

Appendix J: Demolition and Construction Management Plan



METRONET Byford Rail Extension Demolition Management Plan

Demolition Management Plan

Document details	
Title	Demolition Management Plan
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Rev	Date	Revision Description	Prepared by	Reviewed by	Approved by
00	30/06/2023	Issued for review	Daryl Henderson	Michael Crocetta	Michael Crocetta

Distribution

The master 'controlled' plan will be held within the Project Alliance document management system, where it can be accessed by Alliance Project Team (APT) personnel and supply chain partners as required.

Issue, revision and re-issue

This plan is an Alliance sub-plan and is referenced as part of overarching document R30-MET-PLN-CM-000-00001. This plan will be reviewed and updated periodically. Revisions of this plan may also be required in changing circumstances or to implement identified opportunities for improvement.

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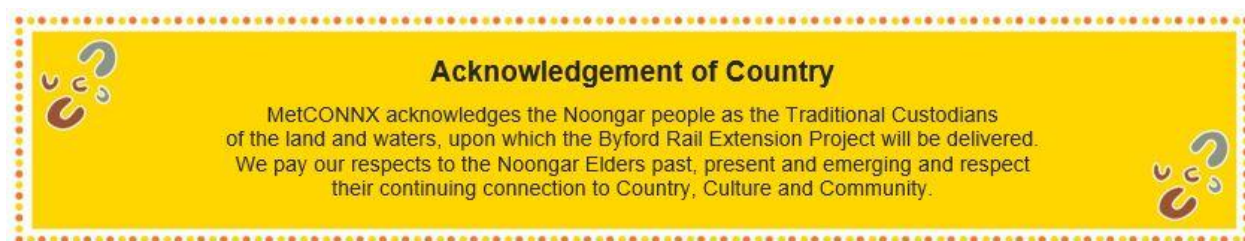
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1. Project overview

1.1 METRONET Vision and Objectives

As one of the largest single investments in Perth's public transport, METRONET will transform the way the people of Perth commute and connect. It will create jobs and business opportunities and stimulate local communities and economic development to assist communities to thrive. The METRONET vision is for a well-connected Perth with more transport, housing and employment choices. In delivering METRONET, the WA Government has considered peoples' requirements for work, living and recreation within future urban centres with a train station at the heart.



The objectives are to:

- Support economic growth with better-connected businesses and greater access to jobs
- Deliver infrastructure that promotes easy and accessible travel and lifestyle options
- Create communities that have a sense of belonging and support Perth's growth and prosperity
- Plan for Perth's future growth by making the best use of our resources and funding
- Lead a cultural shift in the way government, private sector and industry work together to achieve integrated land use and transport solutions for the future of Perth.

1.2 Byford Rail Extension overview

The Byford Rail Extension (BRE) Project has been identified as an essential component of the METRONET program. The Project will extend the electrified passenger rail service from Armadale to Byford, providing a strong transport connection between these two centres, supporting economic growth and providing greater access to jobs. The Project has been developed in line with policy objectives for highly integrated transport and land use planning.



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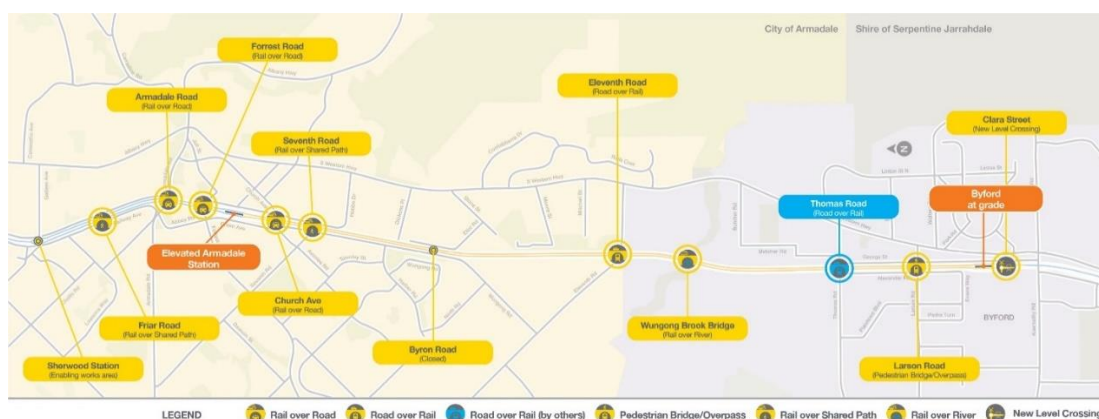


Figure 1: METRONET Byford Rail Extension Project

1.2.1 Project features

Transport infrastructure works for the BRE Project include:

- Demolition of existing station at Armadale and construction of a new elevated station
- Construction of a new Byford station at grade (Base Case)
- Construction of approximately 8km of dual track narrow gauge electrified passenger railway line extending from Armadale station to the newly created Byford station, with a dedicated platform for the Australind line
- Removal of level crossings between the Byford and Armadale stations
- Construction of PSPs and associated infrastructure (including 'rail over road' and 'road over rail' bridges and roads)
- Parking areas at Armadale and Byford stations
- Bus interchange at Armadale and Byford stations
- Upgrade of local roads surrounding both Armadale and Byford stations.



QR code for animated
scope flythrough

1.2.2 General scope of works

The Project's general scope of works includes designing, procuring, manufacturing, constructing, installing and commissioning all rail infrastructure and ancillary works to support an electrified operational passenger rail between Armadale and Byford Stations. Also, in the case of the Australind train service, tying into the non-electrified rail network south of Byford Station.

The Project activities include all site investigation, design, planning, scheduling, procurement, cost control, approvals, construction, OH&S management, environmental management, quality management, testing and commissioning, Entry Into Service (EIS), training and operational readiness required to tie the rail extension to Byford into the existing rail network including the associated road, utilities and other required works to interface with adjacent works and contracts. This will include bulk earthworks and retaining structures, grade separations, roads, and drainage, the demolition and removal and treatment of waste material and contaminated material resulting from construction of the Works, and temporary works constructed for the purpose of facilitating the Works.

The project scope also includes any new road works, modifications to existing roads and signalised intersections, utilities (diversion, protection, and new installation) and any other ancillary works to enable the BRE Project.

2. Purpose of this Plan

2.1 Expectation and Objectives of the Demolition Management Plan

The purpose of the Demolition Management Plan is to describe the construction methodology to be adopted by MetCONNx to facilitate the safe and effective delivery of this works package.

This plan is to be read in conjunction with R30-MET-PLN-CM-000-00001 Construction Management Plan.

2.2 Terms and Definitions

The terms, abbreviations and acronyms used in this management plan are as defined in Appendix B.

3. Scope of this Plan

The Demolition Management Plan will:

- Clearly describe the scope of works to be undertaken including types of activities, work areas and stages.
- Include as attachments construction related sub-plans (i.e. Construction Staging drawings & Site Management Plan).
- Detail how MetCONNx will manage interactions with surrounding key stakeholders and construct the viaduct structure with the least impact to surrounding stakeholders as possible.
- Determine effective construction staging that will ensure current rail operations and the associated transport facilities' operational requirements are maintained, and impact to these is minimised during construction
- Describe procedures for the management of subcontractors and their plans and work method statements
- Describe the processes to ensure the compatibility of any necessary temporary works with each other and with the Works
- Describe procedures to demobilise activities and the Works, including demobilisation of personnel, plant and equipment and closeout of stakeholder communications
- Address the management of interfaces with all authorities and other contractors including:
 - Communication channels, processes for ensuring efficient information flow, communication protocols and meeting schedules
 - Sequencing and timing of activities with the interfaces, including special programs
 - Programming of works to be conducted during track possessions
 - Roles and responsibilities of personnel and organisations for key aspects of the interface
 - Technical and program requirements
 - Work implications and applicable construction methodologies
 - Review of processes and timetables

4. Temporary Works

All temporary works will follow the MetCONNx Temporary Works Procedure to ensure they are safely identified, designed, erected, inspected, maintained and dismantled. The Temporary Works Coordinators and Project Technical Lead will review the full scope of works to identify the temporary works required to deliver the permanent works. For this scope, it is anticipated the following temporary works will be required:

- Armadale Station demolition staging.
- Armadale Bus Interchange demolition staging.
- Crane pad location and bearing pressure design.
- Excavations and ground profiles/batters.

Refer to R30-MET-PLN-CM-000-00001 Construction Management Plan.

5. Plant, Equipment and Materials

Safety, quality and minimising the environmental impact will all be considered when planning, procuring, evaluating and accepting plant, equipment and material.

Refer to R30-MET-PLN-CM-000-00001 Construction Management Plan.

5.1 Craneage and General Lifting Requirements

The Subcontractors Demolition Management will stipulate a more in depth methodology and if cranes are likely to be required. For this scope, it is anticipated the following temporary works will be required:

- Armadale Station demolition.
- Armadale Bus Interchange canopy demolition.
- Wungong Brook Bridge demolition.
- Neerigen Brook Bridge demolition.
- DFES Training tower dismantling.

For any works requiring lifting operations and craneage, MetCONNx will follow Laing O'Rourke's Safety Management System and produce lift studies and plans with an Appointed Person in charge of each lift. Refer to Safety Management Plan (R30-MET-PLN-SA-000-00001) and R30-MET-PLN-CM-000-00001 Construction Management Plan.

6. Interface Management

The objective of the MetCONNx interface management process is to maintain safety and minimise impacts on the operation of road and rail services, the travelling and general public, and other interface parties.

Construction interfaces primarily consist of shared access and haulage routes, program and timing of works by others, Approvals and Possession management. These interfaces will be managed by interface meetings with other parties for the benefit of the program as a whole.

6.1 Interface Coordination and Planning

The Project delivery program and methodology have been developed to minimise actual and potential impacts on interfacing parties.

MetCONNx will continue to develop our detailed construction plans for the Demolition works in consultation with key stakeholders and will ensure that the construction rationale and intent is effectively communicated and understood. Any residual issues, concerns, timing or access constraints will be accommodated within the final methodology and program.

6.1.1 Public Authorities

Management of the interfaces with public authorities primarily concerns consents/permits and (technical) discussions to attain formal approval. The MetCONNx project team will liaise with the relevant authorities and facilitate approvals, consents, site access and permits throughout the various project stages. They will coordinate these activities including the preliminary discussions and follow-up and track the consent process.

Early discussions with relevant groups are proposed to inform the authority about the planned activities, agree mutually on expectations and the followed execution and timeframe of the approval cycle. Authorities and other stakeholders to be approached by MetCONNx include the following:

- Existing railway system or network operators through the PTA's Client Representative
- Services/utility providers (i.e. Western Power/Telstra)
- Local government authorities
- Local council urban planning authorities
- Office of Environment and Heritage
- Main Roads WA
- General public.

Management of approvals and permits will be undertaken by the relevant Project Technical Lead with reference to the overall Project program. This will minimise the risk of delayed approvals and to the start of the construction phases.

6.1.2 Works Directly Affecting Stakeholders

Works directly affecting stakeholders will be constructed in accordance with the designs and construction plans. We will review our performance regularly with affected parties to ensure we continue to minimise our impact.

Detailed methodology and working hours will be in accordance with Out of Hours Works Permits issued by relevant local Councils. Affected work areas will be reduced through a staged approach, clearly demarcated and fenced. Traffic management plans will be developed to ensure the safety of the affected public and road users and ensure selected plant and equipment is fit for purpose.

6.1.2.1 Construction Noise and Vibration

Construction noise and vibration limits controls and mitigation will be dealt with in the CEMP (R30-MET-PLN-EN-000-00001) and Noise Management Plan. All construction activities will comply with this document. MetCONNx shall select methods of construction and plant to minimise adverse noise and vibration impacts.

MetCONNx will carry out a detailed vibration impact assessment based on the methods of construction, plant selected and prevailing site conditions. Based on the vibration impact assessment, controls and vibration monitoring will be implemented where required.

Following the vibration impact assessment, MetCONNx shall assess the adequacy of any existing condition surveys, and carry out additional condition surveys to ensure that all property that may be impacted by vibration from the Works or Temporary Works has had a condition survey undertaken to establish the existing condition of such property.

Vibration monitoring equipment will meet the requirements of BS 5228-2:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites - Vibration; BS 7385-2:1993 Evaluation and Measurement for Vibration in Buildings - to Damage Levels for Groundborne Vibration; and DIN 45669-1:2010 Measurement of Vibration Emission Part 1 Vibration Meters requirements and Tests, as applicable.

6.1.2.2 Community notification

Residents, businesses, road and path users, and other key stakeholders in close proximity to the demolition works will be notified. Works Notices are the primary form of communication and will include:

- a description of the works,
- their times and duration,
- anticipated impacts and corresponding mitigation strategies, and
- a contact number for more information, including an after-hours contact number for works undertaken outside of standard working hours.

Works Notices will be distributed in accordance with the timeframes below.

			Residents/businesses notified at least		
			5	7	10
Time of works	Type of works	Type of notification	business days prior		
Normal work hours Mon - Sat: 7am to 7pm	Activities causing noise and vibration	Letterbox drop	✓		
Weekend and evening works Mon - Sat: 7am to 10pm Sun or public holidays: 7am to 10pm	Activities causing noise and vibration	Letterbox drop	✓		
Night works Mon - Sun: 10pm - 7am	Activities causing noise and vibration	Letterbox drop, doorknocks and individual meetings as required		✓	
Extended night works Mon - Sun: 10pm - 7am	Activities causing noise and vibration for more than 5 consecutive nights	Letterbox drop, doorknocks and individual meetings as required			✓

In addition to Works Notices:

- For road closures and diversions, changes to pedestrian access, carpark closures or changes to public transport operations, we may use additional methods to communicate including Variable Message Signage, Static Signage and wayfinding maps, and advertising in local newspapers and/or Facebook.
- For extended periods of overnight works, we will doorknock to speak to impacted residents individually, advertise on Facebook and provide supporting information such as fact sheets. Group briefings and community information sessions may be used to supplement the above.

Enquiries and complaints will be managed in accordance with *Australian Standard on Customer Satisfaction – Guidelines for Complaints Handling in Organisations ISO 10002:2015*.

7. Dilapidation Survey Works

MetCONNx will complete a full dilapidation survey of the roads, infrastructure and buildings within 100m of the works area in accordance with and as prescribed in the SWTC documentation.

7.1.1 Third Party Property and Public Amenities

Properties located within 100 metres of the construction areas for the project will be offered a pre-condition survey. This is part of our commitment to supporting communities in the project area and minimising any adverse impacts from works.

The Project team is responsible for identifying and recording any third-party property, including public amenities, located within the 100 metre zone and/or that may be affected by the Works.

In cases where third party assets such as reticulation, bores, drainage and garden fixtures that may be temporarily impacted, agreements will be made with the property owner to protect or replace them to an equivalent standard to that existing prior to the commencement of the Works.

7.1.2 Access and Approvals

MetCONNx will obtain permission for site access to all work areas from the relevant stakeholders prior to commencing construction works. All environmental, LGA and rail authority approvals (outside of

what PTA are obtaining) shall be gained prior to construction works commencing on-site. All relevant stakeholders will be kept up to date with progression of and any planned changes to the design or works.

8. Working Hours

Construction works shall generally be between 0700 hours and 1900 hours Monday to Saturday (excluding public holidays).

However, to enhance public safety, minimise disruption to peak hour traffic, and meet the required programme, certain works may be required on a 24/7 basis.

The works will be carried out in accordance with noise control practices set out in Section 4.5 of AS 2436-2010 'Guide to Noise Control on Construction, Demolition and Maintenance Sites' and section 6 of the SWTC.

The Community Engagement Plan details the notice to the PTA's Client Representative for approval before issuing notice to local government authorities (LGA), affected residents and/or businesses of construction works hours and any out of hours applications.

These works will be managed as out-of-hours works applications in accordance with Environmental Protection (Noise) Regulations 1997 WA for the approval of the local government authority, and the PTA's Client Representative.

An Out of Hours Noise and Vibration Plan application will be submitted to the LGA seven days prior to the works being proposed to be undertaken and must include the following:

- Reasons for the work to be completed out of hours
- Proposed noise and/or vibratory activities
- Predictions of noise levels from the site
- Predictions/assurance of vibration levels from site
- Proposed measures to control noise and vibration
- Monitoring of noise and vibration
- Notifications to residents and stakeholders of upcoming out of hours work
- Complaint response procedure.

An Out of Hours Public Notification as part of an Out-of-Hours works application for the predictions of noise will provide an estimation of the potentially impacted premises. Occupants of nearby affected buildings likely to receive noise levels in excess of Assigned Noise Levels defined within Environmental Protection (Noise) Regulations 1997 (WA) must be advised (i.e. letter drop) at least 24 hours prior to work commencing. The notification must provide reasons as to why the work is necessary, reference to the LGA approval and contact details to register complaints.

8.1.1 Target Exceedances and Complaints

Where noise or vibration targets are reached or a complaint regarding nuisance levels are received, MetCONNX will investigate the cause or potential source. The investigation may include the deployment of monitoring equipment to measure noise or vibration levels to demonstrate compliance or alternatively the modification of the work methodology to reduce noise or vibration impacts. If noise or vibration levels are recorded in excess, the work must be modified to be conducted within allowable limits prior to continuing. Any recorded exceedances shall be provided to the PTA in the monthly environmental report.

9. Legislative and License Requirements

9.1 Legislative Requirements

All works will be in accordance with the following:

- The WHS Act 2020 and WHS Regs and Work, Health, and Safety (General) Regulations 2022
- WorkSafe Western Australia – Code of Practice Demolition Work
- AS 2601:2001 – The Demolition of Structures.
- Environmental Protection Act 1986
- Environmental Protection Regulations 1987
- Asbestos: Code of practice and Guidance Note
- Department of Occupational Health and Safety of WA – A Guide for the safe removal of Asbestos cement building products
- National Occupational Health and Safety Commission – Code of Practice for the Safe Removal of Asbestos.

9.2 License Requirements

WorkSafe WA regulates demolition work and determines applications for Demolition licences. The information is based on the Work Health and Safety Act 2020 (WA) (the Act) and Division 1 of Part 4.5 of the Work Health and Safety (General) Regulations 2022 (WA) (the Regulations). A Demolition licence of the appropriate class is required when work is as follows for each class.

