

**Under Road Boring**

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 Management, Governance & Legal Compliance	<ul style="list-style-type: none"> <li>Lack of documented WHS management system aligned with WHS Act 2011 and WHS Regulations</li> <li>Unclear WHS roles, responsibilities and accountabilities for under road boring activities</li> <li>Failure to apply the hierarchy of control at a system level for boring and jacking operations</li> <li>Inadequate processes for consulting workers and subcontractors on WHS matters</li> <li>No formal process to identify, assess and review risks specific to guided boring and pipe jacking works</li> <li>Poor integration of WHS requirements into contracts with plant hire providers and subcontractors</li> <li>Failure to keep WHS records, risk assessments and review evidence as required by legislation</li> </ul>	4A	<ul style="list-style-type: none"> <li>Implement and maintain a certified or equivalent WHS Management System (e.g. ISO 45001 aligned) incorporating specific procedures for under road boring, guided boring and pipe jacking activities</li> <li>Define and document WHS roles, responsibilities and accountabilities for officers, senior managers, supervisors, engineers, leading hands and workers involved in underground borer machine operations</li> <li>Establish a formal risk management procedure (identify, assess, control, review) that explicitly covers boring and jacking works, including design, planning, execution and demobilisation phases</li> <li>Develop and implement a WHS legal register capturing WHS Act 2011, WHS Regulations, Codes of Practice (e.g. Excavation, Construction Work, Confined Spaces, Plant) and relevant Austroads / road authority requirements</li> <li>Embed WHS obligations and performance expectations into all contracts and procurement documentation for boring machines, pipe jacking systems and specialist subcontractors</li> <li>Establish documented consultation, co-operation and co-ordination arrangements with principal contractor, road authority, utility owners and other PCBUs sharing the worksite</li> <li>Implement an internal audit and management review program that periodically verifies compliance of boring operations with the WHS Act 2011 and internal standards</li> <li>Maintain centralised WHS records for risk assessments, training, inductions, incidents, audits, permits and design decisions related to under road boring projects</li> </ul>	3H
2. Design, Engineering & Road / Services Interface Risk Management	<ul style="list-style-type: none"> <li>Inadequate design review of boring alignment and depth leading to strikes on existing underground services and road foundations</li> <li>Insufficient geotechnical investigations causing unexpected ground conditions, collapse or loss of ground over road pavement</li> <li>Poor coordination between designer, road authority and utility owners regarding clearances, separation distances and easements</li> <li>Failure to apply engineering standards for pipe jacking, casing pipes and thrust forces</li> <li>Lack of independent verification of design for high-risk crossings (major roads, rail, critical utilities)</li> </ul>	4A	<ul style="list-style-type: none"> <li>Implement a formal design management procedure requiring risk assessments and constructability reviews for all under road boring and guided pipe jacking designs</li> <li>Require geotechnical investigations (including boreholes, test pits or non-destructive investigations) commensurate with crossing risk, soil type and traffic loading</li> <li>Establish a mandatory service proving process (dial before you dig, utility plans, ground penetrating radar, potholing) and design clearances for all known services</li> <li>Apply relevant Australian Standards and industry guidelines for structural design of jacking pipes, liner pipes and casing (e.g. load ratings, thrust capacity, buckling resistance)</li> <li>Use formal design verification or independent peer review for high consequence crossings such as highways, arterial roads, rail corridors and high-pressure mains</li> <li>Require the designer to document key design assumptions, ground models, allowable tolerances, jacking loads and settlement criteria, and brief these to the site team</li> <li>Include predicted ground movement and settlement assessments in design, with trigger levels for monitoring and contingency actions if movement limits are approached</li> <li>Ensure design incorporates safe access and egress, ventilation, dewatering provisions and emergency response requirements for launch and reception shafts</li> </ul>	2M

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	<ul style="list-style-type: none"> <li>Design assumptions not communicated to construction team, resulting in inappropriate construction methods</li> <li>Insufficient assessment of ground movement impacts on road surface, adjacent structures and third-party assets</li> </ul>			
3. Project Planning, Approvals & Stakeholder Coordination	<ul style="list-style-type: none"> <li>Commencing under road boring works without necessary road authority approvals or traffic management clearances</li> <li>Inadequate planning for interaction with other contractors, utilities or concurrent works in the corridor</li> <li>Poor communication with road owners, councils or asset custodians regarding vibration, subsidence and access impacts</li> <li>Insufficient pre-construction coordination meetings and interfaces between designer, constructor and operations personnel</li> <li>Failure to plan for shaft or relocations of existing services during jacking works, resulting in unplanned outages</li> <li>Lack of defined handover criteria and assurance that installed asset meet operator requirements</li> </ul>	3H	<ul style="list-style-type: none"> <li>Implement a formal project initiation and planning procedure that requires verification of approvals, permits and road authority conditions for mobilisation</li> <li>Conduct multi-disciplinary pre-start planning workshops (including engineering, construction, WHS, traffic management and client representatives) for each crossing</li> <li>Prepare an integrated interface management plan identifying all external stakeholders, adjacent projects, utility owners and their specific requirements</li> <li>Establish documented communication protocols (meeting schedules, notification windows, escalation pathways) with road authorities, councils and utility owners</li> <li>Require written acceptance of construction methodology, settlement criteria and monitoring plans from relevant asset owners for high-risk crossings</li> <li>Document clear asset acceptance and handover requirements, including testing, CCTV inspections, as-built surveys and commissioning processes</li> <li>Institute a change management process requiring assessment and approval of any variation to alignment, methodology, shaft locations or working hours</li> </ul>	2M
4. Contractor, Subcontractor & Specialist Supplier Management	<ul style="list-style-type: none"> <li>Engagement of boring and jacking contractors without adequate WHS capability or experience</li> <li>Subcontractors using non-compliant or poorly maintained jacking frames, hydraulic systems or guidance equipment</li> <li>Inconsistent safety standards between principal contractor and specialist boring contractor</li> <li>Lack of clarity on who controls particular WHS risks (e.g. shaft design, dewatering, traffic interfaces)</li> </ul>	3H	<p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>	2M

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	<ul style="list-style-type: none"> <li>Inadequate review of subcontractor SWMS, risk assessments and training records</li> <li>Payment incentives that drive unsafe productivity expectations or discourage reporting of issues</li> </ul>		[REDACTED]	
5. Workforce Competency, Licensing & Training Systems	<ul style="list-style-type: none"> <li>Under-qualified personnel operating underground borer machines and pipe jacking equipment</li> <li>Lack of verified high-risk work licences for relevant tasks (e.g. dogging, rigging, crane, electrical work)</li> <li>Inadequate training in reading bore plans, utility plans and guidance system outputs</li> <li>Supervisors without specific competency in tunnelling / boring risk management and shaft work</li> <li>No structured refresher training on emergency procedure, containment risks, or plant isolation</li> <li>Reliance on informal on-the-job learning without competency assessment</li> </ul>	4A	[REDACTED]	2M
6. Plant Selection, Procurement & Engineering Controls	<ul style="list-style-type: none"> <li>Use of unsuitable or unapproved boring machines for ground conditions, pipe size or drive length</li> <li>Plant lacking essential safety features such as emergency stop systems, guarding, interlocks and pressure relief devices</li> <li>Inadequate consideration of power source risks (hydraulic, electrical, pneumatic) during selection</li> <li>Non-compliance of imported plant with Australian Standards and WHS Regulation plant requirements</li> </ul>	4A	[REDACTED]	2M

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	<ul style="list-style-type: none"> <li>Failure to specify guidance and monitoring systems for alignment, jacking loads and ground movement</li> <li>No formal acceptance testing or commissioning before plant is used on live bores</li> </ul>		[REDACTED]	
7. Plant Inspection, Maintenance & Pre-Start Assurance	<ul style="list-style-type: none"> <li>Failure of jacking systems, hydraulic cylinders or pipe supports due to poor maintenance</li> <li>Unplanned loss of power or control to the borer leading to entrapment or collapse risks</li> <li>Leaks of hydraulic fluid, fuel or coolant causing fire, slip or environmental hazards</li> <li>Non-functioning emergency stops, interlocks or guards due to lack of inspection</li> <li>Inadequate pre-start checks in launch/reception shafts and underground locations</li> <li>Reliance on reactive repairs rather than planned preventative maintenance</li> </ul>	4A	[REDACTED]	2M
8. Shaft, Excavation & Ground Control Management Systems	<ul style="list-style-type: none"> <li>Collapse of launch or reception shaft due to inadequate design, shoring or installation controls</li> <li>Uncontrolled ground loss leading to subsidence of the road surface or adjacent structures</li> <li>Ingress of water causing instability of shaft walls, loss of ground or borer entrapment</li> <li>Lack of systematic monitoring of ground conditions, settlement and support performance</li> <li>Improvised alterations to shaft dimensions, benching or access without engineering review</li> </ul>	4A	[REDACTED]	2M

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	<ul style="list-style-type: none"> <li>Inadequate control of loads applied to shaft edges from cranes, vehicles or spoil stockpiles</li> </ul>		[REDACTED]	
9. Traffic, Road Corridor & Public Interface Management	<ul style="list-style-type: none"> <li>Vehicle collisions with workers, plant or shafts due to inadequate traffic management</li> <li>Road pavement failure or noticeable subsidence impacting public traffic safety</li> <li>Uncontrolled access of the public into work zones or open shafts</li> <li>Inadequate communication of lane closures, detours or speed reductions</li> <li>Poor coordination between traffic controllers and boring operations leading to congestion and rushed work</li> <li>Non-compliance with road authority traffic control requirements</li> </ul>	4A	[REDACTED]	2M
10. Confined Space, Ventilation & Atmospheric Risk Management	<ul style="list-style-type: none"> <li>Unrecognised confined spaces with shafts, pipes or bore tunnels leading to asphyxiation or toxic exposure</li> <li>Inadequate ventilation within launch shafts or jacked pipes causing build-up of exhaust gases or fumes</li> <li>Lack of atmospheric testing before entry to pipes or enclosed work areas</li> <li>Uncontrolled entry into shafts or pipes by untrained or unprotected personnel</li> <li>Poor rescue planning for workers incapacitated within a shaft or pipe</li> <li>Use of combustion engines, welding or cutting equipment in poorly ventilated spaces</li> </ul>	4A	[REDACTED]	2M

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			[REDACTED]	
11. Utilities, Service Location & Strike Prevention Systems	<ul style="list-style-type: none"> <li>Striking live electrical, gas, water, sewer, telecommunications or fibre lines during boring</li> <li>Reliance on outdated or inaccurate utility plans without verification</li> <li>Poor communication with asset owners about exact location, depth and protection requirements</li> <li>Lack of formal change process when services are found in unexpected locations</li> <li>Inadequate documentation of potholing, proving and clearances for future reference</li> <li>Insufficient separation distances between new and existing assets</li> </ul>	4A	[REDACTED]	2M
12. Environmental, Groundwater & Spoil Management Systems	<ul style="list-style-type: none"> <li>Uncontrolled discharge of drilling fluids, spoil or contaminated groundwater to the environment</li> <li>Groundwater draw-down affecting nearby structures, pavements or ecosystems</li> <li>Inadequate classification and disposal of contaminated spoil or slurry</li> <li>Noise and vibration from boring operations impacting nearby receptors</li> <li>Non-compliance with environmental approval conditions linked to road and utility works</li> </ul>	3H	[REDACTED]	2M

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13. Fatigue, Rostering & Remote / After-Hours Work Management	<ul style="list-style-type: none"> <li>Operator fatigue due to extended shifts, night works or high workload during critical boring stages</li> <li>Inadequate supervision and support during after-hours or weekend works</li> <li>Long travel times to remote road crossings without journey management controls</li> <li>Pressure to complete bores under tight road occupation windows leading to extended hours or skipped breaks</li> <li>Lack of fit-for-work checks and reporting culture around fatigue and impairment</li> </ul>	3H	[REDACTED]	2M
14. Communication, Documentation & Change Management	<ul style="list-style-type: none"> <li>Critical information about ground conditions, design assumptions or service locations not reaching operators and supervisors</li> <li>Uncontrolled changes to alignment, bore length, shaft position or method without risk review</li> <li>Outdated drawings, permits or SWMS being used in the field</li> <li>Breakdown in communication between shifts resulting in inconsistent controls</li> <li>Language, literacy or numeracy barriers affecting understanding of boring procedures and risks</li> </ul>	3H	[REDACTED]	2M
15. Emergency Preparedness, Rescue & Incident Management	<ul style="list-style-type: none"> <li>Delayed or ineffective response to shaft collapse, entrapment, inundation or plant failure emergencies</li> <li>Lack of practical rescue capability for workers inside shafts or pipes</li> <li>Unclear roles and responsibilities during incidents involving road users or public utilities</li> </ul>	4A	[REDACTED]	2M

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	<ul style="list-style-type: none"> <li>Insufficient coordination with emergency services regarding site access and hazards</li> <li>Inadequate post-incident investigation and corrective actions to prevent recurrence</li> </ul>		[REDACTED]	
16. Monitoring, Measurement, Audit & Continuous Improvement	<ul style="list-style-type: none"> <li>Deterioration of controls over time due to lack of monitoring and verification</li> <li>Repeated near misses or minor failures in boring operations not being detected as systemic issues</li> <li>Failure to analyse data from incidents, inspections and monitoring to improve systems</li> <li>Over-reliance on paperwork without field verification of actual practices</li> <li>Inconsistent auditing of subcontractor and specialist contractor performance</li> </ul>	3H	[REDACTED]	1L

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.