Merimbula Sewage Treatment Plant Upgrade and Ocean Outfall

Appendix B

Community and Stakeholder Plan and Memorandums

Community and Stakeholder Engagement Plan and Memorandums

Merimbula Sewage Treatment Plant Upgrade and Ocean Outfall - Concept Design and Environmental Impact Statement

Client: Bega Valley Shire Council

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1.0 Introduction and context

1.1 Purpose

This community and stakeholder engagement plan describes the communication and engagement for the Merimbula Sewage Treatment Plant (STP) Upgrade and Ocean Outfall Project. It identifies who, when and how we will engage over the Project period and what resources and materials are required to support the process. AECOM is responsible for the implementation of this plan with support and approval from Bega Valley Shire Council (BVSC).

1.2 Project background

BVSC has engaged AECOM to prepare a Concept Design and Environmental Impact Statement (EIS) for the Merimbula STP Upgrade and Ocean Outfall.

The Project includes consideration of options for upgrading the existing Merimbula STP, selection of an alignment for an ocean outfall and concept design of infrastructure required as part of the upgrades proposed under a preferred outfall option.

AECOM prepared an Effluent Management Strategy and initial options assessment in 2014 and this next stage of the Project will include:

- confirmation of the preferred option and value management approach;
- engagement with the local community and stakeholders;
- concept design and optimisation of a preferred option;
- preparation of an EIS for the preferred option; and
- obtaining regulatory and statutory approval.

The EIS for the Project will need to comply with the Secretary of Planning and Environment's Assessment Requirements (SEARs). The concept design needs to consider a range of environmental, engineering and buildability technical issues, such as oceanic currents, water quality criteria and unknown geotechnical risks, to provide a value for money and environmentally sensitive solution.

1.3 Further context

Currently treated sewage (treated wastewater) from the STP storage ponds is used for irrigation by both the Pambula Merimbula Golf Club (PMGC) and Oaklands on their farmland. In wet weather, this irrigation is not possible. Surplus treated wastewater is disposed to the ocean via a beach-face outfall or to dunal exfiltration ponds for disposal to groundwater.

The existing beach-face outfall consists of a 250 mm diameter pipeline from the STP pumping station to a pipe head structure located in the fore dunes at the centre of Merimbula Beach between the estuary entrances of Merimbula Lake in the north and Pambula Lake in the south.

The pipeline length is approximately 1 kilometre from the STP pumping station to the discharge point on the beach. The treated wastewater is discharged just above the normal high-water mark and flows across the beach and into the ocean waters of Merimbula Bay. The pipeline originally extended into the surf zone but was damaged in a large storm event in the 1970s and has not been reinstated.

The existing beach-face outfall has created significant community concern regarding potential impacts upon the aquatic environment and public health, particularly during the summer months when the ocean and beach experience their highest recreational use. The impact of the algal blooms in Merimbula Bay on beach experience, recreational use and local amenity, has focused community attention towards the outfall and discharge into the bay.

Figure 1: Existing beach-faced outfall Merimbula Bay

Further details about the STP can be found here:
https://www.begavalley.nsw.gov.au/page.asp?f=RES-SIL-25-00-71

1.4 Project site and area profile

The proposed STP upgrade and ocean outfall is located in Merimbula, a coastal tourist township situated between Tathra and Eden on the south-eastern extremity of coastal NSW (**Figure 3**). The site is within the Bega Valley Shire and located approximately 5.5 hours from Sydney by road. The Merimbula STP is currently operated by Downer EDI under contract with BVSC, but BVSC will be taking back operations of the STP.

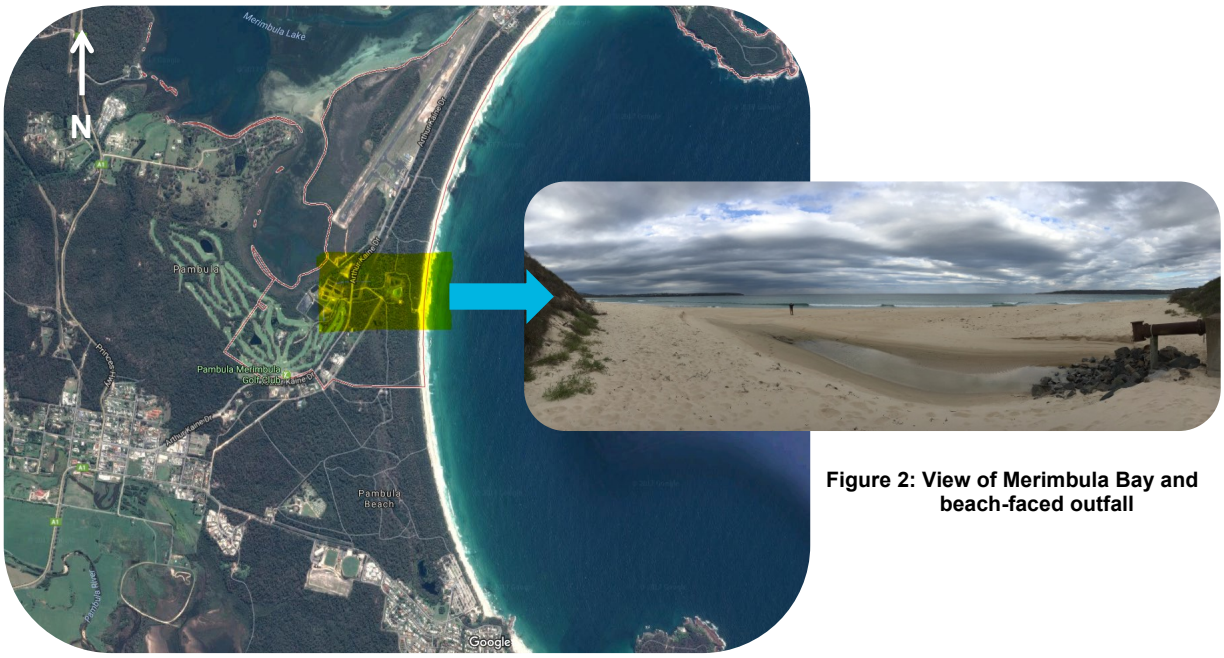

Figure 2: View of Merimbula Bay and beach-faced outfall

Figure 3: Site location Merimbula Bay ocean outfall ***Image source: Google Maps***

Merimbula includes residential, commercial and industrial land use, holiday areas, and rural areas. Rural land is used largely for conservation, timber production and beef and dairy farming, with some sheep grazing.

The major features of Merimbula and the immediate surrounding area include: South East Forests National Park, Bournda Nature Reserve, the Merimbula Town Centre, Merimbula Lake, The Back Lake, Bar Beach, Main Beach, Middle Beach, Short Point Beach, Spencer Park Beach, Merimbula Aquarium, Magic Mountain, Potoroo Palace, Merimbula Boardwalk, Old School Museum, Merimbula Marina, Merimbula Marina Ocean Adventure Tours, Merimbula Wharf, Merimbula Airport, Mitchies Jetty, Berrambool Sportsground, Boller Park, Ford Oval, Main Beach Recreation Reserve, Rotary Park, Short Point Recreation Reserve and Spencer Park.

The estimated resident population for Merimbula in 2016 was 4,464, living in 2,726 dwellings[1]. 16.8% of the population was aged between 0 and 17 years, and 36.5% were aged 60 years and over. 1.6% of the Merimbula population identified as being Aboriginal or Torres Strait Islander. 91% of the population speaks only English, the other languages identified were German and Dutch.

1.5 Project milestones

Table 1 describes the forecast Project milestones.

Table 1: Project milestones

Milestone	Estimated Timing (as of June 2017)	Notes
Project inception	May 2017	-
Project introduction	November 2017	Confirmation of Preferred Effluent Disposal Option
Options for STP and Ocean Outfall Complete	November 2017 (start of CWG)	10% - sub-options defined
Preliminary Preferred Design Option	August 2019 (end of CWG)	20% - sub-option development and recommend preferred option
Preferred Design Option Confirmation	TBC	-
Completion of Concept Design of Preferred Option	TBC	30% concept design completion
EIS Public Display	TBC	-
Prepare and Submit Submissions Report	TBC	-
Ministerial Decision	TBC	-

[1] http://profile.id.com.au/bega-valley/about/?WebID=140

2.0 Stakeholders

The list below identifies the 12 stakeholder groups we will engage with directly using targeted communications throughout the Project. We will also engage with the wider community who are not defined by organisations or groups by using general communications. More detail around direct and indirect communications are in **Section 6.0**.

A detailed list of the stakeholders within each category is provided in **Appendix A**.

Stakeholder category
Internal stakeholders: BVSC executive staff, BVSC Project team, BVSC staff (not Project related), sub-consultants and AECOM Project team
Government agencies: State Government agencies with an interest in the Project
Political stakeholders: State and Federal Members of Parliament
Infrastructure and service providers: Roads, maritime, education, emergency services and utilities
Recreation/commercial fishing groups: aquaculture associations
Community groups: clubs, community and resident associations
Aboriginal stakeholders: Land Councils
Environmental interest groups: land care and conservation groups
Recreational users of beach and lake: golf, surfing and diving
Affected landowners: Golf Club and other irrigation customers
Businesses and tourism stakeholders: Chamber of Commerce and tourism operators
Media: print, radio and digital

3.0 Likely community and stakeholder issues

Table 2 identifies the likely issues for the stakeholder groups listed in **Section 2.0**. As we engage with stakeholders, we will be able to confirm actual issues rather than the perceived issues below. We will track them in a stakeholder interaction spreadsheet from which we can draw issues for the EIS. Issues will be tabled at internal meetings and discussed with the Project team. The issues identified may also be used to determine the communication materials produced (e.g. fact sheets, website and social media content).

Table 2: Potential community and stakeholder issues

Issue	Stakeholder category											
	Internal stakeholders	Government agencies	Political stakeholders	Infrastructure and service providers	Recreation/ commercial fishing	Community groups	Aboriginal stakeholders	Environmental interest groups	Recreational users of beach and	Affected land and business owners	Businesses and tourism stakeholders	Media
Tourism	■		■		■	■				■	■	■
Sport/recreation	■		■		■	■			■	■	■	■
Livelihood	■				■					■	■	■
Public health	■	■				■			■	■		■
Odour						■		■	■	■	■	■
Algae blooms					■				■			■
EIS process	■	■	■		■	■		■	■			■
Cost of Project	■	■	■			■		■	■			■
Heritage/ Culture		■	■				■	■				■
Construction impact		■	■	■	■	■	■	■	■	■	■	■
Wildlife		■	■					■				■
Property values										■	■	■

4.0 Communication and engagement risks

Table 3 identifies some of the potential Project communication and engagement risks for the wider community, multiple stakeholders as well some for a few of the specific stakeholder groups identified in Section 2. The table outlines the issue, risk and proposed approach to mitigate the impacts.

Table 3: Potential Project communication and engagement risks

Stakeholder group	Issue	Risk	Mitigation approach
All stakeholders including the wider community	Lack of understanding for the need of the Project by stakeholders and the community	Community and stakeholders do not support the proposal. Project is delayed or not approved	Implement rigorous engagement process which educates stakeholders and the community on the need for the proposal Provide consistent, relevant, jargon-free and up to date information on the Project through accessible, tailored communication channels and adapt communication to different stakeholders depending on their needs Managing expectations by closing the feedback loop and sharing results through the Project updates and communications.
	Lack of community acceptance of the Project	Negative impact on reputation Community and stakeholders do not accept need or outcomes for the Project	Regular briefings and early engagement with key and influential stakeholders Build trust and rapport with stakeholders and the community through transparency, inclusivity and responsiveness Monitor issues to and provide regular updates that address issues and questions Communicate impacts and how they will be managed Leverage trusted voices in the community to become Project advocates.
Internal stakeholders	Internal BVSC staff do not support or understand the Project	Inconsistent messaging from BVSC about Project need and outcomes	Empower BVSC Project team to give information to BVSC staff/executive/elected BVSC representatives for them to champion the Project internally Be sure BVSC communications are aligned with Project communications and vice versa

Stakeholder group	Issue	Risk	Mitigation approach
	Feedback from community not fed through to Project team and considered in design	Community and stakeholders do not support the proposal Project is delayed or not approved.	Set up system to track community and stakeholder issues (stakeholder spreadsheet) and provide regular updates to Project team for response and action
Government agencies	Personnel changes in agencies that affect decision making and statutory consultation process	Stakeholders do not support the proposal Project is delayed or not approved.	Track agreements and issues raised by departments through minutes and stakeholder spreadsheet so impacts from personnel changes can be managed
	Unclear level of consultation outlined in section 4 of the SEARs	Department of Planning and Environment assesses the EIS as not outlining a sufficient amount of consultation.	Design an effective community consultation and engagement program that is proactive and genuine (this plan) Actively involving the community and stakeholders in the STP upgrade and ocean outfall design through a co-design approach
Political stakeholders	Change in positions/ local elections / funding decisions/ political agendas	Project delay, Project cost impact.	Provide accurate, regular and reliable information in regular briefings to government officials Provide regular information to community to dispel/eliminate rumours
Infrastructure and service providers	Personnel changes affecting decision making and statutory consultation process	Project delay, Project cost impact.	Track agreements and issues raised by departments through minutes and stakeholder spreadsheet so impacts from personnel changes can be managed
Aboriginal stakeholders	Cultural engagement does not satisfy legislative requirements	Community trust impacted and reputation tainted Project is delayed or not approved.	Appropriately qualified staff appointed to deliver Aboriginal engagement

Stakeholder group	Issue	Risk	Mitigation approach
Media	Negative media stories	Reputation of BVSC and AECOM impacted	Positive and accurate information provided through media releases, high quality photos, community stories, video uploads on Project website and BVSC's social media

The communication and engagement team will record issues raised during consultation. These issues will be fed into the overall Project risk register to allow consistency and ease of monitoring and Project reporting.

5.0 Key messages

Key messages are categorised into three main topics, and all Project communication should aim to include at least one key message from each topic. The key messages can be adjusted and expanded to suit the communication activity and audience. The Project team will review the key messages throughout the Project and update all communication materials to reflect any changes.

