AUS-SPEC *TECHguide*
TG 405

October 2024

Guide to road reserve maintenance system and documentation

This guide sets out the procedures for the compilation of documentation for the maintenance of road reserves. It addresses the philosophy behind the creation and development of the AUS-SPEC maintenance system based on quality, competitive principles and programmed maintenance. It reflects the execution by competitive maintenance contracts, either by the Principal's own business units or private contractors.

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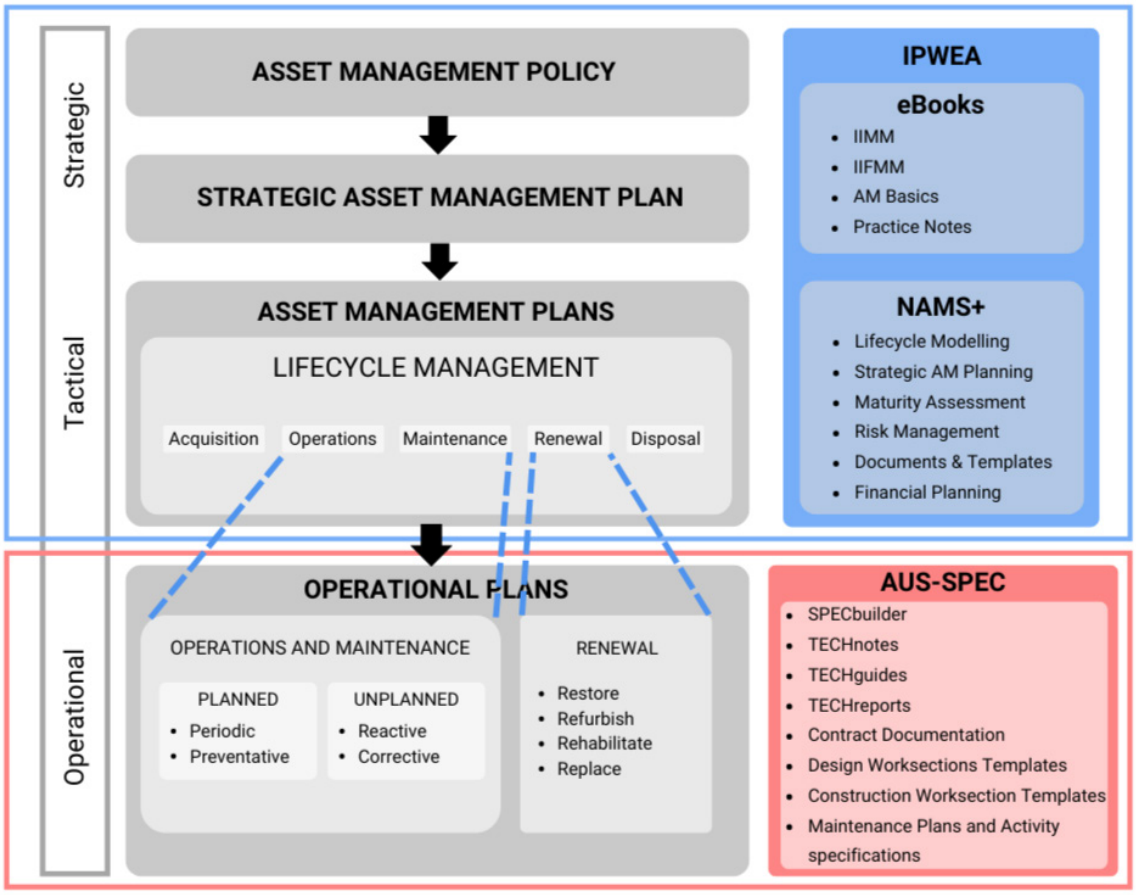
CONTENTS

1 INTRODUCTION

This TECHguide describes the philosophy and components of the AUS-SPEC maintenance system which is based on quality management, competitive principles and programmed maintenance. It reflects the move from predominantly direct control, responsive maintenance and operations to the proactive approach outlined in the National Sustainability Frameworks for Asset Management for Local Government and developed in the Asset Management Basics (AMB), *International Infrastructure Management Manual (IIMM) and the International Infrastructure Financial Management Manual (IIFMM)* Operations studies previously carried out by State and Local Government form the foundation of AUS-SPEC documents.

The AUS-SPEC resources complement the strategic and tactical resources provided by IPWEA as mentioned in the brochure available at www.aus-spec.com.au and as shown in the diagram below:



This diagram shows the relationship between the asset management functions, and hierarchy of documents in the Asset Management System and the IPWEA eBook Library, NAMS+ and AUS-SPEC resources.

NATSPEC TECHnote GEN 017 for guidance on using AUS-SPEC for asset management. IPWEA's national uniform code for assessing road pavement condition, Practice Notes 9, 9.1 and 9.2 provides more guidance on visual assessment of condition and asset performance of road pavement assets.

The AUS-SPEC maintenance system allows asset owners to balance the level of service and the maintenance and operations budget and prepare documentation for in-house and/or private maintenance contracts. It includes records of asset inspections, defects, programmed and prioritised works and monthly works completed reports. These records and reports improve the maintenance history and asset inventory and provide a defence against possible litigation.

AUS-SPEC provides a professional and best practice approach to responsibly maintaining the community's assets within the budgetary constraints of the owner of the asset.

1.1 Referenced documents

The following documents are incorporated into this TECHguide by reference:

TECHguides

AUS-SPEC TG 102 *Guidelines for Principals – Standard contracts*

AUS-SPEC TG 103 *Guidelines for Principals – Period supply and service contracts*

AUS-SPEC TG 406 *Guide to adapting asset delivery documentation to road reserve maintenance*

TECHnotes

TECHNote GEN 017 Using AUS-SPEC for asset management

TECHnote GEN 018 Using AUS-SPEC for asset maintenance

TECHnote GEN 023 Using AUS-SPEC for management of unsealed roads

TECHnote GEN 026 Otta seal – A new approach to sealing

TECHnote GEN 027 Maintenance of unsealed roads

TECHnote DES 034 Pavement stabilisation for unsealed roads

TECHnote DES 035 Improvement and stabilisation of unsealed roads

TECHreport

TECHreport TR08 Management of council gravel pits in country areas – A case study

Worksections

0122 Information for tenderers

0123 Conditions of tendering

0124 Tender submission documents

0147 Conditions of contract

1601 General requirements – road reserve (Maintenance)

1602 Contract schedules – road reserve (Maintenance)

1603 Road reserve maintenance plan (RMP)

1604 Annexures to Road reserve maintenance plan (RMP)

Standards

AS 2124-1992 General conditions of contract

AS 4000-1997 General conditions of contract

AS/NZS ISO 9001:2016 Quality management systems - Requirements

GC 21-2022 New South Wales Government General conditions of contract (Edition 2)

NCW4-2019 General conditions of contract for construction

NPWC3-1981 National Public Works Contract - General conditions of contract

Other publications

Australian Accounting Standards Boards

AASB 116 2021 Property, plant and equipment

AUSTROADS

AGAM06-2018 Guide to Asset Management – Processes – Defining and Understanding Asset Requirements

AGPD04-2014 Guide to Project Delivery – Direct Management of Project Works

AGPT05-2019 Guide to Pavement Technology – Pavement Evaluation and Treatment Design

AGPT06-2009 Guide to Pavement Technology – Unsealed Pavements

AGPT07-2009 Guide to Pavement Technology – Pavement Maintenance

Austroads AP-R673 2022 Road asset data standard Version 4

IPWEA

AMB-2018 Asset Management Basics – Applying Infrastructure Asset Management Principles

IIFMM-2020 International Infrastructure Financial Management Manual

IIMM-2020 International Infrastructure management manual. 6th edition

Practice Note 9-2015 Road pavements (Visual assessment)

Practice Note 9.1-2016: Condition assessment and asset performance guidelines - How to assess road pavement condition

Practice Note 9.2-2016: Condition assessment and asset performance guidelines - How to integrate pavement assessments into AM planning

2 AUS-SPEC MAINTENANCE SYSTEM

2.1 A proactive approach

Maintenance and operations - General

The main objective of a maintenance strategy is the maintenance of assets at an appropriate level of service and structural integrity at the lowest possible cost to the asset owner and users. Maintenance aims to preserve an asset, not upgrade it, and includes regular checking, repairs and minor improvements to remove the cause of any defects and avoid excessive repetition of maintenance effort. Regular maintenance is less costly than reconstruction, which becomes necessary if maintenance is neglected. Delayed maintenance also has other indirect costs e.g. increased operating costs due to difficulty in using roads.

The AUS-SPEC maintenance system conforms to a quality management model with the following characteristics:

- A systematic approach: Each project is broken into a number of defined activities.
- Inspection and test plans: Provided for each activity to allow systematic and progressive verification of conformance with requirements.
- Simple clear checklists: For in-the-field recording, as evidence of conformance with requirements.
- Hold points: Assigned to critical aspects of the work.
- Conformance: Designed to encourage the service provider to identify and correct process faults and thereby assure the purchaser of good quality and productivity. If some aspect of the work does not conform and cannot be corrected, a non-conformance report is required.

The AUS-SPEC maintenance system in addition to road reserves also includes parks and recreations areas, buildings and facilities. See TECHnote GEN 018. Further, the following construction worksections will assist in the maintenance of sealed roads:

- *1142 Cold mix asphalt*
- *1143 Sprayed bituminous surfacing*
- *1144 Asphalt (Roadways)*
- *1146 Microsurfacing*
- *1147 Sprayed preservation surfacing*

Maintenance and operations – Unsealed roads

The maintenance of unsealed roads requires more frequent inspections and regular treatment as compared to sealed roads. Factors influencing the performance of unsealed roads are material properties, road geometry and drainage, environmental influences and traffic conditions. The dynamic and changeable nature of unsealed roads makes it difficult to forecast optimal expenditure and allocation of resources. The maintenance works are prioritised based on regular inspections, customer requests, minimise risk and ensure safety to the communities. In addition to the **Maintenance and operations – General** the following documents will assist in the maintenance of unsealed roads:

- *TECHnote GEN023 Using AUS-SPEC for the management of unsealed roads.*
- *TECHnote GEN 027 Maintenance of unsealed roads.*
- *TECHnote DES 034 Pavement stabilisation for unsealed roads.*
- *TECHnote DES 035 Improvement and stabilisation of unsealed roads.*
- *TECHnote GEN 026 Otta seal – A different approach for road sealing.*
- *TECHreport TR08 Management of gravel pits in country areas – A case study.*
- Planning and Design worksections: *0051 Geometric rural road design – sealed* and *0052 Rural pavement design – unsealed, 0053 Rural pavement design – sealed and 0054 Rural pavement design – unsealed.*

- Construction worksections: *1113 Subgrade and formation stabilisation, 1130 Rural concrete base* and *1140 Wearing course, base and subbase – unsealed, 1161 In situ pavement stabilisation using cementitious binders, 1162 In situ pavement stabilisation using bituminous binders, 1163 Ex situ (plant mix) pavement stabilisation and 1164 In situ pavement stabilisation of unsealed roads.*

Capital renewals and replacement
Renewal is major work which does not increase the asset's design capacity but restores, rehabilitates, replaces or renews an existing asset to its original capacity. For asset renewal and rehabilitation for road reserves, use the combination of AUS-SPEC Construction worksections from *Workgroup 01, 02, 03, 11 and 13* and Maintenance worksections from *Workgroup 16*.

2.2 Roles and responsibilities

Principal's roles and responsibilities
Under the AUS-SPEC maintenance system, the Principal/Asset owner/Council:

- Classifies each road in the road reserve network to define the level of risk aligned to the Asset Management Plan and strategy.
- Determines the likely maintenance activities and documents the performance requirements and standards.
- Assesses the quality capability of the Contractor/Service provider.

Contractor's roles and responsibilities
Under the AUS-SPEC maintenance system, the Contractor/Service provider:

- Controls the processes and methods, verifies conformance and provides only quality products and services.
- Inspects the road reserve network regularly, records and reports on performance parameters such as distress to be rectified (e.g. footpath trip or pothole), or the need for remedial action (e.g. impeded open drain or long grass on footpath).
- Prepares and implements the maintenance work program.
- Repairs defects which have reached the documented recording level within a defined period.
- Verifies conformance to the specified performance standard.
- Provides the Principal with data on the condition of the road reserve network to facilitate the currency of roads condition records. This data is the basis of the Contractor's claim for payment if a Contractor has been used.

Superintendent's roles and responsibilities
Under the AUS-SPEC maintenance system, the Superintendent:

- Audits the maintenance system, methods and end product during the course of the Contract.
- Releases Hold points.

2.3 Procurement

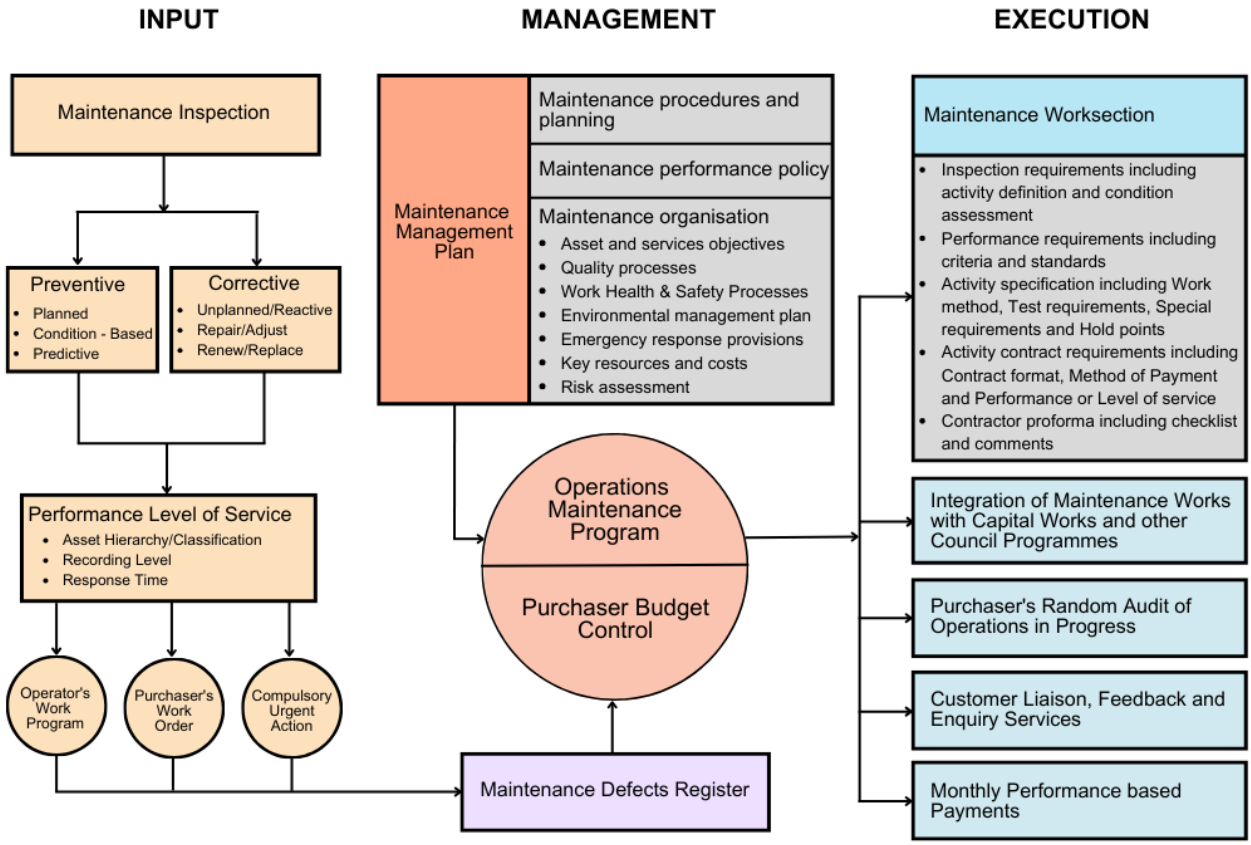
Maintenance may be procured in the following ways:

- Outsourced to private contractors by competitive tender.
- In-house service agreements e.g. Council's own provider business units.
- A combination of in-house service agreements and external contracts.

The AUS-SPEC system is adaptable for use with any of these procurement methods. AUS-SPEC road reserve maintenance worksections cover routine, periodic and urgent unplanned maintenance for roads. AUS-SPEC design and construction worksections can be incorporated into the documentation for projects requiring rehabilitation.

A **Flow diagram of typical AUS-SPEC Maintenance worksection** is shown with the main headings of Input which includes preventive and corrective maintenance, Management includes the Maintenance management plan and Execution includes the maintenance performance and contract requirements.

