

## Strategy and Assets Committee

**Meeting Date:** Tuesday, 20 March, 2018

**Location:** Council Chambers, City Administrative Centre, Bridge Road, Nowra

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Office of  
Local Government

# SUPPORTING JOINT ORGANISATION SUCCESS

REGULATION CONSULTATION GUIDE

February 2018



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Office of  
Local Government

Supporting Joint Organisation Success: Regulation Consultation Guide

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# 1 Introduction and Purpose

Joint Organisations (JOs) will officially “open for business” in regional NSW from 1 July 2018.

JOs will transform the way local and state governments work together to plan and deliver the things that matter to regional communities. They will give local councils a seat at the table in planning for important regional infrastructure and investment.

The NSW Government is providing \$3.3 million in seed funding to establish JOs and the Office of Local Government (OLG) will continue to support local councils and JOs during the establishment phase.

A key milestone was to pass [amendments to the Local Government Act 1993](#) (the Act) to allow JOs to be established. The amendments set out the principal functions of JOs and provide the framework for JOs to operate in an effective and accountable way.

The next step is to finalise the regulations that support the Act amendments. This will be delivered via amendments to the Local Government (General) Regulation 2005. A draft of the Local Government (General) Amendment (Regional Joint Organisations) Regulation 2018 (the [Draft Regulation](#)) has been prepared for consultation.

This guide explains the Draft Regulation to enable councils to make informed submissions.

The proposed regulations are minimal, to ensure that JOs can focus on their core business and build organisations that reflect the unique characteristics of their region.

## 2 Providing feedback on the draft regulation

### The NSW Government is inviting feedback on the Draft Regulation.

This Guide explains the key aspects of the Draft Regulation and how they relate to the Act. It also explains how JOs might use these provisions in their day to day operations. The Government is inviting council feedback on the Draft Regulation and some key questions.

Councils are invited to provide feedback on the draft regulation to support JOs by **5pm on Friday 16 March 2018**.

A list of focus questions is included in **Appendix A** to assist in preparing submissions. Submissions may be made using an online feedback form. Go to [www.olg.nsw.gov.au](http://www.olg.nsw.gov.au) and follow the link to the JO webpage.

Alternatively, submissions can be made by printing the form at Appendix A and scanning and emailing to [jointorganisations@olg.nsw.gov.au](mailto:jointorganisations@olg.nsw.gov.au) or mailing to:

**Office of Local Government**

**Joint Organisation Regulation Consultation**

**Locked Bag 3015**

**Nowra NSW 2541**

OLG staff are available to speak to councils to answer any queries they may have in relation to the proposed regulations on (02) 4428 4100.

## 3 Key aspects of the Draft Regulation

### 3.1 The Charter

The Charter will be unique to each JO. It outlines how the JO will operate.

#### What the Act requires

The Act (section 400U(3)) requires each JO to prepare and adopt a Charter that contains, but is not limited to, the following:

- Operational principles for the JO
- Governance principles for the JO.

#### What is proposed in the Draft Regulation

The Draft Regulation proposes to require JO's Charters to include a methodology for determining annual financial contributions to the JO by member councils to ensure transparency (clause 397B(1) of the Draft Regulation). It will be up to each individual JO to develop its own methodology.

The Draft Regulation also proposes requiring that each JO makes its Charter available to the public by publishing it on its website (clause 397B(2)).

### 3.2 Election of the Chair

The JO Chairperson will play an important leadership role in representing the region and ensuring the efficient conduct of JO business. Councils have made it clear that they want the Chairperson to be a serving Mayor, chosen from amongst the voting members.

#### What the Act requires

The Act (sections 400T and 400V) prescribes that the Chairperson:

- is elected by the mayors who are voting representatives on the Board
- preside at meetings of the Board
- does not have a casting vote, and
- holds office for a term of 2 years.

The Act also allows each JO to decide whether or not it would like to have an independent, non-voting Chairperson to facilitate decision-making. Where this is the case the following will apply:

- the non-voting chair must still be the Mayor of a member council
- the Deputy Mayor of that council will be appointed to vote on their behalf as a member of the Board
- where there is no Deputy Mayor (or the Deputy is already a voting member), another councillor may be appointed to vote.

#### What is proposed in the Draft Regulation

The Draft Regulation proposes a process for electing the JO Chairperson that is similar to the way that the chair of a county council is currently chosen. In essence, it requires that:

- a Chairperson must be elected at the first meeting of the Board, at the first meeting after each two year term expires, or any time the position becomes vacant;
- the Executive Officer will usually be the election returning officer;
- the election can be either by open vote, ordinary ballot or preferential ballot; and
- where the vote is tied, the Chairperson can be chosen by lot.

For more details of the process see Schedule 7A of the Draft Regulation.

### 3.3 Tied votes

Member councils of JOs have equal voting rights on the Board as an equal partnership is fundamental to the success of JOs.

#### What the Act requires

Section 400T (10) of the Act provides that the regulations may prescribe a mechanism for resolving decisions of a board in the event of an equality of votes.

#### What is proposed in the draft Regulation

The Draft Regulation (clause 397D) clarifies that, in the event of an equality of votes, a motion at a JO Board meeting is taken to be defeated.

### 3.4 Alternates

There will be circumstances where the Mayor is not able to attend a JO meeting, for example due to illness or leave, so it is important to provide a process for appointing an alternate representative.

#### What the Act requires

The Act (section 400W) allows the regulations to make provisions about the appointment and functions of alternates for voting representatives on the JO Board.

## Key aspects of the Draft Regulation

### What is proposed in the Draft Regulation

The Draft Regulation (clause 397E) proposes that the Deputy Mayor of a member council is to be the standing alternate for the Mayor. If there is no Deputy Mayor, or if the Deputy Mayor is already a voting member of the JO, the member council is to appoint another councillor as alternate for a 2 year period (or any other period that they see fit). The alternate has all the functions of the JO representative when acting in their place on the Board and is legally taken to be a representative.

### 3.5 Expenses and facilities

Like a council, a JO will be required to have an expenses and facilities policy and JOs will only be able to reimburse expenses in accordance with that policy.

#### What the Act requires

The Act (Schedule 6, item 17B) allows for regulations to be made about matters including travel and other expenses payable to board representatives.

#### What is proposed in the draft Regulation

The Draft Regulation (clause 397J) proposes to apply section 252 of the Act to JOs. This will require JOs to adopt an expenses and facilities policy within 12 months of being established and require reimbursement to be in accordance with that policy. JOs would be required to consult their member councils in developing this policy.

### 3.6 Remote participation and voting

JOs may cover very large geographic areas and it may not be practical for voting representatives to attend every meeting in person. Board members are to be enabled to attend and vote at Board meetings remotely – either by telephone or videoconferencing. This and other key differences in JO meeting practices are proposed to be reflected in a Model Code of Meeting Practice.

#### What the Act requires

Schedule 6 Regulations (Item 17B) of the Act provides for various regulations to be made in relation to JOs and lists examples that include remote voting and remote participation in a meeting.

### What is proposed in the Draft Regulation

The Draft Regulation (clause 397F) provides that the Board of a JO may transact any business at a meeting in which representatives participate by telephone or other electronic means, as long as the representative speaking can be heard by the other representatives.

### 3.7 Planning and Reporting

Planning and reporting requirements for JOs are proposed to be minimal, fit for purpose and aligned to Integrated Planning and Reporting (IP&R) requirements for councils.

#### What the Act requires

The Act says that a principal function for JOs is to establish strategic regional priorities for the local government areas covered by the JO, and to develop plans to deliver those priorities (see section 400R of the Act). The Act requires the relevant strategic priorities or plans of member councils (including Community Strategic Plans) and those of the NSW Government are considered by a JO in establishing its strategic regional priorities.

The Act (section 413(1)) also requires each JO to prepare financial reports for each year, and refer them for audit as soon as practicable after the end of that year.

#### What is proposed in the Draft Regulation

Three key planning and reporting requirements are proposed in the Draft Regulation:

1. a Statement of Strategic Regional Priorities;
2. an Annual Performance Statement – reporting on progress in implementing its priorities; and
3. financial reports.

#### Statement of Strategic Regional Priorities

It is proposed in the Draft Regulation (clause 397G) that each JO will have a succinct Statement of Strategic Regional Priorities (SSRP) outlining the JO's vision for its region and how it plans to work with others towards achieving that vision. This builds on, rather than duplicates, the planning work of councils in their Community Strategic Plans and provides important connections between local and regional planning.

The Draft Regulation proposes the JO Board prepare and adopt the SSRP following the adoption by councils of their Community Strategic Plans so that the JO can take these into account. A JO must consult with member councils about the content of the proposed SSRP.

To assist JOs in their first year, it is proposed that the first SSRP be prepared and adopted by the end of 2018 or six months after the date JOs officially commence (whichever is later)(clause 397G(3) of the Draft Regulation). After this, JOs must prepare and adopt a SSRP within 12 months of the local government general elections (i.e. generally every 4 years).



## Key aspects of the Draft Regulation

### Annual Performance Statement

It is also proposed that each JO produce a succinct Annual Performance Statement (APS) (clause 397H of the Draft Regulation) each year to show how the JO has progressed against its strategic priorities and plans. APS documents are to be prepared for each financial year and adopted and published before 30 November each year. JOs may, but need not, prepare an Annual Performance Statement for the first year they are established (clause 397H(3) of the Draft Regulation).

### Financial Reports

To assist JOs in their first year of operations, the Draft Regulation allows JOs to wait until after their first full year of operations to prepare their first financial report (clause 397K).

## 3.8 Executive Officers

It will be up to each JO to determine whether to engage a full-time person in the Executive Officer role, the level of remuneration to be offered and the performance-based requirements to be applied.

### What the Act requires

The Act (section 400Y) provides for the role of the Executive Officer. The role has responsibility for the day-to-day management of the JO in accordance with the strategic regional priorities and other plans, programs, strategies and policies of the organisation, and, to implement, without delay, lawful decisions of the JO.

### What is proposed in the Draft Regulation

The Draft Regulation (clause 397L) assists JOs through their first year of operations by providing that the standard provisions to advertise the Executive Officer position and make an appointment on merit are suspended for 12 months. This will allow JOs to make an interim appointment of the Executive Officer, should they choose to do so, to enable a smooth start-up process. After this period, the JO must advertise the position and make an appointment on merit.

## 3.9 Other Staff

While JOs are not required to have any staff other than the Executive Officer, some may wish to do so, particularly where they have agreed to take on other functions delegated by member councils.

Once each JO is proclaimed, the NSW Government will seek the support of the Commonwealth Government to order that each specific JO is not a national system employer. This will ensure that future staff are covered by the State industrial relations system.

### What the Act requires

The Act (section 400ZG) says that staff, other than the Executive Officer, may only be appointed by a JO if the entity is not a national system employer for the purposes of the Fair Work Act 2009 (Cth).

### What is proposed in the Draft regulation

The Draft Regulation (clause 397M) proposes to allow for the transfer of staff between JOs or between a JO and a council (including a county council) without loss of entitlements. This would maintain any long service and sick leave accrued under the Local Government (State) Award.

Importantly, this will rely on the Award containing the relevant provisions and does not affect any leave entitlement of a senior staff member of a council under his or her employment contract.

The draft regulation (clause 397M(2)) also proposes to modify how clauses 406C and 406D of the Local Government (General) Regulation 2005 apply to JO staff. This essentially extends the effect of those provisions, which deal with the transfer of entitlements of senior staff, to senior staff of a JO whose employment is transferred by Proclamation.

Further, it is proposed (clause 397M (3)) to enable lateral transfers of staff that are not senior staff in connection with any transfer of functions to, or from, a JO and a council. This extends the effect of section 354G of the Act to staff in these circumstances, so that:

- lateral transfer of staff can occur through an internal process in which staff have the opportunity to apply, but external advertising of position/s is not required;
- preference is then given to employees performing substantially the same duties; and
- if there is more than one employee performing substantially the same duties, the employee with the greatest merit must be given preference in the filling of available positions.

## 3.10 Application of Act and Regulation

JOs are part of the system of local government in NSW so it is important that they share the same legislative framework as local councils.

Many of the provisions of the Local Government Act 1993 will also apply to JOs – for example the requirement for JO Board representatives to comply with the Code of Conduct. Some provisions do not apply – for example the capacity to raise rates will remain with local councils and not be applied to JOs.

Where a JO is delegated a function by its member councils, dis-applied provisions will apply to the JO in carrying out those functions as delegate of the councils.

**Appendix B and C provide further details on these provisions.**

## Appendices

**Appendix A** – Feedback form and questions

**Appendix B** – The Local Government Act – What applies and does not apply to JOs

**Appendix C** – The Local Government (General) Regulation – What applies and does not apply to JOs.

## Appendix A – Feedback Form

### Below is a copy of the online feedback form containing questions about the regulation of Joint Organisations (JOs)

Submissions can be made online by 5pm on Friday 16 March 2018. To complete the submission go to [www.olg.nsw.gov.au](http://www.olg.nsw.gov.au) and follow the link to the Joint Organisations webpage.

For further information please contact the Joint Organisations Team in the Office of Local Government on **02 4428 4100**, via email to

[jointorganisations@olg.nsw.gov.au](mailto:jointorganisations@olg.nsw.gov.au), or

**Office of Local Government**  
**Levels 1 & 2**  
**5 O'Keefe Avenue**  
**Locked Bag 3015**  
**NOWRA NSW 2541**

### Privacy Notice

When you give us your feedback, the Office of Local Government (OLG) will be collecting some personal information about you, in particular:

- your name
- your email address
- the name of your organisation (if provided)
- any personal information you decide to put in the additional comments fields.

All feedback received may be made publicly available. Please do not include any personal information in your feedback that you do not want published.

This information is being collected by OLG to help the Government develop the regulations to support the establishment of Joint Organisations. As part of that process, we may need to share your information with people outside OLG, including other public authorities and government agencies. We may also use your email contact details to send you notifications about further feedback opportunities or the outcome of consultation.

There may also be circumstances when OLG is required by law to release information (for example, in accordance with the requirements of the Government Information (Public Access) Act 2009). There is also a privacy policy located on the OLG website that explains how some data is automatically collected (such as your internet protocol (IP) address) whenever you visit the OLG's website. The link to that policy is <http://www.olg.nsw.gov.au/privacy>

### General Information

**Name:**

**Position:**

**Organisation Name:**

**Organisation category (please tick applicable box below):**

- ☐ Council
- ☐ ROC/Pilot JO
- ☐ Peak industry body
- ☐ State agency

☐ **Other**

If 'Other', please specify:

**Postal or email address:**

## Appendix A – Feedback Form

### Feedback Questions

Question	Support
<b>The Charter – Section 3.1</b>	
Are the proposed provisions for the Charter appropriate?	Yes No In-part
What improvements could be made, if any?	Comment

### Election of the Chair – Section 3.2

Are the proposed provisions setting out how a Chair may be elected appropriate?	Yes No In-part
What improvements could be made, if any?	Comment

### Alternates – Section 3.4

Are the proposed provisions for the appointment of alternates appropriate?	Yes No In-part
What improvements could be made, if any?	Comment

### Expenses and Facilities – Section 3.5

Are the proposed provisions on expenses and facilities appropriate?	Yes No In-part
What improvements could be made, if any?	Comment

## Appendix A – Feedback Form

### Feedback Questions

Question	Support
<b>Remote participation and voting – Section 3.6</b>	
Are the proposed provisions about remote voting appropriate?	Yes No In-part
What improvements could be made, if any?	Comment

### Planning and reporting – Section 3.7

Are the proposed provisions for planning and reporting appropriate?	Yes No In-part
What improvements could be made, if any?	Comment

### Executive Officers – Section 3.8

Are the proposed provisions allowing JOs to appoint their first Executive Officer without needing to advertise or undertake merit-based selection for a period of up to 12 months appropriate?	Yes No In-part
What improvements could be made to the provisions for appointing Executive Officers, if any?	Comment

### Other staff – Section 3.9

Are the proposed provisions enabling the lateral transfer of staff between councils and JOs to support the local government workforce appropriate?	Yes No In-part
What improvements could be made to the provisions for staff transfers, if any?	Comment

## Appendix A – Feedback Form

### Feedback Questions

Question	Support
<b>Application of Act and Regulation – Section 3.10</b>	
Is the proposed application of the Local Government Act and regulations to JOs appropriate?	Yes No In-part
What improvements could be made, if any?	Comment

### Other comments

What other comments do you have about the proposed regulations to support JOs?	Comment
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## Appendix B – Local Government Act and JOs – What applies and does not apply

*Note: The table below provides an indication only, please seek your own legal advice. Please also note the effect of section 400ZH(4) of the Local Government Act in relation to excluded provisions which may apply in certain circumstances*

Reference	Subject/s	Applies?
<b>Chapter 1</b>	<b>Preliminary</b>	Yes
	<ul style="list-style-type: none"> <li>• Application to Crown</li> <li>• Geographical application</li> </ul>	
<b>Chapter 2</b>	<b>Purposes of the Act</b>	Yes
<b>Chapter 3</b>	<b>Principles for Local Government</b>	No
	<ul style="list-style-type: none"> <li>• Object of principles</li> <li>• Guiding principles</li> <li>• Financial management</li> <li>• IP&amp;R principles</li> </ul>	
<b>Chapter 4 Part 1</b>	<b>How the community can influence what council does</b>	Yes
	<ul style="list-style-type: none"> <li>• Open meetings</li> <li>• Guidelines from Departmental Chief Executive</li> </ul>	
<b>Chapter 4 Part 3</b>	<b>How the community can influence what council does</b>	No
	<ul style="list-style-type: none"> <li>• Expressions of Community Opinion – council polls and referenda</li> </ul>	
<b>Chapter 5</b>	<b>What are council's functions</b>	Yes
	<ul style="list-style-type: none"> <li>• Functions under this Act</li> <li>• Other functions</li> <li>• Supplementary, incidental and consequential functions</li> <li>• DCE Guidelines</li> </ul>	
<b>Chapter 6 except for Part 3</b>	<b>Service functions of councils</b>	No
	<ul style="list-style-type: none"> <li>• General (provision of goods, services, facilities etc)</li> <li>• Public land</li> <li>• Environmental Upgrade Agreements</li> </ul> <p><i>Note: Part 2A Minister for Environment portfolio</i></p>	
<b>Chapter 6 Part 3</b>	<b>Service functions of councils</b>	Yes
	<ul style="list-style-type: none"> <li>• Restraints and qualifications that apply to service functions including: <ul style="list-style-type: none"> <li>– Tendering</li> <li>– Extension of requirements to council related entities</li> <li>– Water supply, sewerage and stormwater drainage works and facilities</li> <li>– Private works</li> </ul> </li> </ul>	

## Appendix B – Local Government Act and JOs – What applies and does not apply

Reference	Subject/s	Applies?
<b>Chapter 7</b>	<b>Regulatory functions</b>	No
	<ul style="list-style-type: none"> <li>Activities that require approval</li> <li>Crown activities</li> <li>Making and determining applications for approval</li> <li>Approvals for filming</li> <li>Accreditation of components, processes and designs</li> <li>Orders and Local Policies</li> <li>Appeals</li> </ul>	
<b>Chapter 8</b>	<b>Ancillary council functions</b>	No
<b>Part 1</b>	<ul style="list-style-type: none"> <li>Acquisition of land (clause 397N of the Regulation)</li> </ul>	
<b>Chapter 8</b> <b>Part 2</b>	<b>Ancillary council functions</b>	Yes
	<ul style="list-style-type: none"> <li>Entry onto land and other powers</li> </ul>	
<b>Chapter 9 – section 252 (except for 252(2))</b>	<b>How councils are established</b>	Yes
	<ul style="list-style-type: none"> <li>Fees, expenses and facilities</li> </ul>	
<b>Chapter 9 except for section 252</b>	<b>How councils are established</b>	No
	<ul style="list-style-type: none"> <li>Areas – constitution and dissolution, amalgamation and alteration of boundaries</li> <li>Councils – constitution, the mayor, councillors, Local Government Remuneration Tribunal</li> <li>Local Government Boundaries Commission</li> </ul>	
<b>Chapter 10</b>	<b>How people are elected to civic office</b>	No
	<ul style="list-style-type: none"> <li>Who may vote and who may be elected</li> <li>System and timing of elections</li> <li>Filling of casual vacancies</li> <li>How elections are conducted</li> <li>Postponement of elections</li> <li>Political parties and political donations</li> <li>Dismissal from civic office</li> </ul>	
<b>Chapter 11 – sections 335 and 342</b>	<b>How councils are staffed</b>	No
	<ul style="list-style-type: none"> <li>Functions of General Manager</li> <li>Appointment of Public Officer</li> </ul>	
<b>Chapter 11 – sections 348(1) and (2) and 349</b>	<b>Advertising and merit appointments for first executive officers</b>	Modified
	<ul style="list-style-type: none"> <li>A JO may choose not to comply with these provisions in appointing the first executive officer, if the appointment is for less than 12 months. Otherwise the provisions do apply.</li> </ul>	



## Appendix B – Local Government Act and JOs – What applies and does not apply

Reference	Subject/s	Applies?
<b>Chapter 11 – section 354G</b>	<b>Staff transfers</b> <ul style="list-style-type: none"> <li>The application of section 354G is expanded so that it applies to transfers of staff between JOs and councils or county councils.</li> </ul>	Modified
<b>Chapter 11 (except for 335 and 342)</b>	<b>How councils are staffed</b> <ul style="list-style-type: none"> <li>Organisation structure</li> <li>General Manager and other senior staff* (except s.335 – functions of GM)</li> <li>The public officer – functions. While section 342 does not apply to enable appointment, note section 400Y which allows an executive officer to designate another member of staff (if there is any) as public officer</li> <li>Equal Employment Opportunity</li> <li>Other provisions about staffing (including merit, advertising, temporary appointments, restrictions etc)</li> <li>Arrangements for staff affected by amalgamations etc</li> </ul>	Yes
<b>Chapter 12 –sections 355, 365, 370, 371, 375A, 377-380 and Part 5</b>	<b>How councils operate</b> <ul style="list-style-type: none"> <li>How councils exercise functions</li> <li>How often councils meet</li> <li>Voting entitlements of councillors</li> <li>What constitutes a council decision</li> <li>Recording votes on planning matters</li> <li>Delegations <ul style="list-style-type: none"> <li>General power of council to delegate</li> <li>Delegations by the GM</li> <li>Delegations of regulatory functions</li> <li>Review of delegations</li> </ul> </li> <li>County councils</li> </ul>	No
<b>Chapter 12 (except for sections 355, 365, 370, 371, 375A, 377-380 and Part 5)</b>	<b>How councils operate</b> <ul style="list-style-type: none"> <li>Financial assistance to other councils</li> <li>Exercise of functions outside council areas</li> <li>Restrictions on forming corporations and other entities</li> <li>Councils acting as agents</li> <li>Decision making – Code of Meeting Practice</li> <li>Other council meeting requirements except <ul style="list-style-type: none"> <li>How often council meets</li> <li>Voting entitlement of councillors</li> <li>What constitutes a council decision</li> <li>Recording votes on planning matters</li> </ul> </li> <li>Delegation of functions – ONLY: <ul style="list-style-type: none"> <li>Exercise of functions conferred or imposed on council employees under other Acts</li> </ul> </li> <li>Insurance against liability</li> <li>Public private partnerships</li> </ul>	Yes

## Appendix B – Local Government Act and JOs – What applies and does not apply

Reference	Subject/s	Applies?
<b>Chapter 13 – Parts 2 &amp; 4, s.438T, 438ZA and 438ZB</b>	<b>How councils are accountable for their actions</b> <ul style="list-style-type: none"> <li>Strategic planning</li> <li>Annual reports</li> <li>No amalgamations or alterations to area during temporary suspension of council</li> </ul>	No
<b>Chapter 13 – section 406</b>	<b>Statement of strategic regional priorities</b> <ul style="list-style-type: none"> <li>Section 406 applies so that a reference in the section to a community strategic plan is to be read as a statement of strategic regional priorities.</li> </ul>	Modified
<b>Chapter 13 Part 3</b>	<b>First annual report</b> <ul style="list-style-type: none"> <li>The first annual report for a JO is to be prepared for the period that ends at the expiry of the first full year after the JO is established.</li> </ul>	Modified
<b>Chapter 13 (except for Parts 2 &amp; 4, sections 406, 438T, 438ZA and 438ZB)</b>	<b>How councils are accountable for their actions</b> <ul style="list-style-type: none"> <li>Financial management – including funds, accounting records and auditing, other audit functions, auditors</li> <li>Inquiries, reviews and surcharging</li> <li>Performance management – including PIOs, temporary advisers and financial controllers</li> <li>Temporary suspension of council except: <ul style="list-style-type: none"> <li>s.438T – No amalgamations or alterations to area</li> </ul> </li> <li>Public inquiries <ul style="list-style-type: none"> <li>s.438ZA – Ordinary election during suspension period</li> <li>s.438ZB – Election of Mayor during suspension period</li> </ul> </li> <li>Service of ministerial and departmental documents</li> </ul>	Yes
<b>Chapter 14</b>	<b>Honesty and disclosure of interests</b> <ul style="list-style-type: none"> <li>Conduct</li> <li>Serious corrupt conduct</li> <li>Misconduct</li> <li>Duties of disclosure, written returns and meetings</li> <li>Complaints about non-disclosure, investigations and NCAT proceedings</li> <li>Miscellaneous – acts of disorder, recovery of monetary benefits</li> </ul>	Yes
<b>Chapter 15 – Parts 10, 12 and 13 and section 620</b>	<b>How councils are financed</b> <ul style="list-style-type: none"> <li>Council fees for services and activities, certain annual charges</li> <li>Loans and restrictions</li> <li>Investments</li> <li>Minister's grants</li> </ul>	Yes
<b>Chapter 15 (except for Parts 10, 12 and 13 and section 620)</b>	<b>How councils are financed</b> <ul style="list-style-type: none"> <li>Limit of annual income from rates and charges</li> <li>Ordinary rates, charges</li> <li>Making and levying of rates and charges</li> <li>Rateable land</li> <li>Payment of rates and charges, concessions</li> <li>Miscellaneous – records, certificates, expenses, coastal protection service charges, writing off rates, charges, accrued interest</li> <li>Grants [Local Government Grants Commission]</li> </ul>	No

## Appendix B – Local Government Act and JOs – What applies and does not apply

Reference	Subject/s	Applies?
<b>Chapter 16</b>	<b>Offences</b> <ul style="list-style-type: none"> <li>• Failure re approvals and orders</li> <li>• Public places</li> <li>• Water, sewerage and stormwater drainage</li> <li>• Street drinking</li> <li>• Parking, immobilisation and detention of vehicles <ul style="list-style-type: none"> <li>– Acting in civic office while disqualified</li> </ul> </li> <li>• Miscellaneous e.g. obstruction, wilful destruction</li> </ul>	Yes
<b>Chapter 17 – Part 2 Divisions 4 and 5</b>	<b>Enforcement</b> <ul style="list-style-type: none"> <li>• Proceedings by the council or its employees for the recovery of rates and charges through legal action</li> <li>• Sale of land for unpaid rates and charges (proposed by draft regulation)</li> </ul>	No
<b>Chapter 17 (except for Part 2 Divisions 4 and 5)</b>	<b>Enforcement</b> <ul style="list-style-type: none"> <li>• Legal proceedings and other remedies</li> <li>• Proceedings by the council or its employees except: <ul style="list-style-type: none"> <li>• Division 4 – for the recovery of rates and charges</li> </ul> </li> <li>• Proceedings against councils, councillors and staff including liability and exemptions</li> <li>• Miscellaneous except s.736(2) below.</li> </ul>	Yes
<b>Chapter 18 – Section 736(2)</b>	<b>Miscellaneous</b> <ul style="list-style-type: none"> <li>• Proclamations</li> </ul>	No
<b>Chapter 18 (except for Section 736(2))</b>	<b>Miscellaneous</b> <ul style="list-style-type: none"> <li>• General – public hearings, preliminary inquiries, proclamations (except s.736(2)) privacy, correcting errors, notice, record keeping dispute resolution, property in waste, DCE and Ministerial delegation of functions, authorised officers, review of Act</li> <li>• Regulations</li> <li>• Savings transitional and other provisions</li> </ul>	Yes
<b>Schedules 1-5</b>	<ul style="list-style-type: none"> <li>• Local Government Remuneration Tribunal</li> <li>• Boundaries Commission</li> <li>• Project Review Committees (PPPs)</li> <li>• Local Government Grants Commission</li> </ul>	No
<b>Schedules 6-9</b>	<ul style="list-style-type: none"> <li>• Regulations</li> <li>• Code of Conduct</li> <li>• Savings, transitional and consequential provisions – this Act and other Acts</li> <li>• Special provisions for winding up of Cudjoe County Council</li> </ul>	Yes
<b>Dictionary</b>	<b>All terms</b>	Yes

## Appendix C – The Local Government (General) Regulation 2005 – What applies and does not apply to JOs

Clause references		Subject/s	Applies?
Part 1	all	<b>Preliminary</b>	Yes
Part 2	all	<b>Approvals</b>	No
Part 3	all	<b>Orders</b>	No
Part 4	all	<b>Community Land</b>	No
Part 5	all	<b>Rates and charges</b>	No
Part 5A	all	<b>Environmental upgrade agreements</b>	No
Part 6	all	<b>Water services</b>	Yes
Part 7	all	<b>Tendering</b>	Yes
Part 8	all	<b>Honesty and disclosure of interests</b>	Yes
Part 9	clause 201, 217 – 219	<b>Management and accountability</b> <ul style="list-style-type: none"> <li>Annual statement of council's revenue policy</li> <li>Additional matters for annual reports</li> <li>County councils</li> </ul>	No
Part 9	remainder	<b>Management and accountability</b> <ul style="list-style-type: none"> <li>Budgeting by councils including system for budget control and budget review statements/revision of estimates except annual statement of council's revenue policy</li> <li>Council's funds</li> <li>Accounting records and accounting practices</li> <li>Annual financial reports</li> <li>Auditor's matters</li> <li>Half yearly inspection</li> <li>Loans to council to be charge on income</li> <li>General manager to notify borrowings</li> </ul>	Yes
Part 10	clause 235 and 236	<b>Meetings</b> <ul style="list-style-type: none"> <li>Remote attendance at meetings prohibited</li> <li>Councillor elected to preside at certain meetings</li> </ul>	No
Part 10	remainder	<b>Meetings</b> <ul style="list-style-type: none"> <li>Definition of "councillor" will be amended to include a voting representative of a non-voting chairperson of a JO Board, so the Part will apply to them in the same way as to a councillor.</li> <li>Convening of, and attendance at, meetings</li> <li>Procedure for the conduct of council meetings – except councillor to be elected to preside at certain meetings – including: <ul style="list-style-type: none"> <li>Chair to have precedence, Order of business, agendas, meeting papers, extraordinary meetings, motions, official minutes, speeches, voting, meetings are public</li> </ul> </li> <li>Keeping order at meetings</li> <li>Council committees</li> <li>Miscellaneous including inspection of minutes, tape recording requires permission</li> </ul>	Yes
Part 11	all	<b>Elections</b>	No

## Appendix C – The Local Government (General) Regulation 2005 – What applies and does not apply to JOs

Clause references		Subject/s	Applies?
Part 12	all	<b>Penalty notices</b>	Yes
Part 13	division 3, 6 and 11, and clause 404	<b>Miscellaneous</b> <ul style="list-style-type: none"> <li>• Surveys and polls relating to council amalgamations or boundary changes</li> <li>• Payments to councillors</li> <li>• Winding up of Cudgegong (Abattoir) County Council</li> <li>• Functions of general manager</li> </ul>	No
Part 13	Clauses 406A, 406C and 406D	<b>Transfer of staff</b> <ul style="list-style-type: none"> <li>• The relevant provisions concerning staff transfers apply to transfers from JO to JO, JO to councils and councils to JOs.</li> </ul>	Modified
Part 13	remainder	<b>Miscellaneous</b> <ul style="list-style-type: none"> <li>• Council seal</li> <li>• Compulsory acquisition for resale (section 188)</li> <li>• Council staffing matters</li> <li>• Certain exclusions</li> <li>• Bathing control notices (section 633)</li> <li>• Disclosure and misuse of information</li> <li>• Application of certain penalties</li> <li>• Standards of coastal protection services</li> <li>• Performance management criteria and suspension criteria</li> </ul>	Yes
Part 14	all	<b>Savings and transitional provisions</b>	No
Sch. 1-2	all	<b>Standards relating to approvals and enforceable by orders</b>	No
Sch. 3	all	<b>Form of return – disclosure of interest</b>	Yes
Sch. 3A	all	<b>Form of special disclosure of pecuniary interest</b>	Yes
Sch. 4	all	<b>Counting of votes – optional preferential system</b>	No
Sch. 5	all	<b>Counting of votes – proportional system</b>	No
Sch. 7	all	<b>Election of mayor by councillors</b>	No
Sch. 7A	all	<b>Election of chairpersons of joint organisations</b>	Yes
Sch. 8	all	<b>Election of members and chairs – county councils</b>	No
Sch. 10&11	all	<b>Constitutional referendums, council polls, forms</b>	No
Sch. 12	all	<b>Penalty notice offences</b>	Yes



# **Nowra Bridge project**

## Preferred Option Report

Roads and Maritime Services | February 2018







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## Abbreviations

Abbreviation	Definition
AHIMS	Aboriginal Heritage Information Management System
HML	Higher Mass Limit
LEP	Local Environmental Plan
LGA	Local Government Area
LoS	Levels of Service
MHWS	Mean High Water Springs
PACHCI	Roads and Maritime Procedure for Aboriginal Cultural Heritage Consultation and Investigation
PAD	Potential Archaeological Deposit
REF	Review of Environmental Factors
PEI	Preliminary Environmental Investigation
TfNSW	Transport for New South Wales
VKT	Vehicle Kilometres Travelled
VHT	Vehicle Hours Travelled

## Executive summary

The Princes Highway on the NSW south coast is the main road connecting Sydney with the Illawarra, Shoalhaven and other regional centres towards the Victorian border. It serves as the main transport corridor providing freight and passenger movements to and from the Illawarra and South Coast regions, supports south coast tourist travel demand and connects towns on the south coast with Wollongong and Sydney.

The Princes Highway currently crosses the Shoalhaven River at Nowra via two bridges.

- The *southbound 'Whipple' truss bridge* is a mixed cast and wrought iron structure that was opened in 1881. This bridge provides two narrow lanes for southbound traffic with a clip on pathway for pedestrians and cyclists on the downstream side.
- The existing northbound bridge is a concrete box girder structure and was opened in 1981. This bridge has three lanes for northbound traffic, one of which is a dedicated left turn into Illaroo Road. A pathway on the upstream side caters for pedestrians and cyclists.

The two bridges are the only crossings of the Shoalhaven River.

The existing crossings of the Shoalhaven River at Nowra require an upgrade to address the following issues:

- Reduced freight access due to restrictions for higher mass limit (HML) semi-trailers and B-doubles on the old southbound bridge
- Reduced overheight vehicle access due to a height restriction of 4.6 metres on the old southbound bridge
- The old southbound bridge is in poor condition with increasing costs for ongoing maintenance
- Higher than the state average annual crash rates on the Princes Highway between Bolong Road and Bridge Road for the same class of road
- High traffic volumes during peak times leading to congestion between Bolong Road and Bridge Road and the wider network
- Poor intersection performance at Bolong Road, Illaroo Road, Bridge Road and Pleasant Way.

Early investigations concluded the need for a new bridge over the Shoalhaven River. In 2014 the NSW Minister for Roads and Freight announced the preferred location for a new river crossing in Nowra was immediately to the west of the existing Princes Highway river crossings. This announcement was supported by numerous studies and workshops informing the decision making process. These investigations are described in detail in the *Site Options Development Report* (Roads and Maritime, 2014) available on the Roads and Maritime project website. Following this announcement Roads and Maritime focussed on further developing intersection options on either side of the new crossing aimed at addressing traffic congestion and safety.

The future of the old southbound bridge has been the subject of an extensive period of investigation which considered a number of options including its retention and demolition. In 2017 an independent assessment confirmed the old southbound bridge was unsuitable for the current and future operational demands of the Princes Highway and local road network. The assessment also concluded once a new crossing is constructed the old southbound bridge should be closed to vehicular traffic. The independent assessment acknowledged the heritage value of the old bridge and considered the long term life costs and annual maintenance costs to retain the old bridge. It concluded that these costs required to preserve the old southbound bridge were not considered excessive and its social and heritage value outweighed the costs to maintain it.

Investigations carried out by Roads and Maritime identified a total of 39 potential network combinations of bridge and intersection upgrades. The preliminary options generally included:

- At grade intersection upgrades
- Grade separated options
- Relocation of intersections
- Other major network changes such as relocating parts of the Princes Highway.

A subsequent shortlisting process modelled each combination to identify the six best performing options to be taken forward for consideration and further investigation. The options included:

- Option 1: a new four lane bridge with no intersection upgrades
- Option 2: a new three lane bridge with at grade intersection upgrades
- Option 3: a new four lane bridge with at grade intersection upgrades
- Option 4: a new four lane bridge with grade separation on the southern approach
- Option 5: Nowra Bomaderry Structure Plan which includes a new four lane bridge and mix of at grade and grade separated upgrades
- Option 6: a new four lane bridge with grade separation on both approaches.

The options were presented to an Options Assessment Workshop where the participants recommended Option 3 as the preferred option.

The preferred option is considered to be the most balanced proposal as it addresses the objectives of the project, meets the expectations of key stakeholders and the community and ensures that long term planning for the Princes Highway is not compromised while minimising impacts on the surrounding community and environment as much as possible. The preferred option for the Nowra Bridge project includes:

- A new four lane northbound bridge immediately to the west of the existing bridge crossings
- Reconfiguration of the existing northbound concrete bridge to carry three southbound traffic lanes
- Intersection upgrades at Illaroo Road including additional turning lanes
- An upgrade of the Bridge Road intersection to a T-intersection with access to Pleasant Way removed
- A new Pleasant Way intersection further to the south with all turning movements provided
- Additional lanes on the Princes Highway between Bolong Road and Bridge Road
- Keeping the old southbound bridge for adaptive reuse such as a shared pedestrian and cyclist path.

Subsequent traffic modelling studies confirmed that the proposed preferred option provides improved traffic conditions across the network study area beyond the extent of the traffic model at 2046.

Roads and Maritime is seeking community and stakeholder feedback on the preferred option from 19 February 2018 until 23 March 2018. Feedback from this display period will be used to develop the environmental assessment and design of the project. The environmental assessment will be on display later in 2018 for further community and stakeholder feedback.

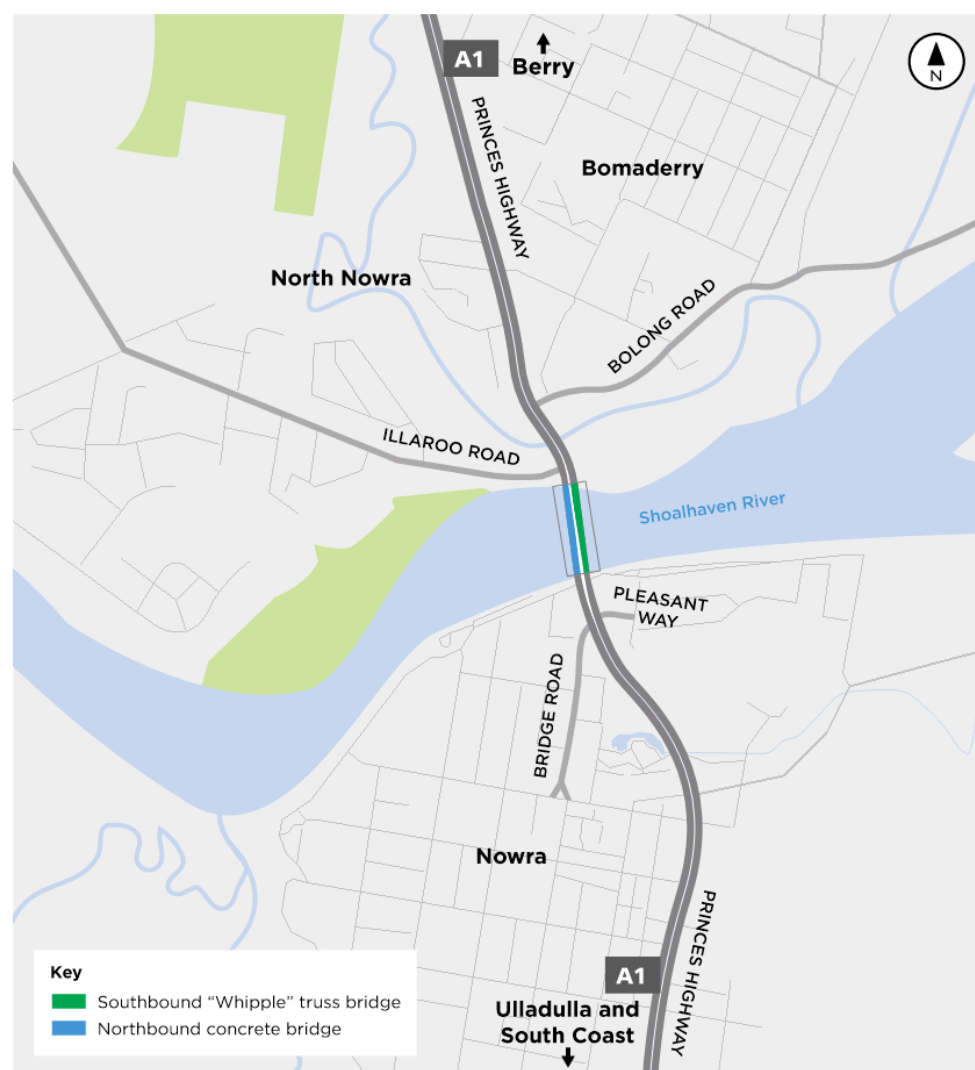
At this stage there is no commitment to funding or timing of construction of the Nowra Bridge project. Roads and Maritime will continue to seek funding wherever it is economically justified.

# 1 Context

## 1.1 Background

The A1 Princes Highway on the NSW south coast is the primary arterial road corridor connecting Sydney with the Illawarra, Shoalhaven and other regional centres towards the Victorian border. It serves as the main transport corridor providing freight and passenger movements to and from the Illawarra and South Coast regions, supports south coast tourist travel demand and connects towns on the south coast with Wollongong and Sydney.

Figure 1.1 Map of Nowra-Bomaderry



The Princes Highway currently crosses the Shoalhaven River at Nowra via two bridges.

- The *southbound 'Whipple' truss bridge* is a mixed cast and wrought iron structure that was opened in 1881. This bridge provides two narrow lanes for southbound traffic with a clip on pathway for pedestrians and cyclists on the downstream side
- The existing *northbound bridge* is a concrete box girder structure and was opened in 1981. This bridge has three lanes for northbound traffic, one of which is a dedicated left turn into Illaroo Road. A pathway on the upstream side caters for pedestrians and cyclists.

The two bridges are the only crossings of the Shoalhaven River.

Early investigations completed by Roads and Maritime concluded the need for a new bridge over the Shoalhaven River. In 2014 the NSW Minister for Roads and Freight announced the preferred location for a new river crossing in Nowra was upstream immediately to the west of the existing Princes Highway river crossings. This announcement was supported by numerous studies and workshops informing the decision making process. These investigations are described in detail in the *Site Options Development Report* (Roads and Maritime, 2014) available on the project website.

**Figure 1.2 The existing Princes Highway crossing of the Shoalhaven River in Nowra**





## 1.2 Need for the project

### 1.2.1 Traffic

The section of the Princes Highway across the Shoalhaven River bridges experiences some of the highest traffic volumes on the NSW south coast with about 50,000 vehicles crossing the river on an average day. The site is a pinch point and the old southbound bridge in particular is constrained by two narrow lanes. The level of service (LoS) is poor during morning and afternoon peak periods with average travel speeds regularly dropping below 20 km/h and queueing extending along both bridges.

Traffic conditions often deteriorate further during holiday periods when the Princes Highway becomes a popular tourist route for the Shoalhaven and surrounding areas on the NSW south coast. There is a clear seasonal increase in traffic over the summer months with daily volumes increasing by up to 50 per cent on public holiday long weekends.

### 1.2.2 Freight

Heavy vehicles and freight are estimated to make up about six per cent of the traffic that crosses the Shoalhaven River on an average day. The 'Whipple' truss design prevents oversized vehicles from using the old southbound bridge. High vehicles may be able to straddle the centre lane lines and travel down the middle of the carriageway to avoid truss members. However many oversized vehicles must be escorted across the river by contra flow on the northbound bridge, which imposes restrictions on the time these vehicles can travel, and also requires traffic control.

The truss structure is also vulnerable to impacts from large heavy vehicles, and routine inspections regularly identify many areas of minor damage to the bridge.

