Guideline
Excavation and Penetration Works

Contents

1 Purpose

The purpose of this guideline is to specify the safe working requirements and minimum standards to undertake works on or in the vicinity of underground services and structures at Federation University. This is to eliminate or minimise, so far as is reasonably practicable, the risks associated with excavation and penetration works in Federation University-managed campuses and premises.

Strict adherence to this guideline is necessary for the health and safety of employees, contractors and visitors of Federation University.

No excavations are to be undertaken on Federation University-managed land, property and facilities until an *Excavation Permit* has been obtained for any excavation works to be undertaken, regardless of depth.

Excavation work means work involving the moving/removal of soil or rock from a site to form an open face, hole or cavity using tools or machinery. Excavation includes but is not limited to digging, trenching, drilling, piling, boring, potholing, post digging, slotting, cutting, and profiling.

2 Scope

This Guideline applies to all excavation and penetration works within the boundary of Federation University-managed campuses and premises.

All workers, students, visitors and contractors must comply with this Guideline when undertaking work that involves excavation.

3 Legislative and Regulatory Context

- Occupational Health and Safety Act 2004 (Vic)
- Work Health and Safety Act 2011 (Cwlth)
- Safe Work Australia Code of Practice: Excavation Work

4 Responsibilities

4.1 Excavation Permit Requestor

The Excavation Permit Requestor is usually the Contractor engaged to perform the excavation work. They must obtain the required documentation and information by liaising with the Federation University Representative. They must:

- liaise with various stakeholders and obtaining clearances from relevant organisations prior to commencement of planned works;
- conduct excavations in accordance with the permit received and defined scope of works; and
- obtain and maintain the necessary competencies to undertake excavation works.

***Note**: Before You Dig Australia (BYDA) drawings may not contain the location of Federation University Services. Permit Requestors must consult with Federation University before relying on BYDA information. The available documentation cannot be relied upon, and Requestors must undertake further risk assessment to determine whether further services location investigation is required. The Permit Approver may also request an underground services detection to be engaged by the Contractor, prior to approving the Excavation Permit.*

4.2 Excavation Permit Approver

The Campus Facilities Manager/Coordinator is responsible for approving all excavations and penetration work to be undertaken at Federation University. The responsibilities of the Excavation Permit Approver are to:

- ensure all reasonable steps have been taken to identify underground services within the work area;
- ensure that the Excavation Permit form has been satisfactorily completed by the permit requestor;
- ensure that the contractor's workers are trained and competent to undertake the work;
- authorise approval for work to be undertaken, once confident that the permit requestor can complete the task safely;
- monitor the work undertaken by the permit requestor, ensure duration times are adhered to and ensure risk assessments have been completed;
- ensure supervision, information and training to manage risks involved with excavation work as it pertains to work under their control;
- ensure the Excavation and Penetration Works Guideline is adhered to for all excavation work under their control;
- consult, as far as is reasonably practicable, with workers undertaking excavation work and University staff and students who are (or are likely to be) directly affected by excavation work;
- sign off on the "Work Completion" section of the permit after verifying that the work site has been left in a safe condition; and
- maintain records of work permits including associated documentation such as risk assessments.

4.3 Federation University Representative

The Federation University Representative is the designated person who engages a contractor to undertake the excavation work. In most cases, the Project Manager is the University Representative for excavation and penetration works.

The responsibilities of the Federation University Representative are to:

- coordinate and manage the contract;
- ensure that the contractor is aware of the Excavation Permit process and requirements; and

- oversee the Excavation Permit process and providing clearance to proceed from a project perspective.

4.4 Health, Safety and Wellbeing (HSW) Department

The HSW Department shall:

- provide professional input to excavation or penetration work on request; and
- provide expert and regulatory guidance to responsible persons on request.

5 Excavation Work Process

5.1 Steps

***Note**: Several underground services are in all campuses managed by Federation University, which are located at various depths and locations on site. The historical nature of these services and changes to ground conditions mean that university maps, plans and other BYDA information cannot be solely relied upon. A risk assessment and possible further investigation will be required to maintain a safe work environment. Employees and contractors who undertake work that has the potential to disturb these services must follow the protocol established by the Property and Infrastructure Directorate.*

Services located on sites include but are not limited to high voltage electricity, high pressure gas, fibre optic, telecommunications, wastewater, water, other electrical and gas.

All excavation work, repairs and/or maintenance must be undertaken by an appropriately competent person, in accordance with current relevant legislation, engaged by the Property and Infrastructure office. The engagement of contractors or other service providers to undertake work at University worksites does not absolve the University of its responsibilities and obligations as an employer. There remains a statutory duty for the University to ensure its workplace is safe, so far as is reasonably practicable, regardless of any contractual terms and conditions.

The following steps briefly outline the process for excavation works:

1) Prior to the commencement of any such work, the Property and Infrastructure office must be contacted to identify all services (through, drawings held by P&I office and information from Operations and Maintenance personnel). Note that BYDA information is a secondary source of information, and you must consult with Property and Infrastructure before relying on this information.
2) The Contractor must discuss with the University representative and O&M staff, regarding work that is to be performed, and ensure controls are in place to comply with the Safe Work Australia Code of Practice for Excavation Work and other relevant regulations.
3) Contractor must then apply for Excavation Permit with the P&I front desk and obtain the approved permit before commencing works on site.
4) On completion of work, the contractor must get the “Work Completion” section of the Excavation Permit signed by the Permit Approver.
5) The Contractor must supply updated drawings of any underground services that have changed due to the works undertaken.
6) Where a contractor identifies underground services which have not been recorded on the current drawings of the proposed excavation area, the contractor must notify the University Representative. On request from the University Representative, the Planning and Design Unit (Design & Drawings Coordinator) will:
    - inspect the site;
    - survey the location of services including geo-positioning;

- document the changes to the services drawings as applicable, superseding any earlier versions; and
- upload the updated services drawing to BYDA Portal.

5.2 Existing Service/Conditions Documentation

The Permit Requestor is to note that the BYDA drawings and other University plans showing the position of underground services are for guidance purpose only.

***Note**: BYDA drawings may not contain the location of Federation University Services, you must consult with Federation University before relying on BYDA information.*

The plans may show the position of such services, other structures and equipment relative to fences, building walls, etc. as at the time the service was installed and may not consider any subsequent change. The University accepts no liability for inaccuracies in the information or lack of information on plans provided to the contractor as part of this permit process.

Where satisfactory information is not sighted in the drawings, the Permit Approver will request that a detailed scan of underground services in the work area be undertaken by the Permit Requestor.

Prior to commencing the work, the Permit Requestor must ensure that the location of all services in the area of excavation (within 2m) is marked on site.

5.3 Issuing Excavation Permit

The Property and Infrastructure Office issues Excavation Permit forms. The Permit Requestor is to provide at least 48 hours' notice of the proposed excavation work to apply for a permit. Emergency rectification works may necessitate the immediate need for a permit and as such 48 hours' notice is not required. All relevant sections of the permit must be completed.

The Permit Approver will also issue drawings detailing the known services located in the proposed area of excavation, or the floor slab, wall or road location. The Federation University Representative must ensure that the contractor fully understands that the relevant permits must be obtained before work can commence.

The permit and attached paperwork shall identify current underground essential services information about the area(s) proposed for excavation. This may include essential services that use pipes, cables or other associated plant located underground.

The permit should also outline any other considerations in relation to proposed excavation work that may be affected by the excavation, such as:

- the essential services that may be affected,
- the location, including the depth, of any pipes, cables or other plant associated with the affected essential services,
- any conditions on the proposed excavation work.

See also sections 5.5 on Safe Work Method Statements and 6. on risk assessments.

5.4 High-Risk Work (HRCW)

High-risk construction work involves activities:

- where there is a risk of a person falling more than 2m;
- on or next to roadways or railways used by road or rail traffic;
- in, over or next to water or liquids where there is a risk of drowning;
- at workplaces where there is any movement of powered mobile plant;

- where there are structural alterations that require temporary support to prevent collapse;
- in an area where there are artificial extremes of temperature;
- on or near energised electrical installations or services;
- involving a trench or shaft more than 1.5m deep;
- on or near pressurised gas distribution mains or piping;
- involving demolition;
- involving a confined space;
- on or near chemical, fuel or refrigerant lines;
- involving tilt-up or precast concrete;
- on telecommunications towers;
- involving diving;
- involving removal or disturbance of asbestos;
- in an area that may have a contaminated or flammable atmosphere;
- involving the use of explosives; and
- involving a tunnel.

All high-risk construction works require Safe Work Method Statements (SWMS). In addition, the University requires a SWMS for any excavation or penetration work, whether or not it qualifies as HRCW under the definition provided above. See section 5.5 below for more information.

***Note**: When there is a need to excavate a trench or shaft more than 1.5m deep, the following requirements apply:*

- *work area shall be secured against unauthorised access; and*
- *all sides of the trench are to be adequately supported by adequate shoring, shielding or other comparable means, benching or battering to safeguard personnel entering the trench.*

The contractor must comply with all WorkSafe requirements for trench support. Soft, yielding or other unsuitable material must be removed and replaced with compacted clean, low plasticity soils or stabilised sand. Unsuitable material must be removed from the site at full cost of the contractor.

Trenches for underground services must be excavated in a straight line using a mechanical excavator or similar approved means. The trench width must be 300mm wider than the service to be laid. Wider trenches may be approved by the Permit Approver only where the space is necessary for personnel to safely enter the trench to connect services. Trenches must be wider than 150mm to ensure adequate compaction of the backfill.

The Permit Approver reviews the work scope prior to approving the Excavation Permit and will determine whether any other Permit to work is also required (e.g. Hot Work, Work at Height, Confined Spaces, etc.).

5.5 Safe Work Method Statements (SWMS)

The Permit Requestor must submit a SWMS attached to the Excavation Permit. The SWMS must:

- identify any type of high-risk construction work that is applicable to the work;
- specify the health and safety hazards and risks arising from that work;
- describe how the risks will be controlled;
- describe how the control measures will be implemented, monitored and reviewed; and
- be developed in consultation with workers and their representatives who are carrying out the high-risk construction work.

Excavation-specific hazards that may need to be considered in the SWMS include:

- underground essential services – including gas, water, sewerage, telecommunications, electricity, chemicals and fuel or refrigerant in pipes or lines;
- the fall or dislodgement of earth or rock;
- falls from one level to another;
- falling objects;
- inappropriate placement of excavated materials, plant or other loads;
- the instability of any adjoining structure caused by the excavation;
- any previous disturbance of the ground including previous excavation;
- the presence of or possible inrush of water or other liquid;
- hazardous manual tasks;
- hazardous chemicals (these may be present in the soil where excavation work is carried out);
- hazardous atmosphere in an excavation;
- vibration and hazardous noise; and
- overhead essential services (power lines) and ground mounted essential services (transformers, gas and water meters).

5.6 Concrete Cutting and Penetration Work

Where the scope of works covers concrete slab cutting, coring or drilling penetrations, the contractor must ensure that:

- all electrical power, gas and water services associated with the concrete slab or associated buildings and site infrastructure (e. g. HV) are identified and appropriately isolated and documented in a hazard assessment and or Safe Work Method Statement (SWMS);
- all disconnections are confirmed and physically locked and tagged out by each individual working at risk and the details recorded in the SWMS; and
- all cut surfaces of the slab penetrations are checked for evidence of unidentified services prior to reconnecting or re-energising the locked-out services

5.7 Hazardous Materials

The Contractor must give notice immediately to the University representative of any hazardous materials or conditions found, including but not limited to the following:

- asbestos or material containing asbestos;
- flammable or explosive liquids/gases;
- toxic, infectious or contaminated materials;
- radiation or radio-active materials;
- noxious or explosive chemicals; and
- tanks or containers that have been used for storage of explosive, toxic, infectious or contaminated substances.

5.8 Relocation and Abandonment of Services

The Contractor must notify the University Representative upon discovery of new services or services obstructing the proposed works. The obstructing service may need to be diverted, relocated, removed

or abandoned, depending on whether it is live or disconnected. The Contractor must liaise with the University Representative and the Permit Approver to resolve the issue to their satisfaction.

Any relocated or abandoned services are to be noted in the as-built drawings and coordinated with the Planning and Design Unit.

5.9 Duration of Work

The contractor must note the duration of the work in the Excavation Permit, and it must be authorised by the Permit Approver.

Any change to the duration period needs to be communicated and authorised by the Permit Approver through the completion of a new permit. Impacts due to the variation of the works will need to be communicated with relevant stakeholders appropriately.

5.10 Completion of Work

Contractor Responsibilities

At the completion of the job, all tools, equipment and persons must be removed from the excavation site and the permit must be returned to the Permit Approver. The work area is to be made safe and tidy and all waste removed. The contractor must clear the work site of all rocks, soil and other debris and return it, as far as is practicable, to its original condition.

Federation University Responsibilities

The Permit Approver will confirm the contractor in charge of the excavation has completed the work and the Excavation Permit has been satisfactorily signed off before closing the Permit.

The University Representative will coordinate with P&I Planning and Design Unit to ensure that drawings and other documentation are updated to reflect any changes due to the work just completed. The Planning and Design Unit will ensure that the geo-positioning data of the new/amended services is recorded in the updated drawings and also uploaded to the BYDA portal.

6 Risk Assessment and Management

6.1 Risk Assessment

A Risk Assessment involves:

- identifying which people are at risk;
- determining what sources and processes are causing the risks; and
- identifying what kind of control measures should be implemented to mitigate the risks.

A risk assessment shall be prepared, and attached to the permit, where excavation work risks are identified. Some of these risks are:

- a person falling into an excavation;
- a person being trapped by the collapse of an excavation;
- a person working in an excavation being struck by a falling thing,
- a person working in an excavation being exposed to an airborne contaminant;
- local site conditions, including access, ground slope, adjacent buildings and structures, water courses (including underground) and trees;
- depth of excavation;
- soil properties, including variable soil types, stability, shear strength, cohesion, presence of ground water, effect of exposure to the elements;

- fractures or fault in rocks, including joints, bedding planes, dip and strike directions and angles, clay seams;
- any specialised plant or work methods required (e.g. ground support);
- the method/s of transport, haul routes and disposal;
- what exposures might occur, such as noise, ultraviolet rays or hazardous chemicals;
- the number and type of people involved;
- the possibility of unauthorised access to the work area;
- local weather conditions; and
- the length of time that the excavation will be open.

6.2 Risk Control

Risks are to be controlled in accordance with the hierarchy of control, with elimination of risk having priority as far as is practicable. The hierarchy of control is:

1. **Elimination**: Eliminate the need to undertake excavation work. If the hazard (and hence the risks) cannot be eliminated it must be reduced or minimised as far as is reasonably practicable by using a combination of the following controls.
2. **Substitution**: Substitute the hazard for something less hazardous (e.g. using an excavator rather than a manual method).
3. **Isolation**: This involves separating or isolating the worker (or others that may be affected) from the hazard (e. g. using barriers to prevent entry to excavation area). This also includes isolating all potentially hazardous services (e. g. electricity, gas, refrigerant, etc) prior to the commencement of excavation.
4. **Engineering**: This is usually implemented in the planning and design stage and includes methods such as benching, bettering or shoring the sides of the excavation to reduce the risks of ground collapse.
5. **Administration**: This refers to the implementation of policies, procedures, guidelines and training for people to follow. This also includes organising / managing work practices to reduce risks, e.g. plan work to take place when there is minimum pedestrian traffic in area to reduce the risk of inadvertent entry to excavation area.
6. **Personal Protective Equipment (PPE)**: Should only be used when the use of other controls have not sufficiently reduced the risk.

Other risk controls include:

- contractors will provide support systems and retaining structures to protect their workers against cave-ins;
- safe access will be provided for the area in and around the excavation or demolition so that the contractor's workers can move freely and without risk;
- barriers and warning signs will be erected if excavation work has the potential to place any staff member, student or other contractor at risk of injury if working in proximity to the excavation or demolition activity. Safe access will be provided for vehicle and pedestrian movement around the work site;
- where dust emissions could be a hazard to staff, students, the contractor's workers and other contractors who may be present in the area where work is being conducted, emissions will be minimised by extracting the dust at point of generation or using water for dust suppression;
- the risk assessment conducted at the start of the work will identify possible emergency situations that might arise because of the excavation and arrangements for managing such a situation will be included in the contractor's SWMS and also in the Permit to Work; and

- where the existing services drawings available are determined to be insufficient by the Permit Approver, the Contractor will be directed to undertake a comprehensive scan and marking of existing services around excavation, prior to commencement of any works on site.

7 Emergency Procedures

The person/contractor undertaking the excavation must ensure that there is an emergency plan to deal with unexpected incidents, appropriate to the risks identified. E. g. ground slips, flooding, gas leaks and the rescue of workers from an excavation.

In the event of an emergency, anyone in an excavation who is physically able must exit immediately, assisting others only if not endangering their own safety.

University Security will need to be contacted and an Incident Report lodged with the HSW Department.

8 Process Evaluation

The Document Owner will regularly review the Excavation and Penetration Works Guideline to ensure:

- the risk assessment process has been effective in identifying all hazards;
- that hazards are being effectively controlled;
- that the implemented controls are not introducing other uncontrolled hazards; and
- that work is being carried out in accordance with the risk assessment.

Aspects which need to be considered during such review include:

- unauthorised entries;
- identification of a hazard not covered in a permit;
- an injury or near miss resulting from an excavation work
- detection of a condition prohibited by permit;
- a change in the use/configuration of an excavation area;
- employee, safety committee or contractor concern; and
- following completion of any review, the Guideline will be revised/updated to rectify any deficiencies before further entries are authorised.

9 Record-Keeping

The following record-keeping actions are to be undertaken:

- the Excavation Permit must be kept at the work site during excavation;
- the Operations and Maintenance office maintains the record copies of all closed permits and associated SWMS, Risk Assessments etc.; and
- the Planning and Design unit updates and maintains as-built drawings.

10 Associated Forms

Excavation Permit

11 Responsibility

The Associate Director, Operations and Maintenance (in charge of the Permit Approvers) is responsible for monitoring the implementation and outcomes of this Guideline and the permit system.

The Associate Director, Projects and asset Services (as Document Owner) is responsible for the process evaluation and for maintaining the contents of this Guideline.

The Director, Property and Infrastructure (as the Document Sponsor) has overall responsibility for the process.