Rolling Stock PPP

Double Deck Trains

Exhibit 7

RailCorp Maintenance Facility Specification

Change Log

Issue	Date	Author	Change
v4	CONTRACT		
v5	29/06/2009	ARJS	Addition of text changes from RFTA Group 13: 00324 00325 00327 00328 00300 Addition of text changes from RFTA Group 14: 00329 Addition of text changes from RFTA Group 15: 00341 00344 Notes: RFTA 00342 of Group 14 amends the Maintenance Facility Design Book, Requirement ID MFDB.1473. RFTA 00345 of Group 14 amends the Maintenance Facility Design Book, Requirement ID MFDB.936. RFTA 00346 of Group 14 amends the Maintenance Facility Design Book, Requirement ID MFDB.961. RFTA 00347 of Group 14 amends the Maintenance Facility Design Book, Requirement ID MFDB.1369. RFTA 00331 of Group 15 amends the Maintenance Facility Design Book, Section 3.1. RFTA 00343 of Group 15 amends the Maintenance Facility Design Book, Requirement ID MFDB.467. RFTA 00344 of Group 15 also amends the Maintenance Facility Design Book, Requirement ID MFDB.860. RFTA 00349 of Group 15 amends the Maintenance Facility Design Book, Section 3.1 *Drainage Type*.

Issue	Date	Author	Change
v6	31/08/2010	ARJS	Addition of text changes from RFTA: 00339 00356 00358 00374 00369 00370 Notes: RFTA 00339 amends Attachments 6 & 7. For attachment 6, Drawings SG 0405297 to 0405324 are amended as follows: NOTES: 8. All shunt signals to be post mounted unless otherwise agreed by RailCorp. RFTA 00358 relies on external documents, now included as Attachments 8.1 to 8.7. RFTA 00374 amends Attachment 7. RFTA 00365 amends the Maintenance Facility Design Book, Requirement ID MFDB.1813 Underfloor Wheel Profiling Plant Building.52. RFTA 00369 also amends the Maintenance Facility Design Book, Requirement IDs MFDB.742 Signalling and Yard Control.54 & MFDB.762 Signalling and Yard Control.74.
v7	17/01/2011	ARJS	No changes to document body of RailCorp Maintenance Facility Specification, however: RFTA 00377 amends the Maintenance Facility Design Book, Clause 4.1.1.20 Building Services: Power Electrical Services – Power Supply (pp177-178). RFTA 00379 amends the Maintenance Facility Design Book, Section 3.1.2 (pp68-69) and Section (4.1.1.20 pp177).

CONTENTS

1 INTRODUCTION

1.1 Overview

This RailCorp Maintenance Facility Specification sets out the minimum requirements that apply to the design, construction, testing and commissioning by PPP Co of the Maintenance Facility Works. The design of the Maintenance Facility must cater for one thousand (1,000) cars.

The Maintenance Facility Works comprise:

(a) the "Site Works" which include all works to be carried out by PPP Co on the Construction Site in accordance with this RailCorp Maintenance Facility Specification and the Contract other than the works relating to the Buildings and the RailCorp Enabling Works. The requirements relating to the Site Works are set out in section 3 of this Specification; and

(b) the works relating to the design, construction, testing and commissioning of the "Buildings" which comprise the matters set out in clause 4.1.

The Buildings must be capable of accommodating the maintenance, repairs and other relevant TLS Phase Activities in respect of the Sets, and the provision of maintenance, repairs and other through life support services in respect of the Other Sets. The requirements relating to the works in relation to the construction of the Buildings are set out in section 4 of this specification.

The design and layout of the Site Works and the Buildings must maximise opportunities for utilisation of the Maintenance Facility for the provision of through life support services in respect of the Other Sets.

In addition, there are several work packages described as RailCorp Enabling Works that will be carried out by RailCorp. Those work packages are described in the RailCorp Enabling Works Specification.

1.2 Construction Site

The Construction Site is shown on the Auburn Masterplan included at Attachment 1 of this specification. The Auburn Masterplan provides information relating to the planned Site Works and Buildings required for the development of the Maintenance Facility.

Information relating to planned Site Trackwork for the Maintenance Facility is provided in the Track Schematic at Attachment 2 of this Specification.

Full details of the RailCorp Maintenance Facility Reference Design are provided at Attachment 6 of this Specification.

2 SCOPE – GENERAL

The scope of work for PPP Co in respect of the Maintenance Facility Works includes but is not limited to the following:

(a) obtain all Approvals other than the Planning Approval (but subject to clauses 7.3 and 7.4 of the Conditions of Contract);

(b) carry out any necessary investigations and searches;

(c) carry out all required design;

(d) prepare all required Design Documentation; and

(e) undertake all construction, testing and commissioning.

Without limiting any other provision of the Contract in respect of PPP Co's design or safety obligations (including clause 4.6.2 of the Contract Management Requirements), PPP Co must ensure that the safeworking requirements for access to the suburban and main lines (including emergency access during the Delivery Phase) can be achieved with the PPP Co design and RailCorp may reject PPP Co's design if this requirement is not satisfied.

3 SITE WORKS

3.1 Scope

The Site Works must satisfy the requirements and provisions set out by the Auburn Masterplan included in this Specification at Attachment 1, the Standards listed at Attachment 3, and the RailCorp Maintenance Facility Reference Design included in this Specification at Attachment 6.

The Site Works shall include but not be limited to the following:

(a) Site Earthworks as required by clause 3.1.1 of this specification;

(b) Utility Services as required by clause 3.1.2 of this specification;

(c) Electrolysis Protection as required by clause 3.1.3 of this specification;

(d) Site Trackwork as required by clause 3.1.4 of this specification, including the Wheel Condition Monitoring Machine as required by clause 3.1.4.1 of this specification;

(e) Signalling and Yard Control as required by clause 3.1.5 of this specification;

(f) Overhead Traction Power System as required by clause 3.1.6 of this specification;

(g) Car Parking, roadways and pedestrian walkways as required by clause 3.1.7 of this specification;

(h) Fencing and Security as required by clause 3.1.8 of this specification;

(i) Landscaping as required by clause 3.1.9 of this specification;

(j) Underfloor Wheel Profiling Plant as required by clause 3.1.10 of this specification;

(k) Washplant facility as required by clause 3.1.11 of this specification;

(l) Simulator Area as required by clause 3.1.12 of this specification;

(m) Decant Area as required by clause 3.1.13 of this specification;

(n) Grade-separated pedestrian access from the Car Parking and the pedestrian entrance(s) to the Maintenance Site and the Buildings as required by clause 3.1.14 of this specification;

(o) Realignment of Pedestrian Walkway from Duck River bridge to Manchester Road North as required by clause 3.1.15 of this specification;

(p) RailCorp Site Construction Office as required by clause 3.1.16 of this specification; and

(q) Other matters such as consideration of the potential needs for any future development upon land adjacent to the Maintenance Site, as required by clause 3.1.17 of this specification.

3.1.1 Site Earthworks

PPP Co must design and construct all Site Earthworks required to prepare the Construction Site (including levels and structure), the connecting roads and Site Trackwork for the construction of the Maintenance Facility Works, including but not limited to:

(a) the Maintenance Building;

(b) the Underfloor Wheel Profiling Plant Building;

(c) the Washplant Building;

(d) the Wheel Condition Monitoring Machine;

(e) the Simulator Area; and

(f) the Site Works.

3.1.2 Utility Services

PPP Co must design, construct and commission the Utility Services. The scope of work must include:

(g) locating, securing or relocating as necessary all existing Utility Services on the Construction Site, as well as taking account of those (future/proposed) services shown on the Auburn Masterplan and the RailCorp Maintenance Facility Reference Design to be located in or reticulated to adjoining land parcels. PPP Co must preserve or realign the existing easements and Utility Services such as the electrical easement between the Metro Division Re-railing Building and the RailCorp Central Warehouse as shown on the Auburn Masterplan included at Attachment 1; and

(h) providing all Utility Services, and all connections for all Utility Services required for the design, construction, operation and maintenance of the Maintenance Facility. These Utility Services, and the related connections include but are not limited to power for all purposes (including any high voltage and/or low voltage substations to be provided by Energy Australia and/or PPP Co, but not including the substation and related power feed for the Overhead Traction Power System), yard control measures, gas, water, fire protection, sewerage, drainage, environmental protection, telecommunications, and lighting for the Maintenance Facility.

(i) PPP Co is not required to make provision for the supply of gas services to the Maintenance Facility

All Utility Services must be designed so that they do not adversely impact on RailCorp assets and must be clearly marked as to their nature. All buried and/or concealed Utility Services must be provided with clearly visible above-ground and, where appropriate, below-ground markers that clearly identify the Utility Services and their location and contain an appropriate description of the Utility Services.

It should be presumed that services within the adjacent MainTrain leasehold property, other RailCorp properties and along Manchester Road do not have the capacity to provide services to/from the Maintenance Facility. All Utility Services to the Maintenance Site requiring metering must be metered separately by the respective suppliers independently of their supplies to other operations and facilities operated/managed by RailCorp or other parties.

The Maintenance Site is to be provided with fire hydrant coverage in accordance with all applicable laws and best practice guidelines.

PPP Co must provide a substation facility as part of its power supply strategy. All High Voltage feeders and substations remote from and adjacent to the site will be arranged by PPP Co.

PPP Co must provide details to RailCorp of the provisions for redundancy included in its design. If PPP Co establishes a substation upon the Maintenance Site that is supplied from adjacent aerial service(s), then PPP Co must ensure that the subject aerial service remains suitable to provide for a further substation to be supplied immediately adjacent to and below the subject aerial, and within the Future RailCorp Facility.

RFTA

00324

It is to be noted that, pursuant to hazards analysis and risk assessment strategies, PPP Co must not construct buildings beneath 33 kV aerial power lines. Further, all 33 kV aerial track crossings ~~must be perpendicular and~~ must not cross more than two (2) tracks.

PPP Co is expected to include provision of suitable retention facilities in its stormwater drainage design.

3.1.3 Electrolysis Protection

PPP Co must design, construct and commission the Electrolysis Protection System.

The Electrolysis Protection System must be appropriate for the environment characterised by the presence of the proposed Overhead Traction Power System within the Maintenance Site, the Underfloor Wheel Profiling Plant, Wheel Condition Monitoring Machine, Washplant and their surrounds.

The purpose of the Electrolysis Protection System is to protect all Site Trackwork, buildings, structures and pipework, including gas lines and new and existing services (including Utility Services).

PPP Co must collaborate and coordinate with RailCorp and any other potentially affected parties during the Delivery Phase to ensure the design of the Electrolysis Protection System is appropriate and will operate satisfactorily.

3.1.4 Site Trackwork

PPP Co must design, construct and commission all of the Site Trackwork within the boundaries of the Maintenance Site, the Car Turning Loop and connecting trackwork between the Maintenance Site, MainTrain and Manildra. This includes the trackwork associated with connections to MainTrain, and trackwork to and from the Maintenance Building, the Underfloor Wheel Profiling Plant Building, the Washplant Building and the Bypass Road 1 and the connections to the Down Relief line except at the Auburn end.

The design of the Site Trackwork must be consistent with the Track Schematic and include the catchpoints indicated. PPP Co must ensure that its design for the Site Trackwork caters for all operating conditions. .

PPP Co will be required to work with RailCorp to ensure that a clear throw off area or other appropriate mitigation measures are adopted to minimise the damage to the Set and the surrounding infrastructure. The Site Trackwork includes turnouts and any components related to the interface with signalling equipment. PPP Co is to install the turnouts and supply and install any components related to the interface with signalling equipment on the Down Relief line shown on the Auburn Masterplan that provide access to the Maintenance Site. RailCorp will supply three (3) tangential turnouts with associated points motors, connecting rods, etc 'free-supply' to PPP Co for the connection to the Down Relief line.

The design of the Site Trackwork must incorporate suitable and clearly signposted Handover Points and Pick-up Points denoting where Crews are expected to pick-up or leave Sets and Other Sets respectively.

The minimum design standards for the Site Trackwork are as follows:

(j) 53 kg/m rail on medium duty concrete sleepers laid over 150 mm of standard ballast and an appropriately engineered formation capping layer;

(k) recycled 53 kg/m rail for plain track and recycled turnouts may be used, provided the recycled materials are in good condition and suitable for the Design Life of the Maintenance Facility;

(l) subject to paragraphs (a) and (b), requirements for Class 1 Sidings and RailCorp Standard TS 3101 – Standard Classification of Lines; and

(m) the Site Earthworks (including formation, etc) are to be constructed to RailCorp standards, in particular TS 3421 – General Standards for Formation and Earthworks, and TS 3422 – Standard for Formation Capping Material.

The Site Trackwork must incorporate the following design features:

(a) centre distance between roads must be in accordance with the Design Guidelines for the Upgrade and Construction of New and Existing Train Stabling Yards and Turnback Sidings and any other relevant standards as set-out in Attachment 3; where there is a conflict between the centre distance between roads proposed by PPP Co and the relevant Standard, during the detailed design stage PPP Co will work with RailCorp to resolve this conflict to the satisfaction of RailCorp.

(b) each road to be at least of sufficient length to accommodate 8-car sets measuring 163 m long (unless noted otherwise in clause 3.1.4) plus clearances for signalling, catchpoints and any other operational requirements including access for Crew to prevent fouling points where required;

(c) entry or exit from the Storage Roads must not require the Sets, or the Other Sets to travel via the Maintenance Roads;

(d) trains on the Storage Roads must not restrict the movement of other trains to and from the Maintenance Roads or the Bypass Road 1; and

(e) sealed, illuminated pathways between each road and to the Car Parking and Crew Room for staff pedestrian access.

Construction of the Site Trackwork that potentially impacts upon MainTrain and/or Manildra must be planned and coordinated with those parties and must minimise disruption to their operations and must be as agreed by RailCorp prior to commencement.

3.1.4.1 Wheel Condition Monitoring Machine

The Site Trackwork must include a single Wheel Condition Monitoring Machine to monitor and report on the condition of the wheels of the majority of trains entering or leaving the Maintenance Site. With respect to the RailCorp Maintenance Facility Reference Design, a possible location would be immediately east of the turnout leading to the Underfloor Wheel Profile Plant. However PPP Co is to select the appropriate location for the Wheel Condition Monitoring Machine based on their planned track configuration to meet the requirements of this Specification. The Wheel Condition Monitoring Machine must be capable of monitoring and reporting the following:

(a) wheel profile condition;

(b) actual wheel diameter;

RFTA 00325

(c) wheel flat conditions (percussion testing);

(d) wheel tread surface and metal defects including spalling; and

(e) surface crack detection.

The surface and metal defects identified by the Wheel Condition Monitoring Machine shall be required to undergo visual inspection to confirm the spalling or other defect type for recording.

The Wheel Condition Monitoring Machine must be linked to the MMIS to record and report wheel defects on the appropriate car for each train.

3.1.4.2 Storage Roads

PPP Co must design, construct and commission the Storage Roads within the Maintenance Site to provide roads for the handover and pick-up of sets by RailCorp and storage of Sets and Other Sets. The Storage Roads shall be treated as examination sidings.

The Storage Roads must have the capacity for the storage of at least eight 8-car, 163 m long trains. At least two of these Storage Roads must also be able to store RailCorp sets that measure approximately 192 m long. These Storage Roads must be of sufficient length so that the stored set is clear of the running line signals or signal and stop board, and other operational requirements where required.

These Storage Roads must be provided in addition to the enclosed Maintenance Roads within the Maintenance Building and the Standing Roads immediately before and after the Maintenance Roads.

3.1.4.3 Standing Roads

The Site Trackwork is to include six (6) Standing Roads on the Auburn side of the Maintenance Building (Standing Roads East) and six (6) Standing Roads on the Clyde side of the Maintenance Building (Standing Roads West). The Standing Roads shall be treated as examination sidings.

The Standing Roads must be of sufficient length to stand an 8-car set of at least 163 m length clear of the Maintenance Roads and Maintenance Building and all turnouts and signalling and must not restrict access to any other Storage Roads, Maintenance Roads or building stores areas.

The Standing Roads East are to be connected to the Storage Roads such that all Storage Roads are connected to all Standing Roads. The design of the Standing Roads East must be such that the Storage Roads are capable of being fully signalled. It is noted that the diamond crossover shown on the RailCorp Maintenance Facility Reference Design is a 1:3.5 type.

The Standing Roads West are to connect each of the Maintenance Roads to the access points on the Down Relief line. These roads are also to provide roads for the handover and pick-up of sets by RailCorp. The design of the Standing Roads West must be such that the sets standing on these roads are clear of the vehicular/pedestrian access crossing over the roads, and signalling and other operational requirements for access to the Down Relief line.

3.1.4.4 Bypass Road 1

PPP Co must provide a Bypass Road 1 as part of the Site Trackwork. This Bypass Road 1 must allow trains to access the Maintenance Facility, MainTrain, and travel through the Maintenance Site from and to the Down Relief line without needing to use the Maintenance Roads.

The Bypass Road 1 must provide the access points to MainTrain as shown in the RailCorp Maintenance Facility Reference Design.

3.1.4.5 Access Road 1

The Site Trackwork is to include an Access Road 1 connecting the Storage Roads to the Down Relief line. The design of the Access Road 1 must be such that an 8-car set of 192 m length can stand clear of all turnouts and signalling requirements at both ends of the road.

Until such time as the Down Relief line is fully commissioned as main line, RailCorp requires control of the movements at the intermediate turnout connecting the Access Road 1 to the Commissioning Track to be via Yard Control.

3.1.4.6 Car Turning Loop

PPP Co must design, construct and commission a re-aligned Car Turning Loop on the Construction Site in accordance with the Auburn Masterplan included at Attachment 1 and the RailCorp Maintenance Facility Reference Design included at Attachment 6.

The design, construction and commissioning of the Car Turning Loop must be undertaken in a manner that ensures that there are minimal impacts on MainTrain and/or Manildra, and as agreed with RailCorp prior to commencement.

Further, the design shall be carried out in a manner that reduces the amount of land required to accommodate the Car Turning Loop. In particular, the minimum acceptable design radius of 160m shall be adopted for this purpose.

3.1.4.7 MainTrain Siding

PPP Co must provide trackwork off the Bypass Road 1 and connect to the MainTrain Siding at or adjacent to the MainTrain lease boundary

3.1.5 Signalling and Yard Control

PPP Co must provide the signalling and yard control scope of works in accordance with the staging as shown in the RailCorp Maintenance Facility Reference Design in Attachment 6, and the Signalling Functional Specification in Attachment 7. This includes the:

(a) Supply, installation and commissioning of signalling equipment, motorised turnouts and track circuits for the Maintenance Facility and those prescribed works on the Down Relief line. (Note: RailCorp will supply to PPP Co the three (3) turnouts and associated motors, rods, etc for the Down Relief line);

(b) Supply, installation and commissioning of signals shown on the Down Relief as PPP Co responsibility;3

(c) Supply, installation and commissioning of appropriate cabling, control equipment and Visual Display Unit/s for Yard Control within the Maintenance Facility;

RFTA 00370

(d) Supply, installation and commissioning of Yard Control to Driver communication facilities via signal telephones at locations to be agreed by RailCorp.~~'phones located at the signal locations on each of the Storage Roads and each of the Standing Roads West, and 'phones located near the centre of the Storage Roads and Standing Roads West~~; and

(e) Supply, installation and commissioning of cabling and associated pits at a location to be agreed by RailCorp to facilitate the connection of the Maintenance Facility signalling equipment to RailCorp control when the Down Relief reverts fully to RailCorp's control of the signalling. RailCorp is yet to finalise the extent and scope of works required along the Down Relief line to revert control of the Down Relief back to RailCorp, denoted as Stage 3 of the

Signalling work. Once defined, PPP Co shall treat this as a RailCorp Initiated Variation in accordance with the Contract.

3.1.6 Overhead Traction Power System

PPP Co must design, construct and commission all aspects of the Overhead Traction Power System for the Site Trackwork constructed as part of the Site Works. The scope of this work must include:

(a) design, supply and installation of all supporting structures, including any foundations required;

(b) design, supply and installation of the Overhead Wires, suspension system, and insulators; and

(c) design, supply and installation of the controls and switchgear, including safety isolation arrangements, procedures and documentation to the standards listed in Attachment 3.

PPP Co must provide Overhead Traction Power System for the Car Turning Loop, sufficient to power a 192m long train along the Car Turning Loop so that the trailing end of the train is at least 20m clear of the associated points.

PPP Co must calculate the power draw required from the Overhead Traction Power System for the Maintenance Facility. PPP Co must provide this information to RailCorp to enable finalisation of the design of the power feed from the overhead traction power substation being provided by RailCorp. The calculation must include the power required for any Sets or Other Sets in the Maintenance Facility and on the Car Turning Loop.

3.1.7 Car Parking, Roadways and Pedestrian Walkways

PPP Co must design, construct and commission the car parking, roadways, drainage and pedestrian walkways for accessing the Building and for general movement(s) within the Maintenance Site.

The car parking must consist of a sealed car park capable of accommodating car numbers commensurate with the planned staffing levels of PPP Co and RailCorp staff numbers. For the purpose of this clause, the car numbers commensurate with RailCorp staff numbers is sixty (60), consisting of twenty (20) crew members in each of two shifts, plus twenty (20) others at any given time. The car park is to be kerbed, guttered, parking spaces line-marked, illuminated, and appropriately drained.

The car parking must be designed to comply with the requirements of people with disabilities and conform with Australian Standard AS 1428 Part 2 Enhanced and Additional Requirements – Buildings and Facilities.

The roadways must consist of sealed heavy-duty pavements suitable for articulated heavy vehicles. The scope of work must include all signage necessary for road vehicle movements (including maximum speed signs, stop signs etc) and a pedestrian pathway accessing the Maintenance Site from the street. The truck access to the Maintenance Site is proposed to be at-grade from Manchester Road North. The road should involve the

minimum practical number of track crossings and must not hinder the typical operations of the Maintenance Facility.

PPP Co must design, construct and commission sealed, illuminated pedestrian walkways linking all areas where PPP Co or RailCorp personnel or visitors are likely to gain access, including access to Sets, the Other Sets, Storage Roads, Standing Roads, Access Road and the roads to and from the Underfloor Wheel Profiling Plant Building and the Washplant Building.

PPP Co is required to consider and accommodate in its design all logistic matters associated with the likely pedestrian movements of all employees wishing to commute daily to and from the Maintenance Facility. The design of the pedestrian walkway system will extend beyond the boundary of the Maintenance Site and must incorporate strategies that conveniently connect the Maintenance Facility with adjacent public transport centres.

PPP Co must provide gates to prevent vehicular and / or pedestrians crossing the Bypass Road, the Washplant road and Underfloor Wheel Profiling Plant road at the western end of the Maintenance Facility. These gates are to be interlocked with the signals on the track to ensure that vehicular crossings are prevented whilst trains are crossing the roadway.

3.1.8 Fencing and security

PPP Co must design, construct and commission the fencing and security of the Maintenance Site. The scope of this work must include:

(a) site fencing along the re-aligned boundary for the RailCorp Central Warehouse, including the removal and make-good (post holes), and disposal off site of the interim RailCorp Central Warehouse site fencing supplied and installed by others on an alignment generally 500mm inside the actual RailCorp Central Warehouse boundary line;

(b) site fencing along the RailCorp property boundary parallel to and adjacent the eastern boundary of Manchester Road North, and extending from the Clyde walkway to the adjoining property owner to the south. This scope initially comprises supply and installation of a suitable boundary fence to serve the purpose during construction. Then, at Practical Completion of the Maintenance Facility Works, a replacement fence that conforms with the RailCorp Specification requirements as detailed in Attachment 5.

RFTA 00344

(c) site fencing to the perimeter of the Maintenance Site and the car parking must be enclosed by a~~n alarmed~~ security fence designed and constructed in accordance with RailCorp's requirements as detailed in Attachment 5 (note that the fence structure only will exist along the northernmost boundary of the MainTrain lease area, and the remainder of the fencing and security scope of works must be carried out by PPP Co);

(d) gates at the two MainTrain siding crossings located along the northernmost boundary of the MainTrain lease area as shown by the RailCorp Maintenance Facility Reference Design;

(e) rail entrance and departure: the rail entrance and departure points must be provided with an access system providing appropriate security and conforming

with RailCorp's requirements as detailed in Attachment 5. The access system should cater for automatic after hours access for the Sets, and the Other Sets;

(f) pedestrian entrance: entrance for pedestrians (staff and visitors) to the Maintenance Facility must be via a turnstile security gate with identity authorisation system (such as a magnetic card system or finger print scanning). An intercom system must be provided to authorise and allow entry by persons not possessing an entry card or other identity authorisation as appropriate to the system provided. PPP Co's design of these provisions is required to include suitable means of easy access to comply with the requirements of people with disabilities. The pedestrian entrance security must conform with RailCorp's requirements as detailed in Attachment 5;

(g) road entrance: appropriate entrance security for road vehicles entering the Maintenance Facility must be provided. The road entrance security must conform with RailCorp's requirements as detailed in Attachment 5;

(h) CCTV monitoring: a CCTV security system must be provided, including digital recording, to monitor the entrances, perimeter fencing, yard, car parking, and Storage Roads (including between sets) and other Maintenance Facility yard areas. The CCTV system must be linked to a suitable monitoring location within the Maintenance Facility. The CCTV security system must conform with RailCorp's requirements as detailed in Attachment 5, including the requirement for it to be linked to the RailCorp CCTV system;

(i) site lighting: illumination levels of the Maintenance Site including yards, roads (including access roads to the Maintenance Site), pedestrian walkways and car parking must comply with occupational health and safety laws and be in accordance with industry best practice for working and security;

(j) car parking access control. The car park must have a fence separating it from the operational areas of the Maintenance Site and must be provided with dedicated pedestrian and vehicle electronic access control; and

(k) access gates for authorised RailCorp personnel to gain access across the Maintenance Facility / Maintenance Site for the purpose of maintenance and emergency recovery operations within the adjacent Auburn corridor area, including the land on which the Commissioning Track / Down Relief line is situated. The location(s) for these gates is shown on the Auburn Masterplan and in more detail by the RailCorp Maintenance Facility Reference Design.

The security for the Maintenance Facility must reflect the requirement for a 24 hours per day, 7 days per week security presence.

3.1.9 Landscaping

The design and construction of the landscaping of the Maintenance Site must include trees and shrubs of local provenance native species, and must present an aesthetically pleasant Maintenance Facility.

Trees and shrubs in the landscaping should not inhibit the performance of the CCTV and the natural surveillance (clear sight lines) of the Maintenance Site. Trees should be well

clear of all Overhead Wire, aerial power lines and track work. Also, trees deflected by wind should not present an obstruction to surveillance. Lower tree limbs should be above average head height. Shrubs should not provide easy concealment and should not be more than 900mm in height. All landscaping must have vegetation designed with consideration to clear sight lines for CCTV surveillance and minimise the risk of concealed or shaded areas, dead-end paths and corners which provide hiding points for vandals, vagrants or potential criminals.

PPP Co must collaborate and coordinate with RailCorp during the Delivery Phase to ensure the landscaping arrangements are aesthetically and operationally harmonious, and that the planned work will satisfy the requirements of the local council.

In particular, attention is drawn to a vegetated area situated in the western area of the Maintenance Site adjacent to the planned Commissioning Track / Down Relief corridor that will be affected by the new cable routes associated with the relocation of the Clyburn Exchange from the Maintenance Site. That parcel of enabling works requires the removal of significant, established trees in this area. Council has already granted approval for RailCorp to remove the subject trees on the basis that the regeneration plan to be developed by PPP Co includes sufficient planting to regenerate the affected area.

3.1.10 Underfloor Wheel Profiling Plant

PPP Co must design, construct and commission an Underfloor Wheel Profiling Plant located within the Maintenance Site as shown on the Auburn Masterplan.

The Underfloor Wheel Profiling Plant must have the capacity to service the Sets, and the Other Sets (including RailCorp's existing electric cars but excluding L, S and R class rolling stock). Sets and Other Sets using the Underfloor Wheel Profiling Plant shall travel along that road only in a uni-directional manner from east to west. PPP Co shall establish a Pick-up Point along this road at an appropriate location to the west of the Underfloor Wheel Profiling Plant Building.

The scope of this work must include:

(a) the Underfloor Wheel Profiling Plant, including the necessary clamping equipment for the Sets, the Other Sets (excluding L, S and R class rolling stock);

(b) all Site Trackwork necessary to operate the Underfloor Wheel Profiling Plant and to move all sets through it;

(c) a system for gathering and disposing of all swarf from the Underfloor Wheel Profiling Plant.

PPP Co must collaborate and coordinate with RailCorp during the Delivery Phase in order to ensure:

(a) the design of the Underfloor Wheel Profiling Plant meets the requirements of PPP Co, and the Other Sets (including RailCorp's existing electric cars but excluding L, S and R class rolling stock); and

(b) the Underfloor Wheel Profiling Plant can be operated harmoniously with the other items on the Maintenance Site, within the constraints imposed by the general environment, in particular limitations on noise emissions.

The Underfloor Wheel Profiling Plant and associated Site Trackwork must be capable of handling 4,000 wheel sets per annum in addition to the requirements of the Sets and the Other Sets.

3.1.11 Washplant

PPP Co must provide a Washplant and associated plant, equipment and facilities. RailCorp has provided details of its three (3) pre-existing washplants at Appendix B within Part 5 of the RailCorp Train Performance Specification. It is noted that the three (3) pre-existing washplants have been established for approximately 30 years – RailCorp wishes to see a modern Washplant incorporated into the Maintenance Facility.

The Washplant shall be capable of a consistent throughput of 20, 8-car sets per day. (7,000, 8-car sets per year). It is expected that the Washplant will be situated adjacent to the Underfloor Wheel Profiling Plant Building, and adjacent to the Bypass Road 1. PPP Co must take account of all of the parameters associated with the likely physical and operational environment(s) of the proposed Washplant.

The Washplant shall be a drive-through plant with a fully automatic cleaning system. The main functions and features for the Washplant shall include pre-wetting sprays, detergent application stations and brushes, car end wash station, main rinse station, final rinse station and drying blowers.

RailCorp requires PPP Co to adopt a Washplant system that facilitates development of an integrated design that maximises recycling opportunities, minimises environmental impact(s) and optimises the cleaning performance of the Washplant facility. A recycling water plant will be included for the train wash process and all water used will be recycled to the maximum practical potential.

The performance expected from the Washplant includes the removal of all airborne contaminants/pollutants that have adhered to the car body, removal of particulate matter derived from the wear and oxidation of overhead wires and carbon contact strips and to restore the various surfaces of the cars to a clean, unsoiled finish with a natural lustre expected of the design surface finish.

The Washplant will be designed to wash Sets and Other Sets.It is expected that Crew will be able to deliver sets to either end of the Washplant; that they will be able to initiate automatic operation of the Washplant from either end; then, drive the respective train away from the Washplant in order to return it to service. Further, it is expected that the bi-directional Washplant operation will be controlled by a programmable PLC and be automatically started/stopped by track switches mounted at the front of the Washplant.

PPP Co will provide Overhead Wire (OHW) through the train-wash facility. Upon the train being presented for washing the arrangement of the OHW shall allow the driver to engage automatic controls enabling the train to enter the wash facility at "creep (or Wash Mode) speed". The Sets will be powered through and out of the train wash.

PPP Co will provide an electrical isolation of the catenary cables at either end of the train wash building to enable maintenance work to proceed with power off.

3.1.12 Simulator Area

PPP Co must provide a designated area to accommodate the Mobile Version Simulator close to the Crew Room. This Simulator Area will comprise a dedicated hardstand area of appropriate dimensions, covered walkways interconnecting the Simulator area with the Crew Room accessible by RailCorp personnel, provisions to enable users of the Simulator to gain safe access and egress, lighting, etc, all as necessary. The area shall be provided with all necessary services and suitable connections to / for the Mobile Version Simulator.

3.1.13 Decant Area

PPP Co is required to make provision for an area within the Maintenance Facility for the purpose of emptying effluent from Other Sets (Interurban trains) which are fitted with controlled emission toilet systems. Provision for effluent to be conducted to a local reticulated sewer system must be provided by PPP Co.

The Decant Area is to be located between the two (2) 192 m long Storage Roads and, when developed at a later time, shall enable decanting operations to be carried out for a set standing on those roads immediately adjacent the location of the decanting facilities. The dedicated decant pump house would likely be positioned at the west end of the Storage Roads.

The decant facility shall be able to accommodate up to 192 m long sets standing clear of all other roads and significant signalling locations. PPP Co must ensure that access for maintenance would always be available.

The work to be carried-out by PPP Co comprises the in-ground provisions/services for seven (7) localised decant/tanking points, and the in-ground provisions/services to an adjacent location on the Maintenance Site suitable for a future pad area to be developed for pumping, storage tanks, plant and equipment. PPP Co is required to provide water and power facilities, and a suitable connection to transport effluent from these areas to a local reticulated sewer system.

3.1.14 Grade-Separated Pedestrian Access

PPP Co must design, construct and commission a grade-separated pedestrian access linking the Car Parking and pedestrian entrance to the Maintenance Site and the Buildings.

The design of the grade-separated pedestrian access must allow all pedestrians to enter the Buildings from the Car Parking and street without a need to cross Site Trackwork. Further, the design must include a clear span across that section of the Future RailCorp Facility, with sufficient vertical clearance to provide a train path including overhead wire(s).

3.1.15 Realignment of Pedestrian Walkway

PPP Co must realign the pedestrian walkway between Manchester Road North and Duck River to facilitate continued access to Clyde Railway Station along the boundary between

the RailCorp Central Warehouse and the Maintenance Site. PPP Co is required to develop a solution in which the number of road crossings is minimised.

The pedestrian walkway must be sealed, fenced and illuminated with suitable mazes to align pedestrians to the direction of traffic where road crossings occur. Pedestrian and vehicular gates are to be provided for access to and across the pedestrian access from existing RailCorp facilities on either side of the walkway.

3.1.16 RailCorp Site Construction Office

PPP Co must provide on the Construction Site an air-conditioned, temporary, portable site construction office for RailCorp's contract liaison officer and associated staff (8 people) during the construction of the Site Works and the Buildings. The RailCorp Site Construction Office must be located sufficiently close to PPP Co's construction office and access must be given to PPP Co's amenities (toilets, meeting rooms, car parking and other facilities) on site.

The RailCorp Site Construction Office must be fully equipped and include the following items:

(a) plan shelves and a plan bench;

(b) facility to pin-mount plans;

(c) 8 office workstations (including storage);

(d) a conference / meeting room capable of holding 12 people seated together with associated tables and chairs, and electronic whiteboard;

(e) facsimile machine;

(f) photocopier;

(g) shredder;

(h) a kitchenette equipped with

i. 220 litre (min) refrigerator;

ii. 700 W (min) microwave oven;

iii. sink and drainer washing area;

iv. wall-mounted hot water urn;

v. bench top, storage cupboards and drawers;

vi. waste and recycling bins; and

vii. kitchen utensils.

(i) computer system and telephone/facsimile connections from RailCorp's network and telephone system to each workstation;

(j) water cooler/filter; and

(k) wall clock (synchronised to the RailCorp station clocks system).

3.1.17 Other

The Auburn Masterplan shows provision of a parcel of land designated Future RailCorp Facility. PPP Co is required to make provision for various Utility Services. The necessary provisions are defined and quantified by RailCorp in the RailCorp Maintenance Facility Reference Design.

The RailCorp Maintenance Facility Reference Design shows the Commissioning Track / Down Relief line in an adjacent rail corridor. PPP Co is required to connect the outflows from several in-ground drainage pipes that originate within the Down Relief and Auburn rail corridors. The subject pipes will be accessible at the boundary of the Down Relief corridor with the Maintenance Site boundary. The design parameters have been specified for PPP Co to determine the magnitude of those inflows to the Maintenance Facility drainage system design.

Any parameters or design criteria not specified by RailCorp in the RailCorp Maintenance Facility Reference Design are the responsibility of PPP Co to determine and quantify.

RailCorp must construct a 200m long pathway using fine ballast material on either side of the Commissioning Track within the Down Relief corridor adjacent to the connection of Access Road 1 onto the Commissioning Track. This area will provide an inspection walkway for PPP Co for use whilst testing and commissioning on the Commissioning Track. RailCorp will include looped conduits as a provision for the installation of bollard-type lighting by PPP Co.

PPP Co must provide the necessary power cables and dedicated circuits from its distribution system at the Maintenance Facility to the subject walkway, reticulate the cabling, and supply and install the light fittings, and maintain the installation. At the completion of its use of the Commissioning Track, PPP Co shall remove the light fittings and cap-off any openings in the inspection walkway, and remove all associated power cables.

RFTA 00358

3.1.18 RailCorp Temporary Accommodation

PPP Co must provide air-conditioned, temporary, demountable buildings to accommodate Crew, Testing and Commissioning engineers, inspectors and the training team during the delivery phase of the Sets. Accommodation should be suitable for continuous use over a four year period. The temporary accommodation must be located on the north side of the car park adjacent to the Guard House.

The RailCorp Temporary Accommodation must include the following facilities:

(a) Crew Waiting Area;

(b) Crew Management Area with 8 workstations;

RFTA 00358

(c) Kitchen and common dining area;

(d) Male and female toilets, male and female changing rooms and a disabled toilet;

(e) Meeting Room;

(f) Testing And Commissioning Team office areas (2) with 10 workstations each;

(g) Testing and Commissioning Team meeting room with separate reception, waiting area, IT/Communications and storage/filing/printer area;

(h) Outdoor covered seating area with fixed BBQ;

(i) Office area with 12 workstations;

(j) Training Team office area with 12 workstations;

(k) Simulator Training Room with 15 workstations;

(l) Training Rooms (3) with 13 desks each and the ability to combine two of the three rooms into one larger training room;

(m) Male and female toilets;

(n) Training Area IT/Communications room;

(o) Training Room Office;

(p) Reinstallation of office equipment and fittings recovered from the crew area within the main building

(q) Other supporting services and fitout.

Refer RFTA 00358 Attachments 1 to 7 for details.

4 BUILDINGS

4.1 Scope

The Buildings must enable PPP Co to carry out the maintenance, repair, and other TLS Phase Activities in respect of the Sets as required under the Contract and the provision of maintenance and other through life support services in respect of the Other Sets.

PPP Co must design and construct the Buildings in accordance with:

(a) requirements of the Auburn Masterplan;

(b) requirements of this RailCorp Maintenance Facility Specification, including the RailCorp Maintenance Facility Reference Design;

(c) PPP Co's Maintenance Facility Works Delivery Plan;

(d) all applicable laws;

(e) all relevant standards including those listed in Attachment 3;

(f) Draft Disability Standards for Access to Premises [Buildings] 200X;

(g) RailCorp's ICT (Information and Communication Technology) requirements listed in Attachment 4;

(h) All other requirements of the Contract.

The Buildings shall include but not be limited to the following:

(a) Maintenance Building as required by clause 4.1.1 of this specification;

(b) Maintenance Roads as required by clause 4.1.2 of this specification;

(c) Underfloor Wheel Profiling Plant Building as required by clause 4.1.3 of this specification;

(d) Washplant Building as required by clause 4.1.4 of this specification;

(e) PPP Co Office Area as required by clause 4.1.5 of this specification;

(f) Training Room as required by clause 4.1.6 of this specification;

(g) Stores Area(s) as required by clause 4.1.7 of this specification;

(h) Amenities Area(s) as required by clause 4.1.8 of this specification;

(i) Crew Amenities Area as required by clause 4.1.9 of this specification;

(j) RailCorp Office Area as required by clause 4.1.10 of this specification;

(k) Crew Room as required by clause 4.1.11 of this specification;

(l) Security as required by clause 4.1.12 of this specification;

(m) Communications as required by clause 4.1.13 of this specification; and

(n) Other matters as required by clause 4.1.14 of this specification.

4.1.1 Maintenance Building

PPP Co's design of the Maintenance Building must incorporate the following features:

(a) structure:

i. galvanised steel portal frame structure; and

ii. galvanised purlins, girts and fastenings;

(b) roof cladding: Colorbond steel with insulation, vapour barrier, and safety mesh support;

(c) natural lighting: levels to conform to all requirements of occupational health and safety laws and reflect industry best practice;

(d) pedestrian areas: all walking areas are to be finished with slip resistant surfaces and are to be well drained;

(e) gutters & downpipes: stainless steel;

(f) external wall cladding: Colorbond steel with insulation, vapour barrier, and mesh support to inside face;

(g) windows: powder coated aluminium framed, glazed with laminated glass;

RFTA 00327

(h) road doors: 5000 x ~~6000~~ 5750 mm high ~~semi-glazed~~, motorized operation;

(i) railings and / or barrier walls: 'Armco' protective railings and / or reinforced concrete walls along both the external and internal surfaces of the Maintenance Building to protect the wall(s) from fork lift truck damage;

(j) lighting levels: lighting levels in all areas of the Maintenance Building, including the pits under the Maintenance Roads and elevated maintenance platforms, are to be suitable for the relevant TLS Phase Activities required to be undertaken at night;

RFTA 00328

(k) fire detection: all areas to be ~~covered~~protected by either heat ~~and~~ or smoke detection and alarm systems in accordance with relevant standards;

(l) fire protection: all areas to be protected in accordance with all applicable laws;

(m) ventilation levels: natural ventilation to be supplemented, if necessary, with mechanical ventilation in accordance with all applicable laws;

(n) air conditioning: all office areas are to be air conditioned;

(o) public address system: all areas to be covered by a public address system;

(p) first aid room: an air conditioned, fully-equipped first aid room is to be provided.

4.1.2 Maintenance Roads

PPP Co must provide at least six (6) parallel, multipurpose Maintenance Roads within the Maintenance Building to support all the requirements of maintaining and repairing the Sets and the Other Sets as well as performing any other relevant TLS Phase Activities required under the Contract.

The Maintenance Roads shall be capable of accommodating 8-car sets that are up to 163 metres long. The Maintenance Roads shall be enclosed within the Maintenance Building and shall incorporate the following features:

(a) all Maintenance Roads shall be "through type" (i.e. cars shall enter at one end and exit at the other, with the capability of entering and exiting at either end);

(b) centre distance between Maintenance Roads shall be a minimum of 8 metres;

RFTA 00329

(c) fork lift truck working access shall be provided along the full length of both sides of each Maintenance Road, unless otherwise agreed by RailCorp;

(d) Maintenance Roads shall be of the "raised" type;

(e) maintenance pits shall be provided under each Maintenance Road, and extend the full length of each Maintenance Road. The pits shall be provided with emergency exit arrangements complying with all laws;

RFTA 00341

(f) ~~two "drop table" facilities shall be provided on each of at least four (4) Maintenance Roads for bogie removal from the Cars. The drop tables shall also be capable of handling the bogies of the existing RailCorp electric fleet, the heaviest of which weighs 10.2 tonnes. The drop tables shall be positioned such that any bogie can be accessed with minimal train movement(s);~~Bogie removal and exchange stations (and associated equipment) together with bogie drop tables (i.e. mobile lift/drop equipment incorporating a powered side shift trolley) shall be provided on each of at least four Maintenance Roads for bogie removal from Cars. On two of the Maintenance Roads, to ensure that any bogie on a Set can be changed with minimal train movement(s), sixteen bogie removal and exchange stations (and associated equipment) will be required together with a minimum of two bogie drop tables.

On each of the other two Maintenance Roads concerned, a minimum of two bogie removal and exchange stations (and associated equipment) together with a minimum of one bogie drop table shall be provided for bogie removal from the existing RailCorp electric fleet.

All stations and drop table equipment should be able to accommodate bogies weighing up to 10.2 tonnes.

(g) two (2) travelling gantry cranes shall be provided on each Maintenance Road. Each crane must be capable of lifting the heaviest roof-mounted components

on the Cars and the heaviest roof-mounted component of the existing RailCorp electric fleet (2.5 tonnes) plus associated lifting frames, slings, etc. The cranes shall be interlocked in respect of location and the Overhead Traction Power System;

(h) Maintenance Roads grades shall be designed such that rolling stock will not roll due to gravity;

(i) elevated platforms shall be provided on both sides of each Maintenance Road for access to car equipment mounted at roof level. The design of these platforms must allow for removal and fitting of window glass. Adequate fall protection is to be provided in accordance with occupational health and safety laws;

(j) access to elevated platforms shall be by fold-up stairs interlocked to prevent access whilst the Overhead Traction Power System is operational;

(k) supply from the Overhead Traction Power System shall be provided to each Maintenance Road, with interlocking system and 'swing away' mounting of the Overhead Wire;

(l) 'Shore' Supply 415 Volt, 3 phase 50 Hz AC power supply shall be provided to each Maintenance Road with outlets at regular intervals for the test operation of Car equipment;

(m) 415 Volt, 3 phase 50 Hz power outlets shall be provided on both sides of each Maintenance Road for the operation of portable power tools and welders along the full length of each Maintenance Road;

(n) 240 Volt, single phase power outlets shall be provided on both sides of each Maintenance Road at regular intervals for the operation of portable power tools and lights along the full length of each Maintenance Road;

(o) access must be provided on all Maintenance Roads to enable presentation personnel to safely and efficiently access the sets for all cleaning work- including Major Cleans, Daily Cleans and Turnaround Cleans;

(p) water supply points shall be provided on both sides of each Maintenance Road for cleaning operations along the full length of each Maintenance Road; and

(q) reticulated general service compressed air supply is to be provided with 'Quick Connect' outlets on both sides of each Maintenance Road for the operation of pneumatic tools along the full length of each Maintenance Road.

4.1.3 Underfloor Wheel Profiling Plant Building

PPP Co must provide the Underfloor Wheel Profiling Plant Building to enclose the Underfloor Wheel Profiling Plant and associated equipment and facilities. As a minimum, the PPP Co design of the Underfloor Wheel Profiling Plant Building must incorporate the same features stipulated above for the Maintenance Building that are relevant to the Underfloor Wheel Profiling Plant's physical and operational environments.

4.1.4 Washplant Building

PPP Co must provide the Washplant Building to enclose the Washplant and associated plant, equipment and facilities. The PPP Co design of the Washplant Building must incorporate the same features stipulated above for the Maintenance Building that are relevant to the Washplant's physical and operational environments.

4.1.5 PPP Co Office Area

PPP Co must provide an air-conditioned PPP Co Office Area integral with the Maintenance Building that:

(a) is sized and equipped to accommodate the supervisory and administrative staff of PPP Co and the associated heat load;

RFTA 00330

~~(b) includes provision of a workstation and all necessary support facilities necessary for yard control, along with vision of all yard areas;~~

(c) is lined and insulated against heat and noise;

(d) is dust proofed; and

(e) is designed to comply with the requirements for people with disabilities, and conform with Australian Standard AS 1428 Part 2 Enhanced and Additional Requirements – Buildings and Facilities.

RFTA 00330

PPP Co must provide an air-conditioned PPP Co yardmaster's office that:

(a) is sized and equipped to accommodate the yardmaster and the associated heat load;

(b) includes provision of a workstation and all necessary support facilities necessary for yard control, along with vision of all yard areas;

(c) is lined and insulated against heat and noise;

(d) is dust proofed; and

(e) is designed to comply with the requirements for people with disabilities, and conform with Australian Standard AS 1428 Part 2 Enhanced and Additional Requirements – Buildings and Facilities.

4.1.6 Training Room

PPP Co must provide an air-conditioned Training Room in the Maintenance Building for the purposes of PPP Co training PPP Co and RailCorp personnel in accordance with the Contract Management Requirements and the RailCorp Through Life Support Specification and RailCorp training RailCorp Crew. The Training Room must be:

(a) sized and equipped to accommodate 15 trainees at work stations and the associated heat load;

(b) equipped with a very large white board (approx four (4) metre wide face when fully opened);

(c) lined and insulated against heat and noise; and

(d) dust proofed; and

(e) designed to comply with the requirements for people with disabilities, and conform with Australian Standard AS 1428 Part 2 Enhanced and Additional Requirements – Buildings and Facilities.

4.1.7 Stores Area(s)

PPP Co must provide a Stores Area(s) which include racking and shelving suited to fork lift truck handling to house the stock Maintenance Parts and Materials necessary to support the TLS Phase Activities. The Stores Area(s) are to be integral with the Maintenance Building.

PPP Co must provide an air conditioned office within the Stores Area(s), sized and equipped for an appropriate heat load.

4.1.8 Amenities Area(s)

PPP Co must provide air-conditioned Amenities Area(s) as necessary as part of the Maintenance Building that include:

(a) toilet facilities;

(b) change rooms and showers; and

(c) a meal room.

The Amenities Area(s) shall be designed to comply with the requirements of people with disabilities and conform with Australian Standard AS 1428 Part 2 Enhanced and Additional Requirements – Buildings and Facilities.

The Amenities Area(s) must be sized and equipped to meet the forecast workforce numbers projected by PPP Co and the associated heat load, and any related buildings must conform to the requirements of all applicable laws.

4.1.9 Crew Amenities Area

PPP Co must provide toilet and associated facilities that can be accessed by RailCorp staff and other authorised personnel close to the designated Handover Point(s) and Pick-up Point(s) for Sets and the Other Sets.

4.1.10 RailCorp Office Area

PPP Co shall provide air-conditioned office facilities located adjacent the PPP Co Office Area, integral with the Maintenance Building. These office facilities must be:

(a) sized and equipped to accommodate RailCorp's contract commissioning and liaison staff, and the associated heat load;

(b) lined and insulated against heat and noise;

(c) dust proofed; and

(d) designed to comply with the requirements of people with disabilities, and conform with Australian Standard AS 1428 Part 2 Enhanced and Additional Requirements – Buildings and Facilities.

The RailCorp Office Area shall be partitioned-off from any PPP Co areas. It shall be lockable, and fitted with a security system comprising the following:

(e) CCTV coverage of all egress points, interfaced with RailCorp's CCTV network;

(f) electronic access control compatible with RailCorp's access control systems; and

(g) intruder alarm system with an acceptable response protocol in place.

RFTA

00356

The office facilities shall include the following fixtures and fittings (Note: Any existing surplus equipment, fittings and fixtures are to be removed and stored for future use in temporary accommodation area):

(h) plan shelves and a plan bench;

(i) facilities to pin-mount large drawings;

(j) twenty-two (22) ~~seven (7)~~ office workstations (with storage) and four (4) round discussion tables;

(k) one (1) ~~corner~~ enclosed office space (with secure storage) for a manager with managers desk and chair, electronic whiteboard, small conference table and four chairs;

(l) facsimile machine;

(m) heavy duty shredder;

(n) fireproof safe (minimum capacity of 0.4 cubic metres) to be located in the new Manager's Office;

(o) a conference room capable of holding 20 people together with associated tables, chairs and electronic whiteboard. The room should enable a comfortable configuration of twelve (12) seated around the conference table and another eight (8) seated in a second row, a 40 inch LCD television, DVD player and antennae outlet;

(p) a kitchenette equipped with:

i. 220 litre (min) refrigerator;

ii. 750 W (min) microwave;

iii. sink & drainer washing area;

iv. wall-mounted hot water urn;

v. bench top, incorporating storage cupboards and drawers;

vi. waste and recycling bins;

vii. kitchen utensils; and

viii. dishwashing machine.

(q) separate male and female toilets;

(r) computer system and telephone/facsimile connections integrated with RailCorp's network;

(s) first-aid box;

(t) four (4) steel storage cabinets (1 to be fire-rated) with shelves and lockable doors (relocated inside the utility room);

(u) four (4) steel open file cabinets with shelves (relocated inside the utility room);

(v) wall-mounted water cooler/filter;

(w) not used ~~wall-mounted clock (synchronised to the RailCorp station clocks system); and~~

(x) provision for three (3) photocopier/printers – one (1) colour and two (2) black & white capable;

RFTA 00356

(y) wall-mounted telephone outlet outside the entry glass doors;

(z) quiet room with table and four chairs, laptop desk, telephone and computer network outlets and electronic whiteboard (relocated from Crew Room); and

(aa) utilities room (previously Manager's Office) to contain storage cabinets and shelves, colour photocopier/printer and facsimile machine.

4.1.11 Crew Room

PPP Co must provide an air-conditioned Crew Room, located within the Maintenance Building, exclusively to accommodate Drivers and Guards waiting to crew the Sets and the Other Sets. The Crew Room shall be self-contained and sized to cater for the anticipated heat load and designed to comfortably accommodate up to 74~~0~~ people. Existing surplus equipment, fittings and fixtures are to be removed and stored for future use in temporary accommodation area. The Crew Room shall be equipped as follows:

(bb) lined, insulated, and dust proofed;

(cc) 7~~40~~ comfortable, ergonomic chairs;

(dd) non-slip floor covering(s);

(ee) one (1)~~two (2)~~ wall-mounted clock~~s~~ (synchronised with the RailCorp station clocks system;

(ff) room lighting fitted with diffusers;

(gg) two (2)~~four (4)~~ telephone lines and connection points (for internal RailCorp use);

(hh) not used ~~two (2) public pay telephones~~;

(ii) not used ~~wall-mounted water cooler/filter~~;

(jj) not used ~~ice machine~~;

(kk) notice boards (relocated to foyer);

(ll) electronic white board (relocated to Quiet Room);

(mm) "Keep Room Clean" and other appropriate advisory wall signs;

RFTA 00356

(nn) ~~television (minimum size 60 cm) and~~ antenna system (relocated to RailCorp meeting room);

~~(oo)~~ not used~~a kitchenette equipped with:~~

~~i. refrigerator(s) with an appropriate total capacity;~~

~~ii. microwave(s) with an appropriate combined capacity;~~

~~iii. hot plates and ovens with range hoods;~~

~~iv. toasting facilities;~~

~~v. wall-mounted hot water urns;~~

~~vi. benchtops, incorporating storage cupboards and drawers;~~

~~vii. kitchen utensils; and~~

viii. ~~dishwashing machine(s)~~.

(pp) four (4) computer connections to the RailCorp network (for Crew information);

(qq) separate male and female toilets (appropriately separated from the meal area eg by an air lock); and

(rr) not used ~~first-aid box~~.

4.1.12 Security

PPP Co must provide a security system for the Maintenance Facility. The security system shall conform with the RailCorp Security Requirements set out in Attachment 5.

4.1.13 Communications

PPP Co must provide communications facilities in accordance with the scope described in section 12 of the PPP Maintenance Facility Reference Design Report in Attachment 6.

4.1.14 Other

PPP Co must provide all other items of relevant, necessary equipment, tools and services at the Maintenance Facility that are either not specifically covered in Section 4 of this RailCorp Maintenance Facility Specification, or are not required by the Maintenance Facility Works Delivery Plan, but which are required for the TLS Phase Activities related to the Sets, and the maintenance and through life support services for the Other Sets and the Maintenance Facility. For example, subject to the method proposed by PPP Co for operational control within the Maintenance Site, this may include a yard control area designed to control movements within the Maintenance Facility, and co-ordination with RailCorp of movements in and out of the Maintenance Facility, and co-ordination with Manildra, MainTrain and other users.

ATTACHMENT 1: AUBURN MASTERPLAN

The Auburn Masterplan is represented by the Drawing Nos SK-RA 001, and SK-RA 003.

ATTACHMENT 2: TRACK SCHEMATIC

The Track Schematic is Drawing No CV 0405163 Rev 02 and included in the RailCorp Maintenance Facility Reference Design – see Attachment 6 of this Exhibit.

ATTACHMENT 3: STANDARDS

Standards applying to the design, construction and operation of the Maintenance Facility include but not necessarily limited to those listed below:

	RailCorp System Safety Manual
	WorkCover's An Occupational Health and Safety Model for Self Insurers
AS 4292	Railway Safety Management
AS 4801	Occupational Health and Safety Management Systems
	Building Code of Australia
AS 3000	Electrical Installations - Buildings, Structures and premises (known as the AS/NZ Wiring Rules)
AS 1428.2	Design for access and mobility – Enhanced and additional requirements – Buildings and facilities
AS/NZS 1680.2.4:1997/Amdt:1998	Interior Lighting – Industrial Tasks and Processes
AS 1680.2.2 - 1994	Interior Lighting – Office and Screen-based Tasks
AS 4282	Control of Obtrusive Effects of Outdoor Lighting
AS 1158.1	Road Lighting – Vehicular Traffic (Category V) Lighting – Performance and Installation Design Requirements
AS 2118.1 - 1999	Automatic Fire Sprinkler Systems – General Requirements
AS 4100 - 1998	Steel Structures
AS/NZS 2890.1:2004	Parking facilities - Off-street Car Parking
AS/NZS 3016:2002	Electric Installations – Electric Security Fences
AS/NZS 4663:2004	Slip resistance measurement of existing pedestrian surfaces
AS/NZS 4586:2004	Slip resistance classification of new pedestrian surface materials
AS 1055.1-1997	Acoustics – Description and Measurement of Environmental Noise - General Procedures
AS 1055.2-1997	Acoustics – Description and Measurement of Environmental Noise - Application to Specific Situations
AS 1055.3-1997	Acoustics – Description and Measurement of Environmental Noise - Acquisition of Data Pertinent to Land Use

RailCorp Transit Space Standards

C 2100 November 2001	Transit Space Handbook – System Overview 3.0
C 2101 November 2001	Transit Space Policy 2.0
C 2105 November 2001	Application of Kinematic Envelope 2.0
C 2106 November 2001	Infringement of Transit Space Standards 2.0
C 2107 November 2001	Base Operating Standards for Clearances 2.0
C 2108 November 2001	Clearances at Platforms 3.0
C 2111 November 2001	Track Centre Clearance Signs for Yards 3.0
ESC 510 Sept 2005	Boundary Fences v1.0

RailCorp Track Design Standards:

Sept 2005	Design Guidelines for the Upgrade and Construction of New and Existing Train Stabling Yards and Turnback Sidings – version 0.3
	SRA Guide to OH&S Construction in Stabling Yards and Sidings (Draft 5 Nov 2002)
TS 3101 June 2004	Standard Classification of Lines
TS 3103 March 2004	Track Standards Construction 3.1
TS 3202 Nov 2001	Basic Siding Track Design Standards
TS 3501 Nov 2001	Turnouts – Components Definitions
TS 3502 Nov 2001	Standard Turnouts
TS 3421 Nov 2001	General Standards for Formation and Earthworks 2.0
TS 3422 Nov 2001	Standard for Formation Capping Material
TS 3424 Nov 2001	Standard Procedures for Embankment Widening

RailCorp Track Rails Standards:

C 2104 February 2002	Structure Gauge 1994
C 2405 May 2005	Rail Defect Standards May 2004
CSI 029	Grinding of Crossings Nov 2001
AP 5373	Internal Rail Inspection March 2004

RailCorp Track Components, Track Welded Standards:

C 1100 Nov 2001	Earthworks Construction Procedures
C 2303 Nov 2001	Technical Specifications for Manufacture of Turnouts and Components
C 2501 Nov 2001	Welded Track – Definition of Terms
C 2508 Nov 2001	Maintenance of Welded Track (Summer Period)
C 2514 Nov 2001	Maintaining Rail Adjustment in Track Adjoining a Major Removal
C 2532 Nov 2001	Maintenance of Non Welded Track (Summer Months)
C 3109 Nov 2003	Prestressed Concrete Sleepers - Design
TS 3322 Sept 1997	Specification for the manufacture and supply of resilient rail fastening assemblies for SRA concrete sleepers
TS 3341 Nov 2001	Use of Resilient Fastenings Pandrol Type
TS 3342 May 2004	Use of Reformed Plates with Resilient Fastenings
C 3361 Nov 2001	Field Application of Swage Fasteners in Existing Trackwork
TS 3362 Nov 2001	Use of Flame Cut Rails
C 3363 Nov 2001	Manufacture and Pre-Installation Testing of Assembled Glued Insulated Joints
C 3365 Nov 2001	Specifications for the Supply of Field Assembled Mechanical Insulated Joint Components
TS 3371 Nov 2001	Standard Fishbolts, Washers and Nuts
TS 3394 Nov 2001	Use of Glued Insulated Joints
TS 3396 Nov 2001	Pre-Assembled Double Glued Insulated Joint Specification
TS 3397 Nov 2001	Use of Resilient Fastenings at Glued Insulated Joints
TS 3402 Nov 2001	Specification for Supply of Aggregate for Ballast
TS 3601 May 2004	Field Welding Standards
TS 3602 Nov 2001	Standard Procedures for Welding
TS 3603 Nov 2001	Approved Aluminothermic Welding Processes for Field Welding of Rail
TS 3604 June 2004	Rails Approved for Welding

TS 3606 Nov 2001	Rails Approved for Use as Junction Rails
TS 3640 Nov 2001	Policy Use of Welded Track
TS 3642 Nov 2001	Standard for Laying Continuous Welded Rails
TS 3645 Nov 2001	Anchoring of Track
TS 3648 Nov 2001	Maintenance of Welded Track (General)
TS 3650 Nov 2001	Adjustment & Field Welding for Cont Welded Track
TS 3654 Nov 2001	Rail Inserts and Slotted Plates – Use and Maintenance
C 5200 Nov 2001	Evaluation and Approval of Track Components

RailCorp Structures General Standards:

C 1001 Nov 2001	Civil Engineering - Introduction
G 8530 Nov 2001	Use of Survey Control Marks by External Bodies
G 8001 Nov 2001	Worksite Safety Boundary Markers

RailCorp Structures Design Standards:

C 4004 Oct 2002	Design Requirements for Pier or Column Protection – v 3.0
AP 6111 Sept 2003	Derailment Protection of Existing Supporting Structures
TS 31 200 1 01 SP Jan 2002	Guard Rails – Configuration Standards
TS 30 000 3 01 SP July 2003	Structures – Design Standards

RailCorp Overhead Wiring Standards:

EP 08 00 00 01 SP March 2003	Overhead Wiring Standards for the Electrification of New Routes
EP 08 00 00 02 SP Oct 2001	Overhead Wiring Maintenance Standards
EP 08 00 00 03 SP Oct 2001	Overhead Wiring Base Safety and Operating Standards
EP 08 00 00 04 SP Nov 2001	Relative Positions of Signals and Airgaps
EP 08 00 00 05 SP Nov 2001	Methods of Rail Connecting 1500V OHW
EP 08 00 00 06 SP Nov	Vegetation Control near 1500V DC Equipment Overhead Wiring Policy

2001	
EP 08 00 00 07 SP Nov 2001	Safety Screens for Bridges over 1500V OHW Equipment
EP 08 00 00 10 SP	Overhead Wiring Maintenance Standards
EP 08 00 00 12 SP Nov 2001	Level Crossings – OHW Clearance Requirements
EP 08 00 00 13 SP Jan 2002	Overhead Wiring Fittings and Materials
EP 08 00 00 14 SP April 2002	Services Erected Above Overhead Wiring
EP 08 00 00 16 SP Feb 2002	Designations of Overhead Wiring Conductor Systems
EP 08 00 00 17 SP May 2003	Overhead Wiring Conductor System Selection Criteria
EP 08 00 00 19 SP Jan 2002	Performance Specification for Overhead Wiring Post Insulator Units
EP 08 00 00 20 SP Jan 2002	Performance Specification for Overhead Wiring String Insulator Set
EP 08 00 00 21 SP Jan 2002	Insulator Type Tests – DC Power Arc Withstand

RailCorp Traction Return Standard:

EP 09 00 00 01 SP Aug 2002	Trackside Negative Bus-Rails

RailCorp Earthing, Bonding Electrolysis Standards:

EP 12 00 00 01SP Nov 2001	High Voltage and 1500 System Earthing References and Definitions
EP 12 00 00 02 SP Nov 2001	Low Voltage Distribution and Installation Earthing References and definitions
EP 12 10 00 10 SP Sept 2002	System Substation Earthing
EP 12 10 00 11 SP Nov 2001	Distribution Substation Earthing
EP 12 10 00 12 SP Nov 2001	Transmission Line and Cable Earthing
EP 12 10 00 13 SP Nov 2001	1500V Traction System Earthing

EP 12 10 00 20 SP Nov 2001 Low Voltage Distribution Earthing

EP 12 10 00 21 SP Nov 2001 Low Voltage Installations Earthing

EP 12 10 00 22 SP Nov 2001 Buildings and Structures Under Overhead Lines

EP 12 20 00 01 SP Nov 2001 Bonding of Overhead Wiring Structures to Rail

EP 12 30 00 01 SP Jan 2002 Electrolysis from Stray DC Current

RailCorp Electrical General Standards:

EP 00 00 00 01 TI Nov 2001 RIC Electrical System General Description

EP 00 00 00 02 SP Jan 2002 Electrical Technical Maintenance Coding System

EP 00 00 00 07 SP Nov 2001 Requirements for Handling & Disposal of Material Containing PCB

EP 00 00 00 08 SP Nov 2001 Safe Limits of DC Voltages

EP 00 00 00 12 SP Dec 2003 Electrical Power Equipment – Integrated Support Requirements

EP 00 00 00 13 SP Jan 2004 Electrical Power Equipment – Design Ranges of Ambient Conditions

EP 00 00 00 15 SP Jul 2004 Common Requirements for Electrical Power Equipment

RailCorp Power Transformer Standards:

EP 02 00 00 01 SP Nov 2001 Transformer Loss Evaluation

RailCorp Distribution Transformer Standards:

EP 16 00 00 01 SP July 2002 Pole Mounted Distribution Transformer

EP 16 00 00 02 SP Aug 2002 Outdoor Ground Type Distribution Transformer

RailCorp DC Switchgear Standards:

EP 04 01 00 01 SP Dec 2004 1500 V High Speed DC Feeder Circuit Breaker

EP 04 00 00 02 SP Dec 2004 System Substation 1500 V DC Links and Switches

RailCorp Fault Protection Standards:

EP 19 00 00 01 SP Nov 2001 DCCB and Delta I Relay Setting Calculation Method

EP 19 00 00 02 SP Oct 2005 Protection System Requirements for High Voltage Network

EP 19 00 00 03 SP Aug 2002 Commissioning of Translay Pilot Wire Protection Scheme

RailCorp HV AC Switchgear Standards:

EP 01 00 00 01 SP Jul 2004 33 kV AC Indoor Switchgear: Non-Withdrawable

EP 01 00 00 02 SP Aug 2004 11 kV AC Indoor Switchgear – Non-Withdrawable

RailCorp Low Voltage Standards:

EP 17 00 00 06 SP Nov 2001 Installation Inspections

EP 17 00 00 11 SP Nov 2004 Low Voltage Isolating Transformers

EP 17 00 00 12 SP Nov 2001 Demarcation of RIC Low Voltage Distribution System

RailCorp Transmission Lines Standards:

EP 10 00 00 04 SP Nov 2001 Transmission Line Easement Conditions

EP 10 00 00 05 SP Nov 2001 Transmission Line Current Ratings & Standard Conductors

EP 10 01 00 03 SP Jan 2001 Transmission Line Base Safety and Operating Standards

EP 10 01 00 05 SP April 2002 Requirements for Electric Aerials Crossing RIC Infrastructure

RailCorp HV AC & Traction Cable Standards:

EP 20 10 00 01 SP Oct 2002	1500 Volt DC Cable Ratings
EP 20 10 00 02 SP Oct 2002	High Voltage Cable Selection Guide
EP 20 00 00 03 SP Oct 2002	Above Ground Cable Installation Systems – Selection Guide
EP 20 00 00 20 SP Oct 2002	Testing of High Voltage Cables
EP 20 00 03 01 SP Oct 2002	Requirements for Cable Polymeric Terminations and Joints
EP 20 00 04 01 SP Oct 2002	Cable Route Selection Guide
EP 20 00 04 02 SP Oct 2002	Underground Installation Configurations for High Voltage and 1500 V dc Cables
EP 20 00 04 04 SP Oct 2002	Ground Entry Arrangements
EP 20 00 04 05 SP Oct 2002	Cable Pits
EP 20 00 04 06 SP Oct 2002	Underground Cable – Location Recording

ATTACHMENT 4: RAILCORP ICT REQUIREMENTS

RailCorp ICT requirements have been integrated with Exhibit 5 - RailCorp Through Life Support Specification.

ATTACHMENT 5: RAILCORP SECURITY REQUIREMENTS

The RailCorp Security Requirements comprise the following five (5) documents:

Security Components Functional Specifications and Standards for Train Services Rollingstock – Security Components for Maintenance Centres – V1.2, 31 August 2005

Part A: Fencing Functional Specification for RailCorp Maintenance Centres and Stabling Locations – V1.3.1, 10 July 2006

Part B: Exterior Lighting Functional Standard for RailCorp Maintenance Centres and Stabling Locations – V1.1, 31 August 2005

Part C: CCTV Functional Standard for RailCorp Maintenance Centres and Stabling Locations – V1.2, 7 June 2006

Part D: Access Control Functional Specification for RailCorp Maintenance Centres and Stabling Locations – V1.2, 16 August 2005

ATTACHMENT 6: RAILCORP MAINTENANCE FACILITY REFERENCE DESIGN

The RailCorp Maintenance Facility Reference Design comprises the following documents:

DRWG No.	DRAWING TITLE	REVISION
CV 0405151	Cover Sheet and Drawing Index	04
CV 0405152	Maintenance Facility General Arrangement (Aerial Image)	02
CV 0405154	Maintenance Facility General Arrangement	02
CV 0405156	Civil Key Plan Sheet 1	02
CV 0405157	Civil Key Plan Sheet 2	02
CV 0405158	Civil Key Plan Sheet 3	02
CV 0405159	Civil Key Plan Sheet 4	02
CV 0405160	Civil Key Plan Sheet 5	02
CV 0405161	Civil Key Plan Sheet 6	02
CV 0405162	Civil Key Plan Sheet 7	02
CV 0405163	Track Schematic	02
CV 0405164	Control Line Setout Plan Sheet 1	02
CV 0405165	Control Line Setout Plan Sheet 2	02
CV 0405166	Track Longitudinal Section PPP MC00	02
CV 0405167	Track Longitudinal Section PPP MCN0	02
CV 0405168	Track Longitudinal Section PPP MC30	02
CV 0405169	Track Longitudinal Section PPP MCJ0	02
CV 0405170	Typical Cross Sections PPP MC00 Sheet 1	02
CV 0405171	Typical Cross Sections PPP MC00 Sheet 2	02
CV 0405172	Typical Cross Sections PPP MC00 Sheet 3	02
CV 0405173	Typical Cross Sections PPP MC00 Sheet 4	02

CV 0405174	Track and Civil Details	02
CV 0405175	Security Plan	02
CV 0405176	Utility Services Key Plan Sheet 1	02
CV 0405177	Utility Services Key Plan Sheet 2	02
CV 0405178	Utility Services Key Plan Sheet 3	02
CV 0405179	Utility Services Key Plan Sheet 4	02
CV 0405180	Utility Services Key Plan Sheet 5	02
CV 0405181	Utility Services Key Plan Sheet 6	02
CV 0405182	Boundary Key Plan Sheet 1	09
CV 0405183	Boundary Key Plan Sheet 2	09
CV 0405184	Boundary Key Plan Sheet 3	08
CV 0405185	Boundary Key Plan Sheet 4	09
CV 0405186	Boundary Key Plan Sheet 5	08
CV 0405187	Boundary Key Plan Sheet 6	08
CV 0405188	Boundary Key Plan Sheet 7	08
CV 0405189	Boundary General Arrangement	07
CV 0405190	RailCorp Crew Unisex Toilets	01
CV 0405191	Gate House	01
CV 0405192	In-between Tracks Landscaping Eastern Plan Sht 1	02
CV 0405193	In-between Tracks Landscaping Centre Plan Sht 2	02
CV 0405194	In-between Track/Car Park/Entry Landscaping Plan Sht 3	02
CV 0405195	Car Park Landscaping Plan	02
CV 0405196	Entry Park Landscaping Plan	02
CV 0405197	Landscaping Detail Plan and Section	02
EL 0405231	Electrical Services Key Plan Sheet 1	02
EL 0405232	Electrical Services Key Plan Sheet 2	02

EL 0405233	Electrical Services Key Plan Sheet 3	02
EL 0405234	Electrical Services Key Plan Sheet 4	02
EL 0405235	Electrical Services Key Plan Sheet 5	02
EL 0405236	Electrical Services Key Plan Sheet 6	02
EL 0405237	Electrical Services Key Plan Sheet 7	02
EL 0405238	LV Single Line Diagram	02
EL 0405239	Traction Power Sectioning Diagram	02
EL 0405240	Lighting Plan	02
EL 0405241	OHW Plan Sheet 1	02
EL 0405242	OHW Plan Sheet 2	02
EL 0405243	OHW Plan Sheet 3	02
EL 0405244	OHW Plan Sheet 4	02
EL 0405245	OHW Plan Sheet 5	02
SG 0405297	Signalling Plan Stage 1 & 2 Control Areas Sheet 1	02
SG 0405298	Signalling Plan Stage 1 & 2 Control Areas Sheet 2	02
SG 0405299	Signalling Plan Stage 1 & 2 Control Areas Sheet 3	02
SG 0405300	Signalling Plan Stage 1 & 2 Control Areas Sheet 4	02
SG 0405301	Signalling Plan Stage 1 & 2 Control Areas Sheet 5	02
SG 0405302	Signalling Plan Stage 1 & 2 Control Areas Sheet 6	02
SG 0405303	Signalling Plan Stage 1 & 2 Control Areas Sheet 7	01
SG 0405304	Signalling Plan Stage 3 Control Areas Sheet 1	01
SG 0405305	Signalling Plan Stage 3 Control Areas Sheet 2	01
SG 0405306	Signalling Plan Stage 3 Control Areas Sheet 3	01
SG 0405307	Signalling Plan Stage 3 Control Areas Sheet 4	01
SG 0405308	Signalling Plan Stage 3 Control Areas Sheet 5	01
SG 0405309	Signalling Plan Stage 3 Control Areas Sheet 6	01

SG 0405310	Signalling Plan Stage 3 Control Areas Sheet 7	01
SG 0405311	Signalling Plan Stage 1 & 2 Construction Areas Sheet 1	02
SG 0405312	Signalling Plan Stage 1 & 2 Construction Areas Sheet 2	02
SG 0405313	Signalling Plan Stage 1 & 2 Construction Areas Sheet 3	02
SG 0405314	Signalling Plan Stage 1 & 2 Construction Areas Sheet 4	02
SG 0405315	Signalling Plan Stage 1 & 2 Construction Areas Sheet 5	02
SG 0405316	Signalling Plan Stage 1 & 2 Construction Areas Sheet 6	02
SG 0405317	Signalling Plan Stage 1 & 2 Construction Areas Sheet 7	02
SG 0405318	Signalling Plan Stage 3 Construction Areas Sheet 1	01
SG 0405319	Signalling Plan Stage 3 Construction Areas Sheet 2	01
SG 0405320	Signalling Plan Stage 3 Construction Areas Sheet 3	01
SG 0405321	Signalling Plan Stage 3 Construction Areas Sheet 4	01
SG 0405322	Signalling Plan Stage 3 Construction Areas Sheet 5	01
SG 0405323	Signalling Plan Stage 3 Construction Areas Sheet 6	01
SG 0405324	Signalling Plan Stage 3 Construction Areas Sheet 7	01
	Connell Wagner Reference Design Report	08

ATTACHMENT 7: SIGNALLING FUNCTIONAL SPECIFICATION

ATTACHMENT 7 - MAINTENANCE FACILITY SIGNALLING FUNCTIONAL SPECIFICATION

Change Log

Issue	Date	Author	Change
v4	28/9/06	WW	Contract
v5			Working version: not issued/rev no not used
v6	16/10/07	WW	Modified to reflect impact of Clyburn Junction and Access Control Application for stages 1&2
v7	01/09/2010	ARJS	Addition of text changes from RFTA: 00339 00370 00374

TABLE OF CONTENTS

1 INTRODUCTION

The Rolling Stock Public Private Partnership (PPP) Project incorporates the design, construction, maintenance and finance of new passenger rail cars to replace existing R, S & L rolling stock and associated maintenance facilities for the rail cars. The maintenance site for this project is located between Auburn and Clyde stations on the southern side of the western Main Line. The PPP Co. will operate the facility for approximately 35 years before it is handed back to RailCorp.

The capacity of the PPP Maintenance Facility is to maintain a fleet of 1000 cars comprising the PPP Sets and, Other Sets (that include sets that RailCorp agrees to be maintained at the Maintenance Facility).

This facility will have a number of storage and maintenance sidings with connections to the RailCorp network via the Down Relief currently being upgraded. The facility will also share access to the Down Relief with MainTrain, Presentation Services and the Manildra flour store.

Note: This document also refers to a Future RailCorp Facility adjacent to the PPP Maintenance Facility. Based on preliminary planning for the site it is expected that this facility will be a Stabling Yard, however no decision has been made at this time.

This functional specification outlines the key signalling requirements for the new PPP Maintenance Facility, and it's interfaces with the existing RailCorp network including the Down Relief.

2 OVERVIEW

2.1 KEY ELEMENTS OF THE FACILITY

The proposed PPP Maintenance Facility is south of the existing western Main Line and Down Relief between 18.900 km and 20.5km.

Key elements of the PPP Facility include:

- A Maintenance Building with maintenance roads.
- Storage Roads (for storage of sets, hand over and pick up, driver's preparation and minor repairs).
- Standing Roads east and west of the Maintenance Building (trains entering/leaving Maintenance Building, cleaning if not done in Building, Graffiti removal, minor repairs and driver's preparation).
- Underfloor Wheel Profiling Plant (UWPP) Facility.
- Train Washplant Facility.
- A Bypass road around the facility.
- Car Turning Loop road around MainTrain.

The Down Relief is an important interface for the PPP Maintenance Facility. It extends between the Main Line access point at the existing No.53 crossover at Auburn and No.705 crossover at Clyde. It is to be upgraded by RailCorp (under a separate project).

Existing turnouts No.49 and No.52 on the Down Relief at the Auburn end of the site are to remain and be used as key entry points to the PPP Maintenance Facility. RailCorp is to upgrade the Down Relief in accordance with the Enabling Works specification that will provide access to the PPP Site from the Granville and Auburn ends

Access between the PPP Maintenance Facility and the RailCorp network will also be provided by new crossovers joining the Down Relief at approximately 20+050km (known as Clyburn Junction).

3 OPERATIONAL OBJECTIVES

The key operational objective of the PPP Maintenance Facility is to maintain a fleet of 1000 cars comprising the PPP Co. Sets and, other RailCorp trains. This will include commissioning of new sets.

Other operational objectives include:

1. The site will be also used for washing of RailCorp trains.
2. Accommodate and maintain RailCorp electric trains and Sets of 163m length with provision for 192m trains at nominated locations.
3. Primary access to the facility from the Down Relief with:
   - Two turnouts at the Auburn end utilising existing turnouts numbers No.49 and No.52.
   - Two new turnouts at the Clyde end.
   - Network access to the Down Relief via Clyburn Junction
4. Secondary access (Access Road 1) to the Down Relief from Storage Roads 1-4 for additional flexibility and access reliability.
5. Ability to directly access the UWPP and train Washplant facilities from any of the Storage Roads.
6. Ability to shunt between all Storage Roads and all Standing Roads East.
7. Capability for RailCorp crew to deliver sets to, and pick up sets from,
   - the Storage Roads;
   - the Standing Roads West;
   - the UWPP; and
   - the Washplant.
8. All storage and standing roads or zones are to be provided with clearances for signalling, catchpoints and any other operational requirements to prevent fouling points etc.
9. Access to the MainTrain siding and facilities
10. Car Turning Loop road around western side of MainTrain facility with minimal land take.
11. Bypass road around the PPP Maintenance Facility.
12. Provision is to be made to restrict facilities being constructed within the train run-off areas from the Catchpoints to provide both a safe run-off area and to limit damage should trains run-off into these areas.
13. The Down Relief is to be used as a Commissioning Track by the PPP Co. during stage 1.
14. Provision for incorporation of the Future RailCorp Development.

Note: The facilities (listed above) and flexibility of the maintenance facility will vary during the various stages of operation outlined in section 4.

4 STAGING OF OPERATIONS

As part of the Auburn Corridor Upgrade, RailCorp is planning to replace the Auburn and Granville signal boxes and relocate control of the signalling to Strathfield signal box.
Stages 1 & 2 are to be delivered with minimal changes to the Auburn and Granville Signal boxes.
Stage 3 is to become operational with the relocation of signal control to Strathfield Signal Box.

For specific operational requirements see attachment 5.

For this reason operation of the PPP Yard Area and the adjacent Down Relief will occur in the following stages:

4.1 STAGE 1 (DELIVERY OF SET 1 THROUGH TO COMPLETION OF SET 78)

The Down Relief is to be used by the PPP Co. as a commissioning track for the Sets.

Signalled Main Line access to / from the Down Relief (Commissioning Track) will be provided, using the existing 53 crossover at Auburn and 705 crossover at Clyde.

During Stage 1, the Down Relief will provide the following operational features:

- At the Auburn end it will continue to provide the existing access to / from MainTrain and the Manildra sidings
- Also at the Auburn end it will provide entry to the PPP Yard Area - (To Bypass Road 1, Arrival Road 1 and Arrival Road 2). It will also allow trains to exit from the PPP Yard area via Departure Roads 1 to 4.
- At the Granville end it will provide entry / exit to the PPP Yard.
- The section in between is allocated for use as a commissioning track, under PPP Co. control. Train operations on the Commissioning Track section of the Down Relief during this period to be in accordance with agreed Network Operation Rules.
- Clyburn Junction joins the Down Relief in the section allocated for use as a Commissioning Track. Clyburn Junction will be configured to allow for:
    - Commissioning Activities
    - Up arrivals
    - Down arrivals
    - Down departures

Notes:

1. During Stage 1 the existing RailCorp signal boxes at Auburn and Granville will remain in operation.

2. To facilitate safe and efficient management of control on the Commissioning Track, three Access Control Areas will be established with a form of dual access control as shown on drawings in Attachment 1 and described further in Section 5.1.1.

4.2 STAGE 2 (FROM PRACTICAL COMPLETION OF SET 78 UNTIL TRANSFER OF CONTROL TO STRATHFIELD SIGNAL BOX)

The Commissioning Track will cease to be used for train testing and will operate as a Master siding, under PPP Co. Control, providing access to PPP Yard Area.

All other operational features as listed for Stage 1 will remain, including the existing RailCorp signal boxes at Auburn and Granville

4.3 STAGE 3 (RAILCORP RESIGNALLING OF THE AUBURN TO GRANVILLE CORRIDOR)

When RailCorp resignals the main Auburn to Granville corridor the Auburn and Granville signal boxes will be closed and a new facility at Strathfield will control the new signalling It is proposed that the following changes to the signalling on the Down Relief will occur at this stage:

- At the Auburn end all PPP Co. sidings will become bi-directional arrival / departure / storage roads
- Main line signalling will be commissioned on the Down relief.
- The interfaces between the PPP Co. Yard signalling and the new RailCorp signalling will be enhanced to provide Dual control (RailCorp / PPP Co.) of entry / exit moves at both the Auburn and Clyde ends of the Maintenance Facility as well as entry to / exit from Access Road1.

5 CONTROL AREAS

5.1 PPP CO. YARD CONTROL

A PPP Co. Yard Controller will be responsible for all train operations within the PPP Yard Area, except during Stages 1 & 2, where those sidings marked as Arrival Road 1, Arrival Road 2 and By Pass Road 1 will be controlled by RailCorp. RailCorp will have the ability during Stages 1 & 2 to direct a train into these sidings without the need for the Yard Controller's authority. The Yard Controller must ensure that at least 1 of these designated Arrival Roads is kept free to accept a train from the RailCorp network.

During Stages 1 & 2 the Yard Controller will interface with the RailCorp signallers in the Auburn and Granville signal boxes for all train movements leaving the PPP Yard Area to the RailCorp network. The Yard Controller will also interface with the RailCorp signallers in the Auburn and Granville signal boxes whenever a change of control for one or more of the Access Control Areas on the Down Relief is required. (Later during Stage 3 - the interface will be with the RailCorp signallers at Strathfield - for movements from and to the PPP Yard Area)

PPP Co. is to provide a Yard Control facility that will have:

- Visual identification (eg via CCTV and/or Track Circuits) of all tracks in the Maintenance Facility under its control.
- 24 hour operation

5.1.1 DUAL ACCESS CONTROL AREAS

To facilitate safe and efficient management of control on the Commissioning Track section of the Down Relief, three Access Control Areas will be established with a form of dual access control as shown on drawings in Attachment 1. These Access Control Areas will each be of sufficient length to receive an 8-car Set (plus stopping distance) and are located at:

- Access Control Area 1 - Spans both sides of Clyburn Junction
- Access Control Area 2 – Auburn end of the Commissioning Track.
- Access Control Area 3 – Granville end of the Commissioning Track.

The Access Control Areas will each be managed via an access control mechanism which serves to change the mode of control of train movements within and entering / exiting each of the areas. The operating mode of each Access Control Area must be capable of being changed independently of the other two areas. Two modes of control are to be provided for each area, namely:

- "PPP Co Control" and,
- "RailCorp Control".

Note: Both the PPP Yard Controller and the appropriate RailCorp signaller must confirm acceptance of change from one operating mode to the other.

See also Section 11.

5.2 STAGE 1 AREAS OF CONTROL

RailCorp will control:

- All train movements entering / leaving the Auburn end of the Down Relief line into the PPP Maintenance Facility sidings, Manildra and MainTrain.
- In particular RailCorp will control all train movements into the following PPP Co. Roads from the Auburn end of the Down Relief:
  - Bypass Road 1
  - Arrival Road 1
  - Arrival Road 2

  Note: PPP Co. Will be required to keep at least one of these roads clear at all times to allow RailCorp to move trains off their Main Lines and into the PPP Co. Facility as soon as the trains arrive at Auburn. This is to ensure trains waiting to enter the PPP Co. Yard and associated areas do not block the RailCorp Main Lines

- All train movements to and from the Down Relief via 705 crossover at Granville (only possible when Access Control Area 3 is under RailCorp control).
- All train movements between the network and the Down Relief via Clyburn Junction (only possible when Access Control Area 1 is under RailCorp control).
- All train movements to and from the Down Relief (Access Control Area 2 area) via 49 points at Auburn (only possible when Access Control Area 2 is under RailCorp control).

PPP Co. Yard Control will control:

- All mechanical yard points associated within the PPP Maintenance Facility
- Signals and Points on:
  - Departure Roads 1 to 4 up to RailCorp signal 21U.
  - The By Pass 1 Road (from the eastern connection to the MainTrain siding through to Access Control Area 3)
  - Train Washplant road
  - Wheel Profile Road
  - Car Turning Loop Road
  - All western turnouts to the Standing Roads West, including those on the Down Relief.
  - Turnouts to the Access Road 1 from the Down Relief.
  - The release of the MainTrain Siding to PPP Co By Pass Road 1 crossover

- Train movements on the Commissioning Track (Down Relief). Note that movements from one end to the other of the Commissioning Track through Access Control Area 1 will require Access Control Area 1 to be under PPP control.

5.3 STAGE 2 AREAS OF CONTROL

There is no change to the areas of control, which remain as shown above for Stage 1.

5.4 STAGE 3 AREAS OF CONTROL

With the commissioning of the new RailCorp signalling on the main Auburn to Granville corridor changes will occur to the areas of control.

RailCorp will control:

- All movements along the Down Relief line including:
  - Movements to/from the Down Suburban
  - Exit from the eastern-end of Arrival/Departure/Storage Road (1-8), By Pass 1, Manildra /MainTrain Sidings
  - Arrival/Departure/Storage road (1-8) *(Shall be under 'dual control' by both PPP Co and RailCorp)*
  - Entrance & exit to Access Road 1
  - Entrance & exit to the western-end of:
    - Standing Road West (1-6) (Shall be under 'dual control' by both PPP Co and RailCorp)
    - Wheel profile Road (The latter section shall be under 'dual control' by both PPP Co and RailCorp)
    - Train Wash (The latter section shall be under 'dual control' by both PPP Co and RailCorp)
    - By Pass 1 (The latter section shall be under 'dual control' by both PPP Co and RailCorp)

PPP Co. Yard Control will control:

- All mechanical yard points associated within the PPP Maintenance Facility
- Signals and Points on:
  - Arrival/Departure/Storage road (1-8) *(Shall be under 'dual control' by both PPP Co and RailCorp)*
  - The western exits from Arrival/Departure/Storage roads (1-8) commencing at the PPP Co stop boards through to the Maintenance building including:
    - Standing Road East (1-6)
    - Standing Road West (1-6) *(Shall be under 'dual control' by both PPP Co and RailCorp)*
    - The exit from the 'one car' MainTrain Siding including the derailer device
    - Train Washplant Road up to the western-end exit signal. *(The latter section shall be under 'dual control' by both PPP Co and RailCorp)*
    - Wheel Profile Road up to the western-end exit signal. *(The latter section shall be under 'dual control' by both PPP Co and RailCorp)*
    - Access Road 1 up to the western-end exit signal. *(The latter section shall be under 'dual control' by both PPP Co and RailCorp)*
  - The By Pass 1 Road from the eastern connection to the MainTrain siding through to the exit signal from the west end of the By Pass1 road immediately adjacent to the Train Washplant Facility. *(The latter section shall be under 'dual control' by both PPP Co and RailCorp)*
  - The release of the Maintrain Siding to PPP Co By Pass Road 1 crossover

.

The interfaces between the PPP Co. signalling and RailCorp signalling systems will be enhanced to provide increased flexibility and Dual Control of movements into / out of the PPP Co. Facility as detailed above including:

- Auburn end connections (arrival/departure/storage roads)
- Turnouts to the Access Road 1
- Granville end connections (Standing Roads West, Train Washplant Road, Wheel Profile Road and western end of Bypass Road 1)

Note: PPP Co. will be required to keep at least one road (at both the Auburn and Granville ends of the PPP Co. Facility) clear at all times, to allow RailCorp to move trains off their Main Lines and into the PPP Co. Facility, as soon as the trains arrive at the facility. This is to ensure trains waiting to enter the PPP Co. Facility and associated areas do not block the RailCorp Main Lines

6 TRACK LAYOUT

Key track elements for the PPP Maintenance Facility include:

- Maintenance roads within the Maintenance Building x 6 no.
- Storage Road x 8 no.
- Standing Road East x 6 no.
- Standing Road West x 6 no.
- A Bypass road around the facility.
- Underfloor Wheel Profiling Plant (UWPP) Facility road.
- Train Washplant Facility road.
- Car Turning Loop road around MainTrain.
- Access Road 1 to the Down Relief
- Connections between the eight Storage Roads and the six Standing Roads (East)
- Commissioning Track/Down Relief
- Connections between the By Pass Road and:
    - MainTrain Sidings
    - Car Turning loop
    - UWPP
    - Train wash plant

Turnout No.52 provides access from the Down Relief to:

- PPP Co. Maintenance Facility
- MainTrain Access
- Manildra

Turnout No.49 provides access to the Down Relief from the PPP Co. Departure roads

The Down Relief (West of the Auburn connections to the PPP Co, Facilities through to a Point 360m east of RailCorp crossover No.705) is to be used as a commissioning track by the PPP Co. during Stage 1. Appropriate operating procedures, which may include possession working, are to be agreed with RailCorp for the use of the Commissioning Track for testing purposes.

7 SIGNALLING AREAS

The new PPP Co Maintenance Facilities and adjoining yards connect onto the RailCorp network. As well as the new infrastructure and related signalling required to service the new yard layout associated with the Maintenance Facility some infrastructure and signalling changes are also required to the adjoining RailCorp network.

Therefore there are three distinct areas as follows:

- RailCorp network area
- PPP Co. Yard area
- Dual Access Control Areas

The three areas are shown in different colours on the Signalling Schematic Concept Design drawings.

Due to the different operational requirements within the three discreet areas there are different signalling requirements for each area.

This functional specification details the specific signalling requirements of these areas, as follows:

- General Signalling requirements common to all three areas are covered in section 8
- RailCorp Network area requirements are covered in section 9
- PPP Co. Yard area requirements are covered in section 10
- Access Control Area requirements are covered in section 11

8 SIGNALLING - GENERAL REQUIREMENTS

8.1 CONCEPT SIGNALLING SCHEMATIC

Concept Signalling Schematics have been developed for the new facility and its interfaces with the RailCorp Down Relief Line. The concept schematics have been prepared as a guide to the level of signalling required for estimating and project planning purposes.

The final number, positioning and form of signals will be determined by:

- A review of the final operational requirements – especially across the interfaces with the RailCorp network.
- A Risk assessment

The Concept Signalling requirements showing the Control Areas for each of the stages are shown on the following A3 drawings:

Stages 1 & 2 – Control Areas	SG0405297 (Sheet 1)	To	SG0405303 (Sheet 7)
Stages 3 – Control Areas	SG0405304 (Sheet 1)	To	SG0405310 (Sheet 7)

Copies of these drawings are included as Attachments 1 & 2 respectively

8.2 DESIGN STANDARDS FOR SIGNALLING AND RELATED SYSTEMS

The signalling, train control and related communications systems design must comply with all current relevant RailCorp design standards.

Details of the latest versions of the standards can be obtained from the RailCorp website.

Where there is no specific RailCorp standard the relevant Australian standards apply.

8.3 ELECTRICAL PROTECTION

The signalling, control and communications systems must be protected from any interference from other electrical power distribution systems, including the RailCorp 1500v DC Traction supply system.

The systems must also be protected from lightning and other electrical surges in accordance with the RailCorp standards.

Note: This site is particularly susceptible to lightning strikes.

8.4 OTHER

At all stages design and construction must make provision for future works as detailed in this specification and the accompanying schematics. Specifically, any cable conduits, pits or ducting required for signalling & telecoms cabling shall be provided, where necessary, during construction irrespective of whether they are relevant to that particular stage or future works. Similarly, provision must be made at every stage for buildings and equipment cases required for signalling & telecoms equipment.

9 SIGNALLING SCOPE - RAILCORP

9.1 SCOPE OF WORK

9.1.1 STAGES 1 & 2

The RailCorp scope of work associated with Stages 1 & 2 of the project is:

- Modify the points layouts and associated signalling on the turnouts leading to the PPP Yard area at the Auburn end of the Down Relief.
- Reinstate / Modify the control and indication of signal routes entering / exiting the Down Relief (Via No.705 Points - Granville End of the Down Relief).
- Design and construct Clyburn Junction.
- Alterations to signal boxes at Auburn and Granville as appropriate, including provision for three Access Control Areas.

9.1.2 STAGE 3

The RailCorp scope of work associated with Stage 3 of the project (as part of the general upgrading of signalling on the Auburn – Granville Main Line corridor) is:

- Upgrade the signalling along the Down Relief line to provide Main Line signals in addition to the shunt signals
- Enhance the signalling interfaces with the PPP Co. Signalling system to provide Dual control bi-directional entry / exit to all PPP Co. sidings

As part of the RailCorp resignalling of the corridor the existing signal boxes at Auburn and Granville will be replaced by a new signal box at Strathfield.

9.2 LINE SPEEDS

Speeds through the turnouts from the Down Relief are:

Crossover / Turnout	Speed
Down Relief turnout into PPP Yard Area – To Access Road 1	25 km/hr
Down Relief turnouts into PPP Yard Area – Two (2) Westernmost turnouts	25 km/hr
Down Suburban to Down Relief at points No. 53	25 km/hr
Down Suburban to Down Relief at points No.705	25 km/hr
Down Relief to PPP Co. Arrival Roads – points No. 52 & 51	15 km/hr
Down Relief to PPPCo. Departure Roads – points No. 49	25 km/hr
Down Suburban to Down Relief at Clyburn Junction	25 km/hr

Crossover / Turnout	Speed
Down Relief to Down Suburban at Clyburn Junction	25 km/hr

Note: Higher speeds on the Commissioning Track may be acceptable subject to suitable operations procedures being developed by PPP Co. and approved by RailCorp.

9.3 SIGNALLING REQUIREMENTS

9.3.1 SIGNALLING DESIGN CRITERIA

The key signalling design criteria are:

Design Criteria	
Overlaps (Emergency Braking)	GE 52A
Braking Distance (Service Braking)	GW 16 (See Note below) GE 62 in the non-Freight Yard
Signal Aspects	• Generally 4 Aspect Signalling • With additional Low speed, shunt indications where required • Shunt Signals

Note: Normal boards are to be provided to suit GW40 braked trains.

9.3.2 SIGNALLING INTERLOCKINGS

9.3.2.1 Stages 1 & 2

The new PPP Co. Signalling system will need to interface with the existing Relay Interlocking at Auburn and SSI Interlocking at Granville as noted on the attached control area drawings (see attachment 1).

Due to the age and condition of the Auburn interlocking and signal box control panel the changes have been kept to an absolute minimum. Alterations to the signalling for the modified track layout connecting to the PPP Co. Yard areas have been designed to allow the reuse of existing control panel switches.

In addition the signalling layout has been designed to eliminate / minimise changes to the Granville interlocking and associated control system.

Note: The Access Control Areas must be designed to ensure minimum changes to the RailCorp signalling systems at both Auburn and Granville.

In order to clearly define the limits of responsibilities between RailCorp and PPP Co suitable interface points shall be provided (by PPP Co), preferably on or near the physical boundary of the Maintenance Facility.

9.3.2.2 Stage 3

The PPP Co. Signalling system will need to interface with the new RailCorp signalling system that will be installed as part of the major resignalling of the Auburn – Granville corridor.

The implementation of a new RailCorp signalling system will allow for enhanced interfaces with the PPP Co. Signalling system, including the provision of bi-directional dual control working into the various PPP Co. sidings

In order to clearly define the limits of responsibilities between RailCorp and PPP Co suitable interface points shall be provided (by PPP Co), preferably on or near the physical boundary of the Maintenance Facility.

9.3.3 SIGNALLING FIELD EQUIPMENT TYPES

The following equipment types to be used, where required, are:

Item	Type
Signals	• Double Light (LED) Colour Light Signals • LED Shunt signals (post mounted)
Signal Profiles	Refer to Concept Signal Schematics
Train Stops	Electro-hydraulic JAH
Points	Electric T 84M point machines (trailable) with Emergency Operating Locks (EOL's).
Track Circuits	• Jeumont Schneider high voltage impulse track circuits over points - Single and double rail type. • CSEE Jointless - DPU's can be used for timing and conditional clearing.
Relays	All relays to be WSA Q type relays

Note: The exact location of all signals and height of posts will be determined by the Signal sighting committee.

9.3.4 ADDITIONAL SIGNALLING EQUIPMENT HOUSINGS

Double skinned stainless steel location cases, with flow through ventilation, are to be provided as required by the final design. The cases are to be designed and installed to ensure the heat control inside the cases is compatible with the requirements of the equipment installed within the cases, and to maintain internal temperatures at ambient.

Note: The exact number required and their location will depend on the final design.

9.3.5 ADDITIONAL SIGNALLING TELEPHONES

Telephone requirements are shown in the table below:

Location	Telephone Requirements
At Main Signals	Telephone required
At Points	A telephone, located adjacent to the Emergency Operations Lock

Note: The telephones to connect to the relevant RailCorp Signal Box (Auburn or Granville for Stages 1 & 2, and Strathfield for Stage 3)

9.3.6 CONTROL OF SIGNAL ROUTES

9.3.6.1 Stages 1 & 2

The control of the various train movements for Stages 1 & 2 (and associated signal routes) is shown below:

Routes / Train Movements	Controlled By
Routes Entering the PPP Yard Area (to the Arrival Roads 1 & 2 and By Pass Road 1) from the Down Relief line (Auburn End)	RailCorp Auburn Signal Box
Routes Exiting the PPP Yard Area (from Departure Roads 1-4) to the Down Relief line (Auburn End)	RailCorp Auburn Signal Box must clear RailCorp signal 21D to allow the PPP Co. Departure road signals to clear
Routes Entering / Exiting the Down Relief Access Control Area 2 Area from Auburn end of Down Relief (via 49 points)	RailCorp Auburn Signal Box (requires RailCorp to have control of Access Control Area 2)
Train Movements along the Commissioning Track (section of Down Relief)	• PPP Co. Yard Control (when all Access Control Areas are under PPP Co. control)

Routes / Train Movements	Controlled By
	• Co-ordinated PPP Co Yard and RailCorp control (when one or more Access Control Areas are under RailCorp control)
Routes Entering the PPP Co. Yard Area via Access Road 1	PPP Co. Yard Control
Routes Exiting the PPP Co. Yard Area via Access Road 1	• PPP Co. Yard Control (when Access Control Area 1 is under PPP Co. control) • Co-ordinated PPP Co Yard and RailCorp control (when Access Control Area 1 is under RailCorp control)
Routes Entering the Down Relief from the Down Suburban (via points B)	RailCorp Granville Signal Box (requires RailCorp to have control of Access Control Area 1)
Routes Entering / Exiting the Down Relief from the Down Suburban (via points C)	RailCorp Granville Signal Box (requires RailCorp to have control of Access Control Area 1)
Routes Entering / Exiting the PPP Co. Yard Area from the Commissioning Track via points “F” or “G”	PPP Co. Yard Control
Routes Entering the Down Relief (Via 705 crossover) from the RailCorp network	RailCorp Granville Signal Box (requires RailCorp to have control of Access Control Area 3)
Routes Exiting the Down Relief (Via 705 crossover) to the RailCorp network	RailCorp Granville Signal Box must clear RailCorp signal 221 to allow the PPP Co. Signal on the Down Relief to clear (requires RailCorp to have control of Access Control Area 3)

.

9.3.6.2 Stage 3

The control of the various train movements for Stage 3 (and associated signal routes) is shown below:

Routes / Train Movements	Controlled By
Routes Entering / Exiting the PPP Yard Area from the Down Relief line (Auburn End)	Dual Control - RailCorp / PPP Co.

Routes / Train Movements	Controlled By
Train Movements along the Down Relief	RailCorp – Strathfield Signal Box
Train movements through Clyburn Junction	RailCorp – Strathfield Signal Box
Routes Entering / Exiting the PPP Co. Yard Area via Access Road 1 (from midpoint of Down Relief line)	Dual Control - RailCorp / PPP Co.
Routes Entering / Exiting the PPP Co. Yard Area from the Down Relief via the Western most turnouts	Dual Control - RailCorp / PPP Co.
Routes Entering / Exiting the Down Relief (Via 705 crossover) from the RailCorp network	RailCorp – Strathfield Signal Box

10 SIGNALLING SCOPE – PPP CO

10.1 SCOPE OF WORK (TO BE UNDERTAKEN BY PPP CO)

Due to the volume of anticipated train movements throughout the area and the different parties involved it has been decided to provide a form of interlocked signalling throughout a large portion of the PPP Yard Area. A "Yard Controller" via a signalling control and indication system will control the signalled areas. The Yard Controller will also be responsible for train movements in the non-signalled areas of the yard.

10.1.1 STAGES 1 & 2

The PPP Co. scope of work for the PPP Yard Area associated with Stages 1&2 of the project is:

- Assist RailCorp with the modification of the points layouts and associated signalling (RailCorp Area) leading to the PPP Co. Yard area at the Auburn end of the Down Relief
- Provide interlocked shunt signals throughout the following sections of the PPP yard area as shown in blue on the signalling schematic drawings. In general it includes
    - Entrance and exit to arrival roads, departure roads, Access Road 1, Train Wash, Wheel Profile Road and Standing Roads West.
    - The Down Relief line along the section to be used as a Commissioning Track
    - Connections to MainTrain sidings from the By Pass Road 1
    - Connections to the Car Turning Loop
- PPP Co. to provide the required interfaces (at interface locations at the extremities of the PPP Co. Yard area and at Clyburn Junction) for connecting to the Auburn and Granville signal boxes.

10.1.2 STAGE 3

The PPP Co. scope of work for the PPP Yard Area associated with Stage 3 of the project is:

- Provide additional signalling on the Storage roads at the Auburn end of the Yard to convert them to Bi-directional Arrival / Departure / Storage Roads.
- Provide enhanced interfaces (at interface locations at the extremities of the PPP Co. Yard area) for connecting to the Strathfield Signal Box.

10.2 LINE SPEEDS

The maximum line speeds are:

Area	Speed
All lines throughout the PPP Yard Area	8 km/hr

Area	Speed
Through all turnouts and crossovers in the PPP Yard Area	8 km/hr
All lines across the Level Crossing	8 km/hr
Train Testing on the Commissioning Track	25 km/hr

Note: Higher speeds on the Commissioning Track may be acceptable subject to suitable operations procedures being developed by PPP Co. and approved by RailCorp.

10.3 SIGNALLING REQUIREMENTS

The Signalling and related Train Control and Communications requirements are covered in the following sections:

10.3.1 SIGNALLING DESIGN CRITERIA

The key signalling design criteria are:

Design Criteria	
Train Length	8 Car Suburban Set (Except as shown below)
	8 Car Inter-Urban "V" Set in the following areas: • Storage Road 5 • Storage Road 6 • Car Turning Loop (immediately after By Pass turnout)
Overlaps (Emergency Braking)	GE 52A (10m minimum)
Braking Distance (Service Braking)	GE 62

10.3.2 SIGNALLING INTERLOCKING CONFIGURATION

PPP Co. are to provide Microlok II interlockings to control the signalling within the PPP Yard Area

All signalling within the PPP Yard Area is to be designed and installed as a separate system from the signalling systems on the adjacent RailCorp Network subject to the necessary integration required for the Access Control Areas. All train movements in the PPP Yard Area (and Access Control Areas when under the control of the PPP Co. Yard Controller) are to be independent of the RailCorp Signallers. Wherever possible, failures on the RailCorp system must not impact on operations within the PPP Yard Area, and vice versa.

RFTA 00370

Microlok cardfiles are to be located at relevant signal locations with interconnection by duplicated single ~~multi-~~mode fibre optic links.

However interfacing between the PPP Yard Area and RailCorp systems shall be incorporated to provide the functionality listed below:

During Stage 1& 2:

- Dual Access Control (PPP Co. Yard Controller and the relevant RailCorp Auburn or Granville signaller.) for the Access Control Areas as detailed in section 11.

During Stage 3:

- Dual control (PPP Co. Yard Controller and RailCorp's Strathfield Signallers) for all train movements between the two areas.
- Transfer of Train Description (TD) Information between RailCorp and PPP Co.' s control systems

PPP Co shall provide the physical equipment necessary to interface to RailCorp systems; this will include signalling & telecoms equipment along with any necessary buildings/equipment rooms and power supplies. The interfacing shall be provided in such a manner as to clearly define the boundary between RailCorp and PPP Co equipment.

The number of Microlok II units required will depend on the final system design. The final system design must be in accordance with applicable RailCorp Microlok standards.

10.3.3 SIGNALLING FIELD EQUIPMENT TYPES

The following equipment types are proposed for the installation:

RFTA 00339

Item	Type
Signals	LED Shunt signals (post mounted) unless otherwise agreed by RailCorp).
Signal Profiles	Refer to Concept Signal Schematic
Train Stops	Electro-hydraulic JAH
Points – Power operation	Trailable Electric 84M points machines.
Points – Mechanical operation	Trailable Mechanical points.
Track Circuits	• Jeumont Schneider high voltage impulse track circuits - Single and double rail type.
Relays	All relays to be WSA Q type relays

Note: The exact location of all signals and height of posts will be determined by the Signal sighting committee.

10.3.4 SIGNALLING EQUIPMENT BUILDINGS AND HOUSINGS

10.3.4.1 Equipment Buildings

Three (3) Signalling equipment buildings / bungalows are required as shown on the concept signalling schematic drawings.

The buildings are to be designed and constructed by PPP Co. (using awnings, external shades, forced airflow or other appropriate construction methods) to ensure the heat control inside the buildings is:

- Compatible with the requirements of the equipment installed within the buildings
- Maintained at an acceptable temperature for maintenance staff to work within the building at all times of the year

Notes:

1) The number, size and positioning of these signalling equipment buildings are indicative only. The exact number required, their size and location will depend on the final system design.

2) For tendering purposes it should be assumed that the size of the buildings will be 6m by 4m.

10.3.4.2 Location Cases

Double skinned stainless steel location cases, with flow through ventilation, are to be provided by PPP Co. as required by the final design. The cases are to be designed and installed to ensure the heat control inside the cases is compatible with the requirements of the equipment installed within the cases, and to maintain internal temperatures at ambient.

Note: The number and positioning of these location cases, as shown on the concept signalling schematic, are indicative only. The exact number required and their location will depend on the final design.

10.3.5 SIGNALLING POWER SUPPLY

The Signalling power supply will be provided by PPP Co. from one central point and reticulated throughout the Yard area

The following power supply arrangements are required at the central power supply location

- Dual supplies – “Normal” and “Standby” with automatic changeover facilities.
- Power distribution (signalling mains) between signalling locations can be at Voltages up to 415V AC. The signalling distribution mains must be transformed down to a nominal 120 volts (at the signal equipment locations) for operating the signalling equipment.
- Changeover from the Normal supply to the Standby supply and back again must not cause any disruption to the signalling system. Line conditioners and UPS systems are

to be provided where required to ensure that the overall signalling / control system operates reliably.

- Visual "normal" and "backup" power status and alarm indications are required. These indications are to be displayed locally at each supply location and remotely, on the Controller's control panel, at the Control Centre

10.3.6 SIGNALLING TELEPHONES

Telephone requirements are shown in the table below:

Location	Telephone Requirements
At Signals	No telephone required
At motorised Points	No telephone required
At Ground Frame operated points	A telephone, located adjacent to the points, with a direct connection to the PPP Yard Control is required

10.3.7 CONTROL SYSTEM

10.3.7.1 Location

RFTA 00374

A new computer based control system, provided by PPP Co., is required to control and monitor all train movements within the signalled areas of the PPP Yard Area and across the various interfaces with the RailCorp Network.

The control system will be operated from a Control Room to be strategically located within the Yard Area so as to allow the Yard Controller to see as much of the Yard as possible.

It is proposed that the Yard Control will be in operation 24 hours a day, 7 days a week.

10.3.7.2 Key Requirements and Functionality

The control system must be in accordance with RailCorp standards and meet the following key requirements / functionality:

- Reliability / Availability
- Operator Interface
- Cover the required control area
- Train Describer facilities (For Arriving / Departing Services)
- Automatic Train Reporting (ATR) facilities (For Arriving / Departing Services)
- Electronic data logging and replay of all inputs and outputs.
- Interface to relevant RailCorp train control systems

10.3.7.3 Reliability / Availability

The control system must consist of a duplicated computer-based VDU (Visual Display Unit) system with automatic changeover (Hot Standby) facilities – to switch between computers in the event of one computer failing.

The changeover between systems shall not affect availability of the overall signalling system.

10.3.7.4 Operator Interface

The Train Control System must have operator input controls and screen displays based on RailCorp standards. LCD wide-screen displays to be provided for the controller's workstation.

The control system must be capable of controlling and displaying, over the control area, the following:

Item	Control	Display
Trains operating within the PPP Yard Area	Yes	Yes
Trains entering / leaving the PPP Yard Area at the interfaces with the adjacent RailCorp network	Yes (Dual control in conjunction with the relevant RailCorp signaller)	Yes
Trains approaching (on the RailCorp lines) the interfaces between the PPP Yard Area & RailCorp network	No (Under RailCorp control)	Yes

Notes: The exact requirements for the control of signal routes, for all stages, are detailed in section 9.3.6

The information displayed by the control system to the controller must provide all the information covered in the standards, including the following:

Item	Comment
Train location	Track circuit occupancy – individual track circuit resolution is required
Train Identification	Train Description required for trains standing at Departure signals waiting for clearance to enter the RailCorp network. (Train Description required for trains entering the PPP Yard from the RailCorp network - Stage 3 only)

Item	Comment
Routing information	Signal routes set
Signals	Signal status. Cleared or at stop
Points	Points position (Normal / reverse) and status (locked / free)
Dual Access Control Switches	Access Control Status – PPP Co. or RailCorp (Defining Auburn or Granville Signal Box)
Releasing Switches	Status
Power Supplies	Status

Note: Multiple switchable display layouts must be provided with the ability to select the level of information displayed at any one time so as minimise "clutter" on the displays. Display of information "by exception" to be provided wherever practical.

Indications of Approaching Trains

Indications of train movements approaching the PPP Co. controlled Yard areas from the RailCorp network are to be displayed on the new PPP Co. control system. The indications must extend back far enough to ensure adequate warning of trains approaching the various RailCorp / PPP Co. Area interfaces to enable the Yard Controller to set routes and not cause delays to the train services exiting the RailCorp network.

Indications of PPP Yard to be displayed in RailCorp's Signal Boxes

PPP Co is to procure, test and commission a LCD monitor that displays track occupancy for the Yard for subsequent installation into Auburn and Granville Boxes by RailCorp. This display is to show the relevant signal, track, and point indications that are available to the PPP Co. Yard Controller.

11 SIGNALLING – DUAL ACCESS CONTROL AREAS

11.1 GENERAL

The Down Relief line between signal 20D (near 46 catchpoints) at the Auburn end and signal 221 (near 705 points) at the Granville end will be used for a variety of Operational roles:

- Commissioning Track
- Provide access points for trains to move to and from the RailCorp network and the PPP Co. facility

To facilitate safe and efficient management of control on this Commissioning Track section of the Down Relief, three Access Control Areas will be established with a form of dual access control as shown on drawings in Attachment 1. These Access Control Areas will each be of sufficient length to receive an 8-car Set (plus stopping distance) and are located at:

- Access Control Area 1 - Spans both sides of Clyburn Junction
- Access Control Area 2 – Auburn end of the Commissioning Track.
- Access Control Area 3 – Granville end of the Commissioning Track.

The Access Control Area will each be managed via an access control mechanism which serves to change the mode of control of train movements within and entering / exiting each of the areas. The mode of each Access Control Area must be capable of being changed independently of the other two areas. Two modes of control are to be provided for each area, namely:

- "PPP Co Control" and,
- "RailCorp Control".

Note: Both the PPP Yard Controller and the appropriate RailCorp signaller must confirm acceptance of change from one operating mode to the other.

11.2 TRAIN OPERATIONS IN THE ACCESS CONTROL AREAS.

The control of train operations within these Access Control Areas will vary depending on the type of operation required. Train operations when the line is used as a "Commissioning Track" will need to be under the control of PPP Co. whilst train operations when trains are entering / leaving the particular Access Control Area to move from / to the RailCorp network must be under the control of the relevant RailCorp Signal Box.

The management of the Access Control Areas must be independent of each other so that each area can be individually switched to RailCorp or PPP Co. control.

With this flexibility the length of the Commissioning Track can be extended or reduced depending on the need for other trains to enter / exit the Down Relief and move from / to the RailCorp network.

11.3 CONTROL FOR THE ACCESS CONTROL AREAS.

The switching of control of each of the Access Control Areas between RailCorp and PPP Co. must be done in a safe manner and with the agreement of both the PPP Co and RailCorp signallers..

Three “Access Control” switches (or electronic equivalent) are to be provided on the PPP Co Yard Controller’s panel, one switch for each Access Control Area. The switches will allow the control of each Access Control Area to be changed from RailCorp to PPP Co. or vice versa.

To ensure that the control of the interfaces is not changed by the PPP Co. Yard controller without the agreement of the relevant RailCorp signaller, a Release/Accept arrangement is to be provided. The signalling system must not allow a change of control without both the PPP Co Yard Controller and the relevant RailCorp signaller agreeing to the change and operating an appropriate input to the system. This Dual control functionality must be provided in a manner that meets the operational requirements in a safe and robust way but also minimises the changes to the existing signalling systems at Auburn and Granville.

Indications showing the status of who has control of each Access Control Area must be provided on the PPP Co Yard Controller’s panel and on the relevant RailCorp signallers panels at Auburn or Granville.

Additional indications are to be provided for each Access Control Area to show

- that the PPP Co. Yard Controller has requested the RailCorp signaller to accept a change in control of the interface, or vice versa
- that the relevant RailCorp signaller has agreed to the change and released the “Access Switch” allowing the change in control to occur , or vice versa

These additional indications are to be displayed to both the PPP Co. Yard Controller and the relevant RailCorp signaller.

Change of control for each Access Control Area can only occur when safe for train movements and points and signals are in the appropriate safe state.

11.4 ACCESS CONTROL SWITCH OPERATION – IMPACT ON TRAIN OPERATIONS

The operation of the Access Switches for each Access Control Area will impact on the available train routes as follows;

Access Control Area	Access Control Set To	
	RailCorp	PPP Co.
1	Trains from Down Suburban can travel into Access Control Area 1 (via “B” crossover) up to signal CT7	Trains Can Not enter Access Control Area 1 from the Down Suburban
	Trains from Up Suburban can travel via Down Suburban (“D” crossover)	Trains Can Not enter Access Control Area 1 from the Up Suburban

Access Control Area	Access Control Set To	
	RailCorp	PPP Co.
	into Access Control Area 1 (via "C" crossover) up to signal CT4	
	Trains from Access Control Area 1 can exit via signal CT5 and "C" crossover onto the Down Suburban	Trains can enter Access Control Area 1 from either direction via one of the following signals: CT3 or AR2 or CT8
	Trains can not enter Access Control Area 1 from the Down Relief via signals CT3, AR2 or CT8, unless the route is accepted by RailCorp.	
2	Trains can enter Access Control Area 2 from the Down Relief via 49 & 46 points up to signal CT1	No Trains can enter Access Control Area 2 through 49 & 46 points.
	Trains can exit Access Control Area 2 onto the Down Relief via signal 20D	Trains can exit Access Control Area 2 west along Down Relief past signal CT1
	Trains can not enter Access Control Area 2 from the Down Relief via signal CT2 unless the route is accepted by RailCorp.	Trains can enter Access Control Area 2 via signal CT2 and travel up to signal 20D.
3	Trains can enter Access Control Area 3 from the Down Suburban via signal 234 and 705 points and travel up to signal CT10	Trains can enter Access Control Area 3 from the Down Relief via signal CT9 and travel up to signal 221.
	Trains can exit the Access Control Area 3 onto the Down Suburban via signal 221 and 705 points	Trains can exit Access Control Area 3 east along the Down Relief via signal CT10.
	Trains can not enter Access Control Area 3 from the Down Relief via signal CT9 unless the route is accepted by RailCorp.	

12 CONSTRUCTION

12.1 GENERAL

The Signalling must be in accordance with RailCorp standards for Signalling, and Communications systems.

All materials used must meet the requirements set out in the relevant RailCorp standards.

See the RailCorp website for details of the latest standards.

Where there is no specific RailCorp standard the relevant Australian standards apply.

12.2 CONSTRUCTION AREAS

The relevant RailCorp and PPP Co. construction areas and responsibilities are shown in colour on a version of the signalling schematic drawings.

The Concept Signalling requirements showing the Construction Areas for each of the stages are shown on the following A3 drawings:

Stages 1 & 2 – Construction Areas	SG0405311 (Sheet 1)	To	SG0405317 (Sheet 7)
Stages 3 – Construction Areas	SG0405318 (Sheet 1)	To	SG0405324 (Sheet 7)

Copies of these drawings are included as Attachments 3 & 4 respectively

12.3 SPECIFIC REQUIREMENTS

Provision must be made for the Interfaces to the RailCorp network – including RailCorp's control of all trains entering the By Pass 1, Arrival 1, Arrival 2 and Commissioning Track/Down Relief during stage 1 as detailed on the attached signalling drawings.

Provision must also be made during the construction of Stage 1 for the requirements of Stages 2 & 3.

These requirements include:

- All cable routes, underline crossings and pits
- All conduits including spares
- Buildings
- Location cases
- Power supplies
- Interfaces to the RailCorp network
- Suitable method of access by RailCorp personnel

13 STAGEWORK

PPP Co. will be required to undertake stageworks impacting on the existing RailCorp signalling system to accommodate the various construction activities associated with the PPP Co. Yard works.

Staging works to be undertaken by PPP Co. include:

- Removal and / or relocation of existing RailCorp signalling equipment, cables and cable routes and provision / utilisation of some of the new signalling components, including signals, point machines and cable routes /ULX's.
- Adjustment and / or reconfiguration of existing track circuits and track bonding and utilisation of new ULX's, cable routes utilisation of some of the new signalling components, especially cable routes. ULX's and bonding

PPP Co. must design and implement the stageworks to minimise:

- The impact on the existing RailCorp signalling system.
- The impact on train services, especially RailCorp services.
- The work required for commissioning of the new signalling system.

14 ATTACHMENTS

Attachment 1 – Stages 1 & 2 Control Areas - Concept Signalling Schematic

- SG0405297, Sheet 1 of 7, Rev03
- SG0405298, Sheet 2 of 7, Rev03
- SG0405299 , Sheet 3 of 7, Rev03
- SG0405300 , Sheet 4 of 7, Rev03
- SG0405301, Sheet 5 of 7, Rev03
- SG0405302, Sheet 6 of 7, Rev03
- SG0405303, Sheet 7 of 7, Rev02

Attachment 2 – Stage 3 Control Areas - Concept Signalling Schematic

- SG0405304, Sheet 1 of 7, Rev01
- SG0405305, Sheet 2 of 7, Rev01
- SG0405306, Sheet 3 of 7, Rev01
- SG0405307, Sheet 4 of 7, Rev01
- SG0405308, Sheet 5 of 7, Rev01
- SG0405309, Sheet 6 of 7, Rev01
- SG0405310, Sheet 7 of 7, Rev01

Note: Stage 3 details (attachment 2) have NOT been updated to reflect Clyburn Junction, but no changes to the control areas depicted result from its inclusion. Drawing numbers listed above are as per Rev 04 of this document, and have not been issued with subsequent revisions.

Attachment 3 – Stages 1 & 2 Construction Areas - Concept Signalling Schematic

- SG0405311, Sheet 1 of 7, Rev03
- SG0405312, Sheet 2 of 7, Rev03
- SG0405313 , Sheet 3 of 7, Rev03
- SG0405314 , Sheet 4 of 7, Rev03
- SG0405315, Sheet 5 of 7, Rev03
- SG0405316, Sheet 6 of 7, Rev03
- SG0405317, Sheet 7 of 7, Rev03

Attachment 4 – Stage 3 Construction Areas - Concept Signalling Schematic

- SG0405318, Sheet 1 of 7, Rev01
- SG0405319, Sheet 2 of 7, Rev01
- SG0405320, Sheet 3 of 7, Rev01
- SG0405321, Sheet 4 of 7, Rev01
- SG0405322, Sheet 5 of 7, Rev01
- SG0405323, Sheet 6 of 7, Rev01
- SG0405324, Sheet 7 of 7, Rev01

Note: Stage 3 details (attachment 4) have NOT been updated to reflect Clyburn Junction, the construction of which is RailCorp scope, noting that allowance for integration into the signalling systems must be made during Stage 1. Drawing numbers listed above are as per Rev 04 of this document, and have not been issued with subsequent revisions.

14.1 ATTACHMENT 1 - STAGES 1 & 2 CONTROL AREAS

SG0405297 (Sheet 1) to SG0405303 (Sheet 7)

14.2 ATTACHMENT 2 - STAGE 3 CONTROL AREAS

SG0405304 (Sheet 1) to SG0405310 (Sheet 7)

Note: Not reissued with Rev06.

14.3 ATTACHMENT 3 - STAGES 1 & 2 CONSTRUCTION AREAS

SG0405311 (Sheet 1) to SG0405317 (Sheet 7)

14.4 ATTACHMENT 4 - STAGE 3 CONSTRUCTION AREAS

SG0405318 (Sheet 1) to SG0405324 (Sheet 7)

Note: Not reissued with Rev06.

RFTA

00358

ATTACHMENT 8: RFTA00358 ATTACHMENTS

Attachment 8.1: A-001 SITE PLAN.PDF

Attachment 8.2: A-002B GROUND FLOOR PLAN.PDF

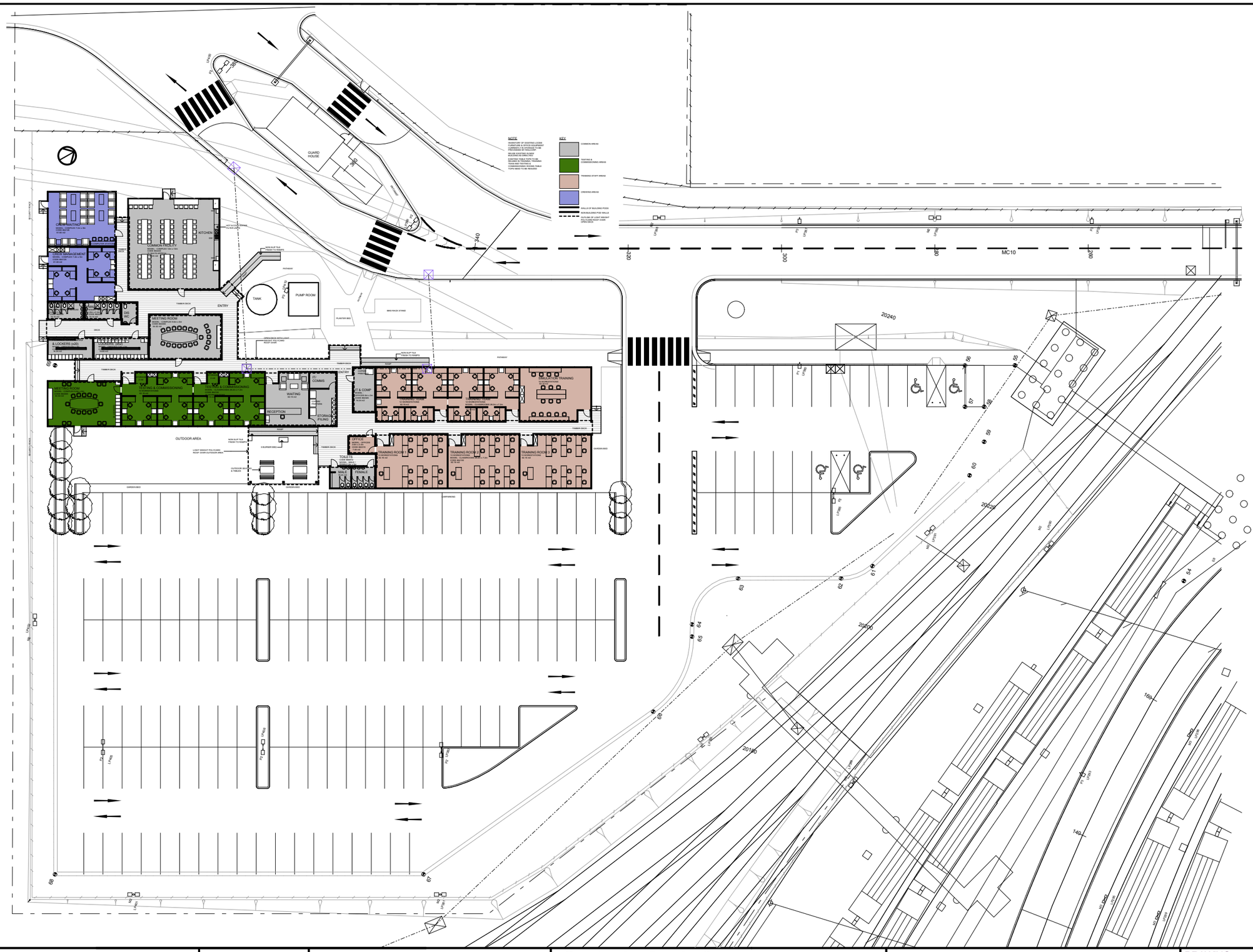
Attachment 8.3: Construction Summary Form - Comms SP2.doc

Attachment 8.4: Construction Summary Form - Temporary building Architectural Services 060510.doc

Attachment 8.5: Electrical Supply datasheet.doc

Attachment 8.6: Training Facility Concept Drainage 01.pdf

Attachment 8.7: Training Stormwater datasheet 01.doc



AMENDMENTS				QA CHECK	
No.	Item	Drawn	Date	Architect	Director

NOTES

Principal Architect: Stephen Caldis Registration No: 4265

CALDIS COOK GROUP
ACN 051 302 900

ARCHITECTS
LEVEL 2,
45 CHIPPEN STREET
CHIPPENDALE
NSW 2008

TEL.(02) 9319 3077
FAX.(02) 9319 3577

ACN 051302900

Website:www.caldiscook.com
Email: projects@caldiscook.com

CLIENT
RailCorp

PROJECT
RailCorp AMF Facility
External Training / T&C /
Crew Staff Facility

STATUS PRELIMINARY

DRAWING
SITE PLAN

PROJECT No. 06-049

DWG.No. A-001

SCALE 1:500

DATE 14/04/2010

NOTE

INVENTORY OF EXISTING LOOSE FURNITURE & OFFICE EQUIPMENT CURRENTLY IN STORAGE TO BE PROVIDIDED BY RAILCORP.

REUSE EXISTING IN NEW BUILDING AS DIRECTED

EXISTING TABLE TOPS TO BE REUSED IN TRAINING, TRAINING TEAM AND TESTING & COMMISSIONING ROOMS,TABLE TOPS NEED TO BE RESIZED

KEY

- COMMON AREAS
- TESTING & COMMISSIONING AREAS
- TRAINING STAFF AREAS
- CREWING AREAS
- WALLS OF BUILDING PODS
- NON BUILDING POD WALLS
- OUTLINE OF LIGHT WEIGHT POLYCARD ROOF OVER OPEN DECK

SECURITY FENCE

GUARD HOUSE

360

PATHWAY

LP399

P2

340

320

CREW WAITING
MODEL : COMPLEX 7.2m x 9m
CODE 864125
61.60 m2

4 COMPUTER STATIONS

CREW MANAGEMENT
MODEL : COMPLEX 7.2m x 9m
CODE 864125
61.60 m2

TIMBER DECK

COMMON FACILITY
MODEL : COMPLEX 12m x 12m
CODE 864220
70 SEATS APPROX.
139.24 m2

KITCHEN

F

MW

DW

HOT & COLD WATER FILTER UNITS

NON SLIP TILE FINISH TO RAMPS

RAMP

PATHWAY

TANK

LP410

P3

PUMP ROOM

PATHWAY

BIKE RACK STAND

PLANTER BED

FEMALE
MODEL : ABLUTION BLOCKS
4.8m x 2.4m
CODE 865220
10.12 m2

MALE
MODEL : ABLUTION BLOCKS
4.8m x 2.4m
CODE 865220
10.12 m2

DIS WC

TIMBER DECK

ENTRY

MEETING ROOM
MODEL : COMPLEX 9.6m x 6m
CODE 864065
54.52 m2

DECK

FEMALE CHANGING & LOCKERS (x20)
MODEL : OFFICES 6m x 3m
CODE 862325
16.24 m2

MALE CHANGING & LOCKERS (x52)
MODEL : OFFICES 7.2m x 3m
CODE 862330
19.60 m2

OPEN DECK WITH LIGHT WEIGHT POLYCARD ROOF OVER

NON SLIP TILE FINISH TO RAMPS

RAMP

PATHWAY

69

TIMBER DECK

ENTRY

COPIER/ PRINTERS

IT & COMP
MODEL : OFFICES 6m x 3m
CODE 862325
16.24 m2

OFFICE AREA
12 WORKSTATIONS
62.15 m2

TRAINING TEAM
12 WORKSTATIONS
MODEL : CLASSROOMS 28.2m x 7.2m
CODE 864150
62.19 m2

SIMULATION TRAINING
15 WORKSTATIONS
62.16 m2

MEETING ROOM
MODEL : COMPLEX 9.6m x 6m
CODE 864065
54.52 m2

20 LOCKERS

STORAGE 2 m2

TESTING & COMMISSIONING
10 WORKSTATIONS
62.19 m2

STORAGE 2 m2

TESTING & COMMISSIONING
MODEL : CLASSROOMS 28.2m x 7.2m
CODE 864150
10 WORKSTATIONS
62.15 m2

IT/ COMMS

WAITING
62.15 m2

COPIER/ PRINTERS

RECEPTION

FAX

STORAGE /FILING

RAMP

TIMBER DECK

OUTDOOR AREA

NON SLIP TILE FINISH TO RAMPS

5 BURNER BBQ

LIGHT WEIGHT POLYCARD ROOF OVER OUTDOOR AREA

OUTDOOR SEATING & TABLES

OFFICE
MODEL : OFFICES
3.6m x 2.4m
CODE 862310
7.48 m2

TOILETS
CODE 866910
MODEL : MALE / FEMALE 6m x 3m

MALE
16.24 m2

FEMALE

TRAINING ROOM 1
13 WORKSTATIONS
62.16 m2

TRAINING ROOM 2
13 WORKSTATIONS
MODEL : CLASSROOMS 28.2m x 7.2m
CODE 864150
62.19 m2

TRAINING ROOM 3
13 WORKSTATIONS
62.15 m2

GARDEN BED

GARDEN BED

GARDEN BED

CARPARKING

SECURITY FENCE

2 GROUND FLOOR PLAN POD OPTION
Scale 1:200

AMENDMENTS

No.	Item	Drawn	Date
A	ADD DOOR TO TRAINING ROOM 1 & 2, CHANGE ONE TRAINGING ROOM TO COMMON AREA.	GK	03.05.10
B	AMEND TRAINING ROOM 1 & 2	GK	03.05.10

QA CHECK

Architect Director

NOTES

Principal Architect: Stephen Caldis Registration No: 4265

CALDIS COOK GROUP
ACN 051 302 900

ARCHITECTS
LEVEL 2,
45 CHIPPEN STREET
CHIPPENDALE
NSW 2008
TEL.(02) 9319 3077
FAX.(02) 9319 3577
ACN 051302900
Website:www.caldiscook.com
Email: projects@caldiscook.com

CLIENT
RailCorp

PROJECT
RailCorp AMF Facility
External Training / T&C /
Crew Staff Facility

STATUS PRELIMINARY

DRAWING
GROUND FLOOR PLAN
POD OPTION

PROJECT No. 06-049

DWG.No. A-002B

SCALE 1:200

DATE 3/05/2010

Feasibility Investigation – Auburn Maintenance Facility – RailCorp Staff Facilities

Construction Requirements Summary - Concept

Design Discipline: COMMUNICATIONS AND IT		
Component:	SP1 Existing Office Area ☒	SP2 New External Facility ☑
Reference Drawings / Sketches: Caldis Cook Group – POD Option Drawing A-003		
Description of Works proposed: Provision of Desk Telephones & IT Network in for revised office layout		
Assumptions: Telephones will be provisioned as VoIP over RailCorp ICT Network Phones will be capable of providing data port for PC connection Single Data Outlet will serve Phone and PC solution (to minimize excessive wiring cost) Each Desk will have a one Phone/Date outlet Second Data connection required in Training/Meeting rooms		

Listing of proposed Works (Part 1 - Modification Works)	Comment (if needed)
1. Removal of ceiling in MF to gain access to existing Comms and IT cable trays from existing IT room to cable route adjacent to *Standing Road West 4*.	Required to enable new cables to be laid.
2.	
3.	
4.	
5.	
6.	

Cont'd

Listing of proposed Works (Part 2 – New Works)	Comment (if needed)
1. Provision of LAN router in existing MF RailCorp rack to interconnect to new LAN equipment in POD building. Drawing DEP-DRG-IF-ELE-4000-_0-00	OPTION is for new Fibre Optic cable to be laid from RailCorp ICT interconnection point (in Warehouse building) POD location. To be provisioned through RailCorp ICT group (TBC).
2. OPTION: Provision of additional LAN router and cabling to provide back up link via alternative cable to RailCorp ICT network	
3. OPTION: Installation of 30-pair tie cable to new ICT room in temporary building from RailCorp PABX interconnection point in Warehouse building outside PPP site.	Only to be provisioned if RailCorp have an identified need for direct circuits (e.g. for alarms, back up phone, staff public call box facility)
4. Installation of Fibre optic cable to new ICT room in POD building from either RailCorp rack in PPP MF building or RailCorp IT interconnection point in Warehouse building outside PPP site.	Design detail to be determined during design taking into account ICT capacity requirements, and backup requirements.
5. Provision of new ICT room in POD building	
6. Provision of ICT cabinet in new ICT room in POD building	
7. Provision of Air Conditioning equipment in new ICT room.	
8. Provision of minimum 70 (depending on finalised requirements for data ports in training/meeting rooms) workstation LAN outlets from new RailCorp LAN equipment in new IT cabinet	To be provisioned through RailCorp ICT group (TBC).
9. Supply of 60 new RailCorp telephone instruments for 60 workstation positions and training /meeting rooms	To be provisioned through RailCorp ICT group (TBC).
10. Provision of LAN equipment in POD LAN room, including routers/ POE switches and associated data equipment	RailCorp ICT to specify exact equipment requirements following capacity design
11. Testing of LAN and Telephone cables in IT room and on new desk positions	
12. OPTION: Provision of public call box for staff.	
13. OPTION: Provision of access and security systems	Determination by RailCorp as to requirements and if a need to extend to a RailCorp monitoring centre is needed
14.	

15.	

Indicative duration estimate for design component:	Days:
Indicative duration estimate for construction component:	Days:

This Construction Requirements Summary is intended as a high-level Concept stage output to provide relevant information for use of the Client for the purpose of which it has been prepared, defined under the Client's Scope documentation, and Halcrow / Aurecon undertakes no duty to or accepts any responsibility to any third party who may rely upon this document.

Feasibility Investigation – Auburn Maintenance Facility – RailCorp Staff Facilities
Construction Requirements Summary - Concept

Design Discipline: Architectural Services Date 14/04/2010		
Component:	SP1 Existing Office Area ☒	SP2 New External Facility ☑
Reference Drawings / Sketches: A-003B		
Description of Works proposed: Provide temporary external buildings for AMF Railcorp Training Facilities		

Listing of proposed New Works	Comment (if needed)
1. <u>Common Area Facilities</u> Common Facility Room Portable Buildings Model : Complex 12m x 12m Code: 864220 Area 139m^2 Floor Finish Non slip Vinyl 8 New Tables 70 New Chairs Kitchen Reception, Lounge, Storage, Filing & IT / Comms Room Portable Buildings Part of Classroom Model : Classrooms 28.2m x 7.2m Code: 864150 Area 62m^2 Floor Finish Carpet, Anti Static to IT / Comms Room 3 New Lounge Chairs 1 New Coffee Table 2 New Side Tables 3 Copier / Printer 1 Fax 6 Filing Cabinets IT & COMP Room Portable Buildings Model : Offices 6m x 3m	<u>Note</u> Portable Building Model Classrooms 28.2m x 7.2m, Code 864150 is a 3 room unit model. Window Bars to all windows. Photo Copier Size needs to be confirmed. Notice Boards, White boards and audiovisual has not been included. Portable Building supplier to supply air conditioning units to their building pods.

Code: 862325
Area 16.24m^2
Floor Finish Anti Static Vinyl
1 Copier / Printer

Female Toilets & Shower
Portable Buildings
Model : Ablution Block 4.8m x 2.4m
Code: 865220
Area 10m^2
Floor Finish Non slip Vinyl
3 Toilets
1 Shower
3 Wash basins
1 Hot water unit

Male Toilets & Shower
Portable Buildings
Model : Ablution Block 4.8m x 2.4m
Code: 865220
Area 10m^2
Floor Finish Non slip Vinyl
3 Toilets
1 Shower
3 Wash basins
1 Hot water unit

Disabled Toilet
Non portable building
Floor Finish Non slip Vinyl

Female Changing & Lockers
Portable Buildings
Model : Office 6m x 3m
Code: 862325
Area 16.24m^2
Floor Finish Non slip Vinyl
20 Lockers 450 x 600 x 1000mm
2 Bench Seats

Male Changing & Lockers
Portable Buildings
Model : Office 7.2m x 3m
Code: 862330
Area 19.60m^2
Floor Finish Non slip Vinyl
52 Lockers 450 x 600 x 1000mm
1 Bench Seats

Meeting Room Portable Buildings Model : Complex 9.6m x 6m Code: 864065 Area 54.52m^2 Floor Finish Carpet 1 Boardroom Table 20 Chairs 1 White Board Toilets Male & Female Portable Buildings Model : Male / Female 6m x 3m Code: 866910 Area 16.24m^2 Floor Finish Non slip Vinyl <u>Female Cubicle</u> 4 Toilets 3 Wash Basins <u>Male Cubicle</u> 2 Toilets 2 Wash Basins 1 Urinal	
2. <u>Crewing Area</u> Crew Management Room Portable Buildings Model : Complex 7.2m x 9m Code: 864125 Area 61.60m^2 Floor Finish Carpet 8 Workstations 2 Cupboards 10 Cabinets Crew Waiting Room Portable Buildings Model : Complex 7.2m x 9m	

Code: 864125 Area 61.60m^2 Floor Finish Carpet 20 Reuse existing Lounge Chairs 4 Reused exiting Coffee Tables 2 New Side Tables 1 Long Table for 4 Computers Re use existing TVs	
3. Testing & Commissioning Area Facilities Meeting Room Portable Buildings Model : Complex 9.6m x 6m Code: 864065 Area 54.52m^2 Floor Finish Non slip Vinyl 1 Boardroom Table 20 Chairs 20 Lockers 450 x 600 x 1000mm Testing & Commissioning Rooms 2 Off Portable Buildings Part of Model : Classrooms 28.2m x 7.2m Code: 864150 Area 62m^2 Floor Finish Non slip Vinyl 10 Workstations 7 Cabinets 1 Storage room 2m^2	
4. Training Staff Area Facilities Two of the training rooms can be converted into a single training room if required Training Rooms 3 Off Portable Buildings Model : Classrooms 28.2m x 7.2m Code: 864150 Area 62m^2 Floor Finish Non slip Vinyl 13 New Tables 13 New Chairs 1 Cupboard Office Room Portable Buildings Model : Office 3.6m x 2.4m Code: 862310 Area 7.48m^2	

Floor Finish Carpet Training Team Rooms 2 Off Portable Buildings Part of Model : Classrooms 28.2m x 7.2m Code: 864150 Area 62m^2 Floor Finish Non slip Vinyl 12 Workstations 7 Cabinets Simulation Training Room Portable Buildings Part of Model : Classrooms 28.2m x 7.2m Code: 864150 Area 62m^2 Floor Finish Non slip Vinyl 4 Long Tables 15 Chairs 2 Cupboards.	
5.	
6.	
7.	
8.	

Cont'd

Listing of proposed New Works	Comment (if needed)
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	

Indicative duration estimate for design component:	Days:
Indicative duration estimate for construction component:	Days:

This Construction Requirements Summary is intended as a high-level Concept stage output to provide relevant information for use of the Client for the purpose of which it has been prepared, defined under the Client's Scope documentation and Halcrow / Aurecon undertakes no duty to or accepts any responsibility to any third party who may rely upon this document.

Feasibility Investigation – Auburn Maintenance Facility – RailCorp Staff Facilities

Construction Requirements Summary - Concept

Design Discipline: Electrical Services		
Component:	SP1 Existing Office Area ☒	SP2 New External Facility ☑
Reference Drawings / Sketches: Maximum electrical demand		
Description of Works proposed: Provide a power supply to the AMF Railcorp Staff Facilities		

Listing of proposed Works (Part 1 - Modification Works)	Comment (if needed)
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	

Cont'd

Listing of proposed Works (Part 2 – New Works)	Comment (if needed)
1. Provide a 160A 400V/3phase/50Hz power supply to the AMF Railcorp Staff Facilities (drawing A-003 B). This electrical demand has been estimated based on the assumptions listed below. Small power design to include power densities as follows: - 30W/m2 to workstation/training areas - 20W/m2 to meeting rooms, kitchen and tea rooms - 5W/m2 to other areas including corridors - 40W/m2 to A/C areas (split A/C) - IT rooms at 10kW each - 10% for hydraulic and fire services. - 20% spare capacity.	
2. Hot water heaters to comprise instantaneous electrical water heaters to amenities and kitchen plus a HWU/CWU to the kitchen. Diversities to AS3000.	
3. HVAC design based on split type wall mounted AC units. Ventilation to general area utilizing opening windows. Assumes all insulation and glazing to BCA requirements. Diversities to AS3000. HVAC not provided in corridor spaces.	
4. Lighting design to include fluorescent lighting to a power density of not more than BCA Section J allowances.	
5. Kitchen equipment to include: - two microwaves - toaster - sandwich maker - coffee maker - fridge	
6. An electrical cupboard is required to house meter panel and distribution board. Recommended cupboard space is 1600x500x2400mm (LxWxH). The cupboard should be outside located near the female locker room close to the substation.	

Indicative duration estimate for design component:	Days:
Indicative duration estimate for construction component:	Days:

This Construction Requirements Summary is intended as a high-level Concept stage output to provide relevant information for use of the Client for the purpose of which it has been prepared, defined under the Client's Scope documentation and Halcrow / Aurecon undertakes no duty to or accepts any responsibility to any third party who may rely upon this document.

NEW PIT CONSTRUCTED OVER EXISTING SW LINE

CONCEPT STORMWATER LAYOUT 16/4/10 JOB 27804

NOTE: DOWNPIPE DRAINAGE INDICATIVE ONLY

CONFIRMATION REQUIRED IF CONNECTION INVERT IS SUITABLE MAY REQUIRE REGRADING TO PIT CP4.

CONNECT INTO EXISTING SW LINE

DEMOLISH AND REMOVE PORTION OF EXISTING SW LINE

RELOCATE SECTION OF EXISTING SW LINE (CLASS 4 FRC)

900 x 900 GRATED PIT (MP)

600 x 600 GRATED PITS

GULLY PIT

GULLY PIT

900 x 900 GRATED PIT

SUBSOIL DRAINAGE IN GARDEN AREAS

NOTE

INVENTORY OF EXISTING LOOSE FURNITURE & OFFICE EQUIPMENT CURRENTLY IN STORAGE TO BE PROVIDED BY RAILCORP

REUSE EXISTING IN NEW BUILDING AS DIRECTED

EXISTING TABLE TOPS TO BE REUSED IN TRAINING, TRAINING TEAM AND TESTING & COMMISSIONING ROOMS. TABLE TOPS NEED TO BE RESIZED

KEY

- COMMON AREAS
- TESTING & COMMISSIONING AREAS
- TRAINING STAFF AREAS
- CREWING AREAS
- WALLS OF BUILDING PODS
- NON BUILDING POD WALLS
- OUTLINE OF LIGHT WEIGHT POLYCARD ROOF OVER OPEN DECK

CREW WAITING
MODEL : COMPLEX 7.2m x 9m
CODE 864125
61.60 m2

4 COMPUTER STATIONS

CREW MANAGEMENT
MODEL : COMPLEX 7.2m x 9m
CODE 864125
61.60 m2

COMMON FACILITY
MODEL : COMPLEX 12m x 12m
CODE 864220
70 SEATS APPROX
131.24 m2

KITCHEN

FEMALE
MODEL : ABLUTION BLOCKS
4.8m x 2.4m
CODE 865220
10.12 m2

MALE
MODEL : ABLUTION BLOCKS
4.8m x 2.4m
CODE 865220
10.12 m2

DIS WC

MEETING ROOM
MODEL : COMPLEX 9.6m x 6m
CODE 864065
54.52 m2

FEMALE CHANGING & LOCKERS (x20)
MODEL : OFFICES 6m x 3m
CODE 862325
16.24 m2

MALE CHANGING & LOCKERS (x52)
MODEL : OFFICES 7.2m x 3m
CODE 862325
19.60 m2

TIMBER DECK

ENTRY

DECK

TANK

PUMP ROOM

LP410

P3

NON SLIP TILE FINISH TO RAMPS

RAMP

PATHWAY

SECURITY FENCE

GUARD HOUSE

360

PATHWAY

LP399

P2

340

320

BIKE RACK STAND

PLANTER BED

OPEN DECK WITH LIGHT WEIGHT POLYCARD ROOF OVER

MEETING ROOM
MODEL : COMPLEX 9.6m x 6m
CODE 864065
54.52 m2

TESTING & COMMISSIONING
16 WORKSTATIONS
62.15 m2

TESTING & COMMISSIONING
MODEL : CLASSROOMS 28.2m x 7.2m
CODE 864150
16 WORKSTATIONS
62.15 m2

LOUNGE
62.15 m2

IT/ COMMS

COPIER/ PRINTERS

RECEPTION

FAX

STORAGE /FILING

OUTDOOR AREA

NON SLIP TILE FINISH TO RAMPS

OPEN DECK WITH LIGHT WEIGHT POLYCARD ROOF OVER

COPY

IT & COMP
MODEL : OFFICES 6m x 3m
CODE 862325
16.24 m2

TRAINING TEAM
12 WORKSTATIONS
62.15 m2

TRAINING TEAM
12 WORKSTATIONS
MODEL : CLASSROOMS 28.2m x 7.2m
62.15 m2

SIMULATION TRAINING
15 WORKSTATIONS
62.16 m2

OFFICE
MODEL : OFFICES
3.6m x 2.4m
CODE 862310
7.48 m2

TOILETS
CODE 866910
MODEL : MALE / FEMALE 6m x 3m

MALE
16.24 m2

FEMALE

TRAINING ROOM 1
13 WORKSTATIONS
62.16 m2

TRAINING ROOM 2
13 WORKSTATIONS
MODEL : CLASSROOMS 28.2m x 7.2m
CODE 864150
62.15 m2

TRAINING ROOM 3
13 WORKSTATIONS
62.15 m2

GARDEN BED

ϕ150 ϕ150 ϕ150 ϕ150 ϕ150 ϕ150 ϕ150 ϕ150 ϕ150 ϕ150 ϕ150 ϕ150 ϕ150 ϕ150 ϕ225 ϕ300 ϕ100 SSD ϕ100 SSD ϕ450 ϕ450 ϕ525 ϕ525 S254

2 GROUND FLOOR PLAN POD OPTION
Scale 1:200

AMENDMENTS

Item	Drawn	Date
AMEND COMMON FACILITY & CREW MANAGEMENT AREA	GK	13.04.10
FLIP TESTING & COMMISSIONING & RECEPTION AREA POD REMOVE DECK	GK	14.04.10

QA CHECK

Architect Director

NOTES

Principal Architect: Stephen Caldis Registration No: 4265

CALDIS COOK GROUP

ARCHITECTS
LEVEL 2,
45 CHIPPEN STREET
CHIPPENDALE
NSW 2008

TEL.(02) 9319 3077
FAX.(02) 9319 3577

ACN 051302900

Website:www.caldiscook.com

CLIENT
CountryLink CityRail RailCorp

PROJECT
RailCorp AMF Facility
External Training / T&C / Crew Staff Facility

DRAWING
GROUND FLOOR PLAN POD OPTION

PROJECT No. 06-049

DWG.No. A-003 B

SCALE 1:200

DATE 14/04/2010

Feasibility Investigation – Auburn Maintenance Facility – RailCorp Staff Facilities

Design Discipline: Stormwater Drainage - Date 16/04/2010		
Component:	SP1 Existing Office Area ☒	SP2 New External Facility ☑
Reference Drawings / Sketches: Concept Stormwater Layout 16/4/10		
Description of Works proposed: Stormwater drainage adjustments to existing carpark and new drainage for buildings and courtyard.		

Listing of proposed New Works	Comment (if needed)
1. Part removal of existing carpark drainage	Refer to attached sketch
2. Installation of new stormwater lines for adjusted carpark and Training Facility buildings.	Connect into existing carpark drainage line near pit CP4 (Refer to attached sketch).
3. Installation of proposed buildings downpipe drainage.	No roof plans provided at this stage – indicative layout only (Refer to attached sketch).
4. Installation of junction pits, gully pits and grated pits.	Refer to attached sketch
5. Grading of courtyard area to suit drainage pits.	
6. Installation of subsoil drainage to new garden areas.	
7. Stormwater connection to rainwater tank including first flush and overflows if required.	To be confirmed

Cont'd

Listing of proposed New Works	Comment (if needed)
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	

Indicative duration estimate for design component:	Days:
Indicative duration estimate for construction component:	Days:

This Construction Requirements Summary is intended as a high-level Concept stage output to provide relevant information for use of the Client for the purpose of which it has been prepared, defined under the Client's Scope documentation and Halcrow / Aurecon undertakes no duty to or accepts any responsibility to any third party who may rely upon this document.