
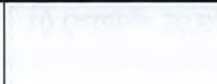
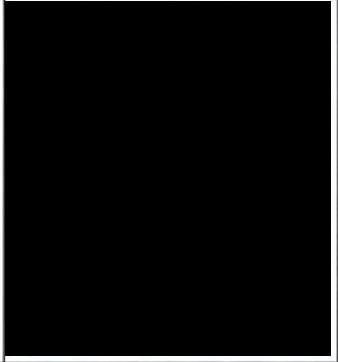
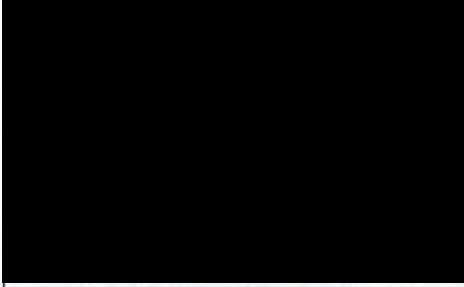
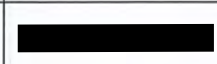
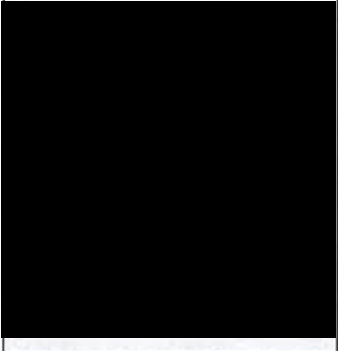
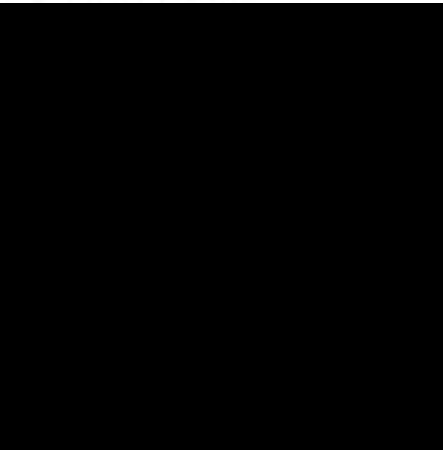

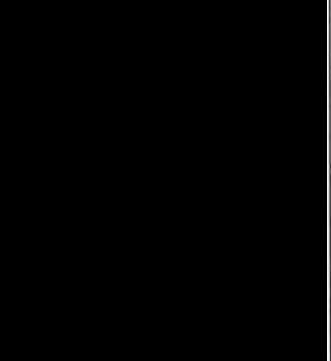



| Milestone | Description | Date for Milestone Achievement | Liquidated damages (clause 23.12(d)(i)) | Level of Completion Required | Comments |
|------------|--|--------------------------------|--|--------------------------------|----------------------------------|
| 2C - North | <p>Degree 2 Activities Completion shown on drawing MP-Milestones-Plan-10, MP-Milestones-Plan-11 comprising:</p> <p>[REDACTED]</p> <p><u>Excludes cable containment to the rooms where fed from cavern areas within the Milestone. To be provided with Milestone 2B North</u></p> | [REDACTED] | <p>For every day after the Date for Milestone Achievement for Milestone 2C - North which occurs in the period:</p> <p>[REDACTED]</p> | Degree 2 Activities Completion | |
| 2C - South | <p>Degree 2 Activities Completion shown on drawing MP-Milestones-Plan-24, MP-Milestones-Plan-25 and MP-Milestones-Plan-26 comprising:</p> <p>[REDACTED]</p> | [REDACTED] | [REDACTED] for every day after the Date for Milestone Achievement | Degree 2 Activities Completion | Excludes Telecom Equipment Room. |
| 2D | <p>Degree 2 Activities Completion shown on drawing MP-Milestones-Plan-09 comprising:</p> | [REDACTED] | For every day after the Date for Milestone Achievement for | Degree 2 Activities Completion | |

| Milestone | Description | Date for Milestone Achievement | Liquidated damages (clause 23.12(d)(i)) | Level of Completion Required | Comments |
|------------|---|--|---|--------------------------------|----------|
| |  |  | Milestone 2D which occurs in the period:  | | |
| 2E - North | Degree 2 Activities Completion shown on drawing MP-Milestones-Plan-01, MP-Milestones-Plan-02, MP-Milestones-Plan-03, MP-Milestones-Plan-04, MP-Milestones-Plan-05, MP-Milestones-Plan-06, MP-Milestones-Plan-07, MP-Milestones-Plan-08 comprising:  |  | For every day after the Date for Milestone Achievement for Milestone 2E - North which occurs in the period:  | Degree 2 Activities Completion | |

| Milestone | Description | Date for Milestone Achievement | Liquidated damages (clause 23.12(d)(i)) | Level of Completion Required | Comments |
|------------|---|--|--|--|----------|
| | | | | | |
| 2E - South | <p>Degree 2 Activities Completion shown on drawing MP-Milestones-Plan-13, MP-Milestones-Plan-14, MP-Milestones-Plan-15, MP-Milestones-Plan-16, MP-Milestones-Plan-17, MP-Milestones-Plan-18, MP-Milestones-Plan-19, MP-Milestones-Plan-20, MP-Milestones-Plan-21, MP-Milestones-Plan-22, MP-Milestones-Plan-23 and MP-Milestones-Plan-24 comprising:</p>  |  | <p>For every day after the Date for Milestone Achievement for Milestone 2E - South which occurs in the period:</p>  | Degree 2 Activities Completion | |
| 2F | Installation of all services required as part of the Station Works to enable the LW Contractor to achieve HV |  | For every day after the Date for Milestone Achievement for | Degree 3 Activities Completion as they relate to HV Power On | |

| Milestone | Description | Date for Milestone Achievement | Liquidated damages (clause 23.12(d)(i)) | Level of Completion Required | Comments |
|-----------|--|--------------------------------|---|--|----------|
| | Power On [REDACTED] | | Milestone 2F which occurs in the period: [REDACTED] | (as defined in Schedule A14) | |
| 2G | Energisation of LV power supply and distribution system for Station Works on permanent power supply. | [REDACTED] | For every day after the Date for Milestone Achievement for Milestone 2G which occurs in the period: [REDACTED] | Degree 3 Activities Completion as they relate to LV Power On | |

| Milestone | Description | Date for Milestone Achievement | Liquidated damages (clause 23.12(d)(i)) | Level of Completion Required | Comments |
|-----------|--|--------------------------------|--|------------------------------------|----------|
| 2H | Completion of all Site Acceptance Testing (SAT) using energised LV power supply & distribution system for the Project Works on a stable permanent power supply. | [REDACTED] | For every day after the Date for Milestone Achievement for Milestone 2H which occurs in the period: [REDACTED] | Degree 3 Activities Completion | |
| 2AA | [REDACTED] | [REDACTED] | For every day after the Date for Milestone Achievement for Milestone 2AA which occurs in the period: [REDACTED] | Stress relief of rock to RL -5.3m. | |

| Milestone | Description | Date for Milestone Achievement | Liquidated damages (clause 23.12(d)(i)) | Level of Completion Required | Comments |
|-----------|---|--------------------------------|---|--------------------------------|----------|
| | | | | | |
| 2J | Degree 2 Activities Completion for all Portion 2A and Portion 2B works. | | Nil | Degree 2 Activities Completion | |

APPENDIX 1 – DEGREES OF COMPLETION

Table 1 –Degrees of Completion (Civil and Building)

| Degree 1 Activities Completion | | Degree 2 Activities Completion | | Degree 3 Activities Completion | |
|--------------------------------|---|--------------------------------|--|--------------------------------|--|
| 1.1 | Structures or building complete, clean, dry and watertight. | 2.1 | All activities identified for Degree 1 Activities Completion complete. | 3.1 | All activities identified for Degree 2 Activities Completion complete. |
| 1.2 | Structure or building as-built survey complete. | 2.2 | Permanent door frames installed with temporary doors and locks. | 3.2 | Head-wall and tail-wall units and communications cupboard complete. |
| 1.3 | Blockwalls, partition walls, all plinths and upstands complete. | 2.3 | Metal staircases, cat-ladders and catwalks complete. | 3.3 | Internal and external finishes to all floors, walls and ceilings complete. |
| 1.4 | Plastering, undercoat and floor screeding complete. | 2.4 | Structural steelwork and associated interface brackets complete including provisions for lift shafts, platform screen doors and surveys accepted. | 3.4 | Ceiling grids complete and all service panels that accommodate Line-wide Contractor/Operator equipment installed. |
| 1.5 | Structural and blockwork mechanical and electrical openings formed and survey complete. | 2.5 | Louvres and grilles installed. | 3.5 | Glazing complete. |
| 1.6 | Movement and expansion joints complete. | 2.6 | Joinery/framing/counter for supporting Rail Contractor equipment available. | 3.6 | Ceiling, wall and floor final finishes at lift lobbies / balustrade, barrier and landings and adjacent to escalators complete. |
| 1.7 | All tunnels, cross passages and adits structurally complete, clean, dry and watertight including backfilling, joints and stitches complete. | 2.7 | Complete pedestal fixing brackets and installation of floor panels for raised floors. | 3.7 | Smoke curtain, roller shutters, fire shutters and smoke barriers complete. |
| 1.8 | Track and platform slab and overtrack air duct complete including survey. | 2.8 | Temporary air conditioning available and operational (as required by the Principal). | 3.8 | All works in power supply electrical rooms including installation of permanent doors complete. |
| 1.9 | Staircases, lift shafts, lift pits, escalator/moving walkway pits and escalator areas complete. | 2.9 | Building Services 1 st Fix complete, refer to Table 3 " <i>Degrees of Completion (Activities for Building Services Fix Stages)</i> " of Appendix 1 to this Schedule A2. | 3.9 | Platform insulation and platform floor finishes up to the platform screen doors threshold complete. |
| 1.10 | Underground earth mat, earth rods, lightning pits and earth pits complete and test results accepted. | | | 3.10 | Building Services 2 nd Fix complete, refer to Table 3 " <i>Degrees of Completion (Activities for Building Services Fix Stages)</i> " of Appendix 1 to this Schedule A2. |

| | | |
|--|--|--|
| <p>1.11 Underground pipework complete, cleaned, and tested including manholes ductwork, valve pits and drawpits.</p> <p>1.12 Sumps complete with temporary pumps operational.</p> <p>1.13 Drainage system including oil interceptors, terminal manholes and discharge connections complete with temporary pumps operational.</p> <p>1.14 Trackbed/base slab/trackside upstands and track turnout slabs complete.</p> <p>1.15 Louvres and acoustic panel frames to trackside areas complete, including station overrun structure.</p> <p>1.16 All works areas backfilled or formed to required formation level.</p> <p>1.17 Completion of the activities described in Table 2 of Appendix 1 of this Schedule A2 as being Provision Activities.</p> <p>1.18 Construction equipment and falsework/scaffolding removed from all track areas.</p> <p>1.19 Cross track ducts complete.</p> <p>1.20 Tunnel invert slab complete.</p> <p>1.21 Water tightness testing to all tanks complete.</p> <p>1.22 Waterproofing complete.</p> | | <p>3.11 Framework for wall panels and cladding complete.</p> <p>3.12 Air tight and acoustic doors for all air plenums installed.</p> <p>3.13 E&M installation complete and main cabling (HV/LV power and fibre optic) complete and tested.</p> <p>3.14 Doors and ironmongery complete.</p> |
|--|--|--|

Table 2 – Provision Activities for Civil and Building

| Provision Activities | |
|-----------------------------|---|
| 1.1 | Cast-in sockets, cable supports and pipe brackets complete. |
| 1.2 | Supports/Sub-frame for trackside advertising panels complete. |
| 1.3 | Temporary power and lighting complete. |
| 1.4 | Temporary ventilation including tunnel ventilation complete. |
| 1.5 | Plant access and material delivery routes clear with permanent frames for delivery or access hatches installed. |
| 1.6 | Lifting facilities (beams, lugs and eyes) complete and certified. |
| 1.7 | Niches, recesses and box outs complete. |
| 1.8 | Cable troughs and trenches complete. |
| 1.9 | Cable duct runs / risers complete. |
| 1.10 | Concealed trunking and conduit complete. |
| 1.11 | Sleeves for penetrations complete. |
| 1.12 | Works and storage areas available. |
| 1.13 | Flood protection provision(s) installed. |
| 1.14 | Survey reference lines and benchmark available. |
| 1.15 | Top plate and hanger beams at concourse complete. |
| 1.16 | Temporary safety barriers at landings and at all lift shafts and floor openings. |
| 1.17 | Lift shaft alignment, location of penetrations and openings surveyed and accepted. |

Table 3 – Degrees of Completion (Building Services Fix Stages)

| Part of the Station Works | Building Services 1 st Fix (Degree 2 Activities Completion) | Building Services 2 nd Fix (Degree 3 Activities Completion) |
|-------------------------------|--|---|
| Environment Control System | <p>The installation of all environmental control system equipment complete, including chillers, pumps, control panels for chillers, cooling tower, motor control centres, fans, split units, air handling units, primary air units and fan coil units.</p> <p>The installation of all duct work and pipe work systems complete, including valves, silencers, dampers, access panels, supports, anchors and guides.</p> <p>All sectional testing complete, where necessary due to concealment or other construction restraints.</p> | <p>Insulation of all ductwork and pipework systems complete.</p> <p>Leakage tests for all ductwork and pipework complete.</p> <p>Power and control cabling/wiring with termination complete.</p> |
| Electrical Services System | <p>The installation of isolating transformers, switchboards, main earthing system, bonding and termination, and test results accepted.</p> <p>The installation of all "cable containment and support systems" (Critical), including ladder racks, cable trays, cable trunking and conduits, brackets, anchors and guides complete.</p> | <p>Installation of all isolators, fused spur units, sockets, lighting and exit signs, distribution boards and UPS/batteries.</p> <p>The installation and testing of all circuitry including cabling/wiring and termination at isolators, fused spur units, sockets, lighting and exit signs, isolating transformers, switchboards, distribution boards, UPS/batteries, power and control points, advertising panels, directional signs and others completed.</p> <p>All electrical testing and commissioning works for the power supply electrical rooms completed ready for operation.</p> |
| Plumbing and Drainage Systems | <p>The installation of all pumps for flushing water system, sump pumps, potable water system and drainage system.</p> <p>The installation of all pipe runs, whether horizontal or vertical, with associated valves, supports, anchors and guides complete.</p> | <p>Installation of the controls for the flushing water system, sump pumps, potable water and drainage system.</p> <p>The power and control cabling/wiring with termination completed.</p> <p>The hydraulic testing of all piping systems for the pumps and associated pipework completed.</p> |

| | | |
|--|--|--|
| | All sectional testing complete, where necessary due to concealment or other construction restraints. | |
| Fire Services System and Automatic Fire Alarm System | <p>The installation of all pump-motor sets for sprinkler system, FM200 water spray system and FH/HR system complete.</p> <p>The installation of all pipe runs, whether horizontal or vertical, with associated valves, supports, anchors and guides complete.</p> <p>The cable containment and support systems for AFA and fire services systems complete.</p> <p>All sectional testing complete, where necessary due to concealment or other construction restraints.</p> | <p>The installation of all control and monitoring for sprinkler system, FM200 system, fire hydrant/hose reel system and trackside firefighting systems at both the local fire control panels and integrated back up panels complete.</p> <p>The power and control cabling/wiring with terminations complete.</p> <p>The hydraulic testing of all pipework complete.</p> <p>The AFA system shall include all cabling/wiring with termination at automatic fire alarm (AFA) system panels and AFA loops completed.</p> <p>The installation of detector base plates and remote indicators.</p> |
| Station Based Control System | | <p>Installation of BCS controllers, PLC panels and other equipment for the station based control system.</p> <p>Cabling/wiring for the station based control system with termination at the BCS controllers, PLC Panels, fire services control panels, LV switchboards, motor control centres, integrated back-up panels, power and control system and other Station ECS and BS equipment complete.</p> |

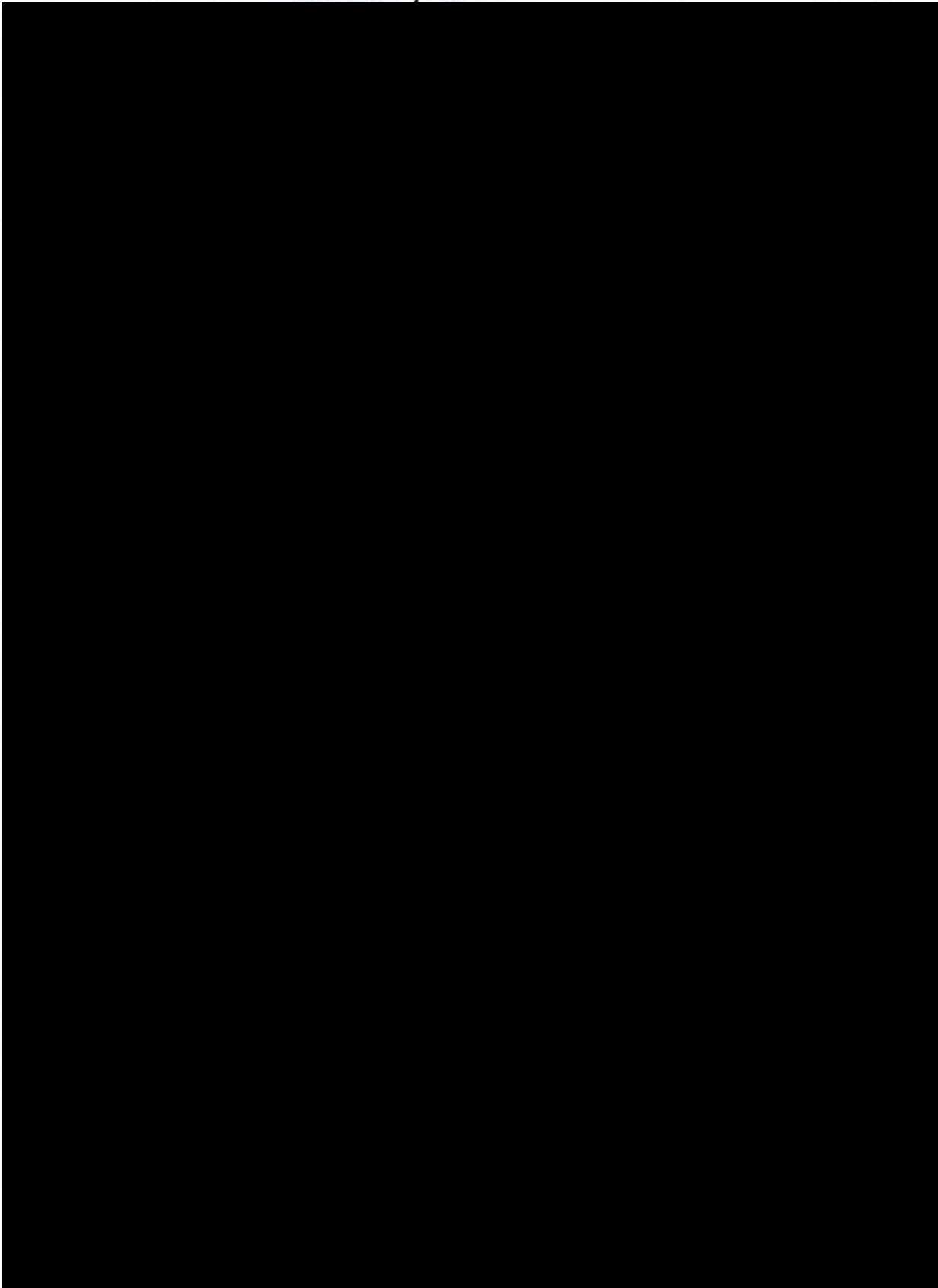
SCHEDULE 3

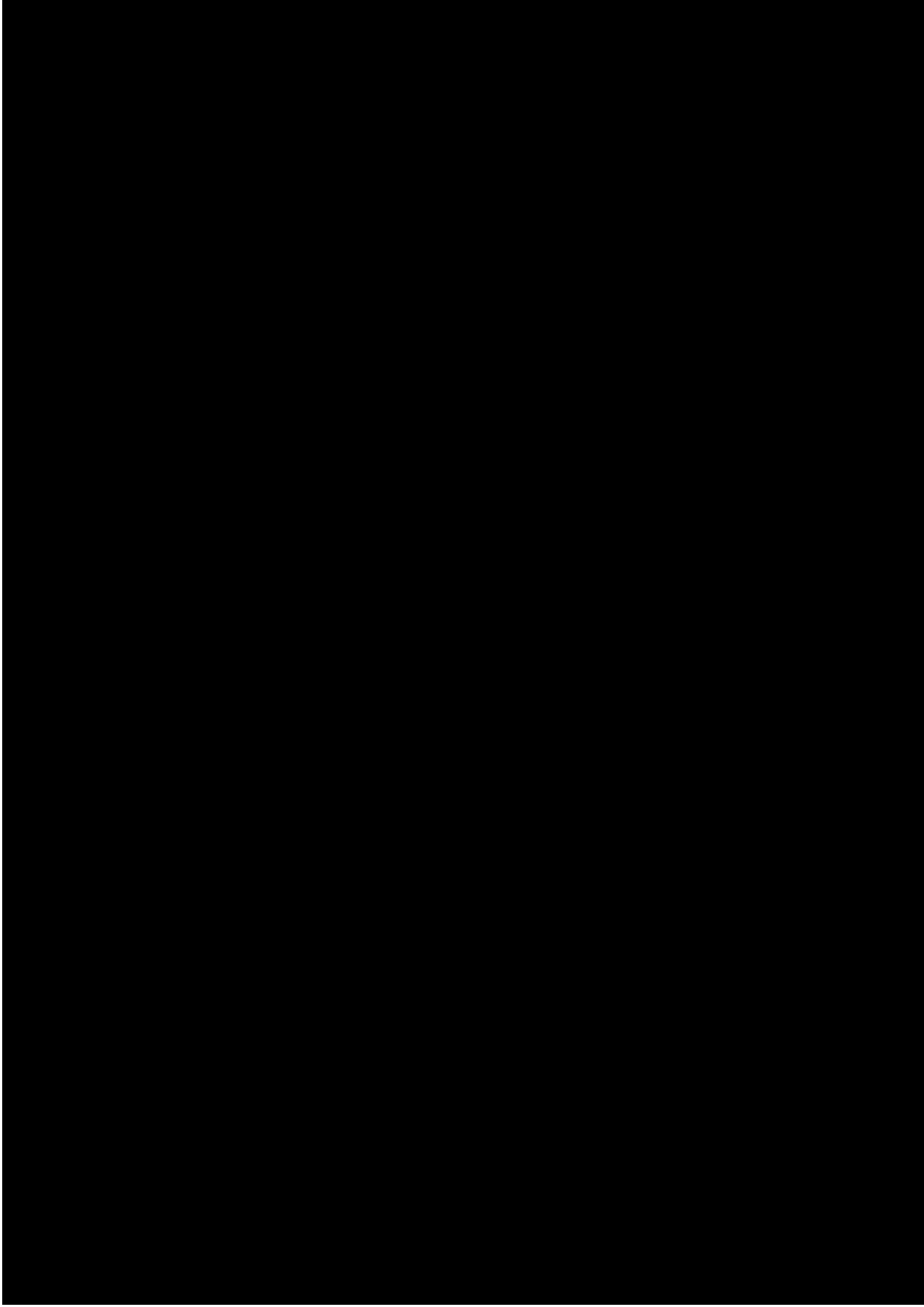
Amendments to Schedule B1 of the Base SDD

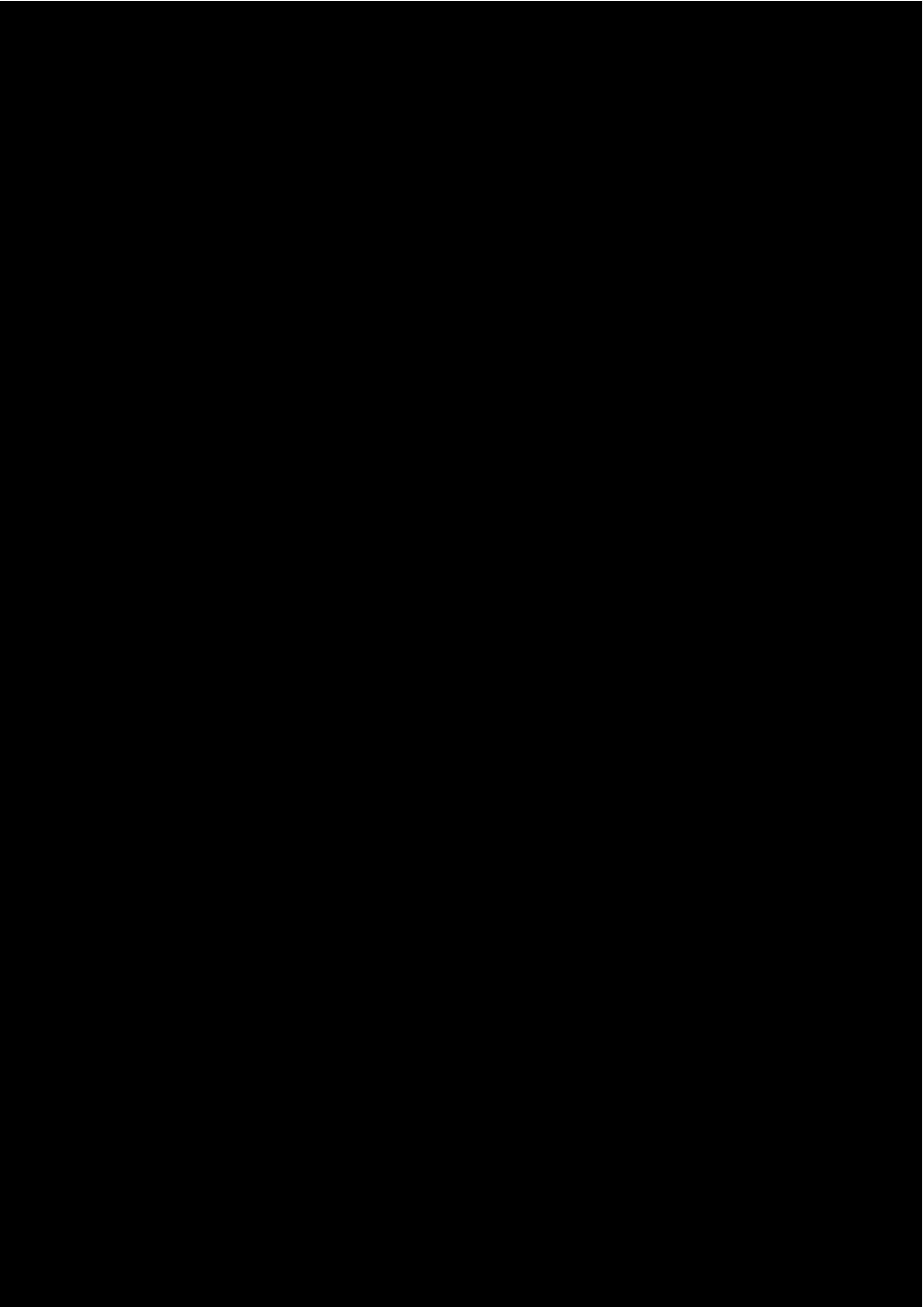
With effect from the Effective Date, Schedule B1 of the Base SDD is deleted and replaced with the version included in this Schedule 3, with the amendments to the version included in the Base SDD shown in mark-up.

SCHEDULE B1

Commercially Sensitive Information







SCHEDULE 4

Amendments to Schedule C1 of the Base SDD

With effect from the Effective Date:

- (a) the SWTC main body comprised in Schedule C1 of the Base SDD is amended and replaced with the version **included** in this Schedule 4, with the amendments to the versions included in the Base SDD shown in mark-up; and
- (b) a new SWTC Appendix 67 in the form included in this Schedule 4 is inserted into the Base SDD.



Sydney Metro City & Southwest

Station Delivery Deed

Martin Place Metro Station Project

Schedule C1

Scope of Works and Technical Criteria

| | | | |
|------------------|--|--------------------|---|
| PROJECT | Martin Place Metro Station | DATE | 11 November 2019 <u>December 2020</u> |
| GROUP | Sydney Metro City & Southwest | STATUS | FINAL |
| AUTHOR | Sydney Metro | REVISION | 6.9 <u>6.10</u> |
| COMPANY | Sydney Metro | FILE NUMBER | SM-17-00078195 <u>XX</u> |
| FILE NAME | <u>MPSDCST Deed of Variatoin - SDD - Schedule 4 – Amendments to Schedule C1 SWTC01 of the Base SDD</u> | | |

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1 Introduction

1.1 TfNSW's Customer service principles

- (a) Sydney Metro is to provide an integral part of the Customer focused integrated Sydney metropolitan public transport services.
- (b) Macquarie must incorporate the TfNSW's Customer service principles into all of its activities to the extent that they relate to the Project Works, the Temporary Works or Macquarie's Activities. These are:
 - (i) *Balanced*: Functional performance is balanced with Customer service to achieve high levels of Customer satisfaction;
 - (ii) *Efficient assisted self-service*: A self-service system that is designed for easy intuitive use. Where assistance may be required, support is available and easy to get;
 - (iii) *Universally accessible*: Meets the needs of all members of the community with service features that accommodate the distinct needs of key Customer segments;
 - (iv) *Flexible*: Able to adapt to a range of typical usage patterns and service whilst delivering a consistent level of service outcomes;
 - (v) *Legible and consistent*: Reflects a service style and tone that is easily understood and consistent with the experience of an integrated transport network; and
 - (vi) *Responsive*: A service system open to feedback from Customers, that adjusts over time as needs and preferences change, and continuously improves.
- (c) Macquarie must address the nine drivers of Customer satisfaction through its physical design and operational solution to the extent that they relate to the Project Works, the Temporary Works or Macquarie's Activities. These are:
 - (i) *Timeliness*: Convenience of access to the service, the service frequency and reliability, and total transit time (A to B time);
 - (ii) *Personal Safety / Security*: Level of perceived personal safety and security arising from physical design features, asset condition, service operation and other people present;
 - (iii) *Ticketing*: Ease and convenience of getting and using a ticket.
 - (iv) *Convenience*: Availability of parking and the ease and convenience of interchange and connection between this and other modes;
 - (v) *Accessibility*: Arrangement of physical facilities to make access to the mode easy, clear information and signage that makes navigating simple;
 - (vi) *Comfort*: A clean, pleasant environment, temperature-controlled well-lit, and with sufficient personal space, and other amenities where needed;

- (vii) *Cleanliness*: A clean, well-maintained environment, with particular attention to clean seats and toilets, and an absence of Graffiti and litter;
- (viii) *Information*: Clear, effective communication of service and timetable information (in real time) plus clear, easy to understand announcements; and
- (ix) *Customer Service*: Polite, knowledgeable, helpful service people who attend promptly and respond effectively to service requests, issues and feedback.

1.2 TfNSW's Customer satisfaction drivers

- (a) TfNSW requires that Customer satisfaction is a critical outcome of the Customer experience on Sydney metropolitan public transport services. The drivers of Customer satisfaction which have been identified by TfNSW and which must be addressed in the performance of Macquarie's Activities to the extent that they relate to the Project Works, the Temporary Works or Macquarie's Activities are:
 - (i) timeliness;
 - (ii) personal safety and security;
 - (iii) ticketing;
 - (iv) convenience;
 - (v) accessibility;
 - (vi) comfort;
 - (vii) cleanliness;
 - (viii) information; and
 - (ix) Customer service.

Timeliness

- (a) Macquarie must support the following timeliness outcomes as relevant:
 - (i) Customers will be offered a frequency of service that enables them to turn up and go;
 - (ii) journey time will be consistent, and transit to their destination will help them to make the most efficient use of their time;
 - (iii) Customers will have confidence of service availability through international best practice for reliability; and
 - (iv) overall travel times will be minimised, including the time taken to transfer between car parks, buses, taxis and bicycle facilities.

Personal safety & security

- (a) Macquarie must deliver and contribute to the following personal safety and security outcomes as relevant:
 - (i) Stations, Station Precincts and trains will incorporate environmental design principles and service features that give Customers a high degree of

confidence about personal safety and security in accordance with crime prevention through environmental design principles;

- (ii) effective lighting and active Station Precincts will enhance passive surveillance and facilitate a safe customer environment in accordance with Macquarie's lighting strategy; and
- (iii) Customers will feel safe on trains. Macquarie must ensure that there are clear and effective responses to manage any incidents and restore confidence.

Ticketing

- (a) Macquarie must deliver and contribute to the following ticketing outcomes as relevant:
 - (i) Customers will experience a consistent ticketing system and service across all transport modes through the implementation of the ETS; and
 - (ii) connections will be seamless across public transport modes, facilitating multi-modal journeys that are not dependant on the car.

Convenience

- (a) Macquarie must deliver and contribute to the following convenience outcomes as relevant:
 - (i) facilities provided across public transport modes, car parks and transport interchanges will be designed as part of the integrated Station Precincts;
 - (ii) amenities will be provided at all Stations with well-located facilities; and
 - (iii) secondary revenue opportunities are appropriate to the social expectations of the local community and reflect the NSW Government's public policy outcomes.

Accessibility

- (a) Macquarie must deliver and contribute to the following accessibility outcomes as relevant:
 - (i) Station Precinct design will ensure integration with pathways, cycle paths, kiss and ride areas and other transport facilities;
 - (ii) the system will provide the benchmark for compliance with requirements for disability access in public transport; and
 - (iii) Customers' special needs will be accommodated by the system design and operation, whether cognitive, physical or sensory; and when travelling with children or handling luggage.

Comfort

- (a) Macquarie must deliver and contribute to the following comfort outcomes as relevant:
 - (i) Trains will have features that provide general ambient comfort and provide seating for at least 30% of Customers in peak hours;
 - (ii) comfort features and facilities will be provided in Stations and Station Precincts including shelter, seating and service amenities; and

- (iii) the air temperature of underground Stations and air-conditioned trains will be comfortable for Customers in accordance with Appendix 30 and Appendix 20 respectively.

Cleanliness

- (a) Macquarie must deliver and contribute to the following cleanliness outcomes as relevant:
 - (i) all trains, Stations and Station Precincts materials, fixtures and fittings will be kept clean and maintain a high quality appearance; and
 - (ii) management measures will ensure effective cleaning and maintenance, contributing to the Customer's feeling of comfort and safety, as well as their satisfaction with the standard of cleanliness.

Information

- (a) Macquarie must deliver and contribute to the following information outcomes as relevant:
 - (i) wayfinding and signage will help Customers to navigate the system easily and intuitively, and will be consistent with other TfNSW modes and with TfNSW Wayfinding Strategy;
 - (ii) Customers will get accurate, reliable real-time information as they need it to help them use the system and be properly informed;
 - (iii) measures will be in place to keep Customers informed and help them work out how to get to their destination if service is disrupted; and
 - (iv) Information about the services the system provides will be fully integrated into Customer information channels.

Customer service

- (a) Macquarie must support the following Customer service outcomes as relevant:
 - (i) staff will be available to assist Customers with special needs, respond to questions about the transport system and ETS, and provide advice on connecting services and locality information;
 - (ii) Customers will be given accurate, prompt and responsive service, particularly when delays occur and during special events;
 - (iii) measures will be in place to ensure that all Customers understand the accepted norms for social behaviour on the system, and there will be processes to address any issues of non-conformance; and
 - (iv) staff will be empowered and trusted to deliver outstanding service, capture feedback and drive continuous improvement.

1.3 Purpose and requirements in this SWTC

- (a) The purpose of this Scope of Works and Technical Criteria (SWTC) document is to set out the scope, performance and technical requirements for the Project Works and Macquarie's Activities. This document forms part of the Martin Place Metro Station Project Station Delivery Deed (deed).

- (b) This SWTC is to be read as one document, with equal standing between the body of the document and any Appendix.
- (c) The requirements in this document are minimum requirements, including technical, operational and performance requirements, for the Project Works and Macquarie's Activities, which Macquarie must satisfy to fulfil its obligations under the deed.
- (d) If more than one requirement applies in respect of any part of the Project Works, the Temporary Works or Macquarie's Activities then all requirements must be satisfied. If there are requirements which are mutually exclusive, then the requirement which delivers the highest standard, will apply.
- (e) Reference to any work includes any additional activities necessary for the satisfactory completion and performance of that work and full compliance with the requirements of this SWTC.
- (f) Macquarie bears the risk that compliance with this SWTC will not fulfil Macquarie's obligations under the deed. In particular, Macquarie will be required to carry out any work, tasks and activities additional to that contemplated by this SWTC to ensure that Macquarie satisfies its obligations under the deed. No requirement in this SWTC limits any of Macquarie's obligations under any other part of the deed including the Environmental Documents.

1.4 Meanings and Interpretations

- (a) Unless otherwise defined in this SWTC, terms which have a defined meaning in the deed have the same meaning where used in this SWTC.
- (b) Where used in the SWTC, including Appendices, the term "construction" has the meaning as defined in the Planning Approval.
- (c) Appendix 01 contains additional definitions and acronyms used in the SWTC that are not set out elsewhere in the deed.
- (d) Unless the context otherwise requires, references to "Appendix" (or "appendix") and "Appendices" (or "appendices") in this SWTC is a reference to an Appendix and the Appendices attached to this SWTC, and a reference to this SWTC includes all Appendices to it.
- (e) Unless the context otherwise requires, references to "section" in this SWTC is a reference to the sections in this SWTC.
- (f) Unless stated otherwise, all survey coordinates specified in this SWTC are to the Map Grid Australia (MGA-GDA-94).

2 Project scope

2.1 Macquarie's Activities

2.1.1 General

- (a) Macquarie must undertake Macquarie's Activities in accordance with the requirements of the deed, including this SWTC, and the Environmental Documents.
- (b) Macquarie must implement a totally integrated approach to the management of Macquarie's Activities which continuously and effectively addresses all requirements. In particular, Macquarie must:
 - (i) not used;
 - (ii) deliver the Project in a manner that ensures the safety of the Customers and personnel at all times;
 - (iii) not used
 - (iv) not used;
 - (v) satisfy the technical and procedural requirements of the Principal with respect to the investigation, design, construction, manufacture, installation, integration, Testing, Commissioning and maintenance of the Project Works and the performance of Macquarie's Activities;
 - (vi) demonstrate an appropriate application of whole of life considerations in the design, construction and maintenance of the Project Works;
 - (vii) develop, implement and maintain workplace initiatives during the performance of Macquarie's Activities including industrial relations and training;
 - (viii) establish and maintain a positive relationship with the Principal, Customers, stakeholders and the community;
 - (ix) establish and maintain a positive relationship with interfacing transport operators;
 - (x) ensure that its planning and programming are comprehensive and provide for the concurrent delivery of the performance and environmental requirements of the deed;
 - (xi) ensure that risks are managed throughout the performance of Macquarie's Activities;
 - (xii) act at all times in a way which supports and enhances the Sydney Metro;
 - (xiii) proactively liaise with and comply with the requirements of all relevant Authorities;
 - (xiv) proactively coordinate and integrate Macquarie's Activities with the activities being carried out by Rail Contractors;

- (xv) diligently address safety, function, durability, maintainability, reliability and aesthetics in all aspects of Macquarie's Activities and the Project Works and the Temporary Works;
- (xvi) develop, implement and maintain an appropriate Integrated Management System and ensure that the Integrated Management System satisfies the requirements of the deed including those relating to rail safety, occupational health and safety, quality, environment, sustainability and community liaison;
- (xvii) undertake all requirements to obtain and retain Accreditation as necessary to design, build, test, integrate, commission and maintain the Project Works;
- (xviii) develop, implement and maintain the Project Plans in accordance with the deed, including clause 7 of the deed and this SWTC;
- (xix) preserve and protect existing infrastructure including structures, public transport facilities, cycleways, footpaths, shared paths, Services, roads, railways and buildings, except for existing infrastructure that is required to be demolished as part of Macquarie's Activities;
- (xx) ensure the Project Works accommodate maintenance requirements while maintaining Customer convenience;
- (xxi) integrate Martin Place Metro Station operationally and physically with Sydney Metro and the greater Sydney metropolitan public transport, facilities and services;
- (xxii) incorporate urban, architectural and landscape design excellence in all relevant aspects of the Project Works;
- (xxiii) diligently minimise disruption and inconvenience to the public and to other affected parties;
- (xxiv) implement a proactive stakeholder and community involvement strategy which enables Macquarie to respond to and accommodate reasonable stakeholder and community expectations;
- (xxv) ensure a high standard of environmental, sustainability, community, safety and quality performance in the delivery of Macquarie's Activities by developing and implementing effective management plans and providing effective leadership to develop and maintain the culture and values that are consistent with this performance obligation; and
- (xxvi) comply with the NSW Code and the NSW Guidelines.

2.1.2 Macquarie's Activities

- (a) Without in any way limiting the Macquarie's obligations under the deed, Macquarie's Activities include all tasks and things necessary to:
 - (i) investigate, design, construct, manufacture, install, inspect, integrate, test and commission the Project Works, the TSE Works as relevant and the Temporary Works;

- (ii) maintain any parts of the TSE Works located within each part or parts of the Construction Site;
- (iii) comply with the Environmental Documents and all Approvals;
- (iv) prepare the Design Documentation;
- (v) prepare, update, submit and report on the SDD Program;
- (vi) cooperate, coordinate and communicate with the Principal, the TSE Contractor and Rail Contractors;
- (vii) secure, maintain, repair, reinstate and hand over, in the specified condition, Temporary Areas and any other areas occupied by or affected by the Temporary Works;
- (viii) investigate, relocate, upgrade, install, test, commission and protect Services as necessary as a consequence of performing Macquarie's Activities;
- (ix) adjust properties, public space and access as necessary as a consequence of performing Macquarie's Activities;
- (x) enable the Independent Certifier to perform its functions (including those identified in the Independent Certifier Deed) and to independently certify in accordance with the Independent Certifier Deed;
- (xi) provide and apply a quality assurance system for the Project Works, the Temporary Works and the Interface Management Services;
- (xii) minimise environmental impacts during performance of Macquarie's Activities;
- (xiii) maintain and repair the Project Works, including the Works, Local Area Works, Property Works and Service Works as required by the deed and maintain and repair the Temporary Works;
- (xiv) repair all Defects in the Project Works as required by the deed;
- (xv) develop and implement all necessary traffic and transport management methods and procedures to effectively and safely manage all road, public transport and public space users affected by the Project Works, the Temporary Works and Macquarie's Activities during construction;
- (xvi) re-open roads affected by the Local Area Works to traffic in accordance with the deed;
- (xvii) facilitate the installation of the ETS by the Principal;
- (xviii) hand over the Project Works and Temporary Areas to the Principal or other relevant owners or Authorities in accordance with the deed;
- (xix) prepare all documentation required and undertake all activities necessary for the integration, Testing and Commissioning of the Project Works to achieve Completion of each Portion including the coordination of Project Works and TSE Works;

- (xx) prepare all documentation required for the operation and maintenance of the Project Works as part of the Sydney Metro;
 - (xxi) any other activities which are necessary to achieve Milestone Achievement of each Milestone, Construction Completion of each Portion and Completion of each Portion;
 - (xxii) demolish existing infrastructure and improvements that are required to be demolished under the deed;
 - (xxiii) remove and dispose of existing infrastructure made redundant by Macquarie's Activities;
 - (xxiv) enable the Environmental Representative to perform the functions identified in the deed;
 - (xxv) develop and implement sustainability strategies and initiatives for Macquarie's Activities, the Project Works and the Temporary Works;
 - (xxvi) develop, implement and maintain the Project Plans in accordance with the deed;
 - (xxvii) prepare and provide all Asset Management Information required by the deed;
 - (xxviii) prepare and provide all reports and documentation required by the deed; and
 - (xxix) undertake the Interface Management Services.
- (b) Macquarie must develop and implement systems integration in accordance with the Technical Management Plan identified in Appendix 54 and the interface management requirements identified in section 5.19 to support the Principal Customer Service Principles.

2.1.3 Not used

2.2 Works to be provided by Macquarie

2.2.1 Project Works

- (a) The Project Works must comply with the scope and requirements documented in this SWTC including those documented in Appendices.
- (b) The Project Works includes:
- (i) the Station Works (refer to section 2.2.2);
 - (ii) the Retail Works (refer to section 2.2.3);
 - (iii) the OSD Entrance Works (refer to section 2.2.4);
 - (iv) the Over Station Rail Works (refer to section 2.2.5);
 - (v) the Third Party Works, which includes:
 - A. Local Area Works (refer to section 2.2.6);
 - B. Property Works (refer to section 2.2.7);

- C. Service Works (refer to section 2.2.8); and
 - (vi) the Concourse Link Works (refer to section 2.2.9).
- (c) The extent of the Retail Works, OSD Entrance Works, Over Station Rail Works and Concourse Link Works must align with the principles identified in Appendix 4.

2.2.2 Station Works

- (a) The Station Works include:
- (i) demolition works to 9-19 Elizabeth Street;
 - (ii) excavation other than TSE Works;
 - (iii) station boxes, concourse boxes and all structural works, including structural works to support the Over Station Development;
 - (iv) two metro platforms;
 - (v) provisions for; rail infrastructure, tunnel infrastructure, communications systems, control systems and other Martin Place Metro Station elements (with the infrastructure, systems and other elements to be completed by Rail Contractors as set out in the Interface Requirements Specifications), including:
 - A. permanent way;
 - B. overhead wiring (OHW);
 - C. signalling and train control systems;
 - D. Traction Power Supply system;
 - E. combined services routes;
 - F. track and tunnel services;
 - G. Platform Screen Doors (PSDs);
 - H. Central Control System (CCS);
 - I. Passenger Information Display Systems (PIDS);
 - J. public address (PA) systems;
 - K. audio frequency induction loop system;
 - L. sound system and intercom system for emergency purposes;
 - M. closed circuit television (CCTV) systems;
 - N. Help Point systems;
 - O. electronic access control systems;
 - P. local area networks;
 - Q. a radio system;
 - R. a precise clocks system;

- S. a communications system;
 - T. a high voltage (HV) power supply and distribution system;
 - U. a tunnel ventilation system;
 - V. advertising; and
 - W. ETS;
- (vi) public art;
 - (vii) civil and structural works for the tunnel ventilation systems, including:
 - A. overtrack exhaust duct and under platform exhaust duct;
 - B. station platform exhaust duct;
 - C. ventilation plenums; and
 - D. draught relief shafts;
 - (viii) an environmental control system to provide conditioned air to the Martin Place Metro Station, excluding the rail corridor beyond the Platform Screen Doors;
 - (ix) adjustments to the Martin Place ESR Station platform at the connection with the Martin Place Metro Station and concourse at the unpaid connection with the Martin Place Metro Station where impact by the Project Works including new and adjustments to existing:
 - A. fixtures, fittings and equipment;
 - B. floor, wall and ceiling finishes; and
 - C. signage and wayfinding;
 - (x) Vertical Transportation;
 - (xi) public and staff toilets;
 - (xii) bicycle parking facilities;
 - (xiii) fire egress stairs;
 - (xiv) fire services systems, including:
 - A. a fire and smoke detection and alarm system;
 - B. a fire sprinkler system;
 - C. a fire hydrant system;
 - D. a fire hose reel system;
 - E. a gaseous suppression systems;
 - F. portable fire extinguishers; and
 - G. fire blankets;
 - (xv) hydraulic services, including:

- A. a drainage system, including sewer drainage system; and
 - B. water services systems, including potable domestic cold and heated water and rainwater service;
- (xvi) signage, wayfinding and tactile indicators;
 - (xvii) wall, floor and ceiling finishes;
 - (xviii) rooms and spaces, including fitout, excluding rooms as defined within the room data sheets;
 - (xix) lighting system;
 - (xx) LV power supply and LV Distribution System, including a centralised UPS;
 - (xxi) earthing, bonding and electrolysis protection systems necessary for the protection of all Project Works including stray current collection mats;
 - (xxii) Building Management Control System;
 - (xxiii) provisions for commercial vending machines;
 - (xxiv) provisions to safeguard future works, specifically the pedestrian connections to the MLC Centre and beneath the existing Hunter Street as per Appendix 11;
 - (xxv) provision and installation of adit backfill to accommodate the revised adit profile constructed by the TSE Contractor; and
 - (xxvi) provision and installation of an over track exhaust system within the platform caverns as further described within the Over Track Exhaust System Reverse Brief (Document Number: CSWSMP-MAC-SMP-EN-BRF-999901).

2.2.3 Retail Works

- (a) The Retail Works includes:
 - (i) all structural works; and
 - (ii) fitout and provision for future fitout of retail rooms and spaces to a 'base building' level of finish as described in Appendix 16. The Retail Works will be completed as part of the OSD Developers Activities.

2.2.4 OSD Entrance Works

- (a) The OSD Entrance Works include:
 - (i) structural works; and
 - (ii) spatial provisions only for the following infrastructure which will be completed as part of the OSD Developer's Activities including:
 - A. fire services systems;
 - B. hydraulic services;
 - C. Vertical Transportation including lift and escalator pits;

- D. wall, floor and ceiling finishes;
- E. retail fitout works;
- F. 'end of trip facilities' including: toilets, showers, hand basins, lockers;
- G. rooms and spaces suitable for staff, equipment and plant accommodation; and
- H. LV power supply and LV distribution system.

2.2.5 Over Station Rail Works

- (a) The Over Station Rail Works include:
- (i) provisions for; rail infrastructure, tunnel infrastructure, communications systems, control systems and other Martin Place Metro Station elements (with the infrastructure, systems and other elements to be completed by Rail Contractors as set out in the Interface Requirements Specifications), including:
 - A. combined services routes;
 - B. communications cabling;
 - C. a tunnel ventilation system; and
 - D. a trackside exhaust system;
 - (ii) civil and structural works for the tunnel ventilation systems, including:
 - A. ventilation plenums;
 - B. draught relief shafts; and
 - C. louvers;
 - (iii) rooms and spaces, including fitout, suitable for staff, equipment and plant accommodation;
 - (iv) hydraulic services including:
 - A. a drainage system, including sewer drainage system; and
 - B. water services systems, including potable domestic cold and heated water and rainwater service;
 - (v) LV power supply and LV Distribution System;
 - (vi) fire services systems, including as relevant:
 - A. a fire and smoke detection and alarm system;
 - B. a fire sprinkler system;
 - C. a fire hydrant system;
 - D. a fire hose reel system;
 - E. a gaseous suppression systems;
 - F. portable fire extinguishers; and

- G. fire blankets.

2.2.6 Local Area Works

- (a) Local Area Works include:
 - (i) those works which are identified in Appendix 06;
 - (ii) all adjustments to any existing Local Area, footpath, shared path, cycleway, park or other publicly accessible area or street which are:
 - A. necessary as a consequence of the Works, the Temporary Works, the Property Works, the Service Works or Macquarie's Activities; or
 - B. required by the Environmental Documents;
including, as a minimum, resurfacing or reconstruction of affected streets and roads;
 - (iii) all fencing, drainage including subsurface drainage, erosion and sediment control works, earthworks, all structures (including retaining walls and bridges), pavements and planting within Local Areas;
 - (iv) all provisions to allow pedestrians, pedal cyclists and disabled persons to use the surrounding transport networks, including footpath, shared path, cycleway, bus and road networks, affected by the Project Works and the Sydney Metro City & Southwest;
 - (v) all permanent arrangements within Local Areas to allow people and vehicles access to property affected by the Sydney Metro City & Southwest;
 - (vi) adjustments to pavement markings, and street lighting;
 - (vii) items of street furniture to improve safety (particularly safety barriers) and all fencing and other security measures necessary to prevent unlawful or accidental access;
 - (viii) not used;
 - (ix) adjustments to footpaths, shared paths and cycleways; and
 - (x) all environmental safeguards necessary to mitigate environmental impacts which might arise as a consequence of the use of the Local Areas, including those identified in the Environmental Documents.

2.2.7 Property Works

- (a) Property Works include:
 - (i) all adjustments to existing infrastructure or property (including upgrade, refurbishment and repair), which are necessary as a consequence of the Works, the Temporary Works, the Local Area Works, the Service Works and Macquarie's Activities;
 - (ii) all changes in access arrangements outside the Project Site and road reserves;
 - (iii) demolition and adjustment of built features;

- (iv) adjustments to existing buildings;
- (v) adjustments to property drainage; and
- (vi) all other property adjustment works necessary as a consequence of performing Macquarie's Activities including those identified in the Environmental Documents.

2.2.8 Service Works

- (a) The Service Works include:
 - (i) the protection, repair, adjustment or enhancement of infrastructure related to Services that do not form part of the Works, but are affected by the Works, the Temporary Works, the Local Area Works, the Property Works or Macquarie's Activities;
 - (ii) all environmental safeguards and measures necessary to mitigate environmental effects which may arise during the design and construction of the Service Works;
 - (iii) the preservation of Services that do not form part of the Works throughout the construction of the Project Works and the Temporary Works; and
 - (iv) the provision of all Services connections that do not form part of the Works, but are required to undertake the Project Works.

2.2.9 Concourse Link Works

- (a) The Concourse Link Works include:
 - (i) excavation of the first 24 meters of the pedestrian link tunnel;
 - (ii) civil and structural works for 24 meters of the pedestrian link tunnel;
 - (iii) fire services systems including as relevant:
 - A. a fire and smoke detection and alarm system;
 - B. a fire sprinkler system; and
 - C. a fire hydrant system.
 - (iv) signage, wayfinding and tactile indicators;
 - (v) floor finishes; and
 - (vi) lighting system, limited to the elements required for Fire & Life Safety.

2.3 Temporary Works

- (a) Macquarie must undertake any necessary Temporary Works.
- (b) Temporary Works include:
 - (i) temporary measures necessary to meet the needs of all road, public area and pathway users during Macquarie's Activities, including the requirements for any temporary footpaths, shared paths and public transport facilities if applicable;

- (ii) temporary arrangements to divert and control traffic and to provide public amenity, security and safety during Macquarie's Activities;
- (iii) temporary arrangements for people and vehicles to access all property affected by Macquarie's Activities;
- (iv) all environmental safeguards and measures necessary to mitigate environmental effects during construction of the Project Works;
- (v) sustainability initiatives to minimise resource use during construction of the Temporary Works;
- (vi) cleaning, maintenance, repair, replacement and reinstatement, as required, of all areas occupied by Macquarie during construction of the Project Works;
- (vii) the maintenance of Local Areas during construction of the Project Works;
- (viii) temporary site facilities required for construction of the Project Works; and
- (ix) temporary infrastructure installed or erected to undertake construction of the Project Works.

3 General requirements

3.1 General

- (a) All investigation, design, approvals, construction, manufacture, installation, Testing, Commissioning, management and maintenance must be entirely integrated and compatible and together they must mutually satisfy all the requirements of the deed including this SWTC.
- (b) The Project Works and the Temporary Works must be designed and constructed to the standards identified in the deed and to deliver the performance requirements of the deed, including this SWTC.
- (c) The required safety performance of the Project Works and the Temporary Works must be taken into account during all stages of Macquarie's Activities, including:
 - (i) safety in design (with input from the end users);
 - (ii) safety during construction and installation;
 - (iii) safety during testing and commissioning;
 - (iv) safety in operation;
 - (v) safety during cleaning and maintenance;
 - (vi) safety for renewal, refurbishment and disposal;
 - (vii) safety during augmentation; and
 - (viii) safety during decommissioning.
- (d) Macquarie must explicitly consider and, to the extent practicable, minimise any adverse impacts on, the continuing operability and maintainability of the Sydney metropolitan train network in all aspects of the Project Works, the Temporary Works and Macquarie's Activities.

3.2 Standards and General Specifications

3.2.1 The Principal's General Specifications

- (a) Macquarie's Activities must, as a minimum, comply with the Principal's General Specifications provided in Appendix 58.
- (b) Any references in the Principal's General Specifications to "TfNSW" must be read as a reference to the Principal.
- (c) Any references in the Principal's General Specifications to "TfNSW's Representative" must be read as a reference to "the Principal's Representative".
- (d) Any references in the Principal's General Specifications to the "Contractor" or the "Company" must be read as a reference to Macquarie.
- (e) Any references in the Principal's General Specifications to the "Project Verifier" must be read as a reference to the Independent Certifier.

- (f) Any references in the Principal's General Specifications to "Drawings" (or "drawings") must be read as a reference to Design Documentation prepared by Macquarie that has been certified by the Independent Certifier and otherwise prepared and submitted in accordance with clause 20 of the deed.
- (g) Any reference in the Principal's General Specifications to the "Works" must be read as a reference to the Project Works, the Temporary Works or Macquarie's Activities as the context requires.
- (h) Any reference in the Principal's General Specifications to submissions to the Principal, the Principal's Representative or otherwise, must be read to also be a submission to the Independent Certifier.

3.2.2 Codes, standards, specifications and guidelines

- (a) The Project Works, the Temporary Works and Macquarie's Activities must, as a minimum, comply with the Codes and Standards.
- (b) Macquarie must comply with the versions of Codes and Standards in accordance with clause 40 of the deed.
- (c) Unless otherwise expressly stated in the deed, including this SWTC, in the event of:
 - (i) any inconsistency, ambiguity or discrepancy between specific provisions in the deed (except Appendix 57 Codes and Standards) and any Codes and Standards; or
 - (ii) any inconsistency, ambiguity or discrepancy between any Codes and Standards,the following order of precedence will apply:
 - (iii) any specific provisions in the deed (except Appendix 57 Codes and Standards) and any documents referenced therein;
 - (iv) the Codes and Standards identified in Appendix 57 section 2;
 - (v) other relevant Standards Australia codes, standards, specifications and guidelines that are not identified in Appendix 57 section 2;
 - (vi) international standards (ISO, IEC, IEEE, CENELEC, ITU, etc.) that are not identified in Appendix 57 section 2;
 - (vii) European norms (EN, TSI) that are not identified in Appendix 57 section 2; and
 - (viii) other relevant international standards that must reflect world's best practice and be reviewed and approved by the Principal's Representative and the Independent Certifier prior to use.
- (d) Wherever two or more Codes and Standards apply to the same issue, or conflicts arise between Codes and Standards, the more stringent must apply to the extent section 3.2.2(c) does not apply to or resolve the conflict.

3.3 Not used

3.4 TSE Works

- (a) The Project Works must be fully compatible with the TSE Works and the TSE Works tolerances in Appendix 35.
- (b) Macquarie's Works include any modifications necessary to the TSE Works to accommodate the Project Works, Macquarie's Activities or to otherwise comply with the deed including this SWTC subject to A16, A20 and A21.

3.5 Effects of Macquarie's Activities

- (a) Macquarie's Activities must have no adverse impacts on any existing ground conditions or on the performance of any infrastructure (including roads, railways, Services, pedestrian access and buildings) including any impact, other than the impacts that are acknowledged in the Environmental Documents, relating to:
 - (i) amenity;
 - (ii) aesthetics;
 - (iii) durability;
 - (iv) function;
 - (v) user benefits;
 - (vi) safety during construction and operation; and
 - (vii) sustainability and environmental performance.
- (b) Macquarie must undertake detailed and rigorous engineering analyses (including numerical modelling) to predict the effects (**Predicted Effects**) of Macquarie's Project Works on existing ground conditions and infrastructure (including roads, railways, Services, pedestrian access and buildings).
- (c) In determining the Predicted Effects, the detailed rigorous engineering analyses must, as a minimum, consider the effects of vertical and horizontal displacements, rotations, strain, shear, structural loads, vibration, noise, seepage and groundwater movement as well as potential variations or changes to the existing ground and infrastructure conditions.
- (d) The Predicted Effects must include the limits of accuracy of the prediction and the expected statistical spread of measured results.
- (e) Macquarie must also determine the extent to which the existing ground conditions and infrastructure may be acceptably affected (**Acceptable Effects**) by the Project Works, consistent with satisfying the requirements in section 3.5(a) above and the Environmental Documents.
- (f) Throughout Macquarie's Project Works, Macquarie must monitor the actual effects of Macquarie's Activities and compare the actual effects to both the Predicted Effects and the Acceptable Effects.

- (g) Monitoring of the actual effects of Macquarie's Activities on existing ground and infrastructure must be undertaken by qualified and experienced geologists, geotechnical engineers, structural engineers, noise and vibration specialists and environmental specialists.
- (h) In the event that the actual effects of Macquarie's Activities exceed the Predicted Effects, Macquarie must review and, if necessary, re-evaluate the Predicted Effects and make any adjustment subsequently necessary to any aspects of the manner in which Macquarie's Activities is undertaken to ensure that the Acceptable Effects are not exceeded and to ensure full compliance with section 3.5(a) above and the Environmental Documents.
- (i) Not used.
- (j) Notwithstanding the Predicted Effects contemplated in section 3.5(b), Macquarie must repair and reinstate infrastructure at the earliest opportunity so that Macquarie satisfies the requirements of section 3.5(a) above in respect of each item of infrastructure and the ground conditions.
- (k) Macquarie must promptly and progressively provide the Principal's Representative and the Independent Certifier with:
 - (i) analysis and determinations, including any revisions, and re-evaluations of the Predicted Effects and the Acceptable Effects;
 - (ii) results of monitoring the actual effects of Macquarie's Activities, in a form which is directly comparable to the Acceptable Effects and Predicted Effects;
 - (iii) details of any adjustments to the manner in which Macquarie's Activities are carried out which are necessary as a consequence of any re-evaluation of Predicted Effects; and
 - (iv) details of designs and materials for the repair and reinstatement of infrastructure required by section 3.5(j) above.
- (l) Macquarie must submit, prior to the Date of Completion of each Portion, a final updated report detailing the Predicted Effects, Acceptable Effects and actual effects of Macquarie's Activities on the existing ground conditions and infrastructure.

3.6 Safety

- (a) Safety requirements must be taken into account in all aspects of Macquarie's Activities with input from involved and affected parties.
- (b) Further to the safety in design requirements in TfNSW – Standard AEO Authorisation Requirements (T MU MD 00009 ST) and without limiting the requirements in the WHS Legislation, the Rail Safety National Law and the Rail Safety Regulations, Macquarie must consider and address all safety issues, hazards and risks and requirements relating to safety during design, investigation, construction, Commissioning, operation, maintenance and decommissioning of the Project Works, the Temporary Works and the Follow-on Works in the development and production of the Design Documentation, including:

- (i) all safety issues, hazards and risks arising out of or in connection with the Project Works, the Temporary Works and Macquarie's Activities;
- (ii) safety goals and objectives and generic hazards associated with the Project Works, the Temporary Works and Macquarie's Activities;
- (iii) safety issues, including generic issues, and hazards and risks associated with the Project Works, the Temporary Works and Macquarie's Activities;
- (iv) all applicable safety standards and codes of practice to be applied to the design input for each design lot, hazards and risks which cannot be eliminated, managed or mitigated by the design and the measures to be adopted in the construction, operation, maintenance and decommissioning phases to manage and mitigate these hazards and risks;
- (v) hazards and risks that require the development of specific procedures in the construction, operation, maintenance and decommissioning phases to eliminate the risks to safety, so far as is reasonably practicable and, where elimination of a risk to safety is not reasonably practicable, reduce those risks so far as is reasonably practicable;
- (vi) hazards and risks associated with working in a rail corridor;
- (vii) safety issues related to the on-going repair, maintenance, upgrading and decommissioning of the Project Works and Temporary Works;
- (viii) issues relating to working adjacent to or with live Services, including high voltages or pressures, overhead clearances, dangerous excavations, contaminated ground or groundwater and asbestos materials;
- (ix) hazards and risks identified as part of the risk management process and resultant changes and management measures in the Design Documentation and Macquarie's Activities;
- (x) safety implications of Macquarie's Activities including the:
 - A. competencies and condition of personnel;
 - B. positioning of site access and egress points;
 - C. location of site facilities and accommodation;
 - D. location of traffic / pedestrian routes;
 - E. safe work at height requirements; and
 - F. proximity to traffic and railway lines during the performance of Macquarie's Activities; and
- (xi) hazards and risks which arise from the materials proposed for the Project Works and the Temporary Works and which require precautions either because of the nature of the materials or the manner of their intended use. The materials must be specified in sufficient detail to allow the safe use of the materials, based on precautionary information provided by the suppliers of those materials. These hazards and risks include exposure to hazardous substances (including lime as a stabilising agent, preservatives

used on timber materials, lead based paint and asbestos) and issues relating to manual handling.

- (c) Macquarie must hold and document the outcomes of formal workshops to identify safety issues, hazards and risks and these must be held at the start of the development period for the Design Documentation and progressively at all stages and phases throughout the development period for the Design Documentation.
- (d) Hazards and risks identified in the WHS risk assessment workshop required by section 5.9(a)(x) must also be reviewed in the formal workshops described in section 3.6(c).
- (e) The formal workshops identified in section 3.6(d) must be attended by representatives of all the major design disciplines and Macquarie's senior representatives in relation to worker health and safety and safety assurance. The Principal's Representative must be invited to attend and allowed to participate in the formal workshops.

3.7 Environment and Sustainability

- (a) Sustainability must be addressed throughout the performance of Macquarie's Activities and must comply with the sustainability requirements set out in Appendix 50a.
- (b) Environmental and sustainability requirements must be taken into account in all aspects of Macquarie's Activities.
- (c) Macquarie must cooperate and liaise with the Green Building Council of Australia and the Principal's Representative as required in meeting the sustainability ratings requirements of the deed, including the SWTC.

3.8 Design

- (a) The design of the Martin Place Metro Station must provide innovation and flexibility to enable future upgrades, improvements to be implemented.
- (b) All visible elements of the Project Works and the Temporary Works must have an attractive appearance and the Project Works must be of no lesser standard than the architectural and urban design for the Project Works as described in the deed and consistent with the Design Stage 1.
- (c) Stations, Station Precincts and Public Domain areas must be designed to accommodate the future proofing requirements identified in Appendices 10 and 11.
- (d) The design and selection of equipment and systems for the Project Works must incorporate:
 - (i) not used;
 - (ii) a modular approach to enable effective exchange of components;
 - (iii) consistency of design, system and equipment types and manufacture across the Sydney Metro;
 - (iv) crime prevention through environmental design principles;
 - (v) sustainability;

- (vi) the process and principles described in 'Crime prevention and the Assessment of Development Applications - Guidelines under Section 79C of the Environmental Planning and Assessment Act 1979';
 - (vii) all equipment and components must be secured or mounted so as not to impede the rolling stock gauge swept path or dynamic envelopes;
 - (viii) demonstrable prior performance in an equivalent rapid transit environment; and
 - (ix) demonstrated application of the Customer Centred Design process to determine suitability to customer needs, as per the Customer Centred Design Plan required under Appendix 54.
- (e) The design and selection of equipment for the Sydney Metro City & Southwest must incorporate an assessment of Macquarie's Activities in accordance with the process and requirements of the NSW Police assessment tools 'Safer By Design Evaluation' and the 'Companion to the Safer By Design Evaluation'. The assessment must be carried out by a suitably qualified individual who has completed the safer by design training course provided by the NSW Police and an assessment statement must be prepared.
- (f) Macquarie must provide a design solution that is fully integrated across the various Sydney Metro systems, particularly as required by the Interface Requirements Schedules.
- (g) Not used.
- (h) Where not specified in the deed or within the Codes and Standards, Macquarie must ensure that all Project Works are able to perform their normal duties or cycles, within the continuous operating environmental ranges provided in Table 1 below.

Table 1 - Operating environment ranges

| Control/environment | Range/comment |
|-------------------------|---|
| Ambient air temperature | Excluding the Environment Control System: -10°C to 55°C dry bulb Environment Control System: as per Appendix 30 |
| Relative humidity | 10% to 95% non-condensing |
| Rainfall rate | up to 40mm/hour |
| Solar radiation | up to 1000W/m ² |
| Dust and particulates | ranges subject to local condition investigations by Macquarie |
| Vibration | Not in excess of an acceleration rate of 0.1 G continuously, or 0.25G intermittently in the frequency range of 5 to 25 Hz |
| Ambient lighting | 10 to 100,000 lux |

- (i) As applicable to the Project Works, where not specified in the deed or within Codes and Standards, Macquarie must comply with the following vibration criteria and assessment requirements:
- (i) assess individual vibration-sensitive equipment where vibration-free performance is essential to the operating outcome, including assessing

any construction impact and operational vibration impacts prior to Commissioning and at Completion;

- (ii) assess individual vibration-sensitive equipment using generic 'vibration criterion' (VC) curves specified in 'Institute of Environmental Sciences and Technology' (IEST) industry standard IEST-RP-CC012 – 'Considerations in Cleanroom Design'; and
- (iii) where required by Macquarie's vibration assessment, carry out field measurements to confirm conformance with the standards. All field measurements must be in accordance with international standard ISO 8569 'Mechanical vibration and shock – Measurement and evaluation of shock and vibration effects on sensitive equipment in buildings'.

3.9 Design Life

- (a) Assets must have the following minimum Design Life (subject to Maintenance):

Table 2 - Design Life

| | Element | Design Life |
|----------------|---|-------------|
| General | | |
| 1 | railway and railway related civil and structural elements including foundations retaining structures, culverts, tunnel portals, tunnel elements, building transfer systems and other structural load bearing elements | 120 years |
| | other civil and structural elements including foundations retaining structures, culverts, tunnel portals, tunnel elements, building transfer systems and other structural load bearing elements | 100 years |
| 2 | Station access shaft external lining, waterproofing and internal structural elements including pre cast and cast in place concrete and load bearing masonry and structural steel | 100 years |
| 3 | Station cavern internal structures including pre cast and cast in place concrete and load bearing masonry and structural steel | 100 years |
| 4 | rock bolts, rock anchors and sprayed concrete | 100 years |
| 5 | permanent and inaccessible elements of fire protection, mechanical and electrical control systems. | 50 years |
| 6 | drainage structures, tanks and inaccessible pipe systems | 50 years |
| 7 | earthing, bonding and electrolysis protection systems (inaccessible) | 100 years |
| 8 | earthing, bonding and electrolysis protection systems (accessible) | 30 years |
| 9 | non-load bearing masonry building elements | 50 years |
| 10 | fire systems – fixed parts including: suppression, hydrant and hose reel systems | 30 years |
| 11 | foundation structures and any permanent connections for all artwork, signage and way finding systems, flood and scour protection | 25 years |
| 12 | road sign support structures and other roadside furniture | 15years |
| 13 | fixed elements of water treatment plant and systems | 30 years |

| | Element | Design Life |
|---|--|-------------|
| 14 | noise barriers, noise attenuation devices and acoustic panels and support systems | 30 years |
| 15 | artwork, signage and way finding - primary support systems (excluding foundation systems or panel faces/fascia panels) | 15 years |
| 16 | pumps, tanks and valves, pump control systems and accessible pipe systems | 20 years |
| 17 | general lighting, electrical, ventilation, fire and other fire life safety services | 25 years |
| 18 | high voltage switchboards, transformers and high voltage electrical subsystems | 30 years |
| 19 | low voltage switchboards, lighting fixtures and electrical systems | 30 years |
| 20 | external building roof finishes, glazing and external cladding | 25 years |
| 21 | external pedestrian paving (including substrate and paving finish) | 25 years |
| 22 | building services – main switchboards, central systems and plant and reticulation | 30 years |
| 23 | lifts, escalators and Vertical Transportation | 30 years |
| 24 | cabling, conduits and cable support systems | 30 years |
| 25 | public telephone operator communication systems, public information systems and security systems | 20 years |
| 26 | external furniture and fittings, fences and security/fire gates or doors | 20 years |
| 27 | internal non-structural elements - fit out, fixtures and finishes | 20 years |
| 28 | fire systems – automatic detection and hoses | 20 years |
| 29 | flexible (asphalt) road pavements, car park surfaces, external paving, footpaths, shared paths and hard landscaping features | 20 years |
| 30 | artwork, signage and way finding - panel faces and fascia panels (internal and external) | 20 years |
| 31 | multi-user-screens, IT equipment and general whitegoods | 5 years |
| 32 | UPS batteries, HV/LV switch/control batteries and battery chargers | 5 years |
| Stations & Station Precincts | | |
| 33 | not used | |
| 34 | not used | |
| SMTF and SMTF (South) | | |
| 35 | not used | |
| 36 | not used | |
| 37 | not used | |
| 38 | not used | |
| 39 | not used | |
| 40 | not used | |
| Rolling Stock | | |

| | Element | Design Life |
|----------------------|--------------------------------------|---|
| 41 | not used | |
| 42 | not used | |
| 43 | not used | |
| Rail Corridor | | |
| 44 | not used | |
| Rail Systems | | |
| 45 | not used | |
| 46 | not used | |
| 47 | not used | |
| 48 | not used | |
| 49 | not used | |
| 50 | not used | |
| 51 | not used | |
| 52 | not used | |
| Other | | |
| 53 | all other Assets not described above | Typical industry values for similar assets of a high standard and quality |

3.10 Durability

- (a) Macquarie must ensure the durability of all Project Works and their components. Durability must be considered and addressed throughout the design and construction of all Assets and their components.
- (b) Macquarie must make its own assessment of the performance requirements of the deed, including this SWTC, in relation to the Project Works and its components in terms of:
- (i) the micro-environment, including local air and ground conditions, groundwater conditions, contamination and exposure conditions including temperature, humidity and CO₂ level;
 - (ii) operational conditions including drying and wetting, vibration, heat and Stray Current effects;
 - (iii) potential deteriorating mechanisms in the micro-environment including penetration of aggressive substances into structural elements through cracks, joints, by wick action or other areas of deterioration;
 - (iv) rate of deterioration;
 - (v) the likely material life;
 - (vi) risk and variability of the constructed product;

- (vii) the feasibility and cost of in-situ monitoring, maintenance and/or repair and replacement;
 - (viii) the necessity of providing additional protection including coatings; and
 - (ix) the significance of failure.
- (c) Macquarie must incorporate all controls necessary to ensure the durability of all Assets and their components and to ensure that the specified Design Life for each Asset is met. These controls must be identified in the Design Documentation and the Project Plans.
- (d) The durability portions of the Design Documentation and the Project Plans must demonstrate the specified Design Life for each Asset and their components and how the selected design, materials, construction and maintenance methods will achieve the durability requirements for each Asset and its components and the specified Design Life for each Asset.
- (e) Where the durability for an Asset has been defined by Macquarie as a high or extreme risk to Normal Operations, the Design Documentation must detail Macquarie's proposed approach to maintaining durability during the life of that Asset.

3.11 Maintainability

- (a) The Project Works must be designed and constructed so that the Sydney Metro can be maintained effectively, safely and with minimum whole of life cycle costs.
- (b) The design must provide for adequate maintenance access to allow for ease of maintenance.
- (c) All equipment must have sufficient clear space on all sides to allow maintenance and replacement to take place.

3.12 Fire engineering

- (a) Macquarie must develop the Martin Place Metro Station fire engineering design in accordance with the requirements of the Appendix 43.

3.13 Electromagnetic compatibility

- (a) Macquarie must ensure that the Project Works and any Temporary Works are designed in accordance with Appendix 38.

3.14 Flood and stormwater immunity

- (a) Macquarie must ensure that the Project Works are designed in accordance with Appendix 22.

3.15 Site investigation

- (a) Macquarie must undertake all site investigations required for the performance of Macquarie's Activities.

- (b) Geotechnical site investigation work must be undertaken in accordance with AS1726 'Geotechnical site investigations'.
- (c) Macquarie must maintain records of all tests, site investigation and geotechnical reports (including position and level of test and investigation locations).
- (d) Site investigations, in conjunction with the design process, must identify all ground conditions and infrastructure conditions (including the condition of rail infrastructure, roads, access driveways, bus stops and associated bus service infrastructure, parks and other publicly accessible areas, footpaths, shared paths and cycleways, Services, railways, buildings and other structures) which may be affected by the Project Works, the Temporary Works or Macquarie's Activities.
- (e) Where ground conditions or infrastructure are expected to be affected by the Project Works, the Temporary Works or Macquarie's Activities, Macquarie must diligently monitor the actual effects in accordance with the requirements of section 3.5 and section 3.16.
- (f) All site investigations must be included in the Design Documentation in the following electronic formats:
 - (i) .pdf; and
 - (ii) ASCII data file in Association of Geotechnical and Geoenvironmental Specialists (**AGS**) format.
- (g) Site investigation digital data files must comply with RMS Custom AGS Format Data Dictionary "AGS 3.1 RTA 1.1", Revision 6 April 2007.
- (h) In addition to the requirements in section 3.15(f) above, all insitu test results, including cone penetration, stress, packer permeability and pressure meter test results, groundwater monitoring and laboratory test results related to site investigations must be provided in electronic format (either .xls or .xlsx).
- (i) All contamination laboratory test results must be provided in environmental data management software (ESDAT) electronic lab data format.
- (j) Macquarie must provide the Principal's Representative and the Independent Certifier with two copies of all site investigation reports, including progressive copies of such documents as each is developed, promptly, and in any event within 5 Business Days of Macquarie receiving such reports.

3.16 Condition Surveys

- (a) Without limiting the requirements of the Environmental Documents, Macquarie must undertake pre-construction ground and infrastructure condition surveys to establish the condition of all existing ground and infrastructure which could be affected by Macquarie's Activities prior to commencing any activity which could affect existing ground conditions or infrastructure (roads, access driveways, bus stops and associated bus service infrastructure, parks and other publicly accessible areas, footpaths, shared paths and cycleways, Services, buildings and other structures).
- (b) The pre-construction ground and infrastructure condition surveys must, subject to section 3.16(d), be conducted with the agreement of the property or infrastructure

- owner and any occupier and be completed at least 30 days prior to Macquarie commencing the relevant activity. Macquarie must prepare a detailed record that, as a minimum, includes dated photographs of the pre-construction conditions of all ground and infrastructure which may be affected and summary description of the pre-construction condition of the ground and infrastructure.
- (c) Macquarie must provide the Principal's Representative and the Independent Certifier and the owner and/or occupier with a hard copy and an electronic copy in .pdf format of the pre-construction survey report promptly, and in any event within 5 Business Days, after Macquarie receives the report.
- (d) Macquarie must provide property or infrastructure owners or occupiers with a notice proposing at least two alternative dates for carrying out pre-construction ground and infrastructure surveys. If a property or infrastructure owner or occupier does not provide Macquarie with sufficient access to carry out a pre-construction ground and infrastructure survey within 21 days of the latest date which Macquarie included in the notice, Macquarie must give the Principal's Representative a copy of the notice and a signed statement by Macquarie to the effect that the property or infrastructure owner or occupier has not provided sufficient access to carry out the pre-construction ground and infrastructure survey.
- (e) Prior to Completion of the last Portion, Macquarie must undertake post-construction ground and infrastructure surveys to establish the condition of all ground and infrastructure (including the ground and infrastructure subject to pre-construction ground and infrastructure condition surveys) which may have been affected by Macquarie's Activities.
- (f) The post-construction ground and infrastructure surveys must be:
- (i) carried out within 14 days after the completion of all activities which may affect ground conditions and infrastructure; and
 - (ii) conducted with the agreement, subject to section 3.16(h), of the property or infrastructure owner and any occupier and must include a detailed record (including dated photographs) of the post-construction conditions of the ground conditions and infrastructure.
- (g) Macquarie must provide the Principal's Representative and the Independent Certifier and the owner and/or occupier with a hard copy and an electronic copy in .pdf format of the post-construction survey report promptly, and in any event within 5 Business Days, after Macquarie receives the report. Each report must contain a certificate from the surveyor who performed the survey, certifying that the survey has been completed and is an accurate assessment of the ground and infrastructure's condition.
- (g1) Each post-construction ground and infrastructure condition survey report must include a determination of the cause of any monitored change or damage identified since the pre-construction or previous construction survey and Macquarie's proposed remedial works or activities. If any damage is found to have been caused by Macquarie's Activities, Macquarie must:
- (i) provide the Principal's Representative and the Independent Certifier with a proposal setting-out the remedial action required; and

- (ii) obtain the relevant owner's acceptance, in a form agreed to by the Principal's Representative, of the compensation, repair or reinstatement work and release from future claims and actions.
- (h) Macquarie must provide property or infrastructure owners or occupiers with a notice proposing at least two alternative dates for the carrying out of post-construction ground and infrastructure surveys. If a property or infrastructure owner or occupier does not provide Macquarie with sufficient access to carry out a post-construction ground and infrastructure survey within 21 days of the latest date which Macquarie included in the notice, Macquarie must give the Principal's Representative a copy of the notice and a signed statement by Macquarie to the effect that the property or infrastructure owner or occupier has not provided sufficient access to carry out the post-construction ground and infrastructure survey.
- (i) As a condition precedent to Completion, Macquarie must issue to the Principal's Representative, the Independent Certifier and the property or infrastructure owner and/or occupier a hard copy and an electronic copy in .pdf format of the pre-construction and post-construction survey report except where the property owner or infrastructure or occupier does not provide sufficient access to complete the pre-construction ground and infrastructure survey or the post-construction ground and infrastructure survey in which case Macquarie must issue to the Principal's Representative and the Independent Certifier a hard copy and an electronic copy in .pdf format of the notice and statement referred to in section 3.16(d) and section 3.16(g) above.
- (j) The pre-construction and post-construction ground and infrastructure condition surveys detailed in this section 3.16 must be carried out by an independent and appropriately qualified and experienced assessor for the specific element of ground or infrastructure being surveyed.
- (k) Infrastructure condition surveys detailed in this section 3.16 must be undertaken in accordance with the requirements of either:
 - (i) sections 4 and 5 of the "Royal Institute of Chartered Surveyors (RICS) Guidance Note 63/2010 Building surveys and technical due diligence"; or
 - (ii) AS4349 "Inspection of Buildings – General Requirements",and with specific regard to the heritage elements.
- (l) The reports on condition surveys of buildings must as a minimum record the following features and include dated photographs:
 - (i) major features of the buildings and developments including location, type, construction, age and present condition, including any defects or damage;
 - (ii) type of foundations including columns, walls and retaining structures;
 - (iii) an assessment of the susceptibility of the building to further movement or stress;
 - (iv) an assessment of the effectiveness of water-proofing systems in basements to the anticipated movements caused by the Macquarie's Activities;

- (v) an assessment of the susceptibility of the building to changes in water levels resulting from the Macquarie's Activities; and
 - (vi) existing levels of aesthetic damage, recorded in accordance with the assessment requirements of "Building Damage Classification", by Burland et al, 1977 and Boscardin and Cording, 1989 or another similar or equivalent assessment method to the satisfaction of the Principal's Representative.
- (m) Macquarie must comply with all requirements allocated to Macquarie for condition surveys and ongoing monitoring set out in Third Party Agreements and Environmental Documents.

3.17 Survey

- (a) Macquarie must provide and verify survey control for Macquarie's Activities.
- (b) Macquarie must promptly provide the Principal's Representative and the Independent Certifier with two copies of all property and land surveys, including progressive copies of such documents as each is developed.
- (c) Survey undertaken by Macquarie must comply with the requirements in the Principal's General Specification G71.
- (d) Macquarie must avoid where possible disturbance of established survey marks and must re-establish any such marks disturbed or affected by Macquarie's Activities, in accordance with the requirements of relevant Authorities and the requirements in the Principal's General Specification G71.
- (e) All survey and design levels must refer to Australian Height Datum (AHD). All survey plan coordinates must refer to the MGA -94 Zone 56 coordinates, based on the Geocentric Datum of Australia (GDA).
- (f) Macquarie must, as a minimum, establish permanent survey marks within the Construction Site at Martin Place Metro Station.
- (g) The permanent survey marks must be placed in accordance with the requirements of the Surveying and Spatial Information Regulation 2012 (NSW) and the requirements in the Principal's General Specification G71.

3.18 SDD Program

- (a) Macquarie must develop, manage and report the SDD Program in accordance with the Sydney Metro Basis of Schedule & Management Procedure which has been modified specifically for the Project Works.

3.19 Rooms

- (a) Macquarie must design and construct rooms as specified in Appendix 25b.

4 Third Party Works requirements

4.1 Local Area Works

- (a) Macquarie must carry out all Local Area Works necessary as a consequence of the Works, the Property Works, the Service Works and Macquarie's Activities.
- (b) Macquarie must carry out all Local Area Works which are:
 - (i) necessary to satisfy the Principal's obligations arising from the Environmental Documents;
 - (ii) required to allow all road users and the affected public to safely use any Local Area affected by the Project Works or Macquarie's Activities;
 - (iii) necessary to prevent either unlawful or accidental access; or
 - (iv) required as a consequence of requirements arising from the stakeholder and community liaison process.
- (c) In addition to the standards and requirements specified in this SWTC, Local Area Works must be in accordance with the requirements of all relevant Authorities.
- (d) Evidence of Approvals from Authorities must be provided to the Independent Certifier in accordance with the deed.
- (e) Macquarie must carry out the Local Area Works in such a way as to minimise delay and disruption to all road users (including pedestrians, cyclists, public transport passengers and operators).
- (f) Macquarie must use appropriate traffic and transport management methods and procedures to effectively and safely manage all road users throughout Macquarie's Activities.
- (g) Macquarie must maintain access to and minimise disruption to affected businesses, properties and land throughout Macquarie's Activities.
- (h) Macquarie must communicate its planned processes, solutions and program to the tenants, occupiers and owners of properties that have the potential to be affected by the construction of Local Area Works.
- (i) Without limiting any other requirements of the deed, including this section 4.1, Macquarie must, as a minimum, undertake the Local Area Works identified in Appendix 06.

4.2 Property Works

- (a) Macquarie must carry out all Property Works necessary as a consequence of the Works, the Local Area Works, the Service Works and Macquarie's Activities including work which is necessary to satisfy the Principal's obligations arising from the Environmental Documents and required as a consequence of requirements arising from land acquisition and the stakeholder and community liaison process.

- (b) Macquarie must carry out all Property Works required to provide people and vehicles access to and egress from existing buildings, infrastructure and properties which are affected by Macquarie's Activities or the Project Works.
- (c) Macquarie must carry out all Property Works necessary to ensure the amenity or the functionality of any property (including any building or structure) which is affected by Macquarie's Activities or the Project Works is maintained to at least the standard prior to Macquarie's Activities.
- (d) Without limiting any other requirements of the deed, including this section 4.2, Macquarie must, as a minimum, undertake the Property Works identified in Appendix 52.
- (e) The Property Works must be designed and implemented to the standards specified in the deed, including this SWTC.
- (f) Access to properties affected by the Property Works must be provided by Macquarie to the Principal's Representative at all times while Macquarie has access to the relevant property.
- (g) Where Macquarie's Activities require work within or directly adjacent to properties, Macquarie must consult with the owner of the property and gain their consent, as far as is reasonably possible, to the planned methodology for protection of existing infrastructure.

4.3 Service Works

- (a) Macquarie must carry out all Service Works necessary as a consequence of the Works, the Local Area Works, the Property Works and Macquarie's Activities.
- (b) Macquarie must carry out all Service Works necessary to satisfy the Principal's obligations arising from the Environmental Documents.
- (c) Macquarie must carry out all Service Works which are:
 - (i) necessary to preserve and protect Services throughout the design and construction of the Project Works and Temporary Works; and
 - (ii) required for the provision of all Services and Services connections for undertaking Macquarie's Activities.
- (d) Macquarie must identify all the Services (including overland flow paths) potentially affected by Macquarie's Activities to determine requirements for adjustment, protection and support. This must be undertaken in consultation with the relevant Service owner or Authority.
- (e) Macquarie must identify all Services required for Macquarie's Activities and must do all things necessary to provide and maintain connections of such Services to the Project Works and the Temporary Works.
- (f) Macquarie must investigate, adjust, protect, support, relocate or provide for all Services that are affected by Macquarie's Activities or required for the Project Works, Temporary Works or Macquarie's Activities whether or not the existence or extent of the existing Services were known prior to the execution of the deed.

- (g) Macquarie must ensure that there are no unplanned disruptions to Services resulting from Macquarie's Activities and that planned disruptions are minimised. Macquarie must advise all affected parties including local residents, businesses and the Principal prior to any disruption of any Service.
- (h) Macquarie must arrange, and where necessary design, and coordinate the relocation of all Services and must ensure that the requirements of each Service owner and Authority are met. Macquarie must obtain the written approval and acceptance of all works to and around any Service from the relevant Service owner or Authority in accordance with the deed.
- (i) Macquarie must inform the Principal's Representative of the status of the Service owner or Authority arrangements and must provide sufficient notice to allow the Principal's Representative and the Independent Certifier to attend Service owner or Authority meetings as may be required from time to time.
- (j) Permanent location markers must be provided as required by the relevant owner or Authority. As constructed details of the locations of Services must be provided to the Principal's Representative and the Independent Certifier on completion of each section of the Project Works.
- (k) All Services exposed to view as a consequence of Macquarie's Activities must be protected and concealed in accordance with the requirements of the relevant Service owner or Authority.
- (l) With the approval of the relevant Authorities, Macquarie may abandon Services, in which case any works to make safe the Services must be to the satisfaction of the relevant Service owners and Authorities.

5 Management Requirements

5.1 Project management

- (a) Macquarie must implement and maintain processes, procedures, protocols, methodology and responsibilities which will ensure that Macquarie efficiently and effectively delivers its obligations under the deed.
- (b) Macquarie must, at all times, ensure that the personnel employed in the undertaking of Macquarie's Activities are appropriately capable, experienced, trained, committed and authorised to ensure that Macquarie efficiently and effectively delivers its obligations under the deed.

5.2 Integrated Management System

- (a) Macquarie must implement and maintain an effective Integrated Management System which address all Macquarie's obligations under the deed.
- (b) The Integrated Management System must seamlessly integrate all of Macquarie's systems and processes, including those related to rail safety, rail accreditation, quality, environmental, sustainability, health and safety.
- (c) The Integrated Management System must include all management processes, procedures, standards and protocols which are to be implemented by Macquarie for governance and control of Macquarie's Activities as well as to ensure and record compliance with the deed, including this SWTC and Law.
- (d) The Integrated Management System must accommodate, coordinate and give effect to the Project Plans.
- (e) The Integrated Management System must comply with all relevant Law, including law relating to railway design, construction, accreditation and operation.
- (f) Macquarie must comply with the Integrated Management System.

5.3 Project Plans

- (a) Macquarie must prepare and update Project Plans in accordance with the requirements of clause 7 of the deed and Appendix 54.
- (b) Macquarie acknowledges that the requirements in Appendix 54 do not necessarily meet all of the requirements of the deed.
- (c) Macquarie must ensure that the Project Plans it develops and uses comply with the deed.
- (d) Project Plans must incorporate the requirements and recommendations of the Independent Certifier and the Principal's Representative as required under clause 7.3 and clause 7.5 of the deed.
- (e) Each Project Plan must be a quality assurance document prepared in accordance with AS/NZS/ISO9001.

- (f) All Project Plans must recognise and adhere to the requirements of the Quality Plan.

5.4 Particular rail safety management requirements

- (a) Macquarie must:
- (i) eliminate risks to safety associated with Macquarie's Activities, so far as is reasonably practicable;
 - (ii) ensure that the Project Works and the Temporary Works are safe and fit for their intended use;
 - (iii) carry out verification and validation, including testing and examination, to demonstrate that the Project Works and the Temporary Works are safe and fit for their intended use;
 - (iv) ensure that the Design Documentation and inspection and test plans are fit for their intended use;
 - (v) ensure that verifiers have a suitable level of independence from the personnel involved in preparing Design Documentation and that any inspection and test plans verify and validate the Design Documentation and inspection and test plans for the various components of the Project Works and the Temporary Works;
 - (vi) provide the Principal's Representative with all relevant information in relation to the use of the Project Works and the Temporary Works, including:
 - A. the results of Testing and examination; and
 - B. any conditions for safe use of Project Works and the Temporary Works;
 - (vii) ensure that a Safety Assurance Plan is developed, implemented, maintained and updated as required throughout the performance of Macquarie's Activities;
 - (viii) ensure that a Security Management Plan is developed, implemented, maintained and updated as required throughout the performance of Macquarie's Activities;
 - (ix) ensure that an Incident Management Plan is developed, implemented, maintained and updated as required throughout the performance of Macquarie's Activities;
 - (x) ensure that the processes and procedures in the Incident Management Plan are tested at least annually and that the Principal's Representative is invited and permitted to attend and participate in the tests;
 - (xi) provide a copy of the Security Management Plan and the Incident Management Plan to all relevant Authorities, including Emergency Services, all relevant Macquarie's personnel and Subcontractors' personnel as well as any other person or organisation that may be required to assist in the implementation of the Security Management Plan

- or the Incident Management Plan or are affected by the Security Management Plan or the Incident Management Plan;
- (xii) assess, identify and acquire the competencies required to carry out Macquarie's Activities;
- (xiii) ensure that all rail safety workers have the competence to carry out the relevant rail safety work that they are undertaking as part of Macquarie's Activities by reference to:
 - A. any qualification or unit of competence applicable to Macquarie's Activities being carried out that is recognised under the Australian Qualifications Framework overseen by the Ministerial Council on Education, Employment, Training and Youth Affairs;
 - B. any prescribed provisions of the Rail Safety Regulations applicable to Macquarie's Activities; and
 - C. the knowledge and skills that are needed to enable the rail safety work to be carried out safely;
- (xiv) ensure that training is provided to enable Macquarie's Activities to be carried out safely;
- (xv) ensure that records of competence and training are maintained for all rail safety workers and that copies of such records are provided to the Principal's Representative upon request;
- (xvi) ensure that all rail safety workers hold and carry identification cards as required by section 118 of the Rail Safety National Law;
- (xvii) identify and assess the hazards and risks associated with Macquarie's Activities at or near a public road and must:
 - A. determine measures to manage those hazards and risks; and
 - B. comply with the requirements of any interface agreements with any relevant road Authority.
- (b) Macquarie must comply with the requirements in AS4292.1 and AS4292.2 and must:
 - (i) identify and address the hazards and risks which may affect the integrity of the Project Works, the Temporary Works or Macquarie's Activities;
 - (ii) communicate with the Principal's Representative in respect of any matter which could affect the safe and continuous operation of the Sydney Metro;
 - (iii) establish and implement standards and procedures to ensure that any interfaces between Macquarie's Activities and any activity that involves other parties are safely managed;
 - (iv) establish and implement standards and procedures to ensure that the design, construction and Commissioning of the Project Works will enable the Project Works to remain fit for the safe and continuous operation of the Sydney Metro; and

- (v) establish and implement standards and procedures for the verification and validation of all stages of the design, construction and Commissioning of the Project Works and the Temporary Works.
- (c) Macquarie must:
- (i) ensure that alcohol or any forms of illegal drugs are not permitted at any place where Macquarie's Activities are undertaken;
 - (ii) ensure that rail safety workers do not carry out rail safety work, nor are on duty, while under the influence of a drug or of alcohol as prescribed in the Rail Safety Regulations;
 - (iii) ensure that the personnel undertaking Macquarie's Activities are not affected by fatigue related impairment;
 - (iv) ensure that rail safety workers comply with Macquarie's fatigue management programs;
 - (v) ensure that the personnel undertaking Macquarie's Activities (including all rail safety workers) are of sufficiently good health and fitness to carry out those Macquarie's Activities (including all rail safety work);
 - (vi) ensure that human factors are taken into account and addressed in all aspects of Macquarie's Activities;
 - (vii) ensure that any public venues used by Macquarie are safe and accessible; and
 - (viii) provide the monthly safety performance data.
- (d) Macquarie must develop effective risk management standards and procedures to identify hazards and risks, assess hazards and risks and plan work processes to control and communicate those hazards and risks.

5.5 Quality requirements

5.5.1 Quality management requirements

- (a) Macquarie must provide a dedicated responsible person (Quality Manager) who:
 - (i) is directly responsible to Macquarie's senior management;
 - (ii) must act independently of the other personnel undertaking Macquarie's Activities; and
 - (iii) has responsibility for ensuring that the requirements of the Quality Plan are implemented and maintained throughout Macquarie's Activities.
- (b) The Integrated Management System must incorporate and comply with the Principal's General Specifications and AS/NZS/ISO9001.
- (c) All Integrated Management System records and all records relating to the quality of the Project Works must be freely accessible to the Principal's Representative and the Independent Certifier until all Macquarie's Activities have been completed and must be held at the Construction Site up to the Date of Completion of the last Portion to reach Completion.

- (d) All Integrated Management System records and all records relating to the quality of Macquarie's Activities must be freely accessible to the Principal's Representative.
- (e) Macquarie must supply to the Principal's Representative all applicable identified records, as identified and required by the Principal's General Specifications as a precondition to Completion.
- (f) Macquarie must:
 - (i) develop all aspects of its Quality Plan which impact upon the operation of Sydney Metro; and
 - (ii) incorporate these aspects of the Quality Plan into the Operation and Maintenance Manuals in accordance with Appendix 48.

5.5.2 Quality Plan requirements

- (a) Macquarie must develop and maintain a Quality Plan in accordance with the requirements of the deed, including Appendix 54.
- (b) The Quality Plan must:
 - (i) nominate the Quality Manager who has the defined authority and responsibility for ensuring that the requirements in the Quality Plan are implemented and maintained;
 - (ii) define the responsibilities and authority and reporting function of personnel primarily responsible for upholding the quality assurance provisions of the deed;
 - (iii) identify how independent inspection, witnessing, monitoring, auditing and reporting will be carried out;
 - (iv) identify the interfaces between corporate support and on-site personnel in relation to sections 5.5.2(b)(i) and 5.5.2(b)(ii);
 - (v) identify the qualifications, experience and required competencies of personnel who must undertake the duties required in each of sections 5.5.2(b)(i), 5.5.2(b)(ii) and 5.5.2(b)(iii);
 - (vi) contain systems, processes and procedures which give effect to and co-ordinate the implementation of each Project Plan;
 - (vii) address the durability of the Project Works in every aspect of Macquarie's Activities; and
 - (viii) address safety in every aspect of Macquarie's Activities.
- (c) Macquarie must undertake surveillance, audit and review of its Quality Plan and report on all non-conformances in accordance with the requirements of the Principal's General Specifications.

5.5.3 Hold Points and Witness Points

- (a) The Quality Plan must include a schedule of Hold Points and Witness Points.
- (b) The Independent Certifier may at any stage during the performance of Macquarie's Activities nominate Hold Points and Witness Points for inclusion in the Project Plans.
- (c) The schedule of Hold Points and Witness Points must include, as a minimum, all Hold Point and Witness Points nominated in the Principal's General Specifications, or nominated by the Independent Certifier as contemplated by clause 4.4(e)(iii) of the deed. The schedule must include any Witness Points required by the Principal's Representative. The schedule must contain sufficient additional Hold Points as are necessary to ensure that Macquarie's Activities and related activities are undertaken in a manner consistent with the Integrated Management System.
- (d) the Principal's Representative and the Independent Certifier may nominate persons to attend or witness the release of any Hold Point or to attend any Witness Point.
- (e) the Principal's Representative must be given a minimum of 3 Business Days' notice of all Hold Points and Witness Points that relate to construction, Testing or Commissioning activities.

5.5.4 Release of Hold Points

- (a) Each Hold Point must be assigned a designated authority by Macquarie that is acceptable to the Principal's Representative and the Independent Certifier to release the Hold Point, except where a designated authority is already specified in this SWTC.
- (b) The Quality Manager must be satisfied that all activities in the Hold Point process (including methods of work, sequences of activities, inspections and tests preceding any Hold Point specified in the Quality Plan) comply fully with the requirements of the deed and, once satisfied, must:
 - (i) release that Hold Point, where the Quality Manager is the designated authority, in order that work may proceed on that part of Macquarie's Activities; or
 - (ii) obtain release from the designated authority that work may precede on that part of Macquarie's Activities.
- (c) Macquarie must not proceed beyond any Hold Point referred to in the Quality Plan without release by the designated authority.
- (d) The release of a Hold Point by the designated authority, allowing the work to proceed beyond that Hold Point, will not relieve Macquarie of any responsibility for carrying out all or any part of Macquarie's Activities in accordance with the requirements of the deed.
- (e) Without limiting section 5.5.3(e), the Principal's Representative and the Independent Certifier must be given reasonable notice of the release of any Hold Point and must be given reasonable opportunity to witness any inspections and tests preceding the release of any Hold Points and the release of any Hold Points.

5.5.5 Non-conformances and continuous improvement

- (a) Macquarie must regularly update and develop the Quality Plan and the other Project Plans in order to minimise the recurrence of any non-conformances.
- (b) the Principal and the Independent Certifier may advise Macquarie of apparent non-conformances. In this event Macquarie must treat the matter as a non-conformance to be addressed within Macquarie's Quality Management System.
- (c) Macquarie must review and analyse the cause of all non-conformances and develop a plan of corrective action to minimise the likelihood of recurrence. Macquarie must provide details of such corrective actions to the Principal's Representative and the Independent Certifier.
- (d) Macquarie must examine relevant changes in technology and work methods for opportunities to improve its processes, particularly processes which interact with the Principal and the Independent Certifier.
- (e) The Quality Plan must include structured and verifiable processes for monitoring and ensuring compliance of Macquarie's Activities with the requirements of the deed as well as include structured and verifiable processes for the rectification of any non-conformances.
- (f) The Quality Plan must make specific provision for reporting of all non-conformances that may reduce the future durability or performance of any part of the Project Works and the rectification of any such non-conformances.
- (g) All non-conformances must be promptly reported to the Principal's Representative and the Independent Certifier.
- (h) Proposals for rectification work of non-conformances must be reviewed by the relevant designer and the Independent Certifier and must take all durability objectives, safety objectives and performance requirements into account.
- (i) Macquarie must provide details of all proposals for rectification work for non-conformances to the Principal's Representative and the Independent Certifier.

5.5.6 Audits and monitoring

Macquarie must:

- (a) have its compliance with the Quality Plan and the other Project Plans audited, whenever requested by the Principal's Representative, by an independent auditor;
- (b) permit representatives of the Principal and the Independent Certifier to be present during such audits; and
- (c) deliver copies of each audit report to the Principal's Representative and the Independent Certifier within 5 Business Days of its completion.

5.5.7 Records

- (a) Macquarie must satisfy the record management requirements of the Principal's General Specification Q6, the State Records Act 1998 (NSW) and other relevant legislation.

5.6 Design management requirements

- (a) Macquarie must:
- (i) provide a qualified and experienced design team which works collaboratively with the Principal, Rail Contractors, the Independent Certifier and relevant Authorities throughout the design of the Project Works and Temporary Works;
 - (ii) undertake all studies, investigations, design, documentation and reporting required to design the Project Works and the Temporary Works;
 - (iii) produce fully integrated Design Documentation with all design component interfaces managed and co-ordinated;
 - (iv) produce Design Documentation that incorporates and complies with all functional, durability, economic, whole of life, social, aesthetic, environmental and sustainability requirements of the deed, including this SWTC;
 - (v) provide high quality design services and high quality Design Documentation;
 - (vi) ensure that Design Documentation complies with all of the requirements of the deed, including this SWTC;
 - (vii) verify and validate all Design Documentation to ensure that it meets the requirements of the deed, including this SWTC, using recognised engineering principles;
 - (viii) manage the design development and review process in accordance with the Technical Management Plan, which must comply with Appendix 54; and
 - (ix) integrate the Design Documentation with Rail Contractors' Work and Rail Contractors' Activities.

5.7 Environmental management requirements

- (a) Macquarie must ensure that environmental management is addressed throughout the performance of Macquarie's Activities in accordance with the requirements of the Environmental Documents and the Principal's General Specifications.
- (b) Macquarie must ensure that the Integrated Management System:
- (i) complies with the requirements of Appendix 54;
 - (ii) complies with the Environmental Documents;
 - (iii) is compatible with and responds to the Sydney Metro City & Southwest Sustainability Strategy;
 - (iv) is compatible with and responds to the TfNSW, Sydney Metro City & Southwest Construction Environmental Management Framework;
 - (v) complies with AS/NZS/ISO14001;

- (vi) complies with the NSW Government Environmental Management Systems Guidelines Edition 2 (September 2009); and
 - (vii) is accredited by a NSW Government construction agency.
- (c) Macquarie must develop, implement and maintain a Construction Environmental Management Plan as identified in Appendix 54.

5.8 Sustainability management requirements

- (a) Macquarie must ensure that sustainability is addressed throughout the performance of Macquarie's Activities in accordance with the requirements of Appendix 50a.
- (b) Macquarie's Integrated Management System must:
- (i) comply with the Environmental Documents;
 - (ii) be in accordance with AS/NZS/ISO14001, and apply procedures to social and economic issues in addition to environmental issues where appropriate;
 - (iii) not used;
 - (iv) comply with the requirements and intent of G4 Sustainability Reporting Guidelines (Global Reporting Initiative); and
 - (v) be documented in the Sustainability Plan that complies with the Environmental Documents and the requirements of Appendix 50a and Appendix 54.
- (c) Macquarie must develop, implement and maintain a Sustainability Plan as identified in Appendix 54.

5.9 Safety requirements

- (a) In addition to the requirements of clause 9.4 of the deed, Macquarie must:
- (i) take account of, and incorporate all applicable, relevant or necessary requirements in relation to WHS in all aspects of Macquarie's Activities;
 - (ii) ensure that its Integrated Management System complies with the NSW Government Occupational Health and Safety Management Systems Guidelines and is maintained for the duration of Macquarie's Activities. The Integrated Management System must be accredited in accordance with NSW Government Occupational Health and Safety Management Systems Guidelines;
 - (iii) develop, implement and maintain a Project Health and Safety Management Plan (PHSMP) as required in Appendix 54 for Macquarie's Activities;
 - (iv) develop, implement and maintain safe work method processes and statements for all aspects of Macquarie's Activities as part of the PHSMP that ensure the safety of all of Macquarie's staff and others within and adjacent to the Sydney Metro;

- (v) demonstrate how the Integrated Management System is integrated with the wider safety policy in the PHSMP in Appendix 54;
- (vi) comply with the requirements of the Principal's General Specifications;
- (vii) provide a suitably qualified site safety representative with the authority and responsibility for issues relating to work health and safety for all Macquarie's Activities;
- (viii) up until Completion of the last Portion to reach Completion, engage the site safety representative in Macquarie's Activities exclusively for WHS management and WHS issues;
- (ix) not used; and
- (x) prior to the development of the PHSMP, hold and document the outcomes of a formal WHS risk assessment workshop. the Principal's Representative must be invited and permitted to attend and participate in the WHS risk assessment workshop. The WHS risk assessment workshop must identify and document WHS hazards and risks and control measures associated with Macquarie's Activities to address different trades / phases / work areas or processes not covered during earlier risk assessment workshops, prior to the commencement of the relevant activity, phase or section of work.

5.10 Risk management requirements

- (a) Macquarie must undertake risk management as an integrated part of Macquarie's Activities as follows:
 - (i) Macquarie must implement risk management techniques to determine risks which could affect the Sydney Metro and develop and implement risk management strategies to manage these risks. These risk management strategies must be documented in the Risk Management Plan;
 - (ii) Macquarie must produce a consolidated risk register that includes all hazards and risks associated with Macquarie's Activities, including risks which could affect the Sydney Metro, safety hazards and risks identified in the workshops required by sections 3.6(c) and 5.9(a)(x);
 - (iii) The project risk register must be included in the Risk Management Plan and must include:
 - A. a description of all hazards and risks and their likely impact;
 - B. the risk level assessed for each hazard and risk;
 - C. specific control measures to be implemented to eliminate or reduce risks;
 - D. the residual risks;
 - E. methods to be used to monitor effectiveness of control measures;
 - F. the personnel responsible for monitoring implementation of the control measures;

- G. consultative processes employed by Macquarie in relation to the risk and the personnel involved in the consultative process; and
 - H. demonstration that risks to safety have been eliminated, so far as is reasonably practical, and where elimination of risks to safety was not reasonably practicable, those risks to safety have been minimised so far as is reasonably practicable.
- (iv) Macquarie must implement and maintain a risk management database for the management of risks and opportunities. The risk management database must be available via the PDCS;
 - (v) Macquarie must manage adverse effects and realise potential opportunities relating to the Martin Place Metro Station and the performance of Macquarie's Activities;
 - (vi) Macquarie must undertake risk management in accordance with the requirements of AS/NZS/ISO31000 and the requirements of ISO/IEC31010;
 - (vii) Macquarie must develop, implement and continuously update the Risk Management Plan, as detailed in Appendix 54;
 - (viii) Macquarie must report any newly identified risks classified as key risks to the Principal's Representative within 48 hours; and
 - (ix) Macquarie must report on risks and risk management in accordance with the reporting requirements in the Risk Management Plan and Appendix 53a.

5.11 Training management requirements

- (a) Macquarie must, in addition to its commitments in the Workplace Relations Management Plan as required in Appendix 54:
 - (i) comply with the NSW Government Training Management Guidelines;
 - (ii) achieve the project training management targets identified in the NSW Government Training Management Guidelines for civil construction projects;
 - (iii) meet all statutory obligations relating to WHS training;
 - (iv) provide induction on WHS, quality, environmental and sustainability objectives, systems and procedures and stakeholder and community relations for all employees and persons engaged on Macquarie's Activities, including persons nominated by the Principal's Representative;
 - (v) provide structured training programs to address the requirements of the deed including WHS, quality, environmental sustainability, stakeholder and community relations and project specific requirements;
 - (vi) ensure that all personnel engaged in Macquarie's Activities are suitably trained, competent, licensed and certified;
 - (vii) ensure that suitable facilities for the training of personnel are available;

- (viii) provide a structured training program, including rail safety, power safety, environmental and project specific requirements; and
- (ix) provide the Principal's Representative with access to all training material and all training management records, to enable the Principal's Representative to undertake the implementation reviews identified in the NSW Government Training Management Guidelines.

