EXHIBIT A – TfNSW STANDARD REQUIREMENTS

The TfNSW Standard Requirements comprises the following documents:

a) TSR Prelude (Reference # 3849950_1);

b) TSR C – Communications and Community Liaison (Reference # 3849947_1);

c) TSR E – Environmental Management (Reference # 3849948_1);

d) TSR P – Project Administration (Reference # 3849949_1);

e) TSR S – Safety Management (Reference # 3849952_1); and

f) TSR T – Technical Management (Reference # 3849953_1).

Included on the attached CD titled "MEDIUM WORKS CONTRACT – DESIGN AND CONSTRUCTION CONTRACT, NUMBER: ISD-18-7801, POWER SUPPLY UPGRADE PROGRAM, DESIGN & CONSTRUCTION OF CHALMERS STREET SUBSTATION AND GRANVILLE JUNCTION SUBSTATION, ELECTRONIC FILES."

TfNSW Standard Requirements

TSR Prelude

5TP-FT-300/5.0

Template Applicable to:

Transport Projects

Quality Management System

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V3.0	27 Feb. 2013	Changes to reflect new Rail Safety National Law; general update.
V4.0	1 July 2013	Updated definitions, responsible parties and references to other documents to reflect the ASA and Sydney Trains. Changes to Configuration Management, at clause 5.2. Changes to risk management, at clause C16
V5.0	1 July 2014	New version following TSR rationalisation initiative.

1. General

1.1. Scope

The suite of TSRs describes the Principal's standard requirements for working on a project.

The suite of TSRs contains requirements which form part of the Contract and reflect the Principal's standard requirements on a project. The suite of TSRs must be read in conjunction with the applicable Works Brief or Services Brief and other documents forming the Contract.

The Principal's suite of TSRs consists of the following documents:

(a) TSR Prelude (this document);

(b) TSR C – Communications and Community Liaison;

(c) TSR E - Environmental Management;

(d) TSR P - Project Administration;

(e) TSR S – Safety Management; and

(f) TSR T – Technical Management.

1.2. Changes to the Standard Requirements

Each TSR includes an Annexure A document that describes any project-specific requirements including deletions and amendments to the parent TSR or additional requirements.

1.3. Reference Documents

Documents referenced in each TSR are listed in an Annexure B to that TSR.

1.4. Terms and Definitions

Unless noted otherwise, wherever used in the TSRs, words and phrases defined in the Contract or the General Conditions of Contract have the meaning given to them in the Contract or the General Conditions of Contract. In addition to these defined terms the following words or phrases have the meaning given to them below:

Asset Handover	means the point in time at which the control of certain specified assets is transferred to an Operator/Maintainer and/or Asset Owner for their ongoing operation and maintenance.
Asset Owner	means an organisation who will ultimately own the assets subject to the Asset Handover. In some cases this may also be the Operator/Maintainer.
Australian Network Rules and Procedures	means Australian Network Rules and Procedures as defined by the Rail Industry Safety and Standards Board.
CDR	means the critical design review or equivalent stage of the design as developed in accordance with the Contractor's systems engineering processes.

Climate Change Impact Assessment Report	means a report that identifies and evaluates, in monetary and/or non-monetary terms, the effects of climate change on natural and human systems.
Commissioning	means the systematic process of ensuring that all infrastructure, equipment and systems installed in a project perform interactively in accordance with the design intent and the Operator/Maintainer's functional and operational needs.
Commissioning Management Plan	means a Management Plan to be developed by the Contractor in accordance with the requirements of TSR T - Technical Management which describes the Contractor's strategy and procedures for effective Commissioning of the Works.
Commissioning Management Team	means the management team established by the Contractor accordance with TSR T - Technical Management.
Communications Management Control Group (CMCG)	means a management group with representation from both the Contractors and the Principal, which provides a forum to exchange information and coordinate communication and consultation activities with Other Contractors and the Principal, to ensure a consistent approach to the community and other stakeholders is delivered.
Communications Management System (CMS)	means the Principal's web-based communications management system for the collection and recording the details of all project contact and correspondence with the community and stakeholders, which the Contractor must update and maintain in accordance with TSR C - Communications and Community Liaison.
Community Liaison Management Plan (CLMP)	means a Management Plan to be developed by the Contractor in accordance with the requirements of TSR C - Communications and Community Liaison. The CLP must provide a clear framework, including policies, processes, and procedures that will be used to achieve effective and proactive communications management on the project.
Commuter and Passenger Management Plan	means a Management Plan to be developed by the Contractor in accordance with the requirements of TSR P - Project Administration which describes how public movements will be accommodated during the various stages of the Contractor's Activities.
Compliance Working Group	means the working group established by TP to manage the collaborative audit process as detailed in "TfNSW Project Compliance and Assurance - 9TP-ST-020".
Configuration Control Board,	means the board established by the Principal to manage configuration changes for the Transport Projects Division of the Principal's programs and projects.
Construction and Site Management Plan (CSMP)	means a Management Plan to be developed by the Contractor in accordance with the requirements of TSR P - Project Administration which describes the procedures and processes that the Contractor will undertake to plan and execute the construction of the Works.

Construction Environmental Management Plan (CEMP)	means a Management Plan to be developed by the Contractor in accordance with the requirements of TSR E - Environmental Management which describes how the Contractor will manage the environmental related matters and issues that arise during the term of the project
Construction Greenhouse Gas Reports	means the "Construction Greenhouse Gas Reports" defined in "AS14064.1-2006".
Contract Management Plan (CMP)	unless otherwise defined in the Contract means a Management Plan to be developed by the Contractor in accordance with the requirements of TSR P - Project Administration which acts as a framework for bringing together all the management requirements for the Contractor's Activities into a coordinated and integrated plan.
Contractor's Environmental Manager	means the Contractor's representative that has defined responsibilities and authority to ensure that an Environmental Management System is established, implemented and maintained in accordance with the Contract and who reports to the Contractor's senior management on the performance of the Environmental Management System for review and improvement.
Danger Zone	means Danger Zone as defined in the Australian Network Rules and Procedures.
Defects Management Plan	means a Management Plan to be developed by the Contractor in accordance with the requirements of TSR P - Project Administration which describes how the Contractor will manage the rectification of Defects arising in the Works.
Design Management Plan	means a Management Plan to be developed by the Contractor in accordance with the requirements of TSR T - Technical Management which describes the Contractor's strategy and procedures for effective utilisation of human resources on the project.
Discipline -Specific Management Plans	means the Construction and Site Management Plan, Risk Management Plan, Commuter and Passenger Management Plan, Human Resources Management Plan, Workplace Relations Management Plan, Traffic Management Plan and Defect Management Plan.
Earned Value	means a method of measuring and reporting project cost performance based on integrated time, cost and scope elements in accordance with "TfNSW Quality Management System - Earned Value Management using Primavera P6".
Ecologically Sustainable Development	has the meaning given in the *Protection of the Environment Administration Act 1991* (NSW).
Emergency and Crisis Management Plan	means a Management Plan to be developed by the Contractor in accordance with the requirements of TSR S - Safety Management which describes how the Contractor will manage the safety related matters and issues that arise during the term of the project
Environmental Assessment	means a process to quantify environmental effects of proposed initiatives before they are carried out for the purposes of achieving the requirements for development under the *Environmental Planning and Assessment Act 1979* (NSW).

Environmental Control Map (ECM)	means a document prepared to assist in the planning and delivery of construction works, specific to a work area and/or activity that identifies the physical location of physical protection measures, work method controls and monitoring requirements to minimise the impact of construction activities on the environment and community.
Environmental Impact Statement	means a formal process used to predict the environmental consequences (positive or negative) of a project prior to the approval decision being made for the purposes of achieving the requirements for development under the *Environmental Planning and Assessment Act, 1979* (NSW).
Environmental Management System (EMS)	means a tool for managing the impacts of an organisation's activities on the environment and provides a structured approach to planning and implementing environment protection measures.
Environmental Risk Assessment	means an assessment of the level of risk the proposed activity may have on the environment or any area of the TP business. The consequence of an environmental risk is rated by assessing the potential severity of the impact using the consequence descriptors provided in "TfNSW Project Risk Management – 3TP-PR-086".
Fruin Level of Service	means a level of service standard for pedestrian access created by John J Fruin PhD.
Greenhouse Gas Protocol	means an accounting tool for government and business to understand, quantify, and manage greenhouse gas emissions.
Hierarchy of Control Measures	means the Hierarchy of Control Measures as defined in the "Work Health and Safety Regulations 2011 Part 3.1 Managing Risks to Health and Safety".
Hold Point	means a verification point identified in the TSRs or Works Brief or Services Brief beyond which the relevant part of the Contractor's Activities may not proceed without the verification and subsequent written authorisation of the Principal's Representative or the relevant person nominated in the TSRs.
Human Resources Management Plan	means a Management Plan to be developed by the Contractor in accordance with the requirements of TSR P - Project Administration which describes the Contractor's strategy and procedures for effective utilisation of human resources on the project.
Local Possession Authority (LPA)	means the Local Possession Authority as defined in the Australian Network Rules and Procedures.
Management Plans	means any of the Management Plans including the Discipline -Specific Management Plans to be developed by the Contractor in accordance with the requirements of the TSRs which describe how the Contractor will manage related matters and issues that arise during the term of the project.
Monuments	means Monuments as defined in the *Surveying and Spatial Information Regulation 2012* (NSW).
National Counter Terrorism Alert Levels	means the levels described in the Australian Government's National Terrorism Public Alert System and referenced on the Australian National Security website

Nurse Call stations	means a communication system to notify predesignated recipients almost instantly when events requiring medical assistance occur.
Operational Readiness	means the process which ensures that the primary functional or operational output of a project or a defined part of a project is ready to operate, with all necessary operational plans and approvals in place, fully trained operating staff, all external works and related projects completed and with the Operator/Maintainer ready to accept the responsibility for ongoing operation and maintenance of the facility or assets generated by the Works.
Operator/Maintainer	means an organisation that, post Asset Handover, will operate and maintain the assets. In some cases, this may also be the Asset Owner.
Original Equipment Manufacturer (OEM)	means the company that originally manufactured the product.
PDR	means the preliminary design review or equivalent stage of the design as developed in accordance with the Contractor's systems engineering processes.
Planning and Environmental Compliance Monitoring System (PECOMS)	means the Planning and Environmental Compliance Monitoring System developed and used by the Principal to monitor compliance with the conditions of all licenses, permits and approvals of its projects.
Principal's Safety Hazard Log.	means the document, so titled, initially prepared by the Principal and further updated and maintained by the Contractor in accordance with the requirements set out in the Contract.
Project Rail Safeworking Coordinator	means the Principal's position role that is accountable for monitoring the management of worksite protection and rail safety requirements for controlled and managed worksites on the programs/projects being delivered by Transport Projects on behalf of the NSW State government.
Project Work Health and Safety Management Plan	means a Management Plan to be developed by the Contractor in accordance with the requirements of TSR S - Safety Management which describes how the Contractor will manage the safety related matters and issues that arise during the term of the project.
Property Damage Management	means the section of the Property Management Plan, entitled Property Damage Management.
Property Management Plan (PMP)	means a Management Plan to be developed by the Contractor in accordance with the requirements of TSR P - Project Administration which describes the procedures and processes the Contractor will implement to manage property issues.
Property Representative (PR)	means the Principal's Property Representative.
Protection Officer	means Protection Officer as defined in the Australian Network Rules and Procedures.
Rail Industry Safety Induction (RISI) Identification Card	means a competence card issued to demonstrate successful completion of the Rail Industry Safety Induction training course and medical examination.
Rail Safety	means Rail Safety as defined in the Rail Safety National Law (NSW).

Rail Safety Act	means the *Rail Safety National Law* (NSW).
Rail Safety Work	means Rail Safety Work as defined in the Rail Safety Act.
Rail Safety Worker (RSW)	means Rail Safety Worker as defined in the Rail Safety Act.
Rail Train Operator	means an entity defined by the Rail Safety Act as a rail operator or rail transport operator.
Regulator	means a holder of a public office, or a public authority, of the Commonwealth, or of a State, or member of a governmental regulatory agency who or which is responsible for enforcing laws, regulations, and established rules.
Regulator Notifiable Incidents	means Regular Notifiable Incidents as defined in Part 3 of the WHS Act and Rail Safety National Law National Regulations 2012.
Review of Environmental Factors	means an environmental assessment under Part 5 of the *Environmental Planning and Assessment Act 1979* (NSW) that is required as part of the assessment of activities needing approval under NSW legislation.
Risk Management Plan	means a Management Plan to be developed by the Contractor in accordance with the requirements of TSR P - Project Administration which describes the management of risks applicable to the undertaking of the Contractor's Activities on the project.
RMS	means Roads and Maritime Services, a corporation constituted by section 46(1) of the *Transport Administration Act 1988* (NSW). A reference in any of the TSR documents to the “Roads and Traffic Authority” or “RTA” is to be construed as a reference to Roads and Maritime Services.
Safe Work Method Statements (SWMS)	means the documents so titled prepared in accordance with TSR S – Safety Management and that give specific instructions on how to safely perform a work related task, or operate a piece of plant or equipment etc.
SDR	means the system definition review or equivalent stage of the design as developed in accordance with the Contractor's systems engineering processes.
Senior Management Representative	means the person responsible for implementing and maintaining the requirements of TSR S – Safety Management.
Survey Certificate	means Survey Certificate as defined in the *Surveying and Spatial Information Regulation 2006* (NSW).
Survey Plan	has the meaning given to that term in the *Surveying and Spatial Information Act 2002* (NSW).
TP	means the division within the Principal that is responsible for delivery of transport infrastructure projects.
Traffic Control Plan (TCP)	means a control plan developed in accordance with the “RTA Guideline Traffic Control at Worksites 4th Ed (June 2010)”.
Traffic Management Plan	means a Management Plan to be developed by the Contractor in accordance with the requirements of TSR P - Project Administration which describes the procedures and processes the Contractor will implement to manage traffic.

Vehicle Registration Database	means the Principal's database recording a rail vehicle's ownership and technical details to indicate that the vehicle has met the Principal's acceptance requirements and is authorised to operate on rail infrastructure managed by the Principal.
Witness Point	means a point identified in the TSRs or Works Brief or Services Brief where the Principal's Representative, or the relevant person nominated in the TSRs, may review, witness, inspect, or undertake tests on any component, method, or process of the Contractor's Activities.
Work Breakdown Structure	means a framework of discrete work elements (or tasks) used to organise and define the total project work scope, cost, and schedule control elements.
WorkCover NSW	means the WorkCover Authority of New South Wales.
Workplace Relations Management Plan	means a Management Plan to be developed by the Contractor in accordance with the requirements of TSR P – Project Administration and the "NSW Code of Practice for Procurement: Building and Construction" and its Guidelines.
Worksite Protection	means the safety measures adopted, in relation to rail operations, to protect persons brought or invited to any part of the Site located within the Rail Corridor
Worksite Protection Personnel	means the personnel assigned to implement the required Worksite Protection for work within the Rail Corridor.
Worksite Protection Plan	means the plan documenting the safety measures adopted, in relation to rail operations, to protect persons brought or invited to any part of the Site located within the Rail Corridor.

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ANNEXURE A – Additional Project Requirements

Annexure A - Additional Project Requirements

A1 TSRs

The following TSRs apply to this project, as listed in the table below:

TSR Reference	Applies?	Reference
TSR C – Communications and Community Liaison	Yes	TSR Prelude Clause 1.1(b)
TSR E – Environmental Management	Yes	TSR Prelude Clause 1.1(c)
TSR P – Project Administration	Yes	TSR Prelude Clause 1.1(d)
TSR S – Safety Management	Yes	TSR Prelude Clause 1.1(e)
TSR T – Technical Management	Yes	TSR Prelude Clause 1.1(f)

A2 Project specific amendments to TSR Prelude

Clause/Para/Line	Project Specific Requirement
N/A	Not Used

TfNSW Standard Requirements

TSR C – Communications and Community Liaison

5TP-FT-333/4.0

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V3.0	1 July 2013	No content change to V2.0. Dates on cover updated.
V4.0	1 July 2014	New version following TSR rationalisation initiative.

1. Introduction

1.1. Purpose

This TSR C – Communications and Community Liaison describes the requirements and processes with which the Contractor and any Subcontractors must comply as a minimum to ensure communications and community relations activities are appropriately managed and designed to engage positively with the community, minimising disruption to the adjacent residents, property owners and all transport users. This TSR C must be read in conjunction with the Contract.

Unless noted otherwise in Annexure A - Additional Project Requirements, all requirements specified in this TSR C apply to the Contract.

1.2. User Instructions

Unless noted otherwise, wherever used in this TSR C - Communications and Community Liaison words and phrases have the meaning given to them in the General Conditions and/or the TSR Prelude.

2. General Community Liaison Obligations

The Contractor must:

(a) appoint suitably qualified and experienced community relations personnel to fulfil the communications requirements of the Contract;

(b) ensure timeframes and resources for community notification and consultation are incorporated into project planning and programs;

(c) develop a Community Liaison Management Plan (CLMP) in accordance with clause 3 below;

(d) record and maintain records in the project's communications management system (CMS);

(e) ensure its employees, Subcontractors and agents comply with the requirements of this TSR C;

(f) ensure that the Principal, stakeholders and the community are provided with adequate notification of planned construction activities and milestones;

(g) ensure that stakeholders and the community are fully aware of and understand the contractor's activities, their objectives, benefits, potential impacts and expected outcomes;

(h) consult the Principal prior to taking any action that may impact on stakeholders and the community; and

(i) comply with all reasonable suggestions and requests of the community.

3. Community Liaison Management Plan (CLMP)

Unless otherwise noted in Annexure A, a CLMP must be prepared by the Contractor. The CLMP must develop, implement and maintain a clear framework, including policies, processes and procedures, for proactive communications management.

The CLMP must be submitted to the Principal's Representative for review in accordance with the Contract. The timing for the initial submission of the CLMP to the Principal's Representative for review in accordance with the requirements of the Contract is nominated in Annexure A of this TSR C. The Contractor must review and update the CLMP every six months unless otherwise stated in Annexure A.

The CLMP must include the following as a minimum:

(a) details of the community relations resources, including personnel, to be employed by the Contractor whilst carrying out the Contractor's Activities;

(b) a comprehensive, project-specific analysis of issues to be managed prior to and during construction and Commissioning of the Works, including proposed strategies and tools to manage these issues;

(c) a comprehensive stakeholder list, highlighting issues/interests and strategies for dealing with each audience;

(d) an indicative program for the implementation of community liaison activities. This program should include key dates for the commencement and conclusion of construction activities, associated impacts to the community and the Contractor's proposed strategies for minimising impacts and informing the community;

(e) details of Contractor specific key messages to be used in information materials and when responding to enquiries and complaints;

(f) details of requirements of the project environmental assessment and the conditions of the Planning Approval for community and stakeholder consultation and proposed methodologies and timeframes for undertaking this consultation;

(g) policies and procedures for handling community complaints and enquiries;

(h) details of the Contractor's nominated 24 hour contact for management of complaints and enquiries;

(i) policies and procedures for incident management and reporting;

(j) policies and procedures for ensuring Subcontractors comply with this TSR C;

(k) details of activities which will be undertaken to monitor and evaluate the effectiveness of the community liaison program;

(l) analysis of other major projects/influences in the area with the potential to result in cumulative impacts to the community and strategies for managing these; and

(m) details of procedures for obtaining approval from the Principal prior to planning and implementing any marketing or promotional activities.

The Contractor must also prepare a summary CLMP for uploading on to the Principal's website.

4. Communications Management System (CMS)

The Principal has a web-based CMS for the collection and recording the details of all project contact and correspondence with the community and stakeholders. The Contractor must complete formal training to become familiar with the CMS. The Contractor must update and maintain the CMS with accurate contact details to ensure easy identification and rapid distribution of information when required.

The Contractor must record all contacts with the community, including but not limited to phone calls, meetings, emails, and actions resulting from these contacts in the CMS within 24 hours of the contact/activity occurring or receiving correspondence.

Entries into the CMS must provide an accurate, succinct summary of the contact and include contact details, actions required and be updated once actions are closed out.

Monthly reports on community contacts (detailing issues and frequency) must be produced and reviewed by the contractor to ensure the CMS is up-to-date before being issued to the Principal.

5. Communications Management Control Group

A Communications Management Control Group (CMCG) will be established by the Principal prior to the commencement of the Contractor's Activities on the Site. From then until Final Completion, the CMCG will meet fortnightly or less frequently if approved by the Principal.

The Contractor must attend and provide administration for all CMCG meetings.

At each meeting the Contractor is required to provide the following information:

(a) a summary of current and upcoming Contractor's Activities, likely impacts, and proposed communication strategies to address these;

(b) an update on any current or emerging issues and/or opportunities;

(c) an update on complaints received and action taken to resolve them; and

(d) other information as requested by the Principal.

The CMCG provides a forum to exchange information and coordinate communication and consultation activities with Other Contractors and the Principal to ensure a consistent approach to the community and other stakeholders is delivered.

The CMCG may comprise of representatives from Other Contractors, the Contractor and the Principal.

6. Meetings with the Community and Other Stakeholders

The Contractor must coordinate engagement activities with the community and other stakeholders. This includes organising meetings with the community or with key stakeholders (or accompanying the Principal) to discuss the Contractor's Activities or any issues in connection with the Contractor's Activities. The Contractor must provide relevant materials for presentation and/or distribution at such meetings. The Contractor must provide the Principal with a minimum of 3 Business Days' notice prior to any meeting with the community or stakeholders.

The Contractor must ensure that suitable persons are available to attend such meetings (including after-hours). Such persons must be adequately informed and suitably qualified to participate and be able to take the lead during meeting where requested by the Principal.

7. Public Communication Materials

7.1. General requirements

(a) The Contractor must promptly provide all information as reasonably required or directed by the Principal.

(b) All public communication material produced by the Contractor must be consistent with and comply with the "TfNSW Transport Projects Style Guide for Contractors and Consultants - 8TP-ST-100" and the "TfNSW Editorial Style Guidelines".

(c) Any public communication material produced by the Contractor must be submitted at least 5 Business Days prior to its planned release for the Principal's Representative's review and approval. The Contractor must amend the content as may be reasonably required by the Principal for approval to be granted. The Contractor must not release any public communication material until it is approved by the Principal's Representative.

(d) For urgent communications where it is not feasible to provide material to the Principal's Representative 5 Business Days before release, such as notice related to emergency or remedial works, the Contractor must provide the material with as much notice as possible along with written advice setting out the reason(s) the required notice period cannot be given and the deadline by which approval is requested.

(e) The Contractor must provide a PDF version of all final communication materials produced and distributed by the Contractor to the Principal before they are delivered to the public.

(f) Where the Contractor's Activities are adjacent to other works being undertaken for other public projects, public communication activities must be coordinated (via the CMCG) and shared as required before distribution to the public.

(g) For complex or potentially contentious issues or works (for example, major road closures or disruptions to major events), or where directed by the Principal, the Contractor must develop an issues-specific communications strategy to adequately consider, address and manage the communications process. Communications strategies must be submitted to the Principal's Representative for review and approval at least 5 Business Days prior to the commencement of implementation of the strategy.

7.2. Community notifications

(a) The Contractor must notify stakeholders, and the community of current and upcoming Contractor Activities with the potential to impact on stakeholders and the community.

(b) The Contractor must produce and distribute all community notifications relating to the Contractor's Activities. Notifications must be in English and also in languages widely spoken in the communities where the notifications are distributed. Alternatively, the Contractor may provide a translation service to ensure that notifications are easily understood by the community.

(c) The Contractor must identify an appropriate distribution area for all community notifications and submit a map of the area to the Principal's Representative for review and approval.

(d) The Contractor must issue written notifications to stakeholders and the community at least 7 days before commencing any activity with the potential to impact on any stakeholders or member of the community being undertaken including but not limited to:

i. construction commencement;

ii. significant milestones (i.e. completion of a Portion or stage or a component of the Works);

iii. changes to the scope of work;

iv. night works;

v. changes to traffic conditions;

vi. modifications to pedestrian routes, cycleways and bus stops;

vii. out of hours work;

viii. disruption of residential or business access;

ix. disruption of access to cultural, sporting or entertainment events;

x. changing or disrupting of utility services; and

xi. investigation activities.

(e) The Contractor must ensure that the notifications contain all required details, including the following:

i. scope of work;

ii. location of work;

iii. hours of work;

iv. duration of activity;

v. type of equipment to be used;

vi. likely impacts including noise, vibration, traffic, access and dust; and

vii. the project's 24 hour telephone number, website address, postal address and email address.

(f) The Contractor must provide and erect signage that identifies changes to traffic and access arrangements at least 7 days before:

i. making changes to pedestrian routes;

ii. impacting on cycle ways;

iii. changing traffic conditions; and

iv. disrupting access to public transport modes.

(g) The Contractor must, whenever possible, provide written and verbal notification to properties immediately adjacent to or impacted by any emergency works at least two hours prior to commencing any emergency works.

(h) Except in the case of emergency works, all notifications to the community and stakeholders must be submitted to the Principal's Representative for review and approval in accordance with clause 7.1 above.

(i) The Contractor must issue to the Principal the final versions of all notifications issued to the community and stakeholders in electronic format for uploading onto Principal's website.

7.3. Advertisements

(a) The Contractor must plan in advance and develop appropriate advertisements as required to update the community of current and upcoming Contractor Activities.

(b) The Contractor must prepare and publish advertisements relating to the performance of the Contractor's Activities that are required to comply with the Law and Approvals.

(c) The Contractor must, as a minimum, advertise in newspapers that cover the geographical areas of the Contractor's Activities.

(d) Planned advertising must comply with the policies of the Principal and Department of Premier and Cabinet in relation to procurement of advertising services by an external vendor and must adhere to the "NSW Government Advertising Guidelines".

(e) The Contractor must submit a draft of all advertisements to the Principal's Representative for review and approval in accordance with clause 7.1 above.

7.4. Construction update newsletters

(a) The Contractor must develop, produce and distribute a quarterly construction update newsletter;

(b) The quarterly construction update newsletters must:

i. inform the community of the progress of the project and key milestones or activities planned to take place during the following three months;

ii. be of high quality, and include relevant photos, maps, graphics and illustrations;

iii. be at least two A4 double sided sheets in full colour;

iv. be distributed to all affected commercial and residential properties within a minimum of 500m radius of the Works; and

v. be submitted to the Principal's Representative in accordance with clause 7.1 above.

8. Information to the Principal

The Contractor is required to provide (and explain) accurate communications information to the Principal regarding current and upcoming Contractor's Activities (including works of Subcontractors) and all associated community impacts as follows and as required:

(a) **Prior to Site establishment:** a program of the Contractor's Activities, scheduling, and details of the planned community impact minimisation measures; and

(b) **Monthly:** the Works completed and upcoming Contractor's Activities, including any associated community impacts (in a format suitable for inclusion on the Principal's website).

The Contractor must be contactable on a 24-hour basis (as required).

9. Marketing and Promotional Opportunities

(a) The Contractor must not commit to marketing or promotional opportunities or develop marketing or promotional materials that relate to the project or the Contractor's Activities, without the prior approval of the Principal in accordance with clause 7.1 above. This includes but is not limited to:

i. signage;
ii. media articles and releases;
iii. advertisements;
iv. presentations at conferences;
v. photographs;
vi. sponsorships;
vii. website text and graphics;
viii. social media activities;
ix. award entries
x. events;
xi. case studies; and
xii. other corporate materials.

(b) The Contractor must recognise and identify the Principal's role in any promotional material or award submissions that it develops in relation to the Contractor's Activities. The Principal must be given 5 Business Days to approve or request further changes to any promotional material or award submission.

10. Complaints and Enquiries Management

The Contractor is responsible for responding to complaints and enquiries received regarding the Contractor's Activities and impacts associated with the Contractor's Activities. Complaints and enquiries may be received through a variety of avenues including the Principal's 24-hour construction response line or project info line, in writing (letter or email), direct to the Principal via telephone, or direct to the Contractor or Subcontractors.

In responding to complaints the Contractor must:

(a) record details of every complaint received and how it was managed and closed out in the CMS;

(b) investigate and determine the source of the complaint immediately, including an immediate call to the complainant where the complaint was received by telephone. Should the Contractor determine that the complaint does not relate to the Contractor's Activities, the Contractor must immediately notify the Principal;

(c) provide at least an oral response to the complainant regarding what action is proposed as soon as possible and within a maximum of 2 hours from the time of the complaint (unless the complainant requests otherwise). If a phone number is provided, complaints received by email and letter must be responded to orally within a maximum of 2 hours from time of receipt. If no phone number is provided, the

complaint must be responded to within a maximum of 24 hours for emails and one week for letters from time of receipt;

(d) forward information on any complaints received, including response times and details of any actions undertaken or proposed or investigations occurring, to the Principal in writing each Business Day to meet the project's reporting requirements;

(e) provide a detailed written response to the complainant within 7 Business Days, outlining the details of the issue and the remedial action that has been taken. A draft written response is to be provided to the Principal for approval within 5 Business Days of receipt of the complaint;

(f) forward a scanned signed copy of the approved written response to the Principal on the day it is sent; and

(g) provide the Principal with details in writing of complaint close out actions and the date action was implemented.

In responding to enquiries the Contractor must:

(h) record details of enquiries received in the CMS;

(i) provide at least an oral response to the enquirer within 2 hours from the time of the enquiry during standard construction hours as outlined in the Planning Approval, or on the next Business Day during all other times ; and

(j) forward information on any enquiries received, and response given, to the Principal in writing each Business Day to meet the reporting requirements of the project.

11. Media and Government Relations

The Contractor must:

(a) immediately make any enquiry/contact by the media or elected government representative known to the Principal;

(b) not make any statement (verbal or written) or provide any photographs or illustrations on social media or to the media, or elected government representatives regarding the Contractor's Activities without the prior written approval of the Principal;

(c) not permit any media or elected government representative on a worksite without the prior written approval of the Principal;

(d) proactively identify positive media and/or community relations opportunities and inform the Principal of these opportunities in a timely manner;

(e) provide the Principal with relevant information in a timely manner, as required to respond to media and government enquiries;

(f) ensure all Subcontractors comply with these requirements; and

(g) record all contact with the media and elected government representatives, and project related articles (paper and web based) and online discussions (blogging) into the CMS and send copies of articles or web links to the Principal.

12. Incident Management and Reporting

The Contractor must immediately notify the Principal of any incident or issue associated with the Contractor's Activities that may have an impact on the community, environment,

employees, Subcontractors or other stakeholders or may attract the attention of the media, the Minister for Transport, a local MP, council or the broader community.

Where the incident or issue is in respect of a work, health and safety issue the Contractor must also comply with the notification provisions of TSR S. Where the incident is in respect of the environment the Contractor must also comply with the notification provisions of TSR E.

In the event of an incident or issue, the Contractor must not contact or provide information to any person (other than that which is required to directly manage the incident or to comply with law), including any stakeholder, the media or the public, without the prior approval of the Principal. The Contractor must make available senior personnel to respond to the community, the media and other stakeholders when required by the Principal.

The Contractor must provide the Principal with all necessary communications materials that may need to be disseminated as a result of such incidents, if required by the Principal.

The details of response times for incident reporting by the Contractor are:

(a) immediate verbal notification to the Principal's Representative, which is interpreted as:

  (i) within 10 minutes of the incident occurring, in the case of an incident that has attracted or will imminently attract the attention of the media, the Minister for Transport, a local MP, or the broader community. Examples of such incidents include without limitation:

    - any delays to train timetables caused by the incident;
    - incidents where employees of the Contractor or Subcontractor, or a member of the community are harmed; and
    - access to trains is blocked and preventing (or severely restricting) access to commuters,

  (ii) otherwise, within 1 hour of the incident occurring;

(b) a report detailing the incident to be issued to the Principal's Representative within 24 hours of the incident occurring, using:

  (i) "TfNSW Safety and Environmental Incident Report - 90-FT-002" for any incident or issue in respect of WHS or for any environmental incident; or

  (ii) the Contractor's incident report form, in respect of all other incidents or issues; and

(c) a corrective action report prepared by the Contractor in accordance with "AS/NZS ISO 9001 (2008)" and submitted to the Principal's Representative within 5 Business Days of the incident occurring.

The Contractor must ensure that all details of an incident or issue are recorded in the CMS.

13. Site Inspections by Visitors and Photography

The Contractor must not organise any site visits by community members or other stakeholders without approval from the Principal. The Contractor must provide the Principal with at least 48 hours prior written notice of all proposed visits.

The Contractor must accommodate regular, periodic visits to the Site by the Principal for the purpose of photography or videography for promotional purposes. Any photographs or film footage taken by the Contractor or the Principal become the property of the Principal who

may, without the Contractor's approval, use the photographs and/or film footage for footage for whatever purpose the Principal deems necessary or appropriate.

14. Construction Hoardings and Fences

Hoardings and fencing, including shade cloth or other material on the external face of any hoarding or fence, must be provided in a colour and material approved or specified by the Principal. Plans for any such hoardings or fencing, including shade cloth or other material on the external face of any hoarding or fence, must be submitted to the Principal for review and written approval.

15. Signage, Graffiti and Bill Posters

the Principal will provide the Contractor with signage to be installed by the Contractor at the Site. This is in addition to the Contractor's responsibilities with regard to WorkCover legislation (and any other Laws) to provide out of hours contact details. The Contractor must provide, as requested, the resources required to assist the Principal with the provision and/or installation of any other signage or graphics required on the hoardings or fencing.

The Contractor must not place any signage, advertising or branding (other than safety signage) on the external face of any hoarding or fence without the prior written approval of the Principal.

The Contractor must prepare and install any way finding signage to direct pedestrians/commuters/vehicles around the Site as appropriate.

Hoardings, site sheds, fencing, acoustic walls around the perimeter of the Site and any structures built as part of the Works must be maintained free of graffiti and any advertising not authorised by the Principal during the construction period.

The Contractor must carry out daily inspections for graffiti and unauthorised advertising and must remove or cover any such graffiti or unauthorised advertising identified within the following timeframes:

(a) offensive graffiti must be cleaned or covered within 24 hours;

(b) highly visible yet non-offensive graffiti must be cleaned or covered within 1 week;

(c) graffiti that is neither offensive nor highly visible must be cleaned or covered during normal operations within one month; and

(d) any advertising material must be removed or covered within 24 hours.

16. Communication Requirements as Part of Site Inductions

The Contractor must ensure its employees and the employees of Subcontractors are adequately inducted and trained on the communication requirements of the Contract, with particular focus on incident management, incident reporting procedures, community enquiries or complaints, and media enquiries, prior to commencing work on the Works. A record of inductions must be kept and made available to the Principal upon request.

The Contractor must periodically carry out further inductions of persons previously inducted to ensure the communications procedures remain clear.

The proposed induction materials must be submitted to the Principal for review and approval prior to use.

17. WHS

To the extent an issue regarding the health and safety of any person is identified within this TSR C, the Contractor must have regard to TSR S and to the principle that the Contractor must ensure the highest level of safety of all persons who may be affected by the project.

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ANNEXURE A – Additional Project Requirements

Additional Project Requirements

A1 CLMP clause 3 TSR C

Clause	Management Plans	Is Management Plan Required ?	Timing for Initial release	Frequency of update
3	Community Liaison Management Plan	Yes	30 Business Days after the date of the Contract	6 months minimum or as significant changes occur

A2 Project specific amendments to TSR C

Clause/Para/Line	Project Specific Requirement
7.1(e)	Add: 'PDFs must be in a web accessible format and must be transferred to TPD in file sizes no larger than 10MB'
7.2(i)	Add: 'File sizes of all notifications must be no greater than 10MB'

ANNEXURE B – List of Reference Documents

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List of Reference Documents

- Transport Projects Style Guide for Contractors and Consultants - 8TP-ST-100
- Transport for NSW Editorial Style Guidelines
- TfNSW Safety and Environmental Incident Report - 90-FT-002
- NSW Government Advertising Guidelines.
- AS/NZS ISO 9001 (2008)

TfNSW Standard Requirements
TSR E – Environmental Management

5TP-FT-304/4.0

Template - Applicable to:

Transport Projects

Quality Management System

Status:	Approved
Division:	Transport Projects
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Table of Contents

Version	Date of Approval	Summary of Change
V2.0	10 March 2013	General update.
V3.0	1 July 2013	Expanded Sustainability requirements at Clause 7.2 and Annexure A.
V4.0	1 July 2014	New version following TSR rationalisation initiative.

1. Introduction

1.1. Purpose

TSR E – Environmental Management describes the environmental management requirements and processes with which the Contractor and any Subcontractors must comply with, consistent with the "TfNSW Environmental Policy – 1TP-PO-002". This TSR E must be read in conjunction with the Contract.

Unless noted otherwise in Annexure A - Additional Project Requirements, all requirements apply as specified in this TSR E.

1.2. User Instructions

Unless noted otherwise, wherever used in this TSR E – Environmental Management, words and phrases have the meaning given to them in the General Conditions and/or the TSR Prelude.

1.3. General

The environmental requirements contained within this TSR E are in addition to any requirements prescribed in any Authority Approval.

2. Contractor's Environmental Management System

Unless otherwise noted in Annexure A, the Contractor's Environmental Management System (EMS) must comply with the relevant requirements of the "NSW Government Environmental Management System Guidelines" and remain accredited under "AS/NZS ISO 14001:2004" whilst the Contractor's Activities are undertaken.

In the case of an alliance contract, the alliance may elect to adopt the accredited EMS from one of the Non-Owner Participants or develop its own EMS.

The EMS utilised must be consistent with the requirements of the Principal's EMS as prescribed in this TSR E or elsewhere in the Contract.

For the avoidance of doubt, Subcontractors are required to work under the Contractor's EMS, unless otherwise specified.

3. Construction Environmental Management Plan

3.1. Scope

Unless otherwise noted in Annexure A, the Contractor must have submitted to the Principal's Representative for review in accordance with the Contract, maintain and consistently apply until Final Completion a project and site-specific Construction Environmental Management Plan or CEMP that covers all the work necessary for the Contractor to fulfil its environmental obligations under the Contract.

The timing for the initial submission of the CEMP to the Principal's Representative for review in accordance with the requirements of the Contract is nominated in Annexure A of this TSR E.

The Contractor must progressively review, monitor, amend, update the CEMP and submit for review in accordance with Annexure A of this TSR E.

The CEMP(s) must comply with the "NSW Government Environmental Management System Guidelines" and be consistent with the requirements of the Contract.

The CEMP(s) must address, and be consistent with, all Authority Approvals (including the conditions imposed on these) and the Environmental Assessment (being the environmental assessment report, Environmental Impact Statement or Review of Environmental Factors), and must address all aspects and impacts identified in the Environmental Risk Assessment (refer also to clause 3.3).

The CEMP(s) must include a matrix or equivalent outlining how the Contractor's EMS and CEMP address the requirements of this TSR E, the Authority Approvals and any other relevant Contract requirements.

The Contractor must regularly review and update the CEMP(s) and implement additional environmental protection measures if the protection measures in the CEMP(s) are not adequate to achieve compliance with the environmental obligations under the Contract.

The CEMP must:

(a) indicate the names, responsibilities and authorities of the site management personnel for implementing the CEMP, monitoring its effectiveness, providing environmental input to design, rectifying any environmental deficiencies and keeping environmental records; and

(b) nominate a member of the site management team as the Contractor's environmental representative who:

  (i) has the responsibility and authority to ensure that an Environmental Management System is established, implemented and maintained in accordance with the Contract;

  (ii) reports to the Contractor's senior management; and

  (iii) will be the authorised contact person for the Principal and relevant Authorities for all environment related issues.

3.2. Submission

The CEMP(s) must be submitted to the Principal's Representative for review in accordance with the requirements set out in the Contract.

HOLD POINT:	Prior to the submission of the CEMP to any Authority or the commencement of any construction work (including Temporary Works)
SUBMISSION DETAILS:	Submit the CEMP(s) documentation addressing the Contract requirements for review in accordance with the time frames specified in the Contract
RELEASE OF HOLD POINT:	The Principal will consider the CEMP(s) documentation. If the Principal does not reject or make comments on the CEMP within the period specified in the Contract then the Hold Point will be released

3.3. Environmental Risk Assessment

Prior to the commencement of early works (including pre-construction works), the Contractor must undertake a comprehensive and site-specific Environmental Risk Assessment in conjunction with the Contractor's construction personnel and the Environmental Representative. The risk assessment must identify the environmental aspects and impacts of the Contractor's Activities and the control measures required to minimise or mitigate adverse impacts in accordance with the requirements of the Contract.

With respect to the Contractor's Activities (and where the Site is at more than one location, for each part of the Site), the Environmental Risk Assessment shall consider as a minimum the following aspects:

(a) noise and vibration;

(b) air quality, including dust;

(c) soil and surface and groundwater water;

(d) waste management;

(e) contamination;

(f) Aboriginal and non-Aboriginal heritage;

(g) flora and fauna; and

(h) traffic and pedestrian management.

The Environmental Risk Assessment shall be documented as part of the CEMP.

3.4. Competence, Training and Awareness

The Contractor must ensure its employees and the employees of Subcontractors engaged in carrying out the Contractor's Activities on the Site are inducted and trained in the environmental requirements of the Contract to achieve a level of awareness and competence appropriate to their assigned activities and required for the effective implementation of the CEMP prior to the relevant employee carrying out any works on Site.

The CEMP(s) must document the site-specific environmental training program, including inductions and toolbox talks, to cover all relevant environmental issues including as a minimum:

(a) implementation and maintenance of erosion and sedimentation controls;

(b) out-of-hours work protocols;

(c) sensitive environmental areas/aspects;

(d) sensitive receivers;

(e) use and interpretation of Environmental Control Map(s);

(f) an overview of the Planning Approval, EPL, CEMP and other relevant Authority Approvals; and

(g) incident response procedures.

The Contractor must establish and maintain a register of environmental training carried out including dates, names of people who have completed the training and details of the trainer.

The Contractor's Project Manager, Environmental Manager and other relevant personnel must attend any training provided by the Principal's Representative specified in Annexure A, or as otherwise directed by the Principal's Representative.

3.5. Air Quality Management

The Contractor must so far as is reasonably practicable minimise dust and air pollution arising from the Contractor's Activities. As a minimum air quality management and monitoring must be consistent with the "TfNSW Construction Air Quality Guideline - 4TP-SD-107" (except where that aspect of the Works is subject to an EPL). The management and monitoring measures must be documented in the CEMP.

3.6. Soil, Water, Erosion and Sediment Control

The Contractor must supply, install and maintain adequate water, erosion and sediment controls in accordance with "The Blue Book" (Managing Urban Stormwater: Soils and Construction 2004 - 4th Edition (Landcom/Department of Housing)). Management and monitoring measures must be documented in the CEMP.

The Contractor must include in the CEMP a procedure for water discharge and reuse. The procedure must be consistent with the "TfNSW Water Discharge and Reuse Guideline - 7TP-ST-146" (except where that aspect of the Works is subject to an EPL).

3.7. Heritage Management

Any identified Aboriginal or non-Aboriginal heritage/archaeological items on the Site and the requirements to mitigate impacts to them are described in the Authority Approval(s). A protocol for the management of any previously unidentified Aboriginal or non-Aboriginal heritage/archaeological items that may be discovered during the Contractor's Activities must be documented in the CEMP and be consistent with all Laws, the Authority Approvals and the "TfNSW Unexpected Heritage Finds Guideline - 4TP-SD-115".

3.8. Biodiversity

Measures for the protection and management of vegetation and fauna, and management and disposal of weeds, must be documented in the CEMP. The measures must, as a minimum, be consistent with the:

(a) "TfNSW Vegetation Management (Protection and Removal) Guideline - 4TP-SD-111";

(b) "TfNSW Fauna Management Guideline - 4TP-SD-113"; and

(c) "TfNSW Weed Management and Disposal Guideline - 4TP-SD-110".

If the Contractor considers it necessary to trim, cut, prune or remove any vegetation which has not been identified as being impacted in the Authority Approval(s), then:

(d) approval from the Principal's Representative must be obtained prior to carrying out the work, using the "TfNSW Application for Removal or Trimming Vegetation (not identified in the Environmental Approval) - 9TP-FT-078"; and

(e) the Contractor must obtain all Authority Approvals required to authorise the additional vegetation removal.

3.9. Waste Management Reduction and Reporting

The CEMP must document proposed waste management measures and must demonstrate the manner in which a target of at least 95% of construction waste generated during Site preparation and construction of the project must be diverted from landfill and either recovered, recycled or reused. In addition, the CEMP must address how 100% of usable spoil material will be recovered for beneficial use.

The CEMP must also include a six monthly reporting regime for construction waste data. At a minimum, this must require a separate detailed breakdown of the construction waste generated and recycled (in tonnes). Materials to be included are vegetation waste, concrete, spoil, asphalt, timber, glass, steel, non-ferrous metals and any other construction waste.

3.10. Storage and Use of Hazardous Materials

Construction hazard and risk issues associated with the use and storage of Hazardous Materials must be addressed in the CEMP and be consistent with "TfNSW Chemical Storage and Spill Response Guidelines - 9TP-SD-066".

Management measures for concrete washout areas must be documented in the CEMP and, as a minimum, be consistent with "TfNSW Concrete Washout Guideline - 4TP-SD-112".

3.11. Construction Noise and Vibration

The Contractor must assess, mitigate and monitor the construction noise and vibration impacts of the Contractor's Activities in accordance with the "TfNSW Construction Noise Strategy – 7TP-ST-157", and any requirements of the Authority Approvals and the EPL (if applicable).

3.12. Environmental Inspections and Monitoring

The CEMP must document the procedures to be implemented to verify that the Contractor's Activities relating to environmental management matters are compliant with the requirements of the Contract and all Authority Approvals. At a minimum, this must include the Contractor undertaking:

(a) periodic and planned inspections to verify the adequacy of controls for all environmental aspects of the Contractor's Activities and documenting these via inspection records;

(b) planned internal reviews of the environmental documents that make up the EMS, e.g. Management Plans, procedures, forms etc; and

(c) planned reviews of Subcontractor systems and works, including off-site inspections as appropriate.

3.13. Notification of Incidents and Noncompliances

The Contractor must notify and manage all environmental incidents and noncompliances in accordance with the Contract and "TfNSW Environmental Incident Classification and Reporting - 9TP-PR-105".

3.14. Complaints

Complaints received by the Contractor from any source in relation to environmental issues must be handled, recorded and reported in accordance with TSR C and the conditions of all Authority Approvals (if applicable). The Contractor must also notify the Principal's Representative (or nominated delegate) and the Environmental Representative of any environmental complaints received and the actions taken to resolve the complaint.

3.15. Emergency Planning and Response

In respect to emergency planning and response the Contractor must comply with "AS/NZS ISO 14001:2004" (specifically clause 4.4.7) and the relevant parts of TSR S and TSR C.

A program of environmental incident simulation drills should be prepared and documented in the CEMP, with an environmental scenario drill to be run at least annually.

The CEMP must also include:

(a) a list of emergency response personnel with contact details and a 24 hour contact number;

(b) the location of emergency response equipment and material safety data sheets;

(c) details of emergency services including specialist environmental response organisations that may be required (e.g. emergency containment and clean up);

(d) details of immediate containment measures to be implemented in the event of an emergency situation; and

(e) clear communication strategy in the case of an emergency, including notification requirements to the Principal's Representative and relevant Authorities.

In addition, where an EPL is held for the project, the Contractor must prepare, implement and test a pollution incident response management plan.

4. Environmental Control Maps

The Contractor must develop, implement and maintain Environmental Control Map(s) or "ECM(s)" in accordance with all Authority Approvals and the "TfNSW Guide to Environmental Control Map - 3TP-SD-015". The ECM must be specific to a work area and/or work activity and identify the sensitive environmental areas and receivers and the location of mitigation measures to minimise the impact of construction activities on the environment and community.

Each ECM must be prepared as a map, suitably enlarged (e.g. A0 size) for mounting on the wall of a site office and for use by site personnel (e.g. A3 size).

The Contractor must submit the ECM(s) to the Environmental Representative for review at least one week prior to the commencement of construction in the area covered by the ECM(s). The Contractor must incorporate any comments made by the Environmental Representative into the final ECM.

The Contractor must regularly review and update the ECM(s) to incorporate works progression and changing site characteristics, and revise or amend environmental protection measures if those identified in the ECMs are not adequate in achieving compliance with the environmental obligations under the Contract. The revised ECM(s) must be submitted to the Environmental Representative for review and approval unless otherwise agreed with the Environmental Representative.

5. Sustainability Requirements

The Contractor must:

(a) comply with any project-specific sustainability requirements listed in Annexure A;

(b) prior to commencing design, submit to the Principal's Representative for review, in accordance with the requirements set out in the Contract, a draft sustainable design implementation plan that:

  (i) demonstrates integration of applicable sustainable design initiatives (to achieve the nominated design rating) across the project design disciplines including items (e) and (f) below;

  (ii) demonstrates how the Contractor's Activities meet the principles of Ecologically Sustainable Development as outlined in the *Protection of the Environment Administration Act 1991* (NSW); and

  (iii) nominates a member of the Contractor's team, with appropriate competency and qualifications, as responsible for assuring the Principal that sustainability measures are appropriately addressed;

(c) comply with the "TfNSW NSW Sustainable Design Guidelines - 7TP-ST-114" to meet a minimum "silver" design rating as applicable to the Contractor's Activities;

(d) submit to the Principal a completed checklist in electronic format (standard template supplied by the Principal) confirming compliance with the requirements of the "TfNSW NSW Sustainable Design Guidelines - 7TP-ST-114" and the project specific sustainability requirements at the intervals listed in Annexure A;

(e) unless otherwise noted in Annexure A, prepare and submit to the Principal's Representative for review, in accordance with the requirements set out in the Contract, a greenhouse gas inventory report in accordance with the "TfNSW Greenhouse Gas Inventory Guide for Construction Projects – 7TP-ST-035". This report must:

(i) be submitted for review at the commencement of SDR (or equivalent) stage of the detailed design unless otherwise agreed by the Principal;

(ii) provide calculations of the total estimated carbon footprint for all construction activity associated with the Works;

(iii) nominate all initiatives that will be implemented to reduce the project's overall carbon footprint (examples include the selection of construction materials and the creation of suitable offsets including renewable energy initiatives);

(iv) be updated to address any comments provided by the Principal;

(v) be updated at the CDR (or equivalent) stage of the detailed design and upon Final Completion of the Works; and

(vi) identify and allocate responsibility for greenhouse gas tracking and reporting Scope 1, 2 and 3 emissions generated in accordance with "AS 14064.1-2006" and the "Greenhouse Gas Protocol". The Construction Greenhouse Gas Reports must be submitted to the Principal on a six (6) monthly basis during both the pre-construction and construction phases of the Contractor's Activities;

(f) unless otherwise noted in Annexure A, prepare and submit for review by the Principal's Representative, in accordance with the requirements set out in the Contract, a Climate Change Impact Assessment Report at the commencement of SDR (or equivalent) stage of design. This report must, as a minimum:

(i) identify any project-specific climate change risks (utilising climate modelling data); and

(ii) recommend risk mitigation measures to reduce the identified climate risks; and outline how risk mitigation measures will be addressed through the design process to reduce "extreme", "high" and "medium" risks to "low" where practicable.

Any comments made by the Principal's Representative on the draft plans and reports submitted for review under this clause must be incorporated into the final document by the Contractor in accordance with the Contract. The Contractor must implement the final plan or report in carrying out the Contractor's Activities.

6. Planning Approvals

The Contractor must fulfil all the conditions and requirements of the Planning Approval except to the extent that the Contract allocates responsibilities to the Principal.

Where the Contractor is responsible for submitting any documents or information to an Authority under the Planning Approval, the Contractor must provide the Principal with the submission for review in accordance with the requirements set out in the Contract prior to issue to the relevant Authority.

Where the conditions of a Planning Approval require the Principal to approve any document, plan or strategy then the Principal's approval must be obtained under the Planning Approval for the relevant document (in addition to the review process which applies under the Contract).

The Contractor is not to communicate (phone, mail, email etc) directly with approval Authorities unless written consent is provided by the Principal, and a communications protocol has been established.

Consistency checklists, in the format provided by the Principal unless otherwise agreed, must be completed by the Contractor and submitted to the Principal's Representative for review in accordance with the requirements set out in the Contract, prior to the carrying out of any Works which are likely to deviate from the Planning Approval or other Authority Approvals.

Should the Works be found not to be consistent with the Planning Approval or other Authority Approvals, the Contractor may request the Principal seek a modification. Under such circumstances, it is the Contractor's responsibility to provide the necessary reports, studies and final submission to the Principal to justify and assess the modification.

Compliance with Planning Approval will be tracked through the Planning and Environmental Compliance Monitoring System (refer clause 11).

7. Resources and Responsibilities

The Contractor must provide sufficient resources (including as outlined in Annexure A) on-site and off-site to ensure effective implementation of the EMS and CEMP(s).

The Contractor's Environmental Manager is to be based on site and be present during all inspections undertaken by the Environmental Representative

8. Pre-Construction Minor Works Approval

The Contractor must submit the details of any pre-construction works to the Principal's Representative using the form "TfNSW Pre-Construction Minor Works Approval - 9TP-FT-202" for review in accordance with the requirements set out in the Contract at least 10 Business Days prior to the commencement of such works. All supporting documentation must be attached and pre-construction activities must comply with the requirements of all Authority Approvals. Pre-construction works may not commence until the review process required by the Contract is complete.

9. Principal Raised Nonconformity, Corrective Action and Preventative Action

The Principal's Representative may advise an environmental nonconformance or deficiency in writing. Upon receipt of such advice the Contractor must deal with and close-out the noncompliance or deficiency under its EMS and in accordance with the requirements of the Contract. The "TfNSW Environmental Incident/Non-Compliance Report – 9TP-PR-101" must be completed by the Contractor and returned to the Principal's Representative within 48 hours, unless otherwise agreed with the Principal's Representative.

The Contractor must ensure that any environmental nonconformances are identified, managed and addressed (including via the carrying out of corrective actions and preventative actions) in accordance with the provisions of "AS/NZS ISO 9001:2008" that relate to control of nonconforming product and improvement.

10. Control of Environmental Records

The Contractor must comply with section 4.5.4 (Control of Records) of "AS/NZS ISO 14001:2004".

The Contractor must retain all environmental records for a period of no less than 5 years from the Date of Completion.

The Contractor must provide the Principal's Representative with copies of the environmental records stated at Annexure C. Records not required to be stored on-site must be forwarded to the Principal's Representative within 3 Business Days of a request.

11. Planning and Environmental Compliance Monitoring System (PECOMS)

The Planning and Environmental Compliance Monitoring System is the system developed and used by the Principal to monitor compliance with the conditions of all licences, permits and approvals of its projects.

Where nominated in Annexure A, the Contractor is required to

(a) use PECOMS to undertake self-regulation to confirm that all Contractor's Activities are compliant with all Authority Approvals (including the EPL); and

(b) implement a PECOMS reporting structure in addition to any other reporting requirements under Contract and follow the applicable parts of "TfNSW Guide to Compliance Monitoring and Reporting using PECOMS - 9TP-SD-012".

12. Bushfire Risk Management

Prior to commencement of activities on the Site, and if nominated in Annexure A, the Contractor must:

(a) undertake a risk assessment for bushfire risks using the "Bushfire Environmental Assessment Code for NSW 2006";

(b) develop controls to:

  (i) adequately mitigate all bushfire risks identified in the risk assessment prepared under paragraph (a); and

  (ii) prevent bushfires and minimise the spread of bushfires (refer *Rural Fires Act 1997* (NSW) Part 4, Division 1, Section 63);

(c) ensure that the controls developed in paragraph (b) are included in the relevant Management Plans and submitted to the Principal for review in accordance with the Contract;

(d) ensure that the incident response procedure for the Site includes notification of bushfire incidents to:

  (i) on-site personnel as soon as they occur in order to minimise on-site bush fire danger (refer *Rural Fires Act 1997* (NSW) Part 4, Division 1, Section 64(1(a));

  (ii) local fire authorities (refer *Rural Fires Act 1997* (NSW) Part 4, Division 1, Section 64(1(b)); and

  (iii) the Principal within seven days of any bushfire incident (other than a reportable incident which must be notified to the Principal immediately)

using "TfNSW Environmental Incident Classification and Reporting - 9TP-PR-105"; and

(e) ensure that bushfire management is included in the Site induction training for all personnel working on-site.

Throughout the performance of the Contractor's Activities and if nominated in Annexure A, the Contractor must:

(f) comply with the requirements of the *Rural Fires Act 1997* (NSW);

(g) ensure that all necessary fire-fighting equipment is available on-site and fully operational at all times;

(h) keep records, including serial numbers and expiry dates, of all on-site fire-fighting equipment and make these records available to the Principal on demand;

(i) ensure that personnel with the required competencies to prevent and manage bushfires are available when and where required;

(j) maintain records of all actions taken to minimise bushfire hazards and make these records available to the Principal on demand; and

(k) maintain records of the incidence of all bushfire incidents and make these records available to the Principal on demand (refer *Rural Fires Act 1997* (NSW) Part 4, Division 1, Section 74(2)).

13. WHS

To the extent an issue regarding the health and safety of any person is identified within this TSR E, the Contractor must have regard to TSR S and to the principle that the Contractor must ensure the highest level of safety of all persons who may be affected by the project.

ANNEXURE A – Additional Project Requirements

Additional Project Requirements

A1 Contractors Environmental Management System clause 2 TSR E

Requirement	Applies?
(i) Is a contractor's Environmental Management System accredited under ISO 14001:2004 required.	Yes
(ii) If No in (i) above, is a contractor's Environmental Management System required.	N/A

A2 CEMP clause 3.1 TSR E

Clause	Management Plans	Is Management Plan Required?	Timing for Initial Review	Frequency of update
3	CEMP	Yes	30 Business Days prior to commencement of site mobilisation	6 months or as significant changes occur

A3 Principal provided training clause 3.4 TSR E

Not Used

A4 Project-specific sustainability requirements clause 5(a) TSR E

Not Used

A5 Compliance with the project-specific sustainability targets clause 5(d) TSR E

The Contractor must submit the completed checklist in electronic format (supplied by the Principal) at the following intervals:

(a) At each design submissions (SDR & CDR) that are applicable to this project

(b) 6 monthly intervals during construction; and

(c) At Final Completion

A6 Greenhouse gas inventory report clause 5(e) TSR E

Requirement	Applies?
Prepare, and submit for approval, a Greenhouse Gas Inventory report in accordance with TfNSW's Guideline.	Yes

A7 Climate Change Impact Assessment Report clause 5(f) TSR E

Requirement	Applies?
Prepare, and submit for review, a Climate Change Impact Assessment Report at the SDR stage of design in accordance with listed content requirements.	Yes

A8 Contractor's Resources clause 7 TSR E

The Contractor's Environmental Manager is to be allocated three days a week for this project for the duration of construction.