### 1.2.3 Road safety

The casualty crash rate for the southbound bridge across the Shoalhaven River is higher than the state average for the same class of road in an urban commercial environment. The dominant crash types on the old southbound bridge are associated with rear end collisions, mostly as a result of the intersection controls at the approaches to the river crossings. About 10 per cent of all crashes involve a vulnerable road user while crashes associated with vehicles impacting the bridge barriers are also highly represented.

In 2010 a fatal crash occurred at the northern approach to the southbound bridge when a vehicle entered the river after being hit by another vehicle. A similar near miss incident preceded this fatality earlier in the same year.

Road safety audits have identified objects that present themselves as potential safety hazards located in close proximity to the road.

### 1.2.4 Maintenance

The old southbound bridge is more than 135 years old and requires regular maintenance to ensure continued safe operation for the travelling public.

The ongoing maintenance includes work to address corrosion of the wrought and cast iron components, deterioration of the protective paint system, repair of bearings, pier strengthening and repairs to the concrete deck. There is also an accumulation of damage to truss members from the impact of vehicles. The southbound bridge remains capable of carrying the current legal loads that are allowed to use the bridge, but with a factor of safety slightly less than the design code requirements which is not unusual for a bridge of this age.

The necessary maintenance and inspection works are becoming increasingly difficult to undertake during the day without introducing extensive queues and delays to the Princes Highway and the surrounding local road network. More costly options to undertake maintenance work at night will be required and this is expected to increase over time.



### 1.3 Project objectives

The Nowra Bridge project has been developed to address the above project needs and improve conditions on the Princes Highway over the Shoalhaven River at Nowra.

The objectives for the project are:

- To provide southbound access for over height vehicles and HML freight on the Princes Highway across the Shoalhaven River
- To enable safe and efficient maintenance activities on the Shoalhaven River crossings without causing extended delays to the road network
- To reduce crash rates on the Princes Highway between Bolong Road and Bridge Road
- To support future traffic growth accessing the Princes Highway associated with planned land use in the Nowra Bomaderry area
- To reduce delays and queuing on the Princes Highway between Bolong Road and Bridge Street.

These objectives relate to the function of the project. Roads and Maritime also places a high priority on achieving quality project outcomes from a safety, environmental, community and value for money perspective.

### 1.4 Purpose of this report

The purpose of this report is to document the decision making processes used to arrive at the preferred options of the Nowra Bridge project.

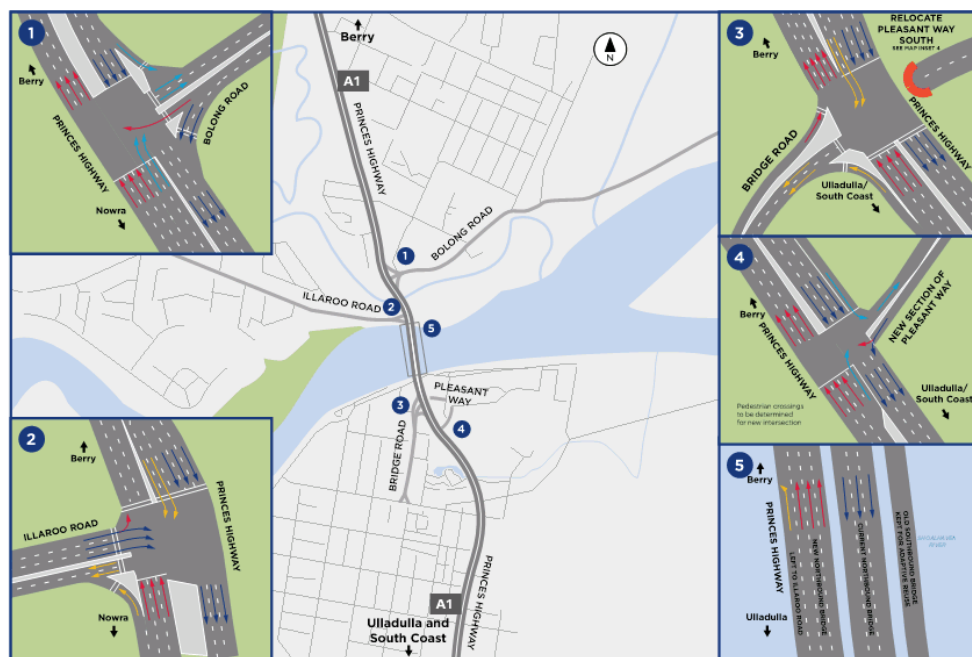
It includes the identification, consideration and assessment of a number of options for the future of the old southbound bridge, lane capacity requirements for a new bridge and configurations for intersection upgrades.

## 1.5 Preferred option

The preferred option is shown in Figure 1.4 and consists of:

- A new four lane northbound bridge immediately to the west of the existing bridge crossings
- Reconfiguration of the existing northbound concrete bridge to carry three southbound traffic lanes
- Intersection upgrades at Illaroo Road including additional turning lanes
- An upgrade of the Bridge Road intersection to a T-intersection with access to Pleasant Way removed
- A new Pleasant Way intersection further to the south with all turning movements provided
- Additional lanes on the Princes Highway
- Keeping the old southbound bridge for adaptive reuse such as a shared pedestrian and cyclist path.

Figure 1.4 Preferred option for the Nowra Bridge project



## 2 Future of the old southbound bridge

In order to progress the preferred option a decision about the future of the old southbound bridge was needed. Since the announcement of the preferred location for a new bridge in 2014, the future of the old southbound bridge has been the subject of an extensive period of investigations. A number of options to retain or demolish the bridge have been considered.

There have been multiple reviews by internal and independent external experts into:

- The heritage significance of the old southbound bridge and Roads and Maritime Services obligations under the Heritage Act
- The expectations of the community and stakeholders
- The anticipated maintenance activities and costs necessary to retain the old southbound bridge in its current location
- The estimated costs associated with any demolition or relocation activities.

### 2.1 Options considered

Roads and Maritime has considered a wide range of options for the future of the old southbound 'Whipple' truss bridge. These options have included:

- **Retain and maintain options** – These options would see the bridge remain in place and Roads and Maritime would continue to maintain it to a standard that would ensure structural integrity and that would satisfy heritage requirements. Such options could involve adaptive re-use or closure of the bridge to public access
- **Retain and transfer options** – These options would also see the bridge remain in place and Roads and Maritime could seek to transfer responsibility for the asset to another party

- **Partial demolition options** – These options would involve demolition of the bridge except for one or both of the spans immediately adjacent the shorelines. Such options could allow public access to the shoreline span(s)
- **Partial demolition options with relocation of spans** – These options would involve demolition of the bridge with one or more of the central spans relocated within the local area for posterity. One or both of the spans immediately adjacent the shorelines would be retained and could be accessible to the public
- **Full demolition options with relocation of spans** – These options would involve demolition of the bridge with one or more of the central spans relocated within the local area for posterity
- **Full demolition** – This option would involve complete removal of the entire bridge
- **Deferral or 'mothballing'** – In the absence of an identified preferred option, deferral of the decision or 'mothballing' could be a temporary measure until a longer term decision is made.

### 2.2 Considerations

#### 2.2.1 Heritage

The old southbound bridge is one of only three known American pin-jointed 'Whipple' trusses in Australia. It is the only one that is still intact in New South Wales and is the only one in the country that has historically been used for road traffic.

The bridge pre-dates by about a decade the popularisation of the majority of metal truss forms in the 1890's, making it a particularly early, rare and significant example of a technological innovation that had been previously untested in Australia. The bridge also symbolically demonstrates the movement at the time towards a less conservative approach to infrastructure within the Colonial Government, moving away from the traditional British construction methods that had been adopted previously.

Referring to the NSW Heritage Assessment Criteria, if an item meets one of the seven heritage criteria below and retains the integrity of its key attributes, it can be considered to have heritage significance (either Local or State). Table 2.1 summarises the most recent significance assessment from heritage specialists.

**Table 2.1 Assessment of significance of the old southbound 'Whipple' truss bridge**

NSW Heritage Assessment Criteria	Assessed Significance
<b>A Historical Significance</b> An item is important in the course or pattern of the local area's cultural or natural history.	STATE
<b>B Associative Significance</b> An item has strong or special associations with the life or works of a person, or group of persons, of importance in the local area's cultural or natural history.	STATE
<b>C Aesthetic Significance</b> An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in the local area.	LOCAL
<b>D Social Significance</b> An item has strong or special association with a particular community or cultural group in the local area for social, cultural or spiritual reasons.	LOCAL
<b>E Research Potential</b> An item has potential to yield information that will contribute to an understanding of the local area's cultural or natural history.	STATE
<b>F Rarity</b> An item possesses uncommon, rare or endangered aspects of the local area's cultural or natural history.	STATE
<b>G Representativeness</b> An item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places of cultural or natural environments (or the cultural or natural history of the local area).	STATE

Overall the independent assessment of the bridge against the above criteria identified that it has significance for its historic value, its landmark aesthetic qualities, its ability to contribute to research questions relating to the construction of 'Whipple' truss bridges in Australia, its rarity, and its representativeness.

The bridge is currently listed on the Roads and Maritime S170 Register. Under Section 170A of the Heritage Act government instrumentalities are responsible for ensuring that the items entered on their registers under Section 170 that are under their care, control or management are maintained in accordance with State Owned Heritage Management Principles. These Principles state that management of redundant heritage assets should be planned and executed so as to conserve the item's heritage significance.

Heritage specialists have advised that the best outcome for the bridge from a heritage perspective would be "retention and adaptive re-use with heritage interpretation"; this would at least retain its aesthetic and technical significance.

### 2.2.2 Estimated costs

Estimating the costs associated with each of the different options was complex. Options to retain all or parts of the old southbound bridge required assumptions around the necessary activities and methods required to maintain it to a standard that would ensure structural integrity and that would satisfy heritage requirements.

#### Retention options

The assumed maintenance activities were based on the results of the most recent available Roads and Maritime inspection and assessment reports, as well as the findings of multiple independent reviews by external specialists.

Activities considered necessary to maintain the old southbound bridge for adaptive re-use would require:

- Repainting of all truss elements
- Tightening or replacement of any loose, damaged or corroded truss elements
- Inspection and maintenance or replacement of pin joints
- Removal and replacement of the deck attachment system
- Maintenance of expansion bearings
- Pier strengthening
- Remediation of footings.

Historically the annual maintenance costs for the old bridge have been substantial in the order of about \$770,000 each year since 2008. It has been estimated that should the old bridge remain in its current location the total maintenance cost necessary over the next 50 years would be in the order of \$35 million.

#### Demolition options

It is anticipated that demolition of the old bridge would be a complex activity. A general methodology for demolition would include:

- Removing any heavy components such as the deck and some supporting structures which do not impact on the structural integrity of the truss itself
- Removal of other non-structural components such as utilities and footways by truck or barge
- Demolition of the truss either by removal as a complete unit using cranes and barges, or by dismantling after supporting the truss via temporary structures
- Archiving and recording heritage aspects of the bridge as it is demolished or dismantled.

The option to demolish the bridge has been estimated to cost approximately \$18 million.

### 2.2.3 Community and stakeholder response

During late 2014 Roads and Maritime spoke to the community about the future of the old southbound bridge. As part of the consultation activities Roads and Maritime:

- Spoke to over 1,850 people at pop up kiosks in Stocklands Nowra, at the Shoalhaven River Festival and at two information sessions
- Received 38 email or mailed submissions
- Received around 676 online survey submissions
- Received six suggestions on Facebook.

The results of the community engagement activities indicated strong support for retaining the old southbound 'Whipple' truss bridge due to its engineering heritage and community value. Conversations with the community, written submissions and feedback from an online survey showed an overwhelming response to retain the old bridge in some form. There was a small proportion of the community that wanted to see the old bridge removed completely and money instead spent on other projects in the region.

Written submissions were received from Office of Environment and Heritage (OEH), National Trust of Australia, and Engineers Australia. All of these bodies referred to the historic significance of the old bridge and voiced their opposition to any options that would see it demolished or relocated.

More information on the outcomes of this consultation can be found in the *Nowra Bridge Project Consultation Summary* (May 2015) available on the project website.

#### **2.2.4 Independent assessment of options**

Roads and Maritime engaged an independent specialist to review all investigations completed to date relating to the future of the old southbound bridge. The independent assessment has confirmed the Roads and Maritime position that the old southbound bridge is operationally unsuitable for the current and future demands of the Princes Highway, and that once a new bridge crossing is constructed the old bridge should then be closed to vehicular traffic.

The independent assessment gives substantial weight to the heritage value and considers the community impacts of any option to remove the old southbound bridge. It also considers adaptive reuse to be viable in the medium term and does not consider the long term life costs and annual maintenance cost to be excessive in order to preserve the social and heritage value of the old southbound bridge.

### **2.3 Preferred option for the old southbound bridge**

After consideration of both internal and independent assessments Roads and Maritime supports an option to retain the old southbound bridge for adaptive reuse. In doing so Roads and Maritime proposes:

- The old southbound bridge be retained and maintained for adaptive reuse, such as a pedestrian and cyclist path, but be closed to vehicular traffic
- The design for a new bridge should cater for pedestrian and cyclists as the old southbound bridge may not be a reliable alternative indefinitely
- The old southbound bridge should continue to be inspected annually or at such times deemed necessary to assess the ongoing viability of retention of the structure into the future
- The estimated costs associated with restoring the old southbound bridge as per the requirements of the Heritage Act should be included as part of the Nowra Bridge project.



## 3 Intersection options identification

With three intersections and many potential network changes available, the development and short listing of options for the new bridge and intersection upgrades was complex. Options ranged from upgrading existing intersections, to the grade separation of intersections involving various forms of flyovers and overpasses. Some options also considered relocating intersections at different locations on the network. Given that the old southbound bridge would no longer be relied upon for vehicular traffic, the number of lanes for the new bridge would need to be sufficient to cater for future traffic growth.

Further, the intersections of the Princes Highway with Bolong Road, Illaroo Road, Bridge Road and Pleasant Way currently experience traffic congestion. High traffic volumes and insufficient capacity at intersections is creating congestion. It is appropriate that the Nowra Bridge project propose upgrades to the approach intersections.

### 3.1 Preliminary option identification

The preliminary identification of options was developed by reviewing the existing traffic volumes and performance of the intersections at Bolong Road, Illaroo Road, Bridge Road and Pleasant Way. Existing planning studies for the area were reviewed and key stakeholders such as Shoalhaven City Council were consulted.

The preliminary options generally included:

- At grade intersection upgrades
- Grade separated options
- Relocation of intersections
- Other major network changes such as relocating parts of the Princes Highway.

A total of 19 different options and sub options were identified resulting in about 39 possible network combinations for consideration.

The preliminary list of options was reviewed by Roads and Maritime Services and Shoalhaven City Council to identify the potential benefits and impacts associated with each option as well identify the assessment criteria to be used in subsequent options evaluation process.

### 3.2 Intersection options shortlisting

In order to reduce the number of options for wider assessment, a shortlisting process was carried out by specialists from Roads and Maritime and Shoalhaven City Council.

Due to the number of intersection option combinations, traffic modelling was an important tool used to assess the shortlisting process by testing combinations of intersections across the project study area. This traffic modelling was the first of many modelling exercises completed to help identify the preferred option for the Nowra Bridge project.

The traffic modelling used the latest 2014 traffic data from origin destination surveys and intersection counts. Forecast traffic growth was estimated at 2.7% compounding at five year intervals up to 2039. This growth rate was considered an upper limit and was adopted at the time to assess the impact of substantial increases in development planned within the area over a compressed time period and was consistent with modelling completed for neighbouring Princes Highway projects.

Many combinations of intersection arrangements were modelled. The outcome of this assessment was that some combinations of grade separated options were found to perform poorly as they created weaving and merging traffic movements that were inefficient and not safe.

This was specifically an issue for a northern grade separated option combined with at grade solutions on the southern side and a four lane northbound bridge. Although this option provided benefits on the local road network, it introduced additional congestion on the Princes Highway. As a result this option was not considered as a standalone shortlisted option.

The results of the traffic modelling provided a shortlist of the six best possible intersection option combinations.

### 3.3 Intersection shortlisted options

The shortlisted intersection options for the Nowra Bridge project were:

**Table 3.1 Shortlisted options**

Option	Description
Base Case	Existing network
Option 1	New four lane bridge, no intersection upgrades
Option 2	New three lane bridge, at grade intersection upgrades
Option 3	New four lane bridge, at grade intersection upgrades
Option 4	New four lane bridge, grade separation on southern approach
Option 5	Nowra Bomaderry Structure Plan which includes a new four lane bridge and mix of at grade and grade separated upgrades
Option 6	New four lane bridge, grade separation on both approaches



Figure 3.1 Shortlisted intersection options



Option 3 initially included access to Pleasant Way.

## 4 Intersection options assessment

This section outlines the process used to assess the shortlisted intersection options to confirm the preferred option for the Nowra Bridge project.

### 4.1 Intersection option considerations

As part of the assessment process, criteria considered to be the most influential for choosing a preferred intersection option were identified. The chosen criteria related to the Nowra Bridge project objectives including:

- Potential traffic efficiency improvements:
  - Travel time on the Princes Highway
  - Reduced delay on local roads.

The chosen criteria which best enabled differentiation between options included:

- Potential impacts:
  - Heritage impacts
  - Environmental impacts
  - Impacts on residential property owners
  - Impacts on other sensitive property or future land use
  - Work health and safety and whole of life maintenance.

#### 4.1.1 Traffic modelling

Traffic modelling<sup>1</sup> of the shortlisted options shown in Figure 3.1 was completed using the same methodology discussed in Section 3.2.

A key finding from the modelling was at grade intersection upgrades could perform satisfactorily for about 20 years before any grade separation might be necessary, but only if the new bridge was built with four northbound lanes.

The traffic modelling suggested that Option 1 does not perform well and that some form of treatment is required at the intersections (a new bridge alone would not provide long term traffic improvements).

The key findings of the traffic modelling were:

- The performance of the existing network is poor. There is insufficient capacity in the right turn into Bridge Road from the Princes Highway in the morning peak period. This results in queues extending up the Princes Highway and affects the Illaroo Road intersection
- Providing a new three lane northbound bridge without upgrades to the Bridge Road and Illaroo Road intersections results in minimal improvements. These results do not improve if an additional northbound lane is provided on the new bridge
- Providing intersection upgrades and a three lane northbound bridge performs well in the short and medium term
- Intersection upgrades and a four lane northbound bridge improves performance into the long term
- Grade separated options perform only marginally better than the best performing at-grade option
- Some grade separated options introduce weave, merge or queuing issues that don't currently exist.

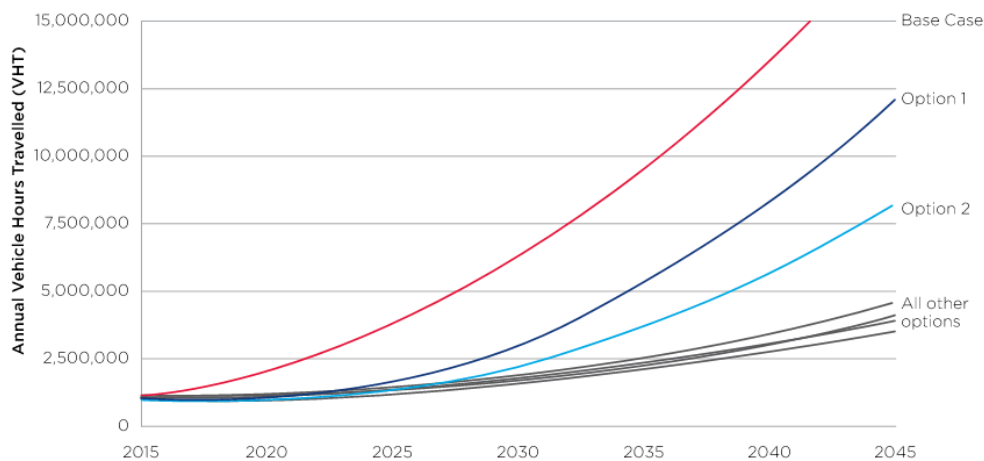
#### 4.1.2 Other impacts

While the traffic modelling generally identified potential benefits of each option compared to the existing network, other criteria were considered that did not provide differentiation between the options included:

- Road safety
- Design
- Urban design including access to the waterfront and pedestrian connectivity
- Utility relocation.

<sup>1</sup> The traffic modelling at this stage adopted a conservative growth rate to be consistent with the Regional TRACKS model and other traffic modelling completed for Princes Highway projects in the area. Subsequent traffic modelling later tested the sensitivity of results to lower growth rates, as described in Section 4.3.1.

Figure 4.1 Network delay (VHT) for shortlisted options at 2.7% growth per annum, 2015–2045



The criteria that helped provide differentiation between the options included:

- Heritage impacts
- Environmental impacts
- Impacts on residential property owners
- Impacts on other sensitive property or future land use
- Work health safety and whole of life maintenance.

#### Heritage

At the time of the options assessment no specific items of archaeological significance had been identified during searches of the Aboriginal Heritage Information Management System (AHIMS). The area was recognised as having a high potential of Aboriginal heritage however it was considered that any impacts would likely be common to all options.

Non-Aboriginal heritage listed items were identified in different locations within the study area (both local and state heritage). Buildings such as Graham Lodge which has state heritage listing is likely to be impacted by grade separated options on the southern side of the river.

#### Biodiversity and Environment

An area of high conservation value was identified to the north of Bolong Road, with potential conservation value identified along creek line vegetation near Bomaderry Creek.

#### Property and land use

Impacts on property were considered likely across all options however it was recognised these would be different for each option. Options involving grade separation to the north were considered likely to impact existing residential properties, businesses and farmland, while options involving grade separation to the south were considered likely to impact businesses and land identified by Shoalhaven City Council as having the potential to develop in the future.

## 4.2 Multi criteria assessment

A multi-criteria assessment process was adopted to evaluate the shortlisted intersection options. An *Options Assessment Workshop* was held on 20 November 2015 and involved the following:

- A review of available information
- Agreement of assessment criteria
- Identification of any 'fatal flaws' that could exclude a particular option
- Assessment using a qualitative performance matrix process.

### 4.2.1 Option assessment criteria

The assessment criteria were adopted from the considerations outlined in section 4.1.

The following assessment criteria were proposed and agreed by the workshop participants:

- Travel time on the Princes Highway
- Reduced delay on local roads (network VHT)
- Heritage
- Environmental impacts
- Impacts on residential property owners
- Impacts on other sensitive property or future land use
- Work health safety and whole of life maintenance.

### 4.2.2 Assessment approach

The assessment approach proposed and agreed to by the workshop participants included rating each of the shortlisted options relative to the others. No weightings were applied to the assessment criteria.

### 4.2.3 Assessment outcomes

Based on the agreed assessment criteria the workshop participants collectively rated each of the shortlisted options as shown in Table 4.1.

**Table 4.1 Performance matrix for multi criteria assessment**

Option	Highway travel time	Network VHT	Heritage	Environment	Residential Property	Property and land use	Maintenance
Option 1	Not assessed due to poor traffic performance						
Option 2							
Option 3	✓	✓	✓✓	✓	✗	✓✓	✓
Option 4	✓✓	✓✓	✓	✗	✗	✗	✗
Option 5	✓✓	✓✓	✗✗	✗✗	✗	✗✗	✗✗
Option 6	✓✓	✓✓	✗	✗	✗	✗✗	✗✗
Key	✓✓ = Better, ✓=Good, ✗ = Poor, ✗✗=Worst						

Based on the results of the multi criteria assessment, Option 3 was considered the preferred option as it best balances the benefits with potential impacts.

## 4.3 Confirmation of preferred option

### 4.3.1 Preliminary design review

Once the preferred option was identified a series of design review were completed to further test the feasibility of the option. These reviews included a series of workshops to assess possible design issues and consulting with key stakeholders. As a result a number of features were identified for consideration and included:

- The likely need for a new bridge structure on the Princes Highway over Bomaderry Creek
- The likely need to relocate the Bridge Road intersection slightly to the south
- The likely need to relocate Pleasant Way as a result of the changes to the Bridge Road intersection.

### 4.3.2 Traffic efficiency review

Further modelling was undertaken of Option 3 to confirm its robustness by challenging a number of assumptions of the earlier traffic modelling.

Specifically the new traffic modelling was used:

- To test a less conservative traffic growth rate of 1.7 per cent
- To incorporate pedestrian phases at all intersections
- To test the relocation of the Pleasant Way intersection.

### Growth rate

Traffic modelling in the early stages of project development adopted a conservative growth rate of 2.7% to assess the impact of substantial increases in development planned within the study area over a compressed time period.

Further analysis of historical data for annual traffic volumes suggests the growth rate has been lower over the last two decades. It was therefore appropriate to test the impact of a lower growth rate. Roads and Maritime adopted a 1.7% growth rate for further analysis based on the latest traffic volumes and growth rates in the recently published *Princes Highway Corridor Strategy*.

### Pedestrian phases

Early modelling did not include pedestrian phases in the traffic light timings at each intersection. Given the long crossing lengths at some intersections it is appropriate that any impacts as a result of pedestrian phases should be tested.

### Relocation of intersections

During the identification and reviews of intersection options, potential benefits of relocating the Bridge Road intersection further to the south was identified. This change would result in turning movements into Pleasant Way problematic. To address this, a new Pleasant Way T-intersection further to the south was suggested.

**The results of the modelling review indicated:**

- The preferred option layout with a three lane bridge would reach the end of its design life in about 2031. By 2036 it would operate at a lower level of performance compared to current conditions
- The preferred option with a four lane bridge provides substantially improved performance and performs at an improved level compared to current conditions up to and beyond the 30 year project forecast.

The travel time benefits of the preferred option over time when compared to the existing arrangement are shown in Table 4.2 and indicate a travel time saving of up to six minutes in 2036.

**Table 4.2 Average time saved by people travelling in the study area**

Year	Morning weekday peak period	Afternoon weekday peak period
2026	Around three minutes	Around three minutes
2036	Four and a half minutes	Over six minutes
2046	Close to six minutes	Over six and a half minutes

**Figure 4.2** and **Figure 4.3** show the comparison of the peak hour performance of the preferred option against the current traffic conditions. It also shows a comparison of an upgraded three lane bridge performance against the current layout. This indicates that under the preferred option (Option 3), traffic conditions usually experienced in the morning and afternoon peaks would not be reached within the 30 year project forecast.

**Figure 4.2 Average morning peak travel times for at grade intersection upgrade options, 2015–2045**

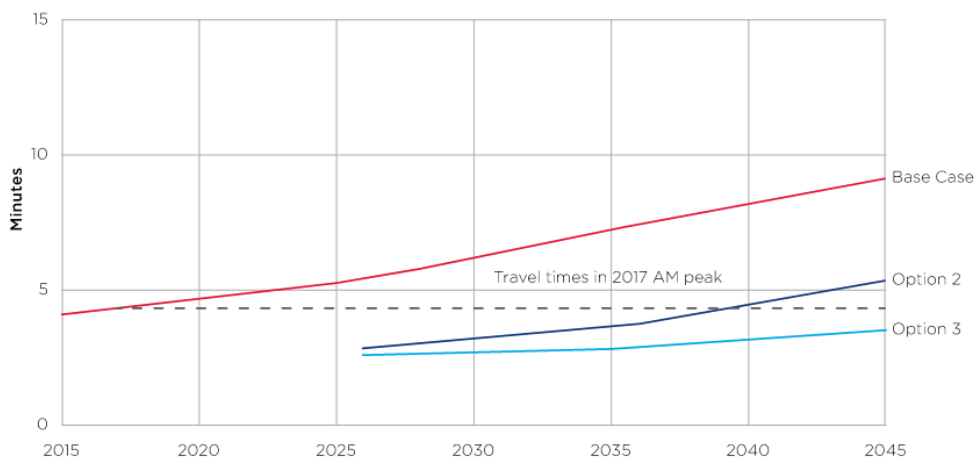
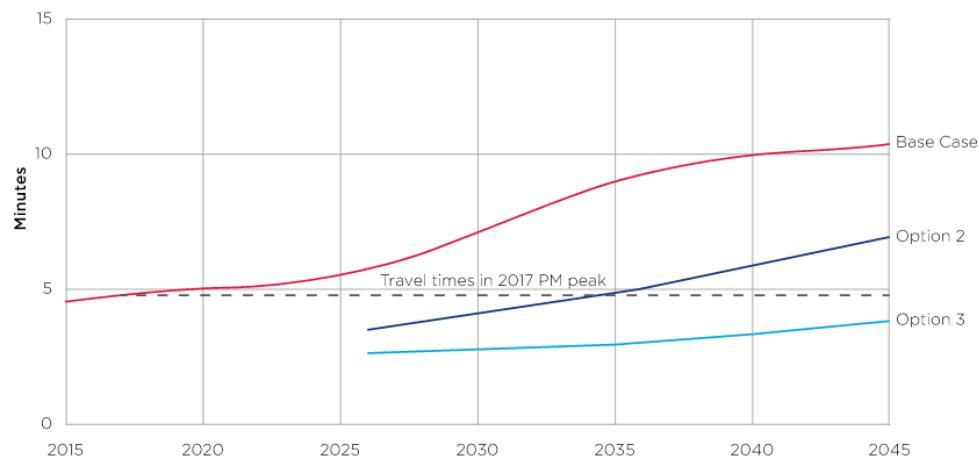


Figure 4.3 Average afternoon travel times for at grade intersection upgrade options, 2015-2045



Please note travel time results are shown as an average time saved by people travelling within the study area.

#### 4.3.3 Constructability review

Roads and Maritime had previously identified possible issues during construction of any option at this location.

This is mainly due to the high traffic volumes accessing the area and the need ensure locals roads such as Illaroo Road can remain open to traffic during construction. Providing adequate space for site offices and ancillary sites for storage of equipment and materials was also an important consideration.

As such, Roads and Maritime engaged an independent construction specialist to carry out a review of the preferred option.

Specifically Roads and Maritime wanted to independently review and confirm:

- Traffic could be suitably managed during construction
- Work could be carried out safely during construction
- Potential property requirements and impacts.

As part of this review Roads and Maritime also considered:

- Bridge construction methods
- The extent of utilities within the area.

The review confirmed while there would be challenges during construction of the preferred option, there are no constructability issues which would prevent the preferred option from being built.

#### 4.4 Conclusion

The results of the multi-criteria options assessment process discussed in Section 4 selected Option 3 as the preferred option.

Subsequent constructability and traffic efficiency reviews confirmed that the proposed preferred option is feasible and can provide improved traffic conditions across the network study area beyond the extent of the traffic model at 2046.



## 5 Preferred option

The preferred option is considered to be the most balanced proposal as it addresses the objectives of the project, meets the expectations of key stakeholders and the community and ensures that long term planning for the Princes Highway is not compromised while minimising impacts on the surrounding community and environment as much as possible.

The preferred option for the Nowra Bridge project includes:

- A new four lane northbound bridge immediately to the west of the existing bridge crossings
- Reconfiguration of the existing northbound concrete bridge to carry three southbound traffic lanes
- Intersection upgrades at Illaroo Road including additional turning lanes
- An upgrade of the Bridge Road intersection to a T-intersection with access to Pleasant Way removed
- A new Pleasant Way intersection further to the south with all turning movements provided
- Additional lanes on the Princes Highway between Bolong Road and Bridge Road
- Keeping the old southbound bridge for adaptive reuse such as a shared pedestrian and cyclist path.

The preferred option would:

- Improve safety, capacity and efficiency across the Shoalhaven River at Nowra
- Improve freight movements and access to the South Coast of NSW
- Improve travel times by up to around six minutes by 2036
- Improve pedestrian connectivity and access to the foreshore
- Preserve the heritage of the old southbound bridge
- Provide infrastructure for the future.



## 6 Next steps

### 6.1 Actions following the options assessment workshop

Roads and Maritime is progressing work on the concept design for the Nowra Bridge project and preparing the environmental assessment for the project. This will be on display later in 2018 for community and stakeholder feedback. We will continue to keep the community and stakeholders updated as the project progresses.

### 6.2 Preferred option

Roads and Maritime is seeking community and stakeholder feedback on the preferred option from **Monday 19 February 2018** until **Friday 23 March 2018**. Feedback from this display period will be used to develop the environmental assessment and design of the new bridge.

### 6.3 Meet the project team

We invite you to meet the project team, provide feedback and understand more about the preferred option. The project team will be at the following locations:

#### **Stocklands Nowra**

Thursday 1 and Saturday 3 March 2018  
11am to 3pm  
60 East Street, Nowra




#### **North Nowra Shops**

Thursday 8 and Saturday 10 March 2018  
11am to 3pm  
1-13 McMahons Road, North Nowra

#### **Nowra School of Arts Annex**

Saturday 17 March 2018  
10am to 1pm  
Berry Street, Nowra



 [rms.nsw.gov.au/nowrabridge](https://rms.nsw.gov.au/nowrabridge)  
 1800 331 713 (toll free)  
 Customer feedback  
Roads and Maritime  
Locked Bag 928,  
North Sydney NSW 2059

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## **Shoalhaven Water Reclamation Annual Report 2016-17**



**Irrigated Dairy Farm - Terara**



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## HIGHLIGHTS & SUMMARY

- Shoalhaven City Council is involved in water reclamation schemes at most of its thirteen wastewater treatment plants involving re-use on 31 properties.
- The largest scheme is the Northern Shoalhaven Reclaimed Water Management Scheme (REMS) involving four wastewater treatment plants and re-use on 23 properties.
- During 2016/17 approximately 1,620ML of reclaimed water was beneficially re-used from all schemes in the Shoalhaven, 18% of all reclaimed water produced.
- The REMS Stage 1A entered its sixteenth year of operation with 45% of scheme output beneficially re-used with the surplus released to Penguin Head. This percentage is below the long-term average rate of re-use for the scheme due to the high rainfall experienced at the beginning and end of the irrigation season.
- There was approximately 350ML of the REMS water recycled for dairy yard wash down in 2016/17, replacing previous usage of potable water for this purpose.
- Each of the water reclamation schemes met its water quality targets with respect to disinfection of reclaimed water.
- Approximately 2,850 tonnes of processed, dewatered biosolids were applied to farmland during 2016/17 in accordance with NSW Government environmental guidelines.
- Environmental monitoring undertaken as part of the REMS, Shoalhaven Heads, Ulladulla and Conjola sewerage schemes found no significant adverse outcomes.
- Construction is underway for REMS stage 1B including the upgrade of Nowra and Bomaderry wastewater treatment plants and their integration into the REMS distribution system.
- Designs are progressing to increase disinfection performance at the Callala, Culburra and Vincentia WwTPs in line with current water recycling guidelines.

## 1.0 SUSTAINABLE WATER RECLAMATION

### 1.1 Objectives of Water Reclamation Schemes

Shoalhaven City Council is committed to promoting the beneficial use of treated wastewater (reclaimed water) and the solids removed during the treatment process (bio-solids). Water reclamation schemes such as the Northern Shoalhaven Reclaimed Water Management Scheme (REMS) can promote sustainable development by:

- protecting the environment;
- reducing demand for potable water supplies ;
- promoting local economic development;
- directly involving the community in water conservation.

In the Shoalhaven, water reclamation projects involve a partnership between Council (supplier) and end-users such as farms, golf courses and sports grounds. For each reclamation project, Council has established procedures to ensure the water recycling activity complies with NSW and Commonwealth guidelines. The aims of water reclamation schemes are to:

- *Safeguard Public Health* – Reclaimed water is highly treated and disinfected to protect people who may come in contact with it and is regularly tested to ensure it meets relevant standards. In the Shoalhaven, reclaimed water typically receives tertiary treatment. The REMS and Sussex Inlet schemes also provide chlorine disinfection. Additional on-site disinfection can be provided where there is a higher risk of public contact. Irrigation properties manage applications to prevent accidental contact by workers and the public by irrigating at night-time where practicable.
- *Reduce impacts on Surface and Ground Water* – Water reclamation schemes such as the REMS can help reduce the volume of reclaimed water discharged to the environment. Residual compounds in reclaimed water such as nitrogen and phosphorus can be detrimental to waterways but are a valuable resource for plant uptake if recycled onto land.
- *Protect The Local Environment* – Water reclamation projects must take into account any constraints in the local area such as poor soils and proximity to other residents or sensitive environments. These are generally addressed in the planning phase.
- *Optimise Resource Use* – Water reclamation schemes aim to improve resource use by recycling a valuable product. Water reclamation is increasingly being examined as a means of reducing demand on potable water supplies by being used in instances where non-potable water use is appropriate.
- *Be Affordable* – Council has limited resources and must look critically at the cost-effectiveness of any proposal for water reclamation projects. This includes consideration of capital and operating costs, environmental benefits and other resources savings.
- *Be Acceptable to the Community* - The Shoalhaven community was extensively involved in the development of the REMS. As Council considers new



applications for reclaimed water, such as residential supply, it is important to consult the community and stakeholder groups on these new applications.

- *Potable Water Substitution* - Reclaimed water is increasingly being seen as one means to reduce demand on potable water supplies. For example, in the REMS, farms are recycling up to 1,000kL of reclaimed water per day for cleaning stock yards where previously potable water was used. Proposals for supply for stock drinking water and a residential dual supply scheme would further reduce demand on potable supplies.

A Reclaimed Water Policy (refer Appendix A) has been developed to guide the design and operation of Council water reclamation schemes.

## 2.0 EXISTING RECLAMATION SCHEMES

### 2.1 REMS Stage 1A

The REMS is one of the largest and more complex water recycling schemes undertaken by a regional water authority (refer scheme map - Figure A.1). Construction was jointly funded by Shoalhaven City Council, the NSW and Commonwealth Governments and individual irrigators. REMS Stage 1A, costing \$34m, was commissioned in January 2002. Fourteen dairy farms, a golf course and several sporting grounds irrigate with reclaimed water from the scheme on well over 500 hectares of land (refer to Appendix Table A.1 for a list of participating land managers). The scheme components are:

**Coonemia Bulk Storage** – The bulk storage facility has a capacity of 600ML for storage of wet weather flows for subsequent re-use in dry periods. The storage holds the equivalent of 12,000 average family swimming pools or 600 Olympic sized swimming pools.



*REMS Bulk Storage*

**Bulk Storage Return Pump Station** – The reclaimed water pumping station and chlorination facility at the Coonemia Bulk Storage draws water from the bulk storage to supply the distribution system when demand exceeds supply from the treatment plants.

**Coonemia Distribution Storage Reservoir** – The 4ML reservoir balances flows pumped from treatment plants to end-users and maintains a constant water pressure in the distribution system.

**Vincentia Wastewater Treatment Plant** – As part of the REMS Stage 1A, the plant capacity was increased and treatment processes upgraded to produce tertiary treated reclaimed water for supply into the REMS. Tertiary treatment is achieved through sand filtration and chlorination.

**Culburra Beach Wastewater Treatment Plant** – As part of the REMS Stage 1A, the plant capacity was increased and treatment processes upgraded to produce tertiary treated reclaimed water for connection to the REMS. Tertiary treatment is achieved through sand filtration and chlorination.

**Callala Wastewater Treatment Plant** – The Callala WwTP was commissioned in 1999 and was purpose built to provide tertiary treated reclaimed water into the REMS. Tertiary treatment is achieved through sand filtration and chlorination.



*Tertiary Filters Callala WwTP*

**St Georges Basin Wastewater Treatment Plant** – This plant produces secondary treated reclaimed water using extended aeration before being pumped to the Vincentia WwTP for tertiary treatment. The plant provides supply directly to the St Georges Basin Country Club golf course and the Bay and Basin Leisure Centre sports grounds from the reclaimed water transfer main to the Vincentia WwTP.

**Vincentia Transfer Main** – This 15km pipeline conveys reclaimed water from the Vincentia Wastewater Treatment Plant through to the REMS distribution storage at Coonemia. The transfer main also supplies reclaimed water directly to White Sands Park and the Huskisson sports ground. Additional ultraviolet disinfection is provided at the sports ground to ensure public health protection.



*Pumping & disinfection system  
Huskisson Soccer Field*

**Distribution Mains** – This 18km pipeline system supplies the agricultural land on the Shoalhaven floodplain east of Nowra from the Coonemia reservoir and bulk storage.

**Farm Balance Ponds & Flow Control Works** – Each of the properties supplied from the REMS is served by a balance pond to store approximately one day's irrigation supply. Supply rates are controlled by automated flow control valves that have the facility to cater for rationing water during periods of low supply.



*Farm flow control valve*

## 2.2 Berry WwTP

A re-use scheme operates from the Berry WwTP with a local farm pumping reclaimed water from the plant's storage pond for irrigation of 25 hectares of pasture. In 2005 the Berry WwTP had its capacity increased and its treatment processes upgraded to tertiary standard. Tertiary treatment is achieved through sand filtration and ultraviolet disinfection.

## 2.3 Shoalhaven Heads WwTP

A re-use scheme operates from the Shoalhaven Heads WwTP with a local turf farm irrigating 14 hectares of turf and the Shoalhaven Heads Golf Club irrigating 10 hectares of green, tees and fairways. Tertiary treatment of reclaimed water is achieved through filtration and chlorine disinfection.



*Upgraded Shoalhaven Heads WwTP*

## 2.4 Nowra WwTP

Reclaimed water from the Nowra WwTP is irrigated on a local dairy farm and the Shoalhaven Ex-Servicemen's Sports Club (golf course). The Nowra plant currently provides tertiary treatment via a maturation pond system.

## 2.5 Sussex Inlet WwTP

Reclaimed water from the Sussex WwTP is irrigated on the nearby Thomson Street sports ground. The Sussex Inlet plant provides tertiary treatment of reclaimed water through sand filtration and chlorine disinfection. Additional ultraviolet disinfection is provided at the sports ground to ensure public health protection.

## 2.6 Ulladulla WwTP

Currently there is a small amount of re-use from the upgraded Ulladulla WwTP on the nearby West Ulladulla sports ground. The potential for larger re-use schemes in the Milton/Ulladulla area were investigated and found to be cost-prohibitive.

## 2.7 Kangaroo Valley WRF

The wastewater reclamation facility (WRF) for Kangaroo Valley was commissioned in 2013. The WRF provides tertiary treated reclaimed water using membrane filtration and ultraviolet disinfection. A 50ML wet weather storage was constructed, equivalent to 1 year's output, to allow beneficial irrigation on 16 hectares of adjacent dairy pasture.

## 2.8 Biosolids Management

The solids removed during wastewater treatment are increasingly recognised as a valuable resource which is high in organic matter and nutrients. Council has a policy to maximise the beneficial re-use of biosolids subject to compliance with NSW environmental guidelines. The treatment of biosolids in the Shoalhaven involves stabilisation in lagoons for up to 12 months. The solids are then dewatered using a centrifuge and then tested for suitability to land application. A new mobile centrifuge was put into operation in 2014.



*Council's new mobile centrifuge (dewatering) unit*

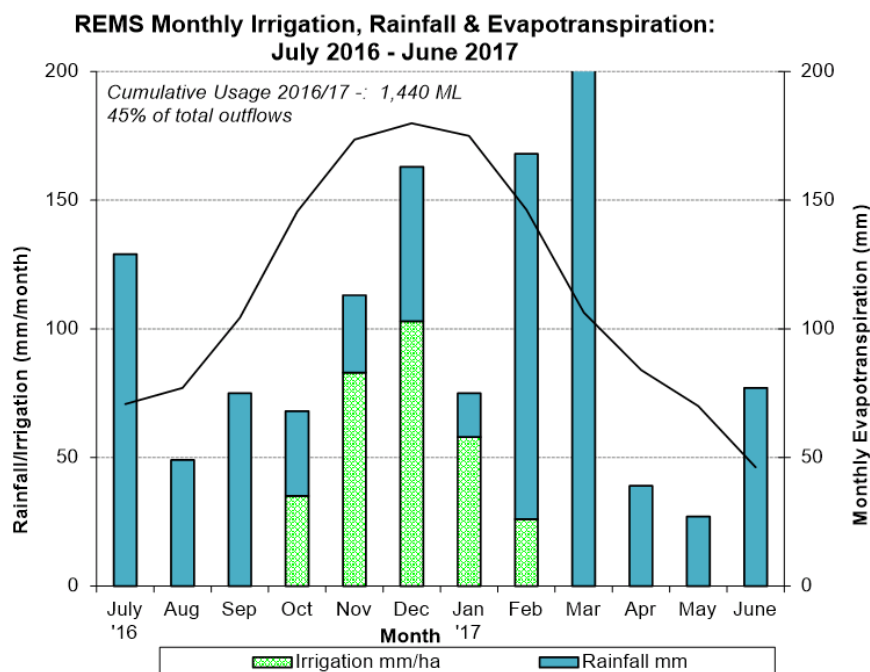
See section 3.3 for details of Council biosolids production.

### 3.0 OPERATIONAL ACHIEVEMENTS 2016/17

#### 3.1 Volumes Re-used

The 2016/17 year characterised by above average rainfall particularly during late summer. Figure 3.1 below shows monthly rainfall, pasture evaporation and irrigation rates for the REMS during 2016/17. Beneficial re-use for the REMS totalled 1,440ML or 45% of total outflows from the Scheme. Farms applied an average of 3.0 ML (300mm) of reclaimed water per allocated hectare for the year.

Figure 3.1 Monthly Water Balance for REMS Irrigation



The cumulative volume of reclaimed water usage in the REMS since operations commenced (i.e. September 2001- June 2017) is in excess of 22,200ML, or approximately 60% of the total flows managed by the scheme (figure 3.2). The average annual volume released to the Penguin Head outfall has been 920ML. This annual average represents a 30% increase in reclaimed water released to the Penguin Head outfall than when the Culbura scheme operated on a stand-alone basis. However, this increase in volume is more than compensated by a higher level of treatment of reclaimed water in the REMS.



Figure 3.2 Annual Summaries – Shoalhaven REMS

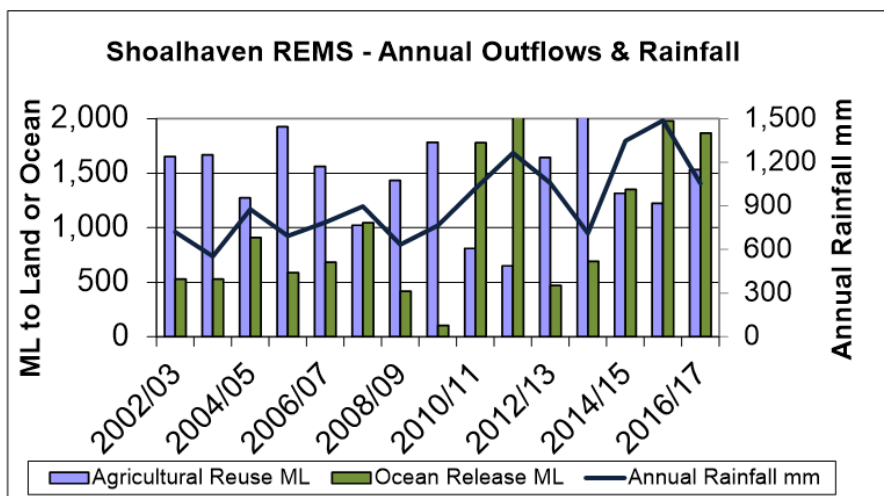


Table 3.1 below shows reclaimed water volumes produced and re-used for all of Council's wastewater schemes. For 2016/17, a total of 1,453 ML was re-used or 17% of the total output from Council's 13 wastewater treatment plants. This percentage is slightly below the NSW water utility average of 20% (2014/15).

Table 3.1 Shoalhaven Reclaimed Water Production, Re-use and Surplus Releases 2016/17

Scheme	Total Output ML	Re-use ML (% of total)	Surplus Released to Environment ML
Berry	288	0 (0%)	288
Shoalhaven Heads	256	87 (34%)	169
Kangaroo Valley	45	35(78%)	0**
Bomaderry	875	0 (0%)	875
Nowra	2,374	48 (2%)	2,326
REMS *	3,170	1,440 (45%)	1,730
Sussex Inlet	540	4 (1%)	536
Conjola	248	7 (3%)	241
Ulladulla	1,344	0(0%)	1,344
<b>Scheme Totals</b>	<b>9,140</b>	<b>1,621(18%)</b>	<b>7,519</b>

\* Includes reclaimed water from St Georges Basin, Vincentia, Culburra Beach and Callala WwTPs and the Coonemia Bulk Storage

\*\* Surplus reclaimed water from the Kangaroo Valley WRF held in 50ML wet weather storage

### 3.2 Compliance with Water Recycling Guidelines

There are complementary State and Commonwealth government guidelines that provide a framework for the design and management of water re-use schemes. These are:

\* Environment Protection & Heritage Council (2006). *Australian Guidelines for Water Recycling: Managing Health & Environmental Risks (Phase 1)*.

\* NSW Department of Environment and Conservation (2004). *Use of Effluent by Irrigation*.

Key factors common to these guidelines are the need to select suitable sites, control measures for reclaimed water irrigation and to ensure reclaimed water has had adequate treatment and disinfection for the intended end use. Table 3.2 provides performance summary of each re-use scheme against the disinfection targets. As shown in the table, all schemes have met these targets and achieved a high level of treatment as evidenced by the removal of organic material and other solids.

**Table 3.2 Compliance of Shoalhaven Schemes with Disinfection Guidelines**

<b>Scheme</b>	<b>Type of Irrigation</b>	<b>Target Disinfection Level * (thermotolerant coliforms)</b>	<b>2016/17 Plant Performance * (thermotolerant coliforms)</b>	<b>2016/17 B.O.D. &amp; Suspended Solids Performance**</b>
Berry	Pasture + withholding	<1,000cfu/100mL	<1 cfu/100mL	BOD <2mg/L SS 1mg/L
Shoalhaven Heads	Turf	<10,000/100mL	57 cfu/100mL	BOD <2mg/L SS 2mg/L
	Municipal: restricted access	<100cfu/100mL		
Kangaroo Valley	Pasture/ no withholding	<100cfu/100mL	<1cfu/100mL	BOD <2mg/L SS <1mg/L
Nowra	Pasture + withholding	<1,000cfu/100mL	780cfu/100mL	BOD 10mg/L SS 21mg/L
	Municipal: restricted access	<100cfu/100mL		
REMS	Pasture/ no withholding	<100cfu/100mL	7 cfu/100mL	BOD <2mg/L SS 1mg/L
	Municipal Open access	<10cfu/100mL	5 cfu/100mL	
St Georges Basin	Municipal Restricted access & application	<1,000cfu/100mL	710 cfu/100mL	BOD <2mg/L SS 4mg/L
Sussex Inlet	Open access areas	<10cfu/100mL	7cfu/100mL	BOD <2mg/L SS 1mg/L
Milton/Ulladulla	Municipal: restricted access	<100cfu/100mL	50 cfu/100mL	BOD 5mg/L SS 4mg/L

\* Median (50th percentile) values

\*\* Average values

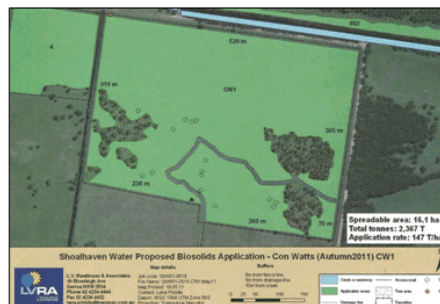
The quality of reclaimed water supplied to the REMS irrigation properties during 2016/17 is given in Appendix Table A.3. For the REMS, the average value of reclaimed water conductivity was 860uS/cm in 2016/17, well below the scheme target of 1,000uS/cm.



### 3.3 Management of Biosolids

Shoalhaven City Council manages the biosolids reclaimed from wastewater in accordance with NSW Government environmental guidelines 'Use and Disposal of Biosolids Products'. This process involves:

- Stabilisation in lagoons;
- Dewatering;
- Testing for contaminants by an accredited lab;
- Grading of biosolids in accordance with the NSW guidelines;
- Carting and land application (or disposal if required).



*Biosolids spreading plan*

In 2016/17 approximately 2,850 tonnes of biosolids were dewatered and tested at Council WWTPs (Table 3.3). All material was found to be suitable for land application (Grade C or better), with all dewatered biosolids applied to local farms in November 2016. The biosolids spreading campaign schedule for April 2017 was delayed due to extreme wet weather.

**Table 3.3 Shoalhaven Biosolids Reclamation 2016/17**

WWTP	Biosolids Reused (wet tonnes)	Suitability for Land Application (Grade)	Where Applied
Berry	470	Suitable (grade C)	Pyree
Shoalhaven Heads	0		
Bomaderry	0		
Kangaroo Valley	40	Suitable (grade C)	Pyree
Nowra	700	Suitable (grade C)	Pyree
Culburra	200	Suitable (grade C)	Pyree
Callala	0		
Vincentia	0		
St Georges Basin	480	Suitable (grade C)	Pyree
Sussex Inlet	320	Suitable (grade C)	Pyree
Bendalong	0		
Conjola	0		
Ulladulla	640	Suitable (grade C)	Pyree
<b>Scheme Totals</b>	<b>2,850 tonnes recycled</b>		

Shoalhaven City Council's Biosolids Management Plan has been updated.

### 3.4 Compliance with the REMS Usage Targets

The REMS use/supply agreement sets a (moving) target that each property should irrigate a minimum of 75% of the groups' average, expressed on a mm/allocated hectare basis. Table A.3 (appendix) indicates each property's usage against this benchmark for the year 2016/17 and since the start of the scheme (15 years). For the years 2002-2014, thirteen of fourteen participating dairy farms have met this 75% target. The only properties not reaching the target were the golf courses and sports grounds that also utilise stormwater in their irrigation systems.

### 3.5 Environmental Monitoring

#### 3.5.1 REMS

As part of the Scheme approvals for the REMS, an Environmental Monitoring Program was developed to ensure beneficial outcomes. Key environmental issues included protection of groundwater and soils in the irrigation areas as well as minimising any impacts from surplus releases to the ocean at Penguin Head.

*Groundwater Monitoring* – A network of eleven groundwater monitoring bores was established in early 2001 within the farm irrigation area. A baseline ground water height and quality sampling program was undertaken between March 2001 and December 2001. A further 74 sampling events have been undertaken to examine trends in local water tables. Table 3.4 shows the average depth before and after scheme implementation. The results indicate that average depth to water table has not changed significantly as a result of the scheme. The groundwater quality monitoring undertaken to date also does not show any significant adverse impact from implementation of the Scheme.

**Table 3.4 Average Groundwater Depth – REMS Irrigation Area**

	Before REMS	During REMS
Average depth to water*	1.94m	1.82m
(standard deviation)	(0.23)	(0.34)

\* Average depth across eleven bores

*Farm Soils* - As part of the REMS Environmental Monitoring Program periodic soil samples are taken from irrigated and non-irrigated farming areas to gauge any adverse impacts from reclaimed water irrigation, such as a build up of soil salinity. Table 3.5 below compares soil conductivity levels, pH and cation exchange capacity (CEC) between four irrigated and two non-irrigated sites. For 2016/17, soil salinity remained below 0.25dS/m for all four of the irrigated sampling sites. Soil salinity levels remain well within the safe irrigation range of <2dS/m.

**Table 3.5 Farm Soil Test Results – Irrigated and Non-Irrigated Paddocks**

Year	Conductivity		pH		Cation Exchange Capacity	
	Irrigated	Non-Irrigated	Irrigated	Non-Irrigated	Irrigated	Non-Irrigated
2002	0.26-0.32	0.25-0.28	4.6-5.3	4.5-5.8	18.8-23.6	17.8-22.9
2003	0.28-0.32	0.15-0.32	4.4-5.7	4.4-5.3	15.5-30.0	13.9-21.0
2005	0.17-0.26	0.12-0.13	4.9-5.0	4.6-5.0	18.8-22.9	16.6-21.2
2006	0.10-0.12	0.09-0.10	4.5-4.9	4.6-5.0	16.1-21.3	16.3-20.0
2007	0.15-0.80	0.20-0.30	4.9-5.7	5.0-5.2	21.0-28.0	22.0-24.0
2008	0.15-0.28	0.06-0.19	4.8-5.5	4.6-4.8	18.4-22.6	16.4-17.9
2009	0.13-0.39	0.06-0.12	4.6-6.2	4.8-4.9	20.1-30.0	20.0-21.0
2010	0.11-0.21	0.06-0.09	4.8-6.5	4.8-5.0	18.3-28.0	18.1-20.0
2012	0.09-0.86	0.07-0.18	5.1-6.4	4.9-5.2	17.2-26.5	17.6-18.8
2013	0.09-0.54	0.06-0.14	5.2-6.2	4.7-4.9	20.2-29.9	16.0-19.4
2014	0.25-0.53	0.15-0.33	5.5-6.5	4.7-4.8	20.1-27.5	15.5-18.9
2015	0.15-0.47	0.15-0.27	5.2-6.1	4.7-4.8	22.1-28.1	15.6-16.4
2016	0.05-0.25	0.50-0.94	4.8-5.2	4.7-5.9	19.0-23.0	18.0-21.0
2017	0.10-0.45	0.20-0.60	5.2-5.8	4.6-5.3	22.1-26.4	17.5-20.6

**Nutrient Balance** – An annual nutrient budget is calculated for the major nutrients applied through reclaimed water irrigation. The results to date suggest that far more nitrogen and phosphorus is removed through grazing than is applied via reclaimed water. The results of these nutrient budgets for 2016/17 are summarised in Table 3.6.

**Table 3.6 Farm Nutrient Budgets 2016/17 – Total Nitrogen & Total Phosphorus**

Nutrient	Average Quantity Applied by Irrigation (kg/Ha/yr)	Quantity Removed by Grazing (kg/Ha/yr)	Net Nutrient Balance (kg/Ha/yr)
Nitrogen	13	126	-113
Phosphorous	14	32	-18

*Environment Protection Licence* - Testing of reclaimed water quality released to Penguin Head during 2016/17 complied with the requirements of the REMS Environment Protection Licence.

*Environmental Benefits* – The REMS has eliminated the need for regular wastewater releases into Jervis Bay. In the twelve months to June 2016 a total of 940ML of reclaimed water was not released into the Bay as a result of REMS. This avoided nutrients and organic materials being released to Jervis Bay as follows:

- 3,800kg nitrogen;
- 3,300kg phosphorous;
- 900kg oil and grease;
- 1,000kg biochemical oxygen demand (BOD);
- 1,500kg suspended solids.

These compounds were instead recycled onto farmland, golf courses and sporting grounds or discharged to the ocean outfall at Penguin Head.

## 4.0 RE-USE DEVELOPMENT

Shoalhaven City Council is committed to increase the amount of beneficial re-use schemes over time. A range of factors need to be considered in examining the feasibility of new schemes including:

- Type of scheme and volume utilised;
- Proximity to existing reclaimed water facilities;
- Cost-effectiveness of scheme;
- Environmental impacts/benefits of specific schemes;
- Ability to substitute/replace existing uses of potable water.

Council funding of new re-use schemes needs to be prioritised against other projects such as developing centralised sewerage systems for un-sewered towns and villages as well as increasing maintenance requirements for existing schemes. An ongoing issue is conservation of drinking water resources, thus recycling projects replacing potable water supply are likely to receive a high priority.

Council has developed a reclaimed water policy to guide the development and operation of reclaimed water management schemes (Appendix A).

### 4.1 REMS Stage 1B

Stage 1B of the REMS, when completed, will add the reclaimed water from the upgraded Nowra and Bomaderry WwTPs to the REMS distribution system, significantly increasing the daily reclaimed water supply managed by the Scheme. The allocated irrigation area will also increase to over 600 hectares.

Detailed designs for REMS Stage 1B were completed and tenders advertised for the following works:

- major upgrading of the Bomaderry and Nowra WwTP s
- design and construction of a reclaimed water transfer pipeline under the Shoalhaven River connecting Bomaderry WwTP to Nowra WwTP
- a reclaimed water transfer pipeline from Nowra WwTP to the existing REMS supply network

Contracts have been awarded for these works and construction is well underway.

The current works program has construction completed in 2019.

In addition, designs are progressing to increase disinfection performance at the Callala, Culbura and Vincentia WwTP in line with current water recycling guidelines.

Recycled water quality management plans are also being prepared for the REMS 1A and REMS 1B schemes.



Construction of the new Nowra WwTP

## 5.0 APPENDICES

### Appendix A: Shoalhaven City Council Reclaimed Water Policy

#### Reclaimed Water Policy

**Policy Number:** POL12/159 • **Adopted:** 24/07/2007 • **Amended:** 25/06/2009, 3/09/2013 •  
**Minute Number:** MIN07.1087, MIN09.774, MIN13.858 • **File:** 12039E • **Produced By:**  
Shoalhaven Water Group • **Review Date:** 1/12/2016

#### 1. PURPOSE

To provide a commitment to the safe and sustainable management of reclaimed water. The policy provides a basis for the development and operation of reclaimed water management schemes involving Shoalhaven City Council's wastewater treatment facilities

#### 2. STATEMENT

Reclaimed water is recognised as a valuable resource in the urban water cycle management. Up to 30% of the treated wastewater produced in the Shoalhaven is currently recycled onto land.

A range of State and Federal Government guidelines have been developed to assist water authorities in the development and management of reclaimed water schemes. More recent guidelines (EPHC, 2006) place increased emphasis on health risk management similar to the Australian Drinking Water Guidelines (2004). The 2006 reclaimed water guidelines encourage water authorities to develop a robust management framework including clear statement of goals/values, scheme development processes and having appropriate operating and management practices in place. A well-defined policy, development and management framework will be essential in gaining NSW Government and community approval/support for new schemes.

#### 3. RECLAIMED WATER MANAGEMENT POLICY

Shoalhaven City Council will *responsibly and sustainably* manage reclaimed water by:

- Ensuring that protection of public health, environment and water resources are of prime importance and that reclaimed water is 'fit for purpose' (for the intended end-use);
- Working with our employees, the Shoalhaven community, health and environmental regulators and other stakeholders to ensure reclaimed water schemes are planned, constructed and operated consistent with industry best practices.
- Adopting a risk management approach to ensure that potential risks are made explicit, are understood, managed and accepted by customers and other stakeholders.
- Regular monitoring and reporting of control measures and reclaimed water quality.
- Assessing all proposed schemes and initiatives consistent with long term economic, social and environmental sustainability criteria.
- Aiming to recognise and capture the economic value of reclaimed water over the long term by applying appropriate cost recovery principles in line with Government policies.
- Agreeing to the level of service to be provided with users of a reclaimed water scheme as part of the process of formulating use/supply agreements.



- Continuing to substitute reclaimed water supplies for potable water where appropriate.

#### 4. IMPLEMENTATION

Shoalhaven City Council will *support* this Policy by:

- Implementing appropriate operation and maintenance procedures for all reclaimed water schemes.
- Reporting on outcomes of its reclaimed water management schemes.
- Having regular contact and meetings with stakeholders and end-users.

#### 5. RELATED DOCUMENTATION

This is a policy document only and is supported by the following guidelines that pertain to the design and management of reclaimed water schemes:

- Australian Guidelines for Water Recycling: Managing Health & Environmental Risk (EPHC, 2006)
- Environmental Guidelines: Use of Effluent by Irrigation (NSW DEC, 2004)
- NSW Environmental Protection Licenses 1736, 4128 and 2419.

##### Shoalhaven Water:

- Shoalhaven Water Strategic Business Plan
- Memorandum of Understanding Between NSW Ministry of Health and Shoalhaven Water (2012)

#### 6. DEFINITIONS

**reclaimed water** – Water generated from sewage and treated to a standard that is appropriate for its intended use.

**risk management** – The systematic evaluation of the reclaimed water supply system, the identification of hazards and hazardous events, the assessments of risks [likelihood and consequence of a hazard causing harm], and the development and implementation of preventative strategies to manage the risks.

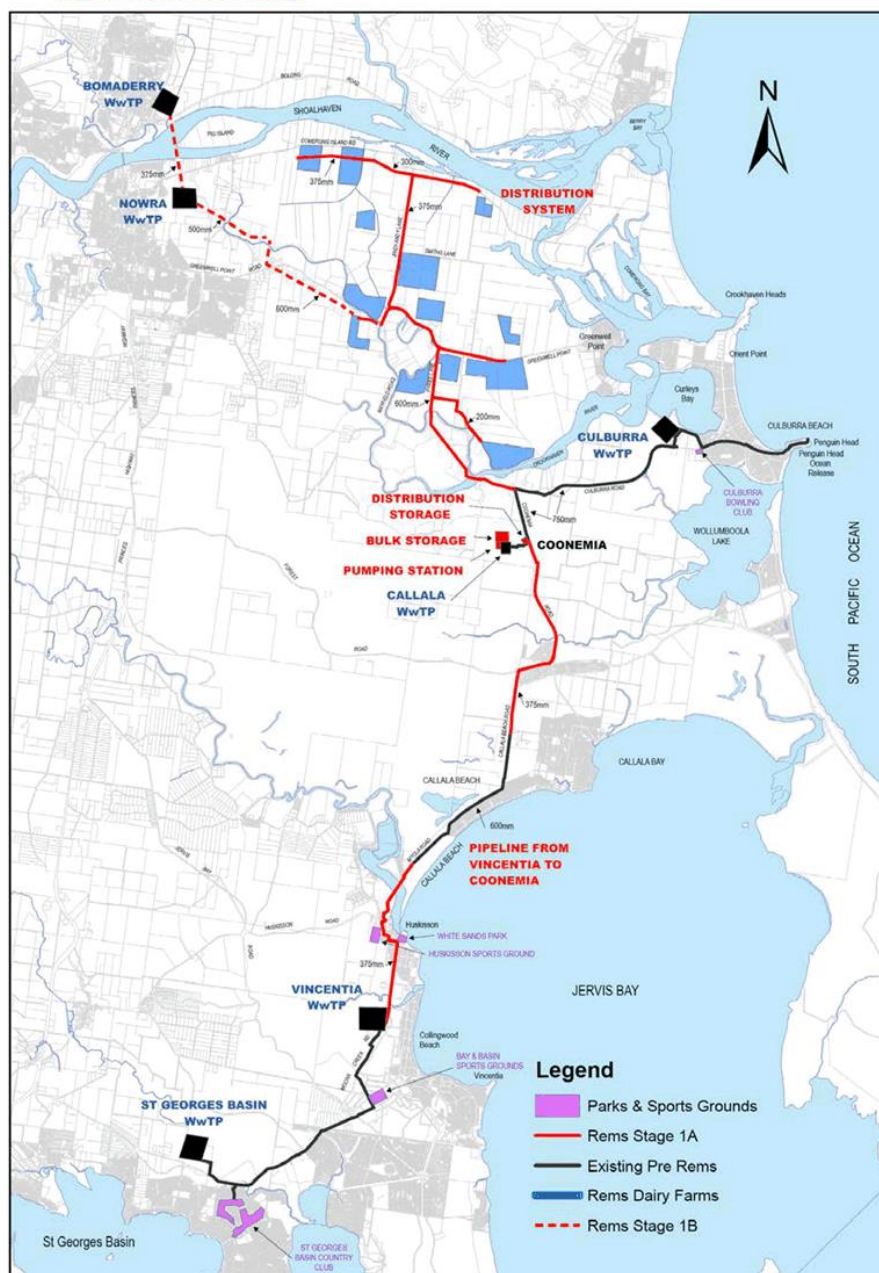
#### 7. REVIEW

The Reclaimed Water Policy and associated development guidelines will be reviewed on a periodic basis and particularly where new guidelines and/or management information dictates.

#### 8. APPLICATION OF ESD PRINCIPLES

The policy will permit the conservation of the City's water resource allowing more water to remain in the environment, reduce pumping and transportation costs and greenhouse gas emissions.

Figure A.1 REMS Map



**Table A.1: Participating REMS Stage 1A Irrigation Properties**

OWNER	PROPERTY LOCATION	STAGE 1A ALLOCATION (Hectares)	2016/17USAGE ML	2016/17USAGE AS A % AVERAGE (Target > 75%)	USAGE SINCE JANUARY 2002 AS A % OF AVERAGE
DJ & JA Watts	Stratheric Lane, Pyree	20	105.0 *	152%	141%
LR & SL Henry	Greenwell Point Road, Pyree	14	3.5	7%	72%
RH Boyd & Son P/L	Greenwell Point Rd, Brundee	32	12.7 *	12%	85%
B, G & S Menzies	Jindy Andy Lane, Numbaa	28	80.8 *	86%	96%
RA Henry & Son P/L	Comerong Island Road, Numbaa	35	133.9 *	114%	99%
RJ & JJ Crawford	Bournes Lane, Pyree	17	38.9	68%	57%
RF Herne & TL Russell	Greenwell Pt. Rd, Brundee	35	155.5 *	133%	112%
RJ & JJ Crawford	Jindy Andy Lane, Numbaa	39	150.2 *	115%	104%
CH & WK Watts	Bournes Lane, Pyree	23	105.0 *	136%	112%
IH & CA Zandstra	Bournes Lane, Pyree	20	100.6	111%	103%
CJ & GR Cochrane	Comerong Island Road, Numbaa	23	142.1 *	135%	100%



Table A.1: REMS Usage cont.

OWNER	PROPERTY LOCATION	STAGE 1A ALLOCATION (Hectares)	2016/17USAGE ML	2016/17USAGE AS A % AVERAGE (Target > 75%)	USAGE SINCE JANUARY 2002 AS A % OF AVERAGE
IH & CA Zandstra	Greenwell Point Road, Pyree	28	148.9*	127%	136%
Beaulands Farms P/L	Comerong Island Rd, Numbaa	10	50.4*	75%	88%
Reg Cochrane P/L	Mayfield Rd, Pyree	28	142.6*	152%	104%
Shoalhaven City Council (Bay & Basin Leisure Centre)	The Wool Road, Vincentia	1	0.6	18%	48%
Shoalhaven City Council (White Sands Park)	Hawke St, Huskisson	0.5	1.5	63%	61%
St Georges Basin Country Club	Paradise Beach Rd, Sanctuary Pt	18	12.7**	21%	42%
Shoalhaven City Council	Park St, Huskisson	2.0	6.3	118%	96%
Culburra Bowling & Recreation Club	Prince Edward Ave, Culburra	0.5	0.9	52%	25%
<b>Total</b>		<b>374</b>	<b>1,435.5***</b>		

\* These properties also use reclaimed water for yard wash down or other approved purposes. This volume is included in their usage figures.

\*\* These properties also use stormwater for irrigation. Stormwater usage is not included in total usage.

\*\*\* Includes volume re-used on four properties for wash down only (43.8 ML in 2016/17).

**Table A.2 Other Shoalhaven Properties Irrigating with Reclaimed Water**

OWNER	PROPERTY LOCATION	Activity	Irrigation Area (Hectares)	2016/17 USAGE ML
<b>Roymao P/L</b>	Mullers Lane, Berry	Dairy Farm	25	0.0
<b>R &amp; S Ryan</b>	Coolangatta Rd, Coolangatta	Turf Farm	14	37.5
<b>Shoalhaven Heads Golf club</b>	Staples St, Shoalhaven Heads	Golf Course	12	48.7 *
<b>RH Boyd &amp; Son P/L</b>	Millbank Rd Terara	Dairy Farm	30	0.0
<b>G &amp; C Chittick</b>	Moss Vale Rd, Kangaroo Valley	Dairy Farm	16	35.5
<b>Shoalhaven Ex-Servicemen Sports Club P/L</b>	Greenwell Point Rd, Womgee	Golf Course	20	47.7 *
<b>Shoalhaven City Council</b>	Thomson St, Sussex Inlet	Sports Ground	3	3.7
<b>Shoalhaven City Council</b>	Camden St, Ulladulla	Sports Ground	2	0.0 *

\* These properties also use stormwater or groundwater for irrigation. Stormwater/groundwater usage is not included in total usage.

Table A.3: REMS Reclaimed Water Test Results July 2016–June 2017

Overall Scheme Targets				
	Range	Average	Target *	# of Samples
B.O.D. (mg/L)	<2.0-8.0	<2	<10	12
Suspended Solids (mg/L)	<1.0-8.0	1.8	<15	24
Total Nitrogen (mg/L)	1.1-7.6	4.4	<15	12
Total Phosphorus (mg/L)	2.1-6.5	3.8	<10	12
Oil & Grease (mg/L)	<1	<1	<2	12
pH	7.2-7.8	7.6	6.0-9.0	24
Faecal Coliforms (cfu/100mL)	<1-38	7	<200	24

\* Source: REMS EIS (1997)

	Range	Average	Target	Samples
Residual chlorine (mg/L)	0.05-0.17	0.11	0.1-0.2	24
Chlorophyll 'a' (ug/L)	<0.1-7.0	3	<20	12
Turbidity (ntu)	0.3-1.6	0.8	<2	12

Other Chemistry & Nutrients				
	Range	Average	Target **	# of Samples
Conductivity (uS/cm)	740-1,020	860	<1000	12
Total dissolved solids (mg/L)	360-520	470	<700	12
Chloride (mg/L)	134-144	139	<250	2
Potassium (mg/L)	17-19	18	-	2
Calcium (mg/L)	31-36	33	-	2
Magnesium (mg/L)	11-16	14	-	2
Sulfates (mg/L)	52-65	59	-	2
Sodium (mg/L)	132-142	138	<250	2
Sodium Absorption Ratio	-	4.4	<10	Annual

\*\* Source: NWQMS Irrigation Guidelines (2001)

Table A.3: REMS Reclaimed Water Test Results July 2016-June 2017 continued

Heavy Metals				
	Range (mg/L)	Average (mg/L)	Target*** (mg/L)	# of Samples
Aluminium	<0.01-0.01	0.01	<5	2
Arsenic	Not detected	-	<0.1	2
Beryllium	Not detected	-	<0.1	2
Boron	0.06-0.09	0.08	<0.5	2
Cadmium	Not detected	-	<0.01	2
Chromium	Not detected	-	<0.1	2
Cobalt	Not detected	-	<0.05	2
Copper	0.003-0.008	0.006	<0.2	2
Fluoride	0.65-0.70	0.67	<1.0	2
Iron	Not detected	-	<1	2
Lead	Not detected	-	<2	2
Lithium	0.004-0.006	0.005	<2.5	2
Manganese	0.003-0.005	0.004	<0.2	2
Molybdenum	Not detected	-	<0.002	2
Nickel	Not detected	-	<0.2	2
Selenium	Not detected	-	<0.02	2
Silver	Not detected	-	<0.02	2
Zinc	<0.005-0.06	0.01	<2.0	2

\*\*\* Source: NWQMS Irrigation & Stock Drinking Water Guidelines (2001)

Toxicants				
	Range (mg/L)	Average (mg/L)	Target	# of Samples
Total Trihalomethanes (THM)	0.05-0.06	0.055	<0.1	2
Organo-chlorine Pesticides (OCP)	Not detected	-		2
Organo-phosphate Pesticides (OPP)	Not detected	-		2
Poly-aromatic Hydrocarbons (PAH)	Not detected	-		2
Poly-chlorinated Biphenyls (PCB)	Not detected	-		2