5.12 Information and documentation management requirements

- (a) Macquarie must give the Principal's Representative and the Independent Certifier copies of notices, reports and submissions it gives to Authorities at the time it submits such notices, reports and submissions as well as any responses from, and details of any consultations with, Authorities.
- (b) Copies of Approvals obtained by Macquarie must be immediately issued to the Principal's Representative and the Independent Certifier.
- (c) Macquarie must prepare and submit to the Principal's Representative and the Independent Certifier, progress reports, updates of the SDD Program, durability assessment reports, Design Documentation, as constructed documentation, construction completion reports, site investigation reports, property and land surveys, ground and infrastructure condition surveys, geotechnical mapping records and inferred ground condition reports and other documents in accordance with the requirements of the deed, including this SWTC and Appendix 53a.
- (d) Macquarie must provide, implement and operate an issues management database of issues arising during the performance of Macquarie's Activities. The issues management database must provide information and data on:
 - (i) all issues, including design, construction, operation and maintenance;
 - (ii) the identities of personnel with responsibility for resolution of the issues;
 - (iii) all comments by the Principal, the Independent Certifier, each designer and Macquarie; and
 - (iv) the status of each issue.
- (e) Macquarie must upload and make available on the PDCS all submissions, information, data and records relating to Macquarie's Activities including the following:
 - (i) copies of notices given in accordance with the deed;
 - (ii) each Progress Report;
 - (iii) each update of the SDD Program;
 - (iv) durability assessment reports;
 - (v) Design Documentation;
 - (vi) as constructed documentation and construction completion report;
 - (vii) site investigation reports;

- (viii) property and land surveys and ground and infrastructure conditions surveys;
 - (ix) geotechnical mapping records and inferred ground condition reports;
 - (x) progress and other reports, minutes of meetings, photographs, programs, information requests, correspondence register, site personnel and Subcontract registers;
 - (xi) each version of each Project Plan;
 - (xii) all Integrated Management System records and all records relating to the governance and control of Macquarie's Activities;
 - (xiii) all Integrated Management System records and all records relating to the quality of Macquarie's Activities, including quality registers, lot registers, audit reports, non-conformance reports, corrective action requests, checklists, conformance reports and Test results;
 - (xiv) environment inspection reports, sustainability reports, Incident reports, action notes, improvement notices, reports and any other documents required by the Environmental Documents, environmental monitoring data and other environmental data;
 - (xv) monitoring reports including monitoring data;
 - (xvi) WHS induction registers, dangerous goods information, hazardous substances register, material safety data sheets, Incident-accident registers and reports, work method statements, safe work procedures, inspections, site safety meetings and toolbox sessions;
 - (xvii) risk information, identification, assessment, actions and reports;
 - (xviii) performance, operational and maintenance activity data, records and reports including passenger related data and statistics;
 - (xix) Asset Management Information;
 - (xx) security information, images and statistics;
 - (xxi) benchmarking reports and other information and studies that Macquarie produces or has access to;
 - (xxii) stakeholder and community complaints, comments, newsletters and notices, registers, fact sheets and meetings;
 - (xxiii) engineering assurance documentation and reports;
 - (xxiv) safety assurance documentation and reports; and
 - (xxv) training materials and registers.
- (f) Macquarie must control user access of the PDCS for:
- (i) Macquarie's staff, agents and representatives; and
 - (ii) any other users approved by the Principal's Representative.
- (g) Macquarie must manage the PDCS user categories for Macquarie's users, including user requests to change or alter the functionality of the user categories.

- (h) All information and data uploaded onto the PDCS must be in both electronic format (.pdf, .nwd, .nwf, .dwf, .dwfx and .kmz) and native (.doc, .docx, .xls, .xlsx, .dgn, .dwg, .fbx, .fbx, .ifc, .sat and .adsk) format.
- (i) Macquarie must ensure that Macquarie's users of the PDCS receive adequate training in relation to the PDCS. Macquarie's users of the PDCS must attend the general user training session relating to the use of the PDCS which Macquarie must arrange with the Principal's Representative.
- (j) Macquarie must provide an adequate number of personnel to manage the PDCS setup and administration activities, including the addition and setup of Macquarie's users, the removal of Macquarie's users and management and administration of Macquarie's files and records.
- (k) Macquarie must ensure that these personnel receive adequate training in relation to the PDCS and attend specific training sessions relating to the use and administration of the PDCS. Macquarie must arrange these training sessions with the Principal's Representative.
- (l) Submission of, access to and any use of information and data on and via the PDCS must comply with the:
 - (i) Sydney Metro City & Southwest File Naming Convention; and
 - (ii) Sydney Metro CAD/GIS/BIM Manual that is identified in Appendix 57.
- (m) Macquarie must maintain and store in a secure location that is approved by the Principal's Representative one hard copy version of all Design Documentation. In the event of any inconsistency, ambiguity or discrepancy in the Design Documentation uploaded onto the PDCS and stored in the secure location, the Design Documentation uploaded to the PDCS will take precedence.
- (n) Notwithstanding and in addition to the information and documentation management requirements of the deed, including sections 5.12(a) to (m) above, and the modelling, Design Documentation and Asset Information System requirements of the deed (including the SWTC), Macquarie must use industry standard building information modelling software (the "BIM Software") to create, manage and produce:
 - (i) a single fully collaborated, integrated and coordinated electronic 3D model of the Project Works;
 - (ii) Design Documentation drawings for the Project Works derived from the electronic 3D model required by section 5.12(n)(i); and
 - (iii) Asset information for the Project Works, (together, the **BIM Deliverables**).
- (o) The creation, management and production of the BIM Deliverables must be in accordance with:
 - (i) BS1192; and
 - (ii) ISO/PAS16739.
- (p) Macquarie must provide current versions of the BIM Deliverables as required by the Principal's Representative.

- (q) Macquarie must implement and comply with Digital Engineering in accordance with Sydney Metro Employer's Information Requirements (EIR) SM EM-ST-203 and Sydney Metro CAD/GIS/BIM Manual SM EM-PW-304.

5.13 Stakeholder and community involvement requirements

- (a) Macquarie must comply with the requirements for stakeholder and community involvement identified in Appendix 51.

5.14 Traffic and transport management requirements

- (a) Macquarie must manage the impacts of Macquarie's Activities on the capacity and performance of the surrounding pedestrian, road traffic and public transport network.
- (b) Macquarie must develop, implement, maintain and update a Traffic Management Plan, including any relevant construction traffic management plans and traffic control plans in accordance with the deed, the PCH&SS and the requirements of all relevant Authorities.
- (c) Macquarie must provide a traffic and transport representative who has authority and responsibility for issues relating to traffic and transport management, including liaison with relevant Authorities, the Transport Management Centre, the CBD Coordination Office and the Traffic and Transport Liaison Group.
- (d) The traffic and transport representative must be given the responsibility for and authority to develop and implement the Traffic Management Plan.
- (e) The traffic and transport representative's qualifications and experience must be in line with Macquarie's competency management system.
- (f) The traffic and transport representative must be engaged during Macquarie's traffic and transport activities.
- (g) Macquarie must provide appropriate Macquarie's personnel and technical experts to attend the Traffic and Transport Liaison Group meetings, as required and requested by the Principal's Representative.

5.15 Aboriginal participation requirements

- (a) Further to the requirements in clause 9.12 of the deed and Appendix 50b, for the purposes of the New South Wales Government Aboriginal Participation in Construction Guidelines, the Sydney Metro City & Southwest is a category 2 project.

5.16 Systems engineering and safety assurance management

- (a) As part of its systems and safety assurance activities, Macquarie must undertake and deliver a comprehensive assurance program to demonstrate that the systems and safety requirements have been met for all Macquarie's Activities in accordance with the requirements of the SWTC and Appendix 55.
- (b) The program must cover design and implementation activities as necessary to provide whole of life assurance to the Works.

- (c) Progressive assurance evidence provided must accurately represent the Project Works.
- (d) Macquarie must:
 - (i) provide a Interface & Integration Manager who has authority and responsibility for activities and resolution of issues relating to systems and safety assurance including those required by Appendix 55;
 - (ii) assign a systems and Interface & Integration Manager with recognised and appropriate engineering qualifications and at least fifteen years relevant systems and safety assurance management experience on similar projects;
 - (iii) engage the systems and safety assurance manager full-time during the execution of Macquarie's Activities; and
 - (iv) the systems and safety assurance manager must be responsible for the development of the Safety Assurance Plan in accordance with Appendix 54.
- (e) Macquarie must identify and manage any interdependence between discrete design and construction elements of Macquarie's Activities.
- (f) Macquarie must demonstrate compliance with the requirements of the deed, including the SWTC, using the Martin Place Metro Station requirements and traceability register as required in Appendix 55.

5.17 Configuration

5.17.1 Configuration management

Macquarie must ensure that its configuration management activities include a change management process aligned with AS ISO 10007 Quality management systems - Guidelines for configuration management.

5.17.2 Configuration control

- (a) Macquarie must have in place, maintain and consistently apply until Final Completion configuration control measures to ensure that Macquarie meets the requirements of the Sydney Metro Configuration Control Board (Sydney Metro CCB)/Sydney Metro Sub-Configuration Control Board (Sydney Metro Sub-CCB) and TfNSW Network Assurance Committee (TNAC) control gates.
- (b) Macquarie must prepare and submit to the Principal's Representative completed Configuration Change Requests (CCRs), including all supporting documentation required for Macquarie's submissions to the relevant Sydney Metro CCB/Sydney Metro Sub-CCB and TNAC for the following control gates:
 - (i) Sydney Metro CCB/Sydney Metro Sub-CCB/TNAC control gate 3 "for construction" submission, which applies before finalisation of approved for construction Design Documentation;
 - (ii) Sydney Metro CCB/Sydney Metro Sub-CCB control gate 4 "ready for testing" submission, which applies on completion of construction and is required as a condition precedent to testing the Works; and

- (iii) Sydney Metro CCB/Sydney Metro Sub-CCB/TNAC control gate 5 “asset acceptance” submission, which applies prior to Commissioning of the Works and placing into operational service.
- (c) Macquarie must not proceed beyond a control gate identified in section 5.17.2(b) until the relevant Sydney Metro CCB/Sydney Metro Sub-CCB and TNAC (where relevant), has issued an approved configuration change request (CCR) and after any conditions imposed by the Sydney Metro CCB/Sydney Metro Sub-CCB or TNAC have been addressed to the satisfaction of the Sydney Metro CCB/Sydney Metro Sub-CCB or TNAC.
- (d) Macquarie must review and adequately adhere to any residual conditions imposed by the Sydney Metro CCB/Sydney Metro Sub-CCB or TNAC during control gates prior to the control gates identified in section 5.17.2(b).
- (e) Macquarie must adequately address any residual open assurance and stakeholder comments prior to the next control gate.

5.17.3 Configuration change request submissions to control gates

- (a) Macquarie must provide completed CCRs, including all supporting documentation required for Macquarie’s submissions to the Sydney Metro CCB/Sydney Metro Sub-CCB and TNAC control gates.
- (b) Macquarie’s proposed Documentation to support each CCR submission must be sufficient for, and of a quality that enables, Sydney Metro CCB/Sydney Metro Sub-CCB or TNAC acceptance. The Principal’s Representative may request additional documents prior to the submission of each CCR.
- (c) Macquarie must complete and comply with the relevant Configuration Change Request Form requirements for each CCR submission, including provision of a list of all supporting documentation with revision numbers. The completed CCR must address, in full for each control gate, all relevant requirements, including provision of all supporting evidence, prior to obtaining sponsorship from the Principal’s Representative under section 5.17.3(d).
- (d) Macquarie must obtain the Principal’s Representative’s sponsorship of all CCR submissions prior to the submission to the Sydney Metro CCB/Sydney Metro Sub-CCB or TNAC by the Principal’s Representative on behalf of Macquarie.
- (e) Submissions to the TNAC must be completed in accordance with the latest requirements published by the TNAC.
- (f) Macquarie must attend all Sydney Metro CCB/Sydney Metro Sub-CCB and TNAC control gate meetings by making available no more than 2 subject matter experts to present to the Sydney Metro CCB/Sydney Metro Sub-CCB or the TNAC.
- (g) Macquarie must keep itself informed of the Sydney Metro CCB/Sydney Metro Sub-CCB and TNAC timetable at all times during the course of Macquarie’s Activities.
- (h) Macquarie must include due allowance in the SDD Program for the preparation and presentation of the required CCRs and to ensure that:
 - (i) a minimum of 3 Business Days is allowed for the Principal’s Representative to review the proposed CCR prior to Macquarie obtaining sponsorship from the Principal’s Representative;
 - (ii) there is a minimum period of 6 Business Days after sponsorship has been provided under section 5.17.3(d) before the day of Macquarie’s

presentation of the CCR submission to the Sydney Metro CCB/Sydney Metro Sub-CCB; and

- (iii) there is a minimum period of 20 Business Days after sponsorship has been provided under section 5.17.3(d) before the day of Macquarie's presentation of the CCR submission to the TNAC.
- (i) Multiple works package submissions per control gate for Sydney Metro CCB/Sydney Metro Sub-CCB and the TNAC review may be permitted with prior agreement of the Principal. Macquarie must give due consideration in determining a strategy for submission of works packages so that each part of Macquarie's Activities may proceed logically and ahead of the completion of works for later stages.

5.17.4 Sydney Trains Regional CCB and Facilities CCB

- (a) Macquarie must present the relevant parts of the works as determined by the Principal's Representative to both the Sydney Trains Regional Configuration Control Board (Sydney Trains Regional CCB) and Sydney Trains Facilities Configuration Control Board (Sydney Trains Facilities CCB) for review when requested by the Principal's Representative.
- (b) Presentations may include, but are not limited to discipline specific elements including track, overhead wiring, signalling, civil, drainage, electrical, earthing and bonding, and communications.
- (c) Macquarie must obtain the Principal's Representative's approval to the presentation material prior to presentation to Sydney Trains Regional CCB or Sydney Trains Facilities CCB.
- (d) Macquarie must submit the proposed presentation material to the Principal's Representative and allow the Principal's Representative 3 Business Days to review and comment on the proposed presentation material.
- (e) Until the Principal's Representative approves the presentation material, Macquarie must continue to update the presentation material to address the Principal's Representative's comments and resubmit to the Principal's Representative.
- (f) Macquarie must allow the Principal's Representative a further 3 Business Days to review and comment on each submission of updated presentation material.
- (g) Once approved under section 5.17.4(c), Macquarie must allow at least 6 Business Days prior to presenting the presentation material to Sydney Trains Regional CCB or Sydney Trains Facilities CCB.
- (h) All comments from Sydney Trains Regional CCB and Sydney Trains Facilities CCB must be addressed to the satisfaction of the Principal's Representative, prior to submission of each of the Design Stage 1, the Design Stage 2 and the Design Stage 3 Design Documentation in accordance with clause 20 of the deed.

5.18 Interface management requirements

5.18.1 General

- (a) Macquarie must manage all interface requirements in connection with Macquarie's Activities, including design, construction, manufacture, Testing and Commissioning of the Project Works and Temporary Works.

- (b) Macquarie must implement interface management and coordination procedures in accordance with Appendix 56, Appendix 64 and the Cooperation and Integration Deed.
- (c) Macquarie must continuously manage the coordination process until the Date of Completion of the last Portion to reach Completion, including the provision of input, feedback and Design Documentation.
- (d) Without limiting its express entitlements under the deed, Macquarie must undertake modifications to the Project Works, Temporary Works and Macquarie's Activities that may be necessary to achieve compatibility with the Rail Contractors' Work and Rail Contractor's Activities in accordance with the Project Cooperation and Integration Deed.
- (e) Without limiting the requirements of the deed, Macquarie must apply the following principles:
 - (i) ensure timely and effective coordination for the interface documentation;
 - (ii) resolve all conflicts and discrepancies between any element of the Project Works and the Rail Contractors' Work which may impact on access, headroom and clearance, equipment interference, delivery routing, maintenance provisions or general engineering practice;
 - (iii) ensure that loadings, supports, internal clear sizes, setting out dimensions, and layout of all the equipment rooms or areas (including cable ducts, pipe ducts, trench, underfloor void, ceiling void, and all the recessed details for electrical and mechanical equipment) shown on architectural drawings, structural and civil layout drawings, are sufficient and suitable for the Rail Contractor's equipment and installation;
 - (iv) ensure that the access requirements for maintenance and installation shown on all delivery route drawings, architectural drawings and/or civil layout and structural drawings are sufficient and suitable for the Rail Contractor's equipment and installation;
 - (v) attend site inspections to confirm with Rail Contractors the positions and setting out of cast-in items prior to concreting;
 - (vi) coordinate with the Rail Contractors, the attendance of Authorities at inspections of the Project Works and the Rail Contractors' Work;
 - (vii) comply with all requirements of the delivery route drawings in determining Macquarie's method and sequence of construction; and
- (f) comply with the layout of major services routes and items of electrical and mechanical equipment shown on the combined services drawings and the room layout and major structures and penetrations shown on the structural electrical and mechanical drawings. All information and data exchanged between Macquarie and the Rail Contractors must be copied to the Principal's Representative for information.
- (g) Where input from a Rail Contractor is required by Macquarie in order to undertake its design obligations and that Rail Contractor has not yet been appointed, the Principal's Representative will provide the inputs that are required until the Rail Contractor is appointed.

5.18.2 Interface coordination team

- (a) Macquarie must establish an interface coordination team (ICT) to manage interfaces on behalf of Macquarie.
- (b) The ICT must provide design and technical support (inclusive of the use of aspects such as 3D visualisations, virtual reality, presentations, models and other interactive materials) to help communicate design information to stakeholders throughout Macquarie's Activities.
- (c) The ICT must manage the provision of information directly with the stakeholders.
- (d) Macquarie must present draft copies of all information to be provided to stakeholders to the interface design coordination meetings identified in section 5.19.3 and Macquarie must address all identified comments prior to providing the information to the stakeholders.

5.18.3 Interface meetings

- (a) The ICT must establish and lead fortnightly meetings with the Rail Contractors, OpCo, Existing Operators and other stakeholders, as agreed with the Principal's Representative to discuss and coordinate interfaces (interface design coordination meetings or **IDCM**).
- (b) Macquarie must arrange and conduct technical working group (**TWG**) reviews on key areas of the design as and where required to ensure stakeholders are able to inform and contribute towards the design development and where required to support the IDCM.
- (c) The TWG reviews must include relevant stakeholders, including:
 - (i) Rail Contractors;
 - (ii) operators and maintainers, including OpCo;
 - (iii) others as required by the Principal's Representative.
- (d) The TWG reviews must include the following elements as a minimum:
 - (i) rail and rail systems;
 - (ii) stations and Station Precincts including heritage;
 - (iii) Approvals, including Planning Approvals and Authority Approvals;
 - (iv) customer and transport integration; and
 - (v) signage and wayfinding, retail and advertising.

5.18.4 Interface Requirements Specifications

- (a) The Interface Requirement Specifications (IRS) included in Appendix 25a are initial IRS and the scope and technical requirements identified in these initial IRS are minimum requirements and the requirements must be further developed by Macquarie in accordance with this section 5.19 and section 6.4.12.

- (b) Macquarie must update the initial IRS and prepare any additional IRS required for each interfacing system and submit to the Principal's Representative within 30 days of the date of the deed.
- (c) Each IRS must clearly identify the interfaces and key interface milestones between Macquarie and the relevant Rail Contractors throughout Macquarie's Activities and the Project Works.
- (d) The updated IRS requirements must be incorporated into the detailed interface specifications identified in section 6.4.12.

5.18.5 Pre-access and access inspections

- (a) Prior to providing access to areas of the Construction Site for a Rail Contractor, Macquarie and the Principal's Representative must undertake the following joint inspections with the relevant Rail Contractors of the required areas of the Construction Site:
 - (i) "13 Week pre-access inspection", to be undertaken 13 weeks in advance of the planned Rail Contractor's access date, to provide the Rail Contractor with an opportunity to familiarise itself with the site environment and for Macquarie and other Rail Contractors working on the Construction Site to be aware of the forthcoming access;
 - (ii) "2 Week pre-access inspection", to be undertaken 2 weeks in advance of the planned Rail Contractor's access date, to enable any outstanding works, including SEM provisions, to be identified for Macquarie to complete before the Rail Contractor's access date; and
 - (iii) "access inspection", to be undertaken on the planned date of Rail Contractor's access, to record the condition of the Construction Site at the time of access including any outstanding work. In the event that the Principal's Representative deems that a required area of the Construction Site is not suitable for access by the Rail Contractor, a second access inspection may be required on a subsequent date.

5.18.6 Room access and control of keys for rail contractors

- (a) Macquarie must coordinate with the Rail Contractors the control of the keys for temporary doors and locks installed as part of the "Degree 2 Activities Completion" identified in Schedule A2.
- (b) Macquarie must provide to the Rail Contractors the keys for permanent doors and locks for power equipment rooms at the time of energisation of the power equipment rooms.

5.19 Authorities, including Emergency Services

- (a) Macquarie must carry out Macquarie's Activities in accordance with, and to satisfy, the requirements of all relevant Authorities, including Emergency Services, and must consult with such Authorities as required by the deed, including this SWTC.

6 Technical and construction requirements

6.1 General

- (a) Macquarie must carry out and manage Macquarie's Activities.

6.2 Handover of TSE Works

- (a) Access to the Construction Site is provided in accordance with clause 17 of the deed and each area will include relevant TSE Works in accordance with clause 11 of the deed.
- (b) At the time of taking possession of Construction Site areas, Macquarie must assume all obligations and responsibilities for the TSE Works on those areas including responsibility for:
 - (i) all local Authority licences relating to occupation of the Construction Site;
 - (ii) consumption and payment of all Services;
 - (iii) collection, treatment and approval of all groundwater discharge;
 - (iv) management arrangements for road and public space users;
 - (v) all site security, including monitoring and management of entry into the Construction Site; and
 - (vi) all site personnel protection requirements.
- (c) The TSE Works must be maintained in accordance with the clause 11.11 of the deed.

6.3 Acceptance of TSE Handover Works

- (a) Access to the Construction Site is provided in accordance with clause 17 of the deed and each area will include relevant TSE Handover Works in accordance with clause 11.18 of the deed.
- (b) At the time of taking possession of Construction Site areas, Macquarie must assume all obligations and responsibilities for the TSE Handover Works, which must be treated as Temporary Works and maintained and disposed of by Macquarie, except to the extent set out in sections 6.3(c) and 6.3(d).
- (c) Macquarie must restore the construction access points provided by the TSE Contractor.

6.4 Design review

6.4.1 General requirements

- (a) Macquarie must manage the design process in accordance with the details and information provided in Macquarie's Technical Management Plan, as identified in Appendix 54, and develop Design Documentation in accordance with the deed, including this section of the SWTC.
- (b) The design process described in this section applies to all design activities and submissions.
- (c) Macquarie must give design presentations to the Principal's Representative as appropriate, following the submission of each design package.
- (d) Design presentations must be made by the key designers involved in the development of the design package.
- (e) Presentations must be given for all core systems, for all architectural works and for other packages as reasonably required by the Principal's Representative.
- (f) Macquarie must regularly attend meetings with the Principal's Representative, the Independent Certifier and other stakeholders to present design development and progress information as requested by the Principal's Representative.

6.4.2 Design Stages

- (a) All Design Documentation must be submitted for review, and must comply with the requirements of clause 20 of the deed.
- (b) The Design Documentation must be submitted to the Principal's Representative and reviews held, as a minimum:
 - (i) at the completion of any design stage prior to Design Stage 2;
 - (ii) at the completion of Design Stage 2 for each design package; and
 - (iii) at the completion of Design Stage 3 for each design package, including all design outputs required to allow construction, and related construction packages.
- (c) Macquarie may propose, in its Technical Management Plan, to remove either a Design Stage 1 or a Design Stage 2 submission for a specific design package. the Principal's Representative may, in its absolute discretion, agree to the removal of a Design Stage for a specific design package. Where a Design Stage is removed, Macquarie must include all the requirements for that Design Stage in the subsequent Design Stage submission of the Design Documentation for the design package.
- (d) Subject to section 6.4.2(c), the Design Documentation submitted for review must be submitted in accordance with the design packages detailed in the Technical Management Plan.
- (e) If Macquarie splits or combines any of the design packages differently to the Technical Management Plan, Macquarie must include in any new combined or split design package all relevant requirements, information, descriptions including a

traceability matrix to the previous design packages to ensure that the Independent Certifier can adequately review the design package.

- (f) The Design Documentation submitted for each Design Stage must include the requirements of this section 6.4 and any specific Design Documentation requirements described in the Appendices.
- (g) Design Stage 1 Design Documentation not provided as part of CCB2 for Martin Place Metro Station must be provided at Revised Design Stage 1.

6.4.3 Design reports

- (a) The Design Documentation for each design package must include a comprehensive design report which describes the basis for the design development of the design package.
- (b) The design report must be prepared progressively and submitted at each Design Stage.
- (c) The design report must remain consistent through the Design Stages subject to the requirements of clause 20 of the deed.
- (d) The design report, as a minimum, must identify, address and include:
 - (i) the scope of the design package, part or element to which it applies;
 - (ii) a description of the overall asset and system and its sub assets and sub-systems;
 - (iii) how the design objectives outlined in the SWTC have been met;
 - (iv) a list, description and status of all interfaces with Rail Contractors;
 - (v) a list of all documents and deliverables that make up the design package;
 - (vi) a list of all design changes compared to the previous Design Stage submission;
 - (vii) a list of all referenced standards and design guidelines and other design reference documents applicable to the design package;
 - (viii) details of how all review comments made against the previous Design Stage submission have been addressed;
 - (ix) details of the consultation held and process adopted to manage interfaces;
 - (x) all assumptions, dependencies and constraints;
 - (xi) other Design Documentation required to be produced by Macquarie, described in the SWTC;
 - (xii) references (including photographs) to any Quality Benchmarks, samples, scale models and prototypes to be submitted as part of the design package; and
 - (xiii) a section on maintainability to demonstrate how Macquarie has addressed the following:

- A. whole of life costs for asset operations, maintenance, replacement and refurbishment demonstrating how costs have been minimised;
 - B. enabling maintenance to be carried out with minimum disruption to passengers and normal operations;
 - C. RAMS demonstration as required by EN 50126 to support RAM targets;
 - D. tabulation of condition monitoring systems, parameters and interfaces required to the operator/maintainer's asset information system;
 - E. access points and methodology and access time;
 - F. maintenance activities including replacement and refurbishment, including detailed steps, any special tools and equipment required, duration of activities with and without access time;
 - G. the appropriate application of whole of life considerations in the design and construction of the Works including application of AS4536 for quantitative whole life cycle cost analysis; and
 - H. standards and acceptance criteria applicable for maintenance activities.
- (e) The design report must identify and address all design inputs relevant to the design package including:
- (i) the requirements of the deed, including the SWTC and the Concept Design;
 - (ii) any departures from the Concept Design, and from the previous Design Stage if appropriate, and the reasons for the changes;
 - (iii) a list of all computer software used for analysis of the design or in preparation of the design package;
 - (iv) Macquarie's specifications;
 - (v) performance criteria and measures to comply with the performance criteria specified for the discrete design components, parts or elements;
 - (vi) environmental and sustainability design criteria;
 - (vii) the sustainability initiatives incorporated as part of the design package;
 - (viii) details of how each sustainability initiative helps to implement the sustainability principles, objectives and targets set out in Appendix 50a;
 - (ix) the findings of any assessments conducted in accordance with the methodologies set out in Appendix 50a;
 - (x) assumptions and constraints;
 - (xi) interim design reviews in summary form;
 - (xii) inputs from stakeholders and the community involvement process;

- (xiii) the findings of any assessments or review conducted with stakeholders;
 - (xiv) inputs from the Accessible Transport Advisory Committee;
 - (xv) details of integration and multi-disciplinary design interface issues and risks associated with other discrete design elements and associated mitigation strategies;
 - (xvi) details of durability issues and risks, and measures to comply with the durability requirements for the discrete design components, parts or elements;
 - (xvii) details of the processes for the development of software and application data for systems;
 - (xviii) the design loadings, load combinations, exposure conditions and design standards that will be adopted for the detailed design of the discrete design elements or components;
 - (xix) details of constructability issues and measures, including traffic management during construction of the Project Works and the Temporary Works, where this influences design;
 - (xx) any specialist engineering input and reports including geotechnical, groundwater, hydrology, flooding, noise and vibrations, materials testing, settlement and movement assessment, monitoring and infrastructure protection;
 - (xxi) inputs from the Design Review Panel;
 - (xxii) inputs from the Heritage Working Group;
 - (xxiii) inputs from Existing Operators and OpCo;
 - (xxiv) inputs from the Customer Centred Design (CCD) process; and
 - (xxv) inputs from security assessments.
- (f) The design report must identify and describe all design outputs relevant to the design package including:
- (i) design drawings, calculations and schedules;
 - (ii) details of any computer software proposed, and whether it is commercially available or is to be developed;
 - (iii) details of proposed configuration of computer hardware resources including processor type, operating systems, development environment, capacity, interfaces and timing diagrams;
 - (iv) details of functional analysis and requirements allocation, including functional flow block diagrams;
 - (v) RAM forecasts and FMECA for the system in accordance with the RAM Plan;
 - (vi) details of any alternative designs considered and the process used to determine the best option;

- (vii) details of manufacturing requirements, including special materials, tooling and processes to be developed or used in construction, operations and maintenance;
 - (viii) consideration of requirements for future safeguarding of the Sydney Metro and associated developments;
 - (ix) detailed specifications for materials, finishes, equipment and systems;
 - (x) design model verification; and
 - (xi) the Predicted Effects requirements of section 3.5.
- (g) The design report must include a Customer Centred Design report, which must as a minimum identify, address and include:
- (i) how the design as described in the Customer Centred Design Plan identified in Appendix 54 relates to the customer service principles and customer outcomes as outlined in section 1.1 and section 1.2;
 - (ii) what Customer engagement activities have taken place, feedback received, and where this influenced the design solution;
 - (iii) a description of the Customer experience design with reference to the jobs-to-be-done scenarios specified in the Sydney Metro Chatswood to Sydenham Design Guidelines identified in Appendix 57; and
 - (iv) outstanding Customer design issues to be resolved through product, systems and spatial solutions in subsequent design stages, or via service model design as evidenced in the Customer Service Plan.
- (h) In addition to other submission requirements, Macquarie must submit the Customer Centred Design report and the Design Documentation created for Customer facing design packages to the Principal's Representative for review in accordance with the deed:
- (i) 6 weeks prior to the Design Stage 2 submission; and
 - (ii) 6 weeks prior to the Design Stage 3 submission.
- (i) The design report must identify and provide details of compliance with:
- (i) the requirements of clause 20 of the deed;
 - (ii) the requirements of this SWTC;
 - (iii) the Environmental Documents, including any potential inconsistency with the Environmental Documents;
 - (iv) any Authority Approvals and requirements; and
 - (v) any other Approvals that Macquarie is required to obtain for the design and construction of the Project Works and the Temporary Works.
- (j) The design report must identify safety issues and other risks relevant to the design package, and describe measures to comply with the criteria specified for the discrete design elements and components, including:

- (i) details to address the requirements of security, Fire and Life Safety, accessibility, passenger and staff safety;
 - (ii) details to address the requirements for Accreditation;
 - (iii) details to address the safe construction of the works through “safety in design”; and
 - (iv) all risks associated with the design and construction of the discrete design components, parts or elements and management strategies.
- (k) The design report must identify all Tests relevant to the design package, including the Testing and Commissioning requirements to be addressed in the Testing Plan and Commissioning and Operational Readiness Plan.
- (l) The design report must contain any test results applicable to the Design Stage.
- (m) The design report must include all comments received by Macquarie from the Independent Certifier on prior Design Stage submissions and a description of how these comments have been addressed.

6.4.4 Design Stage 1 Design Documentation

- (a) The Design Stage 1 Design Documentation for each design package must:
- (i) include a design report;
 - (ii) include a full set of preliminary general arrangement drawings, sections, elevations, room data sheets, finishes and material schedules and system schematics;
 - (iii) if requested by the Principal, include preliminary calculations including assumptions;
 - (iv) include preliminary details of all equipment, plant, materials and finishes; including prototypes and samples;
 - (v) include a compliance check with the Environmental Documents, in particular the Planning Approvals;
 - (vi) include any other Design Stage 1 design submission requirements described in the Appendices;
 - (vii) include any other details, calculations, models, drawings, reports or other information as reasonably requested by the Principal’s Representative or the Independent Certifier;
 - (viii) include an engineering assurance register in .RIF format or IBM® Rational® DOORS® native archive with baselines format;
 - (ix) include a safety assurance statement;
 - (x) include a system concept review to ensure that the system requirements are technically feasible and achievable;
 - (xi) include detailed pedestrian modelling and analysis that supports all key design decisions;

- (xii) include an interface schedule highlighting interfaces with existing systems to ensure that the system interfaces are technically feasible and achievable;
- (xiii) updated IRS documents;
- (xiv) be consistent with, and coordinated and fully integrated with all other design packages that have already been submitted for review;
- (xv) include fully integrated 3D digital models;
- (xvi) be of a quality and detail to demonstrate that Macquarie's proposed design approach complies with and satisfies the functional and performance requirements of the deed;
- (xvii) demonstrate that Macquarie has identified, considered and resolved all of the relevant design requirements of the deed;
- (xviii) include the endorsement of the Design Review Panel where agreed with the Principal's Representative;
- (xix) include all concession applications to the ASA requirements; and
- (xx) include the following Design Documentation:
 - A. an art strategy;
 - B. an advertising strategy;
 - C. a Building Code of Australia (BCA) brief;
 - D. Disability Discrimination Act (DDA) brief;
 - E. a durability report;
 - F. a fire engineering brief;
 - G. a furniture fittings and fitments report;
 - H. a glass cleaning and assessment report, which has been reviewed by OpCo, Existing Operators and other relevant stakeholders and incorporates and addresses all associated comments;
 - I. a heritage impact assessment (HIA) report for specific elements and heritage curtilage;
 - J. a salvage assessment report;
 - K. a photo voltaic feasibility report;
 - L. a human factors report;
 - M. a requirements analysis allocation and traceability matrix (RAATM);
 - N. a safety assurance report (SAR);
 - O. a security assessment report including an initial crime prevention through environmental design (CPTED) assessment;

- P. a sustainability report;
 - Q. a signage and wayfinding report; and
 - R. a vermin management and bird proofing bird roosting report.
- (b) Design Documentation for each design package in subsequent design stages must be consistent with the Design Stage 1 which informs the development of the Revised Design Stage 1.

6.4.5 Design Stage 2 Design Documentation

- (a) The Design Stage 2 Design Documentation for each design package must, as a minimum:
- (i) include an updated design report;
 - (ii) include a full set of developed drawings and schematics;
 - (iii) include summary final calculations including assumptions (full calculation must be provided on request of the Principal's Representative);
 - (iv) include complete details and selections of all equipment, plant, materials and finishes;
 - (v) demonstrate how comments made by the Principal's Representative and other stakeholders, including the Design Review Panel, on the Design Stage 1 Design Documentation have been addressed;
 - (vi) include a compliance check with the Environmental Documents, in particular the Planning Approvals;
 - (vii) include the following Design Documentation and any other Design Stage 2 design submission requirements described in the Appendices to the SWTC;
 - (viii) include an engineering assurance register in .RIF format or IBM® Rational® DOORS® native archive with baselines format;
 - (ix) include a safety assurance statement;
 - (x) include updated prototypes and samples including all Testing and analysis carried out;
 - (xi) include updated detailed pedestrian modelling and analysis that supports all key design decisions;
 - (xii) include details of all approved concession or waivers to the ASA Requirements, noting that all concession or waivers to the ASA Requirements must be submitted and approved by the ASA prior to the Design Stage 2 submission;
 - (xiii) demonstrate to the Principal's Representative that Macquarie has identified, considered, completely thought through, resolved and drawn to scale on the design package drawings, all of the relevant design requirements of the deed;

- (xiv) be coordinated with Rail Contractors' Work and include up to date detailed interface specifications developed with the Rail Contractors in accordance with section 6.4.12;
 - (xv) need only the addition of detailing and specifications to the Design Documentation to permit the construction of the design with minimal risk of any abortive construction;
 - (xvi) include the endorsement of the Design Review Panel where agreed with the Principals Representative;
 - (xvii) be consistent with, and coordinated and fully integrated with all other design packages that have already been submitted for review;
 - (xviii) include the following Design Documentation:
 - A. a fire safety engineering report (FSER);
 - B. a public art report;
 - C. an advertising report; and
 - D. an updated version of each of the Design Documents requested in Design Stage 1; and
 - (xix) be consistent with, and incorporate the development of design packages submitted in the Design Stage 1 submissions.
- (b) The submission of the Design Stage 2 Design Documentation must represent the completion of the design development for each design package. Further development of the design package in Design Stage 3 must be limited to design detailing and preparation of drawings suitable for construction.

6.4.6 Design Stage 3 Design Documentation

- (a) The Design Stage 3 Design Documentation for each design package must:
- (i) include an updated and final design report;
 - (ii) include a full set of complete drawings, technical specifications and acceptance criteria for construction that are suitable for construction of the Project Works and the Temporary Works;
 - (iii) include verification of the Design Documentation against the design inputs, including achievement of acceptance criteria, safety, environmental and other management requirements for the Design Documentation;
 - (iv) include construction documentation for each construction package, including technical specifications and acceptance criteria for construction;
 - (v) include a compliance check with the Environmental Documents, in particular the Planning Approvals;
 - (vi) confirm comments made by the Principal's Representative and other stakeholders, including the Design Review Panel, on the Design Stage 2 Design Documentation have been addressed and identify how these comments have been addressed;