

# NOTICE OF MEETING

Pursuant to the provisions of section 88 (1) of the  
*Local Government Act 1999*

## Infrastructure and Environment Committee of the



will be held in

**Council Chamber  
Redbanks Road, Mallala**

on

**Wednesday 1 December 2021 at 5.00pm**

A handwritten signature in black ink, appearing to be "James Miller", is positioned above the printed name.

James Miller

**CHIEF EXECUTIVE OFFICER**

In light of the ongoing COVID-19 public health emergency, and pursuant to section 302B of the Local Government Act 1999 and the Electronic Participation in Council Meetings Notice (No 1) 2020, **public access to all Council and Committee meetings will be facilitated via live stream on Council's YouTube channel.**

On the day of the meeting, a direct link to the live stream will be displayed on the homepage of Council's website [www.apc.sa.gov.au](http://www.apc.sa.gov.au)

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**5 ADJOURNED BUSINESS**

Nil

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**MATTERS RAISED BY MEMBERS**

**8 QUESTIONS ON NOTICE**

Nil

**9 QUESTIONS WITHOUT NOTICE**

**10 MOTIONS ON NOTICE**

Nil

**11**      **MOTIONS WITHOUT NOTICE**

**12**      **URGENT BUSINESS**


**13**      **CONFIDENTIAL ITEMS**

Nil

**14**      **NEXT MEETING**

To be advised

**13**      **CLOSURE**

	<b>2. Confirmation of Minutes</b>
<b>Wednesday 1 December 2021</b>	

- 2.1 “that the minutes of the Infrastructure and Environment Committee meeting held on Wednesday 4 August 2021 (MB Folios 71 to 75, inclusive), be accepted as read and confirmed.”



# MINUTES

of the

## Infrastructure and Environment Committee

of the



Pursuant to the provisions of section 88 (1) of the  
*Local Government Act 1999*

HELD

**by electronic means**

on

**Wednesday 4 August 2021 at 7.15pm**

The Chairperson formally declared the meeting open at 7.17pm.

## 1. ATTENDANCE

### 1.1 Present:

Mr Richard Dodson	Chairperson	<i>By audio-visual link</i>
Mr Howard Lacy	Independent Member	<i>By audio-visual link</i>
Mayor Mark Wasley	Mayor	<i>By audio-visual link</i>
Councillor John Lush	Mallala/Dublin Ward	<i>By audio-visual link</i>
Councillor Terry-Anne Keen	Mallala/Dublin Ward	<i>By audio-visual link</i>
Councillor Kay Boon	Two Wells Ward	<i>By audio-visual link</i>
Councillor Margherita Panella	Lewiston Ward	<i>By audio-visual link</i>
Councillor Brian Parker	Lewiston Ward	<i>By audio-visual link</i>

### Also in Attendance by audio-visual link:

Chief Executive Officer	Mr James Miller
General Manager – Infrastructure and Environment	Mr Thomas Jones
Acting General Manager – Governance and Executive Office	Ms Alyssa Denicola
General Manager – Development and Community	Mr Darren Starr
Infrastructure and Assets Consultant	Mr Glenn Sandford
Administration and Executive Support Officer/Minute Taker	Ms Stacie Shrubsole
Information Technology Officer	Mr Thomas Harris-Howson

### 1.2 Apologies

Councillor Frank Maiolo	Two Wells Ward
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## 2. CONFIRMATION OF MINUTES

### 2.1 Infrastructure and Environment Committee Meeting – 15 June 2021

#### Committee Resolution

Moved Councillor Parker Seconded Councillor Panella **2021/ 020**

**“that the minutes of the Infrastructure and Environment Committee meeting held on Tuesday 15 June 2021 (MB Folios 63 to 70, inclusive), be accepted as read and confirmed.”**

**CARRIED**

## 3. BUSINESS ARISING

Nil

## 4. DECLARATION OF MEMBERS’ INTERESTS (material, actual, perceived)

Nil

## 5. ADJOURNED ITEMS

Nil

## 6. REPORTS FOR INFORMATION

### 6.1 Committee Resolutions

#### Committee Resolution

Moved Councillor Boon Seconded Councillor Keen **2021/ 021**

**“that the Infrastructure and Environment Committee, having considered Item 6.1 – *Committee Resolutions*, dated 4 August 2021, receives and notes the report.”**

**CARRIED**

## 7. REPORTS FOR DECISION

### 7.1 Draft Infrastructure Asset Management Strategy, and Plans

#### Committee Resolution

Moved Mayor Wasley Seconded Councillor Parker **2021/ 022**

**“that Council, having considered Item 7.1 – *Draft Infrastructure Asset Management Strategy, and Plans*, dated 4 August 2021, receives and notes the report and in doing so, recommends to Council that it release the draft Infrastructure Asset Management Strategy and Plans for public consultation in accordance with Council’s Public Consultation Policy.”**

**CARRIED**

## 7.2 Policy Review – Asset Management Policy

**Committee Resolution**

Moved Councillor Parker Seconded Councillor Lush 2021/ 023

**“that Infrastructure and Environment Committee, having considered Item 7.2 – *Policy Review – Asset Management Policy* dated 4 August 2021, receives and notes the report and in doing so recommends to Council that it adopts the revised Asset Management Policy as presented in Attachment 1 to this report.”**

CARRIED

## 7.3 Wasleys Bridge Remediation Options

**Committee Resolution**

Moved Councillor Parker Seconded Mayor Wasley 2021/ 024

**“that Infrastructure and Environment Committee, having considered Item 7.3 – *Wasleys Bridge Remediation Options*, dated 4 August 2021, receives and notes the report and in doing so recommends to Council that it:**

- 1. Acknowledge the Tonkin Consulting Report - Wasleys Bridge Assessment, Load Capacity Assessment, presented as Attachment 1 to this Report, which strongly recommends the lowering of the Wasleys Bridge load limit from 12 tonne to 6.5 tonne and**
- 2. In acknowledging 1 above, lower the tonnage capacity of Wasleys Road Bridge to 6.5 tonne and implement measures to ensure single vehicle access at any one time.”**

CARRIED

7.3 **Committee Resolution**

Moved Councillor Lush Seconded Mayor Wasley 2021/ 025

**“that the Infrastructure and Environment Committee, having considered Item 7.3 – *Wasleys Bridge Remediation Options*, dated 4 August 2021, recommends that management bring back a further report to the Infrastructure and Environment Committee that deals with alternative options for the river crossing.”**

CARRIED

**8. QUESTIONS ON NOTICE**

Nil

**9. QUESTIONS WITHOUT NOTICE**

Not recorded in Minutes in accordance with Regulation 9(5) of the *Local Government (Procedures at Meetings) Regulations 2013*.

**10. MOTIONS ON NOTICE**

Nil

**11. MOTIONS WITHOUT NOTICE**

Nil

**12. URGENT BUSINESS**

Nil

**13. CONFIDENTIAL ITEMS**

Nil

**14. NEXT MEETING**

To be determined


**15. CLOSURE**

There being no further business, the Chairperson declared the meeting closed at 8.46pm.

Confirmed as a true record.

Chairperson:.....

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

	<b>6.1</b>	<b>Mallala Community Wastewater Management Scheme</b>
	<b>Department:</b>  <b>Report Author:</b>	<b>Infrastructure and Environment</b>  <b>General Manager Infrastructure and Environment</b>
<b>Date: 1 December 2021</b>	<b>Document Ref:</b>	<b>D21/51921</b>

## **EXECUTIVE SUMMARY**

- The purpose of this report is to provide the Infrastructure and Environment Committee (the Committee) an update on the Mallala Township Community Wastewater Management Scheme (CWMS) and its current Mallala CWMS infrastructure shortfalls (infrastructure shortfall).
- The Mallala CWMS project has been an ongoing project commencement circa 2015, with the project being partially funded by Local Government Association (LGA).
- In 2017 WGA was engaged to undertake an assessment of the Mallala systems water balance as a result of high lagoon levels, which occurred with 50% of properties connected to the system.
- There is a total of 2.75ha of existing disposal area and 10ML of storage capacity in the current lagoon at Mallala. To cater for the current design load, WGA advises increasing the irrigation disposal area to 5.3 ha, whilst also constructing a new 10ML lagoon to bring the total storage capacity to 20ML.
- There are a number of upgrades and infrastructure improvements required to remediate the existing CWMS at Mallala to better accommodate the current design inflows. These works will further mitigate the risk of an overflow event (or further emergency tankering), ensuring sufficient capacity and more robustness in the system to deal with adverse circumstances.
- Most recently, discussions with LGA CWMS Program Manager has provided the process to address the current infrastructure short falls, that being;
  - Council must formally submit a letter to the Chair of the CWMS Board.
  - The letter must outline details of infrastructure shortfall, including cost associated with the proposed infrastructure works.
- Prior to sending a letter to the Chair of the CWMS Board, Management are required to quantify the remaining infrastructure works. A fee proposal has been sought from a qualified consultant to provide details (specific infrastructure requirements and their costs) for the remaining infrastructure works, with the cost of consultant being \$15,000.
- It is recommended that the Committee consider this report, and initiate the process outlined above by LGA CWMS Program Manager to resolve the Mallala Township CWMS current infrastructure shortfalls.

## **RECOMMENDATION**

**“that Infrastructure and Environment Committee, having considered Item 6.1 – *Mallala Community Wastewater Management Scheme*, dated 1 December 2021, receives and notes the report and in doing so recommends to Council that it:-**

- 1. Instructs the Chief Executive Officer to engage a suitably qualified consultant in accordance with Council’s Procurement Policy to quantify the current Mallala CWMS infrastructure shortfalls**
- 2. Acknowledges that an allocation of \$15,000 will be incorporated into the second quarter 2021/2022 budget revision.”**

## **BUDGET IMPACT**

Estimated Cost:	\$15,000 (Consultant to quantify the current infrastructure shortfall)
Future ongoing operating costs:	N/A
Is this Budgeted?	No

## **RISK ASSESSMENT**

Given the significance (in terms of the value) of the infrastructure shortfall, failure to undertake the process outlined by the LGA CWMS Program Manager will have a negative financial impact in terms of higher maintenance/capital new investment from Council budget in the short term.

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## **Attachments**

Nil

## **DETAILED REPORT**

### **Purpose**

The purpose of this report is to provide the Infrastructure and Environment Committee (the Committee) an update on the Mallala Township Community Wastewater Management Scheme (CWMS) and its current infrastructure shortfalls.

### **Background/History**

The LGA and the Minister for Local Government have entered into an agreement for the Minister to provide funds to the LGA for the purpose of establishing CWMS for member councils. The current agreement commenced on 1 July 2017 and will expire on 30 June 2027 and provides for annual allocations (approx. \$4 million per annum) to the LGA to subsidise councils that provide CWMS, primarily in regional towns and cities where the SA Water sewer system is not provided. The Agreement requires that funds are allocated by the LGA on the advice of a CWMS Management Committee.

The Mallala CWMS project was funded through the above CWMS scheme and has been an ongoing project commencement circa 2015.

### **Discussion**

#### **Issues**

In 2017 WGA was engaged to undertake an assessment of the Mallala systems water balance as a result of high lagoon levels, which occurred with 50% of properties connected to the system.

Council was required to tanker water away from the plant over the 2017 winter period to avoid system overflow. Irrigation of the area adjacent to the lagoon site had to be ceased over the winter period due to inundation and water logging. The assessment indicated that the irrigation area constructed was less than what was specified in the Irrigation Management Plan (IMP), which is likely to have contributed to the high lagoon levels experienced in 2017. WGA assessed the storage and re-use requirements for the scheme utilising IPOS irrigation scheduling, soil permeability results and accounting for the impact of a 1:10 wet year. This scenario indicated that additional storage and re-use area would be required to satisfy the current design inflows.

#### **What is required**

There is a total of 2.75ha of existing disposal area and 10ML of storage capacity in the current lagoon at Mallala. To cater for the current design load, WGA advises increasing the irrigation disposal area to 5.3 ha, whilst also constructing a new 10ML lagoon to bring the total storage capacity to 20ML.



There are a number of upgrades and infrastructure improvements required to remediate the existing CWMS at Mallala to better accommodate the current design inflows. These works will further mitigate the risk of an overflow event (or further emergency tankering), ensuring sufficient capacity and more robustness in the system to deal with adverse circumstances.

### Way forward

Most recently, discussions with LGA CWMS Program Manager has provided the process to address the current infrastructure short falls, that being;

- Council must formally submit a letter to the Chair of the CWMS Board.
- The letter must outline details of infrastructure shortfall, including cost associated with the proposed infrastructure works.

