Master Specification
Part RD-ITS-D2

TrafficNet Infrastructure Buildings

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Contents

RD-ITS-D2 TrafficNet Infrastructure Buildings

1 General

a) This Master Specification Part sets out the requirements for the design, construction and certification of TrafficNet infrastructure buildings and the design, installation and testing and commissioning of supporting systems provided as part of the TrafficNet infrastructure buildings, including:

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

ii) the TrafficNet infrastructure building requirements, as set out in section 3;

iii) the parking facilities requirements, as set out in section 4;

iv) the environmental control requirements, as set out in section 5;

v) the security and access control requirements, as set out in section 6;

vi) the lighting requirements, as set out in section 7;

vii) the fire detection and suppression requirements, as set out in section 8;

viii) the connection to MABN requirements, as set out in section 9;

ix) the power requirements, as set out in section 10; and

x) the testing and commissioning requirements, as set out in section 11.

b) This Master Specification Part does not apply to:

i) the TrafficNet network design, installation, testing and commissioning, in which case the Contractor must comply with the requirements of RD-ITS-D1 “Design of Intelligent Transport Systems (ITS)” and RD-ITS-C1 “Installation and Integration of ITS Equipment”;

ii) non-habitable structures or roadside cabinets, in which case the Contractor must comply with the requirements of RD-ITS-S3 “ITS Enclosures”; and

iii) any equipment room, substation, Tunnel monitoring facility or other facility forming part of Tunnel infrastructure, in which case the Contractor must comply with the requirements of TUN-FAC-DC1 “Requirements for Tunnel Facilities”.

c) The design of TrafficNet infrastructure buildings and the design and testing and commissioning of supporting systems provided as part of the TrafficNet infrastructure buildings must comply with the Reference Documents, including:

i) AS/CA S009 Installation requirements for customer cabling (Wiring Rules);

ii) AS/NZS 1158.3.1 Lighting for roads and public spaces, Part 3.1: Pedestrian area (Category P) lighting - Performance and design requirements;

iii) AS/NZS 1668 The use of ventilation and airconditioning in buildings;

iv) AS/NZS 1680 Interior and workplace lighting;

v) AS/NZS 2201.1 Intruder alarm systems, Part 1: Client’s premises - Design, installation, commissioning and maintenance;

vi) AS/NZS 2293 Emergency lighting and exit signs for buildings;

vii) AS 2890.2 Parking facilities, Part 2: Off-street commercial vehicle facilities;

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

ix) AS/NZS 3010 Electrical installations - Generating sets;

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

xi) AS/NZS 4282 Control of the obtrusive effects of outdoor lighting;

xii) AS/NZS IEC 60839.11 Alarm and electronic security systems, Part 11: Electronic access control systems;

xiii) National Construction Code (NCC); and

xiv) SafeWork SA Managing the work environment and facilities Code of Practice.

2 Documentation

2.1 Design Documentation

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

a) details of the TrafficNet infrastructure building as required by section 3.1f);

b) details of perimeter security fencing when the TrafficNet infrastructure building is integrated with other Project infrastructure, as required by section 6.1b);

c) details of TrafficNet infrastructure building access control systems and evidence of written agreement from the Department’s security and emergency management team, as required by section 6.2e);

d) details of TrafficNet infrastructure building intruder detection systems and evidence of written agreement from the Department’s security and emergency management team, as required by section 6.3d); and

e) site layout and room layout plans demonstrating CCTV coverage as required by section 6.4h).

2.2 Construction Documentation

In addition to the requirements of PC-CN3 “Construction Management”, the Construction Documentation must include details of the supplier of the contamination control mats required by section 3.2b).

2.3 Quality Management Records

In addition to the requirements of PC-QA1 “Quality Management Requirements” or PC-QA2 “Quality Management Requirements for Major Projects” (as applicable), the Quality Management Records must include the records of the telecommunications cables installed within the TrafficNet infrastructure building, in accordance with section 11d).

3 TrafficNet infrastructure buildings

3.1 General

a) The TrafficNet infrastructure building must be purpose-designed and capable of housing:

i) the TrafficNet core switches;

ii) the TrafficNet distribution network;

iii) the TrafficNet network supporting infrastructure required by the Master Specification Part; and

iv) any facilities, amenities or equipment required to be housed within a computer equipment room (CER) or as required by the Contract Documents.

b) The design of the TrafficNet infrastructure building must:

i) be for the purposes specified in the Contract Documents;

ii) comply with all applicable building codes and regulations, including the NCC;

iii) ensure all doors and corridors of the TrafficNet infrastructure building are of an adequate width and height for easy maintenance, removal, and replacement of equipment without the need for dismantling of equipment;

iv) ensure that servers, routers, switches or other network concentration points are incorporated in one or more CER within the TrafficNet infrastructure building;

v) include structured cabling in accordance with RD-ITS-D1 “Design of Intelligent Transport Systems (ITS)”; and

vi) where required by Contract Documents, include antennas on the roof of the TrafficNet infrastructure building and cabling of antenna cables from the antennas to the location specified within the Contract Documents.

c) CERs within the TrafficNet infrastructure building must be designed:

i) to offer sufficient workspace for the:

A. needs of the equipment housed within that CER; and

B. functions to be carried within that CER;

ii) with a clear walkway of at least 1 m width around all sides of each equipment rack bay within the CER, with all equipment rack bay doors open;

iii) to allow for equipment racks within CERs to be bayed together side-by-side with end panels on each end of the bay; and

iv) such that, if multiple equipment rack bays are required, the equipment racks are arranged logically in parallel rows.

d) All cable pits associated with cabling entering the TrafficNet infrastructure building must be lockable and properly secured.

e) All conduit entries to the TrafficNet infrastructure building must be sealed against the ingress of moisture, contaminants, and vermin, using a method that allows for:

i) easy re-entry for maintenance;

ii) the installation of additional conduits; and

iii) movement or change to the conduits.

f) The Design Documentation must include details of:

i) the purposes for which the TrafficNet infrastructure building will serve;

ii) whether the TrafficNet infrastructure building will be free-standing or integrated into other Project infrastructure; and

iii) all layouts of the TrafficNet infrastructure buildings and CERs.

3.2 Contamination control mats

a) Contamination control mats, also known as “tacky mats” or “sticky mats”, must:

i) be provided at the entrance to each CER within the TrafficNet infrastructure building with:

A. at least 30 tear-off layers; and

B. a minimum size of 900 mm x 1200 mm;

ii) be located such that any person entering or leaving the CER must step on the mat to remove contaminants from the soles of their shoes; and

iii) not be located in a general walkway area where they may be walked on unnecessarily.

b) Details of the proposed contamination control mats and their suppliers must be included as a part of the Construction Documentation.

3.3 Amenities

3.3.1 General

a) TrafficNet infrastructure buildings must be provided with:

i) at least one workstation including a desk to accommodate at least one desktop computer, one laptop computer and one telephone;

ii) a static-safe (electro-static discharge) workbench suitable for:

A. the assembly or disassembly of computer and other electronics hardware; and

B. the purpose of maintaining network and computer equipment installed within the TrafficNet infrastructure building;

iii) access arrangements that allow for easy movement of equipment into, within and out of the TrafficNet infrastructure building using trolleys;

iv) 3 double general purpose power outlets (DGPOs) at each workstation and workbench required by section 3.3.1a)i) and 3.3.1a)ii); and

v) 4 network points at each workstation and workbench required by section 3.3.1a)i) and 3.3.1a)ii).

b) One of the DGPSs required by section 3.3.1a)iv) must be connected to the TrafficNet infrastructure building's essential services distribution board.

c) The network points required by section 3.3.1a)v) must be incorporated in the TrafficNet infrastructure building's structured cabling arrangement such that they can be patched to any access switch within the CER.

3.3.2 Ablution and handwashing facilities

a) Ablution and handwashing facilities in accordance with SafeWork SA Managing the work environment and facilities Code of Practice must be provided where maintenance or operations personnel are likely to work on a regular basis, including:

i) toilets; and

ii) hand washing facilities.

b) The ablution and handwashing facilities required by section 3.3.2a) must have the greater of:

i) the number of toilets required to accommodate the anticipated number and gender of the workforce based on the TrafficNet infrastructure building; and

ii) a minimum of one unisex toilet.

3.4 Construction and certification

a) The construction of TrafficNet infrastructure buildings must comply with:

i) the requirements specified in the Contract Documents; and

ii) all applicable building codes and regulations, including the NCC.

b) The Contractor must appoint a Building Certifier for the assessment and certification of elements of TrafficNet infrastructure buildings deemed to be assessable under the NCC.

4 Parking facilities

a) TrafficNet infrastructure buildings must be provided with parking facilities for commercial vehicles in accordance with AS 2890.2 Parking facilities, Part 2: Off-street commercial vehicle facilities.

b) The parking facilities required by section 4a) must:

i) be sealed for all weather use;

ii) accommodate 2 small rigid vehicles as defined in AS 2890.2 Parking facilities, Part 2: Off-street commercial vehicle facilities;

iii) be located within the perimeter security fencing required by section 6.1; and

iv) be provided with lighting in accordance with section 7.1.

5 Environmental controls

5.1 General

a) TrafficNet infrastructure buildings must be finished and sealed to prevent ingress of moisture, dust and other contaminants through:

i) floors;

ii) walls;

iii) ceilings;

iv) windows; and

v) doors.

b) TrafficNet infrastructure building walls, floors and ceilings must be finished and sealed to prevent the release of dust or particles.

c) TrafficNet infrastructure buildings must be pressurised so that there is a positive air flow from the CER to the outside environment whenever access is obtained (i.e. whenever an external door is opened).

d) All doors and windows must be sealed when closed such that airflow is directed only through open doors.

e) If a vehicle loading bay or undercover parking area is incorporated into the TrafficNet infrastructure building, these areas must not be environmentally controlled.

5.2 Air locks

a) TrafficNet infrastructure buildings must be provided with a dual air-lock at all entry and egress points of the TrafficNet infrastructure building.

b) The air-lock required by section 5.2a) must:

i) be large enough to accommodate the needs of those attending the TrafficNet infrastructure building (including allowing for movement of equipment into or out of the TrafficNet infrastructure building);

ii) be a minimum size of 2 m wide by 3 m long; and

iii) have doors that open inwards against the flow of positive air pressure.

c) If a vehicle loading bay or undercover parking area is incorporated into the TrafficNet infrastructure building, access from the loading bay or parking area into the TrafficNet infrastructure building must be via an air lock.

5.3 Air conditioning

a) CERs within the TrafficNet infrastructure buildings must be provided with redundant split system air conditioning in accordance with AS/NZS 1668 The use of ventilation and air conditioning in buildings.

b) The air conditioning system required by section 5.3a) must:

   i) have redundancy through the use of at least duty and standby split systems;

   ii) have load sharing to maintain even wear and tear on each split system;

   iii) start the standby split system in the event the duty split system fails;

   iv) report the status of each split system to STREAMS; and

   v) be supplied from the TrafficNet infrastructure building's essential services power distribution board.

c) Each component of the redundant split systems required by section 5.3a) must be capable of maintaining the CER:

   i) within the operational needs of the equipment housed within the CER;

   ii) without assistance;

   iii) without suffering undue load;

   iv) without negatively impacting the equipment life cycle; and

   v) with the design load plus 25% spare capacity for future expansion.

d) An instrument independent of the air conditioning system must:

   i) be provided for the CER for the monitoring of the room temperature; and

   ii) interface to STREAMS to report:

      A. the temperature of the CER; and

      B. the status of the instrument.

e) An alarm must be raised in STREAMS where:

   i) any component of the air conditioning system has a fault;

   ii) the temperature of the CER exceeds a user configurable set point; and

   iii) the temperature of the CER falls below a user configurable set point.

6 Security and access control

6.1 Perimeter security fencing

a) Where the TrafficNet infrastructure building is free-standing, the TrafficNet infrastructure building must be provided with the following in accordance with RD-BF-C4 "Supply and Installation of Fencing and Gates":

   i) palisade security fencing around the perimeter; and

   ii) pedestrian and vehicular security access gates to suit the design of the TrafficNet infrastructure building.

b) Where the TrafficNet infrastructure building is integrated with other Project infrastructure, the perimeter security fencing to the Project infrastructure must be agreed with the Principal and submitted with the Design Documentation for approval by the Principal.

6.2 Doors and access control

a) The entry doors to TrafficNet infrastructure buildings and CERs must:

   i) be controlled by an electronic access control system;

   ii) be self-closing;

   iii) open 180 degrees; and

   iv) include latches to allow the door to be retained in the fully opened position.

b) In addition to the requirements of section 6.2a), entry doors to TrafficNet infrastructure buildings must be:

   i) provided with facility for monitoring and reporting by STREAMS when the door is not in the closed position; and

   ii) provided with key operated over-ride of the access control system.

c) The electronic access control system required by section 6.2a)i) must be:

   i) in accordance with AS/NZS IEC 60839.11 Alarm and electronic security systems, Part 11: Electronic access control systems;

   ii) nominated and agreed with the Department's security and emergency management team with evidence of agreement provided as part of the Design Documentation in accordance with section 6.2e)iii);

   iii) supplied from the TrafficNet infrastructure building's essential power system;

   iv) provided with battery back-up power in accordance with AS/NZS IEC 60839.11 Alarm and electronic security systems, Part 11: Electronic access control systems;

   v) interfaced with the TMC operators' dispatch console to enable remote door release; and

   vi) provided with diverse communications paths to the State Protective Security Branch of SAPOL.

d) Where electric door strikes are used, the electric door strikes must be fail-secure type that remain in the locked position when the door strikes lose electrical power or communications.

e) The following information must be submitted with Design Documentation for approval:

   i) the electronic access control system architecture;

   ii) details and datasheets for the components of the electronic access control system; and

   iii) written agreement from the Department's security and emergency management team for the nominated electronic access control system in accordance with section 6.2c)ii).

f) The electronic access control system must include remote monitoring of the health status of the system and its components on a central control and monitoring platform managed by the Department's security and emergency management team.

6.3 Intruder detection system

a) TrafficNet infrastructure buildings must be provided with an electronic intruder detection system.

b) The electronic intruder detection system required by section 6.3a) must be:

   i) in accordance with AS/NZS 2201.1 Intruder alarm systems, Part 1: Client's premises - Design, installation, commissioning and maintenance;

   ii) nominated and agreed with the Department's security and emergency management team with evidence of agreement provided as part of the Design Documentation in accordance with section 6.3d)iii);

iii) provided with facility to be monitored by the State Protective Security Branch of SAPOL;

iv) supplied from the TrafficNet infrastructure building's essential services power distribution board;

v) provided with battery back-up power in accordance with AS/NZS 2201.1 Intruder alarm systems, Part 1: Client's premises - Design, installation, commissioning and maintenance;

vi) provided with diverse communications paths to the Protective Security Services Branch of SAPOL; and

vii) provided with an interface to the electronic access control system required by section 6.2a)i).

c) The electronic intruder detection system required by section 6.3a) must monitor the TrafficNet infrastructure building entry doors and:

i) disarm the intruder detection system upon an authorised entry via the access control system;

ii) arm the intruder detection system upon the exit of an authorised entry; and

iii) arm the intruder detection system if the exit of an authorised entry is not detected for 4 hours.

d) The following information must be submitted with Design Documentation for approval:

i) the electronic intruder detection system architecture;

ii) details and datasheets for the components of the electronic intruder detection system, including the interface to the electronic access control system; and

iii) written agreement from the Department's security and emergency management team for the nominated electronic intruder system in accordance with section 6.3b)ii).

e) The electronic intruder detection system must include remote control and monitoring of the system and its components from a central control and monitoring platform managed by the Department's security and emergency management team, including:

i) monitoring of the health status of the electronic intruder detection system; and

ii) remote arming / disarming of the electronic intruder detection system and detection zones.

f) The electronic intruder detection system must have an interface with the TMC operators' dispatch console to enable remote arming and disarming of each of the electronic intruder detection system zones.

6.4 CCTV monitoring

a) TrafficNet infrastructure buildings must be provided with:

i) fixed CCTV coverage of all entry and exit points of the TrafficNet infrastructure building;

ii) fixed CCTV coverage of all entry and exit points of each CER or other restricted areas incorporated within the TrafficNet infrastructure building;

iii) 100% CCTV coverage of the interior of the TrafficNet infrastructure building, excluding toilets and washrooms where applicable; and

iv) 100% CCTV coverage of the grounds outside the TrafficNet infrastructure building (within the perimeter of the security fence required by section 6.1), including any access gates.

b) All entry and exit points requiring 100% CCTV coverage in accordance with section 6.4a) must be defined as coverage of all points of the entry and exit without the need to pan or tilt any CCTV camera to achieve this.

c) All CCTV cameras must be in accordance with RD-ITS-S5 “Imaging Equipment”.

d) All CCTV cameras must be provided with the following licences:

i) integration of the CCTV cameras with the Principal’s video management system in accordance with RD-ITS-S5 “Imaging Equipment”;

ii) device connection to the Principal’s automated security monitoring systems and the Principal’s automated network performance monitoring systems in accordance with RD-ITS-D1 “Design of Intelligent Transport Systems (ITS)” and RD-ITS-C1 “Installation and Integration of ITS Equipment”.

e) The CCTV cameras providing coverage of all entry and exit points required by section 6.4a)i) and section 6.4a)ii) must be positioned and configured such that a person entering the area being monitored can be clearly identified:

i) in real time; or

ii) from the recorded footage.

f) The CCTV cameras required by this Master Specification Part must be:

i) connected to the Principal’s existing CCTV network; and

ii) recorded on site using network video recorders (NVRs) which:

A. are compatible with the Principal’s existing CCTV network; and

B. may utilize the same NVRs included in the design to record other video streams, such as roadside CCTV cameras.

g) The recorded footage from the CCTV cameras required by this Master Specification Part must be able to be retrieved from either the TMC or BTMC by TMC operators using the Principal’s existing video management software or systems.

h) Site and room layout plans demonstrating the CCTV coverage required by section 6.4a) must be submitted as part of the Design Documentation for approval.

7 Lighting

7.1 Outdoor lighting

a) TrafficNet infrastructure buildings must be provided with outdoor lighting, including:

i) security lighting around the perimeter of the TrafficNet infrastructure building;

ii) gate flood lighting at each entrance gate; and

iii) carpark lighting for outdoor parking facilities.

b) Security lighting required by section 7.1a)i) must:

i) cover areas that are 2 m from the boundary of the TrafficNet infrastructure building;

ii) achieve average horizontal illuminance of not less than 5 lux and point minimum horizontal illuminance of not less than 2 lux within the coverage area; and

iii) be controlled automatically by ambient light level sensors with user configurable triggering level to continuously light the areas during night time.

c) Gate flood lighting required by section 7.1a)ii) must:

i) cover areas within 2 m from each side of entrance gates;

ii) achieve average horizontal illuminance of not less than 20 lux and point minimum horizontal illuminance of not less than 8 lux within the coverage area; and

iii) be controlled automatically by motion sensors with:

A. user configurable triggering ambient light level;

B. user configurable “on” time; and

C. user configurable motion sensitivity.

d) Carpark lighting required by section 7.1a)iii) must:

i) be provided in accordance with AS/NZS 1158.3.1 Lighting for roads and public spaces, Part 3.1: Pedestrian area (Category P) lighting - Performance and design requirements; and

ii) be controlled automatically by ambient light level sensors with user configurable triggering level to continuously light the areas during night time.

e) The design of all outdoor lighting must comply with AS/NZS 4282 Control of the obtrusive effects of outdoor lighting.

7.2 General and emergency lighting

TrafficNet infrastructure buildings must be provided with:

a) general lighting in accordance with AS/NZS 1680 Interior and workplace lighting; and

b) an emergency lighting system in accordance with AS/NZS 2293 Emergency lighting and exit signs for buildings.

8 Fire detection and suppression

a) TrafficNet infrastructure building CERs and rooms housing UPS must be provided with:

i) an aspirating smoke detection system;

ii) a secondary means of fire detection;

iii) a fire alarm system; and

iv) a gaseous fire suppression and discharge warning system.

b) Other areas within the TrafficNet infrastructure building must be provided with hard-wired mains powered smoke detections in accordance with relevant building standards.

c) The aspirating smoke detection system and secondary means of fire detection required by section 8a) must be configured as a “double knock” for reliable operation of the gaseous fire suppression system.

d) The discharge nozzles of the gaseous fire suppression system required by section 8a)iv) must be designed with sound pressure levels and resonance that will not impact the operation of mechanical hard disk drives within computer equipment in CERs.

e) The smoke detection systems and gaseous fire suppression system must:

i) be powered via the TrafficNet infrastructure building’s essential services power distribution board;

ii) include a self-monitoring and system status reporting capability;

iii) report system status to STREAMS; and

iv) simultaneously report alarms to STREAMS and a monitored fire panel.

9 Connection to MABN

a) TrafficNet infrastructure building CERs must be provided with at least 2 geographically diverse conduit paths for connection of the network backbone fibre optic cables to the Metropolitan Area Broadband Network (MABN).

b) The geographically diverse conduit paths required by section 9a) must:

i) maintain physical separation of at least 2 m when entering the TrafficNet infrastructure building; and

ii) maintain physical separation when entering the CER.

10 Power requirements

10.1 General

a) TrafficNet infrastructure buildings must be provided by at least 2 high-reliability, 3-phase power supplies from separate SAPN feeds.

b) General purpose outlets (GPOs) connected to the essential power circuits must be coloured red.

c) All GPOs other than those specified in section 10.1b) must be coloured white.

d) GPOs must be marked to indicate which phase and circuit they are connected to.

10.2 Emergency power system

a) TrafficNet infrastructure buildings must be provided with an emergency power system comprising:

i) a 3-phase UPS; and

ii) standby 3-phase generator.

b) The UPS required by section 10.2a)i) must:

i) be capable of powering all equipment connected to the essential services power distribution board for a minimum of 30 minutes;

ii) include an additional 25% load capacity to accommodate future expansion; and

iii) provide true sinusoidal/pure sine wave filtered and conditioned uninterruptible power.

c) The standby 3-phase generator required by section 10.2a)ii) must:

i) be in accordance with AS/NZS 3010 Electrical installations - Generating sets;

ii) start automatically upon mains power failure;

iii) include a fuel tank capable of supplying the generator set at 100% of its rated capacity for 24 hours; and

iv) be acoustically enclosed.

d) The emergency power system required by section 10.2a) must interface with STREAMS to provide:

i) status of the UPS;

ii) status and health of the batteries;

iii) status of generator; and

iv) faults.

e) The emergency power system required by section 10.2a) must be integrated with the TrafficNet infrastructure building's electrical system to provide the following upon both the loss and return of mains power supply:

i) fully automatic operation;

ii) automatic transfer switching; and

iii) load transfer of critical systems.

f) The UPS and standby 3- phase generator systems required by section 10.2a) must:

i) be designed to allow safe isolation for maintenance and repairs without removing power from any load wherever possible; and

ii) comply with the requirements of RD-ITS-D1 “Design of Intelligent Transport Systems (ITS)”.

10.3 Power leads

a) If power rails with IEC type outlets are supplied, compatible equipment power leads must also be supplied.

b) Devices with captive power leads that use a standard 3-pin Australia/NZ standard power connector must have their connector changed to an IEC plug to suit the power rails.

11 Testing and commissioning

a) Testing and commissioning procedures and documentation must comply with the requirements of:

i) RD-ITS-C1 “Installation and Integration of ITS Equipment”; and

ii) PC-CN1 “Testing and Commissioning”.

b) Where the TrafficNet infrastructure building is part of a Project with wider system requirements the verification strategy of the systems required by this Master Specification Part must form part of the wider Project verification strategy.

c) The testing and commissioning plan required by RD-ITS-C1 “Installation and Integration of ITS Equipment” must include all systems and equipment required by this Master Specification Part.

d) As part of the Quality Management Records, the Contractor must provide a full set of records covering all telecommunications cabling installed in the TrafficNet infrastructure building in accordance with (as a minimum) the requirements set out in:

i) RD-ITS-C3 “Telecommunications Cabling”; and

ii) AS/NZS 3085 Telecommunications installations - Administration of communications cabling systems - Basic requirements.