

PURPOSE:

The purpose of this policy is to provide safety requirements for all excavation and trenching activity performed by the Department of Public Works, regardless of whether it is a planned project or emergency. The goal of this policy is to prevent trench-related injuries to employees within the Department of Public Works. It includes responsibilities, requirements, employee qualifications, authorities, definitions, protective systems, and a Trench Opening Daily Inspection Worksheet that must be utilized each day a trench is open. It is designed to meet all local, state and federal laws.

POLICY:

It is the policy of the Board of Selectmen to keep employees safe by protecting them from cave-in at excavation sites. The Director of Public Works and/or his designee must ensure that a daily inspection is conducted by a designated Competent Person who has completed training to identify excavation hazards and has authority to stop work and make corrections. The Director of Public Works and/or his designee must provide training to employees and ensure that cave-in protection systems are provided when required.

APPLICABILITY

This policy is the governing principle, plan, and understanding that guide all trench opening procedures for the Department of Public Works.

IMPLEMENTATION PROCEDURE:

Upon the adoption of this policy by a favorable vote of the Board of Selectmen, the Director of Public Works shall provide a written program for excavation and trench safety. This program shall outline requirements for cave-in protection, and include a Trench Opening Daily Inspection Worksheet. No trench shall be excavated without the use of said program. This Policy and program will be reviewed annually by the Director of Public Works and requested revisions shall be adopted only upon the approval of the Board of Selectmen.

DEFINITION

EXCAVATION – A man-made cut, cavity, trench, or depression in the earth's surface formed by earth removal.

TRENCH – A narrow underground excavation that is deeper than it is wide and is no wider than 15 feet.

REGULATORY / STATUTORY REFERENCES:

This policy and program is mandated under 29 CFR 1926.20(b)(1).

APPROVED BY:

Board of Selectmen, Chair: Gary Daugherty _____

Board of Selectmen: Stephen Matellian _____

Board of Selectmen: Brett Simas _____

Original date: June 19, 2018

Revised dates:



TOWN OF UPTON, MASSACHUSETTS

DEPARTMENT OF PUBLIC WORKS

EXCAVATION & TRENCH SAFETY PROGRAM

Municipality: TOWN OF UPTON

Department Name: DEPARTMENT OF PUBLIC WORKS

1.0 PURPOSE: This program provides safety requirements for all excavation and trenching activity performed by the Department of Public Works, regardless of whether it is a planned project or emergency.

2.0 RESPONSIBILITY The Director of Public Works and/or his designee is responsible for protecting employees from cave-in at excavation sites. The Director of Public Works and/or his designee must ensure that a daily inspection is conducted by a designated Competent Person who has completed training to identify excavation hazards, *and has authority to stop work and make corrections*. The Director of Public Works must provide training to employees, and ensure that cave-in protection systems are provided when required.

3.0 REQUIREMENTS FOR CAVE-IN PROTECTION

Each excavation will provide safe work conditions to protect employees from cave-in.

3.1 Required for Deeper than 5 feet: A cave-in protection system is **required** when employees enter an excavation deeper than 5 feet. A cave-in protection system could include trench boxes, shoring, or sloping. The only time cave-in protection is not required in an excavation deeper than 5 feet deep is if the excavation is made entirely in stable rock. Cave-in protection is always required in excavations over 5 feet deep for Type A, B or C soils.

3.2 Required for Less than 5 feet: A cave-protection system is **required** for an excavation less than 5 feet deep when examination of the ground indicates a potential for cave-in.

3.2.1 The Competent Person makes this determination in the daily inspection. The Competent Person must complete the

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Daily Inspection Worksheet created by the Director of Public Works

3.2.2 Example signs of potential cave-in include, but are not limited to:

- Water accumulation
- Upward flow of water into cut
- Water seeping out of soil
- Tension cracks or fissures
- Sliding of walls
- Bulging wall or floor
- Undermined structures that are not supported
- Significant vibration or surcharge loads from nearby equipment or traffic
- Wet mud

3.3 **Not Required for Less than 5 feet:** Cave-in protection is not required when employee enters an excavation less than 5 feet deep and the daily inspection by the Competent Person provides no indication of cave-in potential. Complete the Daily Inspection Worksheet to show that site conditions have been evaluated.

4.0 SELECTING CAVE-IN PROTECTIVE SYSTEM PER SOIL TYPE

Soil type is used, in addition to ground conditions, to determine effective shielding (trench box), shoring, or sloping.

4.1 **Assume Type C:** The Public Works Departments may choose to assume all soil is Type C when selecting trench box, shoring, or sloping the site. A manual and visual soil test to classify soil is not required when soil is assumed to be Type C. For Type C soil, you must slope out 1.5 feet on each side for each 1 ft. of depth (i.e. 34° from horizontal). Designs for Type C soil are provided in the OSHA excavation standard 29 CFR 1926.652. Benching is not permitted in Type C soil.

4.2 **Type A, B:** The Competent Person must conduct at least one visual and manual soil test if Type C soil is not assumed. Record these results on the Daily Inspection Worksheet. Then refer to the manufacturers tab data or engineered plan to ensure that the shoring or trench box is adequate for the soil type on the site and the depth of excavation.

4.3 Cave-In Protection Systems: The following equipment is available to the department as owned.

Task	System
Up to 20 Feet Deep	<p>Trench box model number _____ Manufacturer: _____</p> <p>Trench box model number _____ Manufacturer: _____</p> <p>Shoring system Manufacturer: _____ List specs for distance between shores: _____</p> <p>Shoring system Manufacturer: _____ List specs for distance between shores: _____</p> <p>Sloping Type C soil: 1 ft. high to 1-1/2 ft. horizontal run on each side (34°)</p> <p>Type B soil: 1 ft. high to 1 ft. horizontal run on each side (45° slope)</p> <p>Type A soil: 3/4 ft. high to 1 ft. horizontal run on each side (53°) Type A soil (short-term): 1/2 ft. high to 1 ft. horizontal each side (63°)</p>
More Than 20 Feet Deep	Engineered system required by Professional Engineer

5.0 DAILY SITE INSPECTIONS

5.1 Daily Inspection

- 5.1.1 Each crew will have a designated person with knowledge and training to be the “Competent Person.” The Director of Public Works and/or his designee gives authority to the Competent Person to correct hazards at the site.
- 5.1.2 The “Daily Inspection Worksheet” is completed by the designated Competent Person before any worker is allowed to enter a trench, even if the site is less than 5 feet deep (See Appendix A for worksheet).
- 5.2. Repeating the Daily Inspection - A reinspection is conducted using the Inspection Worksheet at the beginning of every shift, *AND as needed throughout the shift. Inspections shall also be made after every rainstorm or other hazard increasing occurrence.*

5.3 Verifying the Daily Inspection –

- 5.3.1 The Daily Inspection Worksheet is returned to the Director of Public Works and/or his designee at completion of the job. The Director and/or his designee will review the Inspection Worksheet and review the safety conditions which occurred during the project with employees to evaluate the effectiveness of the trench safety program.
- 5.3.2 The Director and/or his designee will conduct on-site inspections of excavation sites periodically to ensure that daily inspections are conducted and cave-in protective systems are provided.

6.0 WORK PROCEDURES

6.1 UTILITIES

- a. Digsafe (811) called for underground utilities. Confirmation number kept on file.
- b. Exposed utilities are supported or removed.
- c. Maintain 10 ft. clearance to overhead powerlines when operating trucks or equipment.
- d. To prevent sudden flooding, block or reduce pressure in water mains that could be exposed and accidentally damaged during excavation. Pressure should be reduced even if the actual tasks do not involve planned contact with the water main.

6.2 WET CONDITIONS

- a. Water accumulation is controlled before employees authorized to enter excavation.
- b. Surface water is diverted or controlled.
- c. Re-inspection is conducted after a rain event.
- d. Employees are ordered to exit if water seeps from floor or walls or if water accumulation is not able to be continuously controlled.

6.3 UNDERMINED STRUCTURES

- a. Adjacent foundations, telephone poles, etc. are braced before employees are authorized to enter excavation.
- b. Adjacent sidewalks, pavement, walls, etc. are fully supported. When a structure becomes unsupported or unstable in any way, employees are ordered to exit the excavation.
- c. Exposed underground utility pipes are supported.

6.4 EDGE OF EXCAVATION

- a. Spoils are kept more than 2 ft. from edge.
- b. Top of trench box/shoring reaches grade level, or extends 18" above grade if any portion of the trench is sloped.
- c. Bottom of trench box/shoring is not more than 2 ft. above bottom of excavation. The 2 ft. allowable rise is not allowable if free-flowing soil comes in at the gap.
- d. Trench boxes are installed in a manner to restrict lateral or other hazardous movement of the shield in the event of sudden lateral loads.
- e. Ladder in place for trenches deeper than 4 ft. and placed so that egress is available without traveling more than 25 feet.
- f. Workers prohibited from “riding bucket” into or out of excavation.
- g. Weight of adjacent trucks and equipment are kept a safe distance away from edge to prevent surcharge loading or vibration.
- h. Provide a warning system to prevent mobile equipment from falling over the trench edge.

6.5 HAZARDOUS ATMOSPHERE

- a. Where oxygen deficiency (< 19.5% oxygen) or a hazardous atmosphere exists or could be expected to exist, the atmosphere in the

excavation must be tested before employees enter excavations > 4 ft. deep.

- b. Test air for Oxygen, Carbon Monoxide, Hydrogen Sulfide, flammable levels and VOCs in landfills, underground fuel, or other contaminated soils.
- c. Test air at all levels. Do not assume that toxics are heavier than air.
- d. Test the air for Carbon Monoxide if gas/diesel powered tools are brought into or used adjacent to the excavation. Ventilate.
- e. Control dust when cutting concrete or asbestos pipe. Follow Department of Labor Standards and DEP procedures for asbestos cement pipe.

6.6 WORK ZONE TRAFFIC

- a. Traffic is controlled in accordance with the Manual on Uniform Traffic Control (MUTCD), using MUTCD signs and devices. Close street to traffic if possible.
- b. Use adequate warning signs, cones and taper per MUTCD and MassDOT.
- c. Check blind spots before any vehicle or piece of heavy equipment is moved at the site, use spotters when necessary, and conduct circle checks of DOT vehicles moving off the site.

6.7 EXPOSURE TO FALLING LOADS

- a. Employees are not permitted to work under raised loads.
- b. Employees are required to stand away from equipment that is being loaded or unloaded.

6.8 PERSONAL PROTECTIVE EQUIPMENT

- a. The following Personal Protective Equipment (PPE) is required
 - i. ANSI Class 2 or Class 3 high-visibility reflective clothing, for all work that is located in, or adjacent to a road
 - ii. Hardhat
 - iii. Boots that address the hazards on site.
 - iv. Safety glasses when activities could cause projectiles
 - v. Hearing protection when concrete/metal cutting tools are used
 - vi. Respirator when concrete or asbestos cutting is conducted.

6.9 UNATTENDED TRENCH – Public Risk

Trenches will not be left unattended or pose a hazard to the public. Unattended trenches must be backfilled, covered, or otherwise protected per Department of Professional Licensure (formerly Department of Public Safety) regulation 520 CMR 7.00.

7.0 When Municipal Employees work with a Private Contractor

Private contractors often conduct work on municipal property. Municipal employees should not enter an excavation created by a private contractor unless the municipality's designated Competent Person has conducted an inspection and authorized municipal employees to enter.

8.0 Employee Qualifications

- 8.1 The designated Competent Person must have completed “Trench Competent Person” training, per OSHA 29 CFR 1926.269 *and* have authority from Director of Public Works and/or his designee to stop work, and order that cave-in protective systems be installed and site hazards are corrected, before work continues.
- 8.2 Other employees on site must have completed “Trench Safety” awareness training.
- 8.3 Laborers assigned to use a grinder, saw, or other power tool must have completed training which reviews the Owner’s Manual instructions for use and maintenance of the tool.
- 8.4 Laborers assigned to disturb Asbestos Cement Pipe must have completed “Asbestos Cement Pipe” training.
- 8.5 Equipment operators must have a current Massachusetts Hoisting License issued by Massachusetts Department of Professional Licensure (formerly Department of Public Safety).

9.0 Annual Review:

This policy will be reviewed annually by the Director of Public Works and revised as necessary. In addition, if a near miss incident or injury occurs, this policy will immediately be reviewed and revised if necessary.

Version/ Revision #	
Date of Last Revision or Review	
Signature of Director of Public Works	



TOWN OF UPTON, MASSACHUSETTS

DEPARTMENT OF PUBLIC WORKS

TRENCH OPENING DAILY INSPECTION WORKSHEET

How to Use this Inspection Worksheet: A daily inspection is required at all excavation sites that workers enter, even sites less than 5 feet deep. This form is to be completed and signed by the supervisor each day the trench is open.

Date: _____

Job Name: _____

Excavation Address:

Scope: Purpose of excavation:

Dimensions: _____ Depth: _____ Width: _____ Length: _____

1. CAVE-IN PROTECTION

Is the depth of excavation greater than 5 ft deep? Yes No
If YES, the trench is greater than 5 feet deep, **cave-in protection is required**.

If NO, is there potential for cave-in as determined by the Competent Person? Yes No
If YES, there is a cave-in potential, then **cave-in protection is required**.

Key issues to be reviewed by the competent person in determining the cave-in potential:
Does ground have any of the following:

	<u>Yes</u>	<u>No</u>
<input type="radio"/> Water accumulation	—	—
<input type="radio"/> Water seeping out of wall or floor	—	—
<input type="radio"/> Tension cracks or fissures	—	—
<input type="radio"/> Bulging wall or heaving floor	—	—
<input type="radio"/> Sliding walls	—	—
<input type="radio"/> Significant vibration or surcharge load	—	—
<input type="radio"/> Other _____	—	—

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If excavation is deeper than 5 ft, **OR** the Competent Person determined that there is a potential for cave-in, then cave-in protection is required. Answer the questions below to determine cave-in protection options.

List the soil types, to aid in proper use of protective systems and/or required sloping.
Vibration, surcharge loads, and other conditions may require downgrade of soil type.

Soil Type
<input type="checkbox"/> Type C
<input type="checkbox"/> Type B
<input type="checkbox"/> Type A
<input type="checkbox"/> Stable Rock

List soil tests conducted.
At least one manual and one visual test.

<input type="checkbox"/> No Test, assume Type C soil.
<input type="checkbox"/> Soil Tested: <u>Visual:</u> _____ <u>Manual:</u> _____

List the type or types of cave-in protection that will be used for **all** exposed sides.

Trench and Shoring: The supervisor is responsible to ensure the Owner's Manuals and tab data is available and all equipment is used in accordance with manufacturer's instructions and tab data.

<input type="checkbox"/> Trench Box
<input type="checkbox"/> Shoring
<input type="checkbox"/> Slope
<input type="checkbox"/> Trench box plus slope
<input type="checkbox"/> Engineered system

Max Allowable Slope
C: (34°) 1 ½ H: 1V
B: (45°) 1H: 1V
A: (53°) 3/4H: 1V
Rock: (90°) Vertical

Confirm proper use of protective systems and/or sloping:

If **sloping** is used, what is maximum allowable slope for the soil type? H:V = _____

If **shoring** is used, what are maximum spacing requirements per tab data? H: _____ V: _____

If **trench box** is used, what is the maximum depth certification? _____

If **more than one system** is needed to protect all sides

of the excavation are they all shown above?

Yes **No** **N/A**

2. SAFE WORK PROCEDURES

UTILITIES

a. Digsafe 811 called for underground utilities. Conf. Number: _____	Yes	No	N/A
b. Exposed utilities are supported or removed. _____	_____	_____	_____
c. Water pipe pressure is shut off or reduced at excavation location. _____	_____	_____	_____
d. 10 foot clearance between operating equipment and overhead electrical is maintained. _____	_____	_____	_____

WET CONDITIONS

a. Water accumulation is controlled. _____	Yes	No	N/A
b. Surface water is diverted or controlled. _____	_____	_____	_____
c. A re-inspection for cave-in potential is conducted after each rainstorm. _____	_____	_____	_____
d. Employees exit if water seeps from walls or floor. _____	_____	_____	_____

UNDERMINED STRUCTURES

a. Adjacent foundations, telephone poles, etc. are braced. _____	Yes	No	N/A
b. Adjacent sidewalks, pavement, etc. are fully supported. _____	_____	_____	_____
c. Exposed underground utility pipes are supported. _____	_____	_____	_____

	Yes	No	N/A
EDGE OF EXCAVATION			
a. Spoils are kept more than 2 feet from edge.	—	—	—
b. Top of trench box/shoring reaches grade level or higher.	—	—	—
c. Bottom of trench box/shoring is less than 2 feet from floor.	—	—	—
d. Ladder in place for trenches deeper than 4 feet	—	—	—
e. Trench boxes are installed in a manner to restrict lateral or other hazardous movement of the shield in the event of sudden lateral loads, e.g, space between box plate and soil wall is minimized.	—	—	—
f. Weight of adjacent trucks and equipment are kept a safe distance away from edge to prevent surcharge loading or vibration.	—	—	—
HAZARDOUS ATMOSPHERE	Yes	No	N/A
a. Test air before employees enter excavation > 4 feet deep when oxygen deficiency or a hazardous atmosphere could be expected.	—	—	—
b. Test air for LEL, O ₂ , CO, and VOCs in landfills, underground fuel, or other contaminated soils. Don't assume that toxics are heavier than air.	—	—	—
c. Test air for CO if gas powered tools used in or near excavation.	—	—	—
d. Dust control is used when cutting concrete or asbestos pipe.	—	—	—
WORK ZONE TRAFFIC	Yes	No	N/A
a. Traffic controlled by MUTCD signs/devices. Close street if possible.	—	—	—
b. Hi-visibility reflective clothing worn.	—	—	—
c. Check blind spots before each vehicle is moved at the site.	—	—	—

3.

INSPECTION and VERIFICATION BY SUPERVISOR

To be filled out by the Competent Person:

Name: _____

Inspection date _____ Time _____