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Western Australia.*

# Minimum WHS Control Standards

Works and Services



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## PURPOSE

The purpose of this document is to supplement Main Roads Specification 203 Health and Safety Management relating to WHS, to set out measures to control a number of High Risk Work activities and Principal identified hazards by Main Roads generally within its work programs. As a minimum, the measures must be followed by the Contractor undertaking the work where it has been identified in the Works WHS Risk Assessment, based on the scope of work and/or services under the contract.

## SCOPE

The document covers all work and/or services where Main Roads has engaged a service provider to undertake the works and/or services, and the work involves High Risk Work activities and Principal identified hazards by Main Roads. The document provides only the direct control measures and the indirect/management measures are covered under Specification 203 Safety and Health Management. Where directed by Main Roads, this document may also apply to other forms of Contracts.

## TERMS AND DEFINITIONS

Terms and definition are provided for information and understanding purposes, which may reference external sources of information and where applicable, may include terms and definitions in the contract or specification:

Term	Definition
AS	Australian Standard
AS/NZS	Australian/New Zealand Standard
Authorized Person	Means a person approved or assigned by an employer to perform a specific type of duty or duties or to be at a specific location or locations
Commissioner	In accordance with Section 378 of the WHS Act (WA)
Competent Person	A person that has the required qualifications, certification, authorisation and training required to perform a specific function.
COP	Code of Practice – In accordance with Section 420 of the WHS Act (WA) 2020
DMIRS	Department of Mines, Industry, Regulation and Safety
EQSafe	The Principal's Incident Reporting System
EWP	Elevated Work Platform
HRWL	High Risk Work License - In accordance with <a href="#">Schedule 3 of the WHS Regulations (WA)</a>
HVCoR	Heavy Vehicle Chain of Responsibility
IARC	International Agency for the Research on Cancer (IARC)
ISO	International Standards Organisation
minimum	The least amount possible or allowed
NIOSH	National Institute of Occupational Safety and Health
NOHSC	National Occupational Health and Safety Commission
OEM	Original Equipment Manufacturer
PDF	Personal Floatation Device
Principal's Personnel	Means the Principal's directors, officers, employees, agents and subcontractors, including the Superintendent and the Superintendent's Representative but excluding the Contractor and any Worker

Term	Definition
WHS Regulation	Work Health and Safety (General) Regulations (WA) 2022
Regulator	Worksafe WA, and includes an Inspector of Worksafe WA and Inspectors appointed under the Electricity Act
RTO	Registered training organisation in accordance with Regulation 5 of the WHS Regulations (WA) 2022
SAE	Society of Automotive Engineers
Short Term Worker	A Worker who is on the Site generally less than one (1) work shift to perform work, deliver goods or conduct visual observation
Structure	In the context for safe design, Structure means any component or part that is constructed, whether fixed or moveable, temporary or permanent, which includes buildings, masts, towers, framework, pipelines, roads, bridges, rail infrastructure and underground works (including shafts or tunnels).
SWMS	Safe Work Method Statement
SWL	Safe working load - Maximum gross load that may be applied for a specific use in order to allow an adequate margin of safety. The SWL may equal but never exceed the WLL.
Utility Service Provider	A utility services company which provides services such as gas, water, electricity, telephone, sewer and stormwater
Visitor	A person visiting the Site for a purpose associated with the work under the Contract. who is not conducting any work.
WLL	Working load limit - Maximum gross load that may be applied under general conditions of use.
WHS Act	Work Health and Safety Act (WA) 2020
Worker	Has the same meaning as Part 1 Division 3 (7) of the WHS Regulations (WA)



## **GENERAL REQUIREMENTS**

This document details the “minimum” control measures for High Risk Work activities and Principal identified hazards as defined by Main Roads. This does not exclude any specific control measures, processes or systems, which are part of your certified WHS management system currently in place, which meet or exceed these requirements or your obligations under the WHS Act (WA) and WHS Regulations (WA).

Any Worker qualification (including a training course or certification) stated in this document is to be read to mean any current version of the qualification that has replaced the stated qualification. While each risk and associated control measure is described separately within a section of this document, where the work involves several of such risks, then each associated section applies collectively to the work.

In addition, any act, regulation, code, standard, specification or similar reference stated in this document is to be read to mean any current or updated version.

## **MINIMUM WHS CONTROL STANDARDS**

### **1 WORK AT HEIGHT**

#### **1.1 Training, Competency and Awareness**

1.1.1 - Where a Worker is required to work at height and wear personal fall protection equipment, the Worker must be trained and competent and hold a nationally recognised “Work Safely at Heights” qualification covering the safe use, Bselection, care, inspection, maintenance and storage of the equipment by a registered training organisation.

1.1.2 - Where the need for working at height cannot be eliminated and a Worker is required to wear personal fall protection equipment to arrest or suspend a fall, the following requirements must be in place:

- A working at height permit system authorising the working at height task (excluding an EWP);
- A SWMS specific to the working at height task being undertaken;
- Supervision by a person who holds a nationally recognised Work Safely at Heights qualification;
- Emergency response procedures and emergency rescue planning where fall arrest equipment is used;
- Emergency rescue equipment in the vicinity of the work area where fall arrest equipment is used; and
- Training in emergency procedures for Workers working at height and emergency response personnel.

#### **1.2 Personal Fall Protection Equipment**

1.2.1 - Where a Worker is required to work at height and wear a harness, attached to fall restraint or fall arrest equipment fixed to an anchorage point, the equipment must be compliant with, used and maintained in accordance with the manufacturer’s instructions and the following Australian Standards:

- AS/NZS 1891.1 Harnesses and Ancillary Equipment;
- AS/NZS 1891.2 Horizontal Life Lines and Rail Systems;
- AS/NZS 1891.3 Fall Arrest Devices;
- AS/NZS 1891.4 Selection, Use and Maintenance; and
- AS/NZS 5532 Manufacturing Requirements for Single Point Anchor Device used for Harness Based Work at Height.

1.2.2 - Fall protection equipment must be inspected before each use and at regular intervals. Where a Worker has been arrested from a fall or the equipment shows defects during inspection it must be immediately withdrawn from service. Any defective equipment must have a defect label attached and only a height safety equipment inspector will determine whether the item is to be destroyed or repaired, which must be documented.

1.2.3 - All fall protection equipment (including harnesses, fall arrest/fall restraint equipment) must be documented in a register such as a Height Equipment Register. As a minimum, inspections must be carried out in accordance with manufacturer

requirements or Table 9.1 in Section 9 - Inspection, Maintenance and Storage of AS/NZS 1891.4 by a height equipment inspector.

1.2.4 - Anchorage points must be selected and installed to withstand the force applied as a result of a Worker's fall in accordance with AS/NZS 1891.4 and meet the following requirements:

- Single point anchorages for arresting a fall of one person must have a minimum ultimate directional strength of 15 kilo-newtons and for two persons attached to the same anchorage 21 kilo-newtons to which it is attached.
- Be inspected by a height safety equipment inspector at a frequency specified by the manufacturer or where not specified in accordance with Table 9.1 in Section 9 of Inspection, Maintenance and Storage in AS/NZS 1891.4 by a height equipment inspector.
- Be inspected by a trained and competent Worker prior to attachment and working at height; and
- Have a safe means of access and egress prior to positive connection to an anchorage point.

### **1.3 Mobile Elevated Work Platforms (EWP)**

1.3.1 - Where a Worker is required to work in an EWP, the Worker must hold the following nationally recognised qualifications by a registered training organisation prior to working at height:

- Work Safely at Heights;
- EWP Yellow Card or unit of competency;
- Perform EWP Rescue;
- A High Risk Work license (HRWL) where the length of the EWP boom is 11 metres or more;
- Hold a current driver's license when driven or traversing on a public road; and
- Complete a verification of competency assessment on the specific EWP being operated.

1.3.2 – Where an EWP has been proposed as the safest method to elevate a person to work at height, the risks associated with the work must be assessed to select the most appropriate EWP for the task, which includes (but is not limited to):

- The specific work or activity the EWP will be used for;
- Examination of obstructions above ground (e.g. structures, electrical lines, scaffolding);
- Examination of obstructions below ground level (i.e. excavation, incline, plant and equipment);
- Environmental conditions, such as public access (including public roads);
- Assessment of the safe working load (i.e. weight of Workers, tools and equipment);
- Factors which may affect stability (i.e. falling loads, wind, travelling mobile plant, load distribution);
- Location and positioning of outrigger, stabilizers and extending axles;
- Entanglement and crushing; and
- Any other factors, which may affect the health and safety of Workers.

1.3.3 – All EWP's must meet the design requirements specified in Section 2: Design Requirements and the safety device requirements in Table 2.10: Safety Device Function of an EWP and Required Reliability Levels in AS/NZS 1418.10 Cranes, Hoists and Winches - Elevating Work Platforms.

1.3.4 - All EWP's must have specific markings which meet the requirements of ISO 20381 Mobile Elevating Work Platforms - Symbols for Operator Controls and Other Displays as specified in Section 4.2 of AS/NZS 1418.10 Cranes, Hoists and Winches - Elevating Work Platforms.

1.3.5 - Where Workers are operating an EWP (boom type) elevated at height, personal fall protection equipment must be used which includes a full body harness and a restraining lanyard attached to the manufacturer specified anchorage point at all times. For all other EWP's (i.e. scissor lift) the requirement for personal fall protection equipment must be determined by a risk assessment.

1.3.6 - A dedicated spotter must be in place for each EWP where a Worker is elevated at height. The spotter must have the same qualifications as the EWP operator (clause 1.3.1) and perform the following functions:

- Communicate to the operator any hazards which could cause harm to their person or other Workers;
- If required and trained do so, perform emergency operation by use of a manual recovery system; and
- Ensure safe work practices are adhered to at all times (clause 1.3.9).

1.3.7 - All EWP's must have a dry chemical (ABE) fire extinguisher fitted with a secure bracket which is easily accessible to Workers and have the capacity to extinguish a fire associated with an EWP. The extinguisher must have legible instructions, correct colour coding (red with white band), be fitted with a pressure gauge and a flexible hose to access awkward locations to extinguish a fire. The fire extinguishers must be inspected and maintained in accordance with AS 1851 - Routine Service of Fire Protection Systems and Equipment.

1.3.8 - All EWP's must have a pre-mobilisation assessment completed by a competent person prior to the EWP being operated on site. In addition, the following documentation must be verified as part of the pre-mobilisation assessment and stored with the EWP at all times (where practical) or in the vicinity of the EWP:

- OEM Operator Manual (meeting the requirements of Section 4.1.3 of AS/NZS 1418.10);
- Maintenance Manual (meeting the requirements of Section 4.1.2 of AS/NZS 1418.10);
- Plant Risk Assessment;
- Daily pre-start and log book;
- Service history records (previous 3 months of repairs and maintenance);
- Relevant Worksafe WA Plant Registration; and
- Quarterly and annual inspection records.

1.3.9 - Each EWP must be inspected at intervals specified by the manufacturer and as a minimum meet the inspection requirements detailed in Appendix D: Inspection Flowcharts of AS 2550.10 Cranes, Hoists and Winches - Safe Use of Mobile Elevating Work Platforms.

1.3.10 - Each EWP must be mechanically maintained by a trained and competent Worker (i.e. fitter) in accordance with manufacturer specifications and where applicable regulatory requirements. The frequency of the inspection is to be based on operational use, the operating environment and operating intensity. As a minimum, each EWP must be maintained in accordance with AS/NZS 1418.10 Cranes, Hoists and Winches - Elevating Work Platforms.

1.3.11 - Dependant on the surface of an EWP's final sitting position prior to elevation, the requirements of Section 4: AS 2550.10 Cranes, Hoists and Winches - Safe Use of Mobile Elevating Work Platforms must be considered and put into effect prior to any Workers being elevated to height.

1.3.12 - Safe work practices must be followed at all times by Workers in accordance with Section 5: Operation of AS 2550.10 Cranes, Hoists and Winches - Safe Use of Mobile Elevating Work Platforms, which includes (but is not limited to):

- Completion of a pre-start inspection and functional test prior to daily use;
- Operation in accordance with the manufacturers instruction for it's intended use;
- Be working in accordance with a task specific SWMS;
- Emergency response arrangements in place for EWP emergency scenarios;
- When elevated the EWP must never travel at a greater speed than the creep speed specified by the manufacturer;
- Workers must not transfer materials or attempt to leave the platform whilst in the elevated position;
- Workers must risk assess overhead obstructions and be within regulatory proximity of overhead power lines;
- The EWP must not be used for suspending loads (i.e. crane) including slings or other lifting devices;
- Worker access and egress must only be made when the EWP is in a fully lowered position;
- Use the steps or ladders for access and egress when the EWP is lowered and fundamentally stable;
- The EWP must always be on level ground prior to elevating Workers;
- The EWP must never be loaded with more Workers than the specified load rating;
- Materials and tools must never be carried outside of the basket or platform;
- Step ladders, guard rails or other means to gain additional height must not be used; and

- The travel direction self-propelled EWP must be walked out to identify obstructions (above and below).

## **1.4 Scaffold Structures (above 4 metres)**

1.4.1 - Where the erection, alteration and dismantling of a scaffolding structure is greater than 4 metres in height, Workers must be trained and hold the relevant High Risk Work License (HRWL). Each scaffold Worker must be verified as competent for the HRWL they will operate under, which includes:

- License to Erect, Alter and Dismantle – HRWL Scaffolding Basic Level;
- License to Erect, Alter and Dismantle – HRWL Scaffolding Intermediate Level;
- License to Erect, Alter and Dismantle – HRWL Scaffolding Advanced Level; and
- Work Safely at Heights.

1.4.2 - Scaffold components and accessories which meets AS/NZS standard certification must be erected, altered or dismantled in accordance with manufacturer instructions and the following standards:

- AS/NZS 1576.1 Scaffolding – General Requirements;
- AS/NZS 1576.2 Scaffolding – Couplers and Accessories;
- AS/NZS 1576.3 Prefabricated and Tube-and-Coupler Scaffolding;
- AS/NZS 1576.4 Scaffolding – Suspended Scaffolding;
- AS/NZS 1576.6 Scaffolding: Metal Tube and Coupler Scaffolding compliant with AS/NZS 1576.3; and
- AS/NZS 4576 Guidelines for Scaffolding.

1.4.3 - Where the scaffold structure is greater than 4 metres, complex, or non-standard to Australian Standards, the scaffold design must meet the following design requirements:

- Be designed in accordance with safe design principals to eliminate hazards and risks;
- Be designed by a qualified scaffolding engineer;
- Include calculations, analysis and testing in the safe design report to ensure the structure is without risks;
- Have a certificate of compliance for the scaffold once the scaffold structure is erected;
- Have a revised design report and certificate of compliance when the scaffold structure has been altered;
- Have duty actions, including calculation of total load and concentrated loads in the safe design report.

1.4.4 - The erection, alteration and dismantling of a scaffolding structure, which Workers or an object could fall, more than 4 metres must:

- Have a scaffold plan which outlines the method to safely erect, alter or dismantle the scaffold structure;
- Have a Permit System in place to prevent access to non-essential or untrained Workers;
- Be installed in accordance with the safe design report without modification to components or have items removed or altered without authorisation and the design plan updated;
- Include a task specific SWMS in conjunction with the scaffold erection plan;
- Ensure Workers are in a safe position when erecting, altering or dismantling the scaffold structure;
- Utilize erection platforms where practicable to assist with installation and dismantling;
- Be supervised by a trained and competent Worker with specific knowledge in the structure to be erected; and
- Ensure that no Worker or any other person accesses the scaffold structure for the purposes of work until the scaffold is deemed safe for use, fit for purpose and an authorised inspection certificate has been received.

1.4.5 - For complex, non-standard or where a scaffold structure is over 4 metres, the scaffold structure must be inspected in accordance with the following requirements (as a minimum):

- Prior to first use with a handover inspection certificate confirming the structure is safe for use;
- Inspected daily when in use and authorised by the competent person conducting the inspection;
- Be inspected after any repairs, an incident which affects stability and at intervals no more than 30 days;
- A posted load capacity on the scaffold tag communicated to all Workers who access the structure; and

- Have scaffold tags attached at every access point to the structure, which details the date of erection and any alterations or repairs made to the structure.

1.4.6 - Where there is a risk of a Worker falling from a scaffold structure during the erection, alteration or dismantling, personal fall protection equipment must be used by Workers, which includes, but is not limited to the following tasks:

- Erecting or dismantling drop or hung scaffold, which is constructed from top to bottom;
- Fixing or removing trolley tracks on suspension rings and where the scaffold structure is suspended;
- Attaching and removing spurs projecting from the supporting scaffold structure;
- Erecting or dismantling the first lift of a cantilevered scaffold including the first platform of the structure;
- Erecting or dismantling cantilevered needles and decking between the needles of the scaffold structure;
- The first lift of scaffold erection where Workers are standing on the deck between the needles; and
- Any other installation, erection or alteration activity where there is a risk of a fall.

1.4.7 – The scaffold structure must have open edge protection fixed to the scaffold structure (i.e. guardrails, handrails, mid-rails, toe-boards, guardrail panels and infill panels) to protect Workers from falling from height. Open edge protection must be installed at the following locations, which includes (but is not limited to):

- Open sides and ends of all accessible platforms, landings and temporary stairways are to be protected;
- Openings at points of access to stairways or ladders to be protected with self-closing gates which must not open away from the platform (gates are to function as a guardrail that would otherwise be located at the gate position);
- Where practicable, each working platform is to be placed as close as possible to the working face to protect falling from the inside edge of the scaffold structure;
- Temporary stairways must be protected with handrails;
- Openings in a platform where there is a descending stairway or ladder; and
- Trapdoors, which do not require a person to hold the trapdoor, open while passing through the opening.

## **1.5 Minor and Mobile Scaffold Structures (below 4 meters)**

1.5.1 – All minor scaffold systems must meet Australian Standard structural and component design requirements. Where a minor scaffold system is used, it must be safely erected, altered and dismantled by a trained and competent Worker and meet the requirements of AS/NZS 1576.1 Scaffolding: General Requirements, which includes (but is not limited to):

- A working platform of a minor scaffold must have edge protection in place where the platform is 2m or above the supporting surface;
- Being erected and dismantled in accordance with the manufacturers instructions, including braces, toe boards, mid rails, guard rails and castors;
- The load capacity of the minor scaffold must be capable of holding the load which it is intended to support;
- The mobile scaffold must be used on a firm and flat surface unless castors are adjustable. Where castors are part of the structure, the castors must be compliant with AS/NZS 1576.2 Scaffolding - Couplers and Accessories;
- Where castors have adjustable legs, the ground level surface gradient must not exceed 5 degrees and a flat work platform surface must be achieved;
- For wheel scaffold systems, only wheels which are designed by the manufacturer for that specific minor scaffold must be used when relocating an unloaded scaffold;
- Minor scaffolds must be supported by a solid and flat surface (i.e. concrete) with minor scaffold footplates in place under each footing which must be no less than 25mm x 25mm;
- Where the erection of minor scaffold is not supported by a solid surface, the footplates must be a minimum of 50mm x 50mm to prevent collapse.

1.5.2 - Where a minor or mobile scaffold system has been safely erected, safe work practices must be used meeting the minimum requirements of AS/NZS 1576.1 Scaffolding: General Requirements, which includes (but is not limited to):

- Where possible, the mobile scaffold is to be tied to a solid fixed structure;

- Is kept clear from overhead structures (i.e. power lines);
- Is not in the travel path of vehicles or mobile plant;
- Mobile scaffold wheels must be in a locked before occupation and whenever in a stationary position;
- Where a wheeled minor scaffold systems is used, it cannot be moved from it's fixed (wheel locked) position when a Worker is elevated at height or the platform has unsecured tooling, materials or equipment;
- Temporary stairways or ladders must be used for access and egress and not by climbing end frames (an exemption may include low work platforms); and
- Where there is no other alternative than to climb an end frame to gain platform access, the requirements of Section 3.13.2.3 of AS/NZS 1576.1 must be followed.

## 1.6 Ladders and Work Platforms

1.6.1 - All portable ladders must be designed, maintained and rated in accordance with the following Australian Standards:

- AS/NZS 1892.1 Portable ladders – Metal;
- AS 1892.2 Portable ladders – Timber;
- AS/NZS 1892.3 Portable ladders – Reinforced Plastic;
- AS/NZS 1892.5 Portable ladders – Selection, Safe Use and Care.

1.6.2 – Workers must use safe work practices when working from portable ladders, which includes (but is not limited to):

- Only industrial grade ladders and platforms are permitted for use with a minimum load rating of 120kg;
- All domestic grade ladders or platform ladders are prohibited from use;
- The ladder selected must be appropriate for the task and only used for low elevation or temporary access.
- Step ladders and A-frame ladders are only permitted for access and not to work from, only platform ladders are allowed for temporary work;
- Ladders must be visually inspection upon purchase, before each use to identify damage or faults and after an incident to assess damage and structural integrity. Where damaged or faulty, ladders must be removed from service;
- All ladders must be detailed in a ladder register with specific information on the type, make, model (ID no.), defects, maintenance, in service date and have a thorough structural inspection program in place;
- Ladders must be set up correctly which includes an observation of above, below and passing obstructions, have a firm level and base, secured at both ends regardless of length, angled to minimise outward slipping (i.e. 75 degree angle - 1 step out for 4 steps up) and be extended a minimum of 1 meter above the landing level with a handhold at the top
- Workers must have free climbing ability with both hands available and not carrying tools or equipment in their hands (i.e. use tool bags / belts, lanyard systems); and
- Ladders used as part of an access system (i.e. internal scaffold structure) must be inspected to ensure structural integrity at regular intervals as part of an overall inspection or a stand-alone process.

## 1.7 Open Edge Protection

1.7.1 - Where a permanent or fixed installation platform, walkway, stairway or ladder is installed, it must be installed in accordance with the Safe Design Plan (report) and meet the requirements of AS 1657 - Fixed Platforms, Walkways, Stairways and Ladders - Design, Construction and Installation.

1.7.2 - Where there is a risk of a Worker falling off an exposed edge level ground (i.e. excavation) or a solid elevated structure (i.e. roof or bridge) with no other safer alternative to complete the task, temporary edge protection must be installed.

1.7.3 - Where temporary edge protection is used, all components, fixtures and fittings must be designed, installed and maintained in accordance with the following Australian Standards:

- AS/NZS 4994.1 Temporary Edge Protection Part 1: General Requirements;
- AS/NZS 4994.2 Temporary Edge Protection Part 2: Roof Edge Protection Installing and Dismantling;
- AS/NZS 4994.3 Temporary Edge Protection Part 3: Installing and Dismantling other than roofs;
- AS/NZS 4389 Roof Safety Mesh.

1.7.4 - Dependant on the surface, asset and type of work being performed, where exposed holes, edges, penetrations or openings have been identified as a fall risk, control measures must be implemented, which includes (but is not limited to):

- Protective covers (i.e. grid mesh, secured penetration covers) must be able to support the maximum imposed load in accordance with AS1170 (series) Structural Design Action: Permanent, Imposed and other Actions;
- AS/NZS 4994.1 Temporary Edge Protection Part 1: General Requirements;
- AS/NZS 4994.3 Temporary Edge Protection Part 3: Installing and Dismantling Other than Roofs;
- AS/NZS 4389 Roof Safety Mesh;
- AS 1742.2 Traffic Control Devices for General Use;
- AS 1742.3 Traffic Control Devices for Works on Roads; and
- Include warning signs identifying the risk control measure (i.e. Danger Hole Beneath), compliant with AS 1319 Safety Signs in the Occupational Environment.

1.7.5 - Where there is a risk of a Worker falling from an exposed edge when installing or dismantling a permanent or fixed systems and no safer method been identified to protect a Worker, personal fall protection equipment must be used which meets the requirements of Section 1.2 Personal Fall Protection Equipment.

## **2 DEMOLITION WORK**

### **2.1 Training, Competency and Licencing**

2.1.1 – All Workers who form part of a demolition team must be trained and competent in the specific role or function associated with the demolition work. Where any of the risks specified within this document apply to the demolition work, the applicable training and competency requirements apply collectively.

2.1.2 – Where a dedicated demolition Worker, demolition plant operator or demolition leading hand form part of the demolition team, a Certificate 3 in Demolition must be attained from a registered training organisation. The qualification must be current and verified by way of a verification of competency assessment prior to commencing work.

2.1.3 – A demolition supervisor must be on site at all times while demolition work is being undertaken. The supervisor (demolition) or a dedicated contracted demolition supervisor in charge of the demolition work must hold a current Certificate 3 in Demolition and Certificate 4 in Demolition from a registered training organisation. The qualification must be current and verified by way of a verification of competency assessment prior to commencing work.

2.1.4 – Where the scope of demolition work meets the requirement of class 1, 2 or 3 of Division 9, Sub-division 7 - Demolition of the WHS Regulations, the demolition Contractor must have the appropriate and current demolition license prior to commencing any demolition work.

2.1.5 – Where class 1, 2 or 3 demolition work is conducted in a manner which meets the requirements of AS 2601 Demolition of Structures, the commissioner is to be notified 5 days prior to the intended demolition work with a copy the notification retained in the Contractors record management system.

2.1.6 - Where class 1, 2 or 3 demolition work is not conducted in a manner which meets the requirements of AS 2601 Demolition of Structures, the Worksafe Commissioner is to be notified 10 days prior to the demolition start date to seek approval of the intended demolition method. Where conditions are imposed on the demolition Contractor, the conditions must be met with subsequent approval by the Worksafe Commissioner. A copy the initial notification, conditions imposed and subsequent approval must be retained in the Contractors record management system.

### **2.2 Safe Design and Planning**

2.2.1 – Where a structure is to be demolished under a class 1, 2 or 3 demolition license, site and structural investigations must be completed by a competent person (demolition engineer) in accordance with Appendix A of AS2601 Demolition of

Structures. Site investigations and risk management processes must be applied to ensure safe demolition of the structure, which must be documented in the Demolition Management Plan. The assessment of the risks associated with the demolition work may include, (but are not limited to):

- The location, structural designs, layout and condition of the structure and adjoining structures;
- Pre-weakening, controlled collapsing, explosive blasting (fly rock / material) structural integrity (stability) and loadings at each sequential stage of the proposed demolition;
- Penetrations, voids, slips, trips and falls, trenches, exposed / open edges, fragile walking surfaces, dropped objects, unstable loads, fire, explosion, ground collapse, hot work (i.e. welding) and powered cutting tools;
- Live electrical sources on the structure, confined spaces, noise, vibration, silica, lead, synthetic mineral fibres, PCB's, asbestos, hazardous substances (excl. asbestos), dangerous goods and contaminated atmospheres;
- Underground and overhead structures (i.e. gas, electricity, power lines, sewer systems, telecommunications);
- Conflict points between operating mobile plant, Workers on foot, members of public, structures, equipment or material (i.e. brace supports, scaffolding, temporary edge protection);
- Loading and unloading points, lift planning for crane operation, materials storage, weather conditions, wind loads and the storage, handling and removal of demolished material; and
- Any other hazard identified in the demolition risk assessment.

2.2.2 - In accordance with Section 1.6 Hazardous Substances of AS 2601 Demolition of Structures a hazardous substances audit must be completed to identify their presence on or near the structure, which has the potential to impact Workers or members of the public if disturbed by the method of demolition.

2.2.3 - In accordance with Section 2.3 Work Plan (Demolition Management Plan) of AS 2601 Demolition of Structures, a Demolition Management Plan must be developed by a competent person (demolition engineer) and authorised (Regulator and Contractor) prior to demolition working commencing. Where hazardous substances have been identified or explosive blasting is part of the scope of work, a Hazardous Substance Management Plan and Blast Management Plan must also be developed by a competent person and included in the overall Demolition Management Plan.

## **2.3 Exclusion Zones and Access Control**

2.3.1 – Exclusion zones must be established for all demolition work to prevent health and safety risks to Workers and members of public. Where demolition or High Risk Work activities form part of the scope of work, where exclusions zones apply within this document or other exclusions are required, they must apply collectively.

2.3.2 – Access to the demolition site must be strictly controlled to prevent unauthorised access from members of the public and Workers who do not form part of the demolition work. Access must be controlled by application of the following Australian Standards, which includes (but is not limited to):

- AS 1319 Safety Signs in the Occupational Environment;
- AS 1725 Chain-link Fabric Security Fences and Gates;
- AS 1742.1 General Introduction and Index of Signs;
- AS 1742.2 Traffic Control Devices for General Use; and
- AS 1742.3 Traffic Control Devices for Works on Roads.

## **2.4 Mobile Plant, Equipment and Materials**

2.4.1 – Where plant (i.e. Crane, EWP, and Load Shifting Plant) form part of the demolition work, the requirements specified within this document must be applied collectively.