Flow Diagram for Typical AUS-SPEC Maintenance Worksection



3 COMPONENTS OF THE ROAD RESERVE MAINTENANCE SYSTEM

Road reserve maintenance system

The main components of the AUS-SPEC maintenance system are a series of *Templates* which can be edited to suit a particular project and reflect the asset maintenance management policy of the asset owner. These *Templates* include:

- General requirements.
- Maintenance schedules.
- Quality requirements/Maintenance plan.
- Maintenance worksections and selected worksheets in *1602 Maintenance schedules - road reserve* spreadsheet.

3.2 General requirements

Road reserve maintenance

The *1601 General requirements – road reserve (Maintenance)* worksection is applicable to the General requirements of the Principal/Council for road reserve maintenance contracts. It includes plan requirements, contract period, work by others, traffic management, environmental protection, safety plan requirements, emergency response, accidents and damage and measurement and payment. Edit this *Template* to create a master document for use on all road reserve maintenance contracts. Include project specification information in the RMP, Activity specifications and the contract schedules, as appropriate.

Maintenance schedules

The *1602 Maintenance schedules - road reserve spreadsheet* includes worksheets, with annual works schedules aligned with the Austroads AP-R673 Roads Asset Data Standard (ARADS) as follows:

- Works cost review.
- Bitumen Reseals.
- Seal preservations such as enrichment rejuvenation and PME.
- Major and minor planned/proposed construction.
- Road reserve asset listings.
- Gravel pits test data.
- Gravel resheeting.
- Schedule of rates guide for activities from previous years.
- Plant hire - Sample
- Labour rates to be used in estimating - Sample.

1602 Maintenance schedules - road reserve includes ARADS sort codes for the Priority Data Sets and will assist local government in providing consistency for road reserve asset data collection The Austroads Road Asset Data Standard (ARADS) provides road agencies with a specification for the data that supports common operational activities.

ARADS establishes a common understanding of the meaning or semantics of the data to ensure appropriate use and interpretation of the data by its stakeholders. It also provides information on Priority Data Sets (PDS) that can support harmonisation activities, funding approvals, national reporting, innovation, shared services, and communication for local government.

3.3 Quality requirements and maintenance plan

Road Maintenance Plan (RMP)

A Road maintenance plan (RMP), required under the *1601 General requirements – road reserve (Maintenance)* worksection, is necessary, whether the Works will be performed by in-house employees or private contractors. An RMP outlines the procedures in place to provide assurance that the materials and processes conform or will lead to performance conforming with the documented requirements. It provides the Principal with information regarding day to day execution of the maintenance works and the ways in which the Contractor/Council in-house service provider will record and report information to the Superintendent.

The *1603 Road maintenance plan (RMP)* worksection is based on the structure of a Quality manual and Quality plan, however, the simplified format does not require third party verification or extensive documentation by the Contractor/Council service provider. The RMP is prepared by the Principal and completed with input from the Contractor/Council service provider.

The asset owner should review the RMP regularly, triggered by changes to the organisational objectives, asset requirements, regulation/ legislation, community views, etc.

RMP Structure

The RMP is divided into two parts to allow a Tenderer, in the case of an external contract, to submit a conforming RMP with minimum documentation at the time of tender. Additional information is added to the RMP by the successful Tenderer/service provider during the course of the project. The parts are as follows:

- **RMP Part 1** is a description of the broad scope of the contract management requirements and includes the Activity Specifications. The Principal edits the AUS-SPEC *Template* to suit the particular project and includes it as part of the Request for Tender (if a Request for Tender is being sought). Each Tenderer/ service provider is required to supply details in the pro forma document. Before letting the contract, the Principal may negotiate adjustments to the proposals or details provided by the Tenderer/ service provider.
- **RMP Part 2** comprises additional information for completion by the Contractor/service provider and submission to the Superintendent during the contract establishment period. RMP Part 2 is supplied to inform the Tenderer of the method and extent of the reporting procedures required under the terms of the contract and is not for submission with the tender documents. RMP Part 2 is developed within the establishment period as part of executing the contract and requires the Superintendent's approval. Part 2 includes information on:
  - Maintenance procedures: Includes maintenance records, safety plan, environmental management plan, emergency response, training and non-conformance management.
  - Maintenance planning: Includes monitoring performance/service level, inspections, Superintendent's surveillance, work plan, recording of defects (Lump Sum, schedule of rates or Dayworks), work program and reporting.

Maintenance management forms
The *1604 Annexures to road reserve maintenance plan (RMP)* worksection provides a series of spreadsheets and forms to control the process of management and payment of work including:

- Conformance management forms.
- Hold Point release form.
- Contractor's/service provider's lump sum activities record.
- Contractor's/service provider's Work Order/Work Variation sheet.
- Maintenance defects register.
- Work completed report.
- Damage report and repair forms.

1604 Annexures to road reserve maintenance plan (RMP) includes ARADS sort codes for the Priority Data Sets and will assist local government in providing consistency for road reserve asset data collection.

3.4 Maintenance worksections

Activity specifications
Routine maintenance comprises a large number of small activities, often preventative in nature, that cannot be planned, and quality tested in the same way as construction activities. By necessity, maintenance requirements need to be specified in the form of performance standards and work methods.

Activity specification *Templates* are available for each of the various activities involved in the maintenance and operations of road reserves. Each activity has a unique classification number within the national worksection classification system as well as a unique 3 letter code, suitable for timesheets and checklists. Activities are grouped according to the asset type and activity type: maintenance or operations.

The Activity specification *Templates* follow a consistent format and can be edited to suit the particular project and Principal requirements. For an external contract, the Activity specifications are provided to Tenderers by the Principal and form part of the RMP. They provide basic information on the maintenance activities which are anticipated to make up the Works. The National Classification list available from www.natspec.com.au can be used as a checklist for deciding which, if any, activities will be tendered.

Principals may advise Tenderers that variations to Activity specifications (excepting performance criteria and standards) will be considered at the tender stage and, under certain circumstances, during the contract to allow for improvements and innovation.

Each maintenance worksection includes the following information:

- **GENERAL**
  - **Referenced documents**: A list of referenced documents and standards applicable to the activity. As AUS-SPEC provides an update service, these documents are up-to-date with current standards and regulations at the time of each annual update.
- **INSPECTION REQUIREMENTS**
  - **Activity definition**: Describes the work which reflects the maintenance activity.
  - **Condition assessment:** Describes the nature of distress and defects based on the condition of the park assets as per IPWEA Practice Note 9, 9.1 and 9.2.
- **PERFORMANCE REQUIREMENTS**
  - **Performance criteria**: Describes the criteria to maintain the asset in an appropriate condition.
  - **Performance standards**: Describes the performance standard required for the maintenance activity.
- **ACTIVITY SPECIFICATION**
  - **Work Method requirements**: A statement of the Contractor's, undertaking to provide quality. This is provided to the Tenderer and may be amended by the successful Tenderer following negotiation with the Principal.
  - **Test requirements**: Default test requirements for Principal (if applicable).
  - **Special requirements**: Principal requirements additional to the Work method statement (if applicable, e.g. material source).
  - **Nominated hold points**: Nominated by the Principal (if applicable).

- **ACTIVITY CONTRACT REQUIREMENTS (ACR)**

Each Activity specification is accompanied by an Activity Contract Requirement sheet. The AUS-SPEC *Template* provides default values for the following:

. **Contract format:** Includes Method of payment, e.g. Lump Sum, Schedule of rates or Daywork item.

. **Reporting unit**: Maintenance management system reporting unit for data collection based on the contract format. For example, $/segment, or work hours/segment range.

. **Unit of measurement:** This will be required for Schedule of rates contract. For example, heavy patching.

. **Performance or Level of service:**

* Road traffic score (Category 1-4): A traffic score concept is established to allow Council flexibility to assign different levels of service for different classifications of road or zones. This will most commonly be related to estimated traffic but Councils may use other criteria by editing the ACR. The AUS-SPEC default values are based on the Road traffic score 1 for the lowest order of the road network and 4 is the highest order of the road network.

* Recording level: A state of distress or need for remedial action exceeding a defined threshold to prompt action. This is defined by considering the various modes of early failure that will lead to more expensive damage later, or describing appropriate thresholds (called recording levels) to prompt action (e.g. the clearing of a drain that may cause flooding later if unattended).

* Response time: The time that determines the speed of response to the recording level appropriate to the location.

* Compulsory intervention levels: The level that specifies at what threshold immediate action is required.

Service levels drive the frequency of maintenance and the intervention level at which the maintenance is required. Default recording levels provided in the ACR define the minimum acceptable performance in relation to, e.g. the quality of service, safety. Response times and inspection frequencies are set according to an assessment of risk to the road traffic score category, volume and type of traffic.

To facilitate meaningful benchmarking, retaining the default recording levels is recommended. Response times and compulsory intervention levels can be readily adjusted for each road traffic score to reflect the different road or zone classifications. Periodically review service levels to match with the customer and technical service levels. Austroads AGPT07 provides further guidance on service levels and intervention levels. AGPT05 provides guidance on pavement investigation, testing and evaluations, identification of causes and modes of distress and treatment options.

- **CONTRACTOR PROFORMA**

. **Checklist**: For programmed work items for completion by Contractor in the field.

. Comments: This includes any additional maintenance activity found to be carried out around the area.

. Work locations: This will provide the location where the maintenance activity has been carried out and will include digital data to support this information.

List of Activity Specifications for maintenance and operations of road reserve

ACTIVITY SPECIFICATION	ACTIVITY CODE	METHOD OF PAYMENT LS - Lump Sum DW - Daywork
Horticultural		
1411 Street landscaping *1412 Grass mowing in road reserves* *1413 Tree and vegetation control in road reserves* *1414 Weed control in road reserves*	HSL HMR HRV HWR	LS LS LS LS
Pathways		
1433 Footpath and kerb ramp repairs	PFR	LS
1434 Fire access and fire trail repairs	FFT	LS
Pavement		

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ACTIVITY SPECIFICATION	ACTIVITY CODE	METHOD OF PAYMENT LS - Lump Sum DW - Daywork
1611 Pavement sweeping	PSW	LS
1612 Auxiliary work for reseals	PAW	DW
1613 Repairs to bituminous surfacing	PBS	LS
1614 Crack sealing	PCS	LS
1615 Local shape correction	PSC	LS
1616 Grading unsealed roads	PGU	SOR
1617 Resheeting unsealed roads	PRU	SOR
1618 Heavy patching	PHP	SOR
1619 Minor patching	PMP	LS
1620 Pothole repair	PPR	LS
1621 Concrete pavement repairs	PCR	SOR
1622 Concrete slab stabilisation	PSS	SOR
1623 Emergency pavement repairs	PER	LS
Shoulder		
1631 Edge break repairs	SEB	LS
1632 Grading unsealed shoulders	SGU	LS
1633 Resheeting unsealed shoulders	SRU	SOR
1634 Local scour repair	SSR	DW
Roadside		
1641 Kerb and channel (gutter) repairs	RTI	LS
1642 Traffic Islands	RMF	LS
Pavement moisture control		
1651 Clear road reserve subsoil drains	PSD	LS
1652 Clear road reserve open drains	POD	LS
Traffic facilities		
1671 Road reserve boundary fence repair	TBF	LS
1672 Road reserve fences and handrails	TFH	LS
1673 Street seats and bus shelters	TSS	LS
1674 Carriageway delineators	TDE	LS
1675 Road reserve guard fence	TGF	SOR
1676 Road reserve signs	TRW	LS
1677 Road reserve guide signs	TGS	LS
Operation – road reserve		
1681 Accident repairs (Recoverable)	OAD	LS
1682 Road reserve emergency call out	OEC	LS
1683 Storm damage response for road safety	OSD	LS
1684 Traffic facilities – road traffic control	OTC	DW
Operation - cleaning and waste management		
1691 Road reserve litter collection	OLC	DW
1692 Removal of graffiti visible from roads	OGR	DW
Water cycle management		
1853 Clear road reserve culverts and pits	DCP	LS
1854 Minor repair of lined drains in road reserves	DLD	LS

4 APPLICATION OF THE AUS-SPEC MAINTENANCE SYSTEM

4.1 Trial contracts

It is recommended that Principals embarking on the development of the competitive provision of road reserve maintenance, appoint a project manager to first apply the AUS-SPEC maintenance system to trial maintenance contracts using in-house staff for the following reasons:

- To determine the correct level of effort and investment required to meet the requirements built into the RMP.
- To allow staff to learn the maintenance process and become familiar with a competitive contract environment.
- To progressively collate key road reserve asset information necessary to quantify typical maintenance resource requirements.
- To test the quality of the ongoing asset management data produced by the RMP.
- To quantify realistic budget allocations to the components of maintenance activity in the network so that budgetary control will persist with the advent of a contractual rather than resource driven program.

4.2 Implementation phase

Present AUS-SPEC maintenance system to the Principal's works group or business unit
Explain the process and documentation and form committees to review the Activity specifications, ACRs and General requirements for local application.

The Principal needs to review the AUS-SPEC documentation and adjust definitions, performance criteria and method of payment to suit circumstances. For example, during implementation, the Principal may adopt a greater number of activities for schedule of rates payment rather than Lump Sum payment due to a lack of historical data on both inventory and previous expenditure patterns.

List the implementation tasks
Define the tasks and time scale for implementation and the required resources including:

- Review of Activity definitions and performance criteria.
- RMP documentation.
- Reporting system establishment.
- Resources for initial inventory surveys and inspections.
- Develop the trial road reserve network definition information

Define the trial road reserve network using schedules and base maps. Utilise the work done during the AASB 116 asset management data capture and Maintenance Management System (MMS) and/or Pavement Management System (PMS) data.

Establish a test group for a virtual trial of the process
Amend the *Templates* to suit the Principal's requirements, making sure the documented process is efficient and effective. Inspections shall be made by the provider and the Maintenance Defect Register (MDR) will be created by the Project Manager. When a defect is detected it is entered into the MDR and a response organised in conformance with the appropriate Activity specification and ACR. In order to allow the Project Manager to monitor effort and costs assigned to the AUS-SPEC activities and network segments a costing code system will need to be developed for the implementation trial. This localised network information will be invaluable at completion of the trial when the business unit or tenderers quantify lump sums and unit rates.

Allow the test crew/work gang to identify areas for improvement
Allow the test crew/work gang to identify Activity specifications, ACRs and management processes that need improvement and allocate resources to implement these improvements. Also involve all administrative staff, (in particular financial staff) to make sure the appropriate independent reporting and financial systems will be available and these systems will be resourced to allow them to be carried out efficiently and with probity.

Instigate a full-scale implementation trial of six months
When most processes, systems and resources are in place, allow a realistic implementation phase to proceed. This may cover a geographic zone within a Council area or the entire Council area. During the trial period it is recommended that existing cost and production reporting systems are maintained in parallel with the trial. Timesheet and employee payment systems are not affected by the implementation of the AUS-SPEC maintenance system.

Recommend adjustments to performance requirements/service levels defined in the ACR
This will be possible as the level of the road reserve maintenance budget is monitored relative to the effectiveness of work done and the condition of the network.

The end of the implementation phase
The Principal should aim to have documentation which is clear in its requirements and consistent in its format. The Principal can then choose to either test its maintenance delivery proficiency in the open marketplace or operate an internal contract awarded to an in-house business unit.

At conclusion of the implementation phase, it is anticipated that sufficient asset inventory and historical expenditure data will be available so that the payment methods will more closely reflect the Lump sum listings in the AUS-SPEC Templates. The implementation period will vary from organisation to organisation.

4.3 Example of implementation phase

Case study

IIMM Case study 3.3.3d *Developing maintenance plans and procedures* provides an example of the proactive approach to road maintenance by City of Parramatta, implementing the AUS-SPEC road maintenance system.

More AUS-SPEC Case studies are also available at www.aus-spec.com.au.

4.4 Data collection

Maintenance requires an inventory of all assets. The form and type of data required by the AUS-SPEC maintenance system is consistent with Pavement Management Systems (PMS) and Maintenance Management Systems (MMS) and can be used to assist with the generation of reports for the development of future works programs and assist with road reserve asset management.

The data received facilitates increasing accuracy for costing on a road section basis as well as assisting with the efficient and effective management of the network. The Maintenance Defects Register also provides records which may be required as a defence against litigation.

Austroads AP-R673 Austroads Road Asset Data Standard (ARADS) is the data standard for road management and assists road authorities to harmonise data sets that support common road management activities. *1602 Maintenance schedules - road reserve* and *1604 Annexures to road reserve maintenance plan (RMP)* include the sort codes for the Priority data sets to provide consistency for road reserve asset data collection. Austroads Priority Data Standard vendor spreadsheet is also available so that local government is familiar with Priority data set levels and can collect the appropriate asset data, required for asset performance, inter-organisation communication, reporting, funding approval and benchmarking.

IIMM Section 2.4.4 provides more information on data collection processes and Figure 2.4.4 illustrates the information strategy to collect store, analyse, report and maintain the asset data. Collected asset data can be maintained and improved in accordance with IIMM Section 2.4.5.

Use the following methods of data collection as defined in AGAM06:

- Asset register or inventory: Include an inventory of the key properties and attributes of the asset that usually remains static for a long time. Use location referencing for defining asset location including road number, chainage, etc. for example using GIS.
- Condition data: Include transient physical properties of the asset with the date of recording or measurement. Include the condition data comprising of the name of the distress, severity or magnitude of distress and the extent of distress. Collect the data either by automated methods or by visual inspection as defined in IPWEA Practice Note 9. AGAM06 Table 4.1 provides guidance on the pavement condition classification and AGAM06 Table 4.2 provides guidance on the types of pavement distress. AGAM06 Table 4.3 for standard specifications and test methods.
- Road use data: Include traffic volume, loading and traffic growth.
- Site and environmental data: Include geographical, climate, road geometry, drainage and underground services data.
- Construction, maintenance and expenditure data: Include information on pavement composition and maintenance history including summary of expenditure and the nature of works. Store maintenance data by using location referencing along with condition data.
- Historical data: Include the data recorded repeatedly during the life of the asset to assess the change in the properties between past and future performance.

- Risk data: Include all identified asset risks, their current risk assessment score, identified and evaluated risk treatments.
- Level of service data: Include technical level of service across all assets forming the road infrastructure which is compared with the current asset condition and performance data for developing work programs.

Specialised technology for data collection
Consider the use specialised systems and technology e.g. GIS, digital photography, GPS equipment and satellite navigation, mobile communications and electronic data acquisition equipment. These systems provide several benefits for efficient and improved means of data collection for maintenance purposes. IIMM Section 4.3 provides more detail on information systems and tools for recording and maintaining asset data.

4.5 Pavement treatment

The condition data and the inspections identify the distress modes. Appropriate pavement treatment should then be selected as defined in AGPT05 and AGPT06 for unsealed pavements and implemented using the AUS-SPEC construction and maintenance worksections. For pavement preservation treatments use

1147 Sprayed preservation surfacing.

4.6 Benchmarking

Benchmarking is possible with other organisations using the AUS-SPEC maintenance systems, as the work process and the outcome are effectively the same.

Following implementation, the system progressively improves and provides the asset owner with the control and historical data that allows the organisation to competently improve the management of the assets.

5 COMPILATION OF CONTRACT DOCUMENTATION

5.1 General

Documentation for maintenance contracts generally follows the production and procedures outlined in AUS-SPEC TG 102 and TG 103.

Standard contract documentation is in two sections:

- **Section A Tender documents**: If the maintenance contract will be with an external Contractor, assemble the *0122 Information for tenderers* and *0123 Conditions of tendering* worksections separately.
- **Section B Contract documents**: Assemble contract documents, free from discrepancies and omissions, in 4 volumes as described in the **Contract documentation volumes table**.

Contract documentation volumes table

Contract volumes	Include the following AUS-SPEC worksections and related documents	Notes
Volume 1 CONDITIONS OF CONTRACT (General workgroup)	*0147 Conditions of contract.*	This worksection outlines the general conditions of contract AS 2124, the annexures to the contract and the special conditions of contract. The General conditions of contract (e.g. AS 2124) is included in the contract documents by reference in the *0147 Conditions of contract* worksection.
	Annexure to General conditions of contract.	These are pre-printed forms of Annexure Part A and B for standard contracts.
	Special conditions of contract.	Refer to TG 406 for guidance on adapting General conditions of contract to road reserve maintenance
Volume 2 TECHNICAL SPECIFICATIONS	Technical specification: *1601 General requirements - road reserve (Maintenance)*.	This worksection is applicable to the general requirements of the Principal/Council for road reserve maintenance contracts.
	1602 Maintenance schedules - road reserve) includes worksheets for works cost review, annual reseals, annual bitumen preservations, major and minor annual construction, assets listing, gravel pits test data, annual gravel resheeting, schedule of rates previously calculated for all works activities, and labour hourly rates.	Project specific information provided by the Principal.
	Quality: *1603 Road reserve maintenance plan (RMP).*	
	Road reserve maintenance *Activity specifications* and associated *Activity contract* requirements.	For maintenance activities, use worksections 1611-1677. For operational activities, use worksection 1681-1692.
	1604 Annexures to road reserve maintenance plan (RMP).	Non-conformance management forms, Hold point release, Contractor's records and damage report forms. It also includes completed sample forms for guidance. Provided for information only.
Volume 3 ROAD RESERVE DEFINITION INFORMATION (Separate compilation – referenced in this *Guide*) the road reserve and within the scope of the contract	Map(s) of road reserve network.	
	Schedules of roads in network: Reference spreadsheet *1602 Maintenance schedule - road reserve* worksheets	
	Other schedules and details of assets.	
	Standard drawings.	
Volume 4 TENDER SUBMISSION DOCUMENTS (General workgroup)	*0124 Tender submission documents.*	This worksection outlines the tender submission documents required for the contract such as: • Tender forms. • Tenderer's particulars – current commitments. • Declarations.
	1602 Maintenance schedules – road reserve. As selected from *1602* spreadsheets	This worksection includes schedule of rates, Lump Sum and Daywork rates:
ASSOCIATED DOCUMENTS	Road reserve maintenance history.	

Binding
Volumes: Bind volumes separately.

Exhibit copies: Spiral bind to fix editions for legal and contractual reasons.

Working copies: Assemble in ring binders.

Associated documents: Bind separately without volume status to indicate their exclusion from the formal contract documents.

Alternatively use the electronic records management system.

Responsibility: Assign the responsibility of supervising consistency across all Council contracts, to one Council officer or manager, in conformance with an appropriate Contracts policy.

5.2 Volume 1 – Conditions of contract

Select the General conditions of contract
The AUS-SPEC maintenance system can be used as a fully outsourced contract maintenance regime or as a service agreement governing services provided by an in-house provider business unit. Some business units may act as a head contractor and subcontract selected operations as minor contracts.

Commonly used General conditions of contract include NCW4, NPWC3 (NSW), GC21, AS 2124 and AS 4000. Other specific documents generated by individual consultants may also be used.

Complete the Annexures to the General conditions of contract
Pre-printed forms of Annexure Part A and Part B for standard contracts.

Prepare any special conditions of contract
Refer to AUS-SPEC TG 406 for guidance on issues which impact on normal contract requirements and need to be provided as supplementary clauses for contract documentation. This is provided in a checklist format.

5.3 Volume 2 – Technical specifications

Define the extent of work
Select the maintenance activities to be provided in the road reserve maintenance contract from the schedule in the *1602* Maintenance schedules – *road reserve* various work sheets. Reflect these selected activities in the *1603 Road reserve maintenance plan (RMP)* worksection.

Compile the schedule of work by others
Schedule routine general maintenance work, to be performed by others, under Council's rolling works program during the annual work period, in *1602 Maintenance schedules – road reserve* as selected for required activity type.

Review Principal supplied items

Review the materials and services to be supplied by the Principal, edit the *1601 General requirements – road reserve (Maintenance)* worksection, as appropriate, and complete or delete the schedule in the *1602 Maintenance schedules – road reserve* worksheets.

Review mandatory resources and key staff
Review the minimum mandatory resources required to be provided by the Contractor and document these in the *1603 Road reserve maintenance plan (RMP)* worksection.

Edit *Templates* where necessary
Edit AUS-SPEC Template clauses by deletion or addition of text to suit specific local requirements.

Complete Principal supplied information
Complete the details identified with a (P) in the *1602 Maintenance schedules – road reserve* spreadsheets and *1603 Road reserve maintenance plan (RMP)* worksections. The Principal defines the content of the RMP, which includes a complete set of Activity specifications for the contract.

Review Activity contract requirements
Review the default template response times and compulsory intervention levels and method of payment in line with the Principal's asset management strategy.

Environmental Management training
In addition to the compilation of Volume 2, the Principal should prepare, or arrange for, a training course in environmental practice appropriate to the requirements of the Environmental Management Plan documented in the *1601 General requirements – road reserve (Maintenance)* worksection.

5.4 Volume 3 – Road reserve definition information

Define the road reserve network
The road reserve definition is equivalent to the drawings in a construction contract. It defines the area of responsibility in which the Contractor will perform the defined maintenance activities of the contract and may comprise:

- Map(s) of the road reserve network including location referencing by Geographical Information System (GIS):
  - Location and identification of assets by segment.
  - Access asset attribute information.
  - Display asset information pictorially, e.g. age profile, condition, trends over time.
- Detailed road (strip) maps.
- Sketches and cross sections.
- Standard drawings, e.g. Guard fence and sign installation.
- Schedules of:
  - Roads in the network.
  - Pedestrian and other Council areas.
  - Special street landscaping areas.
  - Significant environmental sites.
  - Noxious weeds and pests sites.
  - Stormwater pits.

Use a consistent location referencing system
This can have an impact on planning the maintenance activity. Austroads AGAM06 clause 3.5 provides further guidance on the different types of location referencing systems.

Schedule key information on assets within each road reserve segment
Sample schedules of the road reserve segment asset listing, road network in the contract and road reserve segment nomination are provided in the *1602 Maintenance schedules – road reserve* spreadsheet.

The network information includes information from Council's road asset system (typically a series of road reserve segments) which provide the framework to refer to the location of condition as in the MDR and MMS reporting data.

The use of the road asset system allows for the ordered collection, storage and retrieval of road related maintenance data which can be co-ordinated with other Council systems such as for PMS and the relevant Australian Accounting Standards Board pronouncements, e.g. AASB 116 available from www.aasb.gov.au. *International Infrastructure Financial Management Manual (IIFMM)* provides further information to link technical and financial aspects of managing infrastructure assets.

5.5 Volume 4 – Tender submission documents

Select appropriate forms and declarations for tender submission
The tender forms and declarations required for a road reserve maintenance contract are essentially the same as for a combined lump sum, schedule of rates contract for a construction contract (by selecting the appropriate worksection from the *General* workgroup), with the addition of a schedule of Daywork rates.

Draft schedules for method of payment
Schedules for Lump Sum components, schedule of rates components and schedule of Daywork rates, based on the schedule templates provided in *1602 Maintenance schedules – road reserve* spreadsheet worksheets.

Prepare RMP Part 1
The Contractor is required to complete RMP Part 1 as part of the Tender submission. This will include a list indicating which, if any, Activity specifications have amendments proposed by the Contractor. A full copy of the Activity specifications and Activity contract requirements containing the Tenderer's proposed changes will be included in the tender submission.

5.6 Associated documents

Compile road reserve maintenance history

Wherever possible, provide historical information of the road network, to the Tenderer. This information should indicate the amount spent and/or quantity of materials used on each maintenance activity, on each section of the contract road network, for as long a period as possible, preferably over the past 3 years as a minimum.

The information provided does not form part of the Contract, is not guaranteed and any tenders submitted must be based on the Tenderer's own investigations and determinations.