Master Specification
Part RW-COM-D1

Communications and Electronics

July 2025

Government of South Australia
Department for Infrastructure and Transport

Build.
Move.
Connect.

Document Information

Document Information	
K Net Number:	14041239
Document Version:	0
Document Date:	09/07/2025

Document Amendment Record

Version	Change Description	Date
0	Initial issue	09/07/2025

Document Management

Contents

RW-COM-D1 Communications and Electronics

1 General

a) This Master Specification Part sets out the requirements for the design of the railway communications and electronics systems, specifically passenger information, CCTV, equipment room and security systems, including:

i) the documentation requirements, as set out in section 2;

ii) the Requirements Definition Design Documentation requirements, as set out in section 3;

iii) the Preliminary Design Documentation requirements, as set out in section 4;

iv) the Detailed Design Documentation requirements, as set out in section 5;

v) the Final Design Documentation requirements, as set out in section 6; and

vi) the requirements for the construction specification, as set out in section 7.

b) The design of the railway communications and electronics systems must comply with the Reference Documents, including:

i) AM4-DOC-000466 - Type Approval for Railway Products;

ii) AR-PT-CE-SPE-00910001 Technical specification optical fibre and copper cabling;

iii) AS/CA S008 Telecommunications technical standard (requirements for customer cabling products);

iv) AS/CA S009 Installation requirements for customer cabling (wiring rules);

v) AS 1049.1 Telecommunications cables - Insulation, sheath and jacket, Part 1: Materials;

vi) AS 1049.2 Telecommunications cables - Insulation, sheath and jacket, Part 2: Test methods;

vii) AS 1125 Conductors in insulated electric cables and flexible cords;

viii) AS 1660.1 Test Methods for electric cables, cords and conductors, Method 1: Conductors and metallic components;

ix) AS 1768 Lightning protection;

x) AS 2857 Timber drums for insulated electric cables and bare conductors;

xi) AS 2967 Optical fibre communications cabling systems safety;

xii) AS 3000 Electrical installations (known as the Australian/New Zealand Wiring Rules);

xiii) AS 3085.1 Telecommunications installations - Administration of communications cabling systems, Part 1: Basic requirements;

xiv) AS 3808 Insulating and sheathing materials for electric cables;

xv) AS 5000.1 Electric cables - Polymeric insulated, Part 1: For working voltages up to and including 0.6/1 (1.2) kV;

xvi) AS 7450 Rail systems interoperability;

xvii) AS 7660 Radio communication in the rail corridor;

xviii) AS 7664 Railway signalling cable routes, cable pits, and foundations;

xix) AS 7666 Train protection and control interoperability;

xx) AS 14763.3 Information technology - Implementation and operation of customer premises cabling, Part 3: Testing of optical fibre cabling (ISO/IEC 14763-3:2014, MOD);

xxi) AS 60825.2 Safety of laser products, Part 2: Safety of optical fibre communication systems (OFCSs);

xxii) AS 60950.1:2015 Information Technology equipment - Safety - General Requirements;

xxiii) CE5-DOC-003514 - Public Transport Standard: Equipment Room Engineering - Design;

xxiv) CS5-DOC-003511 - Public Transport Standard: Electrical Infrastructure Engineering - Design;

xxv) CE5-DOC-003525 - Communications Network Principals & Practices for Public Transport Engineering Standard;

xxvi) D Part 076 Design - Stations - Passenger information systems;

xxvii) EN 50126 - Railway applications. The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS)

xxviii) EN 50128 - Railway Applications - Software for Railway Control and Protection Systems;

xxix) EN 50657 - Railways Applications - Rolling stock applications - Software on Board Rolling Stock;

xxx) IEEE 802.3 IEEE standard for ethernet;

xxxi) IEEE 802.11 IEE standard for information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 11: Wireless LAN medium access control (MAC) and physical layer (PHY) specifications;

xxxii) IEEE 802.16m IEE standard for local and metropolitan area networks Part 16: Air interface for broadband wireless access systems amendment 3: Advanced air interface;

xxxiii) ITU Recommendations M.1457 3G wireless telecommunications standards;

xxxiv) PI4-DOC-000897 Engineering Specification - Security Systems;

xxxv) PI5-DOC-003512 Public Transport Standard - Security Systems - Design - Engineering;

xxxvi) PTS-MS-05-AM-PRC-00000091 Asset management technical data requirements specification;

xxxvii) PTS-MS-1O-SG-STD-00000094 Pit and Conduit Standard for Signalling and Communication Cables;

xxxviii) Rail Industry Safety and Standards Board Guideline - Rail systems interoperability (available at https://www.rissb.com.au/products/guideline-rail-systems-interoperability/); and

xxxix) TC4-DOC-000357 Procedure for non-rail service installations within the rail corridor.

c) The Contractor must ensure the management of design complies with PC-RW30 “Design” and PC-EDM1 “Design Management”.

2 Documentation

2.1 Design Documentation

In addition to the requirements of PC-EDM1 “Design Management” and PC-RW30 “Design”, the Design Documentation must include:

a) the Requirements Definition Design Documentation required by section 3;

b) the Preliminary Design Documentation inclusions as required by section 4;

c) the Detailed Design Documentation inclusions as required by section 5;

d) the Final Design Documentation inclusions as required by section 6; and

e) the construction specification requirements as required in section 7.

3 Requirements Definition Design Documentation

In addition to the requirements of PC-RW30 “Design”, the Requirements Definition Design Documentation for railway communications and electronics systems must include:

a) detailed engineering site survey in accordance with PC-SI5 “Engineering Survey” including:

   i) major monuments (e.g. railway stations, etc.);

   ii) existing railway services;

   iii) existing Utility Services;

   iv) existing OHWS infrastructure;

   v) existing railway corridor access points;

   vi) existing communication services; and

   vii) existing pits and conduit layout;

b) Design Report including confirmation that existing system design drawings and standards are correct and up-to-date;

c) communications and electronics systems Design Drawings including:

   i) hardware and software selection;

   ii) hardware layout and location; and

   iii) proposed modifications and integration to the existing design drawings and system;

d) services route and CSR Design Drawings including station services route for the communications and electronics system applications. The schedule of CSR Design Drawings must include:

   i) stations layout with the proposed system location on the station or platform;

   ii) pits and conduit design and location;

   iii) major monuments including railway stations, side roads, over bridges, and other major monuments; and

   iv) interface review for potential clashes with other services;

e) primary cable containment route Design Drawings which must include:

   i) the proposed location of the primary cable containment (up and/or down track side) and under track crossings;

   ii) indicative make-up of the primary cable containment including conduit, ground level trough or galvanized steel trunking; and

   iii) layout and number of conduits with the correct conduit colour system where the primary cable containment consists of a pit and conduit system;

f) identification of communication and electronic system assets requiring connection via a secondary cable containment route shown on the Design Drawings and detailed in the Design Report;

g) combined services Design Drawings (which may be overlaid on aerial photography) including:

i) chainage;

ii) major monuments (e.g. railway stations, side roads, over bridges, etc.);

iii) existing railway services;

iv) existing Utility Services and detailed design of Utility Services to be relocated;

v) track plan;

vi) OHWS mast locations;

vii) existing Rail Corridor access points; and

viii) cable route; and

h) bill of materials.

4 Preliminary Design Documentation

In addition to the requirements of PC-EDM1 “Design Management”, the Preliminary Design Documentation for railway communications and electronics systems must include:

a) progressive update of information required by section 3, substituting ‘Requirement Definition Design Documentation’ with ‘Preliminary Design Documentation’;

b) communications and electronics system Design Drawings, which must include:

i) block diagram network;

ii) system interconnection wiring schematic;

iii) wide area interconnection diagram;

iv) rack layout drawing including hardware and software selection;

v) proposed location of equipment rooms; and

vi) hardware layout and location on the railway station or platform;

c) primary cable containment route Design Drawings, which must include:

i) location of pits; and

ii) clash review identifying potential clashes of the primary cable containment with other Utility Services including drainage infrastructure;

d) secondary cable containment route Design Drawings, which must include location of pits;

e) new equipment enclosure Design Drawings which must include:

i) preliminary identification of location case, up or down track, approximate chainage with labelling; and

ii) detailed position of location case (which must be within 10m of the final position);

f) Design Report including:

i) engineering waivers being sought pursuant to PC-RW30 “Design”; and

ii) Design Departures being sought;

iii) verification that the Contractor has sought type approval in accordance with AM4-DOC-000466 - Type Approval for Railway Products and include evidence of the Rail Commissioner’s agreement; and

iv) product technical files in accordance with PC-RW30 “Design”;

g) a list of recommended Inspection and Test Plans;

h) bonding Design Drawings for railway station services for passenger information system and CCTV systems; and

i) asset list skeleton as per the requirements of PTS-MS-05-AM-PRC-00000091 Asset management technical data requirements.

5 Detailed Design Documentation

In addition to the requirements of PC-EDM1 “Design Management’, the Detailed Design Documentation for railway communications and electronics systems must include:

a) progressive update of information required by section 4, substituting ‘Preliminary Design’ with ‘Detailed Design’;

b) Design Drawings detailing the overall architecture of the passenger information system head end and its interface to the railway station distribution IP networks;

c) details in the Design Report of:

  i) the interfaces between the communications and electronics systems and other systems (both internal and external); and

  ii) preliminary design and calculations for design of mains power supply to equipment enclosures and equipment rooms, including UPS design and calculations;

d) Design Drawings for site equipment enclosures, equipment room layouts and rack layout of interconnections within the equipment enclosures and equipment rooms;

e) detailed primary cable containment route Design Drawings including:

  i) typical trench, ground level trough and galvanised steel trunking cross sections;

  ii) separation of HV, ELV and LV per communications conduit standard;

  iii) trench and bore cross sectional details; and

  iv) closed out clash review of all previously identified clashes;

f) detailed secondary cable containment route Design Drawings including:

  i) location of secondary cable containment route UTX;

  ii) construction methodology of each UTX and under road crossing;

  iii) secondary cable route connections to communication and electronic system equipment and services;

  iv) clash review identifying potential clashes of the secondary cable containment with other services, including drainage infrastructure;

  v) details of cable pits including:

    A. primary cable / UTX pit;

    B. secondary cable / UTX pit;

    C. location case pits;

    D. under road crossing pit;

    E. secondary cable break out pit;

    F. fibre optic joint pits;

    G. fibre optic make-off loop pit; and

    H. labelling of the pits;

  vi) pit schedule Design Drawings for all pits on primary cable route;

vii) detailed design of all pits to be used. Where proprietary pits are to be used the Contractor must provide a PTF for each pit type to the Rail Commissioner and Principal and include evidence of the Rail Commissioner's agreement; and

viii) Design Drawings of the proposed cable containment, including pit and conduit, ground level trough and galvanised steel trunking pit entry details; and

g) a list of recommended spare parts in the Design Report (noting that any spare part with length must be provided in meters).

6 Final Design Documentation

In addition to the requirements of PC-EDM1 "Design Management", the Final Design Documentation for railway communications and electronics systems must include:

a) progressive update of information required by section 5, in a finalised form, substituting the term 'Detailed Design' with 'Final Design';

b) final system Design Drawings, including approval from the Principal and manufacturer, of any proposed materials;

c) final design and calculations for design of mains power supply to equipment enclosures and equipment rooms, including UPS design and calculations in the Design Report;

d) "As in Service" alterations on the Design Drawings for circuit plans and application data as required to be completed after each level of stagework;

e) combined services plan Design Drawings, including details of railway communications assets and infrastructure to be decommissioned and recovered; and

f) primary cable containment route Design Drawings including:

i) trench cross sections for all arrangements including identification of conduits and compartments within ground level troughing; and

ii) final design arrangement including railway station services, including passenger information and CCTV systems.

7 Requirements for construction specification

In addition to the construction specification requirements in PC-RW30 "Design", the Hold Points listed in Table RW-COM-D1 7-1 must be included for the construction specification for railway communications and electronics systems.

Table RW-COM-D1 7-1 Additional construction Hold Point requirements to be incorporated into the construction specification

Hold point	Documentation or Construction quality	Review period or notification period
Cabling registration for installer and/or supervisors	Documentation	10 Business Days prior to inspection, testing and commissioning stage
Software FAT, signed certificates, system/equipment configuration information and close out report	Documentation	10 Business Days prior to commissioning