5.1 Project justification

- BVSC provides safe and sustainable sewerage services, which meet community expectations, now and into the future. BVSC currently owns and operates ten sewage treatment plants across the Shire, including the Merimbula STP.
- BVSC is committed to protecting our unspoilt aquatic and land environments and to ensuring public health standards are met.
- Both NSW Environment Protection Authority (EPA) and previous community working groups agree the existing beach-face outfall and dunal exfiltration ponds are not sustainable.
- The STP and its associated infrastructure require upgrading.
- The combination of an upgraded STP, new ocean outfall and increased reuse of treated wastewater is the only viable and environmentally sustainable option.
- Upgrades are required as the current disposal facilities do not meet environmental regulatory requirements.
- In recent years, the existing shore-based ocean outfall has caused community concern regarding the aquatic environment and public health.
- Currently, treated wastewater is released into dunal exfiltration ponds. These ponds drain the treated wastewater into the sandy dunes, but the dunes have limited capacity and can only take so much treated wastewater. The practice of exfiltrating treated wastewater poses a risk to Merimbula Lake and affects groundwater quality.
- The dunal exfiltration ponds are in endangered Bangalay Sand Forest. There is also evidence of Aboriginal artefacts in the area. This Project means that we can no longer use the ponds and we must work with the local Aboriginal community regarding future uses and care of the land.
- The existing beach-face outfall and exfiltration ponds at the Merimbula STP are no longer sustainable.
- BVSC beneficially reuses as much recycled water as possible for irrigation at the Pambula Merimbula Golf Club grounds and farmland at Oaklands agricultural area. Expansion of reuse to become the only disposal option is not possible because of land and climate restraints.
- BVSC currently partners with community groups, farmers and golf clubs to operate ten recycled water irrigation schemes between Bermagui in the north and Eden in the south. About a quarter of our communities' treated wastewater is recycled and used beneficially in an average rainfall year.
- We need a sustainable disposal method for when it rains because the Pambula Merimbula Golf Club, Oaklands farm and other feasible reuse sites can't take all of our treated wastewater.
- Finding a long term and effective solution has been difficult and we've considered many factors such as the shape of Merimbula Bay, the need to protect our lakes and vital oyster industry, and our duty to safeguard public health.
- The ocean outfall is a long-term investment in protecting the environment of the coastline. It will improve the water quality in Merimbula Embayment, at the beaches and in the lakes.

5.2 Project process

- Working with the community, BVSC is continuing to investigate upgrading the Merimbula STP and its treated wastewater disposal.
- Over the last 10 years, BVSC, the NSW EPA, a Project Focus Group and a Community Working Group (CWG) have considered many options for upgrading the treated wastewater release points and have concluded that a balance of an upgraded STP, new ocean outfall and increased reuse is the only viable and environmentally sustainable option.
- BVSC has engaged specialist environmental consultant, AECOM, to work with the community to find the most appropriate ocean outfall alignment and design for the STP upgrade.
- The first step in starting the upgrade is developing a concept design and environmental assessment using community consultation and engagement.
- An environmental assessment involves field investigations and looking at all the relevant social, economic and environmental impacts of the Project.
- Building on previous work, the concept design and environmental assessment is an 18 to 30 month process, that includes environmental investigations, design, consultation and environmental approval.
- Studies have focused on the water quality, ocean currents and seabed characteristics in Merimbula Bay and the groundwater quality and flow within the dunes. The seabed investigations allow us to understand construction challenges such as rocky reefs.
- Development of an EIS is underway and will look at the social, economic and environmental impacts of the construction and operation of the Project.
- After environmental approval, BVSC will be able to seek subsidy funding for detailed design and construction.

5.3 Engagement and communication

- A CWG made up of representative local community members will work with the Project team to provide advice on developing a concept design that best meets the need of the community.
- The CWG provides a forum to allow the Project team to work with the community to formulate solutions and incorporate their recommendation to the proposed upgrades to Merimbula STP and the ocean outfall to the maximum extent possible.
- The CWG is working through a design and assessment criteria analysis process and will confirm the preferred option and recommend to BVSC this option be selected.
- At all stages of the Project, BVSC and the Project team will keep stakeholders and the wider community informed through website updates, email, newsletters and drop-in community information sessions.
- We encourage the community and stakeholders to provide feedback to the Project team through these channels.

5.4 Alternatives

- The EPA has instructed BVSC via our Environment Protection Licence to complete an EIS and concept design for, and construction of, a new ocean outfall and STP upgrade.
- Our priority is always to beneficially reuse as much treated wastewater as possible before sending any excess treated wastewater to the ocean outfall.
- It is not possible to achieve 100% reuse because of our climate, hilly topography and coastal lakes and lagoons which support oyster farming and are highly valued for recreation and aquatic ecosystem protection.

- Additional reuse schemes and/or wetlands will not remove the need for a sustainable disposal system at Merimbula.
- During winter and when it rains, there is little demand, if any, for treated wastewater and the treated wastewater produced must go somewhere. Even with very large and numerous storages, there would be times when a disposal system would be required.
- The ocean outfall will only be used to dispose of excess treated wastewater, for example during periods of prolonged rainfall or peak tourist times.
- Land for reuse of treated wastewater needs to have suitable buffer zones from waterways, a slope preferably less than 10% and a suitable soil profile. It also needs to enable irrigation infrastructure that can be programmed to apply water when the vegetation requires it and operated to avoid overspray, spray drift, runoff, ponding and water-logging of soils.
- Constructed wetlands carry a significant risk because there is nowhere to put them without risking our natural wetlands like Panboola and our aquaculture.
- Having the new ocean outfall and upgrades to the Merimbula STP still allows us options for potential future increase in reuse Projects.

6.0 Communication and engagement objective, framework and approach

6.1 Context to communication and engagement approach

Three key guidelines underpin the communication and engagement approach:

1. International Association for Public Participation[2] Spectrum;
2. NSW Secretary of Planning and Environment's Assessment Requirements for Critical State Significant Infrastructure Projects; and
3. Community engagement and communications toolkit and Bega Valley Shire Council Communication Strategy 2013.

6.1.1 International Association for Public Participation (IAP2) Spectrum

The IAP2 Spectrum **(Figure 4**) identifies the level of influence stakeholders have on a Project, from *Inform* through to *Empower.* For this Project we propose that public participation aims to *Collaborate* with stakeholders and the community. This means we will tell the community that we will work with them to create a solution and use their recommendations for a final option to the maximum extent possible.

	INFORM	CONSULT	INVOLVE	COLLABORATE	EMPOWER
Public Participation Goal	To provide the public with balanced and objective information to assist them in understanding the problem, alternatives, opportunities and/or solutions.	To obtain public feedback on analysis, alternatives and/or decisions.	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered.	To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.	To place final decision making in the hands of the public.
Promise to the Public	We will keep you informed.	We will keep you informed, listen to and acknowledge concerns and aspirations, and provide feedback on how public input influenced the decision. We will seek your feedback on drafts and proposals.	We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision.	We will work together with you to formulate solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible.	We will implement what you decide.

Figure 4: IAP2 Spectrum (IAP2 International Federation, 2014)

6.1.2 Secretary of Planning and Environment's Assessment Requirements (SEARs)

The SEARs outlines the engagement required as part of the approvals process. At a minimum, this Project must:

1. Be informed by consultation, including with relevant government agencies, infrastructure and service providers, special interest groups, affected landowners, businesses and the community. The consultation process must be undertaken in accordance with the current guidelines.
2. Document the consultation process and demonstrate how the Project has responded to the inputs received.
3. Describe the timing and type of community consultation proposed during the design and delivery of the Project, the mechanisms for community feedback, the mechanisms for keeping the community informed, and procedures for complaints handling and resolution.

[2] https://www.iap2.org.au/About-Us/About-IAP2-Australasia-/Spectrum

6.1.3 Community Engagement and Communications Toolkit Bega Valley Shire Council

The Bega Valley Shire Council Communication Strategy 2013 and Bega Valley Shire Council Media and Community Policy, and Media Guidelines and Procedures (5.10.1 and 5.10.3) identify strategies relevant to the Merimbula Project which will be incorporated, they are:

- we cannot rely on the provision of information to change behaviour;
- misrepresentation by the media is a failure by us to communicate effectively; and
- people will take ownership of new ideas through discussion, sharing and action via decision making if they are provided with an easily digested message that encourages an emotional response.

6.2 Communication and engagement objective

Support from our stakeholders and community is essential for the successful delivery of the Merimbula STP Upgrade and Ocean Outfall.

As defined by the Council *"community engagement involves two or more parties influencing outcomes through talking and listening to another".* The Council's Engagement Strategy states that thoughtfully executed community engagement builds trusting relationships between BVSC and the community and is of mutual benefit to all parties involved.

At the completion of the Project, we want stakeholders and the community to say:

"I know the upgrade of the STP as well as the ocean outfall and its location are in the best interest of the community. The Council allowed the community to be part of the decision-making process so we know that our values are reflected in the final design."

This communication and engagement objective will be achieved by:

- **Actively involving** the community and stakeholders in the STP and ocean outfall design through a co-design approach;
- **Providing consistent, relevant, jargon-free and up to date information** on the Project through accessible, tailored communication channels and adapt communication to different stakeholders depending on their needs;
- **Responding appropriately and in a timely manner** to issues, concerns or questions raised by the community and stakeholders over the life of the Project to demonstrate how issues are being addressed and managed;
- **Facilitating information flow** to the Project team to ensure stakeholder and community input is appropriately incorporated into the Project's development and delivery;
- **Creating Project advocates** by working with trusted voices in the community and actively engaging with the community to understand their issues;
- **Building trust and rapport** with stakeholders and the community through transparency, inclusivity and responsiveness;
- **Taking a risk management focus** by pre-empting, planning for and proactively managing stakeholder issues as they arise to ensure limited impact on Project;
- **Managing expectations** by closing the feedback loop through sharing results, Project updates, and thank you communications.
- **Accurately capturing, analysing and reporting feedback** received throughout the Project so it can inform the Project development and subsequent application process.

6.3 Communication and engagement framework

We will achieve our communication and engagement objective using a three-layer framework:

- **First layer**: Ongoing communication and feedback made up of regular, transparent and consistent digital and print communications supplemented by two-way contact opportunities such as email, 1800 number, postal address and social media. This will mainly target the wider community. The tools used in this layer are described in detail in Section 7.0. This layer will be active throughout the entire Project.
- **Second layer**: Face-to-face engagement including briefings, meetings and community information sessions. This layer will be active throughout the entire Project.
- **Third layer**: Co-design process. To achieve our goal of stakeholders and the community believing that the ocean outfall and its location reflect their values, we propose a co-design process achieved through a Community Working Group (CWG). Co-design[3] involves actively involving stakeholders in the design of a Project. The value of co-design is that by involving stakeholders in the design process early, and collaboratively, the result is a more innovative solution with long term stakeholder buy-in. This layer will be active for the design option development and selection process and then become part of the second layer for the remainder of the Project.

The three-layer communication and engagement framework for the Merimbula Project is outlined in **Figure 5**.

[3] https://www.yacwa.org.au/wp-content/uploads/2016/09/An-Introduction-to-Co-Design-by-Ingrid-Burkett.pdf

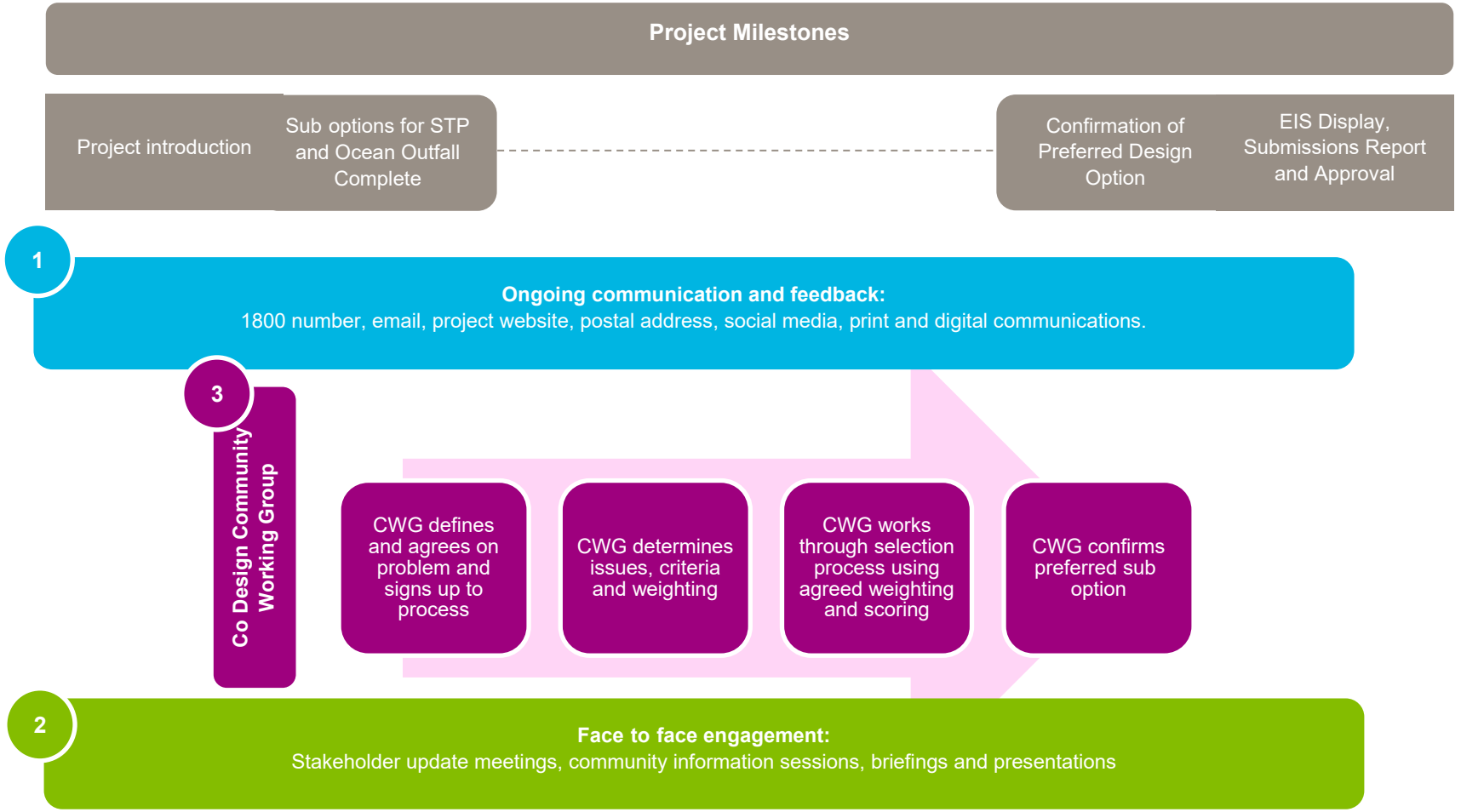

Figure 5: Three layered engagement and communication process

6.4 Ongoing communication and feedback: first layer

The action plan in Appendix B explains the timing of the digital and print communications while the details of the tools are explained in Section 7.0. There are also details of the two-way contact mechanisms in these sections.

We will prepare communication materials with readability in mind - easy to read and free of jargon. Both digital and printed materials will be in plain English and meet the following readability scores as a minimum:

- less than 15% sentences in passive voice; and
- Flesch-Kincaid Grade (readability) level of 10.

