



AUS-SPEC

Case Studies and Technical Resources



IPWEA

INSTITUTE OF PUBLIC WORKS
ENGINEERING AUSTRALASIA



NATSPEC//
Construction
Information

CONTENTS

INTRODUCTION

- 2 NATSPEC and IPWEA
- 3 AUS-SPEC Local Government Specifications

CASE STUDIES

- 4 Dubbo Regional Council — Keswick Estate Regional Subdivision
- 6 Southern Sydney Regional Organisation of Councils — Procure Recycled: Paving the Way
- 8 Shoalhaven and Shellharbour City Councils — Development and Capital Works
- 10 Northern Beaches Council — Adapting an AUS-SPEC Worksection

TECHNICAL RESOURCES

- 12 AUS-SPEC's Industry Collaborations
- 14 Using AUS-SPEC for Asset Management
- 16 Using AUS-SPEC for Asset Design and Delivery
- 18 Using AUS-SPEC for Asset Maintenance
- 20 City of Parramatta — Developing a Maintenance Plan
- 21 Penrith City Council — Defining Technical Levels of Service
- 22 Using AUS-SPEC for Contract Documentation
- 24 Liverpool City Council — Procurement and Management of Outsourced Activities
- 25 Using AUS-SPEC to Specify Building and Facility Maintenance
- 26 Using AUS-SPEC for Management of Unsealed Roads

NATSPEC

NATSPEC is a national not-for-profit organisation that aims to improve the construction quality and productivity of the sustainable built environment through leadership of information. Founded in 1975, it is owned by the design, build, construct and property industry through professional associations and Government bodies.

NATSPEC maintains the National Building Specification, the only comprehensive, up-to-date national Australian master specification, as well as the National Classification System, which assists specification writers in organising the content of specifications. It is also responsible for the AUS-SPEC local government specification system, the National BIM Guide, and other services. NATSPEC is impartial and is not involved in advocacy or policy development.

For more information, visit www.natspec.com.au.

IPWEA

The Institute of Public Works Engineering Australasia (IPWEA) is the peak association for infrastructure asset managers and professionals who deliver public works and engineering services in Australia and New Zealand. IPWEA has expanded its traditional focus on local government engineering to include broader public works, thereby covering all tiers of Government as well as the private sector.

IPWEA is committed to developing the capacity and capability of the sector by providing comprehensive educational programs, conferences and technical publications. It offers the chance to network and collaborate with peers both locally and internationally. IPWEA promotes professionalism, education and knowledge sharing in its community.

For more information, visit www.ipwea.org.

Front and back cover images courtesy of Shellharbour City Council.

AUS-SPEC Local Government Specifications

AUS-SPEC is the essential technical resource for the life cycle management of civil infrastructure assets. As a national local government specification system, AUS-SPEC addresses the challenges associated with inconsistencies in regulation and processes that can occur between jurisdictions controlled by local government. It is a joint venture between NATSPEC and IPWEA.

NATSPEC began maintaining AUS-SPEC in June 2007 on behalf of IPWEA and Standards Australia. It is the key organisation that updates, develops and distributes AUS-SPEC specifications and their associated library of information. NATSPEC manages the National Building Specification, which is owned by Government and industry bodies.

AUS-SPEC specification documents were first released in 1997. Supported by the Australian Local Government Association (ALGA), this was a joint venture between IPWEA and Statewide Roads through its Technical Management consultancy (SWRTM), part of Sinclair Knight Merz (now Jacobs), in coordination with several Councils. Standards Australia took over as IPWEA's joint venture partner in 2003. AUS-SPEC is now updated and maintained by NATSPEC with regular collaboration with a large number of organisations, including IPWEA national and state divisions, Austroads, AfPA, ASCP, AustStab and several other stakeholders to ensure representation of current practices in the construction industry.

AUS-SPEC provides documentation for the design, construction and maintenance of local government assets and assists Councils in providing quality services that are safe for the community and the environment. The information provided in AUS-SPEC documents is updated every October to include changes in standards, regulations, industry practices and technologies. Like the performance-based National Construction Code (NCC), this reflects the dynamic environment of the construction industry by encouraging innovation.

AUS-SPEC is aligned to the NATSPEC National Classification System, which has been widely adopted by the construction industry. This establishes a common language between Governments, organisations and consultants, and improves communication between all parties working on a project. A common language helps prevent misinterpretation and significantly reduces the risk of delays, rework and extra costs.

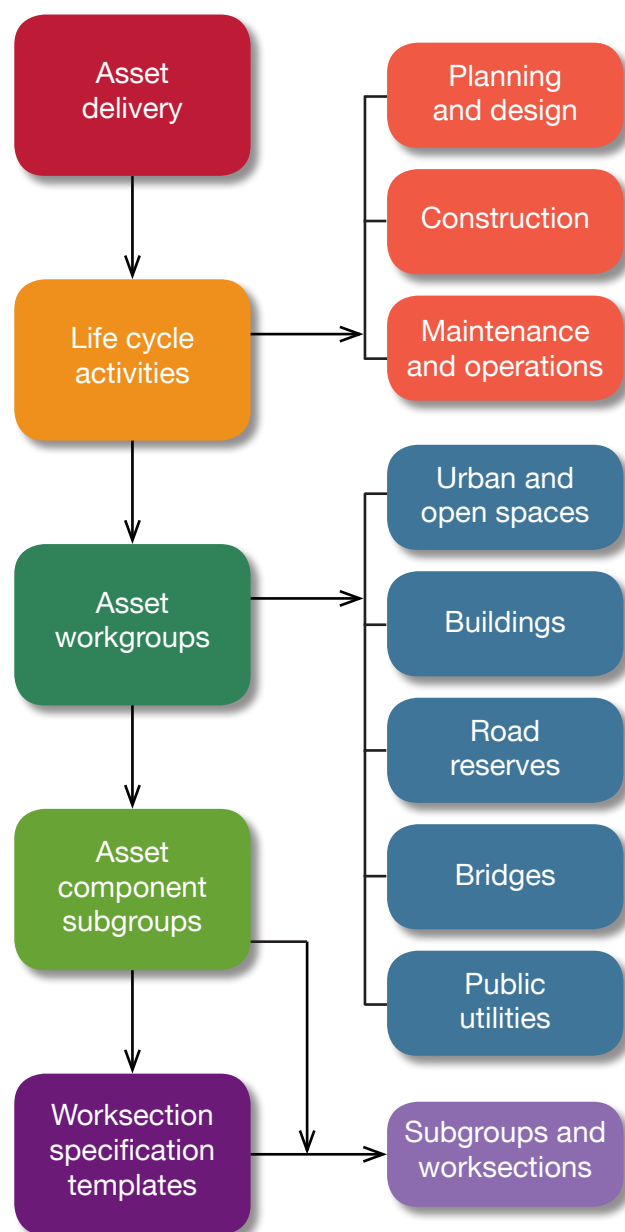
The AUS-SPEC system provides tools, technical specification templates, a framework, and processes to document requirements for various asset life cycle activities. The documents for maintenance and contracts are particularly useful for Councils in allocating budgets for priority projects.

AUS-SPEC specifications are available via a subscription service. The eight available packages are:

- Complete
- Contracts
- Urban and open spaces
- Buildings
- Roadworks and bridges
- Public utilities
- Maintenance
- Rural roads

The system supports technical and contractual consistency between Councils, while allowing flexibility to edit and add project-specific requirements. An essential technical resource, AUS-SPEC documentation underpins Council knowledge.

For more information, including media releases and technical resources, visit www.aus-spec.com.au.



AUS-SPEC Asset Classification Structure.



DUBBO REGIONAL COUNCIL KESWICK ESTATE REGIONAL SUBDIVISION – STAGE 5, RELEASE 1



Over the past several years, Dubbo Regional Council has progressively expanded the city's urban residential districts by developing Council land that was formerly open paddock. The Keswick Estate Residential Subdivision is located between the Mitchell Highway, Wheelers Lane, and Boundary and Sheraton Roads. It is one of Dubbo's eight major residential subdivisions and has been in development since 1995.

Stage 4, Release 3 of the Keswick Subdivision was featured in the 2017 edition of the AUS-SPEC Case Studies and Technical Resources brochure. Stage 4 has since been completed with approximately 140 lots. Work has finished on the 59 lots in Stage 5, Release 1 and the 52 lots in Release 2. Work on Stage 5, Release 3 will soon be underway, and Council has also begun the plans for Stage 6. With regional population growth, Dubbo has seen market demand grow significantly as the subdivision has developed, and expects at least another decade of consistent construction and growth, with several hundred more lots in the pipeline.

The strategic, future-focused planning of Dubbo's new neighbourhoods emphasises comfortable living environments, a strong sense of community, and high-quality, accessible housing. The Keswick Subdivision's standard residential housing blocks are provided with electricity, water, stormwater, natural gas, NBN, and sewer services. The development includes kerb and gutter, roads, underground drainage, major stormwater detention systems and trunk drainage systems, sewerage reticulation, water reticulation service utilities, and street lighting services.

CHALLENGES

The challenges encountered in Stage 4 are part of the learning and improvement process for Stage 5 onwards.

Shallow basalt rock

The Keswick Estate land features shallow basalt rock with significant variations in strength across the subdivision site. During the Stage 4 development, little investigation of the rock was carried out in the design stage. Various excavation methods were used, including ripping with bulldozers, which unfortunately resulted in a burst water main.

