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Project Specific OHS Specifications

For: TRANSNET NATIONAL PORTS AUTHORITY

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Author : Fred du Plessis, Pr.CHSA

Owner : Transnet National Ports Authority

Client : Transnet National Ports Authority

Project Sponsor : **Thami Sithole**

Project Manager : **Nobahle Mncube**

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PRDW CONSULTING PORT & COASTAL ENGINEERS:

Prepared by: Fred du Plessis
Construction Health and Safety Agent Signature Date

Reviewed by: Project Leader
Signature Date

Approved by: Anton Holtzhausen
Project Director Signature Date

CAPITAL DELIVERY UNIT:

Reviewed by: Ntombozuko Xama
Signature 17/07/2025
Date

Reviewed by: Lebese Ramohlale
Signature 17/07/2025
Date

Recommended by: Imtiaz Jeewa
Signature 21.07.25
Date

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Reviewed by:	_____	_____ Signature	_____ Date
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1. Purpose

This Health and Safety specification identifies and encompasses the working behaviours and safe work practices that are expected of all Transnet SOC Ltd employees, *Contractors*, Consultants, Visitors and Suppliers, engaged on Transnet managed projects as required by Construction Regulation of 2014, regulation 5(1)(b).

All *Contractors* and service providers must take careful note of these requirements and must ensure that adequate provision has been made to ensure compliance.

This document was developed to be site specific specifications for the Richards Bay Breakwater Upgrade construction project. In order to determine which requirements are applicable, the *Contractor* must conduct a health and safety risk assessment specific to the project and specific to the *Contractor's* scope of work. All applicable requirements must be addressed in the *Contractor's* Health and Safety Management Plan.

These Specifications will be reviewed and updated periodically (as and when necessary) to address and / or include:

- Changes in legislation;
- *Employer* requirements;
- Leading practices; and
- Lessons learnt from incidents.

The specifications provides the minimum requirements for the above-mentioned construction project and must be used as a guide to develop the site specific Health and safety plans by *Contractors* as it is required by the Construction Regulation of 2014.

2. Construction Scope of Work

The works comprise two main components, i.e. the South Breakwater and the North Breakwater upgrade. The location of the two breakwaters is shown in Figure 2-1.

The primary activities for the breakwaters upgrades and repairs are listed below. A detailed description of the activities is included in the Constructability and Methodology report. The most relevant applicable sections in this specification for each activity is listed in brackets for ease of reference:

- Preparation of site facilities and set up of precast yard (Sections 13.5; 13.31; 13.33; 13.34; 13.40; **Error! Reference source not found.**; 13.45)
- Move navigation light to temporary position (Section 8.2; 11; 13.3; 13.16; 13.22)
- Precast armour units (65t Antifer units and 30t dolos units) (Section 8.2; 11.2; 11.3.3; 13.1; 13.2; **Error! Reference source not found.**; **Error! Reference source not found.**; **Error! Reference source not found.**; 13.32; 13.33; 13.48)
- Demolitions (demolish concrete cap, remove dolos units, remove rock) (Section 8; 11.2; 13.13)
- Concrete cap (Section 8; 13.48)

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- Dredging (seaward toe, incremental sections) (Section 8; **Error! Reference source not found.**; 13.18; **Error! Reference source not found.**)
- Hydrographic surveys (Section 8; 13.20)
- Place rock filter layer (section 8; **Error! Reference source not found.**)
- Place precast armour units (Section 8; **Error! Reference source not found.**)
- Reinstall navigation light to final position (Section 8; **Error! Reference source not found.**; **Error! Reference source not found.**; 13.15; 13.22)



Figure 2-1: Layout of North and South Breakwaters.

These Specifications set out the requirements for eliminating, or if this is not possible, for minimising as far as reasonably practicable, the risk of incidents and injuries occurring during the construction phase of the Richards Bay Breakwater Upgrade and Repairs as detailed in the tender documents. The health & safety specifications document includes public protection protocols and specific construction related minimum safety and health requirements, control measures and procedures which need to be taken into account when designing and undertaking the construction work: pricing the project; programming your activities; compiling your project-specific health & safety plan; compiling your baseline risk assessment document and activity-specific risk assessments; and compiling your project fall protection plan.

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The scope also addresses legal compliance, hazard identification and risk assessment, risk control, and the promotion of a health and safety culture for those personnel working on the project. The health & safety specifications also make provision for the protection of those persons other than employees i.e. site visitors and members of the public making use of the public spaces surrounding the various construction sites / work areas.

3. Definitions

All Injuries: The sum of Lost Time Injuries, Medical Treatment Cases and Fatalities.

Barricade: A temporary structure that is erected as a physical barrier to prevent personnel from coming into contact with an identified hazard.

Battering: Sloping the sides of an excavation to a predetermined angle (usually less than the natural angle of repose) to ensure stability.

Benching: The creation of a series of steps on the sides of an excavation to prevent a collapse.

Bund: An impervious containment structure around and beneath a hydrocarbon / chemical storage facility, isolating the facility from ground and surface water reticulation. Bunds are designed to contain spillages and leaks, and to facilitate clean-up operations, thus preventing pollution of the surrounding environment.

Client: Means any person or registered company in South Africa for whom construction work is being performed. For this project, the client will be represented by the project manager from Transnet.

Critical Lift: A lifting operation which crane operator cannot clearly see all movement of crane and lifting load and he will be depending on rigging supervisor / signalman is called as critical lift.

Competent person: A person who:

- (a) has in respect of the work or task to be performed the required knowledge, training and experience and, where applicable, qualifications, specific to that work or task: Provided that where appropriate qualifications and training are registered in terms of the provisions of the National Qualification Framework Act, 2000 (Act No.67 of 2000), those qualifications and that training must be regarded as the required qualifications and training; and
- (b) is familiar with the Act and with the applicable regulations made under the Act.

Construction work: Any work in connection with:

- (a) the construction, erection, alteration, renovation, repair, demolition or dismantling of or addition to a building or any similar structure; or
- (b) the construction, erection, maintenance, demolition or dismantling of any bridge, dam, canal, road, railway, runway, sewer or water reticulation system; or the moving of earth, clearing of land, the making of excavation, piling, or any similar civil engineering structure or type of work;

Construction Health and Safety Agent (Pr CHSA): a person legally appointed by the client with the requisite competencies and registrations to act as his or her representative.

Contractor: An employer who performs construction work.

Designer: Means –

- a. A competent person who –
 - i. Prepares a design;

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- ii. Checks and approves a design;
- iii. arranges for a person at work under his or her control to prepare a design, including an employee of that person where he or she is the employer; or
- iv. designs temporary work, including its components;
- b. an architect or engineer contributing to, or having overall responsibility for a design
- c. a building services engineer designing details for fixed plant;
- d. a surveyor specifying articles or drawing up specifications;
- e. a contractor carrying out design work as part of a design and building project; or
- f. an interior designer, shop-fitter or landscape architect;

Electrical Equipment: Generally, electrical equipment can be disconnected from its power source with a cord and plug at a receptacle or at a disconnect box. Equipment hardwired, such as but not limited to a breaker panel, is considered part of the facility electrical system and requires shutdown by qualified personnel.

Employee: Any person who is employed or works for an employer.

Employer: Any person who employs or provides work for any person.

Excavation: the making of any man-made cavity, trench, pit or depression formed by cutting, digging or scooping;

First aid Injury (FAI): First aid describes a particular level of treatment for a work-related injury. First aid means the following treatments, regardless of the professional status of the person providing the treatment:

- Visit(s) to a health-care provider for the sole purpose of observation.
- Diagnostic procedures including the use of prescription medications solely for the diagnostic purposes
- Use of non-prescription medications including antiseptics at non-prescription strengths
- Simple administration of oxygen
- Administration of tetanus/diphtheria shot(s) or booster(s)
- Cleaning, flushing or soaking wounds on skin surface
- Use of wound coverings such as bandages, gauze pads, etc.
- Use of hot and cold therapy (e.g. compresses, soaking, whirlpools, non-prescription creams/lotions for local relief except for musculoskeletal disorders)
- Use of any totally non-rigid, non-immobilizing means of support (e.g. elastic bandages)
- Using temporary immobilization devices while transporting an accident victim (e.g. splints, slings, neck collars, backboards, etc.)
- Drilling of a nail to relieve pressure or draining fluid from a blister.
- Use of eye patches
- Removal of foreign bodies embedded in the eye only if irrigation or removal with cotton swab is required.
- Removal of splinters or foreign material from areas other than the eyes by irrigation, tweezers, cotton swabs or other simple means
- Using finger guards
- Using massages
- Drinking fluids for relief of heat stress.

Frequency rates: Measures of performance for each of the metrics of injury (i.e. First aid injury, Medical treatment cases, Lost time injuries and All Injuries) per 200,000 hours worked. For example,

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the lost time injury frequency rate (LTIFR) is calculated by multiplying the number of LTI's by 200,000 and dividing such by the actual hours worked.

Hazardous chemical substance: Any substance or material (solid, liquid or gas) that can harm a person's health, start a fire, explode or cause environmental damage.

High Potential Incident (HIPO): an actual HSEC event or a near miss with the realistic potential to result in:

- A fatality or permanent disability
- A class 4 or 5 environment, social, labour or security event

Incident: An event (or a continuous / repetitive series of events) that results or has the potential to result in a negative impact on people (employees, contractors and visitors), the environment, operational integrity, assets, community, process, product, legal liability and / or reputation.

Injury: Injuries are harm to a person or indirectly as the results of events in the work environment. Injury includes worsening of a pre-existing medical condition or previous injury.

Injury on Duty: - Compensation for Occupational Injuries: Where an employee has suffered an injury on duty and requires medical treatment then the "Employer's report of Accident" form must be completed and "Part B" must accompany the injured to the medical facility where they will be treated.

Isolation and lockout procedure: A system or equipment-specific procedure that describes the method, and sequence to be followed, for rendering equipment and systems safe to work on.

Isolation bar: A device used at a lockout station to which anyone is able to attach a personal lock making it impossible for an isolation officer to remove the key to the equipment locks, thus preventing the de-isolation of a system, plant or equipment while it is still being worked on. A discipline lock must always be the first lock attached to an Isolation Bar and last to be removed.

Isolation officer: A person who has been authorised (in writing) by the Client's project manager to perform isolation / lockout procedures. A person may only be appointed as an isolation officer if he or she has undergone training and has been assessed and found competent in the isolation and lockout of systems, plant and equipment within the scope of his or her designation.

Lifting Appliances (Lifting Machines): Any lifting machine, driven by manual or mechanical power which is able to raise, lower suspend or transport loads and includes the supporting structure and all Plant, Equipment and gear used in connection with such a machine, but excludes continuous mechanical handling devices (i.e. conveyors). A typical list of lifting appliances are Cranes (Mobile, Tower Pedestal etc.), Wall / Pillar Cranes, derricks, Runway beams, pad eyes, gin pole and gin wheels, Winches, hoist (allied electric), crab, telfer hoists, Chain blocks, tripods, pull lifts, trolleys, Power working platforms, Elevators and Lifts.

Lifting Equipment: Generic term "Lifting equipment" shall mean any appliance, structure, item or thing used to rise, lower, suspend or transport a load.

Lifting Tackle: means chain slings, wire rope slings, woven webbing slings, master links, hooks, shackles and swivels, eye bolts, lifting or spreader beams, tongs, ladles, coil lifters, plate lifting clamps and drum lifting clamps used to attach a load to a lifting machine;

Light vehicle: A vehicle that: Can be registered for use on a public road; has four or more wheels and seats a maximum of 12 adults (including the driver); requires the driver to hold only a civil car driving licence; and does not exceed 4.5 tones gross. Examples of light vehicles include cars, four-wheel drive vehicles, sports utility vehicles (SUV`s) pick-ups, minibuses, and light trucks.

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Load cell: An electronic device (a transducer) that is used to convert a force into an electrical signal. A load cell is used to measure the mass of a load being lifted by a crane / hoist and provide an output signal that can be displayed on a digital indicator.

Load limiting device: A device that assesses the load being lifted by a crane / hoist and causes the driving effort to be automatically arrested when the rated capacity of the crane / hoist is exceeded.

Lost time injury (LTI): A Lost Time Injury is any occupational injury or disease that results in the worker's inability to perform routine work functions on the next calendar day after the injury. Inability to perform routine work functions includes cases where:

- a. The employee was assigned to another job on a temporary basis; or
- b. The employee worked at a permanent job less than full time; or
- c. The employee worked at his or her permanently assigned job but, due to the job-related injury, was physically or mentally unable to perform all the duties normally connected with it. Normal duties are considered as those that the employee would be expected to perform at least once per week.

Major Repairs: Is a measure whereby the original state of an appliance will be restored by rebuilding or exchanging parts or units. If essential parts with safety functions are to be rebuilt or exchanged, this is considered to be a "Major Repair."

Mandatory: Includes designers, suppliers, service providers, principal contractors and any other person or organisation engaged to do work, but without derogating from his or her status in his or her own right as an employer or user.

Medical treatment case (MTC): Any injury which requires treatment by medically trained persons (Doctor, Nurse or Paramedic).

Mobile equipment: A vehicle (wheeled or tracked) that generally requires: The driver to hold a specific state or civil licence; or the operator to hold a nationally recognised certificate of competency. Examples of mobile equipment include, but are not limited to, dump trucks, water trucks, tractors, graders, bulldozers, loaders, backhoes, excavators, bobcats, forklifts, telehandlers, mobile cranes, drill rigs, buses, and trucks larger than light vehicles.

Multiple Lift: If more than one lifting appliance is used to lift a material, the lift is called a Multiple Lift.

Near miss: An incident that has occurred that did not result in any injuries, illnesses, environmental or property damage but had the potential to cause an injury, illness, environmental or property damage. Also referred to as a near hit.

Nominated project management representative: A Transnet or PRDW employee or sub-consultant who has been assigned specific responsibilities with regard to this occupational health and safety specification.

Occupational Disease: The disease which results from exposure to any physical, chemical, biological or radiant material in the workplace that affects the function of the body organs and health of employees.

Personal lock: A single lock with one unique key, controlled by an employee. Used for personal protection as part of an isolation and lockout system.



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Principal contractor (PC): A person or organisation providing construction work to the client at a project site in accordance with an agreed scope of work/services, specifications, terms and conditions.

Recordable cases: The sum of fatalities, lost time injuries (LTIs), medical treatment cases (MTCs) and any injury resulting in loss of consciousness.

Restricted Work Cases (RWC): Any injury as direct or indirect result of work-related activity leading to a person being unable to perform any part of their normal job duties, not including the day or shift when the incident occurred.

Service provider: A person or organisation providing services to the Client or any other party associated with the project which does not qualify as construction work. This will typically include servicing and supply of chemical toilets, cleaning of offices, delivery of stationary to site, waste removal and any other deliveries to site.

Shoring: A system of sloping or temporary support used to prevent the collapse of the sides of an excavation.

Supplier: A person or organisation supplying and delivering goods to the Client or any other party associated with the project

Unsafe Act: It is an action of a person which deviates from the required safe practice and creates a hazard to themselves or others. Unsafe acts are about people, what they do or what they failed to do.

Unsafe Conditions: A situation that deviates from an accepted safe condition and could cause injury, interruption of work, damage, spillage or contamination. Unsafe conditions are about equipment and physical situations.

4. Abbreviations

ALARP	As Low As Reasonably Practicable
CR	Construction Regulations 2014
DSTI	Daily Safety Task Instruction
EPC	Engineering Procurement and Construction
EPCM	Engineering Procurement and Construction Management
HIRA	Hazard Identification and Risk Assessment
HEALTH AND SAFETY	Integrated Management System
MS	Management System
OHS	Occupational Health and Safety
OHS Act	Occupational Health and Safety Act
PC	Principal <i>Contractor</i>
SACPCMP	The South African Council for Project and Construction Management Professions
SOC	Safety Observation and Conversation
VFL	Visible Felt Leadership

5. Construction Work Permit Deliverables

The below requirements must be submitted at the kick-off meeting.

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#	Requirement
1	<p>The principal contractor will develop and submit the project specific construction health and safety plan.</p> <p>The attachment must be marked "HSE Management – Attachment A – H&S Plan".</p>
2	<p>The principal contractor will develop and submit the project specific baseline risk assessment covering the contractor's scope as well as the site establishment risk assessment. The baseline risk assessment shall be aligned with the client's baseline risk assessment.</p> <p>The attachment must be marked "HSE Management – Attachment B – Risk Assessments". The assessment must as a minimum comply with the requirements set out in this document for conducting risk assessments.</p>
3	<p>The contractor will make provision in their tender for the cost of Health and Safety. The contractor must show this in an acceptable format , for example as part of the BOQ. It must be comprehensive and not just include the cost of PPE and Safety Resources but include items such as training, shoring, dewatering or drainage of any excavations, medical surveillance, hygiene assessments and surveillance, etc.</p> <p>The attachment must be marked "HSE Management – Attachment C – Safety Budget". The budget must be managed and tracked as part of the normal QS process.</p>
4	<p>An organogram with persons to be appointed to key positions with proof of competence and registration with statutory institutions, must be submitted. As a minimum the following appointments must be included:</p> <ul style="list-style-type: none"> • OHS 16.2 (usually principal contractor project manager) • Construction Regulation 8.1 (Construction Manager) • Construction Regulation 8.5 (Safety Officer / Safety manager) • Construction Regulation 8.7 (Construction Supervisor) <p>The attachment must be marked "HSE Management – Attachment D - Organisational Structure and Proof of Competence".</p>
5	<p>The principal contractor will provide its current CIDB grading certificate to proof corporate competence or a company profile if no CIDB grading is available. "HSE Management – Attachment E – CIDB Grading / Company Profile".</p>
6	<p>An organogram indicating all potential contractors of the principal contractor must be submitted with the Tender documentation and marked 'HSE management – Attachment F – Contractors'. The organogram must indicate:</p> <ul style="list-style-type: none"> • The expected number of employees and level of the sub-contractor; • Duration that the sub-contractor will be on site; • The scope of work; and • Any contractors to the contractor
7	<p>The Principal contractor must be registered with the COID Commissioner or a mutual association approved by the Minister. The principal contractors letter of good standing must be provided. The attachment must be marked "HSE Management – Attachment G - LOGS".</p>

6. OHS Management Plan

Every contractor must prepare, implement and maintain a project-specific Health and Safety Management Plan. The plan must be based on the requirements set out in this specification as well

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as all applicable legislation. It must cover all activities that will take place on site, from mobilisation and set-up through to rehabilitation and site demobilisation.

The plan must demonstrate the contractor's commitment to health and safety and must, as a minimum, include the following:

- A copy of the contractor's Health and Safety Policy
- Arrangements concerning the identification of applicable Legal and Other Requirements, measures to ensure compliance with these requirements, and measures to ensure that this information is accessible to relevant personnel
- Procedures concerning Hazard Identification and Risk Management, including Risk Assessments and Pre-Task Hazard Assessments (a systematic method of managing hazards according to risk priority must be employed)
- Details concerning Organisational Resources, Accountabilities and Responsibilities – this includes the assignment of safety responsibilities to applicable roles within the organisation; the identification of the Safety Officer(s) as well as site agents, managers and supervisors; and the identification of personnel responsible for carrying out safety inspections (additional resources need not be provided, as this task may be shared with other duties and may be rotated within a team)
- Details concerning Training, Competency and Awareness – this includes procedures regarding the selection, placement and training of personnel, including induction training, ongoing training in basic safe work procedures, and occupational health and safety training for newly hired or promoted supervisors; initiatives / programmes for promoting safety awareness should be described
- Supplier and Contractor Management procedures – a process must be in place for the assessment of sub-contractors and suppliers with regard to occupational health and safety requirements / performance
- Documentation and Document Control – a system of health and safety related plans, procedures, work instructions, registers, forms and checklists must be developed and maintained, and procedures must be in place for the control of these documents
- Communication and Consultation arrangements concerning occupational health and safety, including project health and safety meetings, Daily Safe Task Instructions, Toolbox Talks, notice boards, and Safety Observations and Coaching; details concerning contractor senior management involvement with their staff in consultative processes and daily management safety walkabouts should be included
- Operational Control – rules and regulations pertaining to health and safety (particularly safety critical issues such as isolation and lockout, working at height, confined spaces, hazardous substances, etc.); procedures that are in place for recurring work activities; and rules pertaining to the provision of Personal Protective Equipment (PPE) including a PPE matrix for the project (the contractor must provide PPE free of charge to all of his employees)
- Management of Change – a process must be in place to ensure that health and safety risks are considered before changes are implemented

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- Business Resilience and Recovery procedures, including evacuation and emergency response plans
- Measuring and Monitoring plans, including monitoring employee exposures to noise, dust, etc. to ensure the provision of a healthy and safe work environment (Note: If occupational hygiene monitoring is required, an AIA (Approved Inspection Authority) must be used.)
- Non-conformance, Incident and Action Management procedures which describe the protocols to be followed with regard to accident / incident reporting, recording, investigation, analysis and follow-up on corrective and preventative actions
- Procedures relating to Data and Records Management – measures must be in place to ensure that all health and safety related records and data are maintained, accurate, current and secure
- Performance Assessment and Auditing procedures concerning documented daily site health and safety inspections; inspections (by a competent person) of plant, tools and equipment prior to establishment / use on site and at least monthly thereafter; and monthly internal audits to ensure compliance with the health and safety management plan (the contractor must audit his own systems as well as those of his sub-contractors); and

Prior to mobilisation, the Principal Contractor's Health and Safety Management Plan must be forwarded electronically, and as a hard copy, to the Appointed Construction Health and Safety Agent for review and approval before work commences on site. The plan will be audited for completeness and, if found to be adequate, will be accepted (typically "with comments"). Work may not commence until the plan has been approved.

Once the plan has been approved, the principal contractor must action and resolve any issues within 30 days from the start of work.

If the issues requiring corrective action are not resolved within this 30-day period, the contractor will be required to stop any work related to the outstanding actions until they have been resolved.

Any proposed amendments or revisions to the contractor's Health and Safety Management Plan must be submitted to the Client's project manager for acceptance.

Note: Should it be identified that the principal contractor has overlooked a high-risk activity, and as a result has omitted the activity and associated control measures from the Health and Safety Management Plan, the plan will not be approved.

7. Health and Safety Policy

Each contractor must develop, display and communicate a health and safety policy that clearly states the contractor's principles and objectives for the effective management of health and safety. These principles and objectives must be endorsed by the contractor's management representatives and must be consistent with those adopted for the project. The policy must be signed and dated and must be reviewed annually.

The policy must commit to:

- Compliance with all applicable legal requirements;
- the effective management of health and safety risks;
- the establishment of measurable objectives and targets for improving performance;
- the provision of the necessary resources to meet these objectives;
- the prevention of incidents; and

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- achieving continuous improvement with regard to health and safety performance.

All employees of the Principal Contractor as well as the employees of any Contractor that may be appointed by the Principal Contractor must be made aware of the policy. This must be done through Health and Safety Induction Training and Toolbox Talks (refer to Sections 10 and 11).

A copy of the policy must be displayed in each meeting room and on each notice board.

8. Hazard Identification and Risk Assessment.

Prior to the commencement of any work, including mobilisation and site set-up activities, the contractor must demonstrate to the satisfaction of the Client's project manager that a detailed hazard identification and risk assessment process has been followed for all work to be performed as well as for all associated equipment and facilities. The client, at its discretion may require each contractor to use the clients risk management process and templates to ensure uniformity and a general understanding of the risk management process by all parties involved.

The contractor is responsible and accountable for ensuring that effective procedures and assessment systems are in place and documented into a formal HIRA procedure to control hazards and to mitigate risks to as low a level as is reasonably practical. This HIRA procedure must include a review plan and a monitoring plan to ensure alignment with the Construction Regulations.

The process of analysing and managing risk must follow the following steps:

- Establishing the context of the risk assessment, including acceptability criteria for the risk analysis
- Identifying hazards, determining risk scenarios and selecting a suitable level of risk evaluation
- Evaluating risks by qualitative or quantitative assessment(s) and assigning ratings (classification) – this process must be aligned with the standard of consequence and probability matrix as defined in ISO 31010
- Recording the risk analysis in a risk register
- Managing risks (prioritising for action) according to their classification
- Identifying and implementing controls to ensure that risk levels are as low as reasonably practicable (ALARP) – the following hierarchy of controls must be applied:
 - **Elimination** of the risk scenario
 - **Substitution** with a less hazardous material, process or equipment
 - **Isolation** – isolating the hazard from the person or the person from the hazard
 - **Engineering** – redesigning equipment / work processes or introducing engineering / process controls
 - **Administration** – introducing administrative controls or management strategies, e.g. permitting systems, procedures, training, etc.; and
 - **Personal Protective Equipment (PPE)** – issuing and use of PPE as a last resort.
- Developing action plans for reducing risk levels / managing risks

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- Verifying the completion of actions
- Re-evaluating the risks and classifications as appropriate
- Reviewing and updating the risk register
- Monitoring of risk assessments with minimum of three outputs leading to review of the risk assessments, retraining of employees and confirming adequacy; and
- Review of risk assessments when an incident has occurred, when the working environment has changed or when identified during the monitoring process.

Once established on site, the contractor must ensure that detailed project-specific issue-based risk assessments are developed, approved by the contractor and communicated to all relevant employees prior to the scheduled start of any work.

The contractor's site management representatives, supervisory personnel, technical experts (as required) and workforce personnel directly involved with the task being examined must participate in the risk assessment processes. Nominated project management representatives must be invited to attend the risk assessments to provide input where required.

UNDER NO CIRCUMSTANCES may the contractor's Health and Safety Officer perform a risk assessment in isolation. The active participation of all staff referred to above is mandatory.

An Issue-Based (Task-Based) Risk Assessment must at least:

- Be accompanied by a work method statement (the work method statement will describe in detail the specific job or task to be performed)
- Provide a breakdown of every job or task into specific steps
- Identify the hazards or potential hazards associated with each step
- Assess the risk that every hazard identified presents
- Include consideration of possible exposure to noise, heat, dust, fumes, vapours, gas, chemical handling / use, ergonomics, vibration or any other identified health exposure risk on site; and
- Describe how the hazard is controlled such that the residual risk is as low as reasonably practicable (ALARP) to allow work to commence and be completed safely.

Hazards and risk scenarios must be communicated to all persons potentially affected.

Particularly for significant risks, the contractor should develop action plans (in writing) to reduce the risks to levels as low as is reasonably practicable.

The contractor will ensure the applicability and effectiveness of the implemented Issue-Based (Task-Based) Risk Assessment by performing a planned task observation (PTO) based on the employee's awareness of the identified hazards and effective implementation of the controls. The results from the observations must be analysed and if any changes are required a review of both the Issue-Based (Task-Based) Risk Assessment as well as the baseline must be undertaken.

After every completed accident or incident investigation the contractor will ensure a review is undertaken of all applicable Issue-Based (Task-Based) Risk Assessments incorporating all the lessons learned and action items.

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8.1 Baseline Risk Assessments

Prior to site establishment, each contractor must conduct a baseline risk assessment identifying foreseeable hazards and risks regarding their own scope on the project. Details concerning proposed mitigation measures / controls must be included in the baseline risk assessment for acceptance by the nominated project management representative.

Each Principal Contractor must consider the Client's Baseline Risk Assessment when identifying foreseeable hazards and risk scenarios associated with the construction project. Each Contractor must consider both the Client's Baseline Risk Assessment as well as the Principal Contractor's Baseline Risk Assessment when identifying foreseeable hazards and risk scenarios associated with the construction project.

Each Principal Contractor must prepare a Risk Register comprising all significant risks (i.e. Risks rated as major or catastrophic) identified for the project using the information contained in the project Baseline Risk Assessment as well as the Principal Contractor's Baseline Risk Assessment. Key control measures for managing each of these risks must be specified in the register.

The project Risk Register must be reviewed and, if necessary, updated:

- On a quarterly basis during construction;
- When changes are made to a design and / or the construction scope, schedule, methods, etc. That result in a change to the risk profile; and
- Following an incident.

8.2 Task-based Risk Assessments

Once established on site, the contractor must ensure that detailed project-specific issue-based risk assessments are developed, approved by the contractor and communicated to all relevant employees prior to the scheduled start of any work.

The contractor's site management representatives, supervisory personnel, technical experts (as required) and workforce personnel directly involved with the task being examined must participate in the risk assessment processes. Nominated project management representatives must be invited to attend the risk assessments to provide input where required.

UNDER NO CIRCUMSTANCES may the contractor's Health and Safety Officer perform a risk assessment in isolation. The active participation of all staff referred to above is mandatory.

An Issue-Based (Task-Based) Risk Assessment must at least:

- Be accompanied by a work method statement (the work method statement will describe in detail the specific job or task to be performed)
- Provide a breakdown of every job or task into specific steps
- Identify the hazards or potential hazards associated with each step

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- Assess the risk that every hazard identified presents
- Include consideration of possible exposure to noise, heat, dust, fumes, vapours, gas, chemical handling / use, ergonomics, vibration or any other identified health exposure risk on site; and
- Describe how the hazard is controlled such that the residual risk is as low as reasonably practicable (ALARP) to allow work to commence and be completed safely.

Hazards and risk scenarios must be communicated to all persons potentially affected.

Particularly for significant risks, the contractor should develop action plans (in writing) to reduce the risks to levels as low as is reasonably practicable.

The contractor will ensure the applicability and effectiveness of the implemented Issue-Based (Task-Based) Risk Assessment by performing a planned task observation (PTO) based on the employee's awareness of the identified hazards and effective implementation of the controls. The results from the observations must be analysed and if any changes are required a review of both the Issue-Based (Task-Based) Risk Assessment as well as the baseline must be undertaken.

After every completed accident or incident investigation the contractor will ensure a review is undertaken of all applicable Issue-Based (Task-Based) Risk Assessments incorporating all the lessons learned and action items.

8.3 Legal and other Requirements

Contractors must comply with all applicable national, provincial and municipal legislation. In addition to the requirements above, the contractor must comply with any national standard that has been incorporated into legislation and this specification.

As a minimum without limiting the applicability of any law not listed, the contractor will ensure compliance to the following:

- All applicable SAMSA legislative requirements;
- Compensation for Occupational Injuries and Diseases Act, 1993;
- Occupational Health and Safety Act, 1993 and all applicable regulations;
- Basic Conditions of Employment Act, 1997;
- National Environmental Management Act, 1998;
- Any applicable municipal bylaws.

The contractor must compile a register of all requirements applicable to the work that will be carried out / services that will be provided. For each requirement, the current compliance status as well as actions to gain or maintain compliance must be indicated. This register must be updated regularly to ensure that it remains relevant.

The principal contractor must ensure that his direct employees as well as the employees of his subcontractors have been informed of all such applicable laws and standards. The requirements as described in this section is applicable to all activities under the contractual scope as described in the contractor's commercial contract.

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9. Objectives

In order to drive continuous improvement, each contractor must set project-specific objectives and targets concerning health and safety and must establish improvement action plans to achieve them. These objectives and targets must be aligned with the objectives and targets set for the project as a whole.

Significant health and safety hazards and risks, environmental impacts, and legal requirements must be the primary considerations for setting objectives and targets. The intention is to eliminate health and safety hazards, minimise health and safety risks, reduce / prevent environmental impact, prevent incidents, injuries and illnesses, and ensure legal compliance. When establishing objectives and targets, consideration must be given to the following:

- Leading indicators such as inspections, audits, observations and training;
- lagging indicators (to be used purely for identifying areas that require improvement) e.g. Incident frequency rates (i.e. LTIFR and AIFR) with due understanding that the goal is “no harm”; and
- best practices and lessons learnt.

The objectives and targets must be specific and measurable. The improvement action plans must specify the resources required to achieve the objectives and targets, the persons responsible, and realistic timeframes for completion. The contractor must ensure that adequate resources are allocated, and that performance is monitored.

The objectives and targets and associated improvement action plans must be documented, must be submitted to the Client’s project manager for agreement, and must then be communicated to all employees.

Furthermore, objectives and targets must be reviewed at regular and planned intervals and whenever significant change has taken place on the project (i.e. changes to activities, scope of work, operating conditions, etc.). Contractor employees may partake in planning the project level objectives and targets.

Performance reviews must be carried out at quarterly intervals to review performance against established objectives and targets. Where reward and incentive schemes are in place, they must be designed in such a manner that health, safety and environmental performance is not compromised in order to maximise financial reward.

10. Resources, Accountabilities and Responsibilities

Each contractor is responsible for carrying out the work under the contract having the highest regard for the health and safety of all persons on the project site (including visitors).

Health and safety is the responsibility of each and every individual on site, but particularly the contractor’s management team who will be required to set the tone. Visible commitment is essential to providing a safe work environment.

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Contractor managers and supervisors at all levels will be required to demonstrate their commitment and support by adopting a risk management approach to all health and safety issues. They will need to consistently take immediate and firm action to address violations of health and safety rules and actively participate in day to day activities with the objective of preventing harm to people, the environment and property / equipment.

The principal contractor's management representatives are responsible and accountable for health and safety performance on the project. Key responsibilities include the following:

- Preparation, implementation and maintenance of a risk based Health and Safety Management Plan specific to the work that will be carried out;
- Implementing an effective hazard identification and risk management programme to ensure that all reasonably foreseeable hazards are controlled in order to minimise risk;
- Participation in a health and safety review with nominated project management representatives prior to site establishment;
- Ensuring that all contractor employees have clearly defined responsibilities with regard to health and safety, and that these responsibilities are clearly communicated, understood and fulfilled;
- Establishing a needs based system for ongoing training and assessment of skills and competence;
- Establishing procedures to ensure that only competent personnel are permitted to work on site;
- Ensuring that all personnel are kept up to date with regard to health and safety information (e.g. risk assessment reports, incident reports, etc.) and that feedback is provided promptly concerning issues / concerns raised;
- Establishing and maintaining consultative processes with employees for the duration of the project, and implementing programmes that encourage continuous improvement and provide recognition for suggestions made by employees;
- Establishing and implementing health and safety programmes and procedures to ensure that all work is carried out in compliance with the requirements of this document, the contract, and all applicable legislation;
- Maintaining operational control for the protection of site personnel and the public, including, erecting and maintaining safeguards, providing all facilities necessary for the maintenance of proper personal hygiene, preventing unnecessary interference due to the passage of people and equipment / materials at or near the site, preventing nuisance / excessive noise and unreasonable disturbances, and ensuring the adequacy, stability, structural integrity and safety of all construction works, installations and operations;
- Ensuring that the contractor's Project Manager, Health and Safety Officer(s) and Health and Safety Representatives attend site health and safety meetings;
- Providing the Client's project manager with accurate health and safety statistics; and providing the necessary resources for health and safety audits to be conducted and supporting the auditing process.

10.1 Appointments and Delegations

Each contractor working on the project or occupying the project premises is an employer in his own right and must comply with the requirements of all applicable legislation with regard to health and safety related appointments and delegations for the project.

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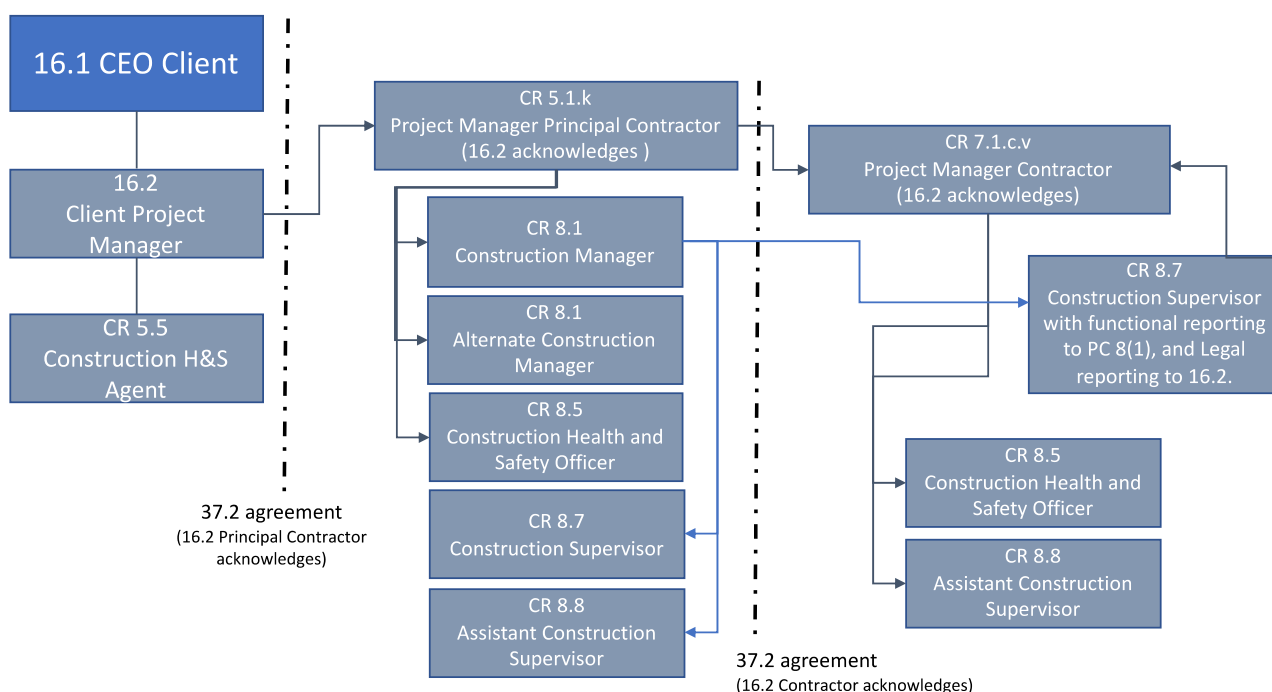
Documented proof of all signed appointments must be available for inspection by the nominated project management representative, or anyone authorised to do so.

Each contractor must provide organisational charts that indicate the internal (company) and site resource hierarchy. The site organisational chart must clearly indicate which persons have been assigned health and safety related responsibilities (i.e. are carrying legal appointments).

Proof of training and competence as well as a valid medical certificate of fitness must be attached by the contractor to each legal appointment.

Principal Contractor must define the project specific legal framework within their OHS Plan. Refer to the below generic legal frameworks for guidance: -

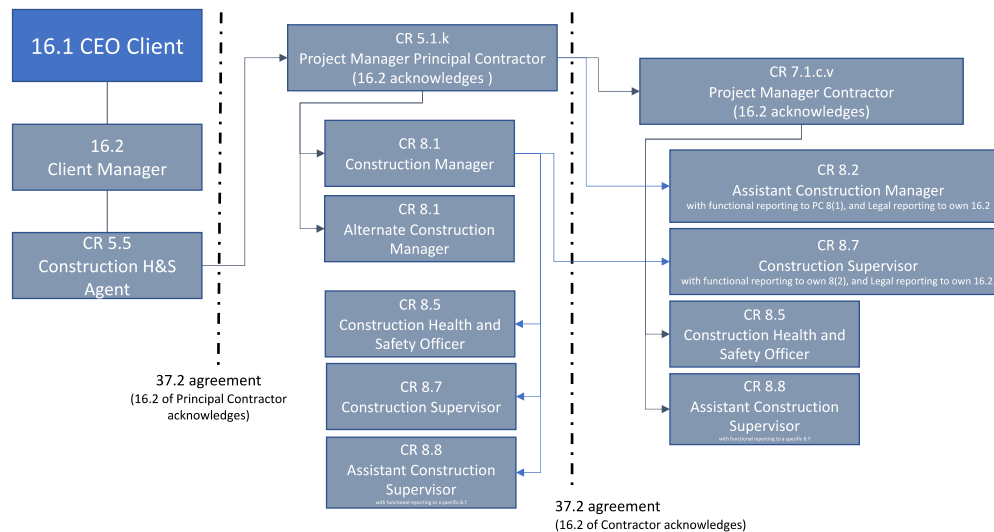
Generic Legal Framework: Construction Projects



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Generic Legal Framework: Construction Projects

(for contractors with over 50 employees at peak)



10.2 Project Manager

Each contractor must nominate and appoint (in terms of section 16.2 of the OHS Act. 85 of 1993) a competent person (the Project Manager) who will be responsible and accountable for the successful and safe completion of the project.

This person will act as the single point of contact for liaison concerning the project and must have the authority to bind the contractor with respect to the contract. The contractor's Project Manager will be responsible for the management of health and safety on the site.

Key obligations in this regard include: Implementation of the contractor's Health and Safety Management Plan; implementation of effective hazard identification and risk management processes; and; ensuring workforce competence.

The contractor's Project Manager must ensure that provision has been made for all of the health and safety requirements specified in this document, in particular: Health and safety planning, leadership and control; specific technical competencies for critical and skilled work; supervision and control on each shift; regular monitoring, auditing and assessment; and; workplace inspections.

The contractor's Project Manager must act consistently and strictly against any individual who transgresses a health and safety rule or requirement.

10.3 Construction Manager

The Principal Contractor must appoint (in terms of Construction Regulation 8.1 of the OHS Act. 85 of 1993) a Construction Manager who will be responsible and accountable for all construction activities

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of the principal contractor as well as the contractors performing work for the principal contractor. The principal contractor must ensure that in the absence of the construction manager from the site an alternate construction manager has been appointed under construction regulation 8.1. A documented handover process must be in place between the construction manager and the alternate construction manager to reflect accountability at any time.

The Construction Manager will be responsible for managing all construction work, including the duty to ensure compliance to health and safety requirements on the site.

Key obligations in this regard include: Compliance to the principal contractor's Health and Safety Management Plan; ensuring the effective use and implementation of hazard identification and risk management documentation and ensuring task performance by a competent workforce.

The principal contractor's Construction Manager must:

- ensure implementation of Health and safety planning, leadership and control.
- ensure supervision and control on each shift; and
- workplace inspections.

The principal contractor's Construction Manager must act consistently and strictly against any individual who transgresses a health and safety rule or requirement.

A construction manager must be fluent in English, and must have the following minimum qualifications, training and experience:

- Appropriate training with regard to construction related hazard identification and risk management processes;
- Relevant training with regard to incident investigation procedures and causation analysis;
- Relevant competency, as per the definition of a competent person in the construction regulations;
- Legal liability, inclusive of construction regulation 2014;
- Fire prevention and protection training; and
- Registration with the SACPCMP as a construction manager is advisable.

Note: By legislative requirement, no work may be carried out without an appointed construction manager being physically present at the work site.

10.4 Construction Supervisors

The principal contractor must ensure that all project / construction works are supervised at all times by an adequate number of qualified, competent and appointed supervisors who have experience in the type of work being carried out.

The construction manager must appoint construction supervisors with reference to the legal framework as per section 10.1 of this document. Each supervisor will be appointed as per construction regulation 8.7 by the construction manager, clearly defining the functional and legislative reporting line for the supervisor as per the legal framework.

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The principal contractor and contractor must appoint assistant construction supervisors as per construction regulation 8.8 after considering the size of the project and the amount work phases to be supervised.

Each supervisor must accept responsibilities (in writing as part of his appointment) for ensuring that all work carried out under his or her supervision is done so in accordance with all applicable legislation, rules, standards, specifications, codes of practice, safe work procedures, and guidelines.

Note: No work may be carried out without an appointed supervisor being physically present in the work area.

Each site supervisor must:

- Be equipped with a mobile telephone (or 2way radio) to ensure that effective communication can be maintained for the duration of the contract;
- provide and maintain a list of contact persons (names and telephone numbers) for the contractor and all appointed sub-contractors;
- ensure that a record of all personnel under his supervision (including the date of induction, relevant skills and licenses for each person) are kept and be able to produce this list at the request of a nominated project management representative;
- notify the Client's project manager of any new starter with evidence of competency and site-specific induction before he or she commences with any work;
- ensure that the requirements specified in this document are discussed with relevant personnel and are adhered to at all times; and
- take necessary action whenever rules or requirements are not adhered to.

A supervisor must be fluent in English, and must have the following minimum qualifications, training and experience:

- Appropriate training with regard to construction related hazard identification and risk management processes;
- Relevant training with regard to incident investigation procedures and causation analysis;
- Relevant competency, as per the definition of a competent person in the construction regulations;
- Legal liability, inclusive of construction regulation 2014; and
- Fire prevention and protection training.

10.5 Construction Health and Safety Officer

Each contractor must appoint a full time Health and Safety Officer for the duration of the contract per breakwater area.

Where a principal contractor deploys up to 50 employees per area (directly or through contractors), at least one full time Health and Safety Officer must be appointed, with an additional Health and Safety Officer appointed for every 50 thereafter.

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Every contractor that deploys up to 50 employees must have a full time Health and Safety Officer appointed with an additional Health and Safety Officer appointed for every 50 thereafter.

Where a principal contractor deploys more than 2 safety officers at least one health and safety administrator must be appointed.

Where the principal contractor appoints more than 2 safety officers at least one will be registered as a construction health and safety manager and assume the responsibilities thereof.

The Construction Health and Safety officer (CHSO) and manager (CHSM) must be registered with the SACPCMP in the appropriate category.

A Health and Safety Officer must be on site before work commences at the start of each day and must remain on site until all activities for that day (including the activities of subcontractors) have been completed.

A Health and Safety Officer must be present during all shifts; therefore, if work is carried out over more than one shift per day, the contractor must make provision for an additional Health and Safety Officer, the same ratio as stated above will be applied per shift if shift work is implemented.

The contractor must ensure that the Health and Safety Officer is adequately equipped to enable him or her to perform his or her duties effectively.

The Safety Officer must be provided with the following:

- A computer with access to all necessary systems, including access to e-mail and the internet;
- A means of positive communication e.g. cellular telephone or radio; and
- Available transportation where required.

A Health and Safety Officer must be computer literate, fluent in English, and must have the following minimum qualifications, training and experience:

- At least 5 years' experience as a Health and Safety Officer on construction projects;
- SAMTRAC or equivalent training course as a minimum qualification;
- Must be registered with the SACPCMP in the category which he or she is appointed, no person having been registered as a candidate may carry any legal appointment;
- Experience and appropriate training with regard to implementing and maintaining a health and safety management system compliant with the construction regulations of 2014;
- Experience and appropriate training with regard to construction related hazard identification and risk management processes;
- Competence, experience and relevant training with regard to incident investigation procedures and causation analysis;
- Health and safety auditing experience and training;
- A valid First Aid certificate;
- Fire prevention and protection training; and
- A valid Driving Licence (light motor vehicle; code B).

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10.6 Health and Safety Representatives

Where 20 or more people are working on a project, a Health and Safety Representative must be elected and appointed. Taking into consideration the number of people employed, the geographical area in which the work is taking place, the different work disciplines, and the shift pattern (if applicable), the contractor must ensure that an adequate number of Health and Safety Representatives (at a minimum ratio of one Health and Safety Representative per 50 employees) are elected and appointed to effectively represent all site personnel.

The contractor must ensure that a documented process for the nomination or election and period of office is developed and implemented.

Each Health and Safety Representative is required to attend an accredited training course for health and safety representatives. The contractor must make the necessary allowances for the Health and Safety Representatives to carry out their duties as specified in the applicable legislation. The contractor must ensure that an appropriate method of identification for Health and Safety Representatives is implemented.

10.7 First Aiders

The contractor must ensure that an appropriate number of First Aiders are trained and appointed. First Aid training must be done through an accredited training institution. The contractor must ensure that an appropriate method of identification for First Aiders is implemented.

11. Competence, Training and Awareness

The principal contractor must ensure that all employees (including contractor employees) are trained and competent, and they understand the risks and controls associated with the work to be executed.

The principal contractor must ensure that all presented competence is aligned with portion (a) and (b) of the definition of a competent person as per the construction regulations 2014.

The contractor must implement systems and procedures to ensure that:

- The necessary competencies required by employees are identified (by occupation), along with selection, placement and any training requirements. Note: Specific competency profiles and selection criteria (fitness for work) must be developed for all roles where significant health, safety or environmental risk exists and a formal training needs analysis must be carried out based on competency profiles and a training matrix must be developed for the project;
- Roles requiring technical certification, registration or licensing are identified and documented, and these roles are filled only by suitably qualified personnel;
- Minimum core health and safety skills required by employees in leadership and supervisory roles are identified and suitable training is provided including hazard identification and risk assessment, incident investigation, and health and safety interactions (observations and coaching);
- Competency-based training is provided, and it includes operational controls (procedures / work instructions), management of change, and emergency response;

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- All employees hold and maintain the required competencies (including appropriate qualifications, certificates and licenses) and are under competent supervision;
- A site-specific principal contractor induction and orientation programme that highlights health and safety requirements, procedures, and significant hazards and risks is in place for all new employees and visitors (understanding must be assessed);
- Personnel are trained / briefed on new or amended standards, rules, safe work procedures, risk assessments, etc.
- Refresher training is carried out as required (e.g. re-induction following an absence from site);
- Records of education, qualifications, training, experience and competency assessments are maintained on site for all employees;

The effectiveness of training is reviewed and evaluated. Prior to the commencement of any work, including mobilisation and site set-up activities, the contractor must provide, to the satisfaction of the nominated project management representative, current documentation verifying that the contractor's employees, as well as the employees of any appointed contractors, are competent and have the necessary qualifications, certificates, licences, job skills, training and experience (as required by this document and applicable legislation) to carry out the work that is to be performed. An Employee Personal Profile must be completed for each employee that will be performing work on site.

All documentation pertaining to an employee's competence (i.e. certified copies of qualifications, certificates and licences as well as proof of job skills, training and experience) must be maintained in this profile. The contractor must provide proof that the training institutions and trainers that are used are appropriately registered with a governing authority. The following must be made available for verification purposes: Proof of registration of the training institution including the training programmes that the institution is accredited to provide.

11.1 Induction Training

Each employee must attend all mandatory Induction Training applicable to the project. No employee will be permitted to enter any project work site until he has attended this training. Each employee must carry proof that he has completed the induction training and may be removed from a site if such proof cannot be produced on request, this as required by the Construction regulations of 2014, regulation 7(5).

Furthermore, employees must attend (where applicable) Area-Specific Training pertaining to the particular hazards identified in the area(s) where the employees will be working. No employee will be permitted to enter a work area until he has attended the relevant area-specific training.

All visitors must receive a visitor induction briefing before entering any project work site. However, this induction does not permit a visitor to enter a site unescorted. Visitors must be accompanied at all times by an appropriately senior employee who has been fully inducted.

11.2 Specific Training and Competency Requirements

The following specific training and competency requirements must be complied with.

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Please Note: An employee must be trained, assessed and found competent before he will be given authorisation to perform certain tasks or fill certain roles.

Table 11-1: Specific Training and Competency Requirements

Training	Applicable To
Health and Safety Induction	All employees
Safety Observations and Coaching (Safety Interactions)	All employees
Risk Assessment	All managers and <i>Supervisors</i>
Incident Investigation	All managers and <i>Supervisors</i>
Safety Leadership	All managers and <i>Supervisors</i>
Legal Liability	All managers and <i>Supervisors</i>
Health and Safety Rep	All elected Health and Safety Representatives
First Aid Levels 1, 2 and 3	All nominated First Aiders
Fire Fighting (Fire Extinguisher Use)	All employees
Working in fall risk positions	All employees using a safety harness
Permit to Work	All Authorised Persons (i.e. Permit issuers) and all Applicants (i.e. Employees who will be applying for permits)
Mobile Equipment Site Licence	All mobile equipment operators
Scaffolding erectors	Training as per SAQA published unit standards
Scaffolding inspectors	Training as per SAQA published unit standards
Scaffolding supervisors	Training as per SAQA published unit standards
Lifting machine operators	As prescribed by DMR18(11)
Skippers license	Marine vessel operators

11.3 Communication, Participation and Consultation

The Principal Contractor must establish and maintain effective communication and consultative processes (allowing for a two-way dialogue) for the duration of the project to ensure that:

- All personnel are kept up to date with regard to health and safety matters (e.g. Hazards and risks, incidents and lessons learnt, leading practices, performance against objectives, etc.);
- General health and safety awareness levels are kept high;
- Prompt feedback is given to personnel with regard to health and safety issues or concerns that they raise; and
- Relevant, and often critical, health and safety related information (e.g. Design changes, instructions, reporting of hazardous conditions or situations, etc.) Is effectively disseminated.

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This must be achieved as follows:

11.3.1 Leadership, Safety Observations and Coaching

The principal contractor's and contractor's leadership teams (Managers and Supervisors) must participate in the project's Leadership program or process. Each member of the leadership team must, as part of his normal duties, perform Safety Observations and Coaching. The intention of this program is to encourage interaction between supervisors and workers concerning health and safety matters in order to:

- Reinforce behaviours consistent with standards, procedures and management system requirements;
- Correct behaviours inconsistent with standards, procedures and management system requirements; and
- Verify whether employees have the necessary training, certification, equipment, etc. to perform the work that they are carrying out.

The number of Safety Observations and Coaching that must be carried out by each senior person will be set for the project and all individuals will be required to participate accordingly. The Safety Observations and Coaching that are recorded must be submitted to the Client's project manager on a daily or weekly basis (as agreed).

The principal contractor will analyse the results from the Safety Observations and Coaching, to determine the leading indicators and ensure the management focus for the period following the analysed observations address the identified shortcomings.

11.3.2 Toolbox Talks

The Principal Contractor must prepare a Toolbox Talk on a weekly basis and must share it with all personnel for which the Principal Contractor is responsible (including all Contractors). Toolbox Talks must address health and safety issues that are relevant to the work performed on the project site(s) and must include information and / or knowledge sharing, lessons learnt from incidents that have occurred, information concerning specific hazards and / or risks and control measures to prevent injury.

Attendance records must be kept and maintained in each Contractor's health and safety file.

11.3.3 Daily Safe Task Instructions (DSTI's)

A Daily Safe Task Instruction (DSTI) is a pre-start discussion amongst the members of a work team, led by the appointed Supervisor, aimed at anticipating hazards and potential risks associated with the activities planned for the day or shift, and ensuring that the necessary control measures are in place to prevent incidents.

At the start of each day or shift, prior to the start of any work, each appointed Supervisor must inspect the work area for which he is responsible and ensure that it is safe. He must then conduct a DSTI with his work team specifically concerning the tasks that they will be performing during the course of the

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day or shift. The relevant Task-Based Risk Assessment for the activity must be used as the basis for the discussion. The correct work method must be reiterated and the identified hazards, risks and control measures must be discussed with the team (each team member must be given the opportunity to contribute and participate in the discussion).

Any team member arriving late must first be taken through the information that was discussed (work method, hazards, risks and control measures) before being permitted to start working. If the work method changes after activities have already begun, the DSTI must be revisited and updated with the team, and the changes must be signed off by the appointed Construction Health and Safety Officer of the contractor.

Every member of the work team must sign the DSTI attendance register. The attendance records must be kept and maintained in each Contractor's health and safety file.

The Contractor's Health and Safety Officer must evaluate the content of the DSTI's daily to ensure that they are task-specific. Furthermore, the Health and Safety Officer must attend at least one DSTI per day prior to the start of work. The Health and Safety Officer may not lead the DSTI discussions, as this is the responsibility of the appointed Supervisor.

11.3.4 Suggestions

All employees must be encouraged to submit suggestions to enhance health and safety management on the project site(s). A process must be in place for documenting, evaluating, implementing (as appropriate), archiving and recognising the improvement ideas.

11.4 Meetings

11.4.1 Principal Contractor health and safety Meetings

The principal contractor must schedule and consistently hold weekly health and safety meetings.

These meetings must be chaired by the contractor's Construction Manager and the following personnel must be in attendance:

- Principal contractor and contractor's supervisors;
- Principal contractor and contractors appointed Health and Safety (Employee) Representatives;
- Principal contractor and contractors Health and Safety Officers;

The meeting must address the following as a minimum: New incidents for the period and corrective / preventive actions taken or to be taken; and implementation status of outstanding actions associated with previous incidents; and Safety Observations and Coaching, PTO's and DSTI's carried out for the period and action required to correct trends identified; Results of any audits, inspections (including H&S Rep inspections) or site visits carried out; A look ahead to ensure that appropriate health and safety planning and preparation is done for upcoming work; Risk Assessments, Safe Work Procedures, etc. that are outstanding or due for review (as well as the quality of these documents); and any other health and safety related matter. The contractor must compile minutes of each meeting and

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attendance records must be kept. These records must be maintained in the contractor's health and safety file which must be made available to a Client's project manager on request.

11.4.2 Project health and safety Meetings

In addition to the weekly Contractor Health and Safety Meetings, project management will schedule monthly Site Health and Safety Meetings that each contractor will be required to attend. Attendance will be as follows:

The contractor management representative; the contractor Health and Safety Officer(s); a contractor Health and Safety (Employee) Representative; a project management representative; the project Health and Safety Manager; and the meeting will address the following as a minimum:

- Feedback from each contractor concerning health and safety performance for the period;
- New incidents for the period and corrective / preventive actions taken or to be taken;
- Implementation status of outstanding actions associated with previous incidents;
- Safety Observations and Coaching, PTO's and DSTI's carried out for the period and action required to correct trends identified;
- Results of any audits, inspections or site visits carried out;
- A look ahead to ensure that appropriate health and safety planning and preparation is done for upcoming work; Risk Assessments, Safe Work Procedures, etc. that are outstanding or due for review; and
- Any other health and safety related matter.

11.4.3 Health and Safety Performance Boards

Each Contractor must provide and maintain a Performance Board to be accepted by the Client's Project Manager and to be positioned at the entrance to the Contractor's site office area. This board must display the following information as a minimum:

- The Contractor's logo;
- Current manpower (heads) on site;
- Man-hours worked for the current month and project to date;
- Lost Time Injury Frequency Rate (LTIFR);
- Dates of last injuries (FAI, MTI and LTI);
- Number of hours worked since the last recorded LTI; and
- Names and contact telephone numbers for the appointed Project Manager and the Health and Safety Officers.

11.4.4 Safety Management Information Notice Boards

For each area, the contractor must provide a portable Health and Safety Management Information notice board to be placed in the work area. The following information / documents, as a minimum, must be posted on these boards:

- The relevant Risk Assessments for the work that is being performed that day;
- The DSTI(s) for the day; the most recent Toolbox Talk;
- Where applicable, all required permits and permissions for the work that is being performed;

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- Emergency procedures; Safety Data Sheets (SDS's) for any chemical substances being used; and the appointed Supervisor's contact details.

12. Documentation and Document Control

The principal contractor must develop, implement and maintain a documented system of health and safety related manuals, plans, procedures and work instructions. Safe Work Procedures must be developed and implemented for all activities involving significant health, safety or environmental risk.

All documents and data related to the health and safety management system must be effectively controlled. The document control process must:

- Provide for the review, revision and version control of documents;
- Uniquely identify documents (as appropriate) to control their business use and function;
- Require approval of the documents for adequacy prior to issue;
- Clearly identify changes and record the status of any revisions to documents; and
- Provide for the effective distribution of documents to, and where necessary the timely removal of obsolete documents from, all points of issue and use.

A file containing all required health and safety related documentation (approved) must be compiled and maintained as per construction regulation 7.1.b. The contents of the file will be audited by the Appointed Construction Health and Safety Agent on a monthly basis. On appointing a contractor, the principal contractor must ensure that the contractor opens and keeps on site a file containing all required health and safety related documentation (approved) must be compiled and maintained as per construction regulation 7.2.b. The responsibility for auditing the contractor falls on the principal contractors and must be completed at least once every 30 days.

Documentation required by the principal contractor includes, but is not limited to, the following:

- Letter of Good Standing from the Workman's Compensation Commissioner (where applicable);
- Proof of Public Liability Insurance; and scope of work under the contract;
- List of Contacts and their Telephone Numbers;
- Health and Safety Policy; and Health and Safety Management Plan;
- Legal Register (electronic or hard copy); and Organisational Chart for the project;
- Appointment Letters (appointment of the contracting company, and appointments for all persons with health and safety related responsibilities);
- Construction Work Permit;
- Register of Risks, Baseline and Issue-Based (Task-Based) Risk Assessments, Safe Work Procedures, Work Instructions; Work Method Statements; and Planned Task Observations;
- Fall Protection Plan (for work at height);
- A dossier (Equipment Profile) for each fuel-driven vehicle, machine or marine vessel;
- Inspection Registers, Forms and Checklists (e.g. for portable electrical tools, ladders, safety harnesses, vehicles, cranes and lifting equipment, first aid boxes, fire extinguishers, etc.);
- PPE Issue Registers and relevant Safety Data Sheets;
- Emergency Response Procedures;
- -Incident Records;
- A dossier (Employee Profile) for each employee containing:
 - A copy of the employee's Identity Document or Passport;

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- Certificate of Fitness and Annexure 3;
- Proof of Induction Training;
- Other Training Records;
- Copies of Qualification Certificates and / or Certificates of Competency; and
- Copies of Licences;
- Meeting Minutes;
- HEALTH AND SAFETY Performance Reports;
- Copies of Inspection and Audit Reports; and
- Daily Safe Task Instructions (DSTI's) and Toolbox Talks.

The principal contractor must ensure that an equivalent file is compiled and maintained by each appointed contractor.

13. Operational Control

Each contractor must develop and document procedures and / or work instructions that detail the controls required for effectively managing the health and safety risks associated with its work activities. These procedures must reference applicable operating requirements, be communicated to all relevant personnel, be available to the appropriate users, and be implemented / followed.

Furthermore, the contractor must develop, document, communicate and implement procedures and / or work instructions for the operation and maintenance of plant and equipment. Plant and equipment must be maintained, inspected and tested to ensure safe operation and to ensure that it meets design descriptions and specifications.

Each contractor must ensure that all moving parts of Machinery and equipment is effectively guarded to ensure no accidental contact can be made with the moving part. The contractor must ensure that those covers that are removable for maintenance purposes cannot be accessed during the normal operation of the machinery or equipment.

The contractor must comply with the following operational control requirements for the project:

13.1 Safe Work Procedures

Each contractor must develop, document and implement Safe Work Procedures for all activities. These procedures must detail the control measures required to effectively manage the health and safety risks associated with the work activities.

Each contractor to develop a procedure taking into account daily weather forecast as well as 48 Hour wave height forecast for planning of activities on breakwater.

Each Safe Work Procedure must be consistent with the Task-Based Risk Assessment completed for the activity.

Every person engaged in an activity for which a Safe Work Procedure has been developed must receive suitable training on the procedure.

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Furthermore, the Contractor must develop, document, communicate and implement formal procedures, work instructions and / or programmes for the operation, maintenance, inspection and testing of all plant and equipment (including protective systems and devices) brought onto the project.

13.2 Planned Task Observations

All Contractor management, safety officers and supervisors must perform Planned Task Observations (PTO's) to verify that the control measures that have been identified in Risk Assessments (and associated Safe Work Procedures) are being adhered to and are being properly implemented, and to provide guidance where deviations are noted.

Each contractor must develop a Monitoring and Review Plan for risk assessments as contemplated in Construction Regulation 9 that includes the both the requirements of legislation and those stipulated in this specification.

Each safety officers and supervisor must complete at least one PTO per day involving one or more employees in his work team.

When an unsafe act or condition is identified, the supervisor must coach the work team to correct the act or condition in line with the Risk Assessments (and associated Safe Work Procedures).

Where valid changes to the work method are identified, the supervisor must ensure that the Safe Work Procedure and Risk Assessment are updated to reflect the current practice.

Project representatives will carry out PTO's on Contractor employees on an ad hoc basis. Should deviations from the contractor's Risk Assessments and associated Safe Work Procedure be observed, the work may be stopped until these deviations are rectified.

13.3 General Rules of Conduct

All persons are required to conform to the following rules of conduct while on the site.

The following acts are prohibited:

- Engaging in practical jokes, horseplay, scuffling, wrestling, fighting, or gambling;
- Assault, intimidation, or abuse of any person;
- Insubordination towards any *Supervisor* or manager;
- Refusing to carry out a reasonable and lawful instruction concerning health and safety;
- Entry into any restricted area (including barricaded areas), unless authorised to do so by the responsible person;
- Unauthorised use / operation of any equipment or machinery;
- Negligently, carelessly or willfully causing damage to any property;
- Destroying or tampering with safety devices, signs, or signals;
- The use of water from fire hydrants or hose reels for any purpose other than extinguishing a fire;
- The willful and unnecessary discharging of fire extinguishers;

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- Refusing to give evidence or deliberately making false statements during incident investigations;
- Bringing alcohol, drugs, or any other intoxicating substance onto site;
- Bringing a firearm, ammunition, or any other offensive weapon onto site;
- Bringing animals onto site;
- Running, except in an emergency;
- The use of any type of earphones or ear pods whilst working on site;
- Sleeping on the job;
- Building fires on site, unless in a suitably constructed barbequing facility; and
- Pouring / pumping / flushing any substance (chemical / hydrocarbon / waste water) into a storm water drain, onto bare soil, or into any area where the substance is not effectively contained.
- Urinating on site

Any of the above actions may result in the temporary or permanent removal of the offending person(s) from site, as well as possible prosecution.

Transnet will not get involved in Contractor disciplinary rules and procedures. The Contractor will simply be informed (with reasons) that the offending employee(s) will be denied access to the project site. Once the Contractor has been informed, the employee(s) must be removed from the site immediately.

13.4 Site Access

The principal contractor may not hire any security services for the project site unless acceptance has been obtained in writing from the Project Manager.

The principal contractor must ensure that the site lay down as well as North breakwater construction area is adequately fenced off as indicated in the commercial documentation and technical layout drawings.

The principal contractor must ensure that access to the helipad, ski boat club and beach south of the north breakwater remains accessible to the public. The principal contractor must ensure that any interface between laydown area, construction area and public access is managed by the North breakwater traffic management plan.

13.4.1 Access Control

Each contractor must comply with all access control, procedures and systems applicable to the project site.

Failure to comply with these requirements will be viewed as a serious safety breach and may result in the permanent removal of the individual(s) / contracting company from site or suspension without payment.

Access will be controlled as follows:

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- The access will be strictly controlled and managed
- Contract period access – an access card valid for the full contract period will be issued to an individual once the following requirements have been met:
 - Completion of a pre-employment medical examination (SAMSA requirements included);
 - Completion of all required project induction training;
 - Completion of task specific risk assessment training;
 - Completion of special training / licensing if applicable (e.g. Driving/operating Licence); and
 - Provision for proof of job / trade-specific qualifications, licences, training, experience and competency (as required).

Note: No access card will be issued unless proof of identification is provided (i.e. an identity document or a valid passport). For foreign labour, an access card will only be issued if a valid work visa is produced.

Note: A driving licence will not be accepted as proof of identification.

13.4.2 Trespassing

The principal contractor must ensure that no employee (including contractor employees) trespasses on any land or water / shipping lanes lying beyond the boundaries of the project site.

If instructed by the Project Manager to do so, the contractor must remove any employee who fails to comply with this requirement from the project.

Each contractor's activities must be confined to the specified construction areas, and access to these areas may only be by means of specified routes.

All required barricading (fencing) must be erected and maintained by the contractor. Site fencing must be at least 1,8 meters in height with controlled access points.

13.4.3 Visitors

Visitors (including reps and suppliers) must be advised in advance of the mandatory Personal Protective Equipment (PPE) requirements for the site, and must arrive with all of this PPE. Upon arrival, all visitors must report to the Security Office where they must sign in. All visitors must undergo a visitor induction briefing before entering the site.

A visitor access card will be issued to each visitor on conclusion of the induction briefing.

Whilst on site, visitors must be accompanied at all times by an appropriately senior employee who has been fully inducted. The visitor(s) must be met at the Security Office, and when the visit is over, must be escorted back to the Security Office.

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When leaving the site, each visitor must return his or her visitor access card to the security personnel posted at the entrance / exit. A visitor will not be permitted to leave the site until he or she produces the access card that was issued.

Note: Visitors are not permitted to perform any work on site.

Note: Any request (typically made by a government official) to carry out a site inspection must be referred to the Project Manager. The contractor must not arrange any such inspection without prior acceptance from the Project Manager.

13.4.4 Alcohol, Drugs and Other Intoxicating Substances

The principal contractor must ensure that all personnel under his authority do not at any time enter the site or perform any work whilst appearing to be under the influence of alcohol, a drug, or any other intoxicating substance.

Selling or possessing drugs, alcoholic beverages or any other intoxicating substance on the site is strictly prohibited.

A drugs and alcohol testing program will be implemented. Persons entering the site will be randomly tested. Any person who tests positive for alcohol or drug consumption will be subject to disciplinary action and shall be permanently removed from the site.

Any person have the opportunity to rather report that he/she is under the influence before accessing the project site – in these case the employee may only be send home for the day by the responsible project manager representative but will then be tested for the following five days (each day) on his return to the project site. If it is found that the same person is frequently reporting that he/she is under the influence before even accessing the project site. It shall be the responsibility of the Project Manager to take disciplinary action and remove such a person's form the project site.

Should the actions and / or demeanour of an employee suggest possible narcosis or drunkenness, the employee must be removed from the site. This may be done without testing.

Note: All personnel involved in an incident / accident must immediately be subjected to an alcohol test and a drug test as part of the investigation.

13.4.5 Firearms, Ammunition and Offensive Weapons

Firearms, ammunition, and weapons of any kind are strictly prohibited. No person may enter /shall not be permitted to enter the site carrying any such item.

13.4.6 Marine Vessels

No marine construction vessel may enter the port unless all the required TNPA and SAMSA requirements are met. All vessels will be correctly moored taking into account the expected tides during mooring. All Marine vessels will be under the direct instruction of a competent person (Skipper) at all times when in operation. The weather forecast as well as the tide forecast as identified in the

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baseline risk assessment will be at hand on the vessel as well as be taken into account for all planned activities for marine vessels.

The principal contractor will ensure that all required authorizations are in place for planned marine construction activities. The principal contractor will ensure that the marine construction area is demarcated with buoys to ensure the area is not entered accidentally by commercial and public vessels. The demarcation layout must be approved by the Harbour Master prior to implementation.

No diving work may be performed unless the principal contractor complies to the requirements of the diving regulations and this specification.

The principal contractor will ensure that all Marine vessels and barges used are in compliance with TNPA and SAMSA requirements.

An Equipment Profile (dossier) must be compiled for each marine vessel to be used on the project site. The principal contractor will number each profile and ensure that a register is kept indicating mobilization date, inspection date, approval date and demobilization date.

All Marine vessels to be used on the project will be approved by the local Harbour master before being allowed to be used on the project, this includes all vessels used for transporting of Employees and material as well as vessels used for construction activities. Each vessel will be under the control of a competent skipper at all times while in use.

All marine vessels (used on the project) must be subject to a risk assessment. The assessment must:

- Involve operators and maintenance personnel who will use and work on the vessel;
- Address all aspects of safe operation including handling, vision, activities on the water, wave and weather conditions, launching and removal of vessels from the water, mooring as well as access and egress for employees and maintenance personnel; and
- Vessel movement planning to be developed and submitted to the project manager and harbour master for approval when travelling or working next to, on or across water ways.

13.4.7 Mobile Equipment, Construction Plant

The principal contractor must ensure all applicable legislation concerning mobile equipment and light vehicles are complied with at all times.

The principal contractor must provide evidence to the Client or his Agent that all light vehicles and mobile equipment to be used on the project (including, but not limited to, lift and carry cranes (or mobi-lifts), mobile cranes, forklifts, mobile elevating work platforms (MEWP's), dump trucks, haul trucks, loaders and road-going cars, light delivery vehicles, and trucks) comply with the requirements of all applicable legislation. This evidence must be provided prior to the equipment being brought onto the project site in the form of an equipment profile. The principal contractor remains responsible for meeting this requirement even if the equipment to be used is leased or provided by a contractor (i.e. not owned directly by The principal contractor).

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An Equipment Profile (dossier) must be compiled for each light vehicle, each item of mobile equipment to be used on the project site. The principal contractor will number each profile and ensure that a register is kept indicating mobilization date, inspection date, approval date and demobilization date.

All mobile equipment and light vehicles (used on the project) must be subject to a risk assessment. The assessment must:

- Involve operators and maintenance personnel who will use and work on the equipment; and
- Address all aspects of safe operation including handling, driver vision, brake failure, tyre blow out, and access and egress for operators and maintenance personnel.
- Traffic management plan to be developed and submitted to the project manager for approval when travelling on public roads

Each light vehicle and each item of mobile equipment must be serviced and maintained as prescribed by the manufacturer of the vehicle or equipment.

No major repairs or services may be carried out on site.

No repairs may be carried out by a driver or operator. Only suitably qualified and competent persons may carry out repair work.

An appropriate pre-operation safety check based on a risk assessment must be carried out for each light vehicle or item of mobile equipment driven or operated for work purposes. For each vehicle or equipment type, an approved checklist must be in place (and must be used). The pre-operation check must include, but not be limited to, inspection and / or testing of the following safety critical features:

- Brakes (testing method must be provided);
- Wheels and tyres (including the spare);
- Lights and indicators;
- Steering;
- Seats and seat belts; and
- Windscreen and windows, including windscreen wipers and washers.

Should any critical feature be defective or damaged, the vehicle or equipment may not be operated until it has been fully repaired.

Supervisors must review the completed checklists on a daily basis to satisfy themselves that there are no major deficiencies that could place a driver or operator at risk.

No person may drive or operate any light vehicle or item of mobile equipment without authorisation. All drivers and operators must be appointed in writing by the contractor.

No driver or operator may be appointed without proof that the individual has been trained, tested and found competent, or is currently licensed.

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The appointment letter must specify the type of vehicle or equipment for which authorisation is being given and must clearly confirm that the driver or operator:

- Is 18 (eighteen) years of age or older;
- Has undergone a medical examination and has been declared fit for work by an occupational medical practitioner; and
- Has received suitable training and has been found competent, or is in possession of a valid driving licence issued by a state, provincial or civil authority that is applicable to the class of vehicle or equipment that is to be driven or operated.

The principal accountability for preventing accidents and incidents lies with the driver or operator of a light vehicle or item of mobile equipment, as he is in full control of any given situation at any given time. It must be stressed to each driver and each operator that safety is his prime responsibility – this must be clearly instructed and understood.

Drivers and operators must be empowered to stop driving or operating immediately should an unsafe condition arise, and refuse to drive or operate any light vehicle or item of mobile equipment that is defective and / or has any inoperative safety features. Similarly, a *Supervisor* must never force a driver or operator to drive or operate a defective vehicle or item of equipment.

If a driver or operator does not adhere to the site rules and regulations, his appointment must be withdrawn and he must not be permitted to continue with his duties. If necessary, site access will be denied (either temporarily or permanently) to any driver or operator who is deemed to not be adhering to site requirements.

No person may drive or operate a light vehicle or item of mobile equipment if he suffers from a medical condition that places both him and those around him at risk of injury.

A fit-for-work policy must be in place, incorporating clearly defined maximum levels of drugs (including prescribed medication) and alcohol permitted in the system of a driver or operator.

Daily alcohol testing and random drug testing must be carried out.

Supervisors must regularly check on the physical condition of drivers and operators during the course of a shift.

A system must be in place to manage driver fatigue.

No eating or drinking is permitted while driving or operating a light vehicle or item of mobile equipment.

A mobile phone, whether hands-free or not, may only be used by the driver or operator of a light vehicle or item of mobile equipment when the vehicle or equipment is stationary and in a safe location. Behaviour-based observations and coaching must include the operation of light vehicles and mobile equipment.

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All light vehicles and mobile equipment must give way to emergency vehicles.

Pedestrians and light vehicle drivers must be made aware of the blind spots associated with mobile equipment.

The driver or operator of a light vehicle or item of mobile equipment must stop the vehicle or equipment and sound the horn before proceeding at blind corners, where his view of the path or intended path is obstructed, and when entering or leaving a building.

Whenever a light vehicle or item of mobile equipment is stopped or parked, the handbrake (if applicable) must be applied.

Measures (such as chocking or the use of ditches or trenches) must be in place for the immobilization of parked mobile equipment.

A parked light vehicle must be chocked in situations where the vehicle would roll forwards or backwards if placed in neutral with the handbrake disengaged.

No light vehicle or item of mobile equipment may be left unattended with the engine running or with a key in the ignition.

No light vehicle or item of mobile equipment may be parked so as to cause an obstruction to any roadway, passage or access way.

No light vehicle or item of mobile equipment may be parked within 50 metres of a loading or off-loading point.

Light vehicles and mobile equipment must be loaded safely. All loads must be secure and must be within the load limit of the vehicle or equipment. A load must be properly secured before the vehicle or equipment is set in motion. Adequate precautions must be taken for any overhanging load.

No unauthorised light vehicle or item of mobile equipment may enter a restricted area or building.

The principal contractor must ensure that Light vehicles have the following minimum safety features:

- Fixed seats and suitable seat (safety) belts for all occupants (i.e. Driver and all passengers);
- Cargo barriers and load restraints for all vehicles designed for carrying loads (other than passengers), or that are unable to have cargo separated from the occupant-carrying space of the vehicle; and
- An air bag on the driver's side, and where available as a manufacturer fitted item, a passenger's air bag;
- A Reverse Alarm.

The principal contractor must ensure that Light vehicles carry:

- Emergency roadside triangles or beacons (three of either);
- Chock blocks for preventing uncontrolled movement of the vehicle when parked;

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- A flashlight;
- A fire extinguisher (2.5kg DCP);
- A first aid kit; and
- Survival or emergency equipment (e.g. a vehicle recovery kit) suitable for the operating environment.

A change management process must accompany all vehicle modifications, including the attachment of any equipment. Examples of changes or modifications include, but are not limited to, any change or modification:

- Made to the overall structure or design of the vehicle body;
- Made to the original manufacturer-fitted type of tyres or wheels;
- Made to the suspension system of the vehicle;
- Made to the mechanical system of the vehicle;
- That may adversely alter the centre of gravity of the vehicle;
- That alters the load carrying capacity of the vehicle; and
- That may affect the ability of the vehicle to withstand a crash (e.g. the fitment of a "bull bar").

Vehicle selection must be based on a risk assessment where consideration is given to the tasks, the application, the environment, roll-over protection and the rating of sturdiness in the event of a crash.

Persons may only be transported in vehicles equipped with manufacturer fitted or approved seats and seat belts. Persons traveling with or involved with the transportation of the 20t dolos units on the low bed must be transported separately to the cargo.

Seat belts must be worn by all occupants of a light vehicle (i.e. the driver and all passengers) at all times.

Only the driver and one passenger are permitted in the cab (front) of a light delivery vehicle or low bed trucks.

No personnel may be transported in the load-bin of a light delivery vehicle or low bed, even if the vehicle is fitted with a canopy. Only tools and equipment may be transported in the load-bin. Furthermore, no persons may be transported in a trailer behind a vehicle.

A pre-operation vehicle safety check and familiarisation system must be in place and must be used by the driver. An approved checklist must be used. All vehicle faults that are recorded must be attended to immediately.

The principal contractor must have systems in place to ensure that risks associated with vehicle journeys are managed and controlled. The systems must include, but not be limited to:

- Formulation of journey management plans prior to the commencement of new or changed travel activities;
- Identification and monitoring of the risks associated with the various routes, intersections, etc. In order to minimise the overall exposure;
- Assessment and communication of changed environmental and road conditions at the time of travel;

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- Outlining of actions required in the event of an emergency (e.g. Collision or breakdown); and
- Provision to manage driver fatigue.

Light vehicle running lights (low-beam headlights) must be switched on at all times when the vehicle is in operation.

The principal contractor must have a system in place to ensure that drivers receive adequate training to ensure that the vehicle intended to be operated or driven can be operated or driven safely. As a minimum, training must include:

- Behaviour-based defensive driving principles;
- Vehicle familiarisation, taking into account the handling dynamics of the vehicle, maximum number of passengers, load limits and various features;
- Loading and restraining principles where the vehicle to be operated is designed for carrying cargo loads;
- Education and awareness concerning driving and travel risks that may be encountered within the environment where the vehicle may be operated or driven, and the requirements pertaining to traffic rules and speed limits;
- Securing (locking) equipment to prevent unauthorised use;
- Emergency crash and breakdown procedures; and
- Basic mechanical principles, including how to change a tyre and perform an adequate pre-operation check.

A system must be in place to ensure that persons operating any equipment associated with a light vehicle (e.g. Vehicle-mounted cranes and winches) are suitably trained and competent.

13.4.8 Training and Licensing

No person may drive a light vehicle or operate an item of mobile equipment unless he has been trained, tested and found competent, or is currently licensed to drive or operate that specific vehicle or item of equipment.

The training must address hazards and risks assessed for:

- That vehicle; and
- The tasks for which it is to be used.

No person may be appointed to drive a light vehicle or operate an item of mobile equipment unless he is in possession of a valid medical certificate of fitness (issued by an occupational medical practitioner).

Each person required to drive a light vehicle or operate an item of mobile equipment on the project site must have a project-specific site licence or appointment to drive or operate that vehicle or item of equipment.

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A system must be in place to ensure that the renewal of licences is based on an assessment of competency to drive and / or operate the vehicle or equipment. The frequency of assessment must either be annual, or derived from a risk assessment for each vehicle or equipment type.

No training of drivers or operators may be carried out on site unless accepted by the Project Manager.

Each person working on or visiting the project site must receive appropriate project-specific induction training concerning road safety and site vehicle hazards.

Driver must be in position of valid certificate, licence and trained by an accredited service provider.

13.5 Signs and Notices

The principal contractor must ensure that all required safety signs and notices are prominently displayed in accordance with the applicable legislation and good safety practice.

Signs and notices must be in English as well as any other language(s) commonly spoken on the project site.

All symbolic signs must comply with the applicable national standards.

No person may deface or damage any safety sign or notice. No person may remove or alter any safety sign or notice unless authorised to do so.

13.6 Batch Plant

The principal contractor must ensure that all moving parts of the concrete batching plant is covered by guarding or other similar means. The principal contractor must ensure that dust mitigation measures are implemented to ensure minimal dust during the receiving of cement dust as well as the batching process.

The principal contractor will appoint a competent person to supervise the bulk mixing operation. The appointed supervisor must ensure that a risk assessment is in place for all the activities pertaining to the mixing operation as well as plant maintenance and refilling of silo's. The risk assessment monitoring process must be applied to the implemented risk assessment to ensure employees working with the operational plant is conversant with both the hazards as well as the control measures stated in the risk assessment.

No other employee may be authorised to operate the bulk mixing plant by the supervisor or operator.

The principal contractor must ensure that the placement and erection of the bulk mixing plant complies with the requirements set out by the manufacturer and that the plant is erected as per the approved design.

The principal contractor must ensure that all devices used to safely start and stop the plant are:

- Placed in an easily accessible position; and

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- Constructed in a manner to prevent accidental starting.

The principal contractor must ensure that a maintenance record escaped of all repairs and maintenance and that this record is available on-site for inspection by the department of labour, the client or his agent.

The principal contractor must ensure that no person enters the silo without a confined space permit and specific risk assessment for the confined space work to be conducted.

13.7 Stockpiling

The principal contractor must ensure that a risk assessment for the activities involved in stock planning is facilitated, the risk assessment must address the stockpiling activity as well as the management of high walls.

The stockpiling activity will be assigned to a competent supervisor that will supervise the activities and ensure compliance to the control measures stipulated in the risk assessment.

The principal contractor must ensure that all stockpiling areas inclusive of traffic routes and haul roads are indicated on the traffic management plan. The traffic management plan must indicate machine-vehicle, vehicle-vehicle, vehicle-pedestrian interaction. The principal contractor must ensure that all material tipping activities are done on a level, stable surface.

No material stockpile may be higher than 4 m. The principal contractor must ensure that when material is sourced from a stockpile the activity does not create a high wall that can collapse onto the mobile equipment or employees in the area.

The principal contractor must ensure that delivery vehicles that comes to site comply with the requirements of the Port of Richards bay as well as this specification. The principal contractor will ensure that drivers of vehicles transporting material on-site comply to the mobilization requirements of the project.

The principal contractor will ensure that drivers of delivery vehicles are fit for work, competent and have a valid certificate of fitness.

13.8 Machinery

The principal contractor must ensure that all plant and equipment brought onto the site is:

- Appropriate for the type of work to be performed
- Approved, inspected, tested, numbered and tagged (if appropriate) before being brought onto site
- Properly maintained in accordance with the manufacturer's recommendations; and
- Placed on a register and checked at least once per month or as required by the applicable legislation.

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The principal contractor must supply, at his cost, all items of plant and equipment necessary to perform the work and must maintain all items in good working order.

Should any plant or equipment become inoperable for a period that is having or will have a significant impact on the work schedule, the *Contractor* must, on instruction from the *Project Manager*, remove the out of service plant or equipment and replace it with similar fully operational plant or equipment at no additional cost.

Items of plant or equipment brought onto site by the principal contractor or his contractor will be inspected by the Project Manager or Supervisor. Should the Project Manager or Supervisor determine that any item is inadequate, faulty, unsafe or in any other way unsuitable for the safe and satisfactory execution of the work for which it is intended, the principal contractor must, on instruction from the Project Manager, immediately remove the item from the site and replace it with a safe and adequate substitute. In such a case, the principal contractor or his contractor shall not be entitled to additional payments or deadline extensions in respect of any delay caused.

13.9 Barricading

Where the principal contractor is required to erect barricading on the project the principal contractor must develop, document and implement Safe Work Procedures that are aligned with the requirements of this standard.

Barricading must be erected to:

- Prevent persons from making contact with an identified hazard;
- Provide warning of the existence of a hazard;
- Prevent unauthorised access (by people, vehicles and mobile equipment) into an area where a hazard exists or where a hazardous activity is being carried out;
- Define the boundaries of a hazardous location and / or restricted area; and
- Allow a work team to perform hazardous tasks without persons unfamiliar with the hazard(s) accessing the area.

Although not limited to these situations, barricading must be erected or installed:

- Around excavations (trenches, pits, etc.) (refer to the Excavation Standard);
- To protect openings and edges (to prevent persons from falling, all openings and edges associated with floors, stairs, and the open sides of buildings and structures during the course of construction must be protected by sturdy, rigid barriers capable of withstanding a force of at least 110 kilograms applied in any direction at any point) (refer to the Working at Heights Standard);
- To prevent access into areas where overhead work is in progress;
- To route vehicles safely through (or around) construction areas; and
- To protect members of the public who may be in the vicinity of a work or construction site (by preventing access).

In all cases, the erection of barricading must be a temporary measure. It must only remain in place until the hazard is eliminated or the potentially dangerous situation is rectified.

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A barricade must present a sturdy physical barrier to entering an area. Therefore, plastic cones, post and chain systems, "danger tape" and "snow netting" will not be accepted as barricading and may only be used for the purposes of low risk demarcation.

For example, snow netting may be used for the demarcation of lay down areas.

Acceptable forms of barricading include:

- Hoarding panels (no less than one metre in height) that can be securely fastened together to form a fence line may be used. Hoarding panels may be constructed from a variety of materials (e.g. wooden board, steel sheeting, wire mesh on a steel frame, etc.)
- Wire mesh fencing (no less than one metre in height with sturdy posts spaced at intervals of no more than 3 metres) may be used in certain circumstances, e.g. Around excavations.
- Sturdy, rigid, and securely fixed (i.e. bolted, welded, clamped, etc.) Metal guard rails may be used, particularly for protecting openings, holes and edges associated with floors, platforms, walkways, etc. The top rail must be positioned at a height of one metre above the working surface, and a mid-rail must be provided.
- Concrete Jersey barriers must be used for the routing of traffic and when work is being conducted in or alongside a roadway.

Regardless of the type of barricade used, the following requirements must be met:

- The installation, alteration and removal of barricades must be supervised by a competent person;
- The barricading must be uniformly and intelligently configured;
- The barricading must be stable, conspicuous and effective;
- The barricading must completely surround the work or hazardous area;
- General access requirements around the work or hazardous area (such as pedestrian walkways, operational access, or general thoroughfares) must be taken into consideration when erecting a barricade;
- The extent of the area that is barricaded must be kept to a minimum so as not to unnecessarily restrict access to other areas. If access routes to other areas are blocked by the barricade, alternative routes must be identified and signposted
- All barricaded areas must have properly designated points of entry and exit for persons and / or vehicles. Each pedestrian access point must be fitted with a self-closing gate. A sign indicating, "DESIGNATED ACCESS POINT – AUTHORISED PERSONNEL ONLY", must be fitted to each gate;
- Additional signage providing warning of specific hazards (e.g. falling objects, electricity, etc.) Including, "NO UNAUTHORISED ENTRY", must be attached to all gates and, where required, to the barricading itself. The signage must be visible from all angles and must be large enough to be read from a distance of 10 metres;
- Barricading must be clearly visible at all times (day and night). If necessary, flashing warning lights must be used;

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- Tags must be attached to the barricading displaying the name and cell phone number of the person responsible for the barricade, and specifying the reason for the barricading and the date on which it is scheduled to be removed;
- Should a person require access to a barricaded area, authorisation must be obtained from the person responsible for the erection of the barricade. The hazards that are present and the Personal Protective Equipment that must be worn within the barricaded area must be communicated to the person seeking access;
- Each barricade must be listed in a register, and each must be inspected daily to ensure that it is still intact and that its positioning is still effective;
- All barricades must be properly maintained and repaired as required;
- When the work has been completed and the hazard has been eliminated, all barricading must be removed without delay. A barricade may not be left in place if no hazard exists;
- Before a barricade is removed (allowing general access), the area must be inspected by the person responsible for the work that was carried out, to ensure that the area is once again safe. If applicable, the person accepting the area back for general use shall do so on completion of his own safety inspection;
- Authorisation to remove (or modify) a barricade may only be granted by the person responsible for the erection of the barricade.

13.10 Cranes and lifting equipment

13.10.1 Design, Manufacturing and Safety Features

Before any crane / hoist is operated on the project premises (i.e. new to site), it must be formally accepted (authorised) by the nominated project management representative. The acceptance process must be based on an inspection and must take the crane's / hoist's safety features and cabin ergonomics (if applicable) into account. The same process must be followed before any crane / hoist is returned to service following any modification or repair. Note: An equipment profile (dossier) must be compiled for each crane.

The Safe Working Load (SWL) must be clearly indicated on each crane, hoist, and item of lifting equipment. If the safe working load (rated capacity) of a crane varies with the conditions of use (i.e. varies with the angle of the boom and the boom length) then the manufacturer's load chart(s) indicating the crane's rated capacity at various boom lengths and angles must be available in the crane cabin. If the crane has a single load chart, it must be displayed in a position visible to the crane operator. If the crane has numerous load charts, they must be easily accessible to the operator.

Each crane, hoist, the manufacturer's operating manual must be available to the operator. The load chart(s) and operating manual for a crane / hoist must be in a language understood by the operator.

All lifting hooks must be fitted with a safety latch to prevent the load from accidentally detaching, unless otherwise specified in a risk assessment.

Each crane / hoist must be fitted with a load cell (with the mass of the load displayed in the visual range of the operator) and a load limiting device to prevent the crane / hoist from being operated outside of its safe working limits.

Where practicable, each crane must be equipped with an upper hoist limit switch (or anti two block device) to prevent the hook block from colliding with the drum, and a lower hoist limit switch to prevent the rope on the drum from unwinding completely. These systems must provide both a visual and an audible alarm to the operator. Under no circumstances may any limit switch or warning device

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be bypassed, disconnected, or adjusted in order to lift a load higher, or lower a load lower, than the respective switches allow.

Limit switches MAY NOT be adjusted to stop the hoist at a particular height under normal operating conditions – these are safety devices, and as such, should not be used as operating tools. Under no circumstances may a load limiting device be bypassed or disconnected in order to lift a load that exceeds the rated capacity of the crane.

Load limiting devices MAY NOT be used to “measure” or “test” the mass of a load – these are safety devices, and as such, should not be used as operating tools. Each overhead travelling crane (including cranes operated using a manual chain drive) must be fitted with an audible travel alarm or an equivalent warning device.

Only items of lifting equipment (tackle) that have been designed and manufactured with adequate factors of safety may be used on site. The following minimum factors of safety (with respect to the Safe Working Load) must be met: Ten (10) for natural-fibre ropes; Six (6) for synthetic-fibre ropes or woven webbing; Six (6) for steel-wire ropes; Five (5) for steel chains; and Four (4) for high-tensile or alloy steel chains.

13.10.2 Planning and risk assessment

For each critical lift that must be carried out on site, a documented and detailed lift plan and risk assessment must be prepared to address all associated hazards. Only suitable qualified, competent and experienced persons (lift planners) may evaluate critical lifts and prepare lift plans.

The lifting supervisor, crane operators, riggers and spotters responsible for carrying out a critical lift must have input into the lift plan and risk assessment and must be consulted before these documents are finalised. All lift planners, lifting supervisors, crane operators, and riggers must be appointed in writing.

No road closures may be affected without approval from TNPA or the applicable roads agency.

No critical lift may commence until the lift plan and risk assessment have been authorised by the nominated project management representative. Critical lifts include:

- All multiple (including dual) crane lifts;
- Lifts where the operational arcs of two or more cranes can overlap;
- Lifts over operating facilities where this may endanger personnel;
- Lifts over or adjacent to power lines;
- Any lift carried out in close proximity to equipment or a vessel containing a flammable or toxic substance;
- Any lift carried out in close proximity to or placing a load on a marine vessel;
- Lifts where the centre of gravity of the load could change, inclusive of lifts where the placement is into the sea where waves and possible currents may affect the centre of gravity;
- Any lift where the total weight on the hook exceeds 50 tonnes;
- Lifts near the rated capacity of the crane (i.e. exceeding 85% of the rated capacity at the working radius);
- Any lift when the wind speed (including gusting) exceeds 32 kilometres per hour;
- Lifts involving a man basket / safety cage;
- Lifts to and from water;
- Lifts requiring specialised equipment or involving complicated lifting / rigging configurations;
- Lifts requiring non-standard rigging / slinging techniques;
- Lifts involving the simultaneous use of more than one hoist on the same crane; and
- Any other lift deemed to be critical by a nominated project management representative, or assessed as critical during a risk assessment.

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The lift plan for a critical lift must include:

- General Information – crane manufacturer, crane model, items to be lifted, and reason for lift;
- Lift Data – load weight, lifting block and hook weight, hoist rope weight, rigging weight, total weight, height of lift, radius of lift, surface area of load, and centre of gravity of load;
- Rigging Data – sling material (chain, wire rope, or synthetic), sling diameter, sling length, sling configuration, sling capacity, hook type, shackle size and capacity;
- Lift Computation – boom length, jib length, radius of lift, crane capacity as configured, size of outrigger footplates, and wind speed;
- Proximity to Power Lines – mobile cranes working in proximity to energised power lines must operate under a Permit to Work, which must define exclusion zones and spotter duties; and
- Local Hazards and Controls – including the route for the crane, ground stability, proximity of people or equipment, and agreed communication method.
- Weather - Daily weather forecast as well as 48 Hour wave height forecast to be taken into account when planning lifts from the breakwater into the sea.

Lifts that are not subject to detailed lift plans (i.e. lifts that are not considered critical) must nevertheless be risk assessed, be properly planned and executed. The use of a crane-suspended man basket (safety cage) may only be considered when all other avenues to safely perform the work (e.g. ladder, scaffolding, mobile elevating work platform, etc.) have been exhausted.

If a crane must be operated in proximity to energised overhead power lines (or any other exposed electrical conductors) then minimum clearance distances (specified by the electrical power utility or the nominated project management representative) must be observed. Whenever possible, power lines must be de-energised and isolated while lifting operations are carried out.

13.10.3 Operation

At the start of every day / shift, the operator of a crane / hoist must carry out a pre-operation safety check using a prescribed checklist. The specific requirements of the pre-operation safety check (and associated checklist) must be based on: Risk that addresses all aspects of safe operation of the crane / hoist; and the inspection recommendations of the manufacturer.

As a minimum, the pre-operation safety check must include: A thorough visual inspection of all wire ropes, chains, hooks and safety latches, hook blocks, sheaves, hydraulic hoses, electrical cables, and the general condition of the crane / hoist; Checks to confirm the serviceability of the operating controls; Tests to confirm the correct operation of all limit switches, emergency shutdowns, load indicators, alarms and other safety devices; and A thorough visual inspection of all lifting equipment (tackle) to be used.

The operator must:

- Check for any loose or missing parts;
- Make sure that the wire rope (or chain) of the hoist is properly seated in its drum and sheave grooves without any slack or overlapping;
- Operate each control to make sure it functions properly, releases immediately, and does not stick.
- Each control must be labelled to indicate its function;
- Listen for any unusual mechanical noises and look for any jerky movements while operating the crane and / or hoist several feet in each direction that it travels;
- Check the functionality of the upper and lower hoist limit switches (if applicable) by slowly raising and then lowering the block to trip the respective switches;
- Check all hooks. Hooks must not be cracked, stretched, bent or twisted. Each hook must have a safety latch that automatically closes the throat of the hook. If the latch is bent, has a

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- broken spring, or is otherwise damaged, it must be repaired before use. Hooks must rotate freely in the block assembly without any "grinding" felt or heard;
- Check the wire rope by lowering the block to its lowest level and looking for the following signs of damage: Reduced rope diameter. This may indicate that the rope has been stretched, has lost its inner core support, or has worn outside wires; Broken wire strands (any number); Kinked, crushed, cut, or "bird caged" wiring, or wiring with heat damage;
- Check all chains for damage including wear at contact points, cracks, or distorted links (bent, twisted or stretched). All mechanical coupling links must be inspected to ensure that the linking pins are secure and in good condition. The capacity rating of each chain must be adequate for the load and the attachment method;
- Check the condition and capacity of wire rope and nylon / synthetic web slings. Capacity ratings must be legible on the manufacturer's label. The capacity of the sling being used must be adequate for the load and the attachment method. A sling must be replaced immediately if it is excessively worn.

The operator must report any fault, defect or damage to his supervisor immediately. A crane / hoist must not be operated if any safety device is out of order or defective, or if any rope, chain, hook or other component is worn or damaged. Completed checklists must be made available (on request) for inspection by the nominated project management representative. Wherever possible, these checklists must be kept with the crane / hoist.

All lifting operations must be supervised by suitably qualified, competent and experienced supervisors.

An effective method of communication between the crane operator and those assisting with the lift must be in place and suitable Safe Work Procedures for crane operations.

13.10.4 Inspection, testing and maintenance

Any crane / hoist brought onto the project premises must have a current test certificate and record of inspection as well as a suitable checklist (derived from the crane / hoist manufacturer's inspection recommendations) for use by the operator(s) when carrying out pre-operational safety checks.

A register of all cranes / hoists and lifting equipment (tackle) brought onto the project premises must be compiled and maintained. Each crane / hoist and item of lifting equipment must have a unique identification code or number, which must be referenced in the register.

For each crane / hoist and item of lifting equipment, the following documentation must be kept on site and must be made available (on request) to the Client's project manager for inspection: Test records and certificates; Inspection records; and Maintenance records.

All cranes / hoists and lifting equipment must be inspected, tested and confirmed fit for purpose / accepted safe for use: Before being operated or put into service; Before being returned to service following any repair or modification; and Periodically as follows (unless local regulations require examination more frequently):

- Each crane / hoist (including all ropes, chains, hooks or other attaching devices, sheaves, brakes and safety devices that form an integral part of the crane / hoist) must be thoroughly examined by a competent, experienced and appointed person every 6 months;
- Each crane / hoist must be subjected to an annual performance test (i.e. a load test) by a competent, experienced registered authority; and
- All lifting equipment (tackle) must be thoroughly inspected by a competent, experienced and appointed person every 3 months.

The system of inspection and testing must provide verification that each crane / hoist is able to function to its design specifications, and must verify the integrity of: Mechanical and electrical components; Controls; Cables and all lifting attachments; Structural components including boom,

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hoist, brakes, wheels, hooks, baskets, out-riggers, hook-blocks and rails; and Load limiting devices, hoist limit switches, alarms / warning devices, and other safety devices and control systems (including independent fail-safe braking systems, devices to stop the crane / hoist such as a dead man's switch, and emergency shut-off switches).

A preventative maintenance system must be in place to ensure that all cranes / hoists are maintained in a safe and serviceable condition. For any crane / hoist, all inspections, testing, maintenance and repairs must, as a minimum, be carried out in compliance with the requirements and specifications of the manufacturer as well as all applicable regulatory requirements (in terms of both the frequency of inspection / testing / maintenance and the physical condition of the crane / hoist).

Repairs to a crane / hoist may only be carried out by competent persons. After repairs have been made, the crane / hoist must be tested and recertified fit for purpose (unless the repairs did not affect the integrity of the lifting mechanism).

Any modification to a crane / hoist must be subject to the approval of the original equipment manufacturer and a rigorous change management process.

Each item of lifting equipment (tackle) must be tagged following each quarterly (3-monthly) inspection. Details of these inspections must be recorded in the lifting equipment register which must be made available to the Client's project manager on request.

The following colour coding system must be used for the tagging of all lifting equipment on the project:

Table 2 - Lifting equipment colour coding

Quarter	Tag Colour
January – March	Blue
April – June	White
July – September	Green
October – December	Yellow

The tag placed on an item of lifting equipment must be traceable to an entry in the lifting equipment register where the following information concerning the inspection of that item of equipment must be recorded: Item description; Unique item identification code or number; Item owner; Date of inspection; Name and signature of competent person who carried out the inspection; and any comments concerning the inspection.

Any item of lifting equipment that is found to be damaged or defective must be removed from service (and tagged, "Out of Service") immediately and must then either be repaired and recertified (if possible) or destroyed to prevent further use. Similarly, any lifting equipment that is known (or is suspected) to have been overloaded must be removed from service immediately and destroyed to prevent further use. If an item of lifting equipment is removed from service or destroyed (scrapped), this must be indicated in the lifting equipment register. Any item of lifting equipment without a tag may not be used.

13.10.5 Training and Competency

Only suitably trained and competent persons who have been authorised in writing by the contractor's Construction/Project Manager are permitted to: Evaluate and plan critical lifts; Supervise lifting operations; Operate cranes / hoists; Use lifting equipment, and rig (sling) loads; Provide signals for controlling lifts; and Inspect, maintain or test cranes / hoists and lifting equipment.

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Each operator must meet the competency requirements for the particular class / type of crane / hoist to be operated. Depending on the project location and applicable legislation, operators may need to hold a certificate of competency issued by a recognised training institution.

13.11 Working at height

Fall prevention or fall protection measures must be in place for all work carried out from a fall risk position.

13.11.1 Fall prevention

Work Platforms: Wherever practical, a safe working area must be provided by means of a work platform with fixed edge protection. This may include: A fixed work platform or walkway (i.e. a fixed steel structure); a fixed or mobile scaffold; or An Elevating Work Platform (EWP) such as a scissor lift, man lift, boom lift or cherry picker.

All work platforms and walkways elevated one metre, or more must have complete floors and edge protection must be in place in the form of toe boards and sturdy guard rails / barricades properly secured (i.e. bolted, welded, clamped, etc.) to prevent accidental displacement.

Safe access and egress must be provided. Guard rails must be capable of withstanding a force of at least 1kN applied in any direction at any point. The top rail must be positioned at a height of between 900mm and 1100mm above the working surface, and a mid-rail must be provided.

Floor openings, holes and edges: Any opening or hole (temporary or permanent) in a floor, platform or walkway must be protected by sturdy guard rails (removable if required) or a cover to prevent a person from stepping into / falling through the gap. Covers must be strong enough to support the loads that will be imposed on them and must be secured to prevent accidental displacement.

Ladder way floor openings and platforms must be protected by standard guard rails and toe boards must be fitted along all edges, except at the entrance to an opening where a gate must be installed and so arranged that a person cannot walk directly into the opening.

When open, hatchways and floor openings must be protected by removable guard rails and toe boards of standard construction. When these openings are not in use, covers of adequate strength must be put in place and must be secured to prevent accidental displacement. Where doors or gates open directly onto a stairway, a platform must be provided, and the swing of the door or gate must not reduce the effective width of the platform to less than 500 mm.

Stairways: Each flight of stairs having three or more risers must be fitted with handrails. Handrails must be installed on both sides of every stairway. Riser height and tread width must be uniform throughout any flight of stairs, including any foundation structure used as one or more treads. Stairways must be free of hazardous projections, such as protruding nails. No materials, equipment or waste may be placed on or beneath any stairway.

13.11.2 Fall protection

Before carrying out any work where a risk of falling exists (or where a risk of falling onto dangerous equipment / machinery or into water exists): A Fall Protection (and Rescue) Plan must be prepared by a competent person and submitted to the Client's project manager for approval (the contractor must ensure that this plan is implemented); A detailed task-specific Risk Assessment must be carried out.

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The rescue plan must make provision for recovering an employee before the onset of suspension trauma. The rescue plan must take the working position into consideration, especially when stringing activities for overhead lines are being conducted and employees are working on barges in the water.

Fall protection must be used at all times whenever there is a risk of falling while working above the ground (or above a platform, floor or surface) and whenever there is a risk of falling onto dangerous equipment / machinery or into water.

An employee has fall protection if he is secured by means of an approved full body harness (well fitted) with shock absorber and two lanyards (where the potential to fall is greater than 4 metres) or two short restraining lanyards (where the potential to fall is less than 4 metres), and secure anchorage points (an employee's lanyard may be attached either directly to an anchorage point or indirectly through the use of a variety of systems that incorporate a lifeline). Note: When selecting fall protection equipment, care must be taken to ensure that the potential fall distance is greater than the height of the person plus the length of the lanyard with its shock absorber deployed (taking the height of attachment into account).

Anchorage points must, where practical, be above the head of the employee, and must ensure that in the event of a fall the employee will neither swing nor touch the ground. All permanent anchorage points must be designed and approved by a professional engineer. All anchorage points must be periodically inspected and tested by a competent person to ensure that they are secure and can support the required load.

A system must be in place to identify anchorage points as authorised for use. Temporary anchorage points (and lifeline systems) may only be used if a competent person has certified them safe to use.

If an elevating work platform is used, such equipment must be fitted with a fixed anchorage point for the attachment of fall protection equipment. The use of fall protection (fall arrest or fall restraint) systems must be avoided wherever and whenever possible through design, the installation of physical barriers that protect employees from falling and employing alternative methods of working. Only if physical barriers protecting against free falls cannot be installed must fall protection equipment be used.

Fall protection (fall arrest or fall restraint) systems are items of personal protective equipment and, if required, must be purchased, installed and provided to employees. Prior to commencing with any work at height, an assessment must be conducted to determine if the work requires the use of fall protection equipment, and if so, which fall protection system is the most appropriate for the work.

There must be a system for ensuring that fall protection equipment is: Tested and certified for use; Inspected by the user before use; and Destroyed following a fall or where inspection has shown evidence of excessive wear or mechanical malfunction.

All employees that are required to work at height (in order to carry out routine or non-routine tasks) must first be trained and certified competent to do so.

All employees required to use personal fall protection equipment must be trained and certified competent in the correct selection, use, maintenance and inspection of such equipment. All fall protection equipment must be thoroughly inspected on at least a quarterly basis by competent persons appointed in writing and each item of equipment must be tagged to show when it was last inspected. All inspections must be recorded in a register. On finding defective or damaged equipment, appropriate action must be taken by the competent person (i.e. the destruction of the equipment to prevent further use).

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Employees making use of personal fall protection equipment must do so in strict accordance with the instructions or requirements specified by the manufacturer / supplier of the equipment or system. Specific pre-use inspection, maintenance and fitting protocols must be established in accordance with the manufacturer's requirements / guidelines and these protocols must be followed by all users of the fall protection equipment.

Solvents may not be used to clean fall protection equipment. Only manufacturer-approved cleaning solutions may be used. No employee required to use personal fall protection equipment may work in isolation (a minimum of two employees working together is required). Adequate supervision must be in place at all times for work being carried out at height.

There must be a system for preparing and testing emergency rescue procedures for fall victims. Note: Even though there is no risk of free fall, fall protection equipment may be required in situations where there is a risk of falling, slipping or sliding down a slope of more than 45 degrees. Note: The maximum service life of fall protection equipment manufactured of synthetic fibre shall be 5 years from the date of first use and / or manufacture unless otherwise specified by the manufacturer.

An employee may climb or descend a ladder without fall protection provided that he is able to use both hands and legs to do so, faces the ladder, and uses one step at a time. The ladder must be tied off or supported at its base.

Prior to any roof work being performed / prior to employees accessing a roof, an engineer must verify that the roof is of sound construction and that it is capable of supporting the weight of the employees as well as any equipment that may be required. Should the engineer's findings be to the contrary, alternative methods of performing the work must be found.

13.11.3 Risk assessment and planning

The following documentation is required for any work where fall protection is required (i.e. where a risk of falling exists): A Fall Protection (and Rescue) Plan; and A Risk Assessment for the task to be performed.

As part of the Risk Assessment and planning processes, the following must be considered:

- Hazards relating to accessing the location at height; the nature of the work location;
- The nature of the work activities to be undertaken at height; Environmental / weather conditions;
- The presence of nearby persons who may be at risk due to falling objects (potentially) or who's activities may be affected by the work being performed at height;
- The selection of fall protection equipment and / or access equipment;
- The selection of anchorage points;
- The load ratings of access platforms, work areas, anchorage points, etc.
- The need for multiple employees and the means of communication;
- A rescue plan that addresses retrieval / rescue contingencies;
- The use of a mobile elevating work platform, man basket, suspended scaffold or boatswain's chair; and
- Any other conditions that may affect the safe execution of the task.

13.11.4 Elevating work platforms

Before hiring or purchasing an elevating work platform (e.g. a scissor lift, man lift, boom lift, cherry picker or similar equipment), the certification of the equipment (with regard to suitability of design and construction) must be verified.

Before using an elevating work platform, it must be verified that the equipment is in good working order and has been serviced regularly. The service record and instruction manual must be kept on site. A system must be in place to ensure that the equipment is maintained and inspected as required by the manufacturer / local regulations. Employees (operators) must be formally trained through an

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accredited training provider and certified competent in the operation of the equipment. Once an employee has been issued with the necessary licence, code C53 from DMR 18.11 National code of practice appendix 6, the operator must be appointed in writing to operate the equipment.

Note: familiarisation certificates from equipment suppliers is a OHSA 10 requirement and not proof of competence as per the national code of practice stated above.

Before using an elevating work platform, the operator must inspect the equipment and a peruse checklist must be completed.

The operator of an elevating work platform must be in the "basket" unless it can be demonstrated to the satisfaction of the Client's project manager that this is not possible / practical.

Every employee in the "basket" must keep his feet on the floor at all times. Every employee in the "basket" must be secured at all times by means of personal fall protection equipment attached to an approved anchorage point, and systems must be in place to prevent tools and equipment from falling.

A mobile elevating work platform must not be driven unless the "basket" has been lowered and secured in a stable position.

Every elevating work platform that is used must be equipped with a dead man's switch or foot pedal at the operator controls. An elevating work platform must only be operated on a firm surface with the outriggers extended (where fitted).

An elevating work platform must not be operated on a grade or slope beyond the capability of the machine (every mobile elevating work platform that is used must be fitted with an inclinometer which sounds an audible alarm before the maximum safe incline has been reached). The area beneath the "basket" and the boom must be barricaded.

13.11.5 Man baskets, suspended scaffolds and boatswain's chairs

The use of a man basket, suspended scaffold or a boatswain's chair may only be considered when all other avenues to safely perform the work (e.g. ladder, scaffolding, mobile elevating work platform, etc.) have been exhausted.

Authorization to use a man basket, suspended scaffold or boatswain's chair must be obtained from the nominated project management representative. If permission is granted, the use of such equipment must be in strict compliance with all applicable legislation.

An employee working from a man basket or a suspended scaffold must remain within the basket and must keep his feet on the floor at all times. Each employee working from a man basket, suspended scaffold or a boatswain's chair must be in possession of a valid medical certificate of fitness and must be trained in the Safe Work Procedures pertaining to the use of the equipment, as well as the Fall Protection Plan.

Each employee working from within a man basket or suspended scaffold or from a boatswain's chair must wear personal fall protection equipment at all times (i.e. an approved full body harness connected by means of a shock absorbing lanyard to an anchorage point or lifeline that does not form part of the basket / chair).

If suspended using a crane, the man basket, suspended scaffold or boatswain's chair must be visible to the crane operator at all times. A suitable means of communication must be in place to ensure that the suspended employee(s) are able to communicate with the crane operator and personnel on the ground.

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The crane operator must remain at the controls at all times while the man basket, suspended scaffold or boatswain's chair is occupied. Where feasible (and if it is safe to do so), tag lines must be used to stabilise the man basket, suspended scaffold or boatswain's chair.

A man basket or suspended scaffold (including the suspension system) must be designed by a qualified engineer. Only an approved / certified man basket or suspended scaffold may be used. Regulations may require approval by an authority or certification to a national or international standard. The manufacturer's procedures and conditions for use must be strictly complied with at all times.

Each man basket or suspended scaffold must be fitted with an information plate indicating the maximum weight and number of persons that may be lifted. Copies of the welding x-rays and engineering drawings must be kept on site. Any work involving the use of a man basket, suspended scaffold or boatswain's chair must be carried out under the supervision of a competent person who has been appointed in writing.

A man basket, suspended scaffold or boatswain's chair must be thoroughly inspected (examined for damage) by a competent person prior to use (every time the equipment is used) and the results of each inspection must be recorded in a register.

The crane or hoist as well as all lifting equipment (tackle) that is used to suspend the man basket, suspended scaffold or boatswain's chair must be tested and inspected. All suspended scaffold erectors, operators and inspectors must be appointed in writing and proof of competency must be provided.

Employees carrying out welding or flame cutting work from within a man basket or suspended scaffold or from a boatswain's chair must take precautions to ensure that they do not accidentally cut or burn through the cables / wire ropes that are suspending them.

13.11.6 Falling objects

In the process of planning work activities, the risks associated with falling objects (i.e. materials, tools or equipment) must be assessed and appropriate control measures must be identified, implemented, and monitored taking the following hierarchy of control into consideration: Preventing objects from falling – by using containment sheeting, toe boards, lanyards to secure tools (to the employee or to the structure), ropes or chains to secure equipment (to the structure), lift boxes, brick cages, etc. and by properly securing loads when lifted by crane or hoist; Protecting people from falling objects – by establishing barricaded exclusion zones, installing catch platforms or catch nets, displaying warning signage, and posting safety watchers / traffic controllers; and Personal Protective Equipment (particularly safety helmets and safety boots) – protective equipment is a last line of defence and must be worn. Where overhead work is being carried out, barricading must be erected around the work area (at the level at which the work is taking place and at every level below including ground level) to prevent people from entering such an area and potentially being struck by falling objects. Wherever hazards related to falling objects exist, appropriate warning signage (i.e. "Overhead Work In Progress" and "No Unauthorised Access") must be prominently displayed.

No items are permitted to lie loose in elevated positions (e.g. nuts and bolts must be securely stored) and good housekeeping standards must be maintained at all times. No tools, equipment, material, debris, waste, etc. may be dropped from height. Objects must be lowered or chuted to ground level in a safe and controlled manner.

13.12 Scaffolding

Please note a new revision of the Scaffold standard, SANS-10085-1-2024-(Ed.-2.00), has been published. This is the new standard to which scaffold must comply as a minimum.

Note: In all cases check against online version for the latest revision prior to use

13.12.1 Training, Competency and Supervision

Scaffolding may only be erected, maintained, altered or dismantled under the strict personal supervision of a competent Scaffolding Supervisor appointed in writing by the contractor. The Scaffold Supervisor must be appointed as per Construction Regulation 16.1 with reference to SANS10085-1:2024 section (16.2) with reference to SANS10085-1:2024 section 6.15.1

The contractor will additionally appoint the following appointees as per the requirements of SANS10085-1:2024:

- Scaffold erectors as per Construction Regulation 16.2 with reference to SANS10085-1:2024 section 6.1.4 & 7.1.4
- Scaffold Inspector, appointed as per Construction Regulation 16.2 with reference to SANS10085-1:2024 section 14.2

Scaffolding can only be erected, maintained, altered or dismantled by competent and appointed Scaffolding Erectors (or Scaffolding Builders). It is the Scaffolding Supervisor's responsibility to ensure that all employees carrying out such work are suitably trained and experienced. A certificate of competency issued by a reputable (i.e. accredited and approved) training provider must be produced for each Scaffolding Supervisor and each Scaffolding Erector.

Training for scaffolding shall be done in line with the relevant Unit Standards:

- Inspectors 263205 + 263245
- Supervisor 263224
- Scaffold Erectors 263245
- Scaffold Fixer 263247
- Team Leader 242821
- Working at heights 229998

13.12.2 Erection and Dismantling of Scaffolding

Only approved scaffolding components may be used to erect a scaffold. Scaffolding must be erected, modified and used in accordance with the manufacturer's guidelines / recommendations, and in strict compliance with all applicable legislation and standards.

Base width to scaffold height ratios prescribed by regulation or by the manufacturer of the components must be adhered to.

If the scaffolding is to be load bearing (i.e. other than normal access and workplace storage) then full calculations and a design must be prepared and authorised in writing by an engineer. The load limits specified by the scaffolding manufacturer may not be exceeded under any circumstances.

Scaffolds must be plumb and level at all times. All scaffolding components must be in good condition (i.e. undamaged and free of corrosion). All scaffolding components must be properly connected / secured, and scaffolding must be effectively braced. Scaffolding must be secured to the structure every 6 metres vertically and every 10 metres horizontally (as a minimum). Adequate underpinning, sills or footplates must be provided for scaffolds erected on filled or otherwise soft ground (including sand or gravel).

Each person erecting, maintaining, altering or dismantling scaffolding must use fall protection at all times (i.e. a full body safety harness with shock absorber and two lanyards fitted with scaffold hooks).

The work must be planned to enable every Scaffolding Erector to be securely anchored at all times. A suitable lanyard length (not exceeding 2 metres) must be selected taking the potential fall distance and height of attachment (height of anchorage point) into account. If the lanyard is too long or the

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anchorage point is too low, the person may hit the ground / a platform / objects below him before the lanyard is able to break his fall.

The area around the base of a scaffold must be barricaded to prevent unauthorised access into the work area. When scaffolding is erected / dismantled on a level / platform / floor lying above ground level and the potential exists for components to fall to levels below the level on which the scaffolding is positioned, then the area directly below the scaffolding on each of those levels must also be barricaded. Appropriate warning signage (i.e. "Overhead Work In Progress" and "No Unauthorised Access") must be prominently displayed.

Hoists, lifts and approved material baskets must be used (where available) to lift scaffolding components to elevated positions. Where components are passed from hand to hand during the erection / dismantling of a scaffold, each Scaffolding Erector must always stand on three boards and not directly above the person below him. During this process, each Scaffolding Erector must remain within the confines of the scaffold and must expose as little of his body as possible to minimise the risk of being struck by a falling component.

Good communication between team members must be maintained at all times. No scaffolding components, tools, or any other material may be dropped from height or thrown from one level to another. Components / tools / materials must be lowered or lifted in a controlled manner. Use may be made of a chute.

Each tool must be secured to the wrist, harness or structure by means of a lanyard. A tool bag (around the waist or over the shoulder) may be used for carrying tools up and down a scaffold structure. Tools or equipment may not be carried by hand up or down a structure, as both hands must be used for climbing. If necessary, a rope must be used for lifting or lowering tools or equipment.

While a scaffold is being erected or dismantled, no scaffolding components may be stacked on the scaffold structure unless it has been designed for that purpose. Any loading of a scaffold structure must be authorised in writing by an engineer. For special scaffolding, a design must be prepared by the appointed Scaffolding Supervisor and this design must be authorised in writing by an engineer before the scaffolding is erected. Scaffolding may not stand on steel grating unless the grating is adequately supported from below. Scaffolding must rather stand on the structure that supports the grating. Empty drums, crates or bricks may not be used to prop up, support or anchor scaffolding.

Should the scaffolding require earthing, this must be done as soon as possible while the scaffolding is being erected. Scaffolding may not be erected if it is raining or in winds stronger than 35km/h.

A green tag (displaying the words, "Scaffold Safe to Use") or a red tag (displaying the words, "Scaffold Unsafe to Use") must be prominently displayed on each scaffold at all times. The tag must be positioned close to the base of the ladder / staircase provided for safe access. The wording on the tags must be in English and any other language commonly used on site. As a minimum, a green tag must display the Scaffolding Supervisor's name, the date that the scaffold was erected, and the date that the scaffold was last inspected. Only an appointed Scaffolding Supervisor may attach, change, update the information on, or remove these tags.

Scaffolding must not be: Left partially erected or partially dismantled except for normal work stoppages (for example, over weekends); Left in an unsafe condition (if scaffolding is unavoidably in an unsafe condition, barricading must be in place to prevent unauthorised access and the required red tags must be prominently displayed on the scaffold structure); or Moved or altered while work is in progress.

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Mobile scaffolding must be fitted with brakes, which must be engaged at all times when the scaffolding is in use. A scaffold may not be moved if any person is on the structure.

13.12.3 Safe Access

Safe and convenient access must be provided to every scaffold platform by means of ladders or staircases. Climbing up or down a scaffold on the braces or ledgers is forbidden. All ladders used to access scaffolding must be securely attached to the scaffold structure. Hook-on and attachable ladders must be specifically designed for use with the type of scaffolding being used. If a ladder is used to access a scaffold platform at a height greater than 1.5 metres above the ground, then the ladder must be secured internally (i.e. within the scaffold structure) and there must be an opening (closed with a trap-door) in the platform at the top of the ladder. If the scaffold platform is at a height of less than 1.5 metres above the ground, then the ladder may be attached externally.

No person may climb over or through the guard rails to gain access to a platform. If a vertical ladder used on scaffolding is more than 5 metres in length it must be equipped with a ladder cage extending from a point 2 metres from the base of the ladder to a height of 1 metre above the platform (or the uppermost platform) that the ladder is providing access to. Circular ladder cages must have an internal diameter of no more than 700 mm.

Square ladder cages must have internal dimensions of no more than 700 mm by 700 mm. The requirement for a ladder cage may be waived if platforms are provided at height intervals not exceeding 4 metres, with the vertical ladder secured on the inside of the scaffolding framework and an opening (closed with a trap-door) in each platform.

Vertical ladders must be braced at three metre intervals (as a minimum) to prevent undue movement. All vertical ladders providing access to a platform must be left in place for as long as the scaffold remains in place and must be inspected as part of the scaffold structure. Any deviation from the requirements stipulated above must be subjected to a risk assessment and the Client's project manager must authorise the deviation in writing.

13.12.4 Scaffolding platforms

Every work platform must be complete (i.e. from ledger to ledger and from transom to transom without any gaps) in order to prevent personnel, materials, tools, etc. from falling through the platform. Every work platform must be constructed from manufactured nonslip steel scaffold boards. Timber boards are not permitted under any circumstances. Each steel scaffold board must be securely hooked (fastened) onto the ledgers / transoms that support it.

On all sides except the one facing the structure, every scaffold platform must be provided with: Sturdy guard rails positioned 500 mm above the platform floor (the mid rail) and 1000 mm above the platform floor (the top rail); and Steel toe boards that are at least 150 mm high and securely attached such that no gap exists between the toe boards and the platform floor.

Scaffold platforms must be as close to the structure as is practicable (but not closer than 75 mm) except where personnel need to sit on the edge of the platform while they work in which case the distance may be increased to no more than 300 mm.

Scaffold platforms must, at all times, be kept free of waste, protruding objects, and any other obstructions. Platforms must be cleaned if necessary, to ensure that they are maintained in a non-slip state.

13.12.5 Inspection of scaffolding

Every scaffold structure must be inspected by a competent Scaffolding Supervisor: Prior to use after erection, and at least weekly thereafter; After inclement weather (heavy rain, strong winds, etc.); After any incident resulting in jarring, tilting or overloading; After any alteration is made; and Before being dismantled.

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On completion of an inspection, the Scaffolding Supervisor must update the information on the scaffold tag. A record of each inspection (date and time of inspection, location of scaffolding, findings, etc.) must be captured in a register. The register(s) must be maintained by the Scaffolding Supervisor(s) carrying out the inspections.

13.12.6 Using scaffolding

The user of a scaffold (i.e. the responsible supervisor) must inspect the erected structure prior to acceptance and must ensure, as far as is reasonably possible, that the scaffold is safe and fit for purpose before allowing his or her team to make use of the scaffold. In particular, the user must ensure that:

- The scaffold and the platforms have been constructed to meet the loading requirements of the work that is to be carried out (the Scaffolding Supervisor must be consulted in this regard);
- The Scaffolding Supervisor has checked that adequate ties and braces are in place;
- The work platforms are in the correct positions and are complete with toe boards and guard rails;
- Safe and convenient access has been provided (ladders and / or staircases); and
- A green ("Scaffold Safe to Use") tag has been attached to the scaffold by the Scaffolding Supervisor. Use of an incomplete / unsafe scaffold is prohibited. Unsteady or non-rigid scaffolds must not be used, and inadequacies must be reported to, and rectified by, the responsible Scaffolding Supervisor.

The user of a scaffold must ensure that every employee in his or her team is aware that no alterations to the scaffold may be made by the team during the course of their work, and that if any alterations are required, they must be made by competent Scaffolding Erectors under the supervision of an appointed Scaffolding Supervisor. A scaffold may not be used:

- If a red tag is displayed indicating that the scaffold is unsafe to use; or
- During inclement weather, defined as wind speeds greater than 40 km/h, thunderstorms, or heavy rain (in excess of 40 mm/h).

Note: With due consideration of possible educational limitations, the contractor must ensure that all employees understand what green and red tags mean.

The area around the base of a scaffold must be appropriately barricaded to prevent unauthorised access into the work area. Appropriate warning signage (i.e. "Overhead Work In Progress" and "No Unauthorised Access") must be prominently displayed. Loose tools and / or materials on scaffold platforms must be secured using lanyards, wire or fibre rope, or must be placed in secured containers. Where appropriate, "catch nets" deemed may be installed as an additional safety measure to prevent materials / tools from falling to the ground. The storage / placement of materials on scaffolding platforms must be kept to a minimum.

Debris as well as tools and materials that are no longer required must be removed from all working platforms at least once per day. Scaffolding platforms must be cleaned regularly.

A heavy load may not be placed on a scaffolding platform unless the scaffold has been designed and constructed specifically for that purpose. Any loading of a scaffold structure must be authorised in writing by an engineer. Scaffolds may not be used as hoisting towers or to support piping or equipment.

Each person working from scaffolding must wear fall protection (i.e. a full body safety harness with shock absorber and two lanyards fitted with scaffold hooks) and must be securely anchored at all times.

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All work must be carried out from properly constructed work platforms. Standing on railings or braces in order to perform work is forbidden. Drums, boxes and other makeshift substitutes for scaffolding may not be used under any circumstances.

Where work on an electrical system has to be undertaken from a scaffold, an electrical engineer must determine whether or not the scaffolding structure requires bonding and earthing. The scaffolding may not be used until this has been determined, and if required, until the structure has been bonded / earthed.

13.12.7 Identification, storage and inspection of scaffolding components

All scaffolding belonging to the contractor must be properly marked to enable positive identification. Prior to erecting a scaffold, all scaffolding components must be carefully inspected by a competent Scaffolding Supervisor.

Components found to be defective during an inspection must be conspicuously marked and removed to a suitably demarcated quarantine area for destruction, repair, refurbishment or removal from site. Deformed and bent wedges must be straightened and inspected for cracks before being put back into service.

All scaffolding components must be stored in a demarcated storage area in such a manner that they are not exposed to environmental extremes and will not cause injury to persons. Suitable barricading or fencing must be erected, and warning signage must be posted (e.g. No Unauthorised Entry).

Within a storage area, scaffolding components must be stacked such that pathways (750 mm in width) are maintained between the stacks. Each stack must be stable, and components must be neatly placed to ensure that no ends protrude into any pathway. The various components must be stacked separately. The weight of scaffolding components must be considered when stacking them in elevated positions. Any storage area for scaffolding components must be positioned such that it will not interfere with any onsite activity (including the operation of any plant or equipment), block any access way, or obstruct access to any plant or equipment. Before establishing a storage area, the location must be agreed with the nominated project management representative.

13.13 Demolition Work

Demolitions on this project will include but not be limited to the concrete cap on South breakwater.

Any Contractor carrying out demolition work must ensure that prior to any such work being carried out, and in order also to ascertain the method of demolition to be used, **a detailed structural engineering survey** of the structure to be demolished must be carried out by a competent person and that a method statement on the procedure to be followed in demolishing the structure is developed.

Prior to any demolition work being carried out and based on the engineering survey, the P/Contractor or appointed Demolition Contractor must prepare a demolition safety plan (method statement) explaining how the work will be carried out, taking into account the Consulting Structural Engineer's specifications and demolition sequence, demolition hazards, and detailing the safety and health measures to be taken to eliminate the risks.

The Demolition Contractor must also detail in its demolition safety plan, the safety measures to be implemented to protect the public. The public will also have to be diverted away from the demolition zone by signs and other diversion methods.

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The following measures must also be adhered to:

- The Contractor must appoint a competent person in writing to supervise and control all demolition work on site;
- The Contractor must ensure that any partly demolished structure does not pose a safety risk to workers and other persons;
- Should the Contractor be in doubt about the safety of a partly standing structure, the structure must be demarcated at a reasonable distance and sign posted, warning persons of the risk until such structure is made safe;
- The Contractor must ensure that no persons work, move or stand under any partly demolished overhanging material, which has not been adequately shored, braced or supported;
- Any support work must be designed to withstand the load being imposed on it, the design drawing and specifications of such temporary works support work must be held on site;
- Where the stability of an adjoining structure, building or road may be negatively impacted, the Contractor must take all necessary steps to ensure the stability thereof;
- The Contractor must ascertain the location and nature of electricity, water, gas, electronics or other similar services, which may be affected by the work being performed. A safe method of removal or work around these services must be drawn up;
- Safe and convenient access must be provided to all work areas;
- While demolition is taking place, all unauthorised persons must be kept well away from the operation – the necessary demarcation and signage notices must be in place to clearly delineate such demolition zones;
- The demolition safety plan must include what applicable personal protective equipment and clothing is required. The minimum being leather gloves; steel toecap boots; hard hats; eye protection where the risk of eye injury exists i.e. cutting, grinding, hot work, impact work; hearing protection for operators and other workers exposed to noise over 85dB(A); and fall prevention and/or arrest equipment when the risk of falling exists.
- Noise and dust must be controlled and managed by the principal contractor.

13.14 Ladders

All ladders used on site must be of sound construction and adequate strength.

Only non-conductive ladders made of wood or fibreglass may be used for electrical work or work being performed in proximity to energised electrical equipment. Metal ladders and ladders with metal reinforcing may not be used.

The use of makeshift ladders is forbidden.

All ladders must be numbered, listed in a register, and inspected by a competent person on a monthly basis (the results of each inspection must be recorded in the register).

Before using a ladder, the user must inspect it for damage.

Ladders with missing, broken, cracked or loose rungs, split stiles, missing or broken spreaders (stepladders) or any other form of damage or defect may not be used.

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A damaged ladder must be removed from service (and tagged, "Out of Service") without delay and must then either be repaired (if possible) or destroyed to prevent further use.

Persons must receive instruction in the correct use and proper care of ladders.

Ladders may only be used as a means of access and egress. The use of ladders as working platforms is prohibited, except for inspection and carrying out minor tasks (i.e. light work and short duration) such as changing a light bulb.

Ladders may not be positioned horizontally and used as walkways or runways or as scaffolding. All portable ladders must be fitted with non-skid safety feet (or some other means to prevent the base of the ladder from slipping) and the feet must always be placed (stand) on a firm level surface.

The use of bricks, stones, wood or any other material to level the stiles of a ladder is prohibited. Ladders may not be placed on movable bases such as boxes, tables, trucks, etc.

The base or foot of a ladder must always be secured to prevent it from slipping. The ladder must be held by an assistant if the base cannot be secured in any other way (e.g. tied off).

A straight ladder must extend at least one meter above its support (or above the working platform that it is providing access to). The top of the ladder must be tied off (or otherwise secured to its support) to prevent accidental movement.

A straight ladder must be placed at a safe angle, i.e. tilted at a ratio of approximately 4:1, meaning that the base of the ladder must be one meter away from the wall (or other vertical surface) for every four meters of height to the point of support.

A stepladder may never be used as a straight ladder. A stepladder must be opened fully and the spreaders must be locked securely.

When using an extension ladder, at least four rungs must always overlap at the center of the ladder. Ladders may not be joined together unless they have been specifically designed and manufactured for that purpose.

A suspended ladder (i.e. not standing on a base) must be attached in a secure manner to prevent undue swinging or swaying, and to ensure that it cannot be displaced.

A ladder may not be placed against a window, glass or any other material which is unlikely to withstand the force exerted on it by the top of the ladder.

A ladder may not be placed in front of a door or window that opens towards the ladder unless the door or window has been locked or barricaded.

When a ladder is used near an entrance or exit, the base of the ladder must be barricaded.

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Materials and / or equipment may not be placed in close proximity to the base or landing of any ladder.

When ascending or descending a ladder, a person must always face the ladder and use both hands (i.e. maintain three points of contact).

Nothing may be carried up or down a ladder if it prevents the person from holding on to the ladder with both hands. Tools must always be properly secured. This can be achieved by attaching them to the wrist using lanyards or placing them in a tool belt around the waist. Tools and materials may also be carried in a bag over the shoulder or hoisted to the landing using a tool bag and rope.

Only one person at a time may use (i.e. be positioned on) a ladder.

No person may stand or step above the third rung from the top of a straight ladder or above the second highest step of a stepladder.

Overreaching from a ladder is prohibited. If the target is not within comfortable reach, the person must climb down and reposition the ladder.

No person may run up or down a ladder, or jump from the lower rungs or steps to the ground. All ladders must be properly maintained and cared for.

Ladders must be stored under cover and should be hung in a horizontal position from several brackets.

No ladder may be left lying on the ground or be left exposed to the weather. A ladder left lying on the ground presents a tripping hazard and it may be damaged by vehicles running over it.

No ladder may be left in such a position where it may fall over, be accidentally knocked over, or be blown over by the wind.

Ladders may not be painted, as the paint may conceal damage, defects, labels or other markings. Instead of paint, clear varnish or wood oil may be used to preserve wooden ladders.

Ladders must be kept clean, as dirt may conceal damage or defects. Oil or grease accumulation on the rungs of a ladder may cause a person to slip.

Before making use of a ladder, each person must make an effort to remove mud, oil, grease, etc. from his boots.

13.15 Portable Electrical Tools

Portable electrical tools and equipment, including electrical extension leads must be visually inspected daily before use with records kept. Such inspections must be carried out by persons competent to do so and records must be kept.

Only appropriately certified intrinsically safe electrical equipment may be used in flammable or potentially explosive atmospheres such as in confined spaces.

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Any equipment or structure on which electric charges may accumulate (such as storage tanks) must be grounded (earthed).

13.16 Electrical Installations

The Principal Contractor must comply with the Electrical Installation Regulations, the Electrical Machinery Regulations and the Construction Regulations (CR 24).

The Principal Contractor responsible for the installation of temporary electrics must keep a copy of the Certificate of Compliance (CoC) for its temporary electrical power supply and installation including site offices. A revised CoC is required whenever the installation is altered or changed in any way. All temporary electrical installations must be inspected at least weekly by a competent person appointed in writing with records kept.

Existing permanent electrical installations under alteration or running through construction zones must be managed and controlled by the principal contractor and its electrical contractor and must remain safe at all times. **An electrical lock-out procedure must be compiled by the electrical contractor and must be submitted to the principal contractor for approval before any electrical work commences on site. The lock-out procedure will serve to set out the isolation procedures when working on the existing electrical installation or part thereof under alteration and therefore prevent any chance of electric shock, electrocution of persons, or fire.**

13.17 Working in close proximity to water

The Principal Contractor is required to develop a safe work procedure which clearly addresses risks associated to working adjacent to the edge of a jetty, barge or breakwater. The safe work procedure must also include a rescue plan so that should a worker or member of the public fall into the ocean, they can be rescued without the delay of waiting for a third party rescue team. Also refer Construction Regulations 26 for more detail in this regard.

13.18 Dredging

A risk assessment relating to the use of a crane deployed dop pump must be compiled, from which a safe work procedure needs to be developed, which describes the protocol for the safe use of the crane, DOP pump and related equipment.

It is expected that divers may need to be on standby in case of DOP pump snags, in which case the save diving procedures as defined in Section **Error! Reference source not found.** should be followed.

Consideration must be given to other vessels whether commercial or private, within the harbour.

Where the Principal Contractor intends making use of a vessel, the vessel must be sea-worthy, and permission must be obtained from the Harbour Master prior to launching the vessel. Similarly, consent must be obtained with regards to where the vessel can be moored. The vessel must be

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under the control of a competent skipper at all times. The skipper must take specific precautionary measures whenever there are divers active in the vicinity of the vessel.

13.19 Tidal Changes and Storms

The Principal Contractor must take the tide schedule into consideration when planning the work. Where tidal changes are likely to impose additional risk on the workers then the work needs to be suspended temporarily until it is deemed safe to proceed.

Storms and Strong winds also need to be monitored and where either of these phenomenon are likely to compromise the operation and therefore the safety of the workers, work must be suspended until conditions improve.

13.20 Hydrographic survey

All work performed from a seagoing vessel must comply with the South African Maritime Safety Authority Act of 1998. In addition risk assessments and safe work procedures must be drafted for activities related to Construction Regulation 2014.

13.21 Permit to Work

All personnel must comply with the Permit to Work system applicable to the project.

A Permit to Work must be obtained by the principal contractor before carrying out any work that involves:

- A hazardous energy source or system, including electricity, compressed fluids (e.g. hydraulics and pneumatics), chemical substances (e.g. toxic, corrosive, flammable or explosive gases and liquids), heat (e.g. steam), radiation, and machinery or materials with potential energy (gravitational and elastic) – isolation and lockout may be required;
- Confined space entry;
- Working at height;
- A critical lift;
- Hot work outside of designated workshops;
- A service (e.g. water supply, fire suppression systems, etc.).

Note: A Permit to Work may only be issued by an Authorised Person, and may only be received (or accepted) by an appointed Applicant (see Definitions).

Each Permit to Work that is issued must make reference to an approved Task-Based Risk Assessment for the work that is to be carried out.

The Permit to Work system that is employed must incorporate the following basic procedures:

- Prior to meeting with the Authorised Person, the Applicant must familiarise himself with all of the hazards associated with the system, plant, equipment, structure or area on or in

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which the work must be performed. He must also consider the risks that may arise as a result of the tasks that will be carried out. A Task-Based Risk Assessment must be in place;

- The Applicant must then request permission to carry out the work and must meet with the Authorised Person to discuss and document the scope of the work as well as the hazards, risks and associated control measures. Isolation and lockout requirements must be identified (if applicable). The isolation and lockout process must be initiated by the Authorised Person who must contact the necessary Isolation Officers.

Note: The Applicant must ensure his own safety and that of his team, and has the right to accompany the Isolation Officers to verify that all of the necessary locks have been fitted to all of the isolation and lockout points in accordance with the applicable plant or equipment-specific Isolation and Lockout Procedure.

- Once all of the necessary isolations have been completed and the necessary Clearance Certificates have been issued by the Isolation Officer(s) (if applicable), and the Authorised Person is satisfied that the system, plant, equipment, structure or area is safe to work on or in provided all identified precautions are observed by the Applicant, then he must issue (sign) the Permit to Work to the Applicant;
- The Applicant must accept (sign) the Permit to Work. If equipment has been isolated, the Applicant must attach his Personal Lock to the relevant Isolation Bar (or Local Isolation Point) and must ensure that every other person working on the isolated equipment also attaches his or her Personal Lock to the Isolation Bar (or Local Isolation Point) before starting any work;
- Before commencing with any work, the Applicant must discuss the hazards, risks, control measures, precautions and limitations as stated in the Permit to Work (and associated Task-Based Risk Assessment) with all personnel who will be carrying out the work. A register must be kept and all persons must sign the register once they have been briefed by the Applicant;
- The work performed must be limited to what is described in the Permit to Work;
- When a particular employee has completed his work, he must sign the personnel register to this effect and (if applicable) must remove his Personal Lock from the Isolation Bar (or Local Isolation Point);
- Once all work is complete, the Applicant must:
 - Ensure that all machine guards have been replaced;
 - Ensure that all tools and materials have been removed from the work area;
 - Ensure that the work area is clean and tidy;
 - Ensure that all Personal Locks (including his) have been removed from the Isolation Bar or Local Isolation Point (if applicable);
 - Inform the Authorised Person that the work has been completed; and
 - Sign off the Permit to Work.
- Once the work is complete and the Applicant has signed off the Permit to Work, the Authorised Person must:
 - Ensure that the relevant Isolation Officers perform all of the necessary de-isolations (if applicable);
 - On completion of the de-isolations, sign off the Permit to Work accepting the system, plant, equipment, structure or area back for service; and
 - Inform all relevant personnel that the system, plant, equipment, structure or

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- area is ready to use.
- Where the work must continue over more than one shift, the Permit to Work must be reviewed at every shift change by an Authorised Person. If the scope of work has changed, the permit must be cancelled and a new permit must be issued.

If any of the original conditions or precautions pertaining to the work is not being complied with, is no longer adequate or is no longer applicable, the Authorised Person must cancel the Permit to Work and must ensure that all work stops until full compliance with either the original or amended (as required) conditions and precautions is achieved and a new permit has been issued.

The Applicant must ensure that the Permit to Work (including the personnel register) is kept where the work is being carried out (i.e. posted on a portable Health and Safety Management Information Notice Board) and that the work is monitored against the permit conditions.

All Permit to Work records must be retained and must be made available for inspection when required.

The implementation of the Permit to Work system applicable to the project may be audited on a regular basis by the *Project Manager*. Furthermore, planned task observations must be carried out periodically.

Note: In addition to obtaining Permits to Work as and when required for specific hazardous activities (identified in this standard), the Contractor must obtain a General Work Authorisation from the *Project Manager* on a monthly basis. A General Work Authorisation is valid for one calendar month and authorises the Contractor's planned work activities. In order to obtain a General Work Authorisation, the Contractor must provide a documented work plan for the month together with the necessary Task-Based Risk Assessments.

13.22 Portable Electrical Equipment

Prior to site establishment, the principal contractor must provide a complete inventory of all portable electrical equipment that he and his contractor intend to use on the site (including plant, machines, appliances, generators, hand tools, lighting, extension cords, etc.). The nameplate data for each item of equipment must be included.

All portable electrical equipment to be used on the site must be supplied and maintained in a serviceable condition.

Any electrical equipment that is in poor condition or is not in proper operating order may not be used. Any electrical equipment that the *Project Manager* or *Supervisor* deems to be unsafe or unsuitable must be removed from site.

Electrical repair work or diagnostic work on electrical equipment may only be performed by personnel who are competent and authorised to perform this work (i.e. qualified electricians).

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With the exception of double-insulated equipment, all electrical equipment must have an equipment grounding (earthing) conductor that connects the frame of the equipment being utilised to the grounding (earthing) conductor of the electricity supply system.

All electrical equipment and all electricity supply systems used (including generators) must be inspected and tested by a registered and competent electrician to ensure that all equipment is properly grounded (earthed).

All electrical equipment used on site must be supplied electricity through (i.e. must be protected by) an approved and tested residual current device (or earth leakage device or unit). If a socket outlet does not have a residual current device in the circuit, a portable residual current device must be used. Outlets without residual current device protection must be labelled as such.

Any electrical equipment that causes an earth leakage device to trip or deactivate the circuit may not be used again until an electrician has inspected and tested the equipment and has recorded in a register that the equipment is safe to use.

Interlocks may never be removed or modified, and fuse terminals may never be bypassed to keep current flowing in any circuit.

All generators must be fitted with suitable overcurrent protective devices (i.e. circuit breakers or fuses).

All generators must be used in compliance with the manufacturer's requirements. Any proposed modification to a generator must be authorised in writing by the manufacturer prior to the modification being made.

Each welding machine used on site must be fitted with a Voltage Reduction Device (VRD). If this is not practical (i.e. for arc welding processes other than stick welding), a dead man's (isolation) switch in the electrode circuit (operated by a trained observer) may be used as an alternative. All welding machines must be properly grounded (earthed).

All portable electrical hand tools used on the site must be double-insulated.

Electrical equipment must be disconnected or unplugged when not in use.

Portable lights must be stable and each light bulb must be protected by a substantial guard.

Handheld lights must be of the all-insulated type and must be extra low voltage (i.e. not exceeding 32V). 120V or 240V handheld lights are not permitted.

Any lighting used in hazardous locations (i.e. potentially explosive atmospheres, confined spaces, and damp or wet areas) must be operated at a maximum of 32 volts, unless earthed and protected by earth leakage devices.

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No person may wear a watch or any jewellery, or carry any metal objects such as a lighter or keys, while working on any electrical system or equipment.

No person may work on or use electrical equipment if his clothing is wet or any part of his body is in contact with water.

No person may handle electrical equipment, equipment cords or extension cords with wet hands or if the floor or ground surface is wet.

Fire extinguishers filled with carbon dioxide must be used to fight electrical equipment fires (water may never be used). If possible, the electrical equipment should be de-energised before fire-fighting activities commence (refer to the Fire Protection and Prevention Standard).

When cleaning or performing maintenance work on an item of electrical equipment, the equipment must be unplugged.

Equipment may not be unplugged while that equipment is switched on. Nor may equipment be plugged into a receptacle (socket) with the equipment's switch turned on.

Electrical equipment that has a defective plug or wiring may not be used. Repair work to defective or damaged electrical equipment may only be carried out by a qualified electrician.

Extension cords may be used for temporary applications only. Permanent cabling must be installed for long-term needs.

Extension cords may not be run through doors, windows, ceilings or holes in walls.

An extension cord must be uncoiled completely before it is used.

An extension cord must be of sufficient current-carrying capacity to power the equipment that it is supplying electricity to. Cords must not be overloaded.

Extension cords must be unbroken and continuous (i.e. no joints or splices in the cord are permitted).

Extension cords may not be daisy-chained (i.e. one extension cord plugged into another extension cord).

Extension cords and equipment cords may not be modified to fit a receptacle (socket).

Two-conductor extension cords may not be used. A three-conductor extension cord (i.e. a grounded or earthed cord) must be used even if the equipment that it is supplying electricity to uses a two-prong plug.

Extension cords that are frayed, have insulation tears, cracks or abrasions, have exposed conductors, or have bent, broken or "spread" plug prongs may not be used.

FEL 4

Note: In all cases check against online version for the latest revision prior to use

Extension cords that will be used outdoors must have heavy duty insulation and must be weather and UV resistant.

All electrical equipment cords and extension cords must be covered or elevated to protect them from damage and to eliminate tripping hazards.

The principal contractor is responsible for protecting his electrical equipment from the weather and from possible mechanical damage.

All portable electrical equipment (including generators) must be inspected, tested and tagged by a competent and appropriately qualified electrician on a monthly basis. Details of these inspections and tests must be recorded in a register which must be made available to the *Project Manager* or *Supervisor* for inspection.

The inspection and testing must include a continuity test of the grounding (earthing) conductor (as applicable) and a complete examination of the equipment or system to assure safe use.

The following colour coding system must be used for the tagging of all electrical equipment:

Table 14.13-1 Colour Coding System for Electrical Equipment

Month		Tag Colour	Month	Tag Colour
January		Red	July	Red
February		Blue	August	Blue
March		Orange	September	Orange
April		Green	October	Green
May		White	November	White
June		Yellow	December	Yellow

The tag placed on a piece of equipment must be traceable to an entry in a register where the following information concerning the inspection and testing of that piece of equipment must be recorded:

- Date of inspection and testing;
- Equipment description;
- Equipment owner;
- Equipment location;
- Name, signature and licence number of the electrician who carried out the inspection and testing; and
- Comments concerning the inspection and testing, and details of any repair work carried out or required.

Any item of electrical equipment that does not pass an inspection or test must be removed from service (and tagged, "Out of Service") immediately and must then either be repaired (if possible) or removed from site.

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Any item of electrical equipment without a tag or with an out-of-date inspection or test may not be used.

Any item of electrical equipment found without a tag or with an out-of-date inspection or test must be removed from service until it has been inspected and tested. If it is found that more than one item of equipment being used by the principal contractor has not been inspected and tested as required, all work with electrical equipment must be stopped until it can be demonstrated to the satisfaction of the *Project Manager* that the principal contractor's systems and controls are adequate and fully implemented.

In addition to the formal monthly inspections and testing carried out by an electrician, electrical equipment (particularly extension cords, portable hand tools, welding machines, compressors and pumps) must be visually inspected by the user on a daily basis prior to use. Users must be trained to look for cracks in casings, loose casings, outer cord sheathing that is not being held firmly in position at the equipment, cuts or cracks in cord or cable insulation, exposed conductors, damaged plugs or sockets, and missing covers. Damage and / or defects must be reported immediately.

Personnel must immediately stop using and report any electrical equipment or machinery that is shocking, sparking, overheating or smoking. Corroded outlets, switches and junction boxes must also be reported.

13.23 Arc Welding

All welding machines must be fitted with voltage reducers.

The supply cable to every welding machine must be correctly rated and fitted with an approved plug to be used only with an approved matching plug socket.

The electrical circuit to every plug socket must be protected by a correctly rated circuit breaker and a supply voltage rated earth leakage unit.

Welding cables must be properly insulated and correctly rated for the welding machines on which they are to be used.

Welding cable terminals must either be covered with a properly designed, constructed and installed cover so that inadvertent human contact with the terminals is impossible, whether the cables are connected or not, or the welding cables must be fitted with insulated plugs so that inadvertent human contact with any live part is impossible when the cables are plugged into the machine. Also the plug socket should be such that when the cables are not plugged in, inadvertent contact with a live part of the socket is impossible.

Earth cable clamps and electrode holders must be of an approved type. Earth clamps and electrode holders must be fixed to welding cables with eye terminals and bolts.

FEL 4

Note: In all cases check against online version for the latest revision prior to use

All welding machines and safety devices must be subjected to regular planned maintenance and a monthly electrical inspection. The inspection must include a test to ensure that the voltage reducer is functioning properly, by measuring and confirming that the open circuit output voltage is reduced.

Before using a welding machine, the welder must ensure that he is wearing all the required and approved protective clothing and equipment:

- Persons assisting the welder must also wear all of the required personal protective Welding hood;
- Leather welding gloves;
- Safety boots with steel toe protection;
- Flame resistant overalls; and
- Any other clothing or equipment necessary to perform his work safely and efficiently.
- equipment.

When changing electrodes or moving the earth clamp, the welder or his helpers must wear gloves to avoid possible skin contact with live electrical parts and to prevent burns.

When attaching welding cables to the terminals of the welding machine, the welder or his helpers must wear gloves, or preferably, the machine should be switched off to avoid possible electric shock.

Helpers who may be holding the work piece being welded must wear gloves and protective goggles.

Where practicable the welder should place protective screens around the area where he is welding, to prevent injury to the eyes of passers-by.

The welder must ensure that the earth cable follows the shortest practical route between the welding machine and the work piece. The earth connection must be directly between the welding machine and the work piece and no building or other structure must form part of the earth return path.

As far as is practicable, the welder should avoid welding under wet or damp conditions. If this is unavoidable, the following precautions should be taken:

- Use only oil filled or other watertight type welding machine;
- Keep the electrode holder as dry as is practical;
- Keep as dry as possible. Stand on an elevated surface out of the water and wear watertight boots and a rain suit. Also ensure that the gloves are in good condition, free of holes.
- Under conditions that result in high perspiration levels, the following measures should be implemented:
 - Use an insulated electrode holder;
 - Change clothing regularly (if possible);
 - Use insulated material like rubber mats and/or timber tuck board to separate yourself from the work piece;
 - Wear dry gloves on both hands during welding;
 - Use fans and air-conditioning to reduce humidity and temperature; and

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- Use an observer capable of responding in an emergency.

When working inside metal vessels or under other conditions where parts of his body may come into contact with conducting surfaces, the welder must take precautions to insulate himself from such surfaces.

When working in confined spaces, the welder must take steps to ventilate the area to prevent inhalation of fumes, which may endanger his health and the health of any assistants.

Engine powered welding machines must not be used in any place that is not very well ventilated since the welder and his helpers may be overcome by carbon monoxide fumes.

The welder should take the necessary precautions when welding objects that may catch alight, explode or release poisonous fumes or gases.

13.24 Gas Welding and Burning

Welding or cutting torches and hoses shall not be connected to cylinders when stored.

When work is stopped and equipment is unattended, all valves at the gas and oxygen cylinders shall be closed. The hoses shall be bled and a check shall be made later for possible pressure build-up. Torches shall be removed from the hoses prior to putting them into the toolbox. Smoking SHALL NOT be permitted during this stopping procedure.

Special care shall be taken during overhead cutting and welding operations to safeguard and prevent falling sparks from starting a fire.

Warning signs shall be posted around and at each level below the area of each overhead welding or burning operation. Fire extinguishers shall be available and fire blankets shall be used for protection.

When welding or cutting, adequate ventilation must be ensured / provided.

Hoses shall be kept clear from passageways, ladders and stairs. When hoses are subject to damage, they shall be properly protected. Hoses shall be inspected daily.

Fire extinguishers shall be ready for instant use in locations where cutting is performed.

Flash-back arrestors must be fitted to all cutting torches at the torch and at the bottle (a total of four arrestors).

Lighting of the cutting and welding torches must only be done using a striker and not an open flame.

Soap Leak tests must be performed on all flash-back arrestors.

Hoses may only be secured using approved hose clips, and not by wire, cable ties or any other means.

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Special care shall be taken when welding with respect to piping that has been painted, as toxic fumes may be emitted in some cases. The *Supervisor's* advice should be sought prior to the above welding operations being carried out.

13.25 Compressed Gas Cylinders

The principal contractor must establish a suitable storage area for oxygen, acetylene, LPG and argon cylinders in compliance with the following requirements:

- The storage area must be located at least 10 metres away from any building, and must be well ventilated;
- The storage area must have a concrete floor;
- The storage area must be enclosed using wire mesh fencing (as this will ensure adequate ventilation). This enclosure must be kept locked. Access into the storage area must be limited and controlled;
- A protective covering or roof must be fitted to the enclosure to provide shade;
- The enclosure may not be used for the storage of any other materials / equipment, and must be kept completely free of all combustible materials at all times;
- Appropriate warning signage (i.e. "No Smoking" and "No Naked Flames") must be prominently displayed on the enclosure;
- A 9kg dry chemical powder fire extinguisher must be mounted near the entrance to the enclosure
- If electrical lighting is required, it must be of an approved intrinsically safe type;
- Oxygen, acetylene, argon and LPG cylinders must be stored separately in the enclosure. Furthermore, full and empty cylinders must be separated. Separate storage sections must be clearly designated within the enclosure for the different gas types, and for full and empty cylinders, i.e. oxygen – full, oxygen – empty, acetylene – full, acetylene – empty, etc.;
- When a cylinder is empty, the cylinder cap must be replaced to protect the valve. Empty cylinders must be clearly marked (there must be no need to open valves to check if cylinders are full or empty);
- All cylinders must be stored in an upright position and must be secured in this position by chaining, strapping or clamping them individually to a wall, a cylinder trolley, rack or carrier, or some other rigid structure;
- Cylinders must be stored in rows (when necessary due to the number of cylinders) with aisles between the rows to facilitate easy and rapid removal in the event of a fire;
- Oxygen cylinders may never be stored near highly combustible materials, particularly oil and grease, or near fuel gas cylinders. When in storage, oxygen cylinders must be separated from fuel gas (LPG and acetylene) cylinders by a distance of 6 metres or by a 2 metre high wall made of fire-resistant material;
- The total quantity of gases stored on site must be limited to a 2 week supply.

Compressed gas cylinders must always stand upright (i.e. when being used, stored or transported) and must be properly and individually secured to prevent them from falling over.

Cylinders must be protected from flame, heat and from being struck by moving equipment and falling objects.

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When handling gas cylinders (whether full or empty), care must be taken to prevent sudden impacts. Whenever a cylinder is not in use, the protective cap must be in place to prevent the valve from being damaged.

Gas cylinders may not be carried, dragged, rolled or slid across a floor or surface.

When gas cylinders are to be moved / used, they must be placed in a proper cylinder trolley fitted with a 1.5kg dry chemical powder fire extinguisher.

Gas cylinders may not, under any circumstances, be used as rollers or work supports.

If transported by crane, hoist or derrick, compressed gas cylinders must be placed in a suitable cradle, net or skip box. Cylinders may NEVER be lifted using wire rope, fiber rope, a web sling or a chain sling. Before moving / transporting a gas cylinder, the regulator must be removed and the protective valve cap must be replaced.

Gas cylinders may not be taken into a confined space. Gas hoses that are run into a confined space must be removed during breaks.

Gas cylinders may not be placed on scaffolding.

Cylinder valve keys must be in place. If no suitable valve key is available then the cylinder may not be used. Nothing but the manufacturer-supplied key may be used to open the valve.

A flashback arrestor and a check valve (non-return valve) must be installed between the regulator and the hose and between the hose and the torch on the oxygen line and on the fuel (acetylene) line.

Connection fittings may not be forced and safety devices associated with cylinder valves or regulators may not be altered / tampered with.

Gas hoses may not be joined. Only approved hose connectors of the crimp type are permitted. Wire and jubilee clamps are prohibited.

Only high quality ancillary equipment may be used. This includes flashback arrestors, hoses, clamps, spindle keys, nozzles and torches.

Only trained and competent personnel may operate gas welding / cutting equipment and appliances.

When an employee opens the valve to a cylinder, he must stand to one side and open it slowly. Valves may never be left partly open – they must either be closed or be opened fully.

Leaking cylinders must immediately be removed from service and the workplace (if it is safe to do so).

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Suitable firefighting equipment must be at hand wherever gas cylinders containing oxygen and / or fuel gas are being used.

Gas cylinders must be prevented from coming into contact with electrical circuits, e.g. welding leads. Never strike an arc on a cylinder.

Oxygen may only be used for the purpose for which it is provided. Do not use oxygen in pneumatic tools or tyres, as an explosion may occur.

Empty cylinders must immediately be marked as such and must be removed to the cylinder storage area at the end of each day / shift.

13.26 Electrically Powered Tools and Equipment

All powered hand tools, such as circular saws, drills, chainsaws, percussion tools, jigsaws etc., must be equipped with a constant pressure switch that will shut off the power when the pressure is released. (Exception: this requirement does not apply to concrete vibrators, concrete breakers, powered tampers, jack hammers, rock drills, and similar hand operated power tools).

Electrical power tools must be of the approved double-insulated type. The electric cord, pneumatic or hydraulic supply line of powered tools must not be used for hoisting or lowering of the tool.

Loose clothing, jewellery or gloves that could get caught in the tool must not be worn when operating powered tools. Operators of powered tools who have long hair must keep their hair tied up.

The power source must be disconnected from the tool before making any repairs, servicing, adjustments, or replacing attachments such as drill bits.

13.27 Angle Grinders

The following personal protective equipment must be worn when using angle grinders:

- Safety helmet;
- Gloves;
- Safety glasses (or safety goggles) and a full face shield (i.e. double eye protection);
- Overalls with long sleeves and long pants, avoid any form of loose clothing;
- Safety boots with steel toe protection;
- Hearing protection;
- Breathing apparatus where dust or fumes may be generated;
- Where grinding machines are used, a face shield is to be worn as extra protection to the safety glasses; and
- Certain tasks may require the use of a leather apron as determined by a risk assessment.

A 230mm angle grinder may not be used for free cutting purposes. Exceptions may be approved only if alternative methods evaluated proved more hazardous or no alternative exists. The risk assessment

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for the task must then specifically include mitigating measures to ensure the safest possible way of performing the task.

The use of 230mm angle grinders for grinding purposes is acceptable, however should this form of grinding be required, the 115mm or 125mm grinders would be preferable.

All angle grinders must have a dead man switch incorporated, with a pressure switch in the handle.

A 230mm electrical angle grinder unit must incorporate a soft start to reduce the starting strain and a braking system to reduce run on after the unit has been switched off.

All angle grinders must have a spindle lock to assist with changing the disc or grinding wheel.

Anti-vibration handles are recommended to further reduce the stress if used for extended periods.

Angle grinders must be equipped and operated with disc guarding at all times.

Angle grinder must not be stored with fitted discs, as this will lead to damaging of the discs.

Before use and mounting of discs it is essential to check the safety codes and specifications printed on the upper side of the disc. Such specifications include the following:

- Revolutions per minute (RPM). The allowable speed of the disc must be equal to or greater than the maximum achievable speed of the grinder;
- Physical dimensions of the disc must meet grinder specification; and
- The disc must be suitable for the material type to be cut / ground as indicated on the disc. Cutting discs must never be used for grinding and vice versa.

It is critical that the correct disc mounting procedure is followed:

- Check that the machine is plugged out;
- Check the machine spindle, backup washer and thread;
- Check the condition of spindle nut - ensure spanner drive holes are not elongated;
- Ensure spindle nut spanner is the tool recommended by machine manufacturers;
- Do not use a hammer, pipe or chisel to tighten the nut, or apply additional mechanical advantage to nut torque. A firm "nip" is sufficient to retain the disc;
- Ensure the spindle diameter is suited to disc bore. Excessive clearance will cause the machine to vibrate due to eccentricity;
- Check to see that the nut and backup washer do not "bottom out". This will result in the disc not being correctly clamped on the spindle;
- Ensure the spindle speed is marked on the grinder and that it is less than the allowable disc speed; and
- Fit the disc, with the metal ring or writing to the nut side.

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13.28 Pneumatically Powered Tools and Equipment

Pneumatic powered tools must only be driven by filtered compressed air with an in-line lubrication system, or be lubricated prior to use if there is no in-line lubrication system. When using pneumatic powered tools the designated tool pressure must be attained by the use of a regulator.

Pneumatic powered tools must be disconnected when not in use. They must not be disconnected from the air supply until all the residual pressure has been released or contained by a shut-off device. Hoses must not be kinked as a means of containment.

Employees operating pneumatic powered tools, and any potentially affected employee in the vicinity of use, must wear suitable personal protective equipment.

All rotary compressed air tools (e.g. drills) must have the rated revolution per minute (RPM) permanently marked on the casing. Only attachments of compatible RPM must be used with these machines.

The actual RPM of the tool must be checked every three months to ensure that the speed is as rated to manufacture specifications.

Pneumatic powered tools must be secured to the air supply hose by an approved positive means to prevent the tool from becoming accidentally disconnected. Safety clips or retainers must be securely installed and maintained on pneumatic impact (percussion) tools to prevent attachments from being accidentally expelled.

All pneumatically driven nailers, staplers, and other similar equipment provided with automatic fastener feed, which operate at more than 100 kPa pressure at the tool, must have a safety device on the muzzle to prevent the tool from ejecting fasteners unless the muzzle is in contact with the work surface.

Compressed air must not be used for cleaning purposes except where reduced to less than 30 kPa, and then only with effective chip guarding and personal protective equipment in place. The 30 kPa requirement does not apply to concrete form, mill scale and similar cleaning purposes. The use of compressed air for cleaning purposes must be accepted by the *Supervisor*. Compressed air must not be pointed at any part of the body or used for cleaning clothing.

Airless spray guns of the type which atomize paints and fluids at high pressures must be equipped with automatic or visible manual safety devices which will prevent pulling of the trigger to prevent release of the paint or fluid until the safety device is manually released. A diffuser nut which will prevent high pressure, high velocity release while the nozzle tip is removed, plus a nozzle tip guard which will prevent the tip from coming into contact with the operator, or other equivalent protection must be provided in lieu of the above.

Abrasive cleaning nozzles must be equipped with an operating valve, which must be held open manually to enable operation. A support must be provided on which the nozzle may be mounted when it is not in use.

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13.29 Fuel Powered Tools and Equipment

Fuel powered tools must be shut down and allowed to cool before being refuelled, serviced, or maintained. Fuel must be transported, handled, and stored in approved fuel containers. Where possible, diesel driven engines must be used in preference to petrol driven engines. All fuel powered tools must be included on the principal contractor's Equipment Register and the register must be submitted to the Project Manager and *Supervisor* prior to the relevant work commencing.

When fuel powered tools are used in enclosed spaces, the space must be ventilated and the atmosphere monitored to measure toxic gas concentrations. Persons in the space must wear the necessary personal protective equipment. Confined Space Entry clearance may apply. This type of activity must only be undertaken in exceptional circumstances and requires the acceptance of the Project Manager.

13.30 Hydraulically Powered Tools and Equipment

Hydraulic powered tools must use only approved fluid that retains its operating characteristics at the most extreme temperatures to which it will be exposed. The manufacturer's stated safe operating pressures for hoses, valves, pipes, filters and fittings must not be exceeded.

Only manufacturer approved hoses, valves, pipes, filters and fittings must be used.

13.31 Explosive Powered Tools

The principal contractor must ensure that all operators are trained by the Supplier of the equipment. The principal contractor shall ascertain that the explosive charges to be used are of the correct strength for the purpose.

Projectiles from explosive powered tools shall NOT be driven into:

- Tile, terracotta, glazed brick, glass, marble, granite, thin slate or other brittle substances;
- High tensile steel, cast iron or steel hardened by heat treatment; or
- Concrete that contains aggregate that will not pass wholly through 25mm mesh screens.

Under no circumstances shall a tool be fired in such a manner as to cause the projectile to fly free.

Suitable safety glasses and hearing protection shall be worn by operators when firing an explosive powered tool.

At all times when a tool is being used, the operator shall display clearly legible signs at or near the place where the tool is in use. Sign should read: WARNING: EXPLOSIVE POWERED TOOL IN USE – KEEP CLEAR.

The operator shall warn all other employees in the vicinity of the area in which the tool is about to be used.

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Tools shall never be stored in a loaded state. Cartridges and tools shall be stored separately in lockable containers.

A logbook must be kept of the number of cartridges used and returned.

13.32 Hand Tools

Employees required to use hand tools must receive training relevant to the tool and have their competency assessed in the operation, inspection and maintenance of the tool. Where necessary, additional applicable personal protective equipment must be worn when using hand tools.

Wrenches, including adjustable, pipe, end, and socket wrenches, must not be used when the jaws are sprung to a point where slippage occurs. Impact tools such as drift pins, wedges and chisels, must be kept free of mushroomed heads. The wooden handles of tools must be kept free of splinters or cracks.

Adjustable wrenches must not be used in lieu of ring or open-end type spanners, unless a risk assessment has been conducted and the use of the adjustable wrench is accepted by the Project Manager. Wherever possible, ring spanners must be used in preference to open end spanners.

Correct hand tools for the job must be used, e.g. screwdrivers must not be used as chisels, and pliers must not be used as hammers.

All wedges and drifts that may spring, fly or fall to lower levels upon impact must be fitted with an attachment which attaches a safety "lanyard" to a solid structure to restrain the impact tool from becoming a projectile.

All hand tools used in elevated areas, that may be dropped or fall to lower levels must be fitted with safety lanyards and attached to solid structures or in the case of podges, scaffold keys etc., attached by wrist lanyard to the user.

Purpose built tools and equipment may not be used unless a risk assessment has been conducted and accepted by the Project Manager.

13.32.1 Inspection of Equipment and Tools

All tools must be inspected by the user before, during and after use. If any faults are identified, the tool must be taken out of service and not used until repaired. Faulty tools that are not able to be repaired must be tagged "out of service" and removed from site.

13.32.2 Manual Handling and Vibration

Any handling or lifting task that can only be done manually must be planned and rehearsed before the task is done.

If more than one person is involved in a task a communication procedure must be agreed in advance. Lowering the load must be done in a controlled manner. Dropping a load is dangerous and must be avoided.

FEL 4

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As a guideline 25 kg is considered to be the limit of what a person can safely handle. Where there are loads exceeding 25 kg the risk of handling the load must be mitigated to assure minimal potential for any injury.

When mechanical lifting aids are provided, they should be used.

Extra care should be taken when lifting awkwardly shaped objects.

Position the feet correctly. The feet should be placed hip-width apart to provide a large base. One foot should be put forward and to the side of the object, which gives better balance.

Bend or 'unlock' the knees and crouch to the load. The weight will then be safely taken down the spine and the strong leg muscles will do the work.

Get a firm grip. The roots of the fingers and the palm of the hand should grip the load. This keeps the load under control and permits it to be distributed more evenly.

The following should be considered with conducting the Risk Assessment with regards Manual Handling and also take into consideration the task factors, physical demands and tools involved in the task:

- Load weight/frequency;
- Hand distance from lower back;
- Asymmetrical trunk/load;
- Postural constraints;
- Grip on the load;
- Floor surface;
- Environmental factors;
- Carry distance; and
- Obstacles en-route.

Team Manual Handling:

- Load weight;
- Hand distance from lower back;
- Vertical lift region;
- Trunk twisting/sideways bending;
- Postural constraints;
- Grip on the load;
- Floor surface;
- Environmental factors; and
- Communication, co-ordination and control.

As far as possible, exposure to vibration must be eliminated.

However, if this is not possible, short-term solutions to decrease exposure include:

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- Reducing the vibration levels;
- Removing the person from the vibrating equipment / tools;
- Reducing the period of time that the person works with the vibrating equipment / tools (at least 40 minutes break after 20 minutes working with a machine that vibrates excessively).

In order to reduce exposure to vibration:

- Consider buying equipment that operates effectively at lower speeds;
- Buy equipment with built-in damping materials;
- Buy lighter tools if they are available - they require less of a grip;
- Maintain the equipment;
- Make sure equipment is balanced and there are no worn parts;
- Use remote controls when they are available;
- Reduce your grip on the equipment when it is safe. The less time you actually have your hands on the equipment the better. Relax your hands during these brief breaks;
- Take scheduled breaks; and
- Do other tasks that allow you to move away from vibrating tools and equipment.

The workplace must be assessed by a competent person for compliance with good design, layout and practice, to avoid or minimise adverse health consequences due to manual handling and vibration issues.

Quantitative evaluations of vibration produced by specific equipment must include the following measurement parameters: direction of movement, frequency, intensity, and variation with time and duration, as per documented methods.

Employees and *Contractors* must be informed of the results of assessments and instructed in appropriate manual handling techniques, where the risk assessment indicates a need.

Workplace vibration sources that could contribute to the exceedance of an Occupational Exposure Limit (hence potential for impact on worker muscular-skeletal fitness) must be identified and adequately characterised.

Manual handling tasks assessed as having the potential to cause a Lost Time Injury (i.e. with potential for impact on worker muscular-skeletal fitness) must be identified and adequately characterised.

Workplace manual / materials handling tasks risk rated as "significant" must be assessed and recorded to include biomechanical factors (e.g. posture, bending, twisting, repetitive motions, working overhead, and exerting force away from the body).

13.33 Personal Protective Equipment

All OHS- Act 85 provisions and standards/codes incorporated thereunder concerning Personal Protective Equipment (PPE) must be complied with at all times.

As a minimum, the following PPE must be worn by all persons (including visitors) at all times whilst on a project site:

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- Safety footwear with steel toe protection;
- Safety glasses (individuals who wear prescription spectacles must be provided with either over-spec safety glasses or prescription safety glasses);
- Safety helmet (hard hat); and
- High visibility protective clothing with reflective taping (long trousers and long-sleeved shirts with collars and cuffs).
- Additional PPE requirements must be determined through hazard identification and risk assessment. This hazard-specific PPE (such as hand protection, hearing protection and respiratory protection) must be worn as required (e.g. when in a certain area, when performing a certain task, or when working with a certain substance);
- The correct PPE must always be worn:
- In accordance with site requirements (as indicated at the entrances to a project site and at the entrances to buildings and / or designated areas on the premises);
- In zoned areas (e.g. noise zones and respirator zones); or
- As required by a Safe Work Procedure, a risk assessment, or a Safety Data Sheet (SDS).

The principal contractor must provide each of his employees with all required PPE (at no cost to the employee). The specific PPE that is provided to a particular employee must be based on the nature of that employee's work and the location in which the work is performed (i.e. must be based on the hazards to which the employee is exposed). PPE requirements for a particular job or for a particular area must be determined through a risk assessment for that job or area.

Any employee who does not have all of the PPE that is required for him to perform his duties safely will not be permitted to work.

Each employee must care for his PPE, maintain it in good condition, and inspect it on a daily basis. If an item of PPE has worn out, has become damaged, or is found to be defective in any way, it must be replaced by the principal contractor.

PPE must be stored in accordance with the manufacturer's requirements and / or recommendations.

Each employee must receive training in the use, maintenance and limitations of the PPE that is provided to him, and must be made aware of why the PPE is necessary as well as the consequences of not wearing it as instructed (i.e. the potential for injury and / or disciplinary action). Training records must be retained.

Any person who refuses to wear PPE as required must be removed from the site.

Symbolic signs indicating mandatory PPE requirements must be prominently displayed at the entrances to a project site and at the entrances to buildings and / or designated areas on the premises where additional PPE is required. These signs must comply with the applicable national standard (if one exists).

The principal contractor must appoint an employee to:

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- Control the issuing and replacement of PPE;
- Keep an up-to-date register as proof that items of PPE have been issued to individuals (an employee must sign for the items that he receives);
- Ensure that there is an adequate supply of all required PPE (i.e. maintain PPE stock levels on site); and
- Carry out regular inspections to ensure that PPE is being used correctly, is being maintained in a good, serviceable and hygienic state, and is not being shared between employees.

13.33.1 Head Protection

A safety helmet (or hard hat) worn correctly will help protect the head in the event of:

- An employee being struck on the head by a falling or flying object;
- An employee striking his head against a fixed or protruding object; or
- Accidental head contact being made with an electrical hazard.

A safety helmet must be worn at all times on a project site, with the following exceptions:

- Vehicle and equipment operators inside enclosed cabs;
- In offices and in office or administration buildings; and
- At designated lunch and break areas (provided that no work is in progress in the immediate break area).

A safety helmet must be worn in accordance with the manufacturer's requirements.

A safety helmet must be worn directly on the head. The wearing of a cap or other headgear beneath a safety helmet is prohibited unless the items have been specifically designed to be used in combination (i.e. the arrangement is approved by the safety helmet manufacturer).

The suspension system inside a safety helmet (that acts as a shock absorber) may not be removed.

The painting of safety helmets is prohibited.

Safety helmets may only be cleaned using a mild detergent and water. No solvents may be used.

13.33.2 Eye Protection

If an employee is carrying out, assisting with, or working adjacent to any activity where sparks or projectile particles are being generated, where chemical mists or fumes are being generated, where liquids may splash or spray, where harmful electromagnetic radiation (heat or light) is being generated, or where there is a risk of wind-blown particles entering the eyes, then suitable protective eyewear must be worn at all times (i.e. safety glasses, safety goggles, a face shield, a welding helmet, or a combination of these).

Such activities include:

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- Working with rotating equipment (e.g. grinders, drills, mills, lathes, and saws);
- Welding and cutting;
- Chipping, chiselling or caulking;
- Using explosive powered tools;
- Abrasive blasting;
- Sanding; and
- Working with chemical substances (e.g. drilling fluids, acids, solvents, paints, pesticides, etc.).

For certain activities, special eye protection is required (e.g. a heat-resistant face shield is required when working near molten metal).

Double eye protection is required for activities such as:

- Grinding, cutting, chipping, chasing and reaming (employees must wear both a full face shield and safety glasses or goggles); and
- Arc welding (welders must wear both safety glasses and a welding helmet).

Screens must be erected to protect passers-by, where practical.

Safety glasses must be worn at all times on a project site, with the following exceptions:

- Vehicle and equipment operators inside enclosed cabs with the windows fully closed;
- In offices and in office or administration buildings;
- At designated lunch and break areas (provided that no work is in progress in the immediate break area); and
- When another form of eye protection is required (e.g. safety goggles).

All safety glasses used on site must have suitable permanent side protection.

In strong sunlight, dark safety glasses should be worn to reduce eyestrain and fatigue. However, caution must be exercised when employees are required to frequently move between outdoor and indoor environments. Dark safety glasses may not be worn indoors or in poor daylight conditions. Prescription spectacles with tinted lenses are prohibited inside buildings or other structures with limited illumination unless the lenses are light-sensing and adjust to changing illumination levels.

Employees who wear prescription spectacles (i.e. require corrective lenses) must make use of either:

- Prescription safety glasses (with permanent fixed side shields) that conform to the requirements of a recognised national or international standard (e.g. CSA, ANSI, or equivalent); or
- Over-spec safety glasses or goggles.

The use of contact lenses in certain areas may not be suitable because of increased risk to the eye due to dust or heat.

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In all instances the use of the correct eye protection must be justified by a suitable task specific risk assessment and be the last source of control.

13.33.3 Hearing Protection

Local regulations concerning occupational exposure to noise and the use of hearing protection must be complied with as a minimum. Refer Noise induced Hearing Loss Regulations (NIHLR)
"Low noise" tools and machinery must be used wherever possible to reduce noise levels.

Where noise cannot be reduced to an acceptable level through engineering and work practice controls, measures must be put in place to minimise the exposure of employees to the noise (i.e. administrative controls and personal hearing protection).

Areas where it is likely that the 95% upper confidence limit of an eight hour Leq mean exceeds 85dB(A), or areas where impulse noise exceeds 140dB(C), must be designated as noise zones. These noise zones must be clearly demarcated and mapped, signs must be posted, and all employees must be made aware of the requirements for working in such an area.

Suitable hearing protection (SANS approved) must be worn in all designated noise zones and when carrying out (or working in the vicinity of) any activity where the noise level exceeds 85dB(A).

Where hearing protection is required, a hearing conservation programme (applicable to all personnel and visitors) must be implemented. The programme must include training in the correct use and proper storage of hearing protection devices as well as replacement requirements. Training must be provided when hearing protection is first issued to an employee and refresher training must be carried out at least annually thereafter. Training records must be retained.

At least two types of personal hearing protection must be made available to employees. The hearing protection devices provided must have adequate noise reduction ratings (i.e. must be able to attenuate the noise level to below 85dB(A)).

Personal hearing protection must be issued on an individual basis and must not be shared.

In addition to personally issued hearing protection, suitable disposable hearing protection must be made available at the entrances to all noise zones.

All Hearing Protection Devices (except for disposable hearing protection) must be properly inspected and cleaned on a regular basis.

13.33.4 Hand and Arm Protection

Gloves must be worn when handling or working with equipment, materials or substances with the potential to cause injury or illness.

Suitable gloves must be selected based on the task to be performed and the specific hazard against which the employee requires protection, such as:

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- Sharp edges;
- Sharp points and splinters;
- Abrasive surfaces;
- Hazardous chemical substances (toxic, corrosive, sensitising, etc.);
- Extreme temperatures; and
- Viruses, bacteria and parasites.

13.33.5 Foot Protection

Safety boots must be worn at all times whilst on a project site, with the exception of offices and office or administration buildings in which closed athletic, business or similar shoes may be worn.

Sandals, slops, slippers, open-toed and high-heeled shoes are not permitted on any project premises.

Safety boots must provide the following protection:

- Steel toe cap to protect against crushing (impact and compression forces);
- Leather uppers that provide resistance against water penetration and water absorption;
- Slip resistant soles;

And where a risk assessment identifies the need:

- Puncture resistant soles (i.e. steel midsoles) for protection against sharp objects;
- Chemical resistant soles for protection against spilt chemical substances (such as solvents, hydrocarbons, acids, and alkalis);
- Heat resistant soles for protection against hot surfaces or molten metal; or
- Electrical shock resistant soles for protection (insulation) against live electrical conductors.
- Gumboots with steel toe caps must be worn when working in water or very wet conditions.

13.33.6 Clothing

All employees working on a project site must wear high visibility protective clothing with reflective taping. Trousers must be long and shirts must be long-sleeved. Shirts must be buttoned at the neck and wrists.

Protective clothing must preferably be made of natural fibres.

Short pants, short-sleeved shirts, sleeveless shirts, and vests are prohibited as outer garments (with the exception of a high visibility vest worn over a long-sleeved shirt).

Loose clothing may not be worn where it may become caught in moving machinery or equipment. For hot work (e.g. welding, cutting, etc.), work in the vicinity of molten metal, and any work carried out in the vicinity of an open flame, the protective clothing worn (shirt and trousers) must be made of a suitable fire retardant fabric. Underwear and socks must be made of natural fibres (preferably wool) or fire retardant fabric.

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No employee may tuck his trousers into his boots when working in the vicinity of molten metal.

13.33.7 Body Protection

Suitable body protection must be provided as required to protect employees against specific hazards. A range of work activities require body protection in one form or another, including but not limited to:

- Working in extremes of temperature, such as firefighting, etc.;
- Hot work (e.g. welding, burning, cutting and grinding);
- Working with hazardous chemical substances (e.g. acids, solvents, pesticides, etc.); and
- Clean up and disposal of hazardous materials and wastes (e.g. asbestos, hydrocarbons, etc.).

A wide variety of protective garments are available, such as firefighting suits, furnace suits, freezer jackets, leather aprons, leather spats, laboratory coats, chemical resistant aprons, chemical resistant (or hazmat) suits, and disposable coveralls. Suitable items must be selected to provide protection against the specific hazard(s) to which an employee is exposed. Hazards must be carefully identified and characterised to ensure that the correct protection is used.

Body protection must be sized properly to prevent tearing, the parting of seams, tripping, or restriction of movement.

13.33.8 Jewellery

Necklaces, dangling earrings, and bracelets may not be worn on a project site.

No ring or watch may be worn where there is a risk that it may become caught in machinery or equipment.

No jewellery or other conductive apparel (such as a key chain or watch) may be worn when carrying out energised electrical work.

13.33.9 Hair

Scalp hair that is longer than the top of the shoulders must be tied up and restrained within the person's safety helmet or within the collar of his or her overalls, shirt or jacket.

For negative or neutral pressure Respiratory Protection Devices, facial hair must not cause the seal between the respirator and facial skin to be broken (or prevent a seal from being formed in the first place).

13.33.10 Sun Protection

The principal contractor must ensure that all personnel are protected in sunlight through the use of long sleeve shirts, long trousers, safety helmets and UV factored sunscreen. Shade structures must also be made available to all employees.

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The principal contractor must conduct training and awareness sessions with his employees, advising on the risks associated with working in the heat (including dehydration) and the precautions to be taken (e.g. ensuring adequate fluid intake).

13.34 Fuel / Flammable Liquid Storage and Refuelling

No fuel (diesel, petrol, paraffin, etc.) or any other flammable liquid (paints, solvents, etc.) may be stored on site unless compliant to CR 25 and accepted in writing by the Project Manager.

If the on-site storage of a fuel or a flammable liquid is accepted, the principal contractor must ensure the following:

- The quantity of fuel / flammable liquid to be stored on site must be kept to the minimum that is required;
- The storage area must be located in a well ventilated area at least 10 metres away from any building, drain, boundary or any combustible material;
- If more than 200 litres of fuel / flammable liquid is to be stored, the tank must be installed / the containers must be positioned within a bund (see Definitions);
- If the fuel / flammable liquid are to be stored in bulk tanks / vessels, then the minimum capacity of the bund must be 110% of the volume of the largest tank / vessel. If many small containers (e.g. 210 litre drums) are to be stored, the bund must be able to contain 25% of the total volume of the stored products;
- The bund must be impermeable. It must have a solid concrete floor and the walls must be constructed out of brick and must be plastered on the inside;
- The bund must be fitted with a lockable drain valve (for draining away rainwater), which must remain locked in the closed position. The valve may only be opened under supervision and in accordance with a written procedure;
- The fuel / flammable liquid storage area may not be used for the storage of any other materials / equipment, and must be kept completely free of all combustible materials (including rubbish, brush and long grass) at all times;
- Access to the storage area must be controlled (wire mesh fencing and gate);
- Appropriate warning signage (i.e. "Flammable Liquid", "No Smoking" and "No Naked Flames") must be prominently displayed at the storage area. The contents and volume of each tank must be indicated;
- In order to contain spillages, the offloading / refuelling bay at the fuel / flammable liquid storage area must have a solid concrete base surrounded by bund walls, ramps or humps and / or spill trenches (covered with steel grating) that lead into a sump;
- Fuel dispensing pumps must be protected against impact damage;
- All fuel / flammable liquid storage tanks and dispensing equipment must be electrically bonded and properly earthed;
- All electrical installations and fittings must be of an approved intrinsically safe type;
- Two 9kg dry chemical powder fire extinguishers must be mounted in an easily accessible position near the entrance gate to the fuel / flammable liquid storage area. Depending on the size of the storage area, additional fire extinguishers may be required to ensure that an extinguisher is no further than 15 metres away from any point on the perimeter of the storage area;

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- A fire extinguisher must be at hand wherever refuelling is carried out;
- Smoking or open flames within 10 metres of a fuel / flammable liquid storage / refuelling area is strictly prohibited;
- No petrol or diesel powered vehicle or equipment may be refuelled while the engine / motor is running;
- Cellular phones must be switched off in fuel / flammable liquid storage / refuelling areas;
- Spill clean-up kits (containing a suitable absorbent fibre product) must be provided;
- Any spillages must be cleaned up immediately and all contaminated cleaning materials must be disposed of in accordance with the applicable legislation;
- If a flammable liquid is spilt or is leaking from a container / vessel, the area must be cordoned off and appropriate warning signage must be displayed to keep unauthorised personnel away from the affected area. Every effort must be made to contain the spillage. All hot work in the vicinity must be stopped immediately. If the spilt product is volatile and the possibility exists that a vapour cloud may form, or if the leak or spillage cannot be contained or stopped, then appropriate emergency response procedures must be activated (refer to Section 14) including the evacuation of all persons in the vicinity. Suitable firefighting equipment must be positioned ready for use should the spilt product ignite;
- The manual decanting of fuel or a flammable liquid from a large container should only be done using a stirrup pump (or similar) or a purpose-made frame which allows the container / drum to tilt for decanting and then return to the upright position;
- Drip trays must be used wherever required;
- All tanks, drums, cans, etc. containing flammable liquids must be tightly closed and properly sealed except for when a container is being filled or when a product is being decanted;
- The transport or storage of corrosive or flammable liquids in open containers is strictly prohibited
- Daily-use quantities of fuel (up to a maximum of 20 litres) must be handled in an approved safety can with a flash arresting screen, spring closing lid and spout cover that will safely relieve internal pressure if the can is exposed to fire;
- Where safety cans may be impracticable, only approved metal containers with screw caps may be used. Each container must be clearly labelled to indicate its contents;
- Only small quantities of flammable liquids (paints, solvents, etc.) may be stored within a building. Each product must be kept either in its original container or in an approved container which must be properly sealed. Each container must be clearly labelled to indicate its contents. When not in use, all such containers must be stored in a well-ventilated steel cabinet which must be kept locked to prevent unauthorised access;
- Not even small quantities of flammable liquids may be stored or dispensed in buildings or places of public assembly, in general warehouses, or in buildings containing sources of ignition such as space heaters, cooking devices, open electric motors, motor vehicles, or where welding, cutting, or grinding activities are being carried out;
- Safe Work Procedures must be compiled for the transportation (including delivery), offloading, storage, handling and use of any fuel / flammable liquid on site;
- All personnel that will be required to work with or may come into contact with a flammable liquid must be made aware of the hazards associated with the product and must be thoroughly trained in the safe transportation, use, handling and storage thereof.

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13.35 Fire Protection and Prevention

The principal contractor must compile a Fire Protection and Prevention Plan for the work that will be carried out on site.

The principal contractor must assess / survey his area of responsibility and identify locations where the risk of fire is high. Cognizance must be taken of the fact that certain locations may need to be designated as high risk due to the presence of large quantities of flammable or combustible materials / substances. For all high risk areas, the principal contractor must ensure that additional precautions are taken to prevent fires and strict control is exercised over any hot work (i.e. welding, cutting, grinding, etc.) that is carried out.

The principal contractor must supply and maintain all required firefighting equipment. The type, capacity, positioning, and number of firefighting appliances must be to the satisfaction of the *Project Manager* and must meet the requirements of the applicable legislation. Fire mains, hydrants and hose reels will rarely be available on site, so use must primarily be made of portable fire extinguishers. If uncertainty exists the local fire chief must be consulted.

Firefighting equipment, fixed and portable, must be strategically located with a view to being able to rapidly deploy the equipment in order to bring potentially dangerous and destructive fires under control while still in their infancy.

All fire extinguishers (and any other firefighting equipment) placed on site must be:

- Conspicuously numbered;
- Recorded in a register;
- Visually inspected by a competent person on a monthly basis (the results of each inspection must be recorded in the register and the competent person must sign off on the entries made); and
- Inspected and serviced by an accredited service provider every six months (the *Project Manager* may require that this frequency be increased depending on the environmental conditions (e.g. high dust levels, water, heat, etc.) to which the fire extinguishers are exposed).

Any fire extinguisher that has a broken seal, has depressurised, or shows any sign of damage must be sent to an accredited service provider for repair and / or recharging. Details must be recorded in the register.

Firefighting equipment may not be used for any purpose other than fighting fires. Disciplinary action must be taken against any person who misuses or willfully damages any firefighting equipment.

Access to firefighting equipment, fixed or portable, must be kept unobstructed at all times.

Approved signage must be in place to clearly indicate the location of each permanently mounted fire extinguisher, fire hose reel, etc.

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The principal contractor must ensure that all persons working in / entering his area of responsibility are made aware of where all firefighting appliances and alarm points are located.

The principal contractor must ensure that sufficient number of his employees (and those of any appointed Contractors) are trained in firefighting procedures and the use of firefighting equipment.

The principal contractor must compile an emergency response procedure detailing the actions that must be taken in the event of a fire or a fire / evacuation alarm (see Section 14).

All personnel working within the Contractor's area of responsibility must be trained, and all visitors must be instructed, on this procedure. Copies of the procedure must be prominently displayed in the workplace in all languages commonly used on the site.

A person discovering a fire must extinguish the fire if he can do so safely, and then immediately report the incident to his *Supervisor*. If the person cannot extinguish the fire, he must raise the nearest alarm and then report the fire as quickly as possible to his *Supervisor*, the person responsible for the area, and / or Security.

On hearing a fire / evacuation alarm, all persons must make any operational plant or equipment safe, and then proceed to the nearest emergency assembly point and await instructions.

All incidents of fire (including the use or misuse of any firefighting equipment) must be reported to the *Project Manager* and *Supervisor* immediately. Used fire extinguishers must be replaced by the Contractor without delay.

No hot work (i.e. welding, cutting, grinding, etc.) or any other activity that could give rise to a fire may be performed outside of a designated workshop without a Permit to Work having been issued.

Wherever hot work is being carried out, a fire extinguisher must be at hand. Where the risk assessment determines that it is necessary, a fire watch must be stationed.

Supervisors must carry out workplace inspections regularly to ensure adherence to fire prevention measures and procedures.

At the end of every working period (i.e. before each tea / lunch break and at the end of every shift / day), the workplace must be thoroughly inspected to ensure that no material is left smouldering and no condition / situation exists that could give rise to a fire.

The principal contractor must ensure that all *Supervisors* and all employees carrying out or assisting with any hot work or any other activity that could give rise to a fire have been trained in firefighting procedures and the use of firefighting equipment. The training must be conducted by an accredited training provider.

When using electrical equipment, all cables must be in good condition and the nearest convenient socket must be used.

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No power socket may be loaded beyond its rated capacity through the use of adaptors, etc.

Makeshift electrical connections are not permitted under any circumstances.

Water-based firefighting equipment must not be used on electrical equipment or burning liquids.

Refer to Section 13.16 – Electrical Safety.

Each vehicle used on site for work purposes and each item of mobile equipment with a diesel or petrol engine must be fitted with a permanently mounted fire extinguisher.

Smoking is only permitted in designated smoking areas. Cigarette ends / butts must be properly stubbed out in the ashtrays provided and never thrown into waste bins.

The principal contractor must ensure that good housekeeping practices are enforced, as this is crucial to the prevention of fires.

All combustible waste materials must be removed from the workplace on a daily basis (at the end of each shift) and placed in waste receptacles located at least 5 metres away from any structure.

The accumulation of waste materials in out-of-the-way places is prohibited.

Offices, desks, cabinets, etc. must always be kept tidy and uncluttered. Waste paper bins must be emptied regularly.

The storage of combustible materials under stairways or in attics is prohibited.

The storage of any materials against the exterior of a building or any other structure is prohibited.

All walkways, passages and stairways must be kept clear (i.e. must be unobstructed) at all times, as they may need to be used as a means of escape.

The areas around and the routes to all exits, fire escape doors, fire hydrants, fire hose reels and fire extinguishers must be kept clear (i.e. must be unobstructed) at all times.

"No Smoking" signs must be conspicuously displayed in and around all storage areas / rooms.

Waste may not be burned on site under any circumstances.

No flammable liquid (such as petrol, acetone, alcohol, benzene, etc.) may be used for starting fires or as a solvent for cleaning clothes, tools, equipment, etc. Only solvents accepted by the *Project Manager* may be used for cleaning purposes.

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Whenever any work is carried out involving the use of a flammable substance / material, the area must be cordoned off and appropriate warning signage (i.e. "No Unauthorised Entry", "No Smoking" and "No Naked Flames") must be displayed.

13.36 Smoking

The principal contractor must not permit smoking on site except within designated smoking areas selected in accordance with the applicable legislation. Such an area must be clearly demarcated and the required signage must be displayed.

Any person found smoking or discarding a cigarette butt outside of a designated smoking area may be removed (temporarily or permanently) from site.

In all designated smoking areas, adequate non-combustible commercial ashtrays and / or cigarette butt receptacles (butt cans) must be provided.

Ashtrays and other receptacles provided for the disposal of smoking materials must not be emptied into rubbish bins or any other container holding combustible materials.

"No Smoking" signs must be strictly observed.

13.37 Housekeeping

The principal contractor must maintain all work areas in a tidy state, free of debris and rubbish. Unless directed otherwise, the principal contractor must dispose of all debris, rubbish, spoil and hazardous waste off site in a designated and authorised area or facility. The principal contractor must familiarize himself with the waste management plan for the site including collection and disposal arrangements, and must align his waste management activities accordingly.

In cases where an inadequate standard of housekeeping has developed and compromised safety and cleanliness, the *Project Manager* may instruct the principal contractor to cease work until the area has been tidied up and made safe.

Neither additional costs nor contract deadline extensions will be allowed as a result of such a stoppage. Failure to comply will result in a clean-up being arranged through another service provider at the cost of the non-complying principal contractor.

The principal contractor must carry out housekeeping inspections on a weekly basis to ensure maintenance of satisfactory standards. The principal contractor must document the results of each inspection. These records must be maintained and must be made available to the *Project Manager* on request.

The principal contractor must implement a housekeeping plan for the duration of the contract ensuring that the site housekeeping is maintained. Furthermore, at the end of every shift, the principal

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contractor must ensure that all work areas are cleaned, all tools and equipment are properly stored, and construction rubble is removed.

Where the principal contractor fails to maintain housekeeping standards, the *Project Manager* may instruct the principal contractor to appoint a dedicated housekeeping team for the duration of the project at the principal contractor's expense.

Littering is prohibited.

13.38 Waste Management

Waste may not be disposed of unless the disposal of that waste is authorised by law. The principal contractor must therefore ensure that all waste that is generated is handled, stored, transported and disposed of in accordance with the requirements of the applicable legislation / local authority.

No waste may be removed from the project site to a waste storage or disposal facility unless that facility has been accepted for use by the *Project Manager*.

An adequate number of waste bins and skips must be provided by the principal contractor and suitable arrangements must be made to ensure that these bins and skips are emptied regularly.

Hazardous wastes must be kept separate from general wastes.

Waste disposal service providers must be accepted by the *Project Manager* before any waste is removed from site. These service providers must be audited on a two-yearly basis (or more frequently if deemed necessary based on risk) in order to ensure compliance with legislation and to help ensure that no liabilities accrue to the project.

13.39 Stacking and Storage

13.39.1 Stacking of Pre-cast Concrete Items

All irregular shaped items will be stacked at ground level in designated stacking areas on a level, firm base capable of withstanding the weight of the concrete items being stacked, all items will be stacked in such a manner (largest base dimension) that the items do not pose a topple over risk or change position due to subsidence or weight transfer when being moved.

The load bearing capacity of the ground must be established when calculating the height/tiers of stacked armor units or dolosse at the cast yard.

13.39.2 General Stacking and Storage

All irregular shaped items will be stacked at floor / ground level in designated stacking areas on a level, firm base capable of withstanding the weight of the commodities being stacked and stacked in such a manner (largest base dimension) that the items do not topple over or change position due to subsidence or weight transfer when being moved.

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Where these commodities are stacked on shelves or racks, the shelves or racks must be designed to carry the weight of the commodity being stacked.

All racks or shelves where heavy material or commodities are stacked will have a weight carrying limitation clearly marked on the structure and have a safety factor of at least +10% of maximum total carrying capacity.

All materials, commodities or articles, which could be damaged due to inclement weather, must be stored under cover.

Waste material that is combustible must not be allowed to accumulate in sufficient quantities to create a hazard.

No commodities or equipment may be stacked or stored within 500mm of where mobile equipment travels.

The storage of material, small equipment, tools, files and general items in cupboards and on shelves must be neat and controlled at all times. Incompatible substances must not be stored in or on the same cupboard or shelf.

No equipment, tools, files or documents may be stored or stacked on top of cupboards which are higher than 1.5 meters in height.

13.40 Facilities

Sanitary conveniences must be provided and maintained at a rate of at least one shower facility for every 30 workers, at least one toilet facility for every 20 workers, separate male and female changing facilities and sheltered eating areas. (Check SANS 10400 Part F).

Where chemical toilets are provided, one toilet for every twenty five employees must be allocated. All toilets must be cleaned daily, disinfected and provided with toilet paper.

All employees making use of these facilities have the responsibility to help keep the facilities neat, clean and hygienic.

Washing facilities, including soap and towels, must be made available for use by the Contractor's employees.

Drainage from all washing / toilet facilities must be properly designed and constructed to prevent employee exposure to waste water (and the associated biological hazards). Waste water may not accumulate or stand in pools at any location on the project site.

Change rooms must be provided and must be kept clean and free from odours at all times.

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No chemicals, except those normally used for domestic cleaning of these facilities, may be stored in the facilities.

No equipment or items (other than those normally associated with hygiene facilities) may be stored in the facilities.

All entrances must be constructed in a way to afford privacy to users.

Drinking water must be provided.

A sheltered (covered) area must be set aside on site to be used as a dining facility (eating area). Adequate seating must be provided for the maximum number of employees. The facility must be kept clean and tidy.

A suitably sized, impervious receptacle (bin) must be provided for the disposal of waste food and other refuse generated at the dining facility. This bin must be emptied and cleaned regularly (i.e. promptly after meal times).

Food may only be consumed in authorised sheltered areas.

Adequate refrigerated storage must be provided to the Contractor's employees for the storage of food and drinks. Fridges must not be overstocked and must maintain sufficiently low temperatures.

13.41 Occupational Hygiene

The principal contractor must ensure that the exposure or potential exposure of his employees to any of the following stressors is assessed and measured (a baseline survey must be carried out by an Approved Inspection Authority - this services to be provided by TCP):

- Noise;
- All applicable physical agents, like Thermal stress (heat and cold);
- Particulates (dust);
- Silica (free crystalline silica);
- Gases or vapours;
- Chemicals;
- Vibration (hand / arm vibration and whole body vibration);
- Ergonomics; and
- Illumination.

If it is determined that exposure levels for a particular stressor are unacceptable, then a monitoring and control plan must be implemented to manage any risk of overexposure.

Note: Where chemical substances are to be used as part of the construction process, the principal contractor must ensure that the chemical composition of each substance is known.

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Carcinogenic (cancer-causing) ingredients must be specifically identified with due understanding that no chemical known to cause cancer will be permitted for use on site (an alternative will need to be sourced).

13.42 Lighting

For all work areas and access ways, if the natural lighting available is inadequate it must be supplemented by artificial lighting to meet the minimum levels required. (Refer to regulation 11 of the Physical Agent Regulations as well as tables 4 to 7 for minimum illuminance values)

Emergency lighting must be provided in all indoor workplaces that do have adequate natural lighting or in which persons work at night. The emergency sources of lighting that are provided must be such that, when activated, an illuminance of not less than 0.3 lux is obtained at floor level, to enable employees to evacuate safely.

Where it is necessary to stop machinery or shut down plant or processes before evacuating the workplace, or where dangerous materials are present or dangerous processes are carried out, the illuminance must be not less than 20 lux.

Windows and translucent sheeting must be kept adequately clean and clear of obstructions as far as reasonably practicable. Light fittings, i.e. lenses and reflectors must be kept clean.

If a light intensity meter is used, a valid calibration certificate must be available.

Neon lights must not be installed in areas where moving parts of machinery or equipment cannot be fully guarded, i.e. lathes, bench grinders, etc. in order to eliminate the stroboscopic effect.

No person may use a portable electrical light where the operating voltage exceeds 50 volts, unless:

- It is fitted with a non-hydroscopic, non-conducting handle;
- All metal parts which may become live are protected against accidental contact;
- The lamp is protected by means of a guard firmly attached to the handle; and
- The cable can withstand rough use.

No person may use a portable electric light in damp or wet conditions or in closely confined spaces, inside metal vessels or when in contact with large masses of metal, unless:

- The lamp is connected to a source incorporating an earth leakage; and
- The operating voltage of the lamp does not exceed 50 volts.

13.43 Hearing Conservation

A hearing conservation program must be implemented and protection against the effects of noise exposure must be provided when the noise exposures equal or exceed an 8-hour time-weighted average sound level of 85 decibels measured on the A-weighted scale of a standard sound level meter at slow response.

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For the hearing conservation program to be effective it must include as a minimum:

- Monitoring of the workplace to determine the representative exposure of employees to excessive noise levels;
- An audiometric testing program for employees, which must include:
 - A baseline audiogram for all employees exposed to noise levels equal to or in excess of the standard;
 - Annual audiograms for each overexposed employee;
 - Analysis of audiogram results with retesting and/or referral to an otolaryngologist or qualified physician when a significant threshold shift (STS) occurs; and
 - Written employee notification of the STS.
- A training program for all employees exposed to noise;
- Provision of personal protective equipment to all affected employees when administrative or engineering controls fail to reduce sound levels to within the levels of the standards.

Monitoring of employee exposures to noise shall be conducted by an Approved inspection Authority.

The monitoring requirement may be met by either area monitoring or personal monitoring that is representative of employee exposures. Personal monitoring is preferred, and may be required based on the type(s) of noise sources.

For purposes of the hearing conservation program, employee noise exposures shall be computed in accordance with local legislation.

A person-task specification shall be available for every job category and shall be submitted with an employee for audiometric testing.

Audiometric testing and an annual audiogram shall be provided as part of the regular medical examinations.

Audiometric test results obtained from the pre-employment medical examination for a new employee shall be used as the baseline audiogram.

Testing to establish a baseline audiogram shall be preceded by at least 14 hours without exposure to workplace noise.

Hearing protectors shall not be used as a substitute for the requirement that baseline audiograms be preceded by 14 hours without exposure to workplace noise.

Employees shall be notified of the need to avoid high levels of non-occupational noise exposure during this 14-hour period.

Record-keeping for the audiogram shall include:

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- Name and job classification of the employee;
- Date of the audiogram;
- The examiner's name;
- Date of the last acoustic or exhaustive calibration of the audiometer;
- Employee's most recent noise exposure assessment.

Audiometric test results shall be maintained in the employee's medical file.

To control noise exposure, its three basic elements shall be examined, i.e. source of the sound, travel path, and effect on receiver or listener. Solution of a given noise problem might require alteration or modification of any or all of these three basic elements.

1) Controlling noise at the noise source can be achieved by the following:

- Select quiet equipment initially. In selecting quiet equipment the following features shall be considered:
 - Low-noise certification;
 - Advertisement of "quiet" operation, evidence of noise control design;
 - Evidence of "lower" and "slower" operating characteristics;
 - Side-by-side noise testing of equipment; and
 - "On-site" or "in operation" inspection of mechanical equipment before purchase.
- Reduce operating noise by considering the following control measures:
 - Reduce impact or impulse noise by reducing weight, size, or height of fall of impacting mass;
 - Reduce speed in machines and flow velocities and pressure in fluid systems;
 - Balance rotating parts – to control machinery noise and vibration of fans, fly wheels, pulleys, cams, etc.
 - Reduce frictional resistance between rotating, sliding or moving parts in mechanical systems: frequent lubrication, proper alignment of moving parts; static and dynamic balancing of rotating parts; correction of eccentricity or "out-of-roundness" of wheels, gears, rollers, pulley, etc.;
 - Reduce resistance in air or fluid systems: use of low flow velocities, smooth boundary surfaces of duct or pipe systems, and long-radius turns and flared sections in pipes, etc., to reduce turbulence noise;
 - Isolate vibration elements in machinery; install motors, pumps, etc. on most massive part of machine; use belt or roller drives in place of gear trains; use flexible hoses and wiring instead of rigid piping and stiff wiring, etc.
 - Apply vibration damping materials such as liquid mastic; pads of rubber, felt, foam or fibrous blankets; or sheet metal visco-elastic laminates or composites to vibrating machine surfaces; and;
 - Reduce noise leakage from the interior of machines such as compressors by sealing or covering all openings or applying acoustical materials to machine interiors.

2) Controlling noise in the transmission path can be achieved by the following:

- Separate the noise source and receiver as much as possible;

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- Use sound-absorbing materials on ceiling, floor or wall surfaces as close to the machine as possible;
- Use sound barriers and deflectors in the noise path;
- Use acoustical lining on inside surfaces of such passageways as ducts, pipe chases or electrical channels;
- Use mufflers, silencers or snubbers on all gasoline or diesel engines, regardless of size; and particularly on equipment when large quantities of high-pressure, high-velocity gases, liquids, steam or air are discharged into the open air; and
- Use vibration isolators and flexible couplers where the noise transmission path is structure borne in character.

3) Protection for the receiver – when engineering controls fail to reduce the levels to within the levels specified in local legislation, the following measures shall be implemented:

- Personal protective equipment shall be provided and replaced as necessary at no cost to employees;
- *Supervisors* shall ensure that hearing protective devices are worn by all employees who are exposed to a time-weighted average of 85 decibels or greater and who have experienced a significant threshold shift;
- Employees shall be given the opportunity to select their hearing protectors from a variety of suitable protectors; and
- Noise zones shall be indicated by means of signs at every entrance to such zones.
- When noise levels exceed 100 dB(A), a combination of earplug and earmuff may be required to achieve protection of the worker.
- It is important to note that using double protection will add only 5 to 10 dB of extra attenuation above that of a single Hearing Protection Device.
- Where an earmuff and earplugs are used together, OSHA recommends using this simple calculation: Take the higher rating of the two devices, and add five.
- Hearing Protection Devices should be worn for the full noise exposure period.

Where an audiometry programme is required, it must meet the following standards:

- All testing must be by pure tone audiometry in an audiometry booth or quiet room, with measured noise levels less than 40 dB(A);
- The initial audiogram must be taken prior (minimum of 24 hours) to exposure to significant noise. Further audiograms must be taken periodically; annually where exposures are over 85 dB(A) Leq or where continued deterioration to hearing is occurring;
- Testing must be performed by trained and competent personnel;
- Audiometers must be calibrated according to the manufacturer's guidelines. As a minimum these will be a weekly biological calibration using an employee unexposed to noise, or a bio-acoustic simulator, and an annual quantitative check. All results must be documented; and
- Audiograms must be read by trained persons who will identify any increasing hearing loss and then determine if this is noise induced. Any employee with a significant downward shift in one or both ears (measured as an average non age-adjusted loss from baseline of 10 dB at 2, 3 or 4 kHz) must be retested following removal from noise for a minimum of 24 hours, usually after a days-off period. If the downward shift persists the employee must be reviewed by a physician and improved hearing protection considered.

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13.44 Hazardous chemical agents

No chemical agent may be brought onto site unless it appears on the contractors HCA register. Every HCA will have available a SDS with the following information: Trade name / product name of substance reagents to neutralise spillages, firefighting foam, etc.); and Approved disposal methods.

Any chemical substance brought onto site without adherence to the requirements stipulated above shall be removed from site immediately. The contractor must ensure a file, or files, containing all of the SDS's must be maintained and must be readily available to all personnel on site (particularly first aiders) as well as other potentially affected parties (e.g. emergency services personnel, persons from the local community, etc.). The SDS's must be in the language(s) commonly used on site. The contractor must appoint a Hazardous Chemical Agents Coordinator who understands and is able to evaluate the risks associated with a wide variety of substances.

This person shall be responsible for: Assessing the hazardous properties and risks associated with all chemical substances brought onto site by the contractor and appointed sub-contractors (using the SDS's); Determining precautions and safe practices for transportation, use, handling, storage and disposal (including PPE requirements) (using the SDS's); Determining first aid and emergency response requirements / procedures (using the SDS's); Maintaining the SDS file.

The risks associated with the transportation, use, handling, storage and disposal of all hazardous chemical substances brought onto site must be assessed and managed by the contractor through a process that incorporates risk reduction using the hierarchy of controls.

13.45 Fitness for Work

The principal contractor must develop and implement a programme to manage employee fitness for work. All employees working on site for whom the principal contractor is responsible (i.e. direct employees of the principal contractor as well as the employees of any appointed Contractors) must be subject to this programme.

All safety critical jobs (i.e. roles where fatigue or other causes of reduced fitness for work could lead to serious injury, illness or death to employees, significant equipment / plant damage, or significant environmental impact) must be identified and the risks associated with reduced fitness for work in these roles must be assessed.

A programme to manage these risks must be implemented, and it must include:

- Mechanisms for managing fatigue, stress and lack of fitness;
- An alcohol and other (including prescription, pharmaceutical or illicit) drugs policy that includes testing;
- An Employee Assistance Programme providing confidential access to resources and counsellors; and
- Training and awareness programmes.



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Each employee has an obligation to present himself fit for work at the start of the day / shift, and to remain fit for work throughout the work period. Reporting for work under the influence of alcohol or any other intoxicating substance will not be tolerated. Any transgression concerning the alcohol and other drugs policy applicable to the project may result in the offending employee's access to the project premises being temporarily or permanently withdrawn.

Alcohol and drug testing on the project premises will be carried out randomly (as employees report for duty and during the course of the day / shift), following significant incidents (all persons involved), and whenever there is reasonable suspicion. Alcohol and drug testing may also be carried out as part of a Pre-Employment Medical Examination.

Sleep deprivation during shift work or from excessive working hours is a known cause of fatigue. Fatigued employees are at increased risk of accidents. Shift system design must consider:

- The effect on worker fatigue;
- The effects of activities carried out during scheduled and overtime hours;
- The impact on sleep cycles of activities such as commuting to and from site; and
- The monitoring and control of working hours.

The principal contractor is responsible for the administration of the working hours of his employees as well as the employees of any appointed contractor. The maximum working hours per day and the minimum rest times between shifts must be specified in the principal contractor's Health and Safety Management Plan and must comply with all applicable legislation.

All employees engaged in safety critical jobs must undergo fitness assessments (medical examinations) which must be carried out prior to the commencement of employment on the project, prior to a change in role, periodically based on an employee's individual risk profile, and on termination of employment on the project:

- Pre-Employment Medical Examination – to assess the physical suitability of the person for the role and environment in which he will work (carried out prior to the commencement of employment on the project and prior to induction);
- Periodic (Surveillance) Medical Examination – to assess the ongoing physical condition of an employee to determine if his role is impacting on his health and whether the employee's fitness level is still adequate for the role he holds (these medical examinations are "risk driven" – the specific protocol followed and the frequency of the examinations will depend on the applicable legal requirements and the employee's individual risk profile as determined by his personal fitness, the nature of his role / duties, and the environment in which he works / occupational health hazards to which he is exposed). The periodic medical assessment programme must include:
 - The identification of modifiable risk factors that may impact fitness for work;
 - Education and support to maintain health or address identified risk factors; and
 - Education and support to help employees regain their fitness for work.
- Role Change Medical Examination – to assess an employee's physical suitability for a different role and work environment (carried out prior to a change in role / duties);

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- Exit (Post-Employment) Medical Examination – to determine the total physical impact of the work the employee performed (carried out on termination of employment on the project if the employee worked on the project site for more than six months).

Note: The results of an Exit Medical Examination from previous employment will not be accepted as a Pre-Employment Medical Examination.

Note: The medical examinations described above may only be carried out by an occupational medical practitioner (i.e. a medical doctor who holds a qualification in occupational medicine).

A detailed job (role) description and an exposure profile (noise, dust, heat, fumes, vapours, etc.) must be provided for each employee or group of employees. The medical examinations that an employee undergoes must be based on (i.e. the employee's fitness must be assessed against) the information contained in these documents as well as the baseline risk assessment for the work. This information must be made available to the occupational medical practitioner performing the medical examination.

For each role, the medical criteria for fitness must be documented and these must be based on an evaluation of the physical and medical requirements for the role.

Depending on the circumstances, certain vaccinations may need to be provided to employees.

The medical examinations carried out for all drivers and operators must include testing / assessment for medical conditions that could affect the safe operation of vehicles or equipment.

Specific testing / questioning must be carried out to determine if an individual:

- Suffers from epilepsy or any other medical condition deemed to be a risk by the occupational medical practitioner;
- Makes use of chronic medication that could affect performance;
- Is colour-blind; or
- Has poor day or night vision.

The medical examinations carried out for employees that are required to work at height must include testing / questioning to determine if an individual suffers from epilepsy, hypertension (high blood pressure) or any other medical condition deemed to be a risk (with regard to working at height) by the occupational medical practitioner.

Electricians must be tested for colour-blindness.

With regard to the placement of new employees:

- Prospective employees must be referred to a suitable occupational medical practitioner (doctor) for a "Pre-Employment Medical Examination";
- If an individual is found to be medically "unfit for placement", the doctor will indicate which work activities cannot be performed by the person;

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- The individual may still be employed on the project if his medical restrictions can be accommodated and provided that no legislation is transgressed.

A process must be established to manage medical restrictions that may be placed on an employee. For every employee with a medical restriction, regular follow up visits with the occupational medical practitioner must be arranged to ensure that each case is proactively managed.

An employee in a safety critical job must report (to his *Supervisor*) any condition that might impair his ability to safely perform the duties associated with his role. A mechanism must be in place for such reports to be referred to an occupational medical practitioner to determine if the employee is fit to continue with his work.

Proof of all medical examinations (i.e. certificates of fitness signed by an occupational medical practitioner) must be kept on site and these records must be readily available for inspection by the Project Manager.

An employee's certificates of fitness must be included in his Personal Profile (dossier). If an Employee Personal Profile (dossier) hasn't already been compiled for a particular employee, then this must be done without delay following the employee's Pre-Employment Medical Examination.

No employee in a safety critical role may commence work on site without proof that he has undergone a Pre-Employment Medical Examination.

Occupational medical examinations and data interpretation may only be carried out by medical practitioners that are appropriately qualified and certified to do so.

Occupational medical data contained in reports to management must be grouped and summarised to ensure that the confidentiality rights of each individual employee are maintained.

All occupational medical data and records must be retained for at least 40 years.

13.46 Diving operations

The principal contractor will ensure that it complies to the requirements as set out in the diving regulations. The principal contractor is seen as the client for whom diving work will be performed and will ensure that:

- A documented health and safety specifications for the diving work is prepared and provided to any diving contractor who is making a bid to perform diving work for the client,
- Appoint each diving contractor as per the diving regulations.

If the principal contractor does not appoint a specific diving contractor and performs the duties of diving work the principal contractor must perform the functions of a diving contractor as per the diving regulations.

13.47 HIV / AIDS

The principal contractor must assess the risks posed by HIV. Appropriate mitigation strategies must be implemented as required.

Discrimination towards employees on the basis of actual or perceived HIV status is forbidden.

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All information on the HIV status and condition of employees and community members, including that relating to counselling, care and treatment and receipt of benefits, must be maintained in medical confidence.

HIV / AIDS screening may not be a requirement for recruitment or a condition of employment.

13.48 Temporary works

The principal contractor must appoint a temporary works designer in writing to design, inspect and approve the erected temporary works on site before use.

The principal contractor must ensure that all temporary works operations are carried out under the supervision of a competent person who has been appointed in writing for that purpose.

The principal contractor must ensure that:

- all temporary works structures are adequately erected, supported, braced and maintained by a competent person so that they are capable of supporting all anticipated vertical and lateral loads that may be applied to them, and that no loads are imposed onto the structure that the structure is not designed to withstand;
- all temporary works designs are done with close reference to the structural design drawings, and where any uncertainty exists the structural designer should be consulted;
- detailed activity specific drawings of temporary works structures are kept on the site and are available on request to an inspector, other *Contractors*, the Employer, the Employer's agent or any employee;
- all equipment used in temporary works structure are carefully examined and checked for suitability by a competent person, before being used;
- all persons required to erect, move or dismantle temporary works structures are provided with adequate training and instruction to perform those operations safely;
- all temporary works structures are inspected daily by a competent person;
- all temporary works structures are inspected by a competent person immediately before, during and after the placement of concrete, after inclement weather or any other imposed load and at least on a daily basis until the temporary works structure has been removed and the results have been recorded in a register and made available on site;
- no person may cast concrete, until authorization in writing has been given by the appointed designer;
- if, after erection, any temporary works structure is found to be damaged or weakened to such a degree that its integrity is affected, it is safely removed or reinforced immediately;
- adequate precautionary measures are taken in order to—
 - secure any deck panels against displacement; and
 - prevent any person from slipping on temporary works due to the application of release agents;
 - as far as is reasonably practicable, the health of any person is not affected through the use of solvents or oils or any other similar substances;

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- upon casting concrete, the temporary works structure is left in place until the concrete has acquired sufficient strength to safely support its own weight and any imposed load, and is not removed until authorization in writing has been given by the competent person contemplated;
- the foundation conditions are suitable to withstand the loads caused by the temporary works structure and any imposed load in accordance with the temporary works design.
- provision is made for safe access by means of secured ladders or staircases for;
- a temporary works drawing or any other relevant document includes construction sequences and methods statements;
- the temporary works designer has been issued with the latest revision of any relevant structural design drawing;
- a temporary works design and drawing is used only for its intended purpose and for a specific portion of a construction site; and
- The temporary works drawings are approved by the temporary works designer before the erection of any temporary works.

13.49 Project Close Out

The contractor must ensure that the complete Health and safety system is handed over to the client on completion of the project in electronic (PDF) format.

As per the legislative requirement the following documentation must be included as a minimum:

- All documents in the contractor's health and safety file.
- Records of all drawings, designs and materials used; including redline drawings, temporary works drawings with load bearing calculations for design and anticipated loads (or a reference to the drawings in the contractors document management system and the quality information for the materials used from the QC system if an integrated system is used)
- Other similar information relevant to health and safety concerning the completed structure and installation; this will include all documents relation to the compliance to OHS section 10, including operating manuals, maintenance manuals and end-user training on the manuals by the supplier or installer (or a reference to the relevant information in the contractor's QC system if an integrated system is used.)

To facilitate this process the contractor will ensure that all documentation in relation to the safety management system as indicated above is scanned on a monthly basis and a copy thereof presented to the Client's project manager as part of the monthly reporting on performance.

This is a contractual and legislated requirement for completion. No extension of time or costs will be granted due to non-management of this deliverable during the project

14. Emergency planning and response

The Principal Contractor will prepare an integrated emergency response plan in accord with the Port of Richards bay emergency response protocol, incorporating the agreed service agreement with regards to emergency response services.

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The contractor must develop, implement, test and maintain an Emergency Response Plan (incorporating an emergency evacuation procedure that is inclusive of severe swells and storms).

The plan must be risk-based and documented, and it must detail the procedures that must be followed when responding to various emergency scenarios such as a medical emergency (including first aid response), a fire, an explosion, a hazardous substance spill, flooding, rescue from height, rescue from a confined space, Rescue from the breakwater, man overboard procedure and vessels emergencies. The Emergency Response Plan must satisfy / comply with all applicable legal requirements.

The contractor must clearly define accountability for the plan and ensure that it is adequately resourced.

An Emergency Response Team (ERT) responsible for the implementation, management and execution of the Emergency Response Plan must be established. The roles and responsibilities of each team member must be clearly defined in the plan. Each team member must receive appropriate training to ensure that each role is performed competently.

The process for managing incident communication, notification, and reporting must be incorporated into the Emergency Response Plan. The responsible person(s) must be clearly identified, and the protocols for communicating with internal and external stakeholders must be defined.

A copy of the plan must be provided to the Client's project manager for approval prior to site establishment.

The contractor must ensure that all persons (i.e. personnel and visitors) working within his area of responsibility leave their places of work in the event of an emergency (e.g. fire, explosion, etc.) and proceed to a safe location (i.e. an emergency assembly point). How this will be achieved, and what actions and behaviours are expected of those who are evacuating, must be detailed in an emergency evacuation procedure (to be included in the Emergency Response Plan).

All persons working in an area where an evacuation alarm is sounded must respond to it immediately. The contractor must designate (and conspicuously signpost) emergency assembly points positioned in safe locations away from buildings, plant and equipment where all persons must assemble and be accounted for following an evacuation.

Where more than one contractor is present on site, the Client's project manager will coordinate activities related to the provision of evacuation alarms and the designation of emergency assembly points.

The contractor must ensure that all personnel working within his area of responsibility receive awareness training on the applicable emergency response procedures, and all visitors entering the area are properly instructed in these procedures. The contractor must ensure that the emergency response procedures are displayed on each Health and Safety Management Information Notice Board.

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Diagrams or plans indicating evacuation routes, emergency assembly point locations, and the positioning of emergency equipment (fire extinguishers, first aid boxes, etc.) must be prominently displayed in all buildings / plants and in other locations on site as may be required.

The principal contractor must compile and maintain an up-to-date list of emergency telephone numbers inclusive of the numbers for the harbour master and the port of Richards Bay emergency team. A copy of the list must be posted at each entrance to site each office on-site within each marine vessel and on all noticeboards.

Critical emergency telephone numbers from this list must be printed on a sticker. The principal contractor must provide each contractor employee with one of these stickers which the employee must affix to the inside of his safety helmet (hardhat).

The contractor must conduct emergency response drills to test the effectiveness of the emergency procedures and equipment, and the knowledge and proficiency of the response personnel. A variety of emergency scenarios must be tested including, but not limited to, medical emergencies, fires, rescues, and hazardous substance spills. The frequency with which these drills are carried out must be agreed with the Client's project manager and must, as a minimum, meet the applicable legal requirements. Each drill must be monitored and the outcomes (highlights and shortcomings) must be documented. Corrective actions must be identified and implemented to address the shortcomings, and the Emergency Response Plan must be amended as required.

14.1 First Aid

The contractor must ensure that First Aiders are trained and appointed as described below and earlier in the document including for off-shore work inclusive of the requirements of SAMSA and must not just comply to the requirements of the OHS Act for on-shore work but must .

If the contractor have less than 50 people that will be working per shift, the contractor must ensure that at least two Level 1 First Aiders are in place (i.e. trained and appointed) per shift, and that each first aider has a first aid box that are provided in the work area and maintained as used. If more than 50 people will be working on any particular shift then an additional First Aider must be added for every 50 employees per shift.

14.2 First Aid Kits

A suitable first aid kit (i.e. appropriate to the level of training) must be readily available to each First Aider. All kits must be provided and maintained by the contractor.

The contents of each first aid kit must be kept clean and dry. Each kit must be contained in either a portable weather-proof case / bag or a steel box mounted to a fixed structure. Access to first aid equipment / supplies must be limited to trained First Aiders only. Access to portable kit bags must be controlled and steel first aid boxes mounted in the workplace must be kept locked. Approved signage must be in place to indicate the locations of the first aid boxes / bags.

A record of each treatment administered must be kept in a suitable register.

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The first aid kits must, as a minimum, contain the equipment and supplies as published in General Safety Regulation 3.

14.3 Emergency Numbers

The principal contractor must compile and maintain an up-to-date list of emergency telephone numbers inclusive of the numbers for the harbour master and the port of Richards Bay emergency team. A copy of the list must be posted at each entrance to site each office on-site within each marine vessel and on all noticeboards.

14.4 Weather Precautions

The Principal Contractor's Emergency Response Manual must include procedures for adverse weather conditions (high winds, flooding, storm surge, lightning). The principal contractor will maintain a 48 hour weather forecast inclusive of information regarding expected wind speeds and expected wave swells. In the event of impending adverse weather or other conditions the Principal Contractor, in consultation with the Client's Project Manager, must decide whether to institute such precautionary measures in connection with the carrying out of the work, for example emergency temporary banding, tie down of cranes and partly installed structures.

15. Management of Change

To ensure that proposed changes do not give rise to unacceptable health or safety risk, the principal contractor must develop and implement a process for identifying and managing change in the workplace (e.g. changes to scope, schedule, procedures, work methods, site conditions, designs, plans, plant and equipment, materials and processes) that may impact on health or safety performance.

The management of change process must take into consideration that changes may be planned or unplanned, sudden or gradual, temporary or permanent.

The process must aim to ensure that:

- Changes are identified and assessed before they are implemented;
- Careful consideration is given to managing the risks associated with any change;
- Due diligence can be shown to have taken place;
- The number of unsatisfactory or unnecessary changes is minimised;
- The right people are involved in the change process; and
- All statutory requirements are met.

All risks associated with a proposed change must be evaluated and ranked. The risks that are ranked as moderate or higher must be managed to prevent serious injury or illness.

It must not simply be assumed that a change will not result in significant risks. All proposed changes must be formally evaluated. The evaluation or review must include:

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- An appropriate level of technical expertise;
- The involvement of the workforce potentially affected by the proposed change; and
- Approval of the change by a person with at least the same level of authority as those who control the existing process or item being changed.

16. Contractor Alignment / Stakeholder management

Processes must be in place to ensure that the health and safety risks associated with the procurement of materials, equipment, services and labour are identified, evaluated and effectively managed.

A process for evaluating a contractor (or supplier's) ability to provide materials, equipment, services and labour that meet defined specifications must be in place. A prospective contractor's health and safety management expertise, experience and capability (including previous health and safety performance) must be formally assessed prior to any contract or purchase order being awarded.

Each appointed Contractor must develop and implement a detailed Health and Safety Management Plan based on the requirements of the principal contractor's Health and Safety Management Plan and the Health and Safety Specification for the project. This plan must be reviewed and approved by the principal contractor prior to the commencement of any work.

The properties of all materials provided to the project must be adequately understood, documented and integrated into operating procedures where exposure to these materials presents a significant health or safety risk.

Procedures, commensurate with the evaluated risk, must be in place for the receiving, storing, dispatching and transporting of all equipment and materials.

Before work commences on any contract, all Contractor personnel must receive comprehensive orientation and induction training.

All work carried out by a Contractor must be managed (activity supervised) throughout the contract period and performance must be reviewed (audited) on a regular basis.

17. Incident Reporting and Investigation

The *Contractor* must establish a procedure for the management of all health and safety incidents. This procedure must define the responsibilities, methodologies and processes that must be followed for:

- Reporting an incident;
- Investigating an incident;
- Analysing an incident to determine the root cause;
- Identifying and implementing corrective actions to prevent a recurrence; and
- Communicating information concerning an incident to relevant persons and / or groups.

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Please Note: Arrangements must be in place to ensure that proper medical care is provided to any *Contractor* (or sub-*Contractor*) employee that suffers an occupational injury or illness (refer to Section 15). These arrangements must be described in the *Contractor's* Health and Safety Management Plan.

An incident may have multiple impacts. For each impact, the Actual Consequence and the Maximum Reasonable Outcome must be evaluated. Each impact must be evaluated independently, with the most significant classification forming the primary rating of the incident.

A Near Hit/Miss is an incident. All Near Hits/Misses must be reported.

The Maximum Reasonable Outcome (MRO) is based on a risk evaluation of the maximum reasonable consequence of an impact and the likelihood of the event occurring again given a reasonable failure of existing controls. Using the matrix referred to above, each impact must be evaluated and classified as:

- Low;
- Moderate;
- High; or
- Extreme.

An incident must be reported on the same work day or shift on which it occurs and preliminary details must be recorded.

Depending on the Actual Consequence and Maximum Reasonable Potential Outcome of the impact(s), the relevant internal and external parties must be notified in accordance with specified protocols and timeframes, and legislative requirements.

In the event of a significant incident (i.e. an incident with an Actual Consequence of Moderate, Major or Catastrophic, or a Maximum Reasonable Potential Outcome of High or Extreme, work must cease and must only resume once the necessary actions (including the re-evaluation of any relevant risk assessments) have been taken to eliminate or reduce the risk of recurrence. Work must only be permitted to recommence once formal authorisation has been granted by the Project Construction Manager. In the case of incidents with an Actual Consequence of Major or Catastrophic, work must not be permitted to recommence until authorisation has been granted by the relevant government authorities (i.e. the South African Police, the Department of Labour or the Department of Mineral Resources).

The Contract Manager must ensure that an investigation is completed for each incident that occurs, and that appropriately senior personnel participate in, and authorise the outcomes of, each investigation. Incident investigations must be facilitated by competent and experienced persons who have been trained in the appropriate methodology.

All significant incidents (i.e. incidents with an Actual Consequence of Moderate, Major or Catastrophic, or a Maximum Reasonable Outcome of High or Extreme must be investigated using the approved

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Transnet investigation methodology. Such an investigation must be facilitated by a trained project representative within 7 calendar days.

For all other incidents (i.e. incidents with an Actual Consequence of Insignificant or Minor, or a Maximum Reasonable Outcome of Low or Moderate other methodologies approved by the Project Health and Safety Manager must be used.

Each incident (including Near Hits) must be investigated to a level of detail that is appropriate for the Maximum Reasonable Potential Outcome of the incident.

Each incident must be analysed to determine the root cause, and corrective actions must be identified and prioritised for implementation to eliminate or reduce the risk(s) in order to prevent recurrence of the incident.

For each corrective action, a responsible person must be designated and an appropriate timeframe (target date) for completion of the corrective action must be specified. Progress on implementing corrective actions (i.e. closing incidents) must be monitored and reported on. The implementation of corrective actions must be verified during monthly audits by the Project Health and Safety Agent but also no later than 7 calendar days after the conclusion of the incident investigation.

The *Contractor* must document the results of each investigation and a report must be submitted to the *Project Manager* within five working days of the incident occurring.

As a minimum, each incident report must include:

- The date, time and location of the incident;
- A detailed description of the incident, including photographs;
- The names of any injured persons;
- Injury details (if applicable);
- A summary of the first aid and / or medical treatment provided (if applicable);
- The current status of any injured persons;
- The root causes of the incident; and
- Detailed corrective actions, including responsible persons and target dates for implementation.

Each significant incident must be summarised for its lessons learnt following the investigation. This information must be reviewed by the *Contractor's* Project Manager to assure completeness, accuracy and relevance before it is shared with (communicated to) all project personnel.

18. Non-conformance and Action Management

The contractor must establish a procedure for the management of all incidents. The procedure must outline the methodologies and processes that will be followed for:

- Recording an incident;
- Investigating an incident;
- Analysing the impact(s) and the potential risk of future incidents;

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- Communicating information concerning an incident to relevant persons / groups; and
- Managing corrective actions to prevent a reoccurrence.

This procedure must be communicated to all personnel through awareness training. Note: Arrangements must be in place to ensure that proper medical care is provided to any contractor (or sub-contractor) employee that suffers an occupational injury or illness.

The contractor must report each incident that occurs (including Near Misses) to the Client's project manager without delay (i.e. immediately). Preliminary details must be recorded on the same workday / shift on which an incident occurs. The contractor must investigate each incident (including Near Misses) to a level of detail that is appropriate for the Maximum Reasonable Outcome of the incident investigation.

All significant incidents must be investigated using a recognised root cause methodology. For all other incidents other methodologies may be used to determine the root cause and to identify corrective and / or preventative actions.

Incident investigations must be facilitated by personnel who have been trained in the appropriate methodology. Investigations into significant incidents must involve the active participation of the contractor's Project / Construction Manager, Health and Safety Officer(s), and relevant Supervisors.

Nominated project management representatives may participate in the investigation. The contractor must document the results of each investigation and a report must be submitted to the Client's project manager within five working days of the incident occurring.

As a minimum, each incident report must include: The date, time and location of the incident; A detailed description of the incident, including photographs; The names of any injured persons; Injury details (if applicable); A summary of the first aid / medical treatment provided (if applicable); The current status of any injured persons; The root causes of the incident; and Detailed corrective and preventative actions, including responsible persons and target dates for implementation.

Each significant incident must be summarised for its lessons learnt following the investigation. This information must be reviewed by the Client's project manager to assure completeness, accuracy and relevance before it is communicated to all employees.

The contractor must establish a process for identifying and recording corrective and preventative actions arising from:

- Incident investigations;
- Hazard identification and risk management;
- Measurement and monitoring;
- Improvement plans and suggestions;
- Managing change;
- Audits and inspections; and
- Safety observations and coaching (safety interactions).

The contractor must establish a procedure for managing actions that addresses:

- Identification, categorisation and prioritisation of actions;
- Formal evaluation and approval of actions;
- Assignment of responsibilities, resources and schedules for implementation;
- Implementation of actions;
- Tracking and reporting against implementation;
- Monitoring and verifying the effectiveness of the actions;
- Analysing trends and communicating performance with regard to closing actions; and

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- Communication concerning the status of actions.

19. Performance Assessment and Auditing

The principal contractor must develop a process for measuring health and safety performance. Metrics must include leading and lagging indicators, and be based on qualitative and quantitative data.

The contractor must set project-specific objectives and targets concerning health and safety, which must be aligned with the objectives and targets set for the project as a whole.

Performance must be measured on a regular basis and this must include an evaluation of: The extent to which objectives are being met; Progress against targets; The effectiveness of controls; Proactive conformance measures; and Reactive or historical performance measures.

19.1 Reporting on Performance

Reports summarising the principal contractors health and safety performance on the project must be compiled on a weekly and a monthly basis, the same applies to each contractor reporting to the principal contractor.

The principal contractor must be prepared to discuss the content of these reports at scheduled health and safety meetings.

The reports must contain the following information:

- Number of *Contractor* and sub-*Contractor* employees on site;
- Total hours worked on site by *Contractor* and sub-*Contractor* employees (by company);
- Number of incidents by category (i.e. Near Hit, FAI, MTI and LTI);
- Lost Time Injury Frequency Rate (LTIFR) (project to date and 12-month rolling);
- Details of all new incidents for the reporting period and the corrective actions taken or to be taken;
- Feedback (progress updates) on all open incidents and outstanding corrective actions;
- Status and feedback on any employee that may have been injured and has not yet returned to work;
- Details of all health and safety training carried out during the reporting period;
- Number of SOC's (Safety Observations and Coaching) carried out during the reporting period;
- SOC trends identified and proposed action for the coming week or month to maintain positive trends and / or address negative trends;
- Details of all audits, inspections and site visits carried out during the reporting period, and the corrective actions taken (or to be taken) to address all non-conformances;
- Feedback (progress updates) on all open non-conformances and outstanding corrective actions;
- Number of Toolbox Talks conducted during the reporting period (monthly);
- Number of Planned Task Observations (PTO's) carried out during the reporting period (monthly);

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- Details of all active risk assessments and Safe Work Procedures highlighting those that are due for review in the coming month (monthly);
- A look ahead (to the coming week, month or quarter) to ensure that appropriate health and safety planning and preparation is done for upcoming work;
- Challenges faced with regard to health and safety; and
- Any other health and safety related information specific to the project that may be required.

Leading indicators (e.g. audit findings, observations, etc.) must be analysed, and any negative trends identified with regard to unsafe behaviour or conditions must be appropriately addressed to prevent incidents.

Lagging indicators (e.g. injuries, illnesses, near hits, etc.) must be investigated in detail to determine the root causes. Corrective actions must be identified, implemented and integrated into Safe Work Procedures to prevent recurrences.

19.2 Audits and Inspections

On a monthly basis, the health and safety management system and workplace activities of the principal contractor will be audited by a Project Health and Safety Agent to assess compliance with the project health and safety requirements. Any deviation from these requirements (i.e. non-conformance) that places the health or safety of any person in immediate danger will result in the specific activity being stopped until the non-conformance is corrected.

For each non-conformance determined during any audit, the principal contractor must identify and implement appropriate corrective actions.

For each corrective action, a responsible person must be designated and an appropriate timeframe (target date) for completion of the corrective action must be specified. Progress on implementing corrective actions (i.e. closing non-conformances) must be monitored and reported on. The implementation of corrective actions will be verified during the monthly audits.

Should it be determined that the principal contractor's level of compliance is unsatisfactory, all work being performed by the principal contractor on the project site may be stopped (at the principal contractor's expense) until an investigation into the reasons for the poor performance has been carried out, a corrective action plan has been developed, and corrective actions have been implemented.

In addition to the audit carried out by the Project Health and Safety Agent, the principal contractor must carry out an internal audit on a monthly basis to assess compliance with the project health and safety requirements (including the requirements of this specification and the principal contractor's Health and Safety Management Plan).

Furthermore, the principal contractor must ensure that each appointed contractor is audited and measured to the same standard. Copies of these audit reports must be submitted to the Project Health and Safety Agent on a monthly basis.

The principal contractor must carry out internal health and safety inspections as follows:

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- General site health and safety inspections on a daily basis; and
- Inspections of plant, tools and equipment prior to establishment or use on site, and at least monthly thereafter.

All audits and inspections must be carried out by competent persons who have been appointed in writing.

A schedule of planned audits and inspections must be compiled and maintained ensuring that:

- All work areas and all activities are covered at regular intervals;
- All applicable legal requirements are complied with; and
- Areas or activities with significant associated hazards or risks receive greater attention.