



SOUTHERN PORTS

ALBANY BUNBURY ESPERANCE

EXCAVATION AND PENETRATION PROCEDURE - ESPERANCE

Excavation & Penetration Procedure - Esperance

DOCUMENT CONTROL

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Important Summary Points

- An excavation is defined as any disturbance of ground to a depth greater than 150mm.
- An Excavation Permit authorised by an Appointed Excavation Permit Issuer shall be obtained by the Permit Holder (the person who is supervising the works) prior to any excavation work being undertaken.
- Where an excavation impedes on trafficable areas, a SPA Traffic Control Plan shall be implemented to ensure that no traffic will jeopardise the excavation integrity or the safety of personnel within the excavation zone.
- A ground support system (benching, shoring, battering, trenching, pot holing etc.) should be in place where a person is working in a trench >1.5m in depth, or where a person is required to bend over to accomplish a task below the natural surface of the ground.
- For the purpose of this procedure a penetration is defined as work which will compromise a man-made structure that may contain concealed services. A penetration may be by manual or mechanical means including but not limited to coring, cutting, chiselling, drilling or the insertion of a fastener.

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Excavation & Penetration Procedure - Esperance

1. PURPOSE

The purpose of this procedure is to provide information and guidance as to the minimum safe work practices for work involving the disturbance of ground or conducting a penetration at SPA - Esperance.

2. SCOPE

This procedure applies to all SPA workers, contractors, port users and visitors while on SPA Port Land.

For the purpose of this procedure:

An excavation is defined as any disturbance of ground to a depth greater than 150mm. An excavation by manual or mechanical means includes but is not limited to:

- Digging, trenching, drilling, post hole boring, directional drilling, pot holing or
- Driving of star pickets, posts, piles and stakes

A penetration is defined as work which will compromise a man-made structure that may contain concealed services which includes but is not limited to:

- Coring, cutting, chiselling, drilling or the insertion of a fastener

3. ACCOUNTABILITY

3.1. Permit Applicant.

The Permit Applicant shall complete Sections 1 – 4 of an Application for Permit to Excavate or Permit to Penetrate. The application shall include documentation indicating the proposed excavation/penetration area and the scope of work including proposed depth/width/length, start date and scheduled completion date. The application shall be submitted to the Appointed Excavation / Penetration Permit Issuer nominally 5 working days prior to proposed commencement of the works.

3.2. Permit Issuer.

A Permit to Excavate / Penetrate shall be authorised by the Appointed Person - Excavation / Penetration Permit Issuer prior to the excavation / penetration work being undertaken.

The Permit Issuer responsibilities include but are not limited to:

- Review proposed excavation or penetration scope of work
- Review, identify and mark out location of existing services in the excavation / penetration area
- Ensure the Environment Department and the Asbestos Register have been consulted regarding possible Asbestos containing material (ACM) or suspected contaminated ground being located in the excavation area
- Complete Section 5 of the Application for Permit and issue the permit to the Permit Holder
- Ensure the Permit Holder understands and acknowledges the conditions of the Permit

3.3. Electrical Supervisor.

The SPA Electrical Supervisor, or their delegate shall ensure underground or concealed services are identified and controls are implemented to mitigate contact with those services.

Ensure the Permit is filled out correctly and signed by the key stakeholders. The Electrical Supervisor shall ensure that the Permit is recorded and retained for the SPA Excavation / Penetration.

3.4. Permit Holder.

The person that the permit is issued to, whom is the supervisor of the work group undertaking the excavation or penetration works.

The Permit Holder responsibilities include but are not limited to:

- Ensuring the conditions of the Permit and the authorised excavation or penetration methodology are adhered to.
- Provide all 'As Constructed' survey data for existing and new services to the SPA Permit Applicant and Project Manager, in accordance with Section 13 Survey Data.
- Manage the specific requirements associated with excavation work including but not limited to compliance with the authorised methodologies associated with the scope of work, and where an excavation is being conducted that the installation and maintenance of safe access and ground support systems are compliant.

4. GENERAL REQUIREMENTS

Safety in and around excavations should be considered as part of job planning from the commencement of an excavation works. Identification of hazards should be part of the planning, design and estimating process. All potential hazards should be identified by the key stakeholders involved in an excavation works before the excavation commences, and during the life of the works as site conditions change.

Hazard identification should be an ongoing process throughout each individual excavation or penetration. Identifying hazards at an early stage should enable excavation methodologies and protective systems to be chosen which will reduce risk, as far as practicable, throughout all stages of the works.

Depending on the complexity of an excavation or penetration a combination of Safety in Design (SiD), Risk Assessment Workshop (RAW), Job Hazard Analysis (JHA) and a Permit shall be used to identify the hazards, assess the risk and identify the required protection controls.

A Permit authorised by an Appointed Permit Issuer shall be obtained by the Permit Holder (the person who is supervising the works) prior to any excavation or penetration work being undertaken.

In addition, during complex civil engineering work, where an excavation has the potential to impact on existing assets including but not limited to structures or existing services, the SPA Project Manager shall ensure a Temporary Works Plan (TQ) is developed and authorised by a Civil Engineer to mitigate engineering changes to the existing structures or services or the project SiD. The JHA shall then be then reviewed to reflect the changed methodologies.

4.1. Penetration.

For the purpose of this procedure, a penetration is defined as work which will compromise a man-made structure that may contain concealed services. A penetration may be by manual or mechanical means including but not limited to coring or cutting, drilling or the insertion of a fastener.

A penetration of a structure such as but not limited to walls, floors, ceiling, re-enforced concrete walls or berth surfaces may result in injury or harm to workers as a result of contact with concealed services such as potable water, fire water, sewage, hydraulic, compressed air or electrical services. In addition, a penetration may potentially compromise the structural integrity of critical infrastructure including but not limited to a berth structure, vessels' hull, or a gantry crane boom.

The Permit Applicant shall complete Sections 1 – 4 of an Application for Permit to Penetrate. The application shall include documentation indicating the proposed location, depth and physical dimensions of the penetration, available services systematic diagrams, and the proposed scope of work. The application should be submitted to the Electrical Supervisor nominally 5 working days prior to proposed commencement of the works.

The Electrical Supervisor, or their delegate, shall conduct an inspection of the proposed work area and consult the available systematic diagrams and the scope of work to determine the potential of hidden services. If no services are identified or the potential for contact is determined to be low risk, they shall sign Section 5 of the Penetration Permit, and if required, identify conditions to mitigate potential contact.

If the Electrical Supervisor, or their delegate, are unable to confirm the location of concealed services and considered it unsafe to penetrate the structure the permit shall not be authorised. The Permit Applicant shall cancel the proposed works or identify an alternate:

- non-penetration method to fasten an object to the structure,
- location for the object, or
- route for the proposed services.

The Permit Applicant shall review the JHA to reflect the alternate scope or work methodologies and develop a new permit application as applicable to the revised scope of work.

4.2. Excavation

Because of the technical issues that may be involved with complex excavations at SPA a competent person shall be a person with an appropriate engineer competence, or a SPA Project Manager or Construction Supervisor acting on advice from an engineer on a specific aspect of the excavation. Complex excavations may include, but are not limited to excavations:

- deeper than 1.2 metres
- adjacent to a body of water
- in soils with slip planes or variable ground conditions (soft sand)
- involving complex de-watering
- where it is necessary to evaluate the pressure on excavation walls from surcharge loads such as excavated material, machinery, or adjacent structures so as to determine appropriate ground support systems.

All competent persons should have a sound knowledge of:

- how to identify and locate underground services;
- the hazard identification, SiD and risk management process for excavation work;
- safe work practices for excavation work including ground support systems;
- how to identify soil types and other factors that affect the safety and stability of an excavation; and
- SPA procedures, workplace health and safety legislation, relevant Australian Standards and Codes of Practice.

4.2.1. Location Of Underground Services And Other Structures

Before any excavation work commences, the exact location of all underground services and structures needs to be established in accordance with the current legislation. These services and structures include but are not limited to, electrical power cables, telecommunications and data cables, fuel lines, sewer pipes, water and drainage pipes, soak wells, storage tanks, gas mains and structural footings.

The Permit Applicant in consultation with the Excavation Supervisor shall mark out the general area that requires existing services to be located, using a suitable marking paint for the environment where it is to be used. During the location process, all identified services shall be marked out with marking paint of a different colour to clearly represent each different service. Refer to Attachment 1.

Systems such as but not limited to Arc Geographic Information System (Arc GIS) mapping, 'Dial Before you Dig', Ground Penetrating Radar (GPR) or electronic cable locator device may be used to determine the exact location of underground services, however a visual method such as Hydro vacuuming (pot holing) is needed to confirm the location before work can commence.

When determining the location of underground services, the Four P's principle should be applied:

Pothole, every 5 metres to ensure that the existing services location is known and understood before commencing;

Plan - develop a risk based authorised excavation methodology and traffic control plan;

Protect - install ground support systems and barricading to protect the excavation site and existing services; and

Proceed - develop a JHA to assess the prevailing work environment conditions and apply for the applicable permits including but not limited High Voltage Access, Hot Work and Confined Space permits.

After authorisation of an Excavation Permit and where services are identified a mechanical excavation using a tooth bucket may be undertaken to a maximum depth of 150mm to penetrate a road surface base. Excavations greater than 150mm shall be undertaken by mechanical excavation using a batter bucket (toothless) to within 300mm of the known pothole depth of the services. The excavation shall then be continued by manual means (shovel) until the service or structure is located.

5. COHESIVE STRENGTH AND EARTH PRESSURE

In their natural condition, soils have varying degrees of cohesive strength and frictional resistance. Examples of materials with virtually no cohesive strength are dry sand, saturated sand and gravels with minimum clay content. Ground encountered in trench excavations can generally be categorised as one of three main kinds:

- hard, compact soil
- soil liable to crack or crumble
- loose or highly unstable material

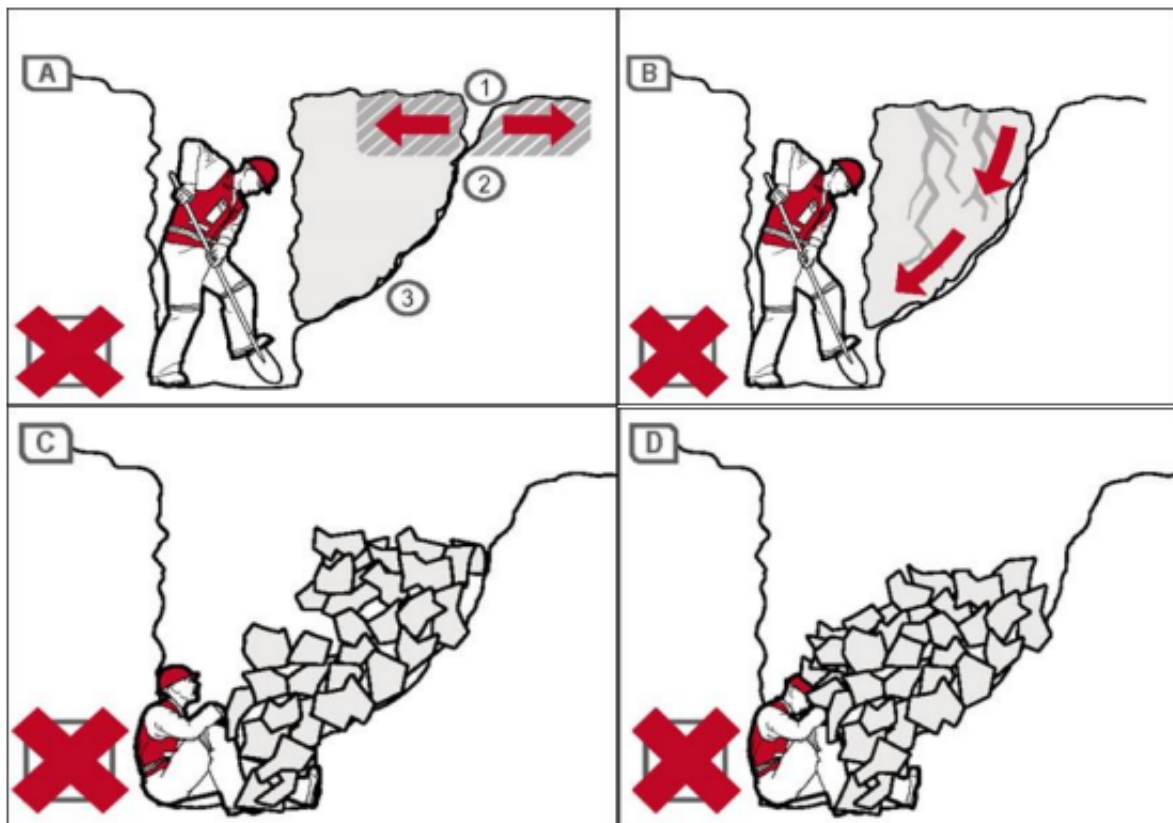


Figure 1. Trench Collapse and Associated Ground Forces

Non-cohesive faces may be very treacherous. With just the right amount of moisture, they look, for a short time, safe and solid. Very little loss of water by evaporation will make the soil crumble, as would an increase in the water content from rain or other causes.

Evaluating pressure on a trench wall is a complex matter requiring consideration of a number of factors including soil type, moisture content, effect of the weight of the excavated material and adjacent machinery loadings and should be undertaken only by a competent person.

A ground support system shall be in place where a worker is working in a trench >1.2m in depth, or where the worker is required to bend over to accomplish a task in a trench, thus placing an individual's breathing zone in a vulnerable position should the trench wall collapse. A competent person shall design and authorise the ground support systems prior to entry.

6. SUPPORT SYSTEMS AND RETAINING STRUCTURES

Support systems and retaining structures include shoring systems to support the sides of an excavation, shield systems to protect against cave-in. This includes Structures such as underpinning, shoring or bracing to provide support to an adjacent structure or an underground installation.

6.1. Shoring.

Shoring is the provision of support for excavation faces to prevent movement of soil. Shoring or shielding is used when the location of an excavation or the depth of cut makes battering or benching impracticable.

6.2. Shields and Trench Box.

Shields or trench boxes differ from shoring in that they do not support the trench face. They are intended primarily to protect workers from cave-ins. The space between the trench box and the sides of the excavation are backfilled to prevent lateral movement of the box. Trench shields are generally used in open areas where craneage is satisfactory. However, they may also be used in combination with sloping and benching. Steel shoring and trench lining equipment should be designed in accordance with AS 4744, Steel shoring and trench lining equipment, Part 1: Design.

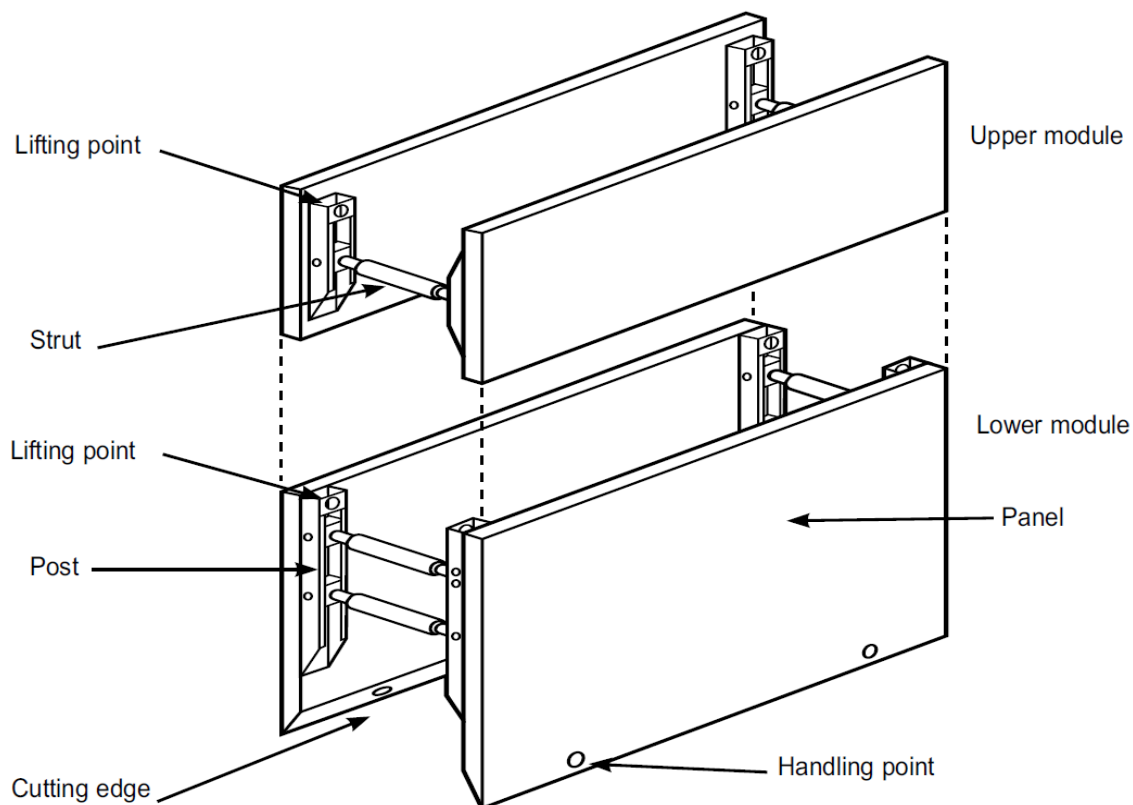


Figure 2. Typical Trench Shield

6.3. Battering.

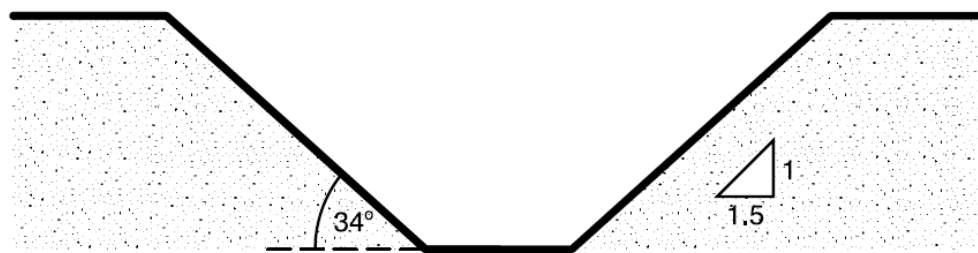
Battering, often referred to as sloping, is a way of preventing cave-ins by cutting the face back to a safe incline. Advice from a competent person is always needed to assess safe slopes since the angle of incline required to prevent collapse varies with the soil type, the height of the face, the moisture content of the soil and any surcharge loads acting on the face.

Battering the sides of an excavation to provide safe working conditions is often only economical for shallow excavations in open ground with minimal obstructions. For deeper excavations and trenches, shoring or the use of shields can usually provide a quicker and more economical option by reducing the quantity of excavation, placement, and backfill.

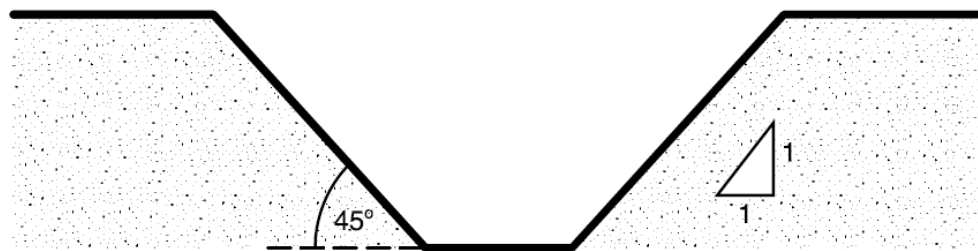
These slopes may not be safe in all soil conditions. Typical circumstances that may require a safer slope (or shoring and other controls) include where:

- There are surcharge loads
- There are planes of weakness or soil layering
- The ground to be excavated is not level, groundwater will be encountered, or there are vibrating forces.

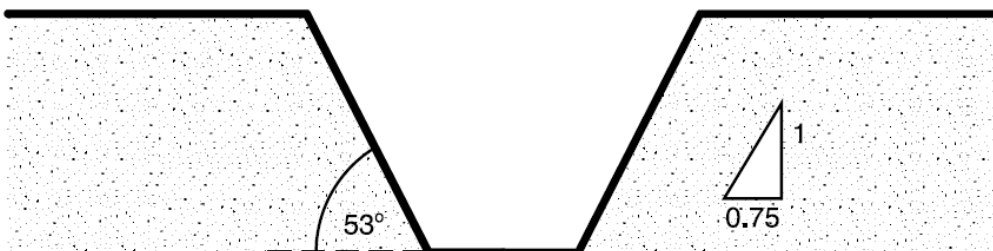
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Granular soils



Weak cohesive soils



Cohesive soils

Figure 3. Soil Types.

Soil type	Horiz/depth ratio	Slope angle
Granular soils: crushed rock, gravel, non-angular poorly graded sand (such as 'Bassendean sand'), loamy sand	1.5:1	34°
Weak cohesive soils: angular well graded sand (such as 'Karrakatta sand' or 'Spearwood sand'), silt, silty loam, sandy loam.	1:1	45°
Cohesive soils: clay, silty clay, sandy clay.	0.75:1	53°

Employees also need to be protected from excavated or other materials or equipment that could fall or roll into the excavation. Materials and equipment should be kept at least 600 mm from the edge of excavations. At SPA- Esp for excavations greater than 600mm a nominal ratio of greater than a 1:1 (depth/distance) shall be maintained.

6.4. Benching.

As for battering, the type of soil determines the horizontal to vertical ratio of the benched side. Benching is suitable only for cohesive type soils. At SPA - Esp, the bottom vertical height of a trench excavation should not exceed 1.2 metres for the bench. Typically, a horizontal to vertical ratio of 1:1 should be applied for benching.

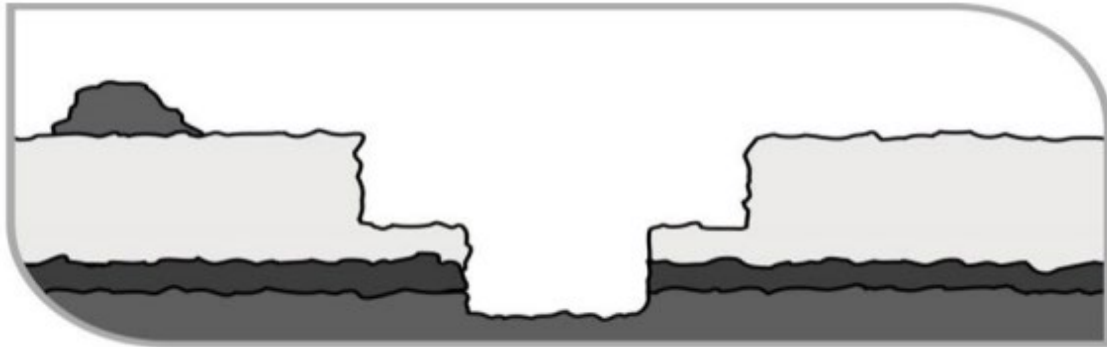


Figure 4. Benching



Figure 5. Combination of Benching and Battering Controls

7. BARRIERS AND WARNING SIGNS

Barrier and warning signs should be erected in accordance with the SPA-Esp Barricading, Guarding and Signage procedure (D18/2169).

The location of the barrier from the edge of the excavation will also depend on the nature of the excavation work being carried out. In deep excavations, the barrier may need to be placed well back from the edge of the excavation to protect the edge from collapse due to the barricade and allow work to be carried out around the edge of the excavation.

Suitable signs that warn of the risk 'Danger – Open Excavation', are to be erected where excavation work is carried out. Signs shall be placed at appropriate locations around the perimeter of the excavation where they may be easily seen. Signs should comply with the requirements of AS 1319.

Where an excavation impedes on trafficable areas a SPA - Esp Traffic Awareness Plan shall be implemented. The location and configuration of traffic management barriers and signage should comply with the Code of Practice for Traffic Management for Works on Roads.

Where an excavation impacts on the turning circle of surface mobile plant including but not limited to prime movers with semi-trailers, tramming Front end loader (FEL), Elevated Work Platform (MEWP) and Forklift (LF) the excavation and structural infrastructure should be protected by hard deflection barricading. Hard deflection barricading shall be concrete barriers, continuous interlinked water filled Jersey Barriers, or a delineated earthen bund >1m high.

8. INGRESS AND EGRESS

When an employee enters an excavation at least 1.2 metres deep they shall have another employee present in the immediate work area.

Provision should be made for movement of persons in and around excavations. For trench excavations a safe means of egress must be established and should be provided at intervals of not more than 20 metres to limit the travel distance of a worker to 10 metres from the nearest means of exit. Where portable ladders are used, they must be in accordance with the relevant parts of AS/NZS 1892, properly secured and extend at least 900 mm above the surface of the excavation or intermediate landing.

9. INSPECTION

Should an excavation be left unattended or open for more than 1 shift, an Inspection of the excavation should be made on return to the excavation by a competent person.

Inspections should look for indications of any situation that could result in cave-ins, indications of failure of protective systems and any indications of hazardous substances or toxic atmospheres being encountered.

Inspections should be carried out:

- daily and before work commences
- when tension cracks, sloughing, undercutting, water seepage, bulging or other similar events occur or when disturbed soil is encountered
- when the size, location or placement of the spoil heap changes from the original scope
- when excavating adjacent to or beneath structure's
- when any indication of movement in an adjacent structure is noticed, and
- after every rainstorm or seismic event

Where inspections reveal potential hazardous situations, employees must be removed from the excavation until precautions have been taken to ensure their safety. A risk based TQ methodology shall be developed and authorized by a competent person in consultation with the SPA Project Manager or his delegate prior to re-entry into the excavation.

10. APPLICATION FOR EXCAVATION PERMIT

In developing an application for a Permit to Excavate the applicant shall ensure that:

- An Application for Permit to Excavate form (GOVE-1688532262-236) is submitted to the Permit Issuer nominally 5 working days prior to the excavation work being performed. In the event of the need for an emergency excavation the 5 day notification period may be waived after consultation with the authorised Excavation Permit Issuer.
- The application for an Excavation Permit shall include the schematic drawings which indicate the location of existing underground services and proposed service or structure installations including but not limited to:
 - Electrical
 - Data
 - Air
 - Communication
 - Sewerage Services

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- Fire Hydrants
- Water Mains
- Drainage
- Fuel services
- Prior to submitting an application for a Permit to Excavate, the excavation supervisor shall mark out the limits of the excavation prior to a site inspection by the authorised Excavation Permit Issuer.
- The authorised Permit to Excavate and JHA shall be available at the work location, at all times during the excavation work.

10.1. Minimising Risk for Concealed Services.

All reasonably practical measures to minimise the risk to those carrying out the work shall be implemented. These shall include all or a combination of:

- Clearly demarcating boundaries of the work area.
- Keeping the demarcated area as small as practicable on the drawings.
- Clearly marking the excavation route on the ground, using paint (by the Excavation Supervisor).
- Identifying and determining the depth of the position of concealed cables, pipelines and services using scanning equipment (by the Electrical Department).
- Hydro-vacuuming (Pot Holing) to determine the exact location of underground services
- Marking the location of these services on the ground using paint.
- Isolating or protecting the services, including shutting down plant.
- Assigning a spotter to constantly watch the excavation for hazards.
- Identifying overhead, adjacent and manual handling hazards.
- Immediately stopping work in the instance that they identify chemical, radioactive, asbestos or other hazards.
- Ensure that only a batter bucket is used on the excavation equipment.
- Ensure that at no point in the works that workers in or around the excavation are placed under a suspended load.

The Excavation Supervisor shall minimise risk by ensuring:

- Excavations are conducted within the area demarcated on the ground and identified in the Permit to Excavate. The Excavation Supervisor shall inspect the excavation site to ensure the area marked, is where the excavation will take place.
- Informing all employees working on the excavation of the risks and controls at the daily Prestart meeting and by ensuring all employees read and sign onto to the JHA for the work.
- Hand excavation or pot holing is conducted within one meter of any known service to expose and confirm identification, exact location, direction and depth prior to any mechanical digging.
- The presence of other services which may not be identified on drawings or are masked by existing services including but not limited to 415V, 3.3KV or 11KV services, fibre optic cable and telecommunications are assumed and that excavation methodologies are employed to mitigate damage, such as:

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- Using only batter bucket on machines for excavation work
- Manually dig carefully across the trench, 50 to 100mm at a time, and then remove spoil with bucket, and
- A Spotter is in place to identify tell-tale signs such as changes in soil type (strata types, sand or small aggregate), or underground marker tape, conduit, bricks or concrete.
- All services encountered are assumed to be live.
- The JHA, Permit to Excavate and excavation methodology shall be available at the worksite at all times during the excavation.
- The Excavation Supervisor shall ensure that all cables, pipelines and services exposed by preliminary Excavation are inspected by a competent person.
- The Permit to Excavate will remain valid for no more than seven (7) working days, unless stated shorter on the Permit to Excavate. Where a drill program has been supplied, then the permit may remain in place for the period of that program, providing that the boundaries of that program are not breached.

10.2. Discovery and Reporting of Unknown Services.

If an unidentified or unknown service is discovered, the Excavation Supervisor shall:

- Initiate a Stop Work Authority and cease excavation operations
- Barricade the area, and
- Notify the Excavation Permit Issuer, SPA Project Manager and Construction Supervisor

10.3. Discovery and Reporting of Possible Fibrous/Asbestos Containing Material.

If suspected fibrous or Asbestos Containing Material (ACM) is found the Permit Holder shall follow the guidance provided in the SPA-Esp safe work instruction Reporting Suspected Fibrous & Asbestos Material. The suspect material must be reported to the Safety and Security Manager or the Ventilation Officer immediately.

- The suspect fibrous/asbestos material is not to be disturbed or handled and should remain in situ.
- The immediate area where the material is located should be marked with appropriate signage and cordoned off.
- The area will then be inspected by the Safety and Security Manager or the Ventilation Officer. (Environment staff will be notified if soil contamination is suspected).

10.4. Generation and Disposal of Fill.

All material removed during excavation (fill) if excess to requirements shall be retained at SPA - Esp. The Excavation Supervisor and Project Manager shall consult with the SPA – Esp Environment Department to determine the location for temporary stockpiling, sampling and analysis requirements, and disposal controls.

11. CONFINED SPACE

A Confined Space is an enclosed or partially enclosed space that is not intended or designed primarily for human occupancy. During installation a civils structure, or aspect of a structure, may be classified as a confined space. These structures included but are not limited to a drainage line, draining pit, interceptor pit or a pond.

All potential Confined Spaces, which personnel may need to enter, shall be registered on the SPA-Esperance Confined Space Register. A Confined Space Evaluation shall be conducted to

identify the hazards, assess the risks and to identify the required controls for the space. In addition, a Confined Space – Emergency Response Plan shall be developed and communicated prior to entry into a confined space.

All drainage supervisors and project managers shall refer to the SPA - Esp Confined Space Entry procedure for guidance when assessing a potential confined space.

12. SURVEY DATA

The SPA Project Manager shall ensure that all new underground services installed are surveyed by a competent Surveyor. On completion of the excavation project the SPA Project Manager shall submit the 'As Built' survey data captured to gis@southernports.com.au.

The survey data submitted to SPA Arc GIS should be in the following formats:

- X, Y, Z real world coordinates ESP2020, AHD (preferred), MGA2020 Zone 51, or using the GDA1994 datum.
- Shapefile format preferred with detailed attribution of infrastructure identified (eg depth of pit/cable/conduit, type, number of conduits, sizes, direction of heading). For points, tabular data is acceptable. For lines or polygons 3D CAD format is acceptable as long as attribution is clearly indicated for each feature.

The Metadata should be submitted as text file or word document which includes:

- date of the survey
- coordinate reference system - horizontal and vertical
- an accuracy statement - horizontal and vertical
- the company name
- the surveyors' name, email address, phone number
- any surveyor notes

Any queries regarding Arc GIS or the submission of survey data should be referred to gis@southernports.com.au.

13. RECORD MANAGEMENT

On completion of the excavation work the SPA Project Manager or Excavation Supervisor should return the completed Permit to Excavate to the Shift Superintendent's, Mission Control office. The Maintenance & Operations Administrator will then scan and file the permit into the Administrator Asset Management data base.

14. DEFINITIONS

Term	Definition
Angle of Repose	The angle of repose of a granular material is the steepest angle of descent or dip relative to the horizontal plane to which a material can be piled without slumping. At this angle, the material on the slope face is on the verge of sliding. The angle of repose can range from 0° to 90°.
Backfill	Material used for refilling excavations.
Barricade	A temporary material, device or systems consisting of either rigid or soft vertical and horizontal members designed to restrict or control access to a work area where there is a hazard that has the potential to result in injury to personnel or damage to plant.
Batter	The stable, formed slope of an excavation or earth bank, cut to an angle less than the natural angle of repose to prevent earth slippage.
Bench	An excavation cut in steps to provide horizontal bearing and sliding resistance.
Construction Supervisor	SPA appointed person with specific responsibility for supervising works on site.
Excavation	Means a work which involves a disturbance of soil or where other subsurface material is removed such as but not limited to: a trench, ditch, shaft, well, pit, pond, tunnel, pier hole, cutting or caisson or a hole drilled in the earth.
Permit Applicant	The person who applies for the permit to excavate. Nominally the excavation project manager or supervisor.
Permit Holder	The competent person supervising excavation work.
Permit Issuer	A SPA employee who is an Appointed Person authorised as an Excavation Permit Issuer.
Personnel	All person working at SPA - Esp including SPA employees, contractors, sub-contractors, clients, port users and visitors.
Project Manager	SPA appointed person with overall responsibility for delivering a project to time, cost and quality objectives in line with the approved business plan (where applicable).
Risk Assessment	<p>May include but not limited to a:</p> <ul style="list-style-type: none"> • Safety in Design (SiD), • Contractor Risk Assessment Workshop (CRAW), • Safe Work Instruction (SWI), • Job Hazard Analysis (JHA), • Stop & Think, or • a combination of the above. <p>For the purposes of identifying hazards and the required controls to minimise risk to safety, health, environment and community.</p>

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Safe Slope	The steepest slope at which an excavated face is stable against slips and slides, having regard to the qualities of the material in the face, the height of the face, the load above the face and the moisture conditions for the time being existing. A safe slope does not flatten when left for a considerable period, there is no movement of material down the slope and the toe of the slope remains in the same place.
Safety in Design	The integration of control measures early in the design process to eliminate or, if this is not reasonably practicable, minimise risks to health and safety throughout the life of the structure being designed.
Shall and should	The word “shall” is to be understood as mandatory and the word “should” as recommended but non-mandatory.
Sign	An inscribed board, plaque or other delineated space on which a combination of legible writing and symbols is used to convey a message, Danger – Excavation in Progress.
Soft Barricades	Temporary delineation tape, bunting, traffic cones or bollards used to warn of a hazard in a work area.
Surcharge Load	A load which is imposed upon the surface of the soil adjacent to the excavation to cause a lateral pressure on the excavation. Surcharge load may include but not limited to excavated soil, surface mobile plant or a structure.
Trench	A long, narrow, open excavation in which the horizontal width across the top is less than twice the vertical depth of the deeper side.
Workplace	A place including but not limited to an area, ship, vehicle, building, or other structure, where employees work or are likely to occupy in the course of their work.

15. RELATED LEGISLATION AND DOCUMENTS

The applying legislation and documents include, but are not limited to the following:

External.

- Work Health & Safety Act 2020 (WA)
- Work Health & Safety (General) Regulations 2022 (WA)
- CoP Excavations – WorkSafe W.A.
- AS 2865.2009 Safe Working in a Confined Space
- AS 1319.1994 Safety Signs for the Occupational Environment
- AS 4744, Steel shoring and trench lining equipment, Part 1: Design.

Internal.

- Isolation and Tagging Procedure (D16/695)
- Barricading, Guarding and Signage Procedure (D18/2169)
- Engineering Design Guideline (GOVE-1688532262-2033)
- Scaffolding Procedure (D17/3943)
- Traffic Management Plan (D16/1012)
- Work at Height Procedure (D20/7758)
- Confined Space Entry Procedure (D20/415)
- Application for Permit to Excavate (GOVE-1688532262-236)
- SWI – Reporting Suspected Fibrous/Asbestos Material (D17/14562)

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ATTACHMENT 1: PERMIT TO EXCAVATE - WORKFLOW

#	Step	Active Contribution	Accountable
1	Prepare construction systematic drawings for all proposed underground services or structure. Initiate a SiD and CRAW for complex excavations being undertaken by a contractor.	Permit Applicant	Permit Applicant
2	Develop the Application for a Permit to Excavate.	Permit Applicant	Permit Applicant
3	Mark out the actual excavation, indicating the excavation limits. <ul style="list-style-type: none"> White mark out for the excavation limits 	Permit Applicant	Excavation Supervisor
4	Raise purchase order for subsurface scanning and surveying	Permit Applicant/ Project Manager	Permit Applicant/ Project Manager
5	Review systematic and ArcGIS drawings	Permit Applicant	Permit Applicant/ Project Manager
5a	Contact Environment Dept to check for the presence of potential ACM	Permit Applicant	Permit Applicant Permit Issuer
6	Walk over job location, identify hazards, mark area for excavation to be scanned and all known services <ul style="list-style-type: none"> Red mark out for area to be scanned Orange mark out for known services 	Local knowledge personnel Engineering Project Manager/ Excavation Supervisor	Permit Applicant
7	Receive drawings, perform scan, mark services/concerns found on drawings <ul style="list-style-type: none"> All services found through the scan shall be marked out in Orange 	Excavation Supervisor Electrical & Mechanical Supervisors	Scanning Technician
8	Complete Sections 1 – 4 of the Application for a Permit to Excavate and attach the engineering systematic drawings, excavation scope of works and excavation methodologies. Submitted the Application for a Permit to Excavate to the Permit Issuer <5 working days prior to commencement of works.	Permit Applicant	Permit Applicant
9	Determine and record the excavation control conditions in Section 5 of the Application for a Permit to Excavate and authorise the permit.	Electrical Supervisor	Permit Issuer/s
10	Explain excavation control measures to Excavation Supervisor, ensuring controls and permit conditions are understood and acknowledged.	Electrical Supervisor	Permit Issuer/s
11	Develop the excavation JHA to reflect the environmental conditions, authorised excavation methodology and permit conditions.	Excavation Team	Excavation Supervisor
12	Conduct Prestart meeting with Excavation Team	Excavation Team Project Manager	Permit Holder/ Construction & Excavation Supervisor
13	Sign on to PTW and the JHA for the excavation work.	Excavation Team	Permit Holder, Construction & Excavation Supervisor
14	Commence excavation	Excavation Team	Permit Holder, Construction & Excavation Supervisor

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14a	Unidentified service located STOP WORK , barricade, and report to Excavation Supervisor, SPA – Project Manager and Permit Issuer	Excavation Supervisor Excavation Team	Permit Holder, Construction & Excavation Supervisor
14b	Unidentified service located Revise the excavation methodology and JHA. Record services found	Excavation Supervisor	Competent Engineer
14c	Suspected fibrous / asbestos containing material is found. STOP WORK. barricade, report per SWI Reporting Suspected Fibrous / Asbestos Containing Material. (D17/14562)	Excavation Supervisor	SPA Environmental Manager
15	Complete Excavation	Excavation Supervisor	SPA Project Manager & Construction Supervisor
16	Submit survey data for new installed service and/or discovered services to SPA ArcGIS.	Excavation Supervisor	SPA Project Manager & Construction Supervisor