Where practicable in Stage 5, Council uses a 100t Track Trencher to excavate rock. This is the best method Council has used so far, and costs about half the price of conventional methods. The shallow basalt rock is also investigated with a 50m grid using test holes to obtain a 3D representation of the rock layer. Where possible, sites are designed for fill, which allows for services to be lifted up out of the rock. As many lots as possible are designed to drain to the road corridor in order to eliminate inter-allotment drainage.

Stormwater

Issues with stormwater level control resulted in road construction problems during Stage 4. There was also poor control of stormwater pits, which led to kerb and gutter misalignment. To alleviate these problems in Stage 5, Council holds regular Project Control Group meetings and has improved communication for the set-out requirements of stormwater pits and their alignments.

“We definitely refer to AUS-SPEC specifications heavily throughout the design phase and use them to help formulate a practical design that is going to be workable, efficient and effective.”

Mark Johnston, Manager Infrastructure Strategy and Design, Dubbo Regional Council

HOW AUS-SPEC DOCUMENTATION HELPED DUBBO REGIONAL COUNCIL

AUS-SPEC is the “governing document for development” at Dubbo Regional Council, as described by Mark Johnston, Manager Infrastructure Strategy and Design. It is the basis for Council’s design and construction documentation.

“We definitely refer to AUS-SPEC specifications heavily throughout the design phase and use them to help formulate a practical design that is going to be workable, efficient and effective,” outlines Mark.

Design work for the residential subdivisions is completed by Dubbo’s in-house design team, while construction work is generally completed by contractors, or by both contractors and in-house construction teams. The design team liaises with contractors to work through any issues on site.

Dubbo Regional Council finds AUS-SPEC particularly useful for contract management as the specifications keep a clear record of what has been agreed for the project. In this way, AUS-SPEC functions as a tool for communication between contractors and project managers.



Keswick Estate Regional Subdivision. Images courtesy of Dubbo Regional Council.



Crushed glass sample. Images courtesy of SSROC.

SSROC PROCURE RECYCLED: PAVING THE WAY



In late 2019, Southern Sydney Regional Organisation of Councils (SSROC) launched the initiative Procure Recycled: Paving the Way. Under this program, a group of metropolitan Sydney Councils collaborated to jointly procure asphalt with recycled crushed glass (RCG) as a substitute for natural sand.

This is the largest local government-led procurement of its kind in New South Wales. In 2021, Paving the Way was awarded a Commendation as a Great Sustainability Initiative at the Greater Sydney Planning Awards held by the Greater Cities Commission. The procurement followed two years of work between Councils, NATSPEC and Transport for NSW (TfNSW). Close collaboration between SSROC and TfNSW facilitated a coordinated approach to the market to further aggregate demand through parallel procurements.

Paving the Way highlights how effectively joint initiatives can encourage circularity in the economy. The program has been carefully planned to maximise environmental, economic and social benefits. An SSROC glass flow analysis conducted prior to the procurement demonstrated that using RCG as a natural sand substitute at the target volume of 20,000 tonnes per annum would not adversely affect higher-order uses of the material, such as onshore manufacturing of glass beverage containers. About 35 per cent of the domestic glass collection did not have a local market and was available for secondary uses, such as civil works. The other approximately 65 per cent is recycled into glass bottles in the Sydney region. Consequently, as Councils continue to adopt and use the Sustainable Pavements contract that resulted from the procurement, Paving the Way will create a market for the remaining 35 per cent, roughly 40 million glass bottles per year. A cost-benefit analysis conducted in collaboration with the NSW Government has indicated that the initiative will deliver positive economic, environmental and social benefits that will increase over time. This initiative is helping Councils to work towards their sustainability targets.

As well as recognising the value of previously unused glass in the market, using RCG lowers greenhouse gas emissions as it reduces the need to mine and transport sand from distant quarries and creates a local market for residual glass otherwise transported interstate. A huge 200 million tonnes of quarried sand, rock and gravel is used each year in Australia. In roadworks, replacing a percentage of this raw material with recycled materials makes sustainability part of daily life in local government areas.

Paving the Way is supporting the development of local recycling infrastructure, supporting local jobs, and increasing the value of recyclable glass. It is hoped that the initiative will also increase community confidence in recycling. As recognised by the Greater Cities Commission, Paving the Way provides a scalable and replicable model for using Council procurement to promote markets for recovered materials in the future.

The collaborative approach between SSROC and NATSPEC has encouraged a large number of Councils to join the procurement. They achieve up to a 20 per cent cost saving.

HOW AUS-SPEC DOCUMENTATION HELPED SSROC

The Councils use TfNSW and AUS-SPEC specifications for RCG in roads and footpaths. AUS-SPEC specifications, which include the use of RCG, crumb rubber, reclaimed asphalt pavement and other recycled materials in asphalt, assure stakeholders of safety and performance. AUS-SPEC worksection 1144 *Asphalt (Roadways)* provides the maximum percentage allowances, types of glass, nominal size, properties, contamination, and testing specifications of granulated glass aggregate in Dense Graded Asphalt. The collaborative approach between SSROC and NATSPEC has encouraged a large number of Councils to join the procurement. They achieve up to a 20 per cent cost saving.

Specifications, especially for recycled content, provide critical confidence and buy-in for stakeholders. Already underway, the second phase of Paving the Way plans to conduct a 12-Council demonstration of crumb rubber asphalt, the largest ever undertaken in Australia. AUS-SPEC specifications help make the use of recycled materials in roads more accessible for local governments.

With local government playing an increasingly active role in the sustainability supply chain, AUS-SPEC creates additional value by promoting sustainability through its specifications and stakeholder engagement. Australia's performance-based building regulations encourage innovation. AUS-SPEC provides local governments with the technical expertise they need to maximise infrastructure sustainability while enhancing the wellbeing of their communities now and in the future.



The 12 member Councils of SSROC.

SSROC

Southern Sydney Regional Organisation of Councils Inc (SSROC) is an association of 12 Councils in the area south of Sydney Harbour, covering central, inner west, eastern and southern Sydney. SSROC provides a forum for Councils to collaborate on issues of common interest. Together, the member Councils cover a population of about 1.9 million, over one-third of the population of Sydney. SSROC seeks to advocate for the needs of member Councils and bring a regional perspective to the issues raised.

At the time of writing, the following Councils are participating in Paving the Way: Bayside, Burwood, Canada Bay, Canterbury-Bankstown, City of Sydney, Georges River, Inner West, Northern Beaches, Randwick, Ryde, Sutherland, Waverley, and Woollahra. More Councils are expected to participate in the next three years.



northern
beaches
council





Artist's impression of Shell Cove. Image courtesy of Shellharbour City Council.

SHOALHAVEN AND SHELLHARBOUR CITY COUNCILS A REGIONAL APPROACH TO DEVELOPMENT AND CAPITAL WORKS PROJECTS



AUS-SPEC specifications for Development and Capital Works are a contemporary set of documents for local government that provide a uniform and precise approach to setting parameters for the creation of high-quality civil infrastructure.

Shoalhaven City Council and Shellharbour City Council utilise the current version of AUS-SPEC specifications (AUS-SPEC Complete) for the design and construction of their development and capital works programs.

The Councils made the switch to the upgraded version to access up-to-date references to Australian Standards, codes and terminology. The upgrade has led to many improvements including access to the latest Australian Rainfall and Runoff 2019 (ARR 2019). It also provides access to Asset Design As Constructed (ADAC), a data specification platform that enables the efficient capture and storage of civil infrastructure asset data. This allows Councils to update their asset management system and include new works.

“The introduction of our updated AUS-SPEC-based specification has allowed for a streamlined and more efficient specification process. One of the big benefits is the standardised pay items allowing rates for cost estimates to be quickly updated based on market rates.”

Micaiah Tipton, Manager Design Services, Shoalhaven City Council

“AUS-SPEC promotes standardised and transparent design, construction and management of local government infrastructure works. Shellharbour City Council has found AUS-SPEC to be an excellent resource that aligns with our core values of integrity, accountability and sustainability. It has enhanced resource efficiency and increased productivity, as well as minimised risk through clear safety, quality and environmental compliance requirements.”

Luke Preston, Manager Subdivision Development, Shellharbour City Council



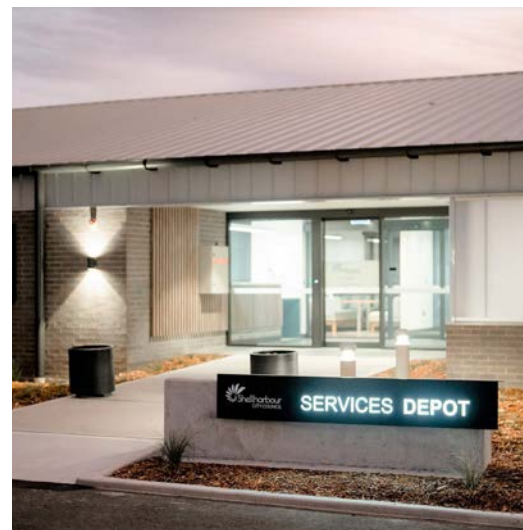
AUS-SPEC Manager Nandini Mehta presenting awards to Trevor Dando of Shoalhaven City Council (above left) and Ben Stewart of Shellharbour City Council (above right) at the IPWEA NSW & ACT Engineering Excellence Awards 2023. Images courtesy of IPWEA.

All new works at Shoalhaven City Council and Shellharbour City Council now follow the amended AUS-SPEC specifications to meet their local requirements. Adjacent Councils may adopt this or a similar version to unify documents on a regional basis, with the potential to create a regional Illawarra version of the documents. Benefits would include economies of scale for developers, constructors and Councils, as all parties work with the same set of requirements.

At the IPWEA NSW & ACT Engineering Excellence Awards 2023, Shellharbour City Council won the Category 1B Award for their Services Depot Building Project and Shoalhaven City Council was Highly Commended for Boongaree Rotary Nature Play Park in Category 1C. Both awards were for the Design and Construction of a Local Government/Public Works Project.



Far North Collector Road Project, currently underway in Shoalhaven City Council.
Image courtesy of Shoalhaven City Council.



Shellharbour City Council's award-winning Services Depot Building Project.
Image courtesy of Shellharbour City Council.



Temporary (left) and permanent restoration (right) of a concrete footpath.

NORTHERN BEACHES COUNCIL ADAPTING AN AUS-SPEC WORKSECTION



northern
beaches
council

AUS-SPEC worksections provide minimum best practice requirements for local government and can be customised to include Council requirements. Each worksection acts as a template document for Council to edit according to their specific project requirements. Northern Beaches Council has customised the worksection *1151 Road openings and restoration* for their local requirements. The Council-specific additions maintain consistency for Council staff across their documentation, and provide clarification for utility groups, contractors and subcontractors.

HOW AUS-SPEC DOCUMENTATION HELPED NORTHERN BEACHES COUNCIL

"The AUS-SPEC document is well laid-out. The restoration specification is very involved because it's a specification of everything, because you have to restore everything," says Matthew Holt, Senior Engineer at Northern Beaches Council.

When it comes to customising the specification, he adds, "The simplicity of it is such that you can do it yourself." AUS-SPEC saved Council time and costs as they were able to adapt the worksection in house.

Northern Beaches Council had been having problems managing the multiple external organisations involved in street openings and restorations, especially in terms of noise, night works and restoration quality. Adapting the AUS-SPEC worksection *1151 Road openings and restoration* gave Council the opportunity to set out their expectations for utility groups.

"We're definitely happy with the result," Matthew says of the customised worksection. "We've clarified what the extent of the restorations has to be. It gives us a very clear point to negotiate."

CUSTOMISABLE WORKSECTION REQUIREMENTS

Certain requirements specific to the local government area were included in the worksection to tailor the documentation to the region's needs. In particular, Council added a requirement to contact the Council's Tree Protection Officer prior to any work within the drip line of a tree, as well as prior to any work on streets with heritage-listed streetscapes. Council also included additions to Submissions, Site documentation, Pathways and driveways and Trench backfill, as well as a customised compaction table and surface restoration requirements.

“The simplicity of it is such that you can do it yourself,” says Matthew Holt, Senior Engineer.

AUS-SPEC saved Council time and costs as they were able to adapt the worksection in house.

Many of Northern Beaches Council's additions to the worksection include information from other AUS-SPEC worksections cross-referenced in 1151, including 1141 *Flexible pavements base and subbase* and 1144 *Asphalt (Roadways)*. This makes the document more practical both for Council and for utility groups and contractors who may not be aware of or have access to other worksections.

Council has edited the worksection's annexures to add value to the document. In particular, Annexure 3.3 provides standards drawings for trench backfill and restoration extents, including for driveways, footpaths, trenches in flexible pavement, and trenches in rigid pavement. This helps to clarify precisely what Council expects from restoration work, whether this is carried out by Council themselves, utility groups, or subcontractors. A simplified summary of modifications that Northern Beaches Council made to the AUS-SPEC worksection has been included as an annexure to the worksection. This clarifies records by setting out Council's changes to the document.

As AUS-SPEC specifications are updated annually to align with regulations, standards and industry practices, Council knows they are working with current documentation that helps them best serve the community. The finished documents provide quality outcomes going forward. With customised AUS-SPEC documentation, Northern Beaches Council can be confident that the works they specify are fit for purpose for their local region. The restoration works are carried out adequately and provide a safe environment for the community.



Temporary (left) and permanent (right) restoration of a trench crossing in asphalt pavement. Images courtesy of Northern Beaches Council.

AUS-SPEC'S INDUSTRY COLLABORATIONS

AUS-SPEC maintains multiple long-term collaborations with industry organisations. This ensures that the national specification system for local government infrastructure assets meets the current standards of best practice and helps Councils provide effective services to their community.

AUSTRALIAN FLEXIBLE PAVEMENT ASSOCIATION (AfPA)

"The Australian Flexible Pavement Association has represented the flexible pavement industry, including state and local governments, for over 50 years. AfPA strongly supports the use of consistent and appropriate standards and therefore is pleased to recommend AUS-SPEC specifications. Specifications developed in conjunction with relevant experts and designed specifically for local government ensure value for money and quality outcomes. The AfPA National Technology and Leadership Committee reviews the AUS-SPEC sprayed seal and asphalt specifications annually to support national harmonisation of best industry practices for local roads. We are happy to give our support to AUS-SPEC specifications."

Anna D'Angelo, Executive Director Technology & Leadership, AfPA



AUS-SPEC and AfPA have been working together for several years to ensure that AUS-SPEC asphalt specifications reflect current industry knowledge and practices. AfPA endorses the worksections 1143 *Sprayed bituminous surfacing* and 1144 *Asphalt (Roadways)* and reviews them prior to each October update. The reviews focus in particular on sustainability and the availability of new materials, for which Councils need accurate specifications to ensure road safety and performance. Through their collaboration, AUS-SPEC and AfPA provide Councils with fit-for-purpose specifications to effectively maintain their road network.

AUSTRALIAN SOCIETY FOR CONCRETE PAVEMENTS (ASCP)

"The Australian Society for Concrete Pavements (ASCP) aims to facilitate improvements in the design, construction and quality of concrete pavements in Australia through education, technology transfer and research. ASCP has been working collaboratively with AUS-SPEC since 2008. Together, we have conducted joint workshops for local government and AUS-SPEC has proactively participated in various ASCP events and online forums for many years. AUS-SPEC specifications are regularly reviewed by ASCP members to ensure that the documents are accurate and current as per industry standards. NATSPEC is a supporting partner of ASCP. We continue to collaborate to assist local government in effectively managing their rigid pavements."

Craig Heidrich, Executive Director, ASCP



AUSTROADS

"Austroads develops and maintains technical guides and tools to promote a nationally consistent approach to the design, maintenance and operation of road networks supporting all levels of government in Australia and New Zealand. We help transport agencies and local governments address current and emerging issues. Austroads has supported AUS-SPEC local government specifications since 2007. This longstanding collaboration involves sharing each other's expertise to achieve the best outcomes for local government. We routinely provide feedback on AUS-SPEC worksections and we have worked together on joint presentations for managing local roads. AUS-SPEC currently cites more than 250 Austroads publications in their specifications. Austroads is a strong believer in the benefits of collaboration to ensure our research is widely implemented, and we are proud to collaborate with AUS-SPEC."

Ross Guppy, Transport Infrastructure Program Manager, Austroads



AUSTSTAB PAVEMENT RECYCLING AND STABILISATION ASSOCIATION



"AustStab is the Australian Pavement Recycling and Stabilisation Association. We help provide a unified approach to the recycling and stabilisation of pavements and in doing so look to work collaboratively with industry partners to ensure specifications are nationally aligned and regularly updated. Collaborating with NATSPEC to jointly develop and publish pavement stabilisation specifications is an important part of achieving this objective. Our work with NATSPEC to develop specifically customised stabilisation specifications for local government under the AUS-SPEC national specification system is an important initiative that will assist all Councils to manage their road network effectively."

Stuart Dack, CEO, AustStab

AUS-SPEC's work with AustStab was made official in June 2022. Both organisations signed a partnership agreement regarding pavement stabilisation worksections. The AUS-SPEC October 2022 update included four new pavement stabilisation worksections: 1161 *In situ pavement stabilisation using cementitious binders*, 1162 *In situ pavement stabilisation using bituminous binders*, 1163 *Ex situ pavement stabilisation*, and 1164 *In situ pavement stabilisation of unsealed roads*. Each elaborates on content in 1113 *Subgrade and formation stabilisation* (formerly 1113 *Stabilisation*).

By working closely with AustStab, AUS-SPEC benefits from specific industry knowledge, allowing an accurate and practical separation of the specification information based on the type of stabilisation method. The worksections align with state road authorities' regulations and Austroads guidelines where relevant.

INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALASIA (IPWEA)



"Our communities demand the utmost in professional competency from the practitioners who deliver public works infrastructure and services. A key objective of AUS-SPEC specification documents is to foster a scalable and consistent approach to the delivery of operational plans agreed to in the strategic asset management planning process. Many of our members have become increasingly aware of the value AUS-SPEC local government specifications provide to the public works sector. They guide infrastructure project managers in all areas to develop, adapt and operate sustainable asset networks at the agreed level of service while managing risk and cost. IPWEA is pleased to support this latest edition of AUS-SPEC local government specifications."

Steve Verity, Principal Advisor Asset Management, IPWEA Australasia

WATER SERVICES ASSOCIATION OF AUSTRALIA (WSAA)



"WSAA is a peak industry body representing the water industry. We facilitate collaboration and foster the exchange of information between industry, government and the community to promote sustainable water resource management. For the last two decades, WSAA has been working collaboratively with AUS-SPEC to ensure that local government is aware of WSAA codes and practices for the design and construction of water supply and sewerage reticulation and pump stations. AUS-SPEC cites around 20 WSAA publications and has recently aligned their information with the WSAA regional codes for water supply and sewerage. This helps regional utilities authorities manage their utility assets effectively."

