

ROADS AND MARITIME SERVICES (RMS)

QA SPECIFICATION R304

MAINTENANCE OF TRAFFIC MONITORING UNITS

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REVISION REGISTER

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GUIDE NOTES
(Not Part of Contract Document)



MAINTENANCE OF TRAFFIC MONITORING UNITS

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VERSION FOR: DATE:

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FOREWORD

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REVISIONS TO PREVIOUS VERSION

This document has been released as RMS Specification R304 Edition 1 Revision 0.

All revisions to the previous version (other than minor editorial and project specific changes) are indicated by a vertical line in the margin as shown here, except when it is a new edition and the text has been extensively rewritten.

PROJECT SPECIFIC CHANGES

Any project specific changes have been indicated in the following manner:

- (a) Text which is additional to the base document and which is included in the Specification is shown in bold italics e.g. ***Additional Text***.
- (b) Text which has been deleted from the base document and which is not included in the Specification is shown struck out e.g. ~~Deleted Text~~.

RMS QA SPECIFICATION R304**MAINTENANCE OF TRAFFIC MONITORING UNITS****1 GENERAL****1.1 SCOPE**

This document sets out the special requirements for the Maintenance of Traffic Monitoring Units (the “Services”). The Specification is formed only when this document is read together with RMS QA R300 ITS Maintenance Services – General Requirements. The details herein include the Services relevant to TMU, so that they remain in good condition, operate as designed and meet the specified performance requirements. The TMU Equipment to be maintained under the Services includes, but not limited to,

- a) TMU Controller;
- b) Detector (including loops);
- c) Communications equipment;
- d) Power supply equipment (including cables, power regulators, surge protection, pits and conduits, etc.);
- e) Power backup equipment;
- f) Controller cabinet; and
- g) Cabling, pits and conduits.

1.2 DEFINITIONS AND ABBREVIATIONS

The following definitions and abbreviations, in combination with those listed in R300, are applicable to this Specification.

1.2.1 Definitions

Term	Description
Detector	The interface board between the loops and the TMU Controller
Enclosure	A housing providing an appropriate degree of environmental protection against contact with live parts (AS/NZS 60529).
Power backup equipment	Includes backup power generator, UPS, batteries and charging units, photovoltaic power supply where applicable, power regulators, etc.
Protocol	RMS Communications Protocol For Roadside Devices (TSI-SP-003)
Supply Point (also known as Connection Point)	The junction of the electricity distributor’s low voltage network conductors with the consumer’s mains, i.e. the point at which the power supply is connected to the Utility network.
Supports	All structural components, brackets, clamps, straps and parts thereof, used to support the TMU Equipment.
Site/work site	Traffic Monitoring Unit site

1.2.2 Abbreviations

Term	Description
AC	Alternating current
DC	Direct current
LED	Light Emitting Diode
OEM	Original Equipment Manufacturer
O&M	Operations and Maintenance
RCD	Residual current device
TMU	Traffic Monitoring Unit

1.3 RELEVANT DOCUMENTS AND ORDER OF PRECEDENCE

This document must be read together with RMS QA R300 – ITS Maintenance Services – General Requirements.

Other relevant RMS specifications and O&M manuals are listed in **Annexure R304/A**.

In the event of any conflicting requirements between documents, the order of precedence must be:

1. Statutory and legislated requirements.
2. This specification (QA Specification R304) read in conjunction with QA Specification R300.
3. Other RMS ITS Maintenance specifications - listed in Annexure R304/A.
4. RMS ITS Equipment specifications - listed in Annexure R304/A.
5. O&M manuals - listed in Annexure R304/A.
6. Australian Standards.

2 MAINTENANCE SERVICES

You must undertake maintenance services of the TMU system and site components as described in clause 1.1 and in accordance with the approved Asset Maintenance Plan and Forward Works Program.

2.1 PLANNED MAINTENANCE

Planned Maintenance Services must adhere to requirements given in QA Specification R300, ITS Maintenance Services – General Requirements. A combination of inspections/checks and preventative maintenance activities constitute planned maintenance to ensure continued serviceability and availability of a TMU asset.