A9 Planning and Environmental Compliance System (PECOMS) clause 11 TSR E

	Applies?	Reference
Use PECOMS to undertake self-regulation to confirm that all Contractor's Activities are compliant with all Authority Approvals (including the Environment Protection License).	Yes	Clause 11(a)
Implement a PECOMS reporting structure in addition to any other reporting requirements for the Contract and follow the applicable parts of TfNSW Guide to Compliance Monitoring and Reporting using PECOMS - 9TP-SD-012.	Yes	Clause 11(b)

A10 Bushfire Risk Management clause 12 TSR E

	Applies?	Reference
Clauses 12 (a) to 12 (e) for bushfire management requirements apply or not?	No	Clauses 12(a) – 12(e)
Clauses 12 (f) to 12 (k) for bushfire management requirements apply or not?	No	Clauses 12(f) – 12(k)

A11 Planning Approvals for Alliances TSR E

Not Used

A12 Project specific amendments TSR E

Clause/Para/Line	Project Specific Requirement
N/A	Nil amendments

ANNEXURE B – List of Reference Documents

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List of Reference Documents

- AS ISO 9001:2008 Quality Management Systems – Requirements
- AS 14064.1-2006
- Greenhouse Gas Protocol
- AS/NZS ISO 14001:2004 – Environmental Management Systems – Requirements with Guidance for Use
- NSW Government Environmental Management System Guidelines
- Bushfire Environmental Assessment Code for NSW 2006
- TfNSW Application for Removal or Trimming Vegetation (not identified in the Environmental Approval) - 9TP-FT-078
- TfNSW Chemical Storage and Spill Response Guidelines - 9TP-SD-066
- TfNSW Concrete Washout Guideline - 4TP-SD-112
- TfNSW Construction Air Quality Guideline - 4TP-SD-107
- "The Blue Book" (Managing Urban Stormwater: Soils and Construction 2004 – 4th Edition) by Landcom / Department of Housing
- TfNSW Construction Noise Strategy - 7TP-ST-157
- TfNSW Environmental Incident/Non-Compliance Report - 9TP-FT-101
- TfNSW Environmental Incident Classification and Reporting - 9TP-PR-105
- TfNSW Environmental Policy - 1TP-PO-002
- TfNSW Fauna Management Guideline - 4TP-SD-113
- TfNSW Guide to Compliance Monitoring and Reporting using PECOMS - 9TP-SD-012
- TfNSW Guide to Environmental Control Map - 3TP-SD-015
- TfNSW Pre-Construction Minor Works Approval - 9TP-FT-202
- TfNSW NSW Sustainable Design Guidelines - 7TP-ST-114
- TfNSW Greenhouse Gas Inventory Guide for Construction Projects - 7TP-ST-035
- TfNSW Unexpected Heritage Finds Guideline - 4TP-SD-115
- TfNSW Vegetation Management (Protection and Removal) Guideline - 4TP-SD-111
- TfNSW Water Discharge and Reuse Guideline - 7TP-ST-146
- TfNSW Weed Management and Disposal Guideline - 4TP-SD-110

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ANNEXURE C – Environmental Records

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Environmental Records

The following lists the environmental records required by TSR E. All records must be made available to the Principal's Representative. The Contractor must ensure that the Principal's Representative has the latest version of the records at all times.

Where the Contractor is required to forward records to the Principal's Representative, the Contractor must submit one original and three copies (one of which is unbound) of each document (including draft and final reports, specifications, drawings, plans, etc) for the Principal's review. In addition the Contractor must also submit an electronic copy on CD/DVD in PDF and native formats (such as Microsoft Word, Microsoft Excel, CAD in *.dwg or *.dgn) of documents.

Required Record or Reference
Copies of all completed forms, templates required under any of the documents/guidelines referenced in Annexure B
Construction Environmental Management Plan and applicable environmental management system procedures.
Contractor's noncompliance, incident, near miss, nonconformance reports and register
Construction waste data (generated and recycled in tonnes)
Preventive and corrective action reports and register
Environmental audit reports
Environmental Control Maps
Evidence of environmental inputs/outputs and outputs into the design process including sustainability initiatives
Index of all environmental records (prior to Completion)
Induction and training records
Records/checklists of inspection and testing
Records of environmental management reviews for the project
Register of equipment, calibration frequency and certificates
Surveillance, audit of subcontractors environmental performance and controls

TfNSW Standard Requirements

TSR P – Project Administration

5TP-FT-309/1.0

Template Applicable to:

Transport Projects

Quality Management System

Status:	Approved
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Table of Contents

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V1.0	1 July 2014	New document following TSR rationalisation initiative. Content includes material previously in TSR Prelude

1. Introduction

1.1. Purpose

This TSR P - Project Administration describes the project administration and property management requirements and processes with which the Contractor and any Subcontractors must comply. This TSR P – Project Administration must be read in conjunction with the Contract.

Unless noted otherwise in Annexure A - Additional Project Requirements, all requirements specified in this TSR P – Project Administration apply to the Contract.

1.2. User Instructions

Unless noted otherwise, wherever used in this TSR P – Project Administration, words and phrases have the meaning given to them in the General Conditions and/or the TSR Prelude.

2. Requirements for the Contract Management Plan (CMP)

The CMP is the Contractor's project-specific overarching project management plan and management system that captures all other Management Plans and systems that the Contractor is required to develop under the Contract. The CMP is to provide a framework to bring together all the management requirements for the Contractor's Activities into one coordinated and integrated Management Plan.

Unless otherwise noted in Annexure A, the Contractor must have in place, maintain and consistently apply until Final Completion, a CMP to inform and direct personnel and others engaged by the Contractor about the specific work practices, resources, sequence of activities, controls and checks that are to be implemented during the performance of the Contractor's Activities. The timing for the initial submission of the CMP to the Principal's Representative for review in accordance with the requirements of the Contract is nominated in Annexure A of this TSR P.

The CMP must:

(a) explain in a systematic, coordinated and integrated structure the management method for performing the Contractor's Activities in delivering the Works;

(b) define responsibilities, resources and processes for planning and performing the Contractor's Activities;

(c) define responsibilities, resources and processes for verifying that the Contractor's Activities meet the requirements of the Contract;

(d) cover all the project-specific management systems, Management Plans and project-specific deliverables required for the performance of the Contractor's Activities and to meet the requirements of the Contract;

(e) cross reference each Management Plan required to be developed by the Contractor, through the use of a matrix or equivalent, listing its compliance with the relevant Contract and TSR conditions and requirements;

(f) identify the responsible person for developing and updating the CMP and any other Management Plan;

(g) describe how the Contractor will interface with the Principal's Representative to enable specific knowledge and experience of the Principal to be utilised in the development of the Management Plans;

(h) describe how the Contractor will comply with all Laws, Codes and Standards and requirements, applicable to the Contractor's Activities;

(i) document the interface between the Management Plans and the Contractor's corporate systems as applicable under the Contract; and

(j) explain the alignment of the operating processes of the Contractor, Subcontractors and the Principal's Representative.

3. Requirements for Discipline-Specific Management Plans (DSMP)

In addition to the general requirements described in this TSR P, the Contractor must provide the Discipline-Specific Management Plans nominated in Annexure A, and for each DSMP, must address the items below:

(a) **Policies:** A clear statement of policy for the discipline covered.

(b) **Objectives:** The objectives that the DSMP seeks to address and the processes that will be used by the Contractor to verify whether the Contractor's Activities and the Works are achieving those objectives.

(c) **Requirements:** The requirements, procedures and processes for the management and implementation of the relevant DSMP and how those will be delivered, including addressing the requirements of the Contract, Authority Approvals, Laws, Codes and Standards, programs, agreements and proposed agreements, drawings and reports.

(d) **Documents/references:** Selected documents that are of ongoing importance for reference or monitoring, such as the development consent conditions. Where such documents are to be updated or are not immediately available, this should be noted in the DSMP.

(e) **Procedures and processes:** Procedures and processes for the management and implementation of the relevant DSMP.

(f) **Roles and responsibilities:** The allocation of personnel roles, responsibilities and delegation of authority, including the division within and between the Contractor and Subcontractors.

(g) **Deliverables:** The various relevant Contract deliverables, including all records, reports and certificates and the outputs of the management process and procedures are to be detailed. The DSMP must demonstrate how the requirements will be achieved.

(h) **Records:** A description of how the records of compliance, decisions and assumptions will be maintained.

(i) **Timing:** An identification and integration of the timing for key milestones and targets.

(j) **Assurance Auditing:** Procedures for surveillance, self-checking and audit by the Contractor to confirm compliance of the Contractor's Activities with the requirements of the DSMP and the Contract, and the effectiveness of the Contractor's management systems.

The CMP must incorporate an audit schedule and a surveillance schedule to be implemented for the project. The Principal's audit and surveillance requirements are set out in clause 7 below.

3.1. Construction and Site Management Plan

The Contractor must have in place, maintain and consistently apply until Final Completion, a Construction and Site Management Plan in accordance with the requirements of the Contract including this TSR P. The Construction and Site Management Plan must describe the procedures and processes that the Contractor will undertake to plan and execute the construction of the Works.

The timing for the initial submission of the Construction and Site Management Plan to the Principal's Representative for review in accordance with the requirements of the Contract is nominated in Annexure A of this TSR P.

The Construction and Site Management Plan must:

(a) detail how the Contractor will comply with its obligations under the Contract in relation to the control, establishment, security, use and rehabilitation of the Site including the arrangements to provide access to, within and through the Site for the Principal, Other Contractors and any other person nominated by the Principal;

(b) determine effective construction staging that will ensure that operations (including railway and other operations as applicable) and the associated transport facilities' operational requirements are maintained and impact to these operations is minimised and managed accordingly during construction of the Works;

(c) describe procedures for the preparation and implementation of plans and work method statements before the start of related construction work;

(d) describe procedures for the management of Subcontractors and their plans and work method statements;

(e) describe the processes to ensure the compatibility of any necessary Temporary Works with each other and with the remainder of the Works;

(f) where the Works includes tunnelling, detail specific measures in relation to construction practices to maintain safety during tunnelling works in accordance with requirements of WHS Legislation;

(g) describe procedures to ensure the prompt identification and recording of Defects, including process and other nonconformances, and system deficiencies, and for the rectification of those Defects and the verification of the results;

(h) describe procedures for the Contractor's mobilisation and demobilisation to carry out the Contractor's Activities, including mobilisation and demobilisation of personnel, Construction Plant and equipment and closeout of stakeholder communications;

(i) address the Contractor's management of time related facets of the Contractor's Activities, including the production and update of the Contractor's Program;

(j) address the management of interfaces with all Authorities and Other Contractors including:

  i. communication channels, processes for ensuring efficient information flow, communication protocols and meeting schedules;

  ii. sequencing and timing of activities with the interfaces, including special programs;

iii. programming of works and communications to be conducted in conjunction with operations by others such as, for example, Track Possessions, shutdowns or outages in conjunction with Operator/Maintainers and/or Asset Owners;

iv. roles and responsibilities of personnel and organisations for key aspects of the interface;

v. technical and program requirements;

vi. work implications and applicable construction methodologies; and

vii. review of work methods, processes and impacts on operations and services (for example timetables etc); and

(k) outline an incident reporting procedure with reference to the Contract, TSR S, TSR E and TSR C.

The Construction and Site Management Plan should refer to any associated Management Plans.

3.2. Risk Management Plan

The Contractor must have in place, maintain and consistently apply until Final Completion, a Risk Management Plan that is in accordance with "ISO 31000 (Risk Management Guidelines and Principles)" and addresses the management of risks applicable to the undertaking of the Contractor's Activities.

The timing for the initial submission of the Risk Management Plan to the Principal's Representative for review in accordance with the requirements of the Contract is nominated in Annexure A of this TSR P.

The Risk Management Plan must include risk criteria and a risk matrix that are appropriate for the Contractor's Activities.

The Risk Management Plan must provide details of how a risk register will be used as a tool to manage risks related to the delivery of the Contractor's Activities. Notwithstanding the requirements of the management and treatment of risks included in TSR S and TSR E, the risk register should identify, document and rank all risks related to the delivery of the Contractor's Activities and, as a minimum, must cover the following risk areas:

(a) cost control;

(b) construction program and key timing constraints (e.g. booked Track Possessions, shutdowns or outages);

(c) construction access;

(d) buildability;

(e) interfaces;

(f) design, technical, quality, environmental and safety issues in delivery;

(g) asset operability, durability, reliability, availability and maintenance;

(h) safety in design, construction, operation and maintenance;

(i) integration and operations of existing assets and services;

(j) adjoining properties;

(k) approvals;

(l) community issues (including media, commuters, residents and councils); and

(m) cooperation and interface with works undertaken outside this Contract by other parties (including Other Contractors) or Authorities.

The Risk Management Plan must also:

(n) include details of the Contractor's risk management tool, and a template of the Contractor's proposed risk register;

(o) define a process and methodology for the management of any risks that are identified by the Principal, and for the inclusion of any such risks in the Contractor's risk register;

(p) identify key project timeframes and milestones where the Contractor will undertake risk workshops/meetings to identify and/or review risks that update the Contractor's risk register;

(q) describe the process that assigns, to an individual in the Contractor's management team, ownership of:

i. each risk (including threat and opportunity events) to the project;

ii. each control measure to manage threats and opportunities; and

iii. each task (being a planned action and associated milestone to improve or enable effective controls).

(r) describe monitoring activities to ensure that risk control measures and tasks are on schedule and effective;

(s) detail how the risks identified under the Risk Management Plan and its processes are integrated and managed with the other Management Plans; and

(t) define performance criteria for the Risk Management Plan and processes and report on their results in the Contractor's monthly report, described in clause 6.

The Risk Management Plan must acknowledge that the Contractor will provide details of the implementation, operation and effectiveness of the Risk Management Plan in the Contractor's monthly report, described in clause 6.

The Contractor must ensure that the individuals and resources allocated to the risk management activities are suitably trained and made available to effectively implement the Risk Management Plan.

Upon request by the Principal's Representative, the Contractor must provide the Principal's Representative with access to the Contractor's complete set of risk register(s). Where the Contractor's risk register(s) are accessible electronically, and the Principal's Representative agrees, the Contractor may provide the Principal with access to project relevant parts of its electronic system in lieu of paper copies. At any time during the Contract, the Principal's Representative may request that the Contractor submit paper or electronic copies of the Contractor's risk register(s).

3.3. Commuter and Passenger Management Plan

The Contractor must have in place, maintain and consistently apply until Final Completion, a Commuter and Passenger Management Plan that demonstrates how public movements will be accommodated during the various stages of the Contractor's Activities.

The timing for the initial submission of the Commuter and Passenger Management Plan to the Principal's Representative for review in accordance with the requirements of the Contract is nominated in Annexure A of this TSR P.

The Commuter and Passenger Management Plan must include:

(a) drawings showing, as a minimum, the layout of public areas, including facilities provided for operational staff and patrons and systems drawings at each stage of the Contractor's Activities;

(b) drawings showing the proposed arrangement of the passenger facilities clearly showing the position of hoardings and provisions for interchange. Clearances and free area of platforms and the like should be clearly documented. Fruin Level of Service diagrams shall accompany the drawings and they shall indicate the proposed level of service for the proposed arrangement;

(c) drawings showing proposed arrangement of signage covering existing signage and new temporary signage. Details must include location, size and wording of temporary and permanent way finding signage and proposed modification to any existing signage;

(d) drawings showing proposed arrangement of passenger information panels including temporary relocations and modifications;

(e) a program clearly indicating when configuration will be changed and proposed period of change;

(f) controlled Site access points;

(g) delineation lines and material to be used for delineation;

(h) access point from public modes of transport and general ingress and egress points; and

(i) identification of accommodation of level changes via ramps, stairs, and other means.

The Contractor must install signage and delineation as shown on the Commuter and Passenger Management Plan to clearly communicate to the public and others routes to safely and easily navigate around or through the Site.

The Principal's Representative may direct the Contractor to include additional or alternative signage and delineation to that documented in the Commuter and Passenger Management Plan.

3.4. Human Resources Management Plan

The Contractor must have in place, maintain and consistently apply until Final Completion, a Human Resources Management Plan that describes the Contractor's strategy and procedures for effective utilisation of human resources on the project.

The timing for the initial submission of the Human Resources Management Plan to the Principal's Representative for review in accordance with the requirements of the Contract is nominated in Annexure A of this TSR P.

The Human Resources Management Plan must include:

(a) a resources program for the Contractor's team;

(b) the allocation of suitable trained and experienced competent personnel to plan, perform and verify work including, but not limited to, the requirements set out in the TSRs;

(c) the management of staff, Subcontractors and suppliers;

(d) compliance with all applicable legislation and guidelines including the following as may be applicable:

i. the *Industrial Relations Act 1996* (NSW);

ii. the *Anti Discrimination Act 1977* (NSW);

iii. the "NSW Government Aboriginal Participation in Construction Guidelines January (2007), Nominated Category 3";

iv. the protection of employee records under the *Privacy and Personal Information Protection Act 1998* (NSW); and

v. the Rail Safety Law;

(e) the inclusion of a Project Induction and Training Management Subplan which:

i. complies with the "NSW Government Training Management Guidelines February (2009)", Nominated Category 1;

ii. includes procedures for the induction and training of all on site and off site personnel covering but not limited to the following as applicable:

A. the project's quality management system and work processes;

B. WHS;

C. community relations;

D. environmental and heritage management;

E. emergency management and incident reporting;

F. property requirements;

G. specific site inductions for example where the Contractor's Activities involves work in or adjacent to the Rail Corridor and the rail environment, rail safety and Operator/Maintainer/Rail Transport Officer; and

H. in the case of an alliance contract, business ethics and fraud and corruption prevention;

iii. describes processes for identifying competencies required of personnel, which personnel will be trained, when they will be trained, and how they will be trained; and

iv. incorporates a project-specific training matrix, which must be submitted to the Principal's Representative for review;

(f) procedures for performance management of personnel; and

(g) in the case of an alliance contract, stipulates that all potential roles within the alliance must be offered to all staff in the alliance and be awarded to the personnel on a 'best for project' basis.

The Contractor must ensure that all on site and off site personnel engaged in the Contractor's Activities (including Subcontractors) have undergone all necessary inductions including any required under the TSRs. Any person who has not undergone all necessary inductions must not work on the Site.

3.5. Workplace Relations Management Plan

The Contractor must have in place, maintain and consistently apply until Final Completion, a Workplace Relations Management Plan in accordance with the NSW Code and NSW Guidelines.

The timing for the initial submission of the Workplace Relations Management Plan to the Principal's Representative for review in accordance with the requirements of the Contract is nominated in Annexure A of this TSR P.

3.6. Traffic Management Plan

The Contractor must have in place, maintain and consistently apply until Final Completion, a Traffic Management Plan that addresses the Contractor's obligations and responsibilities relating to the management of traffic.

The timing for the initial submission of the Traffic Management Plan to the Principal's Representative for review in accordance with the requirements of the Contract is nominated in Annexure A of this TSR P.

The Traffic Management Plan must describe the Contractor's approach to satisfying the requirements in respect of:

(a) the management of traffic on the Site;

(b) the requirements under the WHS Legislation;

(c) Authority Approvals, including any from RMS, NSW Police, State Emergency or any local councils;

(d) The "RTA Traffic Control at Work Sites Manual";

(e) "AS 1742.3-2009 Part 3 - Spoil Control Devices for Works on Roads";

(f) *Roads Act 1993* (NSW) and all other Laws; and

(g) certificates, licences, consents, permits and approvals, including in respect of working hours.

The Traffic Management Plan must recognise, be consistent with and comply with the traffic configuration of the local road network as it exists at various stages during construction of the Works. The Traffic Management Plan must also describe as a minimum:

(h) detailed traffic management procedures for the Site, including those required to manage: modifications to existing roads/paths and traffic patterns; changes to public transport routes and services; impacts on residents and/or commercial enterprises; and the impact of construction traffic within the Site and outside the Site on the adjacent public road system;

(i) procedures to ensure the appropriate notification of relevant emergency services prior to implementing road and pedestrian traffic modifications such as street closures or changes to station access;

(j) safety of commuters, pedestrians, cyclists and site personnel;

(k) changes to traffic usage patterns (average, low and peak flows as well as special events or traffic embargoes);

(l) programmed commencement and completion dates;

(m) management of maintenance requirements, emergencies and incidents;

(n) requirements for traffic and occupation of, or access through, private properties;

(o) coordination of traffic management procedures and plans with the Principal's Representative, Other Contractors and other parties;

(p) procedures for obtaining relevant certificates, licences, consents, permits and approvals;

(q) expected number of truck movements each hour, based on the predicted maximum monthly spoil generation amounts and hours of operation of worksites;

(r) roles and responsibilities of the Contractor's personnel and Subcontractors;

(s) review and reporting procedures; and

(t) procedures for regular updating of the Traffic Management Plan on an "as needs" basis or at the direction of the Principal's Representative.

Where nominated in Annexure A, the Contractor must prepare a detailed Traffic Control Plan (TCP) for the Site generally in accordance with the RTA manual "Traffic Control at Work Sites 4th Ed (June 2010)". The TCP must be submitted to and approved by all relevant Authorities and submitted to the Principal's Representative for review in accordance with the requirements of the Contract prior to the commencement of any work on the Site. Thereafter, the Contractor must ensure that the approved TCP is available for inspection by the Principal's Representative or any officer of WorkCover NSW, NSW Police, the RMS or any other Authority.

3.7. Defects Management Plan

The Contractor must have in place, maintain and consistently apply until Final Completion a Defects Management Plan that addresses the Contractor's obligations and responsibilities relating to the management of Defects.

The timing for the initial submission of the Defects Management Plan to the Principal's Representative for review in accordance with the requirements of the Contract is nominated in Annexure A of this TSR P.

The Defect Management Plan must:

(a) address all contractual requirements for managing Defects;

(b) clearly specify the strategy for managing any Defects raised internally by the Contractor, raised by the Principal and raised by the Operator/Maintainer; and

(c) include a Defect management procedure which must include the utilisation of the Scenario 6 software (see "TfNSW Scenario - Defect Management - 4TP-PR-158"), a tool provided by the Principal.

3.8. Updating the CMP and Management Plans

The Contractor must, at the times specified in Annexure A, progressively review, monitor, amend, update and submit to the Principal's Representative for review, the CMP and the other Discipline-Specific Management Plans throughout the project, in accordance with the TSRs and the Contract.

The Contractor's reviews of the CMP must reassess the CMP's suitability and effectiveness for managing the Contractor's Activities.

Any proposed updates and modifications to the CMP must be submitted to the Principal's Representative for review in accordance with the requirements of the Contract.

4. Contractor's Program

The Contractor is required to update and submit the Contractor's Program monthly to the Principal's Representative by the time specified in Annexure A and at any the other times required by the Contract. The Contractor must submit an A3 size PDF copy of the Contractor's Program, with the monthly progress report.

The Contractor, unless noted otherwise in Annexure A or the Contract, shall submit a base line schedule within 10 days of the date of the Contract for the Principal Representative's review in accordance with the requirements of the Contract.

Without limiting the General Conditions, the Contractor's Program and other programs must comply with the following requirements:

4.1. Working Environment

(a) The Contractor must provide the Contractor's Program in the latest P6 version (XER format). The Principal will import the Contractor's Program into the Principal's Primavera planning environment database. The Principal will maintain the database security and control the access to the database.

(b) The Contractor must develop, status and maintain the Contractor's Program in Primavera P6 on the Principal's planning environment. The Contractor will be given access to the Principal's planning environment via Citrix at no extra cost to the Contractor.

(c) The Contractor must ensure that each update to the Contractor's Program as submitted in clause 4.1 (b) above, is archived within the Principal's planning environment;

(d) The Contractor will be able to export the program file (no more than once per week) via a request to the Principal's Representative. The file will be emailed to the Contractor.

(e) The Contractor will not be provided with access to import any programs into the Principal's Primavera database.

(f) The Principal will not make changes to the Contractor's Program without the approval of the Contractor. Generally, these changes will be limited to the application of activity codes or addition of links to external Principal schedules.

4.2. Program Framework

As a minimum, the Contractor's Program must:

(a) be submitted monthly, with a status date of the last calendar day of the previous month, unless noted otherwise in Annexure A,;

(b) group the Contractor's activities and milestones in a Work Breakdown Structure (WBS) that is aligned to the payment schedule or other form of cost breakdown structure included in the Contract;

(c) show Earned Value in accordance with "AS 4817-2006 Project Performance Measurement using Earned Value" and "TfNSW Earned Value Management using Primavera P6 - 4TP-PR-143";

(d) include budgeted cost and actual cost, input into the relevant WBS item each month, by the Contractor;

(e) show the Principal's review periods in accordance with the requirements set out in the Contract;

(f) define approved Variation activities and/or additional working days in a separate WBS and cost breakdown structure item, so that cost and time of the Variation activities can be clearly distinguished from the original scope; and

(g) have a separate WBS structure outlining each step of the design review process for each individual design package set out in the Design Management Plan prepared in accordance with the requirements of TSR T.

4.3. Program Setup and Maintenance

As a minimum, the Contractor's Program must:

(a) include all key activities and deliverables detailed in each TSR and the Contract and any other activities and deliverables directed by the Principal's Representative;

(b) include requirements for the submission, review and approval of all deliverables including the Management Plans and other Documents (as applicable), in accordance with the requirements of the Contract;

(c) outline the dates when the Contractor will require information, documents, materials or instructions from the Principal's Representative and the dates when the Contractor will provide information or documents to the Principal's Representative. These dates must be consistent with dates that the Principal could reasonably have anticipated as at the date of the Contract;

(d) provide start and finish dates for all elements of the Contractor's Activities (including design, procurement and construction activities), milestones, Track Possessions, external dependencies, Principal deliverables, Operator/Maintainer deliverables and any other significant events and contractual completion dates;

(e) show the lead times for the supply of information, selection of Subcontractors and suppliers, approvals, and the supply of equipment by the Principal, its agents or persons for whom the Contractor is not responsible. Each period must be represented in a separate activity from the Contractor's activity for the relevant items;

(f) clearly identify the access requirements and activities, including Track Possessions and any service outages;

(g) show activities for Site mobilisation, establishment and demobilisation;

(h) clearly identify the critical path activities and milestones;

(i) show codes, resources and expense activities as directed by the Principal's Representative;

(j) show quantities and rates as requested by the Principal's Representative;

(k) identify time leads and lags, resources and other constraints;

(l) show calendars identifying the working and non-working days for the Contractor's Activities. Project calendars are to be up-to-date and reflect changes to the available working periods;

(m) reflect scheduled and actual physical progress of the Works, and be consistent with all constraints on access, performance and coordination;

(n) show allowance for weather and other event contingencies in a single activity at the end of the critical path and prior to the completion date; and

(o) show Commissioning and Asset Handover activities, including the time allowed for testing and Commissioning of major items.

4.4. Program Quality

The quality of the Contractor's Program will be examined by the Principal's Representative upon the initial submission and again upon each subsequent submission. The Contractor shall maintain the quality of the Contractor's Program, by satisfying the criteria in the table provided below. The Contractor's Program will be rejected by the Principal's Representative if the quality does not meet the thresholds prescribed below. Further assessment criteria and thresholds may be added by the Principal's Representative to the assessment of quality.

Deviations from the thresholds must be approved by the Principal's Representative.

The quality of the Contractor's Program will be assessed for all normal activities and milestones that are planned, in-progress, or complete.

Criteria	Description	Remarks	Threshold
Missing Predecessors	Total number of activities that are missing predecessors.	Activities that have missing predecessors are known as open-ended activities. Open ends cause time and risk analysis calculations to be erroneous. Ideally, all open ends should be fixed in a program during the planning phase.	Less than 1%
Missing Successors	Total number of normal activities that are missing successors.	Activities that have missing successors are known as open-ended activities. Open ends cause time and risk analysis calculations to be erroneous. Ideally, all open ends should be fixed in a program during the planning phase	Less than 1%
Merge Hotspot	The total number of activities with a high number of predecessor links.	Also known as merge bias, merge hotspot is an indication as to how complex the start of an activity is. If the number of links is greater than two, then there is a high probability that the activity in question will be delayed due to the cumulative effect of all links having to complete on time in order for the activity to start on time.	Less than 2.5%
Diverge Hotspot	The total number of activities with a high number of successor links.	A diverge hotspot is an indication as to how complex the end of an activity is. If the number of links is greater than two, then there is a high probability that the activity in question may delay a large number of successors.	Less than 2.5%
Critical	Number of critical activities	The number of critical tasks within a grouping. Typically critical activities have	No threshold

Criteria	Description	Remarks	Threshold
		total finish float of zero. Primavera programs may have critical activities with more than zero float depending on the threshold set in Primavera P6.	
0 to 20 Days Float	Total number of activities with positive float of more than zero and less than or equal to 20 days.	Near critical activities should be closely monitored during execution to ensure a successful on-time project.	No threshold
Hard Constraints	Number of activities with hard or two-way constraints.	Hard or two-way constraints such as Must start on or must finish on should be avoided. Consider using soft constraints if absolutely necessary. Includes normal activities and milestones that are planned, in-progress, or complete.	Zero
Soft Constraints	Number of activities with soft or one-way constraints.	Soft or one-way constraints such as start no earlier than or finish no later than, constrain an activity in a single direction. While not as impactful as hard constraints, soft constraints do impact critical path method calculations in a program and should be reviewed carefully.	Less than 2.5%
High Float	Excessive free total float	Number of activities with total float greater than 2 months. Activities must be agreed with the Principal	Less than 5%
Negative Float	Total number of activities with total finish float less than 0 working days.	Negative float is a result of an artificially accelerated or constrained program. Negative float indicates that a program is not possible, based on the current completion dates. Compare this metric to constraint metrics to determine which activities (with negative float) are being impacted by constraints. Ideally, there should not be any negative float in the program. Includes normal activities and milestones that are planned or in-progress.	Zero
High Duration	Total number of activities that have a duration longer than 10 days. This number should not exceed 5%.	Total number of activities that have a duration longer than 10 days. Activities must be agreed with the Principal.	Less than 5%
SF Predecessors	Total number of activities with Start to Finish (SF) logic links.	Start-to-finish links are deliberately used very rarely because they have the unusual effect that the successor happens before the predecessor. Generally a poor practice when planning. Includes only normal activities and milestones that are planned, in-progress, or complete.	Zero
Leads and Lags	Lags in excess of 10 days	A lag is a duration applied to a logic link often used to represent non-working time between activities such as concrete curing. Lags tend to hide detail in programs and cannot be	Zero

Criteria	Description	Remarks	Threshold
		"statused" like normal activities. Lags should typically be replaced with activities. Includes normal activities and milestones that are planned, in-progress, or complete.	

5. Document Management

5.1. General

The Contractor must control all copies of the CMP, other Management Plans and Contract deliverables in accordance with the Contract. The Contractor must provide the Principal's Representative with electronic copies of all documents required to be submitted on CD/DVD in PDF and native formats (such as Microsoft Word, Microsoft Excel, P6, CAD in *.dwg. or *.dgn.). This requirement also applies when the Contractor is re-issuing documentation to the Principal's Representative.

The Contractor must promptly advise the Principal's Representative of any changes made to the submitted documents and re-submit the amended documents within 5 Business Days of the amendment, with the amendments clearly marked on the document.

5.2. Principal's Document Management System Tool

Where nominated in Annexure A, the Principal will administer the Contract document deliverables using the Principal's nominated electronic document management tool. The Contractor must engage and utilise the Principal's electronic document management tool, as specified or otherwise agreed to with the Principal's Representative.

The Contractor must incorporate into the CMP the Principal's administrative requirements for the acceptance, review and tracking of various Contract deliverables (including all Documents) using the Principal's electronic document management tool.

6. Monthly Reporting

Without limiting any other reports that may be required under the Contract, the Contractor must prepare and submit to the Principal's a progress report each month in accordance with the Contract, updating and describing as a minimum:

(a) the status at the end of the previous month of the Contractor's Activities, as compared to the current Contractor's Program and the Contractor's other programs;

(b) planned Contractor's Activities over the forthcoming month and quarter;

(c) a list and timing of Hold Points and Witness Points planned for the forthcoming two (2) months;

(d) a description, including photographs, of the progress made on all current Contractor's Activities;

(e) a summary of the financial status of the Contract, including detailed final cost forecasts, and separate lists for the cost of approved Variations, Claims and outstanding claims for Variations;

(f) the number and categories of personnel and equipment currently engaged by the Contractor to carry out the Contractor's Activities (including apprentices and those engaged in off-site functions such as engineering and specialist subcontractors).

This data must also be compared with the planned resources for the Contractor's Activities;

(g) the status of Design Documentation, major procurement orders, Subcontracts, manufacture and general construction;

(h) key dates for the anticipated submission of design packages at SDR, PDR, CDR, and approved for construction stages (or as otherwise determined in the Design Management Plan).

(i) the status of planning activities including Authority Approvals;

(j) where Contractor's Activities involve any related Track Possession, shutdown or outage activity, the progress report must also include monthly reliability statistics listing the following:

i. Incidents in Track Possession/shutdown/outage;

ii. Incidents in non-Track Possession/shutdown/outage;

iii. actual Incidents;

iv. potential Incidents in Track Possession/shutdown/outage; and

v. potential Incidents in non-Track Possession/shutdown/outage;

(k) safety statistics, as required by TSR S;

(l) any noncompliances with any Authority Approvals, nonconformances of the construction of the Works with Design Documentation and construction processes, and the steps taken by the Contractor to address those noncompliances and nonconformances;

(m) any issues and noncompliances with environmental management requirements of the Contract (including the TSRs and steps taken by the Contractor to address those noncompliances;

(n) any issues arising from or affecting the CMP (or the subject matter of the CMP);

(o) records of all corrective and preventative actions taken by the Contractor under the CMP (and the components thereof), and audits of such actions;

(p) cooperation, coordination, industrial relations and interface issues with Other Contractors;

(q) status of interface management with Other Contractors;

(r) summary updates relating to community issues and potential community issues;

(s) complaints received by the Contractor in relation to the Contractor's Activities;

(t) other key issues that have the potential to affect the Contractor's Activities;

(u) any other information the Principal's Representative reasonably requires;

(v) activities of the Dispute Resolution Board, where such a board is established under the Contract; and

(w) details of the status, implementation, operation and effectiveness of the Risk Management Plan. As a minimum, the Contractor must provide:

i. a report on the risks deemed 'extreme' or 'high' within the risk register;

ii. an overview of the full risk register (e.g. heat map, number of risks by category and rating, number of new risks identified and risks closed out during the previous month);

iii. the status of associated controls and tasks;

iv. the performance criteria specified in clause 3.2 of this TRS P; and

v. any results of risk audits.

Where the Works includes signalling system works, the progress report must also:

(x) include a one page summary of the status of signalling design packages; and

(y) provide the status of signalling inspection and test documentation such as permit to work applications, inspection and test plans, installation works packages, Commissioning test plans and Commissioning works packages.

7. Audits and Surveillance

7.1. Principal's Audit and Surveillance

Audit, surveillance and inspection of the Contractor's process and product may be conducted by the Principal's Representative at any time. The Principal's Representative may utilise independent auditors and surveillance officer(s) to assist the Principal in any such audit, surveillance or inspection. The independent auditor(s) and surveillance officer(s) will assist the Principal's Representative in recording the progress and performance of the Contractor's Activities (on site or off site). These records may be used by the Principal's Representative for any purpose.

The Contractor must be cooperative in assisting the independent auditor(s) and surveillance officer(s) in undertaking their duties.

7.2. Principal's Collaborative Compliance Audits

The Principal will conduct audits on the Contractor's compliance with the requirements of the Contract and the Contractor's quality management system. The CMP must describe the processes and procedures for proactively managing auditing requirements in consideration of the "TfNSW Project Compliance and Assurance - 9TP-ST-020".

The Principal has established a working group to manage the collaborative audit process as detailed in "TfNSW Project Compliance and Assurance - 9TP-ST-020" (Compliance Working Group). The Contractor and the Compliance Working Group will, on a collaborative basis, develop, agree and implement an audit program for both parties to undertake the various audits from feasibility and design through to the construction, testing, Commissioning, Asset Handover and demobilisation phases of the project. The Compliance Working Group will process all audit requests from the Contractor, the Principal and/or the NSW Government. The Compliance Working Group will manage these requests to ensure a coordinated approach to auditing and to ensure a collaboration and cooperation approach to auditing is implemented throughout the project.

The Contractor must attend the Compliance Working Group's meetings. Those meetings are to be held whenever requested by the Principal's Representative, but are typically held on a monthly basis.

Procedures for updating the audit program are also to be included in the CMP. The Contractor must participate and assist the Principal in the development and completion of

these audits. The Contractor's involvement in the collaborative compliance audit process is summarised in "TfNSW Project Compliance and Assurance - 9TP-ST-020".

The Principal's Representative will give at least 10 Business Days notice to the Contractor confirming that an audit is to be conducted.

When any audit is to be undertaken by the Principal, the Contractor must:

(a) 5 Business Days prior to the audit, submit to the Principal's Representative one copy of the following documents:

i. policies and manuals;
ii. Management Plans;
iii. management systems' procedures;
iv. inspection and test plan templates and record forms; and
v. design reports, environmental plans, safety plans etc;

(b) make available all records produced under the Contract;

(c) make suitable facilities available as agreed between the Principal's Representative and the Contractor, to accommodate the audit and audit team; and

(d) provide all reasonable assistance during the audit including the participation of representatives from the Contractor's organisation (and Subcontractors' organisation(s) if the scope of the audit warrants) who can efficiently locate and produce the requested information for the audit. Assistance from technical specialists will also be provided by the Contractor as required by the Principal's Representative during each audit.

Copies of documents submitted for the audit will be returned at the completion of the audit and finalisation of the audit report, if requested by the Contractor.

The Contractor must ensure that the audit report recommendations are actioned in accordance with appropriate corrective and preventive systems in a timely and agreed manner (refer to "TfNSW Project Compliance and Assurance - 9TP-ST-020"). The Contractor must provide the Principal with the necessary cooperation and assistance in the management of the collaborative audit program, closeout of audit actions and the reporting of progress on audit action closeout.

The Contractor must provide the Principal's Representative with a copy of the results of any self verification and any audit, when requested by the Principal's Representative.

8. Working In and Adjacent to the Rail Corridor and Rail Environment

The following requirements of this TSR P shall apply to the Contractor, except where indicated as "Not required" in Annexure A.

8.1. Operating Railway System

The Contractor acknowledges and agrees that:

(a) it is aware that Sydney Trains or another Operator/Maintainer may continue to use areas adjacent to the Site as part of normal operations of the railway system on a commercial basis during the undertaking of the Contractor's Activities;

(b) the continuance of normal operations of the railway system, including within the Rail Corridor, the Site, adjoining areas and railway stations, on a commercial basis by

Sydney Trains or another Operator/Maintainer during the performance of the Contractor's Activities must be maintained to the satisfaction of the Operator/Maintainer as notified by the Principal's Representative. The Contractor must ensure that the railway system operations and infrastructure are not impeded or interfered with by reason of the performance of the Contractor's Activities, except where this is approved in writing beforehand by the Principal's Representative;

(c) it must maintain and coordinate sufficient access to the railway system, for users and operators, so as not to hinder main traffic routes, including access to and from operating railway station platforms, ticketing areas and the Rail Corridor, and the flow of traffic, including on or accessing the Site and the adjoining areas, except where this is approved in writing beforehand by the Principal's Representative;

(d) it must, in performing the Contractor's Activities, do everything that could be reasonably expected of the Contractor to avoid Sydney Trains or another Operator/Maintainer breaching any obligation it may have arising out of or in connection with the continuing operation of the railway system on a commercial basis;

(e) it must ensure:

i. access and egress for Sydney Trains or another Operator/Maintainer and its contractors to the Site to undertake regular inspections and to complete maintenance and repairs of the operator's infrastructure where required;

ii. access and egress to those parts of the Site required by Other Contractor(s) are made available and coordinated so as to minimise any interference with or disruption to the Contractor's Activities; and

iii. emergency egress routes (including routes to the Rail Corridor and its support system) are maintained at all times and that emergency systems (including the Sydney Trains emergency warning intercommunication system and fire alarm panels) remain operational throughout the duration of the Contract;

(f) it must provide a safe place for persons carrying out Rail Track inspections and/or maintenance work, for example, refuges in any hoarding/fencing constructed adjacent to the Rail Track;

(g) it must comply with any Sydney Trains or other Operator/Maintainer standards applicable to the Works including for work that is adjacent to an operating rail line and to live overhead wires;

(h) it must ensure that whilst undertaking the Contractor's Activities, no employees or Construction Plant (including, for example, by the slewing of cranes) of the Contractor, Subcontractors or consultants enter an operating Rail Corridor, except as permitted by Sydney Trains "RailSafe Network Rules"; and

(i) it must at all times, and to the satisfaction of the Principal's Representative, carry out the Contractor's Activities in a manner that will ensure the safety of all property and persons, including the general public, travelling public, station lessees, railway traffic, railway system personnel, road traffic and any person associated or engaged in connection with the Contractor's Activities.

8.2. Arrangements for Track Possessions

The Track Possessions available to the Contractor are set out in the Contract.

Where power isolation is required, the Contractor must specify what power is required to be shut down and the time and duration required for the power isolation. This information must

be submitted to the Principal's Representative for review at least 16 weeks prior to each Track Possession.

For each Track Possession to be utilised by the Contractor, the Contractor must attend and incorporate the requirements from:

(a) the "Tier 6 Possession Coordination Meeting" with Sydney Trains held approximately 12 weeks prior to the Track Possession. This meeting will decide the coordination of all activities in the Track Possession, working hours, movements of equipment and work trains in the Track Possession area;

(b) the "Possession Coordination Meeting" with Sydney Trains held approximately two (2) weeks prior to the Track Possession to discuss train movements and safe working; and

(c) the "Pre-Possession Meeting" with Sydney Trains, usually held prior to the Track Possession to confirm the detailed arrangements for the Track Possession and coordinate the activities of each party working in the Track Possession.

If a Track Possession involves an asset or partial asset being handed over to the Asset Owner or Operator/Maintainer (even if only for maintenance prior to it being commissioned), a Commissioning event and formal Asset Handover will be required. In these circumstances, the following documents appertaining to the assets being handed over are required to be submitted to the Principal's Representative for review in accordance with the Contract at least six (6) weeks prior to the Track Possession:

(d) Safe Work Method Statements;

(e) residual risk assessments;

(f) configuration materials described in TSR T;

(g) Design Documentation; and

(h) any other documents required as directed by the Principal.

8.3. Additional Possessions

It is unlikely that, in addition to those specified in the Contract, weekend Track Possessions, the Operator/Maintainer's resources and/or Track Possessions (with or without power) in overnight periods when trains are not running, will be available for the Contractor's Activities. If the Contractor requires additional Track Possessions, power isolation and/or the Operator/Maintainer's resources, they are to be arranged by the Contractor at the Contractor's own cost. This includes reimbursing the Principal for any costs that it incurs in respect of granting the additional Track Possessions and procuring the Operator/Maintainer's resources. In the case of an alliance contract, the allocation of these additional costs will be in accordance with the commercial framework of the agreement.

The Contractor must provide a written request for additional Track Possessions or power isolation of overhead and transmission lines with a notice period as specified in the Contract.

Upon a written request by the Contractor, the Principal's Representative will seek to facilitate obtaining additional Track Possessions, power isolations and/or the Operator/Maintainer's resources for the Contractor by arranging a meeting between the Contractor and the Operator/Maintainer. At this meeting or subsequent meetings, possible dates for Track Possessions, power isolations and/or additional Operator/Maintainer's resources may be identified.

The Principal does not guarantee the granting of, and is not obliged to arrange additional Track Possessions, power isolations or Operator/Maintainer resources on any particular date, or at all.

8.4. Arrangements during Track Possessions

The Contractor may not have exclusive access to any Rail Tracks or areas within the vicinity of Rail Tracks during a Track Possession. The Contractor must coordinate the Contractor's Activities with those sharing the Track Possession, including parties involved in the operation or maintenance of the rail system and Other Contractors.

This includes, where required, the Contractor allowing for Operator/Maintainers' contractors and Other Contractors to pass through the worksite(s) during the Track Possessions. The extent of Operator/Maintainers' contractors' and Other Contractors' activities on or within the vicinity of the Rail Track during Track Possessions will be determined at the "Tier 6 Possession Coordination Meeting" referred to in clause 8.2.

The Contractor must ensure that all persons invited or brought onto the Site by the Contractor or Other Contractors, and those who enter an area within the Rail Corridor undertake all necessary Site inductions and obey all directions given by the Worksite Protection Personnel.

Prior to the end of the Track Possession, an appropriately qualified inspector holding the appropriate competencies must approve Completion of the relevant Works and sign off on "Sydney Trains Certificate of Practical Completion/Certification (W42F01)".

Any defects listed on W42F01 must be rectified by the Contractor to the satisfaction of the Principal within 5 Business Days of the issue of the relevant W42F01.

The Contractor must immediately comply with any instructions by the Principal's Representative to vary the program described in clause 8.5(b), or curtail the Contractor's Activities if the Principal's Representative considers that continuing with intended Contractor's Activities will result in a delay to returning the Track Possession and/or delay to trains.

The Principal may alter, cancel or curtail any Track Possession at any time.

If assets are being handed over to the Operator/Maintainer under a formal Asset Handover, then the Contractor must assist the Principal.

8.5. Planning and Managing Track Possessions

To ensure that Track Possessions are managed effectively and safely, the Contractor must:

(a) prepare, maintain and update policies and procedures for planning and managing Track Possession work in accordance with the Sydney Trains Possession Manual; and

(b) prepare and submit to the Principal's Representative for review for conformance with the "Sydney Trains Possession Manual", six (6) weeks prior to each Track Possession:

  (i) a consolidated plan comprising all information required in advance of the Track Possession including that detailed in the Sydney Trains Possession Manual; and

  (ii) a program including:

A. the elements of the Contractor's Activities to be completed prior to the Track Possession;

B. an hour by hour breakdown of the elements of the Contractor's Activities to be carried out during the Track Possession;

C. milestones and the time and date by which they must be achieved so as to ensure that the rail infrastructure can be reinstated within the allocated time and which, if not achieved by the nominated time, would result in the Contractor bringing work to an end and commencing reinstatement of the rail infrastructure and other works to avoid a delay in returning the Track Possession and/or delays to trains;

D. adequate allowance of time at the beginning and end of the Track Possession to safely remove and reinstate the affected rail infrastructure to operational condition and for providing and removing safeworking protection and the Operator/Maintainer inspections and certifications;

E. the specific risks to be managed during the Track Possession and the procedures to be followed in managing these risks;

F. any potential interface issue in any way connected with work carried out by an Other Contractor or involving the Operator/Maintainer's operational and maintenance activities; and

G. progress/program review meetings scheduled during the Track Possession as requested by the Principal's Representative and/or the Operator/Maintainer.

8.6. Certification of Work in Track Possessions

Before handover of an area at the end of any Track Possession the Contractor must provide to the Principal's Representative and, if required by the Principal's Representative, to the Operator/Maintainer; the following:

(a) for any form of civil or structural works that will support operating Rail Track, written certification by the Contractor's designers (including design Subcontractors) that the relevant works are safely able to support the operating rail infrastructure;

(b) for any adjustments to or interruptions of service to signalling, track, overhead wiring or high voltage infrastructure, written certification from the Contractor's designers (including design Subcontractors) that such infrastructure is suitable for operations and complies with the approved design;

(c) for any adjustments to or interruptions of service to signalling, overhead wiring or high voltage infrastructure, written certification from a Sydney Trains' (or other relevant Operator/Maintainer's) representative that such infrastructure is suitable for operations; and

(d) all other infrastructure certification required by Sydney Trains or the relevant Operator/Maintainer and/or Asset Owner.

9. Property Management

9.1. General Property Obligations

The Contractor is responsible for managing each Site and minimising the impact of the Contractor's Activities on adjoining owners during any investigations, early/enabling works, construction and Defects rectification activities. The Contractor must ensure it has the necessary legal rights to access the appropriate property prior to commencing the Contractor's Activities.

Clauses 9.1, 9.2, 9.3 and Annexure C of this TSR P apply to the extent noted in Annexure A.

9.2. Property Management Requirements for Less Complex Projects

9.2.1. Property Ownership and Rights of Access

Prior to commencing the Contractor's Activities, the Contractor must conduct property ownership searches (if lands are not supplied by the Principal) and undertake above ground and under ground property boundary surveys of every land parcel where structures are to be built and where the Contractor will occupy or access in support of the Contractor's Activities. The property surveys must include, but not be limited to, above ground property boundaries, below ground property boundaries, easements, stratums, existing building and structures, and any other line that dictates ownership, special rights or special obligations.

The Contractor must confirm with the Principal the properties that are affected by the Contractor's Activities (if lands or properties are not supplied by the Principal), whom the rightful property owners are, and prove that the Contractor has the rights to access the properties.

If the Contractor does not have the rights to access or occupy these properties, but requires access in order to execute its obligations under the Contract, this must be notified in writing to the Principal as soon as possible and in any event 13 months before works are scheduled to commence, unless otherwise agreed to by the Principal. Further, the Contractor must identify this access issue as a risk on its project risk register, apply an appropriate risk rating and assessment, and advise the Principal of the resultant outcome.

The Contractor must provide the Principal's Representative with evidence in the form of an agreement with the land owner that the Contractor can access and undertake Works on the properties for the duration of the project. This will most likely take the form of a licence, lease, contract, construction easement, access easement or temporary easement. The Principal may choose to assist in this regard.

The Contractor must not commence Contractor's Activities on any land where property ownership has not been identified, and the rights of the Contractor to undertake Works have not been confirmed by way of formal agreement, unless otherwise agreed to by the Principal. This is not required where the properties are owned by the Principal or Third Party Agreements exist.

Contractor's Activities to be undertaken on roads e.g. RMS owned lands or Council property, require a Work Authorisation Deed (WAD), Section 138 permit or other *Roads Act* 1993 (NSW) consent or agreement with the owner or authority. If this has not been undertaken by the Principal prior to the engagement of the Contractor, and it is not the Principal's responsibility under the Contract, the Contractor must negotiate the WAD or permit on behalf of the Principal to gain access to the lands and determine who will be the rightful owner of

the new structures, and who will be responsible for the asset management liability. The Principal must approve the content of the agreement before it is formally released to any external party (e.g. RMS and Councils) for negotiation and execution.

9.2.2. Neighbouring Property

The Contractor must identify all neighbouring land owners, tenants, businesses, occupants, who may be impacted by the Works and provide the Principal with a consolidated list that includes:

(a) addresses;

(b) land use (retail, residential, garage, etc);

(c) primary contact Name, phone number and email address;

(d) likely impact that works will have on neighbouring property; and

(e) any past correspondence.

If access to neighbouring property is required by the Contractor, and once the Contractor has discussed the necessity for such access with the Principal's Acquisitions Manager, the Contractor must comply with clause 9.2.1 above and the *Access to Neighbouring Land Act 2000* (NSW). In this case, the Contractor must prepare an application for access, provide the application to the Property Representative for review, and, once approved, submit the application to the local court.

9.2.3. Encroachment of Buildings

The Contractor must not build over property boundaries of adjoining owners. If the design and subsequent development consent specifies for the structures to be built over adjoining properties, the Contractor must ensure that the appropriate agreements are in place with the property owners prior to undertaking any works.

If the building is to be built over the adjoining property and no formal agreement has been reached with the adjoining property owner, the Contractor must cease work on this part of the Works and immediately notify the Principal.

Liability is solely with the Contractor if building works are illegally undertaken on adjoining property owner's land.

9.2.4. Property Subdivision and Amalgamation

To the extent that much of the property landscape has been changed through the nature of the Works and adjustments to property boundaries through subdivision are required, the Contractor is to notify the Principal of any new tenure requirements including easements, restriction on user, public covenants, stratum subdivisions or building management statements that will relate to the ongoing property asset management of the newly built structures.

All documentation is to be submitted and approved by the Principal prior to negotiations and lodgement of any documents.

9.2.5. Design Requirements

Where the design of any part of the Works is part of the Contractor's Activities the Contractor must include referenced drawings at all stages of design (including but not limited to approved for construction and as built drawings) clearly identifying property boundaries relative to all components of the Works.

9.2.6. Asset Management

Configurations materials prepared in accordance with TSR T and the Contract must include consideration of the following matters:

(a) who is, or will be, the property owner of the related property?

(b) who will be the future asset owner for the assets constructed under the project?

(c) who is responsible for property asset management after the completion of the project? and

(d) who is responsible for funding the property asset maintenance after completion of the project?

9.2.7. Property Compliance Checklist

The Contractor must prepare and submit to the Property Representative, the property compliance checklist contained in Annexure C, to demonstrate that all legal and contractual property related obligations have been met. The checklist must be submitted:

(a) 10 days prior to site occupation; and

(b) 10 days prior to construction commencement.

This property compliance checklist requires supporting documentation to be submitted and the Contractor must allocate sufficient time and resources to undertake the property related contractual obligations.

9.3. Property Management Requirements for More Complex Projects

9.3.1. Property Representative

In the event that the Principal has engaged a Property Representative (PR) for the project, the Contractor must work with the PR and provide the PR with access to the Site and all property records requested.

Any findings by the PR from site inspections or document reviews must be actioned within the timeframes reasonably required by the PR. The Contractor must provide written notification to the Principal that the findings of the PR have been closed out within the timeframes specified in the Property Management Plan or in the inspection reports.

9.3.2. Property Management Plan

Unless otherwise noted in Annexure A, the Contractor must have in place, maintain and consistently apply until Final Completion a Property Management Plan which describes the procedures and processes the Contractor will implement to manage property issues.

The timing for the initial submission of the Property Management Plan to the Principal's Representative for review in accordance with the requirements of the Contract is nominated in Annexure A of this TSR P.

The Contractor must progressively review, monitor, amend, update the Property Management Plan and submit for review in accordance with the requirements of the Contract, throughout the project, in accordance with Annexure A of this TSR P.

As a minimum, the content of the Property Management Plan should address the "Sections" listed in the table in this clause 9.3.2 below.

In addressing the requirements to prepare a Property Management Plan and in particular the Property Damage Management section, it is not acceptable for the Contractor to simply restate an obligation under this TSR P and provide an undertaking that the issue will be addressed. The Contractor must address each of the requirements with a high level of detail so that a reasonable person would understand how the Contractor intends to meet the Principal's requirements. In respect of those minimum "Sections" detailed in the table below, the Contractor must explain in detail how it will:

(a) identify, manage and record risks/contingent liabilities, stakeholders, impacted adjoining land and assets;

(b) manage and mitigate those risks directly related to the potential damage of property as a consequence of the Works;

(c) identify actual damage, how it occurred and how that damage will be rectified;

(d) identify disputes in relation to damage and how each dispute will be processed, managed and resolved; and

(e) manage project relations with all adjoining owners and the Principal.

None of the requirements expressed in subclauses (a) to (e) above derogate from any other stated obligations or requirements of this TSR P. The Contractor must comply with all stated requirements of the Property Management Plan.

Section	Title
1	Definitions
2	Project Description
3	Objective
4	Key Resources and Management
5	Requirements
6	Property Condition Surveys
6.1	Pre-construction Condition Surveys
6.2	Refusal or Lack of Response for Condition Surveys
6.3	Compliance Review of Condition Surveys
6.4	Distribution of Property Condition Surveys
6.5	Condition Survey Register
6.6	Post-construction Condition Surveys
7	Property Damage Management
7.1	General Overview
7.2	Notification Process
7.3	Assessment Process
7.4	Damage Rectification
7.5	Unresolved Claims
7.6	The role of an independent Property Damage Assessor
8	Ongoing Property Monitoring
8.1	Monitoring Frequency

Section	Title
8.2	Monitoring of Track and Structures
8.3	Distribution of Monitoring Data
9	Heritage – (if not covered in TSR E)
10	Communications – (if not covered in TSR C)
10.1	Communication Management Systems
10.2	Enquiries and Complaints
10.3	Evaluation and Reporting
11	Self Verification Checklist
Attachment 1	Complaint Resolution Process
Attachment 2	Property Damage Claim Process Flowchart
Attachment 3	Sample letter requesting permission to conduct a property condition survey
Attachment 4	Sample letter of introduction for property condition survey staff
Attachment 5	Sample covering letter for property condition report

9.3.2.1. Property Damage Management

The Property Damage Management section of the PMP must detail the procedures and processes the Contractor will implement to minimise, detect, assess, mitigate and rectify damage to property caused by or as a result of the Contractor's Activities. This will require the Contractor to undertake a risk assessment prior to any Site works in order to identify property and items that could be affected or damaged by the Contractor's Activities. Factors to consider when determining an asset's susceptibility to damage must include, but are not limited to, maximum levels of movement or angular distortion, or strain, or settlement or deflection or groundwater draw down.

The Property Damage Management section of the PMP must cover all property (including assets above and below ground) on and adjacent to the Site and in the sphere of influence of the Contractor's Activities including, but not limited to, premises, access roads and their surroundings, buildings, structures, utilities and services, rail assets and systems (including all property and rolling stock owned by others), roadways, footpaths, street furniture and gutters.

The plan must set out the following:

(a) the damage mechanisms, including trials of construction procedures and methods to help assess the risk of property damage;

(b) noise, vibration and settlement limits that will prevent the damage of existing property and items by the Contractor's Activities. The Contractor must transfer these criteria into method statements and inspection and test plans to ensure that any Contractor's Activities are within the above limits and minimise damage risks. The plan must include procedures for the review of, and change to, construction methodologies to minimise or prevent damage;

(c) a list of properties with the potential to be detrimentally or negatively affected by the Contractor's Activities; and

(d) a list of the properties and assets which will be subject to a condition survey by the Contractor. The Principal's Representative may direct the Contractor to include additional properties and assets if it considers they have the potential to be damaged as part of the Contractor's Activities and a Principal nominated person may attend the undertaking of condition surveys.

9.3.2.2. Pre-construction property condition surveys

The Contractor must carry out pre-construction property Condition Surveys to record the existing condition of adjoining land and properties prior to construction and to assess the susceptibility of critical Services or structures or buildings to damage or unacceptable changes or alterations as a result of the Contractor's Activities.

The property condition survey section of the PMP must describe the Contractor's proposed approach to performing condition surveys. The plan must as a minimum:

(a) set out the minimum standards of pre-construction and post-construction condition surveys;

(b) include a procedure for the use of an independent third party to ensure compliance against the minimum standard of condition surveys; and

(c) describe how the Contractor will minimise disruption to property owners and occupiers by completing single condition surveys in agreement with Other Contractors and Subcontractors.

In addition to the requirements set out in the Contract and the TSRs, the Contractor must comply with all requirements for condition surveys and ongoing monitoring set out in Third Party Agreements.

9.3.2.3. Condition surveys of buildings

The Contractor must ensure that the processes and procedures for performing all condition surveys on buildings and / or other infrastructure facilities are based on industry best practices. Examples of acceptable standards for condition surveys of buildings include:

(a) sections 4 and 5 of the "Royal Institute of Chartered Surveyors (RICS) Guidance Note 63/2010 Building surveys and technical due diligence"; and

(b) "AS 4349 Inspection of Buildings – General Requirements", and with specific regard to the heritage elements within the Site and Remote Sites.

The Contractor's reports on condition surveys of buildings must as a minimum record the following features:

(c) major features of the buildings and developments including location, type, construction, age and present condition, including any defects or damage;

(d) type of foundations including columns, walls and retaining structures;

(e) an assessment of the susceptibility of the building to further movement or stress;

(f) an assessment of the effectiveness of water-proofing systems in basements to the anticipated movements caused by the Contractor's Activities; and

(g) an assessment of the susceptibility of the building to changes in water levels resulting from the Contractor's Activities.

Existing levels of aesthetic damage are to be 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.

9.3.2.4. Construction Phase Monitoring

The Contractor must implement a monitoring and inspection regime for properties with the potential to be detrimentally or negatively affected by the Contractor's Activities. The monitoring and inspection regime must address the requirements of the Contract, the Planning Approvals and Third Party Agreements and agreements made with any Authority. The Contractor must also comply with the project-specific requirements for the construction phase monitoring set out in Annexure A and include these requirements in the Property Management Plan.

For activities in or adjacent to the Rail Corridor, the Contractor must implement specific monitoring regimes and emergency and response procedures for all Contractor's Activities close to or under, and likely to affect, live rail track in accordance with RailCorp monitoring standards.

The PMP must contain a clear statement that all Contractor's Activities causing any damage will cease until the construction methodology is reviewed and damage rectification agreed with the property owner and the Principal's Representative.

9.3.2.5. Post-construction property condition surveys

Within one month of Completion and again at the times specified in Annexure A, the Contractor must perform a post-construction condition survey on each property previously subject to a pre-construction property condition survey and construction phase monitoring.

The Contractor must ensure that post-construction property condition surveys are performed to the same standards as the pre-construction property condition surveys. The Contractor must ensure that the same surveyor performs both the pre construction and post construction condition surveys on a particular property.

The Contractor must submit all post-construction property condition survey reports to the Principal's Representative for review within 10 Business Days of the survey. 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 property's condition.

The post-construction property condition survey report(s) must include a determination of the cause of any monitored change or damage identified (if any) since the pre-construction or previous construction survey(s) and the Contractor's proposed remedial works or activities. If any damage is found to have been caused by the Contractor's Activities, the Contractor must:

(a) provide the Principal's Representative with a proposal setting-out the remedial action required; and

(b) obtain the property owner's acceptance, in a form agreed to by the Principal, of the compensation, repair or reinstatement work, and release from future claims and actions.

If no damage is found to have been caused by the Contractor's Activities, the Contractor must:

(c) write to the property owner and provide a copy of both reports for the property owner's records; and

(d) provide the Principal's Representative with a copy of all records for its future reference.

9.3.2.6. Communication and claims management

The Property Management Plan should restate the Contractor's procedures for communicating with property owners and for managing property damage claims including:

(a) provision of routine and regular advice to property owners and occupiers about the Contractor's Activities in close proximity to and with the potential to detrimentally or negatively affect their property;

(b) receipt and recording of reports of and/or claims relating to damage thought to be associated with the Contractor's Activities, the Temporary Works and/or the Works; and

(c) processes and procedures for the management and resolution of any property damage claims.

The Contractor must also provide an update on the status of claims in each monthly report per clause 6 of this TSR P.

9.3.3. Policy

The PMP(s) must include a Contract-specific property policy that commits the Contractor to meet the property requirements of the Contract. In the case of an alliance contract, the policy must be signed by all members of the alliance leadership team. For all other contracts the policy must be signed by the Contractor's Chief Executive Officer or a person with suitable delegated authority.

The policy must be explained to and understood by the employees of the Contractor and Subcontractors.

9.3.4. Planning

With the exception of an alliance contract, the Contractor must fulfil all the conditions and requirements of the Planning Approval (Conditions of Approval and Statement of Commitments) except to the extent that the Contract allocates responsibilities to the Principal. Where the Contractor is responsible and a submission to an approval Authority is required, the Contractor must provide a submission to the Principal's Representative for review in accordance with the requirements set out in the Contract prior to issue to the relevant approval Authority. The Contractor is to address any comments provided by the Principal's Representative and provide a final submission to the Principal with a request to forward to the relevant Authority. The Principal may provide additional comments to the Contractor should the previous comments not be adequately addressed or additional information has been received by the Principal. The Contractor is not to communicate (phone, mail, email etc) directly with approval Authorities unless written consent is provided by the Principal and a communications protocol has been established.

In the case of an alliance contract, the alliance must fulfil the requirements set out in the Planning Approval and Annexure A with respect to the following:

(a) identifying and obtaining all necessary Approvals including the Planning Approval; and

(b) fulfilling all the conditions and requirements of the Planning Approval (Conditions of Approval and Statement of Commitments).

Consistency checklists, in the format provided by the Principal unless otherwise agreed, are to be completed by the Contractor and provided to the Principal's Representative for review in accordance with the requirements of the Contract in circumstances where project works are likely to deviate from the approved project.

Should the Works be found not to be consistent with the approved project, the Contractor may request the Principal seek a project modification. Under such circumstances, it is the Contractor's responsibility to provide the necessary reports, studies and final submission to the Principal to justify the modification. Any modification must detail property impacts.

The Contractor must track compliance with Planning Approvals by using PECOMS, as described in TSR E.

9.3.5. Design Requirements

Where the design of any part of the Works is part of the Contractor's Activities the Contractor must include referenced drawings at all stages of design (including but not limited to approved for construction and as built drawings), clearly identifying property boundaries relative to all components of the Works.

9.3.5.1. Property Risk Assessment

The Contractor must undertake a comprehensive and Site-specific property risk assessment in conjunction with the Contractor's construction personnel and in consultation with the Property Representative, prior to the commencement of early works (including pre-construction works). A staged risk assessment may be utilised, upon agreement with the Principal. This risk assessment must identify the property aspects and actual and potential property impacts of the Contractor's Activities and the control measures that are required to be implemented in order to provide property protection in accordance with the requirements of the Contract. With respect to the Site (and where the Site is at more than one location, for each part of the Site), this risk assessment is to include:

(a) permanent and temporary worksite access requirements and timing;

(b) access to or across adjoining properties and timing;

(c) crane swings, air rights and impacts on neighbouring properties or the Rail Corridor;

(d) access to Services;

(e) any future subdivision, easements, other title interests or divestment requirements;

(f) any future commercial impacts of resultant works; and

(g) Site investigation and contamination.

9.3.5.2. Works to be constructed within the boundaries

The Contractor must ensure that the Works are constructed within the property boundaries (including air or subsurface stratum) of the Site. The Contractor must:

(a) procure for itself and at its own cost the occupation or use of or relevant rights over any land or buildings in addition to the Site, including any land owned by RailCorp or other property owner, which is necessary or which it may require for the purposes of carrying out the Contractor's Activities; and

(b) at its own cost carry out all activities and procure all Services necessary to make the land or buildings suitable for use by the Contractor.

9.3.6. Implementation

9.3.6.1. Resources and Responsibilities

The Contractor must provide sufficient resources on-site and off-site to ensure effective implementation of the PMP.

The Contractor must appoint a site-based person to be the Contractor's property representative. This representative must be present during all inspections undertaken by the PR.

9.3.6.2. Property Requirements as Part of Site Inductions

The Contractor must ensure its employees and the employees of Subcontractors engaged in carrying out the Contractor's Activities on the Site are inducted and trained in any property requirements of the Contract to achieve a level of awareness and competence appropriate to their assigned activities.

The property requirements of the induction must include informing the relevant persons of Site boundaries, parking and vehicle delivery restrictions, Third Party Agreements, limitation of access rights and access procedures to minimise all potential property impacts including property damage, disturbance and any other property matters.

Any person who has not been inducted must not work on the Site.

9.3.6.3. Training and Awareness

The PMP(s) must include a site-specific training program (e.g. toolbox talks). The site-specific training is to cover all relevant property issues and must include direction on the Site limitations, access and delivery procedures and recording and notification procedures for potential property damage, disturbance or loss of trade claims.

9.3.6.4. Notification of Incidents

All property incidents and noncompliances must be reported to the PR and the Principal's Representative.

9.3.6.5. Pre Construction Land Surveys

The Contractor must verify survey control for the Contractor's Activities and must:

(a) avoid, where reasonably possible, disturbance of existing survey marks and must re-establish any such marks disturbed or affected by the Contractor's Activities;

(b) carry out boundary and engineering surveys in accordance with the *Surveying and Spatial Information Act 2002* (NSW) and the *Surveying and Spatial Information Regulation 2012* (NSW)*;*

(c) prior to commencing any activity which could affect existing infrastructure (including roads, railways, utility services and buildings), undertake a survey to identify and record the location of the construction site boundary in relation to existing infrastructure; and

(d) provide the Principal with reports on the location of the construction site boundary in relation to existing infrastructure prior to commencing the relevant Contractor's Activity.

9.3.6.6. Post Construction Land Surveys

The Contractor must comply with the requirements of the Contract in relation to land surveys.

9.3.7. Principal Raised Nonconformity, Corrective Action and Preventative Action

The Principal may advise the Contractor of nonconformances and deficiencies in relation to property matters and the Contractor must deal with and close-out the nonconformances or deficiencies using its own compliance system. Any requirements incorporated into any such written advice must be responded to by the Contractor within 14 days, unless otherwise agreed with the Principal's Technical Director Project Property Services.

The Contractor must also comply with the requirements of "AS/NZS ISO 9001 Quality Management Systems – Requirements" in relation to the identification, management and addressing of property nonconformance, corrective action and preventative action.

9.3.8. Property Compliance Register

Without limiting the Contract, the Contractor acknowledges and agrees that during occupation of the Site and Extra Land it must comply with all Laws applicable to the Site and Extra Land, and any relevant Third Party Agreements. To assist the Contractor, the Principal has developed a non-exhaustive "TfNSW Property Compliance Register - 2TP-ST-175" which lists the applicable legislation.

9.3.9. Property Records

The Contractor must provide the records described in Annexure A.

One original and one copy (one of which is unbound) and an electronic copy in both PDF and native formats (such as Microsoft Word, Microsoft Excel, CAD in *.dwg or *.dgn) of each document (including draft and final reports, specifications, drawings, plans, etc) must be forwarded to the Property Representative. The latest version of each record must also be provided at the requested intervals.

10. WHS

To the extent an issue regarding the health and safety of any person is identified within this TSR P, the Contractor must have regard to TSR S and to the principle that the Contractor must ensure the highest level of safety of all persons who may be affected by the project.

ANNEXURE A – Additional Project Requirements

Additional Project Requirements

A1 Traffic Control Plan clause 3.6 TSR P

Requirement	Applies?	Reference
Is a Traffic Control Plan required ?	Yes	Clause 3.6

A2 Contractor's Program clause 4 TSR P

Clause	Item	Requirement	Add Insertion
4.0	Contractor's Program	Monthly updates required commencing from a specified date	1st business day of each month
		Baseline schedule requirement	Is base line schedule required? Yes
		Baseline schedule submission	10 days after Contract Award

A3 Management Plans clauses 2, 3, 5 and 9.3 TSR P

Clause	Management Plans	Is Management Plan Required?	Timing for Initial Submission for Review	Frequency of Update
2	Contract Management Plan	Yes	30 Business Days after the date of the Contract	Every 6 Months as a minimum or as significant changes occur
3.1	Construction and Site Management Plan	Yes	Concurrent with first SDR review	Every 6 Months as a minimum or as significant changes occur
3.2	Risk Management Plan	Yes	15 Business Days prior to the commencement of design	Every 6 Months as a minimum or as significant changes occur
3.3	Commuter and Passenger Management Plan	No	N/A	N/A
3.4	Human Resources Management Plan	Yes	30 Business Days after the date of the Contract	Every 6 Months as a minimum or as significant changes occur

Clause	Management Plans	Is Management Plan Required?	Timing for Initial Submission for Review	Frequency of Update
3.5	Workplace Relations Management Plan	Yes	30 Business Days prior to commencement of Site Mobilisation	As Required
3.6	Traffic Management Plan	Yes	30 Business Days prior to commencement of Site Mobilisation	As Required
3.7	Defect Management Plan	Yes	30 Business Days prior to commencement of Site Mobilisation	As Required
9.3	Property Management Plan	Yes	30 Business Days after the date of the Contract	Every 6 Months as a minimum or as significant changes occur

A4 Principal's Document Management Tool clause 5.2 TSR P

Clause	Requirement
5.2	Yes, the Principal will administer the Contract document deliverables using the Principal's electronic document management tool.
	The nominated electronic document management tool is Team Binder

A5 Working in and Adjacent to the Rail Corridor and Rail Environment clause 8 TSR P

Clause	Requirement
8	The Operating Railway System and Track Possessions - Required

A6 Property clause 9 and Annexure C TSR P

Clause	Does Clause Apply?
9.1 General Property Obligations	Yes
9.2 Property Management Requirements for Less Complex Project	Yes
9.3 Property Management Requirements for More Complex Project	No
Annexure C	Yes

A7 Construction Phase Monitoring clause 9.3.2.4 TSR P

General Requirement	Project Specific Requirement
The Contractor must comply with the following project-specific requirements for the construction phase monitoring set out in Annexure A and include these requirements in the Property Management Plan.	Nil

A8 Post-construction property Condition Surveys clause 9.3.2.5 TSR P

Requirement	Interval Frequency
Within one month of Completion and again at times specified in Annexure A, the Contractor must perform a post-construction condition survey on each property previously subject to a pre-construction property condition survey and construction phase monitoring.	Nil

A9 Alliance Contract (Planning) clause 9.3.4 TSR P

Description	Requirement
Identifying and obtaining all necessary Approvals including the Planning Approval.	Not Applicable
Fulfilling all the conditions and requirements of the Planning Approval (Conditions of Approval and Statement of Commitments).	Not Applicable

A10 Submission of the Property Records clause 9.3.9 TSR P

The Contractor must provide the following records to the Property Representative:

Required Record or Reference	Record Required?
Property Management Plan	Yes
List of who holds issued documents on a register of current document issue/revisions	No
Index of all property records (prior to Completion)	No
Personnel and provider qualifications/skills and competency records	No
Induction and training records	No
Property Control and Constraints Maps (Worksite maps)	Yes
Identified property stakeholders within the complaints list as identified by the Principal	Yes
List of all adjoining property owners and details of all interaction / communications	Yes

Required Record or Reference	Record Required?
Evidence of property inputs/outputs within the design development process including any sustainability initiatives	No
Surveillance, audit of subcontractors property performance and controls	Yes
Contractor's nonconformance reports and register	Yes
Transport Projects property non-compliance reports	Yes

A11 Project specific amendments to TSR P

Clause/Para/Line	Project Specific Requirement
N/A	Nil Amendments

ANNEXURE B – List of Reference Documents

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List of Reference Documents

- TfNSW Project Compliance and Assurance - 9TP-ST-020
- TfNSW Property Compliance Register - 2TP-ST-175
- TfNSW Earned Value Management using Primavera P6 - 4TP-PR-143
- AS 4817-2006 - Project Performance Measurement using Earned Value
- ISO 3100 (Risk Management Guidelines and Principles)
- NSW Government Aboriginal Participation in Construction Guidelines January (2007), Nominated Category 3
- NSW Government Training Management Guidelines February (2009), Nominated Category 1
- RTA Traffic Control at Worksites Manual
- AS 1742.3-2009 Part 3 - Spoil Control Devices for Works on Roads
- RTA Guideline Traffic Control at Worksites 4th Ed (June 2010)
- TfNSW Scenario - Defect Management - 4TP-PR-158
- Sydney Trains - RailSafe Network Rules
- Sydney Trains - RailSafe Network Procedures
- Sydney Trains Certificate of Practical Completion/Certification
- Sydney Trains Possession Manual
- Royal Institute of Chartered Surveyors (RICS) Guidance Note 63/2010 Building surveys and technical due diligence
- AS 4349 Inspection of Buildings – General Requirements
- Building Damage Classification, by Burland et al, 1977 and Boscardin and Cording, 1989
- AS/NZS ISO 9001

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ANNEXURE C – Property Compliance Checklist

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Property Compliance Checklist Pre Site Occupation/Pre Construction Commencement

Compiled by: _____

On behalf of: _____

Contract #: _____

Date: _____

#	Issue	Circle relevant answer and add comment	Attachment
1	Has the Contractor been liaising with the Principal's Property Manager?	Y N NA Comment: [insert text here]	
2	Have all properties affected by the project been identified?	Y N NA Comment: [insert text here]	
3	Has a list of all affected properties been issued to the Principal?	Y N NA Comment: [insert text here]	
4	Are all properties owned by the Principal?	Y N NA Comment: [insert text here]	
5	Is access required to properties owned by other parties?	Y N NA Comment: [insert text here]	
6	Are all agreements in place with other landowners to permit the contractor to undertake the works?	Y N NA Comment: [insert text here]	
7	Have all surveys been conducted?	Y N NA Comment: [insert text here]	
8	Have all surveys been cross-checked with the designs?	Y N NA Comment: [insert text here]	
9	Do any of the proposed works fall outside the property / site boundaries?	Y N NA Comment: [insert text here]	
10	If so, has the Contractor got agreements to build on the adjoining land?	Y N NA Comment: [insert text here]	
11	Are new easements, stratums, MOU's or WAD's with stakeholders required for the project?	Y N NA Comment: [insert text here]	
12	Have any new easement, stratums, MOU's or WAD's been drafted and issued to the Principal for review?	Y N NA Comment: [insert text here]	
13	Have all property Pre-Condition Surveys been conducted and submitted?	Y N NA Comment: [insert text here]	

#	Issue	Circle relevant answer and add comment	Attachment
14	Has the Asset Management Plan been considered in design?	Y N NA Comment: [insert text here]	
15	Are there any other property risks?	Y N NA Comment: [insert text here]	

RECEIVED by TfNSW

Signed: _____

Received by: _____

Date: _____

REVIEWED by Property Representative

Signed: _____

Name: _____

Date: _____

Acceptable? (Conforms to contract requirements): Y/N provide reasons:

Comments provided: Y/N (attach comments)

No Comments or no further Comments: Y/N

TfNSW Standard Requirements

TSR S - Safety Management

5TP-FT-332/4.0

Template Applicable to:

Transport Projects

Quality Management System

Status:	Approved
Division:	Transport Projects
Version:	4.0
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Table of Contents

Document History

Version	Date of Approval	Summary of Change
V3.0	1 July 2013	Edits to reflect the new Rail Safety National Law. Remove "RailCorp" to reflect establishment of ASA, Sydney Trains and NSW Trains. Revised incident reporting (INX InControl) and hazard reporting.
V4.0	1 July 2014	New version following TSR rationalisation initiative.

1. Introduction

1.1. Purpose

The requirements of this TSR S Safety Management reflect reasonably practicable steps that the Contractor is capable of implementing to ensure compliance with the Rail Safety National Law and WHS Legislation. This TSR S - Safety Management must be read in conjunction with the Contract. The Contractor warrants that it will comply with this TSR S.

Unless noted otherwise in Annexure A - Additional Project Requirements, all requirements specified in this TSR S – Safety Management apply to the Contract.

TSR S – Safety Management forms part of the Principal's consultation with the Contractor on matters of rail safety and safety generally. It enables the Principal to share its experience and learnings with the Contractor.

The Contractor acknowledges and agrees that the Principal's business or undertaking does not include performing any aspect of the Works and the Principal does not possess expertise in the provision of the Works. The Principal has relied on the Contractor's warranty in this TSR S.

1.2. User Instructions

Unless noted otherwise, wherever used in this TSR S – Safety Management, words and phrases have the meaning given to them in the General Conditions and/or the TSR Prelude.

2. Managing Health and Safety

The Contractor must manage health and safety in accordance with the WHS Legislation, Codes and Standards, NSW Government Guidelines and contractual requirements. The Contactor must ensure compliance, by it and those persons it exercises control over, with relevant Laws, the Rail Safety National Law, Codes and Standards, codes of practice and contractual requirements as a minimum.

The Contractor must identify who will be fulfilling the role of Senior Management Representative responsible for implementing and maintaining the safety requirements of this TSR S (including monitoring the effectiveness of the Contractor’s safety management system in complying with all safety requirements) and reporting to the Principal’s Representative.

The Project Work Health and Safety Management Plan, as described further in clause 4, must document how the safety management system will be communicated to all persons associated with the Contractor’s Activities such that it is incorporated into the Contractor's Activities.

3. Safety Culture

The Contractor must continuously promote a safer, healthier, more productive workplace. The Contractor must establish and maintain an effective safety management system that facilitates the flow of information both within the Contractor’s organisation and between the Contractor's organisation, Subcontractors and, as required, the Principal.

The Contractor must provide strong leadership and promote safety as a core value, establishing and enforcing high standards of performance and ensuring relevant expertise is available.

The Contractor must ensure open and effective consultation and further mutual trust with the Principal, providing timely response to safety issues and concerns.

The Contractor must ensure the safety management system and the safety culture supports:

(a) senior management commitment to safety;

(b) commitment to work with the Principal to develop project-specific lead and lag Key Performance Indicators;

(c) shared care and concern for hazards;

(d) workers to adapt to their changing environment where required;

(e) organisational learning through monitoring, analysis and feedback systems;

(f) methods for providing feedback and set timeframes for such provision;

(g) methods to communicate and share learning from successes and failures;

(h) the encouragement of teamwork and of worker involvement in promoting and maintaining a positive safety culture;

(i) methods to demonstrate how site safety rules will be reflected in the practice on it and how such rules will be incorporated into the Contractor's Activities; and

(j) methods to enable the ongoing development of safety improvements developed in consultation and communication with the Principal's Representative, as required.

4. Contractor's Project Work Health and Safety Management Plan

4.1. Scope

The Contractor must develop a Project Work Health and Safety Management Plan which includes any relevant site-specific work health and safety management plans. Within fifteen days after the date of the Contract, the Contractor must submit the "Project Work Health and Safety Management Plan" to the Principal's Representative. The Principal's Representative may review that plan in accordance with the requirements of the Contract.

The Project Work Health and Safety Management Plan must document the Safety Management System to be applied to the delivery of the contract.

The plan must make provision for development of procedures to meet the safety management requirements stated in the contract, Law and this TSR S and comply with the "NSW Government Work Health and Safety Management Systems and Auditing Guidelines". The plan must be updated to reflect any relevant changes.

4.2. Health and Safety Risk Management

The Project Work Health and Safety Management Plan must include how the Contractor will manage risks in accordance with "AS/NZS ISO 31000:2009 - Risk Management". The Contractor must:

(a) eliminate all risks to health and safety so far as is reasonably practicable; and

(b) if it is not reasonably practicable to eliminate risks to health and safety; minimise those risks so far as is reasonably practicable applying, maintaining and reviewing the prescribed Hierarchy of Control Measures.

As part of the determination of whether risks have been eliminated or minimised so far as is reasonably practicable, the Contractor shall review, and record the review of the Principal's Generic Work Health and Safety Operational Risk Register - 30-SD-101 and where the Contractor's Activities involve Rail Safety Work, the Contractor shall also review the Generic Rail Safety Risk Register - 30-SD-038.

The Contractor must maintain a register of risks which includes:

(c) a description of the risk/hazard and its likely impact;

(d) the risk level assessed for each hazard;

(e) specific control measures, including safe work methods to be implemented to eliminate or mitigate risks;

(f) the residual risks/hazards;

(g) methods to be used to monitor effectiveness of safe work methods and control measures;

(h) the person(s) responsible for monitoring implementation of the control measures;

(i) consultative processes employed by the Contractor in relation to the risk/hazard and the persons involved; and

(j) demonstrable application of the Hierarchy of Control Measures undertaken to lessen the risks so far as is reasonably practicable.

In addition the Principal has detailed a number of control measures that are expected to be deployed, unless a more robust risk control is applied through a process of risk assessment. These control measures are set out in subclauses 4.2.1 to 4.2.7 inclusive.

4.2.1. Construction Plant

The Contractor must ensure that all Construction Plant is properly operated and maintained in accordance with the manufacturer's instructions and in accordance with the *Work and Safety Regulation 2011* (NSW) and the associated codes of practice, so as to ensure that it poses no risk to the health and safety of any person on the Site or on land adjoining the Site.

The Contractor must also:

(a) ensure that quick hitch attachments fitted to excavators and other earth moving machinery are of the fully automatic type with a secondary locking attachment. The secondary attachment is to be capable of preventing the excavator attachment from releasing in the event of a partial or total failure of the power supply or when the operator stops operating the machine. All half-hitch, mechanical-hitch, form-lock, semi-automatic types are prohibited; and

(b) where mobile plant's operating envelope is capable of encroaching within 3m of the Danger Zone or the safe approach distance to live electrical infrastructure, implement the use of programmable zone limiting devices that limit the hoisting and/or slewing and which are designed to be "fail safe" or which meet Category 4 reliability in accordance with "AS4024.1 Safeguarding of Machinery" or a SIL of 3 under "AS 61508 Functional safety of electrical / electronic / programmable electronic safety-related systems".

4.2.2. Electrical Safety

The Contractor must control the risks associated with electrical safety which accords with all relevant Codes and Standards and Laws, including WHS Legislation. These controls must take into account that live work is not permitted and isolated circuits are to be treated as live until they have been proven dead by testing.

4.2.3. Use of Portable Earphone Equipped Music Devices

The use of portable earphone equipped music devices is prohibited.

4.2.4. Fires or Burning Off

Fires or burning off will not be permitted anywhere on the Site.

4.2.5. First Aid and Emergency Arrangements

The Contractor must manage the provision of first aid for the Contractor's Activities in accordance with the WHS Legislation.

In addition the Contractor must provide a defibrillator (and suitable training in its use for its senior first aid personnel) at each major first aid location, and must ensure persons trained in the use of the defibrillator are on Site at all times.

4.2.6. Reference Checks

The Principal's Representative may direct the Contractor to undertake police criminal record checks for any of the Contractor's and Subcontractor's employees. The Contractor must develop procedures on how such checks will be undertaken and how the results will be treated in confidence.

The Principal's Representative must be promptly notified of the results of these checks if any offences have been recorded. The Principal's Representative may review the results of the checks and consider whether those records pose a potential risk to the Works or any person on Site. The Principal's Representative may then liaise with the Contractor to discuss any action that should be taken. The Principal's Representative may direct the Contractor to immediately remove a person, on the basis of their criminal record, from the Site and prevent that person from continuing to undertake any of the Contractor's Activities.

4.2.7. National Counter Terrorism Alert Levels

The Contractor must:

(a) ensure that the security management of the Works reflects the National Counter Terrorism Alert Levels;

(b) develop procedures to communicate and respond to changes in the National Counter Terrorism Alert Levels; and

(c) document how notification of a terrorism incident will be made to the Principal's Representative and law enforcement authorities, and the roles and responsibilities of the Contractor's employees and Subcontractors in such an event.

4.3. Safe Work Method Statements

Before work commences the Contractor must provide Safe Work Method Statements (SWMS) for the proposed work. The Contractor must also ensure that work is carried out in

accordance with the SWMS for the work. The Contractor must ensure that a SWMS is reviewed and, as necessary, revised if relevant control measures are revised.

All SWMS, regardless of whether they are authored by the Contractor or Subcontractors, must, unless otherwise directed by the Principal's Representative, be submitted to the Principal's Representative at least seven days prior to the commencement of any significant construction activity. The Principal may review any submitted SWMS. All SWMS must be listed on a consolidated SWMS register that shall be proactively maintained and communicated to the Principal's Representative no less than monthly.

The Contractor acknowledges and agrees that by exercising its right under clause 4.3, the Principal is not assuming any management or control of the Site or the Works and is only receiving the SWMS information to monitor the Contractor's compliance with its obligations under this Contract and/or applicable Laws, including the WHS Legislation and/or the Rail Safety National Law.

5. Safety Incident Reporting, Investigation and Recording

The Contractor must notify the Principal's Representative of any Incident and comply with the requirements of the "NSW Government Work Health and Safety Management Systems and Auditing Guidelines" and clauses 5.1 and 5.2 below.

5.1. Recording of Incidents

The Contractor must immediately notify the Principal's Representative of any Incident and record the Incident by using the "INX InControl Incident Management System "INX". Should INX not be accessible, the Contractor must report in a manner that enables effective subsequent recording in INX.

Should an Incident occur which relates to rail safety, the Contractor must immediately notify the relevant Rail Transport Office or the nearest network control officer.

All Regulatory Notifiable Incidents or occurrences must be reported immediately to the Principal's Representative and to the relevant Regulator/s.

Where any type of notice, infringement or fine by a Regulator has been issued to the Contractor in relation to undertaking the Contractor's Activities, the Contractor must immediately notify the Principal's Representative.

5.2. Investigation of Incidents

The Contractor must undertake investigation of all minor and major near-miss or actual Incidents. The minor investigation must be recorded within INX utilising the minor investigation template contained therein. Minor investigations must be completed within (28) days of the incident.

The Principal's Representative may direct the Contractor to undertake a major investigation into an Incident or potential Incident, utilising the major investigation template contained within INX. Major investigations must be completed within (42) days of the incident.

Terms of reference for major investigations will be issued by the Principal's Representative. If a major investigation requires the appointment of an external independent investigator, the Contractor shall bear the cost of the investigation.

The Principal's Representative may participate in any investigation being undertaken by the Contractor or initiate its own investigation. If the Principal's Representative instigates its own investigation the Contractor must provide the Principal's Representative with all assistance reasonably required for the purposes of the investigation, this includes the waiver of legal professional privilege over any investigation report prepared by, or on behalf of, the Contractor. The Parties may agree that any investigation report that is subject to legal professional privilege may, between the Contractor and the Principal, be subject to a common interest privilege.

5.3. Safety Performance Reporting

The Contractor must provide monthly safety statistics electronically to the Principal's Representative, by the 25th of the month.

6. Alcohol and Other Drugs

A policy of zero tolerance of alcohol and illegal drug use applies to projects carried out for or controlled or managed by the Principal. Alcohol and illegal drugs are not permitted on any Site or on premises controlled or managed by the Principal.

The Contractor must develop policies and procedures to ensure this policy of zero tolerance of alcohol and other drugs is adhered to at all times. The Contractor must develop and implement effective alcohol and drug testing procedures in line with relevant Laws.

The Contractor must ensure that all persons associated with the Contractor's Activities (including the Contractor's personnel, visitors, Subcontractor workers and agents) are aware of their obligations to comply with all alcohol and drug requirements.

The Principal prohibits any persons under the influence of alcohol or drugs from working on any projects carried out for or controlled or managed by the Principal, regardless of their work location. Prescription and over-the-counter drugs may also affect a person's ability to work safely and the Contractor, in consultation with the Principal, will determine its policy in relation to prescription and over-the-counter drugs on a case by case basis.

All of the Contractor's personnel and workers of Subcontractors may be subject to alcohol and drug testing by an authorised testing officer of the Principal at any time whilst carrying out the Contractor's Activities (including within the Contractor's Site amenities or facilities).

Testing for the presence of alcohol and other drugs may be undertaken during the following occasions:

(a) before performing duties (pre-sign on, primarily alcohol test);

(b) during the performance of duties (random and reasonable cause); and

(c) following any Incident.

The Principal will determine a test program and will select work locations for random testing. The test program schedule of Site visits will remain confidential.

The Contractor must provide the Principal's authorised testing officers with access to the Site and Subcontractor's places of work to conduct the alcohol and other drug testing as required. Drug tests will be in accordance with "AS/NZS 4308:2008".

The Contractor must ensure that all such people co-operate with any person administering investigation and testing procedures on the Principal's behalf. A breach will occur if:

(a) alcohol levels are above zero grams of alcohol in 210 litres of breath or 100 millilitres of blood; or

(b) drug levels are at or above the cut off level stipulated by the “AS/NZS 4308:2008 Procedures for Specimen Collection and the Detection and Quantitation of Drugs of Abuse in Urine”.

Anyone that tests positive to alcohol or drug tests or who refuses an alcohol or drug test must be removed from the Site immediately, and the Principal's Representative must be notified immediately.

Where testing produces a positive result or any other breach in relation to alcohol or other drugs requirements occurs, pending the outcome of the subsequent investigation, the relevant person will not be allowed on the Site or on any other premises controlled or managed by the Principal and, in the case of Rail Safety Workers, their RSW card will be withheld (for RSW cards issued by the Principal) or blocked in the system (for RSW cards not issued by the Principal).

The Contractor must take disciplinary action against a person associated with the Contractor’s Activities who breaches the Principal's policy of zero tolerance of alcohol and illegal drug use. The nature of the disciplinary action to be taken must be agreed upon by the Principal's Representative.

The Principal may have any person who is suspected of being under the influence of alcohol or drugs while carrying out the Contractor’s Activities:

(c) excluded from carrying out the Contractor’s Activities;

(d) tested by an authorised testing officer, medical practitioner or the New South Wales Police Service; and/or

(e) removed from the Site.

In the event of an Incident, the Contractor’s personnel on Site who were involved with the Incident may not leave the Site until they have undertaken alcohol and drug testing, and the Principal’s Representative has agreed to their departure from the Site. If individuals involved in the Incident are taken by ambulance to hospital, then the alcohol and drug testing will be undertaken at the hospital.

Each individual that signs on at the commencement of each shift will be declaring themselves to be free of alcohol and drugs.

7. Fatigue Management, Medical, Mental Health and Health Management

The Contractor must prepare, document and implement a fatigue, medical, mental health and health management program for all employees and Subcontractors that is in accordance with WHS Legislation.

8. Rail Safety

The Contractor must ensure that where the Contractor’s Activities involve work in or adjacent to the Rail Corridor or the rail environment, the Project Work Health and Safety Management Plan includes provision for rail safeworking arrangements, based upon (without limitation) compliance with the Australian Network Rules and Procedures.

8.1. Project Work Notification and Work Activity Advice

The Contractor must complete and submit the relevant Operator/Maintainer's Project Work Notification or other applicable document to the Principal's Representative at least six (6) weeks prior to the planned works, including any works in a Track Possession. The Contractor must comply with the requirements of the "TfNSW/Rail Transport Operator Safety Interface Agreement".

A Work Activity Advice (WAA) must be produced by the Contractor using the form TfNSW Work Activity Advice - 4TP-FT-105. Each WAA must cover a particular part of the Works and includes the SWMS applicable to that part of the Works.

The Contractor must conduct a pre-work briefing with all personnel involved, including the Protection Officer, prior to commencing the work.

8.2. Competencies

The Contractor must provide the Principal's Representative with a list of position descriptions which identifies whether each position is a Rail Safety Worker. The Principal's Representative may require alteration of the designation of Rail Safety Workers as nominated by the Contractor.

Any person supervising or setting up safe work arrangements for the Contractor's Activities on or in the vicinity of the Rail Corridor must hold the qualifications required by the Rail Transport Operator and the Principal.

The Contractor must ensure that no person undertakes Rail Safety Work unless they have been issued with a certificate of competency under the Rail Safety National Law.

The Contractor must consult with the Principal's Representative to obtain a determination as to when the Rail Industry Safety Induction (RISI) Identification Card is required for the Contractor's Activities. The Contractor must ensure that any visitors required to enter the Rail Corridor complete a Rail Industry Safety Induction.

8.3. Fatigue Management, Medical and Health Management

For workers carrying out Rail Safety Work the Contractor must apply the following fatigue, medical and health minimisation controls:

(a) implement a fatigue management program that:

- (i) addresses the requirements of the Rail Safety National Law and this TSR S;
- (ii) restricts workers to no more than 12 hours worked at a time not including travel time to and from work, unless there is a declared Incident in which case work can be performed up to a maximum of 16 hours at a time, as long as workers are not required to drive a motor vehicle or operate heavy plant or equipment after the 12th hour;
- (iii) restricts workers that have worked more than 12 hours from driving after finishing work;
- (iv) includes periods of 11 hours rest away from work;
- (v) restricts the maximum number of work days to 12 work days in 14 consecutive days;

(vi) minimises to five consecutive occasions where eight (8) hours are worked at night (i.e. after normal office hours) or four (4) consecutive occasions where 10 hours are worked at night or three (3) consecutive occasions where 12 hours are worked at night without a 48 hour rest break;

(vii) ensures employees receive a minimum of 48 consecutive hours free of work in a 14-day period; and

(viii) has the capacity to replace or relieve workers where unplanned or unavoidable extended hours have created a risk to employee health and safety;

(b) inform such persons that they are subject to medicals and health assessments in accordance with the "National Standard for Health Assessments of Rail Safety Workers";

(c) ensure that the "National Standard for Health Assessments of Rail Safety Workers" are undertaken and documented including re-examinations. The documented records must be maintained according to the *State Records Act 1998* (NSW); and

(d) inform such persons that additional medical and health assessments may be required to be undertaken where they are involved in a safety accident or where there is reasonable cause for concern that person may be unable to perform work safely (such as upon return from a long illness).

8.4. Alcohol and Other Drugs

In addition to the requirements set out in clause 6, if the Contractor's Activities involves work in or adjacent to the Rail Corridor and the rail environment, the alcohol and other drugs procedures must be in line with the Rail Safety National Law, and the testing regime must include prestart testing prior to Track Possessions.

8.5. Work on Track Methods for Working Safely

Unless specified by the issue of a safeworking notice by the Principal's Representative, the primary work on track methods for working safely are summarised as follows:

Construction Site: A site under construction without any rail traffic movements, or traction power systems being installed. Worksite Protection and RISI Identification are not required.

TfNSW Rail Site: A Principal managed and controlled rail site which has no interface access with other rail sites or rail systems. Work within or potential to impact the Danger Zone requires Local Possession Authority (LPA) in accordance with the Australian Network Rules and Procedures.

Should a TfNSW Rail Site encroach on the Danger Zone of any other adjoining Rail Transport Operator rail sites:

(a) adjacent line protection must be implemented and managed in accordance with the rules of the adjoining Rail Transport Operator; and

(b) an access interface is considered removed if points that allow entry and exit to the site are secured and a physical barrier is established at the limits of the TfNSW Rail Site.

Other Rail Transport Operator Rail Sites: Where the contracted work is undertaken within a rail site managed and controlled by another accredited Rail Transport Operator, the other Rail Transport Operator's Network Rules and Procedures apply.

8.6. Arrangements for Track Possessions

For each Track Possession to be utilised by the Contractor, the Contractor must conform to the requirements of the relevant Rail Transport Operator.

The Contractor may not have exclusive access to any Rail Tracks or areas within the vicinity of Rail Tracks during a Track Possession. The Contractor must coordinate the Contractor's Activities with those sharing the Track Possession, including parties involved in the operation or maintenance of the rail system and Other Contractors.

8.7. Worksite Protection Personnel

Worksite Protection is required for carrying out the Contractor's Activities within the Rail Corridor in accordance with the Australian Network Rules and Procedures and/or the requirements of the Rail Transport Operator.

The Worksite Protection Personnel are required to hold a minimum of Worksite Protection Personnel level 2 accreditation (PO2).

The Worksite Protection Personnel must brief all personnel undertaking the Contractor's Activities on the Worksite Protection arrangements at the Site at the start of each shift or as is required by the Contractor's Activities (and agreed by the Principal's Representative).

Where the Principal is to provide the Worksite Protection Personnel, the Contractor must provide 10 Business Days' notice in writing to the Principal requesting the number of Worksite Protection Personnel required.

8.8. Use of Rolling Stock, Hi-Rail Vehicles and Work Trains

Rolling stock and rail traffic are not permitted to travel or operate on the Site without the approval of the Contractor.

The Principal's Representative may also impose requirements, limitations and constraints on rail traffic travelling or operating on the Site.

To the extent that any part of the Contractor's Activities requires the use of hi-rail vehicles or work trains the Contractor must:

(a) ensure that such vehicles are only operated by persons with appropriate competencies and by an organisation which holds accreditation as a "Rolling Stock Operator" (as that term is defined under the Rail Safety National Law);

(b) ensure that hi-rail vehicles are duly checked and certified as being fit for their intended use at the start of each shift;

(c) ensure the hi-rail vehicle has been certified as compliant and safe to use with the hi-rail modifications by the Original Equipment Manufacturer (OEM) or an independent competent engineer, including from a WHS and rail safety perspective;

(d) ensure that the utilisation of hi-rail vehicles or work trains is appropriately addressed in the Contractor's procedures to ensure safe operations, to prevent injury and damage to infrastructure and to ensure that responsibilities are identified and documented;

(e) assess the past record of potential Subcontractors to ensure that they comply with the Rail Safety National Law and relevant rail accreditation requirements. The results of these assessments must be made available to the Principal upon request;

(f) set out and carry out regular reviews of the performance of train and hi-rail operators engaged for the undertaking of the Contractor's Activities (including at least one review after each major Track Possession or Incident, or in any event every three months). The results of these reviews must be made available to the Principal upon request; and

(g) only use rolling stock, hi-rail vehicles and work trains authorised on the Vehicle Registration Database.

8.9. Swing Arm Plant – Rail Environment

The Contractor must ensure the use of restrictors for swing arm plant.

The Contractor's construction planning process must include the validation of the proposed method of work to be carried out on the day. This validation process must include the completion of a site specific risk assessment and development of a plant working diagram by the Contractor in conjunction with the Project Rail Safeworking Coordinator and any other required project personnel.

The Contractor's pre-work briefing must include the following items:

(a) description of swing arm plant and equipment being used, including the type of restrictor(s) being used;

(b) details of the "line in the sand" for the positioning of the chassis of the swing arm plant or equipment being used (including consideration of the size and reach of the swing arm plant or equipment);

(c) arrangements for the provision of a spotter;

(d) reference to the details included in the Worksite Protection Plan prepared by the Protection Officer that includes swing arm plant considerations; and

(e) in the case of operations involving the use of a crane, details of the lifting plan developed for the Contractor's Activities.

9. Failure to Comply

If the Principal's Representative is of the opinion that the Contractor, the Contractor's personnel or a Subcontractor have not complied, or are not complying with any health and safety requirements in the Contract, this TSR S or under the Rail Safety National and/or WHS Legislation, including the requirement to eliminate or minimise the risks so far as is reasonably practicable, then the Principal's Representative may:

(a) direct the Contractor to immediately comply with the obligation; and/or

(b) if it is in the opinion there is an immediate risk to the health, safety or welfare of any persons as a result of the non-compliance, direct the Contractor to immediately suspend carrying out all or any part of the Contractor's Activities until such time as the Contractor is complying.

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ANNEXURE A – Additional Project Requirements

Additional Project Requirements

A1 Project Specific Amendments to TSR S

Clause/Para/Line	Project-Specific Amendment
8.5 (Clarification)	Work on Track Methods The intent of this section is to define the 3 different types of worksites on TfNSW Projects, and the method of worksite protection required. The definition of these worksites is outlined below.
	Construction Sites Further to the definition of a construction site, this definition relates to projects that are outside of the rail corridor and do not impact on rail sites or the rail system. There are no work on track methods required for these sites.
	TfNSW Rail Sites Further to the definition of a TfNSW rail site, this definition relates to TfNSW rail projects which are isolated from an existing and adjoining rail network or rail system (i.e Sydney Trains or ARTC). An LPA must be utilised on these projects
	Other Rail Transport Operator Sites Further to the definition provided, this definition relates to projects that interface directly with other Rail Transport Operator Networks, i.e Sydney Trains and ARTC. The relevant RTO's Network Rules and Procedures must be utilised on these projects.

ANNEXURE B – List of Reference Documents

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List of Reference Documents

AS/NZS ISO 31000:2009 - Risk Management

AS 4308:2008 Procedures for Specimen Collection and the Detection and Quantitation of Drugs of Abuse in Urine

AS 4024.1 Safeguarding of Machinery

AS 61508 Functional safety of electrical / electronic / programmable electronic safety-related systems

TfNSW/RTO Safety Interface Agreement

Australian Network Rules and Procedures

NSW Government Work Health and Safety Management Systems and Auditing Guidelines

National Standard for Health Assessments of Rail Safety Workers

TfNSW Work Activity Advice - 4TP-FT-105

TfNSW Generic Work Health and Safety Operational Risk Register - 30-SD-101

TfNSW Generic Rail Safety Risk Register - 30-SD-038

TfNSW Standard Requirements

TSR T – Technical Management

5TP-FT-334/5.0

Template Applicable to:

Transport Projects

Quality Management System

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Table of Contents

Document History

Version	Date of Approval	Summary of Change
V1.0	1 April 2012	Original
V2.0	10 Mar. 2013	General update
V3.0	1 July 2013	Update to accommodate ASA and AEO's
V4.0	2 April 2014	Interim update to better reflect requirements for work carried out under an AEO / AEO-EP and requirements for signalling design. Various edits to align review responsibilities with those set out in the General Conditions.
V5.0	1 July 2014	Rewritten to reflect the Rail Services Contract. New version following TSR rationalisation initiative. Consolidation of TSR T1, TSR A1, TSR A10, TSR Q1, TSR Q10, TSR O1, TSR O10, TSR A/TAP and TSR T100.

1. Introduction

1.1. Purpose

This TSR T – Technical Management describes the technical management requirements and processes with which the Contractor and any Subcontractors must comply. This TSR T – Technical Management must be read in conjunction with the Contract.

Unless noted otherwise in Annexure A - Additional Project Requirements, all requirements specified in this TSR T – Technical Management apply to the Contract.

1.2. User Instructions

Unless noted otherwise, wherever used in this TSR T – Technical Management, words and phrases have the meaning given to them in the General Conditions and/or the TSR Prelude.

1.3. Authorised Engineering Organisation Status

All engineering tasks must be undertaken under the authority of an Authorised Engineering Organisation in accordance with ASA Requirements. This authorisation may be held by a Subcontractor and evidence of this authorisation must be provided by the Contractor if requested by the Principal's Representative.

2. General

The Principal reserves the right to notify the ASA of any non-conformance in the performance of the Contractor's Activities that relates to the authorisation granted by the ASA.

3. Engineering Management

The Contractor must have in place, maintain and consistently apply until Final Completion engineering management methodologies, which must, as a minimum:

(a) comply with the ASA Requirements;

(b) provide systems and procedures sufficient to ensure compliance with the Contractor's risk management obligations under Law and under the Contract;

(c) identify any risks in the performance of the Contractor's Activities for which ASA authorisation is required;

(d) provide for the comprehensive and systematic assessment of any identified risks;

(e) specify the controls (including audits, expertise, resources, and staff) that are to be used by the Contractor to manage identified risks; and

(f) include procedures for monitoring, reviewing and revising the adequacy of those controls.

3.1. Quality Management

The Contractor must have in place, maintain and consistently apply until Final Completion an "AS/NZS ISO 9001" certified quality management system in accordance with ASA Requirements.

3.1.1. Management Responsibility

The quality management system must, as a minimum:

(a) describe the organisational structure responsible for the control of engineering management; and

(b) describe the responsibilities and authorities of persons identified in the structure including for those who are ensuring that:

i the Contractor's Activities are carried out at all times in accordance with the authorisation granted by the ASA;

ii engineering management obligations are being met and that resourcing and competency levels are satisfactory;

iii engineering management is reviewed, updated and remains effective;

iv corrective and preventative actions are implemented and effective; and

v training and induction for engineering management is undertaken and documented.

3.1.2. Audit

The Contractor must have in place, maintain and consistently apply until Final Completion an audit plan and audit schedules and must regularly prepare and submit audit reports to the Principal's Representative for review in accordance with the requirements of the Contract. Those documents must include methodologies adopted by the Contractor to assure itself that the requirements of the Contract are being met, including:

(a) preparation of risk based audit schedules for the Contractor's Activities and any Subcontractor's activities that also take account of previous audit outcomes;

(b) supply of competent and experienced resources to maintain the audit plan and implement the audit schedule;

(c) reporting, analysing and determining trends based on those audits;

(d) implementation of corrective and preventative actions as an outcome from those audits; and

(e) measures to assess the effectiveness of the corrective and preventative actions.

3.2. Systems Engineering

The Contractor must have in place, maintain and consistently apply until Final Completion systems engineering measures, which must demonstrate that, as a minimum:

(a) all designs are in accordance with the requirements of the Contract;

(b) all designs undergo staged reviews in accordance with a Design Management Plan that has not been rejected by the Principal;

(c) all designs are supported by systems assurance measures such as: requirements management, preliminary hazard analysis, systems hazard analysis, reliability availability maintainability and safety studies;

(d) all designs include the necessary information to allow the verification and validation of the design objectives including test requirements and acceptance criteria;

(e) all designs incorporate and comply with all necessary functional, safety, environmental, economic, whole of life, social, aesthetic and sustainability requirements;

(f) acceptance criteria is specified by the designer for each system and sub system including interfaces between systems in accordance with ASA Requirements;

(g) once constructed, each system and sub-system is verified against the acceptance criteria nominated by the designer;

(h) each identified interface between systems is verified progressively against the acceptance criteria nominated by the designer;

(i) all items procured, manufactured, constructed, configured, tested and commissioned are in accordance with the Design Documentation, the validation measures (including inspection and test plans) and the other requirements of the Contract;

(j) the Works have been constructed in accordance with, and comply with the requirements of, the Design Documentation;

(k) adequate testing has been developed and undertaken in accordance with the requirements of the Contract, including, as a minimum, factory acceptance tests, installation and operational tests, site acceptance tests and specific system integration tests, and the results of those tests have been recorded and provided to the Principal's Representative;

(l) all Hold Points and Witness Points are determined, registered and incorporated into the construction management process in accordance with requirements of the Contract;

(m) all information in the documents provided by the Contractor to the Principal satisfies the requirements of the Contract;

(n) all works encompassing complex or software intensive subsystems are supported by a comprehensive systems integration plan;

(o) business and/or system requirements management is performed using the Object Management Group Requirements Interchange Format v1.0.1 (ReqIF schema based on XML) available at http://www.omg.org/spec/ReqIF/1.0.1/, unless otherwise specified in the Contract; and

(p) any change to a design solution during construction is notified to the Principal's Representative and managed in accordance with ASA Requirements and any requirements of the Contract.

3.2.1. Safety Assurance

The Contractor must have in place, maintain and consistently apply until Final Completion a Safety Assurance Plan that defines the assurance activities, evidence, deliverables and management arrangements. The Safety Assurance Plan must be submitted to the Principal's Representative for review in accordance with the requirements of the Contract.

The Contractor must provide an initial submission of the Safety Assurance Plan to the Principal's Representative for review, in accordance with the requirements of the Contract.

The Contractor must progressively review, monitor, amend and update the Safety Assurance Plan, and submit for review throughout the project in accordance with the Contract.

The Safety Assurance Plan must include the schedule for the delivery of the assurance evidence for the Works. This must demonstrate that the Works have been designed to be operated and maintained with an acceptable level of safety and have been constructed, tested and commissioned in accordance with the Design Documentation and integrated into the network.

The Safety Assurance Plan must also include, as a minimum, the delivery milestones for:

(a) safety assurance reports;

(b) safety assurance statements;

(c) preliminary hazard analysis;

(d) systems hazard analysis;

(e) reliability availability maintainability and safety analysis; and

(f) human factors analysis.

3.2.2. Design Management

The Contractor must have in place, maintain and consistently apply until Final Completion a Design Management Plan which must be updated and submitted to the Principal's Representative for review in accordance with the requirements of the Contract.

The Contractor must provide an initial submission of the Design Management Plan to the Principal's Representative for review, in accordance with the requirements of the Contract.

The Contractor must progressively review, monitor, amend and update the Design Management Plan, and submit for review throughout the project in accordance with the Contract. The Design Management Plan must be based on the Contractor's management systems and processes as assessed by the ASA as part of its AEO authorisation and must include the measures, including audit, that the Contractor must utilise to ensure that, as a minimum:

(a) all design tasks are appropriately resourced by competent personnel;

(b) all design personnel are aware of the requirements of the Contract and any obligations of designers under the WHS Legislation;

(c) all designs are prepared in accordance with requirements of the Contract;

(d) the development of the design is effectively coordinated and the interrelationships identified and managed across all:

  i design interfaces, including with existing systems, operational systems, and maintenance systems;

  ii design stages;

  iii design packages, where the design work has been portioned into design packages; and

  iv design disciplines (e.g. electrical, civil, track, signalling and rolling stock);

(e) the Contractor is familiar with the Site and understands the constraints, including those relating to a project in a brownfield environment;

(f) all stakeholders have been appropriately identified, that stakeholder consultation is undertaken in accordance with the requirements of the Contract and that

stakeholder comments are duly considered and incorporated into the design. This may include presentations of the design to relevant parties including the design and sustainability review panel;

(g) all design assumptions are documented and verified;

(h) all designs are checked, reviewed and verified by competent personnel and that verification or proof engineering is conducted in accordance with the requirements of the Contract;

(i) all construction methodologies, sequencing, staging, temporary or enabling works are taken into account and the associated risks are managed in the design;

(j) all systems engineering reports, design reports, test reports and methodologies (such as preliminary hazard analysis, systems hazard analysis, reliability availability maintainability and safety, failure modes effects and criticality analysis, requirements allocation analysis and traceability management, verification and validation activities) are developed, coordinated and submitted in accordance with requirements of the Contract;

(k) an asset maintenance strategy and an asset operations strategy are delivered with the design in accordance with requirements of the Contract;

(l) safety, sustainability, reliability, availability and maintainability are demonstrated in the design;

(m) durability assessment and durability statements are included with the design;

(n) all completed designs or completed portions of the design are accompanied by a design assurance certificate from the AEO;

(o) any discipline specific design, design checking, design review, or design verification processes are undertaken in accordance with ASA Requirements (e.g. signalling);

(p) all inspection and test criteria are developed in accordance with the “TfNSW Inspection and Test Plans - Minimum Requirements - 4TP-ST-068";

(q) all documentation is compliant with requirements of the Contract including the “TfNSW CAD Protocols - 4TP-ST-084" and discipline specific ASA Requirements;

(r) all hazards identified in the preliminary hazard analysis and systems hazard analysis are designed out or carried over into the project hazard log;

(s) a construction interface specification is produced in accordance with requirements of the Contract;

(t) a signalling implementation plan is produced in accordance with requirements of the Contract; and

(u) all designs comply with relevant Codes and Standards.

3.3. Configuration Management

The Contractor must have in place, maintain and consistently apply until Final Completion configuration management measures prepared in accordance with the ASA Requirements to ensure that, as a minimum:

(a) all configuration management activities are in accordance with requirements of the Contract;

(b) configuration management activities include a design change process (which, with reference to signalling, may be demonstrated by preparation of a railway signalling documentation plan);

(c) documents are submitted to the Principal's Representative in support of the Principal's submission to the Configuration Control Board, including an assurance statement signed by the authorised representative of the AEO confirming that the project phase is complete and that all applicable requirements of the Contract have been met and the Contractor's equivalent of the Principal's "Certificate of No Objection" and "Certificate of No Objection To Construction" have been issued; and

(d) the Contractor must not commence any new project phase until the Configuration Control Board has issued a configuration change approval number and after any conditions imposed by the Configuration Control Board have been satisfactorily addressed.

3.3.1. Configuration Materials

The Contractor must have in place, maintain and consistently apply until Final Completion systems and processes to ensure the timely collection, production, validation, compilation and submission by the Contractor of the configuration materials to ensure the effective handover of the Works in accordance with the requirements of the Contract.

The configuration materials must include, but are not limited to, work-as-executed drawings, operations and maintenance manuals, systems assurance and safety assurance records, and must be submitted to the Principal's Representative for review in accordance with the requirements of the Contract.

These systems and processes must ensure that, as a minimum:

(a) adequate training and documentation are developed and provided to each Operator/Maintainer ahead of the Asset Handovers;

(b) operation and maintenance manuals are developed, which are comprehensive and cover every element of the Works;

(c) a comprehensive data collection system is implemented for all asset components (asset register), which must provide details of all assets provided as part of the Works;

(d) the Contractor develops a schedule of spares for the assets generated by the Works, which must support the planned operational and maintenance requirements of the assets;

(e) the Contractor develops a schedule of special tools, consumables and equipment necessary for the operation and maintenance of the systems included in the Works;

(f) the Contractor prepares a technical maintenance plan for assets that are not part of the existing network, which must include service schedules for assets provided as part of the Works where the Asset Owner and the Operator/Maintainer standard service schedules either do not exist or are not appropriate for the use to which the asset is to be put;

(g) all testing and Commissioning certificates and all associated Commissioning and test results issued in respect of the Works for the system/sub-system and equipment are provided to the Principal's Representative in accordance with requirements of the Contract; and

(h) any detailed site survey plans (including electronic CAD files) provided are updated and submitted to the Principal's Representative in accordance with requirements of the Contract and the ASA Requirements.

4. Commissioning

The Contractor must have in place, maintain and consistently apply until Final Completion systems and processes to ensure that the programming and coordinating of all commissioning activities, including activities which may be carried out by third parties, are defined in a Commissioning Management Plan and are managed and submitted to the Principal's Representative for review in accordance with the requirements of the Contract.

The Contractor must provide an initial submission of the Commissioning Management Plan to the Principal's Representative for review, in accordance with the requirements of the Contract.

The Contractor must progressively review, monitor, amend and update the Commissioning Management Plan, and submit for review throughout the project in accordance with the Contract. The Contractor must establish a Commissioning Management Team whose membership will include representatives of the Contractor, the Principal, the Asset Owner, the Operator/Maintainer, the Principal's technical advisors and any Other Contractors nominated by the Principal's Representative. The role of the Commissioning Management Team is to ensure that the required activities are undertaken to enable the Works to be commissioned and handed over to the Operator/Maintainer.

5. Operational Readiness

The Contractor must have in place systems, plans and processes to ensure that the programming, coordinating and executing of all Operational Readiness activities that are required to be carried out for the Works, including activities which may be carried out by third parties, are managed in accordance with the requirements of the Contract to enable the effective Asset Handover and operation of the Works to the Operator/Maintainer.

5.1. Completion of the Works and Asset Handover

The Contractor must assist the Principal in each formal Asset Handover involving acceptance and sign-off of the systems and services with the Asset Owner's and/or the Operator/Maintainer's representatives.

5.2. Setting to Work for Commercial Operation

The Contractor must:

(a) provide assistance to the Principal in the finalisation and closure of the project documentation by others; and

(b) provide inputs required to close operational planning approval conditions and procedural requirements related to the operation and maintenance of the Works.

6. WHS

To the extent an issue regarding the health and safety of any person is identified within this TSR T, the Contractor must have regard to TSR S and to the principle that the Contractor must ensure the highest level of safety of all persons who may be affected by the project.

ANNEXURE A – Additional Project Requirements

Additional Project Requirements

A1 Project specific amendments to TSR T

Clause/Para/Line	Project Specific Requirement
	Nil Amendments

ANNEXURE B – List of Reference Documents

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List of Reference Documents

- TfNSW CAD Protocols - 4TP-ST-084
- TfNSW Inspection and Test Plans - Minimum Requirements - 4TP-ST-068
- AS/NZS ISO 9001:2004 Quality Management Systems – Requirements

EXHIBIT B – WORKS BRIEF

The Works Brief comprises the following documents:

(a) Exhibit B - Works Brief - Completion of Design and Construction of Chalmers Street Substation Program Delivery - Power Supply Upgrade (PSU) Infrastructure and Services.

(b) Exhibit B - Works Brief - Design and Construction of Granville Junction Substation.

Included on the attached CD titled "MEDIUM WORKS CONTRACT – DESIGN AND CONSTRUCTION CONTRACT, NUMBER: ISD-18-7801, POWER SUPPLY UPGRADE PROGRAM, DESIGN & CONSTRUCTION OF CHALMERS STREET SUBSTATION AND GRANVILLE JUNCTION SUBSTATION, ELECTRONIC FILES."

Exhibit B - Works Brief

Design and Construction of Chalmers Street Substation
Program Delivery - Power Supply Upgrade (PSU)
Infrastructure and Services

Document Number:	4906628
Version:	3
Status:	Final
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Contents

1 Introduction

The purpose of this Works Brief is to define the Contract specific Works and Contractor's Activities that the Contractor shall perform for TfNSW, including an outline of the scope, detailing the interface, technical and deliverable requirements and any associated Contract specific activities.

This Works Brief contains the following sections:

Section 1 Introduction – contains an overview of the Contract, provides the context of the Works and Contractor's Activities, and lists terms and references

Section 2 Scope of Works – defines the extent of the Works and Contractor's Activities must provide

Section 3 Interfaces and Stakeholders – describes the interfaces with other parties, including stakeholders

Section 4 Technical Requirements - details the technical requirements that the Contractor's Activities and Works must meet and be verified against

Section 5 Activities – details the requirements for management/progress meetings, design workshops and audits. These items are in addition to the requirements of TSR

Section 6 Deliverable Requirements – details the documents the Contractor must deliver, including any reports, drawings, studies, records, results or any other piece of correspondence

Section 7 Commissioning Requirements – details the requirements and activities needing to be completed in preparation for Commissioning

Section 8 Inspection Testing and Quality Requirements – details the requirements for inspection, testing and quality and the documents to be developed by the Contractor

Appendix A – Key Standards, Regulations and Codes – lists standards and codes referenced in this Works Brief

Appendix B – Interface Schedule – provides a summary of the parties that the Contractor will be required to interface with and undertake Works accordingly for the successful completion of the Project

Appendix C – TfNSW Standard Risk Matrix – the risk matrix to be applied to all Contract risk assessments

Appendix D – PSU Requirements for Safety Assurance Plans (SAP) and Safety Risk Summary Reports (SRSR)

1.1 Project Overview

The Chalmers Street Substation Project is part of Power Supply Upgrade (PSU) portfolio of works intended to meet the 2018 timetable deployment and the power demands of the new generation air-conditioned eight (8) car sets Waratah trains.

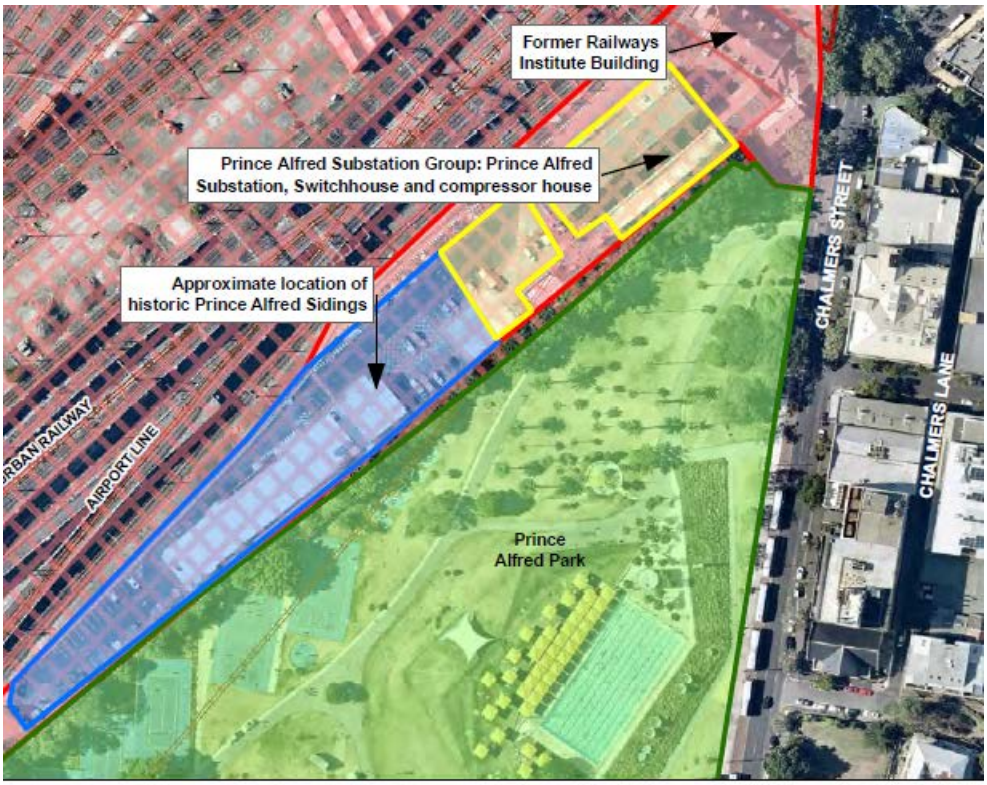


Figure 1 – Location of the prosed Chalmers Street Substation

The proposed Chalmers Street Substation is located in the Prince Alfred (PA) Sidings site, adjacent to the existing PA Substation. The new substation will provide 1500V traction power to the Main Lines at Central Station and 11kV power to City Circle Stations currently connected to the existing PA Substation and power to signalling locations SY4 and SY5.

The new substation is proposed to be a three (3) x 5MW rectifier 33kV substation with twenty-seven (27) DC circuit breakers. This will provide support to the 1500V traction power supply in the area, so that it can sustain the additional train services and air-conditioned train loadings.

The proposed new substation shall be designed, constructed and commissioned in close proximity to the existing live operating rail system and fully integrated with new system interfaces to existing electrical, telecommunications and civil infrastructure and installations.

1.2 Works Overview

The Chalmers Street Substation Project, in conjunction with the Lee Street Substation Project, will address traction power reliability, availability and capacity in the Central Area. The Project is to be designed to address the following requirements:

a) Deliver a new three (3) x 5MW rectifier 33kV substation to the Central Area as per the approved operating diagrams and upgrade associated 1500V DC feeders for the reliable operation of Waratah trains and transition to a 100% air-conditioned fleet;
b) Improve reliability and redundancy in the 11kV network for the supply of emergency services, signalling systems and lighting systems in the City Circle Stations;
c) Removal of end-of-life expired equipment within the existing PA Substation;

Reduce safety risk to personnel and infrastructure that currently co-exist within the existing PA Substation; and

Achieve regulatory compliance and meet all ASA and Australian Standards.

1.3 Terms and Definitions

Table 1 – Terms and Definitions

Unless noted otherwise, wherever used in this document, words and phrases have the meaning given to them in the Contract (including the TfNSW Standard Requirements).

Term	Description
AC	Alternating Current
AEO	Authorised Engineering Organisation
AFC	Approved for Construction
AHD	Australian Height Datum
ASA	Asset Standards Authority
BCA	Building Code of Australia
BRS	Business Requirements Specification
CAS	Commissioning Activity Schedule
CCB	Configuration Control Board
CCTV	Closed Circuit Television
CEP	Commissioning Event Plan
CMAAC	Configuration Management and Asset Assurance Committee (TfNSW)
CMP	Commissioning Management Plan
Contractor	Organisation awarded the contract to deliver the Works and Contractor's Activities outlined in this Works Brief
Contractor's Activities	The investigation, survey, design, systems engineering and safety assurance activities and tasks to be completed by the Contractor
CORAS	Commissioning and Operational Readiness Activity Schedule
CORMT	Commissioning and Operational Readiness Management Team
CT	Current Transformer
DBYD	Dial-Before-You-Dig
DC	Direct Current
DCCB	Direct Current Circuit Breaker
DSS	Detailed Site Survey
EOC	Electrical Operations Centre
EP&A	Environmental Planning and Assessment
EPR	Earth Potential Rise
ESR	Eastern Suburbs Rail
FAT	Factory Acceptance Test

Term	Description
GIS	Gas Insulated Switchgear
GLT	Ground Level Trough
GST	Galvanised Steel Trough
HV	High Voltage
I/O	Input / Output
IRCS	Isolation Rail Connecting Switch
ITP	Inspection and Test Plan
LV	Low Voltage
MEA	Mitsubishi Electric Australia
MGA	Map Grid of Australia
NCR	Non Conformance Report
OHWS	Overhead Wiring Structure
PACT	Possession Access Coordination Tool (Sydney Trains Software)
Principal	Transport for NSW – Transport Projects Division
Project	Design and Construction of Chalmers Street Substation
PHL	Project Hazard Log
PSU	TfNSW Power Supply Upgrade Program
QMP	Quality Management Plan
RAATM	Requirements Apportionment and Analysis Traceability Matrix
RAMS	Reliability, Availability, Maintainability and Safety
REC	Rail Earth Contactor
REF	Review of Environmental Factors
RFI	Request for Information
RTU	Remote Terminal Unit
SAP	Safety Assurance Plan
SRSR	Safety Risk Summary Report
SFAIRP	So Far As Is Reasonably Practicable
SCADA	Supervisory Control and Data Acquisition
Site	Proposed location of the Chalmers Street Substation
SoCE	Schedule of Commissioning Events
SRS	Systems Requirements Specification
ST	Sydney Trains
TfNSW	Transport for NSW
TIP	Track Insulation Plan
TSR	TfNSW Standard Requirement
UGOH	Underground Overhead

Term	Description
ULX	Under Line Crossing
URX	Under Road Crossing
VESDA	Very Early Smoke Detection Apparatus
VoIP	Voice over Internet Protocol
WAE	Work-As-Executed
Works	The construction and commissioning activities and tasks to be completed by the Contractor
OCDN	Operations Critical Data Network

2 Scope of Works

The scope of Works for the Chalmers Street Substation includes the development of the Concept Design prepared by the Principal into the detailed design followed by construction, testing, commissioning and handover.

The Project shall be delivered in accordance with TfNSW Standard Requirements (TSRs), relevant ASA and Australian Standards, Building Code of Australia (BCA) and the TfNSW Configuration Control Board (CCB) Control Gate Stage process.

The TfNSW CCB Control Gate Stages to be undertaken are Stage 3 (approved for construction), Stage 4 (commissioning) and Stage 5 (handover). The Principal has obtained CCB approval for Stage 2 (Concept) of the Project for all scope with the exception of the works described in section 2.14 Supplies to Signalling Locations SY4 and SY5. In addition to obtaining the above Stage Gate 3, 4 and 5 approvals for all of the scope, the Contractor shall obtain Stage 2 (Concept) for the section 2.14 scope.

The Contractor's Activities for the Works can be summarised into the following main components:

a) Assess the Preliminary Design supplied in Exhibit H of the Contract and technical guidance in this Works Brief, develop the Detailed Design to meet the Project objectives and requirements;

b) Civil works including site survey, excavation, earthworks, road works, stormwater drainage and underground, GST or GLT cable routes;

c) Building works comprising the concrete footings/piles and slabs, masonry walls, steel framing, roofing, lighting, mechanical ventilation, hydraulic services and substation security for the new substation building and harmonic filter platform;

d) Tunnel works including new Cable Tunnel No.2, 3 and 4 and refurbishment of existing Cable Tunnel No.1;

e) Modifications to existing PA substation and existing ESR shaft

f) New ESR 1500V link room;

g) Electrical works including 33kV and 11kV underground transmission lines, 1500V positive and negative feeder cabling, earthing and bonding, installation and testing of all electrical equipment supplied by both the Principal and Contractor;

h) Finalise proposed and staged Operating and Sectioning Diagrams for approval by TfNSW, Sydney Trains and ASA as required.

i) SCADA system and telecommunications works within the substation and associated cabling works;

j) Utility services including connection of substation water and sewer supply to existing network;

k) Decommissioning of the existing PA Substation and removal of all redundant electrical equipment and services;

l) Manage and obtain all necessary permits and approvals for the construction, testing and commissioning requirements of the Project, including but not limited, to power isolations, electrical accreditations, commissioning, staging works, ITPs, track possessions and PACT;

m) Comply with and manage all necessary requirements for the successful design, construction, testing and commissioning; and

n) Manage all community, environmental, safety, quality and traffic management requirements.

The works scope described below is not exhaustive, and is to be read in conjunction with the Preliminary Design, Australian Standards, relevant ASA (formerly RailCorp) standards, specifications and reports. Additional Contract Specific Requirements are detailed in Exhibit E of the Contract.

2.1 General

2.1.1 Assurance of Works

The Contractor shall assure the Works under this Works Brief. All engineering tasks must be undertaken under the authority of an Authorised Engineering Organisation in accordance with ASA Requirements.

2.1.2 Application of AEO Engineering Management Methodologies

The Contractor shall have in place, maintain and consistently apply until Final Completion engineering management methodologies for the delivery and assurance of the Works that comply with ASA Requirements and the requirements of the Contract.

This includes application of the requirements within ASA Standard T MU MD 00009 ST “AEO Authorisation Requirements”.

The Contractor’s engineering management methodologies must:

a) provide systems and procedures sufficient to ensure compliance with the Contractor's risk management obligations under Law and under the Contract;

b) identify any risks in the performance of the Contractor’s Activities for which ASA authorisation is required;

c) provide for the comprehensive and systematic assessment of any identified risks;

d) specify the controls (including audits, expertise, resources, and staff) that are to be used by the Contractor to manage identified risks; and

e) include procedures for monitoring, reviewing and revising the adequacy of those controls.

2.1.3 Application of Management Plans

The Contractor shall develop and submit in accordance with the Contract an appropriate management plan (or suite of plans) which defines how the management methodologies are applied to the Works. These plans shall be in accordance with section 6.1 of this brief.

The Contractor shall work in accordance with these plans that have not been rejected by the Principal.

All revisions to the management plans shall be submitted to the Principal in accordance with the Contract.

2.1.4 Configuration Change Control

The Contractor will operate network integration under the remit of the Configuration Control Board (CCB). It will operate under the governance arrangements established by the CCB.

The CCB and a Configuration Management and Asset Assurance Committee (CMAAC) established by the Principal will be required to approve configuration changes at the Configuration Management Gates as per the TfNSW Configuration Management Plan T MU AM 04001 PL.

The Contractor must not commence any Contractor's Activities or proceed to the next phase of the Works until the Configuration Control Board has issued a configuration change approval number for the relevant Configuration Management Gate and after any conditions imposed by the Configuration Control Board have been satisfactorily addressed.

The Contractor is to supply all relevant documentation for gateway submissions for CCB and CMACC (as per the CCR document checklist) and support the Principal to achieve successful approval of each gate submission.

2.1.5 Commissioning

The Contractor must have in place, maintain and consistently apply until Final Completion systems and processes to ensure that the programming and coordinating of all Commissioning activities, including activities which may be carried out by third parties, are defined in a Commissioning Management Plan and are managed and submitted to the Principal's Representative in accordance with the requirements of the Contract. Refer to section 7 for further details in regard to Commissioning.

2.1.6 Operational Readiness

The Contractor must have in place systems, plans and processes to ensure that the programming, coordinating and executing of all Operational Readiness activities that are required to be carried out for any aspect of the Contractor's Activities, including activities which may be carried out by third parties, are managed in accordance with the requirements of the Contract to enable the effective Asset Handover and operation of the Works to Sydney Trains and/or NSW Trains. Refer to section 7 for further details in regard to operational readiness.

2.1.7 Completion of the Works and Asset Handover

The Contractor must assist the Principal in each formal Asset Handover involving acceptance and sign-off of the systems and services with the Asset Owner’s and/or Sydney Trains and/or NSW Trains representatives.

2.1.8 Temporary Works

The scope of works for Temporary Works generally includes, but is not limited to, provision of the following items:

a) Barricades, gates, lighting, signage to provide a safe and secure Site at all stages of the Works;

b) Vehicular access roads within the Site for construction of the Works, including protection of existing Sydney Trains infrastructure and Services;

c) Protection and maintenance of all existing vegetation and trees adjacent to the Site for the duration of the Works;

d) Temporary adjustments and reinstatement of all existing off-site roads, drainage, services, street furniture, and landscaping to provide safe vehicular access to the Site for construction of the Works;

e) Safe access and egress to PA Sidings for Sydney Trains to access the tracks Network Maintenance Depot, PA Substation and rail services throughout all stages of the Works;

f) Hoardings, working platforms, shoring systems and scaffolding structures;

g) Site security for the duration from site establishment to Final completion and handover. When the Contractor's staff are not present a site security guard shall be provided by the Contractor;

h) Remote real time CCTV monitoring with motion activity recording and real time internet based access for the Principal's Representative:

i) Time lapse video of the substation construction works;

j) Provision of temporary electrical power supply, drainage, sewerage and water supply for the construction of the Works;

k) Traffic management, environmental management, community consultation, stakeholder management, safety management, etc.; and

l) Provision of trafficable protection for the existing oil water separator to ensure it is not affected by the Contractor's construction activities.

2.1.9 Site Establishment

The scope of works for site establishment includes the following items:

a) Site mobilisation and traffic management of the whole Site or part thereof.

b) Supply and installation of all barricades, hoarding, fencing and jersey kerbs for demarcation of Site;

c) Provide truck wash bay or alternative vehicle washing facility to prevent vehicles leaving site with debris from the Site;

d) Erection and maintenance of TfNSW provided Contract signboards and banners;

e) Provision of site amenities including meal rooms, offices, showers, toilets and office accommodation for the Contractor;

f) TfNSW shall make available to the contractor office space located above the Prince Alfred 33kV Switch House as highlighted in Sketch 3 for the duration of the works.[3]

g) The contractor will provide all additional amenities including meal rooms, offices, showers, and toilets they may require.[3]

h) The contractor to provide 4 complete work stations and seating, 8 person meeting table and seating, 2 filing cabinets and shelving for use by TfNSW in adjacent office. [3]

i) TfNSW will cover costs associated with utilities excluding telephone. Land lines will not be made available.[3]

j) All facilities provided will be subject to the dilapidation survey.[3]

k) Contractor will clean at regular intervals all amenities.[3]

l) The contractor is to allow reasonable use of their fax and copying machine for the duration of the works.[3]

m) Obtain all necessary approvals and occupancy licenses for all road and footpath occupancies, detours and closures;

n) Establish access arrangements for the Sydney to Burwood Compressor Project – specifically the upgrading of the PA Compressor House

o) Establish arrangements for Sydney Trains access to any operational/maintenance rail network services on site; and

p) All incidental items necessary to deliver the complete Works.

2.1.10 Site Survey

The Contractor shall provide a site survey for the Site with sufficient information of the Site and surrounding areas to confidently progress the design of the substation Works.

Using information obtained from Dial-Before-You-Dig (DBYD) and Detailed Services Search (DSS) and confirmed on Site by pot holing, the Contractor shall identify the location and depth in global (X, Y and Z) coordinates of all existing underground and above ground Services (water supply, stormwater drainage, sewer, gas, compressed air, HV/LV electrical cables, fire hydrants, stormwater, signalling, telecommunications, data, etc) surrounding the proposed substation. The pot holing shall confirm the type, number of conduits/cables, sizes, depth of each Service.

The surveys shall be completed in accordance with the relevant Australian Standards and all relevant legislation for surveying and spatial data and establish sufficient recovery marks to enable the construction of perimeter fencing to secure the Site.

2.1.11 Investigations

a) The Contractor shall carry out a geotechnical investigation prior to excavating to below the footings of any adjacent existing structure.

b) The Contractor shall locate all existing services and complete potholing to existing services or structures prior to the commencement of any excavation adjacent to these services or structures.

c) The Contractor shall sample, validate and classify all excavated material for off-site disposal.

d) The Contractor shall dispose of excavated material in accordance with the waste classification;

e) The Contractor shall obtain validation certificates for all imported fill.

f) The Contractor shall complete a formal Dilapidation Survey of all surrounding areas within PA siding and obtain approval prior to starting any work.

2.2 Enabling Works

The Contractor shall undertake the necessary enabling works activities to prepare the Site for the construction of the Chalmers Street Substation.

2.2.1 Relocation of 33kV and 11kV Feeders

The scope of the Contractor's Activities for the relocation of the 33kV and 11kV Feeders includes the following items:

a) Design, construction and commissioning of temporary 33kV (748 (7U6) and 797(7U1)) and 11kV (640) feeders between interface point at Redfern End and PA Substation;

b) Design, construction and commissioning of temporary 20 pair pilot cables associated with 748(7U6) and 797(7U1) between the interface point at Redfern End and PA Substation;

c) Removal of redundant sections of underground cabling for 33kV (748(7U6) and 797(7U1)) and 11kV (640) feeders;

d) Removal of redundant sections of 20 pair pilot cables 748(7U6) and 797(7U1)

e) Commissioning of the relocated cables will be as per Commissioning requirements detailed in Clause 7 of the Works brief.

f) Contractor to provide relocation methodology of above cables to review by the Principal 30 days prior to commencement of actual works.

2.2.2 Prince Alfred Complex - LV Power Systems

The scope of the Contractor's Activities for the provision of the PA complex LV Power Systems includes the following items:

a) Design and construction of the PA Sidings LV Distribution System including civil and structural works for the distribution system and the future Harmonic Filter, referring to Proposed 11kV System Diagram EL0524941;

b) Design of the installation based on two off 11KV/415V 800kVA (nominal) dry type transformers as per the requirements of EP 16 00 00 02 SP "Outdoor Ground Type Distribution Transformer" to supply the auxiliary load within the Prince Alfred Complex, with each auxiliary transformer supplied from separate 11kV breaker as per the approved operating diagrams. The transformers to be air natural cooling;

c) Detailed design and installation of all auxiliary power cables

d) Installation of the two new PA Sidings No.1 and No. 2 11kV/415V 800kVA dry type transformers and associated ring main switchgear on the PA Switch House cable basement extension to serve all other non-Substation loads within the PA Sidings, including all loads in the former PA Substation building, the former PA 33kV Switch House, the Compressor House and the new CBD Network Base;

e) Installation of the two new Distribution Supply Main Switchboards (DSMSB) adjacent to the new PA Sidings transformers on the PA Switch House cable basement extension to distribute normal and backup supplies to all non-Substation loads within the PA Sidings D&C Contract will have to assess and make any modifications required in the Principal supplied DSMSBs for use for the Prince Alfred Complex – LV power systems.[1]

[1] Refer Addendum 11 Clause 4.2

f) Design, construction and commissioning of the temporary supplies to the PA Sidings No.1 and No.2 transformers from the existing 11kV switchboard in PA Substation. The permanent supplies from the new Chalmers Street Substation 11kV switchboards shall be connected and commissioned when available. The temporary supplies shall then be decommissioned and removed;

g) Connection and commissioning of the existing loads within PA sidings to the DSMSBs to allow the decommissioning and removal of the PA Sidings Low Voltage Switch Hut and the PA Compressor House transformers; and

h) Decommission and remove the redundant PA Sidings Low Voltage Switch Hut and the PA Compressor House transformers.

2.2.3 Transformer Access Provisions

The Contractor shall provide for maintenance access to the existing transformers and reactor located in the transformer alley between Prince Alfred 33kV Switch House and Prince Alfred DC Substation buildings. The existing arrangement which Sydney Trains use to install and remove transformers involves hydraulic rams pushing and pulling transformers directly from the transformer plinths onto the back of a 19m low loader.

The construction of Chalmers Street Substation will prevent the direct access by a low loader to the transformer alley. The Contractor is required to provide an alternative method for acceptance by Sydney Trains for their use during the construction of Chalmers Street Substation.

2.2.4 Other Service Relocations

The Contractor shall undertake all Service relocations works for the Substation Site, which may include, but not be limited to:

a) underground piping, cables, pits and telecommunications Services both within and external to the rail corridor and

b) Reinstatement of any existing structure, building, hard surface or equipment that is damaged by the demolition and relocation works to its original condition.

2.3 Civil Works

The site works construction methodology shall minimise disturbance to the existing operations in the area and the private access road off Chalmers Street.

The Contractor's construction methodology shall include details of the potential staging requirements associated with the construction activities. The requirement for maintaining access to the Site for all stakeholders whilst the cable tunnels are constructed is of particular importance.

2.3.1 Site Preparation

The scope of works for the Site preparation includes the following items:

a) Demolition and removal from Site of all existing structures located on the Substation footprint including buildings, sheds, demountable, fencing etc.;

b) Removal and disposal of all redundant material remaining on Site including rubbish, debris, stockpiles, etc.; and

c) undertake the Hazardous Materials audit required by clause 3.7(d) of the Contract and prepare a report for all buildings and structures to be demolished or modified prior to

commencing the demolition activities which sets out details of all Hazardous Materials contained in the buildings and structures;

d) removal of all Hazardous Material from Site and disposal to an approved facility in a safe manner and in accordance with applicable Law and Codes and Regulations; and

e) All incidental items necessary to deliver the complete Works.

2.3.2 Earthworks

The Contractor shall plan and execute all earthworks to minimise disruption to the nearby rail infrastructure, adjacent streets, adjacent buildings and surrounding amenities. Where ASA Standards and Manuals do not fully define the scope or standard of the works, the relevant Sections of the RMS QA Specification R44 'Earthworks' shall apply.

The scope of works for earthworks includes the design and construction of the following items:

a) All site excavation in all types of soil and /or rock including re-grading, cutting, trimming, filling, compacting and levelling;

b) Any shoring or excavation supports to enable excavation without undermining or damaging any existing pavements, infrastructure and structures;

c) Removal of all contaminated material from Site and disposal to an approved facility;

d) Removal and stockpiling of topsoil, haulage of spoil material to stockpile or transport off Site as required, trimming and compacting to final design earthworks levels;

e) Provide controlled engineered fill with correct thermal resistance and electrical resistance properties;

f) Excavation for cable tunnels, building footings and piles, oil separation unit, stormwater drainage, sewer, cable trenches and pits and transformer bunds; and

g) All incidental items necessary to deliver the complete Works.

2.3.3 Access Road Pavements

The Contractor shall undertake a geotechnical investigation to determine the existing subgrade condition, including the CBR value for pavement design. The Pavement design shall take into account vehicle manoeuvring travel paths and speeds.

The scope of works for the access road pavements includes the design and construction of the following items:

a) Upgrade to existing pavements of access road to substation (including supply, installation, compaction and priming of base and sub-base layers) to allow entry/exit movements and turning paths for 19m articulated truck and 200T crane;

b) New vehicle barriers around perimeter of substation and transformer bays;

c) Any ancillary road works including heavy duty vehicular crossings, kerbs, guttering, dish drains, drainage channels and transitions;

d) Repair of any damages to existing access roads, kerbs, gutters and drainage systems caused by construction activities; and

e) All incidental items necessary to deliver the complete Works.

2.3.4 Utilities and Services Works

2.3.4.1 General

The scope for Services works includes but is not limited to:

a) Identification, protection, relocation and/or adjustment of all existing and proposed utilities, Sydney Trains and other Services, which may conflict, interface and/or require integration with the Works or Temporary Works;

b) Maintaining the connection of all existing Services to be protected, relocated, adjusted, diverted and/or which may conflict with the Works or Temporary Works during construction;

c) Coordination with utilities owners and property owners whose land contains affected utilities and Services;

d) Provision of all license and easement agreements, permits and approvals required to carry out external utilities and Services works;

e) Protection of all heritage items as noted in the Review of Environmental Factors (REF);

f) Provision of all new Services required by the works; and

g) Connection of new Services to existing Services, where required.

2.3.4.2 Stormwater Drainage

The Contractor shall design, supply and construct measures to ensure that post development storm water discharge from the subject Site into the Sydney Trains drainage system does not exceed the pre-development discharge so that the potential for flooding of any other property and flood levels for any storm event are not increased by the presence of the works.

The Contractor shall design the drainage systems for ease of maintenance and for vehicular and / or imposed loading from construction where appropriate. The Contractor shall maintain the operation of all existing stormwater drainage systems during the construction of the Works.

The scope of works for stormwater drainage includes the design and construction of the following items:

a) New stormwater drainage system including all pipework, pits, headwalls, channels, culverts, etc.;

b) Install temporary drainage systems when required;

c) All associated works including excavation, supply, bedding, laying, jointing and backfilling for the new stormwater drainage system;

d) New oil separation unit, oil containment tank and all associated flame traps, plumbing and drainage components, sized per AS 2067 requirements to contain the total volume of the oil contained in the largest item of oil-cooled equipment to be installed at the Substation;

e) Control and monitoring of all pumping equipment when provided, including local control panels. Alarms for levels in sumps shall be integrated with the hydraulic system operation.

f) Connection of new stormwater drainage system to existing stormwater drainage network; and

g) All incidental items necessary to deliver the complete Works.

2.4 Structures

The site works construction methodology shall minimise disturbance to the existing operations in the area and the private access road off Chalmers Street.

The Contractor's construction methodology shall include details of the potential staging requirements associated with the construction activities. The requirement for maintaining access to the Site for all stakeholders whilst the Cable Tunnels are constructed is of particular importance.

The construction of the connection of new cable tunnel to connect with the existing cable basement in Prince Alfred Substation, may impact on the Prince Alfred substation which is also a heritage building. The Contractor shall determine if underpinning or any strengthening is required to ensure the stability and structural integrity of the heritage building.

The scope of works for structures includes the design and construction of the following items:

a) New reinforced concrete foundations, footings, piles, ground and first floor slabs, beams, columns, bund blast walls, stairs and plinths for substation building and bunded yards;

b) New masonry walls including external and internal walls, 2-hour fire-rated reinforced walls, partitions, cubicles and cable support structures;

c) New structural steel roof structure including all rafters, purlins, bracing, insulation, roof sheeting, eaves lining, flashing, fascia panels, capping, guttering and downpipes;

d) New roof fall restraint system including proprietary ladder, eyebolts fixed to roof deck and safety wire fixed to eyebolts;

e) New reinforced concrete tunnel structures for Cable Tunnels 2 and 4;

f) New reinforced concrete footings and slab, masonry walls and structural steel roof structure for ESR 1500V link room;

g) New reinforced concrete footings, piles and retaining walls and structural steel columns, beams, grates and stairs for harmonic filter enclosure; and

h) All incidental items necessary to deliver the complete Works.

2.4.1 Structural Design Actions

2.4.1.1 Dead Loads

a) Dead loads shall be in accordance with AS1170.1 – 2002 "Structural Design Actions: Permanent, Imposed and Other Actions".

b) All design loads shall be verified in the detailed design.

c) The major dead loads for design include the following:

Table 2 – Dead Loads

Aspect	Dead Load
Reinforced Concrete	25 kN/m3
Façade panels	TBC

Aspect	Dead Load
Structural Steel	77 kN/m3
Masonry (brickwork)	20 kN/m3
Masonry (core-filled blockwork)	24 kN/m3

2.4.1.2 Live Loads

a) Live loads shall be in accordance with AS1170.1 – 2002 "Structural Design Actions: Permanent, Imposed and Other Actions".

b) The major live loads for design include the following (uniform loads Shown)

Table 3 – Live Loads

Aspect	Live Load
Switchroom floor	10.0 kPa
Cable Chamber floor	10.0 kPa
Basement floor	10.0 kPa
Stairs	4.0 kPa
Substation roof	0.25 kPa

c) For other areas not defined above Table ,refer to AS1170.1

d) All construction loadings shall be considered within the final design

2.4.1.3 Collision Loads

a) Collision loading on the deflection wall and the support concrete piers shall be in accordance with AS5100.2 – 2004 "Bridge Design Part 2: Design Loads", ESC320 "Overbridges and Footbridges" and any relevant sections of the AS5100 series.

b) All design loads shall be verified in the detailed design.

2.4.1.4 Earthquake Loads

Design parameters for earthquake loading shall be in accordance with AS1170.4 – 2007 "Structural Design Actions Part 4: Earthquake Actions in Australia":

Table 4 – Earthquake Loads

Item	Parameter
Importance level	4
Kp	1.9 (P = 1/3000)

(a) kp not specified for return period of greater than 2500 years in AS1170.4, kp for return period of 3000 years can be determined from Figure C3.3 in NZS 1170.5

Supp 1:2004 "Structural Design Actions Part 5: Earthquake actions – New Zealand - Commentary"

(b) Use more stringent requirement between Appendix F in AS1170.0 and the BCA

All design loads shall be verified in the detailed design.

2.4.1.5 Wind Loads

The design parameters for wind loading shall be in accordance with AS1170.2 – 2002 "Structural Design Actions: Wind Actions":

Table 5 – Wind Loads

Item	Parameter
Importance level	4
Region	A2
Terrain category	3
Regional wind speed vu	49 m/s
Average Recurrence Interval (Ultimate)	3000 years
Average Recurrence Interval (Serviceability)	25 years
Directional multiplier Md	1.0
Shielding multiplier Ms	1.0
Topographic multiplier Mt	1.0

(a) Use more stringent requirement between Appendix F in AS1170.0 and the BCA

All design loads shall be verified in the detailed design.

2.4.2 Structural Design

The structural design shall be carried out in accordance with the provisions of the relevant Australian Standards, ASA Standards and the Building Code of Australia, and in accordance with the accepted practice and principles of structural engineering.

2.4.2.1 Strength

Strength of all the structural elements shall be designed to resist the ultimate limit state load combinations in accordance with AS1170.0 – 2002 "Structural Design Actions: General Principles", Section 4 and all current amendments.

2.4.2.2 Stability

Stability of all primary lateral load resisting structural elements when subjected to imposed live loading, wind and/or seismic loading, using the code load combinations, shall be designed in accordance with AS1170.0 – 2002 "Structural Design Actions: General Principles", Section 4 and all current amendments.

2.4.2.3 Footings

a) The piles shall be designed primarily in accordance with AS2159-2009 and AS3600-2009 for the specified design actions derived from the structural analysis of the applied design load combinations to limit state design, and in conjunction with design parameters provided in the Geotechnical Report and verified by the Contractor's geotechnical investigations. Contamination investigation shall be completed to investigate the durability requirements of footings.

b) The design must include consideration and mitigation of the effects due to the construction of the proposed future rail tunnel and the footing system (eg piles) must not encroach within the exclusion zone of the tunnel.

c) Any potential movement due to future tunnel construction in close proximity to the new substation must be allowed for in the design. This is to limit potential future damage due to movements. The Contractor's design shall include an estimated movement allowance for hypothetical tunnel/s constructed in the locations currently shown, of sizes to match the existing tunnels, and the design of the footing system shall accommodate the movements.

d) The effects of adverse / excessive settlement of the structure footings and foundations material due to future tunnel construction must be addressed in the detailed design. Short term and long term settlements with time must be addressed.

e) Key consideration is required for the location of the new piles, ESR 1500V Link Room and cable tunnels in relation to existing in-ground Services, buildings and the rail corridors. The design shall ensure the stability and structural integrity of the existing Prince Alfred Substation, Prince Alfred Switch House cable basement and the retaining walls and fencing behind the newly constructed Network Base buildings are not impacted by the construction and proposed works/structures.

2.4.2.4 Concrete Sections

The reinforced concrete elements shall be designed primarily in accordance with AS3600-2009 for the specified design actions derived from the structural analysis of the applied design load combinations to limit state design.

2.4.2.5 Substation Roof Design

The steelwork elements shall be designed in accordance with AS4100-1998 for the specified design actions derived from the structural analysis of the applied design load combinations to limit state design.

2.4.2.6 Structural Steel Finish

In addition to structural steel finish requirements elsewhere in the Works Brief the Contractor shall demonstrate in the design the application of AS 2312.1:2014 "Guide to the Protection of Structural Steel against Atmospheric Corrosion by the use of Protective Coatings". The various types of paint coatings for different environmental conditions are recommended in this standard. A realistic assessment of factors, such as its environmental condition, accessibility of the steel elements, architectural appreciation and the frequency of re-coat under the Rail Maintenance system should be considered before the derivation of a protective coating scheme. The protective scheme should achieve 100 years design life as same as for the structure.

2.4.3 Building Works

2.4.3.1 Architectural Works

The scope of works for architectural works includes the design and construction of the following items:

a) All architectural fit out work for new substation building, external transformer yard, harmonic filter enclosure and ESR 1500V link room; including battery room, admin room, switch rooms, WC, kitchen area and all associated ceilings and cornices, cement sheeting, floor coverings, handrails, louvres, security mesh cladding, doors, fixtures, fittings and all other inclusions;

b) All architectural fit out work for new Cable Tunnel no.3 and refurbishment of existing Cable Tunnel no.1 including 2-hour fire rated stud walls, doors and stairs;

c) New doors, security fencing, gates and roller shutters, including 2-hour fire doors, blast doors, metal louvre doors and internal doors;

d) New anti-graffiti treatment to all external walls, clear sealer finish to internal walls, and painting of internal concrete floor;

e) Making good to the decommissioned Prince Alfred Substation and Prince Alfred Switch House which include but are not limited to sealing all cable and equipment penetrations in both buildings after disconnection and removal of redundant equipment.

f) Removal of the transformer plinths and bunds and making good the existing Prince Alfred transformer alley after removal of the equipment; and

g) All incidental items necessary to deliver the complete Works.

2.4.3.2 Building Services

The scope of works for building services includes the design, supply, construction, installation, testing and commissioning of the following items:

a) Substation ventilation louvers and fire dampers, Admin room split system air conditioning unit and condenser with vandal proof enclosure, Toilet exhaust fan and Battery room air grilles and fire damper;

b) Low voltage electrical equipment including internal and external lighting to substation building, security emergency and exit lighting and general power supply outlets;

c) Telecommunications wiring for VoIP telephones, and phone/data outlets;

d) Bell silence switches adjacent to each VoIP telephone;

e) Fire system equipment including VESDA system, fire extinguishers, fire indication panel, smoke detectors and visual warning devices;

f) Security system equipment including alarms, door monitoring, security screens to vents and sterile zoning (based on a Site Criticality Category Assessment of 1 as specified in “RailCorp Security Standard RSS003 – Substations – 2009”);

g) Hydraulic equipment including flame traps, floor waste, hot water system, toilet, kitchen sink, hot water unit, shower/eye wash facility, hand basin, relief gullies, vent pipes, hose taps, kitchen and toilet tapware and all water supply and sewer pipe work; and

h) All incidental items necessary to deliver the complete Works.

2.4.3.3 BCA Compliance and Fire Safety Certification

The scope of works for BCA compliance and fire safety certification includes the following items:

a) Obtain BCA Design Certificate from BCA Certifier that the completed building design complies with the BCA, the EP&A Act and the EP&A Regulations;

b) Obtain BCA Compliance Certificate from BCA Certifier that the completed building work complies with the BCA, the EP&A Act and the EP&A Regulations; and

c) Obtain Fire Safety Certificate from Fire Safety Engineer that the completed work complies with the EP&A Act and the EP&A Regulations.

2.4.3.4 Materials and Finishes

The proposed materials and finishes are tabled below.

Table 6 – Materials and Finishes

Item	Parameter
Cable chamber	In situ ground slab and beam concrete floor on concrete pile foundation. Steel trowel with epoxy paint floor finish.
Switchroom floor	In situ suspended concrete framed beam and slab. Steel trowel with epoxy paint floor finish.
Bund yard floors	In situ ground slab and beam on concrete piles. Steel trowel with oil resistance clear sealer finish.
Bunded areas	In situ ground slab and beam on concrete piles and FRP mesh on concrete hobs flush with plinths. Steel trowel with oil resistance clear sealer finish.
HV pit	Concrete floor slab and roof (pavement) slab. Roof slab supported on in-situ concrete walls and columns. Exposed external walls integral colour finish and shallow vertical rib profile, Class 3.
Cable tunnels and pit	In situ concrete walls and floor slab with precast concrete culvert tunnel sections and/or in situ-concrete at junctions. Steel trowel with clear sealer to floor. Off form finish to walls and ceiling.
ESR 1500V link area	Face brick to match existing PA substation with rendered lintels band. Anti-graffiti finish to external walls
External walls ground floor building envelope, exposed sides, south east, north east and north west.	Non load-bearing precast concrete panels with integral tile facing fixed to concrete or steel frame and set on ground floor slab edge rebate. Smooth face off form with integral colour finish, Class 2. Anti-graffiti finish to external walls.
External walls switchroom south western side to bund yard – ground floor	Non load-bearing precast concrete panels fixed to concrete frame to achieve 2-hour fire rating and 2kPa blast resistance. Smooth face off form.

Item	Parameter
External walls switchroom south western side to bund yard – first floor	Non load-bearing precast concrete panels with integral tile facing fixed to steel frame to achieve 2-hour fire rating and 2kPa blast resistance. Smooth face off form with integral colour finish as for external walls.
External walls to bunded yards	Non load-bearing precast concrete panels with integral tile facing fixed to concrete or steel frame to achieve 2-hour fire rating and 2kPa blast resistance. Off form with integral colour finish. Anti-graffiti finish to external walls.
Internal walls	Pre-cast concrete Class 3 or reinforced/core filled blockwork Steel trowel finish to exposed rear face of precast concrete wall panels or face finish to block walls to achieve 2-hour fire rating and 2kPa blast resistance. 125mm thick precast concrete panels to DCCB cubicle walls. 60mm R 2.6 insulated plasterboard (Kooltherm K17) lining to Office walls. Paint finish to Office and WC internal walls only.
Roof structure and support	Galvanised steel framed roof beams supported on UC columns at first floor level, zinc coated steel purlins and safety mesh. Foil backed R1.3 insulation and screw fixed Colorbond steel metal deck roof at 3 deg pitch. Screw finish to match roof.
Ceilings	Ground Floor: Off form finish to slab and beam. Suspended plasterboard to Office and WC area only with paint finish. Wet area plasterboard to the WC. First Floor: Exposed steel structure and insulation foil to switchrooms.
Roof gutters	Fabricated half round Colorbond eaves gutter to bunded yard side with leaf guard and overflow sumps Stainless steel leaf guards will be installed over edge gutters.
Roof safety	Fall restraint system with fixed lifeline to cover entire roof area and caged access ladder
External doors	45mm prefinished zincalume clad solid core. Roller doors shall be industrial strength to provide security against intrusion (electric operation) with powder coat finish and internally pad lockable. First floor dock roller door shall provide for equipment access with minimum 3m clear height from floor to open door. ESR 1500V: External aluminium louvre door. HF Platform and transformer area: Steel framed with welded security mesh facing
Internal doors	35mm solid core paint finish, 2-hour fire rated.
Door hardware	Electronic access control as specified to nominated external doors and fitted with locks as per Section 5.6.1.2 item 8. Privacy lock to WC door and mortice lock with egress function to Office door

Item	Parameter
Louvres	Steel storm-proof type with powder coat finish, Louvers shall be backed with security mesh as used for fences Bund Yard Louvers: Steel 45 deg louver with powder coat finish. Louvres shall be backed with security mesh as used for fences
Stairs	Concrete framed to 4 off internal stairs with non-slip nosings and gal steel handrails and balustrade to BCA compliance. Concrete framed to all other internal stairs with non-slip nosings and gal steel handrails to BCA compliance. Steel stair in northern end of Tunnel No 1 and to the HF platform.
Fire Dampers	Intumescent to internal ventilation wall openings and 600x600mm panels to fire doors where required.
Bund yard gates	SHS welded frame (electric operation) sliding gate with security mesh cladding in black powdercoat finish incorporating personnel egress gate with no threshold.
Harmonic filter area	Galvanised steel frames and weld mesh wall panels in black powder coat finish
Office	Fit out to include new and durable office furniture as follows: a corner workstation fitted with drawers, two heavy duty (minimum weight capacity 120kg) gaslift adjustable office swivel chairs and a two door full height metal stationery cabinet.

2.4.3.5 Signage and Labels

The scope of works for signage includes the design, supply and installation of the following items:

a) Labelling on the HV Feeders;

b) Danger and Warning Labels;

c) Shower/Eye Wash Signs;

d) Traction Negative Labels;

e) 1500V DC Isolating and Rail Connecting Switch Labels;

f) Capacitor Warning Signs;

g) Feeder and Rectifier DCCB Labels;

h) Bus Bar, Rectifier, Auxiliary, Battery, Location and Room Labels;

i) Emergency Generator Connection Box Signs;

j) Telephone and Bell acknowledgement instructions with ICON telephone numbers at each sign;

k) All other internal signage for access to the cable chambers/tunnels, access to electrical panels and signage required by Law for electrical rooms; and

l) All incidental items necessary to deliver the complete Works.

2.4.4 Fencing & Gates

The scope of works for fencing and gates includes but is not limited to:

a) Security fence and gates to the ground floor entrance.

b) Fence extension from the existing Sydney Yard 1500V outdoor links to enclose the new 1500V cable tunnel exit area.

c) Security fence and gates to the first floor dock. The area is unroofed and without encumbrance to allow for unimpeded equipment access.

d) Security gate to the new ESR 1500V link room.

e) Security fence and gates to the ground floor exit and ladder and cage to roof level

f) Security sliding gate to transformer compound.

g) Security gate and fence to the PA sidings LV distribution equipment.

2.4.5 Landscaping

The scope of works comprises making good to the existing garden behind the recently constructed CBD Network Base buildings.

a) Removing all or part of the existing garden bed sufficient to excavate the HV and communications services trench to install new services.

b) Protection and maintenance of any existing plants to remain.

c) Filling top soil to reinstate the existing garden.

d) Maintenance works to ensure healthy establishment of plant material.

2.5 HV Electrical Works

The design, procurement, installation and testing of the HV electrical works and temporary diversion works shall comply with all the relevant provisions of the relevant Australian and ASA Standards including those referenced in Appendix A. The Contractor is to assess the guidance notes in this Works Brief and confirm that meets the Project Requirements.

The scope of works for the HV electrical works includes the design, supply, installation, testing and commissioning into service of all electrical and communications equipment as per proposed operating diagrams and all incidental items necessary to deliver the complete Works.

The Contractor's installation methodology, potential staging and associated documentation shall provide the installation details to maximise use of possessions and power outages available, whilst maintaining safe and compliant working practices.

The Contractor shall determine appropriate levels of technical support required on site during staging and installation. The installation of cables in the existing cable tunnels may require some existing cables to be relocated in stages before being placed in their final position.

2.5.1 Electrical Advices

At least twelve (12) weeks prior to implementing any change shown on proposed approved operating and/or sectioning diagram, the Contractor shall prepare, submit and obtain approval of the electrical advices from Sydney Trains.

For any staging or alternative works proposed by the Contractor that require the existing Operating and/or Sectioning Diagram in operation to be amended, the Contractor shall amend the Operating and/or Sectioning Diagram, obtain approval of the diagram(s) from the Sydney Trains and ASA stakeholders and prepare, submit and obtain approval of the electrical advices from Sydney Trains at least twelve (12) weeks prior to implementing the change shown on the Proposed Approved Operating and/or Sectioning Diagram(s).

2.5.2 Proposed Electrical Operating Diagrams

The Contractor shall produce and obtain sign off of all proposed operating diagrams for Chalmers Street Substation Contract, including but not limited to affected system diagrams, reference diagrams and indices, reticulation diagrams, remote substation/switching station operating diagrams and any amendments to the staged proposed operating diagrams. The documents shall be produced at SDR and receive sign off of the latest revision by CDR.

The Contractor shall produce updated versions of all affected drawings at remote end substations, including cable schedules, SCADA I/O schedules and detailed electrical drawings.

The detailed design and construction of the Chalmers Street Substation shall be based on the Preliminary design

The Contractor shall produce and obtain approval of all affected Operating Diagrams (including remote ends) and Reference Diagrams, in consultation with relevant stakeholders.

2.5.3 Chalmers Street Sectioning Diagram and Associated Works

Due to the introduction of Lee Street Substation and decommissioning of Prince Alfred Substation from the Sydney Yard 1500V DC Network, the section labelling from Sydney Yard to Newtown Substation has changed.

The Contractor shall review and update and obtain approval for the following in accordance with ASA Technical Note TN003:2013 Version 2:

a) EL0518111_D, Central to Redfern, Traction Supply Upgrade, Proposed 1500V Sectioning Diagram, Single Line Schematic

b) Associated sectioning diagrams including Diagram 3 and Diagram 4

c) All affected operating diagrams and reference diagrams

2.5.4 Equipment Selection

a) Substation electrical equipment has been nominated based on the key criteria of required electrical functionality as per the proposed Operating Diagrams and the specification of ASA type-approved equipment. The Principal will issue to the Contractor that equipment identified as Principal-issued in Table 7 below;

b) The Contractor shall provide the remainder of the Supplier equipment as listed in Table 7;

c) ASA type approved equipment list can be found on ASA website (http://www.asa.transport.nsw.gov.au/ts/railcorp-engineering-standards/electrical/electrical-standards). Contractor to obtain type approval for Non type approved equipments in a

timely manner to meet the project timeline and commissioning dates. Refer to ASA Electrical Type Approvals Technical Note-TN 050:2014 for details.[2]

d) Major electrical equipment selections are summarised in the Table below and depicted in the Preliminary Design drawings; and

e) The Principal issued equipment will be located at Gate 3 Worth Street, Chullora, NSW and it is the Contractor's responsibility to arrange pickup and delivery to Site, including all associated transport and insurance costs.

f) Any other equipment not listed in the table below shall be supplied by contractor unless specifically specified in other parts of the Works Brief.

Table 7 – Substation Electrical Equipment

Description	Quantity Required	Type Approved Supplier	Principal Issued
0.5mH 6400A DC ONAN Smoothing Reactor	1	Transformer Manufacturing Company (TMC)	1
5.35MVA 33000/600-600V Rectifier Transformer	3	TBA	0[3]
Rectifier Transformer 600V Terminal Wildlife Protectors	18	TBA	0[3]
5 MW 1500V DC Rectifier Power Cubicle (Type B)	3	UGL Infrastructure	3
200KVA 11kV/433V Auxiliary Dry Transformer	2	Schneider Electrical –or equivalent	0[3]
800KVA 11kV/433V Auxiliary Dry Transformer	2	Schneider Electrical –or equivalent	0[3]
11kV Distribution Switchgear No. 1 and No. 2	2	Schneider Electrical	0[3]
DSMSB No 1 and No 2 415V Switchboards	2	Any Switchboard manufacturer to Approved Drawings	2[4]
33/11kV 7.5MVA ONAN 9 MVA ONAF Power Transformer	3	TBA	0[3]
11KV Neutral Earth Resistor(F-N-11-1000-10D)	3	Fortress Systems or equivalent	0

[2] Ref Email Rod Stanton dated 8/03/2016

[3] Ref Email Rod Stanton 8.3.16

[4] Refer Addendum 11 Clause 4.1

Description	Quantity Required	Type Approved Supplier	Principal Issued
33kV Indoor Switchboard 1	5 ACCB+1xVT Panel	TBA	0[3]
33kV Indoor Switchboard 2	5 ACCB+VT Panel	TBA	0[3]
33kV Indoor Switchboard 3	5 ACCB+1xVT Panel	TBA	0[3]
33kV Indoor Switchboard 4	6 ACCB+2xVT Panel (1xVT for tariff metering)	TBA	0[3]
11KV Switchgear	7 + 1xVT	TBA	0[3]
11KV Switchgear	8 + 1xVT	TBA	0[3]
11KV Switchgear	7 + 1xVT	TBA	0[3]
11KV Switchgear	7 + 1xVT	TBA	0[3]
1500V DC Isolating & Rail Connect Switch (Outdoor Type)	4	Australian Rail Technology (ART)	0
1500V DCCB Rectifier BHR50B (truck, etc.) including DCCB Base Frames	4	Mitsubishi Electric Australia	4
1500V DCCB Feeder BHF30B, (truck, etc.) with ULME relay including DCCB Base Frames	23, includes 2 operational spares	Mitsubishi Electric Australia	23, includes 2 operational spares
1500V DC Harmonic Filter including Base Frames	2	UGL Infrastructure	2
1500V DC Inter-trip Panel	2	TBA	2
Rail Earth Contactor Panel (REC)	1	UGL Infrastructure	0
Common Equipment Panel (CEP)	2	UGL Infrastructure	0
SCADA RTU / Marshalling Cabinet	3	Invensys RTU	0
Security Panels	1	Any Switchboard Manufacturer to Approved Drawings.	0
Vesda panel	1	Any Switchboard Manufacturer to Approved Drawings.	0
FIP panel	1	Any Switchboard Manufacturer to Approved Drawings.	0
Communication Panel/Cabinet	2	RAILCORP MET RL0363	0

Description	Quantity Required	Type Approved Supplier	Principal Issued
415V AC Aux Supply Changeover (ACO) panel	1	Any Switchboard Manufacturer to Approved Drawings.	0
415V AC Main Switchboard	1	Any Switchboard Manufacturer to Approved Drawings.	0
125V DC Distribution Board	2	Any Switchboard Manufacturer to Approved Drawings.	0
Battery Isolation Board	2	Any Switchboard Manufacturer to Approved Drawings.	0
Battery Charger 3ph (44) Amps 125V	2	Cordex (CPS). Model 3X125-6kW-RC (3ph) (5. Rectifier modules each)	0
Gel Battery Set	2 sets	Energel, Hoppecke or Sonnenschein	0
All 33 KV and 11KV Cables	Quantity to be agreed between Principal and Contractor	Prysmian Power Cables & Systems OR Olex (limited range)	Ref Chullora stock list.[3]
All 1500V cables	As required	Prysmian Power Cables & Systems OR Olex (limited range)	0
Protection Relays	As per Concept Protection Design	Schneider Electric	3 x P124 relays. Remainder by contractor.[3]
Substation Locks	To be confirmed by Contractor	Sydney Trains (barrels and padlocks). Contractor to provide all other hardware	Yes - barrels and padlocks only
Tariff Meter (Check meter)	2	EDMI Mk6E	0
Cable Lugs, Cable Termination & Jointing Kits	To be confirmed by Contractor	Refer to Sydney Trains Engineering Website	0
DTS Panel/Cabinet	1	TBA	Yes

Note – All equipment is to be installed by the D&C Contractor including transformers and switchgear as per the revised interface schedule.

2.5.5 DC Circuit Breaker Testing

DC Circuit Breakers must be tested by Sydney Trains Testing Facility located at Strathfield, NSW prior to final “on site” Commissioning.

The Contractor shall be responsible for all transportation costs, including:

a) Transport DCCBs from Chullora NSW to Strathfield NSW

b) Transport DCCBs from Strathfield NSW to Chalmers Street Substation Site

2.5.6 Equipment layout

The detailed design and construction of the electrical equipment layouts shall be coordinated with all engineering disciplines and the electrical equipment layouts shall

a) Comply with the access and egress requirements per the Building Code of Australia (BCA 2014);

b) Achieve AS 2067 and AS3000 compliant electrical clearances between electrical equipment and other structures or equipment; and

c) Provide suitable access and egress for Authorised Operators to operate and/or maintain the Substation equipment.

2.5.7 Standard Drawings

The detailed design and construction of the substation shall be based on ASA standard drawings for substations. A list of the ASA Standard Drawings, and PDF copies of the current versions of these drawings are attached for information in the Chalmers Street Substation Preliminary Design Materials.

2.5.8 Electrical Standards

The detailed design and construction of electrical systems at the Substation shall comply with the relevant provisions of the versions of the ASA and Australian Standards including, but not limited to those in Appendix A.

2.5.9 33kV and 11kV Cables

The detailed designer shall demonstrate via compliant calculations that the new 33kV and 11kV feeder cables installed from the existing HV feeder routes to the Chalmers Street Substation achieve the following continuous current carrying capacities for the worst-case installation conditions associated with the new feeder diversion works to the Chalmers Street Substation:

a)	Feeder 755 (from Edgecliff SS)	280 Amps
b)	Feeder 748(7U6) (from Ausgrid Pyrmont SS(Lee Street SS))	455 amps
c)	Feeder 798 (from Erskineville SS)	414 Amps
d)	Feeder 797(7U1) (from Rozelle SS(Lee Street SS))	430 Amps
e)	Feeder 747 (from Ausgrid Pyrmont SS)	460 Amps
f)	Feeder 746 (from Argyle SS)	460 Amps
g)	Feeder 518 (to Martin Place No 2 SS)	300 Amps

h)	Feeder 632 (to STR No 1)	300 Amps
i)	Feeder 616 (to Wynyard Station No 1 SS)	260 Amps
j)	Feeder 631 (to STR No 1 SS)	255 Amps
k)	Feeder 620 (to Redfern No 2 SS)	255 Amps
l)	Feeder 600 (to STR No 2 SS)	255 Amps
m)	Feeder 640 (to Sydney Signal Box No 1 SS)	225 Amps
n)	Feeder 637 (to Transport House)	225 Amps
o)	Feeder 633 (to Argyle SS)	260 Amps
p)	Feeder 619 (to Redfern No 1 SS)	225 Amps
q)	Feeder 634 (to Wynyard Station No 2 SS)	260 Amps
r)	Feeder 517 (to Martin Place No 1 SS)	300 Amps
s)	Feeder 507 (to Prince Alfred Sidings No 1 Tx)	50 Amps
t)	Feeder 508 (to Prince Alfred Sidings No 2 Tx)	50 Amps
u)	Chalmers Street SS Aux TX No. 1	11 Amps
v)	Chalmers Street SS Aux TX No. 2	11 Amps

Preliminary cable rating calculations are provided in the Chalmers Street Substation Preliminary Design Materials for information.

All existing and new cables in the ESR shaft shall be protected by the application of ablative coating.

2.5.9.1 33kV and 11kV Cable Works

The scope of works for the 33kV and 11kV cable works includes the design, supply(excuding Chullora stock), installation/removal, testing and commissioning into service the following items. The Contractor is to assess the following guidance notes and confirm it meets the Project Requirements.

a) Two existing 33kV feeders with associated 20 pair copper pilot cables and one 11kV feeder currently installed in conduits between Mortuary cable tunnel and Prince Alfred cable basement shall be diverted from the existing underground conduits to a new route behind the recently constructed CDB Network Base to provide for the construction of the new Chalmers Street Substation. New cable joints to be made in the Mortuary cable tunnel.

b) On completion of the Chalmers Street Substation the feeders shall be diverted into Chalmers Street Substation to provide HV power supplies as per the approved 33kV Operating Diagram.

   (i) 33kV Feeder 7U6 (previously named 748), a Bulk Supply Feeder, which connects between the Ausgrid Pyrmont Substation via the proposed Lee Street Substation and the Prince Alfred 33kV Switch House, shall be diverted from its temporary location into the Chalmers Street Substation. The section of Feeder 7U6 between

the Chalmers Street Substation and the Prince Alfred 33kV Switch House shall be removed.

(ii) 33kV Feeder 7U1 (previously named 797), which currently connects between the Rozelle Switching Station via the proposed Lee Street Substation and the Prince Alfred Substation, shall be diverted from its temporary location into the Chalmers Street Substation. The section of Feeder 7U1 between the Chalmers Street Substation and the Prince Alfred Substation shall be removed.

(iii) 11kV feeder 640 shall be diverted into Chalmers Street Substation from Mortuary tunnel via existing conduits, previously used for 33kV feeders 748 and 797.

(iv) The two 20 pair copper pilot cables associated with the 33kV feeders shall be made redundant and removed from the diversion route.

c) Apart from the required feeder diversion works in the vicinity of the recently constructed CBD Network Base and Chalmers Street Substation, the Contractor is not required to replace any portion of the existing feeders along any portion of the existing routes between interconnecting Substations.

d) 33kV feeder 755 to be diverted to Chalmers Street Substation from Prince Alfred Switch House cable basement via conduits. A new joint shall be made to the existing XLPE cable in order not to disturb the existing gas joint.

e) 33kV feeder 798 to be diverted to Chalmers Street Substation from Prince Alfred Switch House cable basement via the HV cable tunnels. The cable will go directly from the substation into the ESR shaft and a new joint will be established inside the ESR Rail Tunnel.

f) 33kV feeder 747 to be diverted to Chalmers Street Substation from Prince Alfred Switch House cable basement via the HV cable tunnels. Cable will be pulled back from the existing Prince Alfred Switch House cable basement into the ESR Shaft and go to the new Chalmers Street Substation and a new joint will be established inside the new HV cable tunnel number 4.

g) 33kV feeder 746 to be diverted to Chalmers Street Substation from Prince Alfred Switch House cable basement via the HV cable tunnels. The cable will go directly from the substation into the ESR shaft and a new joint will be established inside the ESR Rail Tunnel.

h) 11kV feeder 632 to be diverted to Chalmers Street Substation from Prince Alfred Substation. The cable will be joined to the existing cable in cable tunnel 1.

i) 11kV feeder 616 to be diverted to Chalmers Street Substation from Prince Alfred Substation. The cable will be joined to the existing cable in cable tunnel 1.

j) 11kV feeder 631 to be diverted to Chalmers Street Substation from Prince Alfred Substation. The cable will be joined to the existing cable in cable tunnel 1.

k) 11kV feeder 600 to be diverted to Chalmers Street Substation from Prince Alfred Substation. The cable will be joined to the existing cable in cable tunnel 1.

l) 11kV feeder 637 to be diverted to Chalmers Street Substation from Prince Alfred Substation. The cable will be joined to the existing cable in cable tunnel 1.

m) 11kV feeder 633 to be diverted to Chalmers Street Substation from Prince Alfred Substation. The cable will be joined to the existing cable in cable tunnel 1.

n) 11kV feeder 634 to be diverted to Chalmers Street Substation from Prince Alfred Substation. The cable will be joined to the existing cable in cable tunnel 1.

o) 11kV feeder 619 to be diverted to Chalmers Street Substation from Prince Alfred Substation. The cable will be joined to the existing cable in cable tunnel 4.

p) 11kV feeder 517 to be diverted to Chalmers Street Substation from Prince Alfred Substation. The cable will be joined to the existing cable in cable tunnel 4.

q) 11kV feeder 620 to be diverted to Chalmers Street Substation from Prince Alfred Substation. The cable will be joined to the existing cable in cable tunnel 4.

r) 11kV feeder 518 to be diverted to Chalmers Street Substation from Prince Alfred Substation. The cable will be joined to the existing cable in cable tunnel 4.

s) 11kV feeder 507 from Chalmers Street Substation to Prince Alfred Sidings Substation No 1 via conduits

t) 11kV feeder 508 from Chalmers Street Substation to Prince Alfred Sidings Substation No 2 via conduits.

u) 11kV feeder for Chalmers Street Substation Auxiliary transformer No 1.

v) 11kV feeder for Chalmers Street Substation Auxiliary transformer No 2.

w) All incidental items necessary to deliver the complete Works

2.5.9.2 Distributed Temperature Sensing (DTS)

A common wall mounted DTS termination panel shall be provided within the substation, dimensioned with capacity to terminate DTS for all current and future 33kV feeders on a separate termination tray for each feeder.

Optical fibre link cables composed of 2 cores each of OM1, OM3 and OS1/2 ZWP shall be provided between the DTS panel and each feeder fibre break out point so that a single cable is used per phase of each feeder. The termination panel end of link cables shall be factory pre-terminated with SC and the breakout end shall be fusion spliced into the DTS fibre, with splices stored within a robust compact enclosure.

Where new feeder cables are jointed into existing feeder cabling that includes DTS fibre, then the DTS shall also be jointed through.

Where new feeder cables are jointed into existing feeder cabling that does not include DTS fibre, then a minimum 3m length of DTS fibre breakout shall be safely stored at the joint for splicing if and when the non-DTS feeder cable is ever replaced.

The Principal shall supply the DTS Panel with nominal dimensions 600(W) x 450(D) x 1200(H) and DTS fibre link cables in 50m lengths for installation by the Contractor.

The Principal shall engage Sydney Trains to fusion splice the feeder end of the fibre link cables into the DTS fibre within the feeder. The break out of DTS fibre from the feeder cable shall be prepared by the Contractor.

2.5.10 33kV Switchboards

a) Contractor shall supply, install and commission four indoor 33kV switchboards, three with 5-off and one with 6-off SCADA controlled ACCB panels and associated VT panels, as per the requirements of EP 01 00 00 01 SP “33kV AC Indoor Switchgear – Non-

Withdrawable", and as per the approved operating diagrams and the Concept Protection Design for Chalmers Street Substation 33kV Switchboard.

b) Contractor shall ensure suitable floor penetrations for future 33kV ACCB cable connections from the cable basement shall also be designed and installed and covered with appropriate steel plate.

2.5.11 Power Transformers

a) Provide an external bunded yard to accommodate the installation of three-off 33/11kV Dyn1 7.25MVA ONAN power transformer per EP 02 10 00 01 SP "Power Transformer – 33/11kV", and the installation of an adjacent 11kV Neutral Earthing Resistor (NER).

b) The design and construction of the bunded yard shall provide conduits and penetration arrangements for connection to the substation switchboards, fire rated to a level above the bund height for the equipment installations based on in-service equipment most recently installed on the Sydney Trains network (refer Table 7 above). These penetrations shall be sealed with waterproof, oil fire rated seals.

c) The bunded yard shall drain via compliant sump and flame trap arrangements to a common oil water separator.

d) The bunded yard shall be separated from the Substation and adjoining bunded areas by blast-resistant walls.

e) The design of the transformer bays shall comply with AS2067 requirements, including fire separation, equipment clearances and volume requirements for oil and stormwater retention and drainage.

f) Blast-resistant and 2-hour fire rated walls shall be provided to the sides and the rear of the power transformer bays.

g) The transformer bays shall be open to the front, and equipped with flush plinths within each bay to permit each power transformer to be rolled into position from the transformer alley. FRP walkway mesh shall be installed around the plinths and shall be mounted flush with the finished floor level of the transformer alley to avoid trip hazards.

2.5.12 11kV Switchboards

a) Contractor shall supply, install and Commission four indoor 11kV switchboards, three with 7-off and one with 8-off SCADA controlled ACCB panels and associated VT panels, as per the requirements of EP 01 00 00 02 SP "11kV AC Indoor SCADA Controlled Switchgear Fitted with Stationary (Non-Withdrawable) Switching Devices".", and connect as per the approved operating diagrams and the Concept Protection Design for Chalmers Street Substation 11kV Switchboard.

b) Contractor shall ensure suitable floor penetrations for 11kV ACCB cable connections from the cable basement shall be designed and installed.

2.5.13 Live Chamber for Future 11kV Harmonic Filter

Provide a live chamber for the future installation of an 11kV harmonic filter, including appropriate danger signage to each access door. Special access arrangements shall ensure the live chamber can only be accessed from within the Substation compound, and then only when the future 11kV harmonic filter is de-energised.

The detailed design shall ensure the chamber is appropriately sized in accordance with dimensions of the 11kV Harmonic Filter drawings provided in Schedule 9 – Information Documents and Materials.

The detailed design for access to the future harmonic filter chamber shall assume that:

a) A captive key safety interlock system shall be implemented by others in future to permit access to the harmonic filter area.

b) The safety interlock system (by others) shall incorporate:

(i) A key interlock/release in the future 11kV harmonic filter circuit breaker control circuit, which allows the interlock key to be released when the circuit breaker is open and the isolator earthed.

(ii) A key exchange box (e.g. wall-mounted) with a time delay that accepts the key released from the circuit breaker and releases the keys to access the harmonic filter enclosure after a pre-programmed time delay, sufficient to allow discharge of the harmonic filter capacitors.

(iii) Access control locks on the harmonic filter area access doors/gates, shall be unlocked by the keys released from the key exchange box

c) The Harmonic Filter area doors shall require escape function lever hardware on the inside face to be operative at all times to override external locking functions.

2.5.14 Rectifier Transformers

a) Supply and Install three off outdoor, oil-filled 33kV/600V-600V 5.35 MVA rectifier transformers per the requirements of EP 03 01 40 00 SP “Rectifier Transformer”, and connect as per the approved operating diagrams and the Concept Protection Design for Chalmers Street Substation 33kV Switchboard.

b) The rectifier transformers shall be controlled and protected per the requirements of EP 03 02 00 01 SP “Controls and Protection for Rectification Equipment”.

c) Each oil-cooled rectifier transformer shall be installed in a separate bunded outdoor yard to limit contamination in the event of oil leakage.

d) The bunded yard shall provide penetration arrangements, fire rated to a level above the bund height. These penetrations shall be sealed with waterproof oil fire rated seals.

e) Each bunded yard shall drain via compliant sump and flame trap arrangements to a common oil water separator.

f) Each bunded yard shall be separated from the Substation and adjoining bunded areas by blast-resistant and 2-hour fire rated walls.

g) The transformer bays shall be open to the front, and be equipped with flush plinths within each bay to permit each rectifier transformer to be rolled into position from the transformer alley. FRP walkway mesh shall be installed around the plinths and shall be mounted flush with the finished floor level of the transformer alley to avoid trip hazard.

h) The rectifier transformers shall be connected to associated rectifiers within the switchroom via overhead cabling and cabling penetrations through the blast resistant 2-hour fire rated wall.

i) The cable penetrations shall be protected with a 2-hour Oil Fire Rated Cable Glanding System supplied by Macwil Roxtec.

2.5.15 1500V Rectifiers

a) Install three-off indoor 600V AC / 1500V DC 5.35MVA (5MW) 12 pulse series bridge rectifiers within the switchroom per the requirements of EP 03 02 30 00 SP "Semiconductor 12-pulse series bridge rectifier power cubicle", and connect as per the approved operating diagrams and the Concept Protection Design for Chalmers Street Substation 33kV Switchboard.

b) The rectifiers shall be controlled and protected per the requirements of EP 03 02 00 01 SP "Controls and Protection for Rectification Equipment"

2.5.16 1500V DC Reactor

a) Install one-off 0.5mH 6400A DC 1500V DC ONAN smoothing reactor as per EP 03 05 70 00 SP "Outdoor DC Reactor", and connect as per the approved operating diagrams.

b) The oil-cooled reactor shall be installed outdoors in a bunded yard, which shall drain via compliant sump and flame trap arrangements to a common oil water separator.

c) The bunded yard shall be separated from the Substation and adjoining bunded areas by blast-resistant 2-hour fire rated walls.

d) The reactor bay shall be open to the front, and be equipped with flush plinths within the bay to permit the reactor to be rolled into position from the transformer alley. FRP walkway mesh shall be installed around the plinth and shall be mounted flush with the finished floor level of the transformer alley to avoid trip hazard.

e) The reactor control box shall be accessible to an operator standing on the FRP grating adjacent to the reactor.

f) The bunded yard shall provide penetration arrangements, 2-hour fire rated to a level above the bund height. These penetrations shall be sealed with waterproof, 2-hour oil fire rated seals.

2.5.17 1500V DC Switchboard

The 1500V DC Switchboard shall be configured in two bus sections, per the approved 1500V Operating Diagram (Refer to EL0518081) of the Preliminary Design Report. Controls for the rectifier to be arranged so that a maximum of two rectifiers may be in service simultaneously and either Rectifier DCCB R2A OR Rectifier DCCB R2B can be closed.

The detailed design shall make provision for all conduits and cored holes for the DCCB's.

The scope includes the installation of twenty nine DCCB circuit breaker cubicles, and connection, testing and commissioning into service of the following 1500V DC equipment per the requirements of the approved operating diagrams:

a) Twenty-nine off DCCB frames with busbars and joiners

b) Four off 1500V DC rectifier circuit breakers, as per EP 04 02 00 01 SP "1500V DC High Speed Rectifier Circuit Breaker"

c) Twenty-one off 1500V DC feeder circuit breakers, as per EP 04 01 00 01 SP "1500V DC High Speed Feeder Circuit Breaker"

d) Two off 1500V DC harmonic filter

e) One off spare 1500V DC feeder circuit breaker within each of the operational test bays

2.5.18 1500V Intertrip Panel

Install two DCCB Intertrip Panels and associated cabling from the DCCB cubicles, SCADA Panel and Communications Cabinet. Location of the DCCB Intertrip Panel is shown in the Preliminary Design.

At this stage DCCB Intertrips have implemented only on 422 feeder to Argyle Substation Down Shore.

a) The Contractor shall provide for all feeders that are expected to have intertrip implemented at Prince Alfred Substation prior to commissioning of Chalmers Street Substation, including:

(i) 121/1 PA/Chalmers to Mascot SH Up Airport Line

(ii) 122/2 PA/Chalmers to Mascot SH Down Airport Line

(iii) 401/1 PA/Chalmers to St James City Inner

(iv) 402/1 PA/Chalmers to St James City Outer

(v) 411 PA/Chalmers to Argyle City Inner via Wynyard

(vi) 412 PA/Chalmers to Argyle City Outer via Wynyard

(vii) 421 PA/Chalmers to Argyle Up Shore

(viii) 422 PA/Chalmers to Argyle Down Shore

(ix) 471 PA/Chalmers to Art Gallery Up ESR

(x) 472 PA/Chalmers to Art Gallery Down ESR

The Contractor shall design the layout of the DCCB Intertrip panels to meet the site specific requirements for Chalmers Street Substation. Design drawings for the current Contract installation works at Prince Alfred Substation are provided for information.

2.5.19 1500V DC Wall Mounted Switches

a) Supply and Install 4-off 1500V DC wall-mounted isolating and rail-connect switches (IRCS) per the requirements of EP 04 00 00 02 SP “System Substation 1500 V DC Links and Switches” in the ESR 1500V DC (IRCS) switch area. Connect the ESR 1500V DC IRCS per the requirements in the approved operating diagrams.

b) The IRCS switches shall be mounted as per the supplier drawings to allow easy operator access to the 3-position switch handle for manual operation.

c) All existing 1500V DC isolating and rail-connect switches (IRCS) installed within the Main Line trackside enclosures opposite Prince Alfred Substation shall be reused under the Chalmers Street Substation Contract to supply the OHW via existing arrangements.

2.5.20 1500V DC Feeders

The 1500V DC ESR and Main Line traction feeder cables shall be reticulated via cable tunnel numbers 1, 2 and 4 as applicable, to the new ESR Link area and the Main Line Link area. In

addition new cable shall be reticulated via the ESR shaft from the 1500V link area to the nominated OHWS in accordance with approved 1500V DC Sectioning Diagram, and per the proposed reticulation route in the Preliminary Design drawings.

Note that Preliminary 1500V DC Feeder cable rating calculations are provided in the Chalmers Street Substation Preliminary Design Materials for information.

The Contractor shall obtain possessions and isolations of all required tracks, including adjacent tracks where necessary, to install feeder cables for all cable routes to Link areas.

These works include, but are not limited to the Supply, design and construction of:

a) 1500V DC positive cabling arrangements between the Chalmers Street Substation and the link area locations shall be rated to provide the required 1-hour RMS current capacity requirements defined in the Principal's Design and in accordance with ASA standards.

b) Decommissioning of redundant DCCB cubicles in PA Substation with withdrawal of DCCBs, removal of 1500VDC cables and provision of suitable boarding to be made safe.

2.5.21 All cables used in the ESR shaft and rail tunnels to comply with section 12 of T HR EL 20001 ST.1500V DC Traction Return

A Traction Return Cable Route will be constructed by utilising existing routes and through the new cable tunnels constructed as part of the Chalmers Street Substation Project.

The proposed traction return cable route arrangements, including but not limited to traction return cable arrangements between multiple negative bars and trackside bars in the Sydney Central Electrical Watermain Tunnel, are shown on the Preliminary Design drawings and shall be developed and finalised by the Contractor to provide a compliant traction return system for Chalmers Street Substation for all Eastern Suburbs Railway (ESR) and Main lines.

Preliminary 1500V DC traction return cable calculations are provided in the Chalmers Street Substation Preliminary Design Materials, and indicate that the bus duct is required to have a continuous rating of 7292 Ampere and a peak rating of 9973 Ampere. The detailed designer shall validate and confirm the required number of traction return cables and final size for the bus duct.

The Contractor shall Design, Supply, Install and Commission the required traction return arrangements, cables and ducts for Chalmers Street substation. The Contractor shall aim to achieve this by utilising as much of the current infrastructure as possible (refer to EL0137532 in Design Input Information – Appendix F (Section 1.6.17) of Schedule 9). The Contractor to validate and confirm all data prior to use.

The Contractor shall:

a) Design, Supply, Install and Commission all new negative bars, routes, terminations and cabling as required;

b) Design, Supply, Install and Commission any modification/replacement of the existing negative bars and arrangements for the system;

c) Validate and upgrade any signalling equipment including impedance bonds as required for the traction return system;

d) Undertake all temporary and staging works required to maintain the traction return system for the duration of the Works;

e) Interface with the Lee Street Substation Contractor and validate the Chalmers Street Substation traction returns is a compliant system for both the substations in the area;

2.5.22 Coordinate the works with other projects within the area;11kV and 33kV Switchboard Protection and Pilot Wire Protection

The Contractor shall provide the protection functionality specified in the Concept Protection Designs for Chalmers Street Substation 11kV and 33kV Switchboards, which has been specified in accordance with the requirements EP 19 00 00 02 SP “Protection system requirements for the high voltage network”.

The 11kV and 33kV switchboards provided by thethe Contractor will be designed in accordance with the Sydney Trains Concept Protection Design.

The Contractor shall provide all aspects of the protection design works at Chalmers Street Substation.

The Sydney Trains Concept Protection Design includes:

a) The Concept Protection Designs for the Chalmers Street Substation 11kV and 33kV Switchboards

b) Detailed scope including installation and modifications required at Interface Substations

c) 11kV and 33kV design parameters

d) Specific allocation of HV protection trip circuit functionality to the two 125V DC systems

e) HV Protection testing and commissioning requirements

2.5.22.1 33kV Pilot wire protection

Pilot Wire (PW) protection shall be implemented by way of single mode optical fibre (SMOF) links on all 33kV feeders as they are moved from Prince Alfred Substation to Chalmers Street Substation.

Equipment upgrades required at co-operating substations to enable PW over SMOF shall be provided by the Principal. At this stage, remote end upgrade requirements are as follows:

a) The Concept Protection Designs for the Chalmers Street Substation 11kV and 33kV Switchboards

b) 7U1 – Lee Street Substation will be implemented as SMOF on commissioning of Lee Street Substation

c) 7U6 – Lee Street Substation will be implemented as SMOF on commissioning of Lee Street Substation

d) 755 – Edgecliff Substation requires upgrade from Multimode relay interface with Copper conversion

e) 798 – Erskineville Substation is implemented as SMOF

f) 747 – Ausgrid Pyrmont Substation requires upgrade from copper

g) 746 – Argyle Substation requires upgrade from copper

The Contractor shall coordinate works at Chalmers Street Substation with upgrade works by the Principal and its Subcontractors.

Further details of the requirements for provision of optical fibre for pilot wires are provided under Section 2.9 Telecommunications Works.

2.5.22.2 11kV Pilot Wire protection

The Contractor shall implement Pilot Wire (PW) protection by way of single mode optical fibre (SMOF) links on the 11kV feeders that are already operating as PW over SMOF at the time they are moved from Prince Alfred Substation.

The Contractor shall equip and wire all feeders at Chalmers Street Substation for PW over SMOF implementation at futures stages, including those feeders not ready for SMOF implementation at the co-operating substations at the time of commissioning.

At this stage the following feeders are already operating as PW over SMOF

a) 517 – Martin Place No.1 Substation

b) 518 – Martin Place No.2 Substation

c) 616 – Wynyard Station No.1 Substation

d) 634 – Wynyard Station No.2 Substation

e) 637 – Transport House Substation

f) 640 – Sydney Signal Box No.1 Substation

It is expected that 620 feeder to Redfern No. 2 Substation will be upgraded to PW over SMOF by others prior to commissioning of Chalmers Street Substation. The Contractor shall include the implementation of Pilot Wire (PW) protection by way of single mode optical fibre (SMOF) links on this feeder at Chalmers Street Substation.

Further details of the requirements for provision of optical fibre for pilot wires are provided under Section 2.9 Telecommunications Works.

2.5.23 HV Feeder Bulk Supply Point Metering

The Contractor shall provide two EDMI MK6 electronic tariff meters for the 33kV bulk supply feeder 747 in accordance with EP 19 00 00 02 SP, which include:

a) The electricity service provider (Ausgrid) tariff meter

b) Sydney Trains check meter

The electricity service provider tariff meter shall be located in a wall-mounted panel immediately outside the Substation main access door.

Remote meter reading shall also be provided via a 3G wireless modem incorporated in the panel.

The Sydney Trains check meter shall be connected to the SCADA RTU via an RS485 serial data link to enable uploading of the power consumption KWH and other data from the meter as required.

The required check meter data and format shall be confirmed by Sydney Trains.

2.5.24 Chalmers Street Substation - LV Auxiliary Power Systems

The Contractor shall supply and install two 11KV/415V 200kVA (nominal) dry type auxiliary transformers as per the requirements of EP 16 40 00 01 SP “Dry Type Cast Resin Distribution

Transformer for Indoor Substations" to supply the auxiliary load within the Substation, with each auxiliary transformer supplied from separate 11kV breakers as per the approved operating diagrams. The transformers to be air natural cooling.

The Contractor shall confirm the transformer rating in the detailed design by development and finalisation of the preliminary maximum demand calculations provided in the Chalmers Street Substation Preliminary Design, based on actual equipment selections and provide for 25% spare capacity for future expansion. The detailed design shall specify all auxiliary power cables per AS 3008 requirements

The Contractor shall provide a 415V auxiliary supply automatic changeover panel (ACO) to automatically switch between alternate auxiliary supplies, and which incorporates a manual changeover switch to switch to an emergency generator supply for Chalmers Street Substation. The conceptual changeover arrangements, including the connection requirements for an emergency generator, are shown in the Preliminary Design drawings for development and finalisation by the detailed designer.

The Contractor shall provide a 415V Main Switchboard (supplied from the ACO) to supply all LV equipment within the Substation, including the battery chargers, SCADA, fire systems and all building services loads. The 415V Main Switchboard shall have a minimum Form 2b segregation and provide 25% spare pole capacity on the 415V Main Switchboard. A conceptual schematic of the 415V Main Switchboard is provided in the Reference Design drawings for development and finalisation by the detailed designer.

The Contractor shall provide the following arrangements for the temporary installation of an emergency generator:

a) Compliant fuse terminals on an external wall to allow connection of a temporary generator for use as an emergency auxiliary LV supply at the Substation.

b) Localised area drainage via flame trap to the oil-water separator at the nominated set-down area for the temporary emergency generator to cater for possible restricted availability of double-bunded tank skid mount generators.

c) Specification of the temporary, removable generator connection cables on the detailed design drawings to Sydney Trains requirements

2.5.25 Dual 125V DC Battery System

The Contractor shall provide two-off 125V DC battery systems in accordance with the requirements of EP 19 00 00 02 SP "Protection system requirements for the high voltage network", for a strategic Substation. The dual 125V DC battery systems shall comply with the requirements of EP 06 00 00 01 SP "System Substation Battery and Battery Charger", and shall be used to power protection, control and communications equipment.

Each battery charger shall be supplied from the 415V Main switchboard, and in turn supplies the associated battery and 125V DC distribution board.

Preliminary battery sizing and charger calculations have been developed (refer to Chalmers Street Substation Preliminary Design Materials). The required battery ratings and charger calculations shall be confirmed by the Contractor in the detailed design based on actual equipment selections as per the requirements of EP 06 00 00 01 SP and the Concept Protection Designs for Chalmers Street Substation.

With the dual battery system, it will be necessary to parallel two DC Distribution Boards in case of loss of one set of Battery & Charger. The distribution boards shall be rated to cater for the fault currents in paralleling condition.

Sydney Trains' current preferred battery charger is Model 3x125-6kW-RC (3-phase) 125VDC battery charger, supplied by Cordex (CPS National).

The battery cells procured shall be VLRA (sealed GEL) cells for horizontal installation, with front-facing terminals for easy operator access

The required battery cells shall be installed on a battery stand consisting of 4 flat battery racks, with each rack capable of supporting 14 battery cells (2.25V nominal). The battery stand shall be procured with the batteries, and conform to Sydney Trains' requirements

Each battery system shall consist of the following:

a) 125V DC battery charger

b) battery isolation panel

c) Substation battery (minimum 350Ah C10/1.8V)

d) associated battery racks

e) 125V DC distribution board

2.6 Earthing and Bonding Works

The detailed design of the earthing and bonding system for Chalmers Street Substation shall comply with the requirements of ETN11/02 – "Earthing Designs for RailCorp's High Voltage AC system"

The detailed designer shall develop the earthing and bonding design using the Chalmers Street Substation Concept Earthing Design Report as a basis.

The Contractor shall complete an AS 1768 compliant lightning risk assessment during detailed design to determine if lightning protection is required for the Chalmers Street Substation. If required, the Contractor shall provide lightning protection.

The Contractor shall note that the following ETN11/02 requirements have been undertaken in the development of the Chalmers Street Substation Concept Earthing Design Report:

a) Site investigation and hazard assessment at the proposed Site, including services search data and a documented hazard assessment

b) Soil resistivity measurement and modelling, including

   (i) Resistivity profiling planning based on a review of services searches

   (ii) Resistivity profiling implementation with metal detector over the intended testing traverses

   (iii) Interpretation of the resistivity profiling

c) Establishment of design target limits for step, touch and transfer potentials for identified hazards

2.6.1 Earthing and Bonding Design Standards

The detailed design and construction of the earthing and bonding system for Chalmers Street Substation shall comply with the relevant provisions of the standards, regulations and codes:

2.6.2 Earthing and Bonding Design Report

The earthing and bonding design report shall be submitted at each detailed design stage. The information provided in the report shall contain, but not be limited to:

a) Soil Resistivity Test report;

b) A table of design parameters, including fault currents;

c) A table of references (Codes and Standards) applied in the design

d) A table of permitted touch and step voltage limits;

e) A table of permitted residential boundary voltage gradient limits as per standard AS/NZS 60479.1;

f) Accurate diagram of the software input model;

g) Current split diagram;

h) Earthing system design;

i) Design calculations;

j) A table of calculated results;

k) EPR and Step and Touch Voltage plots;

l) An analysis table of humans touch, step and transferred voltage hazards;

m) An analysis table of equipment/structure transferred voltage hazards;

n) An analysis table of voltage gradient limits as per standard AS 2067;

o) Electrical Hazard and Risk assessment;

p) Hazard mitigation options;

q) Software summary data;

r) Detailed relevant installation drawings and technical specification for construction;

s) An earthing and bonding test strategy which nominates all required earthing and bonding tests, and when and where these tests shall be applied, including, but not limited to:

t) Micro-ohm meter testing for continuity

u) Current injection testing

v) Additional impedance measurement of individual electrodes using the Clamp-on method to serve as a readily repeatable benchmark for routine condition monitoring

w) Copies of referenced manufacturer's data sheets and relevant Sydney Trains drawings

x) Required QA documents including signed Verifier's check sheet

y) An assessment of hazards associated with stray traction DC current imposed on new infrastructure together with mitigating solutions, where required, including but not limited to:

(i) Installation of insulating sections

(ii) Installation of stray current monitoring equipment in close proximity to Substations

(iii) Installation of cathodic protection equipment, if required.

2.6.3 Earthing and Bonding Drawings

The drawings shall contain all information required for construction including:

a) Installation layout drawings, detailing the location of all electrodes, equipment, interconnecting earthing connections, services, fence, troughing and any other construction details necessary to complete the earthing installation

b) Tables nominating installation details for all earthing components, including component part numbers, quantities, etc.

c) The earthing electrode general arrangement drawing shall include relevant data tables (refer to Sydney Trains Standard Drawing EL 0480394) listing:

(i) Measured soil resistivity data table

(ii) Applicable Step and Touch Voltage limits

(iii) Design calculated values of individual electrodes and combined sections of the earth grid system

(iv) Provision for 'fall of potential' measured results of both individual and combined sections of the earth grid system

(v) Provision for 'clamp on meter' measured results for individual electrodes

The Contractor shall submit with the detailed design at CDR a detailed earthing and bonding system test plan to the Principal's Representative for review.

2.7 SCADA Works

2.7.1 General

Implementation of the SCADA system requires:

a) Provision of the distributed RTU system at the Substation and connection to the electric and ancillary plant.

b) Provision of SCADA monitoring of the ESR shaft and cable tunnels

c) The configuration of the System SCADA Master station to incorporate the Chalmers Street Substation into the EOC SCADA network.

d) Finalisation works to decommission SCADA at Prince Alfred Substation in accordance with PR M 50757.

2.7.2 SCADA Works by Contractor

The Contractor shall provide a SCADA remote terminal unit (RTU) per the requirements of EP 11 03 00 02 SP "Electrical SCADA System Remote Terminal Unit Specification". The RTU will be configured as three separate RTU/marshalling cabinets, one for each of the 33kV switchgear, 11 kV switchgear and 1500V DC boards.

One of the RTU's will be configured as a master unit and the others as a remote input/output unit. The RTU's will be interconnected by an optical fibre ring network.

The detailed design of the RTU shall be developed per the requirements of T HR EL 11001 PR Design Technical Reviews for Electrical SCADA Equipment, including:

a) specified spare capacity

b) 33kV/11kV power transformers

c) 33kV switchgear

d) 11 kV switchgear

e) 11kV harmonic filter

f) 1500V DC switchgear

A preliminary SCADA I/O schedule is provided in the Preliminary Design for development and finalisation by the detailed designer.

Additional external SCADA monitoring points such as door alarms and temperature/fire sensors shall be provided outside the Substation in the ESR cable shaft and cable tunnels as required. The Contractor shall assess any requirements for these external points to be monitored prior to the new RTUs being commissioned, and if necessary, negotiate with Sydney Trains for them to be connected to Prince Alfred Substation as an interim arrangement before final connection to Chalmers Street Substation.

2.7.3 SCADA Works by Sydney Trains

Configure the SCADA master station system at the Electrical Operating Centre (EOC) to incorporate the Chalmers Street Substation, which includes the data base, graphic displays, alarms, logging and reporting functions.

Provide support for SCADA testing where required at the SCADA Master Station and Electrical Operations Centre in co-operation with the Contractor's testing activities at the Substation.

2.8 LV Electrical Services

All LV power and lighting cables internal to the switchroom, cable basement and 1500V switch area shall be installed in surface-run conduits.

Essential cabling relating to fire and life safety protection equipment shall not be contained in the same conduit enclosure as non-essential cabling supplying normal lighting and general purpose outlets.

Concept light and power layouts drawings are provided in the Preliminary Design.

The detailed design and construction of LV electrical services shall provide the following:

a) Internal lighting compliant to ETN 01/03 and AS1680 requirements

b) Lighting in the switchroom mounted at 3m above finished floor level, except where wall-mounted on angled brackets

c) Lighting within the cable tunnels, typically wall-mounted on angled brackets

d) Lighting within the 1500V switch area and cable basement, typically wall-mounted on angled brackets

e) Emergency maintained luminaires (with integral 2 hour battery) in the switchroom, cable basement and 1500V switch area - in accordance with AS 2293.1 and BCA

f) Exit signs above all doorways in accordance with AS 2293.1 and BCA;

g) Backup DC lighting within the switchroom and 1500V DC switch area, which shall be automatically controlled per the requirements of Sydney Trains Standard drawing EL0204559

h) Vandal resistant emergency maintained luminaires (with integral 2 hour battery) mounted on wall brackets externally above all doorways. When placed in automatic mode these external lights shall be switched via a photo-electric (PE) cell

i) Passive Infrared (PIR) motion detector (with adjustable, integral timer) in the WC to switch the room lights and the (twin) toilet exhaust fan

j) Passive Infrared (PIR) motion detector (with adjustable, integral timer) in the Office to switch the room lights

k) Automatic control of the office air-conditioning and hot water unit via the Substation Staff Access System (SAS), which will be switched on only when staff are present at the Substation (approximately 3 days a month). Refer to Sydney Trains Standard drawing EL0204559

l) Two-hour fire rated cables for the LV supplies to the FIP and VESDA panels

m) Light switches, lighting control equipment and circuits, and suitable support frames and brackets for all light fittings

n) All power socket outlets, including all terminations and mounting boxes for socket outlets, isolators and switches.

o) Conduits for LV services to future 11kV harmonic filter chamber

p) Power and control for motorised doors and gates

2.9 Telecommunications Works

2.9.1 General

The Telecommunications scope of works includes establishment works to be completed by the Contractor and network integration works to be completed by Sydney Trains.

Total scope for telecommunications includes but is not limited to:

a) Enabling works, such as relocation of any existing telecommunications cabling clear of construction works associated with the Contract

b) Design and construction of telecommunications services required to support the new Substation

c) Reconfiguration of existing Sydney Trains telecommunications network to integrate the new Substation into the network

d) Reconfiguration of existing telecommunications networks to remove any de-commissioned Substations from these networks as required

e) Communications Cabinets

f) Fit out of the Communications Cabinets

g) Lead In Cables and interconnection with the Sydney Trains back bone optical fibre network

h) 48 V DC distribution from the dual DC supplies provided by other works

i) SCADANET

j) Telephones

k) ICT data ports

l) Pilot Protection Circuits

m) Allocation and recording of cable network elements

n) Documentation both for construction and as built for handover

o) CCTV

p) Public Address

q) Security and Access control

2.9.2 Constraints

Telecommunications works shall be in accordance with ASA Standard T HR TE 21003 ST Telecommunications for Traction Substations and Section Huts.

Telecommunications services shall be integrated into the various existing telecommunications networks that support Substations and Sectioning Huts. Sydney Trains is the operator and maintainer of these networks which service a variety of rail network critical and non-critical applications. These networks are tightly controlled to ensure the safe and reliable operation of the rail network.

The telecommunications networks are documented by Sydney Trains on drawings that are and remain the intellectual property of Sydney Trains. These drawings are subject to change from time to time as the network develops.

The optical fibre network is recorded and managed by the Sydney Trains Telecommunications Network Configuration Group on the Communications GIS.

Configuration of the Sydney Trains telecommunications networks is restricted to authorised personnel from Sydney Trains.

Equipment and installation arrangements are standardised as described in T HR TE 21003 ST and other applicable standards to ensure the equipment can be reliably maintained and supported.

TfNSW and Sydney Trains have developed an optical fibre cable network architecture for connection of the Chalmers Street Substation to the optical fibre backbone.

2.9.3 Establishment Works

The Contractor shall be responsible for co-ordination of establishment works by the Contractor with network integration works by Sydney Trains.

The Contractor shall pay particular attention to the Australian and ASA standards requirements for separation of telecommunication cabling and equipment from HV,LV, 1500VDC,120VDC,SCADA and any other hazardous services within the substation. Detailed design shall be specific to measures requirement for construction to meet the standard requirements.

The Contractor shall provide all works required to establish telecommunications at the Site in preparation for integration of the Substation into the live telecommunications network including but are not limited to:

a) Design and construction of any enabling route required for re-location of telecommunications cabling to clear the Site for construction

b) Supply and installation of conduits and cable support systems within the Substations and outside to the relevant Sydney Trains telecommunications route access point;

c) Supply and install communication cabinets

d) Design the location of the telecommunications services and equipment within the Substations

e) Supply and install cat 5e cabling between the relevant communications cabinets and the telephone and desktop data port

f) Supply and install optical fibre tails or link cables from the communications cabinet to the pilot protection relays and SCADA panel

g) Provision of dual 48 VDC cabling from the SCADA Panel to the communications cabinet

h) Supply and install optical fibre tails or link cables between the communications cabinets and the Security equipment cabinet

i) Installation of the optical fibre lead in cable from the substation route interface point (where sufficient slack loop length has been left for the Contractor to haul the lead in cables the rest of the way) to the Substation communications cabinet.

2.9.4 Network Integration Works

TfNSW shall engage Sydney Trains to carry out works required to integrate the relevant Site into the wider rail telecommunications networks including but not limited to:

a) Design and construction of any telecommunications cable relocation into the enabling route constructed by the Contractor

b) Supply of the optical fibre lead in cable

c) Installation of the optical fibre lead in cable from the backbone cable interface point to the substation route interface point. Sufficient slack loop length is to be left at the substation route interface point for the Contractor to haul the lead in cables the rest of the way into the communications cabinet.

d) Terminate the Optical Fibre lead in cable into the Sydney Trains fibre backbone and within communications cabinets

e) Allocation and patching of optical fibre cores through the Sydney Trains backbone

f) Supply and fit out of equipment within the communications cabinets including DC distribution panel, Ethernet switches, VoIP PoE injectors and Optical Fibre termination panels

g) Supply and install VoIP telephone sets

2.9.5 Particular Site Requirements

2.9.5.1 Chalmers Street Substation

Telecommunications establishment works for the Chalmers Street Substation are shown in the Communication Block Diagram in the Preliminary design.

The telecommunications interface within the new Substation shall be the dual communications cabinets installed in the 1500V switch room.

Telephones shall be carried over SCADANET and included into an existing VoIP supervisory phones segment to be determined by Sydney Trains

TfNSW shall engage Sydney Trains to complete the Fibre Interconnect design to confirm the interface points and connection arrangement. At this stage, the concept for fibre Interconnect is provided for information as shown in drawing PASB2 CD0170, refer Schedule 9 – Information Documents.

Network optical fibre shall be installed by Sydney Trains through the backbone cable route with sufficient slack loop length left at the route interface point to allow the Contractor to install the cable the rest of the way into the communications cabinet within the substation.

The new substation SCADA shall be included into an existing or new SCADANET segment to be determined by Sydney Trains. TfNSW shall engage Sydney Trains to complete the SCADANET design. At this stage the concept for SCADANET is as shown in Sydney Trains drawing MET CD0168, refer Schedule 9 – Information Documents.

The new substation security services and fire services telecommunications links to monitoring points shall be included into existing or new data networks carried by the OCDN to be determined by Sydney Trains. TfNSW shall engage Sydney Trains to complete the OCDN network design. At this stage the concept for the security and fire services interface to the OCDN is by way of a dedicated ethernet switch (independent of SCADANET) to be installed in the communications cabinet as shown in the Reference Design drawings.

The Contractor shall provide:

a) Communications cabinets fitted out generally to MET RL0363 but with active equipment, cat 5e patch panel and multimode optical fibre terminations in one 600 wide x 600 deep cabinet and single mode optical fibre terminations in the adjoining 800 wide x 600 deep 45RU cabinet.

b) Suitable space allocation within the Substation for the communications cabinets that aligns with cable entries above and below the cabinets.

c) Route interface points with the Sydney Trains telecommunications backbone cable route as follows:

   (i) Chalmers Street end of the Mortuary cable tunnel for cables to Lee Street Substation, Sydney Signal Box and future cable to Mascot Station.

(ii) Comms Platform over Cable Tunnel No. 3 for cables to Town Hall Station via the ESR Shaft, Erskineville Substation via the ESR Shaft and Central Station ESR ATM Room

d) The telecommunications cable route from the Substation to the interface points.

e) Installation of lead in cable slack loop lengths provided by Sydney Trains from the route interface points into the communications cabinet

f) Telephones together with a substation bell acknowledgement switch at the following locations:

(i) A supervisory telephone in the 1500VDC switch area with hotline connection to Sydney Trains Electrical Operating Centre (EOC);

(ii) In the office;

(iii) Adjacent to the SCADA marshalling cabinet;

(iv) In the basement area;

g) ICT data points at the following locations:

(i) In the office;

(ii) Adjacent to the SCADA marshalling cabinet;

2.9.5.2 Remote end optical fibre cable works

TfNSW shall engage Sydney Trains to upgrade the remote end feeder pilot wire protection from the current copper to optical fibre as detailed in section 2.5.21.1 Pilot Wire Protection.

Optical fibre cores for pilot protection relay circuits shall be allocated and patched through to co-operating Substations by Sydney Trains.

2.9.6 Telecommunication Standards

The detailed design and construction of telecommunications systems at the Substation shall comply with the current versions of the Sydney Trains and Australian Standards.

2.10 Security Services

2.10.1 General

The detailed design and construction of security services at Chalmers Street Substation shall comply with RailCorp Security Standard RSS003 – Substations - 2009.

The Contractor shall consult with appropriate Sydney Trains operations and maintenance stakeholders to determine monitoring points and interconnection arrangements to fit Chalmers Street Substation into the wider networks that support security services.

TfNSW shall engage Sydney Trains to complete reconfiguration of existing backend systems at the monitoring locations to provide for the interconnection of the new substation into the existing systems.

Chalmers Street Substation is considered a Category 1 Substation – Identified NSW Critical Infrastructure. Based on this security classification, the following security systems are required:

a) CCTV system

b) Perimeter detection systems

c) Intruder detection and alarm system

d) Access control system (e.g. swipe cards, keypads)

e) Intruder and staff alarms via the SCADA system

f) A security data server incorporating connection point for the security systems to the Sydney Trains OCDN

g) Long line public address

The security system configuration is shown on the Preliminary Design drawings.

The security system shall comply with the requirements of the Australian standards.

2.10.2 Closed Circuit Television

The Closed Circuit Television (CCTV) system shall be connected to the Sydney Trains security monitoring centre via the OCDN.

The CCTV system provided by the Contractor shall comprise:

a) A video switching and digital recording unit located in the security equipment rack in the office

b) The security equipment rack shall also accommodate the intruder alarm panel and access control panel;

c) Digital IP day night cameras located to view the perimeter of Substation and the entrance doors

d) The cameras shall be connected to the video switching unit using optical fibre cable and an isolated 24 V DC or AC power supply

e) The camera housings shall have tamper alarms

f) A dedicated UPS within the rack

2.10.3 Intruder alarm system

The intruder alarm system provided by the Contractor shall comprise:

a) A security control panel located in the security equipment rack in the office

b) Reed switches at the Substation external doors

c) Perimeter detection devices (Refer perimeter detection system)

The intruder alarm system shall be connected to the Sydney Trains security monitoring centre via the OCDN and the CCTV system and shall activate cameras viewing the area in alarm (Refer CCTV section).

2.10.4 Perimeter detection system

The perimeter detection system provided by the Contractor shall comprise PIR detectors to monitor the Substation doors, which are enclosed with high security gates.

The PIR detectors shall be connected to the intruder alarm panel.

The detailed designer shall consult Sydney Trains security to confirm the requirements of perimeter security.

2.10.5 Access control system

The electronic access control system provided by the Contractor shall comprise:

a) An access control panel located in the security equipment rack in the Office

b) Proximity card readers at the pedestrian entrance doors

c) Electrically operated door locks at the pedestrian entrance doors

The new ESR 1500V link area shall be a separate access control area

The access control system shall be connected via the OCDN to the Sydney Trains access control server for administration of access by authorised personnel.

2.10.6 Intruder and staff alarms via SCADA

In addition to the intruder alarm system the following shall be implemented by the Contractor using functions with the SCADA system:

a) All external doors fitted with magnetically operated reed switches, wired to the SCADA RTU to alert the EOC of persons entering the building or 1500 V DC switch area

b) A Substation staff access switch located near the main Substation access door D01

c) A Mains staff access switch at the main access door to the 1500 V DC switch area, which is independent of the Substation building reed switches

d) Visual and audible warning devices within the Substation connected to a staff-operated cancellation switch

Staff / Intruder alarms shall be installed in accordance with Sydney Trains standard drawing EL0204559.

2.10.7 Long line public address

RailCorp Security Standard RSS003 – Substations - 2009 requires the provision of long line public address to enable announcements for security purpose to be made from the Sydney Trains security management centre.

The Contractor shall provide a long line public address system incorporated in the EWIS to enable broadcasting of security announcements by the Sydney Trains security management centre.

2.11 Fire Services

2.11.1 Existing Services

The following existing hydraulic services are nominated in DBYD information provided by Authorities for the vicinity of the proposed Chalmers Street Substation Site:

a) There is an existing DN150 site wide fire hydrant ring main located to the south of the proposed Substation building.

2.11.2 Fire Hydrant System

The Contractor shall provide three (3) external (two double-headed and one single headed) fire hydrants on the Chalmers Street Substation Site to achieve AS2419.1 compliant fire hydrant coverage.

The fire hydrant service shall be installed as per ESB004.

The fire hydrant system shall be designed to satisfy the pressure and flow requirements as follows:

a) Dual headed External Hydrant 22L/s at 150 kPa (each feed hydrant outlet at 11 L/s @ 150 kPa)

b) The supplying fire hydrant pipe work is to achieve a fire rating of not less than -/60/60. Pipework that may be exposed to fire is to be appropriately protected.

2.11.3 Fire Detection and Alarm

The detailed design for the fire detection and alarm systems shall comply with the requirements of EP 99 00 00 08 SP “Substations Fire Detection and Protection Standard”, and the standards listed in Appendix A.

The system configuration is shown in the Preliminary Design drawings and shall comprise the following Sydney Trains preferred equipment:

a) A fire indication panel (FIP) with outputs to the SCADA RTU for remote monitoring and the alarm transponder for a direct alarm to the fire monitoring centre

b) The FIP shall be a Honeywell microprocessor addressable panel with high level interface to Sydney Trains Central Management and CCTV

c) Multi-point aspirated sampling within the Substation building, cable tunnels, ESR Shaft and ESR 1500V Link Room incorporating a VESDA panel connected to the FIP

d) Alarm transponder connected to FIP to transmit a direct alarm to the fire alarm monitoring centre

e) Photo-optical smoke detectors within the Office and WC connected to the FIP

f) Flame detectors in the outdoor electrical plant areas (transformers, reactor and future harmonic filter bay)

g) Manual call point alarms positioned at strategic locations in the Substation, and directly connected to the FIP

h) Visual warning devices comprising indoor strobe warning lights, and an external strobe light

i) An alarm bell located externally adjacent to the main access door, if required

j) An acoustic occupant warning system comprising an EWIS amplifier, tone generator in the FIP and loudspeakers located to provide coverage throughout the Substation

k) An audio interface to the EWIS connected via the communications network

l) Portable hand-held fire extinguishers provided to serve all areas in accordance with the BCA and AS2444

The locations of the above equipment shall be shown by the Contractor on the detailed design drawings.

2.11.3.1 System Functions

The design shall include the following system functions:

a) Four levels of fire alarm. Levels one to three shall be detected by the VESDA and be alarmed at the EOC via the SCADA system. Level four shall be detected by the VESDA and other detectors and manual call points and alarmed at the EOC and fire monitoring centre via the SCADA system

b) The alarm levels shall be:

   (i) Level 1 – detection

   (ii) Level 2 – alarm recommending evacuation

   (iii) Level 3 – full alarm, evacuation

   (iv) Level 4 – full alarm, Intervention by fire and rescue service

c) Automatic adjustment of the VESDA for outside air quality

d) Shut-down signals from the FIP to ventilation fans in the event of a fire alarm

e) Primary means of communications shall be provided to the Sydney Trains security management centre by way of the Security data network and secondary communications shall be by way of SCADANET.

f) The broadcasting, via the EWIS, of alarm tones activated by the FIP and long line public address announcements originating from the Sydney Trains security management centre

Refer to the ESR Shaft Fire Risk Assessment and Chalmers Street Cable Tunnel Fire Engineering Report for full details of requirements.

2.11.3.2 Monitoring Point Connections

The Substations Fire Detection and Protection Standard EP 99 00 00 08 SP requires the provision of a direct alarm to the fire alarm monitoring centre with primary and secondary communications service as required by the referenced Australian standard.

The Contractor shall implement the primary connection to fire alarm monitoring centre by way of the Security data network and secondary communications by way of SCADANET.

The primary network cabling connection within the Substation shall be two hour fire rated to ensure compliance with the standards.

2.11.4 Fire Protection

The Contractor shall ensure the detailed design for the fire protection system for the Chalmers Street Substation complies with the requirements of EP 99 00 00 08 SP “Substations Fire Detection and Protection Standard”.

A preliminary Fire Risk Evaluation Matrix model (FREM) has been completed for the Substation as per EP 99 00 00 08 SP (refer Chalmers Street Substation Preliminary Design Materials, Appendix H) for development and finalisation by the Contractor during the detailed design.

Note that the following equipment is not required and shall not be provided per the requirements of EP 99 00 00 08 SP "Substations Fire Protection and Detection Standard":

a) Fire hose reels

b) Gaseous fire extinguishing systems

2.11.5 Reference Standards, Codes and Guidelines

The design and construction of fire services shall comply with the relevant requirements of standards, regulations and codes.

2.11.6 Materials and Components

All in ground fire services pipe work shall be of non-metallic material such as polyethylene or similar to prevent the transfer of electric potentials or stray DC currents.

Above ground pipework shall be as per Laws.

All products of the same type are to be sourced from the same manufacturer.

2.11.7 Installation

The Contractor shall provide for the following requirements in the design and construction of the fire protection system:

a) Arrange services so that services running together are parallel with each other and with adjacent building elements.

b) Install piping in straight lines at uniform grades without sags.

c) Arrange piping to prevent air locks.

d) Provide sufficient unions, flanges and isolating valves to allow removal of piping and fittings for maintenance or replacement of plant.

e) Install all isolation valves in readily accessible positions.

f) Pipe bracketing shall be to AS 2419.

2.11.8 Testing

The Contractor shall provide hydrostatic tests to the satisfaction of the relevant Authority.

2.11.9 Completion, Commissioning & Maintenance

Upon completion of the installation, the entire system shall be fully tested and commissioned to the satisfaction of the Principal's representative and the relevant Authorities.

The Contractor's commissioning and testing procedures shall include but not be limited to the following:

a) Functional testing of all flow and alarms

b) Functional testing of the Fire Indicator Panel, including all group alarms, alarm output signals and plant control functions

2.11.10 'As Installed' Drawings

As-Installed drawings shall be produced for the works in conjunction with the associated schedules in accordance with section 17 of AS1851.

These drawings shall be stand-alone drawings separate from any other trades' and shall be endorsed as correct and true.

2.12 Hydraulic Services

The proposed Chalmers Street Substation Site is located in the City of Sydney Council area.

2.12.1 Existing Hydraulic Services

The following existing hydraulic services are located in the vicinity of the proposed Chalmers Street Substation Site:

a) The Site has frontage to a DN300 cast iron cement lined (CICL) water main, located at the North West side of Prince Alfred Park and an existing DN100 metered connection located at the South Eastern embankment facing Prince Alfred Park.

b) There is also an existing DN150 site wide fire hydrant ring main located to the south of the proposed Substation building. This fire hydrant system shall be extended with additional external fire hydrants to provide hydrant coverage throughout the new substation.

c) A DN250 VCP in-ground sewer pipe is located at the northern side of Prince Alfred Park and terminates approximately 60 m from the proposed Site with an access chamber. There is also an existing DN100 sanitary drainage pipe installed draining the newly built CBD Network Base west of the proposed Chalmers Street Substation.

d) The former Railway Institute Building, which is located approx. 100 m from the proposed new Chalmers Street substation building, is connected to the existing 225 VCP sewer.

e) The Site has access to an existing stormwater pit within the Site boundary, consisting of a 450 mm DIA pipe outlet that is nominated as the discharge point for the roof water run-off and the transformer drainage from the proposed development.

2.12.2 Hydraulics Standards, Regulations and Codes

The hydraulic services works shall be designed and constructed in accordance with standards, regulations and codes as per Appendix A

2.12.3 Sanitary Plumbing and Drainage

The Contractor shall design and construct a sanitary drainage and plumbing system in accordance with AS/NZS3500.2 to cater for all wastewater from the proposed Substation.

The detailed design for sanitary drainage and plumbing systems shall minimise maintenance and maximise accessibility to the pipelines, plant and equipment.

Due to the unavailability of a gravity connection, sanitary waste shall be pumped to the Authority sewer by means of sewage pumping system. There is an existing DN100 sanitary drainage pipe installed draining the newly built CBD Network Base west of the proposed Chalmers Street Substation which can be used for this purpose.

The Contractor needs to confirm that the pipe is suitable for use as a connection to the sewer system.

An overflow relief gully and reflux valve shall be provided to protect the Site from surcharging sewage.

Additional drains and floor wastes shall be provided, as required to collect discharge from mechanical, fire and hydraulic plant and equipment.

2.12.4 Stormwater Collection

Roof water collection shall be designed and constructed in accordance with local Council requirements and AS/NZS3500.3

The design for the roof water collection system shall be based on the minimum criteria for the eaves gutters of a 1 in 100 year 5 minute storm event.

The main roof area falls towards the transformer yards. The main eaves gutters above the bunded transformer yards shall be designed to a 1:100 storm event with additional down pipes provided to reduce the risk of overspill onto the bunded yards. The eaves gutter shall be open at each end and discharge into a sump with overflow outlet.

Stormwater collected from roof outlets shall drain to the stormwater system with downpipes located outside the building and connect to the civil stormwater system outside the building.

The design for the stormwater collection system for the bunded transformer yards shall be based on the following minimum criteria:

a) Transformer bunds - 1 in 100 year 5 minute storm event

b) Each bunded transformer yard shall be separately drained via in-bund sumps. The drainage from the bunded yards shall follow similar gravity design to connect to the oil separator.

The in-ground stormwater system is shown on the Preliminary Design drawings.

2.12.5 Domestic cold water

An application has been lodged for connection of this development to the local Authority. As a result a Section 73 certificate has been received for this development from Sydney Water Corporation (case No. 135079), dated 8 May 2014, confirming available services on site.

Based on the age of the existing Site, the existing Sydney Water connection and water meter assembly will have to be upgraded with new testable back flow prevention devices appropriate to the property's hazard rating and based on current installation requirements

The domestic cold water system shall be designed and constructed in accordance with AS/NZS3500.1.

The Contractor shall:

a) Confirm the proposed connection to the existing DN100 metered connection located at the South Eastern embankment facing Prince Alfred Park

b) Provide a cold water supply to the Substation building, which includes:

   (i) the sanitary fixtures and fittings in the WC

   (ii) emergency shower.

c) Reticulate the cold water supplies based on the following pipework parameters:

(i) Minimum 100kPa outlet pressure

(ii) Maximum 500kPa outlet pressure

(iii) Maximum system velocity of 1.6 m/sec

d) Provide stop valves as follows:

(i) Install stop valves in locations accessible by service personnel standing on the floor

(ii) Enable wet areas and individual outlets to be isolated for maintenance purposes without affecting supply to other areas

e) Provide backflow prevention as follows:

(i) To zoned areas

(ii) On incoming water supplies

(iii) On individual fixtures, where required by AS3500 & SWC requirements

2.12.6 Heated domestic water supply

The hot water system shall be designed and constructed in accordance with AS/NZS3500.4.

The Contractor shall:

a) Provide a small (3.5kW) instantaneous hot water unit (HWU), equivalent to ZIP MDX 3 SMARTRONIC to serve the hand basin in the WC

b) Locate the HWU on a wall beside the hand basin as shown in the Preliminary Design drawings

c) Provide pipework designed to the parameters listed in ‘Cold Water’ section

d) Provide insulation to all heated water pipework, which shall be insulated to a K value of 0.04 w/meter

e) Limit the heated water temperature, and deliver hot water to satisfy authority requirements, at the following temperatures:

(i) WC room basin – 43°C

f) Provide control valves in locations accessible by service personnel standing on the floor to isolate items of equipment and fixture clusters

2.12.7 Materials and Components

Where possible all in-ground hydraulics services pipe work shall be of non-metal materials such as polyethylene or similar to prevent the transfer of electric potentials or provide a path for stray DC currents.

Stormwater pipework from the transformer bunds to the oil separator shall be metal pipe work to maintain the integrity of the pipework in the event of a fire.

Above ground pipework shall be either non-metal material or steel as per statutory requirements.

All products of the same type are to be sourced from the same manufacturer.

2.12.8 Installation

No hydraulic services pipework shall be installed within the switchroom or above electrical equipment.

Arrange hydraulic services so that services running together are parallel with each other and with adjacent building elements.

Install hydraulic services piping in straight lines at uniform grades without sags.

Arrange piping to prevent air locks.

Provide sufficient unions, flanges and isolating valves to allow removal of piping and fittings for maintenance or replacement of plant.

Install all isolation valves in readily accessible locations.

2.12.9 Completion, Testing, Commissioning & Maintenance

Upon completion of the installation, the entire system shall be fully tested and commissioned to the satisfaction of the Superintendent and the relevant Authorities.

The commissioning and testing procedures shall include but not be limited to the following:

a) Hydrostatic testing of all sanitary plumbing & drainage lines to a maximum of 3 m head for a minimum 15 minutes in accordance with AS/NZS3500.2. Subsequent Air and Vacuum test are optional and to be completed in accordance with AS/NZS3500.2.

b) Hydrostatic testing of all stormwater plumbing & drainage lines to a maximum of 3 m head for a minimum 10 minutes (using vcp requirements) in accordance with AS/NZS3500.3.

c) Hydrostatic testing of all stormwater downpipes to a maximum of 10m head for a minimum 10 minutes in accordance with AS/NZS3500.3.

d) Hydrostatic testing of all water services to 1500kPa for a duration of 30 minutes minimum in accordance with AS/NZS3500.1 and AS/NZS3500.4.

e) Testing of all thermostatic mixing valves.

f) Testing of Hot Water Units and delivery temperatures

g) Testing of Fire Hose Reels in accordance with AS2441.

h) Testing of associated Hydraulic pumps and equipment.

i) Functional testing of all flow and alarms.

j) Testing of all bunded areas designed to contain spillages.

2.13 Mechanical Services

2.13.1 General

The scope of works for mechanical services for the Substation includes, but is not limited to:

a) Air conditioning services to the office area.

b) Mechanical (with backup electro-mechanical) toilet ventilation system.

c) Natural (non-mechanical) substation battery room ventilation system.

d) Natural (non-mechanical) substation switchroom ventilation system.

2.13.2 Technical Requirements

Natural (non-mechanical) ventilation shall be provided to the Substation switchrooms and cable basement. Natural ventilation shall be achieved by cross-ventilation flows between louver arrangements within the ground floor basement and the Level 1 switchroom incorporating floor vents between ground floor and first floor fire compartments. Louvres shall be backed with security grille and 12mm bird wire mesh to reduce entry of vermin.

The Contractor shall ensure the design demonstrates adequate natural ventilation distribution within the substation. Preliminary ventilation calculations, based on known heat loads from Substation equipment, are provided in the Chalmers Street Substation Preliminary Design Materials for development and finalisation in the detailed design. The preliminary calculations have been based on a temperature rise of 5 degrees above ambient within the space. The Contractor shall provide a ventilation study that ensures the design complies with the requirement of ASA standards EP 00000013 SP [5]
A split system air conditioner shall be provided to the Office. The condenser unit for the air-conditioner shall be installed in the loading dock external to the Substation.

The toilet shall be provided with mechanical exhaust and with a backup fan system with redundancy in accordance with the requirements of ESB004.

The battery rooms shall be naturally ventilated as per AS2676.2 requirements. Preliminary battery room ventilation calculations are provided in the Chalmers Street Substation Preliminary Design Materials for development and finalisation in the detailed design.

The conceptual ventilation arrangements are documented on the Preliminary Design drawings.

2.13.3 Reference Standards, Codes and Guidelines

All mechanical services works shall comply with ASA Station Design Guidelines, Building Code of Australia, NSW Code of Practice and the relevant Australian Standards.

2.13.4 Design Criteria

Table 8 – Design Criteria

Parameter	Design Criteria
External Conditions	
Summer	35.1ºC db 23.4ºC wb
Winter:	7ºC db
Internal Conditions	
Occupied Space	Summer: 23 ºC ± 1 ºC @ 40-60% RH Winter: 21 ºC ± 1 ºC @ 40-60% RH

[5] Refer Addendum12 Clause 4.1

Parameter	Design Criteria
People Load	1 person per 10 m2
Lighting Load	15 W/m2
Office Equipment Load	20 W/m2
Outside Air	To comply with AS 1668 Part 2
Façade and Roof	To comply with the Building Code of Australia (BCA)

2.14 Supplies to Signalling Locations SY4 and SY5

The Contractor shall provide the Preliminary Design, Detailed Design, construction, testing, commissioning and handover of the normal and backup 415V supplies to signalling locations SY4 and SY5 to replace the existing 2kV supplies from PA Substation.
RailCorp drawing EL 0044777, refer Schedule 9 – Information Documents, provides the detail of the existing 2kV reticulation for SY4 and SY5. The Backup Supply (IS1) from PA Substation to SY4 and SY5 is also the Backup Supply to SY6 and SY7. The 415V supplies to SY6 and SY7 are to be provided by another contract.

The proposed 11kV system diagram EL 0524941 shows the proposed supplies for SY4 and SY5 from the price Alfred Sidings Distribution Supply Main Switchboards (DSMSB No. 1 and No. 2. Two supplies are shown for each of SY4 and SY5, i.e. four (4) supplies in total.

A pre-concept design is included in Schedule 9 – Information Documents. This design shows:

a) A supply via one route from DSMSB No. 1 and 2 to SY4 as a Normal Supply

b) A supply via another route from DSMSB No. 1 and 2 to SY5 as a Normal Supply

c) The Backup Supplies to SY4 and to SY5 are to be provided from the existing Ausgrid Point of Attachment (POA). New routes are to be established for these supplies.

The Ausgrid POA is to be upgraded to supply signal locations SY1, SY2, SY4 and SY5 Backup Supplies. An LV isolation padmount transformer is to be provided between the POA and these supplies. The proposed routes are shown on the pre concept drawings.

The Contractor shall decommission and remove the 2kV supplies from PA Substation following the commissioning of the 415V supplies to SY4, SY5, SY6 and SY7 .

2.15 Decommissioning of Existing Prince Alfred (PA) Substation

The scope of works for the decommissioning of the existing PA Substation following commissioning of the new Chalmers Street Substation includes the following items:

a) Decommissioning, removal and transport all redundant electrical 33kV, 11kV and 1500V equipment in operational condition to Sydney Trains Chullora store for disposal by Sydney Trains. All equipment identified for removal that contains oil is to be tested for PCB and the results made available to the Principal 8 weeks prior to transportation.

   Sydney Trains Chullora store is situated at Gate 3 Worth Street, Chullora NSW.

b) Removal and transportation of all redundant electrical 33kV, 11kV and 1500V cabling to Sydney Trains Chullora store at Gate 3 Worth Street, Chullora NSW for disposal by Sydney Trains

c) 1500V DCCB Interface Panels shall be removed and handed over to Sydney Trains by delivery to the Strathfield DCCB Test Bay.

d) Protection relays nominated by Sydney Trains as required for maintenance spares shall be removed and handed over to Sydney Trains by delivery to Granville Maintenance Services Depot

e) De-commissioning of SCADA and associated telecommunications infrastructure in accordance with PR M 50757.

f) Sydney Trains will determine and identify telecommunications optical fibre cabling required to be retained for ongoing operations. Redundant telecommunications cabling is to be removed by the Contractor.

g) Provision of suitable boarding for all penetrations to be made safe; and

h) All incidental items necessary to deliver the complete Works.

2.16 Detailed Site Survey (DSS)

The Contractor shall prepare and implement a DSS Management Plan to ensure any relevant training, site works and DSS drawing updates are completed in accordance with Sydney Trains requirements. The following Sydney Trains DSS procedures are provided on the ASA website.

- TMA 0491 Accurate Field Drawing,
- TMA 0492 Data Capture Procedure
- TMA 0493 Scope Procedure
- TMA 0494 Works as Executed Procedure,
- TMA 0496 Specification for Collection of Services Data
- TMA 0497 Code and Layer Definitions for Services Identification
- TMA 0511 Plan Symbols and Interpretation Guidelines

TfNSW will as Controller request the DSS from Sydney Trains. The Contractor shall have the same obligations as the Controller with regard to the DSS requirements.

a) The Contractor shall produce Accurate Field Drawings / Red-Line mark ups of As-Built drawings on a daily basis. These drawings must be kept on site at all times, and be made available to the Principal within 24hrs of request.

b) The Contractor's Inspection and Test Plans (ITPs) shall include the requirement for the production of these red-line mark ups and be a witness point for the Principal.

c) The Contractor shall produce updated "Class A" DSS drawings. Class A means validation by direct survey measurement of an exposed service. There is a Sydney Trains Panel of Registered Surveyors.

d) The Contractor must validate (by visually locating) DSS drawings prior to construction.

e) Sydney Trains (EDU) asset owner representatives will need to be present during excavation in close proximity to HV services. The Contractor will be required to notify the Principal 4 weeks in advance of planned excavations so that asset owner reps can be made available.

f) The Contractor must comply with the relevant Sydney Trains safety procedures that are available on RailSafe website.

g) The Contractor must follow Sydney Trains Electrical Network Safety Rules (ENSR) and obtain the latest Sydney Trains DSS CAD Template at the time of updating the CAD Files, to ensure use of the latest version.

h) For DSS drawings of areas within the Rail Corridor, CAD updated DSS files must be submitted by the Contractor to the Principal within 2 weeks of performing the works.

i) The Contractor shall allow for staff members to receive DSS Training, (the course cost will be waived for up to 5 people) consisting of three(3) four hour sessions conducted at Sydney Trains Petersham Training College as follows:

(i) DSS - IT24 Introduction to DSS Plans

(ii) DSS - IT25 Work as Executed

(iii) DSS - IT26 Accurate Field drawing

j) The Contractor shall ensure personnel responsible for the construction Site and responsible for producing red line as-built mark ups receive DSS training. The Construction manager, Site manager, Site supervisor, Site foreman and CAD manager are expected to be included in this training.

k) The Contractor shall be responsible for ensuring the acceptance by Sydney Trains of the updated DSS drawings. The procedure for acceptance of updated DSS drawings is anticipated to consist of the following workflow:

(i) The Contractor to produce accurate field drawings

(ii) TfNSW personnel co-signs once checked and accepted

(iii) Contractor to produce CAD (using Sydney Trains DSS CAD templates)

(iv) TfNSW submits CAD to Sydney Trains for review and acceptance

(v) Contractor shall amend and resubmit to comply with Sydney Trains requirements

(vi) TfNSW re-submits CAD drawings for acceptance by Sydney Trains.

(vii) TfNSW is released of DSS responsibilities once accepted by Sydney Trains.

2.17 Sydney Trains Virtual Planroom

2.17.1 Concept and Approved for Construction (AFC) Design

Within fifteen-(15) Business Days of receiving CCB approval at Control Gate Stage 3, and the associated Configuration Change Approval Number (CCAN), the Contractor shall update the design drawings with the CCAN and issue to the Principal the AFC design. The Contractor shall submit the AFC design drawings to the Principal in both CAD and PDF formats in accordance with the requirements of the TfNSW CAD Protocols for lodgement in the Sydney Trains Virtual Planroom by the Principal.

2.17.2 Work As Executed (WAE) Drawings

Within thirty-(30) business days of completing construction and/or commissioning, the Contractor shall submit the Work As Executed (WAE) drawings to the Principal.

WAE drawings are defined as the complete package of AFC drawings, stamped and signed by the Contractor following construction having being completed in accordance with the AFC drawing and noting all exceptions resulting from Requests for Information (RFIs), Non-Conformance Reports (NCRs), shop drawing reviews and all other post AFC design changes constructed by the Contractor.

The Contractor shall ensure the uniformity of the as built documentation including the updated DSS drawings as produced by the Contractor.

The Contractor shall submit the WAE drawings to the Principal in both CAD and PDF formats for lodgement in the Sydney Trains Virtual Planroom by the Principal.

2.18 ESR Shaft Fire Safety

The Contractor scope requirements for the ESR Shaft Fire Safety are outlined in the ESR Shaft Fire Risk Assessment Report included in Appendix H of the Chalmers Street Substation Preliminary Design Report. The recommendations made in the report are detailed in Table 2 Fire Safety Strategy and summarised in Section 4. Conclusion and Recommendations of the report.

2.18.1 Fire Engineering Requirements

The Contractor shall be responsible for the development of the fire engineering process during the detailed design stage and involving consultation with relevant stakeholders and preparation of the final design documentation. The issues to be addressed by the Contractor during the detailed design stage include property protection and business continuity requirements.

The Contractor scope shall include the following requirements from the report recommendations:

a) Protection of the doorway at the bottom of the shaft by a fire door set (-/240/30);

b) Protection of any core holes and cable and service penetrations into the shaft by suitable fire-stopping material to achieve 4 hour fire rating (-/240/-) in accordance with BCA Spec C3.15 Clause 7;

c) Retain the existing Gatic concrete lid;

d) Selection, rating and installation of the cables to prevent overheating (ablative coating is not considered necessary). the appropriate number of cables (33kV, 11kV and 1500V) has been determined to serve the full load requirement of the connected load. The number of 1500V cables has been increased on this basis;

e) Provide fixed ventilation outlet at the top of the shaft to maintain the ambient temperature within the shaft;

f) Installation of an early smoke detection system in the shaft with control unit and appropriate warning located in a building where there are permanent staff presence or monitored by Rail Management Centre (RMC). The product should be VESDA model type Vli or similar to suit the harsh environment in the shaft;

g) Retain the existing lighting within the shaft;

h) Provide a fire damper to the vent between ESR Shaft and Cable Tunnel No.4.

i) Provide fixed ventilation inlet at the bottom of the shaft to maintain the ambient temperature within the shaft; and

j) Provide a fire damper to the vent between ESR tunnel and ESR Shaft.

2.19 Chalmers Street Substation Cable Tunnel Fire Safety

The Contractor scope requirements for the Chalmers Street Cable Tunnels Fire Safety are outlined in the Chalmers Street Cable Tunnel Fire Engineering Report included in Appendix H of the Chalmers Street Substation Preliminary Design Report. The recommendations made in the report are detailed in Section 7. Recommendations and in the Executive Summary of the report.

2.19.1 Fire Engineering Requirements

The Contractor shall be responsible for the development of the fire engineering process during the detailed design stage and involving consultation with relevant stakeholders and preparation of the final design documentation. The issues to be addressed by the Contractor during the detailed design stage include property protection and business continuity requirements.

The Contractor scope shall include the following requirements from the report recommendations:

a) Provide automatic smoke detection and alarm system to BCA specification E2.2a, AS1670.1, throughout the subject building inclusive of the entire length of the cable tunnel;

b) Provide a fire door with an FRL of -/120/30 at the bottom of stair leading to Chalmers Street Substation;

c) Provide a fire damper to the vent between ESR Shaft and Cable Tunnel No.4;

d) Provide natural ventilation in the form of uniformly distributed fixed storm proof louvre achieving a minimum total free area of 12m2;

e) Provide fire extinguishers in the cable tunnel No.4 (near the new submersible pump), 1500V switch room and southern end of cable tunnel No.2, appropriate to the fire hazard associated with the cables;

f) Emergency lighting and exit signs (illuminated and non-illuminated) in the building and cable tunnel shall be in accordance with prescriptive requirements of BCA and applicable Australian Standards;

g) Evacuation procedures to be developed and maintained to AS3745.

3 Interfaces and Stakeholders

Interfaces requirements with relevant parties are provided in Appendix B Interface Schedule.

3.1 Stakeholders

The table below provides a list of stakeholders and their role in the Project. This list is a starting point based on the understanding at the time of writing the Works Brief and may not include all the stakeholders required to consult as part of the works and services. The Contractor is to obtain Authority Approvals from all service providers or Authorities as required to complete the Works.

The Contractor shall prepare a Stakeholder Consultation Strategy and submit to the Principal for review, within 20 Business Days of Contract Award.

The Stakeholder Consultation Strategy shall identify internal (TfNSW stakeholders) and external stakeholders (e.g. Sydney Trains, NSW Trains, neighbours, utilities, etc) and describe the consultation activities to be undertaken by the Contractor.

As a minimum, the Contractor shall:

a) Undertake consultation with relevant stakeholders to seek their endorsement of the Detail Design prior to submission to the Principal for review;

b) Undertake consultation with relevant stakeholders to seek their endorsement of the Contractor's construction and Site investigation activities prior to undertaking any Site works;

c) Arrange stakeholder meetings and/or presentations prior to formal design submissions to inform stakeholders of design progress and specific design issues that require attention;

d) Provide sufficient notice (minimum 1 week) to relevant stakeholders for any planned meetings or presentations;

e) Keep properly documented records of stakeholder consultation activities and include this information in the relevant design reports and construction planning documents;

f) Provide the detailed evidence of stakeholder consultation to the Principal for inclusion in each of the CCB submissions;

g) Submit any proposed correspondence with external government agencies to the Principal for review and acceptance before undertaking the correspondence;

h) Invite the Principal's Representative, or its delegate to attend any meetings with external agencies; and

i) Provide to the Principal any return correspondence / meeting minutes with stakeholders in a timely manner.

Table 9 – Stakeholder Schedule

Stakeholder	Interaction
Sydney Trains a) CBD Network Base (Super Depot) b) OTD Office (formerly C&CS) c) Electrical Operations Centre (EOC) d) Sydney to Burwood Compressor Project	Asset operator and maintainer of rail infrastructure, rolling stock, rail electrical distribution network, Electrical Operations Centre (EOC) SCADA network and rail telecommunications network. To be consulted on all works and services that have an operational or maintenance impact on rail infrastructure, rolling stock, rail electrical distribution network, Electrical Operations Centre (EOC) SCADA network and rail telecommunications network. The Contractor shall program the following Works to be completed by Sydney Trains: i. Concept design for high voltage feeder pilot protection system required to operate between the new substation and connecting substations ii. Design and configuration of modifications to the SCADA master station at the (EOC) to integrate the new substation into the SCADA network iii. Testing of the SCADA master station in conjunction with the testing RTU inputs and outputs on Site; iv. Finalisation works to remove the de-commissioned substation from the SCADA network; Design and configuration of optical fibre interconnections to integrate the new substation into the backbone fibre network. It is expected that the integration will include provision of optical fibre cable from the fibre interconnect points to the route interface pits with sufficient length for the Contractor to install the final lead in through the interface routes into the new substation; v. Design and configuration of SCADANET and VoIP networks to integrate the new substation into existing SCADANET and VoIP network segments; vi. Supply and fit out of equipment within the communications cabinets in the new substation to RL0363 and including DC distribution panel, Ethernet switches, VoIP PoE injectors and Optical Fibre termination panels; vii. All termination and jointing of the optical fibre lead in cable; viii. Allocation, recording, testing and patching of optical fibre cable network elements; ix. Supply and install VoIP telephone sets; x. Finalisation works involving de-commissioning of services and removal of telecommunications equipment from the existing PA Substation. xi. The Contractor shall provide evidence of stakeholder consultation and co-ordination of interface design and construction plans with Sydney Trains for CCB submission at Control Gates Stages 2, 3, 4 and 5.
Sydney Light Rail	Provide support to the Principal to Interface and assist when requested.
Sydney Metro	Provide support to the Principal to Interface and assist when requested.

Stakeholder	Interaction
CBD Coordination Office	Provide support to the Principal to Interface and assist when requested.
Other TfNSW Projects	Provide support to the Principal to Interface and assist when requested.
Sydney Water	Asset owner, operator and maintainer of the stormwater, water supply, and sewer system. To be consulted on all works and services that have an operational or maintenance impact on the stormwater, water supply and sewer system. The Contractor shall provide evidence of stakeholder consultation for CCB submission at Control Gates Stages 2 and 3.
Ausgrid	33kV Bulk Electricity Supplier
TfNSW property	*Protected Future Rail Corridor*

4 Technical Requirements

4.1 Design Life

Design life is defined as the period within which an element of the Works shall continue to meet the technical requirements and its intended function, without replacement, refurbishment or significant maintenance work that disrupts normal rail operations.

The asset elements of the Chalmers Street Substation shall be designed and constructed to achieve the durability requirements as specified in the applicable Australian and ASA Standards and in accordance with those listed in the table below:

Table 10 – Required Durability for Asset Elements

Element	Design Life (years)
Inaccessible and/or permanent structural elements	100
Underground services reticulation	100
Drainage structures and inaccessible pipe systems	100
Roads	20
Drainage plant and equipment	20
Sewer plant and equipment	20
Water supply plant and equipment	20
Substation building	60
Car park surfaces	20
Paths and landscaping	20
Electrical systems	30
Lighting	30
Fire systems	20
Security plant and equipment	20
CCTV plant and equipment	20
Telecommunications plant and equipment	20
Mechanical services equipment	20
Air conditioning equipment	15
Furniture and Fittings	15
Testing Equipment	10
Transformers, rectifiers, reactor	40
Switchboards	30
HV and LV cables	30
Existing OHW structures and equipment (less than 25 years old)	50
OHW Wiring	35

Notes to Table 10

a) Inaccessible and/or permanent structural elements includes bridges, retaining walls, deflection walls, platforms, waterproofing system, footings, substation structure and miscellaneous civil structures

b) All inaccessible permanent works that cannot be inspected, maintained, repaired, or replaced outside of the normal operation shall have a design life of 100 years.

c) All works shall be designed so that all planned maintenance and equipment replacement can be completed outside of the normal operating period of the railway. All activities involving the repair of the failed items shall not impact on train services.

d) Connections between items of different design life shall be detailed to allow for replacement without adverse damage of the item with the higher design life. e.g. fence base plate to top of retaining wall

e) For reinforced concrete structures, the onset of corrosion of the steel reinforcing and prestressing tendons, as relevant, shall not have commenced within the specified Design Life.

f) In the design of each item/asset, the critical governing atmospheric condition and deterioration mechanism shall be identified, assessed and considered. The appropriate or corresponding mitigation measures for this governing atmospheric condition and deterioration mechanism shall then be adopted in the design

g) Substation building includes roof, down pipes, ventilation louvres, access ladders and doors.

h) The design life of tunnels must provide adequate performance and structural integrity for a 100 year design life without significant / disruptive maintenance (to pedestrian usage and rail services). The inside face of the finished tunnel must be dry with no discernible damp patches, moisture or water seepage. ie waterproof membrane or sprayed waterproof is to be provided.

Accessible and replaceable non-structural elements that require periodic replacement prior to the expiry of the design (including external roof and wall sheeting materials, roof guttering and downpipes, external architectural elements, exposed external metalwork such as handrails, ladders, louvres, etc, external doors and door frames, and internal fittings and finishes such as doors, amenities, paintwork, etc.) shall be included in the schedule of maintenance works.

4.2 Concept and Detailed Design

Using the Preliminary Design as supplied in Exhibit H of the Contract, the Contractor shall prepare the detailed design for the Project.

4.3 Sustainability

The Contractor shall plan the stockpiling and management of all surplus material; and address TfNSW Sustainability Guidelines with respect to re-use and waste disposal of earthworks from the Site.

The Contractor shall submit proposals on implementing sustainability initiatives (in accordance with the *TfNSW Standard 7TP-ST-114/7.0 – NSW Sustainable Design Guidelines)* to the Principal for review and endorsement.

4.4 Standards, Regulations and Codes

a) The Works shall be designed, constructed tested and commissioned to comply with the relevant provisions of the latest versions Building Code of Australia (BCA), ASA Standards, ASA standard drawings, TfNSW Standard Requirements and AS/NZS Standards. required by the Contract and the Works Brief including, but not limited to the standards, regulations and codes listed in Appendix A. The standards, regulations and codes applied shall, unless stated otherwise, be the latest versions in force at the time at which the relevant part of the Works is designed.

b) The following order of precedence shall be applied in the event of any inconsistency, ambiguity or discrepancy between the Works Brief, standards, regulations and codes.

(i) Statutory Regulations, Standards and Codes

(ii) TfNSW Standard Requirements (TSR)

(iii) Specific provisions of the Works Brief

(iv) ASA Standards, Specifications and Technical Notes

(v) ASA Procedures and Guidelines

(vi) Australian Standards, Codes and Guides

(vii) Industry Guides and Codes of Practice

(viii) Any other international codes, standards or specifications

c) The Contractor shall detail any ambiguity, inconsistency or discrepancies found, assess the impact and seek clarification from the Principal. Generally the standard, regulation or code, which specifies the greatest level of service or gives the highest standard, shall apply.

d) Where specific standards, regulations and codes are nominated in the Works Brief in relation to particular areas of the Works, these are minimum requirements and do not relieve the Contractors obligation to comply with all relevant standards, regulations and codes.

e) Sydney Trains Substation buildings and yards containing live electrical equipment do not require access under the Disability (Access to Premises - Buildings) Standards 2010.

4.5 System Requirements Specification (SRS)

The Contractor shall prepare a System Requirement Specification (SRS) document based on relevant standards and codes and details of system requirements of the substation as per this Works Brief.

The SRS shall be categorised under the following three-(3) categories:

a) Operational Requirements - Specify the business wants and what a system or a system component must be able to achieve.

b) Non-Functional Requirements - Specify non-technical constraints that are needed to support the functionality of the system.

c) Engineering Requirements - Specify technical constraints, qualities or requirements that pertain to the design, construction, ongoing operation, and maintenance of the system or system components.

A systems engineering approach to the design is required using a requirements analysis and traceability process to ensure all system design and interfaces between systems for operability, such as reliability, availability, maintainability and safety are achieved and demonstrated to be achieved. The requirements shall include those detailed in this Works Brief and as determined from the stakeholder consultation.

ASA standard T MU AM 06004 ST - Requirements Schema (available on the ASA website) details requirements for the AEO that define and manage requirements for planning and acquiring TfNSW new or altered assets.

The Principal will be using the software package DOORS (Dynamic Object Oriented Requirements Management System or Solution).for all systems engineering requirements management.

The Contractor shall ensure that all works, services and activities comply with the requirements set out in the SRS.

As part of the Contractor's verification and validation activities, these system requirements must be validated against to complete the Project.

4.6 Review of Design Packages

During the regular review meetings between the Principal and the Contractor, the design packages shall be progressively reviewed by the Principal or the TfNSW representatives.

The Principal's Representative or its delegate(s) may visit the Contractor's or its Design Subcontractor's design office(s) for the purposes of conducting design progress reviews. These design progress reviews may be conducted fortnightly or as otherwise required by the Principal.

When requested by the Principal, the Contractor shall update and forward all "work in progress" design documentation to the Principal, for discussion at the next review meeting. The purpose of the discussion is to give confidence that the design documentation will meet the contract requirements and for any risks or issues to be discussed with the Contractor in a timely manner.

4.7 Innovation in Design

The Contractor shall embrace innovation in the design in areas such as materials selection, energy use, finishes, facades, and facility optimisation.

The intent is to deliver the Works where design innovation has been utilised in conjunction with sustainability goals to achieve a functional outcome that is aesthetically pleasing and maximises value for money. Such enhancements or innovation will be subject to review and acceptance by the Principal's Representative. The Contractor shall address:

a) Constructability

b) practicality

c) reliability

d) serviceability

e) maintainability

f) value for money

g) sustainability

4.8 Effects of the Works

The Works must have no permanent impact on the condition and performance of any existing properties (including but not limited to roads, railways, bridges, services and buildings) including any impact on:

a) amenity;

b) aesthetics;

c) durability;

d) function;

e) user benefits;

f) safety during construction and operation; and

g) environmental performance of that infrastructure.

5 Activities

Table 11 below contains a summary table of all activities that the Contractor must complete, and their timing and recurrence.

The sections below this summary table outline further details of any requirements of these activities that the Contractor must meet.

Table 11 – Activities Requirements Summary

Activity Item	Requirements Wording Reference	Activity Recurrence
PHL Workshops	TSR-T Section 3.2.1(c) Works Brief Section 5.1.1 Monthly workshops (or review as required)	Monthly then 20 business days before the scheduled CCB Meeting for Control Gate Stages 3, 4 and 5

5.1 Workshops

5.1.1 Project Hazard Log (PHL) Workshop

During the detailed design, construction and commissioning phases of the Project, the Contractor shall prepare the PHL by conducting monthly workshops with the key stakeholders identified in Section 3 and identify any new Contract hazards with the relevant control and mitigation measure.

The Contractor shall submit the updated PHL prior to the TfNSW CCB meetings scheduled for Control Gates 3 (Detailed Design), 4 (Construction) and 5 (Commissioning). The PHL must demonstrate controls to SFAIRP.

Appendix C contains TfNSW's standard risk matrix which must be followed for all PHLs relating to the Project.

5.2 Audits

5.2.1 Audit Plan and Schedules

The Contractor must have in place, maintain and consistently apply until Final Completion an audit plan and audit schedules and must prepare and submit audit reports to the Principal's Representative in accordance with the requirements of the Contract and the audit schedule. Those documents must include methodologies adopted by the Contractor to assure itself that the requirements of the Contract are being met, including:

a) preparation of risk based audit schedules for the Contractor's Activities and any Subcontractor's activities that also take account of previous audit outcomes;

b) supply of competent and experienced resources to maintain the audit plan and implement the audit schedule;

c) reporting, analysing and determining trends based on those audits;

d) implementation of corrective and preventative actions as an outcome from those audits; and

e) measures to assess the effectiveness of the corrective and preventative actions.

5.3 Verification

5.3.1 Hold and Witness Points

The Contractor shall plan and implement an inspection and testing regime to verify the Works are delivered in accordance with the requirements of the Contract and the Design Documentation. The hold and witness points to be contained within the inspection and test documentation will be agreed with the Principal prior to commencement of the Works.

6 Deliverable Requirements

6.1 Management Plans

6.1.1 Design Management Plan

The Contractor must provide an initial submission of the Design Management Plan to the Principal's Representative in accordance with the requirements of the Contract.

The Contractor must progressively review, monitor, amend and update the Design Management Plan. The Design Management Plan must be based on the Contractor's management systems and processes as assessed by the ASA as part of its AEO authorisation and must include the measures, including audit, that the Contractor must utilise to ensure that, as a minimum:

a) all design tasks are appropriately resourced by competent personnel;

b) all design personnel are aware of the requirements of the Contract and any obligations of designers under the WHS Legislation;

c) all designs are prepared in accordance with requirements of the Contract;

d) the development of the design is effectively coordinated and the interrelationships identified and managed across all:

   i) design interfaces, including with existing systems, operational systems, and maintenance systems;

   ii) design stages;

   iii) design packages, where the design work has been portioned into design packages; and

   iv) design disciplines (e.g. electrical, civil, track, signalling and rolling stock);

e) the Contractor is familiar with the Site and understands the constraints, including those relating to a Contract in a brownfield environment;

f) all stakeholders have been appropriately identified, that stakeholder consultation is undertaken in accordance with the requirements of the Contract and that

g) may include presentations of the design to relevant parties including the design and sustainability review panel;

h) all design assumptions are documented and verified;

i) all designs are checked, reviewed and verified by competent personnel and that verification or proof engineering is conducted in accordance with the requirements of the Contract;

j) all construction methodologies, sequencing, staging, temporary or enabling works are taken into account and the associated risks are managed in the design;

k) an asset maintenance strategy and an asset operations strategy are delivered with the design in accordance with requirements of the Contract;

l) safety, sustainability, reliability, availability and maintainability are demonstrated in the design;

m) durability assessment and durability statements are included with the design;

n) all completed designs or completed portions of the design are accompanied by a design assurance certificate from the AEO;

o) a process for managing design change that integrates with configuration management activities;

p) all inspection and test criteria are developed for the delivery of the works for incorporation in the inspection and test documentation that will verify and validate the Works;

q) all documentation is compliant with requirements of the Contract including the "TfNSW CAD Protocols - T MU MD oooo6 ST " and discipline specific ASA Requirements;

r) all hazards identified in the preliminary hazard analysis and systems hazard analysis are designed out or carried over into the Contract hazard log; and

s) all designs comply with relevant Codes and Standards.

6.1.2 Systems Safety Plan

The Contractor must have in place, maintain and consistently apply until Final Completion a Systems Safety Plan that defines the assurance activities, evidence, deliverables and management arrangements. The Systems Safety Plan must be submitted to the Principal's Representative in accordance with the requirements of the Contract.

The Contractor must progressively review, monitor, amend and update the Systems Safety Plan, and submit for review throughout the project in accordance with the Contract.

The Systems Safety Plan must demonstrate how the Contractor will comply with the requirements of ASA Standard TS 20001.

ASA Standard TS 20001 references the use of the TfNSW risk matrix where applicable. This risk matrix has been provided in Appendix F.

The Systems Safety Plan must also include the delivery milestones for the safety assurance evidence documents and reports.

6.1.3 Quality Management Plan

The Contractor shall develop and implement a project-specific Quality Management Plan (QMP) which describes how the requirements of ISO 9001:2008 will be implemented during the Contract. The Contractor shall submit the QMP to the Principal's Representative for review and acceptance within 20 Business Days after commencement of the contract. The QMP shall be reviewed and updated by the Contractor every six (6) months or where significant change requires.

The Contractor shall describe the method for preparing the QMP and include guidelines about how to determine project-specific requirements applicable to the Works.

6.1.3.1 Control of Documents

The Contractor shall stipulate the processes and approval regime for the drafting, modifying and updating of the QMP.

In addition to the requirements of ISO 9001 Clause 4.2, the Contractor shall provide access (to the Contractor's personnel and the Principal's Representative) at all times at the Site to copies of ISO 9001, the Contract and the Design Documentation required by the Contract or necessary to be produced by the Contractor to design and construct the Works and Temporary Works.

6.1.3.2 Control of Quality Records

The Contractor shall retain all product and service conformance records including the Subcontractors' service conformance records and certificates (together the "Quality Records") for a period of no less than five (5) years from the Date of Completion.

All records shall be made available to the Principal. Copies of these documents shall be forwarded to the Principal for his own copy and record and the Contractor shall ensure that the Principal's copies are kept current and up-to-date. Where the Contractor is required to forward records to the Principal's Representative, the Contractor shall submit one original and three copies (one of which is unbound) of each document (including draft and final reports, specifications, drawings, plans, etc.). In addition, the Contractor shall also submit an electronic copy on CD/DVD in PDF and native formats (such as Microsoft Word, Microsoft Excel, CAD in *.dwg or *.dgn) of all relevant documents.

Upon request by the Principal's Representative, the Contractor shall provide the Principal's Representative with copies of any Quality Records. Those Quality Records which are not required or not available on-site shall be forwarded to the Principal's Representative within three (3) Business Days of the request.

6.1.3.3 Management Review

The Contractor shall review and update the QMP at six monthly intervals from commencement of contract in accordance with the requirements of ISO 9001 Clauses 5.6, 5.6.2 and 5.6.3

6.2 Design Deliverables

The Contractor shall develop a list of design deliverables to be provided at each detailed design stage. The list shall be submitted for the Principal's acceptance with the initial submission of the Contractor's Design Management Plan.

The staged design deliverables shall comply with the discipline-specific design deliverables listed in Appendix A of ASA Standard EPD 0013 – Technical Reviews, and any other relevant ASA Standards, Specifications and Manuals. Any of the requirements of the Preliminary Design Review (PDR) stage that are not already listed in the requirements for the Critical Design Review (CDR) stage shall be provided with the CDR for the CCB stage gate 3 submission.

Submissions must be complete with Safety and Engineering Assurance requirements for Stage Gate submissions to the TFNSW CCB.

The Design Report shall be submitted at SDR and CDR stages.

6.2.1 Design Drawings

In addition to the requirements listed in the TSRs, the general arrangement drawings provided must show dimensions, radii, survey, features and set out information required to fully describe the spatial arrangement and inter relationships of the works components.

All drawings shall be able to be interpreted, read and understood as independent documents, with no requirement to scale off the drawings or use 3rd party tools such as CAD software to determine spatial arrangements.

All structural elements shown on drawings must have at least 3 views to properly describe the element.

All reinforcement shown on drawings must be individually bar tagged and include complete information on the bar required.

6.2.2 Shop Drawings

In addition to the requirements listed in the TSRs, the Contractor shall, at the detailed design stage submit a register of those parts of the Works and Temporary Works that require shop drawings to be created.

6.2.3 Design Report

The Contractor must submit design reports as part of the design package.

The report may refer to other separate deliverables where applicable or simply contain a section in the report that addresses the requirements listed below:

a) A description of the scope of work covered;

b) The relationship between design packages and external interfaces;

c) A schedule of reference information and reports providing input into the design (e.g. geotechnical data, cadastral survey, topographical survey, utilities and services data), loads, load combinations, factors, safety requirements (during construction, operation and maintenance), environmental considerations and input from others particularly Other Contractors;

d) Design assumptions, constraints and limitations;

e) Identification of relevant and applicable standards, codes and guidelines (including document versions) and the identification of specific provisions, criteria and classifications within such standards and codes;

f) The design philosophy and the specific design methodology adopted;

g) A full set of drawings including:

   (i) site plans;

   (ii) general arrangements;

   (iii) Elevations, plans and sections;

   (iv) Drawings for all design/construction packages;

   (v) Interface drawings; and

h) Staging and sequencing drawings;

i) Verifier certification (where applicable);

j) Safety in design demonstration (including compliance with the Safety Assurance Plan, identification of the hazards addressed by the design and identification of hazards that will be transferred to the eventual asset owner);

k) A RAMS analysis and how the design addresses RAMS, including identification of required spares, operating and maintenance manuals and any special equipment or skills required for maintenance or operation;

l) Sustainability in design demonstration, including how the sustainability initiatives as identified in the Contract have been addressed;

m) Where applicable to the design package, room data sheets, room schedule and design requirements including sizing and specific weight requirements for equipment rooms. The room data sheets must specify detailed requirements for all new buildings including room sizes, services, furniture and equipment, provisions for equipment and finishes etc.;

n) A construction review, including construction methodology and operations staging (including identification of works requiring track possessions);

o) A schedule of any approved ASA concessions to published standards;

p) Demonstration of compliance with environmental management requirements and the Planning Approval;

q) demonstration of compliance with the requirements of the Project Definition Documents. Any non-compliances must be identified;

r) Demonstration of workmanship, material, product and equipment specifications (including certification of type approval for new materials, products or equipment);

s) Design calculations;

t) Documentation of outstanding issues that may affect the design;

u) Certification obtained by the Contractor from the BCA consultant that the design is in accordance with the fire and life safety requirements of the Building Code of Australia, the Environmental Planning and Assessment Act 1979 NSW, and the Environmental Planning and Assessment Regulation 2000 NSW;

v) Demonstration of compliance with any conditions of approval from Office of Environment and Heritage;

w) An Asset Maintenance Strategy;

x) An Asset Operations Strategy;

y) Outline any requirements for ITPs, Hold Points and Witness Points, together with the criteria for acceptance/release;

z) A decommissioning review, including decommissioning methodology and staging which sets out any restrictions on the asset's capability to be modified, decommissioned, dismantled, demolished and/or disposed of. Any residual hazards which remain after completion of the Works and transferred to the final asset owner must be identified in the relevant Safety Assurance Report.

6.2.4 Technical Deliverables

Table 12 below contains a summary table of all technical deliverables that the Contractor must supply, and their timing and recurrence.

Table 12 – Deliverable Requirements Summary

Item	Requirements Wording Reference	Submissions
Relocation of 33KV and 11KV feeders methodology	Works Brief Section 2.2	30 days prior to commencement of enabling works
System Requirements Specification	Works Brief Section 4.5	With Detailed Design Report
Sydney Trains Configuration Change Plan	Works Brief Section 6.4	20 business days before the scheduled CCB Meeting for Control Gate Stage 3
Detailed Design Report	Works Brief Section 2 and 6.2.3	In accordance with agreed program
Reliability, Availability, Maintainability and Safety Study (RAMS)	TSR-T Section 3.2(e)	With Detailed Design Report
Assurance Certificate	Works Brief Section 6.5	20 business days before the scheduled CCB Meeting for Control Gate Stages 3, 4 and 5
RAATM	Works Brief Section 6.6	20 business days before the scheduled CCB Meeting for Control Gate Stages 3, 4 and 5
PHL	TSR-T Section 3.2.1(c) Works Brief Section 5.1.1	20 business days before the scheduled CCB Meeting for Control Gate Stages 3, 4 and 5
Safety Risk Summary Report	TSR-T Section 3.2.1(a)–(b)	20 business days before the scheduled CCB Meeting for Control Gate Stages 3, 4 and 5
WAE Drawings	Works Brief Section 2.17.2	30 business days after completing Construction and/or commissioning
Configuration Materials Documentation	TSR-T Section 3.3	30 business days after completing Commissioning
Design Management Plan	Works Brief Section 6.1.1	30 business days after commencement of contract
System Safety Plan	Works Brief Section 6.1.2	30 business days after commencement of contract
Quality Management Plan	Works Brief Section 6.1.3	20 business days after commencement of contract

6.3 Safety Assurance Deliverables

6.3.1 Project Hazard Log

Appendix C contains TfNSW's standard risk matrix which must be followed for any risk assessments and Project Hazard Logs (PHLs) that are provided to the Principal which may be requested as a deliverable as part of the Works.

6.3.2 PSU SAP and SRSR Guidelines

The PSU SAP and SRSR guidelines are provided in Appendix D for the information of the Contractor. It is suggested the Contractor use these guidelines in the preparation of their safety assurance documentation.

6.4 Sydney Trains Configuration Change Plan

The Contractor shall prepare a configuration change plan using the latest Sydney Trains format. This document details the configuration materials that will be delivered as part of the proposed configuration change and when these configuration materials will be submitted to Sydney Trains.

The Contractor shall obtain approval for the configuration change plan from Sydney Trains at least twenty-(20) business days before the scheduled CCB Meeting for Control Gate Stages 3, 4 and 5.

The Contractor shall submit all configuration materials to Sydney Trains within the agreed timeframe.

6.5 Assurance Certificate

The Contractor shall provide an assurance certificate to certify to the Principal that:

a) the AEO's accredited processes have been applied to the certified Works and Contractor's Activities;

b) the Works and Contractor's Activities comply with the requirements of the Contract; and

c) the Works have been designed to be wholly within the specified Site boundaries and that the AFC drawings demonstrate this by including those property boundaries.

The certificate shall clearly identify the Works/Contractor's Activities for which the certificate applies and shall be signed by the authorised representative of the AEO.

6.6 Systems Engineering Deliverables

6.6.1 Requirements Management

As a minimum, a Requirements Analysis, Allocation and Traceability Matrix (RAATM) shall be prepared by the Contractor upon completion at each of the following phases: (a) Detailed Design; (b) Construction; and (c) Commissioning.

The RAATM is necessary to support the Principal's submission to the TfNSW CCB for Control Gate Stages 3, 4 and 5.

7 Commissioning Requirements

The Contractor shall be responsible for the overall turnkey testing and commissioning activities, for all electrical equipment included in the scope of works. This includes the commissioning of the substation and sectioning hut into operational service for the rail network. The Contractor shall be responsible for providing all testing and commissioning resources.

The philosophy behind testing and commissioning is to apply a structured approach to the testing of the systems as they are implemented from basic factory assemblies to an integrated, operational and maintainable system.

The objective of the testing and commissioning process is to progressively 'set to work' the commissioning lots, sub-systems, and systems of the Project. This shall be carried out in a manner which ensures safe operation at all times. Testing and commissioning shall demonstrate to the satisfaction of all stakeholders and the authorities concerned, that both the design requirements of the Project and the statutory regulations have been satisfied.

The purpose of detailing the testing and commissioning is to ensure that:

a) Sub-systems, when integrated, provide the functionality and performance mandated by the Contract's user requirements and principal requirements;

b) The system meets all functional and operational requirements;

c) The system aligns correctly with other systems, to provide the full system interchange functionality;

d) The factory acceptance testing and type testing of components or unit-level elements meets their specifications; and

e) The system acceptance testing and system integration testing of system elements meets their specifications.

Note that some testing and commissioning activities require interface with the operational network and personnel authorised by Sydney Trains [listed in Sydney Trains document No.PR D 78701]. For these specific activities, the Contractor obtain authorisation from Sydney Trains for its own testing and commissioning resources.

7.1 Commissioning and Operational Readiness Management Team

As a requirement of the Power Supply Upgrade (PSU) Program Operational Readiness Plan (ORP) included in Schedule 9 of the General Conditions of Contract, an integrated Commissioning and Operational Readiness Management Team (CORMT) shall be established and a Commissioning and Operational Readiness Activity Schedule (CORAS) developed for each Commissioning Event.

7.1.1 CORMT Establishment

The Commissioning and Operational Readiness Management Team (CORMT) must be established by the Contractor at least nine-(9) months prior to the planned commissioning of any assets or systems. If the contract duration is less than nine months, the CORMT must be formed as soon as practicable following the date of contract award.

The CORMT shall be appointed for the whole Contract rather than for each separate Commissioning Event. As a minimum, the CORMT shall have the following representatives:

a) Project Manager;

b) Project Commissioning Manager;

c) Sydney Trains and/or NSW Trains representatives;

d) Transport Projects Project Manager;

e) Transport Projects Operational Readiness Project Manager;

f) Specialised Commissioning Resources; and

g) Other Key Stakeholders.

7.1.2 CORMT Activities

The CORMT shall hold regular meetings, to occur as a minimum of monthly progressing to weekly as the commissioning event approaches. CORMT meeting minutes shall be prepared to accurately reflect the items discussed during the meeting, the decisions made, the actions agreed, the responsibility for these actions and agreed action dates. The minutes shall be distributed to members of the CORMT and relevant stakeholders.

The CORMT shall be responsible for the management of all commissioning activities including the tasks shown below:

a) Define the objectives of the commissioning process and identify all commissioning activities;

b) Review the schedule of assets and systems that will need to be commissioned for each commissioning activity;

c) Review the scope and timing of all commissioning activities required to meet the Contract objectives, the commissioning objectives and the Contract program;

d) Confirm that commissioning tasks tests can be completed within the available scheduled and/or power-out possessions;

e) Define the responsibility for each commissioning activity and ensure that adequate resources are allocated to carry out the required activities;

f) Allocate responsibility for monitoring and reporting to the CORMT for each activity;

g) Prepare the Commissioning Management Plan (CMP) and obtain endorsement of the CMP from the Transport Projects Principal Manager Reliability & Operational Readiness;

h) Ensure each commissioning event has a commissioning event plan which has sufficient detail to demonstrate that the commissioning event has been planned appropriately and relevant competent resources have been assigned to complete tasks;

i) Agree the type of commissioning event (major or minor);

j) Ensure stakeholders are informed of the development in relation to the Contract commissioning;

k) Identify the required resources required for any testing, ensure the competency of the resources and allocate the resource to the testing activity;

l) Reporting and elevation of unresolved issues to both the Principal and Contractor; and

m) Work collaboratively with TfNSW, Sydney Trains and/or NSW Trains and other third parties to assist with Commissioning Events proceeding as planned.

A guideline for minimum timeframes described by the CORAS is included in Schedule 9 of the General Conditions of Contract under “Commissioning and Operational Readiness Timeframe requirements”. These timeframes are guidelines and shall be agreed in Operational Readiness Management Team meetings.

7.2 Commissioning Resources

Testing and commissioning resources need to be competent to undertake their role. The Contractor shall comply with TS 10503:2013 AEO Guide to Engineering Competence Management in assessing and maintaining testing and commissioning resources competency.

7.2.1 Authorised Persons

The Contractor shall note that some testing and commissioning activities require interface with the operational network and Authorised Person(s) from Sydney Trains, refer to section 7.2.2 for details.

The Authorised Person includes the following roles and qualifications:

a) Authorised Operator – Mains (AES06)

b) Authorised Operator – Substation (AES07)

c) Authorised Operator (AES08)

7.2.2 Authorised Persons Certification

Refer to Sydney Trains Document – Personnel Certifications – Electrical PR D 78701 for requirements to be an Authorised Person(s) and list of functions that they can perform.

For the testing and commissioning activities that require interface with the operational network and Authorised Person(s) from Sydney Trains, the Contractor shall complete the following:

a) Obtain authorisation from Sydney Trains for its own testing and commissioning resources (Option 1); or

b) Liaise with the Principal for booking authorised Sydney Trains resources to perform the testing and commissioning works (Option 2).

The Contractor shall only proceed to Option 2 once evidence has been provided to the Principal justifying that Option 1 was not achieved and the evidence has been accepted by the Principal. Evidence can be in the form of stakeholder engagement minutes of meeting(s), email correspondence with Sydney Trains and preparation of competency assessments.

Should the Principal allow the Contractor to proceed to Option 2, the Contractor shall notify the Principal fourteen (14) weeks in advance of the scheduled testing and commissioning date the request for Sydney Trains authorised testing and commissioning resources.

The Principal shall make the request to Sydney Trains on behalf of the Contractor and shall free issue the requested resource to the Contractor.

In the event that authorised testing and commissioning resources are not available within the timeframe required for the Project, the Contractor shall not be entitled to any cost and/or program

claim. In this event, the Principal and the Contractor shall collaboratively work together to develop new testing and commissioning timeframes for the Project.

Work on and around the TfNSW electrical distribution network and 1500V traction network is governed by RailCorp Electrical Network Safety Rules available on the RailSafe website (www.railsafe.org.au).

7.3 Commissioning Management Plan

The Commissioning Management Plan (CMP) will record objectives, events, activities, tasks, timelines, stakeholders, risk mitigation measures, and the methods that will be used to manage the commissioning process for the Project. The CMP shall as a minimum:

a) Summarise the Project Scope of Work;

b) Define the Project staging plan;

c) Include a Schedule of commissioning events which lists each of the commissioning events for the Contract, linking them to the proposed Asset Handovers;

d) Identify Interfaces to the Project;

e) Identify the members of the CORMT and define the roles of each CORMT member in commissioning;

f) Define the commissioning objectives;

g) Describe the commissioning activities required to be delivered to successfully deliver each commissioning event;

h) Confirm that commissioning tasks can be completed within the available scheduled and/or power-out possessions;

i) Define a schedule of the witness, inspection and tests through the Project delivery;

j) Include a hazard log identifying hazards relevant to commissioning the Project. The plan shall include an assessment of the potential risks to commissioning and setting the minimum mitigation requirements for the Contract's commissioning events;

k) Describe the Asset Handover planning;

l) Describe the evidence required to demonstrate that each system or product complies with its safety and engineering requirements and that risk has been reduced to an acceptable level. Potential evidence shall as a minimum include a schedule of inspections, validation, and tests that are appropriate for all assets and systems identified. Tests may include factory acceptance tests, site acceptance tests, installation tests, functional tests, and system integration tests. Sufficient inspection, validation, and testing shall be scheduled to ensure that all installations have been completed in accordance with the requirements of the contract, drawings, specifications, Asset Standards Authority requirements, Australian standards, applicable Laws and any other relevant Contract documentation;

m) Provide detailed Testing & Commissioning Resourcing Schedule for all commissioning activities, indicating Testing & Commissioning Resource Requirements, Names & Authorisations of all proposed Testing & Commissioning Personnel, Note: All Testing & Commissioning staff required to complete the works are to be provided by the Contractor;

n) Schedule of Commissioning Events (SoCE) – this schedule shall identify individual commissioning events including; a description of the scope of work to be commissioned and handed over, submission of individual ITP's, the date of handover, the operational changes as a result of the handover, the maintenance changes as a result of the handover, the associated safety assurance documentation necessary and the applicable CCB approval required; and

o) Commissioning Activity Schedules (CAS) – these shall be developed and monitored for each Commissioning Event and include at a minimum, all the applicable activities from the CAS template, based on the commissioning event scope of work.

7.4 Commissioning Event Plans

A Commissioning Event occurs when the Principal accepts that assets forming part of a particular scope of the Contractor's Activities are suitable for operation, the relevant assets are handed over to the Asset Owner and to Sydney Trains and/or NSW Trains and the Asset Owner and Sydney Trains and/or NSW Trains accepts the relevant assets by commencing operations.

The Contractor shall prepare a Commissioning Event Plan (CEP) for each Commissioning Event. Each CEP shall as a minimum:

a) Summarise the Project Scope of Work;

b) Define the Commissioning Event Scope;

c) Clarify if the commissioning event is major or minor;

d) Identify all significant commissioning activities;

e) Identify the members of the Commissioning Event Team, their roles, required competence and required accreditations;

f) Define the schedule of works for the Commissioning Event (hour by hour schedule);

g) Identify the design packages related to the Commissioning Event;

h) Record the approved Inspection Test Plans related to the Commissioning Event;

i) Include the design assurance processes that has been or is being implemented;

j) Identify interfaces (internal and external) to the Commissioning Event;

k) Include a hazard log identifying hazards relevant to the Commissioning Event. The plan shall also include an assessment of the potential risks to commissioning and set the minimum mitigation requirements for the Commissioning Event;

l) Identify contingency measures for high consequence and high likelihood risks that may occur during the Commissioning Event;

m) Include a register of the defects or omissions identified during construction and pre-commissioning inspections, describe the rectification method, proposed resolution, identify defects to be resolved prior to commissioning and those that can be addressed post commissioning;

n) Describe the reporting procedures to be adopted during the commissioning, typically four (4) hourly;

o) Describe the agreed method for handing over to Sydney Trains and/or NSW Trains the residual risks being transferred to them as a result of the Commissioning Event;

p) Assess the defects that will be resolved post commissioning to address the risk they pose to the safe and reliable operation of the asset/system;

q) Describe the plans, approvals and procedures required to be received prior to commencing commissioning;

r) Include a register of the asset information to be provided to Sydney Trains and/or NSW Trains post commissioning;

s) Describe the agreed asset handover process to be implemented; and

t) Describe the commissioning activities required and the person responsible to ensure successful delivery of the Commissioning Event.

8 Inspection, Testing and Quality Requirements

The Contractor shall perform inspection and testing activities in order to demonstrate the conformity of the products used in the Works to the specified requirements. This inspection and testing shall be undertaken:

a) Before the product is used in the Works (receiving, inspection and testing);

b) Progressively during construction of the Works (in-process inspection and testing); and

c) As a final check to demonstrate conformity of the product with the Contract requirements (final or acceptance inspection and testing).

The Quality Management Plan (QMP) shall describe the Contractor's methodology and processes for inspection and testing.

8.1 Inspection and Test Plans

The Contractor shall prepare Inspection and Test Plans (ITPs) for all of the Contractor's Activities. The ITPs shall be submitted to the Principal for information a minimum of four-(4) weeks prior to the commencement of the relevant activity.

Within two-(2) business days of the tasks defined in the document being completed, the Contractor shall submit all ITPs, inspection, test and verification records and test sheets to the Principal.

8.2 Hold Points and Witness Points

From the ITPs, the Contractor shall establish and maintain a register of all nominated Hold Points and Witness Points for all activities to be released internally by the Contractor and externally by the Principal. The Principal may nominate additional Hold Points and Witness Points to the ones already nominated by the Contractor. The register shall be updated on a monthly basis to include all Hold Points and Witness Points to be implemented in the following three-(3) months.

Factory Acceptance Tests (FAT) for the equipment procured by the Contractor shall constitute a hold point. Three-(3) weeks prior to the FAT's, taking place, the Contractor shall issue to the Principal an invitation to attend the tests. The invitation shall be accompanied with test details including methodology and Pass/Fail criteria.

8.3 Close out of Work Lots and Release of Products

Work lots shall not be closed out or products released, dispatched, used or installed until the Contractor has fully verified their conformity. This may involve obtaining the Principal's approval or release if this is required in the QMP.

Where either products or work fail to pass an inspection/ test, the work lot shall not be closed out until the non-conformity has been rectified and closed out.

8.4 Non-Conformance and Corrective Action

The Contractor shall establish and maintain a "Non-conformance Register" and a "Corrective Action Register" to record a summary of non-conformances and corrective actions. The registers shall be established prior to the start of the Contractor's Activities.

The Contractor shall notify the Principal of any non-conformance and submit a non-conformance report (NCR) within two-(2) business days of the non-conformance being detected. The Contractor shall detail the action it proposes to rectify the non-conformance in the report.

If the Principal, through its own surveillance or audit, indicates that the Contractor's QMP does not comply with the provisions of the Contract or identifies a non-conformance that has not been identified or satisfactorily addressed by the Contractor's system, the Principal will issue a TfNSW System Improvement Observations - 9TP-FT-033. All detected non-conformances constitute a Hold Point until a rectification method has been accepted by the Principal and implemented by the Contractor.

The Contractor shall rectify any non-conformances and issues notified by the Principal as outlined below:

a) Hold Point: The process referred to in TfNSW System Improvement Observations - 9TP-FT-033;

b) Submission Details: Details of the corrective action to be implemented;

c) Release of Hold Point: Upon evaluation, the Principal may provide its written authorisation for the release of the Hold Point.

8.5 Monitoring and Measurement of Product

All laboratory tests required for the Works shall be performed by independent laboratories with current registration under a Joint Accreditation System of Australia and New Zealand (JAS-ANZ) registered authority.

Appendix A – Key Standards, Regulations and Codes

The Contractor shall apply all relevant Australian and ASA standards, specifications, codes and manuals for the Chalmers Street Substation works and temporary works, including but not limited to the key Australian and ASA standards, specifications, codes and manuals listed below.

Reference Number	Title
Asset Standards Authority (ASA)	
Authorised Engineering Organisations	
TS 10503	AEO Guide to Engineering Competency Management
TS 10504	AEO Guide to Engineering Management
TS 10506	AEO Guide to Verification and Validation
TS 10507	AEO Guide to Systems Integration
TS 20001	System Safety Standard for New or Altered Assets
Civil	
T HR CI 12070 ST	Miscellaneous Structures
T HR CI 12080 ST	External Developments
T HR CI 12100 ST	Geotechnical Risk Assessment and Hazard Management
T HR CI 12101 ST	Geotechnical Problem Management
T HR CI 12105 ST	Vegetation Hazard Management in the Rail Corridor
T HR CI 12111 SP	Earthwork Materials
T HR CI 12130 ST	Track Drainage
T HR CI 12135 ST	Rainfall Monitors
T HR CI 12180 ST	Active Transport Links on the Rail Corridor
T HR CI 12200 ST	Access Roads
Configuration Control	
TS 10751	Configuration Management Guide
TS 10752	Railway Asset Product Configuration Information Requirements
TS 10753	Assurance and Governance Plan Requirements
T MU AM 00002 GU	Assurance and Governance Plan - Guidelines
T MU AM 04001 PL	TfNSW Configuration Management Plan
TN 003: 2013	Change Authorisation Process for Proposed Operating Diagrams
Electrical	
T HR EL 00001 TI	RailCorp Electrical System General Description
T HR EL 00002 PR	Electrical Power Equipment - Integrated Support Requirements
T HR EL 00004 ST	Buildings and Structures under Overhead Lines
T HR EL 01001 SP	11kV Indoor Switchgear - SCADA Controlled
T HR EL 08001 ST	Safety Screens and Barriers for 1500 V OHW Equipment
T HR EL 08002 ST	Relative Positions of Signals and Open Overlaps

Reference Number	Title
T HR EL 08003 ST	Level Crossings - OHW Requirements
T HR EL 08004 ST	Overhead Wiring Fittings and Materials
T HR EL 08005 ST	Labels for OHW Structures
T HR EL 08006 ST	Services Erected Above Overhead Wiring
T HR EL 08011 ST	Overhead Wiring Maintenance Standard
T HR EL 10002 ST	HV Aerial Lines - Standard Conductors and Current Ratings
T HR EL 10003 ST	Wood Pole Serviceability
T HR EL 11001 PR	Design Technical Reviews for Electrical SCADA Equipment
T HR EL 11001 PR F1	SCADA I/O Schedule
T HR EL 12002 GU	Electrolysis from Stray DC Current
T HR EL 15001 SP	Substation Electrically Safe Work Area Demarcation Taping Equipment
T HR EL 17000 ST	Demarcation of RailCorp Low Voltage Distribution System
T HR EL 17001 ST	Electrical Distribution System Installation Connection and Inspection
T HR EL 17001 F1	Information Regarding Applications for Connection
T HR EL 17001 F2	Application for Connection
T HR EL 17001 F3	Application for Temporary Connection
T HR EL 20001 ST	High Voltage AC and 1500 V DC Traction Power Supply Cable Requirements
T HR EL 20002 ST	1500 V DC Cables and Cable Ratings
T HR EL 20003 ST	Underground Installation Configurations for High Voltage and 1500V dc Cables
T HR EL 90001 PR	Polarity of AC Signalling Supplies
T HR EL 90002 ST	Heavy Rail Traction System - Voltage Ratings
T HR EL 90003 ST	Heavy Rail Traction System – Current Ratings of 1500 V dc Equipment
T HR EL 99001 ST	Substation and Sectioning Hut Commissioning Tests and Processes
TN 026: 2014	Engineering Minimum Safe Approach Distances - Ground Mounted Signal/Overhead Wiring Interface
TN 050: 2014	Electrical Type Approvals - Interim process
TN 016: 2015	Overbridges and footbridges – Earthing and bonding requirements
Security	
T HR SY 10000 GU	Overview of Rail Security Standards and Interpretation Guide
T MU SY 10001 ST	Public Transport Closed Circuit Television (CCTV) Functional Requirements Standard
T MU AM 06001 GU	AEO Guide to Systems Architectural Design
Systems Engineering	
T MU AM 06003 TI	Development of a Transport Network Architecture Model
T MU AM 06004 ST	Requirements Schema
T MU AM 06006 GU	Systems Engineering Guide
T MU AM 06006 ST	Systems Engineering Standard

Reference Number	Title
T MU AM 06008 ST	Operations Concept Definition
Telecommunications	
T HR TE 01001 ST	Communication Outdoor Cabling
T HR TE 01003 SP	Optical Fibre Termination, Patching and Management
T HR TE 01004 SP	Pre-Terminated Fibre Tails and Link Cables
T HR TE 21001 ST	Telecommunications Equipment Room
T HR TE 21002 ST	Communications Earthing and Surge Suppression
T HR TE 21003 ST	Telecommunications for Traction Substations and Sections Hut
T HR TE 41001 ST	Packet Switched Networks Wired - Local, Metropolitan, and Wide Area Networks
T HR TE 41002 ST	Wireless Data Communication in LIPD Class Licensed Bands
T HR TE 61001 ST	Emergency Telephone Systems
T HR TE 61002 SP	Analogue Two Wire Weatherproof Field Telephones
T HR TE 81001 ST	Telecommunication Equipment – Physical Interfaces and Environmental Conditions
T HR TE 81002 ST	Telecommunication Equipment – Network Management
T MU TE 81003 ST	Test Processes and Documentation for Programmable Electronic Systems and Software
RailCorp Engineering Standards	
Civil	
ESC 215	Transit Space
ESC 300	Structures System
Structures	
ESC 302	Structures Defect Limits
ESC 330	Overhead Wiring Structures and Signal Gantries
ESC 350	Platforms and Retaining Walls
ESC 360	Miscellaneous Structures
ESC 410	Earthworks and Formation
TMC 331	Design of Overhead Wiring Structures and Signal Gantries
Geotechnical	
ESC 420	Track Drainage
ESC 430	Rainfall Monitors
TMC 401	Geotechnical Risk Assessment and Hazard Management Guidelines
TMC 404	Recognising Geotechnical Problems
TMC 411	Earthworks Manual
TMC 421	Track Drainage Manual
TMC 431	Rainfall Monitors
SPC 411	Earthwork Materials

Reference Number	Title
SPC 511	Boundary Fences
SPC 512	Demarcation Fences
Right of Way	
ESC 510	Boundary Fences
ESC 540	Service Installations within the Rail Corridor
ESC 550	Access Roads
TMC 511	Boundary Fences
Electrical	
AC Auxiliary Supplies	
EP 05 00 00 01 SP	Substation Auxiliary Transformer from Rectifier Transformer Secondary
DC Switchgear	
EP 04 00 00 02 SP	System Substation 1500 V DC Links and Switches
EP 04 01 00 01 SP	1500V DC High Speed Feeder Circuit Breaker
EP 04 02 00 01 SP	1500V DC High Speed Rectifier Circuit Breaker
Earthing, Bonding Electrolysis	
EP 12 00 00 01 SP	High Voltage and 1500 System Earthing References and Definitions
EP 12 00 00 02 SP	Low Voltage Distribution and Installations Earthing References and Definitions
EP 12 10 00 10 SP	System Substation Earthing
EP 12 10 00 11 SP	Distribution Substation Earthing
EP 12 10 00 12 SP	Transmission Line and Cable Earthing
EP 12 10 00 13 SP	1500 V Traction System Earthing
EP 12 10 00 20 SP	Low Voltage Distribution Earthing
EP 12 10 00 21 SP	Low Voltage Installations Earthing
EP 12 10 00 22 SP	Buildings and Structures under Overhead Lines
EP 12 20 00 01 SP	Bonding of Overhead Wiring Structures to Rail
EP 12 30 00 01 SP	Electrolysis from Stray DC Current
Fault Protection	
EP 19 00 00 01 SP	DCCB and Delta I Relay Setting Calculation Method
EP 19 00 00 02 SP	Protection System Requirements for the High Voltage Network
EP 19 00 00 03 SP	Commissioning of Translay Pilot Wire Protection Scheme
General	
EP 00 00 00 01 TI	RailCorp Electrical System General Description
EP 00 00 00 02 SP	Electrical Technical Maintenance Coding System
EP 00 00 00 07 SP	Requirements for Handling and Disposal of Material containing PCB
EP 00 00 00 08 SP	Safe Limits of DC Voltages
EP 00 00 00 12 SP	Electrical Power Equipment - Integrated Support Requirements

Reference Number	Title
EP 00 00 00 13 SP	Electrical Power Equipment - Design Ranges of Ambient Conditions
EP 00 00 00 15 SP	Common Requirements for Electrical Power Equipment
EP 00 00 00 16 SP	Electrical Power System Signage
EP 00 00 00 17 TP	Electrical Engineering Waiver Management
HV AC and Traction Cables	
EP 20 00 00 03 SP	Above Ground Cable Installation Systems - Selection Guide
EP 20 00 00 20 SP	Testing of High Voltage and 1500V DC Cables
EP 20 00 03 01 SP	HV and 1500V DC Cables - Joints and Terminations
EP 20 00 04 01 SP	Cable Route Selection Guide
EP 20 00 04 02 SP	Underground Installation Configurations for High Voltage and 1500V DC Cables
EP 20 00 04 04 SP	Ground Entry Arrangements
EP 20 00 04 05 SP	Cable Pits
EP 20 00 04 06 SP	Underground Cable - Location Recording
EP 20 10 00 01 SP	1500 Volt DC Cables and Cable Ratings
EP 20 10 00 02 SP	High Voltage Cable
HV AC Switchgear	
EP 01 00 00 02 SP	11kV AC Indoor SCADA Controlled Switchgear Fitted with Stationary (Non-Withdrawable) Switching Devices
EP 01 00 00 03 SP	11kV AC Switchgear - RMU Suitable For Indoor and Kiosk Installation
EP 01 00 00 06 SP	Replacement of 11kV Circuit Breaker (D4XD) Trucks in South Wales Switchgear
EP 10 00 00 04 SP	Transmission Line Easement Conditions
Low Voltage	
EP 17 00 00 06 SP	Installation Inspections
EP 17 00 00 11 SP	Low Voltage Isolating Transformer
EP 17 00 00 12 SP	Demarcation of RailCorp Low Voltage Distribution System
EP 23 00 00 01 SP	Low Voltage Fire Rated Polymeric Cables
EP 23 60 00 01 SP	Online Dual Conversion Uninterruptible Power Supply for Railway Signalling Loads
Overhead Wiring	
EP 08 00 00 01 SP	Overhead Wiring Standards for the Electrification of New Routes
EP 08 00 00 02 SP	Overhead Wiring Maintenance Standards
EP 08 00 00 04 SP	Relative Positions of Signals and Open Overlaps
EP 08 00 00 07 SP	Safety Screens for Bridges over 1500V OHW Equipment
EP 08 00 00 10 SP	Overhead Wiring Layouts - Requirements and Symbology
EP 08 00 00 13 SP	Overhead Wiring Fittings and Materials
EP 08 00 00 14 SP	Services Erected Above Overhead Wiring
EP 08 00 00 15 SP	Overhead Wiring Construction and Commissioning

Reference Number	Title
EP 08 00 00 16 SP	Designations of Overhead Wiring Conductor Systems
EP 08 00 00 17 SP	Overhead Wiring Conductor System Selection
EP 08 00 00 19 SP	Performance Specification for Overhead Wiring Post Insulator Units
EP 08 00 00 20 SP	Performance Specification for Overhead Wiring String Insulator Set
EP 08 00 00 21 SP	Insulator Type Tests - DC Power Arc Withstand
EP 08 00 00 24 SP	Contact Wire
EP 08 16 00 01 SP	Labels for OHW Structures
EP 08 16 00 02 SP	Safety Barriers for OHW Structures
Power Transformers	
EP 02 00 00 01 SP	Transformer Loss Evaluation
EP 02 44 00 01 SP	11kV Voltage Regulator
Rectification	
EP 03 00 00 01 TI	Rectifier Transformer and Rectifier Characteristics
EP 03 01 40 00 SP	Rectifier Transformer
EP 03 02 00 01 SP	Controls and Protection for Rectification Equipment
EP 03 02 30 00 SP	Semiconductor 12 Pulse Series Bridge Rectifier Power Cubicle
EP 03 05 70 00 SP	Outdoor DC Reactor
SCADA	
EP 11 03 00 02 SP	Electrical SCADA System Remote Terminal Unit Specification
EP 11 00 00 07 SP	Design Technical Reviews for Electrical SCADA Equipment
Surge Protection	
EP 21 00 00 01 SP	Insulation Co-ordination and Surge Arrester Selection
System Requirements	
EP 90 10 00 01 SP	Electrical Phase Relationships
EP 90 10 00 02 SP	Standard Voltage Tolerances
EP 90 20 00 01 SP	1500V DC Equipment Current Ratings
EP 90 20 00 02 SP	1500V System Voltage Ratings
EP 90 30 00 01 SP	Polarity of AC Signalling Supplies
System Safe Operation	
EP 95 00 00 12 SI	Advertising of New Work
EP 95 00 30 03 SP	RailCorp Network Management Plan Chapter 2 - Customer Installation Safety
EP 95 00 30 04 SP	RailCorp Network Management Plan Chapter 3 - Public Electrical Safety Awareness
EP 95 00 30 05 SP	RailCorp Network Management Plan Chapter 4 - Bush Fire Risk Management
EP 95 00 30 06 SP	RailCorp Network Management Plan Chapter 1 - Network Safety and Reliability
EP 95 10 00 06 SI	Requirements for Portable Earthing Equipment for the High Voltage System

Reference Number	Title
EP 95 20 00 06 SI	Methods of Rail Connecting 1500 Volt Overhead Wiring
System Substation	
EP 06 00 00 01 SP	System Substation Battery and Battery Charger
EP 99 00 00 01 SP	Substations Minimum Construction Standards
EP 99 00 00 02 SP	System Substation Commissioning Tests
EP 99 00 00 04 SP	Substations - Base Safety and Operating Standards
EP 99 00 00 07 SP	Substation Fencing
EP 99 00 00 08 SP	Substations Fire Protection and Detection Standard
Test and Support Equipment	
EP 15 00 00 01 SP	High Voltage AC Voltage Detector (Nominal Voltage of 11kV - 66 kV)
EP 15 00 00 02 SP	Voltage Tester for Use on 1500V DC Overhead Wiring
EP 15 00 00 04 SP	Pole Top Rescue Kits
EP 15 00 00 05 SP	Substation Electrically Safe Work Area Demarcation Taping Equipment
EP 15 10 00 03 SP	1500V OHW Attached Climbing Kit Assembly
Traction Return	
EP 09 00 00 01 SP	Trackside Negative Bus-Rails
Technical Notes	
ETN 11/02	Earthing Designs for RailCorp's High Voltage AC System
ETN 01/03	Substation and Sectioning Hut Lighting
Signalling	
SPG 0703	Signalling Documentation and Drawings
SPG 0705	Construction of Cable Routes and Signalling Civil Works
SPG 0706	Installation of Trackside Equipment
SPG 0709	Traction Return, Track Circuits and Bonding
SPG 1014	Cables for Railway Signalling Applications - Traction Return Bonding and Track Connection Cables
SPG 1031	General Requirements for Labelling of Signalling Equipment
SPG 1586	Impedance Bonds
SPG 0711.2	Plans, Programs, Documentation and Packages
SPG 0711.3	Inspection and Testing Principles
SPG 0711.4	Inspection and Testing Procedures
SPG 0711.7	Inspection and Testing of Signalling - Standard Forms
SPG 0711.8	Typical Signal Support Procedures for Trackwork
ESG 100	Signal Design Principles
TMG 1310	Locating of Underground Services
TMG 1440	Requirements for the Locating of Underground Services in the Rail Corridor

Reference Number	Title
TMG A1510	Signalling Design Process for Projects Managed by Third Parties
Telecommunications	
ESM 106	Telecommunications for Traction Substations and Section Huts
ESM 109	Communications Earthing and Surge Suppression Standard
Security	
RSS003	RailCorp Security Standard RSS003 - Substations
Detailed Site Survey	
TMA 0491	Accurate Field Drawing
TMA 0492	Data Capture Procedure
TMA 0493	Scope Procedure
TMA 0494	Work as Executed Procedure
TMA 0495	Infrastructure Services Data Policy
TMA 0496	Specification for Collection of Services Data
TMA 0497	Code and Layer Definitions for Services Identification
TMA 0511	Plan Symbols and Interpretation Guidelines

Standard	Title
Australian Standards	
AS 1101.1	Graphical symbols for general engineering - Hydraulic and pneumatic systems
AS 1102.101	Graphical symbols for electrotechnical documentation – General information and general index
AS 1102.113	Graphical symbols for electrotechnology – Analogue elements
AS 1125	Conductors in insulated electric cables and flexible cords
AS 1158	Lighting for roads and public spaces
AS 1170.0	Structural Design Actions - General Principles
AS 1170.1	Structural Design Actions - Permanent, Imposed and Other Actions
AS 1170.2	Structural Design Actions - Wind Actions
AS 1288	Glass in buildings – Selection and installation
AS 1345	Identification of the contents of pipes, conduits and ducts
AS 1428.1	Design for access and mobility – General requirements for access – New building work
AS 1428.2	Design for access and mobility – Enhanced and additional requirements – Buildings and facilities
AS 1668.1	The use of ventilation and air-conditioning in buildings - Fire and smoke control in multi-compartment buildings
AS 1668.2	The use of ventilation and air-conditioning in buildings – Mechanical ventilation in buildings
AS 1670.1	Fire detection, warning, control and intercom systems - System design, installation and commissioning – Fire
AS 1680	Interior lighting
AS 1768	Lightning protection
AS 1851	Routine service of fire protection systems and equipment
AS 2067	Substations and high voltage installations exceeding 1 kV AC.
AS 2107	Acoustics – Recommended design sound levels and reverberation times for building interiors
AS 2159	Piling – Design and Installation
AS 2184	Low voltage switchgear and controlgear – Moulded-case circuit-breakers for rated voltages up to and including 600 V AC. and 250 V DC.
AS 2201.1	Intruder alarm systems – Client's premises - Design, installation, commissioning and maintenance
AS 2208	Safety glazing materials in buildings
AS 2293.1	Emergency escape lighting and exit signs for buildings – System design, installation and operation
AS 2327.1	Composite structures – Simply supported beams
AS 2419 (All Series)	Fire hydrant installations
AS 2444	Portable fire extinguishers and fire blankets – Selection and location

Standard	Title
AS ISO/IEC 24702	Telecommunications installations – Generic cabling – Industrial premises
AS 2676.2	Guide to the installation, maintenance, testing and replacement of secondary batteries in buildings - Sealed cells
AS 2845.1	Water supply - Backflow prevention devices – Materials, design and performance requirements
AS 3000	Electrical Installations – (Australian/New Zealand Wiring Rules)
AS 3008.1.1	Electrical Installations – Selection of cables – Cables for alternating voltages up to and including 0.6/1 kV – Typical Australian installation conditions
AS 3010	Electrical Installations – Generating sets
AS 3011.2	Electrical installations – Secondary batteries installed in buildings - Sealed cells
AS 3013	Electrical installations – Classification of the fire and mechanical performance of wiring system elements
AS 3015	Electrical installations – Extra-low voltage DC power supplies and service earthing within public telecommunications networks
AS 3017	Electrical installations – Verification guidelines
AS 3080	Information technology - Generic cabling for customer premises (ISO/IEC 11801:2011, MOD)
AS 3084	Telecommunications installations – Telecommunications pathways and spaces for commercial buildings
AS 3085.1	Telecommunications installations – Administration of communications and cabling systems – Basic requirements
AS 3439.1	Low voltage switchgear and control gear assemblies – Type-tested and partially type-tested assemblies
AS 3500 (All Series)	Plumbing and drainage
AS 3600	Concrete Structures
AS 3700	Masonry Structures
AS 3835.1	Earth potential rise - Protection of telecommunications network, users, personnel and plant – Code of practice
AS 3835.2	Earth potential rise - protection of telecommunications network, users, personnel and plant – Application guide
AS 3851	The calculation of short-circuit currents in three-phase AC systems
AS 3947.3 (All Series)	Low-voltage switchgear and control gear
AS 4020	Testing of products for use in contact with drinking water
AS 4100	Steel Structures
AS 4282	Control of the obtrusive effects of outdoor lighting
AS 4292.1	Railway Safety Management – General requirements
AS 4419	Soils for Landscaping and Garden Use
AS 4428 (All Series)	Fire detection, warning, control and intercom systems - Control and indicating equipment
AS 4454	Composts, Soil Conditioners and Mulches

Standard	Title
AS 4586	Slip resistance classification of new pedestrian surface materials
AS 4678	Earth-Retaining Structures
AS 4799	Installation of underground utility services and pipelines within railway boundaries
AS 4806.1	Closed circuit television (CCTV) - Management and operation
AS 4806.2	Closed circuit television (CCTV) - Application guidelines.
AS 4853	Electrical hazards on metallic pipelines
AS 5000.1	Electric cables - Polymeric insulated - For working voltages up to and including 0.6/1 (1.2) kV
AS 60479.1	Effects of current on human beings and livestock – General aspects
AS 60529	Degrees of protection provided by enclosures (IP Code)
AS 60849	Sound systems for emergency purposes (IEC 60849:1998 MOD)
AS 61000 (All Series)	Electromagnetic compatibility (EMC)
AS IEC 61935.1	Specification for the testing of balanced and coaxial information technology cabling – Installed balanced cabling as specified in ISO/IEC 11801 and related standards (IEC 61935-1, Ed 3.0 (2009) MOD)
AS 62271.1	High-voltage switchgear and control gear – Common specifications
HB 197	An introductory guide to the slip resistance of pedestrian surface materials
Other	
BCA	Building Code of Australia
PCA	Plumbing Code of Australia
ENA EG1	Energy Networks Association - Substation Earthing Guide
RISSB	Railway Industry Safety and Standards Board - Standards and Guidelines
SMS-06-EN-0550	RailCorp Electrical Network Safety Rules
SPM 0212	Communications and Condition monitoring infrastructure
SPM 0677	Single-Mode optical fibre cable
TMM P021	Optic Fibre cable Joining, Termination and Management
SPG 0729	Signalling Power System
ENA C(b) 1-2006	Guidelines for design and maintenance of overhead distribution and transmission lines
SPM0123	Reinforced pre-cast concrete cable pits
MET RL 0363	High Voltage site communications cabinet arrangement(drawing)
EP 90 00 00 08 SP	Substations Fire protection and detection
ESC540	Services and System
ESB004	Station Services and system
ESB002	Design Principle
WRAPP	NSW Government's Water Reduction and Purchasing Policy
Technical Note -TN 086:2015	T MU MD 00006 STEngineering Drawings and CAD Requirements

Appendix B – Interface Schedule

WORK INTERFACE SCHEDULE – CHALMERS ST SUBSTATION PROJECT					
Ref	**Description**	**Design**	**Supply (including FAT where applicable)**	**Installation**	**Site Acceptance & Integration Testing**
1	**Principal Issued Equipment as per Section 2.5.4 of Works Brief**	The Principal / Equipment Suppliers. Contractor to verify	The Principal	Contractor.	Contractor
2	**33KV and 11 KV Switchboard**	Contractor	Contractor	Contractor.	Contractor
3	**Electrical Network Protection**	Sydney Trains remote locations / Equipment Suppliers / Contractor Lee Street Substation	The Principal / Equipment Suppliers	Contractor / Equipment Suppliers	Contractor / Sydney Trains
4	**Telecommunications Network Integration Scope** (including data network interconnections)	The Principal / Sydney Trains	The Principal / Sydney Trains / Contractor as per Section 2.9 of Works Brief	The Principal / Sydney Trains / Contractor	The Principal / Sydney Trains
5	**Electrical Network Integration Scope**	Contractor (including Operational Readiness requirements)	Contractor if pathway to accreditations are available, else Sydney Trains / The Principal	Contractor if pathway to accreditations are available, else Sydney Trains / The Principal	Contractor if pathway to accreditations are available, else Sydney Trains / The Principal

WORK INTERFACE SCHEDULE – CHALMERS ST SUBSTATION PROJECT					
Ref	**Description**	**Design**	**Supply (including FAT where applicable)**	**Installation**	**Site Acceptance & Integration Testing**
6	**Pilot Wire Protection of 33kV and 11kV Feeders**	Sydney Trains	The Principal / Sydney Trains	Sydney Trains. Contractor required to coordinate works at Lee Street Substation	The Principal / Sydney Trains (End-to-End Integration Testing)
7	**Proposed HV Operating Diagrams, including Staged Operating Diagrams and Electrical Advices**	Contractor	Contractor	Contractor responsible for obtaining approvals	Contractor / Sydney Trains / ASA need to approve all Operating Diagrams
8	**SCADA Design, Supply, Construction & Integration**	Contractor for all Site design / Sydney Trains for design integration at ICON	Contractor	Contractor	Contractor for Site / Sydney Trains for ICON integration
9	**1500V DC, 33kV and 11kV Feeder Isolations**	Contractor to fill out isolation requests	Contractor to supply switching resources if pathway to accreditation is available, else Sydney Trains	n/a	Contractor to supply switching resources if pathway to accreditation is available, else Sydney Trains
10	**HV AC Cables**	Contractor	The Principal & Contractor	Contractor	Contractor
11	**DC Positive Cables**	Contractor	Contractor	Contractor	Contractor
12	**DC Negative Cables**	Contractor	Contractor	Contractor	Contractor
13	**1500V Feeders (Link to Mainline OHW)**	The Principal / Subcontractors	The Principal / Subcontractors	The Principal / Subcontractors	The Principal / Subcontractors
14	**OHW (ESR)**	Contractor	Contractor	Contractor	Contractor
15	**Earthing**	Contractor	Contractor	Contractor	Contractor
16	**Traction Supply System**	Contractor	Contractor	Contractor	Contractor

WORK INTERFACE SCHEDULE – CHALMERS ST SUBSTATION PROJECT					
Ref	**Description**	**Design**	**Supply (including FAT where applicable)**	**Installation**	**Site Acceptance & Integration Testing**
17	**1500V DC Traction Return**	Contractor for all Design and interface with Lee Street Substation Contractor to validate the traction returns for both substations in the area.	Contractor	Contractor	Contractor
18	**PA Siding Distribution Substation**	Contractor	The Principal	Contractor	Contractor
19	**Supplies to Signalling Locations SY4 & SY5**	Contractor	Contractor	Contractor	Contractor
20	**Supplies to signalling Locations SY6 and SY7**	Sydney Trains / Subcontractors	Sydney Trains / Subcontractors	Sydney Trains / Subcontractors	Sydney Trains / Subcontractors
Note 1	Where works are not identified as being the responsibility of The Principal (TfNSW), Sydney Trains will perform its role as Rail Infrastructure Manager and Electrical Distribution Authority – performing to its own satisfaction any due-diligence and assurance of any proposed works on its network.				
WORK INTERFACE SCHEDULE – CHALMERS ST SUBSTATION PROJECT					

Appendix C – TfNSW Standard Risk Matrix

Table C.1 TERM Risk Assessment – Consequence Criteria

Combined consequence table						
Rating	**C6**	**C5**	**C4**	**C3**	**C2**	**C1**
Descriptor/ Impact Area	**Insignificant**	**Minor**	**Moderate**	**Major**	**Severe**	**Catastrophic**
Health and Safety (Injury and Disease)	Illness, first aid or injury not requiring medical treatment.	Illness or minor injuries requiring medical treatment.	Single recoverable lost time injury or illness, alternate/restricted duties injury, or short-term occupational illness.	1-10 major injuries requiring hospitalisation and numerous days lost, or medium-term occupational illness.	Single fatality and/or 10-20 major injuries/permanent disabilities/chronic diseases.	Multiple fatalities and/or >20 major injuries/permanent disabilities/chronic diseases.
Environment	No appreciable changes to environment and/or highly localised event.	Change from normal conditions within environmental regulatory limits and environmental effects are within site boundaries.	Short-term and/or well-contained environmental effects. Minor remedial actions probably required.	Impacts external ecosystem and considerable remediation is required.	Long-term environmental impairment in neighbouring or valued ecosystems. Extensive remediation required.	Irreversible large-scale environmental impact with loss of valued ecosystems.
Customer Experience/ Operational Reliability	Short duration disruptions affecting part of one transport mode.	Minor disruptions affecting several parts of one transport mode.	Serious disruptions affecting operation of one complete transport mode.	Major disruptions affecting operations of one transport mode with network-wide effects on one or more other modes of transport.	Short duration shutdowns or substantial disruptions affecting multiple transport modes with sector-wide cascading effects.	Extensive shutdowns or extended disruptions with economy-wide effects.
Government/ Stakeholder / Public Trust/ Confidence	Negative ar icle in local media. No discernible reaction/apprehension. Goodwill, confidence and trust retained.	Unease – Series of negative articles in local/state media. Confidence remains with some minor loss of goodwill o r trust. Recoverable with little effort or cost. Some con inuing scrutiny/attention.	Disappointment – Extended negative local/state media coverage. Confidence and trust dented but are quickly recoverable at modest cost within existing budget and resources.	Concern – Short-term negative state/national media coverage. Confidence and trust are diminished but are recoverable with time, staff effort and additional funding.	Displeasure – Extended negative state/national media coverage. Confidence and trust are damaged but recoverable at considerable cost, time and staff effort.	Outrage – Material change in the public perception of he organisation. Confidence and trust are severely damaged, possibly irreparably, and full recovery both questionable and costly.
Regulatory or Legal Breach	Low-level non-compliance with legal and/or regulatory requirement or duty by individuals or TfNSW.	Minor non-compliance with legal and/or regulatory requirement or duty. Investigation and/or report to authority.	Moderate non-compliance. Subject to comment and monitoring from applicable regulator. Small fine and no disruption to services.	Major breach resulting in enforcement action and/or prohibition notices. Substantial fine and no disruption to services.	Substantial breach resulting in prosecution, fines and/or litigation. Licence or accreditation restricted or conditional affecting ability to operate.	Prosecution leading to imprisonment of TfNSW executive. Loss of opera ing licence.

Combined consequence table						
Rating	**C6**	**C5**	**C4**	**C3**	**C2**	**C1**
Descriptor/ Impact Area	**Insignificant**	**Minor**	**Moderate**	**Major**	**Severe**	**Catastrophic**
Management Effort/ Organisational Fatigue	An event, he impact of which can be absorbed as part of normal activity.	An event, the impact of which can be absorbed but some additional management effort is required.	An event, the impact of which can be absorbed but much broader management effort is required.	Major event which can be absorbed, but substantial management effort is required.	Severe event which requires extensive management effort but can be survived.	Catastrophic event with the clear potential to lead to the collapse of he organisation.
Benefit Realisation of Initiative, Program or Project	No time delay with initiative or project but it will incur a slight decrease in the benefits realised.	Minor delay with the initiative and/or a minor decrease in he benefits realised; or minor delay on the project or another project, with no public implica ions.	Several delays with the ini iative and/or moderate decrease in benefits realised; or completion date missed for non-critical path project.	Major delays with the ini iative and/or major decrease in benefits realised; or publicly announced portion/milestone missed or final completion date missed with demonstrable mitiga ing external circumstances.	Severe delays with ini iative, which impacts across divisions and/or significant decrease in benefits realised; or publicly announced portion/milestone missed or final completion date missed on critical path project.	Failure to realise benefits of the initiative which adversely affects the enterprise-wide operations of TfNSW; or publicly announced portion/ milestone significantly missed or final completion date significan ly missed on critical path project.
Budget, Costs or Revenue	<$100k	$100k - $1m	$1m - $10m	$10m - $50m	$50m - $100m	>$100m

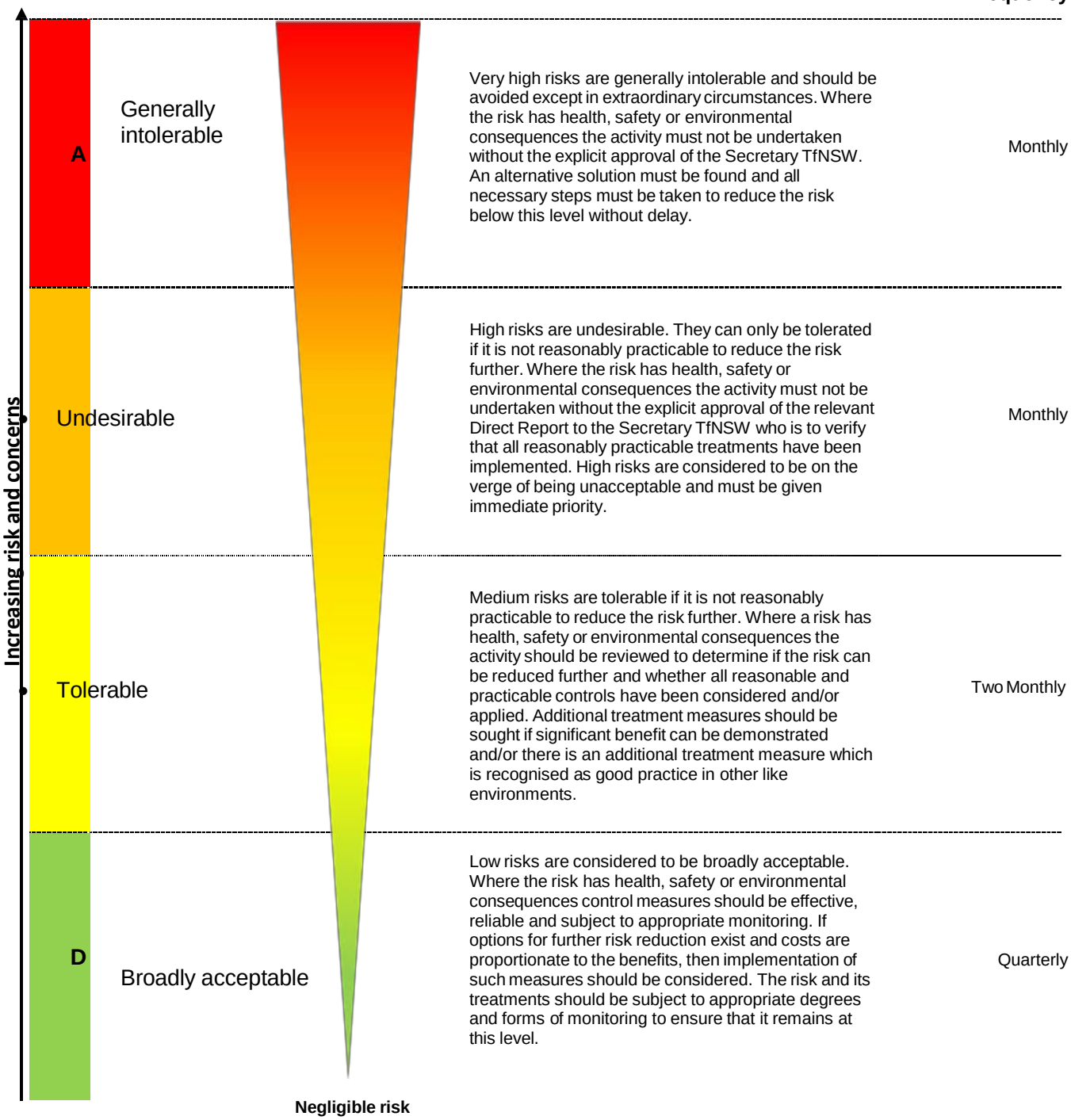
Table C.2 TERM risk assessment – likelihood criteria

Risk Likelihood Table						
Rating	**L6**	**L5**	**L4**	**L3**	**L2**	**L1**
Descriptor / Definition	**Almost Unprecedented**	**Very Unlikely**	**Unlikely**	**Likely**	**Very Likely**	**Almost Certain**
Qualitative Expectation	Not expected to ever occur during time of activity or project	Not expected to occur during the time of activity or project	More likely not to occur than occur during time of activity or project	More likely to occur than not occur during time of activity or project	Expected to occur occasionally during time of activity or project	Expected to occur frequently during time of activity or project
Quantitative Frequency	Less than once every 100 years	Once every 10 to 100 years	Once every 1 to 10 years	Once each year	1-10 times every year	10 times or more every year

Table C.3 TERM risk matrix

Risk Matrix Evaluation Table								
Risk Ratings **A – Very High** **B – High** **C – Medium** **D – Low**			**Consequence**					
			Insignificant	**Minor**	**Moderate**	**Major**	**Severe**	**Catastrophic**
			C6	**C5**	**C4**	**C3**	**C2**	**C1**
Likelihood	**Almost Certain**	**L1**	**C**	**B**	**B**	**A**	**A**	**A**
	Very Likely	**L2**	**C**	**C**	**B**	**B**	**A**	**A**
	Likely	**L3**	**D**	**C**	**C**	**B**	**B**	**A**
	Unlikely	**L4**	**D**	**D**	**C**	**C**	**B**	**B**
	Very Unlikely	**L5**	**D**	**D**	**D**	**C**	**C**	**B**
	Almost Unprecedented	**L6**	**D**	**D**	**D**	**D**	**C**	**C**

Table C.4 TERM risk tolerance and responses table



Appendix D – PSU SAP and SRSR Guidelines

PSU System Assurance Plan Guidelines

PSU ID	Safety Assurance Plan (Minor) Guidelines
SAP-100	**0. Preliminary Information**
SAP-101	**0.1 Cover Sheet**
SAP-102	The SAP shall include a cover sheet with the following minimum content:
SAP-103	(a) "Safety Assurance Plan"
SAP-104	(b) "prepared for Transport for NSW"
SAP-105	(c) Principal Contractor Name/Address/ABN
SAP-106	(d) Document Number/Revision/Date
SAP-107	**0.2 Document History**
SAP-108	The SAP shall contain a table containing the following information per issue of the SAP
SAP-109	(a) Revision Number
SAP-110	(b) Date of Issue
SAP-111	(c) Details
SAP-112	**0.3 Document Approvals**
SAP-113	The SAP shall contain a table containing the following approval information:
SAP-114	(a) Author Name/Signature/Date
SAP-115	(b) Reviewer Name/Signature/Date
SAP-116	(c) AEO Signatory Name/Signature/Date
SAP-117	**0.4 Table of Contents**
SAP-118	The SAP shall contain a Table of Contents to at least level 3.
SAP-119	**0.5 Formatting Requirements**
SAP-120	Each page of the SAP shall contain the following minimum information in headers/footers:
SAP-121	(a) Document Number/Revision Number/Date
SAP-122	(b) Page Number /Total Number of Pages
SAP-123	(c) Project Name
SAP-124	(d) "Safety Assurance Plan"
SAP-125	**1. Introduction**
SAP-126	The SAP shall include an introduction with the following subsections:
SAP-127	(a) Scope of Project
SAP-128	(b) System Definition
SAP-129	Describe the system(s) to be delivered in such a way that it is understandable to people that are not involved with the project. Where possible, include diagrams to show the system breakdown and interfaces. The system boundaries require to be defined and all interfaces identified.

PSU ID	Safety Assurance Plan (Minor) Guidelines
SAP-130	The SAP shall define the following interfaces:
SAP-131	(i) Interfaces between the delivery team's subsystems.
SAP-132	(ii) Interfaces between each of the delivery team's systems.
SAP-133	(iii) Interfaces between the project's systems and external systems
SAP-134	(iv) HMI interfaces
SAP-135	(v) Operational interfaces (including maintenance)
SAP-136	(vi) Organisational interfaces
SAP-137	(c) Purpose of the Safety Assurance Plan
SAP-138	(d) Scope of the Safety Assurance Plan
SAP-139	(e) Assumptions
SAP-140	(f) Dependencies
SAP-141	(g) Constraints
SAP-142	(h) Reference to any novel system or equipment to be introduced by the project which requires additional safety and risk analysis.
SAP-143	(i) Reference to a more detailed system description document (if required)
SAP-144	(j) Reference to an interface management plan or how interfaces will be managed (if required)
SAP-145	**2. Definitions and Abbreviations**
SAP-146	The SAP shall include definitions of all specialist terms and abbreviations used in the SAP.
SAP-147	**3. Roles, Responsibilities, Organisation and Stakeholders**
SAP-148	The SAP shall include a definition of the following as they relate to the AEO:
SAP-149	(a) Engineering Safety Assurance Roles and Responsibilities
SAP-150	(b) Engineering Safety Assurance Organisation during each project phase (including a diagram)
SAP-151	(c) Key Engineering Safety Assurance Stakeholders.
SAP-152	The AEO shall contact the TPD Project Manager to obtain a list of stakeholders to be consulted and their relationships to the project.
SAP-153	**4. Engineering Safety Assurance Activities**
SAP-154	**4.0 Project Phases**
SAP-155	The SAP shall include a process flow diagram
SAP-156	The SAP shall include a description of the Engineering Safety Assurance Activities proposed by the AEO for each of the following project phases:
SAP-157	(a) Concept Design Phase
SAP-158	(b) Detailed Design Phase
SAP-159	(c) Construction Phase
SAP-160	(d) Commissioning Phase.
SAP-161	These phases should be included as applicable to a Contractor's scope of work. It is recognised that phases may be carried out by different Contractors.

PSU ID	Safety Assurance Plan (Minor) Guidelines
SAP-162	**4.0.1. Concept Design Phase Activities**
SAP-163	The description of the Concept Design Phase shall include details of the following activities:
SAP-164	(a) Preparing a Safety Assurance Plan
SAP-165	(b) Conducting a Preliminary Hazard Analysis (including preparation of a PHA report)
SAP-166	(c) Establishing/updating the project ADC Log and Project Specific Risk Register
SAP-167	(d) Preparing a Safety Risk Summary Report (Concept Design).
SAP-168	**4.0.2. Detailed Design Phase Activities**
SAP-169	The description of the Detailed Design Phase shall include details of the following activities:
SAP-170	(a) Reviewing the SAP
SAP-171	(b) Conducting a Detailed Hazard Analysis (including preparation of a DHA report)
SAP-172	(c) Identifying Safety Requirements
SAP-173	(d) Updating the ADC Log and PSRR with the Safety Requirements
SAP-174	(e) Updating the RAATM with the Safety Requirements
SAP-175	(f) Preparing an SRSR (Detailed Design).
SAP-176	**4.0.3. Construction Phase Activities**
SAP-177	The description of the Construction Phase shall include details of the following activities:
SAP-178	(a) Reviewing the SAP
SAP-179	(b) Conducting another Post-Design Safety Review
SAP-180	(c) Capturing Construction Hazards
SAP-181	(d) Updating the ADC Log and PSRR with the Construction Hazards
SAP-182	(e) Updating the RAATM and Verifying Safety Requirements
SAP-183	(f) Preparing an SRSR (Construction).
SAP-184	**4.0.4. Commissioning Phase Activities**
SAP-185	The description of the Commissioning Phase shall include details of the following activities:
SAP-186	(a) Reviewing the SAP
SAP-187	(b) Conducting a Post-Construction Design Safety Review
SAP-188	(c) Capturing Post-Construction Hazards
SAP-189	(d) Updating the ADC Log and PSRR with the Post-Construction Hazards
SAP-190	(e) Updating the RAATM and Validating Safety Requirements
SAP-191	(f) Preparing an SRSR (Commissioning)
SAP-192	**4.1. Preliminary Hazard Analysis**
SAP-193	(a) The Preliminary Hazard Analysis (PHA) technique shall be used as an initial analysis to identify the hazards associated with a project.
SAP-194	(b) A PHA report shall be provided detailing the following:
SAP-195	• Workshop structure
SAP-196	• Date and location for workshop(s)

PSU ID	Safety Assurance Plan (Minor) Guidelines
SAP-197	• Attendees present
SAP-198	• Guidewords used
SAP-199	• Workshop outcomes (including HAZID worksheet).
SAP-200	(c) The output from the PHA shall be transferred to the Project Specific Risk Register for the project.
SAP-201	**4.2. Detailed Hazard Analysis**
SAP-202	(a) The SAP shall describe any Detailed Hazard Analyses to be conducted
SAP-203	(b) Reports similar to that prepared for the PHA shall also be produced for each DHA
SAP-204	**4.3. Project Specific Risk Register**
SAP-205	(a) The results of the Preliminary Hazard Analysis and any subsequent Hazard Analysis shall be recorded in the Safety Risk Register
SAP-206	(b) The PSRR shall be maintained in the format specified in TPD template: Project Specific Risk Register Template (3TP-SD-001)
SAP-207	(c)The PSRR shall be delivered in Excel format with each Safety Risk Summary Report.
SAP-208	**4.4. Design Safety Reviews**
SAP-209	Design Safety Reviews (DSRs) shall be held at the end of the design phase and during the implementation phase to confirm all identified design controls are successfully verified within the relevant phase scope of works and to review any design changes that may impact the hazards or controls identified.
SAP-210	DSRs shall be held prior to the completion of each design package for each phase of the project
SAP-211	Appropriate design, construction, Commissioning and test personnel shall be available to attend each DSR
SAP-212	The DSRs shall, as a minimum, consider the following:
SAP-213	• Identification and review of any changes to the design as a result of the as built configuration.
SAP-214	• Reviewing and assessing the impact of any waivers or NCRs raised during the construction and/or Commissioning phase.
SAP-215	• Reviewing implementation of actions.
SAP-216	• Confirming assumptions, dependencies and constrains addressed during the construction and/or Commissioning phase.
SAP-217	• Confirming compliance evidence is available to satisfy the safety requirements.
SAP-218	Formal minutes for each DSR shall be prepared and referenced in the corresponding SRSR.
SAP-219	The PSRR shall be updated to reflect DSR findings.
SAP-220	**4.5. Human Factors Analysis**
SAP-221	For an overview of Human Factors, refer to the ASA Guide to Human Factors Integration (Ref 1).
SAP-222	The SAP shall explain how Human Factors will be considered in the Preliminary Hazard Analysis workshop.
SAP-223	The SAP shall identify any additional specific Human Factors Analysis required during the Design Phases of the project.

PSU ID	Safety Assurance Plan (Minor) Guidelines
SAP-224	**4.6. So Far As Is Reasonably Practicable (SFAIRP) Assessment**
SAP-225	The SAP shall include an explanation of how SFAIRP assessment is proposed to be conducted.
SAP-226	For those hazards where initial assessment indicates that the risks are not acceptable or where the design controls identified may be cost-prohibitive, the SAP shall describe the techniques that will be used to conduct a more detailed SFAIRP analysis.
SAP-227	**4.7. ADC Log Requirements**
SAP-228	The SAP shall define the requirements for an ADC log.
SAP-229	The minimum contents of an ADC log shall be as follows:
SAP-230	(a) Type (A=Assumption, D=Dependency or C=Constraint)
SAP-231	(b) PUID (Project Unique ID)
SAP-232	(c) Details/description of the assumption, dependency or constraint
SAP-233	(a) Status (Open/Resolved)
SAP-234	(b) Corresponding Hazard IDs (corresponding to the Hazard IDs in the PSRR).
SAP-235	**4.8. RAATM Requirements**
SAP-236	The RAATM shall, as a minimum, include safety-related requirements that originate from:
SAP-237	(a) The Works Brief
SAP-238	(b) The PSRR.
SAP-239	The RAATM shall (as a minimum) include the following attributes for each requirement:
SAP-240	(a) PUID Project Unique Id
SAP-241	(b) Requirement Text
SAP-242	(c) Design Verification Method
SAP-243	(d) Design Compliance Status
SAP-244	(e) Design Verification Evidence
SAP-245	(f) Construction Verification Method
SAP-246	(g) Construction Compliance Status
SAP-247	(h) Construction Verification Evidence
SAP-248	**5. Safety Argument**
SAP-249	The SAP shall include an argument that the project will be acceptably safe to operate and maintain as part of the existing network
SAP-250	**6. Safety Audit and Assessment**
SAP-251	**6.1. Independent Professional Review (IPR) Process**
SAP-252	Until further notice, Independent Professional Review will be carried out by TPD.
SAP-253	**6.2. Engineering Safety Assurance Audits**
SAP-254	The SAP shall detail the audit process proposed to be used during the project's lifecycle.
SAP-255	**6.3. Engineering Safety Assurance Progress Reporting**
SAP-256	The SAP shall detail the proposed timing and conduct of Engineering Safety Assurance Progress Meetings

PSU ID	Safety Assurance Plan (Minor) Guidelines
SAP-257	As a minimum, each Engineering Safety Assurance Progress Meeting shall discuss the following items:
SAP-258	(a) Status of Engineering Safety Assurance deliverables for the project;
SAP-259	(b) Status of the PSRR, including any changes in hazards or risks;
SAP-260	(c) Progress against the ESA program;
SAP-261	(d) ESA activities undertaken during the previous month and planned activities for the next month.
SAP-262	The participants of the ESA progress meetings shall, as a minimum, include the following participants:
SAP-263	(a) Project Manager
SAP-264	(b) Systems / Safety Assurance Manager
SAP-265	(c) Design Manager,
SAP-266	(d) Designers
SAP-267	(e) End Users
SAP-268	(f) Other relevant parties/stakeholders
SAP-269	The SAP shall include a requirement to prepare a monthly ESA progress report for delivery to TPD.
SAP-270	The content of each ESA progress report shall include the following:
SAP-271	(a) status of Engineering Safety Assurance deliverables for the project
SAP-272	(b) status of the PSRR (open, resolved, closed out risks)
SAP-273	(c) changes in hazards or risks within the PSRR
SAP-274	(d) progress against the Engineering Safety Assurance program, including Engineering Safety Assurance activities undertaken during last month and planned activities for the next month
SAP-275	(e) status of the project documentation delivery in line with project schedule.
SAP-276	**7. Engineering Safety Assurance Deliverables**
SAP-277	The SAP shall include a schedule of deliverables with anticipated dates for at least the following documents:
SAP-278	(a) Project Specific Risk Register
SAP-279	(b) Safety Assurance Plan (this document)
SAP-280	(c)Preliminary Hazard Analysis Report
SAP-281	(d) Any additional Hazard Analysis Reports
SAP-282	(e) Safety Risk Summary Reports
SAP-283	The SAP shall cross reference the ESA deliverable with the overall Project Schedule.
SAP-284	**8. Related Documents and References**
SAP-285	The SAP shall include a set of numbered related documents and references.
SAP-286	**9. Appendices**
SAP-287	The SAP shall include a set of appendices referenced from the body of the SAP.

PSU SRSR Guidelines

PSU ID	Safety Risk Summary Report Guidelines
SRSR-100	**0. Preliminary Information**
SRSR-101	**0.1 Cover Sheet**
SRSR-102	The SRSR shall include a cover sheet with the following minimum content:
SRSR-103	(a) "Safety Risk Summary Report" [Concept/Detailed Design/Construction/Commissioning & Handover] Phase (as appropriate)
SRSR-104	(b) "prepared for Transport for NSW"
SRSR-105	(c) Principal Contractor Name/Address/ABN
SRSR-106	(d) Document Number/Revision/Date
SRSR-107	**0.2 Document History**
SRSR-108	The SRSR shall contain a table containing the following information per issue of the SRSR
SRSR-109	(a) Revision Number
SRSR-110	(b) Date of Issue
SRSR-111	(c) Details
SRSR-112	**0.3 Document Approvals**
SRSR-113	The SRSR shall contain a table containing the following approval information:
SRSR-114	(a) Author Name/Signature/Date
SRSR-115	(b) Reviewer Name/Signature/Date
SRSR-116	(c) AEO Signatory Name/Signature/Date
SRSR-117	**0.4 Table of Contents**
SRSR-118	The SRSR shall contain a Table of Contents to at least level 3.
SRSR-119	**0.5 Formatting Requirements**
SRSR-120	Each page of the SRSR shall contain the following minimum information in headers/footers:
SRSR-121	(a) Document Number/Revision Number/Date
SRSR-122	(b) Page Number /Total Number of Pages
SRSR-123	(c) Project Name
SRSR-124	(d) "Safety Risk Summary Report".
SRSR-125	**1. Introduction**
SRSR-126	The SRSR shall include an introduction with the following subsections:
SRSR-127	(a) Scope of project
SRSR-128	(b) Purpose of the Safety Risk Summary Report
SRSR-129	(c) Scope of the Safety Risk Summary Report
SRSR-130	(d) Assumptions, Dependencies and Constraints outstanding from the SAP
SRSR-131	(e) Any new Assumptions, Dependencies and Constraints together with their safety implications.
SRSR-132	**2. Definitions & Abbreviations**

PSU ID	Safety Risk Summary Report Guidelines
SRSR-133	The SRSR shall include definitions of all specialist terms and abbreviations used in the SRSR or (better still) refer to those in the SAP.
SRSR-134	**3. Engineering Safety Assurance Activities**
SRSR-135	(b) The SRSR shall identify the ESA activities carried out during the project phase covered by the current of the SRSR.
SRSR-136	**3.1. Concept Design Phase Engineering Safety Assurance Activities**
SRSR-137	The SRSR shall reference a current and valid SAP (including revision number).
SRSR-138	The SRSRS shall describe the conduct and results of the PHA.
SRSR-139	The SRSR shall include a PHA attendance record and minutes of meeting.
SRSR-140	The SRSR shall reference a baselined version of the following documents that include the results of the PHA carried out in this project phase:
SRSR-141	(a) ADC log
SRSR-142	(b) PSRR
SRSR-143	(c) RAATM.
SRSR-144	**3.2. Detailed Design Phase Engineering Safety Assurance Activities**
SRSR-145	Note: The SAP needs to be reviewed at the beginning of each project phase. As a result, the revision of the SAP referenced at each phase may be different.
SRSR-146	The SRSR shall reference a current and valid SAP (including revision number).
SRSR-147	The SRSRS shall describe the conduct and results of any System Hazard Analysis carried out.
SRSR-148	The SRSRS shall describe the conduct and results of any additional hazard analyses carried out (including Human Factors analyses).
SRSR-149	The SRSR shall include a PHA attendance record.
SRSR-150	The SRSR shall reference a baselined version of the PSRR that incorporates the results of the analyses carried out during the Detailed Design phase.
SRSR-151	The SRSR shall reference a baselined version of the following documents that include the results of the DSR carried out in this project phase:
SRSR-152	(a) ADC log
SRSR-153	(b) PSRR
SRSR-154	(c) RAATM.
SRSR-155	**3.3. Construction Phase Engineering Safety Assurance Activities**
SRSR-156	The SRSR shall reference a current and valid SAP (including revision number).
SRSR-157	The SRSR shall describe the conduct and results of the Post-Design Safety Review.
SRSR-158	The SRSR shall include a Post-Design Safety Review attendance record and minutes of meeting.
SRSR-159	The SRSR shall reference a baselined version of the following documents that include the results of the Post-Design Safety Review:
SRSR-160	(a) ADC log
SRSR-161	(b) PSRR
SRSR-162	(c) RAATM.

PSU ID	Safety Risk Summary Report Guidelines
SRSR-163	**3.4. Commissioning & Handover Phase Engineering Safety Assurance Activities**
SRSR-164	The SRSR shall reference a current and valid SAP (including revision number).
SRSR-165	The SRSRS shall describe the conduct and results of the Post-Construction Safety Review.
SRSR-166	The SRSR shall include a Post-Construction Safety Review attendance record and minutes of meeting.
SRSR-167	The SRSR shall reference a baselined version of the following documents that include the results of the Post-Construction Safety Review:
SRSR-168	(a) ADC log
SRSR-169	(b) PSRR
SRSR-170	(c) RAATM.
SRSR-171	**4. Risk Profiles**
SRSR-172	**4.1 Risk Profile as at end of Concept Design Phase**
SRSR-173	The SRSR shall list the total number of identified hazards as at [date].
SRSR-174	The SRS shall list the Number of Unmitigated Hazards (NUH) of ratings High/Medium/Low.
SRSR-175	The SRS shall list the Number of Mitigated Hazards (NMH) of category High/Medium/Low.
SRSR-176	Note: The total Number of Unmitigated Hazards must be equal to the Number of Mitigated Hazards.
SRSR-177	For each category of hazard rating (High/Medium/Low), the SRSR shall summarise the disposition of the those hazards to each of the following classes:
SRSR-178	(a) Resolved for Design (SFAIRP)
SRSR-179	(b) Transferred to Construction
SRSR-180	(c) Transferred to O&M.
SRSR-181	Note: An example risk profile is shown below. The content highlighted is included for illustrative purposes only.

PSU ID	Safety Risk Summary Report Guidelines

SRSR-182

Hazard Rating	Number of Unmitigated Hazards (NUH)	Number of Mitigated Hazards (NMH)	Status of Mitigated Hazards
High	20	8	1 - Resolved for Design (SFAIRP) 5 – Transferred to Construction 2 – Transferred to O&M
			Total = 8 = NMH(High)
Medium	42	47	32 – Resolved for Design (SFAIRP) 12 – Transferred to Construction 3 – Transferred to O&M
			Total = 47 = NMH(Medium)
Low	7	14	9 – Resolved for Design (SFAIRP) 2 – Transferred to Construction 3 – Transferred to O&M
			Total = 14 = NMH(Low)
Comments	Total = 69	Total = 69 (also)	

SRSR-183	All residual safety risks transferred to the end user shall be translated into the asset owner's risk matrix.
SRSR-184	**4.2 Risk Profile as at end of Detailed Design Phase**
SRSR-185	[As per Section 4.1]
SRSR-186	**4.3 Risk Profile as at end of Construction Phase**
SRSR-187	[As per Section 4.1]
SRSR-188	**4.4 Risk Profile as at end of Commissioning & Handover Phase**
SRSR-189	[As per Section 4.1]
SRSR-190	**5. Summary of Acceptability**

PSU ID	Safety Risk Summary Report Guidelines
SRSR-191	The SRSR shall provide evidence that:
SRSR-192	(a) Safety has been considered an integral part of Concept Design/ Detailed Design/ Construction and Commissioning & Handover phases of the project (as appropriate to the phase of the project for which the SRSR has been prepared)
SRSR-193	(b) All reasonable foreseeable hazards and safety controls have been identified and managed SFAIRP for the current design.
SRSR-194	(c) residual risks have been identified and operational/procedural controls have been recommended for the Asset Owner's acceptance (Commissioning & Handover Phase SRSR only)
SRSR-195	The SRSR shall provide evidence that the overall SFAIRP demonstration process has been applied for all hazards to ensure all reasonably practical measures have been considered and implemented.
SRSR-196	The SRSR shall identify any outstanding issues that require further Engineering Safety Assurance or design development / analysis in subsequent phases of the project
SRSR-197	The SRSR shall:
SRSR-198	(a) Detail how Human Factors were considered during the design for Operation and Maintenance activities
SRSR-199	(b) Demonstrate that all identified safety requirements were reviewed and amended as appropriate during the design safety reviews.
SRSR-200	(c) Demonstrate that all relevant safety requirements were confirmed to be implemented through the RAATM process during Design Safety Reviews.
SRSR-201	**6. Operations & Maintenance Recommendations to Asset Owner**
SRSR-202	Based on safety findings to date, the SRSR shall include a list of procedural safety controls recommended for implementation by the Asset Owner.
SRSR-203	The Commissioning and Handover SRSR shall describe the mechanism whereby operational/maintenance controls are confirmed by the Asset Owner
SRSR-204	The SRSR shall include a reference to the PSRR to provide context for the list of procedural controls.
SRSR-205	**7. Conclusion**
SRSR-206	The SRSR shall summarise the Engineering Safety Assurance activities carried out to the date of issue of the SRSR.
SRSR-207	The SRSR shall explain how Engineering Safety Assurance has been used as an integral part of system development.
SRSR-208	**8. Issues and Constraints**
SRSR-209	The SRSR shall list any outstanding issues to be taken forward into the next project phase or that have not been addressed prior to handover to the end user.
SRSR-210	**9. Related Documents and References**
SRSR-211	The SRSR shall include a set of numbered related documents and references.

PSU ID	Safety Risk Summary Report Guidelines
SRSR-212	Note: As the SRSR is a document that "builds" from one phase to the next, there may need to be separate section for references that are to multiple versions of the same document.
SRSR-213	In particular, the SRSR shall refer to the (potentially multiple versions of) the SAP on which the SRSR is based.
SRSR-214	**10. Appendices**
SRSR-215	The SAP shall include a set of appendices referenced from the body of the SRSR.
SRSR-216	Note: Appendices that contain more than a few pages (or consist of separate files such as Excel spreadsheets) should be included by referencing them rather than by pasting them into the body of the SRSR.
SRSR-217	Note: In particular, the PSRR should NOT be pasted into the SRSR as it is generally illegible when printed.

EXHIBIT C – PRINCIPAL'S INSURANCE POLICIES

Included on the attached CD titled "MEDIUM WORKS CONTRACT – DESIGN AND CONSTRUCTION CONTRACT, NUMBER: ISD-18-7801, POWER SUPPLY UPGRADE PROGRAM, DESIGN & CONSTRUCTION OF CHALMERS STREET SUBSTATION AND GRANVILLE JUNCTION SUBSTATION, ELECTRONIC FILES."

[redacted]
Principal

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Certificate of Currency

Comprehensive General Liability

Our Reference:	Sydney Trains
Department:	Corporate – Transport & Logistics
Contact:	[redacted]
Date:	16 April 2015

This certificate is issued as a matter of information only and confers no rights upon the holder. It does not amend, extend or alter the coverage afforded by the policy. It is provided as a summary only of the cover provided and is current only at the date of issue. For full particulars, reference must be made to the current policy wording.

Insurer:	QBE Insurance (Europe) Limited and other British, European and Australian underwriters
Policy Number:	DR551912
Insured:	Transport for NSW (Transport Projects Division), Sydney Trains, NSW Trains, RailCorporation New South Wales (RailCorp) and/or all subsidiary companies and/or Directors' and Officers' and/or Parties for whom the Insured undertakes to insure for their respective rights and interests. Project Managers, Contract Managers, Head Contractors and sub-contractors and other parties as required by contract or agreement Including the following Insured programs: Clearways, LG CUP, Auburn Stabling; Inner West Light Rail; Transport Access Program; North Sydney Freight Corridor; Novo Rail Program Alliance (formerly RailCorp Program Alliance); South West Rail Link (Brownfield); Power Supply Upgrade, Wynyard Station Upgrade
Period of Insurance:	From 4:00pm Australian Eastern Standard Time on 30 September 2014 To 4:00pm Australian Eastern Standard Time on 30 November 2015
Interest Insured:	Legal Liability to third parties for personal injury and/or property damage (including charges, expenses, legal and other costs incurred) as a result of an Occurrence happening during the Period of Insurance in relation to the following Insured programs: Clearways, LG CUP, Auburn Stabling; Inner West Light Rail; Transport Access Program;

	North Sydney Freight Corridor; Novo Rail Program Alliance (formerly RailCorp Program Alliance); South West Rail Link (Brownfield); Power Supply Upgrade, Wynyard Station Upgrade
Deductible:	$ each and every Occurrence
Limit(s) of Liability:	A$ each and every occurrence during the period of insurance in respect of Public Liability. A$ any one claim and in the aggregate during the period of insurance in respect of Products Liability.
Territorial Limits:	Worldwide but excluding USA and Canada other than for products exported from within Australia or in respect of employee travel

Yours faithfully,

Principal

[redacted]
Principal

Marsh Pty Ltd
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21 November 2014

Certificate of Currency

This certificate is issued as a matter of information only and confers no rights upon the holder. It does not amend, extend or alter the coverage afforded by the policy/policies listed. It is provided as a summary only of the cover provided and is current only at the date of issue. For full particulars, reference must be made to the current policy wording.

Class of Insurance:	Contract Works
Insurer:	AIG Australia Limited
Policy Number:	115680
Named Insured:	Transport for New South Wales (Transport Project Division), Rail Corporation of New South Wales (RailCorp), Sydney Trains, and New South Wales Trains as Principal and Owner; and all companies under their effective management control and all subsidiary corporations (including those acquired or incorporated during the Period of Insurance) for their respective rights and interest.
Additional Insured's:	Contractors, Alliance non-owner participants, contract managers, project managers and subcontractors of any tier and / or other parties, for their respective rights and interests, as more specifically defined in the policy wording
Period of insurance:	<u>(a) Construction Period</u> Cover for each Insured Contract will commence upon possession of the site by the contractor, and cease with respect to each separable portion; i) upon practical completion of the work, or ii) at commencement of commercial operations whichever occurs first.

(b) Defects Liability Period
Cover for each Insured Contract or separable portion will commence at expiry of the Construction Period;

and ceases at the end of the Defects Liability Period as stated in the contracts between the Insured's.

Cover includes up to 12 weeks testing and commissioning included within the Construction Period for each Contract.

Maximum Estimated Construction Period:
48 months.

Maximum Estimated Maintenance Period/Defects Liability Period:
Up to 24 months from the date of Practical Completion for each Contract.

Insured Contracts: Declared Contracts commenced by the Named Insured during the Duration of Policy, including the Glenfield Transport Interchange Project, Northern Sydney Freight Corridor and Power Supply Upgrade projects, and all associated and ancillary works in connection therewith.

Duration of Policy: 23rd November 2014 to 23rd November 2015, both days at 4.00pm.

Covering: Subject to the policy Conditions, Memoranda or Exclusions the Insurers' will by payment of the cost of reinstatement, replacement or repair, indemnify the Insured against an Occurrence to the Property Insured during the Construction Period, arising from any cause whatsoever

(a) whilst on or adjacent to or in the vicinity of the Project Site

(b) in transit thereto or therefrom (subject to a limit any one transit of $ including physical loss or damage occurring during any deviation therein or storage in the course of transit, temporary off-site storage or temporary removal from or return to the Project Site for any purpose whatsoever (including any loading, transit or unloading incidental thereto)

Territorial Limits:	Contract Sites and elsewhere in Australia, including whilst in transit between any places therein.
Limit of Indemnity:	All Contract Works, Permanent Works, Temporary Works, Materials (including free issue materials), equipment, plant, Supplies and the like and work ancillary thereto and all other Property to be incorporated into the Project and all other things brought on to the Project Site for the purposes of the Project, but excluding existing property, temporary buildings and their contents, construction tools, plant and equipment. $ any one Occurrence / any one location Temporary Buildings and Contents thereof (excluding Construction tools, plant and equipment) $ any one Occurrence / any one location

Sub-Limits of Liability:	Escalation
	% of Estimated Contract Value for each separable portion of the contract works
	
	Professional Fees
	$ any one Occurrence and one Contract Site.
	
	Removal of Debris
	$ or % of the loss, whichever is the lesser.
	
	Search and Location Costs
	$ or % of the loss, whichever is the lesser.
	
	Expediting Expenses
	% of the loss to a maximum of $
	
	Transit
	$ in respect of Materials in Transit maximum per Conveyance

Temporary Protection, Government Fees, Local Authority Charges and Shoring and Propping
$ [redacted] any one Occurrence and one Contract Site.

Material Storage Offsite
$ [redacted] any one Occurrence

Claims Preparation Costs
$ [redacted] any one Occurrence

Additional Costs of Constructing Unbuilt Works
$ [redacted] any one Occurrence

Deductible: $ [redacted] each and every Occurrence

Yours faithfully,

[redacted]

[redacted]
Principal

EXHIBIT E – CONTRACT SPECIFIC REQUIREMENTS

Appendix A – Site Plans

Appendix B – Constraints and Requirements on Particular Worksites

Appendix C – Possessions Programme

Included on the attached CD titled "MEDIUM WORKS CONTRACT – DESIGN AND CONSTRUCTION CONTRACT, NUMBER: ISD-18-7801, POWER SUPPLY UPGRADE PROGRAM, DESIGN & CONSTRUCTION OF CHALMERS STREET SUBSTATION AND GRANVILLE JUNCTION SUBSTATION, ELECTRONIC FILES."

Exhibit E – Contract Specific Requirements

Power Supply Upgrade Program

Design & Construction of Chalmers Street Substation

TPD-14-4150

Document Number: 4561794_1

Contents

Appendices

1 Definitions and Terms

Unless stated otherwise, terms within this Contract Specific Requirements have the same meaning as those defined within the General Conditions.

In addition, the following definitions apply:

"Area" means the areas within the Worksites are as indicated on the Drawings.

"Control" of an Area or Worksite means undertaking all the activities required to manage all access to and across the Area or Worksite, and maintaining the temporary infrastructure required for the Area or Worksite provided by the Contractor or any Rail Transport Agency. Such activities will include managing and maintaining the security of the Area or Worksite, conducting familiarisation and safety inductions to, and for all those accessing, the Area or Worksite (but not inductions specific to Other Contractors' activities), operating and maintaining the wheel wash and other facilities involved, managing parking areas and liaising with Authorities in relation to the temporary infrastructure for which the Contractor in Control is responsible.

"Drawings" means the drawings included in Appendix A to this Contract Specific Requirements.

"Establish" an Area or a Worksite means providing all the temporary infrastructure required by the Contractor for its use of the part of the Site involved, including obtaining all Authority Approvals, survey for and construction of all perimeter fences, clearing vegetation, and providing all temporary Services, construction roads, signage, traffic management, car wash bays, drainage, perimeter security management, environmental management measures, pedestrian access, road changes off the Site to provide access, hard stand areas, wheel wash facilities and other facilities required for the Worksite, with all the Contractor's establishment such as offices and amenities (including those for the Principal where required). Other Contractors are responsible for providing their own establishment, including offices and amenities, and to adjust and augment (and maintain such augmentations to) any of the temporary infrastructure to suit their activities.

"Reinstate" an Area or Worksite means restoring the Area or Worksite to a condition not less than that existing immediately prior to the Contractor obtaining access to the Area or Worksite (except for flora growth and improved surfaces that grow), in compliance with conditions of the Planning Approval and any additional conditions required by relevant Authorities, but excluding any change to temporary infrastructure required for use of the Area or Worksite after the reinstatement.

"Rehabilitate" an Area or Worksite means "Reinstating" the Area or Worksite, as well as landscaping, rehabilitating and enhancing the natural environment of the Worksite (as required under this Contract), and removing all temporary infrastructure including fencing from the Area or Worksite.

"Worksites" means the worksites listed in the table in Appendix B to this Contract Specific Requirements.

2 Site

2.1 Description of the Site

The Site consists of the Worksites listed in the table in Appendix B to this Contract Specific Requirements. The Contractor must comply with the Worksite constraints and requirements listed in Appendix B to this Contract Specific Requirements.

Relevant photos of Worksites are provided in Schedule 9 – Information Documents and Materials for the Contractor’s information.

The proposed Chalmers Street Substation is located in the Prince Alfred (PA) Sidings site, adjacent to the existing Prince Alfred Substation. The new substation is proposed to be a three (3) x 5MW rectifier 33kV substation with twenty-seven (27) DC circuit breakers.

The area where the Chalmers Street substation will be constructed is next to an active Sydney Trains CBD maintenance depot. The Contractor will be required to closely coordinate construction works with neighbouring operations including Sydney Trains CBD maintenance depot and Sydney Light Rail. Refer to Appendix A for the site plan.

2.2 Setting-Out and Survey

2.2.1 General

The Contractor must:

(a) check and verify all dimensions and levels on the Site and the location of existing Services on and within the Site;

(b) set out and survey in accordance with the MGA coordinate system;

(c) verify positions of grids and levels from survey marks;

(d) verify and confirm its acceptance of the cadastral survey and all property boundaries provided by the Principal's Representative;

(e) set out the Works using permanent survey marks for the sole purpose of the Works. The permanent survey marks must be coordinated with the cadastral survey;

(f) preserve and maintain in their true position all survey marks;

(g) give the Principal's Representative at least two (2) Business Days notice of the Contractor's intention to perform any part of the setting out or levelling, so that suitable arrangements can be made for review of such work by the Principal's Representative; and

(h) provide adequate recovery pegs in suitable locations within or adjacent to the Site.

2.3 Site Compound

The Contractor's site compound must be located within Worksite 1 as described in the Drawings.

The contractor shall note that use of the entry driveway is limited by the requirement to provide unrestricted, coordinated vehicular access into the Sydney Trains CDB maintenance depot, Prince Alfred Substation and the Compressor House at all times.