2.4.2 – All tools, equipment, plant, training, attachments, structures and personal protective equipment (i.e. lifting equipment, scaffolding, respiratory protection devices), inspection, maintenance or specified safety requirements detailed within this document which forms part of the demolition work, they must be applied collectively.



2.4.3 – Where any electrical work (installation or de-commissioning) is part of the demolition work, it must comply with AS/NZS 3012 Electrical Installations - Construction and Demolition Sites. In addition, where electrical control measures specified in Section 19 - Electrical Work and Installations are applicable to the demolition work, they must be applied collectively.

## **2.5 Positive Two Way Communication Systems**

2.5.1 – Positive two-way communication systems and protocols must be in place for the demolition work. Due to a number of High Risk Work activities associated with demolition occurring simultaneously, where practicable, the positive two-way systems and protocols contained within this document may be applied individually and/or collectively (i.e. multiple or single channel) which will be dependant (risk assessment) on the High Risk Work(s) being undertaken.

2.5.2 – Where multiple work groups (e.g. Contractors, subcontractors, Principal's Personnel) are operating at any one given time and dependant on the communication system which will be used, all Workers must be conversant and compliant with the site specific positive two-way communication system and protocols determined by the Contractor.

## **2.6 Safe Execution of the Demolition Plan**

2.6.1 – Where there is a change to method of demolition which deviates from the Demolition Management Plan, change risk management principals must be applied to identify any introduced hazards or risks from the proposed change. Where this change occurs a formal documented qualitative risk assessment must be completed on any introduced hazards and the control measures to be applied to manage the introduced hazards.

2.6.2 – As a minimum, where any permit to work system (i.e. isolation permit) or specific plan (i.e. lift plan) is specified within this document, then the permit(s) or plan(s) must be applied collectively to the work.

2.6.3 - In accordance with regulatory requirements, any demolition work under a class 1, 2 or 3 demolition licence must have the following information available on site at all times:

- Contractor Demolition License;
- Approval or notification by the Commissioner;
- Any conditions associated with the approval or notification specified by the Commissioner;
- The Demolition Management Plan;
- A copy of AS 2601 Demolition of Structures; and
- A Safety Management Plan (in accordance with regulatory requirements) where the demolition only forms part of the overall scope of work and all High Risk Work SWMS.

2.6.4 – Where the demolition work involves the removal of asbestos under a restricted or unrestricted license, the requirements specified in Section 3 Asbestos Removal and Control must be applied.

2.6.5 - Where AS 2601 Demolition of Structures specifies a safe method of demolition, the method prescribed in the standard must be applied. In addition, where the demolition work involves any High Risk Work activity specified within this document, their associated controls (where practicable) must be applied collectively.

2.6.6 - Daily site inspections and daily pre-operational requirements (i.e. mobile plant pre-start) must be carried out prior to work commencing which includes (but is not limited to):

- EWP, powered mobile plant, cranes, scaffold structures and powered hand tools or similar equipment;
- Any temporary edge protection, bracing or shoring systems have remained stable;
- Conditions or hazards which may impact the vehicle movement plan;
- Barricading, demarcation and signage is in place;
- Clear access and egress throughout the site including emergency access routes;
- Demolished materials have remained stable;

- Hazardous substances or dangerous goods are appropriately stored and segregated; and
- Any isolated services have remained isolated.

2.6.7 – Prior to the completion of daily demolition, work a post work inspection of the demolition site must be completed which includes (but is not limited to):

- Partly demolished structures secure and stabilized;
- Demolished materials have been removed or secured;
- Any ignition sources or embers from hot work activities have been extinguished;
- All emergency access routes are clear of debris or any other obstruction;
- All boundaries are secure to prevent unauthorised access; and
- Any public thoroughfares are clear of debris or any other obstructions.

### **3 ASBESTOS REMOVAL AND CONTROL**

#### **3.1 Training, Competency and Awareness**

3.1.1 – Where asbestos removal is proposed, all Workers must work under an approved Worksafe WA asbestos removal license for the specific type of asbestos to be removed prior to work commencing, which includes:

- A restricted Asbestos Removal License – Bonded non-friable asbestos > 10 square meters; or
- An unrestricted Asbestos Removal License – All forms of friable and non-friable asbestos.

3.1.2 – Where less than 10 square meters of bonded non-friable ACM is to be removed, no Worker is authorised to remove the ACM unless the removal work is directly supervised at all times by a supervisor who holds the current qualification “Supervise Asbestos Removal” by a registered training organisation. The supervisor must ensure all control measures are in accordance with the Code of Practice for the Safe Removal of Asbestos 2<sup>nd</sup> Edition [NOHSC:2002(2005)] are in place to manage the risk of exposure to Workers.

3.1.3 - Where Workers are conducting asbestos removal work under a restricted asbestos removal license, the work must be supervised at all times by a trained and competent supervisor who holds the current qualification “Supervise Asbestos Removal” by a registered training organisation.

3.1.4 - Where any Worker is conducting asbestos removal work under an unrestricted asbestos removal license, all Workers must have the following competencies by a registered training organisation prior to performing asbestos removal work:

- All Workers – Asbestos Awareness
- Supervisor - Supervise Asbestos Removal

The supervisor who is operating under an unrestricted asbestos removal license must be present at all times while the asbestos removal work is being undertaken.

3.1.5 – All asbestos removal work undertaken by a licensed individual or business must be risk assessed to manage and control the risk of asbestos exposure to Workers and/or members of public. The risk assessment must include (but is not limited to):

- The type, amount, condition and location of the removal work;
- The method of removal, PPE requirements, decontamination and disposal (including disposal facility);
- Impacts to other Workers and/or members of the public;
- The requirements for demarcation and barricading (specified distances);
- Wind conditions, direction and any other environmental factors;
- The requirement of conducting air monitoring; and
- Any other conditions, external impacts or hazards, which may contribute to the risk of human exposure.

3.1.6 - Where asbestos is identified in the workplace or permanent structure or the risk assessment based on the scope of work identifies significant impacts from an asbestos source which has the potential to impact Workers or members of the public, an Asbestos Management Plan must be developed in accordance with the Code of Practice for the Management and Control of Asbestos in Workplaces [NOHSC: 2018(2005)].

### **3.2 Barricading, Demarcation and Exclusion Zones**

3.2.1 - Demarcated and barricaded exclusion zones must be established when asbestos removal work is being undertaken for the protection of Workers and/or of the public, which includes and is not limited to (where applicable) application of the following Australian Standards:

- AS 1319 Safety Signs in the Occupational Environment;
- AS 1725 Chain-link Fabric Security Fences and Gates;
- AS 1742.1 General Introduction and Index of Signs;
- AS 1742.2 Traffic Control Devices for General Use;
- AS 1742.3 Traffic Control Devices for Works on Roads; and
- Hazard tape and signage (per AS1319) for short duration where low risk exposure has been determined.

3.2.2 - Barricading, demarcation and signage of the exclusion zone must be in place for the duration of asbestos removal work including aftercare (after work hours). This includes situations where the asbestos removal work is greater than one workday or clearance of the asbestos removal site has not been achieved.

3.2.3 - Communication and consultation arrangements must be in place for the intended asbestos removal work, which includes (but is not limited to):

- Regulatory authorities (where applicable);
- Asbestos removal Workers;
- Non-asbestos removal Workers (in the vicinity of the works);
- Members of public and local authorities (where there is a health and reputational impact); and
- Include a stop work / stop task authority where an asbestos removal exclusion zone has been compromised (i.e. unprotected Worker, member of public).

3.2.4 - Where an unprotected Worker or member of public enters a demarcated exclusion zone when asbestos removal work is being undertaken and there a risk of exposure from airborne fibres or there is an inherent risk from the type, condition or interaction, the occurrence (incident) must be reported immediately. Notification of the potential asbestos exposure must be reported in the Principal's incident reporting system EQSafe for internal and regulatory reporting requirements.

### **3.3 Personal Protective Equipment**

3.3.1 - All Workers who perform asbestos removal work must be supplied with suitable respiratory protection device (RPD) based on the risk assessment (competent person). As a minimum RPD worn by Workers must:

- Provide sufficient respiratory protection to Workers based on the risk assessment;
- Meet the requirements of AS/NZS 1716 Respiratory Protection Devices;
- Meet the requirements of AS 1715 Selection, Use and Maintenance of Respiratory Protection Devices;
- Ensure Workers are adequately trained to use and maintain the RPD (where required);
- Have a fit test completed and recorded to ensure adequate protection and seal is achieved;
- Be worn at all times when asbestos removal work is being undertaken; and
- Where applicable (P1, P2) dispose of the RPD in accordance with asbestos waste disposal requirements.

3.3.2 - In addition to RPD, Workers must be provided with additional PPE (clothing, footwear, gloves) based on the risk assessment which meets the requirements of Section 9.6.2 of the Code of Practice for the Safe Removal of Asbestos 2<sup>nd</sup>

Edition [NOHSC:2002(2005)]. Where laundering of clothing and PPE is required, it must meet the requirements as specified Section 9.6.2 or disposed of in accordance with asbestos waste disposal requirements.

### **3.4 Safe Removal of Asbestos**

3.4.1 - The removal of asbestos under a restricted or unrestricted license must ensure the following information is available, accurate and present at all times while asbestos removal work is being undertaken:

- Applicable Worksafe WA approved Asbestos Removal License;
- Scope of Works;
- Asbestos Removal Control Plan;
- Safe Work Method Statement (SWMS); and
- A copy of the Code of Practice for the Safe Removal of Asbestos 2<sup>nd</sup> Edition [NOHSC: 2002 (2005)].

3.4.2 – The removal of asbestos must be undertaken by wet removal methodologies to reduce the risk of asbestos exposure. Where this cannot be achieved or it is not practicable due to the introduction of additional hazards, justification must be provided, authorised and documented in the asbestos removal control plan.

3.4.3 – Tools and equipment used for asbestos removal work must be appropriate for the task and method of removal, which must be selected as to not disturb the source of asbestos in such a way that it will not become airborne. The following tools must not be used for asbestos removal work, which includes (but is not limited to) high-pressure tools; sanders, quick cut saws, other power saws, high-speed drills and angle grinders or high-pressure equipment; gurneys, compressed air cleaners or high-pressure water jets.

### **3.5 Air Monitoring**

3.5.1 – The requirements for air monitoring is based on the risk (risk assessment) associated with the scope of work. Where air monitoring is not required, justification must be provided, authorised and detailed in the asbestos removal control plan. The requirement for air monitoring may include (but is not limited to):

- Friable asbestos (mandatory);
- Non-friable asbestos (condition dependant);
- Friable naturally occurring deposits requiring disturbance (mandatory);
- Friable or non-friable asbestos in a public place or adjacent to a public place (mandatory); or
- Friable or non-friable asbestos clearance monitoring in an enclosed space (mandatory).

3.5.2 - Where asbestos removal work is being undertaken, air monitoring must be conducted by a suitably trained and competent Occupational Hygienist or Occupational Hygiene Technician in accordance with the Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres [NOHSC:3003(2005)].

3.5.3 – All asbestos monitoring samples must be evaluated by a NATA accredited laboratory. Where a test result from personal or perimeter monitoring confirms an exceedance to the NOHSC exposure standard for asbestos, the occurrence must be reported, investigated with the exceedance entered into the Principal's incident reporting system (EQSafe). In addition, the Worker(s) to whom the monitoring result relate must be notified of the exceedance result as soon as the results become available.

### **3.6 Decontamination and Disposal**

3.6.1 - Dependant on the type of licensed asbestos removal work, decontamination facilities must be available for asbestos removal Workers in the vicinity of the work area for tools, equipment, materials and their person. Where decontamination of a work area is required, it must be done in accordance with specified wet or dry methodologies. As a minimum, all decontamination must be conducted in accordance with section 9.9 of the Code of Practice for the Safe Removal of Asbestos 2<sup>nd</sup> Edition [NOHSC:2002(2005)].

3.6.2 - Where asbestos has been removed it must be contained, sealed and labelled in accordance with the Globally Harmonised System (GHS) for classification and Labelling of Hazardous Substances and Dangerous Goods and meet the containment and disposal requirements in Section 9.10 of the Code of Practice for the Safe Removal of Asbestos 2<sup>nd</sup> Edition [NOHSC:2002(2005)].

3.6.3 - All asbestos waste must be sufficiently sealed and secured prior to transit to reduce the risk of accidental release during transportation. Asbestos waste must be disposed of at a licenced public authority or council asbestos waste facility, the locations of which can be provided by Worksafe. Records of the disposal of asbestos waste must be retained in the Contractors record management system.

## **4 WORK IN CONFINED SPACES**

### **4.1 Training, Competency and Awareness**

4.1.1 - A space will be considered a confined space where it meets the requirements of Section 3.2 – Identification of a Confined Space and Table 1 – Confined Space Hazard Identification Matrix of AS: 2685 Confined Spaces.

4.1.2 – Where it has been determined that work cannot be completed outside a designated confined space or where it is not practicable, a risk assessment must be completed in accordance with regulatory requirements to determine the safest method of work in the confined space. As a minimum the risk assessment must consider the of Section 3.3 Risk Assessment in AS 2685 Confined Spaces.

4.1.3 - Workers that work in, near or with confined spaces must be trained and competent for the specific role or function in association with a confined space. All qualifications must be nationally recognised from a registered training organisation. The training must meet the minimum requirements of Appendix D in AS 2685 Confined Spaces. The qualifications for specific roles and functions of Workers in association with confined spaces include (but is not limited to):

- Identify Confined Space;
- Test Confined Space Environment;
- Enter Confined Space;
- Enter and work in Confined Spaces;
- Undertake Confined Space Rescue; and
- Apply First Aid.

4.1.4 - The roles and function where specific confined space qualifications apply include (but are not limited to):

- Issuing confined space entry permits and it's associated responsibilities;
- Identify, determine and risk assess a confined space;
- Performing work in or on the confined space;
- Performing the duty of a confined space standby person; and
- Providing emergency response and first aid.

4.1.5 - The person who has overall responsibility of the confined space must ensure emergency response personnel:

- Are trained, assessed and deemed competent to conduct a rescue from a confined space;
- Confined space rescue plans and first aid procedures are planned, established and rehearsed;
- Have confined space rescue equipment which is appropriate, available and maintained;
- Are given authority to co-ordinate emergency response when under emergency recovery conditions;
- Are consulted in the development of the rescue plans for all identified confined spaces.

### **4.2 Confined Space Stand by Worker**

4.2.1 - The person who has overall responsibility of the confined space must ensure the standby person has the required qualifications and experience to perform their function, which includes:

- Initiate site emergency response procedures where required;
- Operate, monitor and maintain any specific plant or equipment;
- Monitor the surrounding environment for anything that may impact the confined space; and
- Recognise and understand the risk to Workers inside the confined space and take appropriate action.

4.2.2 - The persons who has overall responsibility in authorising the entry to a confined space must ensure the standby person:

- Remain outside the confined space for every confined space entry conducted;
- Is positioned in a way to be in constant communication with Workers in the confined space;
- Where practicable and without risk or harm, observe those Workers in the confined space;
- Is not involved in another task that will impact their ability to be present at the confined space at all times;
- Is only substituted by a Worker with the equivalent qualifications and experience of the Worker substituted;
- Is able to provide accurate information to emergency response personnel of all known hazardous conditions and other relevant information relevant to the emergency prior to entry.

### **4.3 Confined Space Entry Permit, Signage and Record Management**

4.3.1 - A written authority (confined space entry permit) must be in completed prior to issue and entry to a confined space and as a minimum contain the information from Section 3 - Completion of Written Authority of AS 2685 Confined Spaces. The confined space entry permit must be present at the location while work is being performed in the confined space.

4.3.2 – Identified confined spaces must have an identifiable placard consistent with AS 2685 Confined Spaces. Confined space signage must be displayed while work is being performed in the confined space through to completion. Where applicable, additional signage must be in place for other identified risks (i.e. exclusion zones).

4.3.3 - All Workers including the confined space Workers, supervisor, stand by Worker and Workers involved in rescue must be briefed on the Confined Space Permit requirements including the controls, understanding of their role and agree that the documented arrangements are suitable prior to work commencing.

4.3.4 – Documentation in relation to confined spaces must be recorded and retained which includes:

- The location of confined spaces recorded in a register;
- Risk assessments, inspections and audits;
- Procedures for conducting work in or on a confined space (i.e. Instructions, SWMS);
- Training and competencies;
- Confined space entry permits;
- Atmospheric testing equipment including monitoring, inspection and maintenance; and
- Incidents, which relate to the confined space or work in the confined space.

### **4.4 Atmosphere and Atmospheric Testing**

4.4.1 – Where the risk assessment has determined the requirement to conduct atmospheric testing, no person is to enter the confined space unless testing has been performed to determine:

- A safe concentration of oxygen;
- The concentration of flammable airborne contaminants;
- The concentration of airborne contaminants.

Testing, retesting or continuous monitoring of the confined spaces must be determined which is consistent with the inherent nature or risks associated (risk assessment) with the confined space as prescribed in AS 2685 Confined Spaces.

4.4.2 - No Worker is to enter the confined space unless testing has been performed to determine a safe level of oxygen, which must be between 19.5% and 23.5%. Testing must be conducted in remote locations and different levels within the confined space with atmospheric testing recorded on the entry permit.

4.4.3 – The testing and monitoring equipment must be appropriate for the atmospheric contaminant of concern, which must be performed by a trained and competent Worker in accordance with the manufacturer's instructions.

4.4.4 - Where practicable, atmospheric testing is to be performed outside of the confined space. Where testing can only be performed inside a confined space (i.e. large confined spaces) where detection devices or attachments (probes) cannot reach a risk assessment must identify, assess and stipulate controls prior to entry for the testing (i.e. supplied air breathing apparatus, stand by person, emergency response), which must be done under a permit. Testing of the opening and locations which can be reached must be completed prior to entry.

4.4.5 – Where practicable, purging flammable contaminants must be performed outside a confined space. Where this cannot be achieved, it must be under the conditions of a confined space entry permit. A flammable atmosphere must be cleared and purged which is consistent with Section 3.4.15 of AS 2685 Confined Spaces. Specific controls must be applied where flammable contaminants are purged. The purging and ventilation equipment must meet the following Australian Standards to prevent ignition from a flammable atmosphere:

- AS/NZS 60079.11 Explosive Atmospheres - Equipment Protection by Intrinsic Safety 'I';
- AS/NZS 60079.10.1 Explosive Atmospheres Classification of Areas - Explosive Gas Atmospheres;
- AS/NZS 61241.10 Electrical Apparatus for Use in the Presence of Combustible Dust – Area Classification;
- AS/NZS 1020 The Control of Undesirable Static Electricity.

4.4.6 - Where entry to a confined space is required where the level of flammable contaminants in the atmosphere is greater than 5% but less than 10% of its LEL, all persons are to be removed from the space unless continuous monitoring is maintained in accordance with Section 3.4 of AS 2685 Confined Spaces.

4.4.7 – A safe atmosphere must be maintained (contaminants, temperature and air circulation) which must be specified on the confined space entry permit and include any ventilation to be used, the type, number of devices, flow rates and the maintenance requirements of the ventilation controls.

## **4.5 Atmospheric Testing Equipment and Respiratory Protection**

4.5.1 – Where equipment is used for atmospheric testing, the equipment must be calibrated in accordance with manufacturer requirements and recorded in a register. The equipment must meet the inspection and testing requirements consistent with AS 2685 Confined Spaces and comply with the following Australian Standards:

- AS/NZS 60079.0 Explosive Atmospheres - Part 0: Equipment - General Requirements;
- AS/NZS 60079.29.1 Explosive Atmospheres - Gas Detectors Performance Requirements; and
- AS/NZS 4641 Electrical Equipment for Detection of Oxygen and Other Gases and Vapours at Toxic Levels General Requirements and Test Methods.

4.5.2 – Where control measures cannot ensure a safe atmosphere or the nature of work in the confined space is likely to degrade or contaminate the atmosphere (i.e. hot works), respiratory protection devices must be selected, used and maintained in accordance with the following Standards commensurate to the level of risk within the confined space:

- AS/NZS: 1715 Selection, Use and Maintenance of Respiratory Protection Equipment;
- AS/NZS: 1716 Respiratory Protection Devices.

## **4.6 Safe Work in a Confined Space**

4.6.1 - No person must enter a confined space unless:

- The confined space has been risk assessed to identify the hazards, contaminants and control measures;

- All Workers entering the confined space or associated with the work must be trained and deemed competent;
- Entry and exiting points meet the requirements of Appendix C of AS 2685 Confined Spaces;
- Access and egress is controlled where there is more than one entry point to prevent unintentional access;
- There is a safe atmosphere or adequate protective measures have been implemented;
- All energy sources have been isolated and de-energised under an isolation permit (where applicable);
- A clear and confirmed communication system is in place between all Workers involved in the task;
- Emergency equipment and PPE is available and checked prior to work commencing;
- Confined space signage is in place in a clear and visible location to Workers and other Workers in the vicinity;
- A confined space rescue plan is completed in consultation with the emergency response Workers
- There is a current and valid confined space entry permit issued by an entry permit issuer and the entry permit holder has signed to accept accountability for the confined space work;
- Entrants sign on and sign off to the permit each time they enter or exit the confined space;
- A SWMS must be completed with applicable controls, reviewed and signed onto by all Workers;
- All controls detailed in the SWMS and Confined Space Entry Permit are implemented; and
- All other permits (i.e. hot works) and their conditions have been met and authorised.

## 5 EXCAVATION AND TRENCHING

### 5.1 Safe Design and Planning

5.1.1 – During the planning stage, safe design principles must be applied in accordance with regulatory requirements for any excavation or trench which is greater than 1.5 meters in depth and documented in the safe design plan. The risks associated with excavation and trench work must be evaluated, which includes (but is not limited):

- Underground utilities and services such as gas, water, sewerage, telecommunications, electricity and chemicals;
- Overhead obstructions (i.e. vegetation, bridges, structures, light posts) or overhead electrical utilities;
- Falling from one level to another and falling objects;
- Cave in of side wall and mobile plant falling into the excavation or trench;
- Inappropriate placement of excavated materials, plant or other loads;
- The instability of adjoining structures caused by the excavation;
- The instability of the excavation due to persons or plant working adjacent to the excavation;
- Interaction with other trades in the vicinity and static and dynamic loads near the excavation;
- Management of surrounding vehicle traffic and ground vibration;
- Previous disturbance of the ground including previous excavation;
- The presence of or possible in-rush of water or other liquid, expected weather condition (wet or dry);
- Hazardous chemicals, which may be present in the soil where excavation work is to be carried out;
- The length of time the excavation is to remain open;
- Traffic management, access and egress, exclusion zones and access control and barricading; and
- Mobile plant and equipment used to perform the for the work.

5.1.2 – In conjunction with the Safe Design Report for any proposed excavation or trench, the safe design assessment must identify any unexploded ordnates (UXO). Where UXO has been identified, remediation must be conducted prior to any excavation work. The Department of Fire and Emergency Services (DFES) provides specific information on the management and control of UXO in conjunction with the Department of Defence, of which all regulatory and compliance requirements must be followed. Further information can be sourced from DFES: [DFES – Unexploded Ordnates \(UXO\)](#).

5.1.3 – Where underground or overhead utilities have been identified, controls must be implemented to manage the risks. Where other risks contained within this document may impact excavation and trench work, those controls must be applied collectively (where practicable) to the work where they apply.



5.1.4 - Where excavation and trench work (> 1.5m) is being undertaken, the safe design report must identify the need for ground support system in accordance with AS 1726 Geotechnical Site Investigations. Geotechnical investigations for excavations and trenches must be conducted by a trained and competent Worker (geotechnical engineer) with equipment that has current certificates of calibration and used in accordance with the manufacturer instructions.

5.1.5 - The need for ground support systems as a minimum must take into consideration:

- Depth of the excavation or trench and the work activities to be undertaken (i.e. use of compactors)
- Local site conditions including access, ground slope, adjacent buildings and structures;
- Surface, variable soil types, stability, shear strength, underground water courses and trees
- Whether in a natural condition, degrees of cohesive strength and frictional resistance;
- Fractures or faults in rocks including joints, bedding planes, strike directions and angles and clay seams;
- Hard or compact soil, liability of cracking or crumbling or whether loose or running material; and
- Stressors from vibration potentially caused by pile driving, blasting, passing loads or vibrating plant.

## 5.2 Ground Support Systems

5.2.1 – Where safe design and geotechnical investigation has determined benching and battering is a more suitable method for the proposed excavation or trench, the benching and battering must be conducted by a trained and competent mobile plant operator in accordance with the requirements of Section 11- Mobile Plant Operation, contained within this document.

5.2.2 – Where benching, battering or a combination of bench and batter is used for an excavation or trench, safe work practices must be used which includes, (but not limited to):

- Being designed in accordance with geotechnical design with measured height, depth and angle;
- The vertical face of the bench is no greater than 1.2m for non-cohesive soil types;
- A vertical face within a bench must not be > 1.5m unless geotechnical design determines adequate soil cohesion;
- Prevent access to Workers or members of public while excavation work is being undertaken;
- Identify any loose materials which may impact Workers such as rocks in the sloping or straight face; and
- Meet any specified requirements in the Code of Practice for Excavation (2005) WA.

5.2.3 – Where safe design and geotechnical investigation has determined ground support systems (i.e. shoring / shield) are to be used to prevent cave in of the trench (> 1.5m), the ground support system must meet the requirements of the following Australian Standards:

- AS 5047 Hydraulic Shoring and Trench Lining Equipment; and
- AS 4744.1 Steel Shoring and Trench Lining – Design.

5.2.4 – Any shoring or shield system installed to prevent cave in of a trench (>1.5m) must be installed by trained and competent Workers in accordance with manufacturer instructions and the safe design plan. No shoring system is to be used which does not comply with these Australian Standards.

5.2.5 – Safe work practices for trenches (>1.5m) must be established when installing, maintaining and removing temporary shoring or shield system, which includes (but not limited to):

- Ensure the structures such as buildings, brick walls, scaffold and roads are not compromised;
- No Worker is allowed in an trench where the trench is being excavated by operating mobile plant;
- The work must have a dedicated spotter in place where a Worker is required to enter the trench;
- Mobile plant operators must work at a safe distance from the trench to prevent fall in and cave in.
- Mobile plant operators must be at a safe distance to prevent fume (diesel particulate matter) entering the trench;
- Excavated material must be placed at a distance to prevent cave in, dependant on the type of ground support system taking into account geotechnical information; and
- Meet any specified requirements in the Code of Practice for Excavation WA or any updated version.

5.2.6 - Where there is a bench, batter or shoring ground support system in place, safe work practices must be in place which includes, (but is not limited to):

- Be operating in accordance with an authorised Excavation Permit for the proposed work;
- Be working in accordance with a site and task specific SWMS;
- Where crossing over points are required, designed walkways must be provided with adequate protection (kickboards and guardrail). Trench crossing should be avoided where possible to prevent fall from height risks;
- Have adequate safety signage at appropriate locations around the trench in accordance with AS 1319 Safety Signs for the Occupational Environment;
- Have secure access and egress to the trench at appropriate distances in accordance with AS/NZS 1892.5 Portable ladders - Selection, Safe Use and Care and the requirements of Section 1.6 - Ladders and Mobile Platforms contained within this document;
- Where there is a risk from falling over an exposed edge, suitable edge protection must be installed in accordance with AS/NZS 4994.1 Temporary Edge Protection Part 1: General Requirements and AS/NZS 4994.3 Temporary Edge Protection Part 3: Installing and Dismantling for Edges other than Roofs;
- Control access where practicable with temporary barricading (fencing) to prevent unauthorised access;
- Be inspected and authorised by a geotechnical engineer prior to any Worker entering the trench (>1.5m); and
- Update and communicate vehicle movement plans with information relating to the excavation or trench.

### **5.3 Geotechnical Monitoring and Inspection**

5.3.1 – Where geotechnical monitoring is required in accordance with safe design requirements for a trench (generally > 1.5m), geotechnical monitoring and inspections must be done in accordance with AS 1726 Geotechnical Site Investigations and approved design drawings. Subsequent geotechnical monitoring and inspections must be determined by the geotechnical engineer in the design report and in accordance with AS 1726.

5.3.2 – Inspections must be carried out for any trench (>1.5m) before a person enters the trench (daily when in use) and before work commences. The inspection of a trench must include (but is not limited to):

- Assessment of stability and integrity by identification of any tension cracks, sloughing, undercutting, water seepage, bulging or other identifiable markers where soil is disturbed;
- Any movement of any adjacent structure in the vicinity of the trench;
- The location or placement of the spoil heap or any introduced material which may affect trench integrity;
- Perimeter security, access and egress stability (ladders) and temporary edge protection;
- The presence of any atmospheric contaminants; and
- Any other hazards, which may affect the stability and integrity of the trench.

### **5.4 Exclusion Zones and Access Control**

5.4.1 - Where a Worker is working in a trench (>1.5m), the Worker must have a spotter in place to provide direct supervision. Direct supervision is not required where the sides of the excavation are stable or cut back to a safe level or the sides are adequately supported to prevent a cave-in, which must be determined by a competent person (geotechnical engineer).

5.4.2 – All Workers who enter a trench (>1.5m) must be working under a site and task specific SWMS for the work being carried out. The SWMS must be read, understood and signed by all Workers who enter the trench in conjunction with any permits applicable to the work (i.e. excavation permit).

5.4.3 - Suitable exclusion zones must be established which must be documented in the site vehicle movement plan, which must be communicated to Workers or any other person(s) who may be affected by the trench or excavation. The exclusion zone must be adequate to prevent potential cave in of the trench, taking into consideration the geotechnical investigation report, geotechnical engineer recommendations, plant movement (size, type, frequency), work in the vicinity, adjacent

structures (established or being constructed), the active construction plan or any other factor to establish an suitable exclusion zone. Refer to Section 11.4 – Mobile Plant Operation.

## **6 EXPLOSIVE BLASTING**

### **6.1 Training, Competency and Awareness**

6.1.1 – The blast controller in charge of the blasting activities must be trained, assessed and deemed competent to manage and control the blasting operation, which includes, (but not limited to):

- Provide clear instruction and direction to the shotfirer for safe initiation of the blast and post blast inspection;
- Co-ordination and management of the blast exclusion zones, blast guards and traffic management;
- Ensure prior to firing that all unauthorised personnel are outside the exclusion zone;
- Carry out a siren run to ensure the exclusion zone has been cleared with blast guard confirmation;
- Conduct checks on roads and other area after each blast to ensure the area is safe and blast guards can be stood down to re-open traffic (where applicable); and
- Complete a blast controller checklist for each blast undertaken.

6.1.2 – The shotfirer who has responsibility for initiating the blast must be trained and competent to perform shot firing duties and hold a current shotfirer license issued by the Department of Mines, Industry, Regulation and Safety (DMIRS). As a minimum shotfirers must hold the following qualifications from a registered training organisation and relevant licences (where applicable) in accordance with the Dangerous Good Safety (Explosives) Regulation (2007):

- Explosives Driver's License ([Regulation 160](#));
- Conduct Surface Shot Firing Operations (inside town boundaries)
- Conduct Secondary Blasting (inside town boundaries); and
- Monitor and Control the Effects of Blasting on the Environment (inside and outside town boundaries).

6.1.3 - Workers who transport, store and handle explosive products must be trained and competent to perform those tasks and hold the current nationally recognised, "Store, Handle and Transport Explosives" by a registered training organisation.

6.1.4 – In accordance with the [Regulation 131](#) of the Dangerous Goods Safety (Explosives) Regulations (2007) any Contractor who uses explosives within a town site to blast rock or similar solid material, or to damage, destroy or demolish anything, whether on or under land or water, must have a written permit issued under Regulation 131 by the Local Government of the district in which the explosives are used. The permit of application must meet all the stated requirements in Regulation 131 and public risk insurance for the explosion of at least \$5 million dollars or a stated higher amount as the Local Government decides is reasonable in the circumstances. Where a permit is required under this regulation, the permit must be detailed in the Blast Management Plan and retained by the Contractor in their record management system.

6.1.5 - Prior to the commencement of any explosive blasting, a risk assessment must be conducted to identify the risks associated with the intended explosive blasting and how those risks will be managed and controlled. As a minimum, the risk assessment must meet the requirements in Section 2: General Requirements, Section 4.9: General Safety Precautions and Section 4.10: Special Precautions of AS 2187.2 Explosives – Storage and Use and any additional information (i.e. blast design) and incorporated into a Blast Management Plan.

6.1.6 – The Blast Management Plan must meet the requirements of Appendix A: Blast Management Plan and Records in AS 2187.2 Explosives – Storage and Use. No explosive blasting is to be undertaken until the Blast Management Plan has been approved by the Contractor who has overall responsibility for the work under the Contract.

### **6.2 Explosive Transport, Storage and Handling**

6.2.1 – Explosive products must be transported stored and handled by methods which meet the requirements of and are consistent with following acts, standards and guidance material:

- Explosives and Dangerous Good Act 1961 (WA);
- Dangerous Good Act 2004;
- Dangerous Goods Safety (Explosives) Regulation 2007;
- AS 2187.1 Explosives – Storage, Transport and Use Part 1: Storage;
- AS 2188 Explosives – Relocatable magazines for Storage;
- AS 4326 The Storage and Handling of Oxidising Agents;
- Australian Code for the Transport of Dangerous Goods by Road & Rail Edition 7.6 (2018);
- National Transport Commission - Load Restraint Guide for Light Vehicles; and
- National Transport Commission - Load Restraint Guide.

### **6.3 Planning and Charging**

6.3.1 - The most effective and safe method for blasting must be considered to minimise the impact to Workers, members of the public, infrastructure, asset and where applicable, aboriginal heritage sites. The blasting activity must consider:

- Using the lowest charge appropriate to the task;
- Reducing the number of holes fired on the same delay;
- Delaying secondary blasts;
- Reducing the maximum instantaneous charge by using delays with sequential timing;
- Optimising the length of sub drilling by using air blast and vibration data previously obtained;
- Stemming blast holes with suitable material; and
- Using low energy detonating cord.

6.3.2 - Measurement of vibration and air blast must be conducted at three separate locations at each blasting site and minimising the impacts of noise and airborne shock wave must be managed in accordance with the National Association of Australian State Road Authorities publication Explosives in Roadworks – User Guide.

6.3.3 - The proposed method of firing must be included in the blast design unless Local Government by-laws or other conditions dictate otherwise. The preferred method of firing is non-electric (Nonel) or electrical components (not electric firing), to be initiated by a remote firing device with the shotfirer in a safe location when the blast is initiated.

### **6.4 Blast Exclusion Zones and Access Control**

6.4.1 - Prior to a shotfirer initiating a blast, an exclusion zone must be established to protect Workers and members of public from injury or harm. The risk assessment will determine the area in which will be classified as the exclusion zone which must be documented in the Blast Management Plan. As a minimum, the exclusion zone must consider the requirement specified in Appendix L - Exclusion Zones of AS 2187.2 Explosives - Storage and Use.

13.4.2 - Established exclusion zones must be demarcated by suitable methods such as flagging tape, hazard blast cones, notification boards, signage and other visible means to restrict unauthorised access. The exclusion zone must have appropriate demarcation consistent with the following requirements:

- AS 1318 Use of Colour for the Marking of Physical Hazards and Identification of Equipment in Industry;
- AS 1319 Safety Signs for the Occupational Environment;
- Western Australian Road Traffic Act, 1974;
- AS 1742.1 Manual of Uniform Traffic Control Devices; and
- AS 1742.2 Traffic Control Devices for General Use.

6.4.3 - A competent person (i.e. blast guard, blast controller) must carry out post blast inspections to assess any health and safety risks to Workers upon re-entry. Where applicable, post blast inspection must allow sufficient time for fume and vapour to clear from the blast area. Where the following contaminants may be present; nitrogen dioxide (NO<sub>2</sub>), nitric oxide (NO),

carbon monoxide (CO), sulphur dioxide (SO<sub>2</sub>) and hydrogen sulphide (H<sub>2</sub>S) a personal gas detection monitor must be used during the post blast inspection.

6.4.4 - Gas detection monitors used for post blast inspections must be able to test for the contaminants of concern (i.e. NO<sub>2</sub>), calibrated and used by a person trained and competent in the use of the device. The risk post blast fume assessment must meet the requirements of the Code of Practice for the Management of Blast Generated NO<sub>x</sub> Gases in Surface Blasting, Edition 2 (2011).

6.4.5 - Positive communication systems must be in place with two way radio communication with all blast crew team members trained in the established communication protocols consistent with AS 2187.2 Explosives – Storage and Use or best practice principals specified in the Code of Practice – Edition 2: Blast Guarding in an Open Cut Mining Environment (2018) as recommended by the Australian Explosive Industry Safety Group.

## **6.5 Misfire Management**

6.5.1 - Any misfiring of explosives must be managed and controlled to protect the health and safety of Workers and members of public which meets the requirements of Section 10: Misfires in AS 2187.2 Explosives - Storage and Use, which must be documented in the Blast Management Plan.

6.5.2 – The treatment methodology of misfires must be documented in the Blast Management Plan and as a minimum requirements specified in Section 10.3 of AS 2187.2 Explosives – Storage and Use. All misfire must be recorded and reported to the Contractor who has overall responsibility, with information of the failure and the corrective actions to be taken to detonate the misfire.

6.5.3 – Where a misfire of an explosive occurs which meets the notifiable incident criteria as specified in the Dangerous Goods Safety (Explosives) Regulation 2007, the incident must be reported within the specified time frame to the regulatory authority and the Contractor who has overall responsibility for work under the Contract.

## **6.6 Safe Blast Initiation**

6.6.1 - All Workers involved in blasting activities must ensure safe working practices and precautions are taken to prevent injury or harm to Workers and members of the public, which includes (but is not limited to):

- Weather conditions are checked to ensure no lightning is present in the vicinity of the intended blast and wind direction is assessed where harmful blast fume may travel;
- Ensure any emergency management and response arrangements are established prior to any explosive blasting;
- Ensure the shotfirer shelter is safely positioned in relation to the blast zone, which must be used by the shotfirer at all times when testing electric circuits and firing;
- Ensuring that firing does not occur until all Workers are outside the blast exclusion zone prior to the first signal;
- Ensure the communication system between the shotfirer and other personnel including the site supervisor and traffic controllers are in place and effective before the first firing warning siren signal to the sounding of the all clear signal;
- All persons on adjacent lands of an impending blast are notified well in advance of each blast and ensure that such persons are not be exposed to any danger of their person or property as a result of an initiated blast;
- Ensure all public access and roadways are blocked off, controlled and warning signs and demarcation is in place;
- Where the fly rock zone is accessible to the general public, ensure personnel are stationed outside the fly rock zone at all accesses to prevent general public access inside the exclusion zones;
- Workers are wearing suitable personal protective equipment to protect against fly rock;
- Use blasting mats where there is the potential of injury to Workers or damage to property from fly rock;
- Conduct post blast inspections within a suitable time frame to prevent exposure to harmful blast fume; and
- Where misfires occur, ensure unauthorised persons do not to enter the exclusion zone until the reasons for the misfire are ascertained, corrective measures have been carried out, and the blast successfully fired.

## **7 ABOVE GROUND SERVICES**

### **7.1 Training, Competency and Awareness**

7.1.1 - All Workers who work near overhead electric lines must be trained and competent in the specific role or function in association with the work. Where any of the risks contained within this document (i.e. mobile plant operation) form part of the work near overhead electric lines, the training, verification of competency and HRWL requirements must be applied collectively.

7.1.2 - Where work is being conducted in the vicinity of live overhead electrical apparatus where the network minimum approach distances may be impacted, Workers must hold the nationally recognised qualification "Working Safely Near Live Electrical Apparatus as a Non-Electrical Worker" by a registered training organisation.

7.1.3 - Where works are conducted in close proximity to live overhead electrical lines where the network minimum approach distances may be impacted, there must be a safety observer in place who holds the nationally recognised qualification "Work as a Safety Observer / Spotter".

### **7.2 Safe Design and Planning**

7.2.1 - Where work is conducted near overhead electric lines, the risks associated with the work must be identified which includes, (but is not limited to):

- Location, height, arrangement and visibility of overhead electric lines;
- The type of work activities required and the frequency of the work tasks;
- Supporting structures like poles, towers and stay wires;
- Voltage of electric lines and exposed energised parts and whether they are insulated or bare;
- Sway or sag of the electric line caused by wind or temperature changes;
- Site conditions (i.e. prevailing or unexpected winds and their strength and direction);
- Plant and machinery required in the vicinity;
- Terrain and unexpected ground movement under plant, vehicular traffic or pedestrians;
- Stability of any suspended load (dimensions, operating manoeuvrability and conductivity if earthed);
- Minimum clearance distances from the closest part of the plant to electric lines; and
- The nature, size and shape of loads to be moved (i.e. load stability, dimensions and surface area facing the wind and whether loads are conductive (all materials should be treated as conductive unless confirmed otherwise).

7.2.2 - In accordance with regulatory requirements, no work is to be conducted in the "danger zone" of a live overhead power line (overhead line for the transmission of electrical energy) unless the power line is de-energised by the service provider. The danger zone of overhead power lines are:

- Within 0.5 metres of a live insulated overhead power line or aerial bundled conductor line of a voltage of not more than 1 000 volts;
- Within 1.0 metre of a live uninsulated overhead power line of a voltage of not more than 1 000 volts;
- Within 3.0 metres of a live overhead power line, whether insulated or not, of a voltage exceeding 1 000 volts but not more than 33 000 volts; and
- Within 6.0 metres of a live overhead power line, whether insulated or not, of a voltage exceeding 33 000 volts.

7.2.3 - Where the work cannot be completed outside of the danger zone, the Utility Service Provider must be contacted to obtain authorisation in accordance with their permit authorisation requirements. Where authorisation has been granted the Utility Service Provider will provide specific information for the management and control of the risks associated with the network asset, which includes (but not limited to):

- Supervision by a trained and qualified Utility Service Provider Worker;
- Installation of aerial visual covers on low voltage lines (tiger tails) or similar visual controls measures;
- Isolation of a low voltage network asset;

- Isolation of a high voltage network asset; or
- Temporary relocation of the network asset.

7.2.4 - In accordance with Regulation 316A of Electricity Regulations 1947, where vegetation clearing is required in the vicinity of overhead electric lines the work must be conducted in accordance with the Code of Practice for Personnel Electrical Safety for Vegetation Control Work Near Live Power Lines (2021).

7.2.5 - Where works are to be conducted in the vicinity of overhead electric lines the work a formal risk assessment must be completed and the works must be completed under a site and task specific safe work method statement for the duration of the work.

### **7.3 Isolation of Overhead Electrical Services**

7.3.1 - Where the works are within the danger zone of overhead electrical services they must be treated as "live" unless documented evidence by the Utility Service Provider has been obtained to ensure the asset is de-energised, isolated and earthed. This documentary evidence must state the date, timeframe of isolation, conditions and any specific precautions.

7.3.2 - Where an overhead electrical service is to be isolated and de-energised, no work activities or plant operation is to commence unless:

- The Utility Service Provider is notified before commencing work;
- Written permission has been provided by the Utility Service Provider;
- An easement entry point has been provided by the Utility Service Provider;
- All conditions specified by the Utility Service Provider are complied with; and
- A spotter is in place where specified and/or representative from the utility.

### **7.4 Safe Work Practices for Overhead Electric Lines**

7.4.1 - Where the risk associated with contact with overhead electric lines are present, the work must be done in accordance with the requirements of the Utility Service Provider (where specified), the Utility Providers Code of Practice (2016) and the guidance material published by [Safe Wor.k Australia](#), which includes:

- Operating Cranes and Mobile Plant near Overhead Electric Lines;
- Scaffolding Work near Overhead Electric Lines;
- Working near Low Voltage Overhead Electric Lines near Structures; and
- Transporting High Loads near Overhead Electric Lines.

7.4.2 - Where there is any reference to, or specified controls measures (i.e. mobile plant operation) contained within this document for overhead electric lines where the controls apply, where practical, they must be applied collectively.

## **8 BELOW GROUND SERVICES**

### **8.1 Training, Competency and Awareness**

8.1.1 - Workers who undertake underground service and utility location must be trained and competent to perform the task and hold the current "Identify, Locate and Protect Underground Services" or similar titled competency by a registered training organisation.

8.1.2 - Mobile plant operators who excavate in the vicinity of underground services and utilities must be trained and competent for the specific item of mobile plant performing the excavation work. The training and competency requirements in Section 11 - Mobile Plant Operation apply.

8.1.3 - Where a spotter is required to perform the role of a safety observer (i.e. live electrical service), the spotter must be competent to perform their role. The role and authority of the spotter includes (but is not limited to):

- Monitoring the movement of people, plant and equipment and give timely warnings of any hazards or non-compliance with agreed safe work methods;
- Having the authority to stop the work immediately if there is imminent threat to the health and safety of Workers;
- Must focus on and give undivided attention to the task and have a clear view of the work being conducted;
- Must remain outside of specified safe approach distance;
- Must let the Workers (plant operators) being observed know when a change of position required and cease work until the new position is established; and
- Must not undertake any other tasks that may distract their focus on the work of their designated spotter duties.

8.1.4 – Where a spotter in place to perform the role of a safety observer the Worker(s) being observed must:

- Verbally respond to the spotter to confirm their understanding of any instructions or warnings;
- Pause the task when the spotter cannot be sighted;
- Pause the task when the spotter has to change position;
- Stay outside of specified safe approach distance while the spotter changes position.

## **8.2 Safe Design and Planning**

8.2.1 – Underground utilities and services must be identified during the project planning stage for any proposed ground excavation in accordance with regulatory safe design requirements. At the planning stage, underground utilities and services must be identified, which includes (but is not limited to):

- Contacting Dial Before you Dig and checking with Utility Service Providers for any updated drawings;
- Contacting Main Roads for design drawings;
- The location, clearance distances, alignments and any other relevant information for identified services shown on utilities drawings prior to work commencing;
- Information must be clearly marked on these documents (graphic and note) whether by photocopy, electronic device or other representation of the original utilities drawing for the proposed work; and
- The contact details for all authorities responsible for the underground utilities must be detailed on the utility drawings (sheet) within specifications for the proposed work.

8.2.2 – The utility owners must be consulted in the planning phase to determine whether any precautions need to be taken to avoid damage or disruption to services. Where it has been identified there is the potential for damage to underground services where energy release or transfer may occur, the direction provided by the Utility Service Provider must be followed.

## **8.3 Service Location and Exploratory Boring Practices (Potholing)**

8.3.1 – Where the following underground location devices (or any new technology) are used for identification of services and utilities prior to exploratory boring (potholing), all devices must have a current certificate of calibration and be serviced in accordance with manufacturer specifications. These devices includes (but are not limited to):

- Metal detectors;
- Magnetic field detectors;
- Radio frequency detectors;
- Transmitter receivers;
- Ground penetrating radar;
- Visualisation Technologies;
- Seismic Reflection Technology;
- Active Acoustic Method; and
- Selection Assistant for Utility Locating Technologies (SAULT).



8.3.2 - Where underground location devices are used, accurate location of the underground utility or service needs to be achieved to prevent risk or harm to Workers. When locating services, you must consider the following requirements as a minimum:

- Inaccuracy due to drafting errors, boundary changes or change of scale during copying of the plans;
- Positions of the reference points may have changed after the plan was drawn;
- Re-grading or other movement of the surface may have altered the indicated depths;
- Services may have shifted because of ground movement;
- Service connectors may not be marked;
- Underground services may not have been laid in straight runs;
- Excess cable lengths may have been coiled near terminating points; and
- Where marked electrical installations cannot be identified, seek assistance from the electrical Utility Service Provider to provide assistance for location.

8.3.3 - Prior to excavation or any other ground penetration, the location of underground services and utilities must be re-evaluated, which includes:

- Review of underground asset information specified in the Safe Design Report;
- Review drawings, schematics, diagrams or any other information on underground asset location;
- Contacting Dial Before You Dig no more than 30 days before work begins;
- Perform underground utility detection using location equipment by a trained and competent person;
- Mark up the underground service route in accordance with AS: 5488 Classification of Subsurface Utility Information Part 1: Subsurface Utility Information; and
- Record and document service and utility position in preparation for safe excavation.

8.3.4 – Prior to excavation or any other ground penetration, services and utilities need to be positively identified using non-destructive methods for visual confirmation. The method of potholing must be done in accordance with the Utility Providers Code of Practice for Western Australia (2018). Safe work practices must be used when potholing, which includes (but is not limited to):

- Working under a SWMS and excavation permit prior to any mechanical ground penetration;
- De-energise electrical services in consultation with the Utility Service Provider;
- Where underground services remain energised, non-destructive penetration methods must be used such as hydro-extraction; vacuum extraction or insulated hand tools with non-conductive handles or similar PPE devices to prevent electrical transfer.
- Where insulated picks, forks or pins are used to break free lumps of stone or breakup hard layers, suitable care must be taken with gentle pressure; and
- Digging must be done alongside the service in a horizontal direction and not direct vertical penetration.

8.3.5 - Where positive confirmation from non-destructive methods (potholing) has identified variance in the location, depth or direction from supplied drawings or plans, or new services have been identified not recorded with Dial Before you Dig, this information must be updated and recorded. You must inform planners, designers and utility owners of the actual locations of utilities where variations are identified.

8.3.6 - Where power tools are required to break up concrete near electrical assets, specific controls measures must be in place, especially where electrical assets have not been positively identified, remain live or there is uncertainty of their direction and depth. The control measures include (but are not limited to):

- Training in the safe use of power tools when in use near electrical services;
- A spotter to assist in identification of services (mandatory where live);
- Isolation to de-energise electrical service and all conductors;
- Mark up clear location where work can and cannot be done;
- The Workers must wear effective electrically-insulating footwear and PPE;

- Use insulated power tools to prevent electrical transfer to the Workers from the power tools tip;
- Insulating all external conductive surfaces of the tool that the operator may contact;
- Electrical earthing of the power tool in consultation with a qualified electrician;
- Insulation blankets / matting to prevent electrical transfer between the operator and power tool.

#### **8.4 Safe Excavation near Electrical Underground Services**

8.4.1 - Where utilities near a proposed excavation cannot be visually located, excavation work must not proceed until the services are de-energised. Where there is a dispute with the Utility Service Provider on the need to de-energise the service, the matter must be escalated for resolution prior to the work proceeding.

8.4.2 - Powered excavators used near utilities and services must be operated in a way to protect the health and safety of Workers and prevent damage. The clearance limits for powered excavation machines must be in accordance Table B1 of the Utility Providers Code of Practice for Western Australia (2018).

8.4.3 - Where powered excavators are used to excavate near underground services, safe work practices must be established which includes, (but is not limited to):

- Working in accordance with a site and task specific SWMS and an authorised excavation permit;
- The operator must be trained and competent to perform the excavation work under supervision;
- Adhering to the Utility Service Providers minimum approach distances for powered tools and plant;
- Using current drawings of underground asset position (depth, type and direction);
- Apply non-destructive methods when minimum approach distances have been reached by digging alongside the service in a horizontal direction and not direct vertical penetration;
- Use only insulated hand tools with non-conductive handles and similar PPE to prevent electrical transfer and only use insulated picks, forks or pins to break free lumps of stone or breakup hard layers with gentle pressure;
- Use a spotter to support the excavator operator to aid in the location of any other potentially unidentified services;
- Two-way positive communications must be in place for all Workers involved in the excavation work; and
- Workers must be outside of established exclusion zone away from the excavator bucket.

8.4.4 – Where there is contact with a live underground service, which results in electrical transfer the following safety measures must be taken:

- If powered mobile plant strikes an underground electric line an attempt should be made to break the contact;
- Where it is not possible to break contact with the electric line, the operator must remain in the item of plant and not attempt to leave the cabin;
- Establishment of an exclusion zone which is set at a minimum distance of 8 metres;
- The plant operator must remain in the cabin until the Utility Service Provider has de-energised the electric line, provided the “all clear” confirmation and made the area is made safe;
- No untrained or unequipped persons should attempt to rescue or render assistance to a person who has received an electric shock where the electrical source is still live as this may result in an injury to the person rendering assistance;
- If immediate evacuation of the cabin is essential as in the case of a fire, the operator must attempt to jump clear to minimise the risk of making simultaneous contact with the plant and the ground.

#### **8.5 Safe Excavation near Gas Pipes and Installations**

8.5.1 – Work must not be carried out near gas pipelines or any aboveground gas installations without the permission of the Utility Service Provider within their specified timeframe. Distances must be confirmed with the utility provider prior to work commencing to determine any specific safety requirements for the gas installations. Refer to Table B1 of the Utility Providers Code of Practice for Western Australia (2018).

8.5.2 - Where underground gas pipelines are in the vicinity of the intended work which carry natural gas or liquid petroleum gas (LPG), the following safety measures must taken which include (but is not limited to):

- Obtain the Safety Data Sheet (SDS) for the identified contaminant by contacting the Utility Service Provider;

- All naked flames, including smoking and other sources of ignition are prohibited where there is the potential for ignition;
- Excavators must not operate within 1 meter of a gas pipe or service or at a greater clearance distances as recommended by the Utility Service Provider;
- Any mechanical excavation used within 1 metre of the pipeline in any direction can only be done when the activity has been approved by the Utility Service Provider and is under the explicit 'on-site' direction of the Utility Service Providers inspector;
- No mechanical excavation is to be conducted closer than 30 centimetres to a gas pipeline. Only safe digging practices with non-invasive hand tools are allowed to prevent damage to the pipeline or coating membrane; and
- Hand-held power tools may be used to break a paved or concrete surface above the gas pipeline provided the pipeline is not close to the surface.

8.5.3 - Where a gas pipeline is uncovered during excavation work the following steps must be taken under the direction of the Utility Service Provider (where applicable):

- Any backfilling must be carried out under the direction of the Utility Service Provider to ensure adequate support to the pipeline;
- Thrust blocks or restraints providing support to the gas pipe must not be moved without the Utility Service Providers consent;
- No hard material (i.e. concrete) is to be placed or left under or adjacent to a gas pipe;
- Concrete backfill is only to be used under the direction of the Utility Service Provider;
- Where the uncovered gas pipe shows damage to its wrapping, the owner must be notified. Gas pipe repairs must not be carried out without the Utility Service Provider approval, which if approved, must be done under the direction of a Utility Service Provider inspector in accordance with AS 2885.3 (2001) Pipelines - Gas and Liquid Petroleum Operation and Maintenance.

8.5.4 - Where a gas leak is suspected or detected, the following safety precautions must be taken:

- No attempt is made to be made to repair the gas leak;
- All persons are to be removed from the vicinity of the gas leak, including members of public and Workers;
- Emergency services must be immediately notified of the occurrence;
- All naked flames, including smoking and other sources of ignition are prohibited; and
- Once rectified the Utility Service Provider must measure a safe atmosphere and provide authority to recommence work.

8.5.5 - No hot work, welding or other hot work involving a naked flame is to be carried out in proximity to gas installations or pipes. Any form of hot work in the vicinity must be under the consent and control of an on-site Utility Service Provider inspector.

## **8.6 Safe Excavation near Water Pipes, Sewer Systems and Telecommunication Cables**

8.6.1 - Where excavation work is conducted near underground water pipes and sewers, the following precautions must be taken:

- Safe digging practices must be followed at all times with minimum approach distances followed in accordance with table B1 of the Utility Providers Code of Practice for Western Australia (2018);
- Where concrete thrust blocks have been used at bends in the water mains, the blocks and ground supporting them must not be disturbed to prevent sudden failure of the mains;
- Exposed pipes should be supported and the correct method of backfilling used in consultation with the Utility Service Provider;
- Where a pipe or the wrapping is damaged, the Utility Service Provider and any other assets owner affected must be notified.

8.6.2 - Where water pipes or sewerage system are ruptured where there is a risk from biological hazards or hazardous chemicals (industrial waste) the following safety precautions must be taken:

- Contact the sewerage asset owner as soon as possible to report the occurrence;
- Obtain any SDS's for any potentially harmful contaminants prior to working near sewerage assets;
- Where a person is contaminated, shower or wash down with large amounts of water and remove contaminated clothing;
- Where there is a risk of an infection from eye contact or contact with broken skin, flush with large amounts fresh water. Where ingestion occurs seek medical advice and refer to SDS where available.

8.6.3 - Where excavation work is conducted in the vicinity of underground telecommunication cables, the following safety precautions must be taken (but not limited to):

- Safe digging practices must be followed at all times with minimum approach distances followed in accordance with Table B1 of the Utility Providers Code of Practice for Western Australia (2018);
- The utility owner must be consulted on precautions to be taken to avoid damage to the utility and disruption of services;
- While all underground cables should be regarded as electrically energised (until proven otherwise), communications cables require no special precautions to prevent danger to Workers; and
- All persons must be kept well clear of the mechanical excavator while it is operating.

## **9 PRE-CAST TILT UP CONCRETE**

### **9.1 Safe Design and Planning**

9.1.1 – Manufactured precast concrete elements and erection support components must meet specific design requirements in accordance with the following Australian Standards:

- AS 3850.1 Prefabricated Concrete Elements – General Requirements;
- AS 3600 Concrete Structures;
- AS 1012 Methods of Testing Concrete Strength Tests - Concrete, Mortar and Grout Specimens
- AS/NZS 1170.0 Structural Design Actions – General Principles;
- AS/NZS 1170.1 Structural Design Actions – Permanent, Imposed and Other Actions;
- AS/NZS 1170.2 Structural Design Actions – Wind Actions;
- AS 1170.4 Structural Design Actions – Earthquake Actions in Australia;
- AS 1111.1 ISO Metric Hexagon Bolts and Screws – Product Grade C – Bolts;
- AS 1252 High Strength Steel Bolts with Associated Nuts and Washers for Structural Engineering;
- AS 1554.1 Structural Steel Welding (where welding into final fixing position); and
- Section 4: Design Considerations of the National Code of Practice for Pre-cast, Tilt-up and Concrete Elements.

9.1.2 – Where pre-cast concrete elements are proposed for manufacture, specific safe design duties must be applied in accordance with AS 3850.1 Prefabricated Concrete Elements. Notification must be provided to the Worksafe Commissioner 10 days prior to the manufacture of any elements intended for erection.

9.1.3 - The Contactor must verify that all design requirements specified in AS 3850.1 Prefabricated Concrete Elements have achieved and all design requirements with all applicable compliance certificates are verified prior to the elements being delivered to site.

9.1.4 – Where pre-cast concrete tilt-up elements are to be erected a Safe Erection Design Plan must be developed by a competent design engineer in consultation with the manufacturer, Contractor and subcontractors (erector). The Plan must be authorised prior to element erection with the method of erection meeting the requirements of (but may not be limited to):

- Section 2.3 - Erection Design of AS3850.2 Prefabricated Concrete Elements;
- Section 2.4 - Stability during Erection and Construction of AS3850.2 Prefabricated Concrete Elements;
- Section 2.5 - Design for Manufacture, Handling and Erection of AS3850.2 Prefabricated Concrete Elements; and
- Section 3 - Risk Management of the National Code of Practice for Pre-cast, Tilt-up and Concrete Elements.

9.1.5 - The Safe Erection Design Plan for pre-cast concrete tilt-up elements must include specific design information certified by the design engineer, which includes (but may not be limited to):

- The panel erection sequence;
- Orientation (position relative to each other) of the concrete elements;
- Configuration of erection braces including type, size, angle and cross bracing requirements;
- Requirements for erection brace footings (and prop footings if required), brace fixings and concrete;
- Strength of the brace footings (including slabs) at the time of erection by an engineer;
- Levelling shims details for erection; and
- The requirements for grouting in once fixed in final position.

9.1.6 – The transportation and storage of pre-cast elements must take into consideration the risks during transit and storage upon arrival to site. This information must be documented in the Safe Erection Design Plan and take into consideration:

- Loading, unloading and storage of pre-cast elements must be detailed in the safe design plan;
- The size, mass and shape of the elements, specific design requirements including strength and stability;
- Traffic considerations (local roads, turning points, restricted access point, width and length);
- Site accessibility and conflict points from structures;
- Secure fixing to the transport vehicle by restraints that will not cause damage during transit;
- Any damage prior to unloading must be reported to the safe design engineer for assessment.
- Vehicle stability during unloading prior to transportation restraints being removed;
- The unloading must consider installation sequencing and orientation to final position;
- Elements should be lifted directly from the transportation vehicle into position where possible; and
- Where direct transfer to final position cannot be achieved, elements must be stored in engineered drop trailers or temporary storage frames on a stable surface.

9.1.7 – Where relevant to the Heavy Vehicle Chain of Responsibility (Hour) for the transportation of pre-cast elements, all the requirements of Section 13.1 – Vehicle and Driving must be followed where applicable to each designated person in the supply chain.

## **9.2 Training, Competency and Awareness**

9.2.1 – Workers who form part of a tilt up erection crew must hold the relevant High Risk Work licences (HRWL) by a registered training organisation and be verified as competent to perform their specific role or function. As a minimum these qualification include (but may not be limited to):

- Rigger: HRWL - Licence to Perform Rigging - Intermediate Level;
- Dogman: HRWL - Licence to Perform Dogging;
- Crane Operator: HRWL for the Crane which will lift the pre-cast elements;
- Supervisor: Supervise Tilt-Up Work qualification or where a previous superseded version is the equivalent.
- Supervisor: HRWL Licence to Perform Rigging - Intermediate Level (for tilt up only); and
- All Workers: Identify Requirements for Safe Tilt-up Work (all tilt-up team members) or where a previous superseded version is the equivalent.

## **9.3 Mechanical Integrity of Crane**

9.3.1 - The Crane which lifts pre-cast elements must meet the requirements of Section 15 - Crane and Lifting Operations within this document. In addition, any requirements specified in the Safe Erection Design Plan from the design engineer must be followed.

## **9.4 Integrity of Lifting Equipment**

9.4.1 - Rigging equipment which lifts pre-cast elements must be selected to be able to meet the lifting capacity of the forces it will be subject to and documented in the Safe Erection Design Plan and meet the requirements of Section 4: Transport,

Crane and Erection of AS 3850.2 Prefabricated Concrete Elements. Where alterations are made to any rigging configuration, it must be approved by the Design Engineer and updated in the Safe Erection Design Plan.

9.4.2 – The materials, components and equipment, which lift and support pre-cast elements, must meet structural design and manufacturing requirements, which includes (but is not limited to):

- AS 1111.1 ISO Metric Hexagon Bolts and Screws – Product Grade C – Bolts;
- AS 1252 High Strength Steel Bolts with Associated Nuts and Washers for Structural Engineering;
- Section 4: Design Considerations of the Code of Practice for Pre-cast, Tilt-up and Concrete Elements (2008).
- The working load limit (WLL) for lifting inserts, post install brace inserts, cast in fixings and brace inserts compliant with Section 2.5 of AS3850.2 Prefabricated Concrete Elements.

9.4.3 - All lifting equipment must be detailed on a lifting equipment register. Lifting equipment must be clearly and permanently marked in accordance with AS 4991 Lifting Devices and Section 8: Inspection of Ropes, Hooks and Lifting Gear in AS 2550.1 Cranes, Hoists and Winches – Safe Use and General Requirements.

Rigging equipment must be inspected prior to use, paying specific attention to damage and excessive wear. Where this has been identified, the rigging equipment must be tagged out of service and not form part of element lifting.

## **9.5 Exclusion Zones and Access Control**

9.5.1 - Exclusion zones must be established prior to lifting pre-cast tilt-up concrete elements in accordance with the Safe Erection Design Plan, which must take into consideration (but is not limited to):

- The expected radius of an uncontrolled dropped load, utilities, structures, ground conditions, environmental factors and conditions (i.e. lightning), mobile plant movement, access/egress points, members of public, Workers on foot, human factors and any other additional contributing factors;
- Demarcation of the exclusion zone must be barricaded to ensure no unauthorised Workers or any other person can access the area;
- Perimeter fencing or other forms of hard barricading must be in place (where practicable) compliant with AS 1319 Safety Signs in the Occupational Environment and AS 1725 Chain-link Fabric Security Fences and Gates;
- Safe zones for Workers on foot demarcated and communicated where there are potential conflict points; and
- Where conflict points have been identified with member of public pedestrian walkways or footpaths, they must be re-routed including demarcated safe crossing areas.

9.5.2 – Communication systems and protocols must be used when lifting pre-cast elements, which must include:

- The erection crew must be trained and competent in two way communication protocols (i.e. two way & hand signals) with a back-up communication method where the primary communication method fails;
- All erection crew team members who are working in exclusion zone must be present at daily pre-start meetings to ensure daily activities or changes are understood;
- A stop task protocol must be established where positive two-way communication is not established. Where positive communication is not established between erection crew team members, the stop task protocol must be put into effect under the direction of the person who has overall responsibility.
- Where a member of public breaches an exclusion zone or a Worker not involved in element lifting, the stop task protocol must be put into effect under the direction of the person who has overall responsibility.
- The communication plan must clearly define the barricaded exclusion zones, safe zones, safe access areas and any additional controls, which have been established.
- In association with the Rescue Plan and the overall Emergency Management Plan, erection crew team members must be trained in an emergency / mayday protocol for potential emergency situations.

9.5.3 - The exclusion zones must be in place with access controlled prior to element lifting and includes (but not limited to):

- Only trained and competent Workers under the supervision of the erection crew supervisor are allowed to be inside the demarcated exclusion zone.
- Prior to the start of each shift or break, the exclusion zone must be inspected prior to work recommencing. Where the integrity of the exclusion zone is compromised or deemed ineffective, the exclusion zone must be corrected before work can recommence; and
- All erection crew team members within the exclusion zone must maintain the exclusion zone at all times, notify any breaches to the supervisor and implement temporary suspension of work where required.

## 9.6 Safe Execution of the Design Plan

9.6.1 – Braces inserts must be inspected to ensure there is no damage (cracks, rust, deformities or splits) and the screw threaded length can be readily extended to full position and all brace components are what is specified by the supplier. Any faults, defects, design issues, inconsistencies or hazards identified must be reported to the design engineer and tagged out of service.

9.6.2 - In accordance with regulatory requirements and the Code of Practice for Pre-cast, Tilt-up and Concrete Elements (2008), the following documentation must be verified and in place prior to work commencing:

- Notification to the Commissioner and any return information, including any special conditions imposed;
- A copy of any exemption relating to the work;
- A copy of the shop drawings of each concrete panel that is, or is to be, involved in the work;
- A current plan setting out details of the proposed execution of the work (Safe Erection Design Plan);
- A copy of any written or diagrammatic advice, from a qualified practising engineer, received by the Contractor, that sets out the manner in which an aspect of the work should be executed; and
- In relation to each concrete panel that is, or is to be, involved in the work, a copy of the inspection report.

9.6.3 – Prior to lifting pre-cast elements into final position you must ensure:

- All permits have been completed and authorised (i.e. critical lift plan);
- An exclusion zone is in place and visual observations have been made to identify any conflict points;
- Supervision is in place (required at all times while elements are being lifted);
- A task specific SWMS has been created, read, understood and signed onto by the erection team;
- In conjunction with the SWMS, the work is done in alignment with the Safe Erection Design Plan;
- A rescue plan and/or an Emergency Management Plan is in place when part of an overall project;
- There is sufficient clearance for crane access, available clearance for crane outriggers and element bracing;
- The erection sequence is understood by all team members (in accordance with the Safe Erection Design Plan);
- The lifting and bracing inserts are identifiable and in good condition (cleaned out if unclean); and
- Inspection of all bracing support system and securing devices has been completed.

9.6.4 – Safe work practices must be used when lifting and placing elements into final position in accordance with Section 4 and 5 of AS 3850.2 Prefabricated Concrete Elements, which includes (but is not limited to):

- Clutch release ropes are not to be used as taglines. Only approved and inspected tag lines by the design engineer are to be used to control element swing;
- Workers must be clear of the edges at all times due to potential sideways slew of elements;
- Elements must not be suspended or lifted over Workers or other persons. Where this is unavoidable, a risk assessment must be completed to determine the most effective method for securing the element. A back up slinging system must be used authorised by the design engineer;
- Where wind conditions are such that the element cannot be controlled through all stages of the lift, then the element must not be lifted until wind conditions subside;
- All elements must be positively supported by the crane until braced or forms part of the supportive structure;
- The bolts used must not be over torqued which may create instability and potential failure;

- When the element is placed to the final braced position which require grouting, the base and any dowel pockets must be fully grouted in, unless another method is authorised and approved;
- Grout must be mixed and applied in accordance with supplier specifications and approved by the design engineer;
- Temporary supports are not to be moved, removed or modified without approval with braces and props inspected at regular intervals with specific attention to connections; and
- Structural stability must be confirmed in writing by the design engineer upon final positioning of the elements. Where element installation is staged during construction activities, approval of structural integrity must be done at progressive intervals.

9.6.5 – Where pre-cast elements have been fixed in final position the requirements of Section 6: Incorporate into Final Structure of AS 3850.2 Prefabricated Concrete Elements must be followed, which includes (but is not limited to):

- Braces and fixing must be inspected on a weekly basis while the elements are still propped and braced and after significant weather events to assess movement or damage to the elements or supports;
- Due to susceptibility of element collapse, props and temporary supports must not be removed from the final structure until it has been verified by the design engineer.
- Prior to the removal of braces, props and frames supporting the structure, the design engineer must fully inspect the structural integrity of the elements against the design drawings; and
- When the design engineer has inspected and authorised removal of the support system (written approval), the removal must be planned and coordinated to ensure the removal does not cause injury to Workers, damage the structure or damage plant and equipment.

## **10 TRAFFIC MANAGEMENT (INTERACTION WITH LIVE TRAFFIC)**

All requirements detailed in the Main Roads WA Specification 202 Traffic for traffic management must be implemented and all supporting references, which includes, (but is not limited to):

- Road Traffic Code 2000;
- Main Roads Act 1930;
- Rail Safety National Law (WA) Act 2015;
- Code of Practice Traffic Management for Works on Roads - Main Roads WA;
- Guide to the Preparation of Traffic Management Plans - Main Roads WA;
- AS 1742.1 General Introduction and Index of Signs;
- AS 1742.2 Traffic Control Devices for General Use;
- AS 1742.3 Traffic Control Devices for Works on Roads;
- AS 1742.7 Manual Uniform Traffic Control Devices – Railway Crossings.
- AS 1348 Road and Traffic Engineering - Glossary of Terms;
- AS 4292.1 Railway Safety Management – General Requirements

## **11 MOBILE PLANT OPERATION**

### **11.1 Training, Competency and Awareness**

11.1.1 - Where a Worker is required to operate mobile plant, the Worker must be trained and deemed competent to operate the specific item of mobile plant being operated which includes (but is not limited to):

- Current nationally recognised qualifications by a registered training organisation;
- Any High Risk Work licences (HRWL) required in accordance with regulatory requirements;
- Current WA Driver License; and
- A verification of competency (VOC) assessment for each item of plant the Worker is operating.

### **11.2 Inspection and Pre-operational Requirements**



11.2.1 – Each item of mobile plant must have documentation available for assessment during pre-mobilisation and operation, which as a minimum includes:

- Registration - Registerable plant, which meets the requirements of WA Registration (full or conditional). Both number plates must be secured, clearly displayed. Stickers (affixed) and paperwork must be available for each item of plant;
- Plant History - Service and maintenance history (within three years) must be available for each item of plant;
- Log Book - Plant log books must be available and with the machine / operator;
- Pre-start - Daily pre-start must be completed on each item of plant for each item of plant when in use.
- Operator Manual - Operator manual for each specific make and model of plant; and
- Risk Assessment - For each piece of plant, there must be a plant risk assessment.

11.2.2 – Mobile plant must be in good general condition, which includes (but is not limited to):

- Chassis (frame): The chassis/frame must be free from cracks, advanced rust, missing or loose bolts, sharp edges or protrusions that could cause personal injury;
- Body, Cabin, Steps and Handrails: The body/cabin/steps/handrails must be free from cracks, advanced rust, missing or loose bolts, sharp edges or protrusions that could cause injury. All doors, door locks and latches must be secure and functional. Plant with fully enclosed cabins that have no opening windows must have an operational air conditioner fitted. Steps and handrails must be in good condition. Handrails must be fitted on upper decks where Workers traverse to prevent Workers falling from height;
- Attachments and Tools: All attachments must be securely mounted, free from cracks, leaks or any defects and be in good working order (attachments include items such as buckets, blades, cutting edges, tynes, hydraulic tools, etc.).
- Windows: Windscreen and other windows must be free from defects (cracks / fractures) that impair visibility which has the appropriate safety rating;
- Service Brakes: Brake components must be free from leaks or defects and be securely mounted. Brake controls must be fully operational and free from any defects;
- Suspension: Suspension components must not be broken, loose, cracked, cut, missing or modified. All nuts, bolts and locking devices must be in place and secure. The maximum allowable wear on any suspension must be in accordance with manufacturer OEM requirements;
- Steering: Steering components must not be broken, loose, cracked, cut, missing or modified. All nuts, bolts and locking devices must be in place and secure;
- Tyres: Tyres must be in good condition, have adequate grip, be within wear limits and be free from deep cuts, bulges or other signs of failure. Tyres must be of the correct type, load rating and size to suit the wheel rims;
- Tracks: Where applicable, tracks must be in good condition and must provide sufficient traction while in operation;
- Controls and Switches: All controls and switches must be secure, function correctly and permanently and clearly labelled to indicate the direction of the movement;
- Operators Seat: The operator's seat must be in good condition, secure and be ergonomically set-up as to not affect the operator's ability to operate the plant.

11.2.3 – Mobile plant must meet specific design specifications for protective structures, which includes AS, AS/NZS and ISO standards. Earthmoving machinery (designed to have a mass of 700 to 100,000 kg) must be fitted with a protective structure conforming to AS 2294 Earthmoving Equipment - Protective Structures. Tractors designed to have a mass of 560 kg or more, but less than 15,000 kg, must be fitted with a protective structure conforming to AS 1636 (series) (1996) Tractor Roll Over Protective Structures. The following International Standards also apply to mobile plant protective structures, which includes:

- Roll Over Protection Structures (ROPS): Fitted and certified as compliant with ISO 3471 Earthmoving Machinery Roll Over Protective Structures: Laboratory Tests and Performance Requirements;
- Falling Object Protection Structures (FOPS): Fitted and certified as compliant with ISO 3449 (2005) Earth-moving Machinery Falling-object Protective Structures - Laboratory tests and performance requirements;

- Tip Over Protection Structures (TOPS): Fitted and certified as compliant with ISO 12117 Earthmoving Machinery - Tip-over Protection Structure for Compact Excavators - Laboratory Tests and Performance Requirements; and
- Where Workers are required to access the top of mobile plant where there is a risk of a fall, the mobile plant must have compliant fall prevention installed in accordance with AS 1657 Fixed Platforms, Walkways, Stairways and Ladders – Design, Construction and Installation.

11.2.4 - All earth-moving machinery fitted with a roll-over protective structure must be fitted with seat belts conforming to one of the following Standards: ISO 6683 Earth-moving Machinery: Seat Belts and Seat Belt Anchorages, AS/NZS 2596 Seat Belt Assemblies and SAE J386 Operator Restraint Systems for Off Road Work or equivalent.

11.2.5 - All earthmoving machinery must be fitted with specific safety features in accordance with OEM specifications. Specific safety devices for earthmoving machinery must include, (but is not limited to):

- Emergency Stop Devices: Compliant with ISO 13850 Safety of Machinery: Emergency Stop Function – Principals for Design. The emergency stops must be in a prominent position close to the operator for accessibility and of a durable construction. The buttons, handles or bars must be coloured red and not have any of the electrical components altered from its intended installation which may cause malfunction.
- Lights: Mobile plant for night work must have suitable and efficient lights, including headlights or work lights.
- Reverse Camera: Mobile plant must be fitted with reversing cameras to assist operators while travelling in reverse;
- Mirrors, Lights and Reflectors: Plant must be fitted with rear vision mirrors that provide adequate rear vision on both sides of the plant and should be used in conjunction with reversing cameras (where practicable). Where mobile plant has limited visibility, A quantitative reference source for mirror visibility and blind spots can be found on the [National Institute of Occupational Safety and Health](#) (NIOSH) website for road construction plant.
- Audible Horn: All plant must be equipped with a clearly audible horn. Exhaust whistles, compression whistles, sirens or alternating tone horns are not acceptable and must not be used;
- Reverse and Travel Alarms: All plant must be fitted with a reverse alarm, which is clearly audible and automatically activated when reversing. Excavators and plant with restricted operator vision in both forward and reverse directions must be fitted with a travel alarm, which operates in both directions. Alternatively, two alarms may be fitted.
- Rotating Amber Beacons: Plant must have at least one amber beacon that is wired through the ignition switch and is active whenever the plant is travelling or operating on the job site. The beacon must flash between 120 to 200 times per minute, mounted as near as possible to the top of the plant and be clearly visible in normal daylight up to a distance of 200 metres (and closing) in all directions. Truck mounted plant must be fitted with a switch to turn the beacon off when travelling on roads outside the worksite;
- Guarding: Where there are hot, rotating and moving components they must be fitted with safety guarding to and not removed in accordance with manufacturer specifications; and
- Articulation Joints: Clearance in the articulation joint must be within the manufacturer's specifications. There must also be a means of locking the articulation joint; and
- Neutral Start: Neutral start switches must operate on all transmissions other than manual gearboxes fitted with a mechanical type clutch. Excavators and skid steer loaders are exempt from the normal type of neutral start switch; however, travel levers must self-centre to the neutral position. All OEM safety equipment/hydraulic locks must operate as originally designed.

11.2.6 - All hydraulic quickhitches must be compliant with AS4772 Earthmoving Machinery: Quickhitches for Excavators and Backhoe Loaders. The quickhitch and all attachments must be correctly matched to each other. Hitches must be identified with a unique identification mark, manufacturer's name and model, maximum rated attachment capacity, mass of the hitch and the lift point capacity (kg). All quickhitches must be fully automated double locking hydraulic which prevents swing or fall in the event of primary system failure.

11.2.7 - All plant used as a crane (i.e. backhoes, loaders and excavators) having components used for lifting (hooks and lugs), that do not have a manufacturer's identification and Safe Work Limit (SWL), require a structural engineer's certificate for these components where they are intended to be used as a lifting device.

11.2.8 - Electrical systems, including both electrical wiring and connections both inside and outside of plant must be secure and free from any damage or corrosion. Insulation must not be chafed and affixed (clipped) in accordance with OEM specification as to not cause short circuit. All electrical equipment must operate as intended by the manufacturer. The battery must be securely mounted and free from any cracks or leaks.

11.2.9 - Noise levels must be under the exposure standards at operator ear position in accordance with AS/NZS 1269.1 Occupational Noise Management - Measurement and Assessment of Noise Emission and Exposure. Where noise levels are above occupational exposure standards suitable hearing protection must be worn by the operator to prevent noise induced hearing loss.

11.2.10 - Fire extinguisher must be affixed to mobile plant with a minimum 4.5 kg (class ABE) which must be tested and tagged (six monthly). A small extinguisher minimum 1kg dry chemical (class ABE) located in cabin and identification decal on door. Where fire suppression is fitted, it must be operable (ground and cabin).

11.2.11 – Specific safety signage must be affixed to mobile plant, which includes (where applicable to each item of plant):

- Hearing Protection Signage: Any plant with a noise level above 85 dB(A) must be fitted with two 225 mm hearing protection signs, one on each side, and one 50 mm hearing protection sign fitted to the console;
- Safe Working Load Signage: Safe working load signs must be distinctively labelled on all backhoes, excavators and loaders that are used for lifting loads;
- Electrical Hazard Signage: Plant whose height can alter whilst working must be fitted with an Electrical Hazard;
- Safe Working Distances: Warning notice that displays the minimum safe working distances;
- Seat Belt Signage: All plant fitted with a ROPS canopy must have a safety sign warning that a roll over hazard exists, requiring the operator to wear the seat belt;
- Hydraulic Steering Signage: Plant with hydraulic steering must have a sign warning of the importance of maintaining hydraulic fluid level;
- Confined Space Signage: Plant with a confined space, e.g. water tankers, must have a sign fitted near the entry point to the confined space;
- Dual Control Signage: Dual control signage must be fitted for dual control plant; and
- Water Filled Tyre Signage: Water filled tyres on mobile plant must have a warning sign adjacent to each tyre.

### **11.3 Mechanical Integrity of Mobile Plant**

11.3.1 - If any safety related fault is found at any time, the operator must immediately report the fault. The nature of the defect must be assessed and authority sought and given by the person responsible for managing the plant. Where the plant cannot be operated safely, it must be isolated from use, parked, key removed and locked (if possible) and tagged as "out of service" or removed from site. Prior to returning to service, maintenance records must confirm the fault has been rectified and safe prior to operation. Safety defects and faults may include (but not limited to):

- Where there is dangerous steering, suspension or tyres;
- An inoperative reversing camera or inaudible reverse/travel alarm (where applicable to the type of plant);
- The mechanical lock pin is not available or not fitted to a quick hitch;
- Where there is no manual transmission lock (where required);
- A defective seat belt or absence of a seat belt when ROPS is fitted;
- Any defective service, park or emergency brakes;
- Where there is no machinery guarding fitted;
- Where there is a defective neutral start switch; or
- Any other condition, which could impair safe operation.

11.3.2 - All mobile plant must be inspected at regular intervals in accordance with Regulation 213 (inclusive of the requirements of Subdivision 3 - Additional control measures for certain plant) and manufacturer OEM requirements, which includes (but is not limited to):

- Daily pre-start inspections;
- Routine inspections (fortnightly);
- Periodic third party inspections;
- Major inspections; and
- Have documented records of all inspections.

11.3.3 - All mobile plant must have a preventative maintenance program in place at a frequency determined by the manufacturer, frequency and intensity of use and the working environment. Preventative maintenance must include (but is not limited to):

- Maintenance in accordance with manufacturer OEM design specifications;
- In accordance with regulatory requirements (where applicable);
- Parts and components replaced identical or equivalent to the original parts and components;
- Be in a safe and secure location, fundamentally stable, brakes applied and chocked (where necessary); and
- Be maintained by a trained and competent Worker (fitter).

11.3.4 - Prior to maintenance or inspections on mobile plant it must be isolated in accordance with a documented isolation procedure to ensure all energy sources are isolated and "tested for dead" prior any maintenance or inspection (excl. functional testing during pre-start and maintenance). Isolation procedures must meet the requirements of Section 19 – Isolation and Lock out of Electrical Sources (where applicable) in this document.

## **11.4 Exclusion Zones and Access Control**

11.4.1 - Where mobile plant is operating within an active construction site where there is the potential for conflict with Workers on foot, other plant or equipment, vehicles and pedestrians (members of public) the risk must be assessed which includes (but is not limited to):

- The volume and type of public traffic if adjacent to an active construction site;
- The interface with the traffic management plan, traffic guidance scheme;
- The size, location, access and egress of the active construction site;
- The mobile plant required during each stage and sequence of the active work / construction plan;
- Separation, segregation, exclusion zones and "no go zones" within the active construction site;
- Mobile plant blind spots and mirror visibility;
- Utilities, structures, overhead obstructions, ground conditions, demolition work and environmental factors;
- Speed limits, work zone traffic control devices and travel paths;
- Spotter requirements; and
- Human factors.

11.4.2 - Vehicle movement plans must be established where conflict points have been identified within the active construction site, which must include (but is not limited to):

- The number, types, location(s) and directional travel of the mobile plant;
- Exclusion zones and no go zones need to be clearly defined;
- Safe zones for Workers on foot, safe crossing areas and/or safe travel pathways for members of public;
- Any trenches, excavations or overhead obstructions in the travel path of mobile plant;
- Plant turning points and reversing points (reversing to be avoided where possible);
- Access and egress points taking account unauthorised entry from Workers or members of public;
- Any other potential conflict points (where applicable to the site); and
- Be a visual schematic (diagram) which includes symbols and a key defining the above parameters.

11.4.3 - Vehicle movement plans and the active construction site must:

- Be inspected on a daily basis and updated where the inspection identifies deficiencies or changes;

- Have demarcation and barricading (where practicable);
- Have a consultation process in place with Workers operating in the active construction site;
- Be understood by Workers who work in the active construction site; and
- Be include in applicable SWMS for High Risk Work within the active construction site.

11.4.4 – Where materials storage, loading and unloading areas, maintenance areas, refuelling point(s) and vehicle and plant park-up area's which is in close proximity or part of the active construction site, they must:

- Be detailed in the vehicle movement plan;
- Have defined access and egress;
- Have separation between mobile plant and light vehicle in the park up areas;
- Detail directional vehicle movement to avoid contact;
- Detail crane and lifting exclusion zones where there is loading and unloading; and
- Have segregation from operating mobile plant, equipment and material; or
- Any other contributing factor, which may cause a conflict, which affects the safety or health of Workers.

11.4.5 – Continual review, update and communication of information on the vehicle movement plan must be provided to Workers within the active construction site, which includes (but is not limited to):

- Be updated in alignment with the active construction plan (where applicable);
- Be communicated at daily pre-start meetings;
- Have all Workers present at pre-start meetings for the daily activities; and
- Be communicated to delivery drivers and temporary Workers.

## **11.5 Positive Two-way Communication Systems**

11.5.1 – A positive two-way communication protocols must be in place for all Workers within active construction site, which includes (but is not limited to):

- All Workers within the active work zone must be trained in two way communication protocols;
- Workers must operate in accordance with the prescribed two way communication protocol at all times;
- Include a stop task protocol in place where positive communication is not established;
- Include a mayday protocol for any emergencies within the construction site;
- Include a documented safe work procedure where Workers are required to enter an active construction site; and
- Include an escort protocol where delivery drivers are required to travel through an active construction site.

11.5.2 - Where positive communication is not established within an active construction site where there is imminent threat or danger to Workers on foot, other mobile plant operators, members of public or any other person(s), a stop task protocol must be established where positive communication is not received.

11.5.3 – Effective positive two-way radio communication is a critical element in prevention of serious incidents to Workers in construction sites and is only effective if it is used correctly under an established protocol. There must be an effective radio communication protocols in place, which includes (but not limited to the following application):

- Ensure two-way radio is turned on, tuned to the correct channel and audible;
- Channels are to be provided at induction, when updated or changed;
- Operators must perform a radio check at pre-start to determine the radio is functioning correctly;
- Adjust the volume control so the incoming call is not distorted or too loud;
- Operator must use equipment numbers or call signs (not names) when calling up equipment or vehicles;
- The user must know what is to be communicated, be short, concise in a normal clear voice;
- Listen to make sure airways are clear, hold the mouthpiece 5-10 cm away from the mouth;
- Use the destination call-sign first, followed by the caller's call-sign, press the button on the hand-piece and count to three before talking, clearly identify yourself, release the button and wait for your answer;

- Hang up the hand-piece on the bracket provided when not in use;
- Always acknowledge the last incoming call;
- Do not swear, yell or use inappropriate language on the radio;
- Do not use the radio for idle chatter;
- Do not use the radio after the mayday communicated, unless you are involved or authorised to do so;
- Do not operate the radio when someone else is talking;
- Do not acknowledge or accept any message by just "clicking" your handset, it must be done verbally and clearly; and
- Where deemed appropriate and intelligibility is required, the NATO phonetic alphabet will be standardized system of communication.

11.5.4 - Where Workers are required to enter the exclusion zone of operating mobile plant within an active construction site, there must be a documented protocol in place authorising a Worker to enter an exclusion zone of operating mobile plant. As a minimum, you must ensure:

- There is a system for positive communication with the mobile plant operator, positive confirmation with Workers on foot or light vehicle to approach an exclusion zone;
- The authority to approach is under the control of the mobile plant operator or where a designated Spotter is in place (whoever has the higher authority in that circumstance);
- The operator grounds any ground engaging tools (GET), is fundamentally stable, brakes are applied, the machine turned off before permission is granted to approach and the operator exits the cabin.
- After the interaction is completed the operator must confirm by verbal communication or visual confirmation the Workers has left the area. Operators must not recommence work until confirmation has been received.

11.5.5 - For delivery drivers required to deliver equipment or material within an active construction site, the following requirements must be met:

- The delivery driver (or similar) must be under escort when travelling in the active construction site;
- Complete an induction (consistent delivery);
- Complete a visitor or temporary Worker induction (inconsistent delivery);
- Provided information on any exclusion zones and any High Risk Work activities in the vicinity or the travel path;
- Have positive two-way radio communication with the person escorting them at all times (correct channel); and
- The delivery driver (or similar) must follow all instructions at all times by the person escorting.

11.5.6 - Where a temporary Worker is at a defined location performing a specific task within an active construction site and no vehicle movement is required (i.e. to another location with the active construction zone), the temporary Worker must not drive from that specific location unless under an escort. In this circumstance where two-way radio communication fails, the temporary Worker must stay at that location and flag down a Worker (i.e. mobile plant operator) to provide assistance in contacting their escort.

11.5.7 – Mayday procedures must be established for emergency situations within an active construction site, which include the provision of:

- A first responder protocols (i.e. verbal mayday x 3 or emergency x 3);
- Protocols for first responder (i.e. first responders name, location, description of event, no of persons involved);
- Protocol for first responder assistance (i.e. assessment of risk to their person, provide first aid)
- Incident and scene management;
- Provision for scene preservation; and
- Provision for external communications.

11.5.8 - In association with emergency situations, incident management protocols must be in place where an incident has occurred. The scene must be preserved for investigation (dependant of the occurrence) or where it is under the control of

emergency services (i.e. police or fire incident controller) or Worksafe WA. Incident management protocols must use the following protocols:

- Prevent entry to an incident scene unless authorised to provide assistance or in the case of a first responder;
- Protect evidence from being disturbed which could limit investigation findings;
- Preserve the scene until sufficient evidence has been gathered by an investigation team (where applicable); and
- Preserve the scene until the authorised person or public authority provides that permission.

This clause applies to any incident where the incident risk ranking requires an ICAM or ICAM light investigation.

11.5.9 - Where an emergency mayday situation is in effect, there must be effective protocols in place for all operating plant not directly involved in the emergency response, which may include, (but is not be limited to):

- Bringing the equipment to a safe stop on a flat level surface where practicable;
- Parking in a position that will not impede or restrict any response vehicles;
- Activate hazard lights and maintain radio silence;
- Remain in the equipment at all times and wait for further instruction;
- Assist where possible under the authorisation of the person in control of the incident;
- Only move when the "all clear" has been provided by the person with overall responsibility.

## **11.6 Safe Operation of Mobile Plant**

11.6.1 - All mobile plant operators must ensure they exercise defensive driving practices at all times and drive to conditions. Where speed limits are posted and vehicle movement plans require compliance (i.e. directional travel, exclusion zones) these conditions must be adhered to at all times. Traversing through rough terrain should be avoided, where this is not practicable, it must be done at a safe speed.

11.6.2 - All equipment must be parked in a fundamentally stable position. If a fundamentally stable position cannot be achieved then the vehicle must be chocked. Where a mobile plant operator is starting up and moving off, the operator must ensure the area is clear for manoeuvring, clear of Workers on foot or any other obstruction. A system must be in place for mobile plant operator to signal their intention to move position (i.e. horn blast). Where mobile plant is broken down it must be parked up, fundamentally stable, demarcated with cones and hazard lights turned on.

11.6.3 - All mobile plant operators must reverse in a safe manner due to restricted visibility and blind spots. Reversing should be avoided wherever possible by making a forward approach. Where it is not possible to avoid reversing, reversing cameras (excl. light vehicles) must be used in conjunction with a warning system of their intention to reverse (i.e. horn blast reversing protocol). Where an operator is in a restricted space or has limited visibility, a spotter must be used to ensure a safe reversing manoeuvre. Guidance on mirror visibility and blind spots of powered mobile plant in road construction industry is published by the [National Institute of Occupational Safety and Health](#) which must be used for guidance.

11.6.4 - Mobile plant operators must use positive two way communication when passing other mobile plant, other vehicles or equipment and not pass until positive confirmation is received. It is the responsibility of the Worker providing confirmation to pass that no hazard will affect the Worker passing (refer section 11.5).

## **12 WORK, ON OVER OR ADJACENT TO WATER**

### **12.1 Planning and Safe Design**

12.1.1 - The risks are associated with working on, over or adjacent to water must be identified and controlled, which includes (but is not limited to):

- Falling into the water source with the risk of drowning;
- Being swept away by fast moving water and being injured or drowning;
- Falling into water with electrical equipment and suffering an electric shock;

- Being trapped under water by equipment or objects and drowning;
- Hitting objects or being hit by moving objects should a person fall into a water body; and
- Being exposed to contaminated water, or being exposed to flora or fauna, in the water.

12.1.2 - Where a risk assessment in consultation with relevant Workers identifies hazards associated with working on, over or adjacent to water, as a minimum the following factors must be considered:

- Access / egress to or from the location on, in or near the water where the work will be carried out;
- The frequency and duration of exposure to the identified water hazards;
- The water body factors which may increase the impact when falling into the water e.g. depth, speed of the water flow, turbulence, debris load and type / slope of the water bed;
- The equipment which is to be carried and used;
- The knowledge, experience and competency of the Workers;
- Adequate housekeeping must be maintained to minimise the risk of falling;
- Environmental conditions which may impact on the work activity and rescue (i.e. remoteness of the workplace, weather conditions such as wind, rain, temperature and lighting); and
- Controls that can eliminate or mitigate the hazards in accordance with the hierarchy of controls.

12.1.3 - Appropriate work planning must be carried out prior to commencing any work activities that involve working on, over or adjacent to water. The work planning and method may include (but not limited to):

- Determining the most appropriate work methods that minimise the risk of falling into water, becoming submerged under water and drowning;
- Allocating adequate and competent Workers to perform the task;
- Selecting fit for purpose equipment and PPE;
- Planning the most appropriate access / egress to or from where the work is being undertaken;
- Developing or reviewing risk assessments where required; and
- Developing a rescue plan.

12.1.4 - Where practicable, appropriate access and egress arrangements must be provided and maintained where work activities are being undertaken on, over or adjacent to a water body. Requirements of security, ongoing maintenance and emergency rescue must be considered when selecting these access and egress methods.

12.1.5 - Temporary edge protection and barriers should be considered where the provision of permanent structure and protection is not reasonably practicable. The temporary edge protection and barriers must comply with the requirements of the AS/NZS 4994 Temporary Edge Protection.

12.1.6 - Appropriate security, lock and signage may be installed to prevent access to an unprotected water edge from any Workers and members of public. Where activities that involve working on, over or adjacent to water are being carried out during the hours of darkness, adequate lighting, which is appropriate to the work being undertaken, must be provided and maintained.

12.1.7 – Commensurate to the level of risk identified through risk assessment, the following equipment and PPE in relation to working on, over or adjacent to water must be available for use, which includes (but is not limited to):

- Fit for purpose equipment (e.g. mobile plant weight ratings);
- Where there is a risk of falling, a fall restraint system and fall arrestment system;
- Lifejackets (PFDs) that comply with AS 4758.1 Personal Floatation Devices: General Requirements.
- Selection and use of PFD in accordance with section 19.5 of AS 4758.1 Personal Floatation Devices
- Rescue floatation device (e.g. life ring, life floats and throw bag) with a rope attached. Where required it should be in a location readily available from the work being undertaken;
- A first aid kit and where relevant a swift water rescue kit; and



- Other appropriate equipment to facilitate the retrieval of personnel from the water will be provided based on the risks and control measures.

12.1.8 - All equipment used for working on, over or adjacent to water must be stored maintained, inspected and serviced as per manufacturer guidelines or a minimum 6 monthly (dependant on the equipment). PFDs rescue flotation devices and fall arrestment and restrain systems must have a service tag affixed to the equipment.

12.1.9 - A lifejacket (PFD) must be worn in the following circumstances:

- When on board any water craft (including barges);
- When installing scaffolding over a water source and personal fall protection equipment is required;
- Where personal fall protection equipment near an exposed edge;
- When working within two metres of an unprotected edge adjacent to a body of water which a Worker could fall; and
- Any other situations where the risk assessment identifies the risk of a Worker drowning.

## **12.2 Training, Competency and Awareness**

12.2.1 - The following training and competencies must be in effect where Workers work working on, over or adjacent to water sources:

- Appropriate instruction on how to check, use and care of a Personal Floatation Device (PFD) must be provided to any Worker required to wear a PFD; and
- For Workers who may need to swim during an emergency should they fall into water, supervisors must confirm with the Workers their competency in swimming.

12.2.2 - Workers who may be exposed to biological hazards (contaminated water) which may be present in water sources where this is a risk of falling, must have suitable biological and infection control health management to prevent potential biological hazard exposure (e.g. Hepatitis B).

## **12.3 Specific Control Measures and Safe Work Practices**

12.3.2 - Where Workers need to access and work within two metres of a water body without edge protection, the control measures identified in the risk assessment must be implemented. Specific control measures include (but are not limited to):

- Options to eliminate or minimise the need to work near the natural water body;
- Installation of temporary barriers or edge protection where reasonably practicable;
- Minimum of two persons required for the task. Workers should remain within sight and sound of each other at all times;
- Use of a fall restraint / restraint system used by trained and competent Workers;
- The requirements of a spotter;
- Wearing a Level 100 or above PFD lifejacket;
- Developing a rescue plan where identified through the risk assessment; and
- An easily accessible floatation device for rescue e.g. life floats, life ring or throw bag with retriever rope.

12.3.3 - A fit for purpose vessel or other means of water transport must be selected where any work activities require working on a water body. Vessel use must comply with all relevant legislation, licensing and safety requirements of the Department of Transport (Marine).

12.3.4 - Where Workers need to operate mobile plant near a water body, a risk assessment must be developed and all the identified controls implemented prior to commencing work. The following controls may include (but are not limited to):

- A walk through to assess the current work area conditions prior to commencing work (i.e. sumping of ground);
- The appropriate mobile plant for the task which must be compliant and in good operational condition;
- Trained and competent mobile plant operators who are performing the task;
- Establishment of exclusion zones and barriers to prevent falling into or submersion under water;

- An easily accessible floatation device for rescue (i.e. life floats, life ring or throw bag with retriever rope);
- A spotter to guide the operator and monitor for any persons in the vicinity;
- A lifejacket readily available which is compliant with AS 4758.1 Personal Floatation Devices: General Requirements; and
- The requirement for a developing a rescue plan with suitably trained and competent Workers who may assist in a rescue.

12.3.5 – All Workers must eliminate or minimise the need to drive on a submerged road where reasonably practicable (e.g. use an alternative route). Where any highway, arterial, suburban or regional road is flooded, all Workers must follow the road closure signs and instructions provided by local shire, or government authority (Main Roads). Workers are permitted to drive across a submerged road if they are comfortable there is no risk in making the crossing and when all of the following criteria are met:

- The depth of waters less than 150-200 mm (around the height of the tyre of the vehicle);
- The water is still, or the flow is less than 0.5 m/s;
- The end of the crossing is visible and there are no signs of erosion or instability of the road base;
- There is no potential for a sudden increase in the depth or velocity of water;
- Their vehicle is of sound condition and the depth of water will not cause a breakdown during the crossing.

12.3.6 - In circumstances where a Worker needs to drive across a submerged road that does not meet the above criteria, the risks associated with safe crossing must be evaluated. The risk assessment must evaluate the conditions with approval by the Workers line manager (i.e. supervisor) prior to making the crossing, with all risk based control measures implemented. Once the crossing is completed, confirmation must be provided to the Workers line manager. Where there is a risk of breaking down when crossing a water, which has, or is known to have a high crocodile population, the crossing must not be attempted.

12.3.7 - Where Workers are suspended over water (i.e. EWP, scaffold), the Workers may not be required to wear personal fall protection equipment subject to the following conditions:

- The risk of falling into water and drowning is higher than the risk of being injured by hitting the water surface or submerged objects;
- A dedicated spotter/dogger is present at all times to guide the operator and monitor the person working over water;
- A floatation device is readily accessible for rescue purpose (i.e. life ring and life floats and a PFD is worn).

12.3.8 - Where possible use pneumatic tools, battery powered tools or extra low voltage powered tools when working on or near water to minimise the risk of contact with electricity (electrocution). Where electrical equipment and leads are selected to be used on or near water, they must be:

- Connected to an earth leakage safety switch or residual current device (RCD) if the equipment and lead needs to be plugged / connected to a main electricity supply;
- Physically prevented, as far as practicable, from falling into water and protected from exposure to water unless specifically rated for that purpose;
- Properly water proofed with appropriate International Protection (IP) rating for liquid ingress; and
- Checked for damage before use, tested, and tagged.

## **13 VEHICLES AND DRIVING**

### **13.1 Training, Licensing and Heavy Vehicle Chain of Responsibility (HVCOR)**

13.1.1 - All Workers who operate a light vehicle or similar licensed road transportation vehicle (i.e. medium rigid) must have a valid and current drivers licence to drive on Western Australian roads. All Workers must notify their employer of any significant change in their status of their driver's licenses and/or driving permits (e.g., cancellation, suspension, and expiration) and abide by all imposed restrictions on their license status. It is recommended that all Workers complete a defensive driving course (light vehicle and/or 4wd off road) aligned with the Australian National Driver Competency Standard.

13.1.2 - Where goods, materials, equipment or plant is being transported, they must be sufficiently restrained at all times, which is dependant on the type of load and method of transport. Loads must be restrained in accordance with the following legislative requirements and guidance material:

- Road Traffic (Vehicles) Act 2012;
- Road Traffic (Vehicles) Regulations 2014;
- National Transport Commission - Load Restraint Guide (2018); and
- National Transport Commission - Load Restraint Guide for Light Vehicles (2018).

13.1.3 - For the transportation of goods, materials, equipment, plant or similar in association with any work under any form of Contract, each involved party (employer) in the supply chain must meet their Heavy Vehicle Chain of Responsibility (HVCoR) obligations under the Road Traffic (Vehicles) Act 2012 and the Road Traffic (Vehicles) Regulations 2014, which includes (but is not limited to):

- Ensuring that suppliers, transport companies and Subcontractors understand their HVCoR duties and have systems in place to fulfil their legislative obligations;
- Ensuring governance which includes the provision of evidence that all parties have met their HVCoR obligations;
- Have obtained and have verifiable records of all applicable permits and approvals from the relevant agencies; and
- There are adequate HVCoR communication methods between site Workers, suppliers, transport companies, subcontractors or any other agent under the control of the Contractor.

13.1.4 - The responsibility of site Workers, suppliers, transport companies, subcontractors or any other agent under the control of the Contractor must ensure the Road Traffic (Vehicles) Act 2012 and the Road Traffic (Vehicles) Regulations 2014 HVCoR requirements are managed and controlled, including safe systems and controls where each party has a responsibility, which includes (but is not limited to):

- vehicle standards and vehicle maintenance;
- mass, dimension and loading of vehicles;
- speeding and driver fatigue;
- hazard identification and risk assessment;
- training in the requirement of managing HVCoR processes and controls where all parties have a duty; and
- the requirements for reporting incidents in breach of the Vehicles Act and Regulations.

Further information on HVCoR can be obtained on the [Main Roads Heavy Vehicle Home Page](#) on the requirements of all persons involved in the supply chain.

## **13.2 Vehicle Maintenance and Inspection**

13.2.1 - Vehicles must be selected, equipped and maintained fit for service, considering the load to be carried (personnel and cargo) and terrain, road and operating conditions in the local environment. All vehicles must used in Western Australia be registered in Australia and meet the standards for vehicle safety and licensing as required by WA statutory requirements, the W.A Department of Planning and Infrastructure, Australian Design Rules and all other required standards for vehicle safety in the state of WA.

13.2.2 - All vehicles must be maintained in roadworthy condition and serviced as per manufacturer's recommendations for servicing or on a more frequent basis, whichever achieves a greater level of safety. All light vehicles accessing the Site should be manufactured no earlier than ten (10) years prior to the date that they access the Site and at the time of manufacture, have a minimum Australian New Car Assessment Program (ANCAP) rating of 4 stars or greater. The above requirements relating to manufacture date and ANCAP rating of light vehicles only may be waived at the Superintendent's sole discretion on request in writing from the Contractor, detailing why it is not feasible to meet these requirements. Any such waiver may place additional conditions on the Contractor relating to the use of such vehicles.

13.2.3 - Site based vehicles must also have the additional features, which includes (but is not limited to):

- be free from any soil or vegetation material;

- contain an fully stocked first aid kit;
- reversing alarm;
- cargo barriers (dependant on equipment weight, mass and frequency of use which requires transit);
- fire extinguisher and tyre change equipment;
- contain an operational UHF radio;
- be fitted with a revolving amber flashing beacons meeting Australian Standard design requirements;
- contain a minimum of 2 litres of potable water;
- maintenance by a suitably trained mechanic who certifies the vehicle is mechanically safe for use; and
- have pre-starts completed at a frequency (daily, weekly, monthly) dependant on travel use, terrain and operating conditions.

### **13.3 Journey Management**

13.3.1 - A system must be in place for journey management and journey planning where the travel time (distance), location (rural/regional), terrain or unfamiliarity to the driver presents a risk. The journey management and planning must enhance the safety of drivers and passengers by minimising risk exposure (through reducing the number of journeys where feasible), identifying and mitigating the hazards associated with each journey.

13.3.2 - Journey plans must be in place for all non-routine trips (A non-routine trip is defined as a trip associated with greater travel distances or unfamiliar terrain, area or routes, or non-routine risk exposure, i.e. journeys conducted on roads outside the limits of a city or town (generally >1 hour), off-road driving, driving during the hours of darkness and driving to remote areas etc.).

13.3.3 - The journey management procedure and journey plan must ensure:

- Journeys are approved and managed at an appropriate level within the organisation;
- Pre-trip briefings are held, documented and discuss at a minimum; routes, stops, hazards, loads, the requirement to report the completion of the journey and contingency plans for en-route emergencies;
- The route is clearly defined and there are appropriate means of communication and regular defined check-in calls;
- Potential driving hazards are identified in advance and mitigated;
- Fit for purpose vehicles are used for the journey based on load (both cargo and passengers), conditions and terrain;
- Only qualified drivers with current certification for the vehicle type to be used and operating terrain;
- Drivers are physically and mentally fit (including the consideration of fatigue and work hours);
- Drivers comply with Fatigue Management requirements and the conditions of the journey management plan;
- Vehicles are inspected prior to an extended journey with adequate provisions in the event of breakdown/isolation.

13.3.4 - The journey management plan must include:

- Purpose of journey;
- Vehicle details;
- Drivers details (including completion of appropriate defensive driving course);
- Passenger details;
- Contact information and communications;
- Destination and planned route;
- Rest stops and positive check call timings;
- Specific equipment required for journey (safety, 4x4 recovery, emergency beacons etc.);
- Weather and road conditions;
- Pre-departure vehicle checks; and
- Emergency Response for overdue vehicles.

### **13.4 Safe Use and Operation of Vehicles**

13.4.1 - All Workers who operate a vehicle, must operate that vehicle in a safe manner in accordance with the Road Traffic Act 1974 and the Road Traffic Code 2000. In addition, where it is not specified in the Act or Code, safe driving practices include (but are not limited to):

- All Workers must be properly seated and wear a correctly fitted and adjusted seat belt for the duration of all journeys;
- Passengers are strictly forbidden from riding in the rear of light vehicle trays and flatbed trucks;
- Drivers are not to use any of the following devices whilst driving with or without hands-free functionality or whilst stationary in traffic or stopped at traffic lights which includes mobile/cellular telephone (including) text messaging, other network enabled device such as pagers, personal digital assistants [PDAs] & laptops;
- Workers, where only necessary may make or receive a call only when the vehicle is located in a safe area and brought to a complete stop without creating a hazard to other road users;
- Drivers not to operate a vehicle while under the influence of alcohol, drugs, narcotics or medication that could impair the operator's ability to safely operate the vehicle;
- All loose items inside the cabin of vehicles which might cause injury from an accident must be secured at all times;
- All luggage and heavy items should be stored in separate cargo compartments or in storage areas that are segregated from vehicle occupants, sufficiently restrained or placed behind an approved cargo barrier; and
- Workers must to adhere to all fatigue management and journey management requirements for extended travel times.

13.4.2 - Workers must make every effort to park the vehicle so that, when leaving the parking space, the vehicle can be first driven in a forward motion to prevent reversing impacts on a person, object, plant or similar. Whenever possible, all vehicles should be parked using the first move forward options in the following order:

- Vehicle is properly parked, i.e. parking brake engaged;
- Transmission in park for automatics and in gear for manual transmission vehicles; and
- If parking on a hill or incline, leave vehicle transmission in park for automatic and leave the vehicle in gear, which is opposite to the slope of the hill (that is, if you are facing up hill select first gear, if you are facing down hill, select reverse gear).

13.4.3 - In the event of a vehicle road accident, it is expected, but not mandatory (at the discretion of each individual) that Workers render assistance to any member of public who may need life saving support or temporary medical treatment. Under the Civil Liability Act, Section 5C General Principles, a person who renders assistance (good Samaritan) to an injured person cannot be held liable or accountable in the act of assisting an injured person, if the assistance they are providing is in good faith for the wellbeing of the injured person. Rendering assistance in the "golden hour" may greatly assist with the survival of an injured person. As a minimum, you must report the incident to the emergency services to ensure appropriate response can be sent to the site of a road accident. Supporting WA road users is noted as a commendable act by the Government of Western Australia.

## **14 BUSHFIRE MANAGEMENT (IGNITION CAUSING BUSHFIRE)**

### **14.1 Risk and Impact Assessment**

14.1.1 - The risks associated with the ignition and fuelling of fires due to work activities must be risk assessed which must take into consideration the following causal factors:

- Engine fires resulting from mechanical or other causes such tyre and wheel fires;
- Vegetation contact with hot exhaust piping or other vehicle components;
- Exhaust sparks and the refuelling of hot vehicles;
- Re-heating bitumen;
- Incorrect disposal of cigarette butts, camp fires and camp cooking appliances;
- Hand held gas torches, mobile generators and welding units, power tools, chainsaws;
- Arc welding, oxy acetylene cutting and welding; and
- Angles grinders and any other grinding.

14.1.2 - In addition to clause 14.1.1, the inherent risk of operating of mobile plant in remote locations represents a major ignition and containment risk. Specific consideration must be given to the management and control of operating mobile plant taking into consideration the following causal factors:

- Trimming of excavators and other tracked machinery or grading on hard surfaces and rock;
- User of rock breakers or tool attachment which perform a similar function; and
- Skid steers, scrapers and any other machinery where metal may contact rock or any other hard surface that may flint.

14.1.3 - All fire risks must be assessed taking into consideration all causal factors (sources of ignition), prevention controls, and all emergency response mitigation controls which must be documented in the Emergency Management Plan.

14.1.4 - The risk assessment must take into consideration multiple consequence categories from the Transport Portfolio's Risk Reference tables due to the impact of bushfires which includes:

- Protect people (worksites and community);
- Protect environment and community assets;
- Protect worksite assets; and
- Protect reputation.

## 14.2 Warnings and Regulatory Notification

14.2.1 - In accordance with the Bush Fire Act 1954, where a total fire ban has been enforced specific conditions and control measures must be applied in order for the works to commence. Where a total fire ban is in effect and the work involves hot works, roadwork (grading and bituminising), off-road activity or blasting activities, the Department of Fire and Emergency Services must be notified 30 minutes prior to commencement, which is done by online notification. The conditions, control measures and online notification of works is available on the DFES website: [DFES Conditions of Works Under Total Fire Ban](#).

14.2.2 - Where any works prescribed in clause 14.2.1 is within 3 kilometres from land managed by the Parks and Wildlife Service, you must notify the respective local District or Regional Duty Officer from Parks and Wildlife between 24 hours and 30 minutes prior to the work commencing.

14.2.3 - Where the risk of bushfires from works is not covered by the DFES total fire ban exemption as specified in the Bush Fire Regulations 1954, a total fire ban exemption must be applied for and approved by DFES prior to commencement of the work. The notification requirements in clause 14.2.1 must also be followed.

14.2.4 - Where a local government Bushfire Control Officer or Ranger has issued a [Harvest and Vehicle Movement Ban](#) under the Bush Fire Regulations 1954 due to engines, vehicles, plant or machinery having the potential to both cause and contribute to the spread of a fire, the requirements of the ban must be applied. The requirements of Harvest and Vehicle Movement Ban and current bans in effect must be checked by contacting the Local Government Bushfire Control Officer or Ranger Service.

14.2.5 - Bushfire warnings issues by DFES must be followed at all times where a fire is in the vicinity any work. Emergency protocols must be documented in your Emergency Management Plan to respond to bushfire warnings issued by DFES. Please refer to [www.emergency.wa.gov.au](http://www.emergency.wa.gov.au). Where watch and act or an emergency warning has been issued in the vicinity of any works, all Worker must follow DFES emergency protocols.

## 14.3 Training, Competency and Awareness

14.3.1 - Where the risk of ignition, which has the potential to cause a fire (bushfire) as part of the works, Workers, must be trained and competent to mitigate the impact and spread of the fire, which includes:

- Complete a basic firefighting response training course, which as a minimum meets the training course content of the nationally recognised, "Demonstrate First Attack Firefighting Equipment" by a registered training organisation, for the use of fire extinguishers and other basic firefighting apparatus (i.e.. fire blankets, extinguishers and hoses);

- A fire watch stand by person to oversee hot works and work having a high potential to cause ignition;
- Hot work permit training for all persons required to work under, write or approve hot work permits;
- A minimum of one person per shift adequately trained as a competent person (or responsible officer) with detailed knowledge of the site bushfire management plan, DFES and community communication and reporting procedures, and site emergency management plans specific to bushfires.

#### **14.4 Fire Prevention and Mitigation of Impact**

14.4.1 - Where the risk of fire is identified, fire mitigation must be included in control strategies. Fire mitigation refers to the capacity to effectively:

- Be alerted to fires starting;
- Prevent or contain fire spread through firefighting tools;
- Prevent or contain fire spread through work area and environmental management; and
- Minimise fire impact on community or environment through response planning.

14.4.2 - Plant activities must be identified and potential ignition sources controlled. Fire prevention during plant operation may include (but not limited to):

- Fuel source management within work area and nearby areas (i.e. Road culverts and edging);
- Fire blankets or engineered spark minimisation or capture (i.e. Kevlar curtains on high spark risk equipment);
- Continuous or periodic water spraying in high risk areas;
- Machinery maintenance programs (including regular inspections for build-up of flora or other fuel sources within machine components such as wheel wells and shafts); and
- Adequate firefighting equipment on machinery.

14.4.3 - The general requirements for fire prevention for all activities must include (but is not limited to):

- Identification of all fire hazards (fuel and ignition sources);
- Controls measures to minimise the impact and control the spread of fire from ignition sources;
- Minimising and prevention of build-up of combustible materials within work areas (including vegetation management);
- Safe segregation and storage of chemical substances in line with safety data sheet (SDS) requirements;
- Ensuring dedicated smoking areas with cigarette butt disposal; and
- Any fires relating to non-work activities (e.g. cooking fires) must be contained within designated areas away from bushland and fuel sources.

#### **14.5 Management and Control of Hot Works**

14.5.1 - Hot works refers to any work activities identified as having the potential to ignite or sustain a fire from the following activities which includes grinding, welding, thermal or oxygen cutting or heating and any other heat or spark producing operations. Hot works may be conducted in designated hot work areas within which flammable or explosive substances are not present, typically permanent structures within workshop facilities. Where a dedicated hot works is established, welding screens must be compliant with AS/NZS 3957 Light Transmitting Screens and Curtains for Welding Operations.

15.5.2 - Where hot works occur outside of a designated hot work area, a hot works permit must be completed and signed by an authorising person. Any hot works on or near drums, tanks, pipes or vessels requires specific risk control measures and must be performed only by trained and competent Workers (i.e. boilermaker). Hot works permits must include the following information:

- The nature of work activities;
- The duration of hot works;
- The identified ignition sources;
- Control of flammable and/or explosive substances in work areas;
- Identify and control relevant hazards inside or outside the work area (i.e. environmental conditions)

- Requirements for continuous or one-off gas monitoring (as per confined space requirements);
- Fire mitigation and firefighting controls in place to manage potential ignition and spread; and
- Designated fire watch who must not complete any other work activities and must remain at the work area for 30 minutes after activities end.

## 14.6 Firefighting Apparatus

14.6.1 - All work areas must have adequate firefighting apparatus available and accessible. Firefighting apparatus must be adequate to the fire risk associated with work activities and the work environment. Considerations to determine the level of Firefighting apparatus at a work area include:

- Prevailing environmental conditions and general fire risk;
- Work activity fire risk;
- Remoteness of work and response times for external firefighting agencies; and
- Fuel sources at work areas (to determine class of fire extinguisher)

16.6.2 - The minimum requirements for firefighting apparatus includes (but is not limited to):

- 1kg dry chemical fire extinguisher within all light vehicles;
- Fire blankets at hot works areas;
- 4.5kg fire extinguishers appropriate to fuel type at chemical storage areas (i.e. diesel, acetylene) or under specific conditions detailed in safety data sheets;
- 4.5kg fire extinguishers appropriate to fuel type at hot works areas;
- 4.5kg dry chemical fire extinguishers within all medium vehicles and mobile plant (e.g. graders, excavators, >5t trucks);
- For remote work activities greater than 30 minutes from local emergency services: 20L aqueous firefighting foam and 400L of water within a designated firefighting apparatus (e.g. high-pressure pump with ultra-high-pressure water / foam nozzle and rewind hose reel with 40m x 12mm hose);
- A select number of water carts fitted with mounted water cannons;
- All conditions specified by DFES where works are conducted under total fire ban; and
- Any additional firefighting / fire mitigation capability based on a fire risk assessment.

16.6.3 - Consideration must be given to communication methods for alerting emergency services of any fire event. A designated responsible person must have an understanding and capability of contacting emergency services where a fire event occurs. This includes the capability to operate a satellite phone.

## 14.7 Specific Fire Personal Protective Equipment

14.7.1 - Where Workers are at significant risk of exposure to fire events (i.e. fire responders, fire watch), PPE must comply with AS/NZS 4602.2 High Visibility Garments: Garments for Fire Service Personnel which includes specific requirements for clothing, boots, welding aprons and chaps, fire blankets and respirators.

14.7.2 - Typically, fire rated clothing and PPE will not be required for general work activities where effective fire prevention controls are implemented. PPE requirements outlined above must be considered for high fire risk activities, large and complex work activities and remote work activities.

## 15 CRANES AND LIFTING OPERATIONS

### 15.1 Training, Competency and Awareness

15.1.1 – Where a Worker are required to operate a Crane the Worker must be trained and deemed competent to operate the specific type of Crane intended for use, which includes:

- A nationally recognised qualification by a registered training organisation;
- The relevant qualification from a registered Worksafe HRWL assessor (specific class criteria);



- Hold the relevant HRWL for the Crane intended for use;
- Current WA Driver License; and
- Complete a verification of competency (VOC) assessment.

15.1.2 – Where a Worker is to perform rigging or dogging work, the Worker must be trained and deemed competent to perform those duties, which includes:

- A nationally recognised qualification by a registered training organisation
- The relevant qualification from a registered Worksafe HRWL assessor (specific class criteria);
- Hold the relevant HRWL for the specific rigging configuration intended for use; and
- Complete a verification of competency (VOC) assessment.

15.1.3 – Where work is Crane operation is conducted in close proximity of live overhead electrical lines, compliant with the minimum approach distances, the Crane Operator, Rigger and Dogman must hold the nationally recognised qualification “Working Safely Near Live Electrical Apparatus as a Non-Electrical Worker” by a registered training organisation.

15.1.4 – In addition to the qualification in clause 15.1.1, where Crane operation is required in the vicinity overhead electrical lines, compliant with the network minimum approach distances, a safety observer must be in place who holds the nationally recognised qualification “Work as a Safety Observer / Spotter”.

15.1.5 - All Worker who operate vehicle loading cranes must be trained and deemed competent by verification of competency assessment and hold a current (CV) HRWL if the capacity is greater than 10 metric tonnes. If the capacity is less than 10-meter tonnes, a verification of competency assessment on each type of equipment is required.

15.1.6 - Any Worker who operates mobile plant with a jib attachment (multi-purpose tool carrier) which performs any lifting activity must hold a current (CN) HRWL, if the capacity of the jib attachment is greater than 3 tonne and deemed competent by way of verification of competency assessment prior to lifting an intended load.

15.1.7 - Any Worker who operators of a forklift with a jib attachment over 3 tonne capacity which is intended to perform any lifting activity must hold a current (CN) HRWL and deemed competent by a verification of competency assessment prior to lifting an intended load.

15.1.8 – Where Crane lifting operations involved the installation, alteration or dismantling of a structure, during the planning stage the work must meet safe design principals in accordance with regulatory requirements. Where there is a risk to Workers or members of the public from Crane lifting, the risks associated with the work must be considered in accordance with AS2550.1 Cranes, Hoists and Winches - Safe Use and General Requirements. These considerations include (but are not limited to):

- The safety of personnel and members of public;
- The size, location and placement of the Crane;
- The expected fall and spread (drop zone assessment) of an uncontrolled load;
- Overhead obstructions (i.e. vegetation, bridges, structures, light posts) or overhead electrical utilities;
- The instability of adjoining structures and cave in of side wall near excavation or trenches;
- The location or placement of the spoil heap or any introduced material which may affect crane sitting;
- Access / egress, separation, segregation, exclusion zones and “no go zones” within the vicinity of the Crane;
- The interface with the traffic management plan, traffic guidance scheme and speed limits;
- Utilities, structures, overhead obstructions, ground conditions, demolition work and environmental factors; and
- Any other hazards, human factor or external impact, which may affect Crane lifting.

## 15.2 Inspection and Mechanical Integrity of Crane

15.2.1 - All Cranes must have a preventative maintenance program in place in accordance with manufacturer requirements and the frequency, intensity of use and the working environment. The preventative maintenance must include (but is not limited to):

- Maintenance in accordance with manufacturer OEM design specifications;
- In accordance with regulatory requirements (where applicable);
- Parts and components replace identical or equivalent to the original parts and components;
- Be in a safe and secure location, fundamentally stable, brakes applied and chocked (where necessary);
- Be maintained by a trained and competent Worker (fitter); and
- Section 7.2 Maintenance and Appendix E of AS2550.1 Cranes, Hoists and Winches - Safe Use and General Requirements.

15.2.2 - In addition to Section 15.4, inspections must be carried out at a frequency as stated in the manufacturer's OEM to ensure the Crane is kept in safe operating condition. The inspections must meet the requirements of AS2550.1 Cranes, Hoists and Winches - Safe Use and General Requirements, which includes:

- Routine inspections;
- Periodic third party inspections;
- Major inspections; and
- With records of all inspections available by the operator for review.

15.2.3 - Inspections must ensure the Crane functions to OEM design specifications, AS2550.1 Cranes, Hoists and Winches: Safe Use and General Requirements and where mechanical or safety feature faults have been identified during inspection, the crane must be stood down and tagged out of service until the fault has been rectified and tested prior to returning to service.

15.2.4 - Modifications to any part of a crane must not be undertaken without undergoing an engineering assessment by a competent person to ensure compliance with AS 1418.1 Cranes, Hoists and Winches General Requirements (Section 6.25 of AS2550.1).

### **15.3 Inspection and Integrity of Lifting Equipment**

15.3.1 - The rigging equipment selected must be able to meet the lifting forces it will be subjected to. All rigging equipment must comply with its associated Australian Standards and have a working load limit (WLL) adequate for its intended use. Where spreader and lifting beams are used in the rigging configuration they must be designed by an engineer in accordance with AS 4991 Lifting Devices.

15.3.2 - All slings must be stored in on suitable racks, shelves or hooks off the ground in clean dry areas. All lifting equipment must be detailed on a lifting equipment register. Lifting equipment must be clearly and permanently marked in accordance with AS 4991 Lifting Devices and Section 8: Inspection of Ropes, Hooks and Lifting Gear in AS 2550.1 Cranes, Hoists and Winches – Safe Use and General Requirements;

15.3.3 - Where ropes are examined to identify kinking, bird-caging, damage and reeving, it must be done in accordance with AS 2759 Steel Wire Ropes – Use, Operation and Maintenance. All lifting lugs must be welded in accordance with AS 1554.1 Structural Steel Welding – Welding of Steel Structures.

15.3.4 - Faulty lifting equipment must be taken out of service and not be used until it is repaired and tested by a competent person. When repairs have been carried out on lifting equipment, the equipment must be proof loaded and re-tagged in accordance with AS 3775.2 Chain Slings for Lifting Purposes - Care and Use. Any modifications made to lifting equipment must meet the requirements of AS1418.1 Steel Wire Ropes – Use, Operation and Maintenance. Any non-repairable lifting equipment, including shackles, hooks and slings must be destroyed.

### **15.4 Pre-operational Requirements**

15.4.1 - Specific documentation must be available prior to site mobilisation and operation, which must be stored with the Crane, which includes:

- Registration: Registrable plant with requirements for WA Registration (full or conditional). Both number plates must be secured, clearly displayed. Stickers (affixed) and paperwork must be available for each item of plant.
- Crane History: Service and maintenance history within three years must be available for each item of plant.
- Log Book: Plant logbooks must be available and with the machinery / operator.
- Pre-start: Daily pre-start must be completed on each item of plant for each item of plant when in use.
- Manual: The operators manual for each specific make and model must each item of plant
- Risk Assessment: For each piece of plant, there must be a plant risk assessment for each specific item of plant.
- Inspection Report: Crane safe inspection report (with applicable compliance sticker);
- Certificates: Applicable rope and hook block certificates; and
- Register: A lifting device register.

15.4.2 – Cranes must be in a good general condition which meets the requirements of relevant Australian Standards and Section 11.2 of Mobile Plant Operation (where applicable to Cranes).

15.4.3 – In addition to the requirements of AS2550.1 Cranes, Hoists and Winches: Safe Use and General Requirements, Cranes must be fitted with the following safety features:

- Load movement indicator (LMI), anti-two block system and a boom angle indicator;
- Carry mounts, wheel chocks and outrigger packing;
- Load chart and overhead power line signage (inside cabin); and
- Free fall function (deactivated).

15.4.4 - All Cranes must be have a pre-operational (pre-start) inspection completed prior to the commencement of each work shift including a functional test, which includes, (but is not limited to):

- Mechanical and electrical components;
- Controls for each piece of lifting or rigging equipment;
- Crane cables and all lifting attachments;
- Structural components of the hoist;
- Function of the brakes, wheels (visual), baskets and outriggers;
- Structures (including hooks, hook-blocks and rails) and load limiting devices;
- Safety devices and limit switches;
- Control systems required for individual equipment i.e. independent fail-safe braking systems, a device to stop the crane such as a 'dead-man' switch, and emergency shut-off switch.

15.2.5 - Prior to maintenance or inspections, Cranes must be isolated in accordance with a documented isolation procedure to ensure all energy sources are isolated and "tested for dead" prior to maintenance or inspection (excl. functional testing during pre-start and maintenance). Isolation procedures must meet the requirements of Section 19 - Electrical Work (where applicable) in this document.

15.3.6 – Lifting equipment must be inspected in accordance with the requirement specified in AS 2550.1 Cranes, Hoists and Winches – General Requirements. Lifting equipment must be inspected immediately prior to use and at regular intervals (documented) which is consistent with the design and use of the attachments. The inspection of lifting equipment must be done by a trained and competent person (i.e. HRWL Rigger).

## **15.5 Exclusion Zones and Access Control**

15.5.1 – An assessment must be completed prior to a Crane lifting an intended load to identify the potential drop zone (spread and fall) of an uncontrolled load. The assessment of the drop zone must also consider the requirements specified in clause 15.1.8.

15.5.2 - Communication protocols must be established for Crane lifting activities, which includes, (but is not limited to):

- Workers must be trained and competent in established positive two way communication protocols (i.e. radio two way & hand signals) with a back-up communication method where the primary communication method fails;
- All Workers involved in the daily lifting must be present at the daily pre-start meetings to ensure daily crane lifting activities are understood including any authorised changes;
- A stop task protocol where positive two-way communication is not established when a load is suspended. The stop task protocol must be put into effect under the direction of the person who has overall responsibility.
- Where an exclusion zone is breached by a member of public or a Worker not involved in the lifting task, the stop task protocol must be put into effect under the direction of the person who has overall responsibility;
- Where external impacts may impact the lifting task, such as other work activities which may compromise the exclusion zone, a stand down procedure (temporary suspension of task) must be put into effect to manage these impacts before work can recommence; and
- An emergency mayday protocol for potential emergencies as part of the Rescue / Emergency Management Plan.

15.5.3 – The person who has overall responsibility of Crane lifting within a demarcated exclusion zones must ensure:

- Only trained and competent Workers under supervision can work inside an established Crane exclusion zones;
- Prior to the commencement of each shift or break the exclusion zone must be inspected for integrity;
- The exclusion zone is monitored when a load is suspended;
- All Workers within the exclusion zone must understand the protocols for establishing and maintaining the exclusion zone, protocols for breaches of the exclusion zone and temporary suspension of the work protocols;
- Where the integrity of the exclusion zone is compromised or deemed to be ineffective, the exclusion zone must be corrected before recommencement of Crane lifting; and
- A communication plan is in place for other Workers who may be impacted by Crane lifting.

## 15.6 Lift Planning

15.6.1 - All lifting activities are subject to a lift plan or by exception a lift log book for frequent lifts (i.e. pick and carry). The lift plan must give specific attention to the requirements of AS 2550:5 Cranes Hoists and Winches: Safe use of Mobile Cranes, which includes, (but is not limited to):

- The Cranes standing position;
- Establishment of demarcated exclusion zones;
- Load control;
- Environmental factors (e.g. wind speed as per OEM recommendations);
- Visibility and clearance issues;
- Required competencies of all Workers involved in the lifting activity; and
- Include a SWMS, which must be task specific, reviewed by and signed onto by all involved Workers.

15.6.2 - Where any Crane lift meets the following criteria, the lifting activity will be classed as a critical lift:

- Lifts over operating facilities;
- Lifts over or near power lines or electrical transformers or substations;
- Lifts involving personnel cages;
- Lifts at or above 90% of maximum rated capacity of crane as configured for the task;
- Multiple crane lifts; and
- Lifts with multiple hoists including load shifting devices (lever hoists / chain blocks) where the centre of gravity or the load share changes between the devices.

15.6.3 - Where a critical lift has been identified, a critical lift plan must be developed, documented and authorised (with representative diagrams) in consultation with the crane operator(s) and Workers who form part of the Crane lift (i.e. rigger / dogman). The critical lift plan must include:

- Lift Data: Weight, rigging weight, total weight, height of lift, radius of lift, surface area and centre of gravity;
- Equipment Data - Manufacturer, model, size, boom length, jib length, load block, material size;
- Rigging Data: Sling and chain diameter, length, configuration, capacity, hook type, shackle size and capacity;
- Lift Computation: Boom length, radius of lift, equipment capacity, size of outrigger footplates and wind speed;
- Personnel: A lift of all personnel involved in the critical lift including their qualifications;
- Hazard Identification and Control: Including but not limited to proximity to energised overhead power lines (must have insulated lifting links and operate under a proximity / vicinity permit), exclusion zones (barricading and demarcation), spotter duties, weather conditions (including lightning), underground obstructions (i.e. trenches / excavations), aboveground obstructions (scaffolding, other plant / equipment, Workers), travel route, PPE requirements and a communication plan; and
- Authorisation: The lift plan must be reviewed and authorised by a competent person prior to lifting.

## 15.7 Safe Execution of the Lift Plan

15.7.1 – In conjunction with the lift plan, a Safe Work Method Statement (SWMS) or Job Safety Analysis (JSA) or similar termed document must be in place prior to crane lifting operations. The SWMS must be created in consultation with the Workers involved in the lift, reviewed, and signed onto by all persons.

15.7.2 - So far as is reasonably practicable, loads must not be suspended or lifted over any persons. If a load has to be suspended or travel over a person a risk assessment must be completed to determine the most effective method to complete the task with appropriate control measures to manage the risk.

15.7.3 - All loads must be adequately controlled when lifting is being undertaken. Where a load is under the direction and control of a competent person other than the Crane operator (i.e. dogman, rigger) that person must direct the load until it is placed into its final position. The Crane operator must take no instruction apart from the competent person directing the load. Prior to lifting, the competent person assisting the Crane Operator must ensure:

- The slings are correctly applied to the load and to the Crane hook;
- The slings are rigged to prevent sliding of the load;
- No part of the load is loose;
- The load is free and ready for hoisting;
- When hoisted, the load will be free of travel obstructions and not contact any object;
- When hoisted, the load will not constitute a hazard to any Workers or members of the public; and
- The load placement area is ready to receive the load.

15.7.4 - Where practical, lightning detectors should be hardwired into cranes with the potential to operate outdoors in accordance with AS/NZS 1768 Lightning Protection. In the absence of a lightning detection system personnel must be vigilant of inclement weather where lightning may be present. Where a lightning detector sounds or Workers become aware of lightning the following safety measures must be taken:

- Inform all personnel in the work area that lifting and slewing will cease;
- If the safe area is available directly below a suspended load, it must be lowered straight to the ground. Where this is not practicable, determine the nearest safe area and slew and lower the load;
- Isolate the crane and leave the area;
- If strikes are imminent and there is no time to lower the load, inform all personnel to leave the area, isolate the crane controls and ensure barricading is in place; and
- Leave the area, notify the person who has overall responsibility, and ensure no other Worker enters the area until the crane operator has returned to the controls of the crane and deemed the area safe.

## 16 DROPPED OBJECTS FROM HEIGHT

### 16.1 Planning and Safe Design

16.1.1 - The risks associated with objects (equipment, materials or tooling) falling from height must be identified where a dropped object has the potential to affect Workers or any other person in the line of fire. The identification of dropped object hazards must include, (but is not limited to):

- Securing of equipment, materials or tooling while elevated at height;
- Dislodgement of plant or equipment components (i.e. scaffolding);
- Collision and snagging when lifting, travelling equipment, tag lines, service loops;
- Failure of fixtures and fittings from poor design, corrosion, vibration or poor installation;
- Human factors such as behaviour, complacency, poor work planning and work method design;
- Inadequate or neglect to secure hand tools, power tools, mobile phones or PPE;
- Materials and objects stored at height not adequately secured or fixed into final position (storage racks);
- Poor housekeeping and loose items at height not secured by a restraining mechanism;
- Inadequate inspection and preventative maintenance of structures; and
- Environmental factors such as wind and rain causing slippery surfaces.

16.1.2 - The prevention of dropped objects from a scaffold structure >4 meters must include guardrails, guardrail infill panels, mid rails and toe boards where specified in the scaffold design plan, which meets the requirements of the following Australian Standards:

- AS/NZS 1576.1 Scaffolding – General Requirements; and
- AS/NZS 4576 Guidelines for Scaffolding.

16.1.3 - Where the scaffold design plan for a scaffold structure >4 meters specifies perimeter containment screens due to the risk of dropped objects, the containment screens must be made of mesh or similar material with rated density strength compliant with AS2423 Coated Steel Wire Fencing Products for Terrestrial, Aquatic and General Use. The scaffold design engineer must consider the effects of wind loading and the weight of the screens, which must be documented in the scaffold design plan.

16.1.4 - Where containment netting or screens are installed on scaffolding structures >4 meters to contain only dropped objects, the installation, alteration or dismantling must be done in accordance with the scaffold plan and manufacturer instructions by trained and competent scaffold Workers with the relevant HRWL.

16.1.5 - Where catch platforms or safety nets are installed on a scaffold structures >4 meters to arrest a falling Worker and falling objects, the erection, alteration or dismantling must also be done in accordance with the scaffold plan and manufacturer instructions.

16.1.6 - Catch platforms installed to arrest falling objects or a falling Worker must:

- Be design rated to contain the maximum impact load;
- Only be installed or altered by trained and competent scaffold Workers with the relevant HRWL where cantilevered, spur or tube and coupler scaffolding system;
- Be inspected at intervals consistent with Section 1: Scaffold Structures Above 4 Meters;
- Include edge protection to protect the Workers from the open edge;
- Include planked-out decking which is positioned a minimum of 2 metres extended beyond the unprotected edge (exclusion: except where extended guardrails are fitted to the catch platform); and
- Be installed as close to the underside of the work area with a maximum free fall distance of no more than 1 meter from the catch platform.

16.1.7 - Safety nets installed to arrest falling objects or a falling Worker must:

- Be design rated to contain the maximum impact load;
- Allow for Workers to move freely and not become an obstruction;
- Be secure, anchored and tensioned before work commences;
- Only be installed or altered by trained and competent scaffold Workers with the relevant HRWL;
- Be inspected at intervals consistent with Section 1: Scaffold Structures Above 4 Meters;
- Be cleared when debris or falling objects are contained within the netting;
- Be stored in a dry and shaded location when not in use;
- Be hung as close to the underside as possible no more than 2 meters below the work area; and
- Do not have any hot works conducted in the proximity of the nets (i.e. welding, oxy cutting) which may damage or compromise the integrity of the netting.

## **16.2 Exclusion Zones and Access Control**

16.2.1 - Where dropped objects from height have been identified, exclusion zones must be established to prevent Workers or members of the public being impacted. Where applicable, the demarcation and delineation of exclusion zones must be in accordance with the following Australian Standards:

- AS 1319 Safety Signs in the Occupational Environment;
- AS 1725 Chain-link Fabric Security Fences and Gates;
- AS 1742.1 General Introduction and Index of Signs;
- AS 1742.2 Traffic Control Devices for General Use;
- AS 1742.3 Traffic Control Devices for Works on Roads; and
- Hazard tape and signage (AS1319) for short duration work.

16.2.2 - Barricading, demarcation and signage of the exclusion zone must be in place for the duration of the work where the risk of dropped objects is present. This includes aftercare (after work hours) on structures where pedestrians or any other person may be in the line of fire of a falling object.

16.2.3 - Where an exclusion zone has been established (i.e. crane lift) the restrictions applicable to that exclusion zones must be communicated to all Workers. This includes pre-start meetings, toolbox talks or other methods of hazard communication to Workers.

16.2.4 - Where Workers are required to enter work zones where there is a risk of falling or dropped objects from height, all Workers must wear a head protection which is compliant with AS/NZS 1801 Occupational Protective Helmets. Where hardhats are required for the duration of the works, temporary hardhat sign posting must be installed in accordance with AS 1319 (1994) Safety Signs in the Occupational Environment.

## **16.3 Securing Devices and Methods of Control**

16.3.1 - Tools used at height must be secured by a securing device, which includes a tool tether and tool lanyard attached to an anchorage point. The securing device system must ensure:

- Securing device system are inspected prior to use and tagged out of service where faults are identified;
- The lanyard attachment point on the tool does not hinder the use or function or use of the tool;
- The length of lanyard wire is appropriate to the unhindered function of the tool;
- The tool and wire have are able to withstand a drop of double the lanyard length;
- The lanyard is fitted with screw gate rated carabineers;
- Where hand tools are >5kg, weight-rated carabineers must be used;
- Wrist lanyards are only used where it is not practical to use a conventional method (i.e. confined spaces);
- Where tools and equipment are >5kg a minimum 4mm certified wire must be used; and
- The securing device is inspected prior to use at height.

16.3.2 - Where tools bags, pouches, tool belts or similar securing systems are used to carry tools or a lifted to an elevated position (i.e. elevated work platform) they must:

- Be attached to the user at all times in a way which does not hinder movement and allows for both hands to be free at all times;
- Be secured and attached to the carrying device or fully encapsulated and locked to prevent falling out;
- Be inspected prior to use and put out of service where faults have been identified;
- Ensure multi-part tools are locked to prevent separation (i.e. sockets locked onto extension bars, knuckles, ratchets and breaker bars).

16.3.3 - Where power tools are used at height, safe use and handling of the tools must be maintained at all times, which includes, (but is not limited to):

- The supply cable for electric powered tools has the sheave secured to the power tool case and supply socket to prevent excessive strain being placed on internal conductors;
- air hose on pneumatic tools are secured to prevent strain on the fittings (both ends);
- Ensuring sockets, extensions and ratchets or similar have the pins locked to power tools (electric and pneumatic) to prevent accidental release
- Ensuring battery powered tools have battery lock attachments in place;
- Lanyards are attached with a load rating appropriate to the weight of the tool and attachments; and
- Where power tools are not in use at height they must be fixed and secure in a safe location

16.3.4 - In addition to the requirements of clause 16.3.3, where heavy tools or equipment >5kg are elevated or used at height the following requirements must be in place, which includes (but is not limited to):

- Ensuring that small and medium rated carabineers are not be used as part of the securing system unless design rated to sustain the load;
- Lanyards and tethers must be design rated to arrest the fall of the intended object it will be fastened to;
- Ensuring securing points for the object are secure to the device, fastened and taut;
- Are all heavy tools, equipment and hand-held machines must be firmly secured against falling when in use and transit to height; and
- If a heavy tool or item of equipment has fallen and a lanyard has arrested the fall, the lanyard and securing device components must be removed from service until an inspection confirms it is fit for re-instatement.

## **16.4 Mechanical Integrity of Plant or Equipment**

16.4.1 - All equipment or plant which has mechanical components which operates or is elevated to height (i.e. EWP, Crane, Drilling / Piling Rigs or similar) must be inspected and maintained in accordance with manufacturer instructions to prevent objects falling from height. This includes (but is not limited to):

- Inspections are conducted at intervals specified by the manufacturer or Australian Standard intervals;
- A pre-start inspection is completed before each use to inspect the integrity;
- The plant or equipment is tagged out of service when faults are identified;
- It is maintained in accordance with the OEM Manual by a suitably qualified fitter or technician;
- The plant or equipment is inspected prior to use; and
- Where faults have been identified, the plant or equipment is tagged out of service.

## **16.5 Stability of Stored or Stacked Materials**

16.5.1 - Where materials and equipment are stored at height on storage racking systems it must be compliant with the requirements of AS 4084 Steel Storage Racking. The storage system must be inspected and maintained to ensure structural integrity, which includes, (but is not limited to):

- Inspected at a frequency in accordance with the manufacturer instructions or the inspection criteria specified in AS 4084 Steel Storage Racking;
- Ensure that the racking installation has not been altered which may compromise the structural integrity;



- Safe working loads are adhered to in accordance with manufacturer instructions and specific load application and configuration charts;
- Examination of the floor surface to ensure sufficient weight bearing capacity for the systems load limit;
- Examination of the structure to identify out of plumb of the racking, dislocation and deformation of sections and connections for uprights and beams;
- Examination of deformation or signs of cracking at the welds, horizontal beam deflection (permanent deformation) and any impact damage from handling equipment or plant; and
- Examination of damage to beam connectors (bowing or bending connectors), missing or damaged safety pins, twisting or leaning posts, missing or dislodged components, corrosion caused by environment factors or from the products being stored.

16.5.2 - Where an inspection or collision impact has identified damage or the structural integrity has been compromised, the storage system must not be used, tagged out of service, exclusion zones established and communicated to Workers until the storage system has been repaired and certified prior to re-instatement.

## **16.6 Safe Loading and Unloading Practices**

16.6.1 - All Workers who lift equipment, materials or similar to and from a shelving storage system with the use of industrial lift truck (i.e. forklift, telehandler or similar industrial lifting device) must be trained and competent to perform the task, which includes:

- Current nationally recognised qualifications by a registered training organisation;
- Any High Risk Work licences (HRWL) required in accordance with regulatory requirements;
- Current WA Driver License; and
- A verification of competency (VOC) assessment for each item of plant the Worker is operating.

16.6.2 - A preventative maintenance, inspection and testing program for industrial lift trucks must be in place to ensure safe mechanical function when in use. The maintenance, inspection and testing program must include, but not be limited to:

- Maintenance in accordance with manufacturer OEM design specifications;
- Meet regulatory requirements (where applicable);
- Ensure parts and components replaced are identical or equivalent to the original parts and components;
- Be in a safe and secure location, fundamentally stable, brakes applied and chocked; and
- Be maintained by a trained and competent Worker (fitter).

16.6.3 - When carrying out maintenance, inspection and repair, energy sources likely to cause a risk of injury should be removed or isolated. This includes stored energy, for example from hydraulic components under pressure or potential energy from a raised forklift carriage that can move under gravity.

16.6.4 - Daily pre-operational inspection must be carried out, which includes, (but is not limited to):

- Assess load rating plates to ensure the industrial lift truck and attachments are right for the task;
- Inspect lift and tilt systems including attachments (i.e. clamps, hydraulic lines for oil leaks, chains, cables and load limiters are functioning correctly;
- Inspection of steering, brakes, park brakes, operating controls and lights are operational;
- Inspection on tyres for wear, damage and inflation for pneumatic types;
- Inspection of guarding and functional e.g. around the battery compartment or fuel lines;
- Warning devices are functioning correctly;
- Fork arms and attachments show no signs of deformation, damage or wear;
- Check of liquid levels e.g. hydraulic oil, brake fluid and water;
- Inspecting of gas cylinders where necessary and their securing system, and
- Inspection and test of seat belts for damage wear and function.

16.6.5 - All operators must exercise defensive driving practices at all times and drive to conditions. Where speed limits are posted and vehicle movement plans require compliance (i.e. directional travel, exclusion zones) these conditions must be followed at all times. Traversing through rough terrain should be avoided, where this is not practicable, it must be done at a safe speed.

16.6.6 - Safe work practices must be in place for lifting plant or equipment where objects are elevated to or from height, which includes (but is not limited to):

- The drop zone work area must have appropriate signage in accordance with AS 1319 Safety Signs in the Occupational Environment, or where appropriate, soft barricading to prevent unauthorised access;
- Where appropriate and dependant on the risk associated with high consequence dropped objects, hard barricading to prevent unauthorised access;
- When loading or unloading, Workers must be safely outside of established exclusion zones (excluding spotters when performing safety observer/spotter duties);
- Entry and exit points to the work area must be clearly communicated to all Workers;
- When equipment is loaded or unloaded, it must be and remain stable when load restraints are removed;
- The equipment used to load or unload must be suitably rated within the safe load limits for the task;
- Loads must be positioned against the carriage or backrest with the mast tilted back to prevent the load slipping, falling or rolling off the fork arms;
- The load must be secure across both fork arms for balance and not travel when in raised position;
- The de-rated capacity of the load must not be exceeded or the rated capacity of the attachment
- Loads are to be lifted vertically (straight up) with no dragging or off-vertical lifts; and
- Travel slowly and cautiously when the load is raised and with the load as low to the ground as possible.

## **17 EXPOSURE TO THERMAL STRESS**

### **17.1 Training, Competency and Awareness**

17.1.1 – Where there risk of thermal stress to Workers, which could contribute to one of the following illnesses, the tasks, must be risk assessed and suitable control measures implemented:

- Heat Stroke: Thermoregulatory failure which is the most serious form of thermal stress illness characterized by hot, dry skin; rapidly rising body temperature; collapse; loss of consciousness; and convulsions;
- Heat Exhaustion: Characterised by clammy skin, weakness or extreme fatigue; nausea, headaches, low blood pressure with a weak pulse which are contributing factors leading to heat stroke;
- Heat Syncope: Fainting caused by an excessive heat load resulting in an inadequate supply of blood being delivered to the brain;
- Heat Cramps: Characterised by painful spasms in one or more skeletal muscles generally in persons who sweat profusely without replacing salt losses or un-acclimatised Workers with higher levels of salt in their sweat; or
- Prickly Heat: Characterised by heat rashes from continued exposure to heat and humidity with the skin remaining continuously wet from unevaporated sweat resulting from blocked glands and reduced sweating,

17.1.2 – Where there is a risk of a thermal stress related illnesses, the risk assessment must take into consideration the following contributing factors, which includes (but not limited to):

- Temperature, humidity, sun exposure and air movement;
- Radiant temperature of surroundings (i.e. reflective sunlight surfaces);
- Clothing (interfering with evaporative heat loss);
- Personal protective equipment (worn for specific work activities i.e. welding);
- Physical activity and work load (contributing to metabolic heat generation);
- Acclimatisation of Workers (where applicable);
- Location of work whether confined or restricted (confined space, trench);

- Personal factors: Age, general health, weight, acclimatisation and alcohol or drug (i.e. prescription); and
- Any other factor, which may contribute to Worker exposure leading to thermal stress related illness.

17.1.3 – Where it has been identified that Workers will be exposed to high thermal environments which could lead to a heat related illness, Workers must be trained in the recognition of signs and symptoms, predisposing factors, acclimatisation (where applicable), hydration management, self-assessment, preventative measures, first aid and emergency procedures which must be taken to avoid and minimise the impact of thermal stress related illness.

17.1.4 – In addition to the above training, supervisors must also be regularly monitoring their Workers to identify visible signs of thermal stress illness, encourage self-reporting and where identified take appropriate measures to manage and controls those effects before more serious health effects occur. This includes first aid treatment and where applicable escalation to emergency management procedures for severely affected Workers.

## **17.2 Hydration Management**

17.2.1 – Workers must be provided with potable and palatable drinking water, which must be freely accessible to all Workers with provision of water containers. Workers must be encouraged to maintain a sufficient water intake to counter losses associated with sweat evaporation in hot environments. When working in high thermal environments Workers must be discouraged from drinking tea, coffee, colas and energy drinks due to the caffeine levels causing a diuretic effect leading to dehydration and hindering rehydration. Electrolyte replacement drinks should be used sparingly and not as the sole form of fluid replacement. Salt tablets must not be used to replace decreased salt loss from sweating.

17.2.2 – Where working in high thermal environments Workers must be provided with self-assessment tools such as urine specific gravity indicator sticks to determine their hydration ranges accompanied by a hydration value range chart. The use of targeted hydration assessment using refractometer measurements to determine more accurate specific gravity measurements is encouraged and at the discretion of the Contractor.

## **17.3 Worker Acclimatisation**

17.3.1 - Where Workers are transitioning from cooler climates to high thermal environments (i.e. FIFO) a process of Worker acclimatisation needs to be implemented to ensure the effects of thermal stress related illness are managed. The acclimatisation process must provide provision for a graduated escalation of high work load activities, work / rest cycling, provision for suitable rest areas, protective observation (buddy system), sustained fluid intake, self-assessment (specific gravity monitoring) and supervision of un-acclimatised Workers.

## **17.4 Work Task Management**

17.4.1 – Where practicable work tasks which involve high exertion or force must be scheduled for cooler times of the day when working in high thermal environments. Where this cannot be avoided, work/rest cycling and/or job rotation must be implemented in addition to established control measures.

17.4.2 – Where high exertion or force tasks cannot be avoided during daily thermal peaks and work/ rest cycling is required, provision for air-conditioned facilities (i.e. office, air conditioned vehicle) or at a minimum shaded areas must be provided to aid in Worker recuperation from high thermal environments.

## **17.5 Safe Work Practices in Hot Environments**

17.5.1 - When working in high thermal environments where there is a risk to the health of Workers from heat illness, the following control measure must be administered (where practicable) commensurate to the level of risk:

- Schedule tasks undercover or in internal environments instead of outdoors where practicable;
- Use plant or other equipment to reduce manual tasks (i.e. crane or forklift to lift heavy objects, earthmoving plant for digging) or organise work to minimise physical body stressors;

- Schedule heavy or strenuous work for cooler times of the day (where possible);
- Modify tasks and work rates to make the work easier and reduce physical exertion;
- Ensure Workers are not working alone in high thermal risk environments (where possible);
- If Workers must work alone, monitor them and make sure that they can easily access help;
- Provide suitable PPE such as broad brim for helmet with neck flap, water jugs / bottles, camel backs, sunscreen electrolytes or ice vests (where practicable);
- Encourage Workers to pace themselves, look out for each other's wellbeing, maintain hydration with adequate potable water, minimise diuretic consumption, modify work intensity and take regular breaks;
- Ensure Workers take proactive action when feeling weak, tired and confused, have a rapid pulse, hot dry red skin, sweating stops or have other identifiable symptoms of thermal stress;
- Ensure Workers are acclimatised when transitioning from cooler climates;
- Work with other people in a buddy system and change out Workers where practicable;
- Ensure Workers maintain higher fluid intakes and start the work day fit for work and hydrated;
- Exposure to direct sun and working in confined or restricted spaces with limited airflow to cooler times of day;
- Ensure a minimum of 250ml every 30 minutes when working in hot environments.
- Where the work causes excessive sweating, essential mineral may be lost. The intake of 1 litre of electrolytes for every 5 litres of water is recommended;
- Ensure Workers monitor their urine colour to specific gravity charts and encourage self-testing (where available); and
- Ensure emergency arrangements, first aid treatment with medical supplies are available and adequately stocked.

## **18 HAZARDOUS SUBSTANCES AND DANGEROUS GOODS (EX. ASBESTOS)**

### **18.1 Training, Competency and Awareness**

18.1.1 - Information, training and instruction must be provided to Workers using, handling, storing, maintaining, repairing, decommissioning or generating a hazardous substance in accordance with the product safety data sheet (SDS). The information, training and instruction provided must include (but is not limited to):

- The nature of the hazardous chemicals involved and the risks to the Worker;
- Selection of adequate control measures appropriate to risk and how to use and maintain them correctly;
- Emergency arrangements including evacuation procedures and first aid instructions and application;
- Selection, use, maintenance and storage of any PPE required and the limitations of the PPE;
- Health monitoring for specified hazardous substances in accordance with regulatory requirements;
- Labelling of containers of hazardous chemicals, the information label provides and those requirements;
- SDSs for all hazardous chemicals, how to access the SDS's and information they provide;
- Work practices in the use, handling, processing, storage, transportation, cleaning up and disposal of hazardous chemicals.

18.1.2 – The risks associated with hazardous substances and dangerous goods must be assessed to determine the necessary preventative and mitigative control measures. The risk assessment must include (but not limited to):

- The nature of the work being carried out in conjunction with the hazardous substance or dangerous good;
- The toxicity, route of entry (ingestion, inhalation, absorption), health effects and other hazardous properties;
- Whether the substance is a carcinogen (causes cancer), mutagen (causes mutations) or teratogen (affects unborn embryos) in accordance with the [International Agency for Research on Cancer \(IARC\)](#);
- The size, location, access / egress and storage facilities at the workplace;
- The number of Workers and other persons at the workplace who may be impacted;
- The compatibility of the hazardous substances or mixtures at the workplace,
- Any potentially hazardous reaction (chemical or physical) between the hazardous chemical and another; substance or mixture, including a substance that may be generated by the reaction;
- Fires, explosions ignition sources and compatibility of emergency equipment currently in the workplace;

- The fire load (volume and distribution) of hazardous substances impacted by a potential ignition source; and
- The health and safety requirements specified in the manufacturer SDS.

18.1.3 - Where pesticides, including herbicides, insecticides, rodenticides, fungicides, molluscides and algaecides are applied, only licenced operators under the Health Act 1911 and Health (Pesticides) Regulations 2011 are to apply the pesticides.

## **18.2 Personal Protective Equipment**

18.2.1 - Where elimination, substitution, isolation and engineering controls cannot provide effective protection to a Worker from exposure (inhalation, absorption, ingestion, injection) to a hazardous substance, personal protective equipment (PPE) must be provided in conjunction with other high order controls where possible to protect Worker exposure. PPE used by Workers must:

- Be suitable for the nature of work and the risks associated with the hazardous substance;
- Be maintained, repaired or replaced when faulty, clean, hygienic and in good working condition;
- Ensure the correct PPE is worn as specified in the manufacturer safety data sheet (SDS); and
- Have adequate information, training and instruction in the use of the PPE.

18.2.2 - Where a chemical has been classed as a hazardous substance in accordance with the regulatory requirements, the PPE must meet Australian Standard specifications, which includes but is not limited to the following standards:

- AS/NZS 1715 Selection, Use and Maintenance of Respiratory Protective Equipment;
- AS/NZS 1716 Respiratory Protective Devices;
- AS/NZS 1336 Eye and Face Protection Guidelines;
- AS/NZS 1337.0 Personal Eye Protection Eye and Face Protection – Vocabulary;
- AS/NZS 1337.1 Personal Eye Protection - Eye and Face Protectors for Occupational Applications;
- AS/NZS 1337.6 Personal Eye Protection - Prescription Eye Protectors against Low and Medium Impact;
- AS/NZS 2161.1 Occupational Protective Gloves - Selection, Use and Maintenance;
- AS/NZS 2161.2 Occupational Protective Gloves - General Requirements;
- AS/NZS 2161.10.1 Occupational Protective Gloves - Resistance to Permeation by Chemicals;
- AS/NZS 2210 - Series Occupational Protective Footwear;
- AS/NZS 4501.2 Occupational Protective Clothing - General Requirements;
- AS 3765.1 Clothing to Protect Skin Against Toxic or Volatile Chemicals; and
- AS/NZS 4501.1 Occupational Protective Clothing Guidelines on the Selection, Use, Care and Maintenance.

18.2.3 - Where safety showers and eyewash stations are installed in premises they must meet the requirement of AS 4775 Emergency Eye Wash and Shower Equipment. Where safety showers and eyewash stations are not practicable, an alternative first aid treatment measure must be put in place (i.e. saline solution eyewash bottle) in the event of contact.

## **18.3 Storage, Handling and Use**

18.3.1 – Safety Data Sheets (SDS) must be readily available and accessible to Workers involved in using, handling or storing the hazardous substances and emergency service Workers, or anyone else who is likely to be exposed to the hazardous substance. SDS's must be kept in a location near the work area where the substance is used which must be in hard copy, or where this is not practicable, electronically.

18.3.2 - A manifest must be available for emergency response personnel compliant with the Guidance Note for Emergency Services Manifests [NOHSC 2010 (1990)]. Placarding must meet the requirements of the Guidance Note for Placarding Stores for Dangerous Goods and Specified Hazardous Substances [NOHSC 3009(1990)].

18.3.3 - Storage of hazardous substances and dangerous goods must comply with the following regulations and standards:

- Explosives and Dangerous Goods (Dangerous Goods Handling and Storage) Regulations 1992 (WA);
- Dangerous Goods Safety (Storage & Handling of Non-explosives) Regulations 2007;

- AS 1216 Class Labels of Dangerous Goods;
- AS 1940 The Storage and Handling of Flammable and Combustible Liquids;
- AS 2187 Explosives – Storage, Transport and Use;
- ASCC - National Code of Practice for the Labelling of Workplace Substances - NOHSC:2012 (1994); and
- AS 3833 Storage & Handling of Mixed Classes of Dangerous Goods - Packages and Intermediate Bulk Containers

18.3.4 – Where segregation is required for incompatible mixed classes of hazardous substances and dangerous goods, all items must be segregated in accordance with regulatory requirements and Australian Standards. Where items have historical pictograms and pictograms under the globally harmonised system (GHS) for the classification of hazardous substances and dangerous goods, comparison charts must be used with placards at storage locations to achieve segregation.

18.3.5 - Inventory inspections of hazardous substances and dangerous goods must be completed for each storage facility and location to ensure compliance with regulatory requirements, which includes:

- The presence or absence of SDSs and their currency (within 5 years);
- Storage, segregation, labelling, signage (pictogram, no ignition source / no flames), and quantities;
- Bunding for minor, intermediate and bulk facilities (where applicable);
- Fire extinguisher suitability, inspection compliance and condition;
- First aid kit and condition of contents; and
- PPE availability applicable to the manufacturer requirements (SDS).

18.3.6 - In association with the [Volatile Substance Code of Conduct](#) from the [Mental Health Commission of WA](#), where volatile substances are used in the performance of work under the Contract, the Contractor must implement the following control measure to prevent theft and subsequent substance misuse by members of the public, which includes:

- a) Seeking alternative chemicals, which perform the same function, which are not volatile substances;
- b) The disposal of volatile substances in accordance with regulatory requirements and disposal methods detailed in the product Safety Data Sheet (SDS)
- c) Ensure security arrangement are in place to prevent unauthorised access to site by members of public where volatile substances are stored;
- d) The transportation of volatile substances, where applicable, are suitably restrained in accordance with the National Transport Commission: Load Restraint Guide for Light Vehicles and Load Restraint Guide; and
- e) Where transportation of volatile substances is by way of heavy vehicle transportation, ensure the Heavy Vehicle Chain of Responsibility (HVCOR) meets the requirements of the Road Traffic (Vehicles) Act (2012), Road Traffic (Vehicles) Regulations (2014).

## **18.4 Safe Storage, Handling and Use of Compressed Gas, Oxygen and Acetylene Cylinders**

18.4.1 - Compressed gases, fuel gases, oxygen and welding materials must be stored, handled and used in accordance with the following Australian Standards:

- AS 4289 Oxygen and acetylene gas reticulation systems;
- AS 4332 The storage and handling of gases in cylinders;
- AS 4326 The storage and handling of oxidising agents;
- AS 4603 Flash back arresters – safety devices for use with fuel gases and oxygen or compressed air;
- AS 4839 The safe use of portable and mobile oxy-fuel gas systems for welding, cutting and heating;
- AS 1674.1 Safety in welding and allied processes - Fire Precautions; and
- AS 1674.2 Safety in welding and allied processes—Electrical.

18.4.2 - Where oxygen / acetylene cylinders are used specific safe work practices in the use, storage and handling must be applied, which includes, (but is not limited to):

- Copper hose connections or fittings are not to be used with acetylene gas and steel hose connections or fittings are not to be used with oxygen gas and all fittings are to be free from oil;

- Oxy acetylene carts must be maintained in accordance with table 1 in AS 4839;
- Oxygen and acetylene should be separated by 3 m unless they are on an oxy-acetylene cart;
- Empty and full cylinders must be segregated with each area labelled. Gas cylinders must not be stored where they may be impacted by vehicles;
- The cylinders, maximum of one each oxygen and fuel, should rest fully and securely on the base of the trolley;
- Acetylene cylinders must remain upright at all times. Restraint with, e.g. a chain or strap, should be provided;
- All gas hoses and cylinders used for hot work must be fitted with flashback arrestors at the cylinder and handpiece. All hoses must be easily distinguished and not interchangeable;
- Cylinder trolleys should be designed and built with due regard to stability in operation;
- The maximum size of cylinder allowed by the design should be stated on a permanent label on the trolley;
- Caution on cylinder position as cylinders sustain damage when exposed to hot slag, sparks and falling objects;
- Precautions must be taken to ensure that no electric current, (i.e. electric welding processes can impinging cylinders);
- Cylinders that are heat-damaged must not be used. Such cylinders must be removed from the work area marked 'heat damaged', quarantined and referred to the gas supplier;
- Oxygen connections must be kept free of oil and grease to prevent spontaneous explosions and fires that may occur when oxygen contacts oil or grease under pressure;
- Oxygen must not be used in place of compressed air or as a source of pressure;
- Oxygen cylinders must be separated from fuel-gas cylinders (such as acetylene, propane, and propylene) by at least 20 feet or by a metal wall at least 5 feet high, at least ¼ inch thick, and as wide as the storage rack; and
- Acetylene hose pressures must be limited to 15 psig to reduce the possibility of an explosion. Acetylene is extremely unstable at pressures above 15 psig.

18.4.3 - Where compressed gas cylinders are used specific safe work practices in the use, storage and handling must be applied, which includes, (but is not limited to):

- Compressed gas cylinders must be transported in approved, corrosion-resistant racks;
- The valve protector cap must be secure before removing the cylinders;
- Regulators must be removed when transporting cylinders in utilities or trucks;
- Cylinder valves must not protrude above the height of the vehicle being used to transport them;
- A purpose built cradle must be used for the lifting of gas cylinders. Lifting by sling wrapping is not permitted;
- A hand trolley must be used to move cylinders to prevent sliding or dragging and securely fastened to the trolley;
- Cylinders must be stored in shaded and/or protected areas with protector caps in place when not in use;
- Compressed gas cylinders must be stored & segregated in accordance with the applicable Australian Standard;
- Compressed gas cylinders must not be placed where they could become a part of an electrical circuit;
- Cylinders must not be exposed to an open flame or high temperatures;
- Cylinders must not be stored or placed in an area where mobile plant in operation or parked up areas;
- Compressed gas cylinders must not be used as rollers or supports, or for any purpose other than to contain gas;
- Cylinders must be secured upright with a non-flammable device to prevent them from being knocked over or damaged. Rope must not be used to secure cylinders.
- Cylinders must be secured and protected from impact, including falling objects, while in use;
- Cylinder valve must be kept closed except when the cylinder is in active use;
- Compressed gas must not be used for cleaning due to risk of injury to eyes or body or risk of fire hazard;
- Cylinders that have been defaced, are missing identifying markings (labels, decals, tags) or have expired hydrostatic test dates must be taken out of service and returned to vendor;
- Regulators, gauges, and hoses must be compatible with the particular gas or group of gases for which they are used;
- Use properly fitted and recommended wrenches with cylinder valve accessories. and
- Flashback arrestors must be installed at the discharge point of the regulators and at the torch.

## 19 ELECTRICAL WORK

## 19.1 Training, Competency and Awareness

19.1.1 – All electrical work, which is installed, maintained and tested, must be conducted by an electrical Worker who is trained and deemed competent to perform their duties, which includes:

- Licenced Electrician (trade qualification) in accordance with Part 3 of the Electrical (Licensing) Regulations 1991;
- Meets all other training and licencing requirements specified in the Electrical (Licensing) Regulations 1991; and
- Works in accordance with Code of Practice for Persons Working On or Near Energised Electrical Installations.

19.1.2 - Where supervision is required for electrical Workers (i.e. apprentice) the supervision must be in accordance with Part 5 of the Electrical (Licensing) Regulations 1991 and the following Code of Practice and Guidelines:

- Code of Practice for Persons Working On or Near Energised Electrical Installations;
- Safe Working Guidelines and Effective Supervision of Electrical Apprentices; and
- Safe Working Guidelines for Electrical Workers.

19.1.3 - All work conducted by licenced electricians or Workers under supervision must be done in accordance with the relevant Standards (ISO, AS, AS/NZS) and regulatory requirements, which includes:

- Electricity Industry Action 2004;
- Electricity Act 1945;
- Electricity Regulations 1947; and
- Electrical (Licensing) Regulations 1991.

19.1.4 – Where the work involves an electrical installation, during the planning stage the work must meet safe design principals in accordance with regulatory requirements. A safe design report for electrical installations must be provided in accordance with Regulation 49A of the Electricity (Licensing) Regulations (1991) for specific electrical installations and installed in accordance with AS 3000 Electrical Installations (Wiring Rules).

19.1.5 - Electrical records, diagrams and documentation must be retained compliant with Australian Standard and statutory requirements. Plans must be maintained showing the location of cabling, fixtures, equipment, main switches and buried electrical services. All modifications to as-designed electrical drawings must be submitted to the project manager / superintendent or delegated person with records of any modifications or design changes from the original design.

19.1.6 - Where there is a risk to Workers from electrical work, the risks associated with the work must be considered which includes (but not be limited to):

- Electrical sources and the voltage levels associated with those sources;
- The type of installation or maintenance to be conducted;
- Sources of electrocution, electric shock and arc flash;
- The type of plant, equipment and machinery being used;
- Live electrical sources and the requirements for isolation and testing for dead;
- Work above and below ground (refer Above Ground Services and Below Ground Services);
- Work in or near pits, ladders, scaffolding structures and work in confined spaces (volatile atmosphere);
- Inclement weather (rain), fire and explosion; and
- Any other hazard, which may cause a risk to the safety or health of Workers from electrical sources.

19.6.7 – In accordance with regulatory requirements a task specific SWMS must be in place for the electrical work conducted by electrical Workers and safe work procedures to the type of electrical work being conducted. The SWMS must be read, understood and signed onto by all Workers involved in the electrical work.

## 19.2 Electrical Protection and Inspection



19.2.1 – Electrical sources (portable and non-portable) which supply electricity must be protected by a type 1 or 2 residual current devices (RCD's) in accordance with regulatory requirements. RCD's must be installed, maintained and tested by a trained and competent Worker in accordance with AS/NZS Electrical Installations (Australian/New Zealand Wiring Rules) and AS/NZS 3190 Approval and Test Specification – Residual Current Devices (current-operated earth-leakage devices).

19.2.2 - RCD's and electrical installations must have an inspection and testing regime in place to ensure the integrity and function in accordance with AS/NZS 3760 In-Service Safety Inspection and Testing of Electrical Equipment and AS/NZS 3190 Approval and Test Specification – Residual Current Devices (current-operated earth-leakage devices).

19.2.3 – In addition to scheduled and periodic testing, electrical equipment must be tested when (but not limited to):

- After any repair or servicing that could affect the electrical equipment;
- Before first use and where it is purchased second hand; and
- Detailed on an electrical inspection tag, which is durable, water resistant, self-adhesive and well secured.

The inspections and testing of electrical equipment, installations and electrical sources must include (but not limited to):

- Looking for obvious damage, defects or modifications to the equipment, accessories connectors, plugs or cords;
- Discolouration which indicates exposure to excessive heat, chemicals or moisture;
- Integrity of the protective earth and insulation resistance;
- Cords sufficiently anchored to equipment, plugs, connectors and cord extension sockets and damage free;
- Operating controls are in good condition (secure, aligned and appropriately identified)
- Coverings and guards are secure and working as intended by the manufacturer;
- Ventilation inlets and exhausts are not obstructed; and
- The current rating of the plug matches the current rating of the electrical equipment.

19.2.4 – Records must be retained to document the date electrical equipment was placed into service and include:

- The date of purchase and that the equipment is 'new to service';
- The date of entry into service;
- The date when the first electrical safety test is due, and
- Whether the equipment has not been tested.

19.2.5 - Where faults are identified with any component of an electrical installation it must be tagged out of service (with appropriate tag) until repaired and re-testing has been completed by a trained and competent Worker.

### **19.3 Isolation and Lockout of Electrical Sources**

19.3.1 - All electrical equipment or circuits must remain de-energised and effectively isolated from all relevant sources of electricity supply. The isolation and lockout of electrical equipment and circuits must include (but not limited to):

- Isolation points which are fitted, accessible and suitable to the type of isolation (switching) being conducted;
- The necessary hardware for the isolation point and the hardware to effect the isolation;
- An isolation procedure which Workers must be readily accessible to all electrical Workers;
- Electrical Workers trained and deemed competent to perform isolations; and
- Supervision and safe work procedures for effective and safe isolation.

19.3.2 - Safe isolation systems must be in place with the use of lock and tag systems. When performing an isolation safe isolation procedures must include (but is not limited to):

- Treat each exposed part as energised until it is isolated and determined not to be energised;
- Ensure each high-voltage exposed part is earthed after being de-energised;
- The correct point of isolation is identified;
- An appropriate means of isolation is used;

- The supply cannot be inadvertently re-energised while the work is carried out;
- A tagging systems at the point(s) of isolation to provide general information on the isolation; and
- The isolation is secure by locking off and tagging the electrical source.

19.3.3 – The isolation point must be fitted with control mechanisms that prevent electrical equipment from being inadvertently re-energised, which includes a deliberate action to engage and disengage the device. It must be able to withstand conditions that could lead to the isolation failing (i.e. vibration) which may include switches with built in locks, lock outs for switches, circuit breakers, fuses and safety lock out jaws (hasps). All circuit breakers, switches and combined fuse switch units must be locked off to secure the isolation (where practicable). Alternative controls may include additional components (i.e. clip screw, bolt or pin) which can be inserted to prevent the switch from being operated which must be used in conjunction with additional control measures of danger tags and a permit system.

19.3.4 – Where more than one person is working on the same de-energised electrical source Workers must ensure their own person lock is applied to the isolation point (scissor clip). No Worker must operate an isolator or knowingly use equipment where the isolator has a control mechanism attached. Where isolation points are accessible to other persons, the isolation method or system must not be inadvertently compromised.

19.3.5 – A tag by itself does is not an acceptable method of isolation. An isolation must have suitable warning or safety signs and locks secure for the duration of the isolation. The danger tab must be durable and securely fixed to the isolator and clearly state the warning about the specific hazard associated to the isolation (i.e. multiple point supply). The isolation procedure must provide information on the purpose of the danger tag, which includes (but is not limited to):

- The electrical equipment is isolated or out of service;
- The electricity supply must not be switched back (only by the person who performed the isolation); and
- Switching on or reconnecting electricity may endanger the life of the electrical Worker(s).

## 19.4 Verification of Zero Energy

19.4.1 – Prior to any form of interaction (i.e. maintenance, replacement) with an electrical source, a verification of zero energy (test for dead) must be conducted by a trained and competent Worker in accordance with Section 8 of AS/NZS 3000 Electrical Installations (Australian/New Zealand Wiring Rules). Verification of zero energy in the isolation process must include (but is not limited to):

- Treating all potential sources of energy as energised until it is isolated and tested for dead (even if the electrical supply is assumed to be isolation it must be assumed as live until zero energy is confirmed);
- Voltage testers must be tested to ensure correct operation and function;
- If there are any exposed conductors in the immediate work area they should be separated by design or segregated with insulated barriers (shrouding or insulated material) to prevent inadvertent or direct contact;
- Testing for 'dead' must be undertaken each time before electrical work is carried out;
- The electrical Worker carrying out the testing must understand testing procedures;
- The testing method, including the tester used, must be safe and effective; and
- Each high voltage exposed part is earthed after being de-energised.

19.4.2 – Where work is carried out in a cable the cable must be de-energised with the isolation point secured by the tag out and lock out system. Cable must be treated as energised with the procedures for working on energised electrical equipment applied. If cable connections are exposed the connections and attached live parts must be verified as containing zero energy (test for dead) Additional precautions must be taken to ensure insulated or covered cables are de-energised, whether the cables are low voltage, high voltage or control cables.

Note: The action of cutting a multi-core control cable is likely to create a risk if secondary current from a current transformer is present.

19.4.3 - Where power is to be restored after work on an isolated electrical source, equipment precautions must be taken to ensure the health and safety of the end user, which includes (but is not limited to):

- Take precautions as appropriate to ensure that other electrical equipment is not inadvertently energised;
- Carrying out appropriate testing on any new, altered or repaired electrical equipment (i.e. tests for insulation resistance, earth continuity, polarity, correct connection) and functional testing;
- Removal of any safeguards, including temporary bonds and short-circuiting devices;
- Follow procedures to remove any locks or other control mechanisms, tags, notices and safety signs;
- Carry out a visual inspection to ensure that all tools, surplus material and waste have been removed; and
- Notify Workers working on the equipment and others affected that electricity is restored.

19.4.4 - In accordance with AS/NZS 3017 Electrical Installations – Verification Guidelines, when electricity is restored, tests must be carried out to confirm that correct polarity, actives are switched on and where applicable phase sequences are correct before electrical equipment is used.

## **19.5 Non-conductive Tools, Equipment and Test Instruments**

19.5.1 - All non-conductive insulated tools and equipment must have special design characteristics suitable for the task and well maintained. Poorly maintained electrical tooling can lead to serious electrical risks to Workers. Non-conductive insulated tools must be in good working order, including regular maintenance, inspection and testing. Where any faults or defects have been identified, they must not be used. Maintenance and inspection should be carried out according to manufacturer instructions.

19.5.2 - When working near exposed energised parts or working energised, only non-conductive or insulated tools and equipment are to be used. Tools must be restrained so they do not fall into energised switchboards and compromise the integrity and safety of equipment. Lanyards around wrists, tool holders, and restraints such as tool pouches and baskets must be used where practicable.

19.5.3 – All Workers who carry out electrical testing must be appropriately trained and deemed competent in test procedures and in the use of testing instruments and equipment, which includes (but is not limited to):

- Using the device safely and in the manner for which it was intended;
- Determine, by inspection, that the device is safe for use, not damaged and fit for purpose;
- Understand the use, limitations and function of the equipment;
- Understand the electrical safety implications for others when the device is being used; and
- Understanding of electrical safety requirements when an inconclusive or incorrect result is obtained.

19.5.4 - Test instruments that are to be used or connected to electrical equipment must meet the following requirements:

- Be suitable for the work being undertaken used in accordance with their function, operating range and accuracy;
- Be in good condition and working order, clean and have no cracked or broken insulation, with particular attention to the condition of insulation on leads, probes and clips of the test equipment;
- Test equipment must not pose a danger of electrocution or damage to electrical equipment when testing;
- Must have insulated leads and connection probes that enable connection or contact with energised parts to be made with minimal risk to the electrical Worker, and
- Provide suitable protection against hazards arising from over-voltages that may arise from or during the testing or measurement process.

19.5.5 - The classification for instruments based on their immunity to over-voltage which may be experienced in different parts of electrical equipment, must be compliant with AS 61010.1 Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use – General Requirements. Instruments should be rated as category III or IV to enable their use on all parts of the equipment.

## 19.6 Electrical Personal Protective Equipment and Signage

19.6.1 – Where electrical work is being conducted personal protective equipment (PPE) must be used by Workers for protection against electrical sources. PPE for electrical work including testing and fault finding must be selected to minimise risks to Workers and maintained, repaired or replaced where required and used (or worn) by Workers. The PPE must be able to withstand the energy at the point of work when energised. The use and type of PPE includes (but is not limited to):

- Suitable arc rated face protection (i.e. full face shield) where there is of high current and arcing;
- Use of insulated gloves to the highest potential voltage expected for the work. Leather work gloves may be considered for de-energised electrical work;
- Use non-synthetic clothing, flame resistant clothing of non-fusible material. Clothing made from conductive material or containing metal threads should not be worn;
- Non-conductive footwear, (i.e. steel toe cap boots or shoes) manufactured to a suitable standard;
- Safety belts and harnesses should be checked and inspected each time before use with particular attention being paid to buckles, rings, hooks, clips and webbing; and
- Metal spectacle frames for eye protection should not be worn.

19.6.2 - Where signage is required for electrical work the signage must comply with AS 1319 Safety Signs in the Occupational Environment and where referenced in Australian Standards referenced within this section.

## 19.7 Live Electrical Work

Since 2014, live electrical work has been prohibited by WorkSafe, unless special exemption has been obtained. Electrical work on energised equipment or in close proximity to energised equipment is prohibited unless that work has been approved by the issue of an Electrical Energised Live Work Permit in accordance with AS/NZS 4836 Safe working on or Near Low-Voltage Electrical Installations and Equipment and the Code of Practice for Persons Working on or Near Energised Electrical Installations by Energy Safety.

## 20 PILING RIG OPERATION

### 20.1 Training, Competency and Awareness

20.1.1 - Where a Worker are required to operate a Piling rig, the Worker must be trained and deemed competent to operate the specific type of piling rig intended for use, which includes:

- The nationally recognised qualification (Conduct Pile Driving Operations) by a registered training organisation;
- The relevant qualification from a registered Worksafe HRWL assessor (specific class criteria);
- Hold the relevant HRWL for the Crane, where a Crane is intended for piling foundation work; and
- A verification of competency (VOC) assessment.

20.1.2 - During the planning stage, [safe design principles](#) must be applied in accordance with [regulatory requirements](#) for any excavation greater than 1.5 meters in depth which must be documented in the Safe Design Plan. Geotechnical investigations must be completed by a trained and competent person (geotechnical engineer) and documented in the Safe Design Plan.

20.1.3 - In addition to the safe design requirements in the planning stage, the hazards associated with piling rig operation must be risk assessed. Where applicable to the site location, the following hazards must assessed, which includes (but is not limited to):

- The handling, transportation, erection (assembly and dismantling) of the piling rig and foundation equipment;
- Entanglement with the rotating parts of the piling rig;
- Falling loads due to inappropriate use and selection of lifting gear;
- Underground utilities and services such as gas, water, sewerage, telecommunications, electricity and chemicals;
- Overhead obstructions (i.e. vegetation, bridges, structures, light posts) or overhead electrical utilities;

- Falling from one level to another (i.e. platform edges/slopes) and falling objects (drill mast and mast components);
- Falling into pile holes and excavations during hole inspections;
- Cave in of side wall and the piling rig falling or tipping from a level position;
- The instability of adjoining structures caused by piling rig vibration or the any existing holes;
- Interaction with other trades in the vicinity and static and dynamic loads near excavations or existing holes;
- Management of surrounding vehicle traffic and ground vibration;
- Previous disturbance of the ground including previous piling or excavation work;
- Hazardous chemicals, which may be present in the soil where piling work is to be carried out;
- Traffic management, access / egress, exclusion zones, access control and barricading; and
- Mobile plant and equipment used to perform the for the work.

20.1.4 - In conjunction with the Safe Design Report for any proposed piling work, the safe design assessment must identify any unexploded ordnates (UXO). Where UXO has been identified, remediation must be conducted prior to any piling work. The Department of Fire and Emergency Services (DFES) provides specific information on the management and control of UXO in conjunction with the Department of Defence, of which all regulatory and compliance requirements must be followed. Further information can be sourced from DFES: [DFES – Unexploded Ordicates \(UXO\)](#).

20.1.5 - The design requirements of the working platform (piling rig) must be based on a geotechnical site investigation to prevent instability and collapse of the piling rig while tramming and during drilling/boring operation. The geotechnical information must meet the geotechnical design requirements of AS 2159 Piling – Design and Installation to determine the design of the working platform. Once the design requirements of the working platform have been established a working platform certificate must be authorised by the Contractor prior to commencing any piling rig operation.

## **20.2 Inspection and Mechanical Integrity of Piling Rig**

20.2.1 - All Piling Rigs must have a preventative maintenance program in place in accordance with manufacturer requirements, which includes (but is not limited to):

- Maintenance in accordance with manufacturer OEM design specifications;
- In accordance with regulatory requirements (where applicable);
- Parts and components replace identical or equivalent to the original parts and components;
- Be in a safe and secure location, fundamentally stable, isolated and “tested for dead” prior to any maintenance work;
- Be maintained by a trained and competent Worker (fitter); and
- Where Cranes are used for piling foundation work, the Crane must meet the preventative maintenance and inspection requirements of AS2550.1 Cranes, Hoists and Winches - Safe Use and General Requirements.

20.2.2 - In addition to 20.2.1, inspections must carried out at a frequency as stated in the manufacturers OEM to ensure the piling rig is kept in safe operating condition. The inspections must meet the requirements of the Piling Work and Foundation Engineering Sites Industry Standards (2014) which includes:

- Routine inspections;
- Annual inspections (can be incorporated into routine maintenance inspection);
- Major inspections (including non-destructive testing);
- Non-destructive testing on critical components within a 12 month period of initial purchase (i.e. welds);
- There must be records of all inspections available for review; and
- Where a Crane is used for piling foundation work, the mechanical integrity and inspection requirements of the Crane must meet the requirements of Section 15 – Cranes and Lifting Operations.

20.2.3 - Where any repairs are done which includes welding, the welding must be conducted by a trained and competent Worker (boilermaker) and meet the structural welding requirements of AS/NZS 1554 Structural Steel Welding. Repairs involving welding on load bearing components must be recorded in service logbooks and detailed in the piling rigs maintenance records.

## 20.3 Pre-operational Requirements

20.3.1 - Specific documentation must be available prior to site mobilisation and operation, which must be stored with the Piling Rig, which includes:

- Piling Rig History: Service and maintenance history within three years must be available;
- Log Book: Plant logbooks must be available and with the machinery / operator;
- Pre-start: Daily pre-start must be completed on each item of plant for each item of plant when in use;
- Manual: The manufacturer OEM manual for the Piling Rig;
- Risk Assessment: There must be a plant risk assessment for the specific Piling Rig to be operated; and
- Where a Crane is used as a Piling Rig, the pre-operational requirements for clause 15.4.1 must be applied.

20.3.2 - Piling Rigs must be in a good general condition which meets the requirements of relevant Australian Standards and Section 11.2 - Mobile Plant Operation (where applicable to Piling Rigs) and where Cranes are used with piling foundation attachments, the general condition requirements must be applied collectively.

20.3.3 - All Piling Rigs must have a pre-operational (pre-start) inspection completed prior to the commencement of each work shift including a functional test, which includes, (but is not limited to):

- Mechanical and electrical components including boom/mast, mast positioning, cylinders and wire rope;
- Structural components of the hoist, pile hammer, clamps, rigging and drive head;
- Function of the brakes, tracks, baskets and outriggers;
- Structures (including hooks, hook-blocks and rails) and load limiting devices;
- Safety devices and limit switches; and
- Control systems required for individual equipment i.e. independent fail-safe braking systems, a device to stop the crane such as a 'dead-man' switch, and emergency shut-off switch.

20.3.4 - Prior to maintenance or inspections, Piling Rigs must be isolated in accordance with a documented isolation procedure to ensure all energy sources are isolated and "tested for dead" prior to any maintenance or inspection (excl. functional testing during pre-start and maintenance). Isolation procedures must meet the requirements of Section 19 - Electrical Work (where applicable) in this document.

20.3.5 - Where piling rigs are assembled and disassembled on site safe, work practices must be in effect which includes (but is not limited to):

- Assembled and disassembled by competent Workers in accordance with manufacturer instructions;
- Assembled and disassembled in accordance with a site and task specific SWMS;
- Is supervised of a supervisor who is trained and competent in piling rig operation, assembly and disassembly;
- Have established exclusion zones in place around the footprint of the working platform of the rig, which is based on the geotechnical design of the load bearing pressure on the surface the working platform will be working on;

## 20.4 Exclusion Zones and Access Control

20.4.1 - An assessment must be completed prior to any piling rig operation to identify the potential drop zone (spread and fall) to establish the exclusion zone for piling rig operation. The drop zone assessment must include assessment of:

- The piling rig mast and mountings which may become dropped objects (i.e. bolts, pins, steel cables, pulleys);
- Ground conditions of the working platform through geotechnical design (including edges, slopes, cave in)
- The movement of the tramping piling rig to different locations within the work zone; and
- Any other factor identified in the risk assessment during the planning phase.

20.4.2 - Access to piling rig operation must be strictly controlled to prevent unauthorised access from members of the public and Workers who do not form part of the piling rig work. Where practical, access must be controlled by application of the following Australian Standards, which includes (but is not limited to):

- AS 1319 Safety Signs in the Occupational Environment;
- AS 1725 Chain-link Fabric Security Fences and Gates;
- AS 1742.2 Traffic Control Devices for General Use; and
- AS 1742.3 Traffic Control Devices for Works on Roads.

20.4.3 - The person who has overall responsibility of the piling rig operation within a demarcated exclusion zones must ensure:

- Only trained and competent Workers under supervision can work inside the demarcated exclusion zone;
- During each shift or break the exclusion zone must be inspected for integrity;
- The exclusion zone is monitored during critical activities (inserting casing, rig tramming);
- All Workers within the exclusion zone must understand the protocols for establishing and maintaining the exclusion zone, protocols for breaches of the exclusion zone; and
- Where the integrity of the exclusion zone is compromised or deemed ineffective, the exclusion zone must be corrected before recommencement of piling operation.

20.4.4 - Communication protocols must be established for Piling Rig operations, which includes, (but is not limited to):

- Workers must trained and competent in established positive two way communication protocols (i.e. radio two way & hand signals) with a back-up communication method where the primary communication method fails;
- All Workers involved in the daily piling rig operation must be present at the daily pre-start meetings to ensure daily activities are understood including any authorised changes;
- A stop task protocol where positive two-way communication is not established when a load is suspended. The stop task protocol must be put into effect under the direction of the person who has overall responsibility.
- Where an exclusion zone is breached by a member of public or a Worker not involved in the lifting task, the stop task protocol must be put into effect under the direction of the person who has overall responsibility;
- Where external impacts may impact the lifting task, such as other work activities which may compromise the exclusion zone, a stand down procedure (temporary suspension of task) must be put into effect to manage these impacts before work can recommence; and
- An emergency mayday protocol for potential emergencies as part of the Rescue / Emergency Management Plan.

## **20.5 Safe Work Practices**

20.5.1 - Safe work practices must be established for the operation of piling rigs which includes (but is not limited to):

- The assembly, disassembly and operation of the piling rig is to be completed in accordance with a SWMS;
- Pile hole shafts are guarded to prevent Workers falling and properly backfilled when empty/unused;
- The piling rig operation is under the supervision and where required a spotter for safe movement while tramming;
- Platform edges must be clearly marked and delineated for the same movement of the piling rig;
- When the piling rig is in drill mode, the operator must not leave the controls while the drill head is turning;

20.5.2 - The working platform must be maintained, modified and repaired to ensure the safe operation of the piling rig and from hazards which can be generated from the working platform, which includes (but is not limited to):

- The working platform must have adequate drainage including the management of water and slurry build up on the working platform, which can cause trip hazards, uneven or unstable ground.
- Slurry transfer to work equipment, which increases the risk of slips on steps as well as difficult handling of work tools.
- Any excavations made in the working platform which have the potential to cause soft spots must be reinstated to the design standard, including any reinforcement and separation; and
- The working platform must be regularly inspected by a competent person throughout its design life and after any reinstatement or any works where modification has occurred which must be documented in an inspection log book;
- Where applicable, ramp access must be in straight lines between working areas at a sufficient gradient to allow for safe movement of plant. Directional change cannot be made on incline ramps, only on a flat surface.

## REFERENCES AND RELATED DOCUMENTS

<b>Acts and Regulations</b>
Work Health and Safety Act 2020
Work Health and Safety Regulations 2022
Main Roads Act 1930
Rail Safety National Law (WA) Act 2015
Explosives and Dangerous Good Act 1961 (WA)
Dangerous Good Act 2004
Dangerous Goods Safety (Explosives) Regulation 2007
Western Australian Road Traffic Act 1974
Road Traffic Code 2000
Road Traffic (Vehicles) Act 2012
Road Traffic (Vehicles) Regulations 2014
Explosives & Dangerous Goods (Dangerous Good Handling & Storage) Regulations 1992 (WA)
Dangerous Goods Safety (Storage & Handling of Non-explosives) Regulations 2007
Electricity Industry Action 2004
Electricity Act 1947
Electrical (Licensing) Regulations 1991
Explosives Driver's License (Regulation 160)
Health Act 1911
Health (Pesticides) Regulations 2011
<b>Codes of Practice</b>
Code of Practice Traffic Management for Works on Roads - Main Roads WA
Guide to the Preparation of Traffic Management Plans - Main Roads WA
Code of Practice for the Safe Removal of Asbestos 2 <sup>nd</sup> Edition [NOHSC:2002 (2005)]
Code of Practice for the Management and Control of Asbestos in Workplaces [NOHSC:2018(2005)]
Code of Practice for Excavation (2005) WA



Australian Code for the Transport of Dangerous Goods by Road & Rail Edition 7.6 (2018)
Code of Practice for the Management of Blast Generated NOx Gases in Surface Blasting, Ed. 2 (2011)
Code of Practice – Edition 2: Blast Guarding in an Open Cut Mining Environment (2018)
National Code of Practice for Pre-cast, Tilt-up and Concrete Elements
Code of Practice Electrical Safety for Vegetation Control Work Near Live Power Lines (2021)
Utility Providers Code of Practice for Western Australia (2018)
Code of Practice for Persons Working On or Near Energised Electrical Installations
Volatile Substance Code of Conduct - Department of Health (WA)
Piling Work and Foundation Engineering Sites Industry Standards
Main Roads Specifications
Specification 202 - Traffic (Main Roads WA)
Specification 203 – Health and Safety Management
National Occupational Health and Safety Commission
Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres [NOHSC]
National Code of Practice for the Labelling of Workplace Substances [NOHSC]
National Standard for Plant NOHSC 1010
Guidance Note for Emergency Services Manifests [NOHSC]
Guidance Note for Placarding Stores for Dangerous Goods and Specified Hazardous Substances [NOHSC]
Industry or Governing Body
Department of Transport (Marine)
Australian Explosive Industry Safety Group
Society of Automotive Engineers SAE J386 Operator Restraint Systems for Off Road Work
Explosives in Roadworks – User Guide. National Association of Australian State Road Authorities
National Transport Commission - Load Restraint Guide for Light Vehicles
National Transport Commission - Load Restraint Guide
Mental Health Commission of WA
International Standards Organisation
ISO 12117 Earth Moving Machinery Tip-over Protective Structures for Compact Excavators
ISO 12117.2 Earthmoving Machinery for Protective Structures of Excavators
ISO 13850 Safety of Machinery – Emergency Stop Function – Principals for Design
ISO 20381 Mobile Elevated Work Platforms – Symbols for Operator Controls
ISO 6683 Earth-moving Machinery: Seat belts and seat belt anchorages - Performance requirements and tests

ISO 3449 (Earth-moving Machinery Falling-object Protective Structures
ISO 3471 Earthmoving Machinery Roll Over Protective Structures
Australian or New Zealand Standards (AS/NZS) or Australian Standard
AS 2664 Earthmoving machinery - Seat belts and seat belt anchorages
AS/NZS 1891.1 Harnesses and Ancillary Equipment
AS/NZS 1891.2 Horizontal Life Lines and Rail Systems
AS/NZS 1891.3 Fall Arrest Devices
AS/NZS 1891.4 Selection, Use and Maintenance
AS/NZS 5532 Manufacturing Requirements: Single Point Anchor Device used for Harness Based Work at Height
AS 1851 Routine Service of Fire Protection Systems and Equipment
AS1418.10 Cranes, Hoists and Winches – Mobile Elevating Work Platforms
AS:4024.1604 Safety of Machinery Design of Controls, Interlocks and Guarding - Emergency Stop Design
AS/NZS 1576.1 Scaffolding – General Requirements
AS/NZS 1576.2 Scaffolding – Couplers and Accessories
AS/NZS 1576.3 Prefabricated and Tube-and-Coupler Scaffolding
AS/NZS 1576.4 Scaffolding – Suspended Scaffolding
AS/NZS 1576.6 Scaffolding – Metal Tube and Coupler Scaffolding – Compliant with AS/NZS 1576.3
AS/NZS 4576 Guidelines for Scaffolding
AS/NZS 1892.1 Portable Ladders – Metal
AS/NZS 4994:3 Temporary Edge Protection Part 3: Installing and Dismantling for Edges other than Roofs
AS 1892.2 Portable Ladders – Timber
AS/NZS 1892.3 Portable Ladders – Reinforced Plastic
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AS 1657 Fixed Platforms, Walkways, Stairways and Ladders – Design, Construction and Installation
AS/NZS 4994:1 Temporary Edge Protection Part 1: General Requirements
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AS/NZS 4389 Roof Safety Mesh
AS 1170 (series) Structural Design Action – Permanent, Imposed and other Actions
AS/NZS 4994:1 Temporary Edge Protection Part 1: General Requirements
AS 2601 Demolition of Structures
AS 1319 Safety Signs in the Occupational Environment
AS 1725 Chain-link Fabric Security Fences and Gates

AS 1742.1 General Introduction and Index of Signs
AS 1742.2 Traffic Control Devices for General Use
AS 1742.3 Traffic Control Devices for Works on Roads
AS 1742.7 Manual Uniform Traffic Control Devices – Railway Crossings
AS 1348 Road and Traffic Engineering - Glossary of Terms
AS 4292.1 Railway Safety Management – General Requirements
AS/NZS 3012 Electrical installations – Construction and Demolition Sites
AS/NZS 1716 Respiratory Protection Devices
AS 1715 Selection, Use and Maintenance of Respiratory Protection Devices
AS 2685 Confined Spaces
AS/NZS 60079.11 Explosive Atmospheres - Equipment Protection by Intrinsic Safety 'I'
AS/NZS 60079.10.1 Explosive Atmospheres Classification of Areas - Explosive Gas Atmospheres
AS/NZS 61241.10 Electrical Apparatus for Use in the Presence of Combustible Dust – Area Classification
AS/NZS 1020 The Control of Undesirable Static Electricity
AS/NZS 60079.0 Explosive Atmospheres - Part 0: Equipment - General Requirements
AS/NZS 60079.29.1 Explosive Atmospheres - Gas Detectors Performance Requirements
AS/NZS 4641 Electrical Equipment for Detection of Oxygen and Other Gases and Vapours at Toxic Levels
AS 1726 Geotechnical Site Investigations
AS/NZS 4994.1 Temporary Edge Protection Part 1: General Requirements and
AS/NZS 4994.3 Temporary Edge Protection Part 3: Installing and Dismantling for Edges other than Roofs
AS 2187.1 Explosives – Storage, Transport and Use Part 1: Storage
AS 2188 Explosives – Relocatable Magazines for Storage
AS 4326 The Storage and Handling of Oxidising Agents
AS 2187.2 Explosives – Storage and Use
AS 1318 Use of Colour for the Marking of Physical Hazards and Identification of Equipment in Industry
AS 2187.2 Explosives – Storage and Use
AS: 5488 Classification of Subsurface Utility Information Part 1: Subsurface Utility Information
AS 2885.3 Pipelines – Gas and Liquid Petroleum Operation and Maintenance
AS 3850.1 Prefabricated Concrete Elements – General Requirements
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AS 1012 Methods of Testing Concrete Strength Tests - Concrete, Mortar and Grout Specimen
AS/NZS 1170.0 Structural Design Actions – General Principles

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AS/NZS 1170.2 Structural Design Actions – Wind Actions
AS 1111.1 ISO Metric Hexagon Bolts and Screws – Product Grade C – Bolts
AS 1252 High Strength Steel Bolts with Associated Nuts and Washers for Structural Engineering
AS 1554.1 Structural Steel Welding (where welding into final fixing position)
AS:4991 Lifting Devices and Section 8: Inspection of Ropes, Hooks and Lifting Gear in AS:2550.1 (2011)
AS 4991 Lifting Devices Cranes, Hoists and Winches – Safe Use and General Requirements
AS 1111.1 ISO Metric Hexagon Bolts and Screws – Product Grade C – Bolts
AS 1252 High Strength Steel Bolts with Associated Nuts and Washers for Structural Engineering;
AS 2294 Earthmoving Equipment – Protective Structures
AS 1636 Tractors – Roll Over Protective Structures
AS 4772 Earthmoving Machinery: Quickhitches for Excavators and Backhoe Loaders
AS/NZS 1269.1 Occupational Noise Management - Measurement of Noise Emission and Exposure
AS/NZS 2596 Seat Belt Assemblies
AS 1418.1 Cranes, Hoists and Winches General
AS 1170.4 Structural Design Actions – Earthquake Actions in Australia
AS 2759 Steel Wire Ropes – Use, Operation and Maintenance
AS 1554.1 Structural Steel Welding – Welding of Steel Structures
AS 3775.2 Chain Slings for Lifting Purposes - Care and Use
AS 2550:5 Cranes Hoists and Winches: Safe use of Mobile Cranes
AS/NZS 1768 Lightning Protection
AS/NZS 1336 Eye and Face Protection Guidelines
AS/NZS 1337.0 Personal Eye Protection Eye and Face Protection – Vocabulary
AS/NZS 1337.1 Personal Eye Protection - Eye and Face Protectors for Occupational Applications
AS/NZS 1337.6 Personal Eye Protection - Prescription Eye Protectors against Low and Medium Impact
AS/NZS 2161.1 Occupational Protective Gloves - Selection, Use and Maintenance
AS/NZS 2161.2 Occupational Protective Gloves - General Requirements
AS/NZS 2161.10.1 Occupational Protective Gloves - Resistance to Permeation by Chemicals
AS/NZS 2210 - Series Occupational Protective Footwear
AS/NZS 4501.2 Occupational Protective Clothing - General Requirements
AS 3765.1 Clothing to Protect Skin Against Toxic or Volatile Chemicals
AS/NZS 4501.1 Occupational Protective Clothing Guidelines on the Selection, Use, Care and Maintenance

AS 4775 Emergency Eye Wash and Shower Equipment
AS 1216 Class Labels of Dangerous Goods
AS 1940 The Storage and Handling of Flammable and Combustible Liquids
AS 2187 Explosives - Storage, Transport and Use
AS 3833 Storage and Handling of Mixed Classes of Dangerous Goods, Packages and Intermediate Bulk Containers
AS 4289 Oxygen and acetylene gas reticulation systems
AS 4332 The storage and handling of gases in cylinder
AS 4326 The storage and handling of oxidising agents
AS 4603 Flash back arresters – safety devices for use with fuel gases and oxygen or compressed air
AS 4839 the safe use of portable and mobile oxy-fuel gas systems for welding, cutting and heating
AS 1674.1 Safety in welding and allied processes - Fire Precautions
AS 1674.2 Safety in welding and allied processes—Electrical
AS 3000 Electrical Installations (Wiring Rules)
AS/NZS 3760 In-Service Safety Inspection and Testing of Electrical Equipment
AS/NZS 3190 Approval and Test Specification – Residual Current Devices (current-operated earth-leakage devices)
AS/NZS 3017 Electrical Installations – Verification Guidelines
AS 61010.1 Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use
AS/NZS 1554 Structural Steel Welding
AS 2159 Piling – Design and Installation

## APPENDICES

Appendix	Title
None	None