6.5 Face-to-face engagement: second layer

The action plan in Appendix B explains the timing of the face-to-face engagement detailed in this section. This engagement will consist of regular Stakeholder update meetings, community information sessions and briefings throughout the life of the Project. There will also be doorknocks as part of the fieldwork notification process. The purpose of this engagement is to provide:

- overview of Project and update on progress;
- timely and accurate information; and
- opportunities to identify, record, address and manage issues/opportunities.

6.5.1 Stakeholder update meetings

Targeting the 11 core stakeholder groups outlined in Section 2 (excludes media as they will be targeted using media releases), the Project team will hold Stakeholder update briefings made up of people representing specific groups such as: recreational beach users, tourism, environment and community groups. Meetings can be held where groups normally meet (to avoid “them coming to us”) or in relaxed settings such as on the beach or in community settings. This will also include briefings with BVSC as well as State and Federal Members.

6.5.2 Community information sessions

Targeted to the wider community and open to anyone with an interest in the Project, these drop-in sessions will be linked to existing community events where possible or held in high footfall locations. Maps, banners and information boards will aid engagement. Feedback forms will be made available at the events.

6.6 Community Working Group (CWG): third layer

To achieve our goal of stakeholders and the community believing that the ocean outfall and its location reflect their values, we propose a co-design process achieved through a Community Working Group (CWG). This will be the Project team’s justification for how they worked with the community to formulate solutions and incorporate their recommendation into the decision to the maximum extent possible.

The CWG will be made up of a group of people representative of the impacted community. They will be selected from volunteers canvassed from the community. AECOM will facilitate the CWG and invite subject matter experts, when required. The meetings are not open to the public.

The CWG will meet approximately five times once design options are confirmed and they will meet until they confirm a preferred design option. The CWG will work through a design and assessment criteria analysis process whereby they will actively participate in identifying the problem, prioritising issues, developing the assessment criteria and analysing the proposed Project solutions developed by the Project team by applying the assessment criteria.

After the selection of the preferred option, the CWG will continue with update meetings in line with the Stakeholder update briefings.

During Project inception, the Project team will create a draft Terms of Reference for the CWG to confirm when established. A Terms of Reference defines the purpose and structure of a group who will work together to accomplish a shared goal.

7.0 Communication and engagement tools and techniques

The table below summarises the communications tools we will use in addition to the face-to-face meetings explained in the previous section. How and when these tools, including the face-to-face meetings, will be used is detailed in the action plan in **Appendix B**.

Activity	Purpose	Comments/notes
Support systems		
Stakeholder spreadsheet	Develop and maintain a spreadsheet containing stakeholders' contact details, correspondence with Project and summary of issues raised.	All stakeholder and community engagement activity must be recorded in the spreadsheet. This stakeholder spreadsheet will also be used as a tool to create lists of stakeholders for targeted communication activities.
Communication protocols	Identify and document the complaints/enquiries management, collateral approval process as well as the media and government protocols.	**Complaints/ enquiries management** We will respond to verbal community and stakeholder enquiries within 24 hours and written enquiries within five days, depending on the technical response required. We will update the database within 24 hours of contact and produce weekly updates of the number of calls and emails received and issues raised. Complaints will be reported to BVSC within 24 hours. **Collateral approval** All print and digital collateral will be provided to BVSC for comment and approval before it is published. This process can be amended as the Project progresses. **Media and government** All enquiries from elected representatives and the media will be forwarded to BVSC for approval along with a draft response from the Project team.
Feedback mechanisms: **Email** **1800 number** **Postal address**	Allow the community to ask questions and provide feedback on the proposal.	Feedback mechanism details will be included in all public materials.

Activity	Purpose	Comments/notes
Print		
Advertising	Informing the community and stakeholders of Project events.	Advertisements in targeted publications throughout the Project area. Newspapers and community newsletters.
Media release	Positive news stories, Project updates and feedback period.	Encourage use of info graphics and high-resolution images.
Stakeholder letter	Informing the community and stakeholders of the start of the Project, inviting to participate in CWG and inviting to provide feedback/attend events.	Targeted letter to stakeholders
Notification letters	Informing the community and impacted residents about fieldwork.	Will be issued to agreed stakeholders at least 7 days before fieldwork events.
Project update	Newsletter printed and distributed at key milestones to keep community informed throughout the Project.	Encourage community to submit content, include photos and diagrams.
Maps/diagrams	Visual explanation of the Project and associated impacts.	For use on print materials and presentations.
Feedback form (online and print)	Feedback forms for commenting on the proposal.	Available on the website and in hard copy at events.
Digital materials and social media		
Dedicated Project webpage	For Project updates, contact details and archive of documents published.	Include Project feedback mechanisms.
Electronic direct mail (EDMs)	Encourage sign up to Project mailing list.	This list of stakeholders will be sent Project updates and information about upcoming community events.
Facebook posts on Council's Facebook page	Used to provide Project updates.	Use video where possible.
Fact sheets	Tailored and topic specific fact sheets.	Developed based on feedback from CWG and in liaison with Project team.
Presentation	Provide a clear and easy to understand summary of the Project to key stakeholders.	For use at briefings.

8.0 Evaluation

Evaluating the engagement and communication is essential to continuous improvement.

Table 4: Process and outcome evaluation

Measure of success	Tool
Process evaluation	
Full variety of stakeholders involved	• Number of attendees to engagement events • Types of attendees at engagement events • Community Working Group is representative of a wide variety of community stakeholders
Variety of feedback received	• Number of feedback forms received • Comments in feedback forms are backed up by arguments
Stakeholders and community feel they have been heard	• Verbal feedback at events • Consultation feedback form
Stakeholder and community are aware of Project	• Number of Project newsletter subscriptions
Positive media articles (print and online)	• Monthly report of media sentiment: positive/neutral/negative • Content analysis
Stakeholders and community engage in two-way dialogue with Project team	• Number of phone calls to Project information line, emails, letters logged
All enquires responded to within 24 hours.	• Call log • Email correspondence log
Event attendees would attend a future engagement event	• Feedback forms at engagement events
Stakeholders and community engage with online information	• Website hits • Number of document downloads • Number of re-tweets/ shares • Number of likes/ loves etc. on Facebook • Surveys (quick polls on website)
Outcome evaluation	
Input from community and stakeholders affects decision making process	• EIS and concept design
Final EIS reflects interests and values of community and stakeholders	• Review EIS against engagement undertaken
Attitudes by stakeholders about Council is positive	• Evaluation forms indicating how stakeholders felt their feedback influenced the design
Stakeholders and community support the Project	• Feedback provided • Correspondence • Verbal feedback at events • Stakeholder and community advocates

Appendix A

Stakeholder list

Appendix A Stakeholder list

Stakeholder category	Organisation	Name
Internal stakeholders	Council executive staff	Leanne Barnes (General Manager)
		Director Community, Relations & Leisure
		Nina Churchward (Executive Manager People and Governance)
		Ian Macfarlane (Acting Director Transport & Utilities)
		Director Planning & Environment
		Graham Stubbs (Director, Business and Governance)
	Council Committees	Planning and Environment (Sustainability) Committee
		Community, Culture and Leisure (Liveability) Committee
		Development Advisory Panel
	Elected Councillors	Mayor Cr. Kristy McBain-
		Deputy Mayor Cr. Mitchell Nadin
		Cr. Tony Allen
		Cr. Robyn Bain
		Cr. Jo Dodds
		Cr. Russell Fitzpatrick
		Cr. Cathy Griff
		Cr. Liz Seckold
		Cr. Sharon Tapscott
	Council Project team	Jim Collins BVSC Manager Water & Sewer
		Andrew T Stewart BVSC Project Manager
		Chris Best BVSC Water and Sewer Assets Engineer
	AECOM Project team and sub-consultants	AECOM Sydney
Government agencies	Department of Planning and Environment	Andrew Beattie
	Office of Environment and Heritage	Allison Treweek
	NSW Environmental Protection Agency	Janine Goodwin
	NSW Department of Primary Industries – Water	Allan Lugg Regional Manager Aquatic Ecosystems
	NSW Department of Primary Industries – Fisheries	Ian Lyall Manager of Aquaculture
	NSW Health	Paul Byleveld Manager Water Unit
	NSW National Parks	Rob McKinnon Senior Project Officer Reserve Establishment

Stakeholder category	Organisation	Name
	NSW Food Authority (Merimbula and Pambula Lake Shellfish QA Program)	Anthony Zammit Manager Shellfish Program
	Local Land Services South East (formerly Southern Rivers Catchment Management Authority)	Graham Scott Senior Land Services Officer
	Crown Lands	
Political stakeholders	State Member for Bega	Andrew James Constance (Liberal)
	Federal Member for Eden Monaro	Hon Dr. Mike Kelly AM (Labour)
Infrastructure and service providers	Roads and Maritime Services	
	Emergency services	Fire and rescue NSW Merimbula
		NSW Police Merimbula
		Ambulance Service of NSW
Recreation/commercial fishing groups including aquaculture associations	NSW Recreational Fishing Alliance	Stan Konstantaras Chairman/President
	Merimbula Oyster Farmers	Jillian Keating – environmental management systems officer
	Merimbula Lake Shellfish Association	Dominic Boynton - coordinator shellfish program
	Pambula Lake Shellfish Association	Greg Canton- Broadwater Oysters
	Sapphire Coast Wilderness Oysters	Sue McIntyre
	Merimbula Lake & Big Game Fishing Club	John Whiticker President
	Professional Fishers Association	
	Wild Caught Fishers Coalition	
	Abalone Association NSW	G Ryzy, J Smythe, J Clarke, S Bunney, D Clark
	Merimbula Marina	Jessica Miller
	Merimbula Marina	Simon Miller
	Reel Affair Fishing Charters	Phil Mitchell
	Rathlan Fishing Charters	Craig Chambers
	Fishpen Charters Merimbula	Bill Deveril
	Headland Fishing Charter	
	Merimbula Big Game & Lakes Angling Club Inc.	President - Lindon Thompson
Community groups	Bega Valley Shire Residents & Ratepayers Association Inc.	John Richardson – Secretary
	Merimbula-Imlay Historical Society	Shirley Bazley
	Pambula-Merimbula Lions Club	Robyn Bedford – President
	Rotary Merimbula	Gai Byrne – President
	Merimbula View Club	Kerry Lewis – President
	1st Merimbula Scout Group	Jamie Clark
	Education	Merimbula Public School
		Lumen Christi Catholic College
		Pambula Public School
Action groups	Merimbula/Pambula Wastewater Alternatives	Marianne Kambouridis
Aboriginal stakeholders	Eden Local Aboriginal Land Council	Penny Stewart – CEO
Environmental interest groups	Panboola Wetlands Trust	Michelle Richmond
	Pambula Beach LandCare	Michelle Richmond

Stakeholder category	Organisation	Name
	Marine Discovery Centre Eden	Karen Wood – Centre Manager
	Bournda EEC	Doug Rekord – Principal
Recreational users of beach and lakes	Merimbula Divers Club	Michael Standen
	Pambula Surf Life Saving Club,	Ann Smith – Captain Stephen Hodgson- President
	Sapphire Coast Boardriders	Craig Ryan
	Merimbula Sailboard Club	John Smythe
Affected land and business owners (including neighbours)	Merimbula Airport – Airport Manager	Ian Baker
	Pambula Merimbula Golf Club	Ryan Clark – GM
	Oaklands Barn Farm	
Businesses and tourism stakeholders	Merimbula Aquarium	Anthony Daley – Manager/Owner
	Merimbula Chamber of Commerce	Orit Karny Winters
	Merimbula Area Promotions & Tourist Info	
	Sapphire Coast Tourist Association	Anthony Osborne – Executive Officer Sapphire Coast Tourism
	Top Lake Boat Hire & Sunset Kiosk	Robby Robertson – Director
	Merimbula Stand Up Paddle Lessons & Tours	Stephen Farley
	Coastlife Adventures	
	Merimbula Lake Holiday Park	
	South Coast Holiday Parks Pambula	
	Discovery Parks Pambula Beach	
	Best Western Fairway Motor Inn	
	Acacia Ponds by Gateway Lifestyle	
	From Little Things Parklands	David Barrie
Media	**Local (paper, radio, online)** Bega District News	Ben Smyth – Editor
	Bega Valley Shire Council Village Newsletter	
	Merimbula News Weekly	Ben Smyth – Editor Denise Dion - journalist
	Merimbula Community Page (online)	
	Power FM Bega Bay	
	Sapphire FM Community Radio	
	ABC South East NSW	Adriane Reardon

Appendix B

Communication and engagement action plan

Appendix B Engagement and communication action plan

Based on the key Project milestones the following activities are planned and will be monitored throughout the Project. The communication and engagement action plan will be adjusted as required.

Timing	Communications activity	Audience	Responsibility
June 2017	Presentation of CSEP to Council	Internal stakeholders	AECOM
July 2017	Media release announcing AECOM appointment	Wider community	
July 2017	1800 number established	N/A	
August 2017	Presentation for Council executive briefing developed		
August 2017	Council executive briefing		
September 2017	Presentation for initial elected Council briefing developed		
September 2017	Engagement HQ, email, and postal address established		
September 2017	Initial Facebook and website content drafted including summary communication engagement plan		
September 2017	Project introduction collateral drafted including: Advertising Media release Community update newsletter Maps/diagrams Electronic direct mail (EDMs)		
September 2017	Develop presentation for initial Federal and State Member briefing		
September 2017	Presentation for initial stakeholder updates developed		
September 2017	Materials for initial community information sessions developed		
September 2017	Develop draft Terms of Reference for Community working group		
Project introduction – October/November 2017			
September 2017	Initial elected Council briefing	Internal stakeholders	AECOM

Timing	Communications activity	Audience	Responsibility
November 2017	Initial Federal and State Member briefing	Political stakeholders	AECOM
November 2017	Initial Facebook and website content goes live	Wider community	Council
November 2017	Letters/emails and calls for briefing invites sent out to stakeholder groups	Government agencies Infrastructure and service providers Recreation/commercial fishing groups Community groups Aboriginal stakeholders Environmental interest groups Recreational users Affected land owners Businesses and tourism stakeholders	AECOM
November 2017	Project introduction collateral published and distributed - explain Project and process, includes invite to information sessions and explains CWG process and asks for feedback: Advertising Media release Community update newsletter Maps/diagrams	Wider community Media	AECOM
November 2017	Initial stakeholder update meetings with groups to explain Project and process and ask for feedback (1 meeting for each of 9 groups)	Government agencies Infrastructure and service providers Recreation/commercial fishing groups Community groups Aboriginal stakeholders Environmental interest groups Recreational users of beach and lakes Affected land owners Businesses and tourism stakeholders:	AECOM
November 2017	Initial community information sessions (3 sessions over 3 days)	Wider community	AECOM

Timing	Communications activity	Audience	Responsibility
November 2017	Call for interest to be on community working group	Wider community	Council
November 2017	Draft report on initial briefings	Internal Stakeholders	AECOM
Options for STP and Ocean Outfall Complete - December 2017			
December 2017	First CWG meeting	N/A	AECOM
February 2017	CWG site visit	N/A	AECOM
March 2018	Second CWG meeting	N/A	AECOM
March 2018	Facebook and website content update	Wider community	AECOM
March 2018	Project update collateral published and distributed explaining CWG and design progress and ask for feedback – includes information on next information sessions Advertising Media release Community update newsletter Maps/diagrams	Wider community Media	AECOM
March 2018	Stakeholder update meetings with groups to explain CWG and design progress and ask for feedback (1 meeting for each of 9 groups)	Government agencies Infrastructure and service providers Recreation/commercial fishing groups Community groups Aboriginal stakeholders Environmental interest groups Recreational users Affected land owners Businesses and tourism stakeholders	AECOM
March 2018	Community information sessions explaining CWG and design progress and ask for feedback (3 sessions over 3 days)	Wider community	AECOM
March 2018	Facebook and website content update – updates from last round of meetings and briefings	Wider community	AECOM
May 2018	Special CWG Session	N/A	AECOM

Timing	Communications activity	Audience	Responsibility
July 2018	Redo of Second CWG meeting	N/A	AECOM
July 2018	Facebook and website update with info from CWG meeting	Wider community	AECOM
August 2018	CWG meeting	N/A	AECOM
August 2018	Facebook and website update with info from CWG meeting	Wider community	AECOM
December 2018	Project update with CWG	N/A	AECOM
November December 2018	Facebook and website update with info from CWG meeting	Wider community	AECOM
November December 2018	Website update	Wider community	AECOM
February 2019	EPA Meeting with CWG	N/A	AECOM
February 2019	Project update collateral published and distributed explaining CWG and design progress and ask for feedback – includes information on next information sessions Advertising Media release Community update newsletter Maps/diagrams	Wider community Media	AECOM
February 2019	Community information sessions explaining CWG and design progress and ask for feedback (4 sessions over 4 days)	Wider community	AECOM
March – May 2019	Twelve week intensive engagement period, including: Information sessions Internal Council briefing Media Tour Stakeholder meetings Social media campaign Newspaper articles and letter to the editor Video series Project signage at beach entrances	Wider community Internal staff	AECOM & BVSC
March 2019	CWG meeting	N/A	AECOM

Timing	Communications activity	Audience	Responsibility
March 2019	Facebook and website update	Wider community	AECOM & BVSC
May 2019	Project collateral published and distributed explaining reuse and dunal exfiltration, including: Advertising Media release Facebook and website Factsheet incl. maps and diagrams	Wider community Media	AECOM
May 2019	Community information sessions about reuse and dunal exfiltration (2 sessions over 2 days).	Wider community	AECOM
June 2019	Social media post – thanking community for attending the info sessions	Wider community	AECOM
July 2019	CWG meeting to discuss oceanographic modelling and carry out preliminary Project options assessment	N/A	AECOM
July 2019	Video (promoted via social media and Project webpage)	Wider community	BVSC
July 2019	Media release on **heritage** and **oceanographic** modelling developed and distributed	Wider community	AECOM
August 2019	Video (promoted via social media and Project webpage)	Wider community	BVSC
August – September 2019	Factsheet/media release on **marine** and **terrestrial ecology** developed and distributed	Wider community	AECOM
Preferred Design Option Confirmation – November 2019			
November 2019	Briefings to regulatory agencies (EPA and Fisheries) on preferred design option	Government agencies	AECOM
November 2019	Council briefing on preferred design option (both elected and executive)	Internal stakeholders	AECOM
November 2019	Federal and State Member briefing on preferred design option	Political stakeholders	BVSC & AECOM

Timing	Communications activity	Audience	Responsibility
December 2019	Project update collateral published and distributed explaining CWG, design progress and preferred design option and ask for feedback – includes information on next information sessions Advertising Facebook and website Media release Community update newsletter Maps/diagrams Electronic direct mail (EDMs)	Wider community Media	AECOM
December 2019	Stakeholder update meetings with groups to explain CWG decision, design progress and preferred design option and ask for feedback. (1 meeting with 8 groups, separate meeting with Aboriginal stakeholders)	Government agencies Infrastructure and service providers Recreation/commercial fishing groups Community groups Aboriginal stakeholders Environmental interest groups Recreational users Affected land owners Businesses and tourism stakeholders	AECOM
December 2019	Community information sessions explain CWG, design progress and preferred design option and ask for feedback (3 sessions over 3 days)	Wider community	AECOM
December 2019	Facebook and website content update – updates from last round of meetings and briefings	Wider community	AECOM
EIS Public Display			
	Facebook and website content update - explain display and approval process, includes information on how to make a submission, and invites to next info sessions	Wider community	AECOM
	Project update collateral published and distributed - explain display and approval process, includes information on how to make a submission.	Wider community Media	AECOM

Timing	Communications activity	Audience	Responsibility
	Advertising Media release Community update newsletter		
Prepare and Submit Submissions Report			
	Facebook and website content update	Wider community	AECOM
	Project update collateral published and distributed – including letters to 10 stakeholder groups and CWG Advertising Stakeholder letters Media release Community update newsletter Electronic direct mail (EDMs)	Government agencies Political stakeholders Infrastructure and service providers Recreation/commercial fishing groups Community groups Aboriginal stakeholders Environmental interest groups Recreational users of beach and lakes Affected land owners Businesses and tourism stakeholders Media CWG Anyone who made a submission	AECOM
Ministerial Decision			
	Facebook and website content update	Wider community	AECOM
	Project update collateral published and distributed – including letters to 10 stakeholder groups and CWG Advertising Stakeholder letters Media release Community update newsletter Electronic direct mail (EDMs)	Government agencies Political stakeholders Infrastructure and service providers Recreation/commercial fishing groups Community groups Aboriginal stakeholders Environmental interest groups Recreational users of beach and lakes Affected land owners	AECOM

Timing	Communications activity	Audience	Responsibility
		Businesses and tourism stakeholders Media CWG Anyone who made a submission	

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Memorandum

To	Bega Valley Shire Councillors	Page	1 of 13
CC			
Subject	Merimbula Effluent Management Strategy Focus Group Multi Criteria Analysis Results and Interpretation		
From	Matthew Renshaw		
File/Ref No.		Date	24-May-2013

Dear Councillors,

The Merimbula Effluent Options Investigation project is a project to investigate all options for future effluent disposal and reuse from Merimbula Sewage Treatment Plant (STP). An improved effluent disposal system is required because the existing disposal systems, which include a shore-based ocean outfall and dunal exfiltration ponds, no longer meet environmental objectives or community expectations.

Merimbula STP is licenced by the NSW Environment Protection Authority under the Protection of the Environment Operations Act 1997. The licence contains a Pollution Reduction Program (PRP) requirement that Council must fully consider all reasonable and feasible disposal options as well as the range of beneficial reuse options, and undertake a sound and adequate assessment of the options and the impacts on environmental values, sustainability, Aboriginal cultural heritage and other issues. PRP6 also requires Council to consult with stakeholders to nominate a preferred strategy for the disposal and beneficial use of effluent.

4 independent investigative reports and 16 Fact Sheets have been developed for the project since it commenced in late 2009. A Focus Group was established in 2010 to consult, guide, review and discuss the available project information. The Focus Group has met four times.

Plate 1. Focus Group - Merimbula Effluent Options Investigation

Back (L to R). Matthew Renshaw (AECOM), Paul Lee (NSW Office of Water), Bill Taylor (BVSC), Michael Britten (BVSC), John Dawson (Community Representative), Brett Weingarth (Merimbula Lake Shellfish Quality Assurance Program), Sue McIntyre (Pambula Lake Shellfish Quality Assurance Program), Dr Nicholas Yee (Elgin & Associates). Front (L to R). Nigel Sargent (NSW Environment Protection Authority), Jim Collins (BVSC), Ken McLeod (BVSC), Mandi Stevenson (Southern Rivers Catchment Management Authority) Absent: Ian Bovill (Community Representative), Helen Davies (Southern Rivers Catchment Management Authority)

This memorandum provides both the graphical output of results and interpretation of results from the Focus Group's Multi-Criteria Analysis (MCA) of shortlisted Effluent Disposal System options, Effluent Reuse Scheme options and Effluent Management Strategies.

The Focus Group have, through their appreciation and consideration of an option's life cycle performance, constraints and opportunities, made informed decisions when scoring one option relative to another.

The results show the relative benefits and costs of one option compared with another, before combining the result for disposal options with reuse options to form and compare effluent management strategies. The intended purpose of presenting the output in this manner is to show those options and strategies which provide the greatest or least relative benefit against those that have the highest or least capital and NPV costs. This allows decision support and trade-offs to be considered.

1.0 Effluent Disposal Only Evaluation

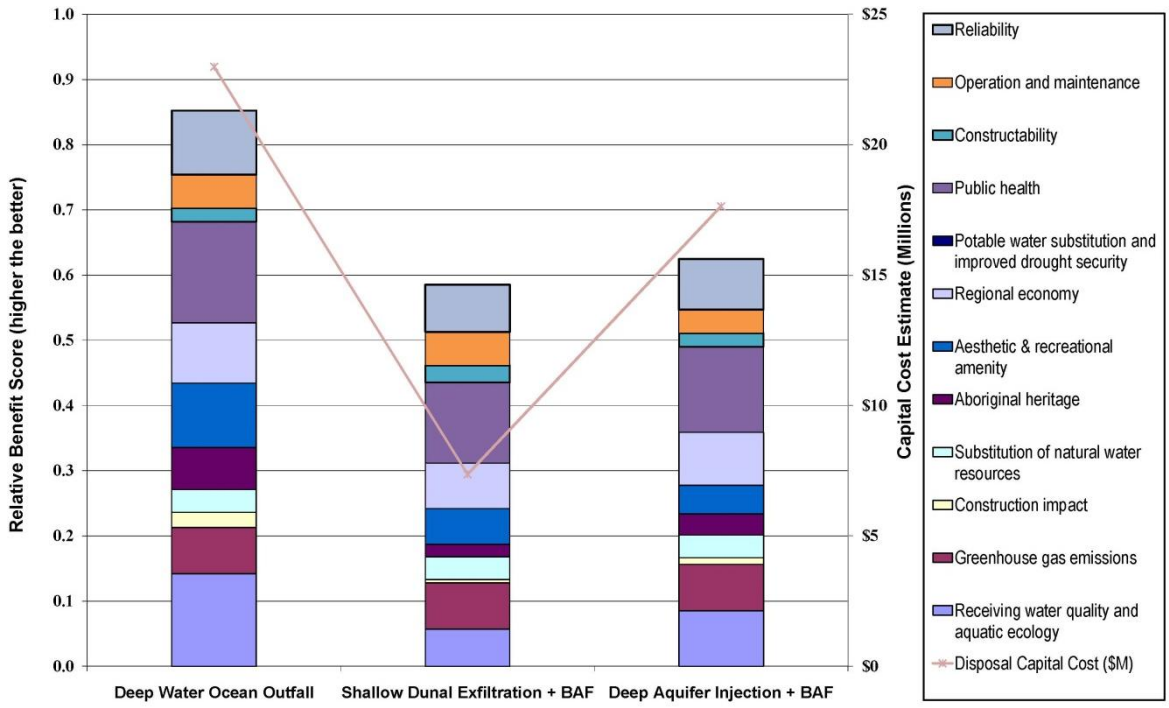


Figure 1 Merimbula Effluent Disposal Systems - Decision Support / Multi-Criteria Analysis

1.1 Interpretation of Disposal Non-Cost Results

The following interpretations can be deduced from Figure 1.

The Focus Group consider that the shortlisted effluent disposal options provide the greatest relative benefit in the following order:

1. System 1 - *Deep Water Ocean Outfall* – considerable additional benefit over *Shallow Dunal Exfiltration* and *Deep Aquifer injection*.
2. System 3 - *Deep Aquifer Injection (with reduced nitrogen concentrations achieved through nitrification and de-nitrification Biologically Activated Filters (BAF))* – marginal additional benefit over *Shallow Dunal Exfiltration*.
3. System 2 - *Shallow Dunal Exfiltration (with reduced nitrogen concentrations achieved with BAF).*

The Focus Group considers that:

- the *Deep Water Ocean Outfall* means of disposal offers the greatest relative benefit through improving receiving water quality and ecology, providing the least construction impacts, greatest preservation of aboriginal heritage, improving aesthetic and recreational amenity, enhancing the regional economy, protecting public health and providing the greatest system reliability.

- the *Deep Alluvial Aquifer* offers greater relative benefit over *Shallow Dunal Exfiltration* through improving receiving water quality and ecology, providing greater preservation of aboriginal heritage, and enhancing the regional economy.
- the *Shallow Dunal Exfiltration* offers greater relative benefit only through less complex construction.

1.2 Consideration of Disposal Costs

The estimated capital cost and annual operation and maintenance (O&M) cost of the three disposal systems are shown in Table 1:

Table 1 Estimated Capital, Annual O&M and CO2-e costs of Effluent Disposal Systems

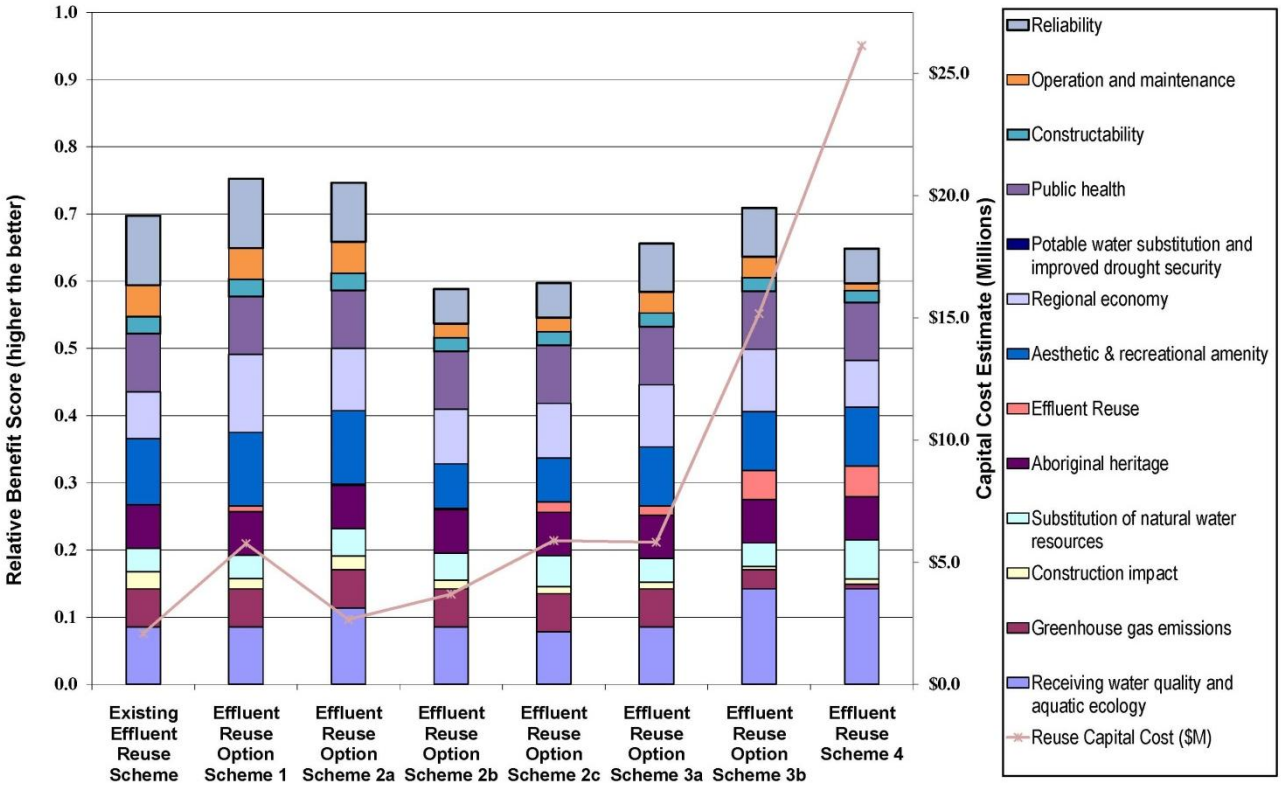
Effluent Disposal System	Approx. Est. Capital Cost	Approx. Est. Annual O&M Cost	Approx. O&M Cost NPV over 30 years	Approx. Est. 30 year NPV Cost	Approx. Est. Annual CO2-e Cost (@$25/tonne)[1]
Deep Water Ocean Outfall	$23.0 million	$26,000	$0.3 million	$23.3 million	$700
Deep Aquifer Injection	$17.6 million	$300,000	$3.9 million	$21.5 million	$2,000
Dunal Exfiltration	$7.4 million	$240,000	$3.1 million	$10.4 million	$1,100

[1] *Note that the cost of CO2-e emissions is not included in the NPV costs as Council does not currently qualify for the NGER Scheme and therefore does not pay for its carbon emissions.*

Table 1 shows:

- the deep water ocean outfall would be the most expensive effluent disposal system to construct, costing approximately three (3) times more than a shallow dunal exfiltration system.
- the deep water ocean outfall would be approximately ten (10) times less expensive to operate than other systems and produce less greenhouse gas emissions and CO2-e cost.
- The deep water ocean outfall would be over twice as costly to construct, maintain and operate, than a shallow dunal exfiltration system over a 30 year planning period and the typical design life of these systems.

2.0 Effluent Reuse Only Evaluation



Pambula Merimbula Golf Club	Pambula Merimbula Golf Club EXPANSION	Pambula Merimbula Golf Club	Pambula Merimbula Golf Club	Pambula Merimbula Golf Club	Pambula Merimbula Golf Club	Pambula Merimbula Golf Club	Pambula Merimbula Golf Club
Oaklands Agricultural Irrigation	Oaklands Agricultural Irrigation	Oaklands Agricultural Irrigation	Oaklands Agricultural Irrigation	Oaklands Agricultural Irrigation	Oaklands Agricultural Irrigation	Oaklands Agricultural Irrigation	Oaklands Agricultural Irrigation
		Pambula Urban Open Space Irrigation	South Pambula Agricultural Irrigation	South Pambula Agricultural Irrigation	Millingandi Agricultural Irrigation	Wolumla Agricultural Irrigation	Indirect Potable Reuse (YPD)
				Lochiel Agricultural Irrigation			

Figure 2 Merimbula Effluent Reuse Schemes - Decision Support / Multi-Criteria Analysis

2.1 Interpretation of Reuse Non-Cost Results

The following interpretations can be deduced from Figure 2.

The Focus Group consider that the shortlisted effluent reuse scheme options (which include upgrade of the sewage treatment plant to reduce phosphorus concentrations and improve disinfection) provide the greatest relative benefit in the following order:

1. *PMGC Expansion* and Oaklands Agricultural Irrigation (Scheme 1)
2. *Pambula urban open space*, PMGC Existing and Oaklands agricultural irrigation (Scheme 2a)

3. *Wolumla agricultural irrigation*, PMGC Existing and Oaklands agricultural irrigation (Scheme 3b)
4. PMGC Existing and Oaklands agricultural irrigation (*Existing Effluent Reuse Scheme*)
5. *Millingandi agricultural irrigation*, PMGC and Oaklands agricultural irrigation (Scheme 3a)
6. *Yellow Pinch Dam (YPD) Indirect Potable Reuse*, PMGC Existing and Oaklands Agricultural Irrigation (Scheme 4)
7. *Lochiel agricultural irrigation*, South Pambula agricultural irrigation, PMGC Existing and Oaklands agricultural irrigation (Scheme 2c)
8. *South Pambula agricultural irrigation*, PMGC Existing and Oaklands agricultural irrigation (Scheme 2b)

It is important to note that the Focus Group have recognised interdependencies associated with the reuse schemes when partnered with particular effluent disposal systems. These differentiations are not shown in the above Figure 2, however are evident in Figure 3 (Section 3 of this Memorandum)

The Focus Group considers that:

- *Scheme 1 – PMGC Expansion* and *Scheme 2a - extension of the existing scheme to irrigate Pambula urban open space* offer the greatest relative benefits over other schemes through improving aesthetic and recreational amenity, enhancing the regional economy and providing the greatest system reliability.
- *Scheme 3b – Wolumla agricultural irrigation* - offers the greater relative benefits over other schemes through improved receiving water quality and ecology and minimising disposal through increasing effluent reuse. Some benefits are also perceived over other effluent reuse schemes towards improving the regional economy, and improving aesthetic amenity. However, Scheme 3b scores poorly with respect to construction impact and carbon emissions.
- *Existing Effluent Reuse Scheme* (no increased effluent reuse) offers greater relative benefits over other schemes through least carbon emissions, least construction impact, improving aesthetic and recreational amenity, simplest construction, least demanding operation and maintenance requirements and providing good system reliability.
- Scheme 3a – *Millingandi agricultural irrigation* - offers greater relative benefits over other schemes through improving the regional economy and increased scheme reliability. Some benefits are also perceived over other effluent reuse schemes towards improving aesthetic amenity and minimising disposal through effluent reuse. However, Scheme 4 provides the least benefit with respect to carbon emissions.
- Scheme 4 – *YPD Indirect Potable Reuse with Advanced Water Treatment Plant* - offers greater relative benefits through improved receiving water quality and ecology, and by minimising disposal through indirect potable reuse. Some benefits are also perceived over other effluent reuse schemes towards improving aesthetic and recreational amenity and increasing the substitution of natural water resources. However, Scheme 4 provides the least benefit with respect to its contribution to construction impact and carbon emissions.
- Schemes 2b –*South Pambula agricultural irrigation* and Scheme 2c - *South Pambula and Lochiel agricultural irrigation* - offer the least relative benefit. Whilst these schemes offer improvements over the status quo, relatively speaking they score poorly to improving receiving water quality and ecology, improving the regional economy, and are considered to have more issues associated with reliability and operation and maintenance.

The Focus Group favours, in order of preference, the following effluent reuse schemes over others:

1. Scheme 1 – *PMGC Expansion*
2. Scheme 2a – *Pambula urban open space*
3. Scheme 3b – *Wolumla agricultural irrigation*
4. *Existing Effluent Reuse Scheme* (no increased effluent reuse only treatment plant upgrades)

The Focus Group is less inclined to favour the following effluent reuse schemes over others:

5. the Scheme 3a – *Millingandi agricultural irrigation*

6. the Scheme 4 – *YPD Indirect Potable Reuse with Advanced Water Treatment Plant*

The Focus Group is least in favour of the following effluent reuse schemes over others:

7. Schemes 2b – *South Pambula agricultural irrigation*
8. Scheme 2c – *South Pambula and Lochiel agricultural irrigation*

The Focus Group scored highly (second), Scheme 2a, considering it to have greater relative benefit over other irrigation schemes. This scheme achieves a very small (~1% per annum) increase in effluent reuse above existing and shows that the Focus Group considers the many benefits of a scheme like this to outweigh the benefit of broader scale effluent reuse (that typically increases the overall volume of reuse and minimises disposal to the environment).

This is not to say that the Focus Group does not value increasing effluent reuse. The increasing benefit trend with Schemes 2b, 2c, 3a & 3b suggest additional reuse is valued by the group. However it is clear when comparing the relative benefits of the Existing Effluent Reuse Scheme, Scheme 1 and Scheme 2a against other schemes that the Focus Group appears to consider that the risks of broader effluent reuse outweigh the benefits.

The Focus Group appears conscious of introducing more risk into the Pambula River catchment through increased irrigation of agricultural land with effluent, considering that the adjacent Merimbula Lake catchment and further inland to Wolumla in the Bega River Catchment are better able to deal with effluent reuse scheme risks than the Pambula River catchment. This is reflected in the relative benefit which Schemes 3a and 4 offer over Schemes 2b and 2c. It is also likely that the Focus Group scored reuse opportunities in the Pambula River catchment low due to concerns over the Oaklands reuse scheme in operation. As a measure of community perception of what broader reuse schemes “look like”, the Oaklands agricultural reuse scheme needs to be a well-run, efficient and effective scheme in order for community trust and confidence to be built sufficiently as to “pave the way” for extended reuse in the Merimbula Pambula area.

2.2 Consideration of Reuse Costs

The estimated capital cost and annual O&M costs of the eight effluent reuse schemes are shown in Table 2:

Table 2 Estimated Capital, Annual O&M and CO2-e costs of Effluent Reuse Schemes

Effluent Reuse Scheme	Approx. Capital Cost	Approx. Annual O&M Cost	Approx. O&M Cost over 30 years	Approx. Est. 30 year NPV Cost	Approx. Annual CO2-e Cost (@$25/tonne)
Existing Effluent Reuse Scheme	$2.1 million	$165,000	$2.5 million	$4.6 million	$5,700
Effluent Reuse Option Scheme 1	$5.8 million	$181,000	$2.7 million	$8.5 million	$6,000
Effluent Reuse Option Scheme 2a	$2.7 million	$169,000	$2.5 million	$5.2 million	$5,800
Effluent Reuse Option Scheme 2b	$3.7 million	$180,000	$2.7 million	$6.4 million	$6,000
Effluent Reuse Option Scheme 2c	$5.9 million	$210,000	$3.1 million	$9.0 million	$7,700
Effluent Reuse Option Scheme 3a	$5.8 million	$214,000	$3.1 million	$8.9 million	$7,800
Effluent Reuse Option Scheme 3b	$15.2 million	$384,000	$5.3 million	$20.5 million	$17,000
Effluent Reuse Scheme 4	$26.1 million	$1,854,000	$27.5 million	$53.6 million	$121,500

[1] *Note that the cost of CO2-e emissions is not included in the NPV costs as Council does not currently qualify for the NGER Scheme and therefore does not pay for its carbon emissions.*

Table 2 shows:

- the Scheme 4 – *YPD Indirect Potable Reuse with Advanced Water Treatment Plant* would be the most expensive effluent reuse scheme to construct, maintain and operate, costing more than ten (10) times the improvements proposed to the *Existing Effluent Reuse Scheme* through upgrade of the sewage treatment plant to reduce phosphorus concentrations and improve disinfection.
- the Scheme 1 – *PMGC Expansion* would be approximately two (2) times as expensive to construct, maintain and operate than improving the *Existing Effluent Reuse Scheme* through upgrade of the sewage treatment plant to reduce phosphorus concentrations and improve disinfection.
- the Scheme 2a – *Pambula urban open space* would be approximately one and a half (1.5) times as expensive to construct, maintain and operate than improving the *Existing Effluent Reuse Scheme* through upgrade of the sewage treatment plant to reduce phosphorus concentrations and improve disinfection.
- The Scheme 3b – *Wolumla agricultural irrigation* would be approximately four and a half (4.5) times as expensive to construct, maintain and operate than improving the *Existing Effluent Reuse Scheme* through upgrade of the sewage treatment plant to reduce phosphorus concentrations and improve disinfection.

3.0 Effluent Management Strategy Evaluation

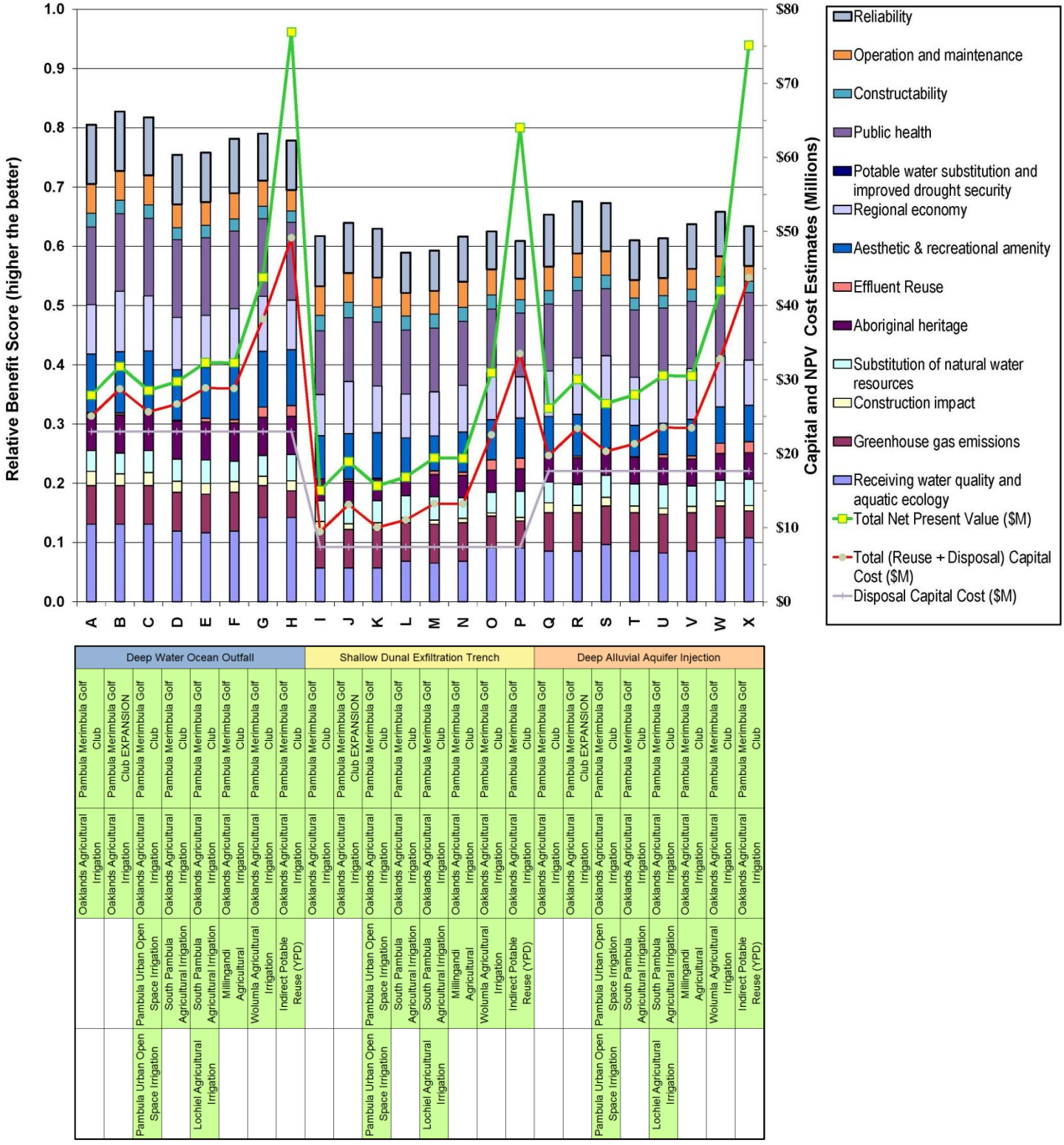


Figure 3 Merimbula Effluent Management Strategies - Decision Support / Multi-Criteria Analysis

3.1 Interpretation of Strategy Non-Cost Results

The following interpretations can be deduced from Figure 3, where disposal systems and reuse schemes are combined into effluent management strategies.

The Focus Group consider that:

1. Deep water ocean outfall disposal based effluent management strategies have significantly greater relative benefits over all others.
2. Shallow dunal exfiltration and deep aquifer injection disposal-based effluent management strategies have near equal relative benefits.

The Focus Group considers that:

- *Strategy B – Deep Water Ocean Outfall* and *expanded irrigation of the PMGC* and *Strategy C - Deep Water Ocean Outfall and irrigation of Pambula urban open space* offer the greatest relative benefit through improving receiving water quality and ecology, providing the least construction impacts, providing the greatest potential preservation of aboriginal heritage, improving aesthetic and recreational amenity, enhancing the regional economy, protecting public health and providing the greatest system reliability.
- *Strategy L – Shallow Dunal Exfiltration trench* and *South Pambula agricultural irrigation* and *Strategy M – Shallow Dunal Exfiltration trench* and *South Pambula and Lochiel agricultural irrigation* - offer the least relative benefits. These schemes score poorly with the Focus Group factoring in perceived risks to improving receiving water quality and ecology, improving the regional economy, and are considered to have more issues associated with reliability and operation and maintenance.
- Strategies R & S rank well on account of the Focus Group seeing relative benefit (in the form of reduced risks) with *Deep Alluvial Aquifer Injection* based reuse schemes relative to corresponding *Shallow Dunal Exfiltration.* It is reasonable to conclude that the technical risks associated with *Deep Alluvial Aquifer Injection* based schemes were not fully appreciated by the Focus Group in the MCA workshops. AECOMs technical team scored *Deep Alluvial Aquifer Injection* based schemes lower on account of their own professional understanding.

3.2 Consideration of Strategy Costs

The estimated capital cost and annual O&M cost of the 24 effluent management strategies are shown in Table 3:

Table 3 Estimated Capital, Annual O&M and CO2-e costs of Effluent Management Strategies

Effluent Management Strategy	Approx. Est. Capital Cost	Approx. Est. Annual O&M Cost	Approx. Est. 30 year NPV Cost	Approx. Est. Annual CO2-e Cost (@$25/tonne)
A	$25.1 million	$191,000	$27.9 million	$6,400
B	$28.7 million	$207,000	$31.8 million	$6,700
C	$25.6 million	$195,000	$28.5 million	$6,500
D	$26.7 million	$206,000	$29.7 million	$6,700
E	$28.9 million	$236,000	$32.3 million	$8,400
F	$28.8 million	$240,000	$32.3 million	$8,500
G	$38.2 million	$410,000	$43.8 million	$17,700
H	$49.1 million	$1,880,000	$76.9 million	$122,200
I	$9.4 million	$403,000	$15.0 million	$6,800
J	$13.1 million	$419,000	$18.9 million	$7,100
K	$10.0 million	$407,000	$15.7 million	$6,900
L	$11.1 million	$418,000	$16.8 million	$7,100

Effluent Management Strategy	Approx. Est. Capital Cost	Approx. Est. Annual O&M Cost	Approx. Est. 30 year NPV Cost	Approx. Est. Annual CO2-e Cost (@$25/tonne)
M	$13.2 million	$448,000	$19.4 million	$8,800
N	$13.2 million	$452,000	$19.4 million	$8,900
O	$22.5 million	$622,000	$30.9 million	$18,100
P	$33.5 million	$2,092,000	$64.0 million	$122,600
Q	$19.7 million	$469,000	$26.1 million	$7,800
R	$23.4 million	$485,000	$30.0 million	$8,100
S	$20.3 million	$473,000	$26.8 million	$7,800
T	$21.3 million	$484,000	$28.0 million	$8,000
U	$23.5 million	$514,000	$30.5 million	$9,700
V	$23.5 million	$518,000	$30.5 million	$9,900
W	$32.8 million	$688,000	$42.0 million	$19,100
X	$43.8 million	$2,158,000	$75.1 million	$123,600

Table 3 shows:

- The least cost effluent management strategy (capital, operating and NPV) is Strategy *I -Shallow Dunal Exfiltration disposal and Existing Effluent Reuse Scheme (no additional reuse)*.
- The highest cost effluent management strategy (capital, operating and NPV) is*, Strategy H –Deep Water Ocean Outfall disposal and YPD Indirect Potable Reuse .* This and Strategies P, W & X are significantly more costly than all other strategies.

Excluding those strategies which incorporate *Wolumla agricultural reuse* and *YPD Indirect Potable Reuse:*

- *Shallow Dunal Exfiltration based str*ategies average approximately $17.5 million over 30 years
- *Deep Aquifer Injection* based strategies average approximately $28.6 million over 30 *years*
- *Deep Water Ocean Ou*tfall based strategies average approximately $30.4 million over 30 years

4.0 Other Considerations

4.1 State and federal Government Subsidy Funding

Council has allowed a notional amount of approximately $20 million over the next 10 years for Merimbula STP effluent disposal and reuse in Council's *DRAFT Development Servicing Plan – Sewerage Services* (NSW Public Works, 2013). Based on the planning level cost estimates prepared to date as part of this study, this amount is currently insufficient to fund any of the deep water ocean outfall disposal based strategies (A-H) including strategies B and C, which the Focus Group have ranked as having the highest relative benefits. State and/or Federal Government subsidy would be required to realise strategies B or C in the near term. Funding shortfall may mean a less meritorious strategy needs to be chosen.

4.2 Shallow Dunal Exfiltration

Despite significant work investigating the hydrogeological capacity and potential water quality impacts of a dunal exfiltration system, further investigation as part of an Environmental Impact Assessment will be required. The EPA has recently requested more information to assess this option including: more soil sampling and analysis to determine the phosphorous sorption capacity through the full depth of affected soil profiles, the length of time for phosphorous sorption exhaustion and differences in redox potential and variability in de-nitrification potential; further consideration and assessment of the environmental values of impacted waterways; examination of other relevant pollutant (e.g. heavy metals) impact on values; defining a mixing zone for exfiltration induced groundwater discharge in Merimbula Lake; assessment of impacts on the ecology of the Lake; impacts on Aboriginal archaeological heritage and impacts on Bangalay Sand forest Endangered Ecological Community.

4.3 Deep Aquifer Injection

The investigations into the deep aquifer injection disposal option have been limited to one study involving resistivity imaging and test drilling of one pilot bore. There remains relative uncertainty regarding the conditions and potential for effluent disposal, particularly disposal of peak wet weather flows (in comparison to Deep Water Ocean Outfall). Further investigations involving long term pump tests, hydro-chemical studies and modelling are required. An Environmental Impact Assessment would need to incorporate this work along with consideration of the environmental values of potentially impacted waterways; examination of other relevant pollutant (e.g. heavy metals) impact on such values; defining a mixing zone for deep aquifer induced groundwater discharge; impacts on Aboriginal archaeological heritage and impacts on Bangalay Sand forest Endangered Ecological Community. Council costs for these studies have not been determined, nor included in cost estimates prepared for this current study.

4.4 Effluent Constituents other than nutrients

Other effluent constituents have not been considered as a part of the detailed assessment of disposal systems. They will likely need to be considered as a part of a full ecological assessment under an Environmental Impact Assessment framework to determine their required mixing, attenuation and/or treatment to enable a safe and sustainable discharge.

4.5 Improved Sewage Treatment and potential for reduction in capital costs for Deep Water Ocean Outfall

Providing an increased level of treatment at the sewage treatment plant may offer potential to reduce the capital costs associated with the construction of a *Deep Water Ocean Outfall*. The capital cost of the ocean outfall has been based on modelling of existing effluent quality and the need to convey through a 4.4km pipeline offshore to a depth of 40m in order to be subject to sufficient hydrodynamic effects and meet the relevant water quality objectives.

Hydrodynamic modelling of a reduced concentration of phosphate (2.5 mg/L) in the effluent resulted in relevant water quality objectives being achieved at a depth of 20m. A similar result may be possible for nitrogen species through the addition of Nitrification and De-nitrification Biologically Activated Filters (BAF).

If the relevant water quality objectives could be met closer to the shoreline by improving effluent quality through nutrient removal treatment plant upgrades, it would allow a reduction in pipeline length of about 2.2km based on the current indicated alignment (from STP eastwards to Merimbula Bay). Alternative land-based alignments in conjunction with "off-headland" alignments have not been considered in any detail. Council costs for these studies have not been determined, nor included in cost estimates prepared for this current study. Allowing for the additional capital cost of BAF ($3.8 million) for a shorter outfall the total capital cost of an ocean outfall would be

reduced from $23.0 million to $18.4 million. A reduced level of additional treatment may result in relevant water quality objectives being achieved at 30m depth, allowing a reduction in pipeline length of 1.1km and an upper estimate of total capital cost of $22.6 million.

This compares with capital costs for *Deep Aquifer Injection* of $17.5 million and *Shallow Dunal Exfiltration* of $7.5 million.

4.6 Impacts on Existing Recycled Water Users

There is a need to discuss with the PMGC and Oaklands Recycled Water Users, Council's commitment to reducing effluent nutrient concentrations at the sewage treatment plant. The current plant configuration does not allow for any side stream diversion to these users which would allow for existing effluent nutrient concentrations to remain.

Should either dunal disposal system be proposed, the golf course and Oaklands Recycled Water Users would need to be made aware that concentrations of both P & N will be significantly reduced in the effluent they receive. As a result, there may be a need and an associated cost to supplement the effluent application with additional nutrients (e.g. superphosphate, urea, DAP fertiliser). Nevertheless, the availability of water at no charge through accepting Council's effluent would be much more attractive to the PMGC than paying for an equivalent amount of potable town water to irrigate the golf course. Likewise, no charge for effluent provides a financial savings on river water usage for the Oaklands Recycled Water user.

4.7 Scheme 3b Wolumla Agricultural irrigation

Scheme 3b was chosen third in terms of relative benefits for effluent reuse schemes, offering particular benefits in terms of receiving water quality and ecology and effluent reuse achieved. The high amount of potential effluent reuse (85%) is contingent upon a large available land area (~280ha), large storage (~200 ML) and multiple property owners utilising the effluent efficiently in perpetuity. The reliance on 3rd parties in perpetuity is problematic and not without risk, especially if this option results in a reduction in disposal system size (e.g. a beach face outfall for wet weather flows only). Less risky, although also problematic, would be Council purchasing the required land and operating the effluent reuse system(s) as well as the disposal system. This may help to make an effluent management strategy with such a heavy reliance on reuse more feasible.

4.8 Benefits of reuse when considered with a disposal system

The importance of increasing effluent reuse quantities and reducing disposal volumes is considered greater for a shallow dunal exfiltration disposal system than a deep water ocean outfall disposal system. This is because there are phosphorous sorption capacity, nitrogen mobilisation and Merimbula Lake nutrient loading issues that would be lessened by reducing the volume of effluent disposed to the dunes (by increased effluent reuse). Such issues do not apply for the deep water ocean outfall option.

4.9 Greenhouse Gas Emissions

Companies and public authorities which generate over 25,000 tonnes of CO2-e emissions each year, qualify as being liable entities under the National Greenhouse and Energy Reporting (NGER) Act and are subject to the carbon pricing mechanism . Currently there are 15 NSW Councils which qualify for the scheme (LEPID, 2013), largely as a result of their emissions associated with the operation of their landfills. Sewage treatment is also a contributor to their total emissions amongst other emitting operations such as fleet vehicles and electricity usage through pumping and treatment of water and sewage.

Bega Valley Shire Council reported in 2011/12 that there total emissions in tonnes of CO2-e was 21,874 tonnes. Bega Valley Shire Council is not currently listed for the 2012/13 financial year on the Liable Entities Public Information Database as maintained by the Clean Energy Regulator (CER).

The Focus Group consider greenhouse gas or carbon emissions to be an important criteria when considering effluent management opportunities, having attributed a relative weighting of 7% in the context of all other MCA criteria. Without considering any carbon off-set arrangements, the Focus Group should be aware that Scheme 4 has the potential to qualify Council for the NGER Scheme and payment for its annual carbon emissions to the CER.

4.10 Cost Estimate Contingencies

The capital cost and NPV cost estimates include the following allowances on direct costs, i.e. sum of infrastructure components – quantity x rates ($ per unit):

- Pre-construction activities, engineering design costs at 10% of the direct cost
- Construction Supervision / Project Management at 6% of the direct cost
- Contractor Profit at 15% of the direct cost
- Contingency (incl. Overheads) at 20% of the direct cost

These are typical engineering estimates used at an options study level for planning purposes and relative comparison of options. The sum of these allowances equates to 50% on top of direct cost and is considered to be appropriate for this level of investigation.

5.0 Focus Group Recommendations

The following Focus Group recommendations were developed at Workshop #4. They are based on the Focus Group's consideration of the MCA relative benefits, costs and Council's notional budget allocation for effluent management. They are provided as recommendations to Council for consideration of a future effluent management strategy for the Merimbula STP to meet NSW Environment Protection Licence PRP6 requirements.

	Focus Group Recommendations	Estimated 30-year net present value (NPV) cost	Estimated up-front capital cost
1.	As a minimum, upgrade the sewage treatment plant to reduce phosphorus concentrations and improve disinfection.	$4.6M	$2.1M
2i.	A *Deep Water Ocean Outfall* is the favoured effluent disposal option offering the greatest relative environmental and public health benefits. Council should pursue this disposal option and ways to fund a possible capital funding shortfall exceeding $10.0M over and above that allowed in Council's current long-term financial plan for Merimbula/Pambula STP upgrades and effluent disposal (ie. $11.5M over 4 years). Council should defer the expansion of effluent reuse beyond the existing schemes until an outfall is built using all available funds.	$23.3M	$23.0M
2ii.	The Focus Group also considers there is an opportunity to reduce the length of an ocean outfall, providing that the point of discharge occurs outside the limits of Merimbula Bay and still be subject to the influence of predominant ocean currents. A shorter length outfall may also require the provision of an increased level of treatment (eg. nitrogen reduction) which would be an additional cost to that shown right.	$19.1M	$18.8M
3i.	If funding for a *Deep Water Ocean Outfall* is insufficient, Council should consider an effluent management strategy involving a *Shallow Dunal Exfiltration* system for disposal, additional treatment plant upgrades including nitrogen reduction and the expansion of effluent irrigation on the Pambula Merimbula Golf Club.	$14.3M[1] (Dune: $4.53 N red.: $5.91 PMGC:$3.88)	$11.0M[1] (Dune: $3.61 N red.: $3.76 PMGC:$3.66)
3ii.	*Pambula urban open space* areas should also be considered as a part of the strategy, if and when funding is available for effluent reuse expansion.	$0.62M[1]	$0.56M[1]
3iii.	*Millingandi agricultural reuse* areas should also be considered as a part of the strategy if and when funding is available for effluent reuse expansion to increase the volume of reuse and thereby decrease the volume to effluent disposal to a *Shallow Dunal Exfiltration* system. (Note: even though Wolumla was considered to offer higher relative benefits the NPV cost was considered to be excessive).	$4.3M[1]	$3.7.M[1]
4	No further consideration of strategies which incorporate Scheme 4 *YPD Indirect Potable Reuse* due to the excessive NPV cost and greenhouse gas emissions / costs.	-	-
5	No further consideration of strategies which incorporate Schemes 2b and 2c for the lesser relative benefits and higher NPV costs	-	-

[1] *Cost assumes minimum upgrades at the sewage treatment plant to reduce phosphorus concentrations and improve disinfection have been implemented prior.*

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Memorandum

To	Bega Valley Shire Council	Page	1 of 9
CC	AECOM Project Team		
Subject	Merimbula STP Upgrade / Outfall & EIS Project : Multi-Criteria Analysis (MCA) to Support Selection of Best Apparent Option		
From	Sean Gilchrist		
Reviewed	Matthew Renshaw		
File/Ref No.	60541653-MO-WW-0002	Date	18 Sept 2019

Background

AECOM has developed several treatment plant options and discharge location options for the Merimbula STP Upgrade and Ocean Outfall Concept Design & Environmental Impact Statement (EIS) project.

Selection of several non-cost criteria for use in comparing developed options were documented in *Preliminary Assessment Criteria, AECOM, 22 Dec 2017*.

To support selection of the "best apparent" option, key AECOM team members recently (30 August 2019) weighted selected non-cost criteria and then scored 8 developed options against each criterion.

This Memorandum documents the outcomes of the completed MCA, makes reference to the separate Community Working Group's own MCA outcomes, and draws conclusions on the "best apparent" option.

When the "best apparent" option (or a modified / hybrid option) is mutually agreed with BVSC, AECOM will be able to document a formal "Project Description" which will trigger:

- commencement of more detailed and site-specific environmental studies (tailored to support the further development and environmental assessment of the "best apparent" option);
- further development of the STP Upgrade Concept Design;
- further development of the Ocean Outfall Concept Design; and,
- formal commencement of EIS document preparation.

Agreed Evaluation Criteria

Several non-cost criteria, falling in the broad categories of Environmental, Social, and Economic, were previously developed in late 2017 by the AECOM project team and subsequently documented (*Preliminary Assessment Criteria, AECOM, 22 Dec 2017*). These criteria were similar to the criteria subsequently developed by the Community Working Group (CWG) in a separate exercise.

On account of the broad alignment of the CWG's adopted non-cost criteria with the previously developed AECOM team non-cost criteria, seven (7) final criteria were adopted for use in AECOM's own MCA of the 8 options as follows:

Category	Criterion	Description
Environmental	Water quality	Potential impacts/benefits to water quality (groundwater, estuarine and marine) with consideration of: • Water chemistry – disinfection chemicals (e.g. chlorine) and by-products, nutrients (nitrogen, phosphorus), heavy metals, micro-plastics • Effluent plumes and zones of influence – including during rainfall events; risk of long-shore drift/ circulation/ flow-back to beaches or estuaries, potential algal blooms • Human health risk (via marine contact pathways, or future reuse opportunity pathways – e.g. sporting field irrigation)
	Ecology	Terrestrial and/or aquatic impacts/benefits (in particular, with respect to any threatened species, threatened habitat or endangered ecological communities, wetlands, marine life) • Terrestrial Potential impacts/benefits to terrestrial threatened species and populations, habitat and endangered ecological communities – e.g. through the removal of or damage to vegetation and habitat. • Aquatic Potential impacts/benefits to threatened aquatic species, populations, habitat and communities – e.g. wetlands, benthic habitats, rocky reefs, disturbance of the seabed, bioaccumulation risk, noise and vibration impacts on marine mammals.
	Odour	Odour impacts/benefits (e.g. from the operation of a wastewater treatment process (including any associated lagoons/pondage), an effluent flow discharge, sewer vent or pumping station)
	Heritage	Aboriginal and European heritage impacts/benefits (during construction or operation) such as scarred trees, middens, rock art sites, burial sites, buildings, historical sites, sensitive landscapes, Empire Gladstone shipwreck off Haycock Point.
	Sustainability	Resilience to climate change (e.g. rainfall variance, extreme weather, sea level rise), greenhouse gas production (in construction, operation, and/or renewal work) • Resilience to Climate Change Ability to adapt to suit changing conditions – rainfall variance, extreme weather / storm impacts (e.g. east coast lows), sea level rise, capacity for ecosystem migration • Greenhouse gases Embodied CO_2 for construction, operation/maintenance, and renewal • Adaptability to technology change – including ability to continue to maximise land-based reuse, minimise ocean disposal • Ability to meet ISCA target rating

Category	Criterion	Description
Social	Recreation	Impacts/benefits to recreational amenity (e.g. boating, swimming, fishing, bushwalking, and other recreational pursuits) • Fishing – including impacts/benefits to proposed artificial reef • Diving • Swimming, surfing, beach use/ beach walking/ beach health • Recreational boating • Visual amenity – aesthetics [of constructed project infrastructure] • Noise/traffic during construction
Economic	Local and regional economy	Impacts/benefits to tourism, tourism-related industries, business-in-general, employment (including long-term – e.g. employment, 'clean' reputation) in areas such as: • Aquaculture - Oyster, abalone, commercial fishing industries • Agriculture • Tourism - during construction; seasonal impacts – e.g. during school holidays • Pambula Merimbula Golf Club • Restrictions on vessels in Merimbula Bay

Weighting of Criteria

Each of these criterion was compared, pairwise, with the other criteria and the AECOM Project Team identified which was the more important criterion from each comparison. Each pairwise comparison involved some degree of Project Team discussion before team consensus was reached. This process continued until all criterion were compared with each other.

The tallied number of times that a particular criterion was deemed more important than all others was then calculated (as a percentage of all other comparisons), and reported as a normalised percentage weighting.

The outcome of the AECOM Project Team's weighting of criteria is depicted below:

	Person conducting Forced Ranking:	AECOM PROJECT TEAM			Water Quality	Ecology	Odour	Heritage	Sustainability	Recreation	Local and Regional Economy	Relative Importance / Weight	Number of Times This Criteria was Judged to be More Important than the Criteria it was Compared To
Rank	Category	Criteria	Definition / thought prompts		A	B	C	D	E	F	G		
2	Environmental	Water Quality	Potential impacts/benefits to water quality (groundwater, estuarine and marine) with consideration of: • Water chemistry – including faecal coliforms, nitrogen, phosphorus, turbidity • Effluent plumes and zone of influence – including during rainfall events • Human health	A	A	B	A	A	A	A	A	23.8%	5
1		Ecology	Terrestrial Potential impacts/benefits to terrestrial threatened species and populations, habitat and endangered ecological communities – e.g. through the removal of or damage to vegetation and habitat. • Aquatic Potential impacts/benefits to threatened aquatic species, populations, habitat and communities – e.g. SEPP 14 wetlands, benthic habitats, rocky reefs, disturbance of the seabed, noise and vibration impacts on marine mammals.	B		B	B	B	B	B	B	28.6%	6
7		Odour	Potential odour impacts/benefits from the operation of the STP upgrade options	C			C	D	E	F	G	0.0%	0
5		Heritage	Potential impacts/benefits to Aboriginal and European heritage values – e.g. numerous recorded Aboriginal sites and sensitive landscapes, and the Empire Gladstone shipwreck off Haycock Point.	D				D	E	D/F	G	7.1%	1.5
3		Sustainability	• Ability to meet ISCA target rating • Resilience to Climate Change Ability to adapt to suit changing conditions – rainfall variance, extreme weather, sea level rise, capacity for ecosystem migration • Greenhouse gases Embodied CO2 for construction, operation/maintenance, and renewal	E					E	E	E	19.0%	4
5	Social	Recreation	Potential impacts/benefits to recreational amenity including: • Fishing – including impacts/benefits to proposed artificial reef • Diving • Swimming, surfing, beach use • Recreational boating	F						F	G	7.1%	1.5
4	Economic	Local & Regional Economy	Potential economic impacts/benefits (including long term) in areas such as : • Aquaculture - Oyster, abalone, commercial fishing industries, • Agriculture • Tourism •Pambula Merimbula Golf Club •Restrictions on vessels in Merimbula Bay	G							G	14.3%	3
												100%	21

Which is more important, 'F' or 'G'? Make this same comparison for each

When an individual AECOM Project Team member's pairwise comparison initially differed from the team as a whole, relevant discussion ensued until whole team agreement was reached.

In one instance, the AECOM Project Team was undecided for a particular pairwise comparison – this instance was captured and documented as a normal part of the assessment (for subsequent sensitivity analysis consideration when the options are scored against all seven weighted criteria).

Summary

The AECOM Project Team members agreed that the outcomes of the pairwise comparison process resulted in an appropriate weighting of the seven criteria, rounded as follows:

- Environmental – Ecology 29% Rank 1st
- Environmental – Water Quality 24% Rank 2nd
- Environmental – Sustainability 19% Rank 3rd
- Economic – Local and regional economy 14% Rank 4th
- Social – Recreation 7% Rank Equal 5th
- Environmental – Heritage 7% Rank Equal 5th
- Environmental – Odour 0% Rank 7th

Options

Using combinations of two STP Upgrade treatment sub-options and four ocean discharge sub-options (both documented elsewhere), eight options were conceived for evaluation; namely:

- **NS-1P-NoF** – a North Short [**NS**] ocean outfall discharge location, with single point [**1P**] chemical dosing for phosphorus removal, and no new additional filtration process [**NoF**]
- **NL-1P-NoF** – a North Long [**NL**] ocean outfall discharge location, with single point [**1P**] chemical dosing for phosphorus removal, and no new additional filtration process [**NoF**]
- **SS-1P-NoF** – a South Short [**SS**] ocean outfall discharge location, with single point [**1P**] chemical dosing for phosphorus removal, and no new additional filtration process [**NoF**]
- **SL-1P-NoF** – a South Long [**SL**] ocean outfall discharge location, with single point [**1P**] chemical dosing for phosphorus removal, and no new additional filtration process [**NoF**]
- **NS-2P-w/F** – a North Short [**NS**] ocean outfall discharge location, with dual point [**2P**] chemical dosing for phosphorus removal, and a new additional filtration process [**w/F**]
- **NL-2P-w/F** – a North Long [**NL**] ocean outfall discharge location, with dual point [**2P**] chemical dosing for phosphorus removal, and a new additional filtration process [**w/F**]
- **SS-2P-w/F** – a South Short [**SS**] ocean outfall discharge location, with dual point [**2P**] chemical dosing for phosphorus removal, and a new additional filtration process [**w/F**]
- **SL-2P-w/F** – a South Long [**SL**] ocean outfall discharge location, with dual point [**2P**] chemical dosing for phosphorus removal, and a new additional filtration process [**w/F**]

The eight options are summarised in the MCA spreadsheet excerpt, pasted below:

OPTIONS FEATURES

	DISCHARGE LOCATION	North Short	North Long	South Short	South Long	North Short	North Long	South Short	South Long
	TREATMENT	Single Point P Dosing	Single Point P Dosing	Single Point P Dosing	Single Point P Dosing	Multi point P Dosing	Multi point P Dosing	Multi point P Dosing	Multi point P Dosing
		Disinfection by UV	Disinfection by UV	Disinfection by UV	Disinfection by UV	Disinfection by UV	Disinfection by UV	Disinfection by UV	Disinfection by UV
		Disinfection by Chlorine	Disinfection by Chlorine	Disinfection by Chlorine	Disinfection by Chlorine	Disinfection by Chlorine	Disinfection by Chlorine	Disinfection by Chlorine	Disinfection by Chlorine
						Filtration	Filtration	Filtration	Filtration
		Future Wet Weather Flow Management	Future Wet Weather Flow Management	Future Wet Weather Flow Management	Future Wet Weather Flow Management	Future Wet Weather Flow Management	Future Wet Weather Flow Management	Future Wet Weather Flow Management	Future Wet Weather Flow Management
		Future IDEAS to SBR Conversion	Future IDEAS to SBR Conversion	Future IDEAS to SBR Conversion	Future IDEAS to SBR Conversion	Future IDEAS to SBR Conversion	Future IDEAS to SBR Conversion	Future IDEAS to SBR Conversion	Future IDEAS to SBR Conversion
	TREATED WASTEWATER STRATEGY	Existing/ Expanded Reuse Scheme + Excess to Ocean Outfall	Existing/ Expanded Reuse Scheme + Excess to Ocean Outfall	Existing/ Expanded Reuse Scheme + Excess to Ocean Outfall	Existing/ Expanded Reuse Scheme + Excess to Ocean Outfall	Existing/ Expanded Reuse Scheme + Excess to Ocean Outfall	Existing/ Expanded Reuse Scheme + Excess to Ocean Outfall	Existing/ Expanded Reuse Scheme + Excess to Ocean Outfall	Existing/ Expanded Reuse Scheme + Excess to Ocean Outfall
		A	**B**	**C**	**D**	**E**	**F**	**G**	**H**
	OPTIONS NAMING	NS - 1P - NoF	NL - 1P - NoF	SS - 1P - NoF	SL - 1P - NoF	NS - 2P - w/F	NL - 2P - w/F	SS - 2P - w/F	SL - 2P - w/F

Scoring of Options

Key AECOM project team members were selected to participate in the scoring of options against weighted non-cost criteria. Team members were selected for their technical expertise, understanding or deeper knowledge in the areas of each criterion.

Prior to scoring, the selected team members refreshed and reviewed their collective knowledge of:

- Oceanographic modelling outcomes (available at the time of scoring)
- Treatment options
- Discharge location options
- Recent specialist constructability advice

- Relevant background studies, and
- Relevant community and stakeholder feedback

Scores were allotted on a 1 to 5 scale. The greater the ability of an option to maintain or perform against the seven respective environmental, social, or economic non-cost criteria, the higher the score the option attracted.

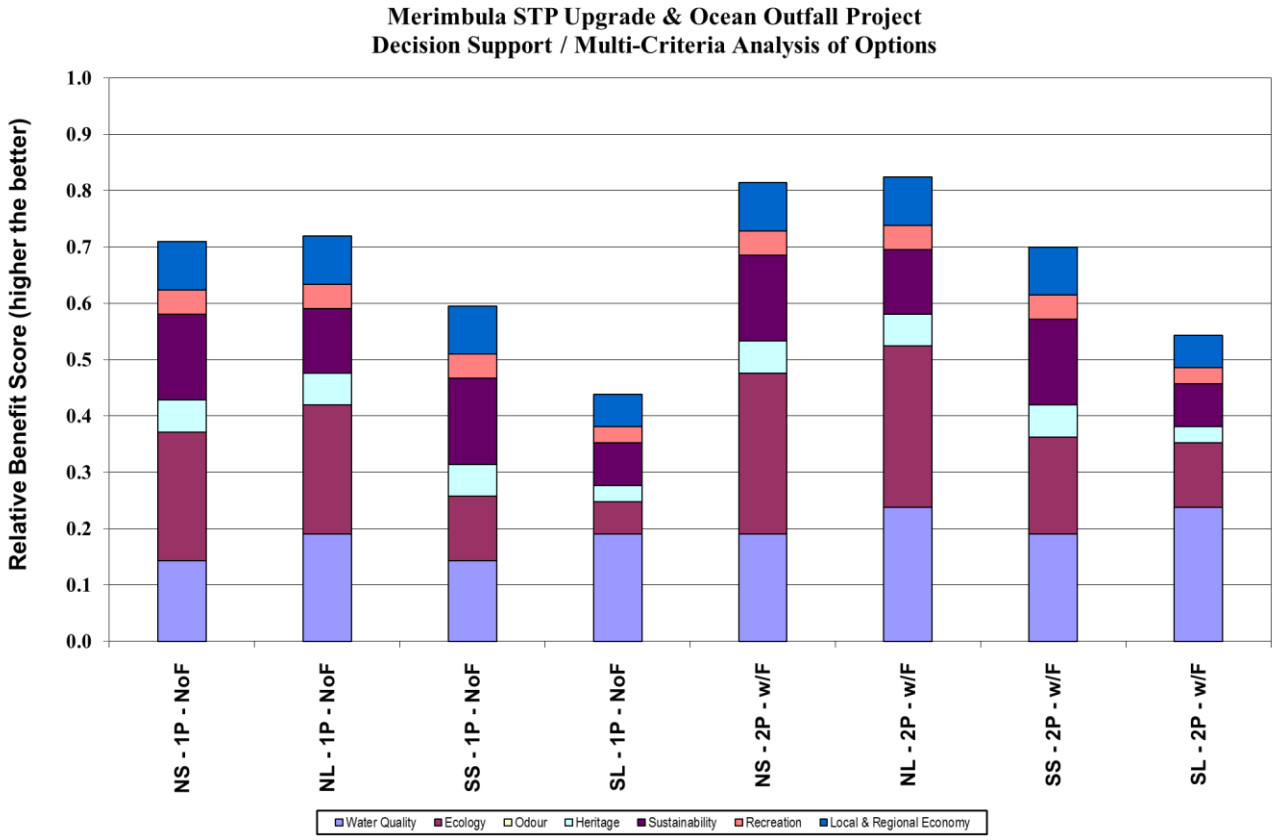
The AECOM Project Team scores are summarised in the MCA spreadsheet excerpt, pasted below:

OPTIONS FEATURES									
	DISCHARGE LOCATION	North Short	North Long	South Short	South Long	North Short	North Long	South Short	South Long
	TREATMENT	Single Point P Dosing	Single Point P Dosing	Single Point P Dosing	Single Point P Dosing	Multi point P Dosing	Multi point P Dosing	Multi point P Dosing	Multi point P Dosing
		Disinfection by UV	Disinfection by UV	Disinfection by UV	Disinfection by UV	Disinfection by UV	Disinfection by UV	Disinfection by UV	Disinfection by UV
		Disinfection by Chlorine	Disinfection by Chlorine	Disinfection by Chlorine	Disinfection by Chlorine	Disinfection by Chlorine	Disinfection by Chlorine	Disinfection by Chlorine	Disinfection by Chlorine
						Filtration	Filtration	Filtration	Filtration
		Future Wet Weather Flow Management	Future Wet Weather Flow Management	Future Wet Weather Flow Management	Future Wet Weather Flow Management	Future Wet Weather Flow Management	Future Wet Weather Flow Management	Future Wet Weather Flow Management	Future Wet Weather Flow Management
		Future IDEAS to SBR Conversion	Future IDEAS to SBR Conversion	Future IDEAS to SBR Conversion	Future IDEAS to SBR Conversion	Future IDEAS to SBR Conversion	Future IDEAS to SBR Conversion	Future IDEAS to SBR Conversion	Future IDEAS to SBR Conversion
	TREATED WASTEWATER STRATEGY	Existing/ Expanded Reuse Scheme + Excess to Ocean Outfall	Existing/ Expanded Reuse Scheme + Excess to Ocean Outfall	Existing/ Expanded Reuse Scheme + Excess to Ocean Outfall	Existing/ Expanded Reuse Scheme + Excess to Ocean Outfall	Existing/ Expanded Reuse Scheme + Excess to Ocean Outfall	Existing/ Expanded Reuse Scheme + Excess to Ocean Outfall	Existing/ Expanded Reuse Scheme + Excess to Ocean Outfall	Existing/ Expanded Reuse Scheme + Excess to Ocean Outfall
		A	B	C	D	E	F	G	H
	OPTIONS NAMING	NS - 1P - NoF	NL - 1P - NoF	SS - 1P - NoF	SL - 1P - NoF	NS - 2P - w/F	NL - 2P - w/F	SS - 2P - w/F	SL - 2P - w/F
		A	B	C	D	E	F	G	H
Water Quality	Potential impacts/benefits to water quality (groundwater, estuarine and marine) with consideration of: • Water chemistry – including faecal coliforms, nitrogen, phosphorus, turbidity • Effluent plumes and zone of influence – including during rainfall events • Human health	**2**	**4**	**3**	**4**	**3**	**5**	**4**	**5**
Ecology	Terrestrial Potential impacts/benefits to terrestrial threatened species and populations, habitat and endangered ecological communities – e.g. through the removal of or damage to vegetation and habitat. • Aquatic Potential impacts/benefits to threatened aquatic species, populations, habitat and communities – e.g. SEPP 14 wetlands, benthic habitats, rocky reefs, disturbance of the seabed, noise and vibration impacts on marine mammals.	**3**	**4**	**2**	**1**	**4**	**5**	**3**	**2**
Odour	Potential odour impacts/benefits from the operation of the STP upgrade options	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
Heritage	Potential impacts/benefits to Aboriginal and European heritage values – e.g. numerous recorded Aboriginal sites and sensitive landscapes, and the Empire Gladstone shipwreck off Haycock Point.	**4**	**4**	**4**	**2**	**4**	**4**	**4**	**2**
Sustainability	• Ability to meet ISCA target rating • Resilience to Climate Change Ability to adapt to suit changing conditions – rainfall variance, extreme weather, sea level rise, capacity for ecosystem migration • Greenhouse gases Embodied CO2 for construction, operation/maintenance, and renewal	**4**	**3**	**4**	**2**	**4**	**3**	**4**	**2**
Recreation	Potential impacts/benefits to recreational amenity including: • Fishing – including impacts/benefits to proposed artificial reef • Diving • Swimming, surfing, beach use • Recreational boating	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**2**
Local & Regional Economy	Potential economic impacts/benefits (including long term) in areas such as : • Aquaculture - Oyster, abalone, commercial fishing industries, • Agriculture • Tourism •Pambula Merimbula Golf Club •Restrictions on vessels in Merimbula Bay	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**2**

Results

The MCA results, pasted below, show the relative benefits of one option compared with another.

Options with a higher "stacked bar" graphic (i.e. a higher relative benefit score) are generally preferred, on a non-cost basis, over other options. Each option's "stacked bar" also depicts the relative contribution of scores for that option against each criterion (to help understand the sensitivity of each to the overall "stacked bar" height).



Discussion

The MCA results, and the process of weighting criteria and scoring options, resulted in the following important observations and outcomes:

- the four options that include the addition of a new STP filtration process generally scored higher compared to the four options without such a new process (this is largely attributable to the team's perception that such options, in the absence of any environmental impact assessment having yet been undertaken, *should* be scored higher against the two highest ranked criteria (Ecology 29% and Water Quality 24%). The team noted in particular that the function of the additional filtration process:
  - was originally only conceived as a means to provide a more efficient and assured chemical dosing-based phosphorous removal strategy (and was in lieu of re-purposing any existing lagoon/pond for such a purpose as capturing and removing chemical sludge), and
  - was not proposed for the purposes of improved overall treatment (i.e. for the removal of any other wastewater pollutants – e.g. suspended solids), even though some improved removal of such might reasonably be expected
- options associated with the more distant (from shore) outfall discharge locations (NL and SL) generally scored higher on account of their discharge locations being in waters of stronger ocean currents, rather than currents of the Bay (or influenced by the Bay). Again, in the

absence of any environmental impact assessment having yet been undertaken, such options were scored higher relative to others (although the South Long option's apparent benefits in this regard were significantly offset by the team's assessment of the South Long discharge location lending itself to perceived or potential negative impacts of treated wastewater discharges on proximate rocky reef ecology and/or rocky reef water quality)

- significantly, discharge locations along the northern (mid-Bay) alignment (i.e. NS and NL) were scored significantly higher than those associated with a more southerly alignment. The project team, using early results from oceanographic modelling of treated wastewater releases from all four locations (under both north-to-south and south-to-north predominant ocean current scenarios) determined, as a result of modelled discharge pollutant concentrations resolving to Water Quality Objective goals or ambient concentrations more quickly, and before potentially influencing or moving toward or over rocky reef habitat areas, that such discharge locations offer significant advantages over others when compared to many of the more highly ranked criteria. In fact, MCA results indicate that there was little difference between the NL and NS discharge location options.

Other relatively minor observations included the following:

- although odour (and odour potential) was identified as a criterion by which the performance of options should be compared, it's weighting as a criteria was significantly low (relative to the six other criteria) as to warrant it unimportant. This is a very supportable proposition given the current STP's location and the relative distance to sensitive receptors. In addition, of all 8 options conceived to date, the team assessed (in its scoring of options against this criteria) no material differences between the options.
- although heritage (land, marine, European and Indigenous Peoples) was identified as an important criterion (Heritage 7% weighting, Rank Equal 5th), the conception and development of the 8 project options to date has focussed on the avoidance of potential land-based European and Indigenous Peoples-related heritage impacts, wherever possible and practicable.

As all 8 options currently rely on successfully minimising dunal construction impacts (to the same extent), relative scoring necessarily focussed on the marine heritage values associated with each of the 4 ocean discharge locations. The SS Empire Gladstone, which struck submerged rock in 1950 just off/south of Haycock Point (after mistaking the lights of Merimbula for a lighthouse) forms the only marine "heritage item" upon which scoring was based (the wreck is a popular dive spot today with team scores against the "recreation" criterion also reflective of this wreck site's value to the populace).

Conclusions

The following conclusions are made:

- discharge locations along the northern (mid-Bay) alignment are preferred (regardless of associated treatment option). These locations were assessed to have an advantage in that each of the two northerly locations' modelled results indicate minimal physical treated wastewater plume movement or presence over rocky reef areas in the southern parts of the Bay (i.e. plume pollutants have dispersed to WQOs or ambient Bay concentrations before physically impacting these areas)
- the SL discharge location is least favoured of the four discharge locations
- additional filtration afforded the treated wastewater (as a means of providing a more efficient and assured chemical dosing-based phosphorous removal strategy), did not result in as high a relative score improvement as the team might first have anticipated - e.g. Options NS-1P-NoF and NL-1P-NoF were scored only slightly less than their higher treatment equivalents. In addition, Options NS-1P-NoF and NL-1P-NoF both scored better than either of the higher treatment, southerly discharge location options (Options SS-2P-w/F and SL-2P-w/F).

The team attributed this scoring outcome to the fact that oceanographic modelling of phosphorous release (conducted to date) shows less of an impact to the Bay's water quality (in terms of concentrations resolving more quickly to Water Quality Objective goals or ambient concentrations) than the team expected. Further, other oceanographic model runs for parameters such as total suspended solids, total nitrogen and ammonia seem to confirm similar (i.e. quick dispersion to WQOs or ambient levels)

Recommendations

The following recommendations are made:

- Abandon all further investigations associated with the SL discharge location
- Consider, with BVSC agreement, abandoning all further investigations associated with the SS discharge location
- Subject to the development of cost estimates, and environmental impact assessment, an optimised discharge location (nearer to shore than the NL discharge location, but along the route of the same (northern, mid-Bay) alignment) warrants consideration. It follows that scheduled upcoming geophysical and geotechnical studies be aligned (scoped) to encompass an appropriate corridor between NL and NS discharge locations (if possible) to reflect a potential future optimised diffuser location (with the potential for capital cost savings via a reduced outfall pipeline length and via potential 'knock-on' savings to future operational and maintenance costs
- The need for a higher level of treatment (i.e. inclusion of a filtration technology/process) is to be confirmed through additional oceanographic modelling and impact assessment of marine ecology.
- The AECOM project team MCA outcomes (and the recommendations above) should be considered in light of the CWG MCA outcomes and recommendations (the latter of which are currently being documented for review by the CWG prior to AECOM submitting to Council on their behalf)

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