The Contractor must:

(a) submit a 100% design for the site compound and fence to the Principal's Representative for approval two weeks prior to the planned commencement of the site compound and fence or otherwise as agreed with the Principal's Representative;

(b) notify the Principal's Representative that it proposes to use the area at least one week prior to the planned commencement of construction of the site compound and fence or otherwise as agreed with the Principal's Representative; and

(c) prior to Completion, Reinstate the Site to its original or improved condition and remove all temporary site access roads.

2.4 Facilities for use by the Principal

Not used

2.5 Site Access and Controls

The Contractor must ensure that access to all Worksites is restricted to authorised personnel and registered visitors.

For all Worksites, site access controls must include:

(a) a secure perimeter to any part of the Site where hazards exist;

(b) minimisation of access points;

(c) control of all access points with gates kept closed during working hours and locked when the Site is unoccupied;

(d) a notice at the main gate of the site compound stating the name and the 24 hour contact number of the person who has custody of the keys to access the site compound; and

(e) clear and prominently positioned directional, information and safety signage in regard to visitors, site safety, emergency egress and assembly points, the wearing of personal protective equipment, emergency contact numbers and Site conduct in general.

(f) Provision of operational and maintenance access at all times to Sydney Trains staff both in Prince Alfred and Chalmers St substations.

2.5.1 Worksite 1 – Chalmers Street Substation

Site access at the Chalmers Street Substation site is restricted to the following:

(a) During construction, Worksite 1 shall normally be accessed via the entrance between Central Station and the Railway Institute building:

  (i) The Contractor shall protect the heritage walls of the Railway Institute building

  (ii) The Contractor shall have a traffic management plan in place to protect any passengers and members of the public at the entrance.

(b) The Contractor shall obtain approval of access from relevant stakeholders and coordinate access prior to the beginning of construction. The Contractor's construction methodology shall be such that disruptions to Sydney Trains CDB maintenance Depot and maintenance access to Prince Alfred substation are kept to a minimum

(c) As Worksite 1 is located next to an active Sydney Trains maintenance depot and substation, a portion of the layover area shall be delineated as a construction zone in the early stages of construction to permit installation of support structures for the new substation (e.g. piling) and vehicle entry arrangements. Hoardings and appropriate vehicle barriers shall be erected to separate the works from the maintenance depot access road, and to enable construction works on the southern side of the building.

  (i) The hoarding shall remain until all the external construction works on the southern side have been completed including barriers to protect new pavement works, line markings and signage to the layover area.

  (ii) Hoardings and support structures for elevated site sheds shall comply with WorkCover Code of Practice Overhead Protective Structures 1995.

(iii) Rehabilitate any fixing penetrations to pavements or other surfaces following removal of the hoarding.

(d) The Contractor shall coordinate all equipment and material deliveries with Sydney Trains CDB maintenance depot and Sydney Light Rail.

(e) Worksite 1 shall be enclosed in Principal supplied branded mesh and the Contractor is required to consult with the Principal's Representative to ensure the Principal's signage requirements are met. The Contractor shall be responsible for the following as a minimum:

(i) Advise the Principal the total length of branded mesh required for sufficient coverage of site perimeter(s)

(ii) Install Principal supplied branded signage to construction fencing, hoardings or access gates as directed

(iii) Ensure all branded signage is in good condition and free of damage such as graffiti or structural damage (rips/tears etc) and where such damage is discovered, advise the Principal's Representative immediately so that replacement signage can be arranged

2.5.2 Worksite 2 – Prince Alfred Substation

Site access at the Prince Alfred Substation site is restricted to the following:

(a) As Worksite 2 is an operational substation, the work must be done in such a way as to ensure that Prince Alfred substation remains operational during the construction of Chalmers street substation.

(b) The Contractor's construction methodology shall be such that disruptions to Sydney Trains maintenance staff are kept to a minimum. The contractor is to obtain approval and coordinate with Sydney Trains prior to the beginning of construction activities in Worksite 2.

(c) The Contractor must ensure that work in the substation is to be done according to Electrical Network and Safety rules

All activities and works that require interface with the operational network and Authorised Person(s) from Sydney Trains, the Contractor shall complete the following:

(i) Obtain authorisation from Sydney Trains for its own testing and commissioning resources (Option 1); or

(ii) Liaise with the Principal for booking authorised Sydney Trains resources to perform the testing and commissioning works (Option 2).

The Contractor shall only proceed to Option 2 once evidence has been provided to the Principal justifying that Option 1 was not achieved and the evidence has been accepted by the Principal. Evidence can be in the form of stakeholder engagement minutes of meeting(s), email correspondence with Sydney Trains and preparation of competency assessments.

Should the Principal allow the Contractor to proceed to Option 2, the Contractor shall notify the Principal fourteen-(14) weeks in advance of the scheduled activity or work date the request for Sydney Trains authorised resources.

The Principal shall make the request to Sydney Trains on behalf of the Contractor and shall free issue the requested resource to the Contractor.

In the event that required resources with authorised certification are not available from Sydney Trains (or any other resource) within the required timeframe for activities such as design, construction, testing and commissioning, the Contractor shall work in a collaboratively manner with the Principal to develop a new activity schedule & deliverable timeframe for each activity concerned. The Contractor shall not be entitled to any cost and/or program claim in this event. This also applies to section 7 of the works brief.

Work on and around the TfNSW electrical distribution network and 1500V traction network is governed by RailCorp Electrical Network Safety Rules available on the RailSafe website www.railsafe.org.au.

(d) The Contractor shall coordinate all equipment and material deliveries with Sydney Trains CDB maintenance depot and Sydney Light Rail.

2.5.3 All Other Sites

Not Used

2.5.4 Operational Access

Once any part of the substation is operational the Contractor must ensure that work in the substation is to be done according to Electrical Network and Safety rules

All activities and works that require interface with the operational network and Authorised Person(s) from Sydney Trains, the Contractor shall complete the following:

(i) Obtain authorisation from Sydney Trains for its own testing and commissioning resources (Option 1); or

(ii) Liaise with the Principal for booking authorised Sydney Trains resources to perform the testing and commissioning works (Option 2).

The Contractor shall only proceed to Option 2 once evidence has been provided to the Principal justifying that Option 1 was not achieved and the evidence has been accepted by the Principal. Evidence can be in the form of stakeholder engagement minutes of meeting(s), email correspondence with Sydney Trains and preparation of competency assessments.

Should the Principal allow the Contractor to proceed to Option 2, the Contractor shall notify the Principal fourteen-(14) weeks in advance of the scheduled activity or work date the request for Sydney Trains authorised resources.

The Principal shall make the request to Sydney Trains on behalf of the Contractor and shall free issue the requested resource to the Contractor.

In the event that required resources with authorised certification are not available from Sydney Trains (or any other resource) within the required timeframe for activities such as design, construction, testing and commissioning, the Contractor shall work in a collaboratively manner with the Principal to develop a new activity schedule & deliverable timeframe for each activity concerned. The Contractor shall not be entitled to any cost and/or program claim in this event.

2.6 Existing Public Thoroughfares and Rights of Way

The Contractor must provide unimpeded and uninterrupted access twenty four hours a day, seven days a week:

(a) for existing formalised pedestrian access to any adjoining railway station;

(b) for adjoining and nearby property owners, occupiers and users to areas adjacent to and outside the Site;

(c) to Rail Transport Agencies and other contractors requiring access to the Rail Corridor through any access gate; The contractor is to note that during track possessions this area becomes very congested and encounters a significant volume of traffic as it the main track access point. The contractor will need to manage their works around the required access at these times.

(d) for emergency services;

2.7 Existing Property Condition

The Contractor, when preparing Condition Surveys required under clause 3.12 of the General Conditions, must comply with the following requirements.

Prior to commencing any work which may cause damage, the Contractor must make an inspection and produce a comprehensive written and photographic record of the condition of all property (including assets and services below ground level) on and adjacent to the Site and in the sphere of influence of the Contractor's Activities, including all premises, buildings, structures, utilities, and railway system assets (including all property of any Rail Transport Agency) ('Condition Survey'). The Condition Survey must describe and identify the property, its location and its existing condition, prior to the commencement of the Contractor's Activities and document the activities most likely to cause damage and the monitoring frequency proposed by the Contractor.

All areas that show evidence of existing damage or failure must be photographed and carefully recorded, including the location and extent of the damage and the date when the photograph was taken.

The results of the Condition Survey must be embodied in a written report and submitted to the Principal's Representative prior to commencing the Contractor's Activities.

The condition of the property covered by the Condition Survey must be regularly monitored during the carrying out of the Contractor's Activities and the Condition Survey augmented to address any change to the conditions observed.

The Contractor must notify the Principal's Representative immediately of any damage to property caused by the Contractor's Activities whether the property was part of the Condition Survey or not and submit to the Principal's Representative details on the rectification measures the Contractor proposes to undertake.

Within one month of Completion, the Contractor must:

(a) survey, review and record the current condition of each property included in the previous Condition Survey and confirm:

  (i) the condition of the property relative to that recorded previously; and

  (ii) that any damage caused by the Contractor's Activities has been repaired;

(b) obtain the Principal's Representative's agreement that the Contractor's record represents the true condition of their property; and

(c) provide a copy of the record to the Principal's Representative within 14 days of the completion of the survey of the property.

2.8 Site Parking

The Contractor must make its own off site arrangements for parking facilities.

The Contractor is responsible for the provision of parking for essential construction vehicles only and to ensure there is minimal impact to the surrounding Sydney Trains parking during the Contractor's Activities.

Contractor traffic is limited on site to the construction zone for offloading and loading of delivery vehicles.

2.9 Unloading Zones

Not Used

2.10 Existing Services

The information available on the location of existing Services including utilities and/or structures is approximate only and in some cases may be inaccurate or incomplete. Without limiting clause 3.6 of the General Conditions, the Principal accepts no responsibility for and does not guarantee or make any representation as to the accuracy, adequacy, suitability or completeness of the information.

The Contractor must make such further enquiries and investigations, including carrying out any Services searches, as are required to ensure existing Services including utilities and/or structures remain undamaged.

The existence of underground Services may not be shown on the drawings listed in the Contract, or may be in location or elevations different from those shown on the drawings listed in the Contract. The Contractor must ascertain the exact location of each underground Service prior to doing any work that may damage any such Service.

Any damage to the existing Services including utilities and/or structures must be repaired at the Contractor's cost either by the Contractor to the satisfaction of the Authority concerned, or if the relevant Authority so elects, repairs will be effected by the relevant Authority.

The cost of making further enquiries and investigation to ensure the existing Services including utilities and/or structures remain undamaged and the protection and maintenance of existing Services including utilities and/or structures is included in the Original Contract Price.

Where the Contractor's method of working results in additional adjustments to any existing Services being deemed necessary by any Authority having statutory rights in relation to the Service, the Contractor must arrange for and bear all costs in relation to those additional adjustments, notwithstanding that the Principal's Representative may have approved the method of working.

The Contractor is to test, validate and undertake its own assessment of existing Services terminations prior to the commencement of the works in accordance with the WHS Legislation.

The Contractor must deal with any related existing Services encountered, obstructed, or damaged in the course of performing the Contractor's Activities, as follows:

(a) if the Service is to be continued: repair, divert, relocate as required; and

(b) if the Service is to be abandoned: cut and seal or disconnect, and make safe and/or remove in accordance with the requirements of the Principal's Representative and the relevant Authorities.

The Contractor must liaise with the appropriate Authorities and resolve all issues with respect to existing Services in accordance with the Contract and the requirements of any relevant Authorities.

2.11 Site Storage

The Contractor is responsible for the care of the Contractor's Activities including providing safe and proper storage of all Construction Plant and on-Site materials used for or in carrying out the Contractor's Activities.

The Contractor is responsible for the provision of any security enclosures that may be required around or within storage areas. All proper precautions must be taken by the Contractor to keep all poisons and other injurious substances in places secured against access by unauthorised persons.

All Construction Plant and materials on the Site must be stored in accordance with statutory requirements and in such a manner as to prevent mechanical and climatic damage. Storage areas must be kept in a neat and tidy manner to minimise hazards to persons, materials and equipment.

2.12 Rectification of Roads and Footpaths

The Contractor must rectify any and all damage to all roads and footpaths affected by the Contractor's Activities in a timely manner.

2.13 Cleaning and Protection of Work

Whilst undertaking the Contractor's Activities the Contractor must clean and protect the Works, the Temporary Works and the Site. The Site must be in a clean and tidy state at all times (including free from graffiti).

The Contractor must entirely at its own cost remove daily from the Site all materials removed during the course of construction, unless the Principal's Representative indicates that some of these are to be retained by the Principal.

The Contractor must entirely at its own cost, remove from the Site at regular intervals but not less than weekly, refuse (including food scraps) resulting from the Contractor's Activities including any work performed during the Defects Rectification Period. The Contractor must handle refuse in a manner so as to confine the materials completely and prevent dust and odour emissions.

No fires or burning off are permitted on the Site

The Contractor must properly dispose of solid, liquid and gaseous contaminants in accordance with the Law.

The Contractor must protect newly installed Works to ensure no damage or deterioration occurs. The Contractor must also clean and perform maintenance on newly installed Works as frequently as necessary in accordance with the manufacturers' and other relevant cleaning, protection and maintenance requirements until Completion.

The Contractor must remove protection when directed by the Principal's Representative. The Contractor must clean and make good, re-work or re-build any Works soiled, marred or damaged.

2.14 Final Cleaning

The Contractor must provide final cleaning of the Works when directed by the Principal's Representative, or in the absence of such direction immediately prior to Completion. This must consist of cleaning each surface of unit of work to a clean condition expected from a first class building cleaning and maintenance program.

The Contractor must comply with the manufacturer's instructions for cleaning operations.

The necessary cleaning work includes, but is not limited to, the following:

(a) removal of labels that are not required as permanent labels;

(b) cleaning of exposed exterior and interior hard surfaced finishes to be free from dirt, fingermarks, films and any foreign substances and marks;

(c) except as otherwise indicated by the Works Brief or as directed by the Principal's Representative, avoid disturbance of natural weathering of exterior surfaces;

(d) restore reflective surfaces to original and new reflective condition;

(e) wiping the surface of mechanical and electrical equipment clean, including lift equipment and similar equipment and remove excess lubrication and other substances;

(f) removal of debris and surface dust from limited access spaces, paying particular attention to concealed spaces such as plumbing ducts, shafts, pits, cupboards and false ceiling spaces;

(g) vacuum cleaning of floors, including concrete floors, in areas intended to be occupied;

(h) thorough sweeping, cleaning and where required vacuuming, of all floors to ensure a clean and dust free surface;

(i) cleaning light fixtures and lamps so as to function with full efficiency (re-lamp non functioning lamps); and

(j) cleaning signage.

The Contractor must employ experienced workers or professional cleaners for final cleaning operations.

2.15 Properties Adjacent to the Site

The Contractor must prevent nuisance to the owners, tenants or occupiers of properties adjacent to or within the Site, and to the public generally, and must take all steps necessary to maintain clear unobstructed access to buildings still under occupation and neighbouring buildings.

The Contractor must execute the Contractor's Activities in a manner so as to avoid pollution or Contamination of the Site and its surroundings (including not causing any inconvenience to adjoining properties).

2.16 Site Meetings

The Contractor, and appropriate Subcontractors and as required by the Principal's Representative must attend weekly site progress and co-ordination meetings. The meetings will be chaired and minuted by the Principal's Representative or its representative. The location of the progress meetings will be within the Contractor's site offices, unless instructed otherwise by the Principal's Representative.

The site progress meetings and coordination meetings referred to in the paragraph above will be held weekly as a minimum requirement unless otherwise approved by the Principal's Representative and the Contractor must allow for any additional meetings and discussions which are necessary to fully inform the Principal's Representative of the progress of the Contractor's Activities.

The Contractor must, at the first site meeting, submit the names and telephone numbers of all responsible persons who may need to be contacted after hours during the course of the Contractor's Activities.

3 Materials and Workmanship

3.1 Means, Methods, Techniques, Sequences and Procedures

3.1.1 Information

When proposing an alternative work method, technique, sequence of activities or procedures for approval by the Principal's Representative, the Contractor must provide at its cost all available technical information, and any other relevant information requested by the Principal's Representative. If requested by the Principal's Representative, the Contractor must at its cost obtain and submit reports on relevant tests by an independent testing authority with respect to such work method, technique, sequence of activities or procedures.

3.1.2 Alterations

The information provided to the Principal's Representative by the Contractor pursuant to clause 3.1.1 of this Contract Specific Requirements must include whether the use of the alternative will require alteration to any other part of the Contractor's Activities. If the alternative is approved by the Principal's Representative and adopted, the Contractor must carry out any such alteration at its cost.

3.2 Proprietary Items

3.2.1 Definition

A proprietary item is any item identified by graphic representation in the drawings or specifications listed in the Contract, or by naming one or more of the following: manufacturer, supplier, installer, trade name, brand name, catalogue or reference number, and the like.

3.2.2 Implication

The identification of a proprietary item must not necessarily imply exclusive preference for the item so identified, but must be deemed to indicate the required properties of the item. Where the proprietary item is not obtainable, the Contractor may propose an alternative provided it is equal to or better than the original item. The Principal's Representative must not unreasonably withhold approval or reject any proposed alternative provided that any obligations under a sales contract are not compromised.

3.2.3 Claims

The Contractor will not be entitled to make any claim arising out of or in connection with any rejection or adoption of an alternative, unless otherwise agreed.

3.2.4 Information

When proposing an alternative for approval by the Principal's Representative, the Contractor must provide at its cost all available technical information, and any other relevant information requested by the Principal's Representative. If requested by the Principal's Representative, the Contractor must obtain and submit reports on relevant tests by an independent testing authority at its cost.

3.2.5 Alterations

The information provided to the Principal's Representative by the Contractor pursuant to clause 3.2.4 of this Contract Specific Requirements must include whether the use of the alternative will require alteration to any other part of the Contractor's Activities. If the alternative is approved by the Principal's Representative and adopted, the Contractor must carry out any such alteration at its cost.

4 Construction and Operational Staging

4.1 Staging of the Works

The Contractor is to produce a detailed staging proposal for the Works; this must take into consideration the Works undertaken by the Interface Contractor's and have specific staging detail for each track possession and power outage. The staging of the Works must be clearly shown in the Contractor's program. Additionally, the Contractor must supply marked-up drawings detailing the proposed stages, including start and finish dates for each stage of the Works; these must include areas required for storage and/or welfare. The Contractor's staging proposal shall be submitted to the Principal for review 30 Business Days prior to commencement of site mobilisation.

The Contractor's staging proposal must consider access/egress requirements of Sydney Trains, Interface contractors and neighbouring operations.

4.2 Staging Plans

For Works within the rail corridor, the Contractor must provide Staging Plans for all work activities proposed to be conducted. This includes identifying the work activities to be completed.

The coloured Staging Plan should illustrate as a minimum, the following:

(a) Location of major plant and equipment (i.e. cranes, day makers, concrete pump/ trucks etc) for each stage (including swing/reach limit/distances of each plant and equipment);

(b) Sydney Trains Infrastructure i.e. OHW and associated structures, signals etc;

(c) Location of spotters, protection officers etc;

(d) Access / egress and access control point to the rail corridor; and

(e) Brief / high-level overview of the Works for each staging plan.

Where the Contractor proposes to utilise a track possession, refer to Section 5.2, separate staging plans must be produced for each possession.

5 Track Possessions

5.1 General

The Contractor may utilise Track Possession(s) to undertake the Works that involve activities within the rail corridor, in accordance with Exhibit A – TSR P - Project Administration

5.2 Track Possessions Available

The Track Possession(s) available to the Contractor are detailed in the latest possession calendars. It is the responsibility of the contractor to monitor any changes to the planned possessions and adjust their programmes to meet the project objectives.

The Contractor's program must nominate applicable Track Possessions.

The Contractor shall note that track possession and power isolation of particular tracks within Sydney Yard is by arrangement and agreement with Sydney Trains. Any additional power isolations must be negotiated with Sydney Trains with sufficient notice (16 weeks minimum).

The Contractor shall be required to provide accredited HV switching resources to assist Sydney Trains to achieve power isolation of the entire Sydney Yard.

The Contractor shall note that track possession of all 15 tracks in Sydney Yard is not possible. While it is possible to achieve power isolation of overhead wiring for all tracks, diesel trains may continue to utilise the tracks in config 1, 2, 8 and 15 during track possessions. The Contractor's Activities, particularly during commissioning, will need to be carried out with sufficient planning, resourcing and coordination with Sydney Trains operations.

The provided Track Possession(s) dates may be amended or cancelled by Sydney Trains; it is at the Contractor's discretion to request for Possession Calendar updates from the Principal when required.

The Configuration No. 1, 2, 8 and 15 Track Possessions generally commence at 0200 hours Saturday and cease 0200 hours Monday. It should be noted that approximately 5hrs is required at the start and finish of each Track Possession to arrange safe working and power isolations/restorations. The Contractor must take this into account when determining programs for Track Possessions.

The Principal will pay for the bussing costs associated with Config 1, 2, 8 and 15 Possessions. Additional Track Possessions may be available but these would be subject to agreement from Sydney Trains and the Contractor would be responsible for all associated costs.

5.3 Co-ordination with Existing Railway Operations

The Contractor's Works that affect normal rail operations must be programmed during track or weekend possessions. The Contractor must notify the Principal's Representative at least 16 weeks in advance of any proposal from the Contractor that involves alteration to normal train and station operations.

The Contractor must provide all required temporary facilities to maintain the continuous and safe operation of train lines affected by the Contractor's Activities. Where Track Possessions are available and utilised by the Contractor, the Contractor will be responsible for managing, setting up (including provision of all required accredited staff) and maintaining safe means of working. This must include provision of track inspectors to certify that no damage has been caused to train running infrastructure.

Appendix A – Site Plan

Appendix B – Constraints and Requirements on Particular Worksites

Appendix B - Constraints and Requirements on Particular Worksites

WORKSITE	DRAWING NO.	ACCESS FOR/CONTROL BY CONTRACTOR			NEW ACCESS STATUS	REQUIREMENTS
		TYPE	WHEN PROVIDED	WHEN STATUS CHANGED		
Worksite 1 Chalmers St Substation	Worksite Plan	Control by	Contractor to arrange	Within 1 week of completion of relevant works	Area to be handed back to the Principal	Control of worksite by the Contractor. Contractor to Establish, complete substation associated works and maintain. Contractor to carry out works in accordance with Australian Network Rules and Procedures and Electrical Network Safety Rules Contractor to arrange required track possessions and power outages Contractor to coordinate access arrangements into Worksite 1 with adjoining neighbouring operations and ensure disruption to neighbours are minimised
Worksite 2 Prince Alfred Substation	Worksite Plan	Access For	Contractor to arrange	Within 1 week of completion of relevant works	Area to be handed back to Sydney Trains	Contractor will be appointed Principal Contractor for the Worksite, unless otherwise agreed with Sydney Trains Contractor to carry out works in accordance with Australian Network Rules and Procedures and Electrical Network Safety Rules Contractor to seek access approval and authorisations from Sydney Trains. Contractor to coordinate with and gain approval of work site access from Sydney Trains to ensure minimum disruption Contractor to Establish, Reinstate and Rehabilitate as per Contract requirements

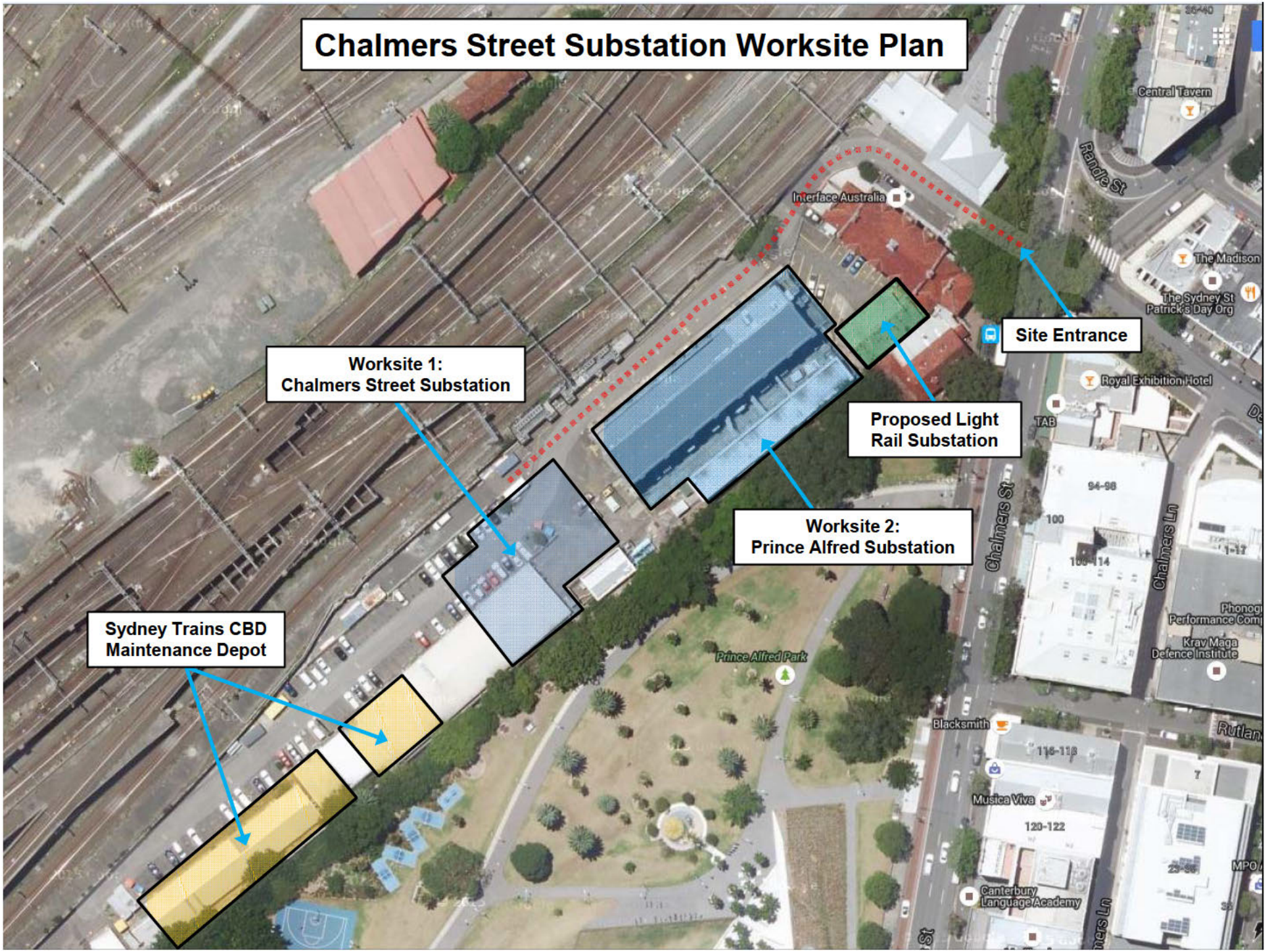
Chalmers Street Substation Worksite Plan
Worksite 1:
Chalmers Street Substation
Worksite 2:
Prince Alfred Substation
Proposed Light
Rail Substation
Site Entrance
Sydney Trains CBD
Maintenance Depot
Central Tavern
Randle St
Interface Australia
The Madison
The Sydney St
Patrick's Day Org
Royal Exhibition Hotel
TAB
Chalmers St
Chalmers Ln
94-98
100
104-114
1-17
Phonogr
Performance Comp
Kray Maga
Defence Institute
Prince Alfred Park
Blacksmith
116-118
Musica Viva
120-122
Canterbury
Language Academy
MPO

EXHIBIT H – PRELIMINARY DESIGN

Included on the attached CD

ITEM	DESCRIPTION / DRAWING TITLE	TYPE	AUTHOR / SOURCE	DATE / REVISION	REFERENCE NO. / DWG NO.
1.2	**Principal's Design Drawings**				**Folder**
1.2.1	Chalmers Street Substation - Reference Design Report - Appendix B - Drawings			67 Drawings	One PDF File
1.2.1.1	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Location Plan and Drawing Schedule		GHD	G	2656-2650-CSSS-AR-0001
1.2.1.2	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Site	Plan	GHD	F	2656-2650-CSSS-AR-0002
1.2.1.3	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Basement Floor	Plan	GHD	F	2656-2650-CSSS-AR-0003
1.2.1.4	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Ground Floor	Plan	GHD	F	2656-2650-CSSS-AR-0004
1.2.1.5	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Level 1 Floor	Plan	GHD	G	2656-2650-CSSS-AR-0005
1.2.1.6	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Roof	Plan	GHD	F	2656-2650-CSSS-AR-0006
1.2.1.7	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. North West	Elevation	GHD	G	2656-2650-CSSS-AR-0010
1.2.1.8	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. South West	Elevation	GHD	G	2656-2650-CSSS-AR-0011
1.2.1.9	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. North East	Elevation	GHD	E	2656-2650-CSSS-AR-0012
1.2.1.10	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. South East	Elevation	GHD	E	2656-2650-CSSS-AR-0013
1.2.1.11	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Sections		GHD	F	2656-2650-CSSS-AR-0015
1.2.1.12	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Perspectives		GHD	F	2656-2650-CSSS-AR-0020
1.2.1.13	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. PA Substation Cable Tunnel	Floor Plan & Section	GHD	F	2656-2650-CSSS-AR-0030
1.2.1.14	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. ESR 1500V Link Room and Environs	Floor Plan, Elevations & Section	GHD	F	2656-2650-CSSS-AR-0031
1.2.1.15	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. ESR 1500V Link Room Sections	Sections	GHD	D	2656-2650-CSSS-AR-0032
1.2.1.16	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. ESR 1500V Link Room and Environs - PA SS Cable Shaft	Arrangements & Sections	GHD	D	2656-2650-CSSS-AR-0033
1.2.1.17	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. General Arrangement and Vehicle Turning Path	Plan	GHD	D	2656-2650-CSSS-CI-0101
1.2.1.18	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Stormwater Drainage	Plan	GHD	D	2656-2650-CSSS-CI-0102
1.2.1.19	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade ESR 1500V Link Room Existing Services	Plan	GHD	D	2656-2650-CSSS-CI-0110
1.2.1.20	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Substation Communications - Sheet 1 of 3	Block Diagram	GHD	E	2656-2650-CSSS-CO-0503

ITEM	DESCRIPTION / DRAWING TITLE	TYPE	AUTHOR / SOURCE	DATE / REVISION	REFERENCE NO. / DWG NO.
1.2.1.21	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Substation Communications - Sheet 2 of 3	Block Diagram	GHD	E	2656-2650-CSSS-CO-0504
1.2.1.22	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Substation Communications - Sheet 3 of 3	Block Diagram	GHD	E	2656-2650-CSSS-CO-0505
1.2.1.23	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Substation Security Systems	Block Diagram	GHD	D	2656-2650-CSSS-CO-0507
1.2.1.24	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Basement and Ground - Lighting and Power	Plan	GHD	E	2656-2650-CSSS-EL-0402
1.2.1.25	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Level 1 - Lighting and Power	Plan	GHD	F	2656-2650-CSSS-EL-0403
1.2.1.26	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. 125V DC Distribution Board No. 1 and No. 2	Schematic Diagram	GHD	E	2656-2650-CSSS-EL-0404
1.2.1.27	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Auxiliary Supplies Change Over Panel	Schematic Diagram	GHD	D	2656-2650-CSSS-EL-0406
1.2.1.28	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Main Switchboard	Schematic Diagram	GHD	D	2656-2650-CSSS-EL-0407
1.2.1.29	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade PA Cable Tunnels and ESR 1500V Link Room	Lighting Layout	GHD	E	2656-2650-CSSS-EL-0410
1.2.1.30	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Fire Detection and Alarm System	Legend & General Notes	GHD	D	2656-2650-CSSS-FP-0800
1.2.1.31	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Fire Detection and Alarm System	Block Diagram	GHD	E	2656-2650-CSSS-FP-0805
1.2.1.32	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Hydraulic Services	Concept Plan	GHD	D	2656-2650-CSSS-PL-0700
1.2.1.33	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Roof Layout	Plan	GHD	D	2656-2650-CSSS-PL-0701
1.2.1.34	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Loadings Ground Floor	Plan	GHD	E	2656-2650-CSSS-ST-0205
1.2.1.35	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Loadings Level 1	Plan	GHD	G	2656-2650-CSSS-ST-0206
1.2.1.36	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Foundation / Pile Setout	Plan	GHD	E	2656-2650-CSSS-ST-0210
1.2.1.37	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Concrete Ground Floor	Plan	GHD	E	2656-2650-CSSS-ST-0211
1.2.1.38	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Concrete Level 1	Plan	GHD	G	2656-2650-CSSS-ST-0212
1.2.1.39	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Roof Framing	Plan	GHD	E	2656-2650-CSSS-ST-0230
1.2.1.40	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Harmonic Filter	Plan	GHD	E	2656-2650-CSSS-ST-0235

ITEM	DESCRIPTION / DRAWING TITLE	TYPE	AUTHOR / SOURCE	DATE / REVISION	REFERENCE NO. / DWG NO.
1.2.1.41	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade ESR 1500V Link Room and Environs	Floor Slab & Structural Sections	GHD	D	2656-2650-CSSS-ST-0240
1.2.1.42	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade ESR 1500V Link Room and Environs	Tunnel, Typical Sections, Breakthrough to ESR Shaft	GHD	D	2656-2650-CSSS-ST-0241
1.2.1.43	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Ground Floor Equipment Layout	Plan	GHD	F	2656-2650-CSSS-TR-0303
1.2.1.44	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Ground Floor Penetration Layout	Plan	GHD	E	2656-2650-CSSS-TR-0304
1.2.1.45	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Level 1 Equipment Layout	Plan	GHD	G	2656-2650-CSSS-TR-0305
1.2.1.46	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Level 1 Penetration Layout	Plan	GHD	G	2656-2650-CSSS-TR-0306
1.2.1.47	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Basement and Ground Fl HV Cable Ladder Route	Plan	GHD	F	2656-2650-CSSS-TR-0310
1.2.1.48	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. HV Cable Ladder Routes - Sheet 1 of 2	Sections	GHD	E	2656-2650-CSSS-TR-0311
1.2.1.49	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. HV Cable Ladder Routes - Sheet 2 of 2	Sections	GHD	D	2656-2650-CSSS-TR-0312
1.2.1.50	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. HV Cable Ladder Routes	Plan	GHD	E	2656-2650-CSSS-TR-0313
1.2.1.51	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. HV Feeder Routes - Sheet 1 of 3	Plan	GHD	F	2656-2650-CSSS-TR-0315
1.2.1.52	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. HV Feeder Routes - Sheet 2 of 3	Plan	GHD	D	2656-2650-CSSS-TR-0316
1.2.1.53	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. HV Feeder Routes - Sheet 3 of 3	Plan	GHD	D	2656-2650-CSSS-TR-0317
1.2.1.54	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Electrical Earthing - Sheet 1 of 2	Schematic	GHD	E	2656-2650-CSSS-TR-0320
1.2.1.55	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Electrical Earthing - Sheet 2 of 2	Schematic	GHD	E	2656-2650-CSSS-TR-0321
1.2.1.56	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. External Earthing	Layout	GHD	E	2656-2650-CSSS-TR-0322
1.2.1.57	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade ESR 1500V Link Room - Equipment Layout	Plan & Schedule	GHD	D	2656-2650-CSSS-TR-0340

ITEM	DESCRIPTION / DRAWING TITLE	TYPE	AUTHOR / SOURCE	DATE / REVISION	REFERENCE NO. / DWG NO.
1.2.1.58	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade ESR 1500V Link Room - HV Cable Route to ESR Shaft	Plan & Sections	GHD	E	2656-2650-CSSS-TR-0341
1.2.1.59	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade 1500V Outdoor Link Area - Cable Support - Sheet 1 of 3	Plan	GHD	E	2656-2650-CSSS-TR-0345
1.2.1.60	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade 1500V Outdoor Link Area - Cable Support - Sheet 2 of 3	Plan	GHD	E	2656-2650-CSSS-TR-0346
1.2.1.61	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade 1500V Outdoor Link Area - Cable Support - Sheet 3 of 3	Plan	GHD	E	2656-2650-CSSS-TR-0347
1.2.1.62	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade 1500V Outdoor Link Area - Cable Support - Sheet 1 of 2	Sections	GHD	E	2656-2650-CSSS-TR-0348
1.2.1.63	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade 1500V Outdoor Link Area - Cable Support - Sheet 2 of 2	Sections	GHD	E	2656-2650-CSSS-TR-0349
1.2.1.64	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Preliminary Cable Schedule		GHD	C	2656-2650-CSSS-TR-0318
1.2.1.65	Chalmers Street Airport Line 0.352km, Substations – Power Supply Upgrade. Preliminary SCADA I/O Schedule		GHD	A	2656-2650-CSSS-TR-0319
1.2.2	Chalmers Street Substation - Reference Design Report - Appendix B1 - Façade Documentation			16 Drawings	One PDF File
1.2.2.1	Chalmers Street Substation - Site Plan	Plan	TZG	2	SK-01
1.2.2.2	Chalmers Street Substation - Ground Floor Plan	Plan	TZG	2	SK-11
1.2.2.3	Chalmers Street Substation - Level 1 Plan	Plan	TZG	2	SK-12
1.2.2.4	Chalmers Street Substation - Elevation 1	Elevation	TZG	3	SK-21
1.2.2.5	Chalmers Street Substation - Elevation 2	Elevation	TZG	4	SK-22
1.2.2.6	Chalmers Street Substation - E/N North Elevation Overall	Elevation	TZG	2	SK-23
1.2.2.7	Chalmers Street Substation - Façade Plan Setout Detail - Ground Floor	Setout	TZG	1	SK-25
1.2.2.8	Chalmers Street Substation - Façade Details 1	Details	TZG	1	SK-27
1.2.2.9	Chalmers Street Substation - Façade Details 2	Details	TZG	3	SK-28
1.2.2.10	Chalmers Street Substation - Finishes Schedule	Schedule	TZG	1	SK-29
1.2.2.11	Chalmers Street Substation - 3D View 1	Views	TZG	2	SK-31
1.2.2.12	Chalmers Street Substation - 3D View 2	Views	TZG	2	SK-32
1.2.2.13	Chalmers Street Substation - 3D View 3	Views	TZG	2	SK-33
1.2.2.14	Chalmers Street Substation - 3D View 1- View from North	Views	TZG	2	SK-35

ITEM	DESCRIPTION / DRAWING TITLE	TYPE	AUTHOR / SOURCE	DATE / REVISION	REFERENCE NO. / DWG NO.
1.2.2.15	Chalmers Street Substation - 3D View 2- View from Rail Corridor	Views	TZG	1	SK-36
1.2.2.16	Chalmers Street Substation - 3D View 3 - View from Park	Views	TZG	1	SK-37
1.2.3	Chalmers Street Substation - Reference Design Report - Appendix B2 - Operating Diagrams			30 Drawings	One PDF File
1.2.3.1	Chalmers Street Illawarra Line AL 0+352 Chalmers Street Substation Project - PSU - Proposed 33kV Operating Diagram	Single Line Schematic	GHD	K	2656-2650-CSSS-TR-1001
1.2.3.2	Chalmers Street Illawarra Line AL 0+352 Chalmers Street Substation Project - PSU - Proposed 11kV Operating Diagram	Single Line Schematic	GHD	I	2656-2650-CSSS-TR-1003
1.2.3.3	Metropolitan Area Chalmers Street Substation Project - PSU Wynyard Station No.1 and No.2 Substation - Proposed HV & LV Operating Diagram		GHD	C	2656-2650-CSSS-TR-1063
1.2.3.4	Sydney Signal Box No. 1 & No. 2 Substation Chalmers Street Substation Project - PSU - Proposed HV & LV Operating Diagram	Diagram	GHD	C	2656-2650-CSSS-TR-1061
1.2.3.5	Metropolitan Area Chalmers Street Substation Project - PSU Sydney Transformer Room Substation - Proposed HV & LV Operating Diagram		GHD	C	2656-2650-CSSS-TR-1060
1.2.3.6	Metropolitan Area Chalmers Street Substation Project - PSU Redfern No.1 & No.2 Substation - Proposed HV & LV Operating Diagram		GHD	C	2656-2650-CSSS-TR-1058
1.2.3.7	Erskineville Substation Illawarra Line 2.726 km Chalmers Street Substation Project - PSU - Proposed HV Operating Diagram	Diagram	GHD	C	2656-2650-CSSS-TR-1056
1.2.3.8	Edgecliff Substation Eastern Subarban Line 4.451 km Chalmers Street Substation Project - PSU - Proposed HV Operating Diagram	Diagram	GHD	C	2656-2650-CSSS-TR-1055
1.2.3.9	Argyle Substation North Shore Line 2.937 km Chalmers Street Substation Project - PSU - Proposed HV Operating Diagram	Diagram	GHD	C	2656-2650-CSSS-TR-1052
1.2.3.10	Chalmers Street Substation to Meeks Road Substation Chalmers Street Substation Project - PSU - Proposed HV Reticulation Diagram	Diagram	GHD	B	2656-2650-CSSS-TR-1051
1.2.3.11	Chalmers Street Substation to St Leonards Substation Chalmers Street Substation Project - PSU - Proposed HV Reticulation Diagram	Diagram	GHD	B	2656-2650-CSSS-TR-1050
1.2.3.12	Inner Areas Chakmers Street SS Project - PSU Proposed Inner Areas 33 & 66kV System	Key Map	GHD	I	2656-2650-CSSS-TR-1005
1.2.3.13	Metropolitan Area Chalmers Street SS Project - PSU Proposed Inner Area 11kV System	Key Map	GHD	H	2656-2650-CSSS-TR-1004
1.2.3.14	1500V Sectioning Diagrams Chalmers Street Substation Project - PSU - Proposed Key Map	Diagram	GHD	C	2656-2650-CSSS-TR-1070
1.2.3.15	33kV Feeder Numerical Index Chalmers Street Substation Project - PSU - Proposed Sheet 1 of 2	Diagram	GHD	C	2656-2650-CSSS-TR-1065
1.2.3.16	Prince Alfred Siding Illawarra Line 0.267 Chalmers Street Substation Project - PSU - Proposed 11kV System Diagram	Single Line Schematic	GHD	F	2656-2650-CSSS-TR-1006
1.2.3.17	Metropolitan Area Chalmers Street Substation Project - PSU City Rail Proposed 11 kV System Diagram (Extract)		GHD	C	2656-2650-CSSS-TR-1067

ITEM	DESCRIPTION / DRAWING TITLE	TYPE	AUTHOR / SOURCE	DATE / REVISION	REFERENCE NO. / DWG NO.
1.2.3.18	Chalmers Street Substation to St Peters Chalmers Street Substation Project - PSU - Proposed 11 kV System Diagram (Extract)		GHD	C	2656-2650-CSSS-TR-1066
1.2.3.19	Eastern Suburbs Railway Chalmers Street Substation Project - PSU Chalmers Street Substation to Bondi Junction Substation Proposed 11kV System Diagram (Extract)		GHD	C	2656-2650-CSSS-TR-1068
1.2.3.20	Metropolitan Area Chalmers Street Substation Project - PSU Chalmers Street Substation to Lewisham Substation Proposed 11kV System Diagram (Extract)		GHD	C	2656-2650-CSSS-TR-1069
1.2.3.21	Argyle Substation North Shore Line 2.937 km Chalmers Street Substation Project - PSU - Proposed 1500V DC Operating Diagram	Diagram	GHD	C	2656-2650-CSSS-TR-1053
1.2.3.22	Art Gallery Substation Eastern Subsurban Line 2.689 km Chalmers Street Substation Project - PSU - Proposed 1500V DC Operating Diagram	Diagram	GHD	C	2656-2650-CSSS-TR-1054
1.2.3.23	Erskineville Substation Illawarra Line 2.726 km Chalmers Street Substation Project - PSU - Proposed 1500V DC Operating Diagram		GHD	C	2656-2650-CSSS-TR-1057
1.2.3.24	Undercliff Substation Airport Line 9.500 km Chalmers Street Substation Project - PSU - Proposed 1500V DC Operating Diagram	Diagram	GHD	C	2656-2650-CSSS-TR-1062
1.2.3.25	Newtown Substation Main West 3.706 km Chalmers Street Substation Project - PSU - Proposed 1500V DC Operating Diagram	Diagram	GHD	C	2656-2650-CSSS-TR-1064
1.2.3.26	Metropolitan Area Chalmers Street Substation Project - PSU - Prince Alfred Substation Proposed HV Operating Diagram		GHD	B	2656-2650-CSSS-TR-1074
1.2.3.27	2kV Signalling & Lighting Feeders Chalmers Street Substation Project - PSU - Proposed Central - Macdonaldtown - Erskineville Reticulation Diagram		GHD	B	2656-2650-CSSS-TR-1073
1.2.3.28	2kV Signalling & Lighting Feeders Chalmers Street Substation Project - PSU - Proposed Key Map	Diagram	GHD	B	2656-2650-CSSS-TR-1072
1.2.3.29	Metropolitan Area Chalmers Street Substation Project - PSU - Proposed Prince Alfred Compressor House and Prince Alfred Sidings Low Voltage Switch Hut		GHD	B	2656-2650-CSSS-TR-1071
1.2.3.30	Metropolitan Area Illawarra Line 0.267 km Chalmers Street Substation Project - PSU - Prince Alfred Complex Proposed LV Operating Diagram		GHD	B	2656-2650-CSSS-TR-1075

Page 301 redacted for the following reason:
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EXHIBIT I – THIRD PARTY AGREEMENTS

Draft Third Party Agreements:

(a) Power Supply Upgrade – Program Safety Interface Agreement

Included on the attached CD titled "MEDIUM WORKS CONTRACT – DESIGN AND CONSTRUCTION CONTRACT, NUMBER: ISD-18-7801, POWER SUPPLY UPGRADE PROGRAM, DESIGN & CONSTRUCTION OF CHALMERS STREET SUBSTATION AND GRANVILLE JUNCTION SUBSTATION, ELECTRONIC FILES."

Power Supply Upgrade

Program Safety Interface Agreement

Transport for NSW
ABN 18 804 239 602

Sydney Trains
ABN 38 284 779 682

CONTENTS

KEY DETAILS

1.	**Execution Date**	See Execution page
2.	**Parties**	
	TfNSW Name	Transport for NSW ABN 18 804 239 602
	Address	Level 5, Tower A, Zenith Centre, 821 Pacific Highway, Chatswood 2068
	Sydney Trains Name	Sydney Trains ABN 38 284 779 682
	Address	477 Pitt Street Sydney 2000
3.	**Project**	The Power Supply Upgrade Program is a program of works involving multiple projects required to upgrade the electrical network supplying the NSW Rail Network
4.	**Site**	NSW Rail Network
5.	**TfNSW Representative**	[insert representative]
6.	**Sydney Trains Representative**	[insert representative]

BACKGROUND

A The Rail Safety National Law requires Rail Transport Operators to:

(a) identify and assess, so far as is reasonably practicable, risks to safety that may arise from Railway Operations carried out by or on behalf of that Rail Transport Operator and that may be caused wholly or partly by Railway Operations carried out by or on behalf of any other Rail Transport Operator;

(b) manage such risks as far as reasonably practicable; and

(c) for the purposes of managing those risks, seek to enter into an Interface Agreement with the other Rail Transport Operator.

B This Agreement is an Interface Agreement for the purposes of the Rail Safety National Law.

C The parties are Rail Transport Operators who will satisfy the above requirements by applying their Safety Management Systems to manage risks in accordance with this Agreement.

TERMS

1 Interpretation

1.1 Definitions

The following words have the following meanings in this document, unless the context requires otherwise.

Business Day means a day other than a Saturday, Sunday or a public holiday as gazetted in NSW.

Contractors means any person engaged by a party to provide any works required by, or perform any obligation under, this Agreement including any further person engaged by such a person to carry out any such work or obligation.

Date of this Agreement means the date on which this Agreement has been executed by both parties.

Interface Agreement means an interface agreement required under section 106 of the Rail Safety National Law.

National Safety Regulator means the Office of the National Rail Safety Regulator established under Part 2 Division 1 of the Rail Safety National Law.

Personnel means officers, employees, agents, Contractors, and officers, employees and agents of Contractors.

Rail Safety National Law means the Rail Safety National Law (NSW) No 82a.

Rail Transport Operator has the meaning given to that term under the Rail Safety National Law.

Railway Operations has the meaning given to that term under the Rail Safety National Law.

Safety Management System means a person's safety management system which:

(a) complies with the Rail Safety National Law;

(b) has been accepted and approved by the National Safety Regulator for use by a person for Railway Operations for which that person holds rail safety accreditation under the Rail Safety National Law,

as amended from time to time.

1.2 Interpretation

The following apply in the interpretation of this document, unless the context requires otherwise.

(a) A reference to this Agreement, this deed, this document or a similar term means either the agreement set out in this document or the document itself, as the context requires.

(b) A reference to any statute, regulation, rule or similar instrument includes any consolidations, amendments or re-enactments of it, any replacements of it, and any regulation or other statutory instrument issued under it.

(c) A reference to the singular includes the plural number and vice versa.

(d) A reference to a gender includes a reference to each gender.

(e) A reference to a party means a person who is named as a party to this Agreement.

(f) **Person** includes a firm, corporation, body corporate, unincorporated association and a governmental authority.

(g) A reference to a party or a person includes that party's or person's executors, legal personal representatives, successors, liquidators, administrators, trustees in bankruptcy and similar officers and, where permitted under this Agreement, their substitutes and assigns.

(h) **Includes** means includes but without limitation.

(i) Where a word or expression has a defined meaning, its other grammatical forms have a corresponding meaning.

(j) A reference to doing something includes an omission, statement or undertaking (whether or not in writing) and includes executing a document.

(k) A reference to a clause, schedule or annexure is a reference to a clause of, or a schedule or an annexure to this Agreement.

(l) A heading is for reference only. It does not affect the meaning or interpretation of this Agreement.

1.3 Schedules

Any schedule attached to this Agreement forms part of it. If there is any inconsistency between any clause of this Agreement and any provision in any schedule, the clause of this Agreement prevails.

2 Term

(a) This Agreement commences on the Date of this Agreement and continues until it is terminated by a party under clause 2(b).

(b) A party may terminate this Agreement by providing the other party with no less than 6 months' written notice. If a party provides a notice under this clause 2(b) that it wishes to terminate this Agreement and Interface Agreements under the Rail Safety National Law are still required between the parties, the parties must negotiate in good faith to enter into a replacement agreement for this Agreement prior to the date on which the termination of this Agreement will take effect.

3 Risks arising from Railway Operations

3.1 Risk Register

Before the Commencement Date, the parties must compile the Risk Register with reference to the Interface risk categories listed in clause 1 of Schedule 1 by identifying:

(a) the Interface(s) that arise from this Agreement;

(b) the nature of the Railway Operations that arise from this Agreement and the risks to safety that may arise from those Railway Operations;

(c) each party's responsibility for the risk management strategies for each Interface arising from this Agreement including:

(i) the identified risks to safety, including risks associated with the fitness of rail safety workers;

(ii) risk assessments;

(iii) measures to manage safety risks;

(iv) the party responsible for implementation and maintenance of the safety risk management measures;

(v) where appropriate the timetable for implementation of safety risk management measures; and

(vi) the other details required to be completed in the Risk Register; and

(d) the timelines for carrying out the implementation of risk management strategies.

3.2 Works and risk management measures

(a) The party set out in the Risk Register under the heading 'Control Responsibility' must:

(i) implement and monitor the performance of each of the risk control measures allocated to it in the Risk Register; and

(ii) modify the operation of each of the risk control measures allocated to it in the Risk Register, whether or not in response to performance information, provided that any modification by one party must, to the extent it involves the other party, be agreed by the other party.

(b) Each party must participate in risk meetings which will involve:

(i) the joint review of safety risks and control measures contained in the Risk Register;

(ii) review of the safety risks and control measures contained in the Risk Register to ensure that they continue to provide effective safety controls of the Railway Operations on and around the interfaces;

(iii) the parties will consulting with each other in relation to the outcome of the review; and

(iv) the parties will work collaboratively and cooperatively to agree on more control measures to manage the safety risk so far as is reasonably practicable and will record any changes in the Risk Register.

(c) Reviews under clause 3.2(b) will take into consideration any incidents related to the Interfaces and any operational changes or changes made to the control measures.

3.3 Changes to an Interface

(a) The parties must consult with each other regarding any planned alteration to infrastructure, operations, or circumstances which may impact on safety risks arising from Railway Operations at an Interface.

(b) If a party becomes aware of:

(i) a risk that is not being managed to the extent reasonably practicable at an Interface;

(ii) a new safety risk at an Interface; or

(iii) a new Interface,

then:

(iv) that party must provide the other party with notice of that risk;

(v) the parties' Risk Representatives must work collaboratively and cooperatively to agree on control measures to manage that safety risk so far as reasonably practicable; and

(vi) amend the Risk Register to include those measures.

3.4 Notification and reporting of incidents and accidents

Each party must notify the other party's Representative, and the other relevant contacts listed in the table set out in clause 3 of Schedule 1, in accordance with the framework set out in clause 4 of Schedule 1 as soon as reasonably practicable after becoming aware of any safety incident or accident.

3.5 Register of interface agreements

Each party must record this Agreement in that party's register of interface agreements.

4 Interface co-ordination meetings

(a) The Responsible Officers or their delegates must attend the Interface Co-ordination Meetings on a fortnightly basis or at other times as agreed between the parties or as required under this agreement.

(b) The agenda for Interface Coordination meetings will initially include:

(i) report on Rail Safety Interfaces;

(ii) identification of any additional Rail Safety Interfaces;

(iii) notification of each party’s requirements for activities and work plans;

(iv) notification of each party’s progress of activities and work plans;

(v) notification of each party’s expectations and exclusions (i.e. what they are not doing, but are relying on others to do);

(vi) identification and assessment of Rail Safety Interface risks;

(vii) reviewing and monitoring of Rail Safety Interface risk controls and proposed changes to the operation of risk controls.

(viii) discussion of preventative and remedial actions required as a result of Safety Incidents and Notifiable Occurrences;

(ix) identification and management of service interruptions or revised access arrangements;

(x) identification and exchange of information and reports on ongoing audits and inspections;

(xi) status of resolution of disputes;

(xii) review and update of the contact list;

(xiii) review and update of the physical interfaces; and

(xiv) such other items as may be agreed between the parties from time to time.

(c) TfNSW must organise, schedule and minute the Interface Co-ordination Meetings. The minutes will be distributed (for acceptance or comment) within two working days.

5 Access

(a) If a party, or any of its Personnel, require access to the other party's infrastructure or land for the purposes of meeting its obligations under this Agreement, the party seeking access must:

(i) provide the other party with details of the access sought including the locations, times and Personnel; and

(ii) comply, and ensure that its Personnel comply, with all relevant instructions, obligations and safety plans as advised by the other party, and/or any that parties nominee.

(b) TfNSW must provide Sydney Trains with notice as soon as reasonably practicable if TfNSW may require a track possession to perform any of its obligations under this Agreement.

(c) Sydney Trains must provide TfNSW with notice as soon as reasonably practicable if Sydney Trains may require a track possession to perform any of its obligations under this Agreement and that track possession impacts upon any work being carried out by or on behalf of TfNSW.

6 Dispute resolution

(a) If a party:

(i) discovers any non-compliance with this Agreement;

(ii) otherwise wishes to raise a dispute in relation to this Agreement,

(together referred to as an **Issue**)

that party must as soon as reasonably practicable, provide the other party with notice of the Issue.

(b) If a party provides a notice under clause 6(a):

(i) representatives from the parties with appropriate delegations must attempt to resolve the Issue within [10] Business Days;

(ii) if the Issue is not resolved by the parties' representatives under clause 6(b)(i), it must referred to a representative from each party who is responsible for that party's safety operations and that representative must attempt to resolve the Issue within [5] Business Days.

7 Miscellaneous

7.1 Notices

(a) Any notice given in connection with this Agreement must be in writing and must be addressed to that party and either:

(i) hand delivered to, or sent by post to, the party's registered office, principal place of business or any other address the party notifies for the service of notices;

(ii) sent by fax to any fax number the party notifies for the service of notices; or

(iii) sent by email to any email address the party notifies for the service of notices.

(b) A notice is taken to have been given:

(i) in the case of being hand delivered, on the date on which it is delivered;

(ii) in the case of being sent by post, on the third (seventh if sent to an address in another country) day after the date of posting;

(iii) in the case of being sent by fax, at the time of dispatch as confirmed by a transmission report by the sending machine; and

(iv) in the case of delivery by email, at the time sent, unless the sender is notified, by a system or person involved in the delivery of the email, that the email was not successfully sent.

7.2 Costs

Each party will be responsible for its own costs in complying with this Agreement.

7.3 Proportionate liability

This Agreement does not affect or derogate from the parties' rights and obligations under the Civil Liability Act 2002 (NSW) or their functions and powers under other laws.

7.4 Government authorities

If a party is reconstituted, renamed, replaced or if the powers and functions are transferred to another organisation, a reference under this Agreement to that party includes the reconstituted, renamed or replaced organisation or the organisation to which the powers of functions are transferred (as the case may be).

7.5 Variation

No provision of this Agreement nor any right conferred by such agreements can be varied except in writing signed by the parties.

7.6 Entire agreement

This Agreement:

(a) records the entire agreement between the parties; and

(b) supersedes all previous negotiations, understandings, representations and agreements,

in relation to the subject matter of this Agreement.

7.7 Waiver

A waiver is effective only if in writing and signed by or on behalf of the party to be bound and is effective to the extent that the party giving it expressly states in writing.

7.8 Governing law

This Agreement is governed by the law in force in New South Wales and the parties submit to the jurisdiction of it courts.

EXECUTION

Signed as a deed on 2013

SIGNED for and on behalf of **TfNSW** by its authorised officer in the presence of

Signature of Witness

Signature of Authorised Officer

Name of Witness (print)

Name of Authorised Officer (print)

SIGNED for and on behalf of **Sydney Trains** by its authorised officer in the presence of

Signature of Witness

Signature of Authorised Officer

Name of Witness (print)

Name of Authorised Officer (print)

SCHEDULE 1

1 Interface risk categories

The interface risks associated with the parties are categorised as follows and were considered when developing the attached Interface Risk Register:

(a) Track access (including at grade separations);

(b) Track and civil infrastructure;

(c) Signalling/electrical infrastructure;

(d) Construction impact on Rail Infrastructure;

(e) Configuration management;

(f) Commissioning;

(g) Power - HV and LV;

(h) Overhead wiring;

(i) Communications – telecommunications and data;

(j) Railway operation;

(k) Emergency management;

(l) Rail Safety Incident reporting and investigation ;

(m) Station operations;

(n) Sydney Trains maintenance operations (including maintenance of assets at the interfaces);

(o) Security/access management;

(p) Existing services (management below ground, ground, above ground);

(q) Possessions;

(r) Safe working arrangements;

(s) Design & construction standards;

(t) Working near public (on Sydney Trains property); and

(u) Removal of hazardous materials. (from Rail Corridor).

2 Risk Register

Interface	Safety risk event	Potential cause	Current proposed control	Control responsibility	Comments

Interface	Safety risk event	Potential cause	Current proposed control	Control responsibility	Comments

Interface	Safety risk event	Potential cause	Current proposed control	Control responsibility	Comments

Interface	Safety risk event	Potential cause	Current proposed control	Control responsibility	Comments

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Interface	Safety risk event	Potential cause	Current proposed control	Control responsibility	Comments

Interface	Safety risk event	Potential cause	Current proposed control	Control responsibility	Comments

Interface	Safety risk event	Potential cause	Current proposed control	Control responsibility	Comments

3 Contact register

[Insert contact register. The register below is an example only]

Risk	Party	Risk Review Representative	Title	Contact details
[insert]	[insert]	[insert]	[insert]	[insert]

Emergency contract	Area of responsibility	Contract details
Rail Management Centre		9379 1743
Sydney Trains Possession Protection Officer		[insert]
Sydney Trains Network Control Officer		[insert]
TfNSW Possession Protection Officer		[insert]
Fire, Police, Ambulance		000
Electricity		131 003
Gas		131 909

Water		132 090
City of Sydney		[insert]
[Insert adjacent neighbour contact details]		[insert]

4 Reporting requirements

[Insert reporting requirement framework. The framework below is an example only]