions

Term	Description
Environmental Health and Safety Representative	A person who is trained in EHS subject matter. This person may be a Tesoro or contract employee.
Excavation	Digging, trenching, pile driving, boring, horizontal directional drilling, pipe bursting, pipe jacking, blasting, or any method of creating a depression in the earth of 12" or more.
Registered Engineer	Professional engineer registered in the state where the work is to be performed.
Responsible Person	The person who initiates the excavation process and the initial excavation forms. This person could also be the Competent Person.
Shield	A structure that is able to withstand the forces imposed on it by a cave-in and thereby protect employee within the structure. Shields can be a permanent structure or can be designed to be portable and moved along as work progresses. Shields used in trenches are usually referred to as "trench boxes" or "trench shields".
Shoring (Shoring System)	A structure such as a metal hydraulic, mechanical or timber shoring system that supports the sides of an excavation and which is designed to prevent cave-ins.
Sloping (Sloping System)	A method of protecting employees from cave-ins by excavating to form sides of an excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors as the soil type and environmental conditions of exposure.
Trench	Narrow excavation made below the surface with the depth generally greater than the width. The width is generally not more than 15' measured at the bottom.

3.0 ROLES AND RESPONSIBILITIES

3.1 The Responsible Person shall:

- Complete the Excavation Approval Form (Attachment 5).
- Review all permits to ensure the work is clearly defined and can be performed safely.
- Alert all affected persons in the area of the work to be completed.
- Specify any restrictions, precautions, and/or approvals which may be required.
- Ensure an onsite person is identified and responsible for the safety of personnel, all safety equipment required is in place and personnel are trained in its proper use.
- Arrange for stand-by personnel as needed.
- Inform those performing the work of the boundaries, work precautions, restrictions, and conditions.

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- Make final inspection of the job site, along with the person doing the work, to ensure all permit conditions are met.
- Ensure the work is performed under the direct supervision of a Competent Person if other than self.

3.2 The Competent Person shall:


- Determine soil type and required protective system to prevent cave-in. Assume Class C type soils unless otherwise determined.
- Review the job plan to ensure all precautions have been considered.
- Complete the Daily Excavation Checklist (Attachment 4) and make periodic inspections of the site to for conditions which may result in permit changes, or other unsafe conditions.
- Ensure that the applicable permits will be renewed daily, or often as the conditions dictate.
- Stop a job whenever conditions become unsafe.
- Ensure proper access and egress.
- Ensure walkways, ramp, bridges, ditches over which workers or equipment are required to crossover be provided with standard guardrails.

4.0 GENERAL EXCAVATION REQUIREMENTS

- Initiate the excavation approval form (Attachment 5), and complete "Excavation activity to be performed" section.
- Excavation Approval form is only valid for the duration of the project.
- Review the job site, overhead obstructions and develop proper safeguards. Obtain information for buried utilities within 5' of the excavation. Complete the excavation approval form and applicable work permit(s).
- All drawings to be marked with the specific project location that excavation will take place.
- Consult with the permit coordinator to determine if outside agency permits are required. Contact a Tesoro Environmental representative if work is located with 200' of the shoreline. Arrange for required city, state or local permits to close and/or reroute traffic on public roads.
- Stop all work if excavated material appears to be contaminated with hydrocarbons or other chemicals. Contact a Tesoro Environmental representative for further direction.
- Hand dig or probe to identify precise location of the pipelines/ conduits within 3' of excavated surface before use or re-use of power equipment.
 - Contractor companies shall provide their excavation, trenching and shoring procedure, including probing.
- Protect, support, or remove all underground installations while the excavation is open.
- Personnel shall avoid area under loads handled by mechanical equipment. Personnel shall remain clear of any mechanical equipment operations.
- Evaluate any damaged structures and remove unsafe equipment from service.

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- Ensure necessary barricades, posting and lighting is provided for the protection of the employees at the trench or excavation.
- Dust conditions should be kept at a minimum level by the use of water or other safe means.
- All wells, pits, shafts, etc. shall be barricaded or covered. Upon completion of exploration and similar operations, temporary wells, pits, shafts, etc. shall be backfilled or covered.


5.0 EXCAVATIONS INVOLVING ENTRY

In addition to requirements stated in 4.0, the work may continue under the following conditions:

- A Competent Person must be on the job site.
- The required employee protection system per the Daily Excavation Checklist (Attachment 4) is installed.
- A registered engineer has approved the protection system if the excavation is greater than 20' deep.
- The Competent Person may waive the shoring/benching requirement if the excavation is less than 4' and there is no potential for cave-in; or the excavation is made entirely in stable rock that has no potential for collapse.
- A stairway, ladder, ramp or other safe means of egress shall be located in trench excavations that are 4' or more in depth as to require no more than 25' of lateral travel for employees.
- Employees shall not work in excavations in which there is accumulated water, or in excavations where there is water accumulating. The precautions necessary to protect employees against the hazards posed by water accumulation vary with each situation, but could include special support or shield systems to protect from cave-ins, water removal equipment or use of a safety harness and lifeline.
- In excavations and trenches in which employees may be required to enter, excavated or other material shall be effectively stored and retained at least 2' or more from the edge of the excavation.
- The walls and faces of all excavations in which employees are exposed to danger from moving ground shall be guarded by a shoring system, sloping of the ground, or some other equivalent means.
- Sides, slopes, and faces of all excavations shall meet accepted engineering requirements by scaling, benching, barricading, rock bolting, wire meshing or other equally effective means. Special attention shall be given to slopes that may be adversely affected by weather or moisture content.
- Materials used for sheeting, sheet piling, cribbing, bracing, shoring, and underpinning shall be in good serviceable condition, and timbers shall be sound, free from large or loose knots, and of proper dimensions.
- If it is necessary to place or operate power shovels, derricks, trucks, materials, or other heavy objects on a level above and near any excavation, the side of the excavation shall be sheet piled, shored, and braced as necessary to resist the extra pressure due to such superimposed loads.
- Supporting systems; (i.e., piling, cribbing, shoring, etc.) shall be designed by a qualified person and meet accepted engineering requirements. When tie rods are used to restrain the

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top of sheeting or other retaining systems, the rods shall be securely anchored well back of the angle of repose. When tight sheeting or sheet piling is used, full loading due to ground water table shall be assumed, unless prevented by weep holes or drains or other means. Additional stringers, ties, and bracing shall be provided to allow for any necessary temporary removal of individual supports.

6.0 TRAINING


- Contractor companies are required to submit a list of competent excavation personnel working onsite, along with a copy of their training certificate.
- No training required for this document.

7.0 REVIEW AND REVISION HISTORY

Revision #	Preparer	Date	Description
0	Zac Nightingale	11/19/2021	Updates Per Intelex Recommendations for Contractor companies: 219192: Management system for documenting compliance to this Site Regulation. 219193: Provide a list of competent personnel and their training certificate. 219194: Provide their company procedure for excavations. Reformatted and Numbered per Document Control Policy, R-63-001.

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8.0 ATTACHMENT 1 – SOIL TYPE CLASSIFICATION

This attachment provides general descriptions of each soil type. Soil types must be determined by a Competent Person based on one visual and one manual test. Visual and manual testing requirements can be found in OSHA 29 CFR 1926 Subpart P Attachment A.

8.1 Soil Types

- 8.1.1 Type A Soil is cohesive, with an unconfined compressive strength of 1.5 tons/ft² (tsf) or greater. Type A soils include clay, silty clay, sandy clay, clay loam, caliche and hardpan. However, no soil can be a Type a soil if any of the following soil conditions apply:

- Is fissured
- Is subject to vibration
- Has been previously disturbed
- Is a layered system in which layers dip into the excavation at a slope of 4 horizontal to 1 vertical or greater

Contains other factors which classify it as a less stable material.

Given these criteria, Type A soil is unlikely to ever be encountered.

- 8.1.2 Type B Soil is cohesive soil with an unconfined compressive strength greater than .5 tsf, but less than 1.5 tsf. Type B soils include angular gravel (crushed rock), silt, silt loam and sandy loam. Type B soils include:

- Soils previously disturbed, except when determined to be Type C soils
- Soils subjected to vibration and fissures
- Dry rock which is not stable
- Layered systems in which layers dip into an excavation on a slope less than 4 horizontal to 1 vertical, but only if the material would otherwise be classified as a Type B soil.


A large number of excavations will be dug in Type B soils.

- 8.1.3 Type C Soil is cohesive soil with an unconfined compressive strength of .5 tsf or less or granular soils including:

- Submerged soil or soil from which water is freely seeping
- Submerged rock that is not stable
- Layered systems in which the layers dip into an excavation or a slope of 4 horizontal to 1 vertical or greater.

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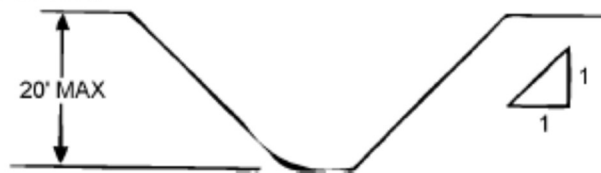
9.0 ATTACHMENT 2 – SLOPING AND BENCHING SYSTEMS

This attachment contains specifications for sloping and benching to protect employees from cave-ins while working in excavations. Classify soils before using these tables.

ROCK OR SOIL TYPE	MAXIMUM ALLOWABLE SLOPES (H:V) FOR EXCAVATIONS LESS THAN 20' DEEP
Type B Soil	1:1 (45 o)
Type C Soil	1-1/2:1 (34 o)

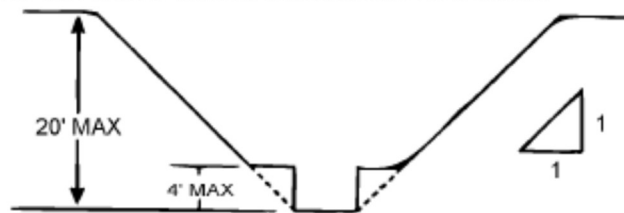
Excavations Made in Type B Soil

1. All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1.



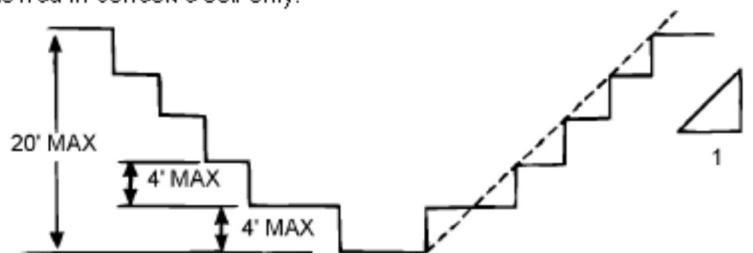
SINGLE SLOPE

2. All benched excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1 and maximum bench dimensions as follows:



SINGLE BENCH

This bench allowed in cohesive soil only.



MULTIPLE BENCH

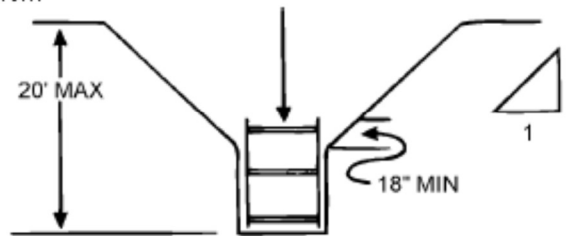
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3. All excavations 20 feet or less in depth which have vertically sided lower portions shall be shielded or supported to a height at least 18 inches above the vertical side. All such excavations shall have a maximum allowable slope of 1:1.

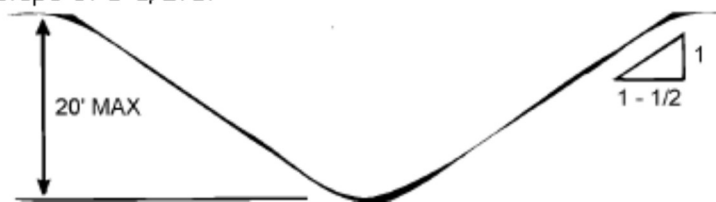
Support of Shield System



VERTICALLY SIDED LOWER PORTION

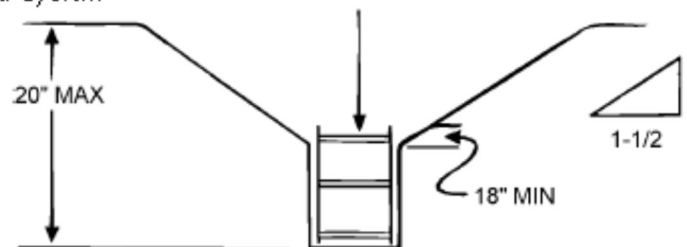
Excavations Made in Type C Soil

1. All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1-1/2:1.



SIMPLE SLOPE


Support or Shield System



VERTICALLY SIDED LOWER PORTION

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10.0 ATTACHMENT 3 – ALUMINUM HYDRAULIC SHORING FOR TRENCHES


This attachment provides general guidelines to follow when using aluminum hydraulic shoring to protect employees working in trenches 20' deep or less.

- Install hydraulic shoring per manufacturer's tabulated data. Ensure that manufacturer's tabulated data is stamped by a registered professional engineer.
- Keep manufacturer's tabulated data at the excavation site while the aluminum hydraulic shoring is in the excavation.
- If no manufacturer's tabulated data exists, aluminum hydraulic shoring may be installed as directed by the Competent Person or a registered professional engineer.

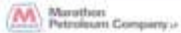
Plywood shall be 1.125" thick softwood, or 0.75 inch thick 14 ply arctic white birch, commonly called FINFORM.

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11.0 ATTACHMENT 4 – TRENCHING AND EXCAVATION - DAILY EXCAVATION CHECKLIST SAMPLE (R-11-013-F01)


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SITE LOCATION:			
DATE:	TIME:	COMPETENT PERSON:	
SOIL CLASSIFICATION: STABLE ROCK <input type="checkbox"/> TYPE A <input type="checkbox"/> TYPE B <input type="checkbox"/> TYPE C <input type="checkbox"/> TYPE B TEST PERFORMED:			
TYPE OF SOIL TEST:		EXCAVATION DEPTH: PROTECTION SYSTEMS FOR DEPTHS GREATER THAN 20' REQUIRE A REGISTERED ENGINEER APPROVAL.	EXCAVATION WIDTH:
TYPE OF PROTECTIVE SYSTEM USED:			
Indicate for each item: Yes – No – N/A (not applicable)			
1. General Inspection of Jobsite:			
A. Surface encumbrances removed or supported?			
B. Employees protected from loose rock or soil that could pose a hazard by falling or rolling into the excavation?			
C. Spoils, materials, and equipment set back at least two feet from the edge of the excavation?			
D. Location of the excavation marked by flagging, tape, or barricades?			
E. Walkways and bridges over excavations four feet or more in depth are equipped with standard guardrails, toeboards, and/or netting to prevent object from falling below?			
F. Warning vests or other highly visible clothing provided and worn by all employees exposed to public vehicular traffic?			
G. Warning system established and utilized when mobile equipment is operating near the edge of the excavation?			
H. Employees prohibited from working on the faces of slopes or bermed excavations above other employees?			
3. Means of Access and Egress:			
A. Lateral travel to means of egress no greater than 25' in excavations four feet or more in depth?			
B. Ladders used in excavations secured and extended three feet above the edge of the excavation?			
C. Structural ramps used by employees designed or approved by a competent person?			
D. Structural ramps used for equipment designed by a registered engineer?			
E. Ramps constructed of materials of uniform thickness, cleated together on the bottom, equipped with non-slip surface?			
4. Wet Conditions:			
A. Precautions taken to protect employees from the accumulation of water?			
B. Water removal equipment monitored?			
C. Surface water or runoff diverted or controlled to prevent accumulation in the excavation?			
D. Inspections made after every rainstorm or other hazard-increasing occurrence?			
5. Support Systems:			
A. Materials and/or equipment for support systems selected based on soil analysis, trench depth, and expected loads?			
B. Materials and equipment used for protective systems inspected and in good condition?			
C. Materials and equipment not in good condition have been removed from service?			
D. Protective systems installed to prevent worker exposure to cave-ins, collapses, or threat of being struck by materials or equipment?			
E. Members of support system securely fastened to prevent failure?			
F. Support systems provided to ensure stability of adjacent structures, buildings, roadway, sidewalks, walls, etc.?			
G. Excavations below footings or foundations supported, as approved by a registered engineer?			
H. Shield system placed to prevent lateral movement?			
COMPETENT PERSON - Signature:			
NAME OF REGISTERED ENGINEER: (If required)			