Minimum planned maintenance inspection/checks are;

- a) TMU operation.
- b) Condition of TMU enclosure, foundation structure and other externally mounted accessories for damage, disfigurement (including vandalism), peeling or damaged galvanizing/paint surface coating and corrosion.

- c) Presence of moisture, dirt, vermin/insects inside TMU enclosure, pits, exposed ducts and civil structure crevices.
- d) Wearing off or damaged site infrastructure i.e. concrete pathways, platforms, retaining walls, safety barriers, handrails, drains, landscaping etc.

Annexure R304/B is a sample Planned Maintenance Service checklist for both checks/inspections and preventative maintenance items.

Planned maintenance frequency will be 12 months.

2.2 REACTIVE MAINTENANCE

2.2.1 Fault Attendance Service

You must provide a fault attendance service on twenty-four (24) hours per day, seven (7) days per week basis for all TMU faults.

Typical causes of TMU faults include, but are not limited to;

- a) TMU Controller and associated equipment malfunctions,
- b) Detector, loops and associated equipment malfunctions,
- c) Communication equipment malfunctions,
- d) Power supply equipment malfunctions,
- e) Power backup equipment malfunctions,
- f) wiring faults,
- g) overheating,
- h) moisture or dust ingress,
- i) accident damage,
- j) storm damage, and
- k) vandalism.

All repair works must be in accordance with RMS Specifications listed in Clause 1.3 or as amended.

2.2.2 Procedure

You must make arrangements to continually monitor the Fault Management System(s) for TMU.

These systems, hosted by RMS, currently include:

- CMCS FMS web page for fault log on the intranet; and

You will be provided with access (e.g. remote login via VPN) to these systems. You may also develop your own software interface to read the CMCS “flat file” which is periodically updated with TMU

fault status. In that case you will be provided with access to the CMCS “flat file” and a description of its structure.

Upon fault notification, you must review the nature and urgency of the problem and prioritise your response. You must dispatch appropriately skilled resource(s)/technician(s) to attend the site as soon as possible, but within the specified response time (see clause 2.2.3 for Response Time and Repair Time). Notification of the fault is either via phone callout or at the start of shift of your resource(s)/technician(s). It is expected that your skilled resource(s)/technician(s) review current faults at the start of their shift to determine their work priorities.

Upon arriving on site you must inform TMC by phone and log the time of attendance in your fault management system together with your initial findings and any other relevant information (e.g. estimated time to repair). You must also notify the TMC by phone before leaving the site.

You must assess whether the condition of the site poses any safety hazards to motorists or the public and make the site safe as a matter of priority.

In the event of a power failure, you must first contact the electricity distributor from off-site to ascertain that the cause of the outage is upstream of the TMU supply point. You must still ascertain from site that there are no other power equipment failures at the TMU site and then enter the appropriate fault response details in your fault management system.

In the event of a communications failure, you must first contact the service providers i.e. Telstra, Optus etc to ascertain that the failure is external to the TMU system. Once confirmed, you must log communications faults with the appropriate third party communications service provider and follow-up to expedite rectification of the fault. You must still ascertain from site that there are no other communication equipment failures at the TMU site and then enter the appropriate fault response details in your fault management system.

2.2.3 Response Times for Fault Attendance

Response time starts from the initial fault occurrence time stamp in the appropriate electronic Fault Management System or from the time of the fault call (whichever is earlier) and is the sum of following;

- Remote investigation time to ascertain nature of defect(s)
- Equipment/parts/materials preparation time, and
- Travel time to site.

Response times for initial site attendance upon notification of a TMU fault is guided by the criterion in **Annexure R304/C**.

Service provider to locate maintenance crews to facilitate their travel time to site.

2.2.4 Repair Time

Repair time at site is the time taken to trouble-shoot the fault, completely repair the asset and make it available for service. Asset downtime directly effects operational availability. Swift, efficient and well coordinated repairs will bring the asset back into operation quickly and positively affect performance targets.

You must inform RMS as soon as possible of any abnormal delays, reasons for delayed repairs and estimate of the time required to complete the repairs.

2.2.5 Repetitive Failures

Where the same reported fault requires callouts on three (3) occasions within a fourteen (14) day period you must carry out root cause analysis, identify and implement appropriate actions to prevent recurrence.

Where these actions recommend replacement or major renewal of the TMU asset and these works have not been included in the current Forward Works Program (FWP) you must submit a Business Case to RMS for approval. The Business Case must be based on a life cycle cost comparison of the proposed action against a “business as usual” maintenance approach. If RMS agrees with your recommendations the renewal or replacement works will be included in the next FWP.

Till the recommended and approved replacement works in the FWP are completed, the availability target (%) will be reviewed and a lower KPI may be accepted or under unsustainable operating conditions, the asset excluded from the KPI assessment until replaced.

2.2.6 Requests for RMS Assistance

Where a technical problem cannot be resolved by you, you may request assistance from RMS. When requesting assistance you must be able to demonstrate to RMS that the technical problem is complex and/or outside your scope of services, e.g. system integration issues with RMS or TMC systems.

If the technical problem cannot be resolved by RMS remotely, a site visit will be arranged by RMS at a mutually agreeable time. You must attend the site with relevant documents and information related to the technical problem.

2.3 INCIDENT SUPPORT

An Incident Support report should be raised when;

- an incident is known to your team
- or when informed by the TMC
- or by the relevant SMC Service Provider.

In the event of an incident, response time and repair time for Reactive Maintenance applies.

On site attendance, you must assess whether the condition of the site poses any safety hazards to the public and make the site safe as a matter of priority.

You must also prioritise and rectify all other faults and defects as if for Reactive Maintenance.

Upon arriving on site you must inform TMC by phone and log the time of attendance in your fault management system together with your initial findings and any other relevant information (e.g. estimated time to repair). Report form in **Annexure R304/D** may be used on site. You must also notify the TMC by phone before leaving the site.

You must assist RMS with all insurance claims and recovery actions arising from the incident.

Incident Support reports must be submitted as part of your monthly report to RMS.

3 PARTS AND EQUIPMENT

3.1 SUPPLY

You must arrange and manage supply of all parts, equipment, materials and technical services from OEM suppliers for the purpose of making available the TMU site. Quality of parts, equipment and technical services from OEMs is to be assured.

When supply disruptions occur due to unavailability or obsolescence of a part or equipment, a Replacement part or equipment is to be recommended to RMS as a business case. RMS may approve use of the Replacement part or equipment after necessary technical review and testing.

3.2 HOLDING STOCK

At all times, you must hold in stock adequate minimum levels of parts and equipment to meet Planned and Reactive Maintenance needs.

Service provider is to determine minimum stock levels for parts, equipment and materials based on TMU maintenance scope.

An inventory of spares for parts, equipment, materials and technical services is to be maintained by the service provider. Inventory is to update minimum stock levels and holding stock periodically to match the TMU maintenance scope.

Inventory of spares is to be updated for Replacement parts and equipment, on approval by RMS.

3.3 DISPOSAL OF DAMAGED, DEFECTIVE, OBSOLETE OR REDUNDANT PARTS & EQUIPMENT

Due to maintenance or incidents, parts and equipment which are damaged, defective, obsolete or redundant are required to be removed from the Work Site and disposed. Such removal is to be done after formal information and agreement with RMS.

Such parts and equipment are to be distinctly and permanently marked prior to disposal by indicating their condition.

Disposal of parts and equipment is to be done as follows;

- a) Repair or refurbish the parts or equipment and hold them as spares in store for future use. For purposes of quality assurance, repaired or refurbished parts are to be treated the same as Replacement parts & equipment (Clause 3.1). Their repair history is to be maintained and made available to RMS when requested.
- b) Carry out disposal of parts and equipment that are beyond-economical-repair (BER) by recycling. Items being disposed must be physically disfigured prior to recycling at a certified facility. Certificate of disposal must be provided.

4 PERFORMANCE REQUIREMENTS (ASSET SPECIFIC)

You must meet the included Key Result Areas (KRAs) and Key Performance Indicators (KPIs) for performance of your Services.

Your asset Inspection and Planned Maintenance Services must support a design life for each TMU asset i.e. site availability should be sustained during design life for different components comprising a TMU site. Design life of different components varies as follows;

- TMU electronics and electrical components- Twenty (20) years.
- Steel Enclosure, Brackets and Fixtures – Fifty (50) years.
- Concrete & Masonry construction at Site - Thirty (30) years.
- Power back-up system / Batteries – Five (5) years.

As per definitions given in R300 the following performance criteria will be measured:

- a) Availability
- b) Response Time
- c) Repair effectiveness Time

Premature asset failures requiring major renewal or replacement of the asset (other than due to Incidents or Force Majeure events) may reduce your overall Stewardship Performance KPI score.

4.1 AVAILABILITY (OPERATIONAL)

RMS QA R300 defines Availability for ITS assets. Performance calculation method is provided in the contract. The performance target for TMU availability is **95.0%**.

Availability as defined in R300 will be measured monthly by you across all TMU assets in your Zone.

Failure to meet the Availability performance targets will impact on your Asset Performance KPI score.

4.2 RESPONSE TIME AND REPAIR EFFECTIVENESS

The measure of Response Time and Repair Effectiveness is defined in R300.

5 REPORTING AND RECORD KEEPING

5.1 REPORTING

You must provide a monthly performance report to RMS on work achievement against the FWP and asset performance statistics by the second week of the following month. The report must include the following items:

- (i) Availability
- (ii) Response Time
- (iii) Repair Effectiveness

See R300 for Availability, Response Time and Repair Effectiveness definitions.

You must report on the status of fault attendance and repairs through the appropriate Fault Management Systems in accordance with Clause 6.3 in R300.

These reports will be included in the KPI assessments by end of every month in accordance with the contract.

5.2 RECORD KEEPING

You must keep and maintain accurate records of all repairs, calibrations, replacements and design alterations made to any TMU Equipment/site.

All Reactive and Planned Maintenance service attendances must be recorded in the electronic fault management system. Details of each attendance must also be manually recorded with you and should include the date and details of service carried out with the technician's name.

You must maintain all necessary records to support the monthly evaluation of actual performance against the specific performance targets.

You must retain records, including all details for accidents/damages/repairs for a period of at least five (5) years.

ANNEXURE R304/A – REFERENCE DOCUMENTS

A1 RMS ITS Maintenance Specifications

RMS QA R318 Maintenance of Power Backup Systems

A2 RMS ITS Equipment Specifications

TSI-SP-003 Communications Protocol For Roadside Devices

A3 O&M Manuals

Refer to respective O&M Manuals based on make and model number of each TMU.

A4 Australian Standards

AS2703 Vehicle loop detector sensors.

ANNEXURE R304/B – SAMPLE PLANNED MAINTENANCE SERVICE REPORT

TMU ID: **LOCATION:**

REPORT DATE:

1. Mark as actioned for each item with a ✓ in the “ACTIONED” columns.
2. If any item requires further attention, write reasons in comments column and mark that item with a ✓ in the “for further action (FFA)” column.
3. Enter date in dd/mm/yy format and time in 24 hour format.

PREVENTATIVE MAINTENANCE ITEMS	ACTIONED	COMMENTS	FFA
Controller Cabinet			
Check labels and their condition, arrange for replacement if damaged or missing.			
Check for graffiti on Control Cabinet. Remove, if graffiti found. Report date found to RMS.			
Clean the cabinet, remove dust, vermin and other debris, tidy-up wiring			
Check cabinet (inside and outside) is secured to prevent weather damage to electronics			
Check Communication and Power pits for water and other damage, clean as necessary			
Check condition, replace and lubricate door locks, hinges & seals as required.			
Check that log sheet and WEA drawings are complete and intact.			

NOTE: If WAE drawings missing, prepare at site and forward to RMS to reproduce.			
Locate MEN connection inside the cabinet			
Visually/physically check wiring/terminations/earthing items, tighten if required. Check and secure Earth connection. Measure Earth insulation reading using insulation tester Replace or repair as necessary.		Reading between Earth stake & Door = _____ Reading between Earth stake & Mains Earth = _____ Date: _____	
Check if surge protector is installed		Surge protector make and model = _____	
Physically check switchboard and RCD items. Reset circuit breakers. Measure RCD tripping current (in mA) Repair or replace as necessary.		RCD tripping current = _____ mA RCD tester make and model = _____ Date: _____	
Install cable entry plate and seal around the cables			
TMU Controller, Detector, Loops and communication equipment			
Trim all trees that interfere with the controller cabinet			
Mow a strip two (2) meters wide, cut around the controller cabinet			
Mow a strip two (2) meters wide, cut from the roadway to the controller cabinet			
Remove any weeds or grass near cabinet			

Visually inspect footings for any physical damage or unexpected corrosion. Repair or replace as necessary.	Symptoms found: _____ _____ Date: _____	
Check for damaged cables. Repair or replace as necessary	Found: _____ Date: _____	
Inspect electronics of TMU Controller, Detector and communication equipment for symptoms of electrical or thermal fatigue. Repair or replace as specified	Symptoms found: _____ _____ _____ Date: _____	
Remove mains power; verify uninterrupted controller operation. Check existing battery voltage and charger operation. Replace and label battery as specified	Date on battery label or proof of purchase: _____ Date of expiry of battery OEM's warranty: _____ Date reached 400 recharge cycles to 80% depth of charge: _____ Date: _____	
Retrieve TMU fault log. Repair or report as necessary.	Faults: _____ Date: _____	

1. Mark condition of each item with a ✓ in “PASSED/REPAIRED” columns.
2. Mark condition CF or NCF in the FAILED column to categorize.
3. If any item requires further attention, write reasons in comments column and mark item with a ✓ in the “for further action (FFA)” column.
4. Enter date in dd/mm/yy format and time in 24 hour format.

FUNCTIONAL INSPECTION ITEMS	PASSED	FAILED	REPAIRED	COMMENTS	FFA
TMU Controller					
1. Check communication between TMU Controller and CMCS/TMC or other host control centre					
2. Check communication between TMU Controller and Detector					
3. Disconnect power supply and check TMU operation with power backup. Validate occurrence of fault(s), with CMCS/TMC.				TMU fault log: _____ CMCS fault report: _____ _____	
4. Reconnect power supply and check TMU operation. Validate clearance of fault(s), with CMCS/TMC. Repair or replace as necessary.				TMU fault log: _____ CMCS fault report: _____ _____ Date: _____	
5. Retrieve TMU fault log; verify fault log is reporting TMU faults					
Detector and Loop functions					
6. Match each Detector channel (and vehicle detect indicator LED) with its corresponding loop.					
7. Visually verify illumination of the vehicle detect indicator LED of a channel with each vehicle that passes over a loop of that channel a) Channel 1 b) Channel 2 c) Channel 3				LED counts: ____ Vehicles: ____ LED counts: ____ Vehicles: ____ LED counts: ____ Vehicles: ____	

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d) Channel 4				LED counts: ____ Vehicles: ____	
Repair or replace as necessary.				Date: _____	

TECHNICIAN: **COMPANY:**

SIGNATURE: **DATE SIGNED:**

DATE SENT TO RMS:

ANNEXURE R304/C – FAULTS TYPES AND RESPONSE TIMES

Response times for initial site attendance upon notification of TMU faults are detailed in R300 (Clause 6.2.1 Response Times and **Annexure D**). R300 categorizes ITS assets as either High Priority or Normal Priority and assigns suitable response times.

ANNEXURE R304/D – SAMPLE INCIDENT SUPPORT REPORT

TMU ID: **LOCATION:**

INCIDENT DATE: **REPORT DATE:**

Incident Details	
When reported	
Who reported	
Was Incident or fault a dangerous situation? (Y/N)	
Police attendance? (Yes/No) Police Report #:	
Details of any vehicles involved	
Attending supervisor and team at site. Date and time.	
Immediate Safety measures taken. Date & time.	
Power Supply Point / post identification number	

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Initial Repair undertaken. Date & time	
Details of long term repair. Whom forwarded to for action.	
Description of replaced equipment and cost of equipment plus materials	
Number of hours claimed for complete repair	
Notes & Comments	

TECHNICIAN: **COMPANY:**

SIGNATURE: **DATE SIGNED:**

DATE SENT TO RMS: