

**Deep Excavation (over 1.5m) and Ground Stability**

Business Name:		ABN:
Business Address:		
Contact Person:	Phone:	Email:

**THIS RISK ASSESSMENT IS APPROVED BY THE PCBU ON THIS PROJECT**

Under the Work Health and Safety Regulation (WHS Regulation), a person conducting a business or undertaking (PCBU) is required to ensure that a RISK ASSESSMENT is prepared before the proposed work starts.

Full Name:		
Signature:	Title:	Date:

**CLIENT OR PRINCIPAL CONTRACTOR DETAILS**

Client:	SCOPE OF WORKS
Project Name:	
Project Address:	
Project Manager:	
Contact Phone:	
Date Risk Assessment supplied to Project Manager:	



RISK MATRIX									
LIKELIHOOD	INSIGNIFICANT	MINOR	MODERATE	MAJOR	CATASTROPHIC	SCORE	ACTION	HIERARCHY OF CONTROLS	
ALMOST CERTAIN	3 HIGH	3 HIGH	4 ACUTE	4 ACUTE	4 ACUTE			<b>Elimination</b> Remove the hazard.	
LIKELY	2 MODERATE	3 HIGH	3 HIGH	4 ACUTE	4 ACUTE	4A ACUTE	DO NOT PROCEED	<b>Substitution</b> Replace the hazard.	
POSSIBLE	1 LOW	2 MODERATE	3 HIGH	4 ACUTE	4 ACUTE	3H HIGH	Review before work starts.	Isolation Isolate People from the hazard	
UNLIKELY	1 LOW	1 LOW	2 MODERATE	3 HIGH	4 ACUTE	2M MODERATE	Ensure control measures in place.	<b>Engineering</b> Isolate the hazard	
RARE	1 LOW	1 LOW	2 MODERATE	3 HIGH	3 HIGH	1L LOW	Monitor and keep records.	<b>Administrative</b> Change	
								<b>PPE</b>	

  

Risk Rating & Required Action:	
<b>4A</b>	Stop work. The risk is intolerable. Eliminate the hazard or redesign the activity before proceeding. A Safe Work Method Statement (SWMS) or higher-level authorisation is required.
<b>3H</b>	Review and approve additional controls before task starts. Senior supervisor sign-off needed.
<b>2M</b>	Ensure all nominated controls are in place and effective. Proceed with caution; monitor conditions.
<b>1L</b>	Proceed, following standard operating procedures. Monitor and keep records.

  

Consequence Scale:			
Consequence	People (injury/illness)	Project / Assets	Compliance / Reputation
<b>Catastrophic</b>	Fatality or permanent total disability	project shutdown	Significant regulator intervention; criminal prosecution
<b>Major</b>	Serious injury/illness (hospital > 5 days)	critical delay	Improvement notice; major media coverage
<b>Moderate</b>	Medical-treatment injury; lost-time > 1 day	moderate delay	Minor breach; adverse client comment
<b>Minor</b>	First-aid only, no lost time	negligible delay	Isolated non-conformance
<b>Insignificant</b>	No injury	no schedule impact	Deviation caught and corrected on site

  

**Notes on Hierarchy of Controls:**  
Remember to apply controls in the preferred order shown by the coloured pyramid:

1. **Eliminate**
2. **Substitute**
3. **Isolate**
4. **Engineering**
5. **Administrative**
6. **PPE**

Always document **why** a lower-order control is accepted if elimination or substitution is not reasonably practicable.

*aligned with Safe Work Australia's Managing the risk of fatigue at work (2023) and ISO 45001:2018 clauses 6–8.*

JOB STEP	POTENTIAL HAZARDS	IR	CONTROL MEASURES	RR
SPECIFIC WORK STEPS	HAZARDS THAT MAY ARISE	INITIAL RISK	SPECIFIC MEASURES TO BE PUT IN PLACE TO ELIMINATE OR CONTROL THE RISKS	RESIDUAL RISK
1. WHS Governance, Duties and PCBU Responsibilities for Excavations	<ul style="list-style-type: none"> <li>Lack of clear allocation of WHS duties for excavation and ground stability under WHS Act 2011 and WHS Regulations</li> <li>Inadequate consultation, cooperation and coordination between PCBUs on multi-PCBU excavation sites</li> <li>Failure to recognise excavations deeper than 1.5 m as high-risk construction work requiring specific risk management and SWMS</li> <li>Inadequate resourcing for competent design, supervision and inspection of deep excavations and ground support systems</li> <li>Insufficient management oversight of excavation planning, approval and review processes</li> <li>Poor integration of excavation and ground stability risks into the overall WHS management system</li> </ul>	4A	<ul style="list-style-type: none"> <li>Establish and document an Excavation and Ground Stability WHS Governance Procedure that references WHS Act 2011, WHS Regulations and relevant Codes of Practice (e.g. Excavation Work, Construction Work)</li> <li>Define and document PCBU and officer responsibilities for deep excavation (&gt;1.5 m), dewatering and ground stability management, including due diligence obligations</li> <li>Require written appointment of a competent excavation coordinator and a competent person for ground support design and inspection</li> <li>Implement a formal excavation work approval process that includes WHS review, engineering review and consultation with affected PCBUs prior to work commencing</li> <li>Embed deep excavation and ground stability risks into the organisation's WHS risk register and review them at regular WHS management review meetings</li> <li>Develop a documented interface agreement for multi-PCBU sites defining responsibilities for ground assessment, dewatering, inspections, traffic management and emergency response</li> <li>Mandate that all excavations deeper than 1.5 m are classified as high-risk construction work and require current review and SWMS in addition to this system-level risk assessment</li> <li>Include an internal audit schedule focusing specifically on compliance with excavation and ground stability governance requirements</li> </ul>	3H
2. Geotechnical Investigation and Ground Condition Assessment Systems	<ul style="list-style-type: none"> <li>Inadequate or no geotechnical investigation prior to deep excavation</li> <li>Failure to identify potentially unsafe ground conditions such as loose fill, soft clays, collapsible soils or karst features</li> <li>Incorrect assumptions about ground strength and behaviour in design and planning</li> <li>Insufficient consideration of frozen ground, seasonal variations, desiccation cracking and soil softening after rain</li> <li>Poor communication of geotechnical findings to designers, supervisors and workers</li> <li>Use of outdated, incomplete or non-site-specific geotechnical information</li> </ul>	4A	<ul style="list-style-type: none"> <li>Develop a mandatory Geotechnical Investigation Standard for any excavation deeper than 1.5 m or adjacent to structures, specifying minimum investigation scope and reporting requirements</li> <li>Engage a suitably qualified geotechnical engineer to carry out site-specific investigations and provide a formal geotechnical report prior to design finalisation</li> <li>Require geotechnical assessment of special conditions including frozen ground, high groundwater table, expansive clays, soft ground and ground subject to vibration or surcharge loading</li> <li>Implement a formal process for reviewing and updating geotechnical information when site conditions change (e.g. after heavy rain, prolonged dry periods or adjacent construction activities)</li> <li>Ensure geotechnical reports include clear design parameters, allowable slopes, bearing capacities, groundwater conditions and monitoring requirements, and are distributed to relevant stakeholders</li> <li>Require a documented geotechnical risk register for complex or deep foundation pit excavations, detailing residual uncertainties and required monitoring or contingency measures</li> <li>Include verification checks to ensure previous or desktop geotechnical data are validated on site before use in design decisions</li> </ul>	2M

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3. Excavation and Ground Support Design Management	<ul style="list-style-type: none"> <li>Poorly designed or undocumented shoring, bracing or retaining systems for deep excavations</li> <li>Design not suited to actual ground conditions, surcharge loads or groundwater pressures</li> <li>No allowance in design for excavation near or adjacent to existing structures and services</li> <li>Inadequate design for staged excavation, including deep foundation pits and benched slopes</li> <li>Inappropriate reliance on natural batter slopes without engineering justification</li> <li>Lack of design review or independent verification for high-risk or complex excavations</li> </ul>	4A	<ul style="list-style-type: none"> <li>Implement a formal Excavation Design Procedure requiring all excavations deeper than 1.5 m or adjacent to structures to be designed or verified by a suitably qualified engineer</li> <li>Require engineered designs for support systems such as sheet piling, soldier piles, ground anchors, struts, soil nails, secant piles and braced excavations, with calculations retained and accessible</li> <li>Ensure excavation design explicitly considers adjacent structures, live loads, traffic, plant, stockpiles, services and temporary works in determining factors of safety</li> <li>Mandate design of excavation stages (sequence, depth increments, installation of supports) to control ground movement and stability throughout the work</li> <li>Require a design risk assessment that identifies potential failure modes (e.g. base heave, global slip, wall overturning, toe failure) and incorporates appropriate safety margins</li> <li>Introduce an independent engineering review or peer check process for deep foundation pits, long-duration excavations and excavations close to critical infrastructure</li> <li>Ensure design documentation includes hold points, inspection points, monitoring requirements and criteria for modifying the design if unexpected ground behaviour occurs</li> </ul>	2M
4. Dewatering and Groundwater Control Management	<ul style="list-style-type: none"> <li>Uncontrolled groundwater inflow causing erosion, piping and loss of ground support</li> <li>Base heave or uplift failure due to high pore water pressure at the base of excavation</li> <li>Instability of excavation sides resulting from saturated or softening soils</li> <li>Inadequate capacity of dewatering systems during heavy rainfall events</li> <li>Unmanaged lowering of groundwater affecting adjacent structures or ground settlements</li> <li>Improper discharge or management of contaminated or sediment-laden groundwater</li> </ul>	4A	<p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>	2M
5. Excavation Adjacent to Existing Structures and Services	<ul style="list-style-type: none"> <li>Loss of ground support leading to settlement or damage to adjacent buildings, roads or buried services</li> </ul>	4A		2M

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	<ul style="list-style-type: none"> <li>• Uncontrolled movement of retaining walls, foundations or underground structures during excavation</li> <li>• Inadequate identification and protection of underground and overhead services near deep excavations</li> <li>• Excavation undermining nearby structures due to incorrect set-backs or toe levels</li> <li>• Lack of coordination between structural, geotechnical and services designers</li> <li>• Failure to monitor or respond to early movement or cracking in adjacent assets</li> </ul>		[REDACTED]	
6. Management of Plant and Vehicle Movements Near Excavation Edges	<ul style="list-style-type: none"> <li>• Vehicle or mobile plant collapse into excavation due to edge failure or over-loading</li> <li>• Excessive surcharge loading from stockpiles, materials or equipment near unprotected edges</li> <li>• Insufficient separation between haul routes and excavation edges</li> <li>• Lack of engineering assessment for crane outriggers and heavy plant operating near excavations</li> <li>• Inadequate traffic management and exclusion zones around deep excavations</li> <li>• Poor visibility, lighting or signage contributing to vehicle incidents at excavation edges</li> </ul>	4A	[REDACTED]	2M
7. Edge Protection, Access Control and Fall Prevention Systems	<ul style="list-style-type: none"> <li>• Falls of workers or visitors into open holes, trenches or deep foundation pits</li> </ul>	4A	[REDACTED]	2M

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	<ul style="list-style-type: none"> <li>• Unprotected excavated edge work leading to falls at different levels</li> <li>• Inadequate barriers, guardrails or covers around excavations</li> <li>• Unauthorised access to excavation areas by the public or non-inducted personnel</li> <li>• Insufficient control of slip, trip and fall hazards around excavation perimeters</li> <li>• Poorly managed access ways, platforms and ladders into and out of excavations</li> </ul>		[REDACTED]	
8. Inspection, Monitoring and Change Management of Ground Conditions	<ul style="list-style-type: none"> <li>• Failure to identify early signs of ground movement, cracking or instability</li> <li>• No formal inspection regime for excavation walls, supports and adjacent ground</li> <li>• Work continuing after significant weather events (e.g. heavy rain) without reassessment</li> <li>• Uncontrolled changes to excavation geometry, depth or support systems</li> <li>• Inadequate documentation and follow-up of defects, damage or non-conformances</li> <li>• Lack of competence of personnel conducting excavation inspections</li> </ul>	4A	[REDACTED]	2M
9. Environmental and Weather Impact	<ul style="list-style-type: none"> <li>• Rapid loss of stability in excavation walls due to heavy rain or flooding</li> </ul>	3H		2M

SAMPLE

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Management on Ground Stability	<ul style="list-style-type: none"> <li>• Soil softening, erosion or scouring at excavation faces and toes</li> <li>• Unanticipated behaviour of frozen or partially frozen ground during thaw</li> <li>• Surface water run-off entering excavations and undermining supports</li> <li>• Dust, mud and poor visibility contributing to slip, trip and fall events around excavations</li> <li>• Failure to plan for seasonal conditions and extreme weather events</li> </ul>		<p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>	
10. Contractor Management and Competency for Deep Excavation Work	<ul style="list-style-type: none"> <li>• Engagement of contractors without proven experience in excavation and shoring systems</li> <li>• Inadequate verification of licences, qualifications and competency for supervisors and operators</li> <li>• Poor alignment of contractor WHS systems with PCBU excavation and ground stability requirements</li> <li>• Lack of clarity in contract documentation about responsibilities for design, inspections and monitoring</li> <li>• Inconsistent standards between multiple contractors working around shared excavations</li> <li>• Failure of contractors to develop and follow project-specific SWMS and procedures</li> </ul>	3H	<p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>	2M

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			[REDACTED]	
11. Training, Competency and Information for Ground Stability Risks	<ul style="list-style-type: none"> <li>Workers and supervisors lacking understanding of deep excavation and ground instability hazards</li> <li>Insufficient training on identifying potentially unsafe ground conditions</li> <li>Lack of awareness of control measures for excavation in frozen ground, high groundwater or adjacent to structures</li> <li>Inadequate briefing on changes to excavation design, depth or support systems</li> <li>Poor communication of no-go zones, exclusion areas and emergency arrangements</li> <li>Language or literacy barriers restricting understanding of excavation safety information</li> </ul>	3H	[REDACTED]	2M
12. Site Layout, Pedestrian Safety and Slip-Trip-Fall Management	<ul style="list-style-type: none"> <li>Pedestrian exposure to open excavations due to poor site and walkway design</li> <li>Slip, trip and fall hazards created by uneven ground, spoil heaps, hoses and equipment near excavation edges</li> <li>Inadequate separation of pedestrian routes from vehicle movements at excavation perimeters</li> <li>Insufficient lighting or signage around excavation approaches and crossings</li> <li>Uncontrolled access to over-steepened batters or unstable ground surfaces near pits and trenches</li> <li>Poorly planned material storage and laydown areas contributing to ground instability at edges</li> </ul>	3H	[REDACTED]	2M

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			[REDACTED]	
13. Emergency Preparedness and Incident Response for Excavation Failures	<ul style="list-style-type: none"> <li>• Delayed or ineffective response to partial or full excavation collapse</li> <li>• Inadequate rescue arrangements for workers in deep excavations or trenches</li> <li>• Lack of integration between site emergency plans and specific excavation scenarios</li> <li>• Poor communication and coordination between PCBUs and emergency services during an excavation incident</li> <li>• Workers attempting ad hoc rescue in unstable ground conditions</li> <li>• Failure to secure and stabilise excavation areas post-incident to prevent secondary events</li> </ul>	3H	[REDACTED]	2M
14. Documentation, Records and Continuous Improvement of Excavation Management	<ul style="list-style-type: none"> <li>• Inadequate documentation of excavation designs, inspections, monitoring data and approvals</li> <li>• Loss of critical information needed to understand ground behaviour over time</li> <li>• Failure to review and learn from excavation-related incidents, near misses and non-conformances</li> <li>• Poor version control leading to use of superseded excavation drawings or SWMS</li> <li>• Lack of trend analysis to identify recurring issues in ground stability management</li> <li>• Non-compliance with legislative requirements for records retention</li> </ul>	2M	[REDACTED]	1L

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SAMPLE

**EMERGENCY RESPONSE – CALL 000 FOR EMERGENCIES**

Ensure to have an Emergency Management Plan in place as well as adequate numbers of trained first aid staff with easy access to fully stocked first aid kits, rescue equipment, material safety data sheets, adequate access to emergency communication equipment and fire-fighting equipment suitable for all classes of fire and ignition sources.

**LEGISLATIVE REFERENCES**

RELEVANT LEGISLATION AND CODES OF PRACTICE. DELETE THE LEGISLATIVE REFERENCES FOR ANY STATE THAT ARE NOT APPLICABLE

**Queensland & Australian Capital Territory**

Work Health and Safety Act 2011  
 Work Health and Safety Regulations 2011  
 Legislation QLD: <https://www.worksafe.qld.gov.au/laws-and-compliance/work-health-and-safety-laws>  
 Codes of Practice QLD: <https://www.worksafe.qld.gov.au/laws-and-compliance/codes-of-practice>  
 Legislation ACT: <https://www.worksafe.act.gov.au/laws-and-compliance/acts-and-regulations>  
 Codes of Practice ACT: <https://www.worksafe.act.gov.au/laws-and-compliance/codes-of-practice>

**Victoria**

Occupational Health and Safety Act 2004  
 Occupational Health and Safety Regulations 2017  
 Legislation VIC: <https://www.worksafe.vic.gov.au/occupational-health-and-safety-act-and-regulations>  
 Codes of Practice VIC: <https://www.worksafe.vic.gov.au/compliance-codes-and-codes-practice>

**New South Wales**

Work Health and Safety Act 2011  
 Work Health and Safety Regulations 2025  
 Legislation NSW: <https://www.safework.nsw.gov.au/legal-obligations/legislation>  
 Codes of Practice NSW: <https://www.safework.nsw.gov.au/resource-library/list-codes-of-practice>

**Western Australia**

Work Health and Safety Act 2020  
 Work Health and Safety Regulations 2022  
 Legislation Western Australia: <https://www.commerce.wa.gov.au/worksafe/legislation>  
 Codes of Practice WA: <https://www.commerce.wa.gov.au/worksafe/codes-practice>

**Northern Territory**

Work Health and Safety (National Uniform Legislation) Act 2011  
 Work Health and Safety (National Uniform Legislation) Regulation 2011  
 Legislation NT: <https://worksafe.nt.gov.au/laws-and-compliance/workplace-safety-laws>  
 Codes of Practice NT: <https://worksafe.nt.gov.au/laws-and-compliance/codes-of-practice>

**Safe Work Australia Links**

Law and Regulation (All States): <https://www.safeworkaustralia.gov.au/law-and-regulation>  
 Model Codes of Practice: <https://www.safeworkaustralia.gov.au/resources-publications/model-codes-of-practice>

**South Australia**

Work Health and Safety Act 2012 (SA)  
 Work Health and Safety Regulations 2012 (SA)  
 Legislation for SA: <https://www.safework.sa.gov.au/resources/legislation>  
 Codes of Practice for SA: <https://www.safework.sa.gov.au/workplaces/codes-of-practice#COPs>

**Model Codes of Practice**

- Managing noise and preventing hearing loss at work
- Confined spaces
- Labelling of workplace hazardous chemicals
- Managing risks of hazardous chemicals in the workplace
- Welding processes
- First aid in the workplace
- Managing the risk of falls at workplaces
- Hazardous manual tasks
- Managing the risk of falls in housing construction
- Managing electrical risks in the workplace
- Demolition work
- Excavation work
- Work health and safety consultation, cooperation and coordination
- Managing the work environment and facilities
- How to manage work health and safety risks
- Managing risks of plant in the workplace
- Construction work

**Tasmania**

Work Health and Safety Act 2012  
 Work Health and Safety (Transitional and Consequential Provisions) Act 2012  
 Work Health and Safety Regulations 2012  
 Work Health and Safety (Transitional) Regulations 2012  
 Legislation for TAS: <https://worksafe.tas.gov.au/topics/laws-and-compliance/acts-and-regulations>  
 Codes of Practice for TAS: <https://worksafe.tas.gov.au/topics/laws-and-compliance/codes-of-practice>

Details of permits, licenses or access required by regulatory bodies (add or delete as required):

- Permits from local council
- Authorisation to commence work
- Any required documents.