Prior to sending a letter to the Chair of the CWMS Board, Management are required to quantify the remaining infrastructure works. A fee proposal has been sought from a qualified consultant to provide details (specific infrastructure requirements and their costs) of the remaining infrastructure works, with the cost of consultant being \$15,000.

Given the significance (in terms of the value) of the infrastructure shortfall, failure to undertake the process outlined by the LGA CWMS Program Manager will have a negative financial impact in terms of higher maintenance/capital new investment from Council budget in the short term.

## **Conclusion**

It is recommended that the Committee consider this report, and initiate the process outlined above by LGA CWMS Program Manager to resolve the Mallala Township CWMS current infrastructure shortfalls.

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## **References**


### Legislation

*Local Government Act 1999*

### Council Policies/Plans

*Infrastructure and Asset Management Plan*

*Long Term Financial Plan*

	<b>6.2</b>	<b>Funding Opportunity – Coastal Settlements Adaptation Study Review</b>
	<b>Department:</b>  <b>Report Author:</b>	<b>Infrastructure and Environment</b>  <b>General Manager Infrastructure and Environment</b>
<b>Date: 1 December 2021</b>	<b>Document Ref:</b>	<b>D21/51926</b>

## **EXECUTIVE SUMMARY**

- The purpose of this report is to provide the Infrastructure and Environment Committee (the Committee) information on a Federal grant funding opportunity and seeks Council endorsement to apply.
- There is currently a Federal grant funding opportunity available called “Preparing Australian Communities - Local Stream (The funding), Management have reviewed the funding guidelines and believe that the Coastal Settlements Adaptation Study Review project closely aligns with the funding criteria.
- The funding key details are;
  - Applications open 10 December 2021
  - Applications close 6 January 2022
  - 100 per cent of eligible project expenditure for non-infrastructure projects (under \$100,000)
  - Eligible activity categories - Planning
    - assessment of risk, vulnerability, reliance and disaster risk reduction activities, investment/business case or technical feasibility
  - Eligible activities may include
    - community scale flood risk assessments that provide accurate floor height measurements and tailored flood mitigation plans for all houses in the flood prone area
    - climate/disaster risk and vulnerabilities assessments of the LGA and/or a strategy or plan to mitigate these risk and vulnerabilities, and build resilience
    - technical assessment of options and pathways to inform future investments that mitigate risks and build resilience
- In 2013, Council commissioned the University of South Australia to develop the Coastal Settlements Adaptation Study for Middle Beach, Thompson Beach, Webb Beach and Parham, in response to community concerns about impacts of storm damage on coastal natural and built environs.
- The main emphasis of this study was the assessment of the vulnerability of each settlement to projected sea level rises of 0.30m by 2050 and 1.00m by 2100. The overarching adaptation proposal for each settlement was to provide protection (or in the case of Middle Beach,

accommodation strategies) to manage projected sea level rise until 2050. The rationale of this approach was that this protection would provide certainty for each community and a time buffer of ~30-40 years in which the monitoring of sea level rise could take place.

- The Study recommended that “every 5 years the coastline is re-examined and the recommendations arising from this Study be reviewed”.
- Management have requested a quote to undertake a comprehensive review of the 2013 Coastal Settlement Adaptation Study and is presented as **Attachment 1** to this Report.
- It is recommended that the Committee consider this report, and recommend to Council that it apply for The funding with the nominated project being the Coastal Settlements Adaptation Study review.

## **RECOMMENDATION**

**“that the Infrastructure and Environment Committee, having considered Item 6.2 – *Funding Opportunity – Coastal Settlement Adaptation Study Review*, dated 1 December 2021, receives and notes the report and in doing so recommends to Council that it instructs the Chief Executive Officer to seek funding through the Preparing Australian Communities - Local Stream funding stream for the Coastal Settlements Adaptation Study review project”**

## **BUDGET IMPACT**

Estimated Cost:	\$60,000
Future ongoing operating costs:	N/A
Is this Budgeted?	No

## **RISK ASSESSMENT**

Reputation – taking a proactive approach in monitoring and planning for coastal management.  
Financial Management – Funding to cover 100 percent of project if successful. Future infrastructure investment will also be guided by the reviewed Coastal Settlement Adaptation Study. If not through the funding then Council will need to fund the review through the annual budget.

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## **Attachments**

1. Quote to undertaken a comprehensive review of the 2013 Coastal Settlement Adaptation Study

## **DETAILED REPORT**

### **Purpose**

The purpose of this report is to provide the Infrastructure and Environment Committee (the Committee) information on a Federal grant funding opportunity and seeks the Council endorsement to apply.

### **Background/History**

Council, at its Special Council Meeting on 8 July 2020, resolved as follows:-

4.1 *Motion on Notice – Construction of Levee at Parham*

Moved Councillor Lush      Seconded Councillor Keen      **2020 220**

***“that the construction of a levee at Parham be delayed pending more accurate sea level rise data specific to coastal areas north of Port Adelaide.”***

**CARRIED**

For further context the preamble is as follows;

*Following a presentation by Mr John Drexel on sea level rise in the Spencer gulf at a meeting of the Coalition of Coastal Communities on 17 June it is worth considering the accuracy of sea level rise data and whether some local anomalies should be considered before proceeding with the construction of a levee at Parham. Mr Drexel was the principal geologist at PIRSA and the data he presented offered some facts that need consideration before expending ratepayers’ funds on a levee we may not need. The increase in the area of Mangroves at Thompson beach and Middle Beach may be evidence of sea level FALL and I am suggesting we pause and evaluate the data and its application to our local situation.*

In 2013, Council commissioned the University of South Australia to develop the Coastal Settlements Adaptation Study for Middle Beach, Thompson Beach, Webb Beach and Parham, in response to community concerns about impacts of storm damage on coastal natural and built environs.

The main emphasis of this study was the assessment of the vulnerability of each settlement to projected sea level rises of 0.30m by 2050 and 1.00m by 2100. The overarching adaptation proposal for each settlement was to provide protection (or in the case of Middle Beach, accommodation strategies) to manage projected sea level rise until 2050. The rationale of this approach was that this protection would provide certainty for each community and a time buffer of ~30-40 years in which the monitoring of sea level rise could take place.

The Study also recommended that “every 5 years the coastline is re-examined and the recommendations arising from this Study be reviewed”.

