TfNSW Standard Requirements

5TP-FT-425/1.0

Template – Applicable to Transport Projects Delivery Office

Quality Management System

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1 Introduction

1.1 Purpose

This TfNSW Standard Requirement (TSR) describes the requirements and processes with which the Contractor and any Subcontractors must comply. This TSR must be read in conjunction with the Contract.

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

1.2 User Instructions

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

Asset Handover	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	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	Critical Design Review or equivalent stage of the design as developed in accordance with the Contractor's systems engineering processes.
Commissioning	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.
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 this TSR which acts as a framework for bringing together all the management requirements for the Contractor's Activities into a coordinated and integrated plan.
Cost Loaded Baseline Schedule	A baseline program or schedule where the Contractor's costs are distributed across activities such that a cash flow S-Curve may be created, this will also be used as the basis for measuring Earned Value.

Danger Zone	Danger Zone as defined in the Australian Network Rules and Procedures.
Earned Value	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”.
Environmental Control Map (ECM)	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 Management System (EMS)	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.
Fruin Level of Service	A level of service standard for pedestrian access created by John J Fruin PhD.
Global Possession Calender and Standard Working Calendar	Default calendars in TfNSW’s P6 database which can be made available on request.
Hierarchy of Control Measures	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	Verification point identified in this TSR 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 TSR.
Management Plans	Any of the Management Plans to be developed by the Contractor in accordance with the requirements of this TSR which describe how the Contractor will manage related matters and issues that arise during the term of the project.
National Counter Terrorism Alert Levels	Levels described in the Australian Government’s National Terrorism Public Alert System and referenced on the Australian National Security website
Original Equipment Manufacturer (OEM)	The company that originally manufactured the product.

Operator/Maintainer	Organisation that, post Asset Handover, will operate and maintain the assets. In some cases, this may also be the Asset Owner.
PDR	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)	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.
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 Office on behalf of the NSW State government.
Property Representative (PR)	Principal's Property Representative.
Rail Safety	Rail Safety as defined in the Rail Safety National Law (NSW).
Rail Safety Act	The Rail Safety National Law (NSW).
Rail Industry Safety Induction (RISI) Identification Card	A competence card issued to demonstrate successful completion of the Rail Industry Safety Induction training course and medical examination.
Rail Safety Work	Rail Safety Work as defined in the Rail Safety Act.
Rail Safety Worker (RSW)	Rail Safety Worker as defined in the Rail Safety Act.
Rail Train Operator	An entity defined by the Rail Safety Act as a rail operator or rail transport operator.
Regulator	The holder of a public office, or a public authority, of the Commonwealth, or of a State, or member of a government regulatory agency who or which is responsible for enforcing laws, regulations, and established rules.
Regulator Notifiable Incidents	Regulator Notifiable Incidents as defined in Part 3 of the WHS Act and Rail National Safety Law National Regulations 2012.

RMS	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)	Documents so titled prepared in accordance with this TSR and that give specific instructions on how to safely perform a work related task, or operate a piece of plant or equipment etc.
SDR	System Definition Review or equivalent stage of the design as developed in accordance with the Contractor's systems engineering processes.
Vehicle Registration Database	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	Point identified in the TSR or Works Brief or Services Brief where the Principal's Representative, or the relevant person nominated in the TSR, may review, witness, inspect, or undertake tests on any component, method, or process of the Contractor's Activities.
Work Breakdown Structure	Framework of discrete work elements (or tasks) used to organise and define the total project work scope, cost, and schedule control elements.
WorkCover NSW	WorkCover Authority of New South Wales.
Worksite Protection	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	The personnel assigned to implement the required Worksite Protection for work within the Rail Corridor.
Worksite Protection Plan	The plan (provided by the Contractor) 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.

2 Project Administration

2.1 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 and frequency for the initial and subsequent submissions 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.

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.

2.2 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. 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 and frequency for the initial and subsequent submissions 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.

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

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

(d) 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; and

(e) address the management of interfaces with all Authorities and Other Contractors.

2.3 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 and frequency for the initial and subsequent submissions 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.

2.4 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 and frequency for the initial and subsequent submissions 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.

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.

2.5 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 and frequency for the initial and subsequent submissions 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.

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.

2.6 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 and frequency for the initial and subsequent submissions 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.

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 procedure for the management of Defects which must include the use of Scenario 6 software (refer Scenario – Defect Management 4TP-PR-158).

2.7 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 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 Cost Loaded Baseline 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:

2.7.1 Working Environment

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.

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.

The Contractor must ensure that each update to the Contractor's Program as submitted in accordance with this clause 2.7.1 is archived within the Principal's planning environment;

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.

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

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

2.7.2 Program Framework

As a minimum, the Contractor's Program must:

(a) be submitted monthly, on the first working day of the next month 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) 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;

(f) have a separate WBS structure outlining each step of the design review process for each individual design package; and

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

2.7.3 Program Setup and Maintenance

As a minimum, the Contractor's Program must:

(a) include all key activities and deliverables detailed in this 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. The calendars must reflect the Global Possession Calender and Standard Working Calendar which can be provided on request. No other allowances for wet weather or other such contingencies are to be made in the calendars;

(m) reflect the time scheduled, remaining duration 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.

2.8 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 or modified 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 total finish float of zero. Primavera programs may have critical activities with more than zero float depending on the threshold set in Primavera P6.	No threshold
0 to 20 Days Float	Total number of activities with positive float of more than zero and less than or	Near critical activities should be closely monitored during execution to ensure a successful on-time project.	No threshold

Criteria	Description	Remarks	Threshold
	equal to 20 days.		
Hard Constraints (Finish on, Start on, Mandatory Finish, Mandatory Start	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 (Start On or After, Finish On or After)	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.	Zero
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
Zero Duration	Normal activities having a zero duration	Normal activities having a zero duration	Zero
Wrong Status	Activities started or completed in the future	All activities with status in the future must be corrected in order to maintain an accurate execution plan. Includes only normal activities and milestones that are in progress or complete.	Zero
High Duration	Total number of activities that have a duration longer	Total number of activities that have a duration longer than 10 days. Activities must be agreed with the Principal.	Less than 5%

Criteria	Description	Remarks	Threshold
	than 10 days. This number should not exceed 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 "statused" like normal activities. Lags should typically be replaced with activities. Includes normal activities and milestones that are planned, in-progress, or complete.	Zero
Logic on summaries		A summary is not a true activity. Logic should be tied to activities within the schedule	Zero
Reverse logic		As a result of a negative lag (lead) the successor activity starts before their predecessor	Zero

2.9 Document Management

2.9.1 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.

2.9.2 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.

2.10 Monthly Reporting

Without limiting any other reports that may be required under the Contract, the Contractor must prepare and submit to the Principal's Representative, 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.

(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) 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;

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

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

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

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

(p) status of interface management with Other Contractors;

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

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

(s) other key issues that have the potential to affect the Contractor's Activities;

(t) any other information the Principal's Representative reasonably requires;

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

(v) 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. 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; and

iv. any results of risk audits.

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

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

(x) 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.

2.11 Audits and Surveillance

Audit, surveillance and inspection of the Contractor's process and compliance with the requirements of the Contract and the Contractor's quality management system 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. When any audit is to be undertaken by the Principal, the Contractor must:

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

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

(c) 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.

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.

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.

2.12 Property Management

2.12.1 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. To assist the Contractor, the Principal has developed a non-exhaustive "TfNSW Property Compliance Register - 2TP-ST-175" which lists the applicable legislation.

2.12.2 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 underground 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.

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.

2.12.3 Planning

With the exception of an alliance contract, the Contractor must fulfil all the conditions and requirements of the Planning Approval (including 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 any Authority 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, 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.

2.12.3.1 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 2.12.1 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.

2.12.3.2 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.

2.12.3.3 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.

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.

2.12.4 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.

2.12.5 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.

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.

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.

2.12.6 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 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.

2.12.7 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 and frequency for the initial and subsequent submissions 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.

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.

As a minimum, the content of the Property Management Plan should address the "Sections" listed in the table in this clause 2.12.7 below.

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. 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

Section	Title
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
8.2	Monitoring of Track and Structures
8.3	Distribution of Monitoring Data
9	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

2.12.7.1 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.

2.12.7.2 Pre-Construction Property Condition Surveys

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.

2.12.7.3 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;

(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; and

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

i. write to the property owner and provide a copy of both reports for the property owner's records; and

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

2.12.7.4 Property Damage Management

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.

2.12.7.5 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 Contractors' 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.

2.12.7.6 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.

2.12.8 Implementation

2.12.8.1 Notification of Incidents

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

2.12.8.2 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 non-conformance, corrective action and preventative action.

2.12.9 Property Records

The contractor must provide the records described in Annexure A.

2.13 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 requirements of the Contract to achieve a level of awareness and competence appropriate to their assigned activities, and required for the effective implementation of applicable management plans prior to the relevant employee carrying out any works on Site.

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

include site specific training to cover all relevant property, environmental, safety and community issues.

The Contractor's Project 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.

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

3 Environmental Management

3.1 Contractor's Environmental Management System

Unless otherwise noted in Annexure A, the Contractor's Environmental Management System (EMS) and Construction Environmental Management Plan (CEMP) 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.

The timing and frequency for the initial and subsequent submissions of the Construction Environmental Management Plan (CEMP) to the Principal's Representative for review in accordance with the requirements of the Contract is nominated in Annexure A of this TSR.

The EMS and CEMP utilised must be consistent with the requirements prescribed in this TSR or elsewhere in the Contract.

3.2 Management of Environmental Aspects

The Principal has developed a number of environmental management guidelines, which provide guidance on how to manage certain aspects of environmental management during construction. These guidelines are available on TfNSW's website.

3.3 Environmental Inspections and Monitoring

The Contractor 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.

3.4 Notification of Environmental Incidents and Non-Compliances

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

The Principal's Representative may advise an environmental non-conformance 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-FT-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 non-conformances 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.

3.5 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.

3.6 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.

3.7 Complaints

Complaints received by the Contractor from any source in relation to environmental issues must be handled, recorded and reported in accordance with this TSR 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.

3.8 Submission of Environmental Documents

Any environmental documents required by any Authority Approval, including the planning approval, such as the CEMP(s) must be submitted to the Principal's Representative for review in accordance with the requirements set out in the Contract.

3.9 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".

3.10 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 D. Records not required to be stored on-site must be forwarded to the Principal's Representative within 3 Business Days of a request.

3.11 Sustainability Requirements

The Contractor must comply with any project-specific sustainability requirements listed in Annexure A as well as the following:

(a) Steel must be produced, designed and fabricated in an environmentally responsible method that results in efficient use of steel as a building material. Refer BFH-AUR-GN-9090004 Section 6.3 and BFH-AUR-GB-9090009 Section 5.4;

(b) Timber must be certified by either the FSC International or the PEFC forest certification schemes, from a reused source, or a combination of both;

(c) PVC must comply with the Best Practice Guidelines of PVC in the Built Environment http://www.gbca.org.au/uploads/156/2716/Best%20Practice%20Guidelines%20-%20Verification%20Guidance.pdf;

(d) Where practical, use recycled materials in the building/ facility construction such as recycled steel, recycled concrete or timber;

(e) The Contractor should consider the use of less greenhouse intensive fuels in construction vehicles and vessels; and

(f) The Contractor is to consider developing a Green Travel Plan to assist construction site workers making informed decisions about public and/or active transport options to the work site.

4 Safety Management

4.1 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 (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 4.3, 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.

4.2 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.

4.3 Contractor's Project Work Health and Safety Management Plan

4.3.1 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. 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 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.

The timing and frequency for the initial and subsequent submissions of the Project Work Health and Safety 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.

4.3.2 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 4.3.2.1 to 4.3.2.7 inclusive.

4.3.2.1 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".

4.3.2.2 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.

4.3.2.3 Use of Portable Earphone Equipped Music Devices

The use of portable earphone equipped music devices is prohibited.

4.3.2.4 Fires or Burning Off

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

4.3.2.5 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.

4.3.2.6 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.

4.3.2.7 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.

4.4 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 4.4, 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.

4.5 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 4.5.1 and 4.5.2 below.

4.5.1 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.

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.

4.5.2 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.

4.5.3 Safety Performance Rating

The Contractor must provide monthly safety statistics electronically by the 25th of the month.

4.6 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.

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.

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 communicated to the Principal's Representative.

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

4.7 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 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.

5 Communications and Community Liaison

5.1 General Community Liaison Obligations

The Contractor must:

(a) Ensure its employees, Subcontractors and agents comply with the requirements of the details listed below;

(b) Ensure that the Principal is provided with adequate notification of planned construction activities and milestones; and

(c) Consult the Principal prior to taking any action that may impact on stakeholders and the community.

5.2 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).

5.3 Meetings with Stakeholders

The Contractor must not meet stakeholders without seeking approval from the Principal. 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 also support any meetings with stakeholders by providing relevant materials for presentation and/or distribution at such meetings. 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 meetings where requested by the Principal.

5.4 Public Communication Materials

The Contractor must promptly provide all information as reasonably required or directed by the Principal. All public communication material produced by the Contractor must meet *Web Accessibility Guidelines 2.0 (WCAG 2.0) and be* consistent with and comply with the "TfNSW Transport Projects Style Guide for Contractors and Consultants" and the "TfNSW Editorial Style Guidelines". The Contractor must not release any public communication material until it is approved by the Principal's Representative.

5.5 Media Releases and Enquiries

The Principal wishes to exercise control over the release of any information regarding the work. This includes any promotional material that the Contractor seeks to publish, or any press releases or responses to enquiries from the media. The Contractor must refer the information to the Principal for written consent prior to the release. These constraints also apply to the Contractor's consultants and subcontractors.

5.6 Community Notifications

The Contractor must issue written notifications to stakeholders and the community at least 5 Business Days before commencing any activity that incorporate any aspect of a Planning Approval such as planning conditions of consent, that will impact stakeholders and the community. The written notification must first be reviewed and approved by the Principal. The Principal will require a minimum of 5 Business Days to review and approve any written notification before being issued to stakeholders and the community.

5.7 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;

(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 during standard construction hours as outlined in the Planning Approval, or on the next Business Day during all other times (unless the complainant requests otherwise). If no phone number was 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 the Principal with details in writing of complaint close out actions and the date action was implemented.

In responding to enquiries the Contractor must:

(f) record details of enquiries;

(g) provide at least an oral response to the enquirer within a maximum of 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 (unless the enquirer requests otherwise); and

(h) forward information on any enquiries received and response given, to the Principal in writing each Business Day.

6 Working In and Adjacent to the Rail Corridor and Rail Environment

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

6.1 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.

6.2 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 including O&M manuals, drawings etc.

(g) Design Documentation; and

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

6.3 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.

6.4 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 6.2.

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 6.5(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.

6.5 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.

6.6 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.

6.7 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 required in clause 4.3 includes provision for rail safeworking arrangements, based upon (without limitation) compliance with the Australian Network Rules and Procedures.

6.7.1 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.

6.7.2 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.

6.7.3 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;

(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).

6.7.4 Alcohol and Other Drugs

In addition to the requirements set out in clause 4.6, 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.

6.7.5 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.

6.7.6 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.

6.7.7 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.

6.7.8 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.

6.7.9 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.

TSR ANNEXURE A – Additional Project Requirements

5TP-FT-426/1.0

Template – Applicable to Transport Projects Delivery Office

Quality Management System

Status:	Approved
Version:	1.0
Branch:	Commercial
Business unit:	Procurement
Date of issue:	19 August 2015
Review date:	19 August 2016
Audience:	Project Delivery/For use with the PSC templates
Asset classes:	☒ Heavy Rail; ☒ Light Rail; ☒ Multi Sites; ☒ Systems; ☒ Fleets
Project delivery model:	TP Project/Alliance/Novo Rail
Project type:	For all project types
Project lifecycle:	☐ Feasibility; ☐ Scoping; ☒ Definition; ☒ Construction readiness; ☒ Implementation; ☐ Finalisation; ☐ Not applicable
Process owner:	Director Commercial

Document History

Version	Date of approval	Doc. control no.	Summary of change
1.0	19 August 2015	4542124_2	New consolidated Annex A TSR document replacing the suite of individual TSRs (TSR C, TSR E, TSR P, TSR S, TSR T) for use with the PSC Templates

Additional Project Requirements

A2 Traffic Control Plan clause 2.5

Requirement	Applies?	Reference
Is a Traffic Control Plan required?	Yes	Clause 2.5

A3 Contractor's Program clause 2.7

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

A4 Management Plans clause 2

Clause	Management Plans	Is Management Plan Required?	Timing for Initial Submission for Review	Frequency of Update
2.1	Contract Management Plan	Yes	T1	As Required
2.2	Construction and Site Management Plan	Yes	T1	As Required
2.3	Risk Management Plan	Yes	T1	As Required
2.4	Commuter and Passenger Management Plan	No	-	-
2.5	Traffic Management Plan	Yes	T2	As Required
2.6	Defects Management Plan	Yes	T2	As Required
2.12.7	Property Management Plan	No (TSR–Annexure C)	T1	As Required
4.3.1	Project Work Health and Safety Management Plan	Yes	T1	As Required

Legend

T1 21 Business Days after the date of the Contract Award.

T2 30 Business Days prior to the commencement of Site Mobilisation.

A5 Principal's Document Management Tool clause 2.9.2

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

A6 Property Management clause 2.12

Use this section to delete property requirements where they do not apply.

Clause	Requirement	Applies
2.12.5	Property Representative	Yes

A7 Condition Surveys of Buildings clause 2.12.7.1

As a minimum, the Contractor shall complete condition surveys on the following buildings:

Building Address	
i.	Sydney Trains Major Works Office – 137-145 Railway Parade Granville
ii.	Sydney Trains Possessions Planning Office – 137-145 Railway Parade Granville
iii.	Residential Unit Block– 78-82 Railway Parade Granville
iv.	Residential House – 84 Railway Parade Granville
v.	Residential House – 86 Railway Parade Granville
vi.	Residential House – 88 Railway Parade Granville
vii.	Residential House – 94 Railway Parade Granville
viii.	Residential House – 96 Railway Parade Granville
ix.	Residential House – 98 Railway Parade Granville
x.	Residential House – 100 Railway Parade Granville

A8 Post-construction Property Condition Surveys clause 2.12.7.3

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 Construction Phase Monitoring clause 2.12.7.5

General Requirement	Project Specific Requirement
The Contractor must comply with the following project-specific requirements for the	Weekly

construction phase monitoring set out in Annexure A and include these requirements in the Property Management Plan.	

A10 Submission of the Property Records clause 2.12.9

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

Required Record or Reference	Record Required?
Property Management Plan	No
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)	No
Identified property stakeholders within the complaints list as identified by the Principal	No
List of all adjoining property owners and details of all interaction / communications	No
Evidence of property inputs/outputs within the design development process including any sustainability initiatives	No
Surveillance, audit of subcontractors property performance and controls	No
Contractor's non-conformance reports and register	No
Transport Projects property non-compliance reports	No

A11 Contractor's Management System clause 3.1

Requirement	Applies?
(i) Is a 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

A12 CEMP clause 3.1

Clause	Management Plans	Is Management Plan Required?	Timing for Initial Review	Frequency of update
3.1	CEMP	Yes	30 Business Days prior to commencement of	6 months

Clause	Management Plans	Is Management Plan Required?	Timing for Initial Review	Frequency of update
			Site Mobilisation	

A13 Planning and Environmental Compliance System (PECOMS) clause 3.9

	Applies?	Reference
Use PECOMS to undertake self-regulation to confirm that all Contractors' Activities are compliant with all Authority Approvals (including the Environment Protection License).	Yes	Clause 3.9 (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 3.9 (b)

A14 Project-specific Sustainability Requirements clause 3.11

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.

A16 Communications and Community Liaison clause 5

Clause/Para/Line	Project Specific Requirement
Clause 5.1 General Community Liaison Obligations Add (d) – (i)	(d) appoint suitably qualified and experienced community relations personnel to fulfil the communications requirements of the Contract; (e) ensure timeframes and resources for community notification and consultation are incorporated into project planning and programs; (f) develop a Community Liaison Management Plan (CLMP) in accordance with clause 5.8 below; (g) record and maintain records in the project's communications management system (CMS); (h) ensure its employees, subcontractors and agents comply with the requirements of this TSR; and (i) comply with all reasonable suggestions and requests of the community.

Amend Clause 5.6 Community Notifications	The Contractor must issue written notifications to stakeholders and the community at least 7 Business Days before commencing any activity that incorporate any aspect of a Planning Approval such as planning conditions of consent, that will impact stakeholders and the community. The written notification must first be reviewed and approved by the Principal. The Principal will require a minimum of 5 Business Days to review and approve any written notification before being issued to stakeholders and the community. (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 5.1 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.
Clause 5.7 Complaints and Enquiries Management Add (e) – (g)	(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.
Add Clause 5.8 Community Liaison Management Plan (CLMP)	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 this TSR. The Contractor must review and update the CLMP every six months unless otherwise stated. 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) details of the Contractor's nominated 24 hour contact for management of complaints and enquiries; (j) policies and procedures for ensuring Subcontractors comply with this TSR; (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.
Add Clause 5.9 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.

Add Clause 5.10 Communications Management Control Group (CMCG)	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.
Add Clause 5.11 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.
Add Clause 5.12	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

Incident Management and Reporting	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. 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.
Add Clause 5.13 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.
Add Clause 5.14 Construction Hoardings and Fencing	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.
Add Clause 5.15 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.

A17 Working In or Adjacent to the Rail Corridor clause 6

	Applies?
Does Clause 6 apply?	Yes


anville
Centre...
LOT 2
131
Sydney Trains
Major Works Office
137
7
174
170-172
3
5
176
8
90
Eagle
Proposed Granville
Junction Substation
Sydney Trains
Possessions Planning
Railway Parade
Railway Parade
Railway Parade
Smith St
1
114
110
7
9
2
15
6
8
21
25
23
14
102
96
94
3
8
9
88
84
78-82
9

ANNEXURE B – List of Reference Documents

List of Reference Documents

- ISO 31000 (Risk Management Guidelines and Principles)
- 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)
- AS 4817-2006 - Project Performance Measurement using Earned Value
- TfNSW Earned Value Management using Primavera P6 - 4TP-PR-143
- 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,
- 1989AS/NZS ISO 9001:2004 Quality Management Systems – Requirements
- TfNSW Property Compliance Register - 2TP-ST-175
- AS/NZS ISO 14001:2004 – Environmental Management Systems – Requirements
- with Guidance for Use
- TfNSW Environmental Incident Classification and Reporting - 9TP-PR-105
- TfNSW Environmental Incident/Non-Compliance Report - 9TP-FT-101
- TfNSW Guide to Environmental Control Map - 3TP-SD-015
- TfNSW Pre-Construction Minor Works Approval - 9TP-FT-202
- TfNSW Guide to Compliance Monitoring and Reporting using PECOMS - 9TP-SD-012
- TfNSW Generic Work Health and Safety Operational Risk Register - 30-SD-101
- TfNSW Generic Rail Safety Risk Register - 30-SD-038
- AS 4024.1 Safeguarding of Machinery
- AS 61508 Functional safety of electrical / electronic / programmable electronic safety-related systems
- NSW Government Work Health and Safety Management Systems and Auditing Guidelines
- Transport Projects Style Guide for Contractors and Consultants - 8TP-ST-100
- Transport for NSW Editorial Style Guidelines
- TfNSW Work Activity Advice - 4TP-FT-105

ANNEXURE C – Property Compliance Checklist

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	Y N NA Comment: [insert text here]	

#	Issue	Circle relevant answer and add comment	Attachment
	land?		
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]	
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

ANNEXURE D – Environmental Records

Environmental Records

The following lists the environmental records required by this TSR. 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
Contractor's noncompliance, incident, near miss, non-conformance reports and register
Preventive and corrective action reports and register
Environmental audit reports
Environmental Control Maps
Index of all environmental records (prior to Final 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

EXHIBIT B – WORKS BRIEF

The Works Brief comprises the following documents:

(a) Works Brief Version 2.0

Works Brief

Design and Construction of Granville Junction Substation

Status:	Final – For Contract Award
Division:	Infrastructure & Services
Version:	2
Date of issue:	8 April 2016
Document owner:	Project Director
Security classification:	Open Access

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1 Introduction

The purpose of this Works Brief is to define the project specific works and services that the Contractor must perform for TfNSW, including an outline of the scope, detailing any interface requirements, technical and deliverable requirements and any associated project specific activities.

This Works Brief contains the following sections:

- Section 1 Introduction – contains an overview of the project, provides the context of the works and services, and lists terms and references.
- Section 2 Scope – defines the extent of the works and services the Contractor must provide.
- Section 3 Interfaces – describes the interfaces with other parties and stakeholders.
- Section 4 Activities – details the project specific requirements for management/progress meetings, design workshops and audits. These items are in addition to the required activities of the TSR and Contract.
- Section 5 Deliverable Requirements – details the project specific documents the Contractor must deliver, including any reports, drawings, studies, records, results or any other piece of correspondence in addition to deliverable requirements for the TSR and Contract.
- Appendix A – Technical Specification to be used as a guide for the technical requirements that the works must meet and be verified against.
- Appendix B – Business Requirements Specification (BRS) or excerpt.
- Appendix C – Standards – lists standards and codes referenced in this Works Brief.
- Appendix D – Standards Interpretations – tabulates the TfNSW interpretations and/or modifications of selected clauses from applicable standards to provide clarity on TfNSW expectations of application of particular standards.
- Appendix E – 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 F – TfNSW Standard Risk Matrix – the risk matrix to be applied to all project risk assessments.
- Appendix G – Tables outlining PSU SAP and SRSR Requirements for compliance by the Contractor.
- Appendix H – TfNSW Inspection and Test Plans - Minimum Requirements (4TP-RL-002/1.0).
- Appendix I – Checklist for TfNSW Sustainability Design Guidelines to be updated by the Contractor at each stage of the Project.

1.1 Project Overview and Context

The new Granville Junction Substation is part of the Power Supply Upgrade (PSU) portfolio of works intended to meet the power demands of the Sydney Trains 2018 timetable and the new generation air-conditioned eight-(8) car Waratah train sets. The new substation will replace the existing Granville Substation and will provide additional capacity and improved reliability for train operations on the Inner West, Outer West and Old South Main Rail Lines.

The Project also includes upgrading and re-routing existing 33kV and 11kV feeder cables in the rail corridor and on council property to improve network reliability and maintainability.

The scope of works for Granville Junction Substation includes the development of the Preliminary Design (prepared by TfNSW) into the concept design and then to detailed design followed by construction, testing, commissioning and handover.

The Site is adjacent to existing compounds occupied by Sydney Trains for possession planning, maintenance and major works and has both street frontage and access the rail corridor. The Site is substantially concealed from the street with a line of trees minimising the visual impact of the property from residential dwellings on the opposite side of Railway Parade.

1.2 Works Overview and Context

The Granville Junction Substation Project will replace the existing Granville Substation and address traction power reliability, availability and capacity in the outer and inner western area. The Works must be designed and constructed to address the following requirements:

- Deliver a new traction substation with two-(2) x 5MW rectifiers and rectifier transformers, at least fourteen-(14) x feeder DCCBs, two-(2) x rectifier DCCBs, 1500v DCCB bus-tie facility, one-(1) x 33kV harmonic filter and one-(1) x 33/11kV transformer;
- Remove redundant or life expired equipment within the existing Granville Substation to reduce the safety risk;
- Modify, re-route and connect (as required) the existing 718, 719, 721, 722 and 749 33kV feeders and 537, 641 and 623 11kV feeders for improvements to network reliability, maintainability, and whole of life cost efficiency;
- Modify, re-route and connect (as required) existing 373, 374, 381, 382, 383, 384, 371, 372, 741, 741E, 901, 902 and E 1500V feeders for improvements to network reliability, maintainability, and whole of life cost efficiency; and
- Achieve regulatory compliance and meet all applicable ASA and Australian Standards.

1.3 Terms and Definitions

Unless noted otherwise, wherever used in this document, words and phrases have the meaning given to them in the General Conditions to the Contract.

Term	Description
AC	Alternating Current

Term	Description
AEO	Authorised Engineering Organisation as accredited by the ASA
AFC	Approved for Construction
AHD	Australian Height Datum
AIS&S	Sydney Trains Asset Information Systems and Services Unit
ATS	Automatic Transfer Switch
ASA	Asset Standards Authority
BCA	Building Code of Australia
BRS	Business Requirements Specification
CAS	Commissioning Activity Schedule
CCAN	Configuration Change Approval Number
CCB	Configuration Control Board
CCTV	Closed Circuit Television
CEP	Commissioning Event Plan
CGS	Control Gate Stage of the Configuration Control Board Meeting
CMP	Commissioning Management Plan
CMAAC	Configuration Management and Asset Assurance Committee as defined in the TfNSW Configuration Management Plan T MU AM 04001 PL.
CORAS	Commissioning and Operational Readiness Activity Schedule
CORMT	Commissioning and Operational Readiness Management Team
CSR	Combined Services Route
D&C	Design and Construct
DBYD	Dial-Before-You-Dig
DC	Direct Current
DCCB	Direct Current Circuit Breaker
DSS	Detailed Site Survey
DTS	Distributed Temperature Sensing
E	Emergency 1500V Feeder
EE	Endeavour Energy
EOC	Electrical Operations Centre
EOD	Electrical Operating Diagram
EP&A	Environmental Planning and Assessment
FAT	Factory Acceptance Test
GLT	Ground Level Trough
GPO	240V General Purpose Outlet
GST	Galvanised Steel Trough
HV	High Voltage

Term	Description
I/O	Input / Output
I&S	Infrastructure and Services
IRCS	Isolating and Rail Connecting Switch
ISS	Internal Services Search
ITC	Inspection and Test Certificate
ITP	Inspection and Test Plan
JOS	Judgement of Significance
LV	Low Voltage
MDF	Main Distribution Frame
MGA	Map Grid of Australia
NCR	Non Conformance Report
OHW	Overhead Wiring
OHWS	Overhead Wiring Structure
ORD	Operational Readiness Date
ORP	Operational Readiness Plan
PACT	Possession Access Coordination Tool (Sydney Trains Software)
PHL	Project Hazard Log
POD	Proposed Operating Diagram
Project	Design and Construction of Granville Junction Substation
PSU	Power Supply Upgrade Program
QMP	Quality Management Plan
RAATM	Requirements Analysis, Allocation and 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
SCADA	Supervisory Control and Data Acquisition
SFAIRP	So Far As Is Reasonably Practicable
Site	The street address of the new Granville Junction Substation identified as 137-145 Railway Parade Granville, the area of land occupied by the existing Granville Substation and the areas of land proposed for all underground and above ground electrical, communications and signalling services (inside and outside the rail corridor) included in this Works Brief
SoCE	Schedule of Commissioning Events
SRS	Systems Requirements Specification

Term	Description
SRSR	Safety Risk Summary Report
TfNSW	Transport for NSW
TIP	Track Insulation Plan
TSR	TfNSW Standard Requirements
UGOH	Underground to Overhead
ULX	Under Line Crossing
URX	Under Road Crossing
VESDA	Very Early Smoke Detection Apparatus
VoIP	Voice over Internet Protocol
WAE	Work-As-Executed
WC	Water Closet (Flush Toilet)
Works	All works and services contained in this Works Brief

Table 1 Terms and Definitions

2 Scope of Works

The scope of works for the Granville Junction Substation includes the development of the Preliminary Design into the concept design and then to detailed design followed by construction, testing, commissioning, network integration and handover.

The Works must be delivered in accordance with TSR, relevant ASA and Australian Standards, BCA, CCB Control Gate Stage (CGS) process and the other requirements of this Contract.

The TfNSW I&S – Program Delivery CCB CGS submissions to be completed by the Contractor are outlined below:

- CGS 2 - Concept design complete and proceed to detailed design;
- CGS 3 - Detailed design complete and proceed to construction;
- CGS 4 - Construction complete and proceed to testing and commissioning; and
- CGS 5 – Testing and commissioning complete and proceed to asset handover and acceptance.

In addition to the TfNSW I&S – Program Delivery CCB, the Contractor must complete submissions to the TfNSW Configuration Management and Asset Assurance Committee (CMAAC) at the following gates:

- Gate 5 – Asset acceptance.

The Contractor's Activities for the Works include the following main components:

(a) Design development - Using the Preliminary Design, develop Concept and Detailed Design for the Project;

(b) Civil works including site survey, excavation, earthworks, road works, stormwater drainage, HV poles, gantries, overhead wiring structures (OHWS), underline (ULX) and under road (URX) crossings, underground and GST or GLT cable routes;

(c) Building works comprising the concrete footings/piles and slabs, masonry walls, roofing, lighting, mechanical ventilation, hydraulic services, substation security and boundary fencing;

(d) Electrical works including installation, testing and network integration of 33kV and 11kV aerial and underground feeders, 1500V DC aerial and underground feeders, auxiliary services, earthing and bonding systems and fibre optic and copper communications networks;

(e) Finalise proposed and staged Operating and Sectioning Diagrams for approval by TfNSW, Sydney Trains and ASA as required;

(f) Signalling works including negative cabling and new track impedance bonds;

(g) SCADA, pilot wire protection and telecommunications system installations and network integration and associated cabling works within the substation;

(h) Landscaping works including planting of all trees, vegetation, grass and shrubs around the substation perimeter;

(i) Decommissioning, demolition, levelling and making good of the existing Granville Substation;

(j) Manage and obtain all necessary permits and approvals (including Authority Approvals) for the construction, testing and commissioning requirements of the Works, including power isolations, electrical accreditations, commissioning, staging works, ITPs, track possessions and PACT;

(k) Manage all community, environmental, safety, quality and traffic management requirements; and

(l) Comply with and manage all necessary requirements for the design, construction, testing, commissioning, network integration and handover for the successful delivery of the Project.

The scope of works described below is to be read in conjunction with Appendix A - Technical Specification, Exhibit H – Principal's Design, Exhibit F – Reports and relevant ASA (formerly RailCorp) standards, specifications, manuals, guidelines and technical notes. Additional Contract Specific Requirements are detailed in Exhibit E of the Contract.

2.1 Site Establishment

The scope of works for Site Establishment generally includes provision of the following items:

(a) Barricades, gates, lighting, TfNSW approved signage and hoarding, fencing and jersey kerbs for demarcation of Site and 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 and Parramatta City Council infrastructure, assets, services, local flora and fauna;

(c) Protection and maintenance of all existing vegetation, trees, flora and fauna adjacent to the Site for the duration of the Works;

(d) Provide vehicle washing facility to prevent vehicles leaving Site with construction debris;

(e) 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;

(f) 24 hour unimpeded safe access and egress throughout all stages of the Works for Sydney Trains Maintenance and Operations to access all rail infrastructure and assets;

(g) Provision of TfNSW approved project signboards and banners;

(h) Provision of Site amenities with 24 hour access including meal rooms, offices, showers, toilets and office accommodation (desks, chairs, data and telecommunications facilities) for Principal;

(i) Provision of temporary utilities for construction of the Works including electrical power supply, drainage, sewerage and water supply;

(j) Provide temporary electrical power supply to Sydney Trains Possessions Planning Office (other than planned and approved temporary service

disruptions) until permanent power supply from new 11kV padmount substation is commissioned;

(k) Removal and disposal of all redundant equipment above and below ground level including (but not limited to) building piles and foundations, all concrete, bricks, besser blocks, sewerage and stormwater pits and pipes, electrical and telecommunications cabling, pits and conduits, MDF boards, fencing, roof sheeting, garden beds on Site required to construct the new substation and associated services and cable routes;

(l) Submit application, pay all associated fees and obtain approval from Parramatta City Council for rezoning of parking spaces along Railway Parade street front of Site to “Works Zone” (required parking spaces to be re-instated upon completion of the Works);

(m) Submit application, pay all associated fees and obtain approval from Parramatta City Council Traffic Committee for temporary relocation of bus zone at street front of Site to another location on Railway Parade (bus zone to be re-instated upon completion of the Works);

(n) Obtain all necessary approvals and occupancy licences for all road and footpath occupancies, detours and closures; and

(o) All incidental items necessary to deliver the complete Works.

2.2 Site Survey

The Contractor must provide a site survey for the Site with sufficient information of the Site and surrounding areas to confidently progress the concept and detailed designs of the substation and all AC and DC cables.

Using information obtained from Dial-Before-You-Dig (DBYD), Detailed Site Survey (DSS), Internal Services Search (ISS) validation report and confirmed on Site by pot holing, the Contractor must identify the location and depth in global (X, Y and Z) coordinates of all existing underground and above ground services surrounding the proposed substation and the underground, GST and aerial transmission cables and services inside the rail corridor and on council property. The pot holing must confirm the type, number of conduits/cables, sizes, depth of each service.

The surveys must be completed in accordance with the relevant Australian Standards and all relevant legislation for surveying and spatial data and must establish sufficient recovery marks to enable the construction of perimeter fencing to secure the Site. Sufficient recovery marks must be established and maintained to determine the set out coordinates for all permanent infrastructure including the new substation, HV poles, fencing, pits and cable routes.

The Contractor must complete the survey boundary definition and provide a plan with the following information:

(a) Location of recovery marks that define the Site boundary;

(b) Location and details of property boundaries as shown on deposited plans and any easements;

(c) Location of nearest bridges, roads, streets, bus zones, kerb lines and gutters;

(d) Contour levels of the land at 0.2m intervals to Australian Height Datum (AHD);

(e) Location, depth, invert levels and details of existing underground services and pits including water supply, stormwater drainage, sewer, gas, compressed air, HV/LV electrical cables, fire hydrants, stormwater, signalling, telecommunications (Sydney Trains and external carriers) data, underline (ULX) and under road (URX) crossings, underground and GST or GLT cable routes and any other services detected;

(f) Location and details of existing above ground services and infrastructure including buildings, workshops, storage sheds, offices, demountables, boundary and perimeter fencing, street lighting poles, electrical turrets, padmount substations, rail tracks, overhead wiring structures and signal infrastructure within 100m of the Site;

(g) Location, height and details of HV aerial transmission lines, cross arms and poles; and

(h) Location and details of existing vegetation on the Site including height and diameter of trees and foliage.

All survey and other data procured for the Project must be standardised to Map Grid of Australia (MGA) and AHD survey control datum.

Note that the site survey included in Exhibit F is a topographical survey only and does not cover all areas of the Site and the information outlined above required to complete the detailed design. Further, no potholing data is provided in this site survey.

2.3 Civil Works

2.3.1 Earthworks

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) Removal of all contaminated material from Site and disposal to an approved facility;

(c) 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;

(d) Provide controlled engineered fill with correct thermal resistance and electrical resistance properties;

(e) Excavation for building footings and piles, oil separation unit, water tank, stormwater drainage, sewer, cable trenches and pits, transformer bunds, ULX and URX; and

(f) All incidental items necessary to deliver the complete Works.

2.3.2 Asphalt and Concrete Pavements

The scope of works for the asphalt and concrete pavements includes the design and construction of the following items:

(a) New subgrade material for all asphalt and concrete pavements in substation site including supply, installation, compaction and priming of base and sub-base layers;

(b) New trafficable concrete pavement in area adjacent to the substation building for traversing of heavy equipment;

(c) Ancillary road works including heavy duty vehicular crossings, kerbs, guttering, dish drains, drainage channels and transitions;

(d) Repair of any damages to existing council roads and drainage systems caused by construction activities; and

(e) All incidental items necessary to deliver the complete Works.

2.3.3 Stormwater Drainage

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.;

There is a redundant and abandoned communications pit and route on the south side of the substation construction site adjacent to the bus stop. This pit must be excavated and removed by the Contractor. A new stormwater pit must also be constructed on Railway Parade by the Contractor.

(b) Diversion of existing 900mm diameter stormwater drainage pipe underlying the footprint of the substation building;

(c) All associated works including excavation, supply, bedding, laying, jointing and backfilling for the new stormwater drainage system;

(d) Connection of transformer and harmonic filter bays to new underground oil/water separation unit and all associated plumbing, drainage and fire trap components;

(e) Connection of new stormwater drainage system to existing stormwater drainage network;

(f) All additional stormwater drainage works requested by Parramatta City Council due to proposed new substation (refer to Section 3.1); and

(g) All incidental items necessary to deliver the complete Works.

2.3.4 Structures

The scope of works for structures includes the design and on or off-site construction of the following items:

(a) New reinforced concrete foundations, footings, ground and first floor slabs, stairs and plinths for substation building and bunded yards;

(b) New first floor concrete slab must have construction tolerance of +/-5mm *(with exception being the DCCB mounting and rack out area where a tolerance of <3mm in 3000mm applies);*

(c) New reinforced concrete pits, trenches and cast in conduits, internally within the substation building;

(d) New reinforced concrete bund walls and boundary wall fence footings;

(e) New reinforced concrete and/or masonry walls including external and internal walls, fire-rated reinforced walls, partitions, cubicles and cable support structures;

(f) New structural steel roof structure including all rafters, purlins, bracing, insulation, roof sheeting, eaves lining, flashing, fascia panels, capping, guttering and downpipes;

(g) New roof fall restraint system including proprietary ladder, eyebolts fixed to roof deck and safety wire fixed to eyebolts;

(h) Modification or replacement of OHWS MS21+706 for termination of 1500V feeders 371, 372, 381, 382 and E;

(i) New structural steel over track bridge structure for 33kV feeders 718 and 722, 1500V feeder 741 and LV power cable;

(j) New structural steel support for 1500V DC IRCSs; and

(k) All incidental items necessary to deliver the complete Works.

2.4 Building Works

2.4.1 Architectural Works

The scope of works for architectural works includes the design and on or off-site construction of the following items:

(a) All architectural fit out work for new substation building including battery cabinet, admin room, switch rooms, WC, kitchen area and all associated ceilings and cornices, cement sheeting, floor coverings, handrails, louvres, doors, fixtures, fittings and all other inclusions;

(b) The architectural design of the substation building must comply with the REF requirements and Planning Approval conditions;

(c) New doors and roller shutters, including blast doors, metal louvre doors and internal doors;

(d) New 3000mm high (minimum) roller shutter to first floor level for equipment access;

(e) New substation fencing with gates to transformer bay bunded yards;

(f) New high security boundary fencing with insulation panels and double gates at front and rear of Site for truck access;

The Granville Junction Substation Fence requirement is detailed in RailCorp Engineering Standard EP99000007 – v3.1. For clarity the Substation Fence classification are defined as the following:

- The substation **'Intruder Resistant Fence'** must be minimum 3000mm high including a 600mm concertina short barbed topping (razor wire) as referenced in ESC 510 – Section 4.7 **High Security Fence**
- The substation **'Boundary Fence'** must be minimum 2400mm high as referenced in ESC 510 – Section 4.6 **Security Fence** (as long as it is not also the Intruder Resistant Fence)

- The substation **'Internal Enclosure Fences'** (within the Intruder Resistant Fence) must be minimum 1800mm high (to prevent unintended access to exposed electrical equipment such as capacitor banks within a switchyard) as referenced in ESC 510 – Section 4.4 **Urban Fence**

Preferred type:

- **Substation Intruder Resistant Fence** is close spaced welded mesh as detailed in EP99000007 SP 6.2.1 **Welded Mesh Type Fence**
- **Substation Boundary Fence** is the close spaced welded mesh as detailed in EP99000007 SP 6.2.1 **Welded Mesh Type Fence**
- **Substation** Internal Enclosure Fences are detailed in ESC 510 – Section 4.4 **Urban Fence**

(g) New anti-graffiti treatment to all external walls, clear sealer finish to internal walls, and painting of internal concrete floor;

(h) Supply and installation of office furniture to admin room including:

i. One-(1) x workstation;

ii. Two-(2) x ergonomic chairs; and

iii. One-(1) x steel double door filing cabinet (1200W x 500D x 1800H).

(i) Supply and installation of fixed furniture, appliances and whitegoods to amenities area including:

i. One-(1) x kitchenette area containing single bowl stainless steel sink, serving bench and storage cupboards and drawers.

ii. One-(1) x wall mounted stainless steel garbage bin; and

iii. Appliances and whitegoods including microwave, griller oven, under bench refrigerator (3-star energy rated) and kettle. Sufficient GPOs for each plug-in electrical item and one-(1) x additional GPO for general use.

(j) Supply and installation of fixed furniture in the toilet area including:

i. One-(1) x single bowl stainless steel sink with hot and cold running water;

ii. One-(1) x 240v 9.6kW instantaneous hot water system to provided hot water to the sink in toilet area and amenities area;

iii. One-(1) x wall mounted (5L) stainless steel garbage bin;

iv. One-(1) x stainless steel toilet roll holder;

v. One-(1) x stainless steel broom and mop hangers; and

vi. One-(1) x double GPO for general use.

(k) All incidental items necessary to deliver the complete Works.

Separate internal rooms are not required for the kitchen and administration areas as these areas can be accommodated within the substation layout and floor plan. The Contractor shall comply to BCA (Part J) insulation requirements for new offices and administration areas.

2.4.2 Building Services

The scope of works for building services includes the design, supply, construction, installation, testing and commissioning of the following items:

(a) Natural ventilation to all indoor areas including switch room, battery area and toilet;

(b) Split system air conditioning unit and condenser with vandal proof enclosure to admin room;

(c) Low voltage electrical equipment including:

i. Internal and external lighting to substation with two-(2) way switching at all building entrances;

ii. Daylight controlled external lighting (with manual by-pass);

iii. Exit lighting;

iv. Emergency lighting;

v. 120V work lighting;

vi. One-(1) x double GPOs within substation at maximum 10 metre internal perimeter wall spacing intervals; and

vii. Two-(2) x 120V DC 56C210 Switched 2 Flat Pin IP66 Socket special purpose outlets (placed each end of DCCB cubicles)

(d) Telecommunications wiring for VoIP telephones, and phone/data outlets;

(e) Bell silence switches adjacent to each VoIP telephone;

(f) Fire system equipment including VESDA system, fire extinguishers, fire indication panel, smoke detectors and visual warning devices;

(g) Security system equipment including intruder detection system, long line public address system / virtual presence, electronic access control, CCTV cameras, alarms, door monitoring, security screens to windows/vents and sterile zoning (based on a Site Criticality Category Assessment of 2 as specified in *"RailCorp Security Standard RSS003 – Substations – 2009"*);

(h) Hydraulic equipment including flame traps, floor waste, hot water system, toilet, kitchen sink, outdoor emergency eye wash facility, hand basin, relief gullies, vent pipes, hose taps, kitchen and toilet tap ware and all water supply and sewer pipe work; and

(i) All incidental items necessary to deliver the complete Works.

2.4.3 BCA Compliance and Fire Safety Certification

The scope of works for BCA compliance and fire safety certification includes the following items:

(a) Obtain BCA Assessment Report from BCA Certifier on the completed concept design;

(b) 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;

(c) 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

(d) Obtain Fire Safety Certificate from Fire Safety Engineer that the completed work complies with the EP&A Act and the EP&A Regulations.

2.4.4 Signage and Labels

The scope of works for signage includes the design, supply and installation of the following items relevant to the reconfigurations related to the Project for staged and final construction:

(a) Relabelling of the 1500V DC Network Section from the new Granville Junction Substation;

(b) Labelling on the all HV feeder cables at all points where the cables are accessible (e.g. pits, point of substation entry, below switchgear etc);

(c) Labelling of all cables and terminations of substation control and power supply cables;

(d) Labelling of all terminations of substation earthing cables, bars and electrodes;

(e) Danger and Warning Labels;

(f) Warning Labels on Confined Spaces and Pits (Heavy Duty Trafficable Type);

(g) Battery Cabinet and Eye Wash Signs;

(h) Traction Negative and Trackside Negative Bar Labels;

(i) 1500V DC IRCS Feeder Section Number Labels;

(j) 1500V DCCB Feeder Section Number and Rectifier Number Labels;

(k) Capacitor Compound and Cabinet Discharge Warning Signs;

(l) Location, Room and Equipment Labels (e.g. Bus Section, Rectifier No, Auxiliary Tx No, Battery Cabinet, Battery Bank and Battery Cell No);

(m) Emergency Generator Connection Point Signs;

(n) Emergency Phone Numbers and Emergency Assembly Point Signs;

(o) First Aid Station Signs and First Aid Procedure Signs;

(j) All other internal signage for access to the cable basement, access to electrical panels and statutory signage for electrical rooms; and

(k) All incidental items necessary to deliver the complete Works.

2.4.5 Water Supply and Sewer Connections

The scope of works for water supply and sewer connections includes the design and construction of the following items:

(a) Engage Water Servicing Coordinator from Sydney Water List of Providers to prepare detailed design documentation and shop drawings of water supply and sewer connections from substation building to existing water and sewer mains in Railway Parade;

(b) Replacement, encasement or relocation of existing sewer pipe underlying the footprint of the substation building;

(c) Upgrade of existing fire hydrant located at front boundary of substation site for BCA compliance;

(d) Upgrade of existing water meter at front boundary of substation site with provision for separate metering to (i) New Granville Junction Substation; and (ii) Sydney Trains Possessions Planning Office;

(e) Obtain Section 73 Compliance Certificate and all necessary approvals and permits from Sydney Water prior to commencing construction of the water supply and sewer connections;

(f) Construct and test new water and sewer connections in accordance with the Sydney Water approved detailed design documentation and shop drawings; and

(g) All incidental items necessary to deliver the complete Works.

2.4.6 Landscaping

The scope of works for landscaping works includes the design, supply, construction and planting of the following items:

(a) Any trees, plants, garden beds, vegetation, grass, shrubs and other plantings for compliance with the REF requirements and Planning Approval conditions; and

(b) All incidental items necessary to deliver the complete Works.

2.5 Electrical Works

2.5.1 Proposed Staged Changes to the Sydney Trains Electrical Network

For any proposals to alter the configuration of the Sydney Trains Electrical Network that impact upon the existing Electrical Operating and/or Sectioning Diagram, the Contractor must prepare, submit and obtain approval of the Proposed Operating Diagram (POD) from Sydney Trains and ASA.

The approved PODs are to be lodged with the Sydney Trains EOD Engineering Website and advertised as a “Proposed New Arrangement” prior to application for CCB CGS 4 to commission the alteration. Early submission and approval of the POD is recommended prior to CCB CGS 3.

No alteration to the Sydney Trains Electrical Network is to proceed without an approved POD. This applies to all stages of the Works.

Electrical Advices can only to be written with direct reference to an approved POD that clearly describes the configuration change to the Sydney Trains Electrical Network.

2.5.2 Electrical Advices

For any final, staging or alternative works proposed to be implemented by the Contractor, that require the existing Electrical Operating and/or Sectioning Diagram in operation to change, the Contractor must submit an Electrical Advice.

At least twelve-(12) weeks prior to implementing the change, the Contractor must prepare, submit and obtain approval of the Electrical Advice (describing the change) from the Sydney Trains Asset Information Systems and Services (AIS&S) EOD Unit by submitting an Electrical Operating Diagram(s) Advice of Alteration Template (current version) as is shown on the relevant Approved Proposed (final or staged) Electrical Operating and/or Sectioning Diagram.

Any proposed change not previously approved by the appropriate Sydney Trains and ASA authorities on a Proposed (final or staged) Electrical Operating and/or Sectioning Diagram must not be presented in an application to the Sydney Trains AIS&S EOD Unit.

2.5.3 33kV Feeder Works

The scope of works for the 33kV feeder works includes the design, supply, installation/removal, testing and commissioning into service the following items:

(a) Upgrade of 'Pit A' (re: Exhibit H - EL0587747) to a turning and joining pit to accommodate 33kV feeders cables 537 and 749, 1500V feeders cables 381, 382 and E and 1500V negative cables plus appropriate capacity for relevant spares required for each AC and DC feeder for maintenance and increased capacity requirements;

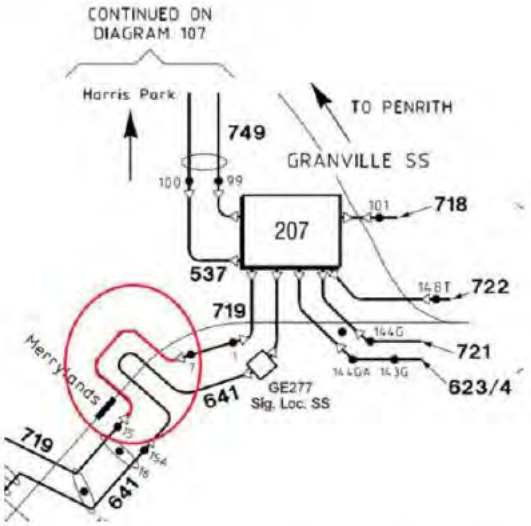
(b) Replacement of the existing Pole 145T with new pole and rearrangement to the existing 33kV feeder 722 aerial transmission line for connection of new UGOH/stay pole arrangement. 33kV feeder 722 to be extended to 1500V structure MS 21+487 and then to a new GST arrangement on the fascia of the Bold Street Bridge northern retaining wall inside the rail corridor. GST to extend along northern retaining wall above the GST for 1500V feeder 741, with transition onto the new over track bridge structure adjacent to the apparatus/comms room. (Note existing 33kV Pole 147T and Pole 148T become redundant with this new transmission line arrangement);

(c) Rearrangement to the existing 33kV feeder 718 aerial transmission line at Pole 99 (+ new stay pole) and provide new 33kV feeder 718 transmission line alignment across Bold Street to the new UGOH pole adjacent to the new over track bridge structure adjacent to the apparatus/comms hut. Redundant 33kV feeder 718 transmission line and 33kV ULX cable along Cowper Street (from Pole 99) to the existing Granville Substation to be removed;

(d) Termination of the existing 33kV feeder 719 at Pole 2 onto new UGOH and stay pole arrangement with early works to install a temporary cable extension from Pole 2 and joint into existing 719 feeder cable to supply existing Granville Substation. The final arrangement to be a new underground cable into new Granville Junction Substation. Redundant Pole 1 and Pole 2 to be removed;

It is unlikely this 33kV cable section of feeder 719 contains DTS fibre as this cable was installed well before 33kV cable with DTS was a requirement.

Note: Alteration to the cable section of feeder 719 from UGOH Pole-7 (Bridge over Woodville Rd) has not been considered within the scope of this project. It will not be considered unless the Contractor can demonstrate a requirement (e.g due to non-conformance to comply with standards).



(e) New 33kV feeder 721 underground cable route from existing UGOH pole 144G into the new Granville Junction Substation;

(f) Replacement of the existing direct buried 33kV feeder 749 to new 300mm^2 single core cables in combined GST and existing pit and pipe route from the new substation to Pole 99;

(g) Installation of DTS Panel and fibre link cables from the fibre breakout point at the new Granville Junction Substation to the DTS panel for each 33kV feeder cable;

(h) Jointing through of DTS fibre at each 33kV feeder joint. (Note: Where new feeder cables are jointed into existing cables that do not contain DTS, then a 3m length of DTS fibre breakout must be safely stored at the joint for future jointing); and

(i) All incidental items necessary to deliver the complete Works.

Note: Should the 33kV feeder works outlined above not comply to current ASA standards, the Contractor shall submit a concession application to ASA in accordance with Appendix D.

The current capacity for the XLPE and aerial are as follows:

- 19/3.75 is rated at 330A (summer)
- 300mm, 3c XLPE 430A
- 400mm, 1c XLPE 520A
- 150mm, 3c XLPE 305A

Please note that the ratings provided above are not derated.

Unable to provide ratings for a 240mm XLPE cable for Feeder 749, however:

- 240mm, 3c XLPE 390A (before derating factors are applied)
- 240mm, 1c XLPE 415A (before derating factors are applied)

2.5.4 11kV Feeder Works

The scope of works for the 11kV feeder works includes the design, supply, installation, testing and commissioning into service the following items:

(a) Removal of existing 11kV feeder 641 cable section from existing Granville Substation and ULX and re-routing in new underground cable route from HV Pit 3 (re: Exhibit H - EL0587747) into new Granville Junction Substation;

(b) New 11kV feeder 623 underground cable route from existing 623 aerial transmission line UGOH pole 144GA into proposed new Granville Facilities Substation padmount;

(c) New 11kV feeder 623 underground cable route from proposed new Granville Facilities Substation to new Granville Junction Substation;

(d) Termination of the existing 11kV feeder 537 from GLT into 'Pit A' (re: Exhibit H - EL0587747) and provide joint for connection of new HV cable route into the new substation; and

(e) All incidental items necessary to deliver the complete Works.

2.5.5 33kV Pilot Wire Protection

The scope of works for the 33kV pilot wire protection includes the design, supply, installation, testing and commissioning into service the following items:

(a) New 33kV pilot wire protection system for 33kV feeders 718, 719, 721, 722 and 749 at Granville Junction Substation. (Note: Contractor to co-ordinate with works at the remote ends to be undertaken by Sydney Trains);

(b) New optical fibre communications links to support the new 33kV pilot wire protection system including early works required for staged transition; and

(c) All incidental items necessary to deliver the complete Works.

2.5.6 Equipment Installation

The scope of works for equipment installation includes the following items:

(a) With reference to Table 2 in Section 2.6, design, installation, testing and commissioning into service all control and auxiliary electrical and communications equipment supplied by the Principal;

(b) Design, supply, installation, testing and commissioning into service all electrical and communications equipment as per the proposed operating diagrams and equipment listed in Section 2.6; and

(c) All incidental items necessary to deliver the complete Works.

2.5.7 1500V Positive Feeders

The scope of works for the 1500V positive feeders includes the design, supply, installation, testing and commissioning all cabling and equipment necessary to bring into service the following items:

(a) 1500V feeders 383 and 384 OHWS MS21+847;

(b) 1500V feeders E at OHWS MS21+845;

(c) 1500V feeders 371, 372, 381, 382 and E at OHWS MS21+706;

(d) 1500V feeder 376 from new substation to OHWS MS 21+142. (Note: Proposal is to use existing cable in GST arrangement along Down Relief track to OHWS MS 21+142. Existing capacity to be retained subject to approved of a concession from ASA);

(e) Removal of the existing 1500V feeder 376 cables from the existing ULX route (cable route to be re-utilised for 415V cabling to Signal Box ATS supply);

(f) 1500V feeders 373, 374, 901, 902 and E from OHWS G21+700 to the new substation. Redundant cable and exposed conduit arrangements on the signal box side of the structure to be removed;

(g) New 1500V feeder emergency cabling from new substation via 'Pit A' to OHWS MS21+706 and OHWS MS21+845 in existing/extended GST and underground pit/pipe cable routes;

(h) 1500V feeder 741 from new substation to MS21+508. (Note: Proposal is to use existing cable arrangement along Up Main to MS21+508. Existing capacity to be retained subject to approved of a concession from ASA); and

741 1500V DC Feeder is required to be connected from the Granville Junction SS 1500V DCCB and IRCS, and jointed to the section of existing 1500V DC cable under Bold St Bridge or alternatively run continuous to MS21+274.

ASA Standard T-HR-EL-20002-ST 1500V DC Cables and Cable Ratings states at Section 9 - DC feeder cables from substations and sectioning huts:

'Feeder cables from substations and sectioning huts to overhead wiring shall have a continuous current rating equal to or greater than that of the associated overhead wiring conductor system'.

If the continuous current rating of any cable arrangement proposed to be installed is not compliant to T-HR-EL-20002-ST (or any other standard) the Contractor must manage an approval of proposal through the application to ASA for a concession to the applicable standard.

(i) All incidental items necessary to deliver the 1500V positive feeder cables and cable routes (both GST and underground) between the substation and the 1500V OHW structures.

The size and number of DC feeder cables (and associated current carrying capacity) from the new substation for each section of the OHW must be designed and installed by the Contractor in compliance with standards such as T HR EL 20002 ST. Section 9 of that standard states the following;

'9 Feeder cables from substations and sectioning huts to overhead wiring shall have a continuous current rating equal to or greater than that of the associated overhead wiring conductor system.'

In order to determine the current carrying capacity of the conductors ST have advised of the following (verbally), regarding the individual OHW system types. However this information is not validated and the Contractor must validate it.

- 1500V Section 901 – System 2
- 1500V Section 902 – System 2

- 1500V Section 374 – System 9
- 1500V Section 373 – System 2
- 1500V Section 376 – System 12
- 1500V Section 741 – Fixed System 129 / 137
- 1500V Section 372 – System 2
- 1500V Section 371 – System 2
- 1500V Section 384 – System 4
- 1500V Section 383 – System 4
- 1500V Section 381 – System 4
- 1500V Section 382 – System 4 with a 270mm Auxiliary feeder.

2.5.7.1 Provision for Future 1500V DC Feeders

The scope of works for the future 1500V DC feeder supplies to the Y-Link - South West Inner and Outer Rail Lines (refer to drwg.no.EL0587715) includes the design, supply, installation, testing and commissioning of the following equipment:

(a) Two-(2) future feeder DCCB cubicles (additional to the test spare DCCB & cubicle) fitted with SafeBond units and all monitoring, control wiring and ancillary equipment for full operation;

(b) Two-(2) future 1500V Isolating and Rail connection switch (IRCS) wall space;

(c) Two-(2) future DCCB capacity within the common equipment panel. This includes all associated equipment and wiring installed;

(d) SCADA panel to allow for the 2 future DCCB's for monitoring and control. This includes the cross wiring to the marshalling cubicle;

(e) Heat load and ventilation must consider for 2 future DCCB's to be in service; and

(f) Provision of the two (2) DCCB units are excluded.

The above items will be associated with Section 2 of the 1500V busbar for configuration of track possessions. See Proposed 1500V DC Operating Diagram No. EL0587714.

The substation layout configuration and access to the cable routes and arrangements must be designed to allow for installation of this type of future infrastructure.

For alternate DCCB type proposed (eg Hawker Siddeley 1500v switchgear) the 1500v bus tie facility must be provided as per the intent of the Proposed 1500v DC Operating Diagram EL0587714 A

2.5.8 1500V Negative Cables

The scope of works for the 1500V traction negative return system includes the design, supply, installation, testing and commissioning all cabling and equipment necessary to bring into service including the following items:

(a) REC, 1500V negative reactor, 1500V DCCBs, 1500V IRCS, new trackside negative bars, main negative bus, impedance bonds, control bus, and 1500V switch area negative bus; and

(b) All incidental items necessary to deliver the complete Works.

2.5.9 LV Power Supply

The scope of works for the LV power supply includes the design, supply, installation, testing and commissioning all cabling and equipment necessary to bring into service the following items:

(a) New Granville Facilities Substation padmount;

Granville Facilities SS (Pad Mount) detailed on the Final Proposed Operating Diagram EL0587719 is supplied from 623 11Kv Feeder. The size has not been determined as far as the size of the load capacity required. A maximum demand calculation must be completed by the Contractor during the concept design stage to consider the loads requirement to be supply the Possession Planning Office, Granville Signal Box (normal supply) and Signal Location GE406 (normal supply) and the Granville Communications Hut. Consideration also has to be made for the council isolation transformer and backup supply to Granville Signal Box and Signal Location GE406.

(b) Assessment of the capacity of the existing Endeavour Energy (EE) isolation padmount and upgrade if required;

(c) New LV main power supply to the existing Sydney Trains Possessions Planning Office from the new Granville Facilities Substation;

(d) New LV main power supply from the new Granville Facilities Substation to the existing Granville Signal Box LV Padmount ATS (supplying Granville Signal Box and signal location GE 406) Note: Existing back up supply from the existing EE isolation padmount transformer to be validated and maintained;

(e) New LV main power supply to the existing Granville apparatus/comms room from the new Granville Facilities Substation via a new CSR to the over track bridge structure;

(f) New LV backup power supply to the existing Granville apparatus/comms room from the existing EE isolation padmount transformer via a new CSR to the over track bridge structure. Note: Existing back up supply from the existing EE isolation padmount transformer to be validated and maintained;

(g) New LV power supply for the new Granville Junction Substation, including the 600/415V transformers, ATS and distribution boards; and

(h) All incidental items necessary to deliver the complete Works.

2.5.10 Signalling

The scope of works for the signalling includes the design, supply, installation, testing and commissioning into service the following items:

(a) Track Insulation Plan (TIP);

(b) New track impedance bonds including all frames, footings and underground cable routes;

(c) Removal of existing redundant signalling equipment; and

(d) All incidental items necessary to deliver the complete Works.

2.5.11 Overhead Wiring

The scope of works for the overhead wiring includes the design, supply, installation, testing and commissioning into service the following items:

(a) Modification or replacement as required to OHW portals MS21+706, MS21+845, MS21+847 and G21+700;

(b) Fixtures and fittings associated with the standard requirements of new 1500V DC positive feeding arrangements on portals MS21+706, MS21+845, MS21+847 and G21+700; and

(c) All incidental items necessary to deliver the complete Works.

2.5.12 Earthing System

The scope of works for the earthing system includes the design, supply, installation, testing and commissioning into service the following items:

(a) Electrodes, earth mat, earth grading ring and earth bars for the substation;

(b) All protective earthing and bonding connections to fixed metallic equipment in the substation;

(c) Earthing of 33kV and 11kV aerial feeders including poles with new electrodes;

(d) Earthing and bonding requirements for new and existing isolation panels within the security and boundary fencing;

(e) Earthing of all other electrical infrastructure such as GST, feeding structures and over track bridge structure; and

(f) All incidental items necessary to deliver the complete Works;

2.5.13 SCADA Works

The scope of works for the SCADA system includes the design, supply, installation, testing and commissioning into service the following items:

(a) New SCADA RTU and Marshalling Panel including all Input/Output (I/O) interface hardware required

(b) All conduits and cabling between the SCADA panel and equipment;

(c) Termination and cross-wiring of field cabling within the SCADA panel; and

(d) All incidental items necessary to deliver the complete Works.

The Contractor must coordinate the off-site works by Sydney Trains required to integrate the new SCADA system into the existing Sydney Trains EOC SCADA network. Refer to Appendix E – Interface Schedule for works to be completed by Sydney Trains.

2.5.14 Telecommunications

The scope of works for the telecommunications includes the design, supply, installation and commissioning of the following items:

(a) Conduits and cable support systems within the new substation;

(b) New telecommunications optic fibre cable route between the new substation and the existing telecommunications backbone route to the city side of the substation by one of two options.

Should the existing telecommunications ULX adjacent Granville Communications Room be viable for running the new lead in cable, the interface with the backbone route must be at a new or existing pit on the down side of the rail corridor.

Otherwise, should the existing ULX adjacent Granville Communications Room not be viable, the Contractor must incorporate an optical fibre route into the electrical cabling over track structure and interface with the backbone route at a new or existing pit on the up side of the rail corridor;

(c) New telecommunications optic fibre cable route between new substation and the existing telecommunications backbone route to the Guildford side of the substation by way of a new or existing pit;

(d) New telecommunications optical fibre cable entry pits outside the new substation;

(e) Install fibre optic cable from the telecommunications backbone cabling route interface pits into the new substation.

(Note: The Principal must engage Sydney Trains to supply and install the optical fibre lead in cables from the fibre interconnection points to the substation route interface points and leave the required lengths of cable looped in the pits for the Contractor to haul the rest of the way into the substation communications cabinet);

(f) New communications cabinet (excluding fit out of telecommunications equipment and fibre terminations within this cabinet);

(g) Telecommunications cabling within the substation from the communications cabinet to SCADA cabinet, telephones, data outlet and pilot protection relays;

(h) Enabling connections for the staged delivery for the transition between decommissioning of equipment in the existing Granville Substation and the commissioning of new equipment in Granville Junction Substation; and

(i) All incidental items necessary to deliver the complete Works.

Telecommunication equipment and cabling must meet Australian Standard and ASA requirements for separation from HV, LV, OHW, SCADA (120V DC) equipment and cabling and any other hazardous services associated with the substation.

The Contractor must coordinate the telecommunications interface works by Sydney Trains required to integrate the new substation into the existing rail telecommunications network. Refer to Appendix E – Interface Schedule for works to be completed by Sydney Trains.

2.6 Equipment Supplied by Principal and Contractor

2.6.1 Principal Supplied Equipment

The list of equipment to be supplied as free issue by the Principal is tabulated below:

Product	Manufacturer	Description	Qty
Transformer	Alstom	33/11kV Power Transformer	1
Protection Relays	Schneider Electric	MiCOM P124	As Required
Locks	Lockwood	C1, D1 and Special Barrels and padlocks supplied by Sydney Trains	As Required
DTS Fibre Link Cables	TBA	Custom order to Sydney Trains specifications	As Required
DTS Cabinet	TBA	• Wall Mount Cabinet 18RU x 600wide x 450deep (to accommodate multiple 18 F1 RU DTS Fibre Termination Kits) • Supplier: Various (CRS, AFL, B&R)	As Required
Communications Cabinet Fitout Equipment	TBA	Communications Cabinet (rack only) must be supplied by Contractor. Communications cabinet fitout equipment supplied by Sydney Trains.	As Required

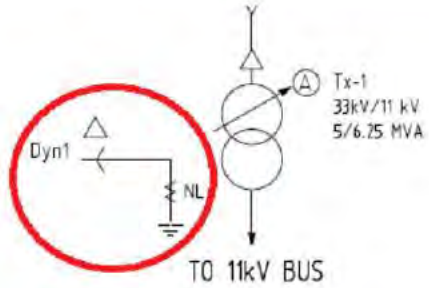
Table 2 Principal Supplied Equipment

Communications cabinet and fitout equipment and hardware must be delivered to Site and installed by Sydney Trains technicians under supervision by the Contractor.

Other Principal supplied equipment must be picked up and delivered by the Contractor from the point of supply within the metropolitan area, delivered to Site, installed, tested and commissioned to meet the Operational Readiness Date (ORD) of the Project. All transportation and handlings costs for the delivery must be borne by the Contractor. The Principal must be given four-(4) weeks' notice by the Contractor prior to any requirement to inspect and retrieve the equipment. All equipment must be transported in an appropriate manner in accordance with manufacturer's requirements.

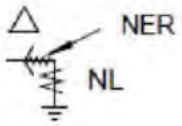
There is no requirement for a neutral earth resistor for the 11/33kV transformer stated in the Technical Specification or the approved Operating Diagrams.

The symbol on the 33kV Proposed operating diagram EL0587712 is not a Neutral Earth Resistor, it is a Neutral Leakage Relay.



The AC Symbols Legend is available on EOD's website if required.

http://engextranet.railcorp.nsw.gov.au/Disciplines/ElectricalOperatingDiagram/AC_SUBSTATION/AC_Symbols_Legend_S4_B.pdf



Dyn 1 (with Neutral Leakage Relay CT and Neutral Earthing Resistor.)

2.6.2 Contractor Supplied Equipment

All other equipment required for the Project (other than equipment supplied by the Principal) must be supplied, installed, tested and commissioned by the Contractor. The equipment shown below must be provided by the Contractor in addition to any other equipment needed for the operation of the new Granville Junction Substation:

- All Hawker Siddeley Lightning Switchboard and NDC breakers with SafeBond technology fitted with Delta I and UMLE relays (including spares)
- All Hawker Siddeley Rectifier 1500V DCCBs
- All Hawker Siddeley Feeder 1500V DCCBs
- All Hawker Siddeley 1500v DCCB cubicles fitted with all ancillary equipment
- All 1500V feeders IRCSs
- 5.35MW Rectifier Transformers
- 5MW Rectifiers
- 1500V Negative Reactor
- 1500V Hawker Siddeley DC Harmonic Filter
- 1500V Hawker Siddeley DC Harmonic Filter cubicle
- 11kV Switchgear
- 33kv Switchgear
- 33kV AC Harmonic Filter

  Note: The ratings of the 33kV AC Harmonic Filter components currently commissioned for the South West Rail Link are based on that system configuration

only. The components rating must be re-modelled to satisfy the feeding arrangement for Granville Junction SS.

Note the following inclusions:

- Two-(2) x RLC04 relays must be provided instead of one-(1) x RCL04 for primary protection of the C-type filter; and
- Screen must be provided for protection of any live parts (inclusive of terminals / terminations and busbars).

- All HV and 1500V cables, aerials, including termination kits, lugs and hardware
- SCADA and Marshalling Panel
- Communications Cabinet (Table 2 – Cabinet Components Principal Supplied Item)
- Two-(2) x Sets of 125V DC Batteries
- Two-(2) x Battery Chargers
- Two-(2) x 600/415V Auxiliary TXs
- 415V Distribution Boards
- 415V ATS
- 125V Distribution Boards
- One-(1) x Common Equipment Panel
- One-(1) x 1500V DC REC
- All Earth and Negative Bars
- Two-(2) x 125V DC 56C210 Switched 2 Flat Pin IP66 Socket special purpose outlets (one at each side of DCCB cubicles)
- All Security System Equipment
- All Fire Protection System Equipment

The Contractor must complete a detailed pre-delivery inspection of all equipment. An acceptance inspection, including any applicable test, is required to be undertaken to each item of equipment to ensure there is no transit or handling damage or defects to that equipment prior to delivery on Site. The detailed pre-delivery inspection is to include a photographic record and an applicable ITP and ITC completed by a competent person entrusted with the responsibility to supervise the delivery, test and installation processes of that equipment. The results of the photographic record, ITP are to be dated and signed by the competent person. Any damage to equipment is to be reported to the Principal within twenty-four-(24) hours and a copy of the photographic record and ITC sent to the Principal within seven-(7) days.

Prior to installation of the new electrical equipment in the substation building, the Contractor must ensure that the substation building:

- perimeter fencing has been installed to the security level for the location;
- is dust free; and

- is water proof

All major equipment to be installed or tested in the new substation must be installed and tested by the Contractor to the manufacturer's and/or supplier's requirements.

2.6.3 Type Approval

All equipment installed in the Granville Junction Substation must be type approved by ASA prior to commissioning of that equipment. Current ASA type approved equipment can be found on http://www.asa.transport.nsw.gov.au/ts/asa-standards/type-approvals.

Pre-ASA (RailCorp) type approved equipment and standard arrangements can be found on the ASA data base at http://www.asa.transport.nsw.gov.au/ts/railcorp-engineering-standards/electrical/electrical-design-information. Prior to ordering any pre–ASA (RailCorp) type approved equipment, the Contractor must confirm the validity of the type approval with ASA.

Table 3 lists equipment that is currently undergoing the ASA type approval process or is proposed to be submitted for type approval. The Contractor must contact ASA to ensure the type approval process has advanced sufficiently and gained ASA endorsement prior to placing any purchase order.

Product	Manufacturer	Description
11kV Switchgear	Schneider Electric	SM6
Rectifier Transformer	Tyree	5.35MVA Rectifier transformer
33kV Harmonic Filter	Schneider Electric	C-Type Filter
1500V DCCB + Switchgear	Hawker Siddeley	Metal Clad Lightning NDC + SafeBond

Table 3 Equipment currently submitted to ASA for Type Approval

Non type approved equipment will need to obtain type approval from ASA by the Contractor in a timely manner to meet the commissioning date. Refer to ASA Electrical Type Approvals Technical Note – TN 050:2014 (or updated version when published).

The Contractor must ensure that the management, application, assessment and approval process for any new non-type approved equipment proposed to be installed does not cause delay or effect the ORD of the Project.

Schneider WSA 33KV Switchgear continues to be able to be supplied to PSU Substation projects and has never been 'suspended'. This is an existing type approved product and it is still permissible for this product to be installed in the RailCorp HV network.

AEO accredited designers are responsible to install equipment, such as the WSA 33KV Switchgear, in accordance with manufacturers requirements and in a manner that reflects the AFL classification. The design will mitigate (or limit) exposure to all the hazards from potential arc faults in AC Switchgear including the installation arrangement of the equipment proposed, the administrative controls for operation and appropriate barriers and signage.

In relation to the AFLR classification in Table 2.This table determines four sides arc fault containment is required for NEW 33KV Switchgear which is required to be type approved by ASA to comply with EP 01 00 00 01 SP and hence requires an AFLR internal arc classification.

2.7 Sustainability

As a minimum, the following sustainability initiatives are to be implemented by the Contractor:

(a) Recycling of building material and/or re-salvaging for reuse demolished building structures at Site (including any demolished material from the decommissioned existing Granville Substation); and

(b) Collection of rainwater in water recycling tank and reuse of water in substation facility.

The Contractor must submit proposals on implementing the above sustainability initiatives and any additional sustainability initiatives (*in accordance with the TfNSW Standard 7TP-ST-114/7.0 – NSW Sustainable Design Guidelines)* to the Principal for review and endorsement.

The TfNSW Sustainable Design Guidelines Checklist to be updated by the Contractor at each stage of the Project and submitted to the Principal for review and endorsement is attached to Appendix I.

2.8 Decommissioning of Existing Granville Substation

The scope of works for the decommissioning of the existing Granville Substation includes the following items:

(a) Decommissioning of all electrical equipment following commissioning of the new Granville Substation;

(b) Decommissioning of SCADA and Telecommunications equipment and cabling following the decommissioning of electrical equipment in accordance with Sydney Trains Procedure PR M 50757; and

(c) All incidental items necessary to deliver the complete Works.

2.9 Demolition of Existing Granville Substation

The scope of works for the demolition of the existing Granville Substation includes the following items:

(a) Removal of all hazardous and contaminated material from the building and disposal to an approved facility. Refer to Hazardous Materials Investigation in Exhibit F. Documented proof of delivery and disposal receipts to be provided to the Principal within seven-(7) days;

(b) Disconnection of all HV/LV services, water supply, stormwater and sewer to the Site;

TfNSW confirms that redundant cables that are not direct buried or encased in sand are to be completely removed (conduits and pits to remain). Redundant cables that are direct buried are also to be removed to the rail corridor boundary. Any redundant cabling unable to be physically removed must be identified on the DSS as redundant.

(c) Removal of redundant electrical equipment (required as spares) and transportation to a Sydney Trains depot/facility within a 100km radius of the existing Granville Substation. Contractor must be responsible to manage and fund all costs associated with the delivery of all equipment required to be retained by Sydney Trains;

(d) All equipment must be removed and transported in an appropriate manner as per manufacturer's requirements;

(e) Removal of all remaining electrical equipment and disposal to an approved facility within a 100km radius of the existing Granville Substation;

(f) Demolition of the building structure to ground floor slab only including roof, walls, windows, doors and security fencing;

(g) Transportation of all non-ferrous metals recovered from the demolition of the existing Granville Substation to the Sydney Trains facility in Chullora. Contractor must be responsible to manage and fund all costs associated with the transport and delivery of these items;

(h) Removal of all demolished material from Site including rubbish, debris, stockpiles, spilled oil etc. and disposal to an approved facility;

(i) Levelling, grading and compaction using imported road base material to a maximum 5 degree fall to existing direction of stormwater flow for prevention of ponding upon completion of the demolition works;

(j) Backfilling of cable pits and topped with road base material to match new Site levels upon completion of the demolition works;

(k) Removal of the existing substation security fencing and concrete hob upon completion of the demolition works; and

(l) All incidental items necessary to deliver the complete Works.

Upon completion of the demolition works, the Site must be:

- Maintenance free and require no periodic maintenance activities or inspections when completed;
- Trafficable with no obstructions to Site access gates or access roads.

Soil remediation of the existing Granville Substation Site is not included in the Works for the Project.

2.10 Detailed Site Survey (DSS)

From the date of this Contract, the Contractor must update the existing Detailed Site Surveys for each Site on a monthly basis in accordance with the RailCorp Engineering Standards for Detailed Site Surveys shown in Appendix D and in Exhibit F of the Contract.

For areas of the Site that are not contained in the existing DSS, a new DSS must be prepared by the Contractor and updated on a monthly basis with the existing DSS.

2.11 General Requirements

2.11.1 Assurance of Works

The Contractor must assure the Works provided in its entirety under this brief.

The Contractor must be responsible for the Safety Assurance of the Works.

This change has been assessed as "Minor".

2.11.2 Authorised Engineering Organisation Status

All engineering tasks must be undertaken under the authority of an Authorised Engineering Organisation in accordance with ASA Requirements.

2.11.3 Application of AEO Engineering Management Methodologies

The Contractor must 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 this Contract.

This includes application of the requirements within ASA Standard T MU MD 00009 ST “AEO Authorisation Requirements”.

2.11.4 Application of Management Plans

The Contractor must develop and submit in accordance with the Contract an appropriate management plan (or suite of plans) which define how the engineering management methodologies are applied to the Works. These plans must be in accordance with Section 5 of this Works Brief.

The Contractor must work in accordance with these plans that have not been rejected by the Principal.

All revisions to the management plans must be submitted to the Principal in accordance with the Contract.

2.11.5 Configuration Change Control

TfNSW will have a Tier 2 CCB and CMAAC to approve configuration changes at the Configuration Management Gates as per the TfNSW Configuration Management Plan T MU AM 04001 PL.

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 CMP and are managed and submitted to the Principal's Representative in accordance with the requirements of the Contract.

2.11.6 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. Refer to Section 5 for the deliverables to be prepared for CMAAC Gate 5 handover phase.

3 Interfaces

Interface requirements with relevant stakeholders are detailed below and provided in an interface schedule in Appendix E of this document for Sydney Trains interface works.

3.1 Works/Services Interfaces with Third Parties

This section provides the details for any Third Party interfaces for the Works not already listed in Exhibit I of the Contract.

Stakeholder	Interaction
Sydney Trains	Refer to Appendix E – Interface Schedule. The Contractor must 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 and 3.
Parramatta City Council	Asset owner, operator and maintainer of all roads and stormwater drainage infrastructure. To be consulted and agreement obtained on all works and services that have an operational or maintenance impact on roads and stormwater drainage infrastructure. The Contractor must prepare Dilapidation Survey upon commencement of the Works and submit to Parramatta City Council for acceptance. The Contractor must design the new substation in accordance with the following council comments, standard requirements and guidelines: i. Council drainage system diagram for this area indicate that stormwater drainage pipelines originating at Jamieson St and Railway Parade near Bold St Bridge pass through Sydney Trains offices to east of proposed substation site to connect to the pipeline which is proposed to be diverted. All stormwater drainage pipelines connecting to pipeline proposed to be diverted are to be located, mapped and included in design details to avoid disruption to these services post works. The investigations should include internal CCTV camera inspection of pipeline to be diverted. It is also requested that CCTV camera inspection of that part of Councils stormwater drainage system, as indicated above, which passes through Sydney Trains offices east of proposed substation site also be undertaken as part of these works. Council has recently received several complaints of localised flooding around Jamieson St/Railway Pde and it is suspected that they may be a blockage in this section of the pipeline. If this turns out to be the case, the co-operation of Sydney Trains/Transport for NSW is requested in clearing the blockage and reinstating full pipe capacity; ii. All proposed works to be in accordance with requirements set out in Council's "Stormwater Disposal Policy" and the Stormwater section of the Draft Design and Development Guidelines; iii. Proposed pipeline diversion to be designed and constructed

Stakeholder	Interaction
	such that there is no reduction in existing pipe system capacity and no adverse impacts relative to current conditions upstream of diversion. In order to minimise increase in hydraulic losses introduced by junction pits/change of direction it is recommended that consideration be given to diverting pipe direct from pit in Railway Pde to proposed driveway entrance; iv. Suitable overland flow path to be provided over pipeline diversion to manage stormwater flows in excess of pipe capacity up to 100 year ARI design flows through proposed substation. Given proposed Site use it is considered appropriate to provide minimum 500mm freeboard to floor level of adjacent structures above predicted 100 year ARI overland flow surface level; v. Dedication to Council of easement minimum 3 metres wide over diverted pipeline and abovementioned overland flow path through proposed substation site; vi. Search and locate all services (water, gas, sewer, telephone, power etc) in vicinity of proposed pipeline diversion; and vii. Submit construction plans detailing proposed diversion works to Catchment Management/Civil Infrastructure Unit of Council for approval prior to commencement of any work on Site. Details should include:- • Longitudinal sections with pit/pipe invert levels, pipe sizes/slopes and ground levels. • Grade line analysis • Location and level of all utilities to confirm no conflict with such services and compliance with all utility authority requirements in regard to minimum clearances, access etc The Contractor must provide evidence of stakeholder consultation with Parramatta City Council for CCB submission at Control Gates Stages 2 and 3.
Sydney Water	Asset owner, operator and maintainer of the water supply, and sewer system infrastructure. To be consulted and agreement obtained on all works and services that have an operational or maintenance impact on the water supply, and sewer system infrastructure. The Contractor must obtain Section 73 Compliance Certificate and all necessary approvals and permits from Sydney Water prior to commencing construction of the water supply and sewer connections. The Contractor must provide evidence of stakeholder consultation with Sydney Water for CCB submission at Control Gates Stages 2 and 3.

Table 4 List of Stakeholders and Interaction

4 Activities

Table 4 below contains a summary table of additional specific project activities that the Contractor must complete in addition to the requirements contained in the TSR and elsewhere in the Contract.

The sections below this summary table outline further details of any requirements of these activities that the Contractor must meet.

Activity Item	Requirements Wording Reference	Activity Deadline	Activity Recurrence
Meetings	Works Brief Section 4.1	7 days from execution of Contract	Every 7 days there after
Review of Design Packages	Works Brief Section 4.2	As required by the Principal Representative	As required by the Principal Representative
PHL Workshops	Works Brief Section 4.3.1	20 Business Days before the scheduled CCB Meeting for Control Gate Stage 2	Monthly then 20 Business Days before the scheduled CCB Meeting for Control Gate Stages 3, 4 and 5
Security Workshop	Works Brief Section 4.3.2	10 Business Days from execution of Contract	-
Audits	TfNSW Standard Requirements Section 2.11 Works Brief Section 4.3.2	As required by the Principal Representative	As required by the Principal Representative

Table 5 Activities Requirements Summary

4.1 Meetings

During the concept design and detailed design phases of the Project, the Contractor must attend weekly meetings with the Principal at Zenith Building, 821 Pacific Highway, Chatswood NSW 2067.

During the construction and commissioning phases of the Project, the Contractor must attend weekly meetings with the Principal at the Site Office of the Project.

The meetings must be chaired and minutes prepared by the Principal's Representative.

4.2 Review of Design Packages

During the regular review meetings between the Principal and the Contractor, the concept and detailed design packages may be progressively reviewed by the Principal's Representative.

When requested by the Principal, the Contractor must update and forward all "work in progress" concept and detailed 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.

4.3 Workshops

4.3.1 Project Hazard Log Workshop (PHL)

During the concept design, detailed design, construction and commissioning phases of the Project, the Contractor must prepare the PHL by conducting monthly workshops with the key stakeholders (including Sydney Trains Operations and Maintenance) identified in Section 3 and identify any new project hazards with the relevant control and mitigation measure.

The Contractor must submit the updated PHL prior to the CCB meetings scheduled for Control Gates 2 (Concept Design), 3 (Detailed Design), 4 (Construction) and 5 (Commissioning).

Appendix F contains TfNSW's standard risk matrix which must be followed for all PHLs relating to the Project.

4.3.2 Security Workshop

Prior to the development of the Concept Design, the Contractor must arrange and facilitate a security workshop with the key stakeholders including TfNSW Security Division, ASA and Sydney Trains North Region.

The purpose of the security workshop is for the key stakeholders to determine the Category Level of Security for the Granville Junction Substation in accordance with *"RailCorp Security Standard RSS003 – Substations – 2009".*

4.4 Audits

4.4.1 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 Deliverable Requirements

The timing of the deliverables below must be relative to the project milestones and phases for design, construction and commissioning as detailed in Schedule 1 of the Contract.

Table 4 below contains a summary table of technical deliverables that the Contractor must supply, and their timing and recurrence.

Item	Requirements Wording Reference	Initial Submission	Subsequent Submissions
Stakeholder Consultation Strategy	Works Brief Section 5.10	20 Business Days from execution of Contract	As required
System Requirements Specification (SRS)	Works Brief Section 5.8.2	30 Business Days from execution of Contract	-
Safety Assurance Plan (SAP)	Works Brief Section 5.9.1	20 Business Days before the scheduled CCB Meeting for Control Gate Stage 2	Update 20 Business Days before the scheduled CCB Meeting for Control Gate Stages 3, 4 and 5
Project Hazard Log (PHL)	Works Brief Section 4.3.1	20 Business Days before the scheduled CCB Meeting for Control Gate Stage 2	Monthly then 20 Business Days before the scheduled CCB Meeting for Control Gate Stages 3, 4 and 5
Assurance Certificate	Works Brief Section 5.7	20 Business Days before the scheduled CCB Meeting for Control Gate Stage 2	20 Business Days before the scheduled CCB Meeting for Control Gate Stages 3, 4 and 5
RAATM	Works Brief Section 5.8.3	20 Business Days before the scheduled CCB Meeting for Control Gate Stage 2	20 Business Days before the scheduled CCB Meeting for Control Gate Stages 3, 4 and 5
Concept Design Report	Works Brief Section 5.2.2	35 Business Days from execution of Contract	-
Detailed Design Report	Works Brief Section 5.2.2	85 Business Days from execution of Contract	-

Item	Requirements Wording Reference	Initial Submission	Subsequent Submissions
Reliability, Availability, Maintainability and Safety Study (RAMS)	Works Brief Section 5.2.2	85 Business Days from execution of Contract	-
Sydney Trains Configuration Change Plan	Works Brief Section 5.5	20 Business Days before the scheduled CCB Meeting for Control Gate Stage 2	-
Safety Risk Summary Report (SRSR)	Works Brief Section 5.9.1	20 Business Days before the scheduled CCB Meeting for Control Gate Stage 3	20 Business Days before the scheduled CCB Meeting for Control Gate Stage 4 and 5
WAE Drawings	Works Brief Section 5.6.2	30 Business Days after completing Construction and/or commissioning	-

Table 6 Deliverable Requirements Summary

All timing of the deliverables below must be relative to the project milestones and phases during design and construction stages.

The Contractor must submit to the Principal all the required CCR deliverables twenty-(20) Business Days before the CCB meeting.

The Contractor is required to work collaboratively with the Principal for the submission of all deliverables and attend all meeting with the appropriate responsible personnel requested to ensure the submission of all deliverables are achieved at the appropriate time and with the appropriate quality of submission required.

It is the Contractor's responsibility to ensure that the deliverables supplied are of an acceptable quality to ensure successful approval by the CCB.

It is the Contractor's responsibility to ensure that if any conditions imposed by the CCB are closed prior to proceeding to the next project phase.

The Contractor's Program must identify CCB submission dates, and must allow for the preparation, submittal and review cycles for CCB approval.

The Contractor is referred to the following documents in regard to Configuration Change and TPO responsibilities for Configuration Change application to the TPO CCB:

- ASA Configuration Management Guide, TS 10751
- TPO Configuration Management Standard, 4TP-ST-192
- TPO Configuration Change Request, 4TP-FT-256 for CCB submission.

5.1 Management Plans

5.1.1 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 and ASA accreditation as an AEO;

(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

(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 appropriately qualified and 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 - 4TP-RL-004" 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; and

(s) all designs comply with relevant Codes and Standards.

5.2 Design Deliverables

5.2.1 Concept and Detailed Design

With reference to the Preliminary Design as supplied in Exhibit H of the Contract, the Contractor must prepare both the Concept and Detailed Design for the Project.

As a minimum, the Contractor must develop the Concept and Detailed Design packages containing the Traction Supply, HV Electrical, 1500V Feeder Cable, Civil, Structural, Mechanical, Architectural, Ventilation, Access, Egress, Electrical, Earthing, Communications, Building Services, Security and Fire Engineering designs addressing all items contained in Section 2 of the Works Brief.

Concept Design is defined as the deliverables (including drawings and reports) produced by the Contractor in further developing the Preliminary Design provided by the Principal to meet the performance and functionality criteria outlined in both the Works Brief and System Requirements Specification (SRS), with the final output being CCB approval at CGS2. Refer to Sections 7.4.2, 19.4 and 19.5 of ASA Management Standard TS 10504:2013 – AEO Guide to Engineering Management.

Detailed Design is defined as the deliverables (including drawings and reports) produced by the Contractor in further developing the Concept Design approved at CCB CGS2 to enable construction and commissioning activities to commence, with the final output being CCB approval at CGS3. Refer to Sections 19.6 of ASA Management Standard TS 10504:2013 – AEO Guide to Engineering Management.

5.2.2 Design Reports

The Contractor must submit design reports for the concept and detailed designs of the Works.

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

vi. staging and sequencing drawings;

(h) Verifier certification (where applicable);

(i) safety in design demonstration (including compliance with the SAP, identification of the hazards addressed by the design and identification of hazards that will be transferred to the eventual asset owner);

(j) 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;

(k) sustainability in design demonstration, including how the sustainability initiatives as identified in the Contract have been addressed;

(l) 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.;

(m) a construction review, including construction methodology and operations staging (including identification of works requiring track possessions);

(n) a schedule of any approved ASA concessions to published standards;

(o) demonstration of compliance with environmental management requirements and the Planning Approval;

(p) demonstration of compliance with the requirements of the Project Definition Documents. Any non-compliances must be identified;

(q) demonstration of workmanship, material, product and equipment specifications (including certification of type approval for new materials, products or equipment);

(r) design calculations;

(s) documentation of outstanding issues that may affect the design;

(t) certification obtained by the Contractor from the BCA consultant that the design is in accordance with the fire and life safety requirements of the BCA, the EP&A 1979 NSW, and the Environmental Planning and Assessment Regulation 2000 NSW;

(u) demonstration of compliance with any conditions of approval from Office of Environment and Heritage;

(v) an Asset Maintenance Strategy;

(w) an Asset Operations Strategy;

(x) outline any requirements for ITPs, Hold Points and Witness Points, together with the criteria for acceptance/release;

(y) 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.

5.3 Design Life

For the architectural, civil and structural design of the Project, the design life must satisfy the durability requirements as specified in the applicable Australian and ASA Standard.

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.) must be included in the schedule of maintenance works upon handover.

5.4 Standards and Codes

The Contractor must comply with the relevant Codes and Standards required by the Contract and any other that are applicable to the Project. A list of standards and codes referenced in this Works Brief is provided in Appendix C.

The Contractor must detail any ambiguity, inconsistency or discrepancies found between the standards, guidelines and codes, and assess the impact and seek clarification from TfNSW prior to commencing any work or design related activity. In such cases, the standard, regulation or code, which specifies the greatest level of service or gives the highest standard, must generally apply.

In addition, refer to Appendix D for TfNSW clarifications to standards.

5.5 Sydney Trains Configuration Change Plan

The Contractor must 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 must obtain approval for the configuration change plan from Sydney Trains at least twenty-(20) Business Days before the scheduled CCB meeting for CGS 3.

The Contractor must submit all configuration materials to Sydney Trains within the agreed timeframe.

5.6 Sydney Trains Virtual Planroom

5.6.1 Concept and Approved for Construction (AFC) Design

Within thirty-(30) Business Days of receiving CCB approval at CGS 2 and 3, the Contractor must submit both the concept and AFC design drawings to the Principal in both CAD and PDF formats for lodgement in the Sydney Trains Virtual Planroom by the Principal. AFC drawings must include the Principal's CCB's Configuration Control Approval Number (CCAN) prior to commencement of works.

5.6.2 Work As Executed (WAE) Drawings

Within thirty-(30) Business Days of completing construction and/or commissioning, the Contractor must 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 must submit the WAE drawings to the Principal in both CAD and PDF formats for lodgement in the Sydney Trains Virtual Planroom by the Principal.

5.7 Assurance Certificate

The Contractor must provide an assurance certificate to certify to the Principal that:

- the AEO's accredited processes have been applied to the certified Works and Contractor's Activities;
- the Works and Contractor's Activities comply with the requirements of the Contract; and
- 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 must clearly identify the Works for which the certificate applies and must be signed by the authorised representative of the AEO.

5.8 Systems Engineering Deliverables

5.8.1 Business Requirements Specification (BRS)

The BRS (or applicable excerpt) is provided in Appendix B and details the overall business requirements of the project.

The Contractor must ensure that all Works and activities comply with the requirements set out in the BRS.

These business requirements must be validated as part of the Contractor's verification and validation activities.

5.8.2 System Requirements Specification (SRS)

Based on the BRS provided by the Principal in Appendix B, the Contractor must prepare a System Requirement Specification (SRS) document based on relevant standards and codes and details of system requirements of the substations and sectioning huts as per this Works Brief.
The SRS must be categorised under the following three-(3) categories:

- Operational Requirements - Specify the business wants and what a system or a system component must be able to achieve.
- Non-Functional Requirements - Specify non-technical constraints that are needed to support the functionality of the system.
- 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 must include those detailed in this Works Brief and as determined from the stakeholder consultation.

The Contractor must 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.

5.8.3 Requirements Management

As a minimum, a Requirements Analysis, Allocation and Traceability Matrix (RAATM) must 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 submission to the TfNSW I&S – Program delivery CCB for Control Gate Stages 3, 4 and 5.

5.9 Safety Assurance Deliverables

5.9.1 Safety Assurance Plan (SAP)

The Contractor must prepare a SAP that defines all System Assurance activities, deliverables and management arrangements throughout the period for the Works.

The SAP must include the schedule for the delivery demonstrating the Works have been constructed, tested, commissioned and integrated into the existing network as per ASA requirements. The SAP must demonstrate compliance with all PSU SAP requirements outlined in Appendix G.

The Contractor must ensure that all systems engineering reports and documents and verification/validation activities are developed and coordinated as per the SAP.

The Contractor must prepare and present safety risk and associated safety requirements through the development of a Safety Risk Summary Report (SRSR) that demonstrates that a review of the identified hazards has taken place and that appropriate controls have been identified in line with SFAIRP principles. The Contractor must adopt any items carried over from the design stage risk and hazard logs and incorporate these into the construction risk and hazard logs.

At the end of each project lifecycle phase, the Contractor must present an updated SRSR that demonstrates the safety risks presented by the Project and that appropriate controls have been identified in line with the SFAIRP principles and implemented. The SRSR must demonstrate compliance with all PSU SRSR requirements outlined in Appendix G.

The Contractor must undertake verification of Systems and Safety Requirements within the design documentation and will generally be through traceability within the Requirements Analysis Allocation and Traceability Matrix (RAATM) managed as part of the overall project requirements management. Any safety outcomes identified during the project needs to be included in the RAATM as a safety requirement to demonstrate traceability.

All identified Systems and Safety requirements must be verified during construction and commissioning. The outcome of the verification process must be captured and presented in the updated safety risk summary report by the Contractor. Any residual risks and requirements must be clearly identified and transferred to the Operator and Maintainer upon handover.

5.10 Stakeholder Consultations

The Contractor must review the Principal supplied Stakeholder Consultation Strategy and prepare and submit a revised Stakeholder Consultation Strategy to the Principal (for the remaining phase of the Project) for review and acceptance, within twenty-(20) Business Days of the date of this Contract.

The Stakeholder Consultation Strategy must identify internal (TfNSW stakeholders) and external stakeholders (e.g. Sydney Trains, NSW Trains, neighbours, utilities, NSW Heritage Branch etc.) and describe the consultation activities to be undertaken by the Contractor.

As a minimum, the Contractor must:

(a) Undertake consultation with all relevant stakeholders to seek their endorsement of the detail design prior to submission to the Principal for review.

(b) Undertake consultation with all relevant stakeholders to seek their endorsement of the Contractor's construction and Site investigation activities prior to undertaking any Site works.

(c) Arrange stakeholders meetings and/or presentations prior to formal design submissions, or as requested by the Principal's representative, to inform stakeholders of design progress and specific design issues that require attention.

(d) Provide sufficient notice (minimum 1 week) to 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 correspondences with external Government agencies for review by the Principal before undertaking the correspondence.

(h) Invite the Principal's Representative, or its delegate to attend any meetings with external agencies.

(i) Provide to the Principal any return correspondence/meeting minutes with stakeholders in a timely manner.

6 Commissioning Requirements

The Contractor must 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 into operational service for the rail network. The Contractor must 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 must be carried out in a manner which ensures safe operation at all times. Testing and commissioning must demonstrate to the satisfaction of all stakeholders and the Authorities concerned, that both the design requirements of the Project and all law have been satisfied.

The purpose of detailing the testing and commissioning is to ensure that:

- Sub-systems, when integrated, provide the functionality and performance mandated by the project's user requirements and principal requirements;
- The system meets all functional and operational requirements;
- The system aligns correctly with other systems, to provide the full system interchange functionality;
- The factory acceptance testing and type testing of components or unit-level elements meets their specifications; and
- The system acceptance testing and system integration testing of system elements meets their specifications.

6.1 Commissioning and Operational Readiness Management Team

In accordance with the Power Supply Upgrade (PSU) Program Operational Readiness Plan (ORP) included in Schedule 9 of the Contract, an integrated Commissioning and Operational Readiness Management Team (CORMT) must be established and a Commissioning and Operational Readiness Activity Schedule (CORAS) developed for each Commissioning Event.

The Commissioning and Operational Readiness Management Team (CORMT) must be established by the Contractor at least six-(6) 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 must be appointed for the whole project rather than for each separate Commissioning Event. As a minimum, the CORMT must have the following representatives:

- Project Manager;
- Project Commissioning Manager;
- Operator/Maintainer representatives;

- Transport Projects Project Manager;
- Transport Projects Operational Readiness Project Manager;
- Specialised Commissioning Resources; and
- Other Key Stakeholders.

The CORMT must hold regular meetings, to occur as a minimum of monthly progressing to weekly as the commissioning event approaches. CORMT meeting minutes must 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 must be distributed to members of the CORMT and relevant stakeholders.

The CORMT must 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 project objectives, the commissioning objectives and the project 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 and 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 project 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, the operator / maintainer 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 Contract under "Commissioning and Operational Readiness Timeframe requirements". These timeframes are guidelines and must be agreed in Operational Readiness Management Team meetings.

6.2 Commissioning Resources

Testing and commissioning resources need to be competent to undertake their role. The Contractor must comply with TS 10503:2013 AEO Guide to Engineering Competence Management in assessing and maintaining testing and commissioning resources competency.

In addition to testing and commissioning activities, the Contractor must note that certain activities requiring access to RailCorp electrical infrastructure must require supervision from Authorised Person(s) accredited under Personnel Certifications – Electrical PR D 78701.

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 example, Authorised Persons includes the following roles and certifications:

- Authorised Officer – Mains (AES06)
- Authorised Officer – Substation (AES07)
- Authorised Operator – Substation (AES08)
- Authorised Traction Operator – Mains (AES16)

For the testing and commissioning activities that require interface with the operational network and Authorised Person(s) from Sydney Trains, the Contractor must 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 must 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 must 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 must make the request to Sydney Trains on behalf of the Contractor and, if applicable, must 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, testing and commissioning, the Contractor must work in a collaboratively manner with the Principal to develop a new activity schedule and deliverable timeframe for each activity concerned.

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.

6.3 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 must 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 project, 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 must include an assessment of the potential risks to commissioning and setting the minimum mitigation requirements for the project'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 must 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 must 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, and any other relevant project documentation;

(m) Provide detailed Testing and Commissioning Resourcing Schedule for all commissioning activities, indicating Testing and Commissioning Resource Requirements, Names and Authorisations of all proposed Testing and Commissioning Personnel, Note: All Testing and Commissioning staff required to complete the works are to be provided by the Contractor;

(n) Schedule of Commissioning Events (SoCE) – this schedule must identify individual commissioning events including; a description of the scope of work to be commissioned and handed over, submission of individual ITPs, 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 must 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.

6.4 Commissioning Event Plans

A Commissioning Event is a project milestone which occurs for a given scope of work when the Principal accepts that the relevant assets are suitable for operation, the relevant assets are handed over to the Asset Owner and to the Operator/Maintainer, and the Asset Owner and the Operator/Maintainer accept the relevant assets by commencing operations.

The Contractor must prepare a Commissioning Event Plan (CEP) for each Commissioning Event. Each CEP must 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 must 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 the Operator/Maintainer 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 the Operator/Maintainer 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.

7 Inspection, Testing and Quality Requirements

The Contractor must perform inspection and testing activities in order to demonstrate conformity of the product to the specified requirements. This inspection and testing must 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 D&C Contract requirements (final or acceptance inspection and testing).

The Quality Management Plan (QMP) must describe the Contractor's methodology and processes for inspection and testing.

7.1 Inspection and Test Plans

The Contractor must prepare Inspection and Test Plans (ITPs) for all activities associated with the project. The ITPs must be submitted to the Principal for information a minimum of four-(4) weeks prior to the commencement of the activity.

The Contractor must prepare, maintain and update inspection and test plans in accordance with TfNSW Inspection and Test Plans - Minimum Requirements - 4TP-RL-002 (refer to Appendix H).

Within two-(2) Business Days of the tasks defined in the document being completed, the Contractor must submit all ITPs, inspection, test and verification records and test sheets to the Principal.

7.2 Hold Points and Witness Points

The Contractor must plan, document, manage approval and implement a regime of inspection and testing plans for each stage of the Works to verify the Works are delivered in accordance with the requirements of the Contract and the detailed design

All ITP's for the Project will be subject to a TfNSW Judgement of Significance (JOS).

The hold and witness points to be contained within the inspection and test plan will be ranked and agreed with the Principal prior to commencement of the Works. The entries completed for hold and witness point recorded are subject to review by the Principal and/or by a compliance audit arranged by the Principal at any stage of the works.

All inspection and testing plans and records must be delivered to the Principal within 7 days on request at any stage of the delivery of the Project and at the Practical Completion stage of the Project. The records must be maintained by the Contractor for a period for one-(1) year after Final Completion.

From the ITPs, the Contractor must 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 must 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 must constitute a hold point. Three-(3) weeks prior to the FAT's, taking place, the Contractor must issue to the Principal an invitation to attend the tests. The invitation must be accompanied with test details including methodology and Pass/Fail criteria.

7.3 Close out of Work Lots and Release of Products

Work lots must 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 must not be closed out until the non-conformity has been rectified and closed out.

7.4 Non-Conformance and Corrective Action

The Contractor must establish and maintain a "Non-conformance Register" and a "Corrective Action Register" to record a summary of non-conformances and corrective actions. The registers must be established prior to the start of the Contractor's activities.

The Contractor must 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 must 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 must 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.

7.5 Monitoring and Measurement of Product

All laboratory tests required for the works must be performed by independent laboratories with current registration under a Joint Accreditation System of Australia and New Zealand (JAS-ANZ) registered authority.

Appendix A – Technical Specification

Appendix B - Business Requirements Specification

Appendix C – Standards and Codes

This table lists standards and codes applicable to this Works Brief.

Reference Number	Title	Version	Issue Date
Asset Standards Authority (ASA)			
All Disciplines			
T MU MD 00001 SP	Network Standards Numbering System	1.0	02/05/2014
T MU MD 00002 ST	Network Standards Governance	2.0	26/08/2015
T MU MD 00011 ST	Concessions to ASA Requirements	2.0	22/09/2015
T MU MD 00011 F1	Request for Concession to ASA Requirement	2.0	22/09/2015
T MU MD 00011 F2	Request for Review of Nonconformance to ASA Requirement	1.0	22/09/2015
T MU MD 00011 F3	Notice of Concession	2.0	22/09/2015
T MU MD 00011 F4	Notice of Review of Nonconformance	1.0	22/09/2015
Authorised Engineering Organisations			
T MU MD 00007 ST	AEO Authorisation Governance Framework	2.0	01/12/2014
T MU MD 00008 GU	AEO Guide to Authorisation	2.0	01/12/2014
T MU MD 00009 ST	AEO Authorisation Requirements	2.0	01/12/2014
TS 10503	AEO Guide to Engineering Competency Management	1.0	06/06/2013
TS 10504	AEO Guide to Engineering Management	1.0	04/06/2013
TS 10506	AEO Guide to Verification and Validation	1.0	30/08/2013
TS 10507	AEO Guide to Systems Integration	1.0	30/08/2013
TS 20001	System Safety Standard for New or Altered Assets	1.0	24/06/2013
T MU EN 00006 GU	AEO Guide to Noise and Vibration	1.0	28/10/2015
T MU HF 00001 GU	AEO Guide to Human Factors Integration	2.0	22/08/2014
T MU MD 00003 GU	Guide to Independent Safety Assessment	1.0	15/05/2014
T MU MD 00004 TI	Independent Safety Assessor (ISA) Requirements (Interim)	1.0	15/05/2014
Civil			
T HR CI 12005 ST	Underwater Examination of Structures	1.0	16/04/2014
T HR CI 12030 ST	Overbridges and Footbridges	1.0	13/04/2015
T HR CI 12070 ST	Miscellaneous Structures	1.0	07/04/2014
T HR CI 12072 ST	Track Slabs	1.0	30/06/2015
T HR CI 12080 ST	External Developments	1.0	05/02/2015
T HR CI 12100 ST	Geotechnical Risk Assessment and Hazard Management	1.0	07/08/2014
T HR CI 12101 ST	Geotechnical Problem Management	1.0	07/08/2014
T HR CI 12105 ST	Vegetation Hazard Management in the Rail Corridor	1.0	24/04/2015
T HR CI 12110 ST	Earthworks and Formation	1.0	06/10/2015
T HR CI 12111 SP	Earthwork Materials	1.0	05/09/2014
T HR CI 12130 MA	Track Drainage	1.0	04/09/2015
T HR CI 12130 ST	Track Drainage	1.0	09/04/2015
T HR CI 12135 ST	Rainfall Monitors	1.0	11/12/2014
T HR CI 12180 ST	Active Transport Links on the Rail Corridor	1.0	05/05/2015

Reference Number	Title	Version	Issue Date
T HR CI 12190 ST	Service Installations within the Rail Corridor	1.0	03/09/2015
T HR CI 12200 ST	Access Roads	1.0	04/04/2014
Configuration Control			
TS 10752	Railway Asset Product Configuration Information Requirements	1.0	19/04/2013
TS 10753	Assurance and Governance Plan Requirements	1.0	04/02/2014
T MU AM 00002 GU	Assurance and Governance Plan - Guidelines	1.0	17/07/2014
T MU AM 04001 PL	TfNSW Configuration Management Plan	4.0	14/08/2015
T MU AM 04002 GU	CMAAC Submissions Guide	1.0	22/06/2015
T MU AM 04003 GU	Configuration Management Guide	1.0	16/09/2015
TN 003: 2013 version 2	Change Authorisation Process for Proposed Operating Diagrams	2.0	21/08/2014
Electrical			
T HR EL 00001 TI	RailCorp Electrical System General Description	1.0	19/03/2014
T HR EL 00002 PR	Electrical Power Equipment - Integrated Support Requirements	1.0	15/05/2014
T HR EL 00004 ST	Buildings and Structures under Overhead Lines	1.0	08/05/2014
T HR EL 01001 SP	11kV Indoor Switchgear - SCADA Controlled	1.0	16/09/2014
T HR EL 08001 ST	Safety Screens and Barriers for 1500 V OHW Equipment	1.0	12/03/2014
T HR EL 08002 ST	Relative Positions of Signals and Open Overlaps	1.0	19/03/2014
T HR EL 08003 ST	Level Crossings - OHW Requirements	1.0	19/03/2014
T HR EL 08004 ST	Overhead Wiring Fittings and Materials	1.0	09/05/2014
T HR EL 08005 ST	Labels for OHW Structures	1.0	30/06/2014
T HR EL 08006 ST	Services Erected Above Overhead Wiring	1.0	10/10/2014
T HR EL 08009 ST	Designations of Overhead Wiring Conductor Systems	1.0	08/07/2015
T HR EL 08011 ST	Overhead Wiring Maintenance Standard	1.0	12/03/2015
T HR EL 100001 ST	HV Aerial Line Standards for Design and Construction	1.0	07/07/2015
T HR EL 10002 ST	HV Aerial Lines - Standard Conductors and Current Ratings	1.0	16/01/2015
T HR EL 10003 ST	Wood Pole Serviceability	1.0	16/01/2015
T HR EL 11001 PR	Design Technical Reviews for Electrical SCADA Equipment	1.0	01/05/2014
T HR EL 11001 PR F1	SCADA I/O Schedule	1.0	01/05/2014
T HR EL 12002 GU	Electrolysis from Stray DC Current	1.0	01/05/2014
T HR EL 15001 SP	Substation Electrically Safe Work Area Demarcation Taping Equipment	1.0	02/05/2014
T HR EL 17000 ST	Demarcation of RailCorp Low Voltage Distribution System	1.0	28/02/2014
T HR EL 17001 ST	Electrical Distribution System Installation Connection and Inspection	1.0	12/02/2015
T HR EL 17001 F1	Information Regarding Applications for Connection	1.0	12/02/2015
T HR EL 17001 F2	Application for Connection	2.0	07/07/2015
T HR EL 17001 F3	Application for Temporary Connection	2.0	07/07/2015
T HR EL 20001 ST	High Voltage AC and 1500 V DC Traction Power	1.0	12/03/2014

Reference Number	Title	Version	Issue Date
	Supply Cable Requirements		
T HR EL 20002 ST	1500 V DC Cables and Cable Ratings	1.0	12/03/2014
T HR EL 20003 ST	Underground Installation Configurations for High Voltage and 1500V dc Cables	1.0	25/06/2014
T HR EL 90001 PR	Polarity of AC Signalling Supplies	1.0	19/03/2014
T HR EL 90002 ST	Heavy Rail Traction System - Voltage Ratings	1.0	14/10/2014
T HR EL 90003 ST	Heavy Rail Traction System – Current Ratings of 1500 V dc Equipment	1.0	23/03/2015
T HR EL 99001 ST	Substation and Sectioning Hut Commissioning Tests and Processes	1.0	12/09/2014
TN 026: 2014	Engineering Minimum Safe Approach Distances - Ground Mounted Signal/Overhead Wiring Interface	1.0	14/03/2014
TN 050: 2014	Electrical Type Approvals - Interim process	1.0	26/06/2014
TN 016: 2015	Overbridges and footbridges – Earthing and bonding requirements	1.0	13/04/2015
Environmental Services			
T MU EN 00001 GU	Overview of the TfNSW Rail Noise Database	1.0	02/02/15
Human Factors			
T HR HF 00001 ST	Human Factors Integration – General Requirements	1.0	22/08/2014
Security			
T HR SY 10000 GU	Overview of Rail Security Standards and Interpretation Guide	1.0	15/10/2014
T MU SY 10001 ST	Public Transport Closed Circuit Television (CCTV) Functional Requirements Standard	1.0	20/03/2015
Signals and Control Systems			
T HR SC 00001 ST	Circuit Design Standard – Typical Circuits	1.0	25/06/2015
T HR SC 01030 SP	Connectors for Signalling Interface	1.0	05/03/2014
T HR SC 01031 SP	General Requirements for Labelling of Signalling Equipment	1.0	05/03/2014
T HR SC 01250 SP	Interfaces between Signalling and Control Systems	1.0	12/06/2015
T HR SC 01251 SP	Signalling Control Systems Interface Requirements	3.0	30/09/2015
T HR SC 01254 SP	Signalling Control System Serial Train Information Interface	1.0	04/04/2014
T HR SC 02000 ST	Mandatory Requirements for Signalling Safeworking Procedures	2.0	26/05/2015
Systems Engineering			
T MU AM 06001 GU	AEO Guide to Systems Architectural Design	1.0	20/04/2015
T MU AM 06002 GU	AEO Guide to Reliability, Availability and Maintainability	1.0	27/07/2015
T MU AM 06003 TI	Development of a Transport Network Architecture Model	1.0	16/10/2014
T MU AM 06004 ST	Requirements Schema	1.0	04/12/2014
T MU AM 06006 GU	Systems Engineering Guide	1.0	05/05/2015
T MU AM 06006 ST	Systems Engineering Standard	1.0	03/03/2015
T MU AM 06008 GU	Operational Concept Definition	1.0	28/05/2015
T MU AM 06008 ST	Operations Concept Definition	2.0	26/03/2015
Telecommunications			

Reference Number	Title	Version	Issue Date
T HR TE 01001 ST	Communication Outdoor Cabling	1.0	30/04/2014
T HR TE 01003 SP	Optical Fibre Termination, Patching and Management	1.0	17/03/2014
T HR TE 01004 SP	Pre-Terminated Fibre Tails and Link Cables	1.0	17/03/2014
T HR TE 21001 ST	Telecommunications Equipment Room	1.0	17/03/2014
T HR TE 21002 ST	Communications Earthing and Surge Suppression	1.0	17/03/2014
T HR TE 21003 ST	Telecommunications for Traction Substations and Sections Hut	1.0	30/04/2014
T HR TE 41001 ST	Packet Switched Networks Wired - Local, Metropolitan, and Wide Area Networks	2.0	03/10/2014
T HR TE 41002 ST	Wireless Data Communication in LIPD Class Licensed Bands	1.0	03/10/2014
T HR TE 61001 ST	Emergency Telephone Systems	1.0	22/05/2014
T HR TE 61002 SP	Analogue Two Wire Weatherproof Field Telephones	1.0	21/05/2014
T HR TE 81001 ST	Telecommunication Equipment – Physical Interfaces and Environmental Conditions	1.0	03/10/2014
T HR TE 81002 ST	Telecommunication Equipment – Network Management	1.0	03/10/2014
T MU TE 81003 ST	Test Processes and Documentation for Programmable Electronic Systems and Software	1.0	27/08/2014
RailCorp Engineering Standards			
Civil			
ESC 215	Transit Space	4.9	12/04/2013
Structures			
ESC 300	Structures System	2.3	01/02/2011
ESC 302	Structures Defect Limits	2.1	01/12/2009
ESC 330	Overhead Wiring Structures and Signal Gantries	2.4	01/08/2011
ESC 350	Platforms and Retaining Walls	2.3	01/06/2012
ESC 360	Miscellaneous Structures	2.2	01/07/2010
Geotechnical			
ESC 410	Earthworks and Formation	2.0	01/07/2010
ESC 420	Track Drainage	2.3	01/08/2011
ESC 430	Rainfall Monitors	1.1	01/12/2009
Right of Way			
ESC 510	Boundary Fences	2.1	01/12/2009
ESC 540	Service Installations within the Rail Corridor	2.2	01/07/2010
ESC 550	Access Roads	1.1	01/12/2009
Structures			
TMC 331	Design of Overhead Wiring Structures and Signal Gantries	1.0	01/08/2011
Geotechnical			
TMC 401	Geotechnical Risk Assessment and Hazard Management Guidelines	1.1.	01/12/2009
TMC 402	Geotechnical Problem Management Procedure	1.0	01/07/2010
TMC 404	Recognising Geotechnical Problems	1.1	01/12/2009

Reference Number	Title	Version	Issue Date
TMC 411	Earthworks Manual	2.0	01/07/2010
TMC 421	Track Drainage Manual	1.2	01/12/2009
TMC 431	Rainfall Monitors	1.1	01/12/2009
TMC 511	Boundary Fences	1.1	01/12/2009
SPC 411	Earthwork Materials	2.1	01/06/2012
SPC 511	Boundary Fences	1.1	01/12/2009
SPC 512	Demarcation Fences	1.2	01/06/2012
Electrical			
AC Auxiliary Supplies			
EP 05 00 00 01 SP	Substation Auxiliary Transformer from Rectifier Transformer Secondary	2.1	15/04/2013
DC Switchgear			
EP 04 00 00 02 SP	System Substation 1500 V DC Links and Switches	2.1	15/04/2013
EP 04 01 00 01 SP	1500V DC High Speed Feeder Circuit Breaker	3.1	01/11/2012
EP 04 02 00 01 SP	1500V DC High Speed Rectifier Circuit Breaker	2.1	15/04/2013
Earthing, Bonding Electrolysis			
EP 12 00 00 01 SP	High Voltage and 1500 System Earthing References and Definitions	3.0	01/05/2010
EP 12 00 00 02 SP	Low Voltage Distribution and Installations Earthing References and Definitions	3.0	01/05/2010
EP 12 10 00 10 SP	System Substation Earthing	3.0	01/05/2010
EP 12 10 00 11 SP	Distribution Substation Earthing	3.0	01/05/2010
EP 12 10 00 12 SP	Transmission Line and Cable Earthing	3.0	01/05/2010
EP 12 10 00 13 SP	1500 V Traction System Earthing	3.0	01/05/2010
EP 12 10 00 20 SP	Low Voltage Distribution Earthing	3.0	01/05/2010
EP 12 10 00 21 SP	Low Voltage Installations Earthing	3.0	01/05/2010
EP 12 10 00 22 SP	Buildings and Structures under Overhead Lines	3.0	01/05/2010
EP 12 20 00 01 SP	Bonding of Overhead Wiring Structures to Rail	3.0	01/05/2010
EP 12 30 00 01 SP	Electrolysis from Stray DC Current	3.0	01/05/2010
Fault Protection			
EP 19 00 00 01 SP	DCCB and Delta I Relay Setting Calculation Method	3.1	15/04/2013
EP 19 00 00 02 SP	Protection System Requirements for the High Voltage Network	4.1	21/06/2012
EP 19 00 00 03 SP	Commissioning of Translay Pilot Wire Protection Scheme	2.1	15/04/2013
General			
EP 00 00 00 01 TI	RailCorp Electrical System General Description	3.2	15/04/2013
EP 00 00 00 02 SP	Electrical Technical Maintenance Coding System	2.0	01/05/2010
EP 00 00 00 07 SP	Requirements for Handling and Disposal of Material containing PCB	3.1	15/04/2013
EP 00 00 00 08 SP	Safe Limits of DC Voltages	3.1	15/04/2013
EP 00 00 00 12 SP	Electrical Power Equipment - Integrated Support Requirements	2.1	20/12/2012

Reference Number	Title	Version	Issue Date
EP 00 00 00 13 SP	Electrical Power Equipment - Design Ranges of Ambient Conditions	2.1	18/05/2012
EP 00 00 00 15 SP	Common Requirements for Electrical Power Equipment	3.1	24/02/2012
EP 00 00 00 16 SP	Electrical Power System Signage	2.1	01/05/2013
EP 00 00 00 17 TP	Electrical Engineering Waiver Management	1.2	11/03/2013
HV AC and Traction Cables			
EP 20 00 00 03 SP	Above Ground Cable Installation Systems - Selection Guide	3.1	15/04/2013
EP 20 00 00 20 SP	Testing of High Voltage and 1500V DC Cables	3.0	04/10/2012
EP 20 00 03 01 SP	HV and 1500V DC Cables - Joints and Terminations	3.0	03/11/2011
EP 20 00 04 01 SP	Cable Route Selection Guide	2.1	18/04/2013
EP 20 00 04 02 SP	Underground Installation Configurations for High Voltage and 1500 Vdc Cables	2.1	18/04/2013
EP 20 00 04 04 SP	Ground Entry Arrangements	2.1	18/04/2013
EP 20 00 04 05 SP	Cable Pits	3.0	01/02/2012
EP 20 00 04 06 SP	Underground Cable - Location Recording	2.1	01/04/2013
EP 20 10 00 01 SP	1500 Volt DC Cables and Cable Ratings	2.1	01/04/2013
EP 20 10 00 02 SP	High Voltage Cable	3.1	19/08/2011
HV AC Switchgear			
EP 01 00 00 01 SP	11kV AC Indoor Switchgear - Non-Withdrawable	2.1	01/05/2013
EP 01 00 00 02 SP	11kV AC Indoor SCADA Controlled Switchgear Fitted with Stationary (Non-Withdrawable) Switching Devices	3.1	01/05/2013
EP 01 00 00 03 SP	11kV AC Switchgear - RMU Suitable For Indoor and Kiosk Installation	4.1	01/05/2013
EP 01 00 00 04 SP	33kV Outdoor Live Tank Circuit Breaker and Post Type CTs	1.1	01/11/2012
EP 01 00 00 05 SP	33kV Outdoor Dead Tank Circuit Breaker Assembly	1.1	01/11/2012
EP 01 00 00 06 SP	Replacement of 11kV Circuit Breaker (D4XD) Trucks in South Wales Switchgear	1.1	01/11/2012
HV Aerial Lines			
EP 10 00 00 04 SP	Transmission Line Easement Conditions	3.1	01/04/2013
EP 10 00 00 05 SP	HV Aerial Lines - Standard Conductors and Current Ratings	4.0	18/05/2012
EP 10 01 00 01 SP	Wood Pole Serviceability	4.1	01/05/2013
EP 10 01 00 02 SP	Aerial Line Maintenance Standards	2.2	01/05/2013
EP 10 01 00 03 SP	Aerial Line Base Safety and Operating Standards	3.2	01/05/2013
EP 10 01 00 05 SP	Requirements for Electric Aerials Crossing RailCorp Infrastructure	2.1	12/11/2012
EP 10 01 00 06 SP	HV Aerial Line Standards for Design and Construction	4.0	22/06/2012

Reference Number	Title	Version	Issue Date
EP 10 01 00 07 SP	Timber Poles	1.0	22/03/2013
Low Voltage			
EP 17 00 00 06 SP	Installation Inspections	3.0	01/05/2010
EP 17 00 00 11 SP	Low Voltage Isolating Transformer	4.1	27/11/2012
EP 17 00 00 12 SP	Demarcation of RailCorp Low Voltage Distribution System	3.0	01/05/2010
EP 23 00 00 01 SP	Low Voltage Fire Rated Polymeric Cables	1.1	01/12/2012
EP 23 60 00 01 SP	Online Dual Conversion Uninterruptible Power Supply for Railway Signalling Loads	1.0	13/09/2012
Overhead Wiring			
EP 08 00 00 01 SP	Overhead Wiring Standards for the Electrification of New Routes	3.1	12/10/2011
EP 08 00 00 02 SP	Overhead Wiring Maintenance Standards	4.0	01/06/2013
EP 08 00 00 04 SP	Relative Positions of Signals and Open Overlaps	4.0	04/10/2012
EP 08 00 00 07 SP	Safety Screens for Bridges over 1500V OHW Equipment	3.1	14/05/2013
EP 08 00 00 10 SP	Overhead Wiring Layouts - Requirements and Symbology	2.1	01/04/3013
EP 08 00 00 13 SP	Overhead Wiring Fittings and Materials	3.0	01/12/2012
EP 08 00 00 14 SP	Services Erected Above Overhead Wiring	2.1	22/05/2012
EP 08 00 00 15 SP	Overhead Wiring Construction and Commissioning	1.0	12/03/2012
EP 08 00 00 16 SP	Designations of Overhead Wiring Conductor Systems	2.1	16/08/2012
EP 08 00 00 17 SP	Overhead Wiring Conductor System Selection	2.1	28/02/2013
EP 08 00 00 19 SP	Performance Specification for Overhead Wiring Post Insulator Units	2.1	01/04/2013
EP 08 00 00 20 SP	Performance Specification for Overhead Wiring String Insulator Set	2.1	01/04/2013
EP 08 00 00 21 SP	Insulator Type Tests - DC Power Arc Withstand	2.1	01/05/2013
EP 08 00 00 24 SP	Contact Wire	1.0	11/05/2012
EP 08 16 00 01 SP	Labels for OHW Structures	4.0	01/05/2013
EP 08 16 00 02 SP	Safety Barriers for OHW Structures	3.1	01/04/2013
Power Transformers			
EP 02 00 00 01 SP	Transformer Loss Evaluation	3.1	01/04/2013
EP 02 10 00 01 SP	Power Transformer 33/11kV	2.1	14/05/2013
EP 02 44 00 01 SP	11kV Voltage Regulator	2.1	14/05/2013
Rectification			
EP 03 00 00 01 TI	Rectifier Transformer and Rectifier Characteristics	3.1	01/05/2013
EP 03 01 40 00 SP	Rectifier Transformer	3.1	01/12/2012
EP 03 02 00 01 SP	Controls and Protection for Rectification Equipment	2.1	01/05/2013

Reference Number	Title	Version	Issue Date
EP 03 02 30 00 SP	Semiconductor 12 Pulse Series Bridge Rectifier Power Cubicle	2.1	01/05/2013
EP 03 05 70 00 SP	Outdoor DC Reactor	2.2	01/11/2012
SCADA			
EP 11 03 00 02 SP	Electrical SCADA System Remote Terminal Unit Specification	1.0	25/07/2011
EP 11 00 00 07 SP	Design Technical Reviews for Electrical SCADA Equipment	1.1	30/10/2012
Surge Protection			
EP 21 00 00 01 SP	Insulation Co-ordination and Surge Arrester Selection	3.1	14/05/2013
System Requirements			
EP 90 10 00 01 SP	Electrical Phase Relationships	3.1	01/05/2013
EP 90 10 00 02 SP	Standard Voltage Tolerances	3.1	01/05/2013
EP 90 20 00 01 SP	1500V DC Equipment Current Ratings	4.1	01/05/2013
EP 90 20 00 02 SP	1500V System Voltage Ratings	3.1	14/05/2013
EP 90 30 00 01 SP	Polarity of AC Signalling Supplies	3.1	14/05/2013
System Safe Operation			
EP 95 00 00 12 SI	Advertising of New Work	2.1	14/05/2013
EP 95 00 30 03 SP	RailCorp Network Management Plan Chapter 2 - Customer Installation Safety	3.3	14/05/2013
EP 95 00 30 04 SP	RailCorp Network Management Plan Chapter 3 - Public Electrical Safety Awareness	1.0	01/03/2011
EP 95 00 30 05 SP	RailCorp Network Management Plan Chapter 4 - Bush Fire Risk Management	3.3	14/05/2013
EP 95 00 30 06 SP	RailCorp Network Management Plan Chapter 1 - Network Safety and Reliability	3.4	14/05/2013
EP 95 10 00 06 SI	Requirements for Portable Earthing Equipment for the High Voltage System	2.0	01/05/2010
EP 95 20 00 06 SI	Methods of Rail Connecting 1500 Volt Overhead Wiring	2.0	01/05/2010
System Substation			
EP 06 00 00 01 SP	System Substation Battery and Battery Charger	4.0	20/05/2013
EP 99 00 00 01 SP	Substations Minimum Construction Standards	3.0	01/05/2010
EP 99 00 00 02 SP	System Substation Commissioning Tests	3.1	14/05/2013
EP 99 00 00 04 SP	Substations - Base Safety and Operating Standards	3.1	01/06/2011
EP 99 00 00 07 SP	Substation Fencing	3.1	01/05/2013
EP 99 00 00 08 SP	Substations Fire Protection and Detection Standard	2.0	01/05/2010
Test and Support Equipment			
EP 15 00 00 01 SP	High Voltage AC Voltage Detector (Nominal Voltage of 11kV - 66 kV)	5.0	28/02/2013
EP 15 00 00 02 SP	Voltage Tester for Use on 1500V DC Overhead Wiring	1.0	30/10/2012

Reference Number	Title	Version	Issue Date
EP 15 00 00 04 SP	Pole Top Rescue Kits	1.0	03/11/2011
EP 15 00 00 05 SP	Substation Electrically Safe Work Area Demarcation Taping Equipment	1.0	02/11/2011
EP 15 10 00 03 SP	1500V OHW Attached Climbing Kit Assembly	1.1	15/04/2013
Traction Return			
EP 09 00 00 01 SP	Trackside Negative Bus-Rails	2.1	14/05/2013
Technical Notes			
ETN 11/02	Earthing Designs for RailCorp's High Voltage AC System	3.0	12/02/2013
ETN 01/03	Substation and Sectioning Hut Lighting	1.0	10/08/2001
Signalling			
SPG 0703	Signalling Documentation and Drawings	1.11	08/03/2013
SPG 0705	Construction of Cable Routes and Signalling Civil Works	1.17	08/02/2013
SPG 0706	Installation of Trackside Equipment	2.3	04/12/2012
SPG 0707	Installation of Equipment Racks and Termination of Cables and Wiring	1.5	07/06/2013
SPG 0709	Traction Return, Track Circuits and Bonding	2.7	29/05/2013
SPG 1014	Cables for Railway Signalling Applications - Traction Return Bonding and Track Connection Cables	1.1	01/05/2010
SPG 1031	General Requirements for Labelling of Signalling Equipment	1.1	01/05/2010
SPG 1586	Impedance Bonds	1.1	11/05/2010
SPG 0711.1	Roles, Responsibilities and Authorities	1.8	30/08/2012
SPG 0711.2	Plans, Programs, Documentation and Packages	1.1	01/07/2010
SPG 0711.3	Inspection and Testing Principles	1.6	01/07/2010
SPG 0711.4	Inspection and Testing Procedures	1.8	30/08/2012
SPG 0711.6	Interface Requirements and Procedures for Alterations	1.4	01/07/2010
SPG 0711.7	Inspection and Testing of Signalling - Standard Forms	2.1	17/12/2012
SPG 0711.8	Typical Signal Support Procedures for Trackwork	1.6	20/05/2013
TMG 1310	Locating of Underground Services	1.0	22/05/2013
TMG 1440	Requirements for the Locating of Underground Services in the Rail Corridor	1.3	01/04/2013
Telecommunications			
ESM 106	Telecommunications for Traction Substations and Section Huts	1.1	01/12/2011
ESM 109	Communications Earthing and Surge Suppression Standard	1.0	01/08/2010
Security			

Reference Number	Title	Version	Issue Date
RSS003	RailCorp Security Standard RSS003 - Substations	1.0	June 2009
Detailed Site Survey			
TMA 0491	Accurate Field Drawing	3.1	19/12/2011
TMA 0492	Data Capture Procedure	4.0	14/12/2012
TMA 0493	Scope Procedure	5.1	19/12/2011
TMA 0494	Work as Executed Procedure	3.1	24/05/2011
TMA 0495	Infrastructure Services Data Policy	1.1	19/12/2011
TMA 0496	Specification for Collection of Services Data	3.2	11/04/2013
TMA 0497	Code and Layer Definitions for Services Identification	2.0	19/12/2011
TMA 0511	Plan Symbols and Interpretation Guidelines	1.1	19/12/2011

Standard	Title
Australian Standards	
AS 1101.1 - 2007	Graphical symbols for general engineering - Hydraulic and pneumatic systems
AS 1102.101 - 1989	Graphical symbols for electrotechnical documentation – General information and general index
AS 1102.113 - 1995	Graphical symbols for electrotechnology – Analogue elements
AS 1125 - 2001	Conductors in insulated electric cables and flexible cords
AS 1158 - 2005	Lighting for roads and public spaces
AS 1170.0 – 2002	Structural Design Actions - General Principles
AS 1170.1 – 2002	Structural Design Actions - Permanent, Imposed and Other Actions
AS 1170.2 – 2011	Structural Design Actions - Wind Actions
AS 1288 - 2006	Glass in buildings – Selection and installation
AS 1345 – 1995	Identification of the contents of pipes, conduits and ducts
AS 1428.1 – 2009	Design for access and mobility – General requirements for access – New building work
AS 1428.2 - 1992	Design for access and mobility – Enhanced and additional requirements – Buildings and facilities
AS 1668.1 – 1998	The use of ventilation and airconditioning in buildings - Fire and smoke control in multi-compartment buildings
AS 1668.2 - 2012	The use of ventilation and airconditioning in buildings – Mechanical ventilation in buildings
AS 1670.1 - 2004	Fire detection, warning, control and intercom systems - System design, installation and commissioning – Fire
AS 1680 - 2009	Interior lighting
AS 1768 - 2007	Lightning protection
AS 1851 - 2012	Routine service of fire protection systems and equipment
AS 2067 - 2008	Substations and high voltage installations exceeding 1 kV a.c.
AS 2107 - 2000	Acoustics – Recommended design sound levels and reverberation times for building

Standard	Title
	interiors
AS 2159 – 2009	Piling – Design and Installation
AS 2184 - 1985	Low voltage switchgear and controlgear – Moulded-case circuit-breakers for rated voltages up to and including 600 V a.c. and 250 V d.c.
AS 2201.1 - 2007	Intruder alarm systems – Client's premises - Design, installation, commissioning and maintenance
AS 2208 - 1996	Safety glazing materials in buildings
AS 2293.1 - 2005	Emergency escape lighting and exit signs for buildings – System design, installation and operation
AS 2327.1 – 2003	Composite structures – Simply supported beams
AS 2419 (All Series)	Fire hydrant installations
AS 2444 - 2001	Portable fire extinguishers and fire blankets – Selection and location
AS ISO/IEC 24702 - 2007	Telecommunications installations – Generic cabling – Industrial premises
AS 2676.2 - 1992	Guide to the installation, maintenance, testing and replacement of secondary batteries in buildings - Sealed cells
AS 2845.1 – 2010	Water supply - Backflow prevention devices – Materials, design and performance requirements
AS 3000 - 2007	Electrical Installations – (Australian/New Zealand Wiring Rules)
AS 3008.1.1 - 2009	Electrical Installations – Selection of cables – Cables for alternating voltages up to and including 0.6/1 kV – Typical Australian installation conditions
AS 3010 - 2005	Electrical Installations – Generating sets
AS 3011.2 - 1992	Electrical installations – Secondary batteries installed in buildings - Sealed cells
AS 3013 - 2005	Electrical installations – Classification of the fire and mechanical performance of wiring system elements
AS 3015 - 2004	Electrical installations – Extra-low voltage d.c. power supplies and service earthing within public telecommunications networks
AS 3017 - 2007	Electrical installations – Verification guidelines
AS 3080 - 2013	Information technology - Generic cabling for customer premises (ISO/IEC 11801:2011, MOD)
AS 3084 - 2003 (R2013)	Telecommunications installations – Telecommunications pathways and spaces for commercial buildings
AS 3085.1 - 2004	Telecommunications installations – Administration of communications and cabling systems – Basic requirements
AS 3439.1 - 2002	Low voltage switchgear and control gear assemblies – Type-tested and partially type-tested assemblies
AS 3500 (All Series)	Plumbing and drainage
AS 3600 – 2009	Concrete Structures
AS 3700 – 2011	Masonry Structures
AS 3835.1 - 2006	Earth potential rise - Protection of telecommunications network, users, personnel and plant – Code of practice
AS 3835.2 - 2006	Earth potential rise - protection of telecommunications network, users, personnel and plant – Application guide

Standard	Title
AS 3851 - 1991	The calculation of short-circuit currents in three-phase a.c. systems
AS 3947.3 (All Series)	Low-voltage switchgear and control gear
AS 4020 – 2005	Testing of products for use in contact with drinking water
AS 4100 - 1998	Steel Structures
AS 4282 - 1997	Control of the obtrusive effects of outdoor lighting
AS 4292.1 – 2006	Railway Safety Management – General requirements
AS 4419 - 2003	Soils for Landscaping and Garden Use
AS 4428 (All Series)	Fire detection, warning, control and intercom systems - Control and indicating equipment
AS 4454 - 2012	Composts, Soil Conditioners and Mulches
AS 4586 - 2013	Slip resistance classification of new pedestrian surface materials
AS 4678 – 2002	Earth-Retaining Structures
AS 4799 – 2000	Installation of underground utility services and pipelines within railway boundaries
AS 4806.1 - 2006	Closed circuit television (CCTV) - Management and operation
AS 4806.2 - 2006	Closed circuit television (CCTV) - Application guidelines.
AS 4853 - 2012	Electrical hazards on metallic pipelines
AS 5000.1 - 2005	Electric cables - Polymeric insulated - For working voltages up to and including 0.6/1 (1.2) kV
AS 60479.1 - 2010	Effects of current on human beings and livestock – General aspects
AS 60529 - 2004	Degrees of protection provided by enclosures (IP Code)
AS 60849 - 2004	Sound systems for emergency purposes (IEC 60849:1998 MOD)
AS 61000 (All Series)	Electromagnetic compatibility (EMC)
AS IEC 61935.1 - 2012	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 - 2012	High-voltage switchgear and controlgear – Common specifications
HB 197 - 1999	An introductory guide to the slip resistance of pedestrian surface materials
Other	
BCA 2015	Building Code of Australia 2015
PCA 2013	Plumbing Code of Australia 2013
ENA EG1 - 2006	Energy Networks Association - Substation Earthing Guide
ENA C(b)1 - 2006	Energy Networks Association - Guidelines for design and maintenance of overhead distribution and transmission lines
RISSB	Railway Industry Safety and Standards Board - Standards and Guidelines
SMS-06-EN-0550 16 May 2012 - V1.2	RailCorp Electrical Network Safety Rules
Sydney Trains PR M 50757	Sydney Trains – SCADA Sites Decommissioning Procedure

Appendix D – Standards Clarifications

Standards clarifications in this Works Brief are listed below.

ASA Standard	Clause	Modification
T HR EL 100001 ST - HV Aerial Line Standards for Design and Construction (Version 1.0)	Sections 2.2 and 6	Tenderers to note that the Principal's Design (Exhibit F) was developed to RailCorp Standard EP 10 01 00 06 SP *HV Aerial Line Standards for Design and Construction* (Version 4.0) and not to current ASA Standard T HR EL 100001 ST *HV Aerial Line Standards for Design and Construction* (Version 1.0). The Contractor must comply to all current design standards including ASA Standard T HR EL 100001 ST *HV Aerial Line Standards for Design and Construction* (Version 1.0) Concession to be submitted to ASA for approval of any proposed non-compliances to Standards are to be submitted in accordance with ASA Standard T MU MD 00011 ST *Concessions to ASA Requirements* .

Appendix E - Interface Schedules

The Contractor is responsible for the construction, installation, testing and commissioning of the Works except where identified as the responsibility of the Principal/Interface Contractor in this Appendix E.

Sydney Trains, as the asset operator and maintainer of rail infrastructure, rolling stock, rail electrical distribution network, Electrical Operations Centre (EOC) SCADA network and rail telecommunications network, must be consulted on all Works and Contractor's Activities that have an impact on the assets, operations and maintenance.

The Contractor must program the following Works to be completed by Sydney Trains:

Ref	System	Works by Contractor	Works by Sydney Trains - Interface Contractor
1	**SCADA**		
1.1	**Design**	a) Design the RTU (Remote Terminal Units) System including I/O schedules and integrated marshaling cabinets for the new Granville Junction Substation. b) Seek approval from the Principal for the RTU arrangement before finalising the detailed design.	Design and undertake the SCADA re-configuration required at remote co-operating locations.
1.2	**Supply & Install**	Supply and install the SCADA Systems at the new Granville Junction Substation, including all interconnection required to associated equipment.	Supply any SCADA re-configuration required at remote co-operating locations.
1.3	**Integration**	Provide the detailed I/O schedules for the new Granville Junction Substation.	Integrate the new SCADA systems into the existing Sydney Trains ICON SCADA network.
1.4	**Testing**	a) Carry out all testing of SCADA on Site at the new Granville Junction Substation. b) Manage and coordinate testing and integration with Sydney Trains ICON SCADA network.	a) Perform any changes required to I/O at remote co-operating locations. b) Provide testing support at the ICON SCADA network.
2	**Telecommunications**		

Ref	System	Works by Contractor	Works by Sydney Trains - Interface Contractor
2.1	**Optical Fibre Network Access**	a) Supply and install conduits, pits and cable support systems within the new Granville Junction Substation and extending outside the new Granville Junction Substation to connect to the nominated Sydney Trains telecommunications route access points. b) Install optical fibre cable tails from the substation route interface pits into the communication cabinet in the substation	a) Supply the optical fibre lead in cables from the network fibre interconnection points to the substation route interface pits, leaving the required lengths cable tails for the Contractor to haul the rest of the way into the substation communications cabinet. b) Terminate and joint the optical fibre lead in cables
2.2	**Communications Cabinet**	a) Supply and install the communication cabinets (rack) in the new Granville Junction Substation. b) Supply dual 48V DC cabling from the SCADA panel to the communications cabinet (of the new Granville Junction Substation).	Supply and fit-out of equipment and terminations within the communications cabinets (of the new Granville Junction Substation) to RL0363 including the optical fibre termination panels, SCADANET data switches, POE converters, media converters and 48 V DC power distribution;
2.3	**SCADA Data Links**	Supply and install optical fibre tails or link cables from the communications cabinet (of the new Granville Junction Substation) to the SCADA RTU panel;	Configuration of the SCADANET data network to add the new Granville Junction Substation
2.4	**Telephones and data outlets**	a) Design the location of the telecommunications services and equipment within the new Granville Junction Substation; b) Supply and install of structured cat 5e cabling between the communications cabinet (of the new Granville Junction Substation) and the telephone and ICT data ports;	a) Supply and install of VOIP telephone sets. b) Undertake the configuration of the VOIP telephone network to add the new Granville Junction Substation. c) Undertake the configuration of the data network to add ICT data ports to the new Granville Junction Substation.
2.5	**Pilot Protection Fibre Links**	Supply and install optical fibre tails or link cables from the communications cabinet to the pilot protection relays	Undertake the allocation, patching and end to end testing of the optical fibre cores for pilot wire protection relay circuits between Granville Junction Substation and co-operating substations.

Ref	System	Works by Contractor	Works by Sydney Trains - Interface Contractor
2.6	**Testing**	Manage and coordinate testing and integration with Sydney Trains communication network.	Allocation, recording, testing and patching of optical fibre cable network elements.
3	**HV Electrical Protection**		
3.1	**Design**	Develop the protection concept design prepared by Sydney Trains into a detailed design and submit it to the Principal for approval	Prepare and provide the concept Protection design, including: a) The concept Protection design for the Substation 33kV and 11kV Switchboards; b) The scope for modifications required at interface Substations; c) The 33kV & 11kV design parameters; d) Specific allocation of HV protection trip circuit functionality to the 125 V DC systems; e) The HV protection testing and commissioning requirements.
3.2	**Supply & Install**	a) Supply and install the 33kV and 11kV Protection Systems at the new Granville Junction Substation, including all inter-connections required to associated equipment. b) Provide the protection functionality for the 33 kV and 11kV Switchboards. c) Provide the protection functionality in accordance with the requirements EP 19 00 00 02 SP	a) Undertake all modification works to remote-end substations to ensure that the 33 kV and 11kV protection systems provided for the new Granville Junction Substation are fully operational and integrated into the electrical system. b) Enter the protection settings on the protection relays within the new Granville Junction Substation
4	**Remote Substations Feeder Protection works**		

Ref	System	Works by Contractor	Works by Sydney Trains - Interface Contractor
4.1	**Feeder Protection works at remote-end substations**	Provide the protection functionality in accordance with the requirements of EP 19 00 00 02 SP.	Undertake all modification works to remote-end substations to ensure that the 33 kV and 11kV protection systems provided for the new Granville Junction Substation are fully operational and integrated into the electrical system.
5	**Pilot Protection Fibre Link**		
5.1	**Pilot Protection Fibre Link**	a) Undertake the design for the pilot wire protection system and construction within the new Granville Junction Substation. b) Supply fibre optic link cable between the communications cabinet and the pilot protection equipment at the new Granville Junction Substation. c) Supply all equipment within the new Granville Junction Substation.	Undertake all fibre optic cable installation works required between the communications cabinet and protection relays at the remote end co-operating substations.
5.2	**Pilot Protection Fibre Link Commissioning**	Coordinate integration of Pilot Protection works between the new Granville Junction Substation and the remote-end substations	Undertake all fibre patching changes required at the remote end subtations required for change over of the pilot protection pilot system from Granville Substation to Granville Junction Substation.
6	**1500V DC Protection and Protection Settings**		
6.1	**1500V DC Protection**	Supply and Install the 1500V DC Protection Systems at the new Granville Junction Substation, including all interconnections required to associated equipment.	a) Undertake and provide calculations for the 1500V DC protection settings for the new Granville Junction Substation. b) Enter the protection settings into the protection devices on Site at the new Granville Junction Substation.
7	**Decommissioning of existing substation**		

Ref	System	Works by Contractor	Works by Sydney Trains - Interface Contractor
7.1	**Decommissioning of existing substation**	Design and construct all works required to decommission and demolish the existing Granville Substation	
7.2	**Decommissioning and removal of redundant equipment**	Transport the redundant/de-commissioned items, identified as strategic spares, to a location within Sydney Metropolitan area, and which is to be advised by the Principal at a later date.	Detail which equipment is to be retained as strategic spares and which items are suitable for disposal.
7.3	**Decommissioning of SCADA and Telecommunications**	Co-ordinate and undertake activities required to de-commission SCADA and associated telecommunications infrastructure at Granville Substation in accordance with PR M 50757 requirements.	Prepare the following SCADA decommissioning designs: a) Update of the ICON SCADA Logical Connectivity Diagram to reflect the proposed decommissioning of the data switches. b) Update of the HV Sites VOIP Supervisory Phones Configuration Schematic to reflect the proposed decommissioning of the VoIP phones. c) Fibre Interconnection Diagram for decommissioning the fibre on Site and repatching the fibre network around the new Granville Junction Substation. d) Marking Site specific schematics as superseded e) Undertake activities required to be completed by Sydney in accordance with PR M 50757
8	**Testing and Commissioning activities**		
8.1	**Option 1: Contractor supplies its own Authorised testing and commissioning resources**	a) Undertake the overall turnkey testing and commissioning activities, for all electrical equipment included in the scope of works. b) Supply all testing and commissioning resources to undertake the testing and commissioning activities	

Ref	System	Works by Contractor	Works by Sydney Trains - Interface Contractor
8.2	**Option 2: Interface Contractor supplies the Authorised testing and commissioning resources**	a) Option 2 applies only if the Contractor can demonstrate that its endeavours to supply its own Sydney Trains Authorised testing and commissioning resources (as defined in Clause 7 of this Works Brief) have not been successful. b) Prepare and submit the request(s) for Sydney Trains Authorised testing and commissioning resources seventy-(70) Business Days in advance.	a) Option 2 applies only if the Contractor can demonstrate that its endeavours to supply its own Sydney Trains Authorised testing and commissioning resources (as defined in Clause 7 of this Works Brief) have not been successful. b) Supply Sydney Trains Authorised testing and commissioning resources to perform the commissioning activities listed in Sydney Trains document No. PR D 78701.

Appendix F – TfNSW Standard Risk Matrix

Table F.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	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 wi h 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 wi h 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 article 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 continuing scrutiny/attention.	Disappointment – Extended nega ive local/state media coverage. Confidence and trust dented but are quickly recoverable at modest cost within	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 nega ive state/na ional media coverage. Confidence and trust are damaged but recoverable at considerable cost, time and staff effort.	Outrage – Material change in the public perception of the 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.	Substan ial breach resulting in prosecution, fines and/or litiga ion. Licence or accredita ion restricted or conditional affecting ability to operate.	Prosecution leading to imprisonment of TfNSW executive. Loss of operating licence.
Management Effort/ Organisational Fatigue	An event, the 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 the 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 the benefits realised; or minor delay on the project or another project, with no public implica ions.	Several delays with the initiative and/or moderate decrease in benefits realised; or completion date missed for non-critical path project.	Major delays with the initiative and/or major decrease in benefits realised; or publicly announced portion/milestone missed or final completion date missed with demonstrable mitigating external circumstances.	Severe delays with initiative, which impacts across divisions and/or significant decrease in benefits realised; or publicly announced portion/milestone missed or final completion date missed on critical pa h 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 significantly missed on critical path project.
Budget, Costs or Revenue	<$100k	$100k - $1m	$1m - $10m	$10m - $50m	$50m - $100m	>$100m

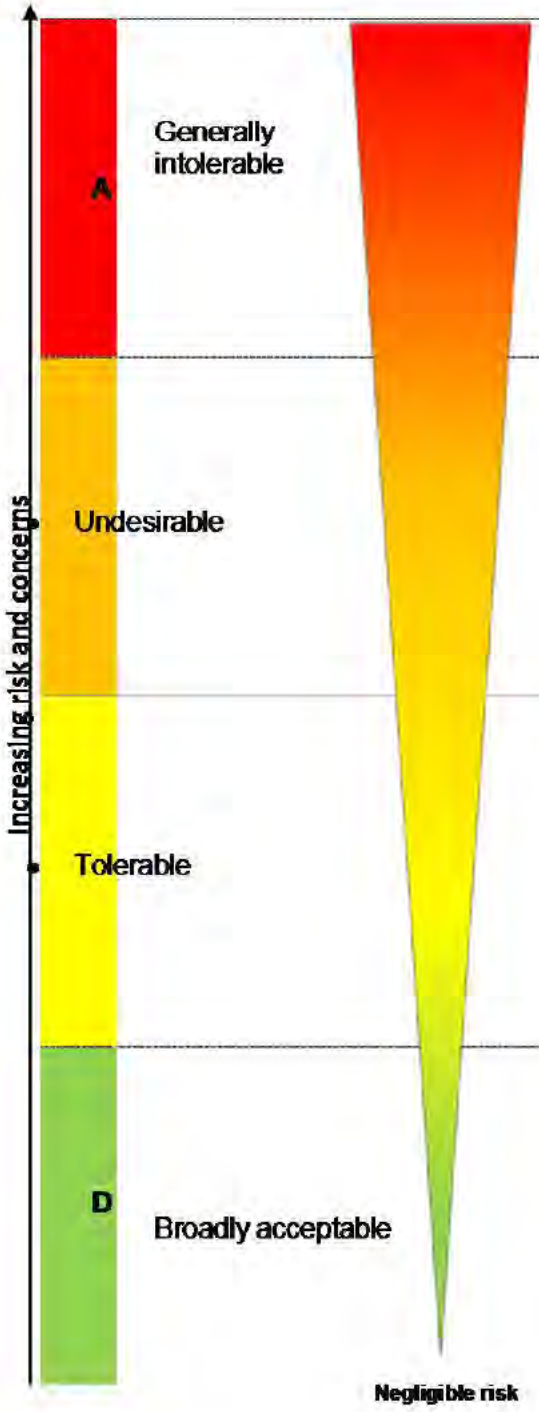
Table F.2 TERM risk assessment – likelihood criteria

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 F.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 F.4 TERM risk tolerance and responses table



Appendix G - PSU SAP & SRSR Requirements

PSU SAP Requirements

In the table below, H=Heading, R= Requirement, A= Advice.

PUID	Safety Assurance Plan (Minor) Requirements	Type
SAP-100	**0. Preliminary Information**	H
SAP-101	**0.1 Cover Sheet**	H
SAP-102	The SAP must include a cover sheet with the following minimum content:	R
SAP-103	(a) "Safety Assurance Plan"	R
SAP-104	(b) "prepared for Transport for NSW"	R
SAP-105	(c) Principal Contractor Name/Address/ABN	R
SAP-106	(d) Document Number/Revision/Date	R
SAP-107	**0.2 Document History**	H
SAP-108	The SAP must contain a table containing the following information per issue of the SAP	R
SAP-109	(a) Revision Number	R
SAP-110	(b) Date of Issue	R
SAP-111	(c) Details	R
SAP-112	**0.3 Document Approvals**	H
SAP-113	The SAP must contain a table containing the following approval information:	R
SAP-114	(a) Author Name/Signature/Date	R
SAP-115	(b) Reviewer Name/Signature/Date	R
SAP-116	(c) AEO Signatory Name/Signature/Date	R
SAP-117	**0.4 Table of Contents**	H
SAP-118	The SAP must contain a Table of Contents to at least level 3.	R
SAP-119	**0.5 Formatting Requirements**	H
SAP-120	Each page of the SAP must contain the following minimum information in headers/footers:	R
SAP-121	(a) Document Number/Revision Number/Date	R
SAP-122	(b) Page Number /Total Number of Pages	R
SAP-123	(c) Project Name	R
SAP-124	(d) "Safety Assurance Plan"	R
SAP-125	**1. Introduction**	H
SAP-126	The SAP must include an introduction with the following subsections:	R
SAP-127	(a) Scope of Project	R
SAP-128	(b) System Definition	R
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.	A
SAP-130	The SAP must define the following interfaces:	R

PUID	Safety Assurance Plan (Minor) Requirements	Type
SAP-131	(i) Interfaces between the delivery team's subsystems.	R
SAP-132	(ii) Interfaces between each of the delivery team's systems.	R
SAP-133	(iii) Interfaces between the project's systems and external systems	R
SAP-134	(iv) HMI interfaces	R
SAP-135	(v) Operational interfaces (including maintenance)	R
SAP-136	(vi) Organisational interfaces	R
SAP-137	(c) Purpose of the Safety Assurance Plan	R
SAP-138	(d) Scope of the Safety Assurance Plan	R
SAP-139	(e) Assumptions	R
SAP-140	(f) Dependencies	R
SAP-141	(g) Constraints	R
SAP-142	(h) Reference to any novel system or equipment to be introduced by the project which requires additional safety and risk analysis.	R
SAP-143	(i) Reference to a more detailed system description document (if required)	R
SAP-144	(j) Reference to an interface management plan or how interfaces will be managed (if required)	R
SAP-145	**2. Definitions and Abbreviations**	H
SAP-146	The SAP must include definitions of all specialist terms and abbreviations used in the SAP.	R
SAP-147	**3. Roles, Responsibilities, Organisation and Stakeholders**	H
SAP-148	The SAP must include a definition of the following as they relate to the AEO:	R
SAP-149	(a) Engineering Safety Assurance Roles and Responsibilities	R
SAP-150	(b) Engineering Safety Assurance Organisation during each project phase (including a diagram)	R
SAP-151	(c) Key Engineering Safety Assurance Stakeholders.	R
SAP-152	The AEO must 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**	H
SAP-154	**4.0 Project Phases**	H
SAP-155	The SAP must include a process flow diagram	R
SAP-156	The SAP must include a description of the Engineering Safety Assurance Activities proposed by the AEO for each of the following project phases:	R
SAP-157	(a) Concept Design Phase	R
SAP-158	(b) Detailed Design Phase	R
SAP-159	(c) Construction Phase	R
SAP-160	(d) Commissioning Phase.	R
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.	A
SAP-162	**4.0.1. Concept Design Phase Activities**	H
SAP-163	The description of the Concept Design Phase must include details of the following activities:	R
SAP-164	(a) Preparing a Safety Assurance Plan	R

PUID	Safety Assurance Plan (Minor) Requirements	Type
SAP-165	(b) Conducting a Preliminary Hazard Analysis (including preparation of a PHA report)	R
SAP-166	(c) Establishing/updating the project ADC Log and Project Specific Risk Register	R
SAP-167	(d) Preparing a Safety Risk Summary Report (Concept Design).	R
SAP-168	**4.0.2. Detailed Design Phase Activities**	H
SAP-169	The description of the Detailed Design Phase must include details of the following activities:	R
SAP-170	(a) Reviewing the SAP	R
SAP-171	(b) Conducting a Detailed Hazard Analysis (including preparation of a DHA report)	R
SAP-172	(c) Identifying Safety Requirements	R
SAP-173	(d) Updating the ADC Log and PSRR with the Safety Requirements	R
SAP-174	(e) Updating the RAATM with the Safety Requirements	R
SAP-175	(f) Preparing an SRSR (Detailed Design).	R
SAP-176	**4.0.3. Construction Phase Activities**	H
SAP-177	The description of the Construction Phase must include details of the following activities:	R
SAP-178	(a) Reviewing the SAP	R
SAP-179	(b) Conducting another Post-Design Safety Review	R
SAP-180	(c) Capturing Construction Hazards	R
SAP-181	(d) Updating the ADC Log and PSRR with the Construction Hazards	R
SAP-182	(e) Updating the RAATM and Verifying Safety Requirements	R
SAP-183	(f) Preparing an SRSR (Construction).	R
SAP-184	**4.0.4. Commissioning Phase Activities**	H
SAP-185	The description of the Commissioning Phase must include details of the following activities:	R
SAP-186	(a) Reviewing the SAP	R
SAP-187	(b) Conducting a Post-Construction Design Safety Review	R
SAP-188	(c) Capturing Post-Construction Hazards	R
SAP-189	(d) Updating the ADC Log and PSRR with the Post-Construction Hazards	R
SAP-190	(e) Updating the RAATM and Validating Safety Requirements	R
SAP-191	(f) Preparing an SRSR (Commissioning)	R
SAP-192	**4.1. Preliminary Hazard Analysis**	H
SAP-193	(a) The Preliminary Hazard Analysis (PHA) technique must be used as an initial analysis to identify the hazards associated with a project.	R
SAP-194	(b) A PHA report must be provided detailing the following:	R
SAP-195	• Workshop structure	R
SAP-196	• Date and location for workshop(s)	R
SAP-197	• Attendees present	R
SAP-198	• Guidewords used	R
SAP-199	• Workshop outcomes (including HAZID worksheet).	R
SAP-200	(c) The output from the PHA must be transferred to the Project Specific Risk Register for the project.	R

PUID	Safety Assurance Plan (Minor) Requirements	Type
SAP-201	**4.2. Detailed Hazard Analysis**	H
SAP-202	(a) The SAP must describe any Detailed Hazard Analyses to be conducted	R
SAP-203	(b) Reports similar to that prepared for the PHA must also be produced for each DHA	R
SAP-204	**4.3. Project Specific Risk Register**	H
SAP-205	(a) The results of the Preliminary Hazard Analysis and any subsequent Hazard Analysis must be recorded in the Safety Risk Register	R
SAP-206	(b) The PSRR must be maintained in the format specified in TPD template: Project Specific Risk Register Template (3TP-SD-001)	R
SAP-207	(c)The PSRR must be delivered in Excel format with each Safety Risk Summary Report.	R
SAP-208	**4.4. Design Safety Reviews**	H
SAP-209	Design Safety Reviews (DSRs) must 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.	R
SAP-210	DSRs must be held prior to the completion of each design package for each phase of the project	R
SAP-211	Appropriate design, construction, commissioning and test personnel must be available to attend each DSR	R
SAP-212	The DSRs must, as a minimum, consider the following:	R
SAP-213	• Identification and review of any changes to the design as a result of the as built configuration.	R
SAP-214	• Reviewing and assessing the impact of any waivers or NCRs raised during the construction and/or commissioning phase.	R
SAP-215	• Reviewing implementation of actions.	R
SAP-216	• Confirming assumptions, dependencies and constrains addressed during the construction and/or commissioning phase.	R
SAP-217	• Confirming compliance evidence is available to satisfy the safety requirements.	R
SAP-218	Formal minutes for each DSR must be prepared and referenced in the corresponding SRSR.	R
SAP-219	The PSRR must be updated to reflect DSR findings.	R
SAP-220	**4.5. Human Factors Analysis**	H
SAP-221	For an overview of Human Factors, refer to the ASA Guide to Human Factors Integration (Ref 1).	A
SAP-222	The SAP must explain how Human Factors will be considered in the Preliminary Hazard Analysis workshop.	R
SAP-223	The SAP must identify any additional specific Human Factors Analysis required during the Design Phases of the project.	R
SAP-224	**4.6. So Far As Is Reasonably Practicable (SFAIRP) Assessment**	H
SAP-225	The SAP must include an explanation of how SFAIRP assessment is proposed to be conducted.	R
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 must describe the techniques that will be used to conduct a more detailed SFAIRP analysis.	R
SAP-227	**4.7. ADC Log Requirements**	H
SAP-228	The SAP must define the requirements for an ADC log.	R
SAP-229	The minimum contents of an ADC log must be as follows:	R

PUID	Safety Assurance Plan (Minor) Requirements	Type
SAP-230	(a) Type (A=Assumption, D=Dependency or C=Constraint)	R
SAP-231	(b) PUID (Project Unique ID)	R
SAP-232	(c) Details/description of the assumption, dependency or constraint	R
SAP-233	(a) Status (Open/Resolved)	R
SAP-234	(b) Corresponding Hazard IDs (corresponding to the Hazard IDs in the PSRR).	
SAP-235	**4.8. RAATM Requirements**	H
SAP-236	The RAATM must, as a minimum, include safety-related requirements that originate from:	R
SAP-237	(a) The Works Brief	R
SAP-238	(b) The PSRR.	R
SAP-239	The RAATM must (as a minimum) include the following attributes for each requirement:	R
SAP-240	(a) PUID Project Unique Id	R
SAP-241	(b) Requirement Text	R
SAP-242	(c) Design Verification Method	R
SAP-243	(d) Design Compliance Status	R
SAP-244	(e) Design Verification Evidence	R
SAP-245	(f) Construction Verification Method	R
SAP-246	(g) Construction Compliance Status	R
SAP-247	(h) Construction Verification Evidence	R
SAP-248	**5. Safety Argument**	H
SAP-249	The SAP must include an argument that the project will be acceptably safe to operate and maintain as part of the existing network	R
SAP-250	**6. Safety Audit and Assessment**	H
SAP-251	**6.1. Independent Professional Review (IPR) Process**	H
SAP-252	Until further notice, Independent Professional Review will be carried out by TPD.	A
SAP-253	**6.2. Engineering Safety Assurance Audits**	H
SAP-254	The SAP must detail the audit process proposed to be used during the project's lifecycle.	R
SAP-255	**6.3. Engineering Safety Assurance Progress Reporting**	H
SAP-256	The SAP must detail the proposed timing and conduct of Engineering Safety Assurance Progress Meetings	R
SAP-257	As a minimum, each Engineering Safety Assurance Progress Meeting must discuss the following items:	R
SAP-258	(a) Status of Engineering Safety Assurance deliverables for the project;	R
SAP-259	(b) Status of the PSRR, including any changes in hazards or risks;	R
SAP-260	(c) Progress against the ESA program;	R
SAP-261	(d) ESA activities undertaken during the previous month and planned activities for the next month.	R
SAP-262	The participants of the ESA progress meetings must, as a minimum, include the following participants:	R
SAP-263	(a) Project Manager	R
SAP-264	(b) Systems / Safety Assurance Manager	R

PUID	Safety Assurance Plan (Minor) Requirements	Type
SAP-265	(c) Design Manager,	R
SAP-266	(d) Designers	R
SAP-267	(e) End Users	R
SAP-268	(f) Other relevant parties/stakeholders	R
SAP-269	The SAP must include a requirement to prepare a monthly ESA progress report for delivery to TPD.	R
SAP-270	The content of each ESA progress report must include the following:	R
SAP-271	(a) status of Engineering Safety Assurance deliverables for the project	R
SAP-272	(b) status of the PSRR (open, resolved, closed out risks)	R
SAP-273	(c) changes in hazards or risks within the PSRR	R
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	R
SAP-275	(e) status of the project documentation delivery in line with project schedule.	R
SAP-276	**7. Engineering Safety Assurance Deliverables**	H
SAP-277	The SAP must include a schedule of deliverables with anticipated dates for at least the following documents:	R
SAP-278	(a) Project Specific Risk Register	R
SAP-279	(b) Safety Assurance Plan (this document)	R
SAP-280	(c)Preliminary Hazard Analysis Report	R
SAP-281	(d) Any additional Hazard Analysis Reports	R
SAP-282	(e) Safety Risk Summary Reports	R
SAP-283	The SAP must cross reference the ESA deliverable with the overall Project Schedule.	R
SAP-284	**8. Related Documents and References**	H
SAP-285	The SAP must include a set of numbered related documents and references.	R
SAP-286	**9. Appendices**	H
SAP-287	The SAP must include a set of appendices referenced from the body of the SAP.	R

PSU SRSR Requirements

In the table below, H=Heading, R= Requirement, A= Advice.

PUID	Safety Risk Summary Report Requirements	Type
SRSR-100	**0. Preliminary Information**	H
SRSR-101	**0.1 Cover Sheet**	H
SRSR-102	The SRSR must include a cover sheet with the following minimum content:	R
SRSR-103	(a) "Safety Risk Summary Report" [Concept/Detailed Design/Construction/Commissioning & Handover] Phase (as appropriate)	R
SRSR-104	(b) "prepared for Transport for NSW"	R
SRSR-105	(c) Principal Contractor Name/Address/ABN	R
SRSR-106	(d) Document Number/Revision/Date	R
SRSR-107	**0.2 Document History**	H

PUID	Safety Risk Summary Report Requirements	Type
SRSR-108	The SRSR must contain a table containing the following information per issue of the SRSR	R
SRSR-109	(a) Revision Number	R
SRSR-110	(b) Date of Issue	R
SRSR-111	(c) Details	R
SRSR-112	**0.3 Document Approvals**	H
SRSR-113	The SRSR must contain a table containing the following approval information:	R
SRSR-114	(a) Author Name/Signature/Date	R
SRSR-115	(b) Reviewer Name/Signature/Date	R
SRSR-116	(c) AEO Signatory Name/Signature/Date	R
SRSR-117	**0.4 Table of Contents**	H
SRSR-118	The SRSR must contain a Table of Contents to at least level 3.	R
SRSR-119	**0.5 Formatting Requirements**	H
SRSR-120	Each page of the SRSR must contain the following minimum information in headers/footers:	R
SRSR-121	(a) Document Number/Revision Number/Date	R
SRSR-122	(b) Page Number /Total Number of Pages	R
SRSR-123	(c) Project Name	R
SRSR-124	(d) "Safety Risk Summary Report".	R
SRSR-125	**1. Introduction**	H
SRSR-126	The SRSR must include an introduction with the following subsections:	R
SRSR-127	(a) Scope of project	R
SRSR-128	(b) Purpose of the Safety Risk Summary Report	R
SRSR-129	(c) Scope of the Safety Risk Summary Report	R
SRSR-130	(d) Assumptions, Dependencies and Constraints outstanding from the SAP	R
SRSR-131	(e) Any new Assumptions, Dependencies and Constraints together with their safety implications.	R
SRSR-132	**2. Definitions & Abbreviations**	H
SRSR-133	The SRSR must include definitions of all specialist terms and abbreviations used in the SRSR or (better still) refer to those in the SAP.	R
SRSR-134	**3. Engineering Safety Assurance Activities**	H
SRSR-135	(b) The SRSR must identify the ESA activities carried out during the project phase covered by the current of the SRSR.	R
SRSR-136	**3.1. Concept Design Phase Engineering Safety Assurance Activities**	H
SRSR-137	The SRSR must reference a current and valid SAP (including revision number).	R
SRSR-138	The SRSRS must describe the conduct and results of the PHA.	R
SRSR-139	The SRSR must include a PHA attendance record and minutes of meeting.	R
SRSR-140	The SRSR must reference a baselined version of the following documents that include the results of the PHA carried out in this project phase:	R
SRSR-141	(a) ADC log	R
SRSR-142	(b) PSRR	R
SRSR-143	(c) RAATM.	R

PUID	Safety Risk Summary Report Requirements	Type
SRSR-144	**3.2. Detailed Design Phase Engineering Safety Assurance Activities**	H
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 are each phase may be different.	A
SRSR-146	The SRSR must reference a current and valid SAP (including revision number).	R
SRSR-147	The SRSRS must describe the conduct and results of any System Hazard Analysis carried out.	R
SRSR-148	The SRSRS must describe the conduct and results of any additional hazard analyses carried out (including Human Factors analyses).	R
SRSR-149	The SRSR must include a PHA attendance record.	R
SRSR-150	The SRSR must reference a baselined version of the PSRR that incorporates the results of the analyses carried out during the Detailed Design phase.	R
SRSR-151	The SRSR must reference a baselined version of the following documents that include the results of the DSR carried out in this project phase:	R
SRSR-152	(a) ADC log	R
SRSR-153	(b) PSRR	R
SRSR-154	(c) RAATM.	R
SRSR-155	**3.3. Construction Phase Engineering Safety Assurance Activities**	H
SRSR-156	The SRSR must reference a current and valid SAP (including revision number).	R
SRSR-157	The SRSR must describe the conduct and results of the Post-Design Safety Review.	R
SRSR-158	The SRSR must include a Post-Design Safety Review attendance record and minutes of meeting.	R
SRSR-159	The SRSR must reference a baselined version of the following documents that include the results of the Post-Design Safety Review:	R
SRSR-160	(a) ADC log	R
SRSR-161	(b) PSRR	R
SRSR-162	(c) RAATM.	R
SRSR-163	**3.4. Commissioning & Handover Phase Engineering Safety Assurance Activities**	H
SRSR-164	The SRSR must reference a current and valid SAP (including revision number).	R
SRSR-165	The SRSRS must describe the conduct and results of the Post-Construction Safety Review.	R
SRSR-166	The SRSR must include a Post-Construction Safety Review attendance record and minutes of meeting.	R
SRSR-167	The SRSR must reference a baselined version of the following documents that include the results of the Post-Construction Safety Review:	R
SRSR-168	(a) ADC log	R
SRSR-169	(b) PSRR	R
SRSR-170	(c) RAATM.	R
SRSR-171	**4. Risk Profiles**	H
SRSR-172	**4.1 Risk Profile as at end of Concept Design Phase**	H
SRSR-173	The SRSR must list the total number of identified hazards as at [date].	R
SRSR-174	The SRS must list the Number of Unmitigated Hazards (NUH) of ratings High/Medium/Low.	R
SRSR-175	The SRS must list the Number of Mitigated Hazards (NMH) of category High/Medium/Low.	R
SRSR-176	Note: The total Number of Unmitigated Hazards must be equal to the Number of Mitigated Hazards.	A

<table>
<tr><th>PUID</th><th>Safety Risk Summary Report Requirements</th><th>Type</th></tr>
<tr><td>SRSR-177</td><td>For each category of hazard rating (High/Medium/Low), the SRSR must summarise the disposition of the those hazards to each of the following classes:</td><td>R</td></tr>
<tr><td>SRSR-178</td><td>(a) Resolved for Design (SFAIRP)</td><td>R</td></tr>
<tr><td>SRSR-179</td><td>(b) Transferred to Construction</td><td>R</td></tr>
<tr><td>SRSR-180</td><td>(c) Transferred to O&M.</td><td>R</td></tr>
<tr><td>SRSR-181</td><td>Note: An example risk profile is shown below. The content highlighted is included for illustrative purposes only.</td><td>A</td></tr>
<tr><td>SRSR-182</td><td>
<table>
<tr><th>Hazard Rating</th><th>Number of Unmitigated Hazards (NUH)</th><th>Number of Mitigated Hazards (NMH)</th><th>Status of Mitigated Hazards</th></tr>
<tr><td>High</td><td>20</td><td>8</td><td>1 - Resolved for Design (SFAIRP)
5 – Transferred to Construction
2 – Transferred to O&M
Total = 8 = NMH(High)</td></tr>
<tr><td>Medium</td><td>42</td><td>47</td><td>32 – Resolved for Design (SFAIRP)
12 – Transferred to Construction
3 – Transferred to O&M
Total = 47 = NMH(Medium)</td></tr>
<tr><td>Low</td><td>7</td><td>14</td><td>9 – Resolved for Design (SFAIRP)
2 – Transferred to Construction
3 – Transferred to O&M
Total = 14 = NMH(Low)</td></tr>
<tr><td>Comments</td><td>Total = 69</td><td>Total = 69 (also)</td><td></td></tr>
</table>
</td><td>A</td></tr>
<tr><td>SRSR-183</td><td>All residual safety risks transferred to the end user must be translated into the asset owner's risk matrix.</td><td>R</td></tr>
<tr><td>SRSR-184</td><td>4.2 Risk Profile as at end of Detailed Design Phase</td><td>H</td></tr>
<tr><td>SRSR-185</td><td>[As per Section 4.1]</td><td>A</td></tr>
<tr><td>SRSR-186</td><td>4.3 Risk Profile as at end of Construction Phase</td><td>H</td></tr>
<tr><td>SRSR-187</td><td>[As per Section 4.1]</td><td>A</td></tr>
<tr><td>SRSR-188</td><td>4.4 Risk Profile as at end of Commissioning & Handover Phase</td><td>H</td></tr>
<tr><td>SRSR-189</td><td>[As per Section 4.1]</td><td>A</td></tr>
</table>

PUID	Safety Risk Summary Report Requirements	Type
SRSR-190	**5. Summary of Acceptability**	H
SRSR-191	The SRSR must provide evidence that:	R
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)	R
SRSR-193	(b) All reasonable foreseeable hazards and safety controls have been identified and managed SFAIRP for the current design.	R
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)	R
SRSR-195	The SRSR must 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.	R
SRSR-196	The SRSR must identify any outstanding issues that require further Engineering Safety Assurance or design development / analysis in subsequent phases of the project	R
SRSR-197	The SRSR must:	R
SRSR-198	(a) Detail how Human Factors were considered during the design for Operation and Maintenance activities	R
SRSR-199	(b) Demonstrate that all identified safety requirements were reviewed and amended as appropriate during the design safety reviews.	R
SRSR-200	(c) Demonstrate that all relevant safety requirements were confirmed to be implemented through the RAATM process during Design Safety Reviews.	R
SRSR-201	**6. Operations & Maintenance Recommendations to Asset Owner**	H
SRSR-202	Based on safety findings to date, the SRSR must include a list of procedural safety controls recommended for implementation by the Asset Owner.	R
SRSR-203	The Commissioning and Handover SRSR must describe the mechanism whereby operational/maintenance controls are confirmed by the Asset Owner	R
SRSR-204	The SRSR must include a reference to the PSRR to provide context for the list of procedural controls.	R
SRSR-205	**7. Conclusion**	H
SRSR-206	The SRSR must summarise the Engineering Safety Assurance activities carried out to the date of issue of the SRSR.	R
SRSR-207	The SRSR must explain how Engineering Safety Assurance has been used as an integral part of system development.	R
SRSR-208	**8. Issues and Constraints**	H
SRSR-209	The SRSR must 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.	R
SRSR-210	**9. Related Documents and References**	H
SRSR-211	The SRSR must include a set of numbered related documents and references.	R
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.	A
SRSR-213	In particular, the SRSR must refer to the (potentially multiple versions of) the SAP on which the SRSR is based.	
SRSR-214	**10. Appendices**	H
SRSR-215	The SAP must include a set of appendices referenced from the body of the SRSR.	R
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.	A
SRSR-217	Note: In particular, the PSRR should NOT be pasted into the SRSR as it is generally illegible when printed.	A

Appendix H – TfNSW Inspection and Test Plans – Minimum Requirements (4TP-RL-002/1.0)

Appendix I – TfNSW Sustainable Design Guidelines Checklist

Sustainable Design Guidelines version 3.0

Please complete the following Tables.

Project ID	
Project Name	Granville Station Upgrade
Person Completing Form	Ian Hustwick
Phone Number	02 9239 7697
email address	ian.hustwick@ghd.com
Form Last Updated	23/06/2015

Please choose what level of compliance the project aims to achieve.
(This is required to be submitted by the Reference Design stage)

Aspirational Target	Gold: 80%

Please choose the asset types in your project and then press the START button.

Stations	Transport interchange	Car park (at-grade)	Car park (multi-storey)	Maintenance facilities	Civil infrastructure	Tunnels	Light Rail
Please Select	Please Select	Please Select	Please Select	Yes	No	Please Select	Please Select

This electronic checklist forms the repor ing aspect of the NSW Sustainable Design Guidelines for Rail version 3.0. Please follow the instructions and requirements in the Guidelines and the Instructions tab found in his checklist.
For each initiative, please record whether it is applicable to your project. Then at each project deliverable stage of your project please also record whether the initiative has been implemented or not. In situations where an initiative is not being implemented a reason why this is the case is required. A copy of this form should be returned to your TPD sustainability representative for your project as required by he Guidelines and/or contract.
Any questions please contact either:

sustainability@projects.transport.nsw.gov.au

Sustainable Initiatives Selection

Key	
Yes	he initiative is applicable to this project
No	he initiative has not been applied to this project Detailed comments are required as to why this init ative has not been applied

Init ative	Stations	Transport interchange	Car park (at-grade)	Car park (multi-storey)	Maintenance facilities	Civil infrastructure	Tunnels	Light rail	heme	Descr ption	Design (D) & Construction (C) Interface	Applicability Maintenance facilities	Reference Design Maintenance facilities	Detailed Design Maintenance facilities	Construction Maintenance facilities	Finalisation Maintenance facilities
Compulsory Initiatives																
C.1 Carbon footprint	C	C	C	C	C	C	C	C	Energy and greenhouse	Undertake AS1 06 -2 (greenhouse gases – project leve) compl ant carbon footprinting exercise or all projects w th a cap tal investment value over $10 mil on in accordance with Transport for NSW s Greenhouse Gas Inven ory Guide for Construct on Projec s. The carbon footprint is to be used to inform dec s on-making in design and construct on. Use s andard carbon coefficient values for construction ma erial and fuel usage. Mon tor and report the carbon footprint every six months during construc ion.	DC	No	No			
C.2 Bui ding orientation and form	C	C	-	C	C	-	-	C	Energy and greenhouse	Optimise the bu lding or enta ion and form to al ow for maximum dayl ght levels (though avoiding overheating).	D	No	No			
C.3 Five star appl ances	C	C	-	C	C	-	C	C	Energy and greenhouse	Purchase plug-in equipment with at least five star Minimum Energy Performance Standards (MEPS) rating (fridges, air condit oners, e c) or an Energy Star accreditation (IT equipment).	DC	Yes	Yes			
C. Insulation	C	C	-	-	C	-	-	C	Energy and greenhouse	Insu ate covered and indoor areas. Techniques include adequate the mal mass, and insu ating walls and ceilings. Also ensure that al opening are sealed.	D	Yes	Yes			
C.5 Renewab e Energy	C	C	C	C	C	C	C	C	Energy and greenhouse	Purchase at least 25% of s te-based electr c ty energy needs from Green Power or renewab e sources during construction of the asset.	C	Yes	Yes			
C.6 C imate change impact assessment	C	C	C	C	C	C	C	C	C imate res lience	Perform a climate change impact assessment for each project worth over $10M using current scient fic predictions (i.e. Intergovernmental Panel on C imate Change (IPCC), Commonwealth Sc entific and Industrial Research Organisat on (CSIRO) etc) to determine the hazards/r sks assoc ated w th future c imatic conditions. Refer to 'Climate Change Impacts and Risk Management: A Guide for Business and Government' and the 'AGIC Gu delines for Clima e Change Adaptation' for gu dance.	D	No	No			
C.7 Design for climate change	C	C	C	C	C	C	C	C	C imate res lience	All projects with a capital investment value over $10 m lion to design out extreme, high and medium risks as iden ified in the c imate change impact assessment where practicab e.	D	Yes	Yes			
C.8 Who e of l fe costing	C	C	C	C	C	C	C	C	Ma erials and waste	Use whole of life costing methodologies e.g. L fe-Cyc e Cost Analysis (LCCA) Method) in line with ISO 15686-5 o inform decis on-making on sign ficant issues pertaining to project scope options (e.g. route select on) and material/techno ogy se ection (e.g. steel versus concre e br dge). S gn ficant issues can be determined using qual ative cr ter a such as likely scale of environmental impact.	DC	Yes	Yes			
C.9 Reduce was e to landfill	C	C	C	C	C	C	C	C	Ma erials and waste	Ensure at least 95 per cent of construction and demoli ion waste (by weight) is diverted from land ll, and either recycled or reused, for all projects with a capi al investment value over $10 mil ion.	DC	Yes	Yes			
C.10 Reuse spoil	C	C	C	C	C	C	C	C	Ma erials and waste	For al projects generating >300m3 of spo l, ensure that 100 per cent of usab e spoil (by weigh) is beneficially reused, onsite or nearby o fsite. Usable spoi s not to be sent to landfill.	DC	Yes	Yes			
C.11 Reduce cement	C	C	C	C	C	C	C	C	Ma erials and waste	Reduce the absolute quant ty of Port and cement by at east 30 per cent, as an average across al concrete mixes, by substituting it w th supplementary cementi ious ma er als (such as a fly ash, ground granu ated blast furnace s ag or alkal activated cements) subject to meeting strength and durab lity requirements.	DC	Yes	Yes			
C.12 Biodiversity offsetting	C	C	C	C	C	C	C	C	B odiversity and heritage	For non-s gnificant impac s (inside or ou side the rail corridor) offsetting is to be in accordance with the TPD Vegetat on Offset Gu de as appl cab e.	DC	Yes	Yes			
C.13 Heritage conservat on and enhancement	C	C	C	C	C	C	C	C	B odiversity and heritage	100 per cent of sign ficant heritage items are identif ed during project deve opment and design and are protected or beneficially reused where practical. This wi l require consultation w th all re evant Indigenous Her tage groups (where app icab e).	DC	Yes	Yes			
C.1 Heritage interpretation	C	C	C	C	C	C	C	C	B odiversity and heritage	Achieve interpretation of all appl cable heritage or historic items through development and imp emen at on of a heritage interpretation stra egy (e.g. incorpora e interpretive signage at the station, which provides in ormat on on the heritage of the area).	DC	No	No			
C.15 Water balance study	C	C	-	C	C	-	C	C	Water	Undertake a water ba ance study for the opera ional phase (including groundwa er where applicab e). The study will estima e ongoing water needs, and dent fy and assess opportun ties for on s te capture and reuse, including non-potab e water sources as appropr ate.	D	No	No			
C.16 Water e ficient fittings	C	C	C	C	C	-	-	C	Water	Ensure onsi e amen ties using potab e water comply w th the fo lowing cr ter a: Toi ets to be WELS (max .5/3 L/min) dual flush toile s; Urinals to be water ess; All aps to be WELS (max 7.5 L/min); (see Green Star Of ice v3). Any other water fixtures should achieve at least a 5 Star WELS rating.	DC	Yes	Yes			
C.17 Water e ficient controls	C	C	C	C	C	-	C	C	Water	Spec fy sensors, timers or spring loaded devices for aps where possible to reduce wa er oss from taps that are eft running.	D	Yes	Yes			
C.18 Mon tor and record construction wa er	C	C	C	C	C	C	C	C	Water	Projects that have capi al value grea er than $10 mil ion are to mon tor and record water consumpt on at the si e office, all outlets available to the construction site and other water uses such as from non-potable sources.	C	No	No			
C.19 Incorporate Water Sensi ive Urban Des gn (WSUD)	C	C	C	C	C	C	C	C	Water	Retain hydrology features (i.e. streams, ponds etc) and incorporate with surface water treatment systems e.g. retention basins. This can also be used o treat runoff from hard surfaces before going to s ormwater to assist with f ood prone areas. We land spec es shou d be p an ed in drainage areas to trap gross po lutants where appropriate. Refer to Austra ian Runoff Qual ty – A Guide to Water Sens tive Urban Design.	DC	Yes	Yes			
C.20 Noise management	C	C	C	C	C	C	C	C	Pollut on control	Project to comply with Transport Projects Construct on Noise Strategy and rela ed cond tions o approval.	DC	Yes	Yes			
C.21 Community involvement in planning	C	C	C	C	C	C	C	C	Community benef t	Ac ively engage with stakeholders including the commun ty during planning.	D	Yes	Yes			
C.22 Planning framework	C	C	C	C	-	-	C	C		Plan and design projec s to take in o considerations existing planning strategies in consu ta ion with re evant authorit es.	D					
C.23 Crime Prevent on Through Environmental Design (CPTED)	C	C	C	C	C	C	C	C	Community benef t	Incorporate CPTED princip es during design. Th s may include natural observat on and use of CCTV. Natural observation s achieved through ence, landscape, stree scape and open space design in publ c or staff supervised areas. This is achieved by minimising narrow corridors, h dden corners and through the use of l ghting.	D	yes	Yes			
Discretionary Initiatives																
1.1 Carbon ootprint	3	3	3	3	3	3	3	3	Energy and greenhouse	Undertake AS1 06 -2 (Greenhouse Gases – project eve) compliant carbon footp inting exercise or projects with a capital investment value under $10 mil ion in accordance w th Transport for NSW s Greenhouse Gas Inven ory Guide for Construct on Projec s. Use standard carbon coe ficient values for construction material and fuel usage. Mon tor and report the carbon footprint every six months during construc ion.	DC	Yes	Yes			
1.2 Quantity surveyor	3	3			3	3	3	3	Energy and greenhouse	Quantity surveyor reports o include mass quanti ies of building materials. This wi l enable the carbon footprinting to be more accurate and more cost effective. Quantity surveyor reports wi l a so include costing for capital and ongoing maintenance of sustainab lity ini ia ives that involve ons te energy gene at on.	DC	Yes	Yes			
1.3 Power factor correc ion	6	6	-	6	6	-	6	6	Energy and greenhouse	Install power factor correction (PFC) un ts o keep the power factor of the system as close to one as possible.	D	No	No			
1. Dig tal cont ol system	9	9	-	9	9	-	9	9	Energy and greenhouse	Install digital control systems to modify flow rates, compressors, pumps, ans, valves, etc.	D	No	No			
1.5 Sub-metering	6	6	5	5	5	-	5	5	Energy and greenhouse	Provide separate meters or sub-me ering or all substantive energy uses (e.g. al ene gy uses of 100 kVa or greater – lighting, small power and individual tenanc es). Make sure that metering can effectively separate tenant loads f om base bu lding loads.	D	No	No			
1.6 Real-time (smart) metering	5	5	-	5	5	-	5	5	Energy and greenhouse	Mon tor and record data of ene gy use patterns in real time. For tunnels, re ay to the Master Control System.	D	No	No			
1.7 Eff cient vehicle circu at on	-	-	6	6	-	-	-	-	Energy and greenhouse	Design layout w th an eff c ent circula ion pattern with a repetitive pat ern and where possible avo d traff c jams in the car park.	D					
1.8 Consider road intersec ions	-	-	7	7	-	-	-	-	Energy and greenhouse	Locate car park entries and ex s clear of intersections and other locations of comp ex traffic movement. Minimise confl cts with pedestr ans and cyc ists and possib e back up of traffic into the street. Locate where adequate sight distance to street traff c s availab e.	D					
1.9 Ramping Sys em	-	-	-	6	-	-	-	-	Energy and greenhouse	Design e ficient ramping sys ems by cons dering s te condi ions, for example on sloping sites, spl t-floor/ha f level ayouts enab e an efficient ramp layout.	D					
1.10 Intel igent parking space identif ers	-	-	-	3	-	-	-	-	Energy and greenhouse	Install a car park iden ifier system that guides commuters to the nearest vacant parking space through intel gent f ee space sensors and signs. See Chatswood West field and Rouse Hill Town Centre or existing examp es.	D					
1.11 Raised stations		-	-	-	-				Energy and greenhouse	Adjust track inclines at stations to use g avity to reduce the energy trains expend in braking and acce eration.	D					
1.12 A ternative fuels in construction veh c es									Energy and greenhouse	Use a ternative fuels to reduce greenhouse gas emissions in construction vehic es.	C	Yes	Yes			
1.13 Green t avel plans	5	5	5	5	5	5	5	5	Energy and greenhouse	Deve op and imp ement green or sustainable travel plans during construc ion for emp oyees to get to s te off ces and construc ion s tes.	C	Yes	Yes			
1.1 Skylights and g azing	7	7	-	-	7	-	-	6	Energy and greenhouse	Use g ass, polycarbonate windows or so ar tubes in walls and roofs to increase daylighting, however avoid overhea ing. Cons der using low-emissivity films o reduce heat gain.	D	No	No			
1.15 Light coloured finishes	7	7	7	7	7	-	-	7	Energy and greenhouse	Use l ght coloured finishes on f oors, wa ls and ce lings of o fices, s at ons and platforms to help ref ect ambient l ght. Within car parks, consider glare and safety issues that may ar se.	D	No	No			
1.16 Façade treatmen s	6	6	-	6	6	-	-	5	Energy and greenhouse	Channel ight into the bui ding core with façade treatments, like ref ecto s and grils. The ref ected l ght wil have litt e so ar heat content, and can reduce the need for indoor l ghting. It can also reduce glare.	D	No	No			
1.17 Photo-e ectric swi ches	7	7	7	7	7	7	-	7	Energy and greenhouse	Install control systems or lighting that dim or switch-off lights according to the amount of day ight the zone s receiving. The lights can also switch on in order to maintain a minimum level of lighting. Lights shou d be off when areas are c osed or unoccup ed.	D	No	No			
1.18 Mot on controlled swi ches	6	6	6	6	6	-	-	6	Energy and greenhouse	Install lighting control systems that include motion sensors to cont ol low traff c areas.	D	Yes	Yes			
1.19 Timed switches	7	7	7	7	7	-	-	6	Energy and greenhouse	Install lighting swi ches that turn on and off at particu ar times where pattern of use s known such as of ices. Note: This initiative is not app icab e where photo-electric switches and motion controlled sw tches are installed.	D	Yes	Yes			
1.20 LED lights	9	9	9	9	9	9	9	9	Energy and greenhouse	Incorporate energy ef icient LED lighting.	D	Yes	Yes			
1.21 Light dimming	7	7	7	7	7	7	7	7	Energy and greenhouse	Al ow lighting system to use ow light or sw tch off whi e meeting lighting requirements.	D	No	No			
1.22 Lighting scheme	9	9	6	6	9	-	-	9	Energy and greenhouse	Prepare a lighting scheme by a sui ably qualified lighting designer. Pay a tention to zoning between lighting demands of different areas and strategic placement of lighting ixtures to maxim se ground coverage.	D	Yes	Yes			
1.23 CCTV lighting	6	6	6	6	6	6	6	6	Energy and greenhouse	Install low ight CCTV monitoring equipment.	D	Yes	Yes			

Sustainable Initiatives Selection

Key	
Yes	The initiative is applicable to this project
No	The initiative has not been applied to this project. Detailed comments are required as to why this initiative has not been applied

Initiative	Stations	Transport interchange	Car park (at-grade)	Car park (multi-storey)	Maintenance facilities	Civil infrastructure	Tunnels	Light rail	Theme	Description	Design (D) & Construction (C) Interface	Applicability Maintenance facilities	Reference Design Maintenance facilities	Detailed Design Maintenance facilities	Construction Maintenance facilities	Finalisation Maintenance facilities
1.2 Photoluminescent emergency lighting	5	5	-	5	5	-	-		Energy and greenhouse	Install photoluminescent strips and products on stairs and steps to direct passengers towards exits in the event of an emergency or power outage. Design and product selection should be in accordance with AS1 28.1 Design for Access and Mobility.	D	No	No			
1.25 Natural ventilation	8	8	-	8	8	-	-	8	Energy and greenhouse	Naturally ventilate structures (refer to AS1668.2-2002 (type 3)). Consider prevailing winds.	D	Yes	Yes			
1.26 Demand operated ventilation	5	5	-	5	5	-	-	5	Energy and greenhouse	HVAC system utilises Carbon Dioxide (CO2) sensors in occupied enclosed spaces (e.g. office spaces). This will allow system to adjust outside air ventilation rates to increase or decrease fresh air flow depending on occupancy rates at a given time.	D	No	No			
1.27 Opening windows	7	7	-	-	7	-	-	6	Energy and greenhouse	Design all occupied areas to have an opening window to the outside to allow for mixed mode ventilation and daylight into the space. The window's area should be a minimum of 5 per cent of the floor area. Placement of windows over track should be avoided.	D	No	No			
1.28 Mixed mode ventilation	7	7	-	-	7	-	-	6	Energy and greenhouse	Incorporate mixed mode ventilation. This involves using natural ventilation when ambient conditions are suitable. Air conditioning only operating at peak temperature periods. Interlock A/C with windows so both cannot be used simultaneously.	D	No	No			
1.29 Tunnel ventilation	-	-	-	-	-	-	6	-	Energy and greenhouse	Minimise mechanical ventilation requirements for energy efficiency (e.g. utilise best practice energy efficient equipment, size vent shafts, lower tunnel friction and/or more draught relief).	D					
1.30 Segregation of ventilation	5	-	-	-	-	-	5	-	Energy and greenhouse	Optimise ventilation between stations and tunnels and consider using platform screen doors. Segregation can reduce noise and improve safety.	D					
1.31 Night flushing of indoor areas	5	5	-	-	5	-	-		Energy and greenhouse	Provide the necessary equipment to enable night flushing within buildings, where air from external areas is ducted into internal areas at night.	D	No	No			
1.32 Double skin facade	6	6	-	-	6	-	-	5	Energy and greenhouse	Incorporate double skin facades to provide an effective thermal and noise barrier.	D	No	No			
1.33 Double glazing	10	10	-	-	10	-	-	8	Energy and greenhouse	Make sure all external windows and skylights are double or triple glazed, where appropriate and cost effective.	D	No	No			
1.3 Chilled beams or under floor supply	3	3	-	-	3	-	-	3	Energy and greenhouse	Install chilled beams or supply air via under floor mechanism to improve air change effectiveness.	D	No	No			
1.35 Solar control film	5	5	-	-	5	-	-	5	Energy and greenhouse	Add solar control film to existing glazing.	D	No	No			
1.36 External solar shading	5	5	-	-	5	-	-	6	Energy and greenhouse	Use external solar shading and vegetation (deciduous trees preferred).	D	No	No			
1.37 Mid pane blinds			-	-		-	-		Energy and greenhouse	Install mid pane blinds in the air cavity of double glazed systems.	D	No	No			
1.38 Automatic blinds	7	7	-	-	7	-	-	7	Energy and greenhouse	Use automatic blinds programmed to close when the leve	D	No	No			
1.39 Temperature sensor placement for HVAC	9	9	-	-	9	-	-	8	Energy and greenhouse	Locate temperature sensors for HVAC system such that direct solar gain, heat transfer through external walls and interference between zones is avoided.	D	No	No			
1. 0 Energy efficient HVAC	8	8	-	-	8	-	-	7	Energy and greenhouse	Select and design HVAC system with prioritisation of energy efficiency. See section .3.1.3 of the ASA Station Design Standard Requirements for further information on air conditioning and ventilation requirements at stations. Also refer to AS1668.2-2002.	D	No	No			
1. 1 Zoning of areas	7	7	-	-	7	-	-	6	Energy and greenhouse	Zone areas of HVAC systems to deal with separate areas known to have different occupancy periods and/or requirements (i.e. communications room has different cooling demand to a ticketing booth).	D	No	No			
1. 2 Power transmission	-	-	-	-	6	-	-	5	Energy and greenhouse	Use pneumatic and/or hydraulic driven maintenance equipment or other suitable efficient power systems.	D	No	No			
1. 3 Energy efficient transformer			-						Energy and greenhouse	Utilise energy efficient transformers such as amorphous metal transformers.	D	No	No			
1. Vertical transport	8	8	7	7	-	-	-	-	Energy and greenhouse	Install energy efficient vertical transport systems (e.g. ramps; variable speed drive escalators that enable a slow-mode, so that they oscillate at lower speeds when not in use and increase in speed when users step into the foot panel at the entry to the escalator. Install and variable voltage variable frequency (VVVF) control gear for lifts.	D					
1. 5 Stair placement to encourage use	8	8	6	8	-	-	-	-	Energy and greenhouse	Locate stairs along desire lines to encourage use. Provide stairs instead of escalators unless there is a 6 metre rise or greater, or a platform clearance or congestion issue. Maintain ramps or lifts for disabled access.	D					
1. 6 High efficiency fans and pumps	8	8	8	8	8	8	8	8	Energy and greenhouse	Specify high energy efficiency for all fans and pumps. Consider utilising variable speed drivers for fans, pumps and waste heat recovery.	D	No	No			
1. 7 Solar hot water	7	7	-	-	7	-	-	6	Energy and greenhouse	Install solar thermal hot water systems to provide hot water and heating for ventilation system	D	No	No			
1. 8 Ground source heat pumps	6	6	-	-	6	-	-	5	Energy and greenhouse	Install ground source heat pumps to provide hot water and heating for ventilation system where solar access and/or gas supply is inadequate.	D	No	No			
1. 9 Allocate space for alternative traction voltage		-	-	-					Energy and greenhouse	Allocate space for alternative traction voltage in the future.	D	Yes	Yes			
1.50 Design for part-load operation	8	8	-	8	8	-	8	8	Energy and greenhouse	Design systems to run most efficiently under the conditions that they are to be used most often and where appropriate design to operate efficiently over a range of conditions.	D	Yes	Yes			
1.51 Photovoltaic panels	6	6	6	8	5	5	-	6	Energy and greenhouse	Integrate photovoltaic panels into structures. For an above ground station, on-site renewable energy technologies supply sufficient quantities so that the station's energy supply to be low carbon as defined in Appendix B. For a below ground station, on-site renewable energy technologies should be maximised. For car parks, renewable energy generation should supply 100 per cent of lighting and ventilation demand (unless restricted by wind and shadowing). For a maintenance facility, renewable energy generation should supply 100 per cent of a lea lighting, small power and ventilation demands.	D	Yes	Yes			
1.52 Wind turbines	5	5	-	6	5	5	-	5	Energy and greenhouse	Install small-scale wind turbines at stations, facilities or multi-storey car parks with good wind access. Placement should be on the building roof either on the building perimeter or 5 metres above the direct centre of the roof.	D	No	No			
1.53 Cogeneration/ trigeneration	6	6	-	-	7	6	6	6	Energy and greenhouse	Install or develop a cooperative arrangement with external parties on a co/tri generation plant that can supply electricity, heating or cooling for a large localised need e.g. station).	D	No	No			
2.1 Climate change risk assessment	5	5	5	5	5	5	5	5	Climate resilience	Perform a climate change risk assessment for all projects with a capital investment value under $10 million using current scientific predictions (i.e. Intergovernmental Panel on Climate Change (IPCC), Commonwealth Scientific and Industrial Research Organisation (CSIRO) etc) to determine the hazards/risks associated with future climatic conditions. Refer to Climate Change Impacts and Risk Management: A Guide for Business and Government' and the AGO Guidelines for Climate Change Adaptation or guidance.	D	Yes	Yes			
2.2 Decrease climate vulnerability	6	6	5	5	5	5	5	6	Climate resilience	All projects with a capital investment value under $10 million to design out extreme, high and medium risks as identified in the climate change impact assessment where practicable.	D	Yes	Yes			
2.3 Passenger comfort	6	6	6	8	-	-	-	6	Climate resilience	Review levels of passenger comfort to take account of climate change e.g. provision of additional shelter from winds and driving rain and increased shading from sun in locations where customers wait for transport).	D					
2. Design for flood/ inundation risk	5	-	5	5	-	-	7	-	Climate resilience	Specify vent levels and portal drainage to address predicted increases in rainfall intensity, future flood conditions and sea levels.	D					
2.5 Thermal comfort			-			-		3	Climate resilience	Select ventilation systems to provide a satisfactory environment during severe heat waves.	D	Yes	Yes			
2.6 Equipment resilience to temperature			-			-			Climate resilience	Select equipment that will be resilient to increased temperature and more frequent and severe heat waves. Temperature resilient equipment will also negate or reduce need for active temperature control, reducing operational energy consumption.	D	Yes	Yes			
2.7 Backup power supply									Climate resilience	Incorporate backup or auxiliary power sources to supply essential services during power outages or extreme events.	D	Yes	Yes			
2.8 Protection from extreme weather (sun, rain, wind)	6	6	-	8	-	-	-	6	Climate resilience	Consider design measures for protecting customers and electrical equipment from wind and rain during storm events.	D					
2.9 Protect sensitive assets	9	9	9	9	9	9	9	9	Climate resilience	Protect sensitive assets (e.g. lifts, escalators) from the effects of extreme climate and weather.	D	Yes	Yes			
3.1 Sustainable procurement	8	8	8	8	8	8	8	8	Materials and waste	Develop a sustainable procurement strategy to be implemented during construction. The strategy must include at a minimum (i) a commitment to sustainable procurement in a relevant policy and/or plan, (ii) sustainability questions and requirements in tender documentation, (iii) a process for evaluating tenderers based on sustainability criteria including percentage tender evaluation weighting on sustainability and iv) sustainability requirements in subcontracts. Project teams should be able to demonstrate that the strategy has influenced procurement decision-making and outcomes.	DC	No	No			
3.2 LCA based environmental footprint									Materials and waste	Undertake ISO 1 0 (Environmental Guidelines – Life Cycle Assessment) compliant life cycle analysis (LCA) to assess the environmental footprint of the development.	DC	Yes	Yes			
3.3 Environmentally responsible suppliers	7	7	7	7	7	7	7	7	Materials and waste	Use materials certified under recognised environmental certification systems (such as EcoSpecifier, Good Environmental Choice, ECO-Buy, water efficiency labelling scheme (WELS), Energy Star, Forest Stewardship Council (FSC), Low Carbon Australia Carbon Neutral Certified).	DC	Yes	Yes			
3. Recycled / renewable materials	7	7	7	7	7	7	7	7	Materials and waste	Maximise the recycled content of construction materials, in particular those included in the Infrastructure Sustainability Council of Australia's IS Materials Calculator available from ISCA or free at www.isca.org.au.	DC	Yes	Yes			
3.5 Optimise design	8	8	8	8	8	8	8	8	Materials and waste	Optimise design to minimise material consumption, mass/volume/space use and above ground land use.	D	Yes	Yes			
3.6 Re-use of structures	5	5	5	5	5	5	5	5	Materials and waste	Retain or refurbish existing structures where possible.	DC	No	No			
3.7 Recycled concrete	8	8	-	-	8	8	8	8	Materials and waste	Reuse concrete, bricks and other structural materials in construction on site where available and suitable.	DC	No	No			
3.8 Low impact concrete	6	6	6	6	6	6	6	6	Materials and waste	Make sure that the mix water for concrete contains at least 50 per cent non-potable water. Substitute aggregates to the following levels (but only if Portland cement content does not increase by more than 5 kg/m3): • At least 0 per cent of coarse aggregate is crushed concrete aggregate or alternative materials. • At least 25 per cent of fine aggregates (sand) are manufactured sand or alternative materials.	DC	Yes	Yes			
3.9 Recycled aggregate	8	8	8	8	8	8	8	8	Materials and waste	Use recycled aggregate in non-structural uses (e.g. building base course, sub-grade to any car parks and footpaths, backfilling to service trenches, kerb and gutter).	DC	Yes	Yes			
3.10 Filling for tunnel annulus	-	-	-	-	-	-	7	-	Materials and waste	Use sand or other low embodied carbon material rather than cement grout to fill tunnel annulus.	DC					
3.11 Replace sand with recycled glass	6	6	6	6	6	6	6	6	Materials and waste	Reuse crushed glass to minimise use of raw materials (e.g. sand).	DC	Yes	Yes			

Sustainable Initiatives Selection

Key	
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Initiative	Stations	Transport interchange	Car park (at-grade)	Car park (multi-storey)	Maintenance facilities	Civil infrastructure	Tunnels	Light rail	Theme	Description	Design (D) & Construction (C) Interface	Applicability Maintenance facilities	Reference Design Maintenance facilities	Detailed Design Maintenance facilities	Construction Maintenance facilities	Finalisation Maintenance facilities
3.12 Recycled materials in formations	-	-	-	-	5	5	5	5	Materials and waste	Use recycled materials for formations. Formations are defined as the surface on which the track (including ballast) is laid. The material is to be analysed for its ability to meet related standard requirements.	DC	No	No			
3.13 Recycled noise control products	6	6	6	6	6	6	6	6	Materials and waste	Use recycled materials in noise and vibration control solutions and products (e.g. tyre derived aggregate ballast mat).	DC	Yes	Yes			
3.14 Sustainable structural steel	7	7	7	7	7	7	7	7	Materials and waste	Source at least 60 per cent of structural steel (by weight) from a steel fabricator/contractor accredited by the Environmental Sustainability Charter of the Australian Steel Institute.	C	Yes	Yes			
3.15 Lower embodied energy bar and mesh	6	6	6	6	6	6	6	6	Materials and waste	Source at least 60 per cent of bar and mesh that is produced through energy reduction processes such as Polymer Injection Technology.	C	Yes	Yes			
3.16 Optimal preassembly of reinforcing steel	5	5	5	5	5	5	5	5	Materials and waste	Source at least 15 per cent of reinforcing steel from suppliers that use optimal off site fabrication techniques such as engineered reinforcing bar carpet, engineered/custom sed mesh or prefabricated reinforcing cages.	DC	Yes	Yes			
3.17 Low VOC paints and finishes	7	7	-	8	7	7	-	7	Materials and waste	Specify low volatile organic compound (VOC) paints and finishes. Refer to Green Star – Office Interiors v1.1 available online.	DC	Yes	Yes			
3.18 Low VOC adhesives and sealants	7	7	-	8	7	7	7	7	Materials and waste	Specify all adhesives and sealants as low VOC. Refer to Green Star – Office Interiors v1.1 available online.	DC	Yes	Yes			
3.19 Composite wood	7	7	6	8	7	7	-	7	Materials and waste	Use low emission formaldehyde composite wood products for all composite wood products.	DC	Yes	Yes			
3.20 Timber	7	7	7	7	7	7	-	7	Materials and waste	95% of all timber products (by cost) comprise re-used or post-consumer recycled timber, Forest Stewardship Council (FSC) or Australian Forest Scheme (AFS) certified timber, and/or timber from NSW sustainably managed forests.	DC	Yes	Yes			
3.21 Fire suppression	5	5	-	5	5	-	5	5	Materials and waste	Stock fire suppression devices which avoid the use of halons, alternatives include carbon dioxide, water-spray, foams and powders.	D	Yes	Yes			
3.22 Services corridor	-	-	-	-	-	2	2	2	Materials and waste	Provide services corridor for energy, water or other buried infrastructure.	D					
3.23 Recycling and refuse bins	3	3	-	1		-	-	3	Materials and waste	Separate and collect patron waste by providing recycling and refuse bins.	D	No	No			
3.24 Bulky waste storage		-	-	-		-	-	3	Materials and waste	Design for the separate storage of non standard waste, such as bulky goods.	D	No	No			
3.25 Cut-fill balance	9	9	9	9	9	9	9	9	Materials and waste	Balance site works to avoid excess or import of spoil.	DC	Yes	Yes			
3.26 On-site spoil reuse	7	7	7	7	7	7	7	7	Materials and waste	Reuse any excess spoil as a landform feature, visual screen, in concrete and or for noise attenuation.	DC	Yes	Yes			
3.27 Off-site spoil reuse									Materials and waste	Where clean spoil cannot be used on-site, prioritise off-site uses that have biodiversity or community benefit, and require minimum transport distances.	DC	Yes	Yes			
3.28 Excavated materials	5	5	5	5	5	5	5	5	Materials and waste	Investigate future use opportunities for excavated materials (e.g. Yellowblock sandstone).	DC	No	No			
3.29 Segregation of waste	7	7	7	7	7	7	7	7	Materials and waste	Enable waste segregation in the design process by including space for the collection and segregation of waste with appropriate marking (e.g. signage) and controls (e.g. lockable lids), located away from sensitive receptors (e.g. water courses). During construction, use facilities and procedures that maximise on-site separation of waste to maximise reuse/recycling.	DC	Yes	Yes			
3.30 Reuse construction waste	8	8	8	8	8	8	8	8	Materials and waste	Maximise reuse of concrete, bricks, earthworks and other structural waste materials.	DC	No	No			
3.31 Mulching	8	8	8	8	8	8	-	8	Materials and waste	Mulch all appropriate waste vegetation (no weeds) where justified by volume or send it to an off site compost facility.	C	No	No			
3.32 Soil geo-grid reinforcement	-	-	-	-	-	6	-	6	Materials and waste	Replace embankment retaining walls with soil geo-grid reinforcement to improve stability and strength of soil and reduce material use.	DC					
3.33 Open cross drains	-	-	-	-	-	6	6	6	Materials and waste	Maximise use of open cross drains versus subsoil drains to reduce use of resources.	D					
3.34 Prevent electrolysis	6	6	6	6	6	6	6	6	Materials and waste	Prevent or minimise the effects of stray current electrolysis from electrified railway that increase the rate of corrosion. Such as selecting suitable building materials, avoiding using metal finishes in the vicinity of high voltage electricity, using masking agents or coatings to prevent exposure of metals, and preventing direct contact between metallic parts.	D	Yes	Yes			
3.35 Modular construction	8	8	8	8	8	8	8	8	Materials and waste	Use modular and replaceable finishing elements (e.g. tunnel lining).	D	No	No			
3.36 Prefabrication	6	6	-	6	6	6	6	6	Materials and waste	Use prefabricated building and civil components (for bridges, walls (retaining, deflection, noise), culverts, platforms, level crossings and tunnel lining etc) to reduce construction waste material usage, pollution risks and travel.	DC	Yes	Yes			
3.37 Low finish interiors	7	7	7	7	7	-	-	7	Materials and waste	Specify low-finish interiors (e.g. exposed brick/rock walls, unpainted galvanised steel, polished concrete walls and floors) to avoid the need for large quantities of paint and/or cement render. Consider graffiti removal in specifying surface textures.	D	Yes	Yes			
3.38 Shell structure roofs	3	3	-	-	-	-	-	3	Materials and waste	Specify lighter and/or lower embodied energy shell structures for canopies to reduce amounts of materials in comparison to other roof structures (e.g. fibre reinforced concrete, timber etc).	D					
3.39 Member spacing	9	9	-	9	-	9	-	9	Materials and waste	Optimise the spacing of structural members in beam and post type designs.	D					
3.40 Façade reuse	6	6	-	-	-	-	-	-	Materials and waste	Incorporate existing building facades in station upgrades.	D					
3.41 Coordinate dimensions	6	6	-	6	6	6	6	6	Materials and waste	Design for standard material sizes and components to reduce waste and improve ease of assembly and disassembly.	D	Yes	Yes			
3.42 Design for disassembly	5	5	-	5	6	6	6	6	Materials and waste	Design for disassembly of new structures to maximise opportunities for recycling materials. Develop a deconstruction plan supported by disassembly principles.	D	No	No			
3.43 Durable finishes	7	7	-	7	7	-	-	7	Materials and waste	Specify building materials and finishes to demonstrate high quality and durability.	D	Yes	Yes			
3.44 Adaptability	8	8	-	8	8	-	-	8	Materials and waste	Design structures for re-use/adaptability to minimise redundancy and or rebuild.	D	No	No			
3.45 Heavy-duty geotextile for foundation	-	-	-	-	6	6	6	6	Materials and waste	Use heavy-duty geotextile instead of oversize stone, to prevent capillary action at the base of the embankment.	D	No	No			
3.46 Optimise track support system	-	-	-	-	-	-	9	-	Materials and waste	Optimise track support system design to minimise tunnel diameter (while also achieving groundborne noise compliance).	D					
3.47 Compact site layout	7	7	7	7	7	7	7	7	Materials and waste	Layout of construction sites (including plant and equipment) to be designed to reduce travel distances and double carrying.	C	No	No			
3.48 Last Planner	7	7	7	7	7	7	7	7	Materials and waste	Planning and scheduling can be done by pull scheduling using the Last Planner System™ (LPS), or an equivalent system, to achieve efficiencies in project delivery (such as reduced program times). At a minimum the system must include a milestone schedule, collaboratively created phase schedules, make-ready look ahead plans, weekly work plans, and a method for measuring. Refer to the Lean Construction Institute website for free online resources.	DC	Yes	Yes			
3.49 Just in time inventory	6	6	6	6	6	6	6	6	Materials and waste	Using 'just in time' methods of equipment and supply delivery; reducing overall storage requirements and potential for waste materials/equipment.	C	Yes	Yes			
4.1 Consult with local nature conservation groups							-	3	Biodiversity and heritage	Consult with local nature conservation groups on opportunities for collaboration (e.g. maintaining publicly accessible bushland).	DC	No	No			
4.2 Ecological value opportunities	7	7	7	7	7	7	-	5	Biodiversity and heritage	Maximise ecological values through landscape species choice, and planting density and configuration. Make sure that appropriate weed management strategies are undertaken to avoid migration or contamination on and offsite.	DC	No	No			
4.3 Clearing protocols	7	7	7	7	7	7	7	5	Biodiversity and heritage	Implement clearing protocols for habitat areas with the involvement of a qualified ecologist, including: • Prepare an inventory of trees and hollows to be removed (including the number, age and structure of mangroves). • Check hollow-bearing trees for fauna and nests prior to removal. • Implement a two-stage clearing process to allow a natural transition of fauna species following the initial disturbance. • Safely relocate any animals found.	DC	Yes	Yes			
4.4 Feral animal and weed programme							-	2	Biodiversity and heritage	Identify, control, monitor and manage feral animals and weeds.	DC	Yes	Yes			
4.5 Bird/bat boxes	3	3	3	3	3	3	-	2	Biodiversity and heritage	Create habitats for winged species for sites that do not pose a health and safety risk.	DC	No	No			
4.6 Fauna crossings	-	-	-	-	-	6	-	3	Biodiversity and heritage	Install fauna crossings such as fauna underpasses, combined fauna drainage/bridge structures and associated fauna fencing as required.	DC					
4.7 Vegetation cover over built assets	5	5	5	5	5	5	-	6	Biodiversity and heritage	Provide a vegetation cover on structures to reduce maintenance and improve amenity (e.g. on noise walls).	DC	No	No			
4.8 Green roofs and walls	5	5	-	5	5	-	-	5	Biodiversity and heritage	Install green roof and/or green walls, maximising the extent of native vegetation.	D	No	No			
4.9 Heritage items in the vicinity	6	6	6	6	6	6	-	6	Biodiversity and heritage	Design for the interrelationship between new development/redevelopment and proximate buildings of heritage/cultural significance.	D	Yes	Yes			
5.1 Rainwater	6	6			8	-	-	8	Water	Store rain from roofs or shade structures in water tanks. Connect water tanks to a new or existing non-potable water reticulation system. Connect sub-meter to all outflow pipes from tanks.	D	No	No			
5.2 Grey or black water			2	2	8	-	-		Water	Harvest grey or black water from all sources on-site for non-potable uses (e.g. for uses in toilets, irrigation or wash down facility).	D	No	No			
5.3 Condensate recovery	1	1	-	-	1	-	-	-	Water	Recover, treat and reuse air conditioning condensate.	D	No	No			
5.4 Fire Protection			-	-	3	-	3	2	Water	Recover and reuse water from fire protection systems that require periodic testing and large quantities of water.	D	No	No			
5.5 Remove cooling towers	5	5	-	-	5	-	-	3	Water	Avoid the use of water intensive cooling towers – alternatively use a ground loop, air cooled system or natural ventilation. Otherwise, make sure that cooling towers have at least six concentration cycles – to avoid extra use of water and chemicals to operate.	D	Yes	Yes			
5.6 Water efficient systems	7	7	7	7	7	7	7	6	Water	Review alternate solutions that increase water use efficiency (e.g. avoid deluge systems). Refer to the Department of Environment and Heritage's Water Efficiency Guide: Office and Public Buildings 2006 for further guidance.	D	No	No			
5.7 Water sub-metering	5	5	5	5	5	5	5	5	Water	Install water sub-meters on all major potable and recycled water uses.	D	No	No			
5.8 Water real-time metering									Water	Monitor and record water use patterns.	D	No	No			
5.9 Water metering linked to central management system	5	5	5	5	5	5	5	5	Water	Link water metering to a Master Control System (MCS) and supervisory control and data acquisition (SCADA) to monitor water consumption and inform leak detection system.	D	No	No			
5.10 Planting	9	9	9	9	9	9	-	9	Water	Select plant species that require minimal or no irrigation after establishment.	DC	No	No			
5.11 Drip feed irrigation	6	6	6	6	6	6	-	6	Water	Use drip feed irrigation or similar water efficient technology from a non-potable water source where irrigation is necessary.	DC	No	No			
5.12 Stormwater reuse during construction	5	5	5	5	5	5	5	5	Water	Maximise non-potable water use during construction e.g. by collecting rain/stormwater in settle ponds or in water tanks at site compounds and treating (where needed) for reuse (e.g. for dust suppression spraying).	C	Yes	Yes			
5.13 Stormwater quality									Water	Install silt and oil separators to make sure scum and particulates are removed from stormwater.	D	Yes	Yes			
5.14 Minimal groundwater pumping	-	-	-	-	-	-	5	-	Water	Minimise groundwater pumping and related treatment requirements.	D					
5.15 Permeable and porous surfaces	5	5	5	5	5	5	-	5	Water	Design for permeable and porous surfaces to allow for stormwater infiltration (preferably with other treatments such as vegetated swales).	D	No	No			
6.1 Refrigerants	7	7	-	-	7	-	-	7	Pollution control	Select refrigerants that do not have ozone depletion potential (ODP) or global warming potential (GWP), such as Refrigerant R7	D	Yes	Yes			

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6.2 Lubricants	3	3	-	3	5	5	5	5	Pollution control	Use biodegradable lubricants where feasible.	DC	Yes	Yes			
6.3 Hydraulic equipment	5	5	-	-	5	-	-	5	Pollution control	Procure hydraulic equipment that uses water as hydraulic fluid.	D	No	No			
6. Avoid dangerous goods and hazardous materials	7	7	7	7	7	7	7	7	Pollution control	Use Safety Data Sheets (SDS) to avoid the use of dangerous goods and hazardous materials. See the materials section in Appendix B for details.	DC	Yes	Yes			
6.5 Apply noise control hierarchy	7	7	6	10	10	10	10	10	Pollution control	Apply a hierarchy of control by addressing noise at source first (e.g. orient equipment away from residential receivers), then propagation path (e.g. a noise barrier) and finally at the receiver (e.g. double glazed windows) as a last option (see Rail Infrastructure Noise Guideline for further information).	D	Yes	Yes			
6.6 Quiet car parks	-	-			-	-	-	-	Pollution control	Design car park to minimise noise during operation (e.g. low noise speed bumps and road surface).	D					
6.7 Optimise alignment for noise	-	-	-	-	-	10	-	10	Pollution control	Optimise the alignment for operational noise (including avoiding tight radius curves, steep gradients and proximity to sensitive receivers).	D					
6.8 Avoid noise sensitive areas	-	-	-	-	6	6	-	6	Pollution control	Locate noise generating infrastructure away from sensitive areas (maintenance facilities, turnouts, crossings, signals, crossing loops, storage road etc) and locally enclose noisy activities.	D	Yes	Yes			
6.9 Avoid level crossings	-	-	-				-		Pollution control	Avoid level crossings where this does not significantly impact upon vehicular or pedestrian accessibility.	D	No	No			
6.10 No whistle boards	-	-	-	-	-	-	6	-	Pollution control	Implement 'no whistle' boards at tunnel portals where appropriate.	D					
6.11 Separate passenger waiting areas from noise	5	-	-	-	-	-	-	5	Pollution control	Segregate passenger waiting area from noisy areas.	D					
6.12 Optimise outdoor PA systems	6	6	-	-	-	-	-	-	Pollution control	Optimise design and installation of open and semi-enclosed stations' PA systems to reduce impact on community.	D					
6.13 Optimise ticket sale acoustics	7	7	-	-	-	-	-	-	Pollution control	Optimise acoustics for the ticket sale interface (i.e. good conditions for communication between staff and customers).	D					
6.1 Location of air intakes	6	6	-	6	6	-	-	6	Pollution control	Make sure that air intakes are located away from loading bays, parking areas, exhaust stacks, garbage/waste storage areas and other contamination points that may transfer odours, particulates or moisture.	D	Yes	Yes			
6.15 Filtration of HVAC systems			-			-	-		Pollution control	Provide high performance filtration for mechanical ventilation systems. High performance in regards to mechanical ventilation systems may be defined as both a high level of energy efficiency as well as filtration efficiency	D	No	No			
6.16 Security and warning lights	7	7	7	7	7	-	-	7	Pollution control	Install security and warning lighting so that they are not directed at neighbouring properties or in such a way that they reflect off trains on to structures or neighbouring properties.	D	Yes	Yes			
6.17 Avoid glare and light pollution	5	5	5	5	5	5	-	5	Pollution control	Minimise ambient light levels and glare towards neighbouring properties (e.g. avoid or obstruct up lighting). Refer to ASA standard 3.11 3.3 for guidance and make sure that design complies with AS 282 Control of the Obtrusive Effects of Outdoor Lighting. Do not exceed minimum requirements of AS1158 for illuminance levels for 95 per cent of outdoor spaces.	D	Yes	Yes			
6.18 Stencil stormwater drains	-				-	-	-		Pollution control	Stencil stormwater drains to explain that the drain is just for rain.	D					
6.19 Maintain groundwater	7	7	7	7	7	7	7	7	Pollution control	Investigate and make sure that aquifers do not deplete or migrate from existing groundwater regimes (e.g. contaminated groundwater migration, or lower existing water tables or water courses).	D	No	No			
7.1 Community involvement in design	6	6	6	6	6	6	6	6	Community benefit	Engage the community and stakeholders during design.	D	Yes	Yes			
7.2 Community involvement in noise mitigation	-	-	-	-	-	7	-	7	Community benefit	Engage with the impacted community when selecting propagation path noise control (e.g. siting of noise barriers).	D					
7.3 Public art	5	5	5	5	-	5	-	5	Community benefit	Consult with the community over potential public art proposals.	DC					
7. Weekend use	-	-	6	6	-	-	-	-	Community benefit	Allow for communal parking space use during non-peak commuting hours.	D					
7.5 Shared adaptive use	-	-	6	6	-	-	-	6	Community benefit	Design in adaptive use on the weekends/non-peak periods (e.g. consider how the car park may be converted into a market or festival space on the weekend).	D					
7.6 Space for retail and other community amenity			-		-	-	-	-	Community benefit	Provide adequate space for retail or other amenity and design to have separate access to utilities from the main station.	D					
7.7 Plan station entries	6	6	-	-	-	-	-	6	Community benefit	Plan station entries that connect directly to existing key desire lines, pedestrian routes or for the most efficient pedestrian routes.	D					
7.8 Bicycle and pedestrian links	5	5	7	7	7	-	-	5	Community benefit	Optimise local pedestrian links to and between community facilities, such as sports grounds etc. Plan pathways within the asset to connect directly with existing pedestrian routes, centre activities and station entries. Design station building in a way to prevent it becoming a visual or psychological barrier to crossing the railway.	D	No	No			
7.9 Integrated with adjacent buildings	-	-	-	6	-	-	-	-	Community benefit	Consider the existing building landscape to allow the incorporation of ground level activities. Design basement level car parking or sleeve multi-storey car parking with single façade buildings.	D					
7.10 Integrate with the use of landscape	-	-			-	-	-	-	Community benefit	Use landscape to screen vehicles from the streetscape and make sure that vegetation species selection is complementary to the existing context.	DC					
7.11 Avoid future possessions	10	-	-	-	10	10	10	10	Community benefit	Consider maintenance and construction solutions that eliminate or minimise need for future possessions (e.g. power isolation).	D	Yes	Yes			
7.12 Future community disruption	6	-	-	-	6	6	6	6	Community benefit	Consider concurrent staging and provision for planned and potential future projects to minimise community disruption.	D	Yes	Yes			
7.13 Enhance visual interest of asset	6	6	7	7	-	7	-	6	Community benefit	Use lighting, landscaping and/or public art to direct visual interest towards the structure and enhance the visual amenity of the structure.	DC					
7.1 Wayfinding strategy	5	5	5	5	-	-	-	5	Community benefit	Develop and implement a wayfinding strategy for the catchment area within 800 metres of the station.	DC					
7.15 Links with bus services	-	5	-	-	-	-	-	5	Community benefit	Incorporate station passenger information (SPI) units at bus stops and interchange areas surrounding the station.	D					
7.16 Enable easy and intuitive navigation	7	7	-	-	-	-	-	7	Community benefit	Devise efficient pedestrian movement routes, and make sure that exits and entries are readily identifiable by sight without any reliance upon signage (e.g. arrows on directional floor tiling to direct to exits).	D					
7.17 Legibility through public art			-	-	-	-	-		Community benefit	Assist orientation in the station through the use of public art (e.g. floorscape art).	D					
7.18 Enhance access and public amenity	5	5	-	-	-	-	-	5	Community benefit	Develop a coordinated strategy between agencies to make sure that modal interchanges are accessible and seamless.	D					
7.19 Kiss and ride	7	7	-	-	-	-	-	7	Community benefit	Provide for kiss and ride at the station.	D					
7.20 Taxi stand and or bus stop	7	7	-	-	-	-	-	7	Community benefit	Provide shelter for nearby taxi stands and bus stops.	D					
7.21 Lockers and showers for cyclists	-	-	-	-	5	-	-	5	Community benefit	Consider the provision of showers and lockers on-site to encourage workers to ride to work.	D	No	No			
7.22 Code of practice for construction	6	6	6	6	6	6	6	6	Community benefit	Prepare a code of practice for construction contractors. Refer to the Australian Procurement and Construction Council (APCC) National Code of Practice for the Construction Industry (1997) and supporting Towards Best Practice Guidelines (1999) and Implementation Guidelines (2009) for guidance.	D	No	No			
7.23 Electric car charging	-	-	7	7	-	-	-	-	Community benefit	Allow capacity for alternative fuel vehicles to recharge now or in the future.	D					
7.2 Car sharing	-	-	6	6	-	-	-	-	Community benefit	Allocate reserved parking spaces outside of any pay parking area.	D					
7.25 Public displays	6	6	7	7	-	-	-	-	Community benefit	Provide real-time displays of train timetable information in the public areas surrounding the station.	D					
7.26 Public displays of sustainability initiatives							-		Community benefit	Provide real-time displays of data collected by smart meters to communicate with workers, passengers and the wider community. When displayed in the public domain the data should use key performance indicators including greenhouse gas emissions reductions from sustainability initiatives.	D	No	No			
7.27 Preferential parking	-	-	7	7	6	-	-	6	Community benefit	After adequate provision of disabled parking spaces, designate preferential parking spaces to motorbikes, small cars and electric vehicles. Where possible, these spaces should be located nearest to the station entry or maintenance facility entry after disabled parking spaces.	D	No	No			
7.28 Bicycle lockers and/or racks	3	3	5	5	3	-	-	3	Community benefit	Provide sheltered bicycle lock ups and/or lockers in or near entrance to the station. Allow for at least 5% of staff use at maintenance facilities. See Section 3.9.3.1 of the ASA Station Design Standard Requirements for further information on bicycle parking requirements at stations.	D	No	No			
7.29 Bicycle storage security	7	7	7	7		-	-	7	Community benefit	Locate bicycle storage area in an area with a high level of passive surveillance and/or prominent CCTV.	D	No	No			
7.30 Separate cycleways and footpaths	-	6	6	6	-	6	-	6	Community benefit	Separate cycle ways and footpaths to decrease the likelihood of collisions and decrease pathway congestion.	D					
7.31 Wide footpaths	-				-		-		Community benefit	Design wider than minimum footpaths to enhance safety and service, keep corners clear of obstructions and improve intersections	D					
7.32 Easy pathways	-	6	-	-	-	-	-	6	Community benefit	Make sure that pathways consider topography; minimising steep slopes and provide alternatives to steps.	D					
7.33 Safe pedestrian movement	7	7	7	7	7	-	-	7	Community benefit	Make sure that safe movement is promoted for pedestrians and cyclists by minimising vehicle crossings of paths, providing clear signage, and providing freedom from obstacles such as poles, trees etc.	D	No	No			
7.3 Passive traffic calming measures	-	7	-	-	-	-	-	7	Community benefit	Use passive traffic calming measures (that do not modify road geometry) to reduce vehicles speeds and improve safety around interchanges – such as tree-lined streets, tree-lawns between a footpath and road, streets with raised centre medians, on-street parking, highly visible pedestrian crossings and short building set back distances.	D					
7.35 Asset protection zones	6	6	6	6	6	6	-	5	Community benefit	Provide an asset protection zone (APZ) fire buffer around buildings and infrastructure. Refer to Standards for Asset Protection Zones (NSW Rural Fire Service).	D	Yes	Yes			
7.36 Safe hot water	6	6	-	-	6	-	-	6	Community benefit	Use safe hot water fittings (instead of mixing valves) to control water temperature at the tap and prevent scalding.	DC	Yes	Yes			
7.37 Create station identity			-	-	-	-	-	5	Community benefit	Create a station identity using public art, architecture, use of colour and materials etc.	D					
7.38 Reduce vandalism	6	6	-	-	6	6	-	6	Community benefit	Minimise risks from vandalism during design, such as designing pedestrian bridges and walkways with a high degree of surveillance or railings, restrict window openings and limit to a maximum 80mm opening.	D	Yes	Yes			
7.39 Reduce graffiti	7	7	7	7	7	7	-	6	Community benefit	Minimise graffiti risks such as through treatment of fencing and other surfaces with anti-graffiti paint or coatings, vegetation cover to deter graffiti or providing designated walls for graffiti.	D	Yes	Yes			
7. 0 Intelligible PA systems	6	6	-	-	-	-	-	-	Community benefit	Design public address (PA) system to maximise coverage and speech intelligibility for customers and staff. Considerations are to include distributed speaker systems, announcements booths to allow clear and audible announcements, acoustic absorption materials in appropriate waiting areas and text based announcements on public displays for the hearing impaired.	D					
7. 1 Station furniture	5	5	-	-	-	-	-	5	Community benefit	Procure high quality and durable station furniture items within existing structures. Where a new station is proposed make sure that station furniture are durable and resistant to graffiti.	D					
7. 2 Public Wi-Fi	5	5	-	-	-	-	-	-	Community benefit	Wireless access points to be located in station awnings built for outdoor wi-fi users.	D					
7. 3 Power and internet			-	-	-	-	-	-	Community benefit	Provide power outlets and seating to support high-speed internet service.	D					
7. Fibre optic backbone	6	6	-	-	-	6	6	6	Community benefit	Provide fibre optic backbone including micro/pico cell access to mobile phone operators. This will enhance train and construction radio, provide GSM service and allow a wireless internet service on the train line.	D					
7. 5 Utility services	6	6	-	-	-	6	6	6	Community benefit	Co-location of utility services (e.g. wi-fi, G, radio).	D					

Sustainable Initiatives Selection

Key	
Yes	he initiative is applicable to this project
No	he initiative has not been applied to this project. Detailed comments are required as to why this initiative has not been applied

Initiative	Stations	Transport interchange	Car parks (Overpark)	Car parks (multi-level)	Maintenance facilities	Civil infrastructure	Tunnels	Lighting	Items	Description	Design (D) & Construction (C) Phases	Aesthetic Maintenance Facilities	Reference Design Maintenance Facilities	Detailed Design Maintenance Facilities	Construction Maintenance Facilities	Finalisation Maintenance Facilities
7. 6 Water bubblers	5	5	-	-	-	-	-	5	Community benefit	Provide wheelchair accessible drinking water bubblers on platforms and within the station building.	D					
7. 7 Comfortable pedestrian and cyclist movement	-	5	-	-	-	-	-	5	Community benefit	Make sure that interchange is designed to promote pedestrian activity and bicycle use by considering the comfort and amenity of users (e.g. including a buffer zone between the roadway and the waiting area, avoid placing pedestrian and cycling crossing points at busy intersections, locate pedestrian and cycle crossings as close to the direct line of travel as possible, make sure that there are clear views of traffic at crossing points, provide kerb ramps, provide alternatives to pedestrian and bicycle crossings at roundabouts).	D					
7. 8 Cigarette disposal			-	-		-	-		Community benefit	Provide cigarette disposal facilities outside station or maintenance facilities, away from ventilation intakes, stormwater drains and entries/exits to reduce litter, and smoke pollutes entering the internal environment.	D	No	No			
7. 9 Wind breaks	5	5	-	5	5	-	-	5	Community benefit	Design structures and landscape to shelter passengers from prevailing winds.	D	No	No			
7.50 Shading	6	6	5	5	5	-	-	6	Community benefit	Provide shade through vegetation or structures over platform, concourse, car parks and pedestrian pathway areas and workl/unch areas.	D	No	No			
7.51 Asset vegetation			3	3	3	-	-	5	Community benefit	Provide vegetation to reduce heat islanding and increase visual attraction.	DC	No	No			
7.52 Heat islands	6	6	6	6	6	-	-	6	Community benefit	Use light coloured materials on roofs and pavements to both shade from and reflect sunlight, in order to decrease heat islanding.	DC	Yes	Yes			
7.53 Wind	-	-	-	6	-	-	-	-	Community benefit	Design and locate multi-storey commuter car parks to avoid the creation of wind tunnels.	D					
7.5 High frequency electronic ballasts			-	-		-	-		Community benefit	High frequency electronic ballasts (greater than 20 kHz or fluorescent lamps and greater than 120 Hz for high- intensity discharge (HID) lamps) to be installed in lights over a minimum of 95% of all areas that utilise fluorescent or HID lighting, in order to reduce flicker.	D	Yes	Yes			
Innovation 01																
Innovation 02																
Innovation 03																
Innovation 04																
Innovation 05																
Innovation 06																
Innovation 07																
Innovation 08																
Innovation 09																
Innovation 10																

Please proceed to the first asset type tab.

Asset Type: Maintenance Facility

Key	
Yes	The initiative is applicable to this project
No	The initiative has not been applied to this project. Detailed comments are required as to why this initiative has not been applied
	The initiative has not been completed on this selection, so please go back and complete

Compulsory Initiatives Percentage	100%	0%	0%	0%
Discretionary Initiatives Percentage	97%	0%	0%	0%

Initiative	Score	Importance	Theme	Description	Design (D) & Construction (C) interface	Applicability	Comments on Applicability	Reference Design	Comments on Reference Design	Detailed Design	Comments on Detailed Design	Construction	Comments on Construction	Finalisation	Comments on Finalisation	User Comments (general)
C.1 Carbon footprint	C	Compulsory	Energy and greenhouse	Undertake AS1 06 2 (greenhouse gases – project level) compliant carbon footprinting exercise for all projects with a capital investment value over $10 million in accordance with Transport for NSW's Greenhouse Gas Inventory Guide for Construction Projects. The carbon footprint is to be used to inform decision-making in design and construction. Use standard carbon coefficient values for construction material and fuel usage. Monitor and report the carbon footprint every six months during construction.	DC	No	Project value is $10m therefore carbon footprint assessment will not be required	No	This will be undertaken during subsequent design and construction stages when materials quantities and selection is known and if the project value exceed >$10mill. Specific reference in works brief has been included to ensure that carbon footprint assessment is undertaken during detailed design and construction stages.							
C.2 Building orientation and form	C	Compulsory	Energy and greenhouse	Optimise the building orientation and form to allow for maximum daylight access (though avoiding overheating).	D	No	For security reasons, windows are not permitted at Sydney Trains substations, therefore artificial lighting will be required - no daylighting permitted	No	For security reasons, windows are not permitted at Sydney Trains substations, therefore artificial lighting will be required - no daylighting permitted							
C.3 Efficient appliances	C	Compulsory	Energy and greenhouse	Purchase plug-in equipment with at least the Minimum Energy Performance Standards (MEPS) rating (fridges, air conditioners, etc) or an Energy Star accreditation (IT equipment).	DC	Yes	With exception of split system airconditioner to be provided for office, no other white goods are permitted in Sydney Trains substations.	Yes	Applicable to air conditioners provided for administration office area only							
C.4 Insulation	C	Compulsory	Energy and greenhouse	Insulate covered and indoor areas. Techniques include adequate thermal mass, and insulating walls and ceilings. Also ensure that all openings are sealed.	D	Yes	Applicable for roof insulation and where substations are not naturally ventilated	Yes	Applicable for roof insulation and where substations are not naturally ventilated							
C.5 Renewable Energy	C	Compulsory	Energy and greenhouse	Purchase at least 25% of site-based electricity energy needs from Green Power or renewable sources during construction of the asset.	C	Yes	Contractor requirement to purchase 25% Green Power	Yes	Contractor requirement to purchase 25% Green Power							
C.6 Climate change impact assessment	C	Compulsory	Climate resilience	Perform a climate change impact assessment for each project worth over $10M using current scientific predictions (i.e. Intergovernmental Panel on Climate Change (IPCC), Commonwealth Scientific and Industrial Research Organisation (CSIRO) etc) to determine the hazards/risks associated with future climatic conditions. Refer to 'Climate Change Impacts and Risk Management: A Guide for Business and Government' and the AGIC Guidelines for Climate Change Adaptation' for guidance.	D	No	As the Project is <$10mil, a climate change impact assessment is not required to be undertaken during the design stage	No	As the Project is $10mil, a climate change impact assessment is not required to be undertaken during the design stage							
C.7 Design for climate change	C	Compulsory	Climate resilience	All projects with a capital investment value over $10 million to design out extreme, high and medium risks as identified in the climate change impact assessment where practicable.	D	Yes	Not applicable as the Project is <$10mil	Yes	Not applicable as the Project is $10mil							
C.8 Whole of life costing	C	Compulsory	Materials and waste	Use whole of life costing methodologies (e.g. Life-Cycle Cost Analysis (LCCA) Method) in line with ISO 15686-5 to inform decision-making on significant issues pertaining to project scope options (e.g. route selection) and material/technology selection (e.g. steel versus concrete bridge). Significant issues can be determined using qualitative criteria such as lifecycle cost of environmental impact.	DC	Yes	Specific TfNSW Services Brief design requirements (such as site location, required structural resilience, required durability, construction materials etc) limit the relevance and feasibility of an LCCA.	Yes	This will be undertaken during subsequent design and construction stages when materials quantities and selection is known. Specific reference in works brief has been included to ensure that a LCCA is undertaken by constructor.							
C.9 Reduce waste to landfill	C	Compulsory	Materials and waste	Ensure at least 95 per cent of construction and demolition waste (by weight) is diverted from landfill, and either recycled or reused, for all projects with a capital investment value over $10 million.	DC	Yes	Not applicable during Project construction as project is $10mil	Yes	Not applicable during Project construction as project is <$10mil							
C.10 Reuse spoil	C	Compulsory	Materials and waste	For all projects generating >300m3 of spoil, ensure that 100 per cent of usable spoil (by weight) is beneficially reused, onsite or nearby offsite. Usable spoil is not to be sent to landfill.	DC	Yes	Excavation for civil works will generate excess spoil	Yes	Specific reference in works brief to be included to ensure that 100% of all usable spoil is reused on site. Contractors to determine what is classified as usable spoil.							
C.11 Reduce cement	C	Compulsory	Materials and waste	Reduce the absolute quantity of Portland cement by at least 30 per cent, as an average across all concrete mixes, by substituting it with supplementary cementitious materials (such as fly ash, ground granulated blast furnace slag or alkali activated cements) subject to meeting strength and durability requirements.	DC	Yes	Applicable for substation construction and design	Yes	Specific reference in works brief to be included to ensure that at least quantity of Portland cement is reduced by 30%.							
C.12 Biodiversity offsetting	C	Compulsory	Biodiversity and heritage	For non-significant impacts (inside rail corridor) offsetting is to be in accordance with the TPD Vegetation Offset Guide as applicable.	DC	Yes	0.17 hectares of native trees to be removed	Yes	All cleared vegetation will be replaced and/or offset in accordance with TfNSW's Vegetation Offset Guide unless otherwise agreed with or directed by Transport for NSW							
C.13 Heritage conservation and enhancement	C	Compulsory	Biodiversity and heritage	100 per cent of significant heritage items identified during project development and design are protected or beneficially reused where practical. This will require consultation with all relevant Indigenous Heritage groups (where applicable).	DC	Yes	Heritage assessment undertaken to identify whether any significant heritage items within project footprint or surrounds.	Yes	Review of Heritage buildings/structures for the area returned nothing of any heritage significance for the entire substation area or near surrounds.							
C.14 Heritage interpretation	C	Compulsory	Biodiversity and heritage	Achieve interpretation of all applicable heritage or historical items through development and implementation of a heritage interpretation strategy (e.g. incorporate into precinct signage at the station, which provides information on the heritage of the area).	DC	No	As the site is a substation, heritage interpretation is not likely to be applicable	No	As the site is a substation, heritage interpretation is not likely to be applicable							
C.15 Water balance study	C	Compulsory	Water	Undertake a water balance study for the operational phase (including groundwater where applicable). The study will estimate ongoing water needs, and identify and assess opportunities for water capture and reuse, including non-potable water sources as appropriate.	D	No	Not applicable as substation is an unattended site which will only be occupied intermittently, therefore water usage is likely to be minimal and insignificant. Only water requirements will be for site office WC (intermittent) and emergency eyewash/shower. No watering requirements for irrigation or landscaping.	No	Not applicable as substation is an unattended site which will only be occupied intermittently, therefore water usage is likely to be minimal and insignificant. Only water requirements will be for site office WC (intermittent) and emergency eyewash/shower. No watering requirements for irrigation or landscaping.							
C.16 Water efficient fittings	C	Compulsory	Water	Ensure all new amenities using potable water comply with the following criteria: Toilets to be WELS (max 4.5/3 L/min) dual flush toilets; Urinals to be waterless; All taps to be WELS (max 7.5 L/min); (see Green Star or Office V3). Any other water fixtures should achieve at least a 5 Star WELS rating.	DC	Yes	Applicable only for site office WC and hand basin. No other amenities on site	Yes	Applicable only for site office WC and hand basin. No other amenities on site							
C.17 Water efficient controls	C	Compulsory	Water	Specify sensors, timers or spring loaded devices for taps where possible to reduce water loss from taps that are left running.	D	Yes	Applicable for handbasin taps. No other taps present at substation	Yes	Applicable for handbasin taps. No other taps present at substation							
C.18 Monitor and record construction water	C	Compulsory	Water	Projects that have capital value greater than $10 million are to monitor and record water consumption at the site office, all onsite sustainable construction sites and other water uses such as from non-potable sources.	C	No	Not applicable during Project construction as project is $10mil	No	Not applicable during Project construction as project is <$10mil							
C.19 Incorporate Water Sensitive Urban Design (WSUD)	C	Discretionary	Water	Retain hydrology features (i.e. streams, ponds etc) and incorporate with surface water treatment systems e.g. retention basins. This can also be used to treat runoff from hard surfaces before going to stormwater or assist with flood prone areas. Wetland species should be planted in drainage areas to trap gross pollutants where appropriate. Refer to Australian Runoff Quality – A Guide to Water Sensitive Urban Design.	DC	Yes	Existing stormwater drains used for surface water runoff and hardstand areas limited to footprint of actual substation. Only hydrology features to be incorporated in to project.	Yes	Specific reference has been incorporated into the works brief that the hydrology features must comply with WSUD and incorporate wetland species where possible to treat water runoff.							
C.20 Noise management	C	Discretionary	Pollution control	Project to comply with Transport Projects Construction Noise Strategy and relevant conditions of approval.	DC	Yes	Contractor to comply with relevant Noise requirements	Yes	Contractor to comply with relevant Noise requirements							
C.21 Community involvement in planning	C	Discretionary	Community benefit	Actively engage with stakeholders including the community during planning.	D	Yes	Stakeholder consultation undertaken as part of Project design	Yes	Stakeholder consultation undertaken as part of Project design							
C.22 Planning framework		Discretionary	Community benefit	Plan and design projects to take into consideration existing planning strategies in consultation with stakeholders.	D											
C.23 Crime Prevention Through Environmental Design (CPTED)	C	Discretionary	Community benefit	Incorporate CPTED principles during design. This may include natural observation and use of CCTV. Natural observation is achieved through fence, landscape, streetscape and open space design in public or staff supervised areas. This is achieved by minimising narrow corridors, hidden corners and through the use of lighting.	D	yes	A requirement of RailCorp's Security Standard RS0003 - Substations	Yes	A requirement of RailCorp Security Standard RS0003 - Substations							
1.1 Carbon footprint	3	Discretionary	Energy and greenhouse	Undertake AS1 06 2 (Greenhouse Gases – project level) compliant carbon footprinting exercise for projects with a capital investment value under $10 million in accordance with Transport for NSW's Greenhouse Gas Inventory Guide for Construction Projects. Use standard carbon coefficient values for construction material and fuel usage. Monitor and report the carbon footprint every six months during construction.	DC	Yes	Project value is likely to be less $10mil, therefore this is applicable	Yes	Specific reference to undertake an AS1 06 -2 Carbon Footprint assessment in works brief to be included.							
1.2 Quantity surveyor	3	Discretionary	Energy and greenhouse	Quantity surveyor reports to include mass quantities of building materials. This will enable the carbon footprinting to be more accurate and more cost effective. Quantity surveyor reports will also include costing for capital and ongoing maintenance of sustainability initiatives that involve onsite energy generation.	DC	Yes	Applicable for project, to be considered during detailed design and subsequent stages	Yes	Applicable for project, to be considered during detailed design and subsequent stages							
1.3 Power factor correction	6	Discretionary	Energy and greenhouse	Install power factor correction (PFC) units to keep the power factor of the system as close to one as possible.	D	No	Not required at Sydney Trains Substations, where LV services within substations represent a small fraction of the substation load. Substations are also unattended and therefore have low energy requirements for general power etc	No	Not required at Sydney Trains Substations, where LV services within substations represent a small fraction of the substation load. Substations are also unattended and therefore have low energy requirements for general power etc							
1.4 Digital control system	9	Discretionary	Energy and greenhouse	Install digital control systems to modify flow rates, compressors, pumps, fans, valves, etc.	D	No	No pumps, compressors or fans installed at substation	No	No pumps, compressors or fans installed at substation							

Initiative	Score	Importance	Theme	Description	Design (D) & Construction (C Interface	Applicability	Comments on Applicability	Reference Design	Comments on Reference Design	Detailed Design	Comments on Detailed Design	Construction	Comments on Construction	Finalisation	Comments on Finalisation	User Comments (general)
1.5 Sub-metering	5	Discretionary	Energy and greenhouse	Provide separate meters or sub-metering for all substantive energy uses (e.g. all energy uses of 100 kVa or greater – lighting, small power and individual tenancies). Make sure that metering can effectively separate tenant loads from base building loads.	D	No	Substation LV auxiliary<100 kVA	No	Substation LV auxiliary<100 kVA							
1.6 Real-time (smart) metering	5	Discretionary	Energy and greenhouse	Monitor and record data of energy use patterns in real time. For tunnels, apply to the Master Control System.	D	No	Substation is an unattended site with intermittent energy use only. Auxiliary systems (lighting and hot water system) are switched off when not occupied	No	Substation is an unattended site with intermittent energy use only. Auxiliary systems (lighting and hot water system) are switched off when not occupied							
1.7 Efficient vehicle circulation	-	Discretionary	Energy and greenhouse	Design layout with an efficient circulation pattern with a repetitive pattern and where possible avoid traffic jams in the car park.	D											
1.8 Consider road intersections	-	Discretionary	Energy and greenhouse	Locate car park entries and exits clear of intersections and other locations of congested traffic movement. Minimise conflicts with pedestrians and cyclists and possible back up of traffic into the street. Locate where adequate sight distance to street traffic is available.	D											
1.9 Ramping System	-	Discretionary	Energy and greenhouse	Design efficient ramping systems by considering site conditions, for example on a sloping site split or half level layouts enable an efficient ramp layout.	D											
1.10 Intelligent parking space identifiers	-	Discretionary	Energy and greenhouse	Install a car park identifier system that guides commuters to the nearest vacant parking space through intelligent free space sensors and signals. See Chatswood Westfield and Rouse Hill Town Centre or existing examples	D											

Initiative	Score	Importance	Theme	Description	Design (D) & Construction (C) Interface	Applicability	Comments on Applicability	Reference Design	Comments on Reference Design	Detailed Design	Comments on Detailed Design	Construction	Comments on Construction	Finalisation	Comments on Finalisation	User Comments (general)
1.11 Raised stations	-	Discretionary	Energy and greenhouse	Adjust track inclines at stations to use gravity to reduce the energy trains expend in braking and acceleration.	D											
1.12 Alternative fuels in construction vehicles		Discretionary	Energy and greenhouse	Use alternative fuels to reduce greenhouse gas emissions in construction vehicles.	C	Yes	Applicable during construction phase. Specific reference in works brief that alternative or green fuels must be used in construction vehicles.	Yes	Applicable during construction phase. Specific reference in works brief that alternative or green fuels must be used in construction vehicles							
1.13 Green travel plans	5	Discretionary	Energy and greenhouse	Develop and implement green or sustainable travel plans during construction for employees to get to site of location and construction sites.	C	Yes	At Contractors discretion	Yes	To be considered during construction where feasible							
1.1 Skylights and glazing	7	Discretionary	Energy and greenhouse	Use glass, polycarbonate windows or solar tubes in walls and roofs to increase daylighting, however avoid overheating. Consider using low-emissivity films to reduce heat gain	D	No	Not applicable - windows not permitted at Sydney Trains substations and substation is naturally ventilated	No	Not applicable - windows not permitted at Sydney Trains substations and substation is naturally ventilated							
1.15 Light coloured finishes	7	Discretionary	Energy and greenhouse	Use light coloured finishes on floors, walls and ceilings of offices, stations and platforms to help reflect ambient light. Within car parks, consider glare and safety issues that may arise.	D	No	Not applicable - windows not permitted at Sydney Trains substations and substation is naturally ventilated	No	Not applicable - windows not permitted at Sydney Trains substations and substation is naturally ventilated							
1.16 Facade treatments	6	Discretionary	Energy and greenhouse	Channel light into the building core with facade treatments, like reflectors and grills. The reflected light will have little solar heat content, and can reduce the need for indoor lighting. It can also reduce glare.	D	No	Not applicable - windows not permitted at Sydney Trains substations and subsequently, artificial lighting is required	No	Not applicable - windows not permitted at Sydney Trains substations and subsequently, artificial lighting is required							
1.17 Photo-electric switches	7	Discretionary	Energy and greenhouse	Install control systems or lighting that dim or switch off lights according to the amount of daylight the zone is receiving. The lights can also switch on in order to maintain a minimum level of lighting. Lights should be off when areas are closed or unoccupied.	D	No	Not applicable - windows not permitted at Sydney Trains substations and subsequently, artificial lighting is required	No	Not applicable - windows not permitted at Sydney Trains substations and subsequently, artificial lighting is required							
1.18 Motion controlled switches	6	Discretionary	Energy and greenhouse	Install lighting control systems that include motion sensors to control low traffic areas.	D	Yes	Relevant for offices and WC	Yes	Lighting controls shall only be installed within office and toilet areas which are infrequently occupied. All for all lighting is installed within substation building, there are automatic lighting controls will not be installed within the substation switchroom to prevent accidental contact with HV and LV equipment (or safety reasons) in the event of low light							
1.19 Timed switches	7	Discretionary	Energy and greenhouse	Install lighting switches that turn on and off at particular times when a pattern of use is known such as offices. Note: This initiative is not applicable where photo-electric switches and motion controlled switches are installed.	D	Yes	Applicable for substation. Basic sensor lighting for areas when unattended is appropriate.	Yes	Applicable for substation. Basic sensor lighting or areas when unattended is appropriate. Include in specification of design							
1.20 LED lights	9	Discretionary	Energy and greenhouse	Incorporate energy efficient LED lighting.	D	Yes	Applicable for substation.	Yes	To be included in substation design.							
1.21 Light dimming	7	Discretionary	Energy and greenhouse	Install lighting dimmers to use only the amount of light required for the space.	D	No	Not applicable for substation - windows not permitted in Sydney Trains substations	No	Not applicable for substation - windows not permitted in Sydney Trains substations							
1.22 Lighting scheme	9	Discretionary	Energy and greenhouse	Prepare a lighting scheme by suitably qualified lighting designer. Provide for zoning between lighting demands of different areas and strategic placement of lighting fixtures to maximise ground coverage.	D	Yes	Artificial lighting levels provided throughout substation shall comply with Sydney Trains lighting standards for Substations RS0009	Yes	Artificial lighting levels provided throughout substation shall comply with Sydney Trains lighting standards for Substations RS0009							
1.23 CCTV lighting	6	Discretionary	Energy and greenhouse	Install overnight CCTV monitoring equipment.	D	Yes	CCTV equipment is required for external security of substation to comply with Sydney Trains security standard RS0003 substations	Yes	CCTV equipment is required for external security of substation to comply with Sydney Trains security standard RS0003 substations							
1.2 Photoluminescent emergency lighting	5	Discretionary	Energy and greenhouse	Install photoluminescent strips and products on stairs and a spots of exit passageways towards exits in the event of an emergency or power outage. Design and product selection should be in accordance with AS1 28.1 Design for Access and Mobility.	D	No	Not applicable for substation - no passengers and lighting must comply with Sydney Trains standards for substations.	No	Not applicable for substation - no passengers and lighting must comply with Sydney Trains standards for substations.							
1.25 Natural ventilation	6	Discretionary	Energy and greenhouse	Naturally ventilate structures (refer to AS1668.2-2002 (type 3)). Consider prevailing winds.	D	Yes	Substation is naturally ventilated	Yes	Substation is naturally ventilated.							
1.26 Demand operated ventilation	5	Discretionary	Energy and greenhouse	HVAC systems should use Carbon Dioxide (CO2) sensors in occupied enclosed spaces (e.g. office spaces). This will allow systems to adjust outside air ventilation rates to increase or decrease fresh air flow depending on occupancy rates at a given time.	D	No	Not applicable - HVAC not required, substation is part of the specification and is naturally ventilated.	No	Not applicable - HVAC not required, substation is part of the specification and is naturally ventilated.							
1.27 Opening windows	7	Discretionary	Energy and greenhouse	Design all occupied areas to have an opening window to the outside to allow for mixed mode ventilation and daylight into the space. The window area should be a minimum of 5 percent of the floor area. Placement of windows over desks should be avoided.	D	No	Not applicable - substation is naturally ventilated and artificial lighting is required no windows allowed as part of Sydney Trains substation design	No	Not applicable - substation is naturally ventilated and artificial lighting is required, no windows allowed as part of Sydney Trains substation design							
1.28 Mixed mode ventilation	7	Discretionary	Energy and greenhouse	Incorporate mixed mode ventilation. This involves using natural ventilation when ambient conditions are suitable. Air conditioning only operating at peak temperature periods. Interlock A/C with windows so both cannot be used simultaneously.	D	No	Not applicable - natural ventilation provided for substation	No	Not applicable - natural ventilation provided for substation							
1.29 Tunnel ventilation	-	Discretionary	Energy and greenhouse	Minimise mechanical ventilation requirements for energy efficiency (e.g. utilise best practice energy efficient equipment, use vent shafts for lower tunnel friction and/or more draught relief).	D											
1.30 Segregation of ventilation	-	Discretionary	Energy and greenhouse	Optimise ventilation between stations and tunnels and consider using platform screen doors. Segregation can reduce noise and improve safety.	D											
1.31 Night flushing of indoor areas	5	Discretionary	Energy and greenhouse	Provide the necessary equipment to enable night flushing within buildings, where air from external areas is ducted into internal areas at night.	D	No	Not applicable - substation is naturally ventilated	No	Not applicable - substation is naturally ventilated							
1.32 Double skin facade	6	Discretionary	Energy and greenhouse	Incorporate double skin facades to provide an effective thermal and noise barrier	D	No	Not applicable - ventilation and noise requirements can be met without double skin facade	No	Not applicable - ventilation and noise requirements can be met without double skin facade							
1.33 Double glazing	10	Discretionary	Energy and greenhouse	Make sure all external windows and skylights are double or triple glazed, where appropriate and cost effective.	D	No	Not applicable - windows and skylights not permitted at Sydney Trains substations	No	Not applicable - windows and skylights not permitted at Sydney Trains substations							
1.3 Chilled beams or under floor supply	3	Discretionary	Energy and greenhouse	Install chilled beams or supply air via under floor mechanisms to improve air change effectiveness.	D	No	Not applicable - substation to be naturally ventilated	No	Not applicable - substation to be naturally ventilated							
1.35 Solar control film	5	Discretionary	Energy and greenhouse	Install solar control film on all glazing.	D	No	Not applicable - windows and skylights not permitted at Sydney Trains substations	No	Not applicable - windows and skylights not permitted at Sydney Trains substations							
1.36 External solar shading	5	Discretionary	Energy and greenhouse	Use external solar shading and vegetation (deciduous trees preferred).	D	No	Not applicable - no trees permitted in close proximity to substation to reduce fire risk. Substation is to be developed within existing industrial and built up area	No	Not applicable - no trees permitted in close proximity to substation to reduce fire risk. Substation is to be developed within existing industrial and built up area							
1.37 Mid pane blinds		Discretionary	Energy and greenhouse	Install mid pane blinds in the air cavity of double glazed systems.	D	No	Not applicable - windows and skylights not permitted at Sydney Trains substations	No	Not applicable - windows and skylights not permitted at Sydney Trains substations							
1.38 Automatic blinds	7	Discretionary	Energy and greenhouse	Use automatic blinds programmed to close when the level	D	No	Not applicable - windows and skylights not permitted at Sydney Trains substations	No	Not applicable - windows and skylights not permitted at Sydney Trains substations							
1.39 Temperature sensor placement for HVAC	9	Discretionary	Energy and greenhouse	Locate temperature sensors for HVAC systems so that direct solar gain, ventilation through external walls and interference between zones is avoided.	D	No	Not applicable, substation is naturally ventilated and no HVAC required.	No	Not applicable, substation is naturally ventilated and no HVAC required.							
1.0 Energy efficient HVAC	6	Discretionary	Energy and greenhouse	Select and design HVAC systems with prioritisation of energy efficiency. See section 3.1.3 of the ASA Station Design Standard Requirements for further information on air conditioning and ventilation requirements at stations. Also refer to AS 1668.2-2002.	D	No	Not applicable, substation is naturally ventilated and no HVAC required.	No	Not applicable, substation is naturally ventilated and no HVAC required.							
1.1 Zoning of areas	7	Discretionary	Energy and greenhouse	Zone areas of HVAC systems to deal with separate areas known to have different occupancy periods and/or requirements (i.e. communication rooms have different cooling demand to a ticketing booth).	D	No	Not applicable, substation is naturally ventilated and no HVAC required.	No	Not applicable, substation is naturally ventilated and no HVAC required.							
1.2 Power transmission	6	Discretionary	Energy and greenhouse	Use pneumatic and/or hydraulic driven maintenance equipment or other suitable efficient power systems.	D	No	Not applicable - major maintenance equipment not stored onsite. Equipment is brought in off site	No	Not applicable - major maintenance equipment not stored onsite. Equipment is brought in off site							
1.3 Energy efficient transformer		Discretionary	Energy and greenhouse	Utilise energy efficient transformers such as amorphous metal transformers.	D	No	Not applicable - transformers are dictated by Sydney Trains specifications	No	Not applicable - transformers are dictated by Sydney Trains specifications							
1. Vertical transport		Discretionary	Energy and greenhouse	Install energy efficient vertical transport systems (e.g. ramps, variable speed drive escalators that enable a slow-mode, so that they oscillate at lower speeds when not in use and increase in speed when users step onto the footpanel at the entry to the escalator. Install variable voltage variable frequency (VVVF) control gear for lifts.	D											
1.5 Stair placement to encourage use	-	Discretionary	Energy and greenhouse	Locate stairs along desire lines to encourage use. Provide stairs instead of escalators unless there is a 6 metre height differential, or a platform disconnected congestion issue. Maintain ramps or lifts for disabled access.	D											
1.6 High efficiency fans and pumps	6	Discretionary	Energy and greenhouse	Specify high energy efficiency for all fans and pumps. Consider utilising variable speed drives for fans, pumps and waste heat recovery.	D	No	Not applicable - none installed in substation	No	Not applicable - none installed in substation							
1.7 Solar hot water	7	Discretionary	Energy and greenhouse	Install solar thermal hot water systems to provide hot water and heating for ventilation system	D	No	Not applicable - substation is naturally ventilated	No	Not applicable - substation is naturally ventilated							
1.8 Ground source heat pumps	6	Discretionary	Energy and greenhouse	Install ground source heat pumps to provide hot water and heating for ventilation system where sewer access and/or gas supply is inadequate.	D	No	Not applicable - substation is naturally ventilated	No	Not applicable - substation is naturally ventilated							
1.9 Allocate space for alternative traction voltage		Discretionary	Energy and greenhouse	Allocate space for alternative traction voltage in the future.	D	Yes	Applicable for substation. To be considered in subsequent design stages.	Yes	Applicable for substation. To be considered in subsequent design stages.							

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1.50 Design for part-load operation	6	Discretionary	Energy and greenhouse	Design systems to run most efficiently under the conditions that they are to be used most often, and where appropriate design to operate efficiently over a range of conditions.	D	Yes	Systems are designed to operate at maximum demand as required under AS3000	Yes	Systems are designed to operate at maximum demand as required under AS3000							
1.51 Photovoltaic panels	5	Discretionary	Energy and greenhouse	Integrate photovoltaic panels into structures. For an above ground station, onsite renewable energy technologies supply sufficient quantities so that the station's energy supply to be carbon neutral as defined in Appendix B. For a below ground station, onsite renewable energy technologies should be maximised. For car parks, renewable energy generation should supply 100 per cent of lighting and ventilation demand (unless restricted by wind and shadowing). For a maintenance facility, renewable energy generation should supply 100 per cent of site lighting, small power and ventilation demands.	D	Yes	Applicable for substation to supplement load and/or non essential lighting or backup power.	Yes	Applicable for substation to supplement load and for non-essential lighting or backup power.							
1.52 Wind turbines	5	Discretionary	Energy and greenhouse	Install small-scale wind turbines at stations, facilities or multi-storey car parks with good wind access. Placement should be on the building roof either on the building perimeter or 5 metres above the direct centre of the roof.	D	No	Not applicable - not considered feasible at substation where LV auxiliary is linked to sporadic and intermittent abundance by operator. Substation LV loads require high level of reliability and hence redundancy.	No	Not applicable - not considered feasible at substation where LV auxiliary is linked to sporadic and intermittent abundance by operator. Substation LV loads require high level of reliability and hence redundancy.							
1.53 Cogeneration/trigeneration	7	Discretionary	Energy and greenhouse	Install or develop a cooperative arrangement with external parties on a cogeneration plant that can supply electricity, heating or cooling or a large local demand (e.g. station).	D	No	Not applicable - substation is naturally ventilated	No	Not applicable - substation is naturally ventilated							
2.1 Climate change risk assessment	5	Discretionary	Climate resilience	Perform a climate change risk assessment for all projects with a capital investment value under $10 million using current scientific projections (i.e. Intergovernmental Panel on Climate Change (IPCC), Commonwealth Scientific and Industrial Research Organisation (CSIRO) etc) to determine the hazards risks associated with future climate conditions. Refer to Climate Change Impacts and Risk Management: A Guide for Business and Government and the AGIC Guidelines for Climate Change Adaptation for guidance.	D	Yes	Project value is likely to be less than $10mil, therefore this is applicable	Yes	Climate change assessment to be undertaken during subsequent design stages							
2.2 Decrease climate vulnerability	5	Discretionary	Climate resilience	All projects with a capital investment value under $10 million to design out extreme, high and medium risks as identified in the climate change impact assessment where practicable.	D	Yes	Project value is likely to be less than $10mil, therefore this is applicable	Yes	To be undertaken during subsequent design stages							
2.3 Passenger comfort	-	Discretionary	Climate resilience	Review levels of passenger comfort to take account of climate change e.g. provision of additional shelter from winds and driving rain and increased shading from sun in locations where customers wait for transport.	D											
2.4 Design for flood inundation risk	-	Discretionary	Climate resilience	Specify ventilation and portal drainage to address predicted increases in rainfall intensity, future flood conditions and sea levels.	D											
2.5 Thermal comfort		Discretionary	Climate resilience	Select ventilation systems to provide a suitable city environment during severe heat waves.	D	Yes	Natural ventilation provided for internal substation - substation only intermittently occupied. Split system provided for office area when in occupation	Yes	Natural ventilation provided for internal substation - substation only intermittently occupied. Split system provided for office area when in occupation							
2.6 Equipment resilience to temperature		Discretionary	Climate resilience	Select equipment that will be resilient to increased temperature and more frequent and severe heat waves. Temperature resilient equipment will also negate or reduce need for active temperature control, reducing operational energy consumption.	D	Yes	Applicable for substation. Must be compliant with Sydney Trains' environmental temperature requirements.	Yes	Applicable for substation. Must be compliant with Sydney Trains' environmental temperature requirements.							
2.7 Backup power supply		Discretionary	Climate resilience	Incorporate backup or auxiliary power sources to supply essential services during power outages or extreme events.	D	Yes	Applicable for substation. Backup batteries necessary for emergency power requirements.	Yes	Exact specification to be confirmed. Typically a dual 125V DC substation battery system is provided to power control systems and DC lighting in the event of an LV AC power outage. Emergency fluorescent luminaires are also typically provided as a portion of lighting to provide for lighting emergency egress							
2.8 Protection from extreme weather (sun, rain, wind)	-	Discretionary	Climate resilience	Consider design measures for protecting customers and electrical equipment from wind and rain during storm events.	D											
2.9 Protect sensitive assets	9	Discretionary	Climate resilience	Protect sensitive assets (e.g. lifts, escalators) from the effects of extreme climate and weather.	D	Yes	All equipment is rated to specific environmental temperature requirements (as per EP 00 00 00 13 SP) and approved by Sydney Trains for use in substations	Yes	All equipment is rated to specific environmental temperature requirements (as per EP 00 00 00 13 SP) and approved by Sydney Trains for use in substations							
3.1 Sustainable procurement	6	Discretionary	Materials and waste	Develop a sustainable procurement strategy to be implemented during construction. The strategy must include at a minimum (i) a commitment to sustainable procurement in a relevant policy and/or plan, (ii) sustainability questions and requirements in tender documentation, (iii) a process for evaluating tenders based on sustainability criteria including percentage tender evaluation weighting on sustainability and (iv) sustainability requirements in subcontracts. Project teams should be able to demonstrate that the strategy has influenced procurement decision-making and outcomes.	DC	No	Not applicable - major portion of equipment and materials to be procured are specific prefabricated structures for the substation and equipment is pre-approved by Sydney Trains from defined suppliers	No	Not applicable - major portion of equipment and materials to be procured are specific prefabricated structures for the substation and equipment is pre-approved by Sydney Trains from defined suppliers							
3.2 LCA based environmental footprint		Discretionary	Materials and waste	Undertake ISO 14040 (Environmental Guidelines – Life Cycle Assessment) compliant life cycle analysis (LCA) to assess the environmental footprint of the development.	DC	Yes	Applicable for substation. To be considered during detailed design and subsequent stages	Yes	Works brief to be updated to include specific reference to complete an ISO 14040 LCA							
3.3 Environmentally responsible suppliers	7	Discretionary	Materials and waste	Use materials certified under recognised environmental certification schemes such as EcoSpecifier, Good Environmental Choice, ECO-Buy, water efficiency labelling scheme (WELS), Energy Star, Forest Stewardship Council (FSC), Low Carbon Australia Carbon Neutral Certified.	DC	Yes	Relevant for split system air conditioner, WC, hand basin and any wood products required for construction	Yes	Relevant for split system air conditioner, WC, hand basin and any wood products required for construction							
3.4 Recycled / renewable materials	7	Discretionary	Materials and waste	Maximise the recycled content of construction materials, in particular those included in the Infrastructure Sustainability Council of Australia IS Materials Calculator available from ISCA or their at www.isca.org.au	DC	Yes	Applicable for substation. To be considered during detailed design and subsequent stages where feasible. Dependent on specific Sydney Trains material requirements and specifications.	Yes	Works brief to include specific reference to use recycled building materials where feasible.							
3.5 Optimise design	6	Discretionary	Materials and waste	Optimise design to minimise material consumption, maximise volume/space use and above ground land use.	D	Yes	Applicable for substations. Building materials and equipment are constrained by the type-approved equipment to be installed. Design for the building structure and facade has been optimised for rapid construction as per Sydney Trains specifications	Yes	Building materials and equipment are constrained by the type-approved equipment to be installed. Design for the building structure and facade has been optimised for rapid construction as per Sydney Trains specifications							
3.6 Re-use of structures	5	Discretionary	Materials and waste	Retain or refurbish existing structures where possible.	DC	No	Not applicable - no existing structure to retain and substation design and construction requirements are stringent and required to specific standard	No	Not applicable - no existing structure to retain and substation design and construction requirements are stringent and required to specific standard							
3.7 Recycled concrete	6	Discretionary	Materials and waste	Replace concrete, bricks and other structural materials in construction with recycled materials where available and suitable.	DC	No	Not applicable - no existing structure to retain and substation design and construction requirements are stringent and required to specific standard	No	Not applicable - no existing structure to retain and substation design and construction requirements are stringent and required to specific standard							
3.8 Low impact concrete	6	Discretionary	Materials and waste	Make sure that the mix water for concrete contains at least 50 per cent non-potable water. Substitute aggregates to the following levels (but only if Portland cement content does not increase by more than 5 kg/m3): - At least 40 per cent of coarse aggregate is crushed concrete aggregate or alternative materials. - At least 25 per cent of fine aggregate (sand) are manufactured sand or alternative materials.	DC	Yes	To be confirmed by Contractor - any alternate materials sourced required to comply with durability and strength criteria required as per the TfNSW Services Brief and Sydney Trains standards	Yes	To be confirmed by Contractor - any alternate materials sourced required to comply with durability and strength criteria required as per the TfNSW Services Brief and Sydney Trains standards							
3.9 Recycled aggregate	6	Discretionary	Materials and waste	Use recycled aggregate in non-structural uses (e.g. building base course, sub-grade to any car parks and footpaths, backfilling to service trenches, kerb and gutter).	DC	Yes	Applicable for substations. To be confirmed by Contractor - any alternate materials sourced required to comply with durability and strength criteria required as per the TfNSW Services Brief and Sydney Trains standards	Yes	To be confirmed by Contractor - any alternate materials sourced as required to comply with durability and strength criteria required as per the TfNSW Services Brief and Sydney Trains standards							
3.10 Filling for tunnel annulus	-	Discretionary	Materials and waste	Use a concrete of lower embodied carbon as an alternative to cement grout to fill tunnel annulus.	DC											
3.11 Replace sand with recycled glass	6	Discretionary	Materials and waste	Reuse crushed glass to minimise use of raw materials (e.g. sand).	DC	Yes	Applicable for substations. To be confirmed by Contractor - any alternate materials sourced required to comply with durability and strength criteria required as per the TfNSW Services Brief and Sydney Trains standards	Yes	Applicable for substations. To be confirmed by Contractor - any alternate materials sourced as required to comply with durability and strength criteria required as per the TfNSW Services Brief and Sydney Trains standards							
3.12 Recycled materials in formations	5	Discretionary	Materials and waste	Use recycled materials for formations. Formations are defined as the surface on which the track (including ballast) is laid. The materials to be analysed for their ability to meet related standard requirements.	DC	No	Not applicable - no trackwork is required for substation	No	Not applicable - no trackwork required for substation							
3.13 Recycled noise control products	6	Discretionary	Materials and waste	Use recycled materials in noise and vibration control solutions and products (e.g. tyre derived aggregate ballast mats).	DC	Yes	To be confirmed by Contractor - any alternate materials sourced is required to comply with durability and strength criteria required as per the TfNSW Services Brief and Sydney Trains standards	Yes	To be confirmed by Contractor - any alternate materials sourced as required to comply with durability and strength criteria required as per the TfNSW Services Brief and Sydney Trains standards							
3.14 Sustainable structural steel	7	Discretionary	Materials and waste	Source at least 60 per cent of structural steel (by weight) from a steel fabricator/contractor accredited by the Environmental Sustainability Charter of the Australian Steel Institute.	C	Yes	To be confirmed by Contractor - any alternate materials sourced is required to comply with durability and strength criteria required as per the TfNSW Services Brief and Sydney Trains standards	Yes	To be confirmed by Contractor - any alternate materials sourced as required to comply with durability and strength criteria required as per the TfNSW Services Brief and Sydney Trains standards							
3.15 Lower embodied energy bar and mesh	6	Discretionary	Materials and waste	Source at least 60 per cent of bar and mesh that is produced through energy reduction processes such as Polymer Injection Technology.	C	Yes	To be confirmed by Contractor - any alternate materials sourced is required to comply with durability and strength criteria required as per the TfNSW Services Brief and Sydney Trains standards	Yes	To be confirmed by Contractor - any alternate materials sourced as required to comply with durability and strength criteria required as per the TfNSW Services Brief and Sydney Trains standards							

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3.16 Optimal preassembly of reinforcing steel	5	Discretionary	Materials and waste	Source at least 15 per cent of reinforcing steel from suppliers that use optimal off site fabrication techniques such as engineered reinforcing bar carpet, engineered customised mesh or prefabricated reinforcing cages.	DC	Yes	To be considered where feasible	Yes	To be considered where feasible							
3.17 Low VOC paints and finishes	7	Discretionary	Materials and waste	Specify low volatile organic compound (VOC) paints and finishes. Refer to Green Star – Office Interiors v1.1 available online.	DC	Yes	To be considered where feasible	Yes	Specific reference to be included in works brief to ensure that low VOC paints and finishes are only used							
3.18 Low VOC adhesives and sealants	7	Discretionary	Materials and waste	Specify all adhesives and sealants as low VOC. Refer to Green Star – Office Interiors v1.1 available online.	DC	Yes	To be considered where feasible	Yes	Specific reference to be included in works brief to ensure that low VOC paints and finishes are only used							
3.19 Composite wood	7	Discretionary	Materials and waste	Use low emissions formaldehyde composite wood products for all composite wood products.	DC	Yes	Applicable for substation. To be confirmed by Contractor - any alternate materials sourced is required to comply with durability and strength criteria required as per the TfNSW Services Brief and Sydney Trains standards	Yes	Applicable for substation. To be confirmed by Contractor - any alternate materials sourced is required to comply with durability and strength criteria required as per the TfNSW Services Brief and Sydney Trains standards							
3.20 Timber	7	Discretionary	Materials and waste	95% of all timber products (by cost) comprise re-used or post consumer recycled timber, Forest Stewardship Council (FSC) or Australian Forest Scheme (AFS) certified timber, and/or timber from NSW sustainably managed forests.	DC	Yes	Applicable for substation although minimal timber products to be required for substation construction. To be confirmed by Contractor - any alternate materials sourced is required to comply with durability and strength criteria required as per the TfNSW Services Brief and Sydney Trains standards	Yes	Applicable for substation although minimal timber products to be required for substation construction. To be confirmed by Contractor - any alternate materials sourced is required to comply with durability and strength criteria required as per the TfNSW Services Brief and Sydney Trains standards							
3.21 Fire suppression	5	Discretionary	Materials and waste	Stock fire suppression devices which avoid the use of halons, alternatives include carbon dioxide, water spray, foams and powders.	D	Yes	Applicable for substation - Portable fire extinguishers to be provided throughout substation	Yes	Portable fire extinguishers to be provided throughout substation							
3.22 Services corridor	-	Discretionary	Materials and waste	Provide services corridor for energy, water or other buried infrastructure.	D	[redacted]										
3.23 Recycling and refuse bins		Discretionary	Materials and waste	Separate and collect patron waste by providing recycling and refuse bins.	D	No	Not applicable - access to substation for authorised personnel only (not general public) and only intermittently, therefore minimal waste	No	Not applicable - access to substation for authorised personnel only (not general public) and only intermittently, therefore minimal waste							
3.24 Bulky waste storage		Discretionary	Materials and waste	Design for the separate storage of non standard waste, such as bulky goods.	D	No	Not applicable - access to substation for authorised personnel only (not general public) and only intermittently, therefore minimal waste	No	Not applicable - access to substation for authorised personnel only (not general public) and only intermittently, therefore minimal waste							
3.25 Cut fill balance	9	Discretionary	Materials and waste	Balance cut and fill to avoid excess import or export of spoil.	DC	Yes	Excavated material will be considered for reuse in bunding or levelling where feasible	Yes	Excavated material will be considered for reuse in bunding or levelling where feasible							
3.26 Onsite spoil reuse	7	Discretionary	Materials and waste	Reuse any excess spoil as a landform feature, visual screen, in concrete or a barrier for noise attenuation.	DC	Yes	To be considered where feasible for suitable components of construction	Yes	To be considered where feasible or suitable components of construction							
3.27 Offsite spoil reuse		Discretionary	Materials and waste	Where clean spoil cannot be used onsite, prior to offsite use that have blood verify or community benefit, and require minimum transport distances.	DC	Yes	Applicable for substation - feasibility to be considered by contractors	Yes	Applicable for substation - feasibility to be considered by contractors							
3.28 Excavated materials	5	Discretionary	Materials and waste	Investigate future use opportunities for excavated materials (e.g. Yellowblock sandstone).	DC	No	Not applicable - no materials of value to be excavated or reuse encountered at site	No	Not applicable - no materials of value to be excavated for reuse encountered at site							
3.29 Segregation of waste	7	Discretionary	Materials and waste	Enable waste segregation in the design process by including space for the collection and segregation of waste with appropriate marking (e.g. signage) and controls (e.g. lockable lids) located away from sensitive receptors (e.g. water courses). During construction, use facilities and procedures that maximise on-site separation of waste to maximise reuse/recycling.	DC	Yes	Applicable for substation - to be implemented by contractor.	Yes	Specific reference in works brief to be included to ensure that waste be segregated on-site into appropriate categories to allow for easy re-use and recycling.							
3.30 Reuse construction waste	8	Discretionary	Materials and waste	Maximise reuse of concrete, bricks, earthworks and other structural waste materials.	DC	No	Not applicable - no structural waste materials present for reuse	No	Not applicable - no structural waste materials present for reuse							
3.31 Mulching	6	Discretionary	Materials and waste	Mulch all appropriate waste vegetation (no weeds) when justified by volume or send it to an off-site compost facility.	C	No	Not applicable - majority of vegetation to be cleared on site have been planted or are weeds; therefore not suitable for reuse as mulch on site	No	Not applicable - majority of vegetation to be cleared on site have been planted or are weeds; therefore not suitable for reuse as mulch on site							
3.32 Soil geo-grid reinforcement	-	Discretionary	Materials and waste	Replace embankment retaining walls with soil geo-grid reinforcement to improve stability and strength of soil and reduce material use.	DC	[redacted]										
3.33 Open cess drains	-	Discretionary	Materials and waste	Maximise use of open cess drains versus subsoil drains to reduce use of resources.	D											
3.34 Prevent electrolysis	6	Discretionary	Materials and waste	Prevent or limit the effects of stray current electrolysis to extend the life of assets and increase the rate of corrosion. Such as selecting suitable building materials, avoiding using metal finishes in the vicinity of high voltage electricity, using masking agents or coatings to prevent exposure of metals, and preventing direct contact between metallic parts.	D	Yes	Substation earthing and design comply with Sydney Trains and AS earthing and bonding standards	Yes	Substation earthing and design comply with Sydney Trains and AS earthing and bonding standards							
3.35 Modular construction	6	Discretionary	Materials and waste	Use modular and repeatable finishing elements (e.g. tunnel lining).	D	No	Although prefabrication building materials have been specified, only limited modularisation is feasible, and in relatively minor insignificant quantities	No	Although prefabrication building materials have been specified, only limited modularisation is feasible, and in relatively minor insignificant quantities							
3.36 Prefabrication	6	Discretionary	Materials and waste	Use prefabricated building and civil components (e.g. bridges, walls (retaining, deflection, noise), culverts, platforms, level crossings and tunnel lining etc.) to reduce construction waste, material usage, pollution risks and time.	DC	Yes	Applicable for substation. Prefabricated construction materials would typically be specified to speed up construction	Yes	Applicable for substation. Prefabricated construction materials would typically be specified to speed up construction							
3.37 Low finishing lines	7	Discretionary	Materials and waste	Specify low-finish interiors (e.g. exposed brick or concrete walls, unpainted, sealed, polished concrete walls and floors) to avoid the need for large quantities of paint and/or cement render. Consider graffiti removal in specifying surface textures.	D	Yes	Applicable for substation. Low finish interiors (exposed brick) typically specified	Yes	Applicable for substation. Low finish interiors (exposed brick) typically specified							
3.38 Shell structure roofs		Discretionary	Materials and waste	Specify lightweight, double curved or folded roof structures for roofs due to reduced use of material in comparison to other roof structures (e.g. tiles, reinforced concrete, timber etc).	D	[redacted]										
3.39 Member spacing		Discretionary	Materials and waste	Optimise the spacing of structural members in beam and post type designs.	D											
3.40 Façade reuse		Discretionary	Materials and waste	Incorporate existing building facades in station upgrades.	D											
3.41 Coordinate dimensions	6	Discretionary	Materials and waste	Design for standard material sizes and components to reduce waste and improve ease of assembly and disassembly.	D	Yes	Applicable for substation - Substation design contains a significant proportion of prefabricated structures to speed up construction	Yes	Substation design contains a significant proportion of prefabricated structures to speed up construction							
3.42 Design for disassembly	8	Discretionary	Materials and waste	Design to disassemble by using structural components that can be recycled easily. Develop a deconstruction plan supported by disassembly principles.	D	No	Not applicable - substation is purpose designed to fit Sydney Trains type approved equipment within a dedicated footprint and nominated life span	No	Not applicable - substation is purpose designed to fit Sydney Trains type approved equipment within a dedicated footprint and nominated life span							
3.43 Durable finishes	7	Discretionary	Materials and waste	Specify building materials and finishes to demonstrate high quality and durability.	D	Yes	Applicable for substation. Nominated materials and finishes will comply with durability requirements as specified in the TfNSW Services Brief	Yes	Nominated materials and finishes will comply with durability requirements as specified in the TfNSW Services Brief							
3.44 Adaptability	6	Discretionary	Materials and waste	Design structures for reuse/adaptability to minimise redundancy and demolition.	D	No	Not applicable - substation is purpose designed to fit Sydney Trains type approved equipment within a dedicated footprint and nominated life span	No	Not applicable - substation is purpose designed to fit Sydney Trains type approved equipment within a dedicated footprint and nominated life span							
3.45 Heavy-duty geotextile for foundation	6	Discretionary	Materials and waste	Use heavy-duty geotextile instead of crushed stone to provide stable foundation at the base of the embankment.	D	No	Not applicable - no embankments required	No	Not applicable - no embankments required							
3.46 Optimise track support system	-	Discretionary	Materials and waste	Optimise track support system design to minimise tunnel diameter (while also achieving groundborne noise compliance).	D	[redacted]										
3.47 Control site layout	7	Discretionary	Materials and waste	Layout of construction sites (including plant and equipment) to be designed to reduce travel distances and double carrying.	C	No	Not applicable - substation site is very limited and located within existing developed area	No	Not applicable - substation site is very limited and located within existing developed area							
3.48 Last Planner	7	Discretionary	Materials and waste	Planning and scheduling can be done by pull scheduling using the Last Planner System™ (LPS), or an equivalent system, to achieve efficiencies in project delivery (such as reduced program times). At a minimum the system must include a milestone schedule, collaboratively created phase schedules, make-ready look ahead plans, weekly work plans, and a method of measuring. Refer to the Lean Construction Institute website or free online resources.	DC	Yes	Applicable for substation construction. To be considered by contractor if feasible.	Yes	Applicable for substation construction. To be considered by contractor if feasible.							
3.49 Just in time inventory	6	Discretionary	Materials and waste	Using 'just in time' methods of equipment and supply delivery, reducing overall storage requirements and potential for waste or mis-use of equipment.	C	Yes	Applicable for substation construction. With limited space on site, Contractor will rely on just in time methods for materials delivery	Yes	With limited space on site, Contractor will rely on just in time methods for materials delivery							
4.1 Consult with local nature conservation groups		Discretionary	Biodiversity and heritage	Consult with local nature conservation groups about opportunities to collaborate (e.g. maintaining public access to bushland).	DC	No	Not applicable. No bushland in immediate vicinity of substation	No	Not applicable. No bushland in immediate vicinity of substation							
4.2 Ecological value opportunities	7	Discretionary	Biodiversity and heritage	Maximise ecological values through landscape species choice, and planting density and configuration. Make sure that appropriate weed management strategies are undertaken to avoid migration or contamination on and off site.	DC	No	Not applicable - no planting or landscaping required as part of substation construction footprint	No	Not applicable - no planting or landscaping required as part of substation construction footprint							
4.3 Clearing protocols	7	Discretionary	Biodiversity and heritage	Implement clearing protocols for habitat areas with the involvement of a qualified ecologist, including: - Prepare an inventory of trees and hollows to be removed (including the number, age and structure of mangroves). - Check hollow-bearing trees for fauna and nests prior to removal. - Implement a two-stage clearing process to allow a natural translocation of fauna species following the initial disturbance. - Safely relocate any animals found.	DC	Yes	Applicable for substation. The proposed driveway construction would require the removal of four planted trees (Trees 3, 5 and 6) as per ecology report.	Yes	Trees 13 and 17 to be retained as per ecology report.							
4.4 Feral animal and weed programme		Discretionary	Biodiversity and heritage	Identify, control, monitor and manage feral animals and weeds.	DC	Yes	Applicable for substation. Substation footprint is minimal however and part of an already urban landscape so unlikely to have any major infestations.	Yes	Applicable for substation. Substation footprint is minimal however and part of an already urban landscape so unlikely to have any major infestations.							

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4.5 Bird/bat boxes	3	Discretionary	Biodiversity and heritage	Create habitats for winged species for areas that do not pose a health and safety risk.	DC	No	Not applicable - substation required to be designed to prevent roosting of all winged species on building structure	No	Not applicable - substation required to be designed to prevent roosting of all winged species on building structure							
4.6 Fauna crossings	-	Discretionary	Biodiversity and heritage	Install fauna crossings such as fauna underpasses, combined fauna drainage/bridge structures and associated fauna fending as required.	DC											
4.7 Vegetation cover over built assets	5	Discretionary	Biodiversity and heritage	Provide a vegetation cover on structures to reduce maintenance and improve amenity (e.g. on noise walls).	DC	No	Not applicable - vegetation not permitted in design.	No	Not applicable - vegetation not permitted in design.							
4.8 Green roofs and walls	6	Discretionary	Biodiversity and heritage	Install green roof and/or green walls, maximising the extent of native vegetation.	D	No	Not applicable - site has to be designed to operate as unattended site. Large vegetation needs continual maintenance.	No	Not applicable - site has to be designed to operate as unattended site. Large vegetation needs continual maintenance.							
4.9 Heritage items in the vicinity	6	Discretionary	Biodiversity and heritage	Design to be sympathetic to heritage items and develop and enhance heritage buildings of heritage cultural significance.	D	Yes	Building design coordinated with heritage consultant	Yes	Building design coordinated with heritage consultant							
5.1 Rainwater	8	Discretionary	Water	Store rainfall from roofs or shade structures in water tanks. Connect water tanks to a new or existing non-potable water reticulation system. Connect sub-meter to all outflow pipes from tanks.	D	No	Not applicable for this site as there is no continual or significant water use onsite	No	Not applicable for this site as there is no continual or significant water use onsite							
5.2 Grey or blackwater	8	Discretionary	Water	Harvest grey or blackwater from all sources on site for non-potable uses (e.g. for uses in toilets, irrigation or wash down facility).	D	No	Not applicable for this site as there is no continual or significant water use onsite	No	Not applicable for this site as there is no continual or significant water use onsite							
5.3 Condensate recovery	1	Discretionary	Water	Recover, treat and reuse air conditioning condensate.	D	No	Not applicable - no significant greywater sources (with exception of WC which will only be used intermittently)	No	Not applicable - no significant greywater sources (with exception of WC which will only be used intermittently)							
5.4 Fire Protection	3	Discretionary	Water	Recover and reuse water from fire protection systems that require periodic testing and large quantities of water.	D	No	Not applicable - no fire hoses or reels permitted in Sydney Trains substations.	No	Not applicable - no fire hoses or reels permitted in Sydney Trains substations.							
5.5 Remove cooling towers	5	Discretionary	Water	Avoid the use of water intensive cooling towers – alternatively use a ground loop air cooled system or natural ventilation. Otherwise, make sure that cooling towers have sufficient concentration cycles – to avoid extra use of water and chemicals to operate.	D	Yes	Natural ventilation provided to substation	Yes	Natural ventilation provided to substation							
5.6 Water efficient systems	7	Discretionary	Water	Review alternate solutions that increase water use efficiency (e.g. avoid deluge systems). Refer to the Department of Environment and Heritage's Water Efficiency Guide: Office and Public Buildings 2006 for further guidance.	D	No	Not applicable - no significant water sources	No	Not applicable - no significant water sources							
5.7 Water submetering	5	Discretionary	Water	Install water sub-meters on all major potable and recycled water uses.	D	No	Not applicable - no significant water sources	No	Not applicable - no significant water sources							
5.8 Water real-time metering		Discretionary	Water	Monitor and record water use patterns.	D	No	Not applicable - no significant water sources	No	Not applicable - no significant water sources							
5.9 Water metering linked to central management system	5	Discretionary	Water	Link water metering to a Master Control System (MCS) and supervisory control and data acquisition (SCADA) to monitor water consumption and incorporate leak detection system.	D	No	Not applicable - no significant water sources	No	Not applicable - no significant water sources							
5.10 Planting	9	Discretionary	Water	Select plant species that require minimal or no irrigation after establishment.	DC	No	Not applicable. No planting possible due to space restrictions after substation complete	No	Not applicable. No planting possible due to space restrictions after substation complete							
5.11 Drip feed irrigation	6	Discretionary	Water	Use drip feed irrigation or similar water efficient technology from a non-potable water source where irrigation is necessary.	DC	No	Not applicable. No planting possible due to space restrictions after substation complete	No	Not applicable. No planting possible due to space restrictions after substation complete							
5.12 Save or reuse during construction	5	Discretionary	Water	Meet use of non-potable water (e.g. bycycled) ... site points or in water tanks at site compounds and testing (where needed) or reuse (e.g. for dust suppression spraying).	C	Yes	To be considered for feasibility by Contractor	Yes	To be considered for feasibility by Contractor							
5.13 Stormwater quality		Discretionary	Water	Install silt and oil separators to make sure silt and pollutants are removed from stormwater.	D	Yes	Substation oil/water separator provided to prevent oil discharge from bunded yards to stormwater system	Yes	Substation oil/water separator provided to prevent oil discharge from bunded yards to stormwater system							
5.14 Minimal groundwater pumping	-	Discretionary	Water	Minimise groundwater pumping and associated treatment requirements.	D											
5.15 Permeable and porous surfaces	5	Discretionary	Water	Design for permeable and porous surfaces to allow for stormwater infiltration (preferably with other treatments such as vegetated swales).	D	No	Not considered feasible or applicable for footprint of this site	No	Not considered feasible or applicable for footprint of this site							
6.1 Refrigerants	7	Discretionary	Pollution control	Select refrigerants that do not have ozone depleting potential (ODP) or global warming potential (GWP), such as Refrigerant R7...	D	Yes	Applicable for substation. Relevant for split system air conditioner	Yes	Split system air conditioner for office will not use refrigerants with ODP or global warming potential							
6.2 Lubricants	5	Discretionary	Pollution control	Use biodegradable lubricants where possible.	DC	Yes	Applicable for substation. To be applied where applicable	Yes	Applicable for substation. To be applied where applicable							
6.3 Hydraulic equipment	5	Discretionary	Pollution control	Procure hydraulic equipment that uses water as hydraulic fluid.	D	No	Not applicable for substation. No hydraulic equipment specified	No	Not applicable for substation. No hydraulic equipment specified							
6.4 Avoid dangerous goods and hazardous materials	7	Discretionary	Pollution control	Use Safety Data Sheets (SDS) to avoid the use of dangerous goods and hazardous materials. See the materials selection in Appendix B for details.	DC	Yes	Applicable for substation. As per Work Health and Safety Regulations	Yes	As per Work Health and Safety Regulations							
6.5 Apply noise control hierarchy	10	Discretionary	Pollution control	Apply a hierarchy of control by addressing noise at source first (e.g. orient equipment away from residential receivers), then propagation path (e.g. a noise barrier) and finally at the receiver (e.g. double glazed windows) as a last option. See Rail Infrastructure Noise Guidelines for further information.	D	Yes	Construction and operational noise to comply with REF	Yes	Construction and operational noise to comply with REF							
6.6 Quiet car parks	-	Discretionary	Pollution control	Design car parks to minimise noise during operation (e.g. low noise speed bumps and road surface).	D											
6.7 Optimise alignment for noise	-	Discretionary	Pollution control	Optimise the alignment for operational noise (including avoiding tight radius curves, steep gradients and proximity to sensitive receivers).	D											
6.8 Avoid noise sensitive areas	6	Discretionary	Pollution control	Locate noisy operations away from noise sensitive areas (e.g. turnouts, crossings, sidings, crossing loops, stop road etc) and locally enclose noisy activities.	D	Yes	Construction and operational noise to comply with REF	Yes	Construction and operational noise to comply with REF							
6.9 Avoid level crossings		Discretionary	Pollution control	Avoid level crossings (e.g. ...) to reduce noise and provide pedestrian accessibility.	D	No	Not applicable - no level crossings required or provided	No	Not applicable - no level crossings required or provided							
6.10 No whistle boards	-	Discretionary	Pollution control	Implement no whistle boards at tunnel portals where appropriate.	D											
6.11 Separate passenger waiting areas from noise	-	Discretionary	Pollution control	Segregate passenger waiting areas from noisy areas.	D											
6.12 Optimise outdoor PA systems	-	Discretionary	Pollution control	Optimise design and installation of open and semi-enclosed stations' PA systems to reduce impact on community.	D											
6.13 Optimise station acoustics	-	Discretionary	Pollution control	Optimise acoustics of the total station facility (i.e. good conditions for communication between staff and customers).	D											
6.14 Location of air intakes	6	Discretionary	Pollution control	Make sure that air intakes are located away from loading bays, parking areas, exhaust stacks, garbage/refuse storage areas and other contamination points that may transfer odours, particulates or moisture.	D	Yes	Applicable for substation. Specific reference in works brief to ensure contractors apply during construction	Yes	Applicable for substation. Specific reference in works brief to ensure contractors apply during construction							
6.15 Filtration of HVAC systems		Discretionary	Pollution control	Provide high performance filtration for all air handling systems. High performance filtration for mechanical ventilation systems may be defined as both a high level of energy efficiency as well as filtration efficiency.	D	No	Not applicable - natural ventilation provided for substation	No	Not applicable - natural ventilation provided for substation							
6.16 Security and warning lights	7	Discretionary	Pollution control	Install security and warning lights and signs so that they are directed ... in such a way that they reflect off adjacent structures or neighbouring properties.	D	Yes	Applicable for substation. External lighting to be installed to RailCorp Security Standard ES0003 - Substations.	Yes	Applicable for substation. External lighting to be installed to RailCorp Security Standard ES0003 - Substations.							
6.17 Avoid glare and light pollution	5	Discretionary	Pollution control	Minimise ambient light levels and glare towards neighbouring properties (e.g. avoid or obstruct uplighting). Refer to ASA standard 3.11.3.3 for guidance and make sure that design complies with AS 4282 Control of the Obtrusive Effects of Outdoor Lighting. Do not exceed minimum requirements of AS 1158 for illuminance levels for 95 per cent of outdoor spaces.	D	Yes	Applicable for substation. Lighting to be designed in accordance with relevant standards	Yes	Applicable for substation. Lighting to be designed in accordance with relevant standards							
6.18 Stencil stormwater drains	-	Discretionary	Pollution control	Stencil stormwater drains to explain that the drain is just for rain.	D											
6.19 Maintain groundwater	7	Discretionary	Pollution control	Investigate and ensure that aquifers do not deplete or ... (e.g. contaminated groundwater migration, or lower existing water tables or water courses).	D	No	Not applicable - no impact to aquifers or groundwater regime	No	Not applicable - no impact to aquifers or groundwater regime							
7.1 Community involvement in design	6	Discretionary	Community benefit	Engage the community and stakeholders during design.	D	Yes	Applicable to substation. Community consultation and stakeholder consultation undertaken as part of design phase	Yes	Community consultation and stakeholder consultation undertaken as part of design phase - included as part of REF							
7.2 Community involvement in noise mitigation	-	Discretionary	Community benefit	Engage with the impacted community when selecting propagation path noise control (e.g. siting of noise barriers).	D											
7.3 Public art	-	Discretionary	Community benefit	Consult with the community over potential public art proposals.	DC											
7.4 Weekend use	-	Discretionary	Community benefit	Allow for communal parking space use during non-peak commuting hours.	D											
7.5 Shared adaptive use	-	Discretionary	Community benefit	Design in adaptive use on the weekends/non-peak periods (e.g. consider how the car park may be converted into a market or festival space on the weekend).	D											
7.6 Space for retail and other community amenity	-	Discretionary	Community benefit	Provide adequate space for retail or other amenity and design to have separate access to facilities from the main station.	D											
7.7 Plan station entries	-	Discretionary	Community benefit	Plan station entries ... to provide the most efficient pedestrian routes.	D											
7.8 Bicycle and pedestrian links	7	Discretionary	Community benefit	Optimise local pedestrian links to and between community facilities, such as sports grounds etc. Plan pathways within the asset to connect directly with existing pedestrian routes, centre activities and station entries. Design station building in a way to prevent it becoming a visual or psychological barrier to crossing the railway.	D	No	Not applicable - substation is restricted to authorised personnel only. No public access allowed	No	Not applicable - substation is restricted to authorised personnel only. No public access allowed							
7.9 Integrated with adjacent buildings	-	Discretionary	Community benefit	Consider the existing building landscape to allow the incorporation of ground level activities. Design basement and car parking or above multi storey car parking with single facade buildings.	D											
7.10 Integrate with the use of landscape	-	Discretionary	Community benefit	Use landscape to screen vehicles from the streetscape and make sure that vegetation species selection is complementary to the existing context.	DC											
7.11 Avoid future power loss	10	Discretionary	Community benefit	Consider maintenance and construction solutions that eliminate or minimise current or future power loss (e.g. power isolation).	D	Yes	Applicable for substation.	Yes	Electrical redundancy and control measures shall be provided as per approved operating diagrams which allow for maintenance without a traction power outage							

Initiative	Score	Importance	Theme	Description	Design (D) & Construction (C) Interface	Applicability	Comments on Applicability	Reference Design	Comments on Reference Design	Detailed Design	Comments on Detailed Design	Construction	Comments on Construction	Finalisation	Comments on Finalisation	User Comments (general)
7.12 Future community disruption	8	Discretionary	Community benefit	Consider concurrent staging and provision for planned and potential future projects to minimise community disruption.	D	Yes	Applicable for substation.	Yes	Management of staging constraints is a key determinant of this project and shall be considered in detail through the design stages and construction							
7.13 Enhance visual interest of asset	-	Discretionary	Community benefit	Use lighting, landscaping and/or public art to direct visual interest towards the structure and enhance the visual amenity of the structure	DC											
7.14 Wayfinding strategy	-	Discretionary	Community benefit	Develop and implement a wayfinding strategy for the catchment area within 800 metres of the station	DC											
7.15 Links with bus services	-	Discretionary	Community benefit	Incorporate station passenger information (SPI) units at bus stops and interchange areas surrounding the station	D											
7.16 Enable easy and intuitive navigation	-	Discretionary	Community benefit	Devise efficient pedestrian movement routes, and make sure that exits and entries are readily identifiable by sight without any reliance upon signage (e.g. arrows on directional flooring or direct to exits)	D											
7.17 Legibility through public art	-	Discretionary	Community benefit	Assist orientation through the use of public art (e.g. landscapes).	D											
7.18 Enhance access and public amenity	-	Discretionary	Community benefit	Develop a coordinated strategy between agencies to make sure that modal interchanges are accessible and seamless.	D											
7.19 Kiss and ride	-	Discretionary	Community benefit	Provide for kiss and ride at the station.	D											
7.20 Taxis and/or bus stop	-	Discretionary	Community benefit	Provide a [illegible] taxi [illegible] bus stops.	D											
7.21 Lockers and showers for cyclists	5	Discretionary	Community benefit	Consider the provision of showers and lockers on site to encourage workers to cycle to work.	D	No	Not applicable - substation only intermittently occupied	No	Not applicable - substation only intermittently occupied							
7.22 Code of practice for construction	6	Discretionary	Community benefit	Prepare a code of practice for construction contractors. Refer to the Australian Procurement and Construction Council (APCC) National Code of Practice for the Construction Industry (1997) and supporting Towards Best Practice Guidelines (1998) and Implementation Guidelines (2009) for guidance.	D	No	Not applicable - community and stakeholder consultation all embodied in REF	No	Not applicable - community and stakeholder consultation all embodied in REF							
7.23 Electric car charging	-	Discretionary	Community benefit	Allow capacity for alternative fuel vehicles to recharge now or in the future.	D											
7.24 Car sharing	-	Discretionary	Community benefit	Allocate reserved parking spaces outside of any pay parking area.	D											
7.25 Public displays	-	Discretionary	Community benefit	Provide real-time displays of train timetable information in the public areas surrounding the station	D											
7.26 Public displays of sustainability initiatives		Discretionary	Community benefit	Provide real-time displays of data collected by smart meters to communicate with workers, passengers and the wider community. When displayed in the public domain the data should use key performance indicators including greenhouse gas emission reductions from sustainability initiatives.	D	No	Not applicable - substation is only infrequently occupied and any LV services are switched off when personnel leave site	No	Not applicable - substation is only infrequently occupied and any LV services are switched off when personnel leave site							
7.27 Preferential parking	8	Discretionary	Community benefit	After adequate provision of disabled parking spaces, designate preferential parking spaces to motorbikes, small cars and electric vehicles. Where possible, these spaces should be located nearest to the station entry or maintenance facility entry after disabled parking spaces	D	No	Not applicable - as substation is only occupied infrequently, single car parking space is provided for site personnel during visit	No	Not applicable - as substation is only occupied infrequently, single car parking space is provided for site personnel during visit							
7.28 Bicycle lockers and/or racks	3	Discretionary	Community benefit	Provide sheltered bicycle lock ups and/or lockers in or near entrance to the station. Allow for at least 5% of staff use at maintenance facilities. See Section 3.9.3.1 of the ASA Station Design Standard Requirements for further information on bicycle parking requirements at stations	D	No	Not applicable - substation only intermittently occupied, bike parking not considered necessary	No	Not applicable - substation only intermittently occupied, bike parking not considered necessary							
7.29 Bicycle storage security		Discretionary	Community benefit	Locate bicycle storage areas in an area with a high level of passive surveillance and/or prominent CCTV.	D	No	Not applicable - substation only intermittently occupied, bike storage not considered necessary	No	Not applicable - substation only intermittently occupied, bike storage not considered necessary							
7.30 Separate cycle ways and footpaths	-	Discretionary	Community benefit	Separate cycle ways and footpaths to decrease the likelihood of collisions and decrease pathway congestion	D											
7.31 Wide footpaths	-	Discretionary	Community benefit	Design wider than minimum footpaths to enhance safety and service, keep corners clear of obstructions and improve sight lines	D											
7.32 Easy pathways	-	Discretionary	Community benefit	Make sure that pathways consider topography, minimising steep slopes and provide alternatives to steps.	D											
7.33 Safe pedestrian movement	7	Discretionary	Community benefit	Make sure that safe movement is promoted for pedestrians and cyclists by minimising vehicle crossings of paths, providing clear signage, and providing freedom from obstacles such as poles, trees etc.	D	No	Not applicable - substation access restricted to authorised personnel only. Ingress and egress to site across footpath will allow for safe movement of pedestrians and cyclists	No	Not applicable - substation access restricted to authorised personnel only. Ingress and egress to site across footpath will allow for safe movement of pedestrians and cyclists							
7.34 Passive traffic calming measures		Discretionary	Community benefit	Use passive traffic calming measures (that do not modify road geometry) to reduce vehicle speeds and improve safety around interchanges – such as tree-lined streets, tree-lanes between a footpath and road, streets with raised centre medians, on-street parking, highly visible pedestrian crossings and short building setback distances	D											
7.35 Asset protection zones	6	Discretionary	Community benefit	Provide an asset protection zone (APZ) fire buffer around buildings and infrastructure. Refer to Standards for Asset Protection Zones (NSW Rural Fire Service).	D	Yes	Substation construction requires buffer for fire risk as default	Yes	Substation construction requires buffer for fire risk as default							
7.36 Safe hot water	6	Discretionary	Community benefit	Use safe hot water fittings (the end of mixing valves) to control water temperature at the tap and prevent scalding	DC	Yes	Applicable for substation for hot water taps	Yes	Applicable for substation for hot water taps							
7.37 Create station identity	-	Discretionary	Community benefit	Create station identity using public art, architecture, use of colour and materials etc.	D											
7.38 Reduce vandalism	6	Discretionary	Community benefit	Minimise risks from vandalism during design such as designing pedestrian bridges and walkways with a high degree of surveillance or railings, restrict window openings and limit to a maximum 80mm opening.	D	Yes	Applicable for substation. Substation located within restricted access area and will be monitored by CCTV as per requirements of Sydney Trains security standard RS 008 - substations.	Yes	Applicable for substation. Substation located within restricted access area and will be monitored by CCTV as per requirements of Sydney Trains security standard RS 008 - substations.							
7.39 Reduce graffiti	7	Discretionary	Community benefit	Minimise graffiti risks such as through treatment of existing and other surfaces with anti-graffiti paint or coatings, vegetation cover to deter graffiti or providing designs that deter graffiti.	D	Yes	As per standard, all external walls shall be treated with Sure Seal Graffiti Shield applied in accordance with manufacturer's directions	Yes	As per standard, all external walls shall be treated with Sure Seal Graffiti Shield applied in accordance with manufacturer's directions							
7.40 Intelligible PA systems	-	Discretionary	Community benefit	Design public address (PA) systems to maximise coverage and speech intelligibility for customers and staff. Considerations are to include distributed speaker systems, announcement booths to allow clear and audible announcements, acoustic absorption materials in appropriate waiting areas and text based announcements on public displays for the hearing impaired.	D											
7.41 Station furniture	-	Discretionary	Community benefit	Procure high quality and durable station furniture items within existing structures. Where a new station is proposed make sure that station furniture are durable and resistant to graffiti.	D											
7.42 Public Wi-Fi	-	Discretionary	Community benefit	Wireless access points to be located in station awnings built for outdoor wi-fi users.	D											
7.43 Power and internet	-	Discretionary	Community benefit	Provide power outlets and seating to support high speed internet service.	D											
7.44 Fibre optic backbone	-	Discretionary	Community benefit	Provide fibre optic backbone including microcell access to mobile phone operators. This will enhance train and construction radio, provide GSM service and allow a wireless internet service on the train line	D											
7.45 Utility services	-	Discretionary	Community benefit	Co-location of utility services (e.g. water, LPG, etc).	D											
7.46 Water bubblers	-	Discretionary	Community benefit	Provide wheelchair accessible drinking water bubblers on platforms and within the station building	D											
7.47 Comfortable pedestrian and cyclist movement		Discretionary	Community benefit	Make sure that interchange is designed to promote pedestrian activity and bicycle use by considering the comfort and amenity of users, e.g. including a buffer zone between the roadway and the walking area, avoid placing pedestrian and cycling crossing points at busy intersections, locate pedestrian and cycle crossings as close to the direct line of travel as possible, make sure that there are clear views of traffic at crossing points, provide kerb ramps, provide alternatives to pedestrian and bicycle crossings at roundabouts).	D											
7.48 Cigarette disposal		Discretionary	Community benefit	Provide cigarette disposal facilities outside of a station or maintenance facilities, away from ventilation intakes, stormwater drains and entrances to reduce litter and smoke particulates entering the internal environment.	D	No	Not applicable - no smoking permitted on site	No	Not applicable - no smoking permitted on site							
7.49 Wind breaks	5	Additional	Community benefit	Design structures and landscape to shelter passengers from prevailing winds.	D	No	Not applicable - no passengers relevant to substation	No	Not applicable - no passengers relevant to substation							
7.50 Shading	5	Additional	Community benefit	Provide shade through vegetation or structures over platforms, concourse, car parks and pedestrian pathway areas and work/lunch areas.	D	No	Not applicable - work areas are located within substation building or within vicinity of overhead power lines which cannot be shaded	No	Not applicable - work areas are located within substation building or within vicinity of overhead power lines which cannot be shaded							
7.51 Add vegetation	3	Additional	Community benefit	Provide vegetation to reduce heat loading and increase visual attraction.	DC	No	Not applicable - areas immediately surrounding substation required to be free of vegetation	No	Not applicable - areas immediately surrounding substation required to be free of vegetation							
7.52 Heat sinks	6	Additional	Community benefit	Use light coloured materials on roofs and pavements to both shade from and reflect sunlight, in order to decrease heat sinking.	DC	Yes	Applicable for substation. Lighter coloured paints to be specified where applicable.	Yes	Applicable for substation. Lighter coloured paints to be specified where applicable.							
7.53 Wind	-	Additional	Community benefit	Design and locate multi-storey commuter car parks to avoid the creation of wind tunnels.	D											
7.54 High frequency electronic ballasts		Additional	Community benefit	High frequency electronic ballasts (greater than 20 kHz for fluorescent lamps and greater than 120 Hz for high-intensity discharge (HID) lamps) to be installed in lights over a minimum of 95% of all areas that utilise fluorescent or HID lighting, in order to reduce flicker.	D	Yes	Applicable for substation. Fluorescent lighting shall use high frequency electronic ballasts	Yes	Applicable for substation. Fluorescent lighting shall use high frequency electronic ballasts							
Innovation 01		Additional														
Innovation 02		Additional														
Innovation 03		Additional														
Innovation 04		Additional														
Innovation 05		Additional														
Innovation 06		Additional														
Innovation 07		Additional														
Innovation 08		Additional														
Innovation 09		Additional														
Innovation 10		Additional														

Initiative	Score	Importance	Items	Description	Design (DI) & Construction (C) Interface	Applicability	Comments on Applicability	Reference Design	Comments on Reference Design	Detailed Design	Comments on Detailed Design	Construction	Comments on Construction	Finalization	Comments on Finalization	User Comments (general)

Once complete please proceed to the next asset type tab. If this is the only asset type, results can be viewed on Report tab.

Report

	Applicability Maintenance facilities	Reference Design Maintenance facilities	Detailed Design Maintenance facilities	Construction Maintenance facilities	Finalisation Maintenance facilities
Number of Compulsory initiatives selected	16	16	0	0	0
Percentage (Compulsory initiatives)		100%	0%	0%	0%
Number of Discretionary initiatives selected	69	68	0	0	0
Score (Discretionary Initiatives)	434	423	0	0	0
Percentage (Discretionary Initiatives)		97%	0%	0%	0%
Overall Percentage		97%	0%	0%	0%
Project's current rating*		Platinum	Non-compliance	Non-compliance	Non-compliance

* Indicative beyond compliance rating only, subject to verification

Instructions

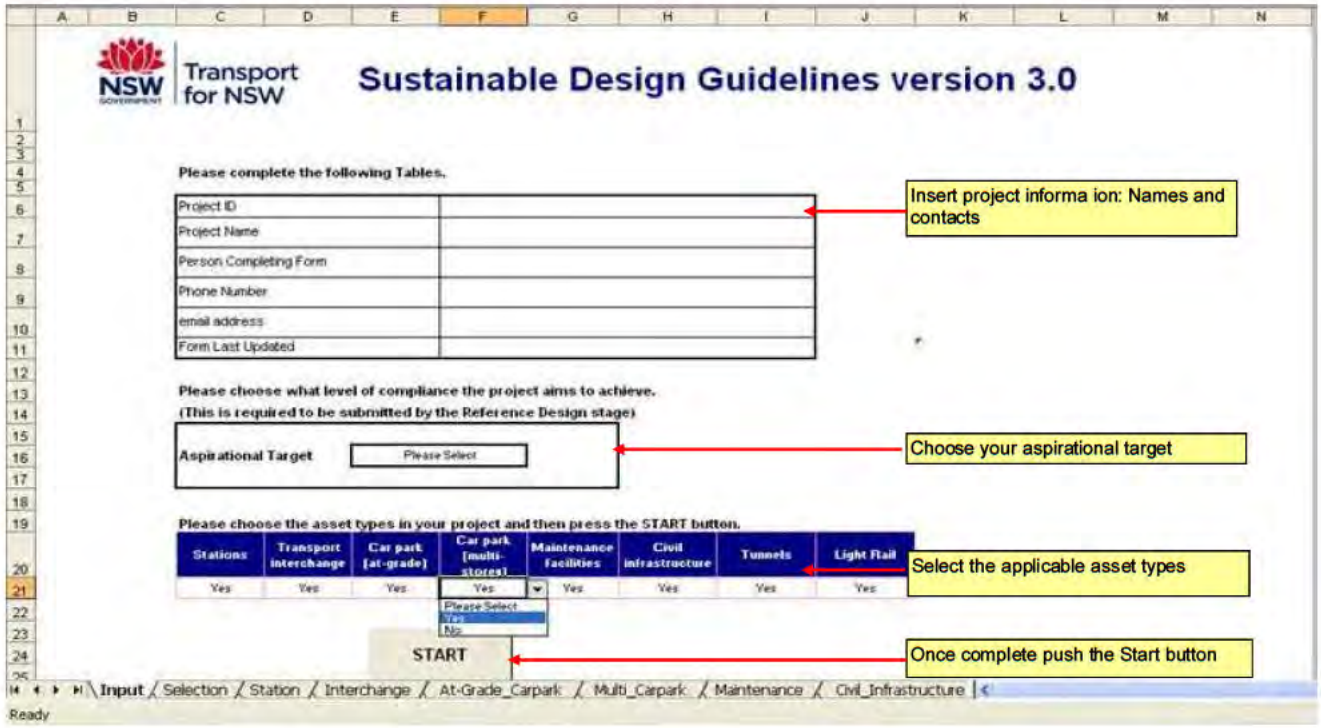
- Data Input

- Initiatives Selection

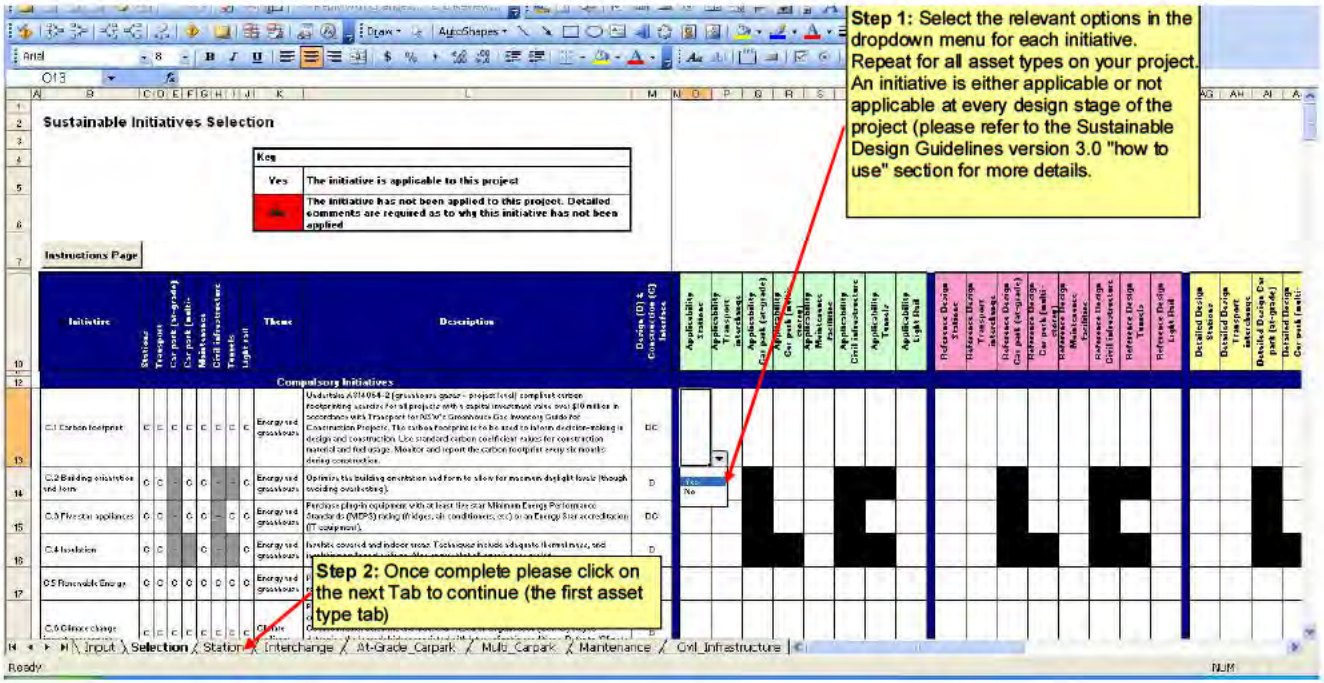
- Comments

- Results

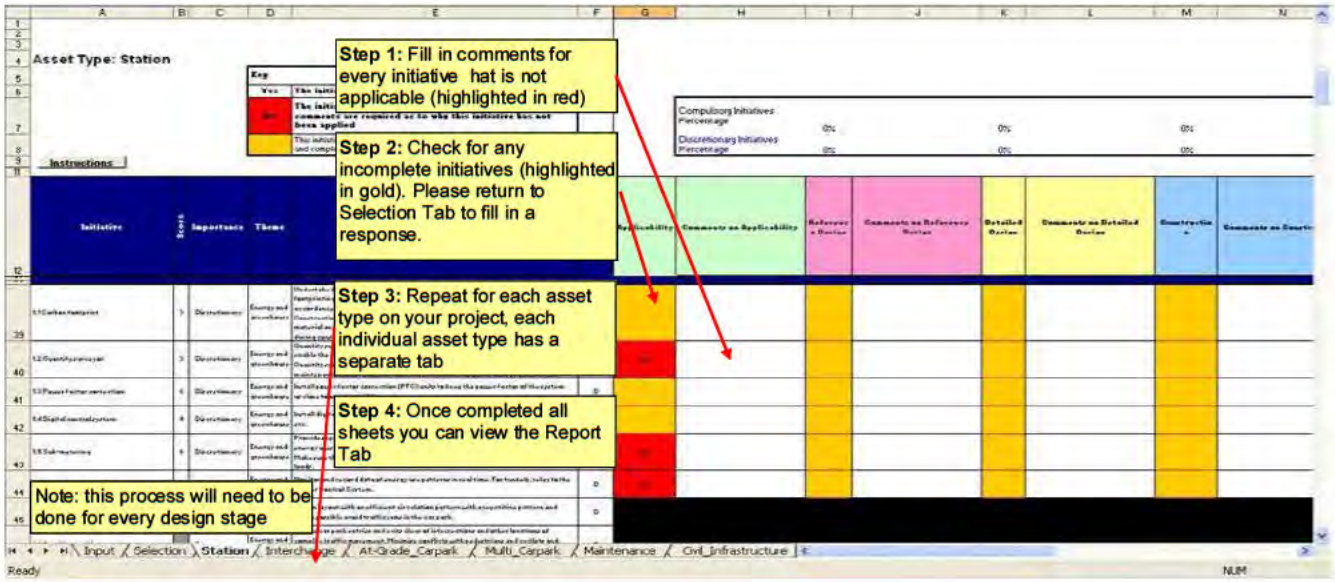
Data Input (Input Tab)



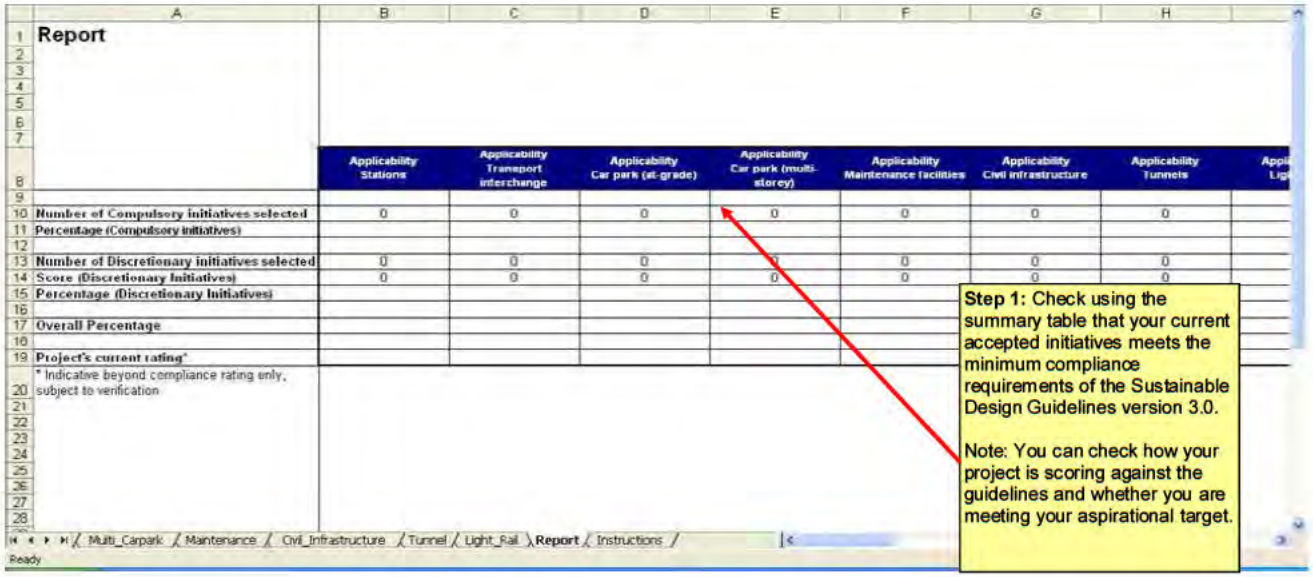
Selecting initiatives (Selection Tab)


Step 1: Select the relevant options in the dropdown menu for each initiative. Repeat for all asset types on your project. An initiative is either applicable or not applicable at every design stage of the project (please refer to the Sustainable Design Guidelines version 3.0 "how to use" section for more details.
Sustainable Initiatives Selection
Key
Yes
The initiative is applicable to this project
The initiative has not been applied to this project. Detailed comments are required as to why this initiative has not been applied
Instructions Page
Initiative
Theme
Description
Compulsory Initiatives
Step 2: Once complete please click on the next Tab to continue (the first asset type tab)
Input
Selection
Station
Interchange
At-Grade_Carpark
Multi_Carpark
Maintenance
Civil_Infrastructure
Ready
NUM

Comments (Asset type tabs)



Results (Report Tab)



Report

	Applicability Stations	Applicability Transport interchange	Applicability Car park (at-grade)	Applicability Car park (multi-storey)	Applicability Maintenance facilities	Applicability Civil infrastructure	Applicability Tunnels	Appli Ligh
Number of Compulsory initiatives selected	0	0	0	0	0	0	0	
Percentage (Compulsory initiatives)								
Number of Discretionary initiatives selected	0	0	0	0	0	0	0	
Score (Discretionary Initiatives)	0	0	0	0	0	0	0	
Percentage (Discretionary Initiatives)								
Overall Percentage								
Project's current rating*								

* Indicative beyond compliance rating only, subject to verification

Step 1: Check using the summary table that your current accepted initiatives meets the minimum compliance requirements of the Sustainable Design Guidelines version 3.0.

Note: You can check how your project is scoring against the guidelines and whether you are meeting your aspirational target.

Multi_Carpark / Maintenance / Civil_Infrastructure / Tunnel / Light_Rail / Report / Instructions /

Ready

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EXHIBIT C – PRINCIPAL'S INSURANCE POLICIES

a) General Liability – Certificate of Currency

b) Contract Works – Certificate of Currency

MARSH

[redacted]
Principal

Marsh Pty Ltd
ABN 86 004 651 512
201 Sussex Street
SYDNEY NSW 2000
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AUSTRALIA SQUARE NSW 1215
02 8864 8321 Fax 02 8864 8077
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Certificate of Currency
Comprehensive General Liability

Our Reference:	Sydney Trains
Department:	Corporate – Transport & Logistics
Contact:	[redacted]
Date:	30 November 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 November 2015 To 4:00pm Australian Eastern Standard Time on 30 November 2016
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]
Managing Principal

Marsh Pty Ltd
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Certificate of Currency
Contract Works Insurance

Date: 23 November 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:	AIG Australia Limited
Policy Number:	115680
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 Insureds	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:	(a) Construction Period 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
Interest 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:	23 November 2015 to 30 November 2016; 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(s) 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
Sub-Limits of Liability:	Payable in addition to the above any one occurrence: Temporary Buildings Escalation % of Estimated Contract Value for each separable portion of the contract works Professional Fees $ Removal of Debris $ Search and Location Costs $ Expediting Expenses $ Transit $ Temporary Protection and/or Government Expenses $

Material Storage Offsite
$

Claims Preparation Costs
$

Additional Costs of Constructing Unbuilt Works
$

Existing Property
$

Loss Prevention
$

Additional Increased Cost of Working
$

Extra Cost of Reinstatement
$

Extra Expense
$

Deductible: $ each and every Occurrence

Except in respect to LEG3 Defects claims which is $ each and every occurrence

Yours faithfully,

Managing Principal

EXHIBIT E – CONTRACT SPECIFIC REQUIREMENTS

Exhibit E - Contract Specific Requirements

Power Supply Upgrade Program

Design & Construction of Granville Junction Substation (TPD-14-4137)

Document Number: 4618463_5

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Appendix A – PSU – Granville Junction Substation Worksites

Appendix B – Granville Office Facility Layout

Appendix C – Constraints and Requirements on Particular Worksites

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Appendix E – Construction Resource Request Form

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's 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 or Sites" means the worksites shown in map in Appendix A and listed in the table in Appendix C to this Contract Specific Requirements.

2 Site

2.1 Description of the Site

The Site consists of the Worksites shown in map in Appendix A listed in the table in Appendix C to this Contract Specific Requirements. The Contractor must comply with the Worksite constraints and requirements listed in Appendix C to this Contract Specific Requirements.

The site location of the new substation, known as Granville Junction Substation is identified as 137-145 Railway Parade Granville. The site is adjacent to existing Sydney Trains business group compounds such as Possession Planning, Maintenance and Major Works.

The construction worksite will have direct access to Railway Parade and the rail corridor. The site is substantially concealed from the street with a line of trees minimising the visual impact of the property from residential dwellings on the opposite side of Railway Parade.

The existing Granville Substation is located within Granville Junction Triangle and access off the end of Morte St and situated between the Boral Concrete works and Granville Signal Box adjacent to the Down West Main railway Line and the Up Old South Main railway line.

At the completion of the commissioning of Granville Junction Substation, the existing Granville Substation will be decommissioned and demolished. This will be managed as a separate worksite at that stage.

Refer to site plan in Appendix A – PSU – Granville Junction Substation Worksites.

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.

2.2.2 Detailed Site Survey

When conducting detailed site surveys, the Contractor must comply with the requirements described in the following ASA held Engineering Manuals:

(a) Accurate Field Drawing (TMA 0491);

(b) Data Capture Procedure (TMA 0492);

(c) Work as Executed Procedure (TMA 0494)

(d) Infrastructure Services Data Policy (TMA 0495);

(e) Plan Symbols and Interpretation Guidelines (TMA 0511);

(f) Scope Procedure (TMA 0493);

(g) Specification for Collection of Services Data (TMA 0496); and

(h) Code and Layer Definitions for Services Identification (TMA 0497).

The Contractor must ensure that the personnel performing the detailed site surveys are competent and familiar with rail survey requirements.

2.3 Site Compounds and Fencing

The Principal has arranged with Sydney Trains for the Contractor, the Principal's Representative (and nominated persons) to utilise an existing office facility with 51 furnished work stations, 3 furnished meeting rooms, a furnished kitchen, toilets and a number of allocated work vehicle parking bays for the duration of the project. This area is detailed in Appendix A – PSU – Granville Junction Substation Worksites as Site A.

The Contractor may wish to organise additional site specific dwellings as required for local supervision and management of the new substation construction and the existing substation demolition described in the Appendix-A drawing as 'Site B' and 'Site C'. All the Contractor's site offices and site compounds must be located within the areas described in the Appendix-A drawing as Sites A, B and C.

Site security fencing has been installed around the new substation site (Site B). There is an existing substation security fence around the existing substation. Alterations to the fencing and site compounds are possible and if required 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, restore the Site to its original or improved condition and remove all temporary site access roads.

2.4 Facilities for use by the Principal and Contractor

2.4.1 Site A - Office Compound and Work Vehicle Carpark

Appendix B provides a layout of the Sydney Trains office facility in Site A. Unless otherwise agreed by the Principal's Representative, the Contractor must provide the Principal with the following within these facilities:

(a) 6 workstations located at the northern end of the office facility. (This area is highlighted in red in Appendix B), including existing desks, chairs and a secure lockable filing cabinet for the exclusive use of the Principal's Representative &/or other authorised persons nominated; and

(b) maintain the large "Meeting Room" room for the joint use of the Principal and the Contractor.

(c) the unlimited use of power, data, external Land line (connected to TfNSW network), A3 colour photo-copy printer machine, kitchen and toilet facilities

(d) the Contractor is to maintain 24hrs site access to for the Principal's Representative and authorised persons to the Sydney Trains building facility and allocated car parks

(e) 2 dedicated parking bays appropriately line marked and with individual signage installed for permanent allocated parking provided to the Principal and nominated representative.

(f) 15 Parking bays appropriately line marked and with parking signage installed for permanently allocated parking dedicated exclusively to Sydney Trains work vehicles. Allocated parking bay layout is show in Appendix A.

The Contractor is responsible for office facilities and maintenance such as:

a) site security (alarm monitoring as required and management of access),

b) weekly office cleaning and rubbish removal,

c) property maintenance and repairs,

d) climate control (heating and air-conditioning),

e) supply items for office, kitchen and amenities such as water, power, telephone, data, WiFi, rubbish collection and cleaning, filtered drinking water, tea and coffee, paper towel, toilet rolls, liquid hand soap, detergent., and;

f) the funding of all costs for supplying all utilities and services such as; water, power, telephone, data, WiFi, rubbish collection, cleaning, filtered drinking water, tea and coffee, paper towel, toilet rolls, liquid hand soap and detergent.

g) The development and maintenance of an emergency evacuation plan for the facility.

It is estimated that 16 car parking spaces within Site A are available to the Contractor for onsite work vehicle parking. The parking within Site A is not provided for the Contractor's staff subcontractor's private vehicles.

The Contractor must carry out a detail stocktake of all items, materials and furnishing list, currently provided in the office facility, to be referenced at the end of the project when office facility and furnishing is handed back to Sydney Trains. Any items damaged or missing shall be the responsibility of the contractor to replace.

2.4.2 Site B – Granville Junction Substation

Site access at the Granville Junction Substation site is restricted to the following:

(a) During construction Worksite B, work/construction vehicles, only required for work activities in scheduled task that day, shall access the worksite

(b) During construction Worksite B, work/construction vehicles shall access the worksite directly from Railway Parade (not from adjacent Sydney Trains areas, unless prior arrangement and approval is agreed with the Principal).

(c) Traffic Management of street traffic, parking, public buses and all traffic movement into and out of the worksite on Railway Parade will be required during high volume materials deliveries, heavy vehicle movements and large volume construction vehicle activities and shall comply with the Contractor's Construction Traffic Management Plan

(d) Once the Substation is commissioned, Worksite B is classified by the ENSR and Electricity Supply Act as a *'live'* HV electrical environment. The following requirements apply as a minimum:

i) All staff entering the location and works must be conducted in compliance with the requirements of the Electrical Network Safety Rules (without exception).
ii) All Contractor's personnel shall either be appropriately accredited or supervised by a permit holder who is an appropriately accredited person under *PR D 78701 Personal Certifications Electrical* (such as an Authorised Operator or Officer substation)
iii) When the work party contains a person(s) whom is not electrically authorised as per PR D 78701 Personnel Certifications – Electrical, the person(s) shall be directly supervised by a Permit Holder who is an Authorised Person.
iv) The Permit Holder shall control the work process and provide direct supervision so that persons carrying out the work (for which a Permit is required) does not work beyond the limits of the Electrically Safe Work Area;
v) In conjunction with the Principal, the Contractor shall have in place an interface agreement with Sydney Trains to allow Sydney Trains maintenance staff access into the Substation at all times required.

vi) Contractor shall ensure current all site hazards are clearly communicated to all Sydney Trains personnel (entering 24hrs a day) for safe entry into the substation by maintaining a site safety notice board daily with all current and relevant safety information.
vii) Contractor shall induct all personnel including Sydney Trains into the site for access.

2.4.3 Worksite C – Granville Substation

(a) The following requirements apply as a minimum:

i) Traffic Management will be required and shall comply with the Contractors Construction Traffic Management Plan
ii) The Contractor shall include, in their interface agreement with Sydney Trains, unimpeded access to the construction site at all times
iii) Sydney Trains Maintenance staff unimpeded access to Granville Substation shall be maintained at all times while still commissioned

(b) Prior to the existing substation being fully decommissioned, Worksite C is classified by the ENSR and Electricity Supply Act as a *'live'* HV electrical environment. The following requirements apply as a minimum:

i) All staff entering the location and works must be conducted in compliance with the requirements of the Electrical Network Safety Rules (without exception)
ii) All Contractor's personnel shall either be appropriately accredited or supervised by a permit holder who is an appropriately accredited person under *PR D 78701 Personal Certifications Electrical* (such as an Authorised Operator or Officer substation)
iii) When the work party contains a person(s) whom is not electrically authorised as per PR D 78701 Personnel Certifications – Electrical, the person(s) shall be directly supervised by a Permit Holder who is an Authorised Person
iv) The Permit Holder shall control the work process and provide direct supervision so that persons carrying out the work (for which a Permit is required) does not work beyond the limits of the Electrically Safe Work Area
v) In conjunction with the Principal, the Contractor shall have in place an interface agreement with Sydney Trains to allow Sydney Trains maintenance staff access into the Substation at all times required
vi) Contractor shall ensure current all site hazards are clearly communicated to all Sydney Trains personnel (entering 24hrs a day) for safe entry into the substation by maintaining a site safety notice board daily with all current and relevant safety information
vii) Contractor shall induct all personnel including Sydney Trains into the site for access

2.4.4 Worksite D – Construction Access

The Contractor will provide jersey kerb and security fencing (or other form of physical barrier) as per the Principals requirements along the rail corridor as a secured pathway between the office facility and the construction site. These areas will be classified as RISI free area (Appendix A – PSU – Granville Junction Substation Worksites, Worksite D – Construction Access); however this will be subject to the Contractor complying with requirements of *Network Rules and Network Procedures Certification Standard* Section 10.7 (available on RailSafe website) and obtain approval from Sydney Trains. Contractor will be responsible to maintain security from access to the rail corridor within these areas.

2.5 Site Access and Controls

The Contractor must ensure that access to all construction site areas (including the rail corridor) is restricted to authorised, registered and inducted personnel only, wearing appropriate identification and PPE in good condition.

The contractor is to carry out drug and alcohol testing prior to access to all construction sites and the rail corridor as required in the Rail Safety Act 2012.

The Principal has installed fencing around the substation construction site area. This will provide separation from the construction site and Sydney Trains facilities. The contractor will manage and maintain the construction site security and modify the fencing and access to the site in compliance with stakeholder management plans and TfNSW security requirements.

Site access controls must include:

(a) a secure perimeter to any part of all Sites where hazards exist;

(b) minimisation of access points;

(c) control of all access points. Gates kept closed during working hours and locked when the Site is unoccupied by contractor or Principals Representative's;

(d) a notice at the main gate of the site compound stating the names of two contractors representative who have custody of the keys for access to the site and are available at call 24hr a day, 7 days a week to attend the site if required; 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) The contractor will provide unimpeded access to Sydney Trains staff traversing through the rail corridor area at all times in compliance with the requirements of the approved stakeholder management plan.

(g) The contractor will provide temporary rigid fencing (fortress type) along the Western line rail corridor between Granville Signal Box and the Boral Concrete plant during the construction of cable routes from the new substation to the Main West rail line and during demolition of the existing Granville substation.

(h) Contractor will provide unimpeded access to the Sydney Trains Granville signal box staff at all times, including during the construction of cable routes from the new substation to the Main West rail line and the demolition of the existing Granville substation.

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 public facility;

(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 existing rail corridor access gate; and

(d) for emergency services.

2.7 Not used

2.8 Site Parking

Additional to the Parking facilities described in 2.4.1, the Contractor is responsible for management and provision of parking for all the Contractor's construction vehicles and staff private vehicles. The Contractor is responsible to ensure there is minimal impact to on-street parking during the Contractor's activities for the life of the Project.

Unless otherwise agreed by the Principal's Representative the Contractor's consultants, subcontractors staff and all other personnel's work and private vehicles shall not be parked in either side of Railway Parade (between Bold Street and Margaret Street) or within Mort Street or around the existing Granville Substation or Granville Signal Box for the life of the Project.

2.9 Unloading Zones

The Contractor must make its own arrangements regarding loading zones, work zones or no stopping zones in compliance with the determination of the REF and pay all necessary Authority fees etc.

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 reports and drawings provided and listed in the Works Brief, or may be in location or elevations different from those shown on the reports and drawings provided and listed in the Works Brief. The Contractor must ascertain the exact location of each underground services 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 the 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 Plan 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 (including adjacent Sydney Trains business units), and to the public generally, and must take all steps necessary to maintain clear unobstructed access to all neighbouring buildings not under the contractors management without appropriate communication, notice and consent from the Principals Representative and the parties affected.

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 (as required by the Principal's Representative) must attend weekly, documented site progress and co-ordination meetings. The meetings will be chaired and minuted by the Principal's Representative or the Contractors representative as required. The location of the progress meetings will initially be conducted at TfNSW office at Chatswood and then, during the execution phase of the Project, will be held at the Granville Site-A office facility, 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. 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. Responsible persons are at the discretion of the Principal's Representative and may vary during the life cycle of the Project.

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 Works Brief, 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 all interfaces with the project and have specific staging detail for processes such as each milestone on the critical path, each track possession, each electrical isolation and each commissioning event.

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.

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 all access/egress requirements of Sydney Trains, all interfaces with the project and any neighbouring operations that may be affected by the works and activities related to the Project.

4.2 Staging Plans

For Works within the rail corridor or any alterations to the configuration of the electrical network, 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.

For proposed staged changes to the Sydney Trains Electrical Network and Electrical Advices to be submitted to TfNSW, refer to sections 2.5.1 and 2.5.2 in the Works Brief.

5 Access to Project Feeders

5.1 General

The Contractor is responsible to appropriately negotiate access to, and must manage and pay all related fees, licences, applications and expenses for any access to Local, State or Federal roads, footpaths and public lands and any private lands (or any obstruction to any of these lands) and manage, organise and fund any other access requirements in relation to the works.

Appropriate notice is to be considered to apply for access and complete the works within the scheduled period. This is to be included in the Contractors Consultation Management Plan.

The access required is to be performed in compliance with the requirements of the REF, The Electricity Supply Act 1995, the Electricity Supply Amendment 2006 and all other relevant Acts, Regulations, Guidelines and any direction from the Principal.

The Principal is to be provided with *10 Business Days written notice and invited by the Contractor to all negotiations with Public Authorities or Private Land Owners in relation to access or obstruction to Public or Private Lands for execution of the works.

*Extract from the Electricity Supply Act 1995 – Section 45 Part (4)

(4) *However, no such work (other than routine repairs or maintenance work) may be carried out unless:*

(a) *notice of the proposal to carry out the work has been given to the local council, and*

(b) *the local council has been given a reasonable opportunity (being not less than **40 days** from the date on which the notice was given) to make submissions to the network operator in relation to the proposal, and*

(c) *the network operator has given due consideration to any submissions so made.*

*Note: The Contractor must comply with the required timeframes above.

6 Track Possessions

6.1 General

The Contractor may utilise current, available planned Track Possession(s) to undertake the Works that involve activities within the rail corridor that potentially may encroach the danger zone.

6.2 Track Possessions Available

The current Track Possession(s) available to the Contractor are detailed in Appendix D – Possession Calendar. It is the Contractors responsibility to maintain a current and up to date of the Sydney Trains track possession calendar. 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 as required.

The Contractor's program must nominate applicable Track Possessions for the nominated work activities as required. The contractor must submit track possession requests via the Sydney Trains PACT system prior to the appropriate time frame submission in compliance with the Sydney Trains Asset Operations Possession Manual Volume 1-3. If the contractor cannot obtain direct access to the Sydney Trains PACT system, the Principal will assist with providing access to PACT. The contractor must provide appropriate representative and a PO-2 accreditation person (during the Pre-possession and final meetings) to attend all possession planning meetings required for the project.

The Contractor shall note that track possession (including electrical isolations required) of particular tracks within Sydney Trains network may require special arrangement and agreement with Sydney Trains (16 weeks minimum).

The Contractor may be required to provide accredited HV switching resources to assist Sydney Trains to achieve electrical isolation of the Sydney Trains electrical network required. If a pathway for accreditation is not available to the contractor at the time required, TfNSW may provide accredited resources to assist.

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 electrical isolations/restorations. The Contractor must take this into account when determining work methodologies and schedules for Possession works.

The Principal will pay for the bussing costs associated with track Possessions. The Principal and Contractor will agree to the number of track possessions and configurations at the execution phase. 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.

6.3 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.

7 Electrical Isolations

7.1 General

The Contractor must utilise electrical isolations to undertake any Works that involve access or clearance to the Sydney Trains electrical networks or any other Electrical Distribution Networks that may potentially encroach the Safe Approach Distance (SAD) of the rated voltage of the associated electrical infrastructure.

All costs associated with Isolations and resources will be at the cost of the Contractor.

Sydney Trains and the Principal will endeavour to assist in all isolation requests and electrical resource requests. In the event the request has been declined, the Contractor must reschedule the planned works to meet the project completion date.

7.2 Electrical Isolations and Electrical Permits Requests

When the Contractor has completed a risk assessment of a work activity and it has been identified that an electrical isolation of electrical infrastructure is required , a '*Request for Electrical Permit'* (Permit Request) application is to be completed and submitted to Sydney Trains (and a copy to the Principal's Representative).

An appropriate document version control system is to be implemented and recorded for all applications for Permit Requests made to Sydney Trains.

The Request for Electrical Permit to Work application form can be found on the RailSafe website at the following link:

http://railsafe.sydneytrains.nsw.gov.au/electrical-safety-sms-documents

The Request for Electrical Permit to Work form provides the various TfNSW Electrical Network Teams involved in the isolation process with appropriate details of the planned work, any other interfacing electrical networks and the electrical isolation required which are to be considered.

To provide a safe worksite for the Contractors staff, other interfacing projects and all members of the public it is the Contractor's responsibility to appropriately risk assess all elements of their planned work and ensure the Request for Electrical Permit to Work application is sufficiently detailed and accurate to provide the required level of information to Sydney Trains. This is required to appropriately review, assess, plan, organise and execute and restore the isolation of electrical networks required.

Other Electrical Distribution Network's must also be appropriately risk assessed and included in the section of the application form that states '*Other Network Operators services from which supply is to be removed'*.

If the Contractor is unsure of any element of safety, the information required regarding the application to Sydney Trains then the Principal's representative is to be notified and appropriate advice obtained prior to any of the associated work commencing.

Permit requests shall be submitted in advance with 12 weeks prior notice to the planned work and must be submitted via email to Electrical Isolations – Coordinator (*EI-C@transport.nsw.gov.au*) with the Principal copied in, in the email.

When submitting the Permit Request via email to the Electrical Network Team, the following details shall be included in the Subject field:

- Weekend OR Week number
- Track Configuration number (if applicable)
- PACT number (if applicable)

- Type of electrical request required: (eg 1500V DC, AC High Voltage (HV), or other network suppliers such as Endeavour Energy or Transgrid HV supplies etc).

Only one permit request shall be sent per email.

Electrical Isolations required of any Electrical Distribution Network other than the RailCorp network (such as a Transgrid or Endeavour Energy network) that are associated with an isolation of the RailCorp Electrical Distribution Network (such as a Transgrid or Endeavour Energy Feeder crossing) must be included on the Sydney Trains Request for Electrical Permit to Work application and organised by Sydney Trains (not the Contractor) with that Network Operator.

For HV isolations, include details of the (Sydney Trains) work order number and switching resources (Switching Coordinator name and contact details).

The Contractor may be required to attend Sydney Trains electrical isolation meetings after an application has been submitted and provide (Sydney Trains accredited) switching resources to assist Sydney Trains to achieve the electrical isolation requested. If a pathway for accreditation is not available to the contractor at the time required, TfNSW may also provide accredited resources to assist.

NOTE: All HV isolation requests should have switching resources organised (via Sydney Trains Scope & Resource meeting) prior to submitting permit request. Refer to Section 6.4 for detail on resourcing isolations.

The electrical isolation walkthrough must be attended by all the nominated accredited electrical permit holders (MEI61) involved in the planned work (in compliance with SMS-06-EN-0598) and a minimum of one Contractor's competent electrical representative with detailed understanding of the scope of electrical work to be undertaken during the relevant electrical isolation requested.

7.3 Managing late requests for permits and isolations

Late permit requests and late isolation requests are treated the same as late scope submissions as they have a similar impact to prior planning and other works as well as generating re-work.

Late requests for permits and isolations result in rework of many of the above listed steps and should be avoided.

In the event a late permit or isolation request is submitted, the requestor is required to complete a late scope submission.

The Late Scope process can be accessed at the below link.

http://sps.railcorp.nsw.gov.au/sites/mtnd/amds/ASDC/Controlled%20Document%20Library/Late%20Scope%20Request%20Procedure.pdf

The late scope process is enforced to ensure the impact of accepting the late requests is fully considered prior to being approved.

Some of the key factors considered for Electrical isolations include:

- The impact to prior to planned works
- Additional resourcing requirements
- The capacity of critical resources to re-work steps within the isolation planning process
- The criticality of the works
- The impact to safety
- The impact to network security and reliability.

7.4 Resourcing Isolations

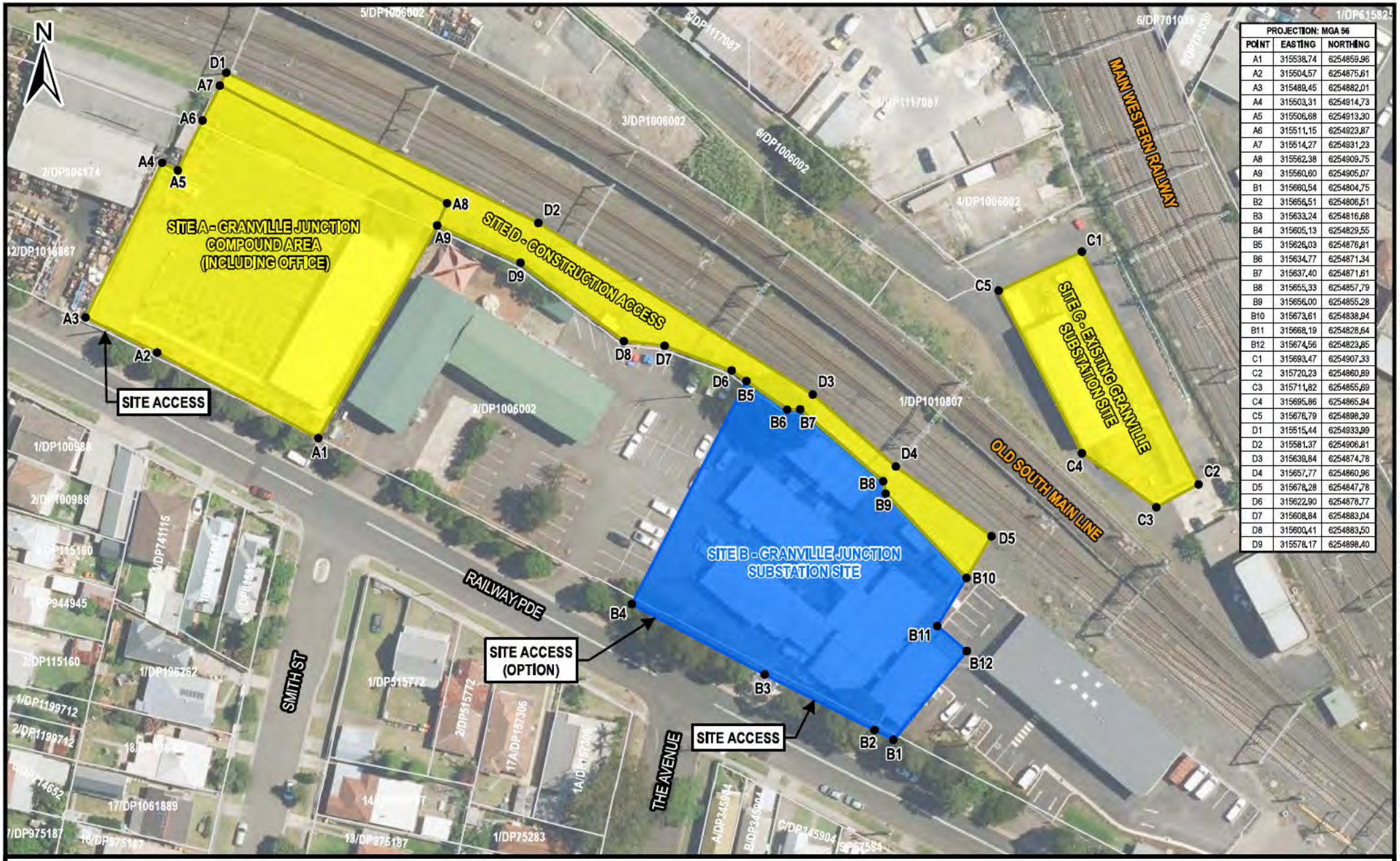
The Contractor is responsible for requesting the necessary resources to carry out the isolations. The Contractor must nominate correctly the critical resources, time and date they require to carry out the isolations and restorations. The Construction Resource Request Form (MS-10-FM-10) must be submitted to the Principal at least 12 weeks out from the planned works.

The Principal will attend on behalf of the Contractor the Sydney Trains Scope and Resource meeting and will endeavour to resource the request. In the event critical resources are not available for the planned isolation works, the Contractor must reschedule and resubmit alternate dates.

This form can be found in Appendix E - Construction Resource Request Form.

Appendix A – PSU – Granville Junction Substation Worksites

PSU - GRANVILLE JUNCTION SUBSTATION WORKSITES



PROJECTION: MGA 56		
POINT	EASTING	NORTHING
A1	315538.74	6254859.96
A2	315504.57	6254875.61
A3	315489.45	6254882.01
A4	315503.31	6254914.73
A5	315506.68	6254913.30
A6	315511.15	6254923.87
A7	315514.27	6254931.23
A8	315562.38	6254909.75
A9	315560.60	6254905.07
B1	315660.54	6254804.75
B2	315656.51	6254806.51
B3	315633.24	6254816.68
B4	315605.13	6254829.55
B5	315626.03	6254876.81
B6	315634.77	6254871.34
B7	315637.40	6254871.61
B8	315655.33	6254857.79
B9	315656.00	6254855.28
B10	315673.61	6254838.94
B11	315668.19	6254828.64
B12	315674.56	6254823.85
C1	315693.47	6254907.33
C2	315720.23	6254860.89
C3	315711.82	6254855.69
C4	315695.86	6254865.94
C5	315676.79	6254898.39
D1	315515.44	6254933.99
D2	315581.37	6254906.81
D3	315639.84	6254874.78
D4	315657.77	6254860.96
D5	315678.28	6254847.78
D6	315622.90	6254878.77
D7	315608.84	6254883.04
D8	315600.41	6254883.50
D9	315578.17	6254898.40

\\wstfil01\GIS\DATA\PSU\2659_GRANVILLE\Projects\Drawings_Sketches\PSU_2659_GRANVILLE_D002_B.mxd 16 Oct 2015

LEGEND

CADASTRE
ASSET LAND
TEMPORARY LAND

0 50 METRES

1:750 (A3)

NSW GOVERNMENT Transport for NSW

Site A – Granville Junction Compound Area – Allocated Parking Bays

Appendix B – Granville Office Facility Layout

Page 213 redacted for the following reason:
- -

Appendix C – Constraints and Requirements on Particular Worksites

Appendix C - Constraints and Requirements on Particular Worksites

		ACCESS FOR/CONTROL BY CONTRACTOR				
WORKSITE	**DRAWING NO.**	**TYPE**	**WHEN PROVIDED**	**WHEN STATUS CHANGED**	**NEW ACCESS STATUS**	**REQUIREMENTS**
Site A Granville Junction Compound Area (Including Office)	PSU – Granville Junction Substation Worksites	Control by	7/12/2015	27/04/2018	Area to be handed back to the Principal	Control of worksite by the Contractor. Contractor will be appointed Principal Contractor for the Worksite Contractor to establish and maintain office facility, as per section 2.4

		ACCESS FOR/CONTROL BY CONTRACTOR				
WORKSITE	**DRAWING NO.**	**TYPE**	**WHEN PROVIDED**	**WHEN STATUS CHANGED**	**NEW ACCESS STATUS**	**REQUIREMENTS**
Site B Granville Junction Substation Site	PSU – Granville Junction Substation Worksites	Control by	7/12/2015	31/12/2017	Area to be handed back to the Principal	Control of worksite by the Contractor. Contractor will be appointed Principal Contractor for the Worksite Contractor to Establish, complete substation and associated works. Contractor to coordinate access arrangements into Worksite B without disturbing adjoining Sydney Trains operations Contractor to carry out works in accordance with Australian Network Rules and Procedures and Electrical Network Safety Rules. Contractor shall establish interface agreement with Sydney Trains for their unimpeded access to Granville Junction Substation. Once Substation is entered into service (AC or DC systems) Contractor shall have in place an interface agreement with Sydney Trains for their maintenance & operational access into the new Substation and all personnel working within Worksite B shall be supervised by sufficiently accredited and Authorised personnel Contractor to seek approval from relevant authorities prior to commencing any services connection and associated excavation works Contractor to rehabilitate any disturbed surfaces in accordance with relevant authority requirements

		ACCESS FOR/CONTROL BY CONTRACTOR				
WORKSITE	**DRAWING NO.**	**TYPE**	**WHEN PROVIDED**	**WHEN STATUS CHANGED**	**NEW ACCESS STATUS**	**REQUIREMENTS**
Site C Existing Granville Substation	PSU – Granville Junction Substation Worksites	Control by	7/12/2015	31/02/2018	Area to be handed back to Sydney Trains	Contractor will be appointed Principal Contractor for the Worksite Contractor to decommission, demolish and rehabilitate as per Contract requirements Contractor to carry out works in accordance with Australian Network Rules and Procedures and Electrical Network Safety Rules Contractor shall establish interface agreement with Sydney Trains for their unimpeded access to existing Granville Substation. While substation has live electrical HV services (AC or DC systems) Contractor shall have in place an interface agreement with Sydney Trains for their maintenance & operational access into the existing Substation and all personnel working within Worksite C shall be supervised by sufficiently accredited and Authorised personnel Contractor to ensure a hazard free thoroughfare for Sydney Trains vehicle access into Granville Substation and Granville Signal box via access lane through Mort Street is maintained at all times.

		ACCESS FOR/CONTROL BY CONTRACTOR				
WORKSITE	**DRAWING NO.**	**TYPE**	**WHEN PROVIDED**	**WHEN STATUS CHANGED**	**NEW ACCESS STATUS**	**REQUIREMENTS**
Site D Construction Access	PSU – Granville Junction Substation Worksites	Control By	7/12/2015	31/12/2017	Area to be handed back to Sydney Trains	Contractor will be appointed Principal Contractor for the Worksite Contractor to Establish, Reinstate and Rehabilitate as per Contract requirements The Contractor will provide jersey kerb and security fencing (or other form of physical barrier) as per the Principals requirements along the rail corridor as a secured pathway between the office facility and the construction site. These areas will be classified as RISI free area (Appendix A – PSU – Granville Junction Substation Worksites, Worksite D – Construction Access); however this will be subject to the Contractor complying with requirements of Network Rules and Network Procedures Certification Standard Section 10.7 (available on RailSafe website) and obtain approval from Sydney Trains. Contractor will be responsible to maintain security from access to the rail corridor within these areas.

		ACCESS FOR/CONTROL BY CONTRACTOR				
WORKSITE	**DRAWING NO.**	**TYPE**	**WHEN PROVIDED**	**WHEN STATUS CHANGED**	**NEW ACCESS STATUS**	**REQUIREMENTS**
Worksite E Feeder work zone Additional Construction Zone (for Feeder new and existing routes from Granville (& Junction) Substation • 749 to Westmead • 721 to Strathfield • 719 to Guildford • 718 to Auburn • 722 to Clyde • 537 to Parramatta • 641 to Cabramatta • 623 to Clyde Feeder route from both end of substation. 10 Metres perpendicular to either side of the feeder route	N/A	Control By	Start of weekend Possession/Electrical Isolation (0200 Saturday)	Start of weekend Possession/Electrical Isolation (0200 Monday)	Area to be handed back to Sydney Trains	Contractor will be appointed Principal Contractor for the Worksite Contractor to Establish, Reinstate and Rehabilitate as per Contract requirements Contractor to carry out works in accordance with Australian Network Rules and Procedures and Electrical Network Safety Rules

		ACCESS FOR/CONTROL BY CONTRACTOR				
WORKSITE	**DRAWING NO.**	**TYPE**	**WHEN PROVIDED**	**WHEN STATUS CHANGED**	**NEW ACCESS STATUS**	**REQUIREMENTS**
Worksite F Possession Work Zones Additional Construction Zone (for Feeder new and existing routes from DCCB in Granville Substation to Feeding arrangement at OHW structure. Adjacent track of each feeder and 100M of both side of track and all in between each track. • 376 • 373 • 374 • 902 • 901 • 381 • 382 • E • 741/E • 372 • 371 • 384 • 383	N/A	Access For	Start of weekend Possession (0200 Saturday)	End of weekend Possession (0200 Monday)	Area to be handed back to Sydney Trains	Any works inside the Rail Corridor will require Contractor to arrange access and hand-back of the area in accordance with TSR requirements. Contractor will be appointed Principal Contractor for the Worksite, unless otherwise agreed with Sydney Trains Contractor to ensure any works, including temporary and unfinished works, are made safe for train operations and all necessary re-certifications are obtained for signalling, electrical and track etc as applicable. Contractor to carry out works in accordance with Australian Network Rules and Procedures and Electrical Network Safety Rules Contractor to Establish, Reinstate and Rehabilitate as per Contract requirements

Appendix D – Possession Calendar

MAJOR CLOSEDOWN and WEEKEND POSSESSION PROGRAMME

2015 | 2016 | Version No. 4

CALENDAR

Changes in Version No. 4

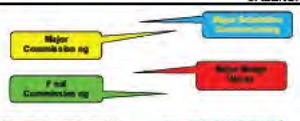
WE 17 Configuration No. 9 includes Flemington to Homebush on Mains and ECRL overnight on Saturday
WE 19 Extend Epping to Chatswood to Full Configuration No. 8 excluding Central to Illawarra Junction Sydney Metro
WE 20 Overnight for ATRICs 3 Hours all tracks
WE 21 Configuration No. 15 now Excludes the Shore lines, George Street Closure
WE 22 Special Configuration No. 1 Moved to WE 34 Configuration No. 2 now cancelled, Special Events
WE 23 Clear of Bankstown to Clear of Sydenham Added TAP
Swap WE 29 Configuration No. 15 with WE 30 Configuration No. 4, Special Events
WE 28 Configuration No. 11 Added
WE 34 Configuration No. 3 Moved to WE 35, Resources
WE 45 Configuration No. 15 City Inner Open and extended to East Hills Weak 41 and Week 42 Night time for Westconnex
WE 48 Configuration No. 6 Moved to WE 42 WestConnex
WE 46 Configuration No. 5 Moved to WE 51 to form Configuration No. 14
WE 47 Coniston to Port Kembla Added
WE 48 Configuration No. 7 Moved to WE 46, Special Events
WE 49 Configuration No. 2 Moved to WE 51 to form Configuration No. 14

Special Events

Special Events

Possession Configurations

- **Track Configuration 1 & 1A**
  - Flying Junction to Coniston on Illawarra Lines
  - Bondi Junction to Eraklneville Junction
  - Sydenham to Hurstville on Illawarra Local Lines
  - Includes Flying Junction to Sydenham on Illawarra Locals on 1A
  - Sutherland to Cronulla
  - Coniston to Port Kembla
- **Track Configuration 2 City Inner or City Outer**
  - City Inner or City Outer
  - Airport Line
  - Turnella to Glenfield All Tracks
- **Track Configuration 3**
  - Sydney Yard 1 to 4
  - Wells Street to Clyde on Main Lines
  - Wells Street to Homebush on Suburban lines
  - Gap at Strathfield for North traffic
  - Flemington Car Sheds All Tracks
  - Flemington to Olympic Park to Lidcombe
- **Track Configuration 4 & 4A City Inner or City Outer**
  - City Inner or City Outer
  - Flying Junction to Sydenham on Illawarra Local Lines
  - Sydenham to Sefton on Bankstown Lines
  - Lidcombe to Cabramatta on Main South Lines
  - Illawarra Junction to Auburn on Suburban Lines
  - Flying Junction to Homebush on Local Lines
  - Excluding Sydenham to Sefton and Cabramatta on a 4A
- **Track Configuration 5**
  - Clear of Lidcombe to Westmead on Suburban Lines
  - Sefton to Leppington on Main South / Leppington Lines
  - Granville to Cabramatta on Old South Lines
  - Merrylands to Westmead on Y Link
- **Track Configuration 6**
  - Auburn to Westmead on Mains then West-Suburbans
  - Granville to St Marys only 3 Tracks
  - Seven Hills to Richmond
  - Clyde to Carlingford
  - Freight & Indian Pacific & CountryLink via Single Line Working
  - 10 Hours Sat Night all 4 Tracks
- **Track Configuration 7**
  - Blacktown to Katoomba
  - Katoomba to Wallerawang
  - Granville - Blacktown 2 tracks
- **Track Configuration 8**
  - Illawarra Junction to Hornsby on Suburban and Shore Lines
  - Epping to Chatswood
- **Track Configuration 9**
  - Strathfield to Wyong Main & Shore Lines
  - Gordon to Hornsby on Shore Lines
  - Wyong to Newcastle
  - Flemington to Rhodes (Goods & Down Relief Lines)
- **Track Configuration 11**
  - Possession of Roads 1 to 4 or 5 to 8 or 9 to15
- **Track Configuration 12**
  - Eveleigh Yard (Power Outage only)
- **Track Configuration 13**
  - Strathfield to Harris Park Possession of 3 tracks only
  - Power Out all Tracks
- **Track Configuration 14**
  - East Hills to Macarthur, Sefton and Fairfield to Leppington
- **Track Configuration 15 (CBD Closedown)**
  - CBD Closedown
  - Access to Sydney Terminal and ESR Only
- **Track Configuration 16**
  - Inner Harbour to Nowra and Unanderra
- **ARTC Configuration No. 16**
- **Hunter Valley Possession**
- **Southern Sydney Freight Line**
- **Goods Road Possession (Configuration No. 10)**



Legend

- Major Special Event Weekends
- Bussing Possession / Closedown
- Non Bussing Possession / Closedown
- Configuration Weekend (No Bussing Config No. 11, 12) Inner or Outer
- New Timetable Exclusion Period
- Contingency Weekends
- Sydney Metro
- Contingency Weekends
- Hunter Valley Possession / Closedown
- SSFL Closedown / Possession
- Goods Road Possession (Configuration No. 10)

Transport Sydney Trains

23/10/2015

Possession Configuration 2015 2016.xls

MAJOR CLOSEDOWN and WEEKEND POSSESSION PROGRAMME

2016 | 2017 | Draft No. 4

CALENDAR

1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52

2-3 July | 9-10 July | 16-17 July | 23-24 July | 30-31 July | 6-7 Aug | 13-14 Aug | 20-21 Aug | 27-28 Aug | 3-4 Sept | 10-11 Sept | 17-18 Sept | 24-25 Sept | 1-3 Oct | 8-9 Oct | 15-16 Oct | 22-23 Oct | 29-30 Oct | 5-6 Nov | 12-13 Nov | 19-20 Nov | 26-27 Nov | 3-4 Dec | 10-11 Dec | 17-18 Dec | 24-27 Dec | 31 Dec-2 Jan | 7-8 Jan | 14-15 Jan | 21-22 Jan | 28-29 Jan | 4-5 Feb | 11-12 Feb | 18-19 Feb | 25-26 Feb | 4-5 Mar | 11-12 Mar | 18-19 Mar | 25-26 Mar | 1-2 April | 8-9 April | 14-17 April | 22-23 April | 29-30 April | 6-7 May | 13-14 May | 20-21 May | 27-28 May | 3-4 June | 10-12 June | 17-18 June | 24-25 June

Special Events

Special Events

Reserve Forces Newcastle & Sydney / City to Surf Newcastle | Bledisloe Cup | City to Surf / Vietnam Veterans Springwood | Unity and Fun Run Walk OLP | AFL TBC | NRL & AFL Finals | NRL Finals / Sydney Running Festival / Floriade | NRL Finals / Floriade | NRL Grand Final / Leura Garden Festival / Oct Long WE | Spring Cycle | Wollongong Bike Ride | Sterosonics | Premiers Concert | Carols in the Domain | Christmas Day / Boxing Day | New Years Day | Opera in the Park / Tamworth Country Music Festival / Elvis Tamworth Country Music Festival / Elvis at Parkes | Australia Day / Big Day | Soundwave | Mardi Gras Parade / Thirlmere Steam Festival | Golden Slipper TBC Premiers Concert | Easter Show / Brigadoon | Easter Show | Easter Show | Easter / International Triathlon | Maitland Steam Festival | Eastar | Anzac Day 25 April | Wings over Illawarra | Vivid Festival | Vivid Festival | Vivid Festival / International Rugby OLP / Great Train Expo | Woodford to Glenbrook Bike and Fun Run

Possession Configurations	2 to 17 July	School Holidays	24/9 – 9/10	School Holiday	21 Dec 2016 to 29 Jan 2017	School Holiday	8 to 23 April	
Track Configuration 1 & 1A								1
Flying Junction to Hurstville on Illawarra Lines								
Bondi Junction to Erskineville Junction								
Sydenham to Hurstville on Illawarra Local Lines								
Hurstville to Port Kembla on All Tracks								
Sutherland to Cronulla								
Includes Flying Junction to Sydenham on Illawarra Locals on 1A								
Track Configuration 2 City Inner or City Outer								2
City Inner or City Outer								
Airport Line								
Turrella to Glenfield All Tracks								
Liverpool to Glenlee								
Track Configuration 3								3
Sydney Yard 1 to 4								
Wells Street to Clyde on Main Lines								
Wells Street to Homebush on Suburban lines								
Gap at Strathfield for North traffic								
Flemington Car Sheds All Tracks								
Flemington to Olympic Park to Lidcombe								
Track Configuration 4 & 4A City Inner or City Outer								4
City Inner or City Outer								
Flying Junction to Sydenham on Illawarra Local Lines								
Sydenham to Sefton on Bankstown Lines								
Lidcombe to Cabramatta on Main South Lines								
Illawarra Junction to Auburn on Suburban Lines								
Flying Junction to Homebush on Local Lines								
Excluding Sydenham to Sefton and Cabramatta on a 4A								
Track Configuration 5								5
Clear of Lidcombe to Westmead on Suburban Lines								
Sefton to Leppington on Main South / Leppington Lines								
Granville to Cabramatta on Old South Lines								
Merrylands to Westmead on Y Link								
Track Configuration 6								6
Auburn to Westmead on Mains then West-Suburbans								
Granville to St Marys only 3 Tracks								
Seven Hills to Richmond								
Clyde to Carlingford								
10 Hours Sat Night all 4 Tracks								
Track Configuration 7								7
Blacktown to Katoomba								
Katoomba to Wallerawang								
Granville - Blacktown 2 tracks								
Track Configuration 8								8
Ashfield to Hornsby on Suburban and Shore Lines								
Epping to Chatswood								
Track Configuration 9								9
Strathfield to Gosford Main & Shore Lines								
Gordon to Hornsby on Shore Lines								
Gosford to Newcastle								
Flemington to Rhodes (Goods & Down Relief Lines)								
Track Configuration 11								11
Sydney Yard Power off all tracks								
Possession of Roads 1 to 4 or 5 to 8 or 9 to15								
Track Configuration 12								12
Eveleigh Yard								
Power outage only								
Track Configuration 13								13
Strathfield to Harris Park Possession of 3 tracks only								
Power Out all Tracks								
Track configuration 14								14
East Hill to Macarthur, Fairfield and Sefton to Leppington								
Track Configuration 15								15
Access to Sydney Terminal and ESR Only								
Track Configuration 16								16
Inner Harbour to Nowra and Unanderra								
ARTC Configuration No. 19								
Hunter Possessions								
Southern Sydney Freight Line								
Goods Road Possession								

Lidcombe to Olympic Park & Flemington Car Siding 02:00 Tuesday to 02:00 Thursday

Lidcombe to Olympic Park & Flemington Car Siding 02:00 Tuesday to 02:00 Thursday

Liverpool to Ashfield All Tracks 26 and 27 of December Up & Down Suburbans and Up & Down Locals Lines 28 December 2016

Lidcombe to Olympic Park & Flemington Car Siding 02:00 Tuesday to 02:00 Thursday

Bridge Street, Westmead Stage No. 2

No overnight Possession

No overnight Possession

Zig Zag to Edgecombe

Zig Zag to Edgecombe

Clear of Wynyard

Woodville Junction - Hamilton Commissioning

CALENDAR

1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52

2-3 July | 9-10 July | 16-17 July | 23-24 July | 30-31 July | 6-7 Aug | 13-14 Aug | 20-21 Aug | 27-28 Aug | 3-4 Sept | 10-11 Sept | 17-18 Sept | 24-25 Sept | 1-3 Oct | 8-9 Oct | 15-16 Oct | 22-23 Oct | 29-30 Oct | 5-6 Nov | 12-13 Nov | 19-20 Nov | 26-27 Nov | 3-4 Dec | 10-11 Dec | 17-18 Dec | 24-27 Dec | 31 Dec-2 Jan | 7-8 Jan | 14-15 Jan | 21-22 Jan | 28-29 Jan | 4-5 Feb | 11-12 Feb | 18-19 Feb | 25-26 Feb | 4-5 Mar | 11-12 Mar | 18-19 Mar | 25-26 Mar | 1-2 April | 8-9 April | 14-17 April | 22-23 April | 29-30 April | 6-7 May | 13-14 May | 20-21 May | 27-28 May | 3-4 June | 10-12 June | 17-18 June | 24-25 June

Major Commissioning

Major Resource Requirement

Executive Review Required

Executive approval gained

Legend

Special Event Weekends

Configuration Weekend (No Bussing Comfit No. 11, 12) Inner or Outer

Bussing Possession / Closedown

Non Bussing Possession / Closedown

New Timetable Exclusion Period

I O

North West Rail Possession

Hunter Valley Possession / Closedown

SSFL Closedown / Possession

Goods Road Possession (Configuration No. 10)

2016

2017

Transport Sydney Trains

23/10/2015

Possession Configuration 2016 2017.xls

MAJOR CLOSEDOWN and WEEKEND POSSESSION PROGRAMME

2017 | 2018

Draft No. 4

CALENDAR

1 2 July | 8 9 July | 15 16 July | 22 23 July | 29 30 July | 5 6 Aug | 12 13 Aug | 19 20 Aug | 26 27 Aug | 2 3 Sept | 9 10 Sept | 16 17 Sept | 23 24 Sept | 30 Sep 2 Oct | 7 8 Oct | 14 15 Oct | 21 22 Oct | 28 29 Oct | 4 5 Nov | 11 12 Nov | 18 19 Nov | 25 26 Nov | 2 3 Dec | 9 10 Dec | 16 17 Dec | 23 26 Dec | 30 Dec 1 Jan | 6 7 Jan | 13 14 Jan | 20 21 Jan | 26 28 Jan | 3 4 Feb | 10 11 Feb | 17 18 Feb | 24 25 Feb | 3 4 Mar | 10 11 Mar | 17 18 Mar | 24 25 Mar | 30 Mar 2 Apr | 7 8 Apr | 14 15 Apr | 21 22 Apr | 28 29 Apr | 5 6 May | 12 13 May | 19 20 May | 26 27 May | 2 3 June | 9 11 June | 16 17 June | 23 24 June

Special Events

Special Events

Reserve Forces Newcastle & Sydney / City to Surf Newcastle | Bledisloe Cup | City to Surf / Vietnam Veterans Springwood | Unity and Fun Run Walk OLP | NRL & AFL Finals | NRL Finals / Sydney Running Festival / Floriade | NRL Finals / Floriade | NRL Grand Final / Leura Garden Festival | Oct L ng WE | Spring Cycle | Wollongong Bike Ride | Stereosonic | Premiers Concert | Carols in the Domain | Christmas Day / Boxing Day | New Years Day | Opera in the Park | Australia Day / Big Day | Soundwave | Mardi Gras Parade / Thirlmere Steam Festival | Brigadoon is Bundanoon | Golden Slipper | Premiers Concert | Thirlmere Steam Festival | Easter Show TBC | Easter Show TBC | Easter Show TBC | International Triathlon | Maitland Steam Festival | Anzac Day 25 April | Wings over Illawarra | Vivid Festival | Vivid Festival | Vivid Festival / International Rugby OLP / G eat ai Expo | Woodford to Glenbrook Bike and Fun Run

Possession Configurations	3 to 16 July	School Holiday	23 /9 to 6 / 10	School Holiday	20 Dec 2017 to 26 January 2018	School Holidays	14 to 29 April	School Holidays
Track Configuration 1 & 1A								
Flying Junction to Hurstville on Illawarra Lines								
Bondi Junction to Erskineville Junction								
Sydenham to Hurstville on Illawarra Local Lines								
Hurstville to Port Kembla on All Tracks								
Sutherland to Cronulla								
Includes Flying Junction to Sydenham on Illawarra Locals on 1A								
Track Configuration 2 City Inner or City Outer								
City Inner or City Outer								
Airport Line								
Turrella to Macarthur								
Track Configuration 3								
Sydney Yard 1 to 4								
Wells Street to Clyde on Main Lines								
Wells Street to Homebush on Suburban lines								
Gap at Strathfield for North traffic								
Flemington Car Sheds All Tracks								
Flemington to Olympic Park to Lidcombe								
Track Configuration 4 & 4A City Inner or City Outer								
City Inner or City Outer								
Flying Junction to Sydenham on Illawarra Local Lines								
Sydenham to Sefton on Bankstown Lines								
Lidcombe to Cabramatta on Main South Lines								
Illawarra Junction to Auburn on Suburban Lines								
Flying Junction to Homebush on Local Lines								
Excluding Sydenham to Sefton and Cabramatta on a 4A								
Track Configuration 5								
Clear of Lidcombe to Westmead on Suburban Lines								
Sefton to Leppington on Main South / Leppington Lines								
Granville to Cabramatta on Old South Lines								
Merrylands to Westmead on Y Link								
Track Configuration 6								
Auburn to Westmead on Mains then West+Suburbans								
Granville to St Marys only 3 Tracks								
Seven Hills to Richmond								
Clyde to Carlingford								
10 Hours Sat Night all 4 Tracks								
Track Configuration 7								
Blacktown to Katoomba								
Katoomba to Wallerawang								
Granville - Blacktown 2 tracks								
Track Configuration 8								
Ashfield to Hornsby on Suburban and Shore Lines								
Epping to Chatswood								
Track Configuration 9								
Strathfield to Gosford Main & Shore Lines								
Gordon to Hornsby on Shore Lines								
Gosford to Newcastle								
Flemington to Rhodes (Goods & Down Relief Lines)								
Track Configuration 11								
Sydney Yard Power off all tracks								
Possession of Roads 1 to 4 or 5 to 8 or 9 to15								
Track Configuration 12								
Eveleigh Yard								
Power outage only								
Track configuration 13								
Strathfield to Harris Park Possession of 3 tracks only								
Power Out all Tracks								
Track Configuration 14								
East Hills to Campbelltown and Fairfield and Sefton to Leppington								
Track Configuration 15 (CBD Closedown)								
CBD Closedown								
Access to Sydney Terminal and ESR Only								
Track Configuration 16								
Inner Harbour to Nowra and Unanderra								
ARTC Configuration No. 16								
Hunter Possessions								
Southern Sydney Freight Line								
Goods Road (Configuration No. 10)								

Lidcombe to Olympic Park & Flemington Car Siding 02:00 Tuesday to 02:00 Thursday

Lidcombe to Olympic Park & Flemington Car Siding 02:00 Tuesday to 02:00 Thursday

Lidcombe to Olympic Park & Flemington Car Siding 02:00 Tuesday to 02:00 Thursday

Zig Zag to Edgecombe

Zig Zag to Edgecombe

CALENDAR

1 2 July | 8 9 July | 15 16 July | 22 23 July | 29 30 July | 5 6 Aug | 12 13 Aug | 19 20 Aug | 26 27 Aug | 2 3 Sept | 9 10 Sept | 16 17 Sept | 23 24 Sept | 30 Sep 2 Oct | 7 8 Oct | 14 15 Oct | 21 22 Oct | 28 29 Oct | 4 5 Nov | 11 12 Nov | 18 19 Nov | 25 26 Nov | 2 3 Dec | 9 10 Dec | 16 17 Dec | 23 26 Dec | 30 Dec 1 Jan | 6 7 Jan | 13 14 Jan | 20 21 Jan | 26 28 Jan | 3 4 Feb | 10 11 Feb | 17 18 Feb | 24 25 Feb | 3 4 Mar | 10 11 Mar | 17 18 Mar | 24 25 Mar | 30 Mar 2 Apr | 7 8 Apr | 14 15 Apr | 21 22 Apr | 28 29 Apr | 5 6 May | 12 13 May | 19 20 May | 26 27 May | 2 3 June | 9 11 June | 16 17 June | 23 24 June

Major Commitments

Major Resource Requirement

Executive Review Required

Executive approval gained

Legend

- Special Event Weekends
- New Timetable Exclusion Period
- Configuration Weekend (No Bussing Config No. 11, 12) Inner or Outer
- Bussing Possession / Closedown
- Non Bussing Possession / Closedown
- North West Rail Possession
- Hunter Valley Possession / Closedown
- SSFL Closedown / Possession
- Goods Road Possession (Configuration No. 10)

2017 | 2018

Transport Sydney Trains

23/10/2015

Appendix E – Construction Resource Request Form

MS-10-FM-10
Construction Resource Request Form

Version 1, August 2015

Following the submission of this form, resources requested will be entered into the Sydney Trains Master Schedule. An assessment will be made regarding the availability of resources for the project.
The assessment of resource allocation will be made based on project priorities, when required.

Resource requests are to be submitted **12 weeks** out from the planned works.
NOTE: Failure to adhere to 12 weeks may mean resources will be unavailable for your project works.

Any projects scope that has been moved or changed will need to complete the attached form in the tab 'Construction Resource Request'.

Any cancellation of resources that occurs within the roster period and/or a Construction Resource Request Form for cancellation is not completed may lead to a resources being charged to the project.

If the project is not already registered on the Master Schedule, the Construction Resource Request Form will not be processed. Complete a Delivery Resource Assessment Form and send to DRA@transport.nsw.gov.au to commence project registration process.
Refer to MS-10-PR-02 Master Schedule Delivery Resource Assessment Procedure for further information.

How to fill in this form:

1. Populate all fields in the tab 'Construction Resource Request'. Refer to tab 'Sample Request Form' for a sample of a populated form.
2. Complete a MS-10-FM-09 Job Card for the project in tab 'Job Card'.
3. Save files and submit to CRR@transport.nsw.gov.au

Refer to MS-10-PR-06 Master Schedule Construction Resource Request Procedure for further information.

Any queries, please contact Asset Scheduling & Delivery Coordination at CRR@transport.nsw.gov.au

i) This form must be submitted to the Asset Management Division for Construction Resource Requests to be processed.
Ii) The submission of this form does not confirm the allocation of resources requested.

Transport
Sydney Trains

MS-10-FM-10 Construction Resource Request Form

1. Project Details:

Project Name

Project Number | Work Order Number

Project Manager

Project Start Date | Proposed Completion Date

2. Project Scope:

Scope Start Date | Scope Completion Date

Please select one of the following options:

- ☐ New Scope
- ☐ Scope Moved or Changed — Date moved from | Date moved to
- ☐ Cancellation of Scope

3. Construction Resources

		Required ?	Start Date	Finish Date	Number of Resource Required	Comments
Electrical Distribution						
1	Authorised Officer (Substations)	☐				
2	Authorised Operator	☐				
3	Authorised Officer Mans	☐				
4	Cable Jointer (specify type)	☐				
5	Others (please specify)	☐				
Electrical Mains						
1	1500V Switching	☐				
2	Authorised Traction Operator	☐				
3	Others (please specify)	☐				
Signalling						
1	Signal Engineer	☐				
2	Signal Electrician	☐				
3	Electrician Mechanic	☐				
4	Signal Mechanic	☐				
5	Bonders	☐				
6	Cable Staff	☐				
7	Others (please specify)	☐				
Track						
1	Track Crew	☐				
2	G Wagon	☐				
3	Side Dump Wagon	☐				
4	MFS Wagon	☐				
5	Ballast Wagon	☐				
6	Ballast Cleaner	☐				
7	Tampers	☐				
8	Others (please specify)	☐				

4. Commissioning Resources

		Required?	Start Date	Finish Date	Number of Resource Required	Comments
1	Commissioning Manager Electrical	☐				
2	Signal Commissioning Engineer	☐				

MS-10-FM-09 Job Card

Note: Include multiple cards for multiple Week/Weekends

No.	Detail required	Project Response WEXX - XX/XX ABC 20X
1	Name of Project	
2	Resources Required Information	
2.a	Booking dates and shift hours for each resource	
2.b	Number of resource required (eg 1xAO + Offsider instead of DIST Team)	
2.c	Scope of work for each resource (eg: hanging 3x working earths)	
2.d	Location of work	
2.e	Site contact Person	
3	Work order / Charge number	
4	Copy of WHVI (if required) including person issuing permit (if required for mains crews)	
5	If any Special equipment is required	

Construction Resource Request Form

1. Project Details:

Project Name	Feeder Upgrade Works Central to Redfern		
Project Number	91452156	Work Order Number	WG10435
Project Manager	J. Smith		
Project Start Date	10/11/2015	Proposed Completion Date	1/12/2015

2. Project Scope:

Scope Start Date: 22/08/2015 Scope Completion Date: 23/08/2015

Please select one of the following options:

- [x] New Scope
- [ ] Scope Moved or Changed — Date moved from: ____ Date moved to: ____
- [ ] Cancellation of Scope

Isolation, Test & Commission 619 & 715 Feeder between Central & Redfern

3. Construction Resources

		Required?	Start Date	Finish Date	Number of Resource Required	Comments
Electrical Distribution						
1	Authorised Officer (Substations)	☐				
2	Authorised Operator	☑	22/08/2015	23/08/2015	2	
3	Authorised Officer Mains	☐				
4	Cable Jointer (specify type)	☑	22/08/2015	23/08/2015	4	3 x 11kv Paper Lead Joints
5	Others (please specify)	☐				
Electrical Mains						
1	1500V Switching	☐				
2	Authorised Traction Operator	☐				
3	Others (please specify)	☐				
Signalling						
1	Signal Engineer	☐				
2	Signal Electrician	☐				
3	Electrician Mechanic	☐				
4	Signal Mechanic	☐				
5	Bonders	☐				
6	Cable Staff	☐				
7	Others (please specify)	☐				
Track						
1	Track Crew	☐				
2	G Wagon	☐				
3	Side Dump Wagon	☐				
4	MFS Wagon	☐				
5	Ballast Wagon	☐				
6	Ballast Cleaner	☐				
7	Tampers	☐				
8	Others (please specify)	☐				

4. Commissioning Resources

		Required?	Start Date	Finish Date	Number of Resource Required	Comments
1	Commissioning Manager Electrical	☑	22/08/2015	23/08/2015	1	
2	Signal Commissioning Engineer	☐				

Transport Sydney Trains

MS-10-FM-09 Job Card

Note: Include multiple cards for multiple Week/Weekends

No.	Detail required	Project Response Week 10 - 5th Sept 2015
1	Name of Project	Feeder 33kV - 740 Glenlee to Nepean BSP (EE)
2	Resources Required Information	1 x AOM(Sunday) 2 x AO
2.a	Booking dates and shift hours for each resource	WE06 Shift times: 1200-2230 Sat: Defect works/Commission 33kV Feeder
2.b	Number of resource required (eg 1xAO + Offsider instead of DIST Team)	1 x AOM (Sunday) 2 x AO Pole 10 to Pole 11. Testing and commissioning to be carried out from Glenlee Substation
2.c	Scope of work for each resource (eg: hanging 3x working earths)	Test and commission 33kV Feeder on Feeder 740 Defect works
2.d	Location of work	Pole 10 to Pole 11. Testing and commissioning to be carried out from Glenlee Substation
2.e	Site contact Person	Mr. X (0402 ...)
3	Work order / Charge number	XYZXYZ
4	Copy of WHVI (if required) including person issuing permit (if required for mains crews)	Sydney Trains to issue WHVI
5	If any Special equipment is required	Nil at this stage

No.	Detail required	Project Response Week 11 - 12th Sept 2015
1	Name of Project	Feeder 33kV - 740 Glenlee to Nepean BSP (EE)
2	Resources Required Information	1 x AOM(Sunday) 2 x AO
2.a	Booking dates and shift hours for each resource	WE06 Shift times: 1200-2230 Sat: Defect works/Commission 33kV Feeder
2.b	Number of resource required (eg 1xAO + Offsider instead of DIST Team)	1 x AOM (Sunday) 2 x AO
2.c	Scope of work for each resource (eg: hanging 3x working earths)	Feeder 740 Defect works
2.d	Location of work	Pole 10 to Pole 11. Testing and commissioning to be carried out from Glenlee Substation
2.e	Site contact Person	Mr. X (0402 ...)
3	Work order / Charge number	XYZXYZ
4	Copy of WHVI (if required) including person	Sydney Trains to issue WHVI
5	If any Special equipment is required	Nil at this stage

EXHIBIT F – REPORTS

The following Reports are provided as a CD Version Only

Ref	Description/ Drawing Title	Author/ Source	Date / Revision	File Format
	Granville Junction Substation			
	Power Study			
ER0315	Western Line DC Power Study Scope Report	RailCorp	Februrary 2012	.pdf
ER0806	2018 Timetable Integrated Rail Delivery Program - Scenario 1 - DC Power Study Report	Sydney Trains	September 2015	.pdf
	Reports			
2759-GHD-HV-000001	Harmonic Monitoring at Granville Substation - 33kV and 11kV Buses (Normal Network Configuration) Analysis Report	GHD/Hill Michael	10/07/2015 Rev D1.0	.pdf
2759-GHD-SU-000003	Granville Junction Substation - TPD-14-4121 - Dilapidation Survey Report	GHD	20/08/2015 Rev 0	.pdf
	Granville Junction Substation - TPD-14-4121 - Hydrology Report	GHD	20/08/2015 Rev 0	.pdf
	Granville Junction Substation - TPD-14-4121 - Geotechnical and Contaimination Report	GHD	14/08/2015 Rev 0	.pdf
	Granville Junction Substation - TPD-14-4121 - Pre-Concept Desktop Earth Study	GHD	13/08/2015 Rev 0	.pdf
	Granville Junction Substation - TPD-14-4121 - Internal Site Survey Report	GHD	14/08/2015 Rev 0	.pdf
	Granville Junction Substation - TPD-14-4121 - Soil Resistivity Measurement Report	GHD	14/08/2015 Rev 0	.pdf
2759-GHD-PE-000002	Granville Junction Substation - TPD-14-4121 - Noise and Vibration Assessment	GHD	August 2015 Rev 0	.pdf
2759-GHD-PE-000003	Granville Junction Substation - TPD-14-4121 - Electromagnetic Energy Report	GHD/EMC	July 2015 Rev 0	.pdf
2759-GHD-PE-000004	Granville Junction Substation - TPD-14-4121 - Sustainability Report	GHD	July 2015 Rev A	.pdf
212709	Granville Substation Pre-Demolition Hazardous Building Materials Assessment	GHD	December 2015	.pdf
	Survey			
2759-GHD-SU-000001	Granville Junction Substation - TPD-14-4121 - Topographic Survey - Area Plan	GHD/Lawrence Group Surveyors	Rev 0	.pdf

2759-GHD-SU-000002	Granville Junction Substation - TPD-14-4121 - Topographic Survey Report	GHD/Lawrence Group Surveyors	August 2015 Rev 0	.pdf
153189-DETL-001/D	With Background- Combined issue 2	Lawrence Group Surveyors	1/09/2015	.pdf
153189-DETL-001/D	With Background- Combined issue with track 2	Lawrence Group Surveyors	1/09/2015	.pdf
153189-DETL-001/D	Detail & Level Survey	Lawrence Group Surveyors	1/09/2015	.dwg
153189-DETL-001/D	153189-DETL-001D	Lawrence Group Surveyors		.map
	gooee colour			.ctb
	MS18+141 F200716169 231110 AND114880500 - 02- Combined - Background		Version 2	.dwg

Note: The Reports obtained by the Principal and provided to the Contractor in this Exhibit F may require additional investigation by the Contractor.

EXHIBIT G – LIST OF WARRANTIES REQUIRED FROM SUBCONTRACTORS

List of Warranties Required From Subcontractors

Description of Equipment and Warranty	Form	Period of Years
Roofing and Roof Installation	Written	25 Years
Waterproofing	Written	15 Years
Mechanical Ventilation	Written	2 Years
Air Conditioning Plant & Equipment	Written	5 Years
Split Systems	Written	5 Years
Chillers	Written	3 Years
Fan Coil Units	Written	2 Years
Fire Hose Reel pumps	Written	2 Years
Fire Extinguishers	Written	5 Years
Kerlite Panels	Written	5 Years
External Louvers	Written	10 Years
Doors and Hardware	Written	5 Years
Door Seals	Written	1 Years
Fall Arrest System	Written	20 Years
Interior Paint Finish	Written	10 Years
Exterior Clear Sealer / Anti-Graffiti Coating	Written	15 Years
Exterior Paint Finish – Steel	Written	15 Years
Powdercoat Finish	Written	15 Years
Exterior Paint Finish – Aluminium	Written	15 Years
Paving Sealer	Written	5 Years
Specific Warranty – Fire Detection	Written	2 Years
Specific Warranty – Fire Protection	Written	2 Years
Specific Warranty – CO2 Gaseous Suppression Systems	Written	2 Years
Hydrant Pumps	Written	2 Years
Fire Hose Reels	Written	2 Years
Earthing Installation	Written	25 Years
All electrical Cabling	Written	25 Years
All electrical Fittings	Written	25 Years
Sewage Septic -Tank	Written	1 Year

Description of Equipment and Warranty	Form	Period of Years
Building & Wet area grates	Written	10 Years
Toilets, Cisterns, Basins, Cleaners Sinks & Taps	Written	5 Years
Sinks	Written	5 Years
Boiling / Chilled Water Units	Written	5 Years
Cast Iron Waste Pipe System	Written	20 Years
Surface Pit Covers	Written	20 Years
Specific Warranty – Low Voltage Electrical System	Written	2 Years
Warranty – Communications	Written	5 Years
Specific Warranty – Paving to External Areas	Written	10 Years
Specific Warranty – Stair Nosings	Written	10 Years
Specific Warranty – External Pit Covers	Written	20 Years
Specific Warranty – Fencing	Written	10 Years
Specific Warranty – W Beam Safety Barrier	Written	10 Years
Specific Warranty – Glazing	Written	10 Years
Specific Warranty – Ceilings and Wall Panels	Written	20 Years
Specific Warranty – Plasterboard and Fibre Cement Partitions and Ceilings	Written	10 Years
Specific Warranty – Steel Balustrades	Written	10 Years
Specific Warranty – Metal Grates to Drains, Floor Outlets and Floor Access Covers	Written	10 Years
Specific Warranty – Louvres	Written	10 Years
Specific Warranty – Tiling, Paving and wet Area Waterproofing	Written	10 Years
Door Fixture and Fittings	Written	1 Year
Door Frames (various order numbers)	Written	1 Year
Fire Rated Door Panels (separate warranty for each)	Written	15 Years
Doors (separate warranty for each)	Written	5 Years
Specific Warranty – Signage	Written	7 Years
Specific Warranty – Fire Stopping	Written	15 Years
Exterior Paint Finish- Concrete	Written	15 years

List of Warranties Required From Manufacturer or Supplier:

Description of Equipment and Warranty	Form	Period of Years
11kV Switchgear	Written	5 Years
Rectifier and Power Transformers	Written	5 Years
Auxiliary Transformer	Written	5 Years
Rectifiers	Written	5 Years
Isolation Rail Connecting Switches	Written	5 Years
1500V DCCB	Written	5 Years
AC Harmonic Filters	Written	5 Years
DC Harmonic Filters	Written	5 Years
SCADA	Written	5 Years

EXHIBIT H – PRELIMINARY DESIGN

The Preliminary Design is not for construction. Contrator is required to complete and amend design to ensure that the Works are fit for its intended purpose. Thw works are to be designed meet the requirments of the Works Brief and relevant standards.

TPD Drawing No	TB DRG No	TB Rev No	Sheet Scale	Line Kilometrage	Drawings Title Full
Pre-Concept					
2759-GHD-SS-176204	CV0176204	A	NTS	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU LOCATION PLAN AND DRAWING SCHEDULE COVER SHEET
2759-GHD-AR-176205	CV0176205	B	1:200	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU SITE PLAN
2759-GHD-AR-176206	CV0176206	B	1:100	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU GROUND LEVEL
2759-GHD-AR-176207	CV0176207	B	1:100	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU SWITCHROOM LEVEL
2759-GHD-AR-176208	CV0176208	B	1:100	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU ELEVATIONS & MATERIAL PALETTE
2759-GHD-AR-176209	CV0176209	B	NTS	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU AERIAL PERSPECTIVES
2759-GHD-AR-176210	CV0176210	B	NTS	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU PERSPECTIVE SOUTH EAST VIEW
2759-GHD-AR-176211	CV0176211	B	NTS	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU PERSPECTIVE SOUTH WEST VIEW

TPD Drawing No	TB DRG No	TB Rev No	Sheet Scale	Line Kilometrage	Drawings Title Full
2759-GHD-AR-176212	CV0176212	B	NTS	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU PERSPECTIVE NORTH EAST VIEW
2759-GHD-AR-176213	CV0176213	B	NTS	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU PHOTOMONTAGE SOUTH EAST VIEW
2759-GHD-AR-176214	CV0176214	B	NTS	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU PHOTOMONTAGE SOUTH WEST VIEW
2759-GHD-AR-176215	CV0176215	B	NTS	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU PHOTOMONTAGE NORTH VIEW
2759-GHD-CI-176221	CV0176221	C	1:200	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU CIVIL – GENERAL ARRANGEMENT
2759-GHD-CI-176222	CV0176222	B	1:200	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU CIVIL – STORMWATER DRAINAGE PLAN
2759-GHD-HV-587744	EL0587744	B	1:100	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU GROUND LEVEL EQUIPMENT LAYOUT
2759-GHD-HV-587745	EL0587745	B	1:100	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU SWITCHROOM LEVEL EQUIPMENT LAYOUT
2759-GHD-HV-587746	EL0587746	B	NTS	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU ELECTRICAL GENERAL ARRANGEMENT SITE PLAN – KEY DIAGRAM
2759-GHD-HV-587747	EL0587747	B	1:500	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU ELECTRICAL GENERAL ARRANGEMENT SHEET 1

TPD Drawing No	TB DRG No	TB Rev No	Sheet Scale	Line Kilometrage	Drawings Title Full
2759-GHD-HV-587748	EL0587748	B	1:500	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU ELECTRICAL GENERAL ARRANGEMENT SHEET 2
2759-GHD-HV-587749	EL0587749	B	1:500	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU ELECTRICAL GENERAL ARRANGEMENT SHEET 3
2759-GHD-HV-587750	EL0587750	B	1:500	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU ELECTRICAL GENERAL ARRANGEMENT SHEET 4
2759-GHD-HV-587751	EL0587751	B	1:500	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU ELECTRICAL GENERAL ARRANGEMENT SHEET 5
2759-GHD-ME-176224	CV0176224	A	1:200	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU HYDRALIC SERVICES
2759-GHD-ME-176225	CV0176225	A	1:100	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU HYDRALIC SERVICES GROUND LEVEL
Operating Diagrams					
2759-GHD-HV-587712	EL0587712	F	NTS	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION - MAIN SOUTH LINE 21.735km - PROPOSED 33 kV OPERATING DIAGRAM
2759-GHD-HV-587713	EL0587713	E	NTS	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION - MAIN SOUTH LINE 21.735km - PROPOSED 11 kV OPERATING DIAGRAM
2759-GHD-HV-587714	EL0587714	E	NTS	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION - MAIN SOUTH LINE 21.735km - PROPOSED 1500 V OPERATING DIAGRAM
2759-GHD-HV-587715	EL0587715	E	NTS	N/A	GRANVILLE JUNCTION - METROPOLITAN - CLYDE TO MERRYLANDS - HARRIS PARK - CARLINGFORD -

TPD Drawing No	TB DRG No	TB Rev No	Sheet Scale	Line Kilometrage	Drawings Title Full
					PROPOSED 1500 VOLT SECTIONING DIAGRAM
2759-GHD-HV-587716	EL0587716	E	NTS	N/A	GRANVILLE JUNCTION - METROPOLITAN - STRATHFIELD TO GRANVILLE JUNCTION & SEFTON - PROPOSED RETICULATION DIAGRAM
2759-GHD-HV-587717	EL0587717	E	NTS	N/A	GRANVILLE JUNCTION - METROPOLITAN AREA - STRATHFIELD TO GRANVILLE JUNCTION - PROPOSED 11 kV & 33 kV PROPOSED RETICULATION DIAGRAM
2759-GHD-HV-587718	EL0587718	E	NTS	N/A	GRANVILLE JUNCTION - METROPOLITAN - WESTERN LINE GRANVILLE JUNCTION - EMU PLAINS - CLARENDON - PROPOSED HV RETICULATION DIAGRAM
2759-GHD-HV-587719	EL0587719	E	NTS	N/A	GRANVILLE JUNCTION - METROPOLITAN - FLEMINGTON SS TO GRANVILLE JUNCTION SS - PROPOSED 11 kV SYSTEM DIAGRAM
2759-GHD-HV-587720	EL0587720	E	NTS	N/A	GRANVILLE JUNCTION - METROPOLITAN - GRANVILLE JUNCTION SS TO BLACKTOWN SS - PROPOSED 11 kV SYSTEM DIAGRAM
2759-GHD-HV-587721	EL0587721	E	NTS	N/A	GRANVILLE JUNCTION - METROPOLITAN AREA - GRANVILLE JUNCTION SS TO CABRAMATTA SS - PROPOSED 11 kV SYSTEM DIAGRAM
2759-GHD-HV-587722	EL0587722	E	NTS	N/A	GRANVILLE JUNCTION - METROPOLITAN AREA - GRANVILLE JUNCTION SS TO WARWICK FARM &

TPD Drawing No	TB DRG No	TB Rev No	Sheet Scale	Line Kilometrage	Drawings Title Full
					SEFTON - PROPOSED RETICULATION DIAGRAM
2759-GHD-HV-587723	EL0587723	D	NTS	N/A	GRANVILLE JUNCTION - KEY MAP - PROPOSED INNER AREAS 33 & 66 kV SYSTEM DIAGRAM
2759-GHD-HV-587724	EL0587724	D	NTS	N/A	GRANVILLE JUNCTION - KEY MAP - PROPOSED INNER AREAS 11 kV SYSTEM DIAGRAM
2759-GHD-HV-587725	EL0587725	D	NTS	N/A	GRANVILLE JUNCTION - KEY MAP - PROPOSED 1500 VOLT SECTIONING DIAGRAM
2759-GHD-HV-587726	EL0587726	D	NTS	MAIN SOUTH LINE 27.661km	GRANVILLE JUNCTION - CABRAMATTA SS - MAIN SOUTH LINE 27.661km - PROPOSED HV OPERATING DIAGRAM
2759-GHD-HV-587727	EL0587727	D	NTS	MAIN SUBURBAN 20.7km	GRANVILLE JUNCTION - CLYDE SS -MAIN SUBURBAN 20.7km - PROPOSED HV OPERATING DIAGRAM
2759-GHD-HV-587728	EL0587728	D	NTS	MAIN LINE 12.402km	GRANVILLE JUNCTION - STRATHFIELD SS -MAIN LINE 12.402km - PROPOSED 33 kV OPERATING DIAGRAM
2759-GHD-HV-587729	EL0587729	D	NTS	MAIN WEST 25.707km	GRANVILLE JUNCTION - WESTMEAD SS -MAIN WEST 25.707km - PROPOSED HV OPERATING DIAGRAM
2759-GHD-HV-587730	EL0587730	D	NTS	WMAIN WEST 25.707km	GRANVILLE JUNCTION - WESTMEAD SS -MAIN WEST 25.707km - PROPOSED 1500 V DC OPERATING DIAGRAM
2759-GHD-HV-587731	EL0587731	D	NTS	MAIN SUBURBAN 19.46km	GRANVILLE JUNCTION - AUBURN SS -MAIN SUBURBAN 19.46km - PROPOSED HV OPERATING DIAGRAM

TPD Drawing No	TB DRG No	TB Rev No	Sheet Scale	Line Kilometrage	Drawings Title Full
2759-GHD-HV-587732	EL0587732	D	NTS	MAIN SUBURBAN 19.46km	GRANVILLE JUNCTION - AUBURN SS -MAIN SUBURBAN 19.46km - PROPOSED 1500 V DC OPERATING DIAGRAM
2759-GHD-HV-587733	EL0587733	D	NTS	MAIN WEST 23.3km	GRANVILLE JUNCTION - PARRAMATTA STATION SS - MAIN WEST 23.3km - PROPOSED HV OPERATING DIAGRAM
2759-GHD-HV-587734	EL0587734	D	NTS	SOUTH 25.896km	GRANVILLE JUNCTION - GUILDFORD SS -MAIN OLD SOUTH 25.896km - PROPOSED HV OPERATING DIAGRAM
2759-GHD-HV-587735	EL0587735	D	NTS	MAIN OLD SOUTH 25.896km	GRANVILLE JUNCTION - GUILDFORD SS -MAIN OLD SOUTH 25.896km - PROPOSED 1500 V DC OPERATING DIAGRAM
2759-GHD-HV-587713	EL0587713	G	-	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT – PSU PROPOSED 11Kv OPERATING DIAGRAM

EXHIBIT H – PRELIMINARY DESIGN

The Preliminary Design is not for construction. Contrator is required to complete and amend design to ensure that the Works are fit for its intended purpose. Thw works are to be designed meet the requirments of the Works Brief and relevant standards.

Drawings included in this exhibit have been removed

TPD Drawing No	TB DRG No	TB Rev No	Sheet Scale	Line Kilometrage	Drawings Title Full
Pre-Concept					
2759-GHD-SS-176204	CV0176204	A	NTS	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU LOCATION PLAN AND DRAWING SCHEDULE COVER SHEET
2759-GHD-AR-176205	CV0176205	B	1:200	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU SITE PLAN
2759-GHD-AR-176206	CV0176206	B	1:100	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU GROUND LEVEL
2759-GHD-AR-176207	CV0176207	B	1:100	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU SWITCHROOM LEVEL
2759-GHD-AR-176208	CV0176208	B	1:100	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU ELEVATIONS & MATERIAL PALETTE
2759-GHD-AR-176209	CV0176209	B	NTS	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU AERIAL PERSPECTIVES
2759-GHD-AR-176210	CV0176210	B	NTS	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU PERSPECTIVE SOUTH EAST VIEW
2759-GHD-AR-176211	CV0176211	B	NTS	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU PERSPECTIVE SOUTH WEST VIEW

TPD Drawing No	TB DRG No	TB Rev No	Sheet Scale	Line Kilometrage	Drawings Title Full
2759-GHD-AR-176212	CV0176212	B	NTS	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU PERSPECTIVE NORTH EAST VIEW
2759-GHD-AR-176213	CV0176213	B	NTS	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU PHOTOMONTAGE SOUTH EAST VIEW
2759-GHD-AR-176214	CV0176214	B	NTS	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU PHOTOMONTAGE SOUTH WEST VIEW
2759-GHD-AR-176215	CV0176215	B	NTS	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU PHOTOMONTAGE NORTH VIEW
2759-GHD-CI-176221	CV0176221	C	1:200	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU CIVIL – GENERAL ARRANGEMENT
2759-GHD-CI-176222	CV0176222	B	1:200	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU CIVIL – STORMWATER DRAINAGE PLAN
2759-GHD-HV-587744	EL0587744	B	1:100	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU GROUND LEVEL EQUIPMENT LAYOUT
2759-GHD-HV-587745	EL0587745	B	1:100	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU SWITCHROOM LEVEL EQUIPMENT LAYOUT
2759-GHD-HV-587746	EL0587746	B	NTS	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU ELECTRICAL GENERAL ARRANGEMENT SITE PLAN – KEY DIAGRAM
2759-GHD-HV-587747	EL0587747	B	1:500	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU ELECTRICAL GENERAL ARRANGEMENT SHEET 1

TPD Drawing No	TB DRG No	TB Rev No	Sheet Scale	Line Kilometrage	Drawings Title Full
2759-GHD-HV-587748	EL0587748	B	1:500	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU ELECTRICAL GENERAL ARRANGEMENT SHEET 2
2759-GHD-HV-587749	EL0587749	B	1:500	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU ELECTRICAL GENERAL ARRANGEMENT SHEET 3
2759-GHD-HV-587750	EL0587750	B	1:500	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU ELECTRICAL GENERAL ARRANGEMENT SHEET 4
2759-GHD-HV-587751	EL0587751	B	1:500	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU ELECTRICAL GENERAL ARRANGEMENT SHEET 5
2759-GHD-ME-176224	CV0176224	A	1:200	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU HYDRALIC SERVICES
2759-GHD-ME-176225	CV0176225	A	1:100	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT - PSU HYDRALIC SERVICES GROUND LEVEL
Operating Diagrams					
2759-GHD-HV-587712	EL0587712	F	NTS	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION - MAIN SOUTH LINE 21.735km - PROPOSED 33 kV OPERATING DIAGRAM
2759-GHD-HV-587713	EL0587713	E	NTS	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION - MAIN SOUTH LINE 21.735km - PROPOSED 11 kV OPERATING DIAGRAM
2759-GHD-HV-587714	EL0587714	E	NTS	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION - MAIN SOUTH LINE 21.735km - PROPOSED 1500 V OPERATING DIAGRAM
2759-GHD-HV-587715	EL0587715	E	NTS	N/A	GRANVILLE JUNCTION - METROPOLITAN - CLYDE TO MERRYLANDS - HARRIS PARK - CARLINGFORD -

TPD Drawing No	TB DRG No	TB Rev No	Sheet Scale	Line Kilometrage	Drawings Title Full
					PROPOSED 1500 VOLT SECTIONING DIAGRAM
2759-GHD-HV-587716	EL0587716	E	NTS	N/A	GRANVILLE JUNCTION - METROPOLITAN - STRATHFIELD TO GRANVILLE JUNCTION & SEFTON - PROPOSED RETICULATION DIAGRAM
2759-GHD-HV-587717	EL0587717	E	NTS	N/A	GRANVILLE JUNCTION - METROPOLITAN AREA - STRATHFIELD TO GRANVILLE JUNCTION - PROPOSED 11 kV & 33 kV PROPOSED RETICULATION DIAGRAM
2759-GHD-HV-587718	EL0587718	E	NTS	N/A	GRANVILLE JUNCTION - METROPOLITAN - WESTERN LINE GRANVILLE JUNCTION - EMU PLAINS - CLARENDON - PROPOSED HV RETICULATION DIAGRAM
2759-GHD-HV-587719	EL0587719	E	NTS	N/A	GRANVILLE JUNCTION - METROPOLITAN - FLEMINGTON SS TO GRANVILLE JUNCTION SS - PROPOSED 11 kV SYSTEM DIAGRAM
2759-GHD-HV-587720	EL0587720	E	NTS	N/A	GRANVILLE JUNCTION - METROPOLITAN - GRANVILLE JUNCTION SS TO BLACKTOWN SS - PROPOSED 11 kV SYSTEM DIAGRAM
2759-GHD-HV-587721	EL0587721	E	NTS	N/A	GRANVILLE JUNCTION - METROPOLITAN AREA - GRANVILLE JUNCTION SS TO CABRAMATTA SS - PROPOSED 11 kV SYSTEM DIAGRAM
2759-GHD-HV-587722	EL0587722	E	NTS	N/A	GRANVILLE JUNCTION - METROPOLITAN AREA - GRANVILLE JUNCTION SS TO WARWICK FARM &

TPD Drawing No	TB DRG No	TB Rev No	Sheet Scale	Line Kilometrage	Drawings Title Full
					SEFTON - PROPOSED RETICULATION DIAGRAM
2759-GHD-HV-587723	EL0587723	D	NTS	N/A	GRANVILLE JUNCTION - KEY MAP - PROPOSED INNER AREAS 33 & 66 kV SYSTEM DIAGRAM
2759-GHD-HV-587724	EL0587724	D	NTS	N/A	GRANVILLE JUNCTION - KEY MAP - PROPOSED INNER AREAS 11 kV SYSTEM DIAGRAM
2759-GHD-HV-587725	EL0587725	D	NTS	N/A	GRANVILLE JUNCTION - KEY MAP - PROPOSED 1500 VOLT SECTIONING DIAGRAM
2759-GHD-HV-587726	EL0587726	D	NTS	MAIN SOUTH LINE 27.661km	GRANVILLE JUNCTION - CABRAMATTA SS - MAIN SOUTH LINE 27.661km - PROPOSED HV OPERATING DIAGRAM
2759-GHD-HV-587727	EL0587727	D	NTS	MAIN SUBURBAN 20.7km	GRANVILLE JUNCTION - CLYDE SS -MAIN SUBURBAN 20.7km - PROPOSED HV OPERATING DIAGRAM
2759-GHD-HV-587728	EL0587728	D	NTS	MAIN LINE 12.402km	GRANVILLE JUNCTION - STRATHFIELD SS -MAIN LINE 12.402km - PROPOSED 33 kV OPERATING DIAGRAM
2759-GHD-HV-587729	EL0587729	D	NTS	MAIN WEST 25.707km	GRANVILLE JUNCTION - WESTMEAD SS -MAIN WEST 25.707km - PROPOSED HV OPERATING DIAGRAM
2759-GHD-HV-587730	EL0587730	D	NTS	WMAIN WEST 25.707km	GRANVILLE JUNCTION - WESTMEAD SS -MAIN WEST 25.707km - PROPOSED 1500 V DC OPERATING DIAGRAM
2759-GHD-HV-587731	EL0587731	D	NTS	MAIN SUBURBAN 19.46km	GRANVILLE JUNCTION - AUBURN SS -MAIN SUBURBAN 19.46km - PROPOSED HV OPERATING DIAGRAM

TPD Drawing No	TB DRG No	TB Rev No	Sheet Scale	Line Kilometrage	Drawings Title Full
2759-GHD-HV-587732	EL0587732	D	NTS	MAIN SUBURBAN 19.46km	GRANVILLE JUNCTION - AUBURN SS -MAIN SUBURBAN 19.46km - PROPOSED 1500 V DC OPERATING DIAGRAM
2759-GHD-HV-587733	EL0587733	D	NTS	MAIN WEST 23.3km	GRANVILLE JUNCTION - PARRAMATTA STATION SS - MAIN WEST 23.3km - PROPOSED HV OPERATING DIAGRAM
2759-GHD-HV-587734	EL0587734	D	NTS	SOUTH 25.896km	GRANVILLE JUNCTION - GUILDFORD SS -MAIN OLD SOUTH 25.896km - PROPOSED HV OPERATING DIAGRAM
2759-GHD-HV-587735	EL0587735	D	NTS	MAIN OLD SOUTH 25.896km	GRANVILLE JUNCTION - GUILDFORD SS -MAIN OLD SOUTH 25.896km - PROPOSED 1500 V DC OPERATING DIAGRAM
2759-GHD-HV-587713	EL0587713	G	-	MAIN SOUTH LINE 21.735km	GRANVILLE JUNCTION SS PROJECT – PSU PROPOSED 11Kv OPERATING DIAGRAM

EXHIBIT I – THIRD PARTY AGREEMENTS

Power Supply Upgrade

Program Safety Interface Agreement

Transport for NSW
ABN 18 804 239 602

Sydney Trains
ABN 38 284 779 682

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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).

Pages 12-26 (Section 2 - Risk Register) have been removed from this disclosure.

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]