Carl Radford, Program Manager Asset Creation, WSAA

At the beginning of 2022, WSAA, in association with the NSW Water Directorate, released amendments and regional editions of the WSA 02 Gravity Sewerage Code of Australia and WSA 03 Water Supply Code of Australia. These documents include specific requirements to suit local water authorities' regulations and regional conditions. The 2022 edition of WSA 04 Sewage Pumping Station Code of Australia was also released.

In response to the changes to the WSA codes, AUS-SPEC reissued the generic design and construction worksections that cover reticulation and pump stations in water supply and sewerage systems. AUS-SPEC undertook this work with input from WSAA to keep local government up to date with the information they need to safely provide for their communities.

USING AUS-SPEC FOR ASSET MANAGEMENT

Ongoing planned maintenance of physical assets reduces life cycle costs and increases asset life. A series of nationally consistent frameworks was developed by the Local Government and Planning Ministers' Council (LGPMC) to provide minimum requirements for asset and financial management and planning by local government across Australia. This development supports improved management of assets such as roads, water and sewerage, drains, footpaths, public buildings and the like, which local government provides for the community.

ASSET MANAGEMENT FRAMEWORK

An asset management (AM) framework drives the implementation of asset management and aligns with the Council's strategic objectives. It consists of:

- **AM policy:** Outlines principles, requirements and responsibilities for AM and is linked to the Council's strategic objectives.
- **AM strategy:** Outlines AM objectives, practices, action plans, and audit and review processes.
- **AM plan:** Outlines asset description, levels of service, demand forecast and life cycle activities.

LIFE CYCLE ACTIVITIES

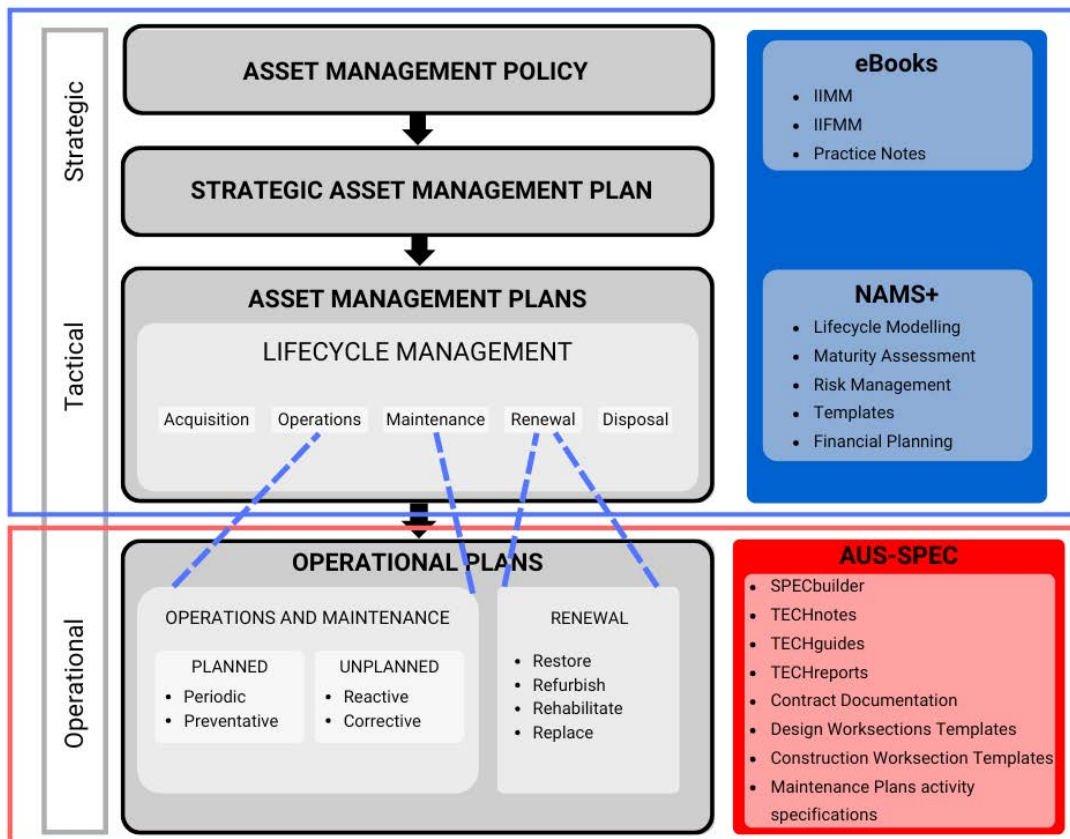
The life cycle activity of an asset is defined as the activity commencing with the identification of the need and terminating with the disposal of the asset. AUS-SPEC is a specification system for the life cycle management of assets. It is aligned to the NATSPEC National Classification

System, which has been widely adopted by the construction industry. AUS-SPEC can be used for the following life cycle activities, as defined in IIMM:

- **Asset Planning:** Defines the most effective solution to meet the services required by the community. Use Workgroup *00 PLANNING AND DESIGN*, which covers development and subdivision of land, design of waterfront development, bushfire protection, design of roadways and design of public utilities.
- **Asset Creation/Acquisition:** Includes works that create a new asset, or works that upgrade or improve an existing asset beyond its existing capacity using capital expenditure. This may result from growth, or social or environmental needs. Assets may also be acquired at no direct cost to the Council, e.g. donated assets. AUS-SPEC focuses on the technical aspects and processes of how to plan, design and construct new assets using the following:
 - **Design worksection templates** provide guidance and procedures for those involved in the design of civil infrastructure for local government, both internally (Council staff) and externally (consultants and developers). The worksections support uniform design practices for civil infrastructure works. For Design, use Workgroup *00 PLANNING AND DESIGN*.
 - **Construction worksection templates** are suitable for both quality control and integrated management contracts associated with most Councils' engineering activities. These worksections have been developed to assist local government to control the quality of works performed by contractors and developers. For Construction, use Workgroups *01, 02, 03, 11 and 13*.
- **Maintenance and Operations:** Operations are active processes of utilising an asset that will consume resources such as manpower, energy, chemicals and/or materials (e.g. cleaning, mowing, etc.). Maintenance is the actions necessary for retaining an asset as near as practicable to its original condition. It excludes major capital rehabilitation and renewal works. Over time, the AUS-SPEC asset maintenance system provides Councils with records of asset inspections, defects, programmed and prioritised works, and monthly works completed reports, which improve a Council's maintenance history and asset inventory. AUS-SPEC maintenance activity specifications cover both planned and unplanned maintenance. For Maintenance and Operations, use Workgroups *14 to 18*.



- **Asset Monitoring/Condition/Performance:** AUS-SPEC provides a framework for performance requirements of Council assets, defines the technical level of service, response times, and compulsory intervention levels to systematically program asset maintenance. AUS-SPEC covers most of the maintenance activities of local government assets. Management strategies for planned and unplanned maintenance of various assets provide a proactive approach to maintenance. For asset monitoring/performance, use Workgroups 14 to 18.
- **Renewal/Rehabilitation/Replacement:** Renewal is major work to replace existing assets or facilities with assets or facilities of equivalent capacity or performance capability. For asset renewal and rehabilitation, a combination of AUS-SPEC construction and maintenance worksections may be required. Use Workgroups 01, 02, 03, 11 and 13 to 18.



The above diagram shows the relationship between the asset management functions, the hierarchy of documents in the asset management system, and the IPWEA eBook Library, NAMS+ and AUS-SPEC resources.

RELATIONSHIP BETWEEN AUS-SPEC AND IPWEA

IPWEA resources such as the eBook Library, NAMS+ and AUS-SPEC are designed to work together. Each fosters a scalable and consistent approach to the effective life cycle management of public works infrastructure assets.

The suite of Manuals and Practice Notes in the eBook Library focuses on how to apply the principles documented in the ISO 55000 and 31000 series of standards.

At the strategic and tactical levels, NAMS+ is the online asset management planning toolkit that assists organisations in writing and maintaining their asset management policy, strategy and plans, aligned to their financial strategy and plan.

AUS-SPEC, on the other hand, provides a library of operational civil design, construction and maintenance specification templates for engineering projects and activities of any size. AUS-SPEC promotes standardisation and consistency in documentation across all local government infrastructure works to increase competition, productivity and efficient use of resources.

Combined, the IPWEA resources help any asset-intensive entity realise the best possible value from their investment in infrastructure assets.

The joint IPWEA and AUS-SPEC brochure is available at www.aus-spec.com.au/case-studies.

USING AUS-SPEC FOR ASSET DESIGN AND DELIVERY

Local government plays an important role in land use planning, development approval, and construction of infrastructure in all Australian states and territories. AUS-SPEC assists Councils in this role by providing documentation templates and guidance material for a systematic approach to the planning, design and construction of new infrastructure assets. AUS-SPEC also provides documentation related to the maintenance of existing assets.

BENEFITS OF USING AUS-SPEC FOR ASSET DELIVERY

AUS-SPEC provides a documentation system for the delivery of assets to meet the essential services required by the community. The system provides the following benefits:

- **Local government focus:**
 - Planning, design, construction and maintenance contract documentation requirements for local government assets.
 - Simple and easy to use.
- **For minor civil works:**
 - Specification requirements are limited to the standard of minor civil works.
 - Addresses minimum best practice requirements.
- **A national document:**
 - Applicable across all Australian jurisdictions.
 - Accommodates variations for metropolitan and regional locations, climate zones or locally available materials.
- **A reference type specification:**
 - Minimal customisation required.
 - Addresses the shortage of in-house technical expertise and reduces the need for outsourcing.
 - Consistency for contractors specialising in local government work.
 - Performance and technical requirements are separated from contract management requirements.
- **An industry standard:**
 - Improved productivity and quality.
 - Good quality outcomes at project level.

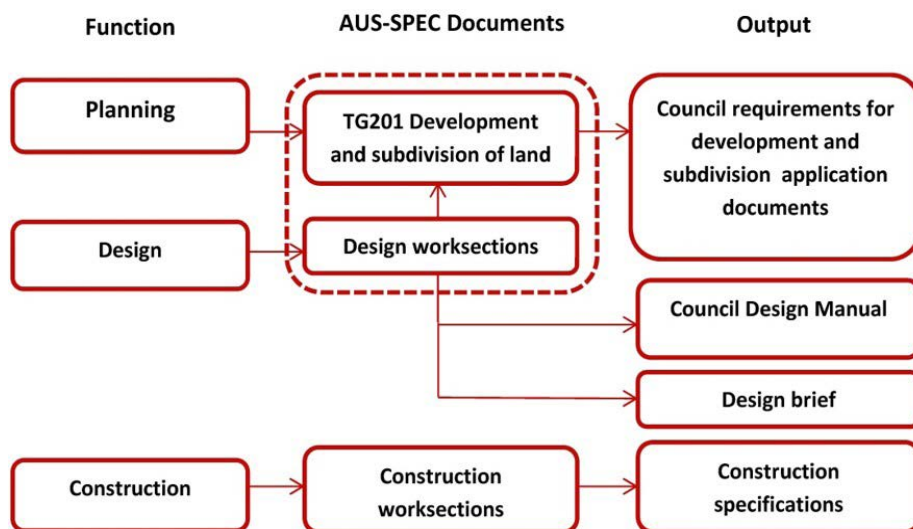
USING AUS-SPEC FOR PLANNING

AUS-SPEC TECHguide *TG 201 Process and procedures for the development and subdivision of land* is applicable to the planning approval process and design requirements for the development and subdivision of land within a Council area. It provides guidance on the infrastructure requirements for subdivision and development in urban residential, rural residential, rural and industrial commercial areas, including development applications, assessment and determination criteria, the appeal process, development application submission documentation requirements, developer contributions and fees, certificates, bonds, and environmental considerations.

This TECHguide is a reference document for the development or updating of documents and forms that set out Council requirements for development and subdivision of land. The guidelines are intended to assist Councils to achieve the following objectives:

- To provide a functional, attractive and safe environment for residents that is consistent with community standards and needs.
- To minimise adverse effects on the natural environment.
- To provide for the needs of future users of the land with respect to building requirements, vehicular and pedestrian access, provision of services and amenities appropriate to the zoning of the land.

- To use the land resource of the area economically.
- To achieve a balance between the development or subdivision of residential, commercial and industrial land and the lifestyle of existing residents and occupants.
- To provide for an equitable and efficient distribution of public amenities and services.
- To minimise Council's future maintenance costs for roads, services and open spaces.



Infrastructure asset delivery using AUS-SPEC.

USING AUS-SPEC FOR DESIGN

The AUS-SPEC Design worksection *Templates* provide guidance, design criteria and documentation requirements for the execution and recording of the design process for local government infrastructure, including open space, road reserves, bridges and public utilities. They complement the AUS-SPEC Construction worksection *Templates*.

The *Templates* should be customised to reflect the Council's particular requirements. The customised *Templates* can then be used to document Council subdivisional guidelines for internal use (Council design staff) or as a design reference document/design manual for developers and external consultants.

This uniform approach provides the following benefits:

- Infrastructure associated with any Council works is designed to be fit for purpose and of a standard maintainable by the Council.
- Clear records of key design processes are documented.
- Data relevant to asset maintenance is available for future use by the Council.
- Specification requirements for development by external developers are the same as the specifications used for construction of the Council's own contract works.
- Quality requirements at the design stage are covered in *0010 Quality requirements for design*. The checklists included in this worksection provide a valuable tool to achieve the following objectives:
 - Remind designers of design criteria.
 - Provide a quality record of the design process.
 - Allow additional criteria to be integrated into the Council's design process.

USING AUS-SPEC FOR CONSTRUCTION

The AUS-SPEC specification system includes specification *Templates* for the construction of local government roads, public utilities, buildings and landscape works.

For construction of minor civil works, use selected worksections from Workgroups 01, 02, 03, 11 and 13.

For construction of building works, use Workgroups 01 to 10 and Workgroup 20.

TECHguides *TG 101*, *TG 102* and *TG 103* provide guidance on the compilation of tender and contract documentation for either quality control or integrated management contracts.

USING AUS-SPEC FOR ASSET MAINTENANCE

The AUS-SPEC system supports a proactive approach to maintenance based on programmed maintenance, quality management and competitive principles.

The specification system can be adapted for documenting routine, periodic and urgent maintenance, using in-house service agreements or external contracts, or a combination of both.

ROLES AND RESPONSIBILITIES

Under the AUS-SPEC maintenance system, the roles and responsibilities are allocated as follows:

- The Principal (Council) specifies the maintenance requirements and assesses the quality capability of the Contractor/Service provider.
- The Contractor/Service provider controls the processes and methods, verifies conformance and provides the products and services. Quality inspection is a separate activity to verify the performance of the completed maintenance work.
- The Principal's Superintendent audits the maintenance system, methods and end product during the course of the Contract.



AUS-SPEC MAINTENANCE SYSTEM

The AUS-SPEC maintenance system includes reference documents and a series of *Templates*, known as worksections, classified according to the NATSPEC National Classification System. The *Templates* can be edited to suit a particular project, reflecting the asset maintenance management policy of the Council. They include:

- **Reference Documents:** Including TECHguides, which assist with the preparation of maintenance contract documentation.
- **General Requirements (Maintenance):** Outlines the work and defines the measurement and payment.
- **Contract Schedules:** Includes schedule of asset network, facility data sheets, maintenance frequency, schedule of rates and dayworks rates, lump sum components, etc.
- **Maintenance Plan:** Nominates anticipated activities and confirms agreement with the Principal's requirements and the method of operation by the Contractor. The plan is prepared by the Principal and completed with input from the Contractor/Service provider. It consists of two parts:
 - **Part 1:** Outlines the maintenance performance policy, maintenance organisation and activity specifications. Part 1 is to be included with the Tender documentation and is to be read in conjunction with the General requirements included in the Tender documentation.
 - **Part 2:** Includes management procedures and maintenance planning. This part of the plan 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/Service provider.
- **Proformas:** Non-conformance management forms, Maintenance Defect Register, Work Order form, Hold Point release form, Damage report and repair form, etc.

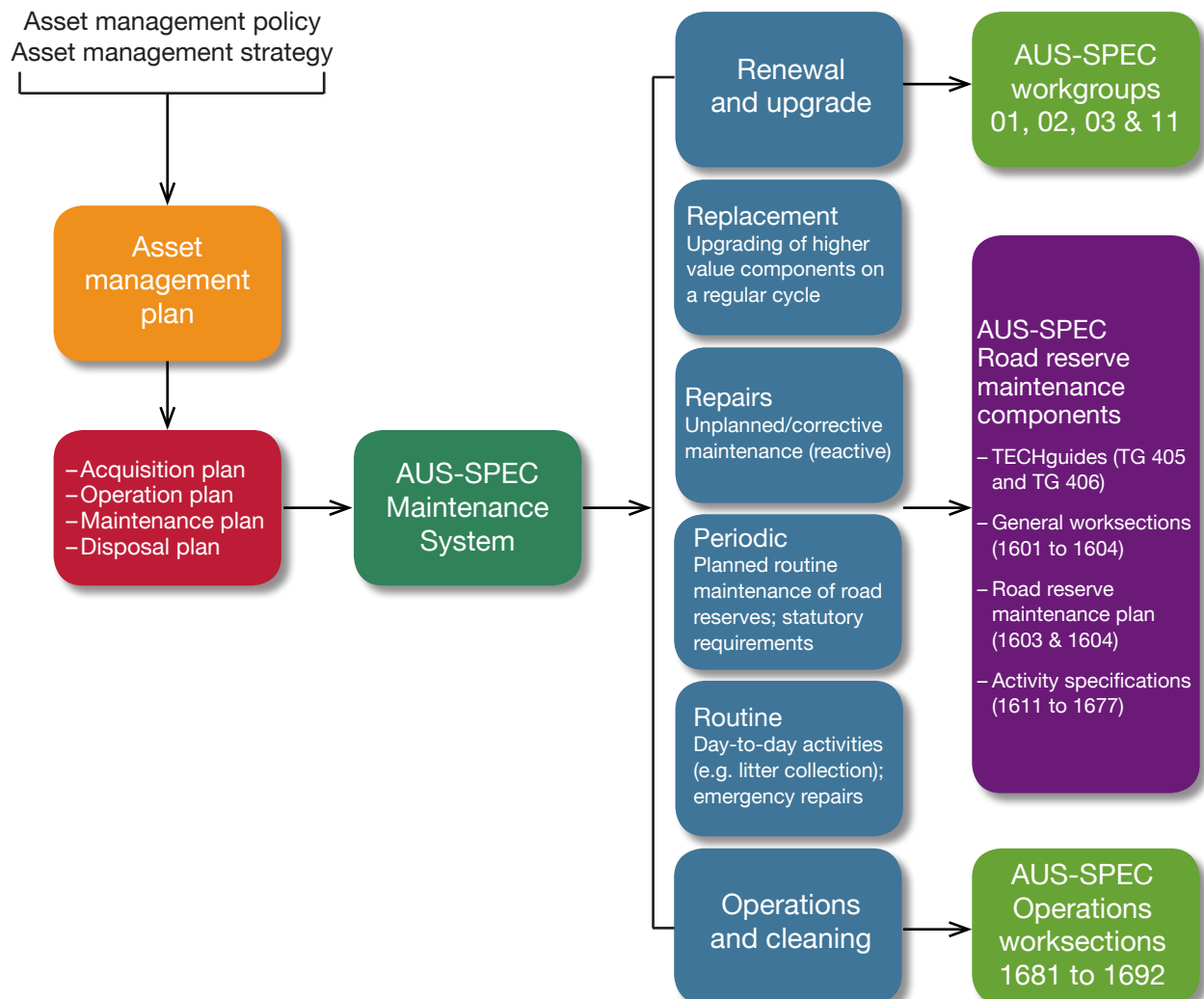
- **Maintenance Worksections:**

- **Activity specification:** Sets out the requirements for a particular activity including scope, work method, inspection requirements, special requirements, hold points and checklists.
- **Activity contract requirements:** Sets out the performance and service level requirements (recording level, response time, intervention levels, MMS reporting units and method of payment for a particular activity, e.g. lump sum/schedule of rates/dayworks). The AUS-SPEC defaults should be revised by Council, in line with the Council Asset Management policy.

BENEFITS OF THE AUS-SPEC MAINTENANCE SYSTEM

The AUS-SPEC maintenance system is a professional, best practice approach to maintenance that allows Councils to:

- Calibrate service levels within their maintenance and operations budgets.
- Prepare documentation for in-house and private maintenance contracts.
- Collect records of asset inspections, defects, programmed and prioritised works, and monthly works completed reports.
- Progressively improve management of asset maintenance, with control and historical data.
- Benchmark with other organisations using AUS-SPEC as work processes and outcomes are essentially the same.
- Manage risk through a systematic approach to maintenance of Council assets.
- Select AUS-SPEC worksections using SPECbuilder, NATSPEC's online specification compilation software, and customise them for specific projects.



A typical example of using the AUS-SPEC Maintenance system for road reserve maintenance.

CITY OF PARRAMATTA

DEVELOPING A MAINTENANCE PLAN

In 2003, City of Parramatta, assisted by external consultants, developed a detailed Road Maintenance Plan using AUS-SPEC. The Maintenance Plan was part of a new, asset-centric approach to road reserve management to improve efficiency and cost-effectiveness.

A PROACTIVE MAINTENANCE SYSTEM

The City of Parramatta proactive maintenance system is based on the AUS-SPEC maintenance system suite of documents and conforms to a quality management model focusing on a systematic approach, inspection and test plans, clear checklists, hold points, and conformance.

THE MAINTENANCE PLAN AS PART OF A MAINTENANCE SYSTEM

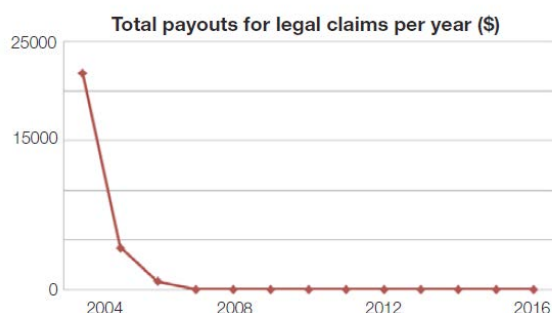
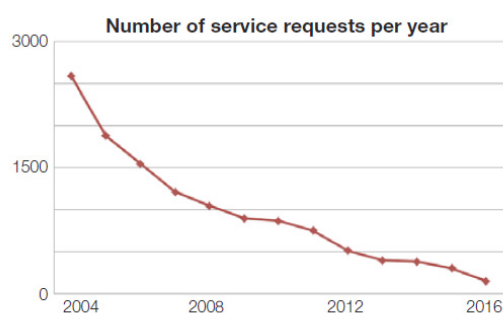
The road maintenance plan (RMP) outlines the procedures in place to provide assurance that the materials and processes conform or will lead to performance conforming with the documented requirements. It provides the Principal with information regarding day-to-day execution of the maintenance works and the ways in which the Contractor or Council in-house service provider will record and report information to the Superintendent.

DEVELOPING THE ROAD MAINTENANCE PLAN

The City of Parramatta developed the original RMP from the AUS-SPEC maintenance documentation and Activity Specification template defaults, customising to the Council requirements. The AUS-SPEC RMP template 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 service provider.

The council moved from a reactive to a proactive approach to maintenance activities. The road reserve network was regularly inspected by Council inspectors. Inspections were recorded on a Maintenance Defect Register, which formed part of the plan and was used to prioritise and allocate maintenance work and record completed work.

Over time, the asset data collected as required by the RMP has assisted the strategic management of the road reserve network. Council regularly reviews the RMP in line with changes to the organisational objectives, asset requirements, regulation/legislation, and community views.



BENEFITS

A proactive system based on quality management, competitive principles and programmed maintenance enabled City of Parramatta over time to balance the level of service and the maintenance and operations budget. This resulted in significant cost savings, a reduction in the number of reactive complaints and a reduction in incident claims arising from defective road pavement, line markings, kerb and gutter, and associated street signage and furniture.

PENRITH CITY COUNCIL

DEFINING TECHNICAL LEVELS OF SERVICE

In 2001-02 Penrith City Council adopted a proactive inspection and intervention approach to road reserve maintenance based on AUS-SPEC.

TECHNICAL SERVICE LEVELS IN PROACTIVE ROAD RESERVE MAINTENANCE

Previously, Council relied heavily on the community to report road and footpath failures before carrying out maintenance work. As part of the new system, Service Levels were developed to drive the frequency of maintenance and the intervention level at which the maintenance is required.

Activity Specifications and associated Activity Contract Requirements setting out the Service levels for that activity, and inspection frequencies, were documented in a Road Reserve Maintenance Plan. Maintenance work is undertaken by roughly 40% in-house business units and 60% outsourced. Defined Service Levels ensure consistent quality outcomes regardless of who provides the service.

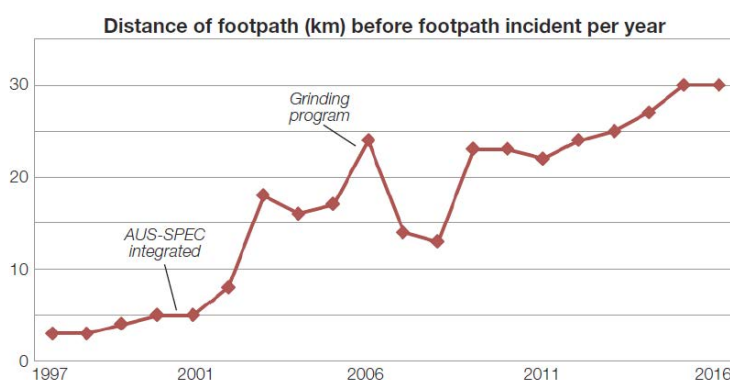
DETERMINING TECHNICAL SERVICE LEVELS

Penrith City Council allocated existing maintenance funds to the activities identified in the AUS-SPEC documentation, and month-by-month costs associated with pre-determined intervention levels for defects were plotted to better prioritise defect maintenance. Progress was monitored monthly and data was used to refine the plan. Service levels were amended to better align with the allocated budget. There have been several revisions over the years to make sure that the management system is safe and efficient. With this system in place, the comprehensive data collected makes it easier to attract the right level of funding from Council for ongoing maintenance to meet performance targets.

Council asset management staff now conduct schedules infrastructure condition surveys up to three times a year, depending on the asset type and location. Intervention and response times for Activity Specifications are reviewed annually after budget allocations to City Works.

EXAMPLE: FOOTPATH MAINTENANCE

Footpath incidents arising from tripping points are the most common claim on Council from the community. After implementing a proactive system for road reserve maintenance with clearly defined technical levels of service, Penrith City Council saw a substantial decrease in the number of footpath incidents, lowering the risk of litigation and damages costs as demonstrated by the graph.



In 1997, a footpath incident occurred every 3km. The year after the AUS-SPEC system was integrated, there was an incident every 8km. A grinding program introduced by the Council was undertaken in 2006, and the distance of footpath per footpath incident has increased since.

Data courtesy of Penrith City Council.

The graph shows that the benefits of a proactive approach continue years after implementing the AUS-SPEC Maintenance system. Records of asset inspections, defects, programmed and prioritised works, and monthly works completed reports continue to improve the maintenance history and asset inventory and provide a defence against possible litigation.

USING AUS-SPEC FOR CONTRACT DOCUMENTATION

“The Australian economy spends approximately \$7 billion per annum to resolve disputes in the construction industry. Concerns exist regarding the cost of tendering, lack of clarity of documentation, and unequal allocation of risk.”

CRC Construction Innovation,
Guide to leading practice for dispute avoidance and resolution: An overview

The AUS-SPEC specification system can be used for standard and period supply and service contract documentation for the life cycle management of assets. The AUS-SPEC system assists users to manage each stage of the contract cycle: project initiation; project delivery; compilation of contract documents; contract management and administration; operation; and maintenance and asset management.

PROJECT DELIVERY AND PROCUREMENT

Local government typically procures the following:

- **Building and construction services** involving major works (e.g. construction of an aquatic centre or construction of a road) or minor works (e.g. repairs to a footpath or resurfacing a car park).
- **Supply of services** including supply of equipment or material.
- **Period supply and services** including construction or non-construction services over a fixed period of time (e.g. linemarking of roads, security surveillance, bituminous surfacing, or weed treatment).
- **Consultancy services** including design and documentation.

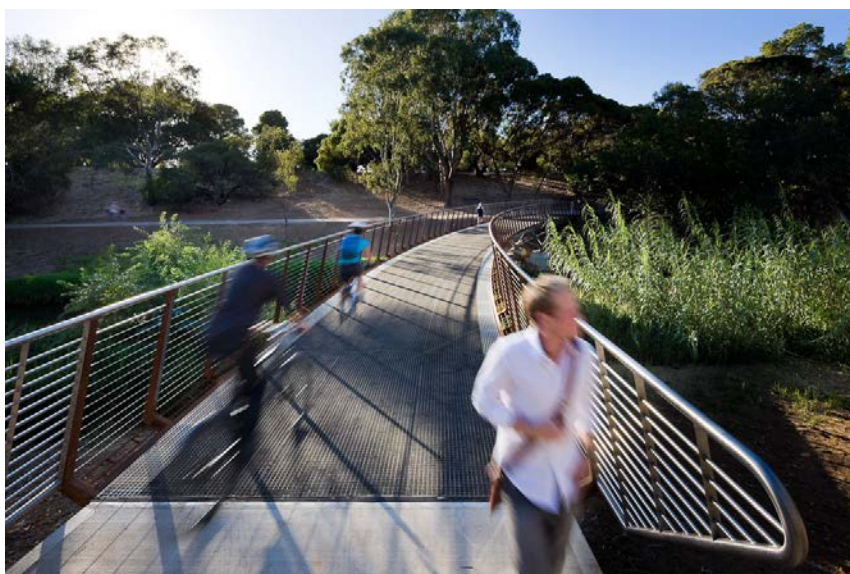
The Local Government Acts of the various states and territories underpin the detailed tendering process and procurement procedures for Councils. AUS-SPEC provides for the incorporation of state-based requirements into contract documentation and references AS 4120 *Code of Tendering*, which sets out the ethics and obligations of the principal and tenderers in the tendering process in the construction industry.

THE IMPORTANCE OF SPECIFICATIONS

Preparing the specification is a core process in tendering and contracting. It is an essential contract management document that sets out the Council's requirements to prospective suppliers and/or contractors. A clear, concise and unambiguous specification results in more accurate tender bids and fewer variation claims.

The AUS-SPEC specification *Templates* and associated guidance documents provide a framework for developing quality documentation for different procurement methods and types of contracts. They can be used to define:

- Outputs.
- Quality standards and standards of compliance.
- Method of payment.
- Risk identification and management.
- Procedures, roles, and responsibilities.
- Dispute resolution processes.
- Requirements for the Council's economic, social and environmental objectives.



River Torrens footbridge, Adelaide.

COMPILATION OF CONTRACT DOCUMENTS

The AUS-SPEC contract document system is suitable for all Council services related to asset management, including design, construction, maintenance and operations of urban and open spaces, buildings and facilities, road reserves and public utilities.

Reference Documents

Before compiling the documentation, refer to the following AUS-SPEC TECHguides for detailed guidance on contracts, technical specifications, tender submission requirements and sample documents.

- *TG 102 Guidelines for Principals – standard contracts.*
- *TG 103 Guidelines for Principals – period supply and service contracts.*
- *TG 104 Guidelines for Principals – sample documents.*

Standard Contracts

Identify the following contract requirements for the project:

- Conditions of tendering: Required for tender documentation only.
- Conditions of Contract: General conditions, Annexures and Special conditions of contract. An SAI Global licence is required to use the Annexures of AS 2124 and AS 4000.
- Quality management system: Quality assurance or Integrated management.
- Method of payment: Schedule of rates, lump sum or a combination of both.

Period Supply and Service Contracts

In addition, for period supply and service contracts, define the following contract requirements:

- Extent of service: Supply only, supply and deliver, or supply, deliver and install/lay/place.
- Type of quality control: Quality control or Quality management system.
- Period of contract: e.g. 12 months with optional extension for 3 to 5 years, or a longer term.
- Method of payment: Monthly payment, proportional payment, payment upon delivery.



Upper Coomera Community Centre, Gold Coast.

SPECbuilder

Using SPECbuilder, NATSPEC's online specification compilation software, select the appropriate AUS-SPEC worksections and Office edited worksections to create a project specification. Edit standard clauses where necessary and customise the worksections to include project-specific information. Complete any checklists and annexures to suit the needs of a particular project.

Project Documentation

Assemble the project-specific documentation in two sections:

- Section A – Tender documents. Assemble separately. For electronic tendering, a PDF file with all the information can be issued to the tenderers.
- Section B – Contract documents. Assemble contract documentation in four volumes: conditions of contract, technical specifications, drawings and schedules (not covered by AUS-SPEC), and tender submission documents and additional information.

LIVERPOOL CITY COUNCIL PROCUREMENT AND MANAGEMENT OF OUTSOURCED ACTIVITIES



Liverpool City Council formed a project team to oversee the concept development, design, contractor engagement and construction of the Bernera Road Extension from the existing intersection at Camden Valley Way, Prestons, through to Edmondson Park Rail Station. This 1350 m road extension, jointly funded by the NSW State Government and Liverpool City Council to a value of \$41 million, provides direct access into land development areas along Sydney's new South West Rail Corridor, with the potential for extension to the Western Sydney International (Nancy-Bird Walton) Airport.

The project involved the construction of a divided four-lane road with median nature strip and adjustment of side roads, including three signalised intersections. In addition to the carrier mains, it included construction of a major multi-cell culvert and the installation of utilities, including stormwater reticulation, temporary and permanent water mains, electrical street lighting circuitry, Telstra and NBN Co. communication lines, and gas and sewer line diversions. The finished roadway was landscaped with the provision of ten bus bays, shelters and pedestrian and cycleway paving along its entire length.

TENDER AND CONTRACT DOCUMENTATION

Council contracted the works as a Separable Portions, Lump Sum Contract, using the AS 2124 General Conditions of Contract with amendments. Five separable portions were defined in the Request for Tender (RFT) and Formal Instrument of Agreement (FIOA). This provided flexibility in the staged awarding of Separable Portions, with Portions B and C relating to major utility installations, Portion D to paths and cycleways construction with landscaping, and Portion E to the laying of the final asphalt wearing course. The RFT stated that all Separable Portions could only be awarded to the successful tenderer.

Liverpool City Council prepared documentation for the RFT and FIOA based on AUS-SPEC. AUS-SPEC provided technical construction specifications and a Capital Works contract shell that were appropriate and adaptable to the production of documentation for the selected contracting option. To facilitate electronic publishing and distribution, the documentation incorporated hyperlinks for easy navigation.

Extensive property acquisitions and a greenfield site presented the opportunity for joint installation of major utility carrier mains along the full road length to build capacity for Sydney's newest land release areas. This was carried out on behalf of Endeavour Energy and Sydney Water. Council maintained the overall Superintendent function, with the operational provisions of the agreement between Liverpool City Council, Sydney Water and Endeavour Energy formalised in separate Deeds of Agreement.



New Bernera Road section.

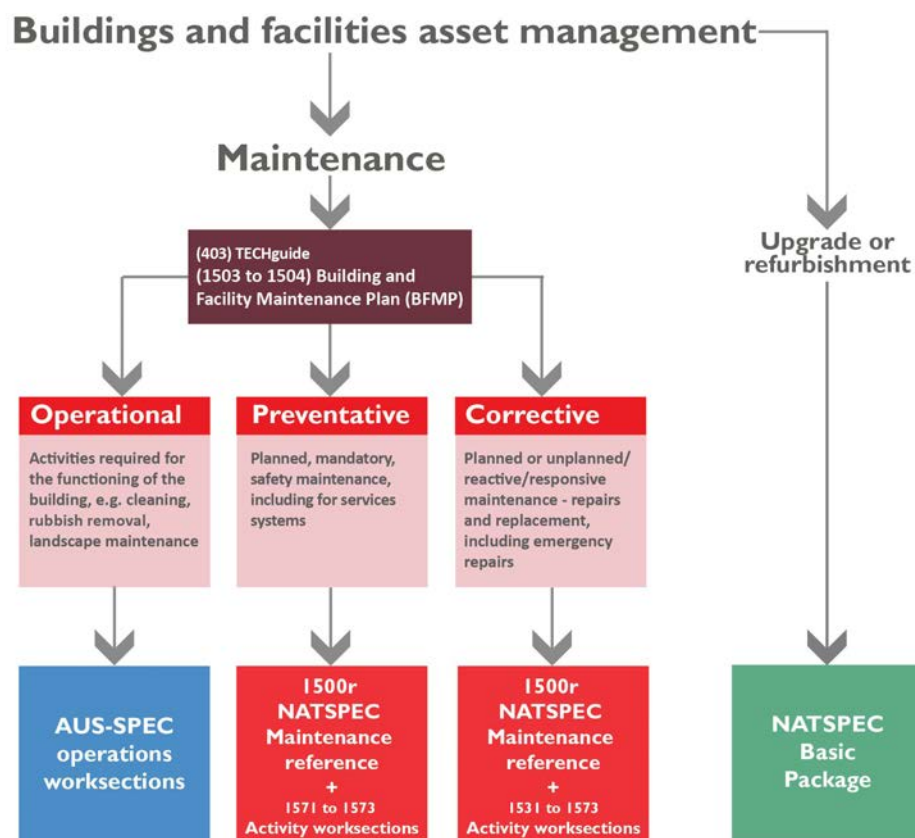
This case study is included in the International Infrastructure Management Manual – Case study 4.5.5a Contract Scoping and Packaging.

USING AUS-SPEC TO SPECIFY BUILDING AND FACILITY MAINTENANCE

Good maintenance, like good design, can be difficult to define. Part of the uncertainty is that maintenance may refer to the whole system as well as its components. For example, maintaining an air conditioning system may involve inspections (e.g. to AS 1851 Routine service of fire protection systems and equipment) without having to change anything, while maintaining a building may involve repairing and replacing parts, such as defective windows.

The AUS-SPEC system uses the International Infrastructure Management Manual (IIMM) definition of building and facility maintenance: “All actions necessary for retaining an asset as near as practicable to its original condition, but excluding rehabilitation or renewal.”

Maintenance includes actions such as regular inspections, repairs and minor replacement of components to eliminate the cause of defects and to avoid excessive repetition of maintenance effort, but does not include upgrading the asset.



AUS-SPEC MAINTENANCE SYSTEM

Effective maintenance of buildings and facilities involves maintenance strategies and maintenance management systems, captured in the maintenance plan. The AUS-SPEC Maintenance System can be used to compile documentation for a maintenance contract, as shown in the figure above, and includes the following:

- TECHguide TG 403 Guide to building and facility maintenance management system and documentation.
- 1500r NATSPEC Maintenance Reference, which covers corrective maintenance works and preventative maintenance works for services systems.
- AUS-SPEC Building and Facilities Maintenance includes General requirements, Contract schedules and Building and facility maintenance plan templates, which can be used to define the scope of work and project-specific requirements.
- AUS-SPEC Activity specifications defining performance criteria and repair and replacement criteria.

USING AUS-SPEC FOR MANAGEMENT OF UNSEALED ROADS

Local government is responsible for approximately 678,000 km (77%) of the total road length in Australia. Rural and regional Councils manage 585,000 km (86%) of this road length, about two-thirds of which is unsealed.

These roads provide access to rural and remote communities, movement of passenger and commercial vehicles, and haulage vehicle routes for different industries as well as for emergency services. Unsealed roads comprise either natural material or gravel and do not have a permanent water-resistant surface like bitumen spray seal, asphalt or concrete.

Councils are facing ever-increasing challenges to ensure service levels for unsealed roads are fit for purpose. Substandard roads can be detrimental to these communities. In 2021, the ALGA National State of the Assets report found that only 50% of unsealed roads were at an acceptable standard.

When Councils collaborate at a regional level using AUS-SPEC resources, they create a consistent approach to infrastructure delivery and maintenance. Effective maintenance plans are crucial to slow down deterioration and increase efficiency and performance outcomes.



MANAGEMENT OF UNSEALED ROADS

Unsealed roads can deteriorate rapidly due to weather conditions, traffic volume, construction quality, lack of availability of materials, poor drainage provisions and inadequate maintenance. Effective and efficient life cycle management of unsealed roads is a significant issue faced by most regional, rural and remote councils. The guiding principles of unsealed road management include:

- Maintenance of road safety through quality design.
- Providing a high-density impervious gravel pavement to deflect rainfall away from the weaker subgrade.
- Reduction of road maintenance costs by using mechanical blending and chemical stabilisation to reduce defects such as potholes, slipperiness, dust, ravelling, corrugating and rutting.
- Testing of materials crushed and screened in each quarry to ensure better service and extended resheeting life.

The AUS-SPEC specification system of *Templates* and procedures can be used for the design, construction and maintenance of unsealed roads. The Rural Roads package assists local governments to effectively manage these extensive assets.

Design

The Workgroup 00 *PLANNING AND DESIGN* covers quality requirements, bushfire protection, site regrading, control of erosion and sedimentation, geometric road design, pavement design, pathways and cycleways, and design of stormwater and subsurface drainage. These *Templates* can be used to document design requirements such as stage of construction, design life, pavement materials, and construction documentation requirements. Alternatively, use the AUS-SPEC Design Reference and associated checklists.

Construction, rehabilitation and renewal

The following AUS-SPEC Workgroups can be used to document the construction, rehabilitation and renewal requirements of unsealed roads:

- 01 *GENERAL*: For tendering requirements, quality assurance, schedule of rates, integrated management, environmental management, and standard contract checklists.

- *02 SITE, URBAN AND OPEN SPACES*: For construction of fire access and fire trails, pathways, masonry walls, crib retaining walls, gabions and rock mattresses.
- *03 STRUCTURE*: For auxiliary concrete works.
- *11 CONSTRUCTION – ROAD RESERVE*: For construction requirements of various elements relating to unsealed roads, including control of traffic, control of erosion and sedimentation, clearing and grubbing, earthworks, stabilisation, pavement base and subbase, road openings, drainage elements such as subsoil and formation drains, pavement drains, and various ancillary items like signposting and boundary fences.
- *13 CONSTRUCTION – PUBLIC UTILITIES*: For construction of drainage elements relating to unsealed road construction including stormwater drainage, pipe drainage, precast box culverts and drainage structures.



Factors affecting maintenance of unsealed roads.

Alternatively, use the AUS-SPEC Construction Reference and schedules to document the construction requirements.

Maintenance

Maintenance practices aim to slow down the rate of deterioration by ensuring the key factors affecting maintenance of unsealed roads, as shown in the figure above right, are adequately managed. Proactive maintenance and inspection programs aim to provide continued structural integrity and safety, minimise erosion and sedimentation, and provide a free draining surface to the formation. Maintenance normally includes reshaping pavement cross-sections, replacing lost wearing course material, adding material where weaknesses occur, cleaning table drains, extending roadside drainage, and removing surface defects. Details on improving materials and maintenance are provided in TECHreport *TR 08 Management of Council gravel pits in country areas – A case study* and TECHnote *GEN 027 Maintenance of unsealed roads*.

The larger City Councils have introduced integrated proactive and reactive maintenance systems based on priority response rankings determined by inspections. This information is converted by the works engineer into job instructions for the selected work team and links to the financial system for budget allocation.

In smaller rural Councils, the Customer Request Management (CRM) forms are sent to the overseer, who sorts the complaints into work team instructions. The overseer may inspect the defect prior to giving the CRM to the relevant team leader. The concept of reactive and proactive maintenance is sorted by the experience of the overseer.

Councils can use the AUS-SPEC maintenance system to collect records and prepare documentation relating to asset inspections, program and prioritise works, align service levels to maintenance and operations budgets, and manage risks relating to unsealed roads through a systematic set of processes.

The following AUS-SPEC Workgroups can be used for effective unsealed roads maintenance:

- *11 CONSTRUCTION – ROAD RESERVE*: For control of traffic, control of erosion and sedimentation, stabilisation, wearing course, base and subbase, subsoil drains, signposting and guide posts related to rehabilitation and renewal.
- *14 MAINTENANCE AND OPERATIONS – URBAN AND OPEN SPACES*: For tree and vegetation control in road reserves, and boundary fence repairs.
- *16 MAINTENANCE AND OPERATIONS – ROAD RESERVE*: For general requirements relating to road reserve maintenance, maintenance schedules and road reserve maintenance plans. Activity specifications include *Templates* for local shape correction, grading and resheeting of unsealed roads and unsealed shoulders, pothole repairs, stabilisation, and ancillary works such as signage, road traffic control and storm damage response for road safety.
- *18 MAINTENANCE AND OPERATIONS – PUBLIC UTILITIES*: For procedures on general maintenance of drainage elements and structures, including pits, culverts and drains located in the road reserve.

Unsealed road networks represent a significant proportion of Australia's infrastructure. When using the AUS-SPEC specification system to document the design, construction and maintenance of unsealed roads, rural and remote Councils can significantly improve the structural integrity, safety and performance of unsealed roads and better serve their communities using the [AUS-SPEC Rural Roads package](#).



David Jenkins
CEO, IPWEA Australasia

IPWEA is renowned for its best practice, industry-leading publications and training. Our solutions management approach is highly valued by Councils, Government and the private sector.

AUS-SPEC was developed by IPWEA Australasia to provide nationally consistent civil specifications for Councils. This prevents duplication of effort and reduces costs.

The AUS-SPEC library of civil engineering design, construction and maintenance templates brings a shared professional language and process to engineering projects. In the current environment of increasing pressure on resource allocation, these publications are a tool to streamline asset life cycle planning and maintenance, while maintaining the essential focus on community safety and risk prevention.



IPWEA

INSTITUTE OF PUBLIC WORKS
ENGINEERING AUSTRALASIA



**NATSPEC//
Construction
Information**

Visit the AUS-SPEC website for subscription packages, technical resources, media releases, papers, articles and more:

www.aus-spec.com.au

NATSPEC//ConstructionInformation

NATSPEC is a national not-for-profit organisation, owned by Government and industry, with the objective to improve the construction quality and productivity of the sustainable built environment through leadership of information. It is impartial and is not involved in advocacy or policy development.

ABN 20 117 574 606
www.natspec.com.au