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

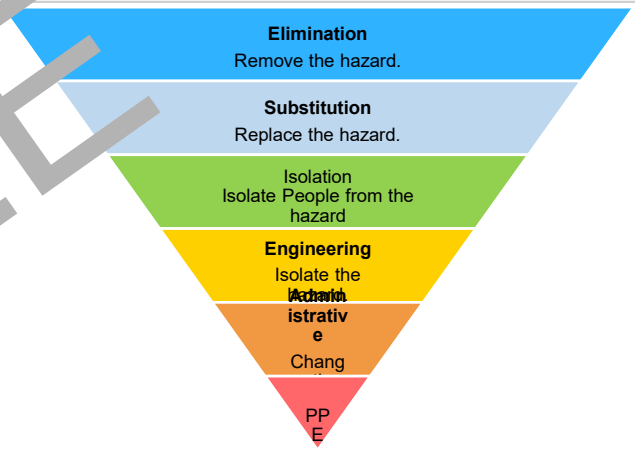
THIS RISK ASSESSMENT IS APPROVED BY THE PCBU OF THE PROJECT		
Under the Work Health and Safety Regulation (WHS Regulation), a person conducting a business or undertaking (PCBU) is required to ensure that a RISK ASSESSMENT is prepared before the proposed work starts.		
Full Name:		
Signature:	Title:	Date:

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
ALMOST CERTAIN	3 HIGH	3 HIGH	4 ACUTE	4 ACUTE	4 ACUTE		
LIKELY	2 MODERATE	3 HIGH	3 HIGH	4 ACUTE	4 ACUTE	4A ACUTE	DO NOT PROCEED
POSSIBLE	1 LOW	2 MODERATE	3 HIGH	4 ACUTE	4 ACUTE	3H HIGH	Rev before work
UNLIKELY	1 LOW	1 LOW	2 MODERATE	3 HIGH	4 ACU	2M MO RATE	Ensure control measures in place.
RARE	1 LOW	1 LOW	2 MODERATE	3 HIGH	3 H	1L LOW	Monitor and keep records.

HIERARCHY OF CONTROLS



Risk Rating & Required Action:

4A	Stop work. The risk is intolerable. E inate the hazar redesign the activity before proceeding. A Safe Work Method Statement (SWMS) or hi er-level authorisati is required.
3H	Review and approve additional c rols b ask arts. Senior supervisor sign-off needed.
2M	Ensure all nominated controls are in ace and effe ive. Proceed with caution; monitor conditions.
1L	Proceed, following standard operating procedures Monitor and keep records.

Consequence Scale:

Consequence	People (injury/illness)	Project / Assets	Compliance / Reputation
Catastrophic	Fatality or permanent total disability	project shutdown	Significant regulator intervention; criminal prosecution
Major	Serious injury/illness (hospital > 5 days)	critical delay	Improvement notice; major media coverage
Moderate	Medical-treatment injury; lost-time > 1 day	moderate delay	Minor breach; adverse client comment
Minor	First-aid only, no lost time	negligible delay	Isolated non-conformance
Insignificant	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. Governance, Legal Compliance and WHS Duties	• Inadequate understanding by officers and senior management of WHS Act 2011 primary duty of care and due diligence obligations for directional drilling activities • Absence of a documented WHS management system specific to trenchless and horizontal directional boring (HDD) operations • Failure to identify and apply relevant WHS Regulations, trenchless standards, Codes of Practice and client/utility requirements • Insufficient consultation with workers, health and safety representatives and subcontractors about HDD-specific risks and controls • Poor integration of WHS requirements into contracts, tenders and design documentation for directional drilling works	High	• Establish and maintain a documented WHS mana ient system aligned with WHS Act 2011 and WHS Regulations, explicitly addressing trenchless an orizontal directional boring activities • Define and document officer due diligenc esponsibilitie including regular WHS performance reviews, site visits to HDD works and verification of ri ontrol the field • Develop a legal and standards register coveri pplicable WH egislation, trenchless/drilling standards, Codes of Practice tility owner requir ents and al council conditions, and review it at least annually • Embed WHS requ and D risk expectation into contracts, tenders, purchase orders and service agreem s, includ mini m compet cy, supervision and equipment standards • Implement f al WHS c sultation gements (HSC/HRS, toolbox talks, pre-starts) that specifically addre HDD r such underground services, drilling fluids and ground stability • Requ ocume risk assessments for HDD projects, including design-stage and pre-mobilisation review ensure ey are endorsed by competent persons and reviewed for high-risk projects • Establ an nual W S objectives and targets plan for directional drilling (e.g. reductions in strikes on rvices ear r s reporting, training completion) and monitor performance against it • Co eriodic independent or internal WHS audits focused on trenchless operations and anagem t system implementation, with documented corrective action plans	Medium
2. Project and Design Risk Management	• Inadequate early design risk assessment for HDD a ments, entry/exit pits, depth and clearances to existing assets • Insufficient geotec formatio leading to unstable ground, inadverte returns or bore collapse • Failure to coordinate wi gners, utility owners and clients to eliminate or reduce risk through design changes • Poor assessment of environmental sensitivities (waterways, contaminated ground, sensitive receptors) before selecting drilling method and fluids • No systematic process to assess feasibility of HDD versus alternative construction methods from a WHS risk perspective	High	• Implement a formal design risk management procedure requiring structured WHS risk reviews at concept, detailed design and pre-construction stages for HDD works • Develop design guidelines for HDD (minimum cover, separation distances, bend radii, pit locations, access, exclusion zones) based on relevant standards and asset owner requirements • Require geotechnical investigations appropriate to drilling length and complexity (e.g. boreholes, test pits, utility locates) and incorporate findings into design and risk assessments • Establish a design coordination process with asset owners, clients and engineering designers to address HDD constraints and adjust alignment, depth or method to reduce WHS and service strike risks • Apply an engineering change management process whenever alignment, depth, drilling method, drilling fluids or plant configuration must be altered, ensuring risks are reassessed before implementation • Integrate environmental impact considerations (groundwater, contamination, protected flora and fauna, erosion, drilling fluid disposal) into the design risk register and control plan • Document criteria for choosing HDD over open cut or alternative trenchless techniques, including explicit consideration of WHS risk, complexity and site constraints	Medium
3. Procurement of Plant, Equipment and Technology	• Procurement of HDD rigs, mud systems and support plant that do not	High	• Develop a formal procurement procedure for HDD plant that mandates compliance with relevant Australian standards, WHS Regulations, manufacturer recommendations and client requirements	Medium

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	comply with Australian standards or WHS Regulations • Lack of documented specifications for safety features, guarding, emergency stops and control systems on drilling equipment • Inadequate vetting of second-hand or hired equipment, leading to use of poorly maintained or modified rigs and tooling • Failure to procure suitable locating and tracking technology, increasing risk of utility strikes and bore deviation • Insufficient consideration of human–machine interface and ergonomics when selecting controls, displays and cab layouts		• Create detailed technical specifications for drilling rigs, mud mixing systems, recycling units, vacuum trucks and support plant that include required safety features, guarding, lock-out/tag-out provisions and emergency stops • Establish a pre-acceptance inspection checkli[illegible] all purchased and hired HDD equipment, including verification of compliance plates, manuals, s[illegible]y features and inspection records • Require suppliers and hire companies to p[illegible]ide do[illegible]ented evidence of maintenance history, inspection certificates and any modifications u[illegible]rtaken on HDD rigs and associated equipment • Specify minimum technical [illegible]abilities for locat[illegible] systems [illegible]g. depth accuracy, tracking modes, interference management) and [illegible]andardise on app[illegible]ed [illegible]tems across the fleet • Include ergonomi[illegible]man-[illegible]ors criteria in procurement decisions (control layout, visibility from operator station[illegible]oise, vib[illegible]ion, se[illegible]ing, comm[illegible]ication systems) • Implement a[illegible]hange cont[illegible] process [illegible]y aftermarket modifications to rigs, tooling or control systems, includi[illegible] risk a[illegible]ssmen[illegible]nd engineer[illegible]g review before use on site	
4. Contractor, Subcontractor and Supply Chain Management	• Engagement of subcontractors for HDD works without verifying WHS management capability and trenchless experience • Inconsistent WHS sta[illegible]and procedures between [illegible]ncipal contractor and drilling subcon[illegible]actors • Inadequate mana[illegible]me[illegible]ultip[illegible] contractors on shared [illegible]orkspaces, leading to conflicting activities and uncontrolled interactions with dri[illegible]g operations • Poor oversight of third-party service providers (locators, vacuum excavation, mud disposal, transport) affecting overall risk profile • Commercial pressures in contracts incentivising unsafe practices, shortcuts or non-compliance with agreed controls	High	[redacted]	Medium
5. Competency, Licensing and Training Systems	• Directional drill operators, locators and supervisors lacking verified competency in HDD techniques and risk controls	High	[redacted]	Medium

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SPECIFIC WORK STEPS	HAZARDS THAT MAY ARISE	INITIAL RISK	SPECIFIC MEASURES TO BE PUT IN PLACE TO ELIMINATE OR CONTROL THE RISKS	RESIDUAL RISK
	• Reliance on informal on-the-job training without structured assessment or recognition of prior learning • Insufficient training on underground service identification, DBYD interpretation and locating equipment • Lack of training for managers and planners on HDD-specific hazards and control requirements during planning and design • No refresher training or reassessment of competency following incidents, near misses or equipment changes		[redacted]	
6. Operational Planning, Permits and Authorisation	• Commencement of drilling without formal review and sign-off of HDD plan, service plans and risk assessments • Absence of a structured permit-to-work system for high-risk HDD operations in congested or sensitive corridors • Poor communication of planned bore path, depths and exclusion zones to site crews and other contractors • Inadequate planning for access, egress, traffic interfaces and public interaction around drill and receiving sites • No defined criteria for authorising changes to drilling parameters, alignment or method once work has commenced	High	[redacted]	Medium
7. Underground Services and Utility Management Systems	• Inadequate processes for identifying, confirming and protecting underground services in the planned bore path	Extreme		Medium

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SPECIFIC WORK STEPS	HAZARDS THAT MAY ARISE	INITIAL RISK	SPECIFIC MEASURES TO BE PUT IN PLACE TO ELIMINATE OR CONTROL THE RISKS	RESIDUAL RISK
	• Over-reliance on desktop DBYD plans without positive identification or coordination with asset owners • Poor system controls around the use, calibration and maintenance of locating and tracking equipment • Lack of standardised methodologies for safe bore path design in congested corridors and high-risk zones • Insufficient documentation and retention of as-constructed bore paths for future reference and asset protection		[redacted]	
8. Plant Safety, Maintenance and Inspection Systems	• Use of HDD rigs, [redacted] pumps, generators and support plant without regular inspection, servicing [redacted] verification of safety-critical components • Failure to identify and manage plant defects, modifications and non-compliant guarding • Uncontrolled energisation or movement of plant during maintenance due to inadequate isolation procedures • Lack of standardised pre-start and periodic inspection processes for drilling and locating equipment • Poor management of spare parts, tooling and high-wear items leading to unexpected failures during drilling	High	[redacted]	Medium

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
			[redacted]	
9. Drilling Fluids, Pressure Management and Inadvertent Return Controls	• Inadequate system-level controls for drilling fluid selection, mixing, storage and disposal • Insufficient monitoring of downhole pressure and returns, increasing risk of hydrofracture, inadvertent returns or blowouts • Lack of standard procedures for managing drilling fluids in environmentally sensitive areas or near waterways • Poor management of fluid additives, leading to chemical exposure risks and environmental contamination • No defined contingency plans or escalation criteria when loss of circulation or unexpected ground behaviour occurs	High	[redacted]	Medium
10. Ground Conditions, Stability and Structural Interaction Management	• Inadequate asse[redacted] conditions along the [redacted] collapse, settlement or heave affecti[redacted] workers, public or nearby structure[redacted] • Failure to identify and ma[redacted] interaction between drilling operations and foundations, retaining walls, pavements or other critical structures • Lack of systems to monitor for ground movement or structural distress during and after drilling • Inappropriate selection of drilling tools, reamers and techniques for the encountered geology • Insufficient consideration of groundwater, artesian pressures or seasonal variations affecting ground behaviour	High	[redacted]	Medium

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
			[redacted]	
11. Traffic, Public Interface and Site Security Management	• Inadequate systems for managing interactions between HDD plant, trucks and public traffic around entry and exit sites • Poor control of pedestrian access to drilling areas, pits, hoses and cables, creating risk of public injury • Insufficient coordination with road authorities and asset owners when working in or adjacent to road reserves • Lack of site security and after-hours controls, leading to unauthorised acce to rigs, pits or stored materials • Poor planning of delivery and spoil removal logistics, resulti ongestio and increased collisi risk	High	[redacted]	Medium
12. Fatigue, Work Scheduling and Workforce Wellbeing	• Extended shifts, night work and irregular rosters leading t tor and locator fatigue during critical HDD activities • Insufficient planning for rest breaks and recovery time in remote or high-demand projects • Pressure to continue drilling to meet program milestones despite signs of fatigue or deteriorating conditions • Poor management of psychosocial risks associated with remote work, time pressure and complex technical decision-making	Medium	[redacted]	Low

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SPECIFIC WORK STEPS	HAZARDS THAT MAY ARISE	INITIAL RISK	SPECIFIC MEASURES TO BE PUT IN PLACE TO ELIMINATE OR CONTROL THE RISKS	RESIDUAL RISK
	• Inadequate systems for workers to report fatigue and be relieved without negative consequences		[redacted]	
13. Emergency Preparedness, Response and Incident Management	• Lack of clear emergency response procedures specific to HDD incidents such as utility strikes, fluid releases, ground collapse or plant rollovers • Insufficient coordination with emergency services, utility owners and regulators for high-consequence scenarios • Inadequate emergency equipment, communication systems and training for crews undertaking remote or confined HDD worksites • Poor incident notification and investigation processes leading to repeated HDD-related events • No formal process fo[illegible]g from HDD incidents and [illegible]ar misses across projects and regio	High	[redacted]	Medium
14. Documentation, Data Management and Continuous Improvement	• Poor control of HDD-related documentation, leading to [illegible]dated procedures, plans and drawings being used in the field • Lack of reliable data on service strikes, near misses, production rates and non-conformances affecting risk-based decision-making • Inconsistent recording and archiving of as-built bore data and project records • Failure to systematically review HDD projects for lessons learned and improvement opportunities • Limited transparency of WHS performance on HDD across	Medium	[redacted]	Low

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
	management levels and geographic regions		[redacted]	

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

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-of-codes-of-practice

Northern Territory
Work Health and Safety (National Uniform Legislation) Act 2011
Work Health and Safety (National Uniform Legislation) Regulations 2011
Legislation NT: https://worksafe.nt.gov.au/laws-and-compliance/workplace-safety-laws
Codes of Practice NT: https://worksafe.nt.gov.au/forms-and-resources/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

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.

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

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

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

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