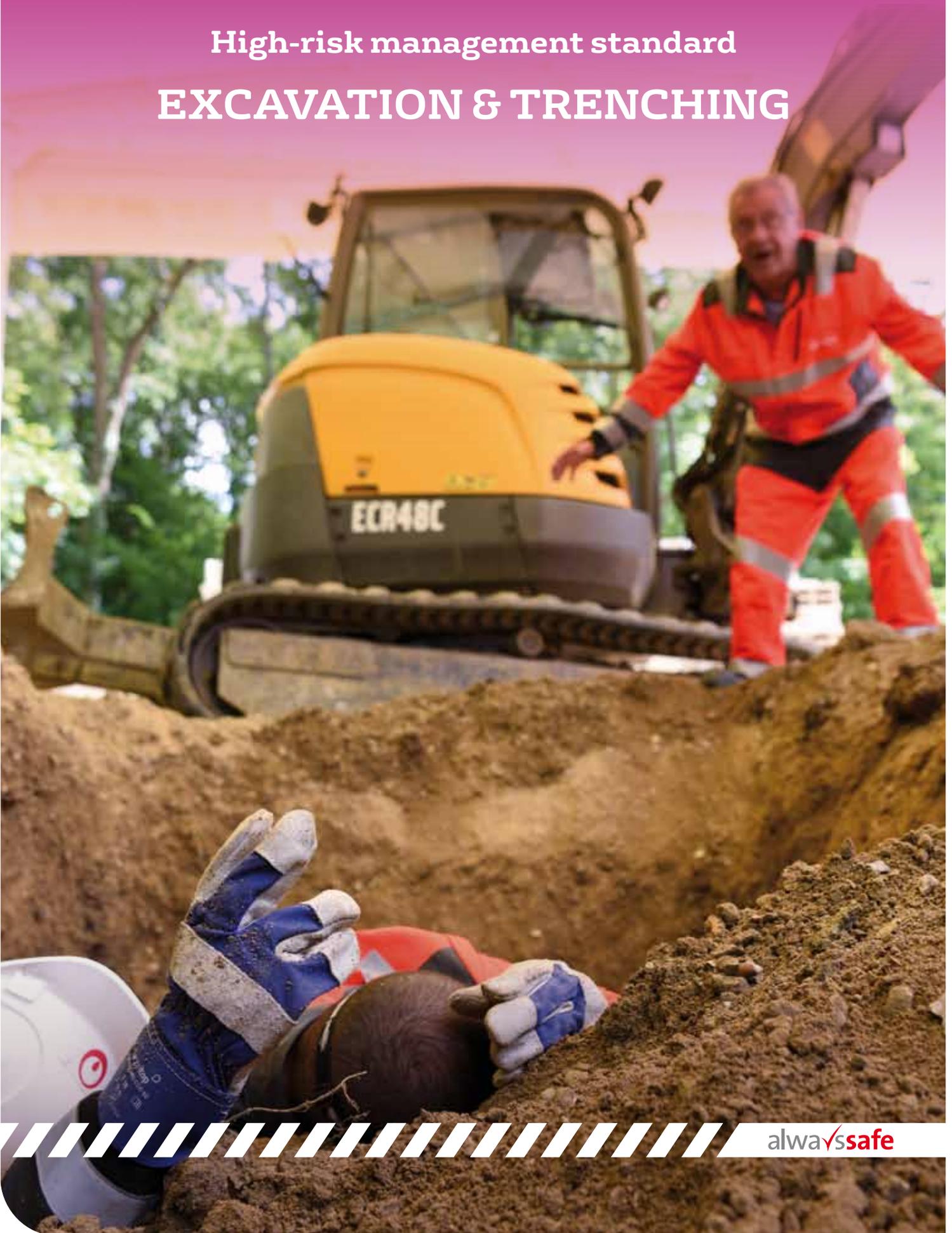


High-risk management standard
EXCAVATION & TRENCHING



Excauation & trenching generally means work involving the removal of soil or rock from a site to form an open face, hole or cavity using tools, machinery or explosives.

Studies show that excavations are one of the most hazardous works in construction. Injuries from excavations tend to be of a very serious nature and often result in fatalities. This standard is intended to ensure that all measures are taken to prevent and control the risk of exposure to the identified hazards.

SCOPE:

This document applies to all activities and sites of Veolia. Contractors of Veolia must also comply with this standard.

It provides practical guidance for persons conducting a business or undertaking on how to manage the health & safety risks associated with excavation and trenching work.



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1.0 > Definitions

Excaavation generally means work involving the removal of soil or rock from a site to form an open face, hole or cavity using tools, machinery or explosives to build, maintain or repair service networks or foundations of buildings and structures.

Must be considered as high-risk, any construction work (including excavations) that is carried out in or near:

- A shaft or trench with an excavated depth greater than 1.3 metres.
- A tunnel.

Examples of excavation and trenching operations

EXCAVATION

Open-faced EXCAVATION

EXCAVATION CUT into slope

DANGER
KEEP BACK
DEEP
EXCAVATION

> Trench:

- Deeper than wide.
- No more than 15 feet wide at the bottom.

TRENCH

2.0 > Main excavation and trenching work hazards

As a minimum, the following hazards must be considered when planning excavation activities:

<p>> Underground service networks</p>	<p>Gas (low, medium or high pressure), water (potable, rainwater, superheated), sewerage, electricity (low, medium or high voltage), chemicals, fuel in pipes, telecommunications, waste</p>	<p>> Instability of the excavation due to works in the vicinity of the excavation</p>	
<p>> Landslide or rock fall</p>		<p>> Presence of possible inrush of water or other liquid</p>	
<p>> Fall from height or falling objects > Fall when crossing the trench (trench too wide)</p>		<p>> Hazardous manual tasks (health and ergonomic risks)</p>	
<p>> Inappropriate placement of excavated materials or other loads</p>		<p>> Hazardous chemicals and contaminated soil</p>	<p>Toxic, irritant or flammable and explosive gases</p> 
<p>> Instability of any adjoining structure caused by the excavation</p>		<p>> Hazardous atmosphere in the excavation and the Trench</p>	
<p>> Any disturbance of the ground including previous excavation</p>		<p>> Note: Please refer to «Confined spaces» standard if there is a potential for the excavation to become a confined space (e.g., concentrations of airborne contaminants in the trench that could lead to impairment, loss of consciousness or asphyxiation).</p>	



3.0 > Excavation and trenching work identification

The management line must manage risks to health & safety associated with excavation work before the beginning of the work including the risk of a person:

- To fall into an excavation.
- To be trapped by the collapse of an excavation.
- Working in an excavation and being struck by a falling object.
- Working in an excavation being exposed to an airborne contaminant.

To manage the risks, all relevant matters must be considered including:

- The type of soil.
- Potential existing water (groundwater level).
- The nature of the excavation (dimensions, depth, various networks...).
- The nature of the excavation work including the range of possible methods of carrying out the work.
- The means of entry into and exit from the excavation (if applicable).

When assessing the risks associated with excavation work, the following must be considered:

<ul style="list-style-type: none">• Local site conditions (access – ground slope – adjacent buildings and structures...)	<ul style="list-style-type: none">• Depth of the excavation	<ul style="list-style-type: none">• Soil properties including variable soil types, shear strength, cohesion, presence of ground water
<ul style="list-style-type: none">• Fractures or faults in rocks including joints, bedding planes	<ul style="list-style-type: none">• Any specialised plant or work methods required (e.g., ground support)	<ul style="list-style-type: none">• What exposures might occur, such as to noise, ultraviolet rays or hazardous chemicals
<ul style="list-style-type: none">• Number of people involved	<ul style="list-style-type: none">• The possibility of unauthorized access to the work area	<ul style="list-style-type: none">• Local weather
<ul style="list-style-type: none">• The length of time that the excavation will be open	<ul style="list-style-type: none">• Safe access into the excavation	<ul style="list-style-type: none">• Safe egress from the excavation

4.0 > Risk management for excavation and trenching

Control measures must be ranked from the highest level of protection and reliability to the lowest. This ranking is known as the HIERARCHY OF CONTROL or RISK MANAGEMENT HIERARCHY.

You must always aim to **eliminate a hazard**, that is the most effective control. If it is not practicable, the risk must be minimized by one or a combination of the following:

HIGHEST	ELIMINATION	Can the excavation and trenching work be totally eliminated? Can the work be done another way?	MOST
Health & Safety Protection 	SUBSTITUTION	Can the excavation and trenching work entry be replaced for a less hazardous method, material or system?	Reliability of control measures
	ENGINEERING	Can a mechanical system be used to keep workers remote from the excavation and trenching work?	
	ISOLATION	Can barriers be put in place to remove/to isolate people from the hazards? Can collective protective equipment be put in place? Can also reduce the frequency of intervention in these places?	
	ADMINISTRATIVE CONTROLS	Can training, increased supervision, procedures, rotation and signage minimize exposure?	
LOWEST	PERSONAL PROTECTIVE EQUIPMENT	Can PPE protect the workers from the hazard or risk?	LEAST

5.0 > Requirements

Application

This High-Risk Management Standard applies to all excavation and trenching works

This standard applies to all managers, employees, contractors, visitors or any other person working on the scope of Veolia business undertakings and operations.

This standard applies in addition to requirements prescribed by prevailing legislation, codes of practice, international standards and health & safety recommendations from manufacturers and risk prevention organisations and bodies.

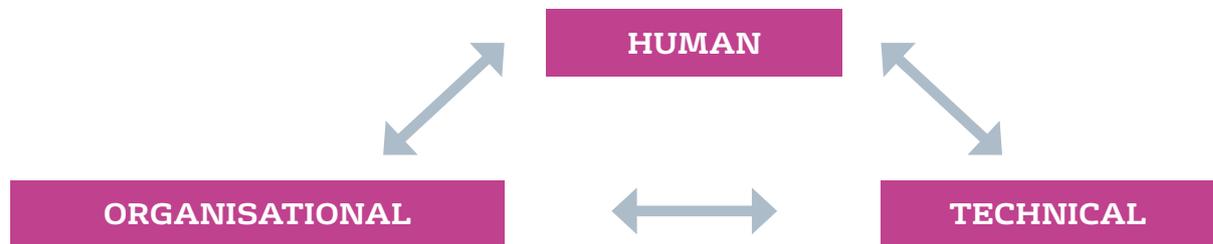
Preliminary requirements

Use of the word “must” within this standard means a requirement is mandatory.

Use of the word “should” within this standard means the primary intent is that the requirement is mandatory but specific circumstances may mean implementation of the requirement is not reasonably practicable.

THIS STANDARD APPLIES TO ALL MANAGERS, EMPLOYEES, CONTRACTORS, VISITORS OR ANY OTHER PERSON WORKING ON THE SCOPE OF VEOLIA.





5.0.1 – Human requirements

- 1. A qualified and competent person must be involved in planning and monitoring excavation and trenching operations.**
- 2. Every manager involved in excavation and trenching operations must be trained to:**
 - Undertake a risk assessment.
 - Carry out excavation and trenching work;
 - Manage or supervise workers operating in or with excavations and trenches.
 - Maintain equipment used for or during work;
 - Purchase and put in place collective protection equipment.
 - Purchase, distribute or maintain personal protective equipment (PPE) for use.
 - Manage an emergency rescue or first aid.
 - Implement the control measures.
- 3. A workplace suitable training programme must be conducted by the project manager.**
- 4. Each operator working in excavations and trenches must have completed a suitable training programme;** evidences of this training must be provided (business card, safety passport...).
- 5. No vehicle or any part of the installation must be parked** or stored near an edge of an excavation or trench to avoid causing a collapse.
- 6. Every operator must only work within secured area** (battering, shoring...)
- 7. A competent person must carry out inspections and safety visits** when working in excavations and trenches.
- 8. Safety visits must include work behaviour observations** and any need for additional specific training must incorporate the results of these observations.

The training must cover all the requirements of the work environment (safety rules, emergency procedures, access, egress, use of collective protections, wearing and maintenance of personal protective equipment, report all hazards, accidents, incidents, near misses and unsafe situations). Remind operators that

5.0.2 – Organisational requirements

> 5.0.2.1 – Before the work:

1. **A local documented excavation and trenching procedure** including mandatory requirements must be developed and implemented in accordance with the requirements of this standard.
2. **Purchase and design** of equipment (including hired and contracted equipment) must meet the requirements.
3. **The services of a registered professional engineer may be required to determine that excavation work will not pose a hazard to employees.**
4. **A management of change process must be** in place for a process or a device that may be changed in case of deterioration of equipment and results in impacts on the excavation and trenching safety process. A risk analysis process must be in place that identifies and controls additional hazards and risks that may be introduced through both physical and operational changes to excavation and trenching operations.
5. **Precautions must be taken to avoid contact with underground services and/or overhead lines:**
 - The appropriate service providers must be contacted and their advice must be asked.
 - Obvious signs of underground services, services – e.g., valve cover or patching of the road surface – must be looked around.
 - Use locator's to trace any service and mark the ground accordingly.
 - Persons using these scanners must be trained and must understand their use.
 - The person supervising excavation work must have service plans and knows how to use them.
6. **A system must** be provided requiring formal **reporting and investigation** of breaches associated with excavation and trenching.
7. **Risk analysis must** identify and monitor other risks and hazards that could be introduced by physical or organisational modifications of the work of excavation and trench.
8. **All the hazards that are likely to be encountered in the work environment must be identified and controlled.**
9. **All the following parameters within the work area** (water pipes and sewerage, passageways gear, buildings weight, state of soil gas networks, power grids, chemical networks, telephone networks, optics fibre) must **be reviewed and considered** in the risk assessment.
10. **A search of potential presence** of a hazardous atmosphere must be performed. It must be treated as a confined space.
11. The work area must be **sufficiently ventilated** to maintain sufficient oxygen and prevent the accumulation of toxic substances.
12. The **necessary shoring** must be set by calculation notes and plans.
13. **A circulation plan** (access, storage, pedestrians and vehicles circulation) must be put in place.



14. In order to know the presence of any soil contamination and the groundwater levels, the project manager must undertake **a soil analysis**.

15. Control and prevention measures must be put in place.

16. A safe and monitored system of work must be developed and put in place, including the making of appropriate emergency arrangements. Collective protection equipment (shoring, battering, access and egress) must be put in place by a competent person.

> **5.0.2.2 – During the work:**

1. Precautions must be taken to protect employees during excavation work:

- Secure adequate ventilation in all workplaces and especially for tunnel works or inside wells so as to maintain an atmosphere fit for respiration and to limit any fume, gas, vapour, dust or other impurity to levels which are not dangerous or injurious to health.
- Guard against danger persons at work from a fall or dislodgement of earth, rock or other material by suitable shoring or other suitable controls.

2. A competent person must inspect excavations:

- At least once every day when persons are at work there.
- If more than 2 metres deep, at the start of each shift before work begins.
- After any event likely to have affected the strength or stability of the excavation or the shoring.
- After any accidental fall of rock, earth or other material.
- At least once every 7 days when persons are not at work there.
- After any major climatic event (freezing, thawing, heavy rain).

3. Measures must be taken to prevent materials from falling onto workers in excavation:

- Do not store spoil or other materials close to the sides of excavations.
- Make sure the edges of the excavation are protected against falling materials. Provide toe boards where necessary.
- Always wear PPE when working in excavations.
- In rock cut excavations where the rock is friable, netting should be used.

4. In order to avoid pedestrians and vehicles coactivity, and to prevent people and vehicles falling into the excavation, following measures must be taken:

- All excavations in public areas must be fenced off to prevent pedestrians and vehicles from falling into them.
- All necessary steps to eliminate the risk of collisions between pedestrians and vehicles must be taken.
- Out of hours precautions must be taken such as backfilling or securely covering excavations.
- If possible excavations in public roads or streets should be backfilled or covered over at night to minimise the risk of accidents to the public.
- Do not leave materials lying beside the area of work if not required for imminent use beside the excavation.

5. Safe access and egress from an excavation must be in place:

- Quick unobstructed and safe access and egress must be available in case of emergencies.
- Ensure that operators have an area allowing them to safety in case of fire or inrush of water or material.
- Develop pedestrian facilities (walkway with railings) to cross the trenches.
- An alternative opening should be used for insertion of hoses, ventilation ducts, power lines and other cables required for work.
- An appropriate means such as a barrier or a safety warning sign should be used to prevent unauthorised entry into a trenching area.

6. An emergency response plan must be written and communicated to all workforce and put in place to deal with excavation or penetration incidents:

- Ground slip; flooding; gas leaks.
- The rescue of workers in the event of an emergency, for example, rescue from an excavation.
- Contact with essential/electrical services.

Note: The risk assessment may indicate the need to install trench supports (or other alternative protective measures) even in relatively shallow excavations less than 1.25 m deep, particularly if ground conditions are particularly poor or the nature of the work requires workers to lie or crouch in a trench.

5.0.3 – Technical requirements

1. Measures must be taken to prevent excavation collapse

- Batter the sides and the ends to a safe angle (natural land).
- Where it is not possible to batter, support the walls with timber, sheeting or proprietary support systems.
- Do not allow any vehicle or item of plant near an edge of an excavation that may be likely to cause collapse.
- Keep equipment and materials piled, grouped or stacked at a suitable safe distance from the edge of the excavations.

2. Control measures must be taken to reduce the instability of a nearby structure

- Ensure excavations do not affect the footings of scaffolds or the foundations of nearby structures. Walls may have very shallow foundations that can be undermined by even small trenches.
- Decide if it is necessary to remove a structure in close proximity to excavation.

- Decide if the structure needs temporary support before digging starts. Surveys of the foundations and the advice of a structural engineer may be needed.
- If shoring support is required, it should be installed in such a way that the stability of the structure is not compromised at any stage of the installation/excavation process.
- If necessary, and in conjunction with the operator, protect the pipes (oil and gas, electricity, steam, superheated water...).

3. Ventilation measures should be in place to avoid exposure to hazardous atmospheres.

4. A safe system of work measures should be in place to avoid accumulation of water in the excavation.

5. In case of working at night, necessary lighting must be installed.



6.0 > Glossary

Barrier: Physical structure which blocks or impedes something.

Benching (Benching System): A method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.

Cave-in: The movement of soil or rock into an excavation, or the loss of soil from under a trench shield or support system, and its sudden movement into the excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury, or otherwise injure and immobilize a person.

Competent Person: A person who has acquired the knowledge and skills to carry out the task through training or experience. Competency is a combination of these attributes that enables a worker to identify both the risks arising from a situation and the measures needed to deal with them.

Cross Braces: The horizontal members of a shoring system installed from side to side of the excavation. The cross braces bear against either uprights or wales.

Excavation: Any man-made cut cavity, trench, or depression in an earth surface formed by earth removal.

Faces or sides: The vertical or inclined earth surfaces formed as a result of excavation work

Failure: The movement of or damage of a structural member or connections that makes it unable to support loads.

Hazardous atmosphere: An atmosphere that is explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen deficient, toxic, or otherwise harmful, that may cause death, illness, or injury

Job Safety Analysis (JSA) / Job Hazard Analysis (JHA): Methods that can be used to identify, analyse and record the steps involved in performing a specific job, the existing or potential safety and health hazards associated with each step, and the recommended action(s)/procedure(s) that will eliminate or reduce these hazards and the risk of a workplace injury or illness.

Protective System: A method of protecting employees from cave-ins, from material that could fall or roll from an excavation face into an excavation, or from the collapse of adjacent structures. Protective systems include support systems, sloping benching systems, shield systems, and other systems that provide the necessary protection.

Qualified person: One who is BOTH competent AND in possession of a recognized degree, certificate, or professional standing.

Ramp: An inclined walking or working surface that is used to gain access to one point from another. A ramp may be constructed from earth or from structural materials such as steel or wood.

Shield (Shield System): A structure that is able to withstand the forces imposed on it by a cave-in and thereby protect employees within structures or can be designed to be portable and moved along as work progresses. Additionally, shields can be either pre-manufactured or job-built.

Shoring (Shoring System): A structure that is built or put in place to support the side of an excavation to prevent cave-ins.

Sloping: The side of the excavation away from the excavation to protect employees from cave-ins. The required slope will vary with soil type, weather, and surface or near surface loads that may affect the soil in the area or the trench.

Stable Rock: Natural solid mineral material that can be excavated with vertical sides that will remain intact while exposed.

Trench (Trench Excavation): A narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6 metres). If forms or other structures are installed or constructed in an excavation so as to reduce the dimension measured from the forms or structure to the side of the excavation to 15 feet (4.6 metres) or less (measured at the bottom of the excavation), the excavation is also considered to be a trench.

“Type A” Soil: Cohesive soils with an unconfined compressive strength of 1.5 tons per square foot, tsf, (144 kPa) or greater. Examples of “Type A” cohesive soils are clay, silty clay, sandy clay, clay loam and, in some cases, silty clay loam and sandy clay loam.

No soil is “Type A” if it is fissured, subject to vibration of any type, been previously disturbed, or is part of a sloped, layered system where the layers dip into the excavation on a slope of 4 horizontal to 1 vertical (4H:1V) or greater or has seeping water.

“Type B” Soil: Cohesive soils with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa). Examples of “Type B” soils are angular gravel, silt, silt loam, previously disturbed soils unless otherwise classified as “Type C” (soil that meets the unconfined compressive strength or cementation requirements for “Type A”, but is fissured or subject to vibration), dry unstable rock, sloped layered systems sloping into the trench at a slope less than 4H:1V but only if the material would be classified “Type B”.

“Type C” Soil: Cohesive soils with an unconfined compressive strength of 0.5 tsf (48 kPa) or less and which include granular soils including gravel, sand and loamy sand, submerged soil, soil from which water is freely seeping, submerged rock that is not stable. Also included is material in a sloped, layered system where the layers dip into the excavation or have a slope of four horizontal to one vertical (4H:1V) or greater.

Unstable rock: Material on the side or sides of the excavation is secured against cave-in or movement by rock bolts or by another protective system that has been designed by a registered professional engineer.

Water scouring: Erosion process resulting from the action of the flow of water.

Zone of influence: volume of soil around the excavation affected by any external load (for example vehicles, plant, excavated materials).

APPENDIX 1 > Applicability and compliance assessment

> REQUIREMENTS	C	NC
HUMAN		
1. A qualified and competent person must be involved in planning and monitoring excavation and trenching operations.		
2. Every manager involved in excavation and trenching operations must be trained to: <ul style="list-style-type: none"> • Undertake a risk assessment. • Carry out excavation and trenching work. • Manage or supervise workers operating in or with excavations and trenches. • Maintain equipment used for or during work. • Purchase and put in place collective protection equipment. • Purchase, distribute or maintain personal protective equipment for use. • Manage an emergency rescue or first aid. • Implement the control measures. 		
3. A workplace suitable training programme must be conducted by the project manager.		
4. Each operator working in excavations and trenches must have completed a suitable training programme; evidences of this training must be provided (business card, safety passport...). The training must cover all the requirements of the work environment (safety rules, emergency procedures, access, egress, use of collective protections, wearing and maintenance of personal protective equipment, report all hazards, accidents, incidents, near misses and unsafe situations). Remind operators that work in shallow trenches can be dangerous. Avoid kneeling work in the trench. Do not enter unsecured trenches...		
5. No vehicle or any part of the installation must be parked or stored near an edge of an excavation or trench to avoid causing a collapse.		
6. Every operator must only work within secured area (battering, shoring...).		
7. A competent person must carry out inspections and safety visits when working in excavations and trenches.		
8. Safety visits must include work behaviour observations and any need for additional specific training must incorporate the results of these observations.		
ORGANISATIONAL		
Before the work		
1. A local documented excavation and trenching procedure including mandatory requirements must be developed and implemented in accordance with the requirements of this standard.		
2. Purchase and design of equipment (including hired and contracted equipment) must meet the requirements.		
3. The services of a registered professional engineer may be required to determine that excavation work will not pose a hazard to employees.		
4. A management of change process must be in place for a process or a device that may be changed in case of deterioration of equipment and results in impacts on the excavation and trenching safety process. A risk analysis process must be in place that identifies and controls additional hazards and risks that may be introduced through both physical and operational changes to excavation and trenching operations.		



> REQUIREMENTS	C	NC
ORGANISATIONAL		
Before the work		
<p>5. Precautions must be taken to avoid contact with underground services and/or overhead lines</p> <ul style="list-style-type: none"> • The appropriate service providers must be contacted and their advice must be asked. • Obvious signs of underground services, services – e.g., valve cover or patching of the road surface – must be looked around. • Use locator’s to trace any service and mark the ground accordingly. • Persons using these scanners must be trained and must understand their use. • The person supervising excavation work must have service plans and knows how to use them. • Everyone carrying out the work must know about safe digging practices and emergency procedures. • Overhead obstructions such as electricity lines in the work area must be identified. 		
<p>6. A system must be provided requiring formal reporting and investigation of breaches associated with excavation and trenching.</p>		
<p>7. Risk analysis must identify and monitor other risks and hazards that could be introduced by physical or organisational modifications of the work of excavation and trench.</p>		
<p>8. All the hazards that are likely to be encountered in the work environment must be identified.</p>		
<p>9. All the following parameters within the work area (water pipes and sewerage, passageways gear, buildings weight, state of soil gas networks, power grids, chemical networks, telephone networks, optics fibre) must be reviewed and considered in the risk assessment.</p>		
<p>10. A search of potential presence of a hazardous atmosphere must be performed. It must be treated as a confined space.</p>		
<p>11. The work area must be sufficiently ventilated to maintain sufficient oxygen and prevent the accumulation of toxic substances.</p>		
<p>12. The necessary shoring must be set by calculation notes and plans.</p>		
<p>13. A circulation plan (access, storage, pedestrians and vehicles circulation) must be put in place.</p>		
<p>14. In order to know the presence of any soil contamination and the groundwater levels, the project manager must undertake a soil analysis.</p>		
<p>15. Control and prevention measures must be put in place.</p>		
<p>16. A safe and monitored system of work must be developed and put in place, including the making of appropriate emergency arrangements. Collective protection equipment (shoring, battering, access and egress) must be put in place by a competent person.</p>		
During the work		
<p>1. Precautions must be taken to protect employees during excavation work:</p> <ul style="list-style-type: none"> • Secure adequate ventilation in all workplaces and especially for tunnel works or inside wells so as to maintain an atmosphere fit for respiration and to limit any fume, gas, vapour, dust or other impurity to levels which are not dangerous or injurious to health. • Guard against danger persons at work from a fall or dislodgement of earth, rock or other material by suitable shoring or other suitable controls. 		
<p>2. A competent person must inspect excavations:</p> <ul style="list-style-type: none"> • At least once every day when persons are at work there. • If more than 2 metres deep, at the start of each shift before work begins. • After any event likely to have affected the strength or stability of the excavation or the shoring. • After any accidental fall of rock, earth or other material. • At least once every 7 days when persons are not at work there. • After any major climatic event (freezing, thawing, heavy rain). 		

<p>3. Measures must be taken to prevent materials from falling onto workers in excavation:</p> <ul style="list-style-type: none"> • Do not store spoil or other materials close to the sides of excavations. • Make sure the edges of the excavation are protected against falling materials. Provide toe boards where necessary. • Always wear PPE when working in excavations. • In rock cut excavations where the rock is friable, netting should be used. 		
<p>4. In order to avoid pedestrians and vehicles coactivity, and to prevent people and vehicles from falling into the excavation, following measures must be taken:</p> <ul style="list-style-type: none"> • All excavations in public areas must be fenced off to prevent pedestrians and vehicles from falling into them. • All necessary steps to eliminate the risk of collisions between pedestrians and vehicles must be taken. • Out of hours precautions must be taken such as backfilling or securely covering excavations. • If possible excavations in public roads or streets should be backfilled or covered over at night to minimise the risk of accidents to the public. • Do not leave materials lying beside the area of work if not required for imminent use beside the excavation. 		
<p>5. Safe access and egress from an excavation must be in place:</p> <ul style="list-style-type: none"> • Quick unobstructed and safe access and egress must be available in case of emergencies. • Ensure that operators have an area allowing them to safety in case of fire or inrush of water or material. • Develop pedestrian facilities (walkway with railings) to cross the trenches; • An alternative opening should be used for insertion of hoses, ventilation ducts, power lines and other cables required for work. • An appropriate means such as a barrier or a safety warning sign should be used to prevent unauthorised entry into a trenching area. 		
<p>6. An emergency response plan must be written and communicated to all workforce and put in place to deal with excavation or penetration incidents:</p> <ul style="list-style-type: none"> • Ground slip; flooding; gas leaks. • The rescue of workers in the event of an emergency, for example, rescue from an excavation. • Contact with essential/electrical services. 		
<p>Note: The risk assessment may indicate the need to install trench supports (or other alternative protective measures) even in relatively shallow excavations less than 1.25 m deep, particularly if ground conditions are particularly poor or the nature of the work requires workers to lie or crouch in a trench.</p>		
<p>TECHNICAL</p>		
<p>1. Measures must be taken to prevent excavation collapse</p> <ul style="list-style-type: none"> • Batter the sides and the ends to a safe angle (natural land). • Where it is not possible to batter, support the walls with timber, sheeting or proprietary support systems. • Do not allow any vehicle or item of plant near an edge of an excavation that may be likely to cause collapse. • Keep equipment and materials piled, grouped or stacked at a suitable safe distance from the edge of the excavations. 		
<p>2. Control measures must be taken to reduce the instability of a nearby structure</p> <ul style="list-style-type: none"> • Ensure excavations do not affect the footings of scaffolds or the foundations of nearby structures. Walls may have very shallow foundations that can be undermined by even small trenches • Decide if it is necessary to remove a structure in close proximity to excavation. • Decide if the structure needs temporary support before digging starts. Surveys of the foundations and the advice of a structural engineer may be needed • If shoring support is required, it should be installed in such a way that the stability of the structure is not compromised at any stage of the installation/excavation process • If necessary, and in conjunction with the operator, protect the pipes (oil and gas, electricity, steam, superheated water...) 		
<p>3. Ventilation measures should be in place to avoid exposure to hazardous atmospheres.</p>		
<p>4. A safe system of work measures should be in place to avoid accumulation of water in the excavation.</p>		
<p>5. In case of working at night, necessary lighting must be installed.</p>		

