CRANES AND LIFTING

PURPOSE AND SCOPE

The Primary Standard details the FSR controls and minimum requirements to eliminate or minimise risks associated with cranes and lifting operations at Laing O'Rourke workplaces.

Section 1 - 'Requirements' in this document is Mandatory and must be achieved across all Laing O'Rourke Workplaces. Where alternative controls are implemented, these must be approved through the FSR/HSEMS Requirement Dispensation process.

Section 2 - 'How to Comply' in this document provides information and guidance on how to comply with the requirements. Laing O'Rourke Workplaces are required to follow this guidance or achieve an equivalent or higher level of safety/outcome, documenting alternatives in the Project Risk Assessment and/or WHS Management Plan.

Definitions are detailed in Appendix 1 - Definitions

REQUIREMENTS

PLANNING WORK

FSR Appoint a Crane Appointed Person to manage lifting operations.

FSR Appoint a Crane Supervisor to oversee lifting activities on site.

FSR All crane crew must be trained and hold the relevant high-risk work licences before commencing lifting activities.

FSR A specific lift plan or analysis is required for every lift, except where a pre-approved analysis is listed in the Schedule of Common Lifts.

- Lift planning must be completed using the lift plan and lift analysis templates on the HSEMS, or an approved equivalent.

FSR Intermediate and Critical Lifts must have an approved Lift Study.

FSR Only set up a crane in locations that have a valid Permit to Load.

- The rated ground capacity detailed in the Permit to Load must exceed the ground bearing pressure(s) identified in the lift planning documents, taking into consideration (crane configuration, loads lifted, outrigger/track loads etc).

FSR Soft Slings may only be used following approval by an operational General Manager using the Soft Sling Authorisation Tool.

FSR Where multiple crane operations interface, the Crane Supervisor must coordinate lifting sequences and interfaces.

- Where cranes overlap or multiple cranes operate in close proximity, planning must address zoning/anti-collision arrangements and interface rules (priority crane / cease rules / comms).

FSR Articulating non-slewing cranes (ANSC) may only be used following approval by an operational General Manager using the ANSC Authorisation Tool.

FSR Before any pick-and-carry movement, confirm the load is within the machine's rated capacity and configuration, with the load tied back to a rated point, or where not possible, controlled by a tagline.

FSR Obtain a Crane Workbox Permit before commencing any workbox operations

FSR All plant must be onboarded by an authorised person using the plant mobilisation process before first use on site. Earthmoving equipment used as a crane must be assessed and approved for lifting through the plant mobilisation process

- Develop a lifting operations plan following the Lifting Operations Plan template on the HSEMS or equivalent.
- Where a mobile plant failure during lifting operations (e.g. roll-over, plant collapse) would result in an imminent threat to public safety at an interface with construction works, the risk(s) must be included on the Project Risk Assessment and control measures implemented to eliminate or reduced SFAIRP.
- Confirm that all registrable plant holds both design registration and item registration in accordance with WHS Regulations.
- Crane logbooks and inspection/maintenance records must be compliant to OEM requirements and maintained and made available upon request.
- Lift points must be rated/certified and fit for purpose for the intended lift.
- Communications methods for the lift must be planned, agreed and confirmed before lifting commences.
- Safeworking Plans must detail the protection arrangements to be implemented when lifting within a rail corridor.
- If lifting within rail protection zone, the lift plan must incorporate the network operator's lifting assessment requirements, including controls to prevent slewing/load encroachment into the corridor and confirmation that bearing pressures and induced ground movement remain within allowable limits

EXECUTING WORK

FSR A restricted work zone is established for all lifting activities using delineation and clear signage.

FSR Prohibit work beneath suspended loads.

FSR When earthmoving equipment is used as a crane, do not use for precision lifting and operate only in accordance with load charts and do not use for precision lifting.

FSR Verify travel paths for pick-and-carry movements are level, compact, and free of personnel, obstacles, and overhead hazards before moving the load.

FSR Cranes operating near powerlines must adhere to asset owner and Safe Approach Distance (SAD) requirements, have slew / height limiters and a trained electrical spotter.

- A Pre-Lift Start Card, Lifting Operations Assessment Form (LOAF) or equivalent must be completed before lifting starts. Lifting must stop if conditions change outside what was assessed and approved.
- Lifting Operations must be undertaken in accordance with the Lifting Operations Plan, Schedule of Common Lifts or specific lift plan or lift analysis.
- Environmental factors, such as wind, weather, visibility, and lighting must be monitored during lifting activities.
- Positive communications between crane operators and ground crew must be maintained throughout lifting operations, and a backup communications method must be available.
- All load movements must be directed and controlled by a competent and qualified person
- Taglines must be used to prevent uncontrolled swing/rotation and snagging, and to prevent working under a suspended load.
- Suspended loads must not be touched by hand(s) if more than 1 meter off the ground.

- Where outriggers are fitted to a crane, short-legging or zero outriggers must be treated as an intermediate lift and be approved via lift study.
- Where there is risk of disturbance/impact to outriggers or support items, vehicle/plant barriers must be installed to prevent contact.
- Ground conditions must be checked by the designated person as per the Lift Analysis/temporary works procedures.

FACILITIES, INSTALLATIONS, PLANT AND EQUIPMENT

FSR A tower crane anti-collision system is operational where there is radius overlap.

- Tower crane erection and operation must be supported by engineer-verified design, competent supervision and commissioning, with mandatory pre-erection inspection/testing and secure base access control to ensure structural integrity and prevent unauthorised access.
- Tower cranes must have a plan implemented to prevent persons working under lifted loads

FSR Inspect lifting and rigging gear before each use for signs of damage, confirm it is certified, fit for use and clearly tagged in line with the RGBY system.

- Confirm it is rated and suitable for the intended lift and compatible with the crane or lifting machinery it is being used with
- Confirm it clearly displays the manufacturer name and identification or serial number, and the WLL is clearly visible and in kilograms.
- Confirm it is attached as per the OEM requirements and the approved lift plan.
- Defective or un-tagged equipment is immediately removed from service (effectively tag out)

- Where more than one gantry crane operates on the same runway, physical stops or proximity anti-collision devices must be in place to prevent unintended contact between cranes or interference with an idle crane.
- All controls must automatically return to the off position when released by the operator, and the crane must be fitted with a means to prevent inadvertent re-energisation following a power failure.
- Where a Crawler Cranes or Lattice Boom Crane has been optioned with free fall capabilities, it must be fitted with a physical lockout device and/or be disabled permanently if possible to do so.
- All telehandlers using jib attachments for lifting operations must be fitted with a calibrated load management indicator system.
- Tag lines must be a minimum of 16mm diameter and made of non-conductive material.

HOW TO COMPLY

This section provides information and guidance on how to comply with '**Requirements**' of this document. Laing O'Rourke Workplaces are required to follow this guidance or achieve an equivalent or higher level of safety/outcome, documenting alternatives in the Project Risk Assessment and/or WHS Management Plan.

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1.0 PROCEDURE

1.1 RISK MANAGEMENT

A risk assessment must be carried out to determine the level of risk to workers and the type(s) of control method/s or protection to be provided. This risk assessment will be conducted in accordance with System Requirement Risk Assessment and SiD.

Cranes and lifting risk management processes are aimed at eliminating/reducing risks associated with:

- Overturning or collapse of a crane
- Failure of rigging equipment
- Uncontrolled release of loads from height (dropped objects)
- Workers being struck by moving crane components
- Workers operating in proximity to cranes and suspended loads
- Interface of crane operations with structures, overhead powerlines, and public are

Type of control	Example
▼ Elimination	**Design the work to eliminate the need for cranes or suspended loads (highest order).** • Design out the lift – Prefabricate modules so components arrive as assembled units that can be slid, bolted, or connected in place without multiple lifts – Cast in place instead of lifting precast elements – Design permanent lifting points and transport frames so the item can be delivered and installed without ad hoc rigging or rehandling. – Reduce component size/weight so it can be installed by smaller mechanical handling equipment or manual handling aids instead of a crane. • Eliminate suspended load exposure – Assemble at ground level and then move into final position by jacking, skidding, rolling, or sliding rather than suspending the load over workers. – Use hydraulic jacks to raise bridge components, formwork systems, or platforms into place. – Install from a safe work platform or deck edge so nobody needs to work beneath or beside a suspended load. – Use track-mounted handling systems or dedicated installation rigs in rail environments instead of mobile cranes near the corridor. • Eliminate repeat lifts – Deliver materials directly to point of use rather than double handling – Store materials at final elevation or zone during earlier stages of construction to avoid later re-lifting. – Bundle and sequence deliveries so components arrive in install order and are handled once.
▼ Substitution	**Replace with an alternative construction or transport methods.** • Substitute the lifting method • Substitute the load or component • Substitute the sequence or work environment
▼ Isolation	**Separate lifting operations from other work groups, public interfaces, traffic, and plant.** • Physical separation of pedestrians and crane activity/suspended loads • Load/unload exclusion zones (LUEZ) • Isolation from unstable ground / edges / overhead hazards

Type of control	Example
▼ Engineering Controls	**Install devices that can reduce risk.** • Movement limiting devices • Boom locks • Slew restrictors • Anti-two block devices • Load moment indicators • Anti-collision systems • Rated capacity devices • Engineered lifting points
▼ Administrative Controls	**Systems, planning, rules, training, supervision** • Procedures / rules – Lift planning documents – Schedule of Common Lifts – Lift Studies – Critical Lift Plans – SWMS – Permits – Pre-Lift Start Cards / LOAF • Competency / communication – Verification of competency / licences – Pre-starts and toolbox talks that reinforce crane operating zones – Crane coordination meetings.
▼ PPE	**Last line of defence (does not control crane or load energy itself).**

1.2 ENGINEERED SAFETY

Engineered Safety in Practice (examples):

Engineered Safety in Practice (examples):

- Loads are designed with rated engineered lifting points as part of the design.
- Near site fabrication or modularisation of components to reduce number of lifts (e.g. smaller number of bigger lifts).
- Crane based engineering controls
  - Rated Capacity Limiters (RCL) / Load Moment Indicators (LMI)
  - Anti-Two Block (A2B) systems
  - Anemometers
  - Slew restrictors and boom locks
  - Anti-collision systems m
  - Dynamic Load Moment Indicators (DLMI)
  - DLMIs and limiting devices
  - Proximity warning systems

1.3 LIFT CATEGORISATION

Risk assessment must verify the equipment type and configuration, the relative position of the crane and load, the number of lifting devices, support structure and ground conditions, temporary works requirements, load and motion limits, hook/block capacity, and the centre of gravity.

Every lifting activity must be assessed against the Lifting Categories and Associated Approvals table below to determine the required level of lift planning documentation.

1	Load Details	Lift Analysis	Lift Study Plan	Critical Lift Plan (Note 5)
1.1	Gross load over 50Te and below 90% or greater of the rated Crane capacity		√	
1.2	Gross load over 90% or greater of the rated Crane capacity / Any Prohibited Lifts			√
1.3	Gross load under 50Te and between 80% and 90% of the rated Crane capacity		√	
1.4	Gross load under 15Te and under 80% of the rated Crane capacity	√		
2	**Crane Set-Up**	**Lift Analysis**	**Lift Study Plan**	**Critical Lift Plan (Note 5)**
2.1	Assessment of ground to be completed by Temp Work Co-Ordinator, permit to Load must be approved before set-up of crane begins	√	√	√
2.2	Crane on a suspended platform or over critical infrastructure or services		√	
2.3	Crane track or outrigger pad/s close to embankment or excavation		√	
2.4	Partially extended outriggers		√	
2.5	Special lift devices (e.g. bespoke gantry systems, climbing jacks, strand jacks, derricks)		√	
2.6	Land based cranes on barges (Note 1)			√
2.7	Lifts over public roads and highways (all risks that could impact on major infrastructure must have appropriate controls in place including emergency response and contingency plans - post consultation with relevant authorities)		√	
3	**Crane Operation**	**Lift Analysis**	**Lift Study Plan**	**Critical Lift Plan (Note 5)**
3.1	Lifting with single crane and two (2) winches		√	
3.2	Where possibility of encroaching overhead powerline safe approach distance exists		√	
3.3	Two (2) crane lifts involving complex manoeuvre and / or pass out operations		√	
3.4	Super lift operation		√	
3.5	Multiple Crane Lifts - two (2) or more cranes			√
3.6	Congested areas	√		
3.7	Standard Crane Set-up	√		
3.8	Pick and Carry Operations by Cranes (including Pick and Carry operations undertaken by Fork Lift, Telehandler or Excavator) (Note 2)		√	
3.9	Dual Winch Lifting			√

4	Rigging and Loading	Lift Analysis	Lift Study Plan	Critical Lift Plan (Note 5)
4.1	Custom designed / bespoke rigging		√	
4.2	Workboxes (lifting personal lifts involving persons suspended in Workbox) Note: must also meet all the criteria of the Workbox permit			√
4.3	Precast Tilt up Panels		√	
4.4	Complex Rigging		√	
4.5	Pre-Cast elements (excluding tilt up)	√		
4.6	Demolition (including pile removal) (Note 3)			√
4.7	Loads with no engineered lift points or lifting method is difficult to sling	√		
4.8	Loads with OEM approved lift points or slinging method	√		
4.9	Simple rigging arrangements (including spreader bars and lifting beams)	√		
4.10	Lifts involving submerged objects			√

NOTES

Note 1: Where land-based cranes are to be used on barges the crane must be de-rated accordingly and barge checked by Naval Architect for suitability. Dynamic Amplification Factors are to be applied to the gross lifted load in accordance with marine lifting standards. Alternatively, a Naval Architect must be engaged to determine accurate dynamic amplification factors based on specific conditions

Note 2: Dynamic effects on crane, rigging and load must be considered in all piling and pick & carry related activities.

Note 3: In all cases, Lift Studies / Plans must be reviewed and approved by the Project AP:

Note 4: Climbing Operations of Tower Cranes must be fully planned and approved in consultation with SELECT Cranes Lifting Solutions & Temporary Works Co-ordinator

Note 5: All Critical Lift Plans need to be approved by a Project Director / Leader or ref Project Specific Guidelines for approval, refer to PS Cranes and Lifting and the Appointed Person Support Library (LOR only).

1.4 TRAINING AND COMPETENCY

All personnel involved in lifting operations must be trained, qualified, and verified as competent before participating in any lifting activity. The following minimum competency requirements apply:

Role	Competency Requirement
Appointed Person	• Must be formally appointed by the relevant Project/Workplace Leader in writing using the Crane Appointed Person letter template on the HSEMS or equivalent. • Holds CPCS Appointed Person, or NPORS Appointed Person certificate, or equivalent.

Role	Competency Requirement
Crane Supervisor	• Must be appointed in writing by the Project/ Workplace Leader using the Crane Supervisor Appointment letter template on the HSEMS or equivalent. • Holds either the same qualifications as an Appointed Person, or hold one of the following qualifications: – A National High Risk Work License (HWRL) Crane operation Class C6 or above – A Crane Supervisor qualification issued by Crane Supervisor and Appointed Person (Lifting Operations - CTI Course), or NPORS (National Plant Operators Registration Scheme) or equivalent qualification verified by Laing O'Rourke – A HRWL with class Intermediate Rigging (RI) or above
Crane Operator	Must hold the relevant HRWL for the class of crane being operated and a VOC for that model of crane. • CB - Bridge crane or gantry crane that is controlled from a permanent cabin or control station on the crane, or remotely controlled and having more than 3 powered operations • CD - Derrick crane • CN - Non-slewing mobile crane • CP - Use of a portal boom crane • CS - Self erecting tower crane • CT - Tower crane • CV - Vehicle loading crane • C2 - Slewing mobile crane (up to 20T) • C6 - Slewing mobile crane (up to 60T) • C1 - Slewing mobile crane (up to 100T) • C0 - Slewing mobile crane (over 100T) • RS - Reach Stacker
Dogger / Rigger	Must hold a valid HRWL at the relevant class (DG, RB, RI, or RA) appropriate to the rigging complexity of the lift being undertaken. • DG - Dogging • RB - Basic Rigging, work involving any of the following: – Structural steel erection – Hoists – Pre-cast concrete members of a structure – Safety nets and static lines – Mast climbing work platforms – Perimeter safety screens and shutters – Cantilevered crane loading platforms • RI - Intermediate Rigging, work involving any of the following: – Rigging work in the Basic Rigging class – Hoists with jibs and self-climbing hoists – Cranes, conveyors, dredges and excavators – Tilt slabs – Demolition of structures or plant – Dual lifts • RA - Advanced Rigging, work involving any of the following: – Rigging work in the Intermediate Rigging class – Gin poles and shear legs – Flying foxes and cable ways – Guyed derricks and structures – Suspended scaffolds and fabricated hung scaffolds

Role	Competency Requirement
Earthmoving Moving / Load Shifting Equipment Operator (when used as a crane to suspend a load)	• HRWL or Plant Competency Refer to PS Plant and Equipment; and • VOC for the specific equipment when configured for crane operations. **In Western Australia only:** • Earthmoving/Load Shifting Equipment operators must hold: – CN HRWL or higher to use a non-slewing mobile crane with a SWL exceeding 3 tonnes – C2 HRWL or higher to use a slewing mobile crane with a SWL exceeding 3 tonnes • Machinery operators have a **time limited exemption** from having to hold the C2 HRWL **until 31 December 2026** if they: – Hold a DG HRWL, and – Have been deemed competent in the training unit, SLELIC301 Conduct Safe Lifting with Excavators, and – Can produce either a paper or electronic copy of their Statement of Attainment for the SLELIC301 course when using slewing earthmoving machinery as a crane.
Forklift or Telehandler Operator (when used as a crane to suspend a load)	• HRWL or Plant Competency Refer to PS Plant and Equipment; and • VOC for the specific equipment when configured for crane operations. **In Western Australia only:** • Forklift or Telehandler operators must hold: – CN HRWL to use a non-slewing mobile crane with a SWL exceeding 3 tonnes – C2 HRWL to use a slewing mobile crane with a SWL exceeding 3 tonnes
Workbox occupants	• RIIWHS204E Work Safely at Heights (or equivalent)

1.5 INDUCTIONS

- Crane Supervisors must be inducted into the Project Lifting Operations Plan by the Appointed Person before supervising any lifting activities.
- Crane Operators and persons responsible for controlling load movements must be trained in the Schedule of Common Lifts (where used by a project) by the Appointed Person.

2.0 MANAGEMENT OF LIFTING OPERATIONS

2.1 CRANE PLANNING / COORDINATION MEETINGS

Planning meetings/mechanisms must enable coordination of cranes and lifting activities on site, and support review and consideration of:

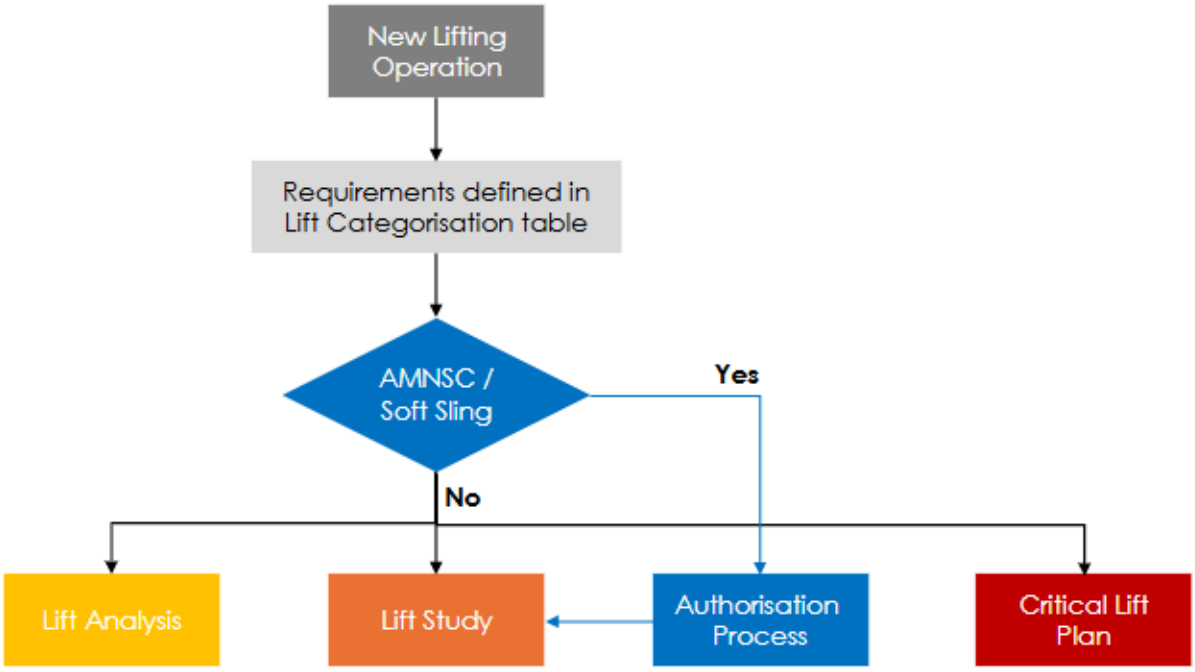
- The risks associated with planned lifts
- The classification of planned lifts and associated authorisations including any associated required approvals
- The required controls that must implemented for each planned lift to occur (i.e. lift planning documentation, temporary works requirements etc
- Logistics, including Heavy Vehicle National Law requirements
- Interfaces with other aspects of the project
- Utilisation of lifting devices across packages.

Meetings must be attended by an AP as a minimum, with other relevant delivery team members (or members of supply chain partners) attending as required.

2.2 LIFT PLANNING DOCUMENTATION

A Lifting Operations Plan (LOP) must be developed by the AP using the Lifting Operations Plan Template on the HSEMS. The LOP must describe the project-specific requirements for all lifting operations and be provided to all supply chain partners involved in crane and lifting activities.

The Following documentation must be developed in line with the requirements detailed in the Lift Categorisation section.



2.2.1 LIFT ANALYSIS AND SCHEDULE OF COMMON LIFTS

- A Lift Analysis is required for all common and non-high-risk lifts
- Schedule of Common Lifts may be developed as part of the LOP to identify and compile repetitive, low-complexity lifts that may be performed using a pre-approved lift analysis. This schedule is owned and managed by the AP and maintained as part of the project LOP.
- Planning for 'Common Lifts' still requires the appropriate level of risk assessment, documentation and review as identified within Lift Categorisation section.
- Any amendments to the Schedule of Common Lifts can only occur following consultation and authorisation with the Appointed Person.

2.2.2 LIFT STUDY

- A Lift Study is required for intermediate lifts and must be approved by the AP.
- The person developing or requesting a Lift Study cannot review and approve the same Lift Study.

2.2.3 CRITICAL LIFT PLAN

- A Critical Lift Plan is required for high-consequence or high-complexity lifts.
- All Critical Lift Plans must be reviewed and approved by AP, following an approval being provided in by the Workplace/Project Leader

2.2.4 SOFT SLING AUTHORISATION

In instances where specialist works, equipment or lifts required the use of soft slings, the Soft Sling Authorisation Template must be completed and approved. As a minimum:

Soft slings must be made from polyester or nylon and be fit for purpose in accordance with the relevant Australian Standards

Slings must have the appropriate tag record attached and be inspected prior to use as per the agreed inspection program

All lifting and rigging activities involving soft slings must be carried out in accordance with the relevant Lift Study/Analysis and safe work method statement.

On completion of the work/lift, soft slings must be removed from the work area and securely stored.

The following activities and tasks do not require separate authorisation within the scope and controls listed below.

Overhead wiring (OHW) and Transmission Lines (TML)

- Due to the specialist nature of the rigging activities associated with OHW and TML works the use of soft slings is permitted subject to the following clarifications:
    - The slings are used specifically for OHW and TML rigging operations ONLY
    - The slings are used for tensioning and de-tensioning operations ONLY – no direct vertical lifting operations.

Mild Steel Cement Lined (MSCL) Pipework and similar products

- Due to the specialist nature of the rigging activities associated with the Installation of MSCL and similar product pipework and the specialist nature of the coatings / compositions of these products, the traditional lifting devices such as chains can cause damage to their surface treatment or structural integrity. The use of soft slings for MSCL and similar pipework is permitted subject to the following clarifications:
    - The manufacturer specifies the use of soft slings, and does not allow for/warranty the use of chains
    - Only flat webbed synthetic slings are used to lift the pipe
    - The slings are used specifically for the pipework rigging operations ONLY.

Hydraulic cylinders / rams and hydraulic pumps

- Lifting activities associated with hydraulic cylinders, rams, and pumps, using lifting devices like chains/wire ropes, may cause damage to hydraulic components may be caused, surface finishes, and increase the risk of uncontrolled movement. The use of soft slings for these items is permitted by Select Plant Australia subject to the following:
    - Endless Round Slings shall be used for the lifting, installation, and removal of hydraulic cylinders, rams, and pumps ONLY
    - The slings must be used in a choked configuration to prevent slipping and enable controlled lifting
    - Use of soft slings will be risk assessed, and lift study completed
    - Soft slings must be managed and consider age, serviceability, and WLL (Working Load Limit).

Telehandler boom section removal and replacement

- When removing and replacing telescopic boom sections, the use of chains or wire ropes may cause damage to components and increase the risk of uncontrolled movement. The use of soft slings for these activities is permitted by Select Plant Australia subject to the following:
    - Endless round slings may be used for the removal and replacement of telehandler boom sections ONLY
    - Slings must be secured in a choked configuration to prevent shifting or slippage during the lift
    - The soft sling dispensation is only applicable to boom section removal and replacement and is not to be extended to other telehandler lifting tasks

Lifting of lattice sections (crawler crane boom sections, tower crane jib sections, mobile crane fly sections)

- When removing and replacing certain crane lattice section, the use of chains or wire ropes may cause damage to components and compromise structural integrity via point loading. The use of soft slings for these activities is permitted by Select Plant Australia subject to the following:
    - This is strictly restricted to:
        - Crawler Crane Boom Sections
        - Tower Crane Jib Sections
        - Mobile Crane Fly Sections
    - Soft slings shall only be used for lifting jib/boom sections. All other crane build, dismantling, and handling activities must use chain slings
    - Soft slings must have a minimum 10t capacity and 6m length to ensure adequate load-bearing capacity for all lattice boom lifts.

Lifts requiring electrical insulation

- Crane activities where insulation between the load and crane is required, lifting components like chains, may introduce conductivity risks that have the potential to compromise crane safety systems. This includes works near overhead power lines, welding from a crane, or where radio frequency (RF) induced current may be present. The use of soft slings for these activities are permitted by Select Plant Australia subject to the following:
    - Use of soft slings will be risk assessed, and lift study completed.

2.2.5 ANSC AUTHORISATION

Where the use of a ANSC is required, the ANSC Authorisation I Form must be completed and approved. When requesting authorisation for review and approval, safety is the primary focus for which the authorisation should be developed. Any production benefits are to be viewed as supplementary only. Considerations for dispensations may include:

- Increased exposure to the effects of a live traffic environment.
- Increased risk due to multiple crane set ups.
- The hazards and risk associated to the use of alternative equipment i.e. telehandlers, forklifts
- Increased risk of exposure to disturbance of outriggers from passing site traffic and equipment.
- Where approved authorisation is provided for the use of ANSC, the minimum requirements that must be met are:
- A lift study plan must be developed and submitted to the AP for review and approval.

- The ANSC must be fitted with a dynamic de-rating system such as a Dynamic Load Moment Indicator (DLMI).
- Software based safety system e.g. 'Franna Safety Radar' must be fitted where identified in the authorisation.

The lifting operations must be supervised and assured in accordance with the author

2.2.6 PRE-LIFT START CARDS / LIFTING OPERATIONS ASSESSMENT FORM (LOAF)

A Pre-Lift Start Cards, LOAF or equivalent must be completed before all lifting activities:

It must be developed and reviewed by the work group involved in the lifting activity.

It may developed for a single lift or a series of similar lifts during a period not greater than one shift. A new pre lift start card, LOAF or equivalent is required if conditions or variables change, such as weather.

Prior to completing, the following must be known by the work group:

- The confirmed or evaluated weight, the shape and centre of gravity of the load to be lifted;
- The ground bearing capacity;
- The type of mobile crane to be utilised (or other powered mobile plant to be utilised in crane mode) and rigging arrangements;
- For static lifts: The location, operating radius and configuration of the mobile crane therefore defining the rated capacity at each stage of the lift.
- The total combined weight.

2.2.7 SAFE WORK METHOD STATEMENTS

Cranes and Lifting Operations are considered high risk construction work and therefore a Safe Work Method Statements (SWMS) must be developed for all activities where there is a requirement to undertake any work detailed in this document. (Refer to SR Safe Work Method Statements.)

2.2.8 MANAGEMENT OF CHANGE

Where a change or amendment is required to an approved Lift Analysis, Lift Study or Critical Lift Plan, the Management of Change Approvals Matrix below must be followed to determine the minimum approval level required before the change is implemented.

Proposed changes to approved lift assessment	Rigger / Dogger	Crane Operator	Crane Supervisor	Appointed Person
Replace rigging components with a similar component of the same or higher capacity	✓	✓	✓	✗
Add rigging of the same or higher capacity to produce required crossfall or to a level load	✓	✓	✓	✗
Different boom configuration required to be used, higher capacity	✗	✓	✓	✗
Different boom configuration required to be used, lower capacity	✗	✓	✓	✓
Add chain blocks or lever blocks to a load	✗	✗	✗	✓
Move crane from approved location	✗	✗	✗	✓
Adjust superlift counterweight configuration	✗	✗	✗	✓

Change lift radius, pick radius and/or place radius to greater than lift plan/study	✗	✗	✗	✓
Significant changes to the rigging of the load	✗	✗	✗	✓
Adjust counterweight configuration to less than lift plan/study	✗	✗	✗	✓
Change the amount of falls on the hook	✗	✗	✗	✓
Change outrigger configuration	✗	✗	✗	✓
Different hook block on the crane	✗	✗	✗	✓
✓ Minimum approval required		✗ Not approved to make change		

2.3 LIFTING OPERATIONS

The following section details guidance on operational safety for Cranes and Lifting activities.

2.3.1 OPERATING CRANES AT NIGHT

When cranes and lifting operations are scheduled to occur at night, planning should include the provision for adequate lighting in accordance with:

- HSE Information Sheet – Lighting at Work

2.3.2 OPERATING CRANES IN INCLEMENT WEATHER

2.3.3 WIND

When wind speeds exceed the maximum figure stated by the OEM of the crane, operation of the crane must cease. The operator should either retract and lower the cranes boom, or otherwise ensure that it is secured.

An anemometer must be fitted to all mobile slewing cranes greater than 45 Tonne and fitted at or near the tip of the boom. A display indicating accurate wind speed must be fitted inside the operators' cabin and be unobstructed from view at all times.

ANSC may utilise a handheld anemometer and/or reference the nearest slew crane for wind speed readings.

The relevant CS should continually monitor weather conditions in the lead up to, and during the lifting activities.

Where conditions such as heavy fog and dust caused by strong winds affects visibility and/or the method of communications, the lifting operations should cease until conditions become acceptable for the activity to proceed safely.

When, in the opinion of the rigger and the crane operator, winds render the lifting operation unsafe regarding the characteristics of the load being lifted, the activity should cease until conditions become acceptable for the activity to proceed safely.

2.3.4 LIGHTNING

Projects/Workplaces must have a process and monitoring method to manage lighting. As a minimum crane operations must cease if lightning is within 30km radius or thunder can be heard.

2.3.5 CONTROL OF SUSPENDED LOADS

It is the responsibility of the Crane Operator and Dogger / Rigger to ensure that all suspended loads are controlled from the point which it is slung, to the point the slings are removed.

Unless determined otherwise via risk assessment, all suspended loads must be controlled via the use of a tagline.

Taglines must be a rope made of natural or synthetic fibres and a minimum 16mm in diameter. Taglines should be semi-stiff or coated so as not to easily tangle and must be in single lengths (continuous, without joints). Taglines should be attached to the load itself, not the rigging equipment used to suspend the load. In some instances, more than one tagline may be required to control a suspended load.

Suspended loads must not be touched by hands if more than 1 meter off the ground.

Suspended loads must never be lifted over people.

2.3.6 PLACING LOADS ONTO SUSPENDED SURFACES

If the load capacity of a suspended surface, such as temporary works, is not known, it is responsibility of the relevant engineer to ensure that the capacity of the suspended surface is determined prior to load being placed.

In instances where multiple loads are to be placed onto a suspended surface, the load capacity of the suspended surface must be clearly marked and visible.

2.3.7 TRAVERSING WITH A SUSPENDED LOAD

Loads be moved via Pick and Carry: should avoid the following:

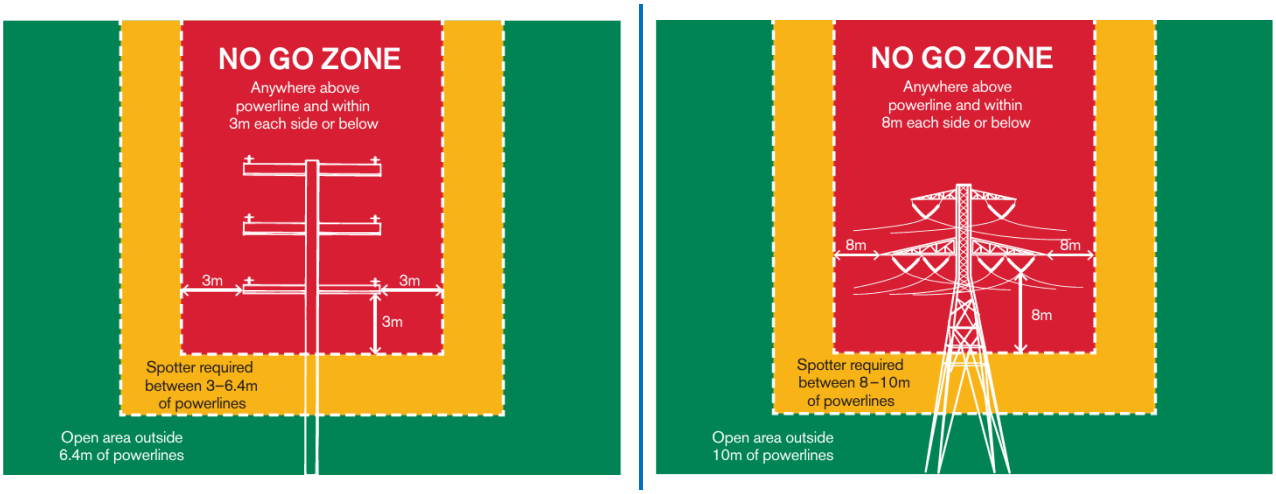
- Rough or uneven terrain on the travel path
- Overhead obstructions
- Underground services and voids
- Excessive travel distances. In these instances, loads should be placed on a truck
- Slewing / articulating on non-level ground

Consideration should be given to:

- The application of a Dynamic Amplification Factor (DAF) to avoid exceedance of WLL of any lifting device and associated rigging equipment
- Securing the load to the crane/plant to avoid uncontrolled movements (pendulum motion) of the load
- Speeds should be maintained as low as possible
- Loads should be kept as close to the ground / supporting surface as possible, with minimum boom length and angle
- Travel routes should be planned prior to movements occurring
- All movements should be applied carefully to avoid excessive swinging of the load
- Rigger / Doggers remaining outside the rollover envelope for the plant including during holding tagline.

2.3.8 WORKS NEAR OVERHEAD POWERLINES

Consideration must be given to the proximity of overhead powerlines (including rail OHW) when planning lifting activities.



Note: Example safe approach distance diagram above, each Network Authority may differ from the above and must be followed.

The above Safe Approach Distances (SADs) for the Network Authority must be maintained at all times when operating mobile plant within the vicinity of powerlines and their associated assets such as poles and towers.

Where operations are expected to encroach within the SADs of powerlines, authorisation must be sought from the relevant power authority by way of permit and its conditions maintained at all times throughout the activity.

In all instances a licenced electrical spotter must be in place for each piece of plant operating within the SADs.

In all instances, consultation must be sought with the relevant power authority prior to works commencing

2.3.9 CRANE OPERATING AREAS

A restricted work zone will be established for all lifting activities using barricades and clear signage to delineate and protect from encroachment by non-authorised people and plant / equipment.

Crane restricted work zones must be delineated in accordance with the **Primary Standard Barricading.**

2.3.10 OUTRIGGERS

Where outriggers are fitted to crane, short-blocking or zero outriggers is not permitted.

Outriggers must always be packed in accordance with OEM requirements, irrespective of ground conditions.

Outriggers associated to concrete placing booms must always be extended to 100%, in line with the OEM requirements.

UNDERGROUND SERVICES

The location of underground services must be determined prior to the commencement of lifting activities. A critical lift plan must be developed and approved for all works where outriggers may be placed in the zone of influence of underground services / assets.

PROTECTION OF OUTRIGGERS

Where there is a risk of impact or disturbance to the outriggers of a mobile crane from passing traffic or equipment, then protection must be in place by means of a suitable vehicle barrier placed

around all points of the outrigger/s, including support items that are at risk of impact, regardless of site speed limits.

The barriers must be placed at a distance suitable, that should an impact occur, the impact from the barrier against an outrigger or support item is not at risk of disturbance. The site speed limits, as detailed on approved vehicle movement plans (VMPs) should be taken into consideration when planning for barrier placement.

The requirement for the protection of outriggers also applies to other plant and equipment that utilises outriggers (i.e. concrete placing booms, MEWPs, light towers etc.

2.3.11 COMMUNICATION

A safe, secure means of communication must be in place, such as secure UHF or whistle, for all lifting operations, regardless of type.

The means of communication must be understood and agreed by the crane operator, rigger / dogger, and all other persons involved in the activity. Where the method of communication does not function correctly or efficiently, the lifting activity must stop until an effective means of communication can be put in place for the activity.

Where UHF is utilised as the means of communication, it must remain free from any interference, or unnecessary 'radio chatter' at during all times when lifts are being undertaken. UHF should be licenced for sole-use channels, or the two-way system should be trunked to eliminate the potential of outside interference during lifting operations.

The UHF channel used for lifting activity should be separate from usual project communications.

2.3.12 MULTIPLE CRANE LIFTS

Multiple crane lifts must be approved as a Critical Lift.

The following de-rating factors should be used as a guide for lift planning:

Lifts using **two** cranes	**20%** greater than the calculated share of the load.
Lifts using **three** cranes	**33%** greater than the calculated share of the load.
Lifts using **four** cranes	**50%** greater than the calculated share of the load.

2.4 LIFTING AND RIGGING EQUIPMENT

All designated lifting points on loads to be lifted, suspended and / or carried and lowered must be marked with the WWL or relevant certification provided which clearly identifies lifting points and the WWL. This WWL must never be exceeded.

All lift points must be inspected and certified for use by a competent person (e.g. rigger or dogger) prior to use.

All lifting and rigging equipment must be adequately protected from sharp edges in accordance with OEM requirements.

2.4.1 STORAGE OF LIFTING AND RIGGING EQUIPMENT

All lifting and rigging equipment:

- Must be stored in a designated storage when the equipment is not in use and on well-ventilated racks or supports where they are not subject to damage from other items
- Should not be stored on the ground, even for short periods
- Should be stored in a clean, dry place that is free from dirt and grit

- Should be stored away from sources of heat, sparks or flame from any source, direct sunlight, chemically degrading materials such as fumes or liquid.

3.0 INSPECTIONS

All plant and lifting equipment must be inspected, tested and certified before mobilisation and during use.

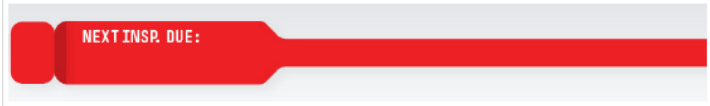
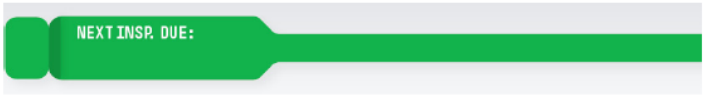
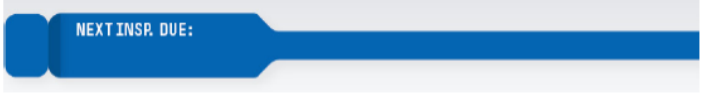
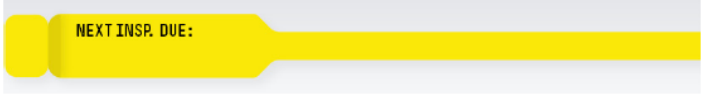
Prior to mobilisation, supply chain plant must supply service history, plant risk assessments, SWMS, pre-mobilisation inspection reports, and evidence of operator competence.

Each item of plant must then be inspected by a competent person before use on project. Mobile cranes must undergo daily pre-start inspections in accordance with OEM requirements and be accompanied by current CraneSafe certification. Cranes remaining in service beyond 10 years must have evidence of a 10-year major inspection. Any fault affecting safe use requires immediate removal from service and re-approval by a competent person before return to use.

Lifting equipment must be fit for purpose, accompanied by test records, identified with WLL, maintained on a lifting gear register, and inspected prior to each use by a competent dogger or rigger.

All cranes, lifting plant, and lifting and rigging gear must be inspected in accordance with the following schedule:

- **Pre-start inspection** - A daily pre-start must be completed at the commencement of each shift in accordance with OEM requirements, before any lift is undertaken. Pre-start records must be maintained in the crane's on-site logbook.
- **Mobile crane periodic inspection** - All mobile cranes must hold current CraneSafe certification. Mobile cranes that have been in service for ten years or more must have a ten-year major inspection completed, with documentation retained in the crane cabin at all times.
- **Periodic inspection of lifting and rigging gear** - All lifting and rigging equipment must be visually inspected by the competent person (Rigger or Dogman) before each use. In addition, a formal periodic inspection must be conducted at intervals not exceeding three months in accordance with the RGBY quarterly colour-tagging system.

Quarter	Colour
January - March	
April - June	
July – September	
October - December	

- **Annual inspection of lifting and rigging gear** - All lifting and rigging equipment must undergo an annual inspection and testing by a competent person in accordance with the relevant Australian Standard for that equipment type.

- **Removal from service -** Lifting equipment and crane components must be immediately removed from service if they are found to be damaged, deformed or worn beyond acceptable limits, overloaded, exposed to corrosive substances or extreme temperatures, dropped from a height, used contrary to OEM instructions, or not accompanied by current engineering certification or evidence of annual inspection. Removed items must be tagged out and must not be returned to service until assessed and cleared by a competent person.
- **Post-incident inspection -** Where a crane has been involved in an incident, collision, impact, or has been subjected to pile driving, dynamic compaction, or other impact-loading activities, a full documented inspection must be completed by a competent person before the crane returns to service.

4.0 ADDITIONAL REQUIREMENT

4.1 MOBILE AND CRAWLER CRANES

The following equipment requirements must be in place in addition to the Laing O'Rourke Mobile and Crawler Crane Minimum Standards

- Assembly and disassembly must be carried out in accordance with a written assembly/disassembly plan prepared by a competent person, in accordance with OEM requirements and AS 2550.5.
- After each assembly or reassembly (including relocation on site), the person leading the assembly must provide a documented assembly completion statement confirming compliance with OEM requirements and that the crane is fit for service, prior to competent-person inspection/approval for use.

4.2 VEHICLE LOADING CRANES

The following must be in adhered to when using vehicle loading cranes

- Outriggers must be fully deployed with pads placed underneath before lifting.
- The crane must not operate where there is risk of outrigger settlement, undermining, or proximity to edges/excavations without controls defined in the lift plan.
- Remote controls must be operated from a position that maintains line of sight
- Crane operator must not operate controls and control the load simultaneously e.g. tagline and crane controls.

Lifting Operations Assessment Form (LOAF) Assessment Truck Mounted Crane – HIAB (Operators / Drivers) on the HSEMS is required to be completed prior to deliveries occurring.

4.3 LIFTING PALLETS

When lifting loads on pallets, consider the following:

- Use a purpose-designed pallet lifting attachment such as pallet forks, pallet lifting frame or stillage that is rated for the load, rather than slinging directly around or through the pallet.
- Verify the pallet is fit for lifting before the lift, including checking for damaged boards, cracked bearers, loose nails, distortion, water damage, or signs the pallet may fail under load.
- Do not lift damaged, non-rated, or poorly constructed pallets unless the load has first been transferred into a suitable stillage, cage, bin, or transport frame.
- Ensure the load is stable and secured to the pallet or support frame to prevent shifting, shedding, or collapse during lifting and landing.
- Keep the load evenly distributed and within the rated capacity of both the pallet attachment and the pallet/support system.

- Use a test lift to confirm pallet stability, load security, and attachment engagement before continuing the full lift.
- Where there is a risk of the pallet breaking apart, the lift must be reassessed and an alternative lifting method used, such as repacking the load into a certified lifting stillage or crate.

5.0 ASSURANCE

Cranes and Lifting assurance/monitoring activities must be included in the project 30-60-90 assessment. As a minimum, this must include a representative sample of the following Intelex inspections:

- FSR Cranes and Lifting

6.0 ROLES AND RESPONSIBILITIES

Role	Responsibilities
Appointed Person	• Organise and control of all lifting operations within their work package. • Ensure that all workers appointed are trained and competent. • Provide training as required so that the personnel are adequately trained for their given duties. • Ensure all Mobile Crane Operators, Riggers or Doggers hold the appropriate license/competency and have had their competence evaluated. • Review and Approve Critical Lift Plans, as appointed in writing by the Alliance Manager. • Ensure that all cranes, mobile plant intended to be used in crane mode, and lifting equipment intended to be used are inspected and certified before mobilisation to the project. • Ensure that a competent person conducts a periodic inspection of all lifting equipment (slings, chains, ropes, shackles etc) • Ensure that an annual inspection of lifting equipment (slings, chains, ropes, shackles etc) is carried out by an independent testing authority. • Take action to ensure non-compliances to the before use, periodic and annual inspections, are remedied. • Maintain current records of lifting equipment (slings, chains, ropes, shackles etc) inspections performed • Ensure that lifting equipment (slings, chains, ropes, shackles etc) or devices etc, that are found to be defective are not used and are decommissioned until the defect has been rectified and re inspected. • Ensure that the Lift Categorisation Matrix is used to determine the lifting classification and requirements for all lifting operations on the Project • Review and Approve Lift Studies • Delegate duties to suitably competent individuals or organisations • Consult with others having specialist knowledge.
Crane Supervisor	• Review approved Lift Assessments • Coordinate and control lifting operations, including ensuring that people involved are able to perform their task, aware of the relevant processes to be followed and aware of their responsibilities. • Assist the lifting device owner/operator with information to allow them to ensure safe operation (e.g., ground conditions, site access, overhead and underground services, load weight/size etc.). • Ensure that all lifting equipment (slings, chains, ropes, shackles etc) or devices etc, have been inspected by a competent person before being used in a particular lift or series of lifts. • Ensure there is a process to facilitate communication between all workers involved in the lift or series of lifts. • Ensure the approved Lift Assessment/s (Pre-Lift Start Card/LOAF, Lift Study Plan or Critical Lift Plan) are available and a Pre-start Meeting is held before the particular lift or series of lifts. • Ensure that Permit to Load has been approved for the crane operation. • Arrange and control any Permit to Work or other associated documentation i.e., Traffic Management Plans, Safe Work Method Statements etc. and ensure they are implemented and are available as close to the planned lift as possible. • Ensure that the Mobile Crane is set up in the correct configuration and correct location. • Ensure that the weather conditions are within the Crane's working parameters. • Ensure that the Cranes safety devices are fully operational. • Ensure that all persons involved in the planned lifting operations have the required licences and competencies. • Report any incidents involving a particular lift or series of lifts, to the AP.

7.0 PLANS FORMS AND TEMPLATES

For relevant plans, forms and templates see the Laing O'Rourke HSEMS at www.lorhsems.com.

- Lifting Operations Plan Template
- Schedule of Common Lifts Template
- Lift Analysis Template
- Lift Study Template
- Critical Lift Plan Template
- Pre-Lift Start Card / Lifting Operations Assessment Form (LOAF)
- Appointed Person Appointment Template
- Crane Supervisor Appointment Template
- Crane Team Meeting Agenda
- Soft Sling Authorisation Approval Form
- ANSC Authorisation Approval Form

8.0 APPENDICES

APPENDIX 1 – Definitions

8.1 APPENDIX 1 – DEFINITIONS

Term	Definition
Common Lift	A lift that is repetitive and low complexity and performed using a standard method with known loads, established lift points and no unusual rigging.
Competent Person	Someone who has acquired, through training, qualification, or experience, the knowledge and skills necessary to safely and effectively carry out a specific task.
Crane Appointed Person	The Crane Appointed Person is the Laing O'Rourke employee responsible for all lifting operations as defined by the Project Leader, including developing, reviewing, and maintaining the Lifting Operations Plan, and must be formally appointed in writing using the pro-forma within that plan. The Crane Appointed Person must hold a CPCS Appointed Person, NPORS Appointed Person (or equivalent) qualification and be in place as the primary Appointed Person.
Crane Supervisor	The Crane Supervisor is the competent person appointed by the Crane Appointed Person to ensure lifting activities are carried out in accordance with the Lifting Operations Plan. The Crane Supervisor must be formally appointed in writing using the pro-forma within the lifting operations plan and must either hold the same qualification as a Crane Appointed Person, or hold one of the following qualifications: • High Risk Work Licence for crane operation class C6 or above, or • High Risk Work Licence class Intermediate Rigging (RI) or above, or • A Crane Supervisor qualification issued by Crane Supervisor and Appointed Person (Lifting Operations – CTI Course), or • NPORS (National Plant Operations Registration Scheme) or an equivalent qualification verified by Laing O'Rourke
Critical Lift	A lift where failure would have high potential consequence and/or the lift has high complexity. Critical lifts include: • Tandem/multi-crane lifts • Lifts near/within restricted zones • Lifts of items with unusual/unknown centre of gravity • Lifts requiring non-standard rigging or temporary works • Lifts at or near maximum capacity
Danger Zone	Any area in or near a railway where the movement of trains, rail vehicles, or associated equipment presents a risk of serious injury or death to a person. This measure may differ for different networks though is commonly referred to as 3 meters from the outside rails and any distance above or below this area unless a safe place exists or is created.
Intermediate Lift	A lift that is non-routine and may have elevated complexity or consequence. It may involve one or more higher-risk factors such as: • Limited visibility • Tighter clearances • Complex rigging • Closer operation to capacity • Interface with other operations • Potential for significant damage if dropped
Load Shifting Equipment	It is defined as machinery and devices designed to lift, move, or transport heavy materials, goods, or earth, typically within construction and other industrial environments. Including loaders, excavators, backhoes, cranes, forklifts, telehandlers.
Earth Moving Equipment	It is defined as a machine used for digging, lifting, pushing, levelling, or moving large amounts of earth, rock, or materials in construction and other industrial environments. Including Excavators, Backhoe Loaders, Front End Loaders, Dozers, Skid Steer Loaders, Graders, Scrapers

Term	Definition
Original Equipment Manufacturer (OEM)	The company that designed and manufactured the plant/equipment and provides the official specifications, load charts, operating limits, inspection/maintenance requirements and instructions for safe use.
Permit to Load	A documented authorisation confirming a nominated location has been assessed and approved to support specified imposed loads for the intended configuration and duration.
Precision Lifting	Lifting that requires fine, controlled placement or alignment of a load where small movements have high consequence. Precision lifting typically requires controlled slewing/hoisting and stable, predictable load control.
Proximity Warning System	A safety device fitted to mobile plant that detects when a person, object, or another piece of plant enters a pre-set hazard zone around the machine and provides an alert (visual, audible, vibration) or initiates an automatic control response to prevent collision.
Rail Protection Zone	The area defined by the rail network operator within which work has the potential to affect the rail corridor or rail operations and therefore requires specific rail safety controls. This includes any area where plant or loads could intrude into the rail danger zone or affect track stability and clearances.
Safe Approach Distance (SAD)	Is the minimum air gap required between a person, vehicle, or machinery and live electrical equipment/overhead powerlines to prevent arcing. These mandatory separation distances are defined by the asset owner and vary in distance based on the voltage levels.
Safeworking Person	The competent person who is able to establish, maintain, brief, and remove worksite protection in accordance with RIM rules.
Verification of Competency (VOC)	A formal assessment and record confirming an individual can safely perform a specific task or operate specific plant/equipment to the required standard, considering the actual workplace conditions and controls
Working Load Limit (WLL)	The maximum load that an item of lifting equipment, lifting accessory, lifting point or assembly is rated to sustain in service under specified conditions.