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12.0 ATTACHMENT 5 – TRENCHING AND EXCAVATION – EXCAVATION APPROVAL FORM SAMPLE (R-11-013-F02)

 ANACORTES REFINERY	REFINERY-WIDE Trenching and Excavation – Excavation Approval Form	R-11-013-F02 Page 1 of 1 REVISION: 0
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This form should be started during the planning phase of work by the Responsible Person. Attach all associated drawings and documentation to this form and keep it at the excavation site. Upon completion, return this form and marked documentation to Drawing Control.

Excavation activity to be performed:
 Date(s): _____ Zone: _____ Area: _____

Type of excavation to be performed: _____

Equipment to be used: _____

Is depth greater than 4'? ☐ YES ☐ NO
 Is worker's head expected to be below grade? ☐ YES ☐ NO

Yes to either question above indicates that excavation is a confined space and Confined Space Permitting requirements must be followed.

EXCAVATION ACTIVITY PREPARATION	YES	NO	N/A
Drawings obtained? (indicate) Utility _____; Sewer/Water _____; Electrical _____; Cathodic Prot. _____; Other _____			
Locating survey performed? (indicate) Electromagnetic method _____; Ground Penetrating Radar _____; Potholing _____; Interview with Process Knowledge/Operations personnel _____			
Underground piping/utility locations marked?			
800- 424-5555 Call/Dig Alert required? If yes, call confirmed _____			
Proper local Utility organizations notified (i.e., Natural Gas, OPL, Kinder Morgan) List Orgs: _____			
Water accumulation controlled?			
Any traffic concerns have been addressed and detours marked?			
Signs, barricades posted. Proper means of access/egress are established?			
Have previous excavations been done in this Area? If yes, describe: _____			

Responsible Person shall hold a review with each of the affected Marathon Reps below and obtain their signatures.

Electrical Rep: Signature: _____ **Date:** _____

Communications Systems Rep: Signature: _____ **Date:** _____

Safety Rep: Signature: _____ **Date:** _____

Location owner (Area Supervisor or Zone Ops. Coord.):
Signature: _____ **Date:** _____

Additional Comments from Reps: _____

SIGNATURE APPROVAL TO BEGIN WORK:

Your signature confirms that the job site has been inspected and this form has been discussed with the recipient

Responsible Person: _____ **Date:** _____

Competent Person: _____ **Date:** _____

When the use of equipment extends beyond the authorized work period, the area must be re-inspected before the equipment may reenter. Location or Safety Rep must complete the re-inspection and update the form.

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