

PART E

TECHNICAL REQUIREMENTS

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1. SCOPE OF WORKS

The Works shall comprise of all materials, labour, plant and equipment as specified herein, or as required or shown, completed to the satisfaction and a standard accepted by RailCorp Representative.

This summary is to provide the Contractor with an understanding of the overall Works requirements. It shall be read in conjunction with all the parts of this RFT documents and the Tender Drawings.

The Contractor is deemed to have inspected the site and informed himself in regard to any matters that may be relevant.

Execute and complete the work in compliance with this RFT and Drawings listed:

1. Dilapidation Survey of the Site.
2. Prepare workshop drawings and documentation for the fabrication and installation works.
3. Prepare a mock up on site containing a set of barriers, sockets and storage rack for approval prior to fabrication.
4. Submit details of proposed locking device for the cross rails along with the tender and samples prior to the works commenced for acceptance by RailCorp.
5. Site establishment as required by Law. Contractor to provide its own Portable Toilets.
6. Demolition, cutting and coring on maintenance decks (Timber) on roads 1 and 2 and making good structure and surface including Works required to, strengthen platforms due to coring/cutting.
7. Removal of existing handrails and make good existing floor penetrations that are affected by removal of existing posts in an appropriate workmanship manner as required.
8. Cleaning and painting of existing handrails above the platforms as shown on the drawings & RFT.
9. Fabrication, supply and installation of aluminium removable safety barriers finished with safety yellow colour powder coated including the cross rails and locking devices as per the Drawings.
10. Fabrication, supply and Installation of galvanised steel support sockets to the existing steel members of the maintenance deck (including accessories).
11. Fabrication, supply and installation of steel storage racks for safety barriers painted safety yellow, including hardware and accessories as per Drawings.
12. Submit Inspection and Test Plans for critical activities and as built documents.
13. Engage required level of Protection Officers to comply with the Rail Safety Regulations.
14. Submit Warranty of 5 years for the aluminium products and powder coating and engineer's certification for the installation.
15. Operation and maintenance manuals and associated documents.
16. Briefing to RailCorp user on the operation and use.
17. Maintenance during the Defects Liability Period of 12 months.
18. Supply 10 off 1200 mm wide and 5 off 300 mm spare removable barriers for the entire contract.

19. The drawings are as listed below.

Document Ref. No.	Revision / Issue No.	Title
0406-03-01 sheet 1 of 2	0	Safety Barrier Road 1
0406-03-01 Sheet 2 of 2	0	Safety Barrier Road 1
0406-03-02 sheet 1 of 2	0	Safety Barrier Road 2
0406-03-02 sheet 2 of 2	0	Safety Barrier Road 2

2. CONSTRAINTS ON WORKS AND LIMITATIONS ON AVAILABILITY OF ROADS 1& 2

- Contractor cannot have exclusive use of roads at any time. Contractor is allowed to occupy and barricade off only two cars lengths on both sides of the platform of an area of a road at a any given time. Successful Completion and handing over of this section will enable the Contractor to take possession of other sections of that road.
- Successful Completion and handing over of a particular road will enable the Contractor to take possession of the other road. Second road will be available to the contractor only upon successfully handing over the first road. Conditions in point 1 will be applied.
- The road or section under possession must be returned to MMC Depot at the end of each working day in an operational condition for safe and smooth operation of Rollingstock maintenance works.
- At the beginning and end of each working day or hour, the Contractor must collect and return all the ANNET keys to the Depot supervisor. Failing this will cause delays and interruptions in moving the train from the affected road. Contractor to propose methodology to manage this process in its SSMP.
- **Road 2 is a busy road which services the lift shop.**
- MMC safe working policy requires that trains be placed on the roads, prior to any access to the high level platforms (via an ANNET Key system). However During these installation Works, this policy shall be waived and the Contractor will access to the high level platforms without the trains in position, after making safe working arrangements which comply with the OH&S Legislative requirements.
- Request to be made to the depot supervisor in advance for the isolation of roads and power.
- **Work hours:** Mortdale Service Centre operates the same servicing regime 7 days a week with little or no variation on weekends. Working during the weekend is acceptable and requires prior co-ordination with the MMC depot.
- During the weekdays roads will be available between 3.00 PM and 7 PM;
During the weekends roads will be available between 6.00 AM and 6.00 PM;
On an average 6 train movements are expected during this time.
- The contractor will be required to limit the level of noise, dust and sparks while completing theses works. Mortdale Maintenance Centre can restrict the use of a platform by locking down one side of the platform and depot will require access to all roads.
- The Contractor will be required to undergo a MMC specific Rail Safety induction and all workers must hold valid RISI (Rail Industry Safety Induction).
- The Contractor will require Protection Officer(s) for Rail Safety on site at all times during the construction.
- Allow for emergency occupation of roads as required by Depot with a minimum notice
- Delivery vehicle size restricted due to the space available within the roads. The Contractor will need to have prior agreement on size of any area required for storage of plant and equipment.
- **There is no provision at Mortdale for toilets, locker or meal room facilities for Contractors.**

- Off site car parking facilities available along Boundary road. Delivery is only through gate 3.
- Contractor shall enter the depot via gate 1, report at security and sign off.
- Contractor to bring own tools, extinguishers and other items required for construction.

3. GENERAL REQUIREMENTS

3.1. GENERAL

3.1.1. PRECEDENCE

Precedence

General: Requirements of subsequent work sections of the specification override conflicting requirements in this worksection.

3.1.2. CROSS REFERENCES

Common Technical Requirements

Associated work sections: Conform to the following:

- *Quality*
- *Metals and pre-finishes*

Cross Referencing

Within the text:

- Worksection titles are indicated by Italicised text
- Clause titles are indicated by Bold text

3.1.3. REFERENCED DOCUMENTS

Contractual Relationships

General: Responsibilities and duties of the Principal, Contractor and RailCorp Representative are not altered by requirements in the documents referenced in this specification.

Current Editions

General: Use referenced documents which are the editions, with amendments, current 3 months before the closing date for tenders, except where other editions or amendments are required by statutory authorities.

3.1.4. INTERPRETATION

Abbreviations

General: For the purpose of this worksection the abbreviations given below apply:

- APAS: Australian Paint Approval Scheme
- AS: Australian Standard
- BCA: Building Code of Australia
- CFC: Compressed Fibre Cement
- MS: Mid Steel

- NATA: National Association of Testing Authorities
- NZS: New Zealand Standard
- SS: Stainless Steel
- SSL: Scientific Services Laboratory – ActivFire register or Fire Protection Equipment

Definitions

General: For the purposes of this worksection the definitions given below apply.

- Attendance: “Attendance”, “provide attendance” and similar expressions mean “give assistance for examination and testing”.
- RailCorp Representative: is the person appointed by the “owner” or “principal”.
- Geotechnical site investigation: The process of evaluating the geotechnical characteristics of the site in the context of existing or proposed construction.
- Give notice: “Give notice”, “submit”, “advise”, “inform” and similar expressions mean “give notice” (submit, advise, inform) in writing to the RailCorp Representative”.
- Hold point: The activity cannot proceed without the approval of the RailCorp Representative.
- IP: “IP”, “IP code”, “IP rating” and similar expression have the same meaning as “IP Code” in AS 60529.
- Maintenance period: Synonymous with “Defects liability period”.
- Obtain: “Obtain”, “seek” and similar expressions mean “obtain (seek) in writing from the RailCorp Representative”.
- Professional Engineer: A person who is listed on the National Professional Engineers Register (NPER) in the relevant discipline at the relevant time.
- Metallic-coated steel: Includes zinc-coated steel, zinc/iron alloy-coated steel, and aluminium/zinc-coated steel.
- Pipe: Includes pipe and tube.
- Principal: “Principal” has the same meaning as “owner”, “client” and “proprietor” and is the party to whom the Contractor is legally bound to construct the works.
- Proprietary: “Proprietary” mean identifiable by naming manufacturer, supplier, installer, trade name, brand name, catalogue or reference number.
- Provide: “Provide” and similar expressions mean “supply and install”: Installation shall include development of the design beyond that documented.
- Tests:
 - Type tests: Tests carried out on an item identical with a production item, before delivery to the site.
 - Production tests: Tests carried out on a purchased item, before delivery to the site.
 - Site tests: Tests carried out on site.

- Completion tests: Tests carried out on completed installations or systems before the date for practical completion, to demonstrate that the installation or system, including components, controls and equipment, operates correctly, safely and efficiently, and meets performance and other requirements. The superintendent may direct that completion tests be carried out after the date for practical completion.
- Registered testing authority:
 - The CSIRO Division of Manufacturing and Infrastructure Technology (CSIRO-MIT).
 - An authority registered by the National Association of Testing Authorities (NATA) to test in the relevant field.
 - An organisation outside Australia recognised by NATA through mutual recognition agreement.
- Required: Means required by the documents, the local council or statutory authorities.
- If required: A conditional specification term for work which may be shown in the documents or be a legislative requirement.
- Samples: Includes samples, prototypes and sample panels.
- Supply: "Supply", "furnish" and similar expressions mean "supply only".
- Verification: Provision of evidence or proof that a performance requirement has been met or a default exists.
- Witness points: Provides an opportunity to attend an activity but does not involve an obligation. The activity can proceed without approval from the RailCorp Representative.

3.1.5. CONTRACT DOCUMENTS

Services Diagrammatic Layouts

General: Layouts of service lines, plant and equipment shown on the drawings are diagrammatic only, except where figured dimensions are provided or calculable.

Before commencing work:

- Obtain measurements and other necessary information.
- Coordinate the design and installation in conjunction with all trades.

Levels

General: Spot levels take precedence over contour lines and ground profile lines.

3.1.6. PERFORMANCE

General

General: If required, provide structures, installations and components as follows:

- Fixed access ways: To AS 1657.
- Structural design actions: To AS/NZS 1170.0 and the **Structural design actions schedule**.

3.1.7. INSPECTION

Notice

General: Minimum notice for inspections to be made: 48 HOURS.

Inspection: If notice of inspection is required in respect of parts of the works that are to be concealed, advise when the inspection can be made before concealment.

Attendance

General: Provide attendance.

3.1.8. SUBMISSIONS

Errors:

General: If a submission contains errors, make a new or amended submission as appropriate, indicating changes made since the previous submission.

Identification

General: Identify the project, contractor, subcontractor or supplier, manufacturer, applicable product, model number and options, as appropriate include pertinent contract document references. Include service connection requirements and product certification. Identify proposals for non-compliance with project requirements, and characteristics which may be detrimental to successful performance of the completed work.

Inspection and Testing Plan

General: Submit an inspection and testing plan which is consistent with the construction program. Include particulars of test stages and procedures.

Test Reports: Submit written reports on nominated tests.

Notice

Minimum notice: 48 hours

Materials and Components

Product certification: If product must conform to product certification schemes, submit evidence of conformance.

Product data: For proprietary equipment, submit the manufacturer's product data as follows:

- Technical specifications and drawings

- Type-test reports
- Performance and rating tables
- Recommendations for installation and maintenance
- Additional product data for services equipment:
 - Model name, designation and number
 - Country of origin and manufacture
 - Capacity of all system elements
 - Size, including required clearances for installation
 - Materials used in the construction

Proposed products schedules: If major products are not specified as proprietary items, submit a schedule of those proposed for use within 3 weeks of site possession.

Samples

Submission: Submit nominated samples

Incorporation of samples: If it is intended to incorporate samples into the works, submit proposals. Incorporate samples in the works which have been endorsed for incorporation. Do not incorporate other samples.

Retention of samples: Keep endorsed samples in good condition on site, until practical completion.

Shop Drawings

General: If required, submit dimensioned drawings showing details of the fabrication and installation of services and equipment, including relationship to building structure and other services, cable type and size, and marking details.

Diagrammatic layouts: Coordinate work shown diagrammatically in the contract documents, and submit dimensioned set-out drawings.

Submission medium:

- | | |
|--------------|----------------|
| - Electronic | PDF and DWG |
| - Hardcopy | B1 and A3 size |

3.2. PRODUCTS

3.2.1. TESTS

Notice

Notice: Give notice of time and place of nominated tests.

Minimum notice for inspections to be made >

Attendance

General: Provide attendance on tests.

Testing Authorities

General: Except for site tests, have tests carried out by a Registered Testing Authority.

- Reports: Submit copies of test reports, including certificates for type tests, showing the observations and results of tests and conformance or non-conformance with requirements.
- Site tests: Use instruments calibrated by authorities accredited by a Registered Testing Authority.

3.2.2. MATERIALS AND COMPONENTS

Consistency

General: For the whole quantity of material or product use the same manufacturer or source and provide consistent type, size, quality and appearance.

Corrosion Resistance

General: Conform to the following corrosivity category with regard to worksection corrosion resistance tables.

Corrosivity category: High – stray current environment

Manufacturers' or Suppliers' Recommendations

Proprietary items: Select, if no selection is given, and transport, deliver, store, handle, protect, finish, adjust, prepare for use, and provide manufactured items in accordance with the current written recommendations and instructions of the manufacturer or supplier.

Proprietary systems/assemblies: Assemble, install or fix to substrate in accordance with the current written recommendations and instructions of the manufacturer or supplier.

Project modifications: Advise of activities that supplement, or are contrary to, manufacturer's or supplier's written recommendations and instructions.

Product certification: If product must comply with product certification schemes, provide them in accordance with the certification requirements.

Proprietary Items

Implication: Identification of a proprietary item does not necessarily imply exclusive preference for the item so identified, but indicates the necessary properties of the item.

Alternatives: If alternatives are proposed, submit proposed alternatives and include samples, available technical information, reasons for proposed

substitutions and cost. If necessary, provide an English translation. State if provision of proposed alternatives will necessitate alteration to other parts of the works and advise consequent costs.

Sealed Containers

General: If materials or products are supplied by the manufacturer in closed or sealed containers or packages, bring the materials or products to the point of use in the original containers or packages.

3.3. PROTECTION OF SERVICES

Requirement: Ensure that all metal pipes and/or conduits, intended for burial below finished floor, is protected from stray current corrosion.

The correct procedure for installing metal pipe services underground around CityRail Electrified areas:

1. All metal pipe must be lagged in either Poly-Lag or Kemlag.
2. All joints i.e. tees, elbows, etc, must be lagged 100mm past either side of the exposed pipe/fitting with Denso Tape and hand fused/welded to create a smooth continuous bonding surface. (i.e. Denso Tape to be applied 100mm onto lagged pipe either side of the exposed pipe/fitting etc) Grey duct tape must be applied tightly and overlapping to provide a watertight application.
3. Lagged pipe must be checked for splits, cuts, etc. Before covering with soil etc. If damaged, above process must be applied to cover any exposed pipe-work.
4. Lagging, Denso Tape, Duct Tape must extend 300mm above ground level at entry, exit positions and for standpipes etc.
5. An isolation joint (Larco's Joint) must be installed above ground level at every metre to prevent electrolysis passing from CityRail's services to Water Board or Council mains. This is a Sydney Water regulation.
6. A Larco's Joint must be installed with an isolation valve where a supply service to a building or depot is installed off an existing service.

The above procedures are to prevent electrolysis entering metal pipe services causing the service to fail which can have the following results:

1. Costly repairs to renew complete water services, i.e. under slabs, inside walls and under tracks.
2. Standard damage to buildings and major property damage.
3. Platform and track subsidence.
4. Signal and Electrical failures and arcing of O.H. wiring.

Failure to comply with the above strict guidelines will result in electrolysis failing pipe-work within a period of one (1) month of installation.

It is extremely critical that the correct procedure is applied on all water services and all joints.

Failure to apply procedure to even only one joint will result in immediate failure of service.

3.4. FIBREGLASS WRAPPING TO UNISOLATED ELEMENTS

Requirement: Where it is not practical to maintain a 2.0 metre clearance between 1500V Overhead Wire Support structures and all metal elements including fence posts to be incorporated into the Works, provide fibreglass wrapping to the un-isolated element as follows:

1. Fibreglass to be a polyester resin reinforced with at least a two layer mat and longitudinal
 - Fibre to a minimum 50% glass content and continuous U.V. absorber, finished to a smooth even surface with a minimum thickness of 3 mm.
2. Materials used are to suit the process and the finish specified.
3. In accordance with AS1530 – Part 3, 1982, Early Fire Hazard Protection of materials, fibreglass materials used with the following indices:
 - Ignitability 0
 - Spread of Flame 0
 - Heat evolved 0
 - Smoke developed 5
 -

3.5. EXECUTION

3.5.1. COMPLETION

Samples

General: Remove unincorporated samples on completion.

Warranties

General: Name the Principal as warrantee in conformance with the **Warranty Schedule**. Register with manufacturers as necessary. Retain copies delivered with components and equipment.

Commencement: Commence warranty periods at practical completion or at acceptance of installation, if acceptance is not concurrent with practical completion.

Approval of Installer: If installation is not by manufacturer, and product warranty is conditional on the manufacturer's approval of the installer, submit the manufacturer's written approval of the installing firm.

3.5.2. RECORD DRAWINGS

General

General: Submit record drawings. Show the "as installed" locations of building elements, plant and equipment. Include "as installed" amendments to shop drawings. Show off-the-grid dimensions where applicable.

Date for submission: Within 2 weeks after practical completion.

Accuracy

Documents: Incorporate all modifications made during the progress of the work and testing period. Show any provisions for the future.

Endorsement: Sign and date all record drawings. Keep one set of shop drawings on site at all times expressly for the purpose of marking changes made during the progress of the works.

Drawing Layout

General: Use the same borders and title block as the contract drawings.

Quantity and Format

General: Refer to **Submissions**.

3.5.3. OPERATION AND MAINTENANCE MANUALS

General

General: Submit operation and maintenance manuals for installations.

Authors and compilers: Personnel experienced in the maintenance and operation of equipment and systems installed, and with editorial ability.

Referenced Documents: If referenced documents or technical work sections require that manuals be submitted, include corresponding material in the operation and maintenance manuals.

Subdivision: By installation or system, depending on the project size.

Date for submission: Within 2 weeks after practical completion.

Contents

General: Include the following:

- Certificates:
 - Certificates from authorities
 - Copies of manufacturers' warranties
 - Product certification
- Directory: Names, addresses, telephone and facsimile numbers of principal consultant, sub-consultants, contractor, subcontractors and names of responsible parties.
- Drawings and technical data: As necessary for the efficient operation and maintenance of the installation.
- Equipment descriptions:

- Name, address, telephone and facsimile numbers of the manufacturer and supplier of items of equipment installed, together with catalogue list numbers.
- Schedules (system by system) of equipment, stating locations, duties, performance figures and dates of manufacture. Provide a unique code number cross-referenced to the record and diagrammatic drawings and schedules, including spare parts schedule, for each item of equipment installed.
- Maintenance procedures:
 - Detailed recommendations for preventative maintenance frequency and procedures.
 - Manufacturer's technical literature as appropriate. Register with manufacturer as necessary. Retain copies delivered with equipment.
 - Safe trouble-shooting, disassembly, repair and reassembly, cleaning, alignment and adjustment, balancing and checking procedures. Provide logical step-by-step sequence of instructions for each procedure.
 - Schedule of spares recommended to be held on site, being those items subject to wear or deterioration and which may involve the principal in extended deliveries when replacements are required. Include complete nomenclature and model numbers, and local sources of supply.
- Operation procedures:
 - Manufacturer's technical literature as appropriate.
- Table of contents: For each volume. Title to match cover.

Format – Electronic Copies

Printing: Provide material that can be legibly printed on A4 size paper.

Scope: Provide the same material as specified for hardcopy in electronic format.

Quantity and format: Refer to **Electronic Submissions**.

Format – Hard Copy

General: A4 size loose leaf, in commercial quality, 4 ring binders with hard covers, each indexed, divided and titled. Include the following features:

- Cover: Identify each binder with typed or printed title "OPERATION AND MAINTENANCE MANUAL", to spine. Identify title of project, volume number, volume subject matter, and date of issue.
- Dividers: Durable divider for each separate element, with typed description of system and major equipment components. Clearly print short titles under laminated plastic tabs.
- Drawings: Fold drawings to A4 size and accommodate them in the binders so that they may be unfolded without being detached from the rings. Provide with reinforced punched binder tabs.
- Ring size: 50mm maximum, with compressor bars.
- Text: Manufacturer's printed data, including associated diagrams, or typewritten, single-sided on bond paper, in clear concise English.
- Number of copies: 3

3.5.4. CLEANING

Final Cleaning

General: Before practical completion, clean throughout, including all exterior and interior surfaces except those totally and permanently concealed from view.

Labels: Remove all labels not required for maintenance.

3.6. SELECTIONS

3.6.1. SCHEDULES

Structural Design Actions Schedule

Quantity and Symbol	Type or Location
Wind Actions	
Direction multiplier, M_d	1.0
Regional ultimate limit state design wind speed, $V_{R (ultimate)}$	50 mps
Regional serviceability limit state design wind speed $V_{R (serviceability)}$	38 mps
Shielding multiplier, M_s	Not applicable (1.0)
Terrain category	TC3
Topographic multiplier, M_t	Not applicable (1.0)

Warranty Schedule

Warranty	Form	Period
Aluminium Barriers	Manufacturer's Form for materials and installation together with Installation Warranty	5 Years
Powder coating	Manufacturer's Form for materials and powder coating together with Installation Warranty	5 Years

4. Metal Works

4.1. GENERAL

4.1.1. CROSS REFERENCES

General

Refer to the *General Requirements* section.

Related Sections

Refer to the following sections: Notes on Structural drawings, Joinery, Painting.

4.2. QUALITY

4.2.1. INSPECTION

Witness Points

Give sufficient notice so that inspection may be made of the following:

- Shop fabricated or assembled items ready for delivery to the site.
- Site erected assemblies on completion of erection, before covering up by cladding and encasing.
- Steel surfaces prepared for, and immediately before, site applied finishes.

4.2.2. SUBMISSIONS

Structural steel shop drawings

Submit shop drawings accompanied by an Engineer's Certificate of structural adequacy, in addition to items noted on Structural Engineer's drawings.

Structural details and specification notes show design intent only.

4.3. MATERIALS

4.3.1. METALS

Steel

Structural hollow section: To AS 1163.

Structural bars and sections: To AS/NZS 3679.1

Sheet: To AS/NZS 1595.

Steel for pre-finishes

Electric resistance welded pipe: To AS 1450 "bright".

Cold rolled bar: To AS 1443 "bright".

Cold rolled sheet: To AS 1595.

Designation: CA2S-E.

Coated Steel

Galvanised structural hollow sections: To AS 1163.

Zinc- coated sheet: To AS 1397.

-- Coating class for sheet: Comply with the recommendations of AS 1397 Appendix B.

Thickness: Metal thickness specified are base metal thicknesses.

Stainless Steel

Plate, sheet and strip: To ASTM A 240/A 240M.

Bars: To ASTM A 276.

Welded pipe (round): To AS 1769.

Welded pipe (square): To ASTM A 554.

Aluminium and Aluminium Alloys

Drawn rod, bar and strip: To AS/NZS 1865.

Extrusions: To AS/NZS 1866.

Drawn Pipe: To AS/NZS 1867.

Plate and sheets: To AS/NZS 1734.

4.4. METAL FINISHING

4.4.1. WORKMANSHIP

Preparation

General: Before applying decorative or protective pre-finishes to metal components, complete welding, cutting, drilling and other fabrication, and prepare the surface using a suitable method.

Standard: To AS 1627.

Priming steel surfaces: Where site painting is specific to otherwise uncoated mild steel or similar surfaces,

- prime after fabrication and before delivery to the works; and
- after installation, repair damaged priming and complete the coverage to un-primed surfaces.

Welding

Steel: To AS/NZS 1554.1.

Aluminium: To AS 1665.

Stainless steel: To AS/NZS 1554.6.

Finishing

Visible joints: Finish visible joints made by welding, brazing or soldering using methods appropriate to the class of work (including grinding or buffing) before further treatment such as painting, galvanising or electroplating. Ensure self-finished metals are without surface colour variations after jointing.

Damage

If pre-finishes are damaged, including damage caused by unauthorised site cutting or drilling, remove and replace the damaged item.

4.4.2. GALVANISING

Galvanising

General ferrous articles: To AS 1650.

- Minimum coating class (sheet): Z200.
- Coatings on steel wire: To AS/NZS 4534.
- Coating type for wire (minimum): Class W10Z.

Components in contact with concrete

Passivate galvanised surfaces to be cast into or in contact with concrete by dipping in 0.2% sodium dichromate solution.

Coating quality

General: Continuous, adherent, smooth, evenly distributed, free from defects detrimental to the end use of the finished article, such as lumps, blisters, gritty areas, uncoated spots, acids and black spots, dross and flux.

4.4.3. POWDER COATING

Thermostat powder coating

Standards: To AS 3715 or AS/NZS 4506 as appropriate.

Internal use: GPC P-155/1 or 4.

External use: GPC P-155/2 or 5.

Finish: Full gloss.

Preparation

General: Use chemical pre-treatments. If recommended, provide conversion coatings.

Unprotected steel: Remove rust to AS 1627.4 Class 2½, clean by immersing in trichloroethylene or an alkaline solution, and apply a coat of iron phosphate.

Galvanised steel: Clean by immersing in a suitable alkaline or acidic solution, apply a zinc phosphate chemical conversion coating, rinse and degrease.

Aluminium: Pre-treat as recommended in AS 3715 Appendix B, including the application of a conversion coating.

4.5. EXECUTION

4.5.1. CONSTRUCTION GENERALLY

Aluminium Structures

Standard: To AS/NZS 1664.1 or AS/NZS 1664.2

Metals

Performance: Provide metals so that they transmit the loads imposed and ensure the rigidity of the assembly without causing deflection or distortion of finished surfaces.

Incompatible metals: Separate using concealed layers of suitable materials in appropriate thicknesses.

Fasteners

Performance: Provide fasteners so that they do not cause galvanic corrosion.

Materials: Provide fasteners in materials of mechanical strength and corrosion resistance at least equal to that of the lowest resistant metal joined.

To aluminium and aluminium alloys: Provide aluminium alloy or non-magnetic stainless steel fixing devices only.

To stainless steel: Provide appropriate stainless steel materials only.

Fabrication

Workshop: Fabricate and pre-assemble items in the workshop wherever practicable.

Edges and surfaces: Keep clean, neat and free from burrs and indentations. Remove sharp edges without excessive radiusing.

Tube bends: Form bends in tube without visibly deforming the cross section.

Colour finished work: Match colours of sheets, extrusions and heads of fasteners.

Thermal movement: Accommodate thermal movement in joints and fastenings.

Fabrication tolerances

Structural work generally: 2 mm

Joints

General: Fit joints to an accuracy appropriate to the class of work. Finish visible joints made by welding, brazing or soldering using grinding, buffing or other methods appropriate to the class of work, before further treatment.

Self-finished metals: Free of surface colour variations, after jointing.

Joints: Fit accurately to a fine hairline.

Marking

Provide suitable and sufficient marks or other means for identifying each member of site-erected assemblies, and for their correct setting out, location, erection and connection. Mark bolted connections to show the bolting category. Do not mark stainless steel by notching.

Splicing

Provide structural members in single lengths.

4.6. COMPONENTS

4.6.1. REMOVABLE ALUMINIUM HANDRAILS

Provide modular aluminium handrail system as detailed with drop-in panel in fixed sleeves at edges platforms to provide a safety barrier to the edges of elevated platforms.

Material: Member sizes and fixing arrangements shall be as noted on drawings.

Finish: Aluminium Powder coated Safety Yellow colour.

AS: Comply with AS 1657 –1992 Fixed platforms, walkways, stairways and ladders

4.6.2. REMOVABLE LOCABLE ALUMINIUM CROSS RAILS

Provide modular aluminium REMOVABLE AND LOCABLE Aluminium cross rail system as detailed with lockable sleeves with removable barriers to provide a safety barrier prevent crew falling in between gangways.

Material: Member sizes and fixing arrangements shall be as noted on drawings.

Finish: Aluminium Powder coated Safety Yellow colour.

AS: Comply with AS 1657 –1992 Fixed platforms, walkways, stairways and ladders

4.6.3. Hardware:

Supply and install hardware as shown in drawings and or specified for each gate supplied or installed

Locks: Supply and install proprietary locking device for cross rail.

4.6.4. Preferred Fabricators for Safety Barriers and Cross Rails

List of suppliers

GM poles Pty Ltd Contact: Brian Snashall;	Unit 6-7/166A, The Entrance Road, Erina NSW 2250	02 4365 3701	02 4365 3599	0408964 574
R&L Wall Pty Ltd Contact: Ian Macdonald	129, Bombay Street, Lidcombe NSW 2141	02 97481831	02 9737 9385	041 961 3112
or any COMPETENT FABRICATORS , installers with demonstrated experience in the high Risk Environments - Rail maintenance Depots				

5. PAINTING

5.1. GENERAL

5.1.1. AIMS

Responsibilities

General: Provide coating systems to substrates as follows and as scheduled:

- Consistent in colour, gloss level, texture and dry film thickness.
- Free of runs, sags, blisters, or other discontinuities.
- Paint systems fully opaque.
- Clear finishes at the level of transparency consistent with the product.
- Fully adhered.
- Resistant to expected impacts in use.
- Resistant to environmental degradation within the manufacturer's stated life span.

5.1.2. CROSS REFERENCES

General

General: Conform to the *General Requirements* worksection.

Associated Work sections

Associated work sections: Conform to the following:

- *Metal Works*

5.2. STANDARDS

5.2.1. Painting

General: Comply with the recommendations of those parts of AS/NZS 2311 and AS/NZS 2312, which are referenced in this worksection.

5.2.2. INTERPRETATION

Definitions

General: For the purposes of this worksection the definitions given below apply.

- Standard: To AS/NZS 2310.
- Substrate: The surface to which sealant must bond.
- Background: The surface to which the undercoat is applied.
- Paint: A product in liquid form, which when applied to a surface, forms a dry film having protective, decorative or other specific technical properties.
- Sealer: A product used to seal substrates to prevent:

- Materials from bleeding through to the surface.
- Reaction of the substrate with incompatible top coats.
- Undue absorption of the following coat into the substrate.
- Primer, prime coat: The first coat of a painting system that helps bind subsequent coats to the substrate and which may inhibit its deterioration.
- Undercoat: An intermediate coat formulated to prepare a primed surface or other prepared surface for the finishing coat.
- Finish coat: The final coat of a coating system.
- Gloss: The optical property of a surface, characterised by its ability to reflect light specularly.
- Sheen: Gloss which is observed on an apparently matt surface at glancing angles of incidence.
- Levels of gloss finish: When the specular direction is 60 degrees, a surface with the following specular gloss reading are defined as follows:
 - Full gloss finish 20 and 50 gloss units.
 - Semi gloss between 5 and 20 gloss units (also known as low sheen).
 - Flat finish < 5 gloss units (also known as matt).
- Opacity: The ability of a paint to obliterate the colour difference of a substrate.
- Adhesion: The sum total of forces of attachment between a dry film and its substrate. See AS 1580 for tests to assess adhesion.
- Gloss unit: Numerical value for the amount of specular reflection relative to that of a standard surface under the same geometric conditions.

5.2.3. INSPECTION

Notice

Inspection: Give sufficient notice so that inspection may be made of the following:

- Painting stages:
 - Completion of a painting surface.
 - After application of prime and seal coats.
 - After application of undercoat.
 - After application of each subsequent coat.
- Clear finishing stages:
 - Before surface preparation of timber.
 - Completion of surface preparation.
 - After staining.
 - After sanding of sealer.
 - After application of each clear finishing coat.

5.3. PRODUCTS

5.3.1. PAINTS

APAS Specifications

General: Provide paints and other materials which are scheduled in the Australian Paint Approvals Scheme "List of Approved Products" as complying with cited ASAP specifications.

Quality: If the product is offered in a number of levels of quality, provide premium quality lines.

Combinations

General: Do not combine paints from different manufacturers in a paint system.

Clear timber finish systems: Provide only the combinations of putty, stain and sealer recommended by the manufacturer of the top coats.

Delivery

General: Deliver paints to the site in the manufacturer's labelled and unopened containers. Ensure containers of materials specified by a APAS specification code are labelled accordingly.

Tinting

General: Provide only products which are colour tinted by the manufacturer or supplier.

Toxic Ingredients

General: Comply with the requirements of Appendix P Uniform Paint Standard to the Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP).

Putty

Non-timber substrates: Oil-based or polymeric based.

Timber finishes: Lacquer or water based only.

5.4. EXECUTION

5.4.1. PREPARATION

Standards

General: to AS/NZS 2311 Section 3.

Protection of steelwork: To AS/NZS 2312 Section 4.

Order of Work

Other trades: Before painting, complete the work of other trades as far as practicable within the area to be painted, except for installation of fittings, floor sanding and laying flooring materials.

Clear finishes: Complete clear timber finishes before commencing opaque paint finishes in the same area.

Protection

Fixtures: Remove door furniture, switch plates, light fittings and other fixtures before starting to paint, and refix in position undamaged on completion of the

installation.

“Wet Paint” Warning

General: Place notices conspicuously and do not remove them until paint is dry.

Restoration

General: Clean off marks, paint spots and stains progressively and restore damaged surfaces to their original condition. Touch up damaged decorative paintwork or misses only with the paint batch used in the original application.

Substrate Preparation

General: Prepare substrates to receive the painting systems.

Cleaning: Clean down the substrate surface. Do not cause undue damage to the substrate or damage to, or contamination of, the surroundings.

Filling: Fill cracks and holes with fillers, sealants, puttings or grouting cements as appropriate for the finishing system and substrate, and sand smooth.

Clear finish: Provide filler tinted to match the substrate.

Clear timber finish systems: Prepare the surface so that its attributes will show through the clear finish without blemishes, by methods which may involve the following:

- Removal of bruises.
- Removal of discolourations, including staining by oil, grease and nailheads.
- Bleaching where necessary to match the timber colour sample.
- Puttying.
- Fine sanding (last abrasive no coarser than 220 grit) to show no scratches across the grain.

5.4.2. PAINTING

Standards

General: To AS/NZS 2311 Section 6.

Protection of steelwork: To AS/NZS 2312 Section 8.

Light Levels

General: During preparation of surfaces, painting and inspection, maintain light levels such that the luminance (photometric brightness) of the surface is equal to the specified permanent artificial illumination conditions or 400 lux, whichever is greater.

Drying

General: Use a moisture meter to demonstrate that the moisture content of the substrate is at or below the recommended maximum level for the type of paint and the substrate material.

Paint Application

General: Apply the first coat immediately after substrate preparation and before contamination of the substrate can occur. Apply subsequent coats after the manufacturer's recommended drying period has elapsed.

Priming before Fixing

General: Apply one coat of wood primer (2 coats to end grain) to the back of the following before fixing into position:

- External fascia boards.
- Timber door and window frames.
- Bottoms of external doors.
- Associated trims and glazing beads.
- Timber board cladding.

Spraying

General: If the paint application is by spraying, use conventional or airless equipment which does the following:

- Satisfactorily atomises the paint being applied.
- Does not require the paint to be thinned beyond the maximum amount recommended by the manufacturer.
- Does not introduce oil, water or other contaminants into the applied paint.

Paint with known health hazards: Provide masking, ventilating and screening facilities generally to the standards set out for spraying painting booths, AS/NZS 4114.1 and AS/NZS 4114.2.

Sanding

Clear finishes: Sand the sealer using the finest possible abrasive (no coarser than 320 grit) and avoid cutting through the colour. Take special care with round surfaces and edges.

Repair of Galvanising

General: For galvanised surfaces which have been subsequently welded, prime the affected area.

Primer: To APAS 2916, two pack.

Tinting

General: Tint each coat of an opaque coating system so that each has a noticeably different tint from the preceding coat, except for top coats in systems with more than one top coat.

Services

General: If not embedded, paint new services and equipment including in plant rooms, except chromium, anodised aluminium, GRP, UPVC, stainless steel, non-metallic flexible materials and normally lubricated machined surfaces. Repaint proprietary items only if damaged.

5.5. SELECTIONS

5.5.1. PAINT SYSTEMS

Paint System Description by ASAP Specification

General: Where nominated in the **Painting Schedule**, apply the paint system specified in the **APAS paint system tables**.

Paint System Description by Brand

General: Where nominated in the **Painting Schedule**, apply the paint system specified in the **Brand name paint system tables**.

Number of Coats

General: Unless specified as one coat or two coat systems, each paint system consists of at least 3 coats.

Colour Selection

General: As nominated in the **Painting schedules**.

5.5.2. PAINTING SCHEDULES

Interior Painting Schedule

Surface Identification	Substrate	Paint System	Colour name or code
Existing Galvanised Handrails that are not removed	Galvanised Steel	Semi Gloss Solvent borne	Safety Yellow