## Discussion

There is currently a Federal grant funding opportunities available, Management have reviewed the funding guidelines and believe that the Coastal Settlements Adaptation Study Review project closely aligns with the funding criteria.

### The Funding

The funding key details are;

- Applications open 10 December 2021
- Applications close 6 January 2022
- 100 per cent of eligible project expenditure for non-infrastructure projects
- Eligible activity categories - Planning
  - assessment of risk, vulnerability, reliance and disaster risk reduction activities, investment/business case or technical feasibility
- Eligible activities may include
  - community scale flood risk assessments that provide accurate floor height measurements and tailored flood mitigation plans for all houses in the flood prone area
  - climate/disaster risk and vulnerabilities assessments of the LGA and/or a strategy or plan to mitigate these risk and vulnerabilities, and build resilience
  - technical assessment of options and pathways to inform future investments that mitigate risks and build resilience

### Coastal Settlements Adaptation Study Review project

Management have requested a quote to undertake a comprehensive review of the 2013 Coastal Settlement Adaptation Study and is presented as **Attachment 1** to this Report.

## Conclusion

It is critical that when seeking grant funding the project candidates align with the funding criteria to give Council the best opportunity to be successful with grant funding. It is recommended that the Committee consider this report, and recommend to Council that it apply for The funding with the nominated project being the Coastal Settlements Adaptation Study review. In so doing, Council will mitigate the risk of having to fund the review through the annual budget.

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## References

### Legislation

*Local Government Act 1999*

### Council Policies/Plans

*Infrastructure and Asset Management Plan*

*Long Term Financial Plan*



Quote for:

## COASTAL ADAPTATION STUDY AND STRATEGY

(Review and update Coastal Settlements Adaptation Study 2014)

For: Adelaide Plains Council

From: Integrated Coasts

17 September 2021

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Photographs: Cover page (clockwise):

Webb Beach, survey of seaweed strands after event of 9 May 2016, Integrated Coasts.

Middle Beach, J. Kellett, University of SA, 2013.

Webb Beach storm event of 9 May 2016, Adelaide Plains Council, 2016.

Port Parham, sea flood modelling for 9 May 2016, Integrated Coasts, 2016.



## Introduction

Integrated Coasts is pleased to provide a quote to review and update the Coastal Settlements Adaptation Study conducted by University of South Australia in 2013-2014. The provision of this quote is to provide Adelaide Plains Council a context from which to consider its next stages in coastal adaptation and therefore it is recognised that aspects of this quote may require further discussion and amendment.

### Background to this proposal

University of South Australia completed the Coastal Settlements Adaptation Study in 2013-2014 for Middle Beach, Thompson Beach, Webb Beach and Parham. The investigative framework included seven steps:

1. Establish settlement history.
2. Analyse existing sea-flood protection.
3. Analyse impact of sea-flood scenarios.
4. Analyse emergency access and egress.
5. Establish profile of the assets at risk.
6. Explore liability issues.
7. Analyse possible adaptation actions.

The State of Play Report covered Steps 1 – 6 for all four settlements but individual reports for all four settlements were produced for Step 7.

The main emphasis of this study was the assessment of the vulnerability of each settlement to projected sea level rises of 0.30m by 2050 and 1.00m by 2100. The overarching adaptation proposal for each settlement was to provide protection (or in the case of Middle Beach, accommodation strategies) to manage projected sea level rise until 2050. The rationale of this approach was that this protection would provide certainty for each community and a time buffer of ~30-40 years in which the monitoring of sea level rise could take place.

Where relevant, the findings of this study will be brought forward into the proposed review study including settlement history, liability issues (if relevant), emergency access and egress. Other elements will be upgraded such as sea-flood modelling and existing sea-flood protection.

Since the Coastal Settlements Adaptation Study was completed, new ways of thinking about coastal adaptation have emerged. What is known as 'pathways' adaptation methodology is the preferred way to undertake coastal adaptation and attempts to deal with uncertainty using three main ingredients: scenario planning, time, and triggers or thresholds. A 'pathways' approach outlines plausible futures from which to identify key thresholds and triggers, and then to consider alternative pathways when these are breached. However, Integrated Coasts is of the view that in most cases less time should be given to extensive analysis to the timing of the likely breaching of thresholds, and more time given to initiating monitoring programs to track change over time.

Additionally, the importance of establishing a baseline understanding of how the coastline has been operating over the last half century is now more accepted. This understanding provides the context from which to determine when the coastline may be operating outside of its normal parameters due to acceleration of sea level rise, which all modelling predicts will occur more substantially in the second half of this century. The Coastal Settlements Adaptation Study (2013-2014) did not provide a historical analysis of the coastline which this proposal intends to achieve.

## A. Project Methodology, Scope and Purpose

### 1. Principles of coastal adaptation

Integrated Coasts has adopted three broad principles of coastal adaptation:

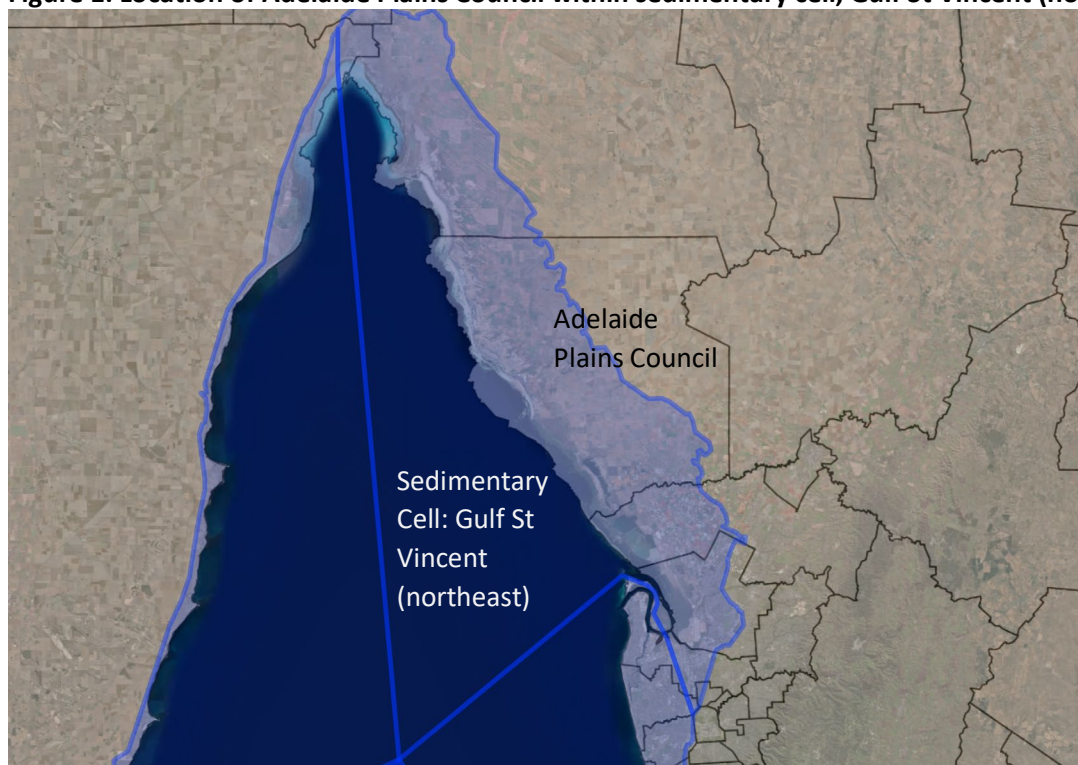
- Coastal adaptation takes place in localities,
- Coastal adaptation is an ongoing process,
- Coastal adaptation should initially be 'data-driven'.

#### 1. Coastal adaptation takes place in localities

In comparison to other climate change hazards, sea-level-rise, and associated erosion, is unique. For example, a uniform increase of temperature of 1-2 degrees will uniformly affect a region such as the Adelaide Plains area. In contrast, a uniform increase of sea level of 0.5m is likely to produce a vast array of impacts, even within a ten-minute walk along the coast. The reason for the difference in the way that the hazards are experienced is that the impact of sea level rise is dependent like no other on the thresholds and tipping points that the geological layout presents at each location.

Furthermore, the fabric of the geology, the bathymetry of the seafloor, and the orientation of the coast to wind and wave exposure, all act as modifiers in the way in which sea level rise and associated erosion are experienced. Therefore, coastal adaptation, including the underpinning risk assessment procedures, must operate in a fine-grained way that appropriately deals with the local nature of the impacts. CoastAdapt<sup>1</sup> has divided the Australian coastline into primary and secondary cells. Adelaide Plains is located within secondary cell, Gulf St Vincent (northeast) SA.02.01.05.

**Figure 1: Location of Adelaide Plains Council within sedimentary cell, Gulf St Vincent (northeast).**



Source: CoastAdapt.

<sup>1</sup> [SA02.01.05.pdf \(coastadapt.com.au\)](https://coastadapt.com.au/SA02.01.05.pdf)

As part of this project, it is recommended to divide the Adelaide Plains coastline into tertiary cells. It is recognised that the settlements are the prime focus, but these should be considered within their local geomorphological setting<sup>2</sup>. Dividing the coast into cells will also form the context for reporting and ongoing monitoring.

**Figure 2: Proposed tertiary cells for Adelaide Plains Council (preliminary).**



Source: [NatureMaps \(environment.sa.gov.au\)](https://www.environment.sa.gov.au/naturemaps)

## **2. Coastal adaptation is an ongoing process**

Integrated Coasts recognises that coastal adaptation is a process that will take place over decades, and even centuries. Additionally, based upon recent assessment of over 60kms of coastline (City of Marion, City of Onkaparinga, Alexandrina Council, City of Victor Harbor) we hold the view that sea level rise has not as yet had a significant impact upon these coastlines. This finding is congruent with the sea level rise projections that predominantly relegate accelerated sea level rise into the second half of this century<sup>3</sup>. However, we have observed cycles of accretion and erosion that take place over decades and there are various 'hot spots' where erosion is more prevalent. The implication of these findings is that a coastal adaptation study should be a baseline study that identifies how the coast has been operating over the last seventy years.

<sup>2</sup> Note: Nature Maps divides the APC coastline into six 'coastal conservation cells' (MA19 to MA24). The above map incorporates two of these cells within each tertiary cell.

<sup>3</sup> See CoastAdapt that utilises Intergovernmental Panel on Climate Change projections to graph various greenhouse gas emissions scenarios at [Sea-level rise and future climate information for coastal councils | CoastAdapt](https://www.coastadapt.org.au/sea-level-rise-and-future-climate-information-for-coastal-councils)

In the context of coastal adaptation, the Ecology Dictionary provides the most appropriate definition of a baseline:

A quantitative level or value from which other data and observations of a comparable nature are referenced... [and]

Information accumulated concerning the state of a system, process, or activity before the initiation of actions that may result in changes.

Two basic elements reside in the definition. To illustrate:

The digital elevation model captured in 2013 and the aerial photography captured in 2021 creates a digital baseline against which future erosion and accretion can be compared.

Comparing photographic images of the shoreline position from the 1940s<sup>4</sup> onward will provide a way to form a baseline understanding of 'the state of the system'. Once this baseline understanding of how a beach has been operating over time has been established, projections can be formulated about the possible future impact of sea level rise.

In summary, identifying how the coast has been operating (over the last 50-70 years), will give Council the basis for knowing when the coastline is beginning to operate outside of its normal parameters due to sea level rise.

What is known as 'pathways' adaptation methodology is the preferred way to undertake coastal adaptation. This methodology deals with uncertainty using three main ingredients: scenario planning, time, and triggers or thresholds<sup>5</sup>. A 'pathways' approach outlines plausible futures from which to identify key thresholds and triggers, and then considers alternative pathways when these are breached. However, Integrated Coasts holds the view that in most cases, less time should be given to extensive analysis to the timing of the likely breaching of thresholds, and more time allocated to initiating monitoring to track change over time. The only exception to this rule is when Council is considering whether to invest in upgrading or installing infrastructure. In these cases, an analysis of the timing of impacts is useful, and the precautionary principle should apply<sup>6</sup>.

### **3. Coastal adaptation should be primarily based upon the assessment of data**

The first steps of any coastal adaptation process should be to identify the physical baseline, then to conduct scenario analysis to identify plausible futures, and then to communicate these realities to the community. Community views on coastal adaptation matters can vary significantly. On one hand, some community members have an apocalyptic view of climate change and imagine that sea level rise will wreak broadscale havoc on their shores. On the other hand, are those who would maintain that nothing much has changed on their shores over time, and changes in the future are likely to be small. Additionally, sometimes unrealistic expectations exist about what Council can do about the impacts of sea level rise and imagine that whole coastlines can be protected. In summary, by conducting a physical analysis of the coastline and the likely impacts of sea level rise over the

<sup>4</sup> Aerial photography may not be available from this time.

<sup>5</sup> <https://coastadapt.com.au/pathways-approach>.

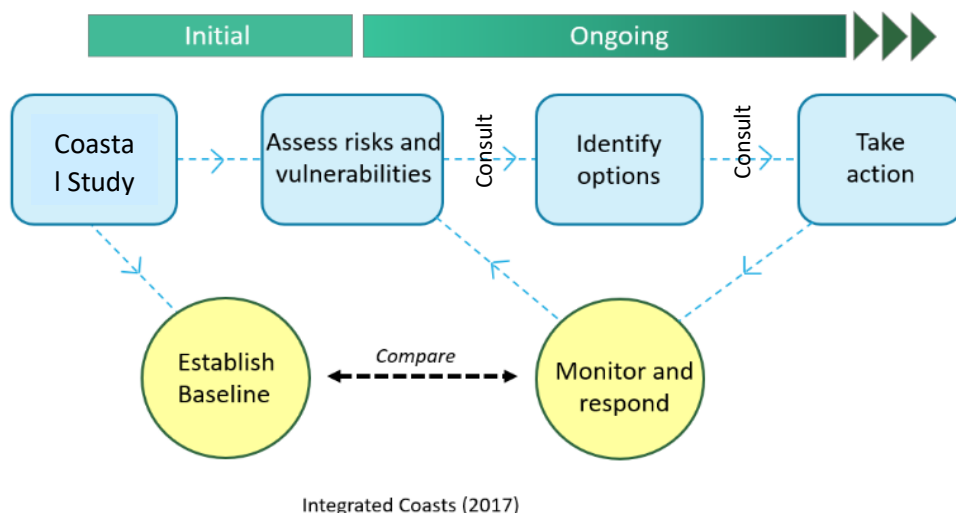
<sup>6</sup> [https://coastadapt.com.au/sites/default/files/factsheets/CoastAdapt\\_Glossary\\_2017-02-06\\_FINAL.pdf](https://coastadapt.com.au/sites/default/files/factsheets/CoastAdapt_Glossary_2017-02-06_FINAL.pdf).

course of a century enables the appropriate context for the community to consider the issues. This principle ensures that the community's understanding and expectations are managed as much as possible within physical realities. If all stakeholders have a shared understanding of the local context then it is more likely they will work together to arrive at common solutions. In summary, a coastal adaptation study is the starting point for coastal adaptation that will take place over decades.

These principles are encapsulated in Figure 3. In this model we observe that:

1. Coastal adaptation will be an ongoing process that will take place over years, decades, and perhaps even centuries.
2. The establishment of a baseline (i.e. an improved understanding of how the coast has been operating over the last 50 years) will provide the basis to determine when the coast is operating outside of its normal parameters due to sea level rise.
3. Scenario flood modelling assists in identifying risks and vulnerabilities.
4. Ongoing monitoring will provide the data from which to make decisions. Monitoring includes how beaches change over time, how storms impact the coast, and more regionally, what are the sea level rise trends at the Outer Harbor tide gauge.

**Figure 3: Coastal adaptation model**



## 2. Purposes of the review

Considering the model for coastal adaptation, and the former study conducted in Coastal Settlements Adaptation Study 2013-2014, the purposes of this project are:

1. To bring relevant assessment and findings of the Coastal Settlements Adaptation Study (2013-2014) into this current project.
2. Formulate a baseline understanding of how the coastline has been operating over the last 50 years. This will provide the context from which to evaluate when and how sea level rise is moving the coastline outside of its normal parameters.
3. To review the longer- and shorter-term geomorphology of the region (analyse historical aerial photography, Coast Protection Board profile lines, trends in mangrove growth).
4. To provide improved flood mapping in clarity but also to provide incremental flood mapping that demonstrates flow paths so that risks can be more finely assessed.
5. To assess the sea level rise trend at the Outer Harbor (using the recent study by Dr. P Watson, 2020).



6. To review the protection and accommodation options provided in the first study (2013-2014), including reporting on implementation progress and to provide an updated implementation strategy.
7. Report the findings in a template that has been utilized for City of Marion, City of Onkaparinga, Alexandrina Council and City of Victor Harbor which will also provide the foundation for ongoing monitoring.

### 3. Project Scope

#### Direct and indirect hazard impacts

Some climate change impacts are more direct than others. Rising sea levels will directly impact the landforms adjacent the coast, either through inundation of lower lying areas, or increasing erosion. Other impacts will be less direct. For example, projections for a drier climate are often associated with less vegetation in dunes, and the increased cracking of cliffs<sup>7</sup>. These more indirect impacts may increase the rate of erosion. Increased intensity of rainfall events may increase the gullying of slopes thereby increasing the potential for increased rates of recession and instability. In the context of a coastal study the impact of rising sea levels can be quantified through sea flood modelling within digital models. Erosion modelling is more difficult but there are a number of tools available to establish a possible erosion outlook. The impact of vegetation loss cannot be easily quantified and as noted above, is based upon less certain projections. Attempting to incorporate too many impacts into a coastal study is likely to compound the level of uncertainty and deliver less clear outcomes. It is also noted that South Australian Coast Protection Board only considers three hazard impacts: inundation, erosion and sand drift. In this project we will consider inundation and erosion.