Class 1 demolition work is:

- Work comprising the total demolition or dismantling of a structure that is 10 metres or more in height when measured from the lowest ground level of the structure to the highest part of the structure.
- Work comprising the partial demolition or dismantling of a structure that is 10 metres or more in height when measured from the lowest ground level of the structure to the highest part of the structure.
- Work comprising demolition work on a structure; and involving the use of load shifting equipment on a suspended floor.
- Work comprising demolition work on pre-tensioned or post-tensioned structural components of a structure.
- Work comprising demolition work on a structure containing precast concrete elements erected by the tilt-up method of construction.
- Work involving the removal of key structural members of a structure so that the whole or a part of the structure collapses.
- Work done to a structure involving explosives.
- Work comprising demolition work on a structure that involves the use of a tower crane or any crane with a safe working load greater than 100 tonnes.
- Work involving the removal of an area of brittle or fragile roofing material in excess of 200m² from a structure if any part of the area to be removed is 10 metres or more above the lowest ground level of the structure.

Class 2 demolition work is work comprising demolition work involving a structure that is less than 10 metres in height when measured from the lowest ground level of the structure to the highest part of the structure, excluding:

- Demolition work involving a single storey dwelling.
- Demolition work on a structure; and involving the use of load shifting equipment on a suspended floor.
- Demolition work on pre-tensioned or post-tensioned structural components of a structure.
- Demolition work on a structure containing precast concrete elements erected by the tilt-up method of construction.
- Work involving the removal of key structural members of a structure so that the whole or a part of the structure collapses.
- Work done to a structure involving explosives.
- Work comprising demolition work on a structure that involves the use of a tower crane or any crane with a safe working load greater than 100 tonnes.

9.3 General Requirements

All demolition will be undertaken in accordance with Laing O'Rourke's Safety Management System Fatal and Server Risk 10 (SFR 10) – Demolition ensuring:

Critical Controls:

- The demolition methodology is verified.
- Hazardous materials assessment is undertaken prior to work commencing.
- Asbestos is identified and removed by a licensed asbestos contractor prior to demolition commencing.
- Trained and competent personnel plan and undertake the works.
- Engineer's sequence and temporary works required for demolition is understood, followed and monitored.
- All services have been disconnected prior to works commencing.
- All services that are to remain live during demolition, including temporary services, are clearly identified and protected from mechanical damage.
- Exclusion zones established.

Local Controls:

- A Demolition Management Plan is developed to AS 2601 and communicated.
- A licensed demolition contractor is engaged and has the correct license.
- Monitoring devices are installed where required - dust, noise, asbestos etc.
- A risk assessment must be carried out prior to demolition. "As constructed" architectural and structural documents **MUST** be consulted in developing the risk assessment, selection of plant and compiling the work method. The risk assessment is to address but is not limited to:
 - The stability requirements and structural integrity for all components of the structure as it is sequentially demolished according to the structural engineer's requirements.

- The competent persons assessment of loadings at all stages of demolition.
- The provision of clear instructions for temporary bracing.
- Plant loadings on suspended floors and ground bearing capacity.
- Alternative methods of demolition.
- The scheduling of the work.
- Public safety and warning signs, barricades, gantries, etc which will be included in the subcontractor Demolition Management Plan.
- Structural integrity of adjacent structures or other premises.
- Hazardous materials & substances e.g. asbestos, PCB's, synthetic mineral fibres, lead paint.
- The layout of the workplace, including whether there are fall hazards both for people and objects.
- What plant and equipment will be used and the location of the plant.
- The skill and experience required by the people who will use it safely.
- Waste segregation, processing, recycling / recovery, storage and transport, on and off site.
- Competencies required by personnel to carry out the demolition safely.
- Location & status of in-ground, overhead & existing services e.g. electricity, water, gas, sewage, telecommunications, hospital gases, hydraulic pressure mains, liquid fuel lines, lubrication systems, process lines.
- Any confined spaces where work will be undertaken.
 - What exposures might occur, such as to noise, vibrations or UV rays.
 - The number of people involved, and the provision of safe access.
 - The handling of components, depending on their size, shape and weight.
 - Local weather conditions and wind loads on the structure.
- When considering the structural integrity of adjacent structures or other premises as part of developing the demolition methodology the following must be considered:
 - The effects of changes in soil conditions as a result of the demolition work (use of shoring and underpinning may be needed).
 - Before existing lateral support is disturbed, provision should be made for the erection of temporary supports, which will need to be checked for effectiveness as the demolition proceeds.
 - Whether other buildings in and around the demolition site could be adversely affected by vibration or concussion during the demolition process. Special precautions may need to be taken near buildings (e.g. hospitals) that contain equipment sensitive to shock and vibration.
 - Whether the demolition process could cause flooding or water penetration to any adjoining building.
- Demolition work is defined as High Risk Construction Work and a detailed Safe Work Method Statements based on the risk assessment and engineer's sequence of demolition and

designated plant to use must be in place, communicated to and signed off by all persons carrying out and supervising the work.

- Applicable permits to work are in place prior to work commencing.
- Demolition work must be directly supervised by an appropriately qualified and competent person.
- Contractor in charge of demolition must provide:
 - Safe access and egress and maintenance of services to adjacent premises.
 - Access to the demolition area, stairways maintained in a clean condition, free from debris and materials.
 - Methods of lowering materials from upper floors, and disposal of rubble and other waste products.
 - Suitable PPE.
 - Emergency/evacuation procedures including firefighting.
- Demolition warning signs are to be put in place before work commences.
- Training and competency verification of workers. Personnel working on demolition work sites shall be trained in safe demolition work by a registered training organisation (RTO) meeting the requirements of the Australian National Training Authority framework.
- The area is to be fenced or barricaded to prevent unauthorised entry.
- Overhead structures are to be erected to protect public places or persons.
- Access roads, paths etc., are to be closed off and only used in connection with the work.
- Work is not to be carried out from a fragile roof unless adequate protection provided.
- Provide adequate lighting.
- If scaffolding is required, it must be rated Heavy duty and design certified.
- Fall risks controlled including penetrations (must be barricaded).
- Keep dust to the minimum by vacuuming, extraction or wetting.
- Run-off water is to be collected for recycling, if possible.

10. Demolition

10.1 Methodology

10.1.1 General Approach

All work will be undertaken in accordance with the MetCONNx Safety Management System and project safety management plans. Each construction work area will have a detailed assessment undertaken that considers site-specific requirements for safety, worksite protection including demarcation and signage, particular site risks, community impacts, environmental impacts, local traffic management, live rail interfaces, other contractor interfaces and dependencies, and allocation of overall site responsibilities. Work activities will be undertaken following a risk assessment and described in the SWMSs. These risk assessments will mitigate all known risks relative to the site and work activity and will be included in the work packs.

All construction work will first be digitally engineered and managed via the work packs which contain all input information such as drawings, permits, ITPs, program, safety requirements, risks, and engineering studies. This allows management and control of lots and maintains overall quality assurance. No construction work will start without a work pack. The main construction areas of work are:

- Armadale Station
- Armadale Bus Interchange
- 89 Eleventh Road, Wungong, vacant property
- DFES Training Tower (Armadale Fire Station)
- Wungong Brook Bridge
- Neerigen Brook Bridge

10.2 Subcontractors Demolition Management Plan

MetCONNx will appoint a specialist, licensed demolition subcontractor to carry out all demolition works required under the classifications above.

Conforming to AS 2601 the subcontractor will submit an additional Management Plan— refer to Appendix D

10.3 Nominated Supervisor

The Subcontractor will present a suitable qualified Nominated Supervisor and must show evidence that they have been trained in safe work methods of demolition.

To satisfy this requirement, Nominated Supervisors must attach a certified copy of their Statement of Attainment for the following units of competency, or their replacements, issued by a Registered Training Organisation (RTO):

- CPCCWHS2001 – Apply WHS requirements, policies and procedures in the construction industry; and
- CPCCCM2009 – Carry out basic demolition.

10.4 Decommissioning

Prior to demolition works, MetCONNx will compile a Decommissioning Management Plan refer to R30-MET-PLN-TC-000-00003 detailing how all existing services and utilities shall be decommissioned.

10.5 Waste Management

The Subcontractor shall provide a waste management schedule for each waste material type. The schedule is to use the waste management options for materials that have been identified within the waste management plan. The Subcontractor shall provide this schedule stating, as a minimum, the following:

- The recovery option and the percentage recycled, reused or sent to landfill;
- The final destination of each waste stream including details of waste management licences or exemption details for each waste stream.
- Provide a list of wastes prohibited under its site licence and the management solutions for such.
- Consignment notes for hazardous waste removed, including details of licences for the facility taking the hazardous waste.

10.6 Armadale Station

Works at Armadale Station are considered Class 1 and include the demolition of:

1. Armadale Station South Entry building.
2. Platform structure.
3. Platform buildings and canopy.
4. Platform access stairs.
5. Passenger access stairs and adjoining building (west).
6. Passenger entrance ramp (west).
7. Passenger bridges over track.
8. Main station building (east).
9. Surrounding forecourts and peripheral items.
10. All in-ground footings and foundations.

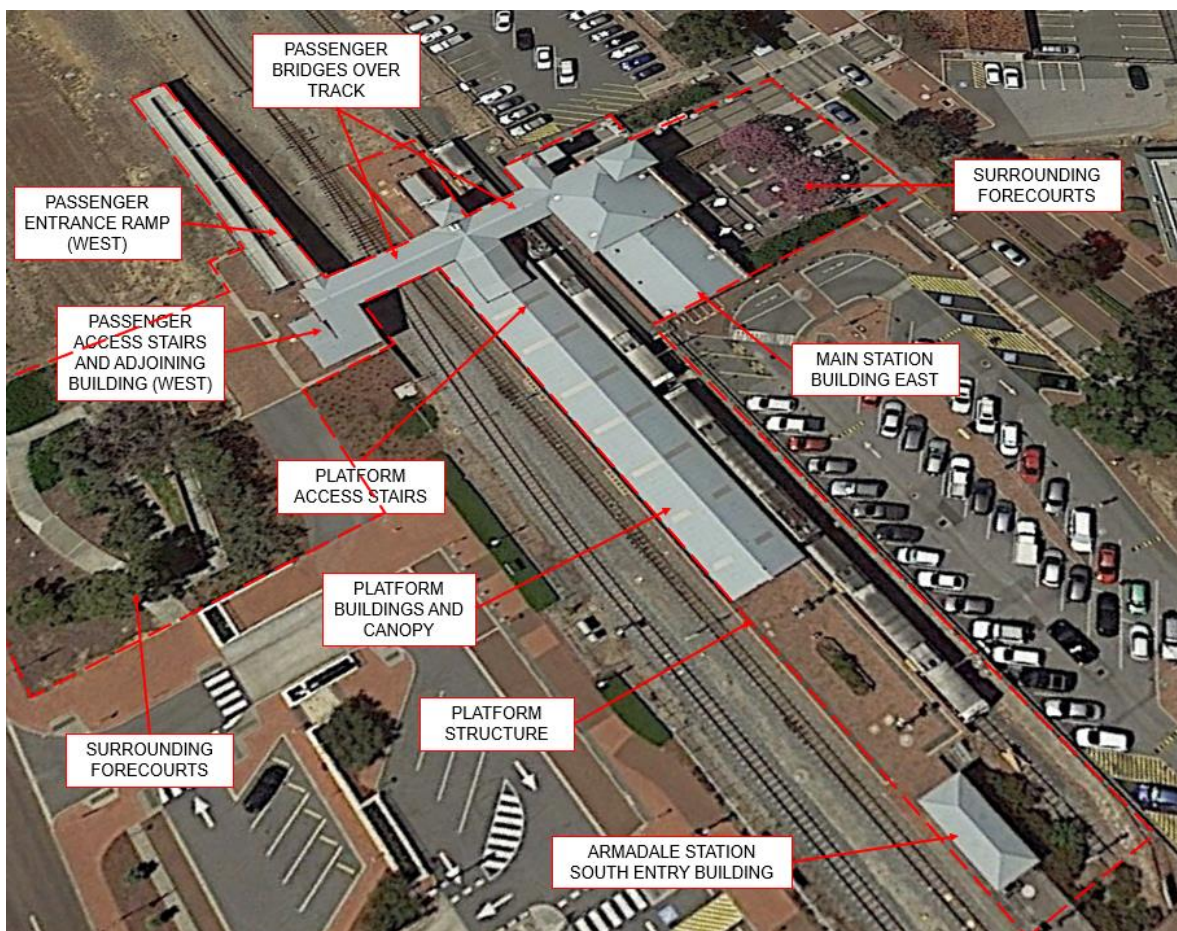


Figure 2: Armadale Station Demolition Areas

10.6.1 PTA Asset Recovery

Prior to works commencing, a schedule of PTA owned assets will be created establishing what items are to be salvaged and stored for further use and which items are to be disposed of.

Items include by not limited to:

- Bicycle Shelters and Bicycle Lockers.
- Smart Parker Machines.
- Parking Vending Machine.
- Stainless Steel Furniture incl Bins and Seating.
- SEC and TVM's.
- CCTV and DAV Cameras.
- PIS and information cubes/screens.
- Lights

10.6.2 Public Displays & Artwork

The existing Tony Jones: Signal Grove (2004) artwork, including the timber sleepers, in the western entry courtyard will be removed, protected and stored in a nominated area throughout construction works, before being incorporated into the final precinct area through the Public Art strategy which is yet to be finalised. The artwork has already had a dilapidation survey undertaken to confirm its existing condition and will remain in place through to November 2023, while the station is in operation. A high level staging plan for the works is as follows:

- July 23- Nov 23: Artwork to remain in place while station in operation



Figure 3: Tony Jones: Signal Grove (2004) Artwork

- Nov 23- Armadale Line Shutdown: Artwork to be securely fenced off



Figure 4: Temporary Fencing

- Nov 23-Dec 23: Staged demolition of Armadale Station- refer to 10.6.3 below and Figure 2 above. Prior to demolition of the surrounding forecourts, the temporary fencing around the artwork will be

removed followed by safe removal of the artwork. Methodology of the removal will be finalised once an appropriate Subcontractor is engaged, however high level methodology is as follows:

1. Removal of timber boardwalk around the artwork and sleepers
2. Confirm connection detail for the artwork:
 - a. Scenario 1: secured onto a footing with hold down bolts and base plate connection
 - b. Scenario 2: direct buried into a concrete footing
3. Safely remove the artwork from the ground:
 - a. Scenario 1: Nuts to be loosened, artwork rigged and lifted from the ground. Artwork to be loaded directly onto gluts, and then onto a truck and removed off site to a safe storage facility- most likely a PTA owned facility
 - b. Scenario 2: Artwork post to be cut at the top of concrete foundation level. Artwork to then be rigged and lifted from the ground. Artwork to be loaded directly onto gluts, and then onto a truck and removed off site to a safe storage facility- most likely a PTA owned facility.
4. Concrete footings to be removed as part of the forecourt demolition works
5. Artwork to be transported from storage facility back to site, and re-installed within the Armadale Precinct in accordance with the finalised Public Art Strategy

10.6.3 Staging

Demolition will occur on multiple fronts and in the following sequence:

Team 1:

1. Removal of PTA assets.
2. Armadale Station South Entry building.
3. Platform structure.
4. Platform buildings and canopy.
5. Surrounding forecourts.

Team 2:

1. Passenger entrance ramp (west).
2. Passenger access stairs and adjoining building (west).
3. Passenger bridges over track.
4. Platform access stairs.
5. Main station building (East).
6. Surrounding forecourts.

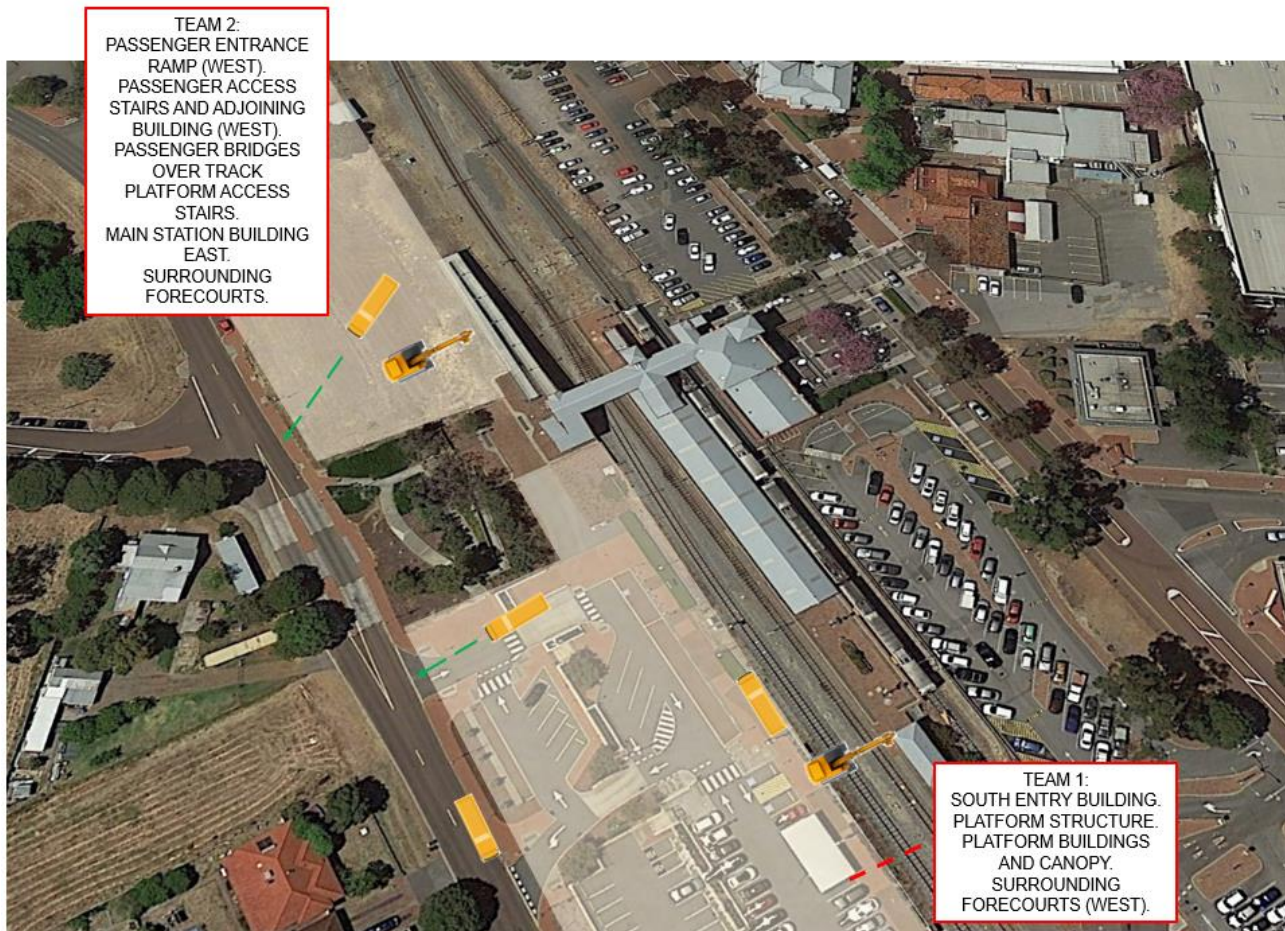


Figure 5: Armadale Station Demolition Staging

Final detailed staging to be confirmed and included in Subcontractor Demolition Management Plan.

Truck access to be via Green Street at nominated entrances and coordinated with wider piling and precast works.

Gate entry and access to the work front will be managed by Traffic Control personnel.

10.7 Armadale Bus Interchange

Works at Armadale Bus Interchange are considered Class 2 and will occur concurrently with the Station and include the demolition of:

1. Canopy structure.
2. Limestone feature walls.
3. Post and panel retaining walls.
4. All pavers, kerbing, concrete cross overs and asphalt.
5. All in-ground footings and foundations.

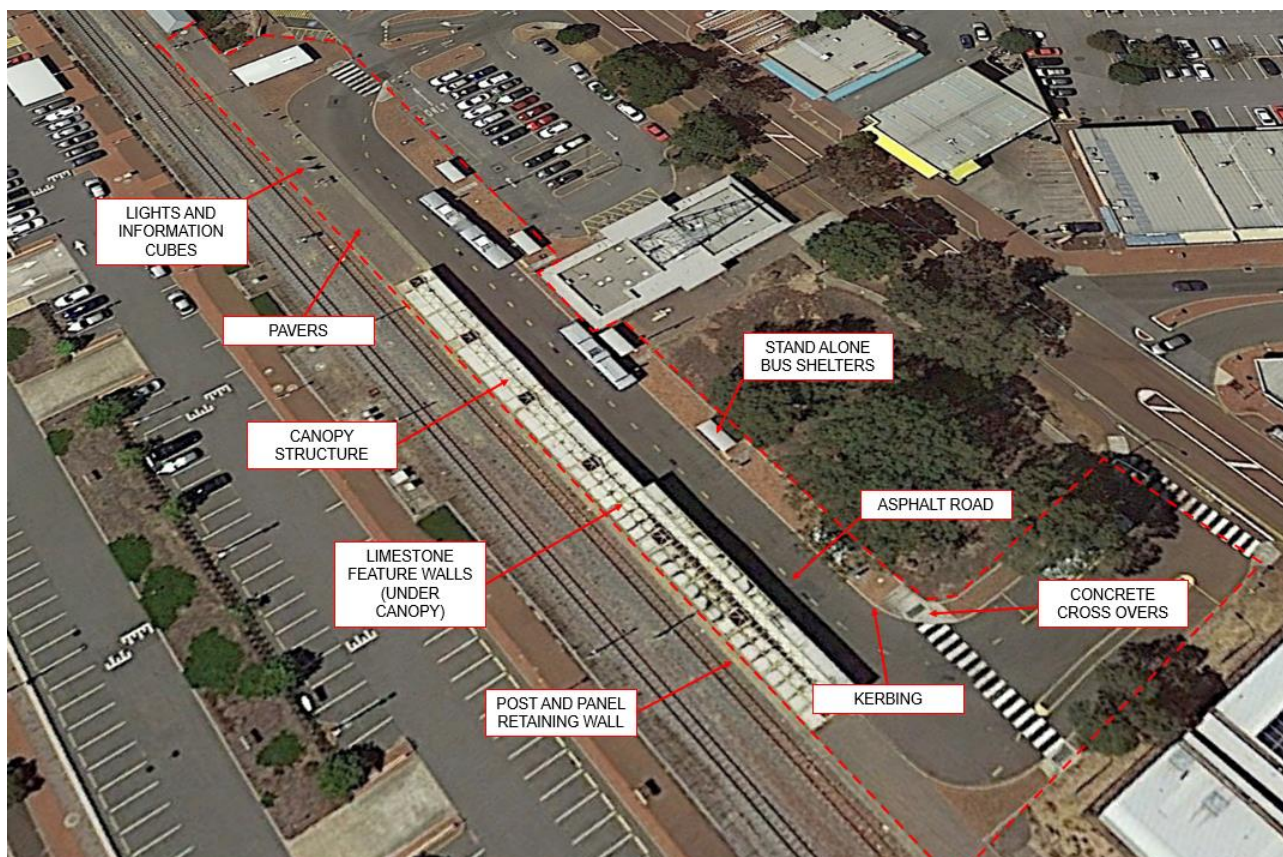


Figure 6: Armadale Bus Interchange Demolition Areas

10.7.1 PTA Asset Recovery

Prior to works commencing and similar to above, a schedule of PTA owned assets will be created establishing what items are to be salvaged and stored for further use and which items are to be disposed of.

Items include by not limited to:

- Stand alone bus shelters.
- Smart Parker Machines.
- Parking Vending Machine.
- Stainless Steel Furniture incl Bins and Seating.
- PIS and information cubes/screens.
- Lights

10.7.2 Staging

Works will occur in a south-to-north direction to allow Piling pad construction to extend and Piling works to continue for the main Viaduct structure and typically:

1. Removal of PTA assets.
2. Removal of canopy structure.
3. Removal of limestone feature walls.
4. Removal of pavers.

5. Localised excavation to remove in-ground footings and foundations incl backfill on removal.
6. Localised excavation along the post and panel retaining wall to relieve surcharge loading.
7. Removal of post and panel retaining wall.
8. Removal of kerbs, cross overs, and asphalt.

Final detailed staging to be confirmed and included in Subcontractor Demolition Management Plan.

Truck access to be via Green Street at nominated entrances and coordinated with wider piling and precast works.

Gate entry and access to the work front will be managed by Traffic Control personnel.

10.8 89 Eleventh road, Wungong

Works at this property are considered Class 2 and include the demolition of:

1. The main building residence.
2. Small outhouses and storage sheds.
3. Removal of septic tank and connecting drainage pipes.
 - a. Prior to the removal of the wastewater system, any remaining waste will be pumped and removed by an approved liquid waste contractor ensuring conformance to Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974

The existing septic tank is within close proximity to the boundary fence and requirements for temporary works, if required, will be detailed in the subcontractors Demolition Management Plan.

Where is it not possible to safely remove nor practicable, the base of the tank will be broken up and the entire system filled with clean fill.



Figure 7: 89 Eleventh Road Demolition Areas

Prior to works commencing the subcontractor will ensure all services and utilities are decommissioned and disconnected (and capped) and the boundary line. A Service Isolation Permit will be issued prior to such works.

Truck access via property entry from Eleventh Road.

10.9 DEFS Training Tower (Armadale Fire Station)

To facilitate the main construction works alterations to the existing fire station are required.

The removal of the training tower is considered Class 2 demolition.



Figure 8: DFES Training Tower Demolition Areas

Hold down bolts to be cut flush with existing concrete surface.

Final detailed staging to be confirmed and included in Subcontractor Demolition Management Plan.

Truck access via Green Avenue.

The fire station will remain fully operational throughout the duration of the works and all access/egress and roadways to and from the main building are to be maintained and unobstructed at all times.

10.10 Wungong Brook Bridge

Works at Wungong Brook Bridge are considered Class 2 and include the demolition of:

1. Rail bridge beams.
2. North and south abutments.
3. Abutment footings.
4. Centre pier.

Timber piles under abutment and centre pier to remain.



Figure 9: Wungong Brook Bridge Demolition Areas

Wungong Brook is of Aboriginal and Heritage significance thus:

- Ensure compliance with Project Aboriginal Heritage Management Plan.
- Ensure compliance with Project s18 approval and engagement of Cultural Heritage Monitors as required.
- If objects are discovered during the Works, the Unexpected Finds Process must be followed. This is detailed within the CEMP Section 21. Alliance Management Team, Environmental Coordinator (or delegate) and PTA representatives must be notified immediately.
- If suspected human skeletal remains are found Works shall cease immediately and managed as per advice from the BRE Alliance Management Team, Environmental Coordinator and PTA. The WA Police will be notified.

Throughout the works, no persons, plant or materials, debris and like and permitted into the Brook and the Subcontractor will protect such for the duration of the works.

Final detailed staging to be confirmed and included in Subcontractor Demolition Management Plan.

10.11 Neerigen Brook Bridge

Works at Neerigen Brook Bridge are considered Class 2 and include the demolition of:

- Rail bridge only.



Figure 10: Neerigen Brook Bridge Demolition Areas

Similar to Wungong Brook, Neerigen Brook is of Aboriginal and Heritage significance thus:

- Ensure compliance with Project Aboriginal Heritage Management Plan.
- Ensure compliance with Project s18 approval and engagement of Cultural Heritage Monitors as required.
- If objects are discovered during the Works, the Unexpected Finds Process must be followed. This is detailed within the CEMP Section 21. Alliance Management Team, Environmental Coordinator (or delegate) and PTA representatives must be notified immediately.
- If suspected human skeletal remains are found Works shall cease immediately and managed as per advice from the BRE Alliance Management Team, Environmental Coordinator and PTA. The WA Police will be notified.

All supporting structures to the bridge i.e: abutments, piers and pilecaps to remain.

Throughout the works, no persons, plant or materials, debris and like and permitted into the Brook and the Subcontractor will protect such for the duration of the works.

Final detailed staging to be confirmed and included in Subcontractor Demolition Management Plan.

Appendix A: Terms and definitions

The following terms, abbreviations and definitions are used in this plan.

Table 1: Terms and definitions

Term	Definition
ABCC	Australian Building and Construction Commission
ABS	Australian Bureau of Statistics
AC	alternating current
AD	Alliance Development
ADA	Alliance Development Agreement
ADT	Articulated dump trucks
AHD	Australian Height Datum
AIM	Asset Information Model
AIR	Asset Information Requirement
ALARP	as low as reasonably practicable
ALT	Alliance Leadership Team
AMT	Alliance Management Team
ANM	ambient noise monitors
APC	automated power control
APT	Alliance Project Team, comprising Laing O'Rourke, KBR, Pritchard Francis and the PTA
AS	Australian Standard
AS/NZS	Australian/New Zealand Standard
ASS	Acid Sulphate Soils
AT	Auto-Tensioned
ATCF	Alternate Train Control Facility
BCA	Building Code of Australia
BIM	Building Information Modelling
BM	Bench Marks
BRE	Byford Rail Extension
CAD	computer aided drafting
CEMP	Construction Environmental Management Plan
CER	communications equipment room
DE	Digital Engineering
DEMP	Digital Engineering Management Plan
DfMA	Design for Manufacturing and Assembly
DGS	Digital ground survey
DLP	Defect liability period

Term	Definition
DOORS NG	DOORS NG requirements management tool
DTM	digital terrain model
DWER	Department of Water and Environmental Regulation
EIS	Entry into Service
EPA	Environmental Protection Authority
EPBC	Environmental Protection Biodiversity Conservation Act 1999
FBW	Flash butt welds
FIC	field inspection checklist
FM	Facilities management
FOC	Fibre optic cable
FOPS	Falling object protection system
FSR	Fatal and severe risk
HAZMAT	hazardous material
HR/IR	Human Resources and Industrial Relations
HSE	health, safety and environment
HSEQ	health, safety, environment and quality
IFC	issued for construction
IRC	Inspection release certificate
IRP	Industrial Relations Plan
ITP	Inspection and Test Plan
ITR	Inspection and Testing Report
JSEA	Job safety and environmental analysis
KPI	Key Performance Indicators
Laing O'Rourke	Laing O'Rourke Australia Construction Pty Limited
LGA	Local Government Authority
MCR	Major Cable Route (legacy Definition Main Cable Route)
MFD	Multi-functional devices
MRWA	Main Roads Western Australia
MSE	Mechanically stabilised earth
N&I	Network & Infrastructure a division of the PTA
NBN	National Broadband Network

Term	Definition
NCR	Non-Conformance Report
NOPs	Non-Owner Participants, Laing O'Rourke, KBR and Pritchard Francis
NVMP	Noise and Vibration Management Plan
O&M	operations and management
OH&S	Occupational Health and Safety
OLE	Overhead Line Equipment
ONRSR	Office of the National Rail Safety Regulator
PAA	Project Alliance Agreement
PIM	Project information model
PRES	Person responsible for electrical safety
Project	METRONET Byford Rail Extension Project
PShP	Principal shared path
PTA	Public Transport Authority
R&O	Risk and opportunity
RDS	Room data sheets
RIW	Rail industry worker

Term	Definition
RMP	Risk Management Plan
ROPS	Roll over protection system
RRM	MRWA road reference marks
RTO	Rail Transport Operator
SAD	Safe approach distance
SER	Signalling equipment room
SOW	Scope of work
SSM	State survey marks
SWMS	safe work method statement
SWTC	Scope of Works and Technical Criteria
T&C	Testing and Commissioning
TEC	Threatened Ecological Communities
TOC	Total Outturn Cost
TRT	Tracked rail transporter
TWCR	Temporary Works Control Register
UTX	Under track crossing
WBS	work breakdown structure

Appendix B: Initial plant and equipment register

Large plant

[illegible]

Appendix C: Temporary Works Control Register

Appendix D: Subcontractor Demolition Management Plans

Table 2: Staging diagrams register

Item	Name

Appendix E: Traffic Management Plan

To be developed.



METRONET Byford Rail Extension

Construction Management Plan - Armadale Station & Precinct

Construction Management Plan

Document details	
Title	Construction Management Plan - Armadale Station & Precinct
Project	Byford Rail Extension (BRE) Design and Construction Project
Laing O'Rourke Project No.	R30
Client	Public Transport Authority of Western Australia
Client contract No.	PTA200142
MetCONNx Document No.	R30-MET-PLN-CM-000-00004



Document revision history and sign-off

Rev	Date	Revision Description	Prepared by	Reviewed by	Approved by
00	19/05/2023	Issued for review	Tom Hiles	Daryl Henderson	Michael Crocetta

Distribution

The master 'controlled' plan will be held within the Project Alliance document management system, where it can be accessed by Alliance Project Team (APT) personnel and supply chain partners as required.

Issue, revision and re-issue

This plan is an Alliance sub-plan and is referenced as part of overarching document R30-MET-PLN-CM-000-00001. This plan will be reviewed and updated periodically. Revisions of this plan may also be required in changing circumstances or to implement identified opportunities for improvement.

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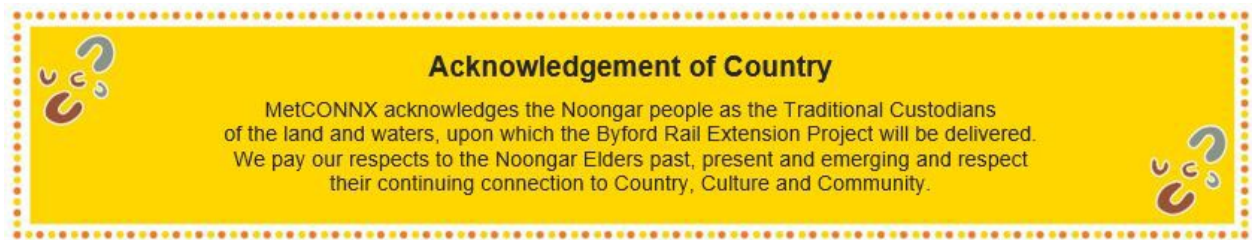
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1. Project overview

1.1 METRONET Vision and Objectives

As one of the largest single investments in Perth's public transport, METRONET will transform the way the people of Perth commute and connect. It will create jobs and business opportunities and stimulate local communities and economic development to assist communities to thrive. The METRONET vision is for a well-connected Perth with more transport, housing and employment choices. In delivering METRONET, the WA Government has considered peoples' requirements for work, living and recreation within future urban centres with a train station at the heart.



The objectives are to:

- Support economic growth with better-connected businesses and greater access to jobs
- Deliver infrastructure that promotes easy and accessible travel and lifestyle options
- Create communities that have a sense of belonging and support Perth's growth and prosperity
- Plan for Perth's future growth by making the best use of our resources and funding
- Lead a cultural shift in the way government, private sector and industry work together to achieve integrated land use and transport solutions for the future of Perth.

1.2 Byford Rail Extension overview

The Byford Rail Extension (BRE) Project has been identified as an essential component of the METRONET program. The Project will extend the electrified passenger rail service from Armadale to Byford, providing a strong transport connection between these two centres, supporting economic growth and providing greater access to jobs. The Project has been developed in line with policy objectives for highly integrated transport and land use planning.



QR code for animated
Project video

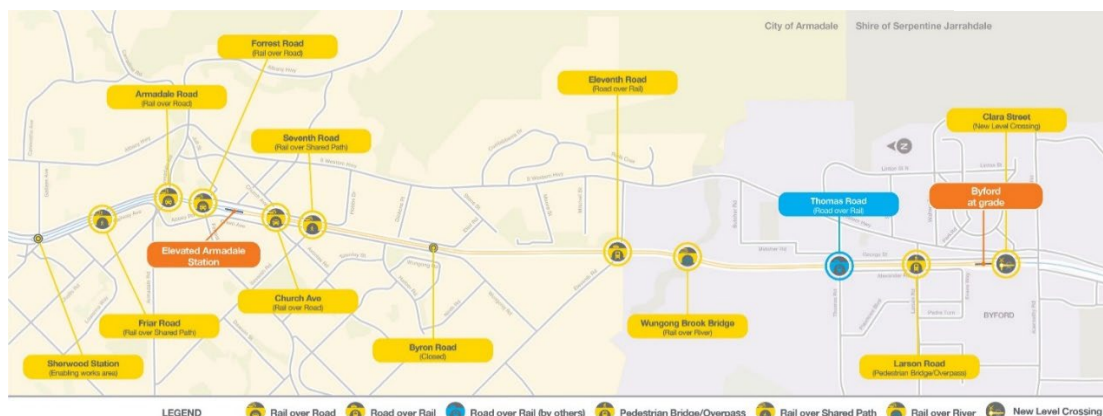


Figure 1: METRONET Byford Rail Extension Project

1.2.1 Project features

Transport infrastructure works for the BRE Project include:

- Demolition of existing station at Armadale and construction of a new elevated station
- Construction of a new Byford station at grade (Base Case)
- Construction of approximately 8km of dual track narrow gauge electrified passenger railway line extending from Armadale station to the newly created Byford station, with a dedicated platform for the Australind line
- Removal of level crossings between the Byford and Armadale stations
- Construction of PSPs and associated infrastructure (including 'rail over road' and 'road over rail' bridges and roads)
- Parking areas at Armadale and Byford stations
- Bus interchange at Armadale and Byford stations
- Upgrade of local roads surrounding both Armadale and Byford stations.



QR code for animated
scope flythrough

1.2.2 General scope of works

The Project's general scope of works includes designing, procuring, manufacturing, constructing, installing and commissioning all rail infrastructure and ancillary works to support an electrified operational passenger rail between Armadale and Byford Stations. Also, in the case of the Australind train service, tying into the non-electrified rail network south of Byford Station.

The Project activities include all site investigation, design, planning, scheduling, procurement, cost control, approvals, construction, OH&S management, environmental management, quality management, testing and commissioning, Entry Into Service (EIS), training and operational readiness required to tie the rail extension to Byford into the existing rail network including the associated road, utilities and other required works to interface with adjacent works and contracts. This will include bulk earthworks and retaining structures, grade separations, roads, and drainage, the demolition and removal and treatment of waste material and contaminated material resulting from construction of the Works, and temporary works constructed for the purpose of facilitating the Works.

The project scope also includes any new road works, modifications to existing roads and signalised intersections, utilities (diversion, protection, and new installation) and any other ancillary works to enable the BRE Project.

2. Purpose of this Plan

2.1 Expectation and Objectives of the Construction Management Plan – Armadale Station & Precinct

The purpose of the Construction Management Plan – Armadale Station & Precinct is to describe the construction methodology to be adopted by MetCONNx to facilitate the safe and effective delivery of this works package.

2.2 Terms and Definitions

The terms, abbreviations and acronyms used in this management plan are as defined in Appendix B.

3. Scope of this Plan

The Construction Management Plan will:

- Clearly describe the scope of works to be undertaken Armadale Station & Precinct including types of activities, work areas and stages.
- Include as attachments construction related sub-plans (i.e. Construction Staging drawings & Site Management Plan).
- Detail how MetCONNx will manage interactions with surrounding key stakeholders and construct the viaduct structure with the least impact to surrounding stakeholders as possible.
- Determine effective construction staging that will ensure current rail operations and the associated transport facilities' operational requirements are maintained, and impact to these is minimised during construction
- Describe procedures for the management of subcontractors and their plans and work method statements
- Describe the processes to ensure the compatibility of any necessary temporary works with each other and with the Works
- Describe procedures to demobilise activities and the Works, including demobilisation of personnel, plant and equipment and closeout of stakeholder communications
- Address the management of interfaces with all authorities and other contractors including:
 - Communication channels, processes for ensuring efficient information flow, communication protocols and meeting schedules
 - Sequencing and timing of activities with the interfaces, including special programs
 - Programming of works to be conducted during track possessions
 - Roles and responsibilities of personnel and organisations for key aspects of the interface
 - Technical and program requirements
 - Work implications and applicable construction methodologies
 - Review of processes and timetables

4. Temporary Works

All temporary works will follow the MetCONNx Temporary Works Procedure to ensure they are safely identified, designed, erected, inspected, maintained and dismantled. The Temporary Works Coordinators and Project Technical Lead will review the full scope of works to identify the temporary works required to deliver the permanent works. For this scope, it is anticipated the following temporary works will be required:

- Slabs, footings and walls formwork and falsework design.
- Slabs, footings and walls reinforcement prefabrication design.
- Precast elements lifting design, transport load restraint and any applicable propping/support on installation.
- Structural steel installation and applicable propping/support on installation.
- Prefabricated platform buildings.
- Prefabricated liftcores and stair frames.
- Scaffold access towers and handrails.
- Man and Material hoists.
- Crane pad location and bearing pressure design.



- Excavations and ground profiles/batters.

5. Plant, Equipment and Materials

Safety, quality and minimising the environmental impact will all be considered when planning, procuring, evaluating and accepting plant, equipment and material.

5.1 Craneage and General Lifting Requirements

The package Work Packs will stipulate a more in-depth methodology and if cranes are likely to be required. For this scope, it is anticipated the following temporary works will be required:

- Prefabricated formwork, falsework and reinforcement.
- Precast elements.
- Structural steel both single units and prefabricated sections.
- Platform buildings.
- Installation of man and material hoists.
- General material lifts.

For any works requiring lifting operations and craneage, MetCONNx will follow Laing O'Rourke's Safety Management System and produce lift studies and plans with an Appointed Person in charge of each lift. Refer to Safety Management Plan (R30-MET-PLN-SA-000-00001) and R30-MET-PLN-CM-000-00001 Construction Management Plan.

6. Interface Management

The objective of the MetCONNx interface management process is to maintain safety and minimise impacts on the operation of road and rail services, the travelling and general public, and other interface parties.

Construction interfaces primarily consist of shared access and haulage routes, program and timing of works by others, Approvals and Possession management. These interfaces will be managed by interface meetings with other parties for the benefit of the program as a whole.

6.1 Interface Coordination and Planning

The Project delivery program and methodology have been developed to minimise actual and potential impacts on interfacing parties.

MetCONNx will continue to develop our detailed construction plans for the Demolition works in consultation with key stakeholders and will ensure that the construction rationale and intent is effectively communicated and understood. Any residual issues, concerns, timing or access constraints will be accommodated within the final methodology and program.

6.1.1 Public Authorities

Management of the interfaces with public authorities primarily concerns consents/permits and (technical) discussions to attain formal approval. The MetCONNx project team will liaise with the relevant authorities and facilitate approvals, consents, site access and permits throughout the various project stages. They will coordinate these activities including the preliminary discussions and follow-up and track the consent process.

Early discussions with relevant groups are proposed to inform the authority about the planned activities, agree mutually on expectations and the followed execution and timeframe of the approval cycle. Authorities and other stakeholders to be approached by MetCONNx include the following:

- Existing railway system or network operators through the PTA's Client Representative

- Services/utility providers (i.e. Western Power/Telstra)
- Local government authorities
- Local council urban planning authorities
- Office of Environment and Heritage
- Main Roads WA
- General public.

Management of approvals and permits will be undertaken by the relevant Project Technical Lead with reference to the overall Project program. This will minimise the risk of delayed approvals and to the start of the construction phases.

6.1.2 Works Directly Affecting Stakeholders

Works directly affecting stakeholders will be constructed in accordance with the designs and construction plans. We will review our performance regularly with affected parties to ensure we continue to minimise our impact.

Detailed methodology and working hours will be in accordance with Out of Hours Works Permits issued by relevant local Councils. Affected work areas will be reduced through a staged approach, clearly demarcated and fenced. Traffic management plans will be developed to ensure the safety of the affected public and road users and ensure selected plant and equipment is fit for purpose.

6.1.2.1 Construction Noise and Vibration

Construction noise and vibration limits controls and mitigation will be dealt with in the CEMP (R30-MET-PLN-EN-000-00001) and Noise Management Plan. All construction activities will comply with this document. MetCONNx shall select methods of construction and plant to minimise adverse noise and vibration impacts.

MetCONNx will carry out a detailed vibration impact assessment based on the methods of construction, plant selected and prevailing site conditions. Based on the vibration impact assessment, controls and vibration monitoring will be implemented where required.

Following the vibration impact assessment, MetCONNx shall assess the adequacy of any existing condition surveys, and carry out additional condition surveys to ensure that all property that may be impacted by vibration from the Works or Temporary Works has had a condition survey undertaken to establish the existing condition of such property.

Vibration monitoring equipment will meet the requirements of BS 5228-2:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites - Vibration; BS 7385-2:1993 Evaluation and Measurement for Vibration in Buildings - to Damage Levels for Groundborne Vibration; and DIN 45669-1:2010 Measurement of Vibration Emission Part 1 Vibration Meters requirements and Tests, as applicable.

7. Dilapidation Survey Works

MetCONNx will complete a full dilapidation survey of the roads, infrastructure and buildings within 100m of the works area in accordance with and as prescribed in the SWTC documentation.

7.1.1 Third Party Property and Public Amenities

Properties located within 100 metres of the construction areas for the project will be offered a pre-condition survey. This is part of our commitment to supporting communities in the project area and minimising any adverse impacts from works.

The Project team is responsible for identifying and recording any third-party property, including public amenities, located within the 100-metre zone and/or that may be affected by the Works.

In cases where third party assets such as reticulation, bores, drainage and garden fixtures that may be temporarily impacted, agreements will be made with the property owner to protect or replace them to an equivalent standard to that existing prior to the commencement of the Works.

7.1.2 Access and Approvals

MetCONNx will obtain permission for site access to all work areas from the relevant stakeholders prior to commencing construction works. All environmental, LGA and rail authority approvals (outside of what PTA are obtaining) shall be gained prior to construction works commencing on-site. All relevant stakeholders will be kept up to date with progression of and any planned changes to the design or works.

8. Working Hours

Construction works shall generally be between 0700 hours and 1900 hours Monday to Saturday (excluding public holidays).

However, to enhance public safety, minimise disruption to peak hour traffic, and meet the required programme, certain works may be required on a 24/7 basis.

The works will be carried out in accordance with noise control practices set out in Section 4.5 of AS 2436-2010 'Guide to Noise Control on Construction, Demolition and Maintenance Sites' and section 6 of the SWTC.

The Community Engagement Plan details the notice to the PTA's Client Representative for approval before issuing notice to local government authorities (LGA), affected residents and/or businesses of construction works hours and any out of hours applications.

These works will be managed as out-of-hours works applications in accordance with Environmental Protection (Noise) Regulations 1997 WA for the approval of the local government authority, and the PTA's Client Representative.

An Out of Hours Noise and Vibration Plan application will be submitted to the LGA seven days prior to the works being proposed to be undertaken and must include the following:

- Reasons for the work to be completed out of hours
- Proposed noise and/or vibratory activities
- Predictions of noise levels from the site
- Predictions/assurance of vibration levels from site
- Proposed measures to control noise and vibration
- Monitoring of noise and vibration
- Notifications to residents and stakeholders of upcoming out of hours work
- Complaint response procedure.

An Out of Hours Public Notification as part of an Out-of-Hours works application for the predictions of noise will provide an estimation of the potentially impacted premises. Occupants of nearby affected buildings likely to receive noise levels in excess of Assigned Noise Levels defined within Environmental Protection (Noise) Regulations 1997 (WA) must be advised (i.e. letter drop) at least 24 hours prior to work commencing. The notification must provide reasons as to why the work is necessary, reference to the LGA approval and contact details to register complaints.

8.1.1 Target Exceedances and Complaints

Where noise or vibration targets are reached or a complaint regarding nuisance levels are received, MetCONNx will investigate the cause or potential source. The investigation may include the

deployment of monitoring equipment to measure noise or vibration levels to demonstrate compliance or alternatively the modification of the work methodology to reduce noise or vibration impacts. If noise or vibration levels are recorded in excess, the work must be modified to be conducted within allowable limits prior to continuing. Any recorded exceedances shall be provided to the PTA in the monthly environmental report.

9. Armadale Station & Precinct Construction Works

9.1 Methodology

9.1.1 General Approach

All work will be undertaken in accordance with the MetCONNx Safety Management System and project safety management plans. Each construction work area will have a detailed assessment undertaken that considers site-specific requirements for safety, worksite protection including demarcation and signage, particular site risks, community impacts, environmental impacts, local traffic management, live rail interfaces, other contractor interfaces and dependencies, and allocation of overall site responsibilities. Work activities will be undertaken following a risk assessment and described in the SWMSs. These risk assessments will mitigate all known risks relative to the site and work activity and will be included in the work packs.

All construction work will first be digitally engineered and managed via the work packs which contain all input information such as drawings, permits, ITPs, program, safety requirements, risks, and engineering studies. This allows management and control of lots and maintains overall quality assurance. No construction work will start without a work pack. The main construction areas of work are:

- Station concourse and platforms.
- Bus Interchange.
- Park and Ride.
- Kiss and Ride.
- Surrounding public areas and hard/soft landscaping.

9.2 Armadale Station Concourse

9.2.1 Staging

Detailed Construction staging visuals can be viewed in Appendix C.

9.2.2 In-Ground Services

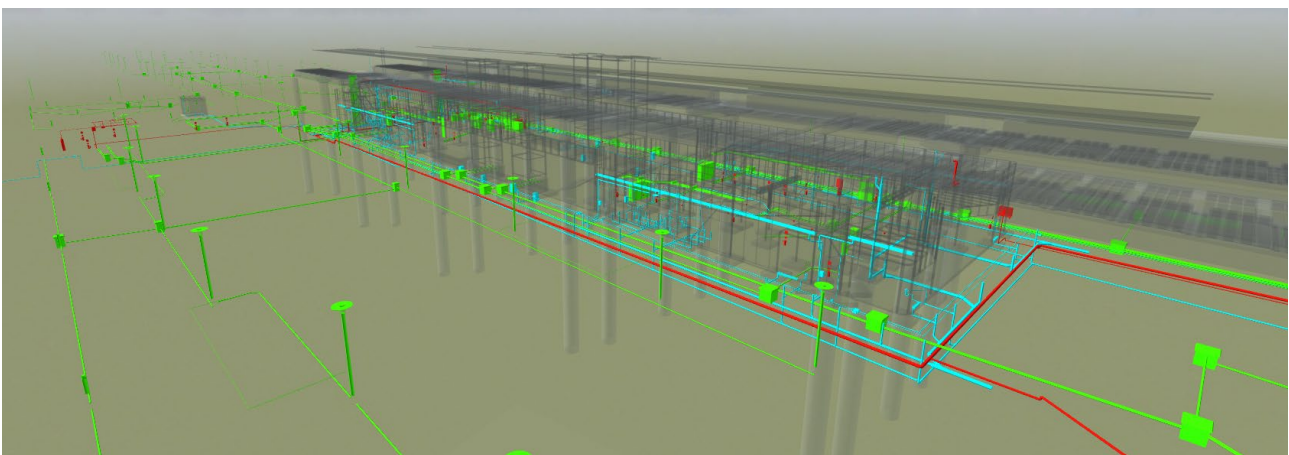


Figure 2: In-Ground Services

Trenching for services conduits and pit excavations typically by small scale excavation (1 or 3.5T) located within the platform. Trenching will occur in a south to north sequence or from lowest point to ensure consistent falls.

Submission of notices including witnessing and hold points requiring attendance by a 'PTA' Representative must comply with 'SWTC' Section 5.0.

A nominal 100mm of bedding sand to be placed prior to laying of conduits.

After laying of conduits, sand embedment must be placed and compacted around the conduits to a minimum height of 150mm above the top of the pipe and/or fittings.

Embedment sand to be coarse, well graded, washed, river (quartz based) sand free of organic matter, soluble salts and other deleterious materials.

Where required, service conduits to have detectable underground marking tape (To AS/NZS 2648.1), placed 250mm (+/- 50mm) above all buried conduits for full length of conduit and covered with circa 100mm sand.

All trenches will be backfilled as soon as possible and on completion of relevant inspections.

Place the trench fill in layers ≤ 150 mm thick and compact to the density, which applies to the location of the trenches to minimise settlement. Compact trench fill to a minimum of 95% of the standard maximum dry density ratio specified in AS 1289.5.4.1 or AS 1289.5.6.1. Compact trench fill in such a manner that the pipes are neither dislodged nor damaged.

Complete the trench filling with topsoil for at least the top 50 mm.

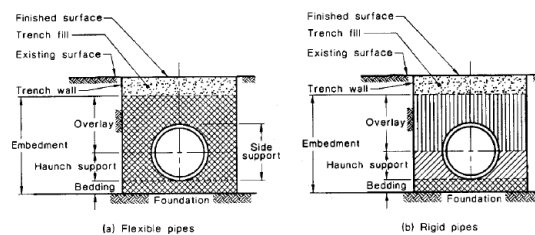


Figure 3: Example of Trenching for Hydraulic Services

9.2.3 In-Ground Footing Construction

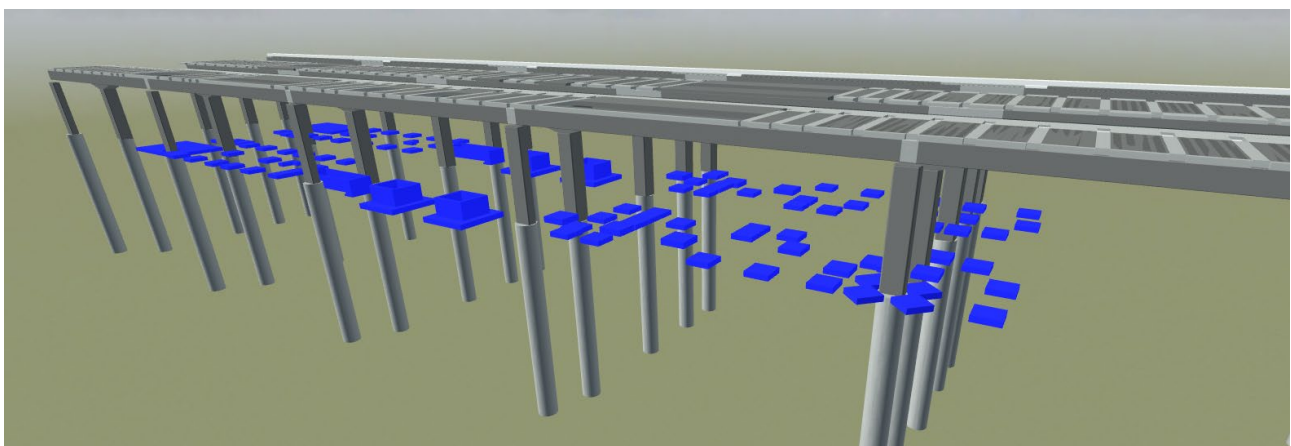


Figure 4: In-Ground Foundations

Footings will be constructed insitu and in a south to north sequence as follows:

- Concrete placement will be via concrete pump parked on the western piling pad or directly from the agi truck chute.

- All concrete agi trucks will be delivered via the site entry and access from Green Street and coordinated against surrounding works.
- Pending piling pad levels, in-ground foundations will be neat excavated, and concrete placed against existing ground or constructed using formwork on top of piling pad.
- Formwork will likely be constructed using a combination of traditional plywood and panel systems formwork for the footing's construction.
- Pedestals are likely to be constructed using a single use removable tube.
- In both cases the formwork can be installed insitu or prefabricated and crane lifted into place. To be determined and dictated by site restraints/conditions.
- Formwork shall conform to the requirements of AS 3610 and AS 3610.1
- Reinforcement will either be tied insitu or prefabricated and crane lifted into place. To be determined and dictated by site restraints/conditions.
- Submission of notices including witnessing and hold points requiring attendance by a 'PTA' Representative must comply with 'SWTC' Section 5.0.
- Reinforcement used shall comply with the Australian Standards listed below.

Table 1: Reinforcement Standards

Reinforcement	Specification
Grade D500N Hot Rolled Deformed Steel Reinforcing Bars for Concrete	AS/NZS 4671
Reinforcing Wire	AS/NZS 4671
Reinforcing Fabric/Welded Mesh Grade 500L	AS/NZS 4671

- All reinforcement shall be firmly supported on mild steel plastic tipped chairs, plastic chairs or concrete chairs at not greater than 1m centres both ways. Bars shall be tied at alternative intersections.
- Bar chairs and spacers used in the Works shall comply with AS/NZS 2425.
- Manufacturers and processors of steel reinforcing materials must hold a valid certificate of approval issued by the Australian Certification Authority for Reinforcing Steels Ltd (ACRS).
- Reinforcement placed in the Works shall be clean and free from all loose rust and mill-scale and all dirt, oil, paint, grease and all other foreign substances that may impair any bond between the concrete and reinforcement.
- The reinforcement shall be secured in position so that it shall not be displaced during the placement of concrete and ensure that there is no disturbance of the reinforcement in concrete that has already been placed.
- Steel reinforcement shall be secured in position by bar chairs and spacers manufactured under factory-controlled conditions from extruded fibre concrete or conventional concrete. Fibres are to be synthetic and non-metallic.

9.2.4 Lift Pit Wall Construction

- Lift pit walls will be constructed insitu and simultaneously.
- Concrete placement will be via concrete pump parked on the western piling pad or directly from the agi truck chute.

- All concrete agi trucks will be delivered via the site entry and access from Green Street and coordinated against surrounding works.
- Formwork will likely be constructed using a combination of traditional plywood and panel systems formwork for the footing's construction.
- In both cases the formwork can be installed insitu or prefabricated and crane lifted into place. To be determined and dictated by site restraints/conditions.
- Formwork shall conform to the requirements of AS 3610 and AS 3610.1
- Reinforcement will either be tied insitu or prefabricated and crane lifted into place. To be determined and dictated by site restraints/conditions.
- Reinforcement used shall comply with the Australian Standards and project specifications in 11.2.2 above.



Figure 5: Example of Lift Core Formwork Systems

9.2.5 Station Area Backfill

Fill material to be stockpiled within close proximity to the work front either within the Precinct or Rail Corridor and transported/backfilled using Front End Loaders (FEL's) and assisted by Excavators positioned adjacent to the platform.

All imported material will be delivered via the site entry and access from Green Street and coordinated against surrounding works or from within the rail corridor pending location of the stockpile.

All plant movement will be within the confines of the work area only.

Similar to the footing construction, the backfill will be in a south to north sequence (pending location of stockpile).

- Fill compaction shall be carried out in uniform layers with layer thickness determined based on material type, plant type and compaction method.
- The maximum fill placement thickness shall be 300mm, unless comprehensive trials are carried out to demonstrate that alternative approaches can meet the design requirements.

- During compaction the moisture content of the fill shall be maintained by drying or with additional moisture. Water spraying equipment shall be capable of distributing water uniformly in controlled quantities and mechanical mixing of the fill may be required for uniform distribution of moisture.
- Compaction testing shall be carried out on the subgrade material at founding level.
- Minimum compaction requirements and frequencies shall be in accordance with below, however, a minimum of 6 samples shall be tested from each Earthworks activity per location.

Table 2: Minimum Compaction Requirements for Earthworks Activities.

Earthworks Activity	Minimum Modified Dry Density Ratio (%)	Minimum testing frequency
Backfilling of grub holes and replacement of unsuitable material	95	One test per 2 layers per 50m ²
Subgrade proof compaction	95	One test per 500m ² to a depth of 600mm.
Embankment fill	95	One test per layer per 500m ²
Fill supporting structures	96	One test per layer per 500m ²
Fill supporting roads, busways and carparks	95	One test per layer per 500m ²
Fill behind structures	96	One test per 2 layers per 50m ²
General fill in landscape areas excluding topsoil	95	One test per layer per 1,500m ²

9.2.6 Column and Stairs Construction

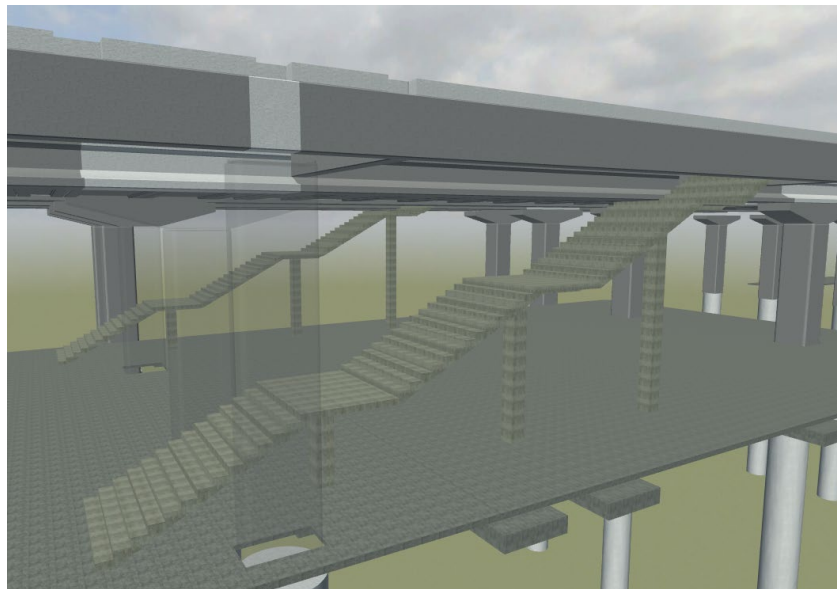


Figure 6: Precast Columns and Stairs

Through early engagement between the design and construction teams, MetCONNx have managed to achieve a solution that allows the concrete columns and stairs to be concrete as precast elements and crane lifted into place.

The solution was developed in line with Laing O'Rourke's innovative Design for Manufacture and Assembly (DfMA) 70:60:30 methodology, which strives to undertake 70% of construction off-site, in order to achieve a 60% improvement in productivity and a 30% improvement in the delivery schedule.

The general methodology for column and stair installation as follows:

- Column footings to be constructed with HD bolts cast into concrete.
- Column size and weights allow the panels to be delivered without restrictions and multiple columns per truck reducing site traffic.
- All columns will be delivered via the site entry and access from Green Street and coordinated against surrounding works.
- Columns will be delivered on a semi-trailer in a just-in-time fashion to reduce any double handling and/or storage. Columns will be secured in accordance with the Temporary Works design and Load Restraint Guide and to be inspected prior to unstrapping.
- A crane will be located on the western piling pad. Final crane type/size/model and final location for each lift will be determined and detailed in the relevant Lift Plan.
- Once columns have been landed, temporary props secured in place and aligned, the column grout tubes and base to be filled using specified grout – details to be matured.
- Stairs will be precast in a single element.
- Stair size and weights mean delivered with restrictions and compliance to all OSOM road restrictions.

9.2.7 Liftcore Frames

The structural steel liftcore frames will be prefabricated, treated off site and crane lifted into place as a single unit as follows:

- Lift pit walls to be constructed with HD bolts cast into concrete.
- Frame size and weights allow delivery without restrictions.
- Frames will be delivered on a semi-trailer in a just-in-time fashion to reduce any double handling and/or storage. Frames will be secured in accordance with the Temporary Works design and Load Restraint Guide and to be inspected prior to unstrapping.
- Two cranes are required to 1/ Lift and rotate the frame and 2/ Lift and install the frame into position.
- Both cranes will be located on the western piling pad. Final crane type/size/model and final location for each lift will be determined and detailed in the relevant Lift Plan.
- Frames will be self-supporting and on tightening of the HD Nuts will not require additional propping.
- Final grouting of the base plates to occur on completion of final alignment and survey.

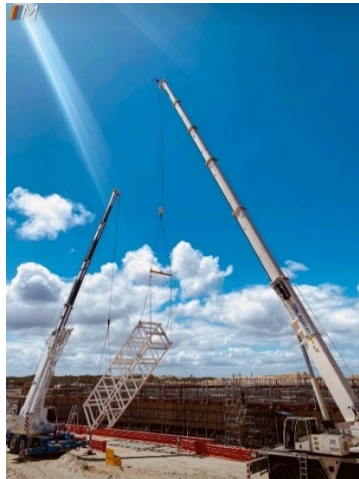


Figure 7: Example of Prefabricated Liftcore Installation

9.2.8 Structural Steel

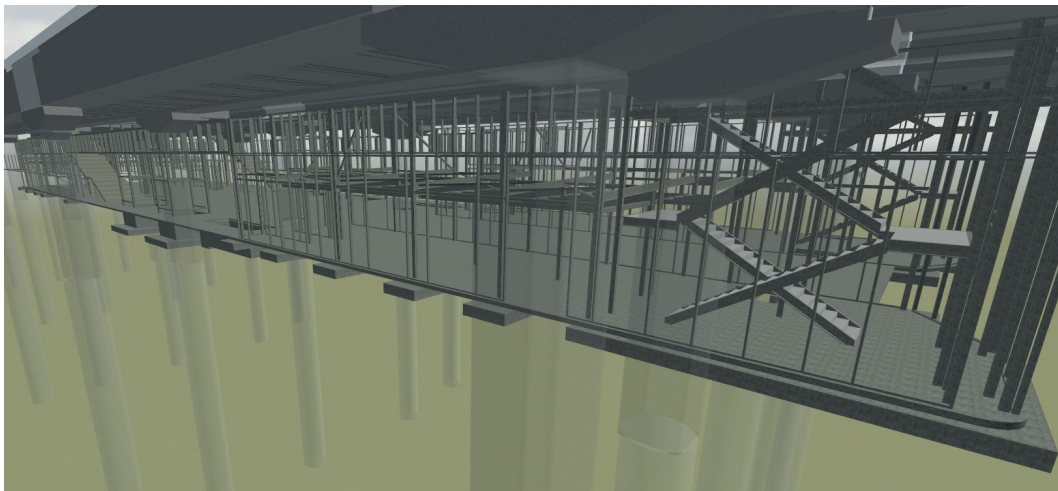


Figure 8: Structural Steel

The structural steel will be installed in a south-to-north sequence commencing at the southern end of the concourse.

The general methodology for the structural steel installation as follows:

- Structural steel installed insitu. Where possible sections will be preassembled on site at ground level and crane lifted into place.
- Where possible, all connections will be bolt connections with limited or no site welding preferred.
- Due to limited head clearance a small spider crane to be located within the concourse and assist in the installation.
- Trucks will be delivered via the site entry and access from Green Street and coordinated against surrounding works.
- Construction sequence will be such that free standing members do not require temporary propping and all horizontal members are installed immediately after.
- Bolts to be tightened by torque wrench to specified requirements and recorded accordingly. Temporary column supports may be required and be designed/installed in line with Temporary Works procedure and requirements.

- Columns to be grouted at the base as specified.

9.2.9 Finishes and Fitout

Finishes and fitout will typically be in a traditional insitu method and in a south-to-north sequence:

- Internal walls/rooms.
- External walls.
- Main lobby and public spaces.

The general sequencing for both external/internal walls/rooms as follows:

- Secondary steel and stud framing including all noggings and back boards.
- Door frames and window subs-sills.
- Internal wall sheeting, flushing and sanding.
- Wall service prelays.
- Weather membrane and external wall finishes/cladding (external walls).
- Ceiling framing.
- Ceiling service prelays.
- Ceiling sheeting, flushing and sanding.
- WPM, screeding and tiling (wet rooms).
- Doors, hardware and Glazing.
- Paint first coat.
- Joinery, fixtures and fitting.
- Final coat.

9.3 Armadale Station Platform

9.3.1 Buildings

Platform buildings are likely to be manufactured off site in a modular format and transported to site.

The solution was developed in line with Laing O'Rourke's innovative Design for Manufacture and Assembly (DfMA) 70:60:30 methodology, which strives to undertake 70% of construction off-site, in order to achieve a 60% improvement in productivity and a 30% improvement in the delivery schedule.

This method of construction was selected to offer:

- Increased construction efficiency and reduction in onsite traffic/delivery movements.
- Increased project safety through reduction in required personnel and duration of high-risk activities.
- Increased Quality Assurance and Management through manufacture in a factory-controlled environment by a specialist contractor.
- Increased potential for sustainability through advantages in thermal and environmental performance.
- Reduction in waste and greater onsite recycling of materials.

Due to the reduced complexity with this methodology the typical sequence is reduced and as follows:

- Building modules will be delivered on a semi-trailer in a just-in-time fashion to reduce any double handling and/or storage. Building modules will be secured in accordance with the Temporary Works design and Load Restraint Guide and to be inspected prior to unstrapping.

- Access to connect the building modules by MEWP with care taken not to place mobile plant and/or persons under suspended loads. MEWP's either placed within the platform or from the corridor pending section to be lifted and other works SIMMOPs.
- Where modules are required to be joined then all works are to be from within the module using platform ladders and at no times will any persons be on top.

Buildings will be delivered on a semi-trailer in a just-in-time fashion to reduce any double handling and/or storage. Panels will be secured in accordance with the Temporary Works design and Load Restraint Guide and to be inspected prior to unstrapping.

A crane will be located on the western piling pad. Final crane type/size/model and final location for each lift will be determined and detailed in the relevant Lift Plan.

Below table with building that could potentially be fabricated off-site pending further investigation and analysis.

Table 3: Buildings Considered for Off-Site Prefabrication

Location	No.	Description
Eastern Platform	1	Store Room / Electrical / CER
	2	Cleaners Store / Drivers Toilet
	3	Office Cubicle / Stair Enclosure / Electrical / CER
	4	CER / PTA Store / Mech Cupboard
Western Platform	1	Store Room / Electrical / CER
	2	Cleaners Store / Drivers Toilet
	3	Office Cubicle / Stair Enclosure / Electrical / CER
	4	CER / PTA Store / Mech Cupboard
Bus Interchange Facilities	1	Crib / WC / UAT / UAT / Cleaners Store / Mech Cupboard / Electrical / CER / Bin Store



Figure 9: Example of Prefabricated Building

9.3.2 Structural Steel Installation

The platform edge angle will be installed in a north-to-south sequence commencing at the ends of each platform.

The general methodology for the structural steel platform edge angle as follows:

- Platform edge angle will be manufactured to same size lengths as platform precast panels to ensure consistent joint locations.
- Edge angle sections are connected to the precast panels using through bolts at pre-determined locations/spacings.
- Edge angle will be installed from within the rail corridor to reduce Working at Heights using a small mobile crane or lifted manually into position pending weights and ground conditions.
- Each edge angle section will be surveyed for alignment and tolerance with necessary adjustment made as required.
- Joints between angle sections likely to be welded and confirmed as design progresses.
- Joints between angle section and precast panels likely to be sealed using an expandable mastic jointing as specified and confirmed as design progresses.

Structural steel columns will be installed individually and connected to HD Bolts cast into the pedestals as follows:

- A crane will be located on the western piling pad. Final crane type/size/model and final location for each lift will be determined and detailed in the relevant Lift Plan.
- Steel columns will be installed in a north to south sequence, lifting from the delivery truck parked adjacent to the crane on the crane pad. Each column will be surveyed for alignment and tolerance with necessary adjustment made as required.
- Bolts to be tightened by torque wrench to specified requirements and recorded accordingly. Temporary column supports may be required and be designed/installed in line with Temporary Works procedure and requirements.
- Columns to be grouted at the base as specified.

The canopy roof structure will be prefabricated off site into sections and similar to the precast panels, in line with Laing O'Rourke's innovative Design for Manufacture and Assembly (DfMA) 70:60:30 methodology, which strives to undertake 70% of construction off-site, in order to achieve a 60% improvement in productivity and a 30% improvement in the delivery schedule.

- Canopy sections, similar to the columns, will be delivered on a semi-trailer in a just-in-time fashion to reduce any double handling and/or storage. Canopy sections will be secured in accordance with the Temporary Works design and Load Restraint Guide and to be inspected prior to unstrapping.
- Access to connect the canopy sections to the columns by MEWP with care taken not to place mobile plant and/or persons under suspended loads. MEWP's either placed within the platform or from the corridor pending section to be lifted and other works SIMMOPs.
- Sections will be installed in a north-to-south sequence or as required to integrate into the station buildings.

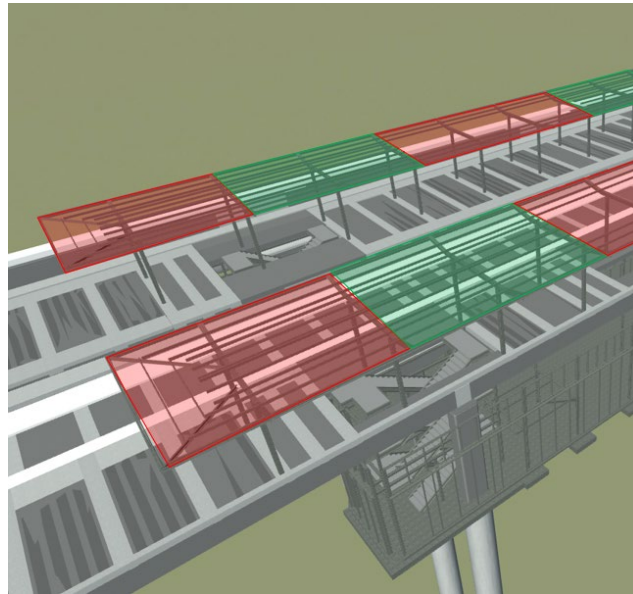


Figure 10: Structural Steel Canopy Sections

9.4 Precinct

Initially the precinct area will be utilised as piling pad and crane pad area for the construction of the viaduct / station. The below is the current piling pad proposal

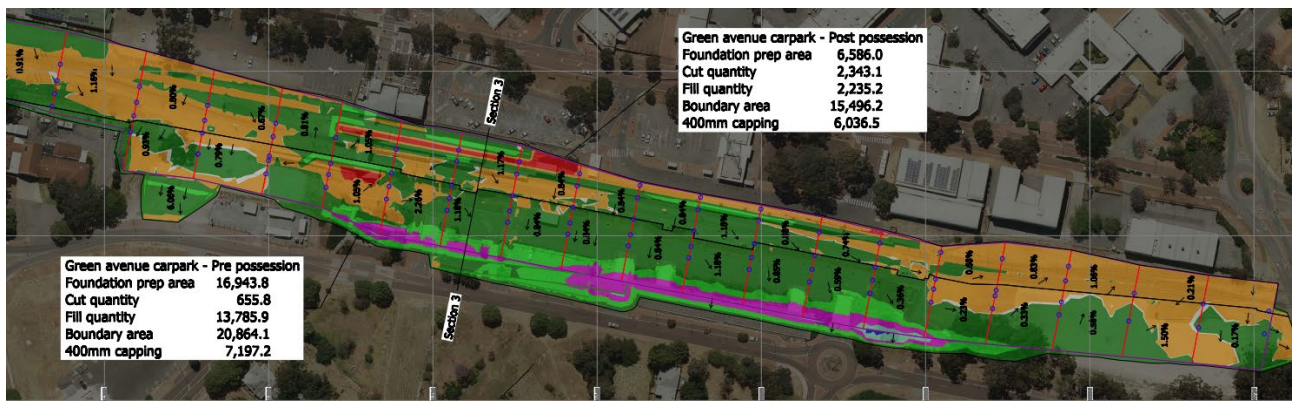


Figure 11: Piling Pad Layout

The intention of the piling pad construction will be to construct the pads as a permanent fill operation and once the piling and viaduct construction is complete the area will be trimmed / regulated to allow for the pavement and hard / soft landscaping as per the final precinct design.

Upon completion and commissioning of the temporary car park the existing western car park will be closed and demolished. After all services have been proven to be de-energised a profiler will be utilised to remove all asphalt surfaces were possible to be able to reuse the RAP on the project for laydown areas and access roads. Once removed, we will demolish all kerbing, fencing, retaining walls landscaping, street lighting and existing furniture in the area to allow for foundation prep works prior to the commencement of fill for the pads.

Filling will be completed as per the approved specification and signed off to allow for the works to be maintained as permanent works. The fill material will be placed in layers utilizing front end loaders, graders, articulated dump trucks and water carts with each layer conditioned, compacted using smooth drum rollers and tested to ensure it meets the required compaction density. Limestone will then be installed on top of the imported general fill and tested as per the approved temporary works requirements to allow for piling operations to commence.

Upon completion of the viaduct construction the piling / crane pad will be regulated to the design underside of pavement levels and compacted to allow for pavement construction. The precinct has been divided into zones as per staging plan (refer to Appendix C) to allow for the construction to be carried out as well as keeping the temporary bus interchange / temporary car park open to the public.

After sub grade regulating is complete, drainage and inground services will be installed prior to pavement works being carried out

9.4.1 Drainage

The stormwater will be managed by the construction team using a combination of existing drainage networks, establishment of temporary drainage, surface drainage and permanent drainage networks. The temporary drainage design will ensure clean water diversions are in place to prevent off-site water from entering the site where possible.

The sequencing of the construction will be considered to ensure that there is an effective path for stormwater throughout the Project delivery lifecycle to reduce the occurrence of water ponding that can damage the earthworks during construction.

The general methodology for drainage installation will involve the following

- Drainage materials will be procured, delivered, and stored on-site close to the proposed drainage installation works
- Excavation permits will be raised, and potholing of services conducted to confirm depth and location of in ground services
- Surveyors will mark out the drainage route to show the location of the pipes and pits or drainage channels as per the design drawings
- Excavators will mechanically remove soil material and load into earthworks trucks for stockpiling and later use as backfill or disposal as spoil depending on design requirements and soil conditions
- Depending on soil conditions and depth of excavation the drainage trench may require benching, batters or trench shoring to allow safe personnel access into the drainage trench
- The temporary works coordinator and temporary works supervisor will manage the inspections and maintenance of any temporary works that may be required
- When excavated down to design levels, the pits and pipes will be lowered into the excavation
- A bedding layer of fill will be placed to grade before laying the pipes
- Pits and pipes will be connected with correct joints and seals in accordance with the Project specifications and design
- Backfilling of trench with suitable fill material will occur in layers. The backfill will be compacted and tested in accordance with project specifications
- Pit lids will be placed and concreted into position at the correct levels.

9.4.2 In-Ground Services Installation

Similar to 11.3.1 trenching for in-ground services conduits and pit excavations will typically be small scale excavation (1 or 3.5T) depending on required depths. Trenching will be in a sequence that is away from the station buildings and progressively behind bulk earthworks.

Similar to above:

- Submission of notices including witnessing and hold points requiring attendance by a 'PTA' Representative must comply with 'SWTC' Section 5.0.
- A nominal 100mm of bedding sand to be placed prior to laying of conduits.
- After laying of conduits, sand embedment must be placed and compacted around the conduits to a minimum height of 150mm above the top of the pipe and/or fittings.
- Embedment sand to be coarse, well graded, washed, river (quartz based) sand free of organic matter, soluble salts and other deleterious materials.

- Where required, service conduits to have detectable underground marking tape (To AS/NZS 2648.1), placed 250mm (+/- 50mm) above all buried conduits for full length of conduit and covered with circa 100mm sand.
- All trenches will be backfilled as soon as possible and on completion of relevant inspections.
- Place the trench fill in layers ≤ 150 mm thick and compact to the density, which applies to the location of the trenches to minimise settlement. Compact trench fill to a minimum of 95% of the standard maximum dry density ratio specified in AS 1289.5.4.1 or AS 1289.5.6.1. Compact trench fill in such a manner that the pipes are neither dislodged nor damaged.
- Complete the trench filling with topsoil for at least the top 50 mm.

9.4.3 Pavement Construction

Granular pavements will be utilised throughout the precinct area at varying thickness of sub base and base course as per the finalised design for the pavement usage.

Crushed Limestone will be used for subbase construction and trimmed using a machine controlled grader

Crushed granite will be used for base course construction again trimmed with machine controlled grader prior to bituminous seal and wearing course application

Kerbing will be extruded to the areas as per the design and the specified profile of kerbing for each area.

9.4.4 Asphalt

For the manufacture of asphalt, the Project will place a large draw on raw materials for the large quantity of asphalt to be produced in a relatively short timeframe. Aggregate material stockpiles will be maintained to a sufficient surplus to allow for advance testing and to protect the integrity of loader removal operations against contamination. Moisture control and protection from the elements of the raw materials will need to be maintained. Sufficient back up plant(s) will be required to ensure production and quality of the end product.

During asphalt delivery, placement and compaction, each load of asphalt will be tested for temperature prior to dispatch from the plant and tarped to prevent loss of heat, The Material Transfer Vehicle (MTV) must be self-propelled capable of receiving asphalt from delivery trucks, storing mix, heating mix in storage and transferring the mix to the asphalt paver without any contact with the paver. Sufficient compaction plant must be available before the commencement of work to support the paver capacity and the expected placement rate. Methods for effective compaction will be confirmed and include adequate treatment to joints to ensure a smooth finish.

The methodology for the protection of laid asphalt prior to bituminous seal application will state that the impact of exposure for asphalt intermediate layers to rainfall or surface water should be minimised. Before commencement, the Project will be mindful of weather forecasts. During placement of layers, which could happen over multiple shifts, it will be managed through the production and compaction of asphalt to suitable air void requirements (targeting less than 5%).

Environmental controls relevant to asphalt work include a prime application for the sub-base pavement layer. The Project will need to ensure there are no uncontrolled run-offs prior to the placement of asphalt intermediate layers. The location and methodology of cleaning plant will be addressed to ensure excess materials are disposed of in a controlled manner.

9.4.5 Hard / Soft Landscaping

Rehabilitation, landscaping, and revegetation over the entire site will be installed upon completion of the various pavements and structures around the precinct area, including hard landscaping.

The landscaping must be consistent with the Urban Design elements and must:

- Maximise retention of existing vegetation
- Use native plants and exotic (deciduous trees) to maximise shade and shelter for pedestrians
- Provide a higher quality planting treatment adjacent to the Road and in the roundabouts
- Screen out undesirable visual elements.

9.4.6 Bus Interchange Canopy Installation

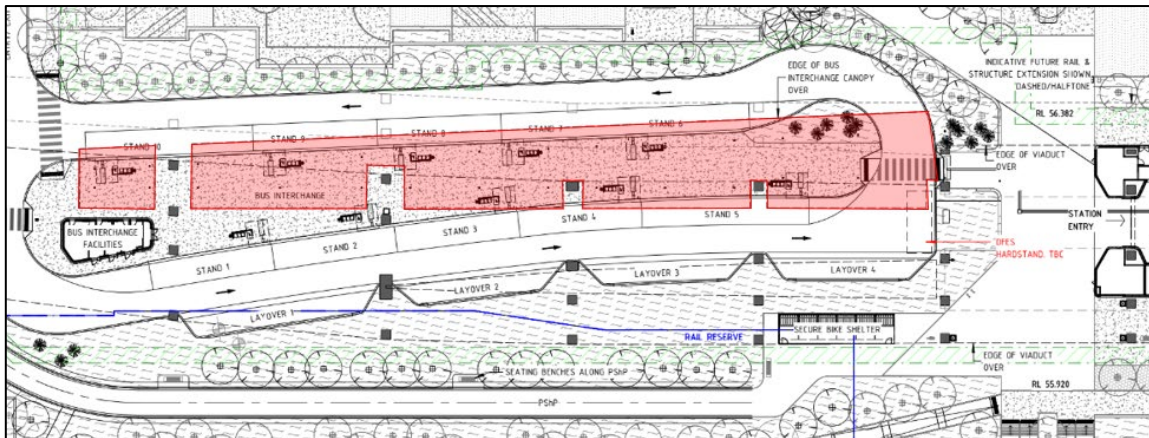


Figure 12: Bus Interchange Canopy

Concrete footings, pending design and ground constraints, will be poured insitu or precast panels with cast in HD bolts.

Structural steel columns will be installed individually and connected to HD Bolts cast into the pedestals as follows:

- A crane will be located on the existing western piling platform. Final crane type/size/model and final location for each lift will be determined and detailed in the relevant Lift Plan.
- Steel columns will be installed in a south-to-north sequence, lifting from the delivery truck parked adjacent to the crane on the crane pad. Each column will be surveyed for alignment and tolerance with necessary adjustment made as required.
- Bolts to be tightened by torque wrench to specified requirements and recorded accordingly. Temporary column supports may be required and be designed/installed in line with Temporary Works procedure and requirements.
- Columns to be grouted at the base as specified.

Similar to Point 11.3.2 the canopy roof structure will be prefabricated off site into sections and similar to the precast panels, in line with Laing O'Rourke's innovative Design for Manufacture and Assembly (DfMA) 70:60:30 methodology, which strives to undertake 70% of construction off-site, in order to achieve a 60% improvement in productivity and a 30% improvement in the delivery schedule.

- Canopy sections, similar to the columns, will be delivered on a semi-trailer in a just-in-time fashion to reduce any double handling and/or storage. Canopy sections will be secured in accordance with the Temporary Works design and Load Restraint Guide and to be inspected prior to unstrapping.
- Access to connect the canopy sections to the columns by MEWP with care taken not to place mobile plant and/or persons under suspended loads. MEWP's either placed within the platform or from the corridor pending section to be lifted and other works SIMMOPs.

- Sections will be installed in a north-to-south sequence or as required to integrate into the station buildings.

9.4.7 Bus Interchange Facilities

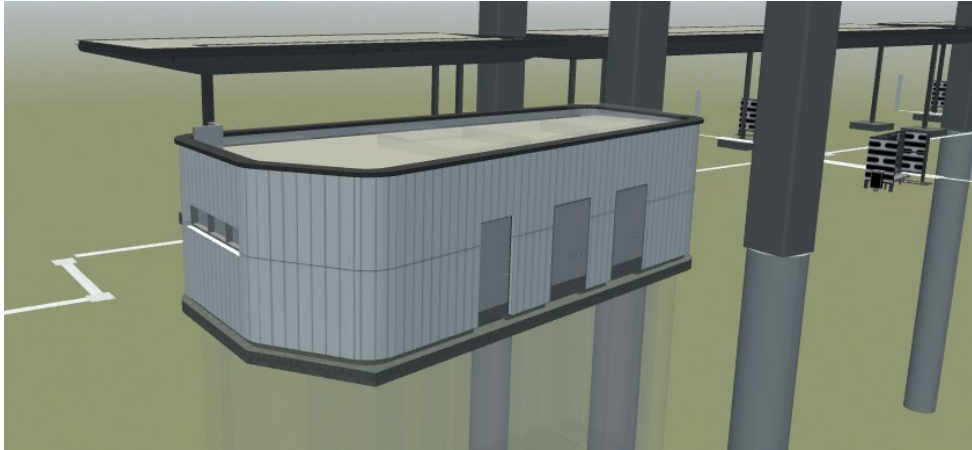


Figure 13: Bus Interchange Facilities Building

Similar to Point 11.3.1 the Bus Interchange Facilities buildings are likely to be manufactured off site in a modular format and transported to site:

- Building modules will be delivered on a semi-trailer in a just-in-time fashion to reduce any double handling and/or storage. Canopy sections will be secured in accordance with the Temporary Works design and Load Restraint Guide and to be inspected prior to unstrapping.
- Access to connect the building modules by MEWP with care taken not to place mobile plant and/or persons under suspended loads. MEWP's either placed within the platform or from the corridor pending section to be lifted and other works SIMMOPs.

A crane will be located on the existing piling pad. Final crane type/size/model and final location for each lift will be determined and detailed in the relevant Lift Plan and consideration given to the restricted clearance height under the Viaduct.

Appendix A: Terms and definitions

The following terms, abbreviations and definitions are used in this plan.

Table 4: Terms and Definitions

Term	Definition
ABCC	Australian Building and Construction Commission
ABS	Australian Bureau of Statistics
AC	alternating current
AD	Alliance Development
ADA	Alliance Development Agreement
ADT	Articulated dump trucks
AHD	Australian Height Datum
AIM	Asset Information Model
AIR	Asset Information Requirement
ALARP	as low as reasonably practicable
ALT	Alliance Leadership Team
AMT	Alliance Management Team
ANM	ambient noise monitors
APC	automated power control
APT	Alliance Project Team, comprising Laing O'Rourke, KBR, Pritchard Francis and the PTA
AS	Australian Standard
AS/NZS	Australian/New Zealand Standard
ASS	Acid Sulphate Soils
AT	Auto-Tensioned
ATCF	Alternate Train Control Facility
BCA	Building Code of Australia
BIM	Building Information Modelling
BM	Bench Marks
BRE	Byford Rail Extension
CAD	computer aided drafting
CEMP	Construction Environmental Management Plan
CER	communications equipment room
DE	Digital Engineering
DEMP	Digital Engineering Management Plan
DfMA	Design for Manufacturing and Assembly
DGS	Digital ground survey
DLP	Defect liability period

Term	Definition
DOORS NG	DOORS NG requirements management tool
DTM	digital terrain model
DWER	Department of Water and Environmental Regulation
EIS	Entry into Service
EPA	Environmental Protection Authority
EPBC	Environmental Protection Biodiversity Conservation Act 1999
FBW	Flash butt welds
FIC	field inspection checklist
FM	Facilities management
FOC	Fibre optic cable
FOPS	Falling object protection system
FSR	Fatal and severe risk
HAZMAT	hazardous material
HR/IR	Human Resources and Industrial Relations
HSE	health, safety and environment
HSEQ	health, safety, environment and quality
IFC	issued for construction
IRC	Inspection release certificate
IRP	Industrial Relations Plan
ITP	Inspection and Test Plan
ITR	Inspection and Testing Report
JSEA	Job safety and environmental analysis
KPI	Key Performance Indicators
Laing O'Rourke	Laing O'Rourke Australia Construction Pty Limited
LGA	Local Government Authority
MCR	Major Cable Route (legacy Definition Main Cable Route)
MFD	Multi-functional devices
MRWA	Main Roads Western Australia
MSE	Mechanically stabilised earth
N&I	Network & Infrastructure a division of the PTA
NBN	National Broadband Network

Term	Definition
NCR	Non-Conformance Report
NOPs	Non-Owner Participants, Laing O'Rourke, KBR and Pritchard Francis
NVMP	Noise and Vibration Management Plan
O&M	operations and management
OH&S	Occupational Health and Safety
OLE	Overhead Line Equipment
ONRSR	Office of the National Rail Safety Regulator
PAA	Project Alliance Agreement
PIM	Project information model
PRES	Person responsible for electrical safety
Project	METRONET Byford Rail Extension Project
PShP	Principal shared path
PTA	Public Transport Authority
R&O	Risk and opportunity
RDS	Room data sheets
RIW	Rail industry worker

Term	Definition
RMP	Risk Management Plan
ROPS	Roll over protection system
RRM	MRWA road reference marks
RTO	Rail Transport Operator
SAD	Safe approach distance
SER	Signalling equipment room
SOW	Scope of work
SSM	State survey marks
SWMS	safe work method statement
SWTC	Scope of Works and Technical Criteria
T&C	Testing and Commissioning
TEC	Threatened Ecological Communities
TOC	Total Outturn Cost
TRT	Tracked rail transporter
TWCR	Temporary Works Control Register
UTX	Under track crossing
WBS	work breakdown structure

Appendix B: Initial plant and equipment register

Table 5: Large Plant Register

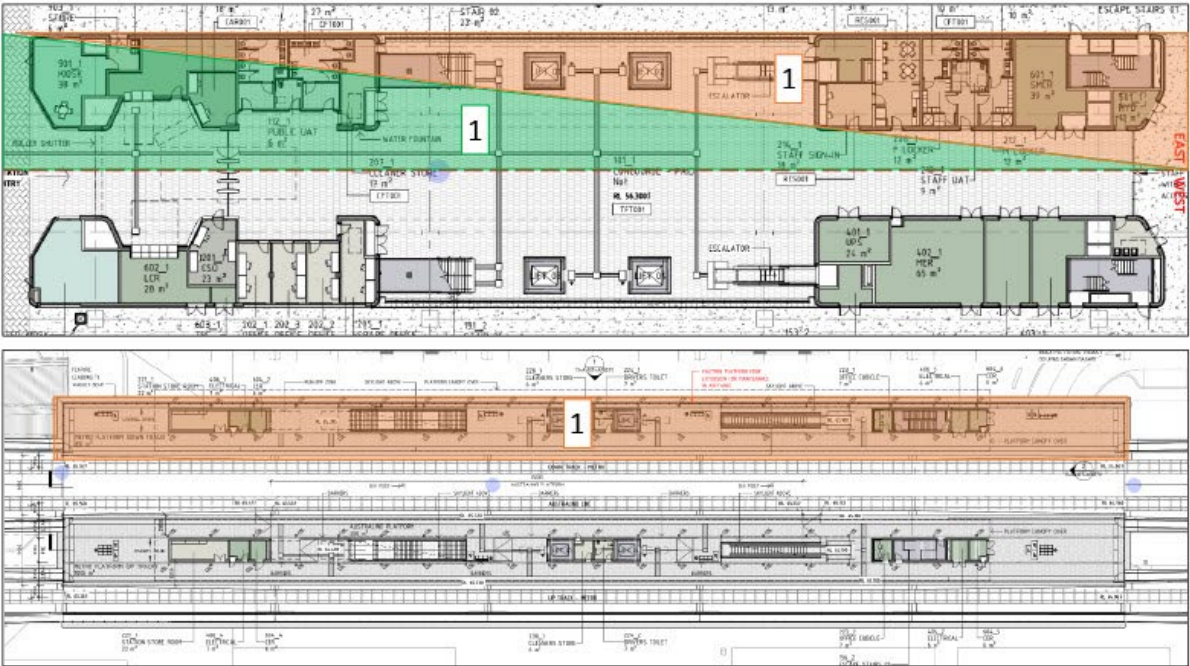
Asset No.	Description	Current Location	Comments
	75t Mobile Crane	Perth	Cross Hire
	100t Mobile Crane	Perth	Cross Hire
	170t Mobile Crane	Perth	Cross Hire
	400t Mobile Crane	Perth	Cross Hire
	40t Dumper Trucks	Perth	Cross Hire
	CAT 330 Excavators	Perth	Cross Hire
	CAT 320 Excavators	Perth	Cross Hire
	CAT 140 Graders	Perth	Cross Hire
	CAT Heavy-Duty Front-End Loaders	Perth	Cross Hire
	18t Sheep's Foot Rollers	Perth	Cross Hire
	19t Smooth Drum Rollers	Perth	Cross Hire
	Telehandlers	Perth	Cross Hire
	Water Carts	Perth	Cross Hire
	Road Sweepers	Perth	Cross Hire
	EWP - Scissor Lifts	Perth	Cross Hire

Appendix C: Staging diagrams

Table 6: Staging Diagrams Register

Item	Name
1.	Armadale Station Platform Level
2.	Armadale Station Concourse Level
3.	Armadale Station Precinct

ARMADALE STATION CONSTRUCTION STAGING – APPENDIX C
DATE RANGE: JUN-24



ACTIVITIES:

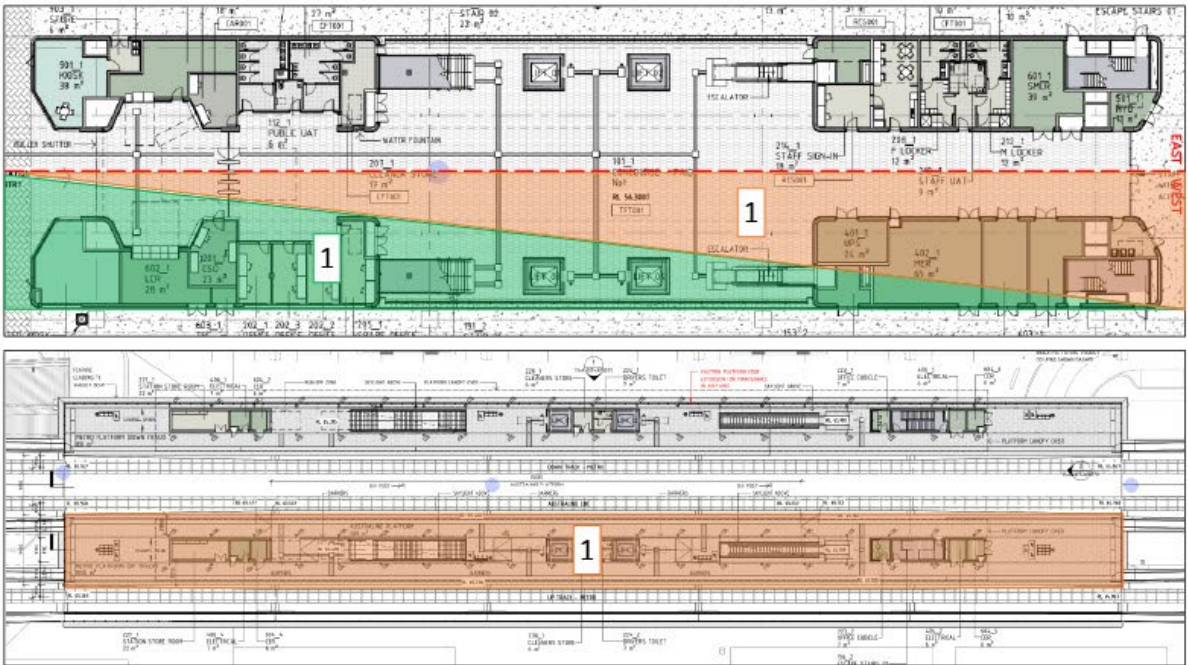
PLATFORM:		CONCOURSE:		Other / Notes:
Civil	Structural	Civil	Structural	
	1 Platform Edge Angle & Structural Steel Canopy Columns		1 FRP Footings and Lift Pit Walls	
Utilities / Building Services	Architectural	Utilities / Building Services	Architectural	Railway Systems
		1 In Ground Services		

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ACTIVITIES:

PLATFORM:

Civil

Structural

- 1 Platform Edge Angle & Structural Steel Canopy Columns

CONCOURSE:

Civil

Structural

- 1 FRP Footings and Lift Pit Walls

Other / Notes:

Utilities / Building Services

Architectural

Utilities / Building Services

- 1 In Ground Services

Architectural

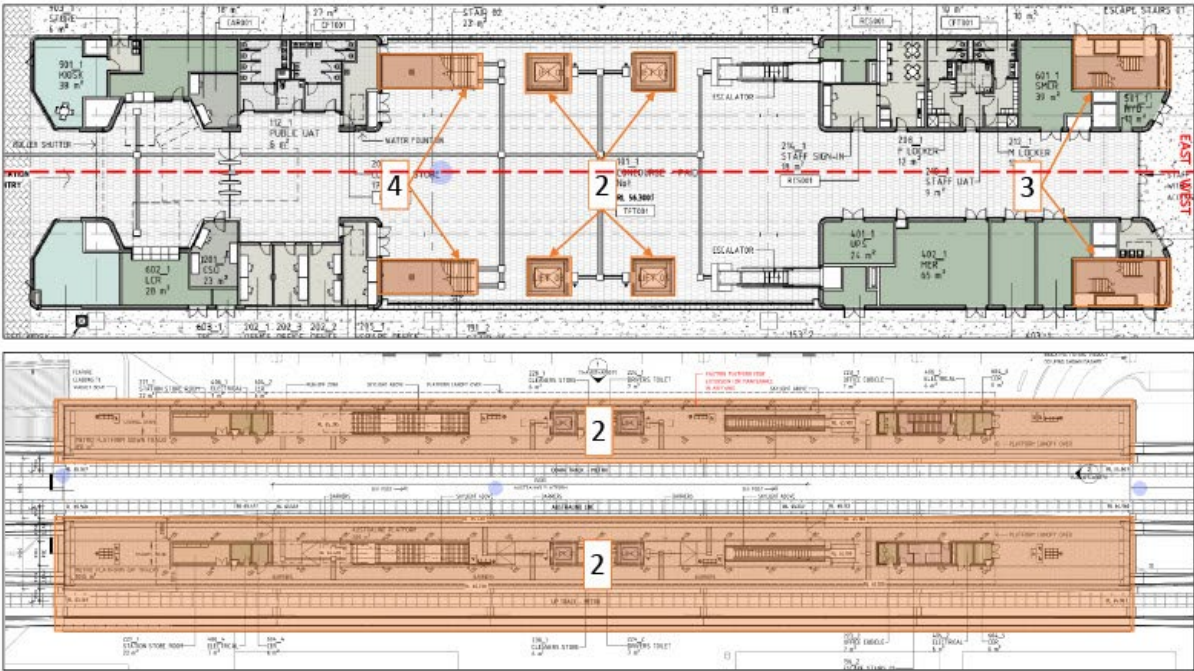
Railway Systems

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ARMADALE STATION CONSTRUCTION STAGING – APPENDIX C
DATE RANGE: JUL-24



ACTIVITIES:

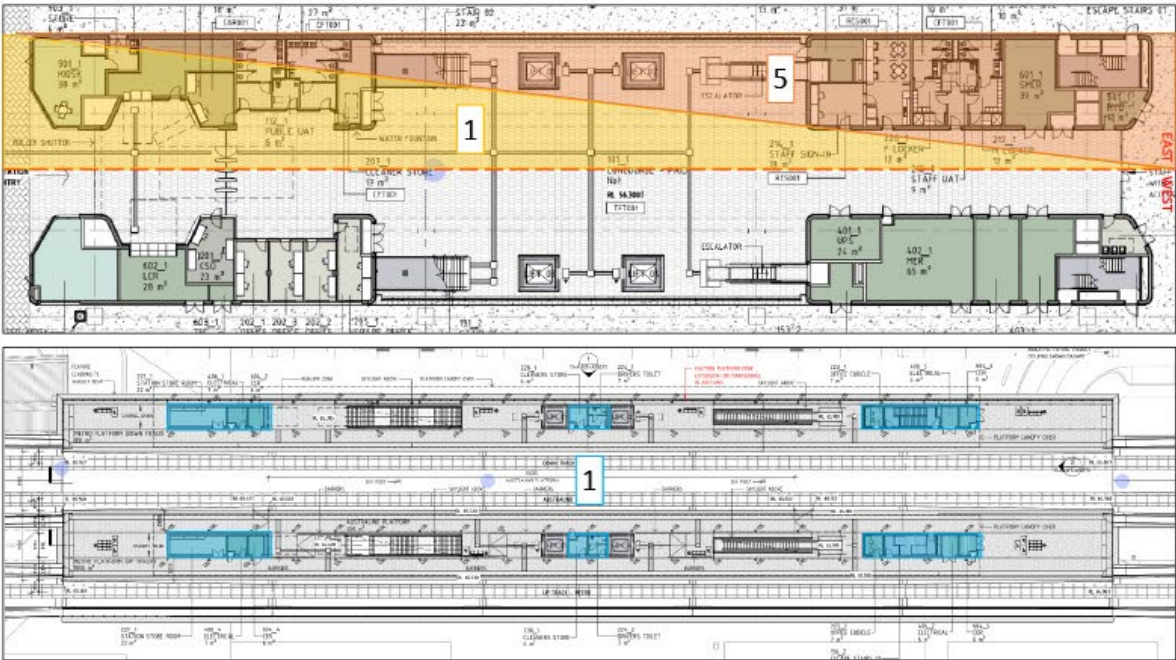
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Utilities / Building Services	Architectural	Utilities / Building Services	Architectural	Railway Systems
		<ol style="list-style-type: none">In Ground Services		

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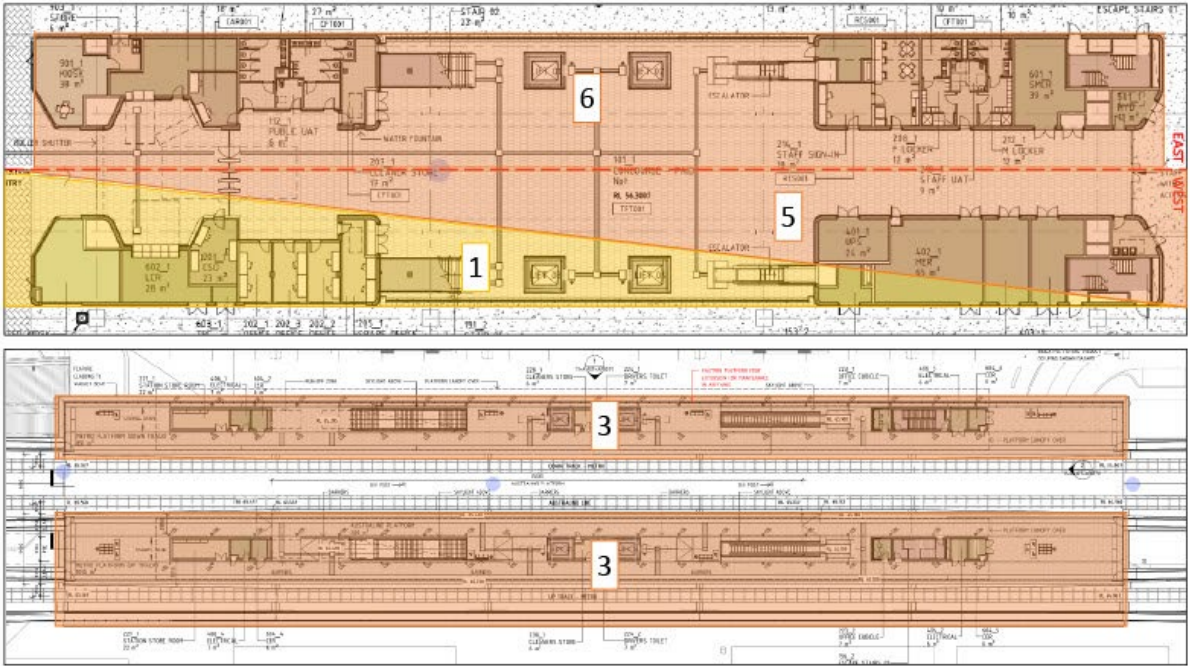
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PLATFORM:		CONCOURSE:		Other / Notes:
Civil	Structural	Civil	Structural	
	1. Platform Edge Angle & Structural Steel Canopy Columns. 2. E&B Mesh / FRP Topping Slab.	1. Backfill	1. FRP Footings and Lift Pit Walls. 2. Install Lift Core Structural Steel Frame. 3. Install Emergency Escape Stairs Structural Steel Frame. 4. Install Precast Columns & Stairs. 5. Building Structural Steel.	
Utilities / Building Services	Architectural	Utilities / Building Services	Architectural	Railway Systems
	1. Install Prefabricated Buildings	1. In Ground Services		

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DATE RANGE: AUG-24



ACTIVITIES:

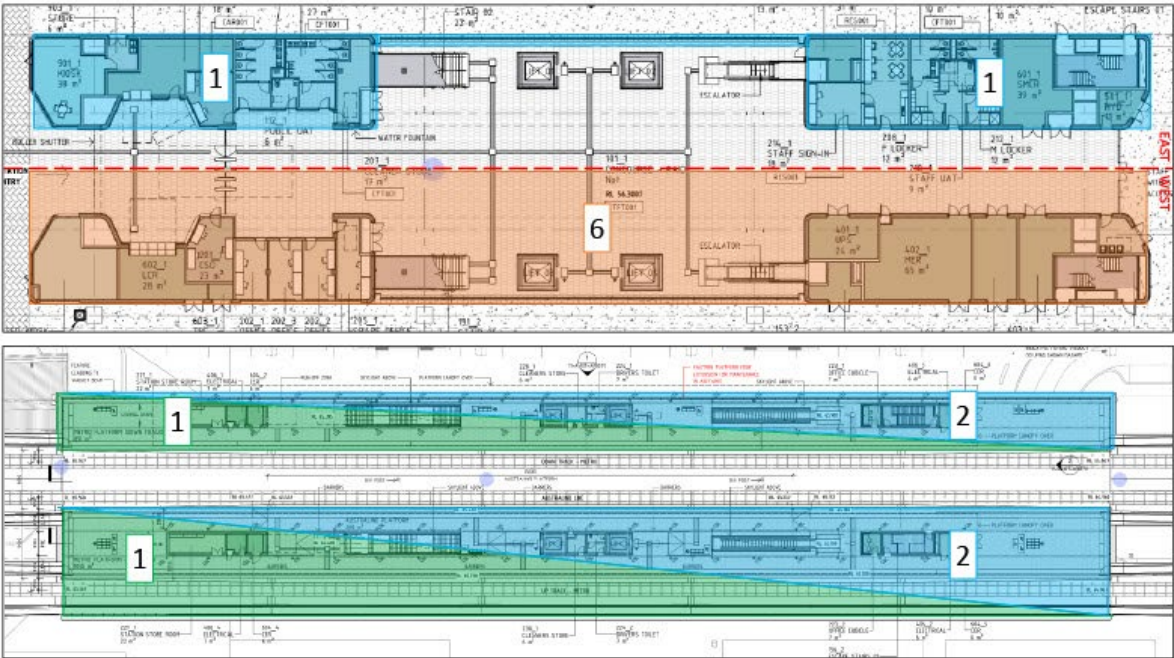
PLATFORM:		CONCOURSE:		Other / Notes:
Civil	Structural	Civil	Structural	
	<ol style="list-style-type: none">Platform Edge Angle & Structural Steel Canopy Columns.E&B Mesh / FRP Topping Slab.Canopy Roof.	<ol style="list-style-type: none">Backfill	<ol style="list-style-type: none">FRP Footings and Lift Pit Walls.Install Lift Core Structural Steel Frame.Install Emergency Escape Stairs Structural Steel Frame.Install Precast Columns & Stairs.Building Structural Steel.FRP Ground Slab.	
Utilities / Building Services	Architectural	Utilities / Building Services	Architectural	Railway Systems
	<ol style="list-style-type: none">Install Prefabricated Buildings	<ol style="list-style-type: none">In Ground Services		

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ARMADALE STATION CONSTRUCTION STAGING – APPENDIX C
DATE RANGE: SEP-24



ACTIVITIES:

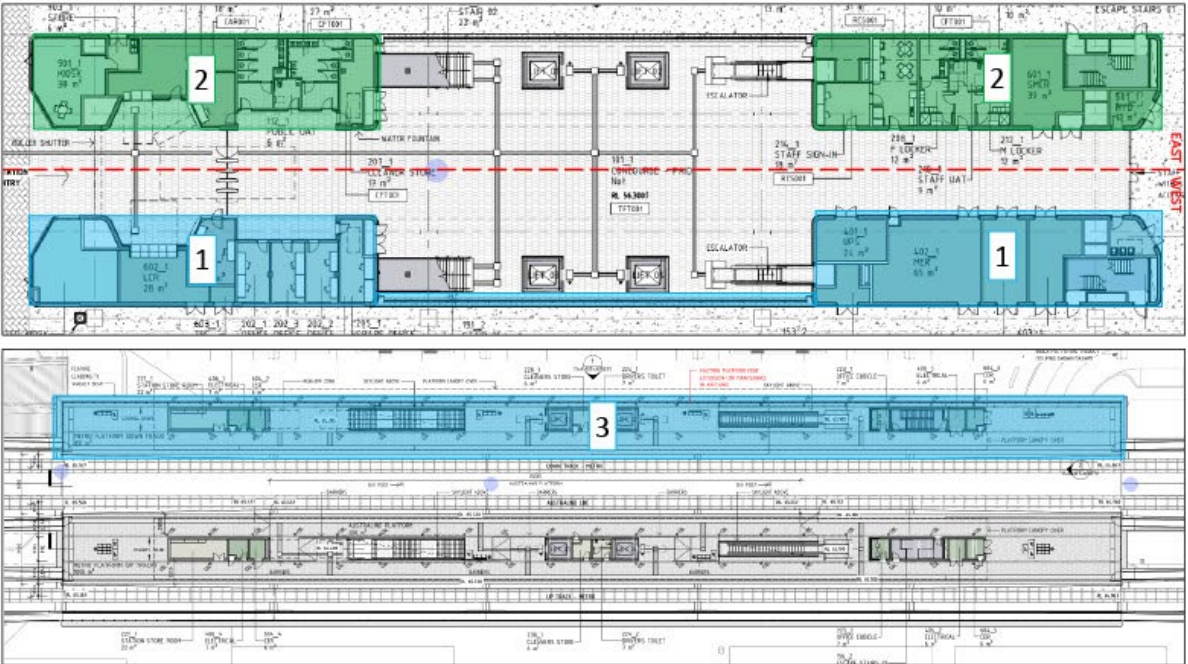
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Civil	Structural	Civil	Structural	
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Utilities / Building Services	Architectural	Utilities / Building Services	Architectural	Railway Systems
<ol style="list-style-type: none">Platform Services & ACO Drain.	<ol style="list-style-type: none">Install Prefabricated Buildings.Platform Screen.	<ol style="list-style-type: none">In Ground Services	<ol style="list-style-type: none">Wall Framing & One Side Sheeting.	

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ARMADALE STATION CONSTRUCTION STAGING – APPENDIX C
DATE RANGE: OCT-24



ACTIVITIES:

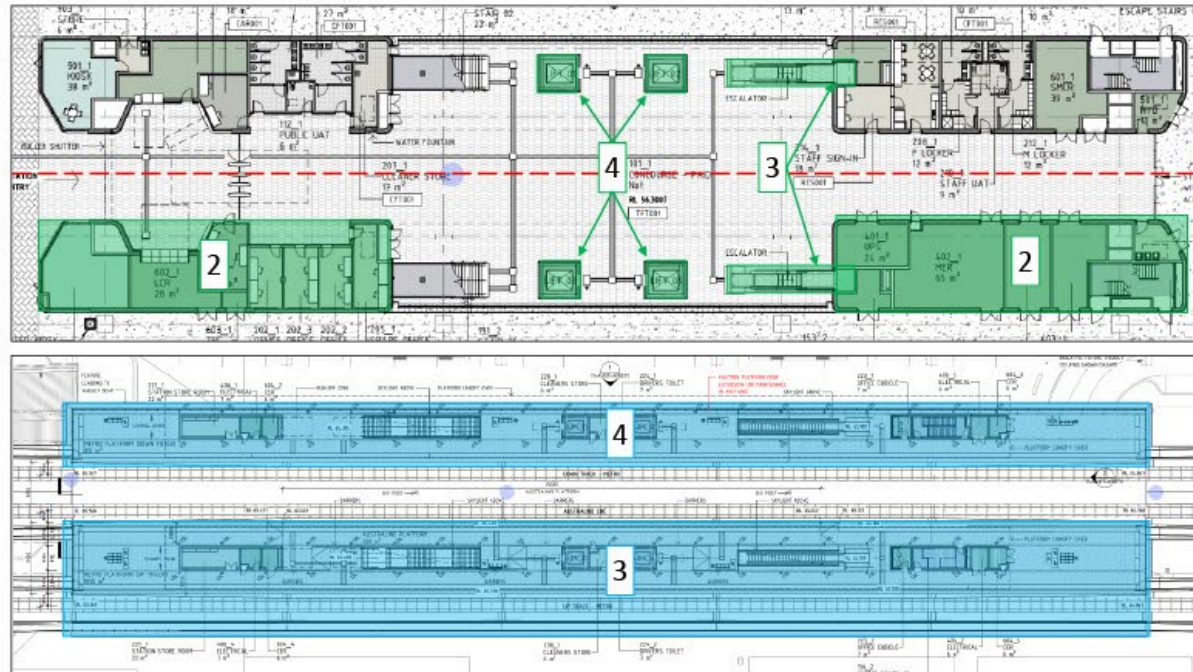
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Utilities / Building Services	Architectural	Utilities / Building Services	Architectural	Railway Systems
<ol style="list-style-type: none">Platform Services & ACO Drain.	<ol style="list-style-type: none">Install Prefabricated Buildings.Platform Screen.Platform Tiling and Paving.	<ol style="list-style-type: none">In Ground ServicesInternal Services Roughin.	<ol style="list-style-type: none">Wall Framing & One Side Sheeting.	

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ARMADALE STATION CONSTRUCTION STAGING – APPENDIX C
DATE RANGE: NOV-24



ACTIVITIES:

PLATFORM:		CONCOURSE:		Other / Notes:
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Utilities / Building Services <ol style="list-style-type: none"> Platform Services & ACO Drain. 	Architectural <ol style="list-style-type: none"> Install Prefabricated Buildings. Platform Screed. Platform Tiling and Paving. Platform Finishes & Fitout. 	Utilities / Building Services <ol style="list-style-type: none"> In Ground Services Internal Services Roughin. Install Escalators. Install Elevators. 	Architectural <ol style="list-style-type: none"> Wall Framing & One Side Sheeting. 	Railway Systems

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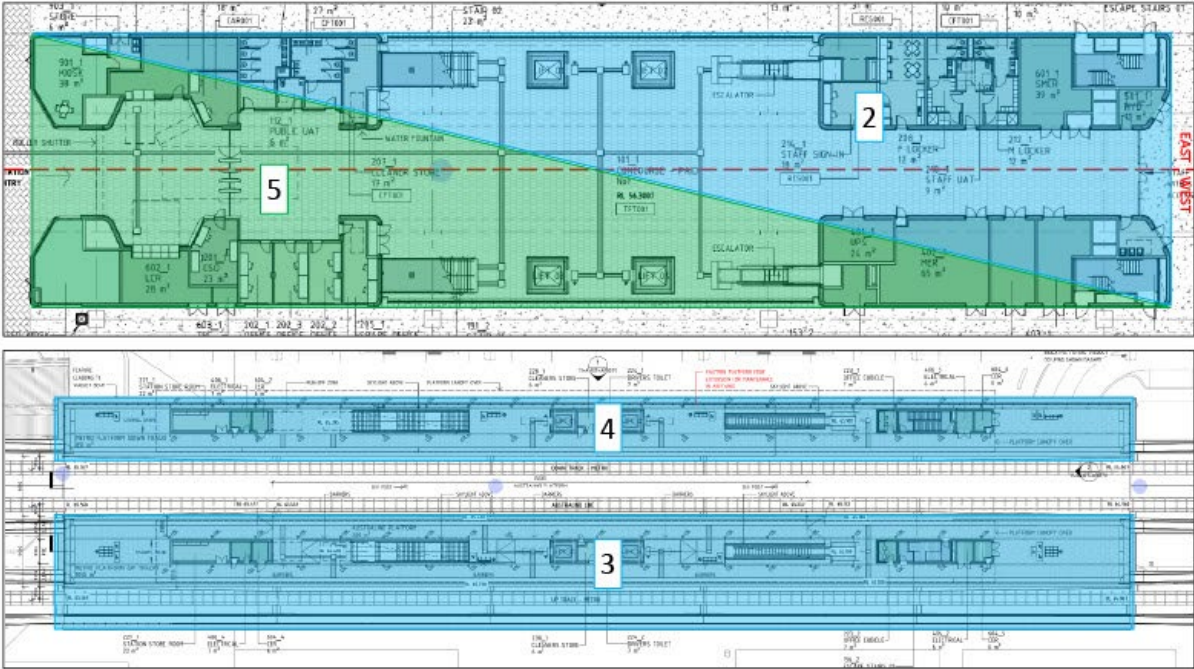
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ARMADALE STATION CONSTRUCTION STAGING – APPENDIX C
DATE RANGE: DEC-24



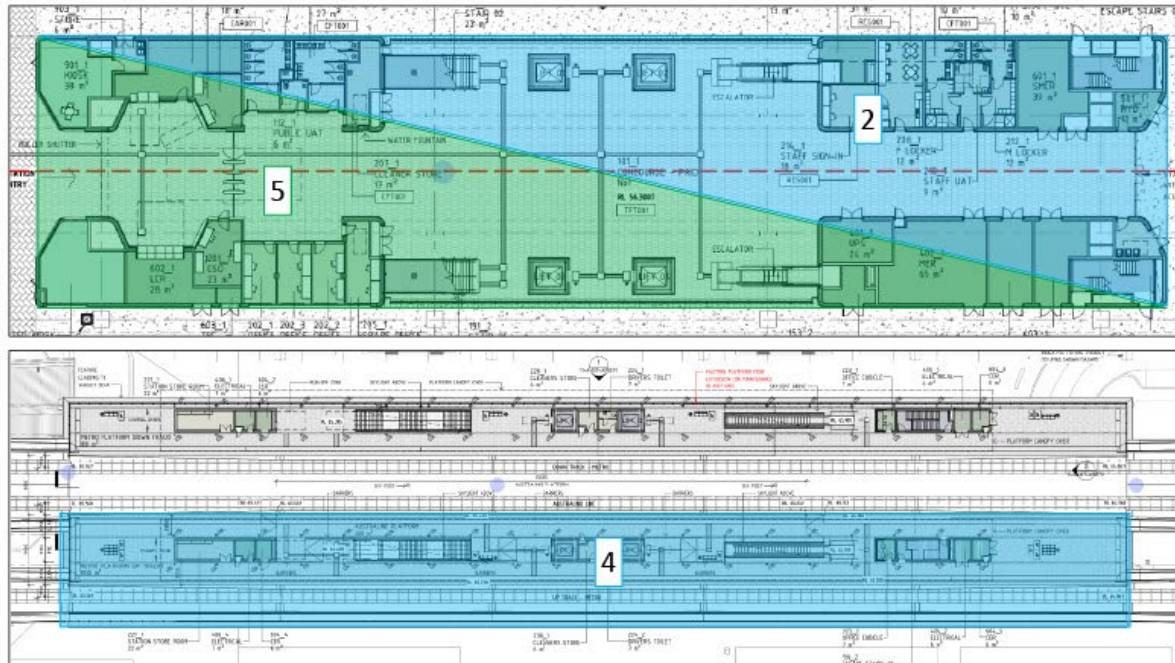
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PLATFORM:			CONCOURSE:		Other / Notes:
Civil	Structural	Civil	Structural		
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Utilities / Building Services	Architectural	Utilities / Building Services	Architectural	Railway Systems	
<ol style="list-style-type: none">Platform Services & ACO Drain.	<ol style="list-style-type: none">Install Prefabricated Buildings.Platform Screed.Platform Tiling and Paving.Platform Finishes & Fitout.	<ol style="list-style-type: none">In Ground ServicesInternal Services Roughin.Install Escalators.Install Elevators.Services Fitout.	<ol style="list-style-type: none">Wall Framing & One Side Sheeting.Finishes and Fitout.		

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ARMADALE STATION CONSTRUCTION STAGING – APPENDIX C
DATE RANGE: JAN-25



ACTIVITIES:

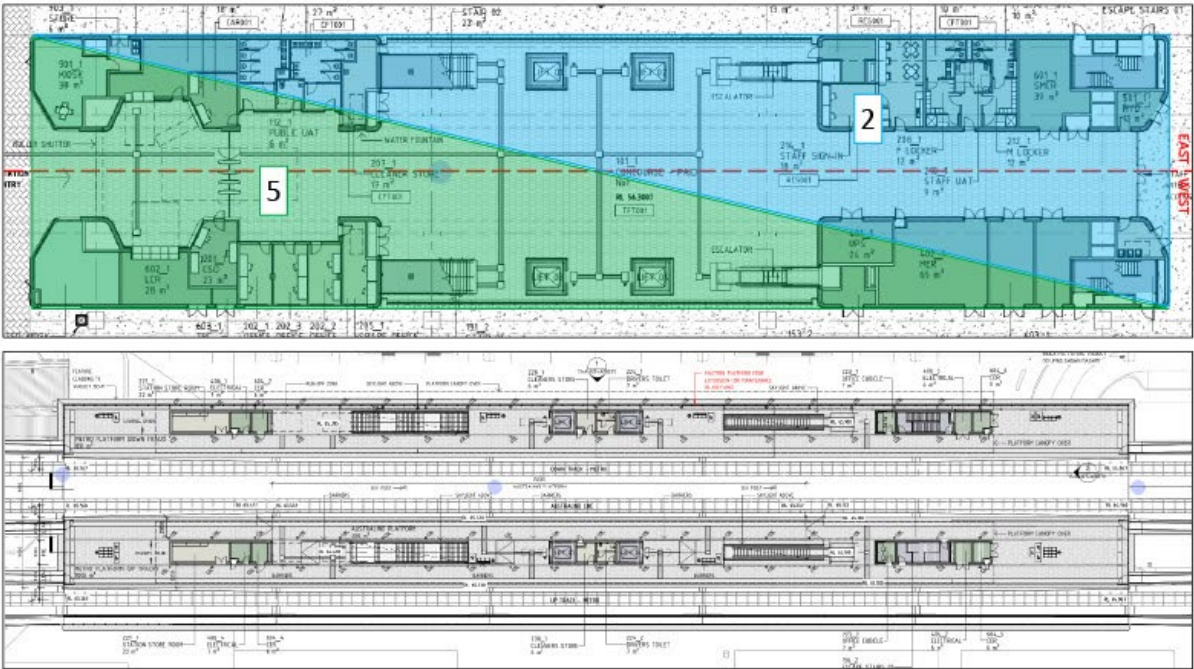
PLATFORM:		CONCOURSE:		Other / Notes:
Civil	Structural <ol style="list-style-type: none"> Platform Edge Angle & Structural Steel Canopy Columns. E&B Mesh / FRP Topping Slab. Canopy Roof. 	Civil	Structural <ol style="list-style-type: none"> FRP Footings and Lift Pit Walls. Install Lift Core Structural Steel Frame. Install Emergency Escape Stairs Structural Steel Frame. Install Precast Columns & Stairs. Building Structural Steel. FRP Ground Slab. 	
Utilities / Building Services	Architectural <ol style="list-style-type: none"> Install Prefabricated Buildings. Platform Screed. Platform Tiling and Paving. Platform Finishes & Fitout. 	Utilities / Building Services	Architectural <ol style="list-style-type: none"> Wall Framing & One Side Sheeting. Finishes and Fitout. 	Railway Systems

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ARMADALE STATION CONSTRUCTION STAGING – APPENDIX C
DATE RANGE: FEB to MAR-25



ACTIVITIES:

PLATFORM:		CONCOURSE:		Other / Notes:
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Utilities / Building Services	Architectural	Utilities / Building Services	Architectural	Railway Systems
<ol style="list-style-type: none">Platform Services & ACO Drain.	<ol style="list-style-type: none">Install Prefabricated Buildings.Platform Screed.Platform Tiling and Paving.Platform Finishes & Fitout.	<ol style="list-style-type: none">In Ground ServicesInternal Services Roughin.Install Escalators.Install Elevators.Services Fitoff.	<ol style="list-style-type: none">Wall Framing & One Side Sheeting.Finishes and Fitoff.	

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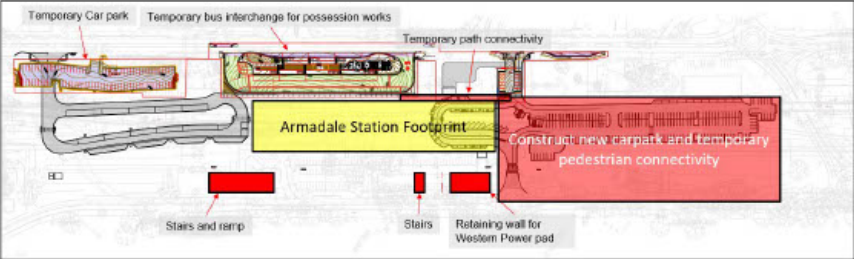
REV 00

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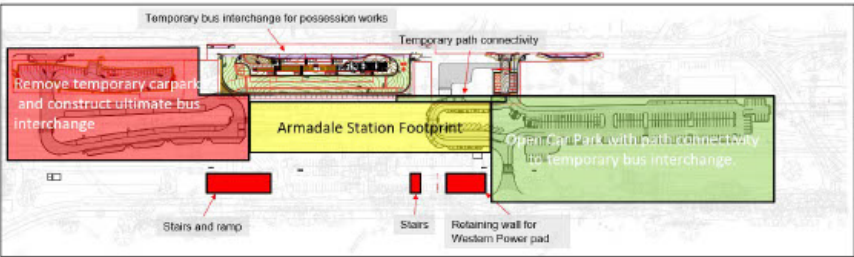
ARMADALE PRECINCT CONSTRUCTION STAGING – APPENDIX C



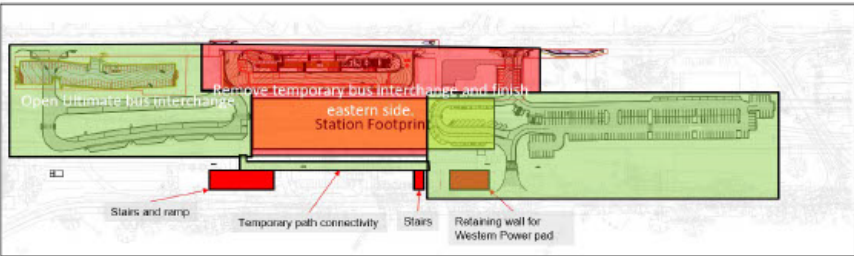
The following staging shows the intent of civils staging post major structure works. Areas highlighted are shown indicatively to show intent of the staging.



Construct new carpark and create temporary pedestrian connectivity to temporary bus interchange.



Commission new car park and temporary pathway to the temporary bus interchange. Temporary carpark to be removed and ultimate bus interchange constructed.



Commission ultimate bus interchange and switch pedestrian connectivity to carpark to the west side of station. Finish all eastern side works.

Open all areas.

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Appendix D: Traffic Management Plan

To be developed.