#### Direct and indirect risks

Direct risks relate to the impact of rising sea levels and associated erosion on the fabric of the coast. In this study we evaluate the direct impact of *inundation* and *erosion* in four main receiving environments. These are listed below and explained later in the project:

- Public assets
- Private assets
- Social disruption
- Ecosystem disruption

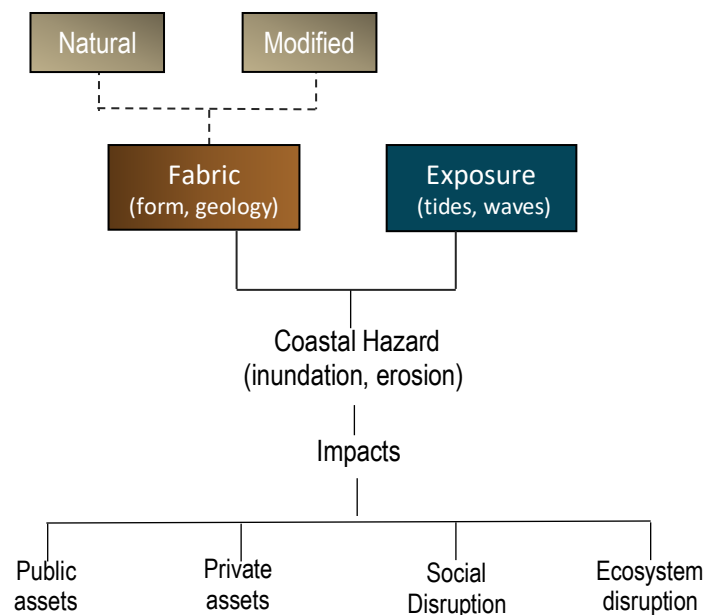
Associated with these direct risks are a range of indirect risks. For example, the potential loss of a beach from erosion is a potential social and economic risk (if the beach is related to economic activity such as tourism). A political risk may occur when decision makers act in ways the communities do not support. A legal risk may occur from not disclosing or responding to risks, or building adaptation structures that fail. However, all of these indirect risks are derived from the direct risks to the coastline from inundation or erosion. In summary, in a bid to increase certainty, this project evaluates the *direct impacts* of inundation and erosion in the context of *rising sea levels*. In a bid to contain focus, this study assesses the *direct risks* to assets, people and ecosystems that are positioned within coastal regions.

<sup>7</sup> Resilient South (2014) Regional Climate Change Adaptation Plan, URPS and Seed Consulting, p.22 (technical report p.3)

## 4. Conceptual assessment framework

Integrated Coasts has developed this assessment tool that adopts a simple and intuitive framework. Adopting a conceptual framework ensures that the study is accessible to all stakeholders. Coastal hazards experienced along a section of a coastline can be generally framed in terms of the nature of the 'fabric' (the nature of the geology and form) in the context of the nature of the 'exposure' (the impact of wind, tides, waves) (Figure 4).

**Figure 4: Conceptual assessment framework**



### Coastal Hazards

South Australian Coast Protection Board considers three main coastal hazards: inundation, erosion, and sand drift. Due to the nature of the Adelaide Plains coastline, only the first two are under consideration in this project.

Inundation and erosion hazards experienced along a section of a coastline can be assessed by considering three main coastal features:

- **Coastal fabric (geology)**

Intuitively we understand that if we are standing on an elevated coastline of granite that the coast is not easily erodible. Conversely, we understand if we are standing on a low sandy dune that erosion may indeed be a factor. It is the geology of the coast upon which our settlements are situated that determines one side of the hazard assessment in terms of elevation (height above sea level), and the nature of the fabric of the coasts (how resistant it is to erosion). We assess coastal geology in four categories of erodibility:

- (1) Low erodibility
- (2) Moderate erodibility
- (3) High erodibility
- (4) Very high erodibility

- **Coastal modifiers (human intervention)**

In some locations there are additional factors that modify this core relationship between fabric and exposure. For example, rock revetment has been placed along the coast at Webb Beach and levees have been installed at Port Parham and Webb Beach. These installations have modified the fabric of the coast from sand to 'rock' or quarry rubble.

In this study we identify how the coast has been modified and in particular provide an update to implementation progress of the recommendations of Coastal Settlements Adaptation Study (2013-2014).

- **Coastal exposure (actions of the sea)**

If we find ourselves on the shore of a protected bay, or in the upper reaches of a gulf, we intuitively know that the impact from the ocean is likely to be limited. On the other hand, if we are standing on a beach on the Southern Ocean and listening to the roar of the waves, we understand that we are far more exposed. This assessment tool categorises coastal exposure in four main ways:

- (1) Very sheltered
- (2) Moderately sheltered
- (3) Moderately exposed
- (4) Very exposed

Due to its location within Gulf St Vincent, the whole of the Adelaide Plains coastal region is generally categorised by Nature Maps (SA) as 'sheltered'<sup>8</sup>. In this study we also investigate how exposed a section of coast is to sea-flooding by modelling routine high-water events and storm surge events within a digital elevation model captured in 2013.

### **Hazard risk assessment**

Each section of the coast is then assessed to determine how inherently at risk it is to the coastal hazards of inundation or erosion. For example, areas of land that are elevated are not at risk from inundation, whereas low lying land is more inherently vulnerable to inundation. Landforms that are highly erodible are assigned as higher risk because they are inherently more vulnerable to erosion, and the converse applies.

### **Changes in the relationship**

In a coastal scoping study, we are also interested to know how this relationship between ***fabric*** and ***exposure*** may change over time, and what this may mean in the context of our coastal settlements. Our sea levels have been quite stable for several thousand years. However, in the last century sea levels rose on average at ~1.7mm per year. The largest rates of rises have occurred since 1993 (4-5mm in our region), but similar rates of rises also occurred in the time period 1920 to 1950<sup>9</sup>. The general consensus of the scientific community is that the rate of sea level rise will continue to escalate towards the end of this century, but the exact rate is uncertain. What is certain is that if

<sup>8</sup> <https://data.environment.sa.gov.au/NatureMaps/Pages/default.aspx>

<sup>9</sup> CSIRO, 2015, Climate Change in Australia, Technical Report, p.143.



seas rise as projected then the relationship between fabric and exposure will change significantly in some coastal locations. In this study, we model routine high-water events and storm surge events that take into account sea level rise projections for 2050 and 2100.

### **Risk assessment**

Taking into all of the above, impacts of erosion and inundation hazards are then considered within four receiving environments:

- Public assets
- Private assets
- Social disruption
- Ecosystem disruption

Each of these are assessed for current risk (2020) and future risk (2100). The structure of reporting within each of the cell reports generally follows the flow of the conceptual framework. We use Council's risk assessment framework that utilises a 'likelihood – consequence' matrix to allocate risk.

These concepts are explained more fully in the next section.

## **5. Project overview**

### **Stage 1: Coastal Adaptation Study**

Stage 1 identifies the geomorphology and coastal processes of the site, formulates the baseline, assesses current and future exposure and assesses the impact of hazards within a risk assessment process.

#### **Settlement history**

- Provide a brief history of the settlement (bringing forward findings from 2013-2014).

#### **Geomorphology**

- Provide a brief overview of how the coast was formed to provide a context from which to understand the coast today.

#### **Coastal fabric**

- Identify the nature of the coastal fabric.
- Analyse changes to the coastal fabric over the last 100 years.
- Identify human intervention (including protection items installed since 2013-2014).

#### **Coastal exposure**

- Incorporate the findings of the storm of 9 May 2016 into this study<sup>10</sup>.
- Model the impact of storm surges upon the backshores<sup>11</sup>.
- Model the impact of routine high-water events upon the backshores.
- Analyse these impacts within time frames: 2020, 2050, and 2100.

<sup>10</sup> Report, Flood mapping of event 9 May 2016.

<sup>11</sup> The methodology employed in this section is to model sea-flood impact in increments of 0.1m or 0.2m so as to establish flow paths. Note, sea-flood modelling has been completed for Parham and Webb Beach.

### **Storm water runoff**

- No storm water infrastructure exists for the region and therefore the first step is to identify where storm water flows and pools within each township in a rainfall event.
- Assess the likelihood of the coincidence of a rain fall event with sea-flood event where flooding of settlements may be compounded.
- Identify possible solutions to manage identified storm water issues.

### **Hazard risks and impacts**

- Assign an inherent hazard rating to each cell (or minor cell, if applicable).
- Describe the likely impact upon the public and private infrastructure, the community and ecosystems.
- Conduct a risk assessment utilising the risk assessment framework of Adelaide Plains Council.

## **Stage 2: Coastal Adaptation Strategy**

A coastal adaptation strategy should have as its first horizon sea-flooding projected for 2050 which takes into account 0.30m of sea level rise. Strategies that are implemented to cater for events projected for 2050 are likely to be viable until 2060 or even longer if seas rise at the projected rate. This strategy provides a 30-40 year time buffer from which to further assess the rate of sea level rise in Gulf St Vincent. However, a shorter time frame is required for Council planning and this is set at 10 years (2021 – 2031).

### **Assess and establish adaptation options<sup>12</sup>**

Adaptation options can be assessed within the following categories:

- Avoidance – avoid the impacts of coastal hazards by ensuring that assets are not placed in areas that could be impacted in the future.
- Hold the line (protect) – install protection infrastructure that reduces the impact of coastal hazards or use environmental practices to strengthen natural protective forms such as dunes.
- Accommodate – accept some degree of hazard or conduct limited intervention to manage the hazard (e.g. in areas that may be subject to inundation, raise houses on poles).
- Managed retreat – progressively move assets or services away from areas that could be impacted by coastal hazards now or in the future.
- Defer and monitor – on occasions there may not be enough data to make the appropriate decision, or the proposal may be determined only necessary if sea level rise begins to accelerate.
- Loss acceptance – accept that coastal hazards will cause negative impacts on assets and services and when this occurs, they will not be replaced.

<sup>12</sup> These explanations of key adaptation terms and principles draws primarily on CoastAdapt.

### **Establish adaptation responses**

Adaptation responses will generally fall into three main categories:

- Planning – planning responses are options that use planning legislation and regulations to reduce vulnerability and increase resilience to climate change and sea level rise.
- Engineering – in the context of climate change, adaptation ‘engineering’ has come to describe adaptation options that make use of capital works, such as seawalls and levees.
- Environmental management – includes habitat restoration and enhancement through activities such as revegetation of coastal dunes and seagrass beds, or developing artificial reefs to reduce wave erosion of shorelines.

### **Assess the adaptation timing**

There are two broad ways in which adaptation can occur in relation to timing/

- Incremental approach – a series of relatively small actions and adjustments aimed at continuing to meet the existing goals and expectations of the community in the face of the impacts of climate change.
- Transformative approach – in some locations, incremental changes will not be sufficient. The risks created by climate change may be so significant that they can only be addressed through more dramatic action. Transformational adaptation involves a paradigm shift: a system wide change with a focus on the longer term.

### **Identify a typical monitoring strategy (preliminary)**

- The purpose of this section of work is to identify the type of monitoring actions that are likely to prove useful for Adelaide Plains to monitor the coastline.

### **Identify limitations, assumptions and where further research is required**

- In this section of work, identify the limitations and assumptions of the study, and where further research is required.

## **6. Outputs.**

The proposed outputs are three stand-alone reports for each of the three cells within a reporting template developed by Integrated Coasts:

- Cell 1: Parham and Webb Beach
- Cell 2: Thompson Beach
- Cell 3: Middle Beach

While there will be some repetition in regard to methodology and geomorphology in each report, the advantage of having a stand-alone report for each cell is that council and the community can easily access relevant information according to location. Additionally, the cell template system allows for addition or updates at a later date. For example, if another major storm was experienced, or protection items added, these findings and issues can be easily inserted at a later date.

## B. Project tasks

### Stage 1: Coastal adaptation study

**Task 1: Initiate the project, set up reporting template for each cell and bring forward relevant data from Coastal Settlements Adaptation Study 2013-2014**

Methodology:

- Bring forward the settlement history, emergency access and egress, and other relevant information.

Personnel	Task	Rate	Days	Cost
Integrated	Initiate project and setup templates	\$1200	2.0	\$2400
		<b>Total</b>	<b>2.0</b>	<b>\$2400</b>

**Task 2: Analyse coastal geomorphology and sea level rise trends**

Methodology:

- Conduct literature review of coastal geomorphology (including, but not restricted to, Belperio<sup>13</sup>, Bourman<sup>14</sup>, and Roche<sup>15</sup>)
- Review sea level rise study by P. Watson, 2020, Updated mean sea level analysis, Australia, and in particular the analysis of the Outer Harbor tide gauge.
- Consult with Professor Hesp (Flinders University) and Peri Coleman (Delta Environmental Consulting) and other relevant experts (if required).

Personnel	Task	Rate	Days	Cost
Integrated	Literature review and tide gauge study	\$1200	3.0	\$3600
Coleman	Provide history and development of mangroves at Middle Beach	\$1200	1.0	\$1200
Hesp/ Western	Review all findings and provide summary	\$1200	1.0	\$1200
		<b>Total</b>	<b>5.0</b>	<b>\$6000</b>

**Task 3a: Analyse the coastal fabric of the coast to produce baseline study (core tasks).**

Methodology:

- Use nature maps to assess bathymetry, contours, benthic and geology,
- Analyse shoreline changes using photographs 1970s to 2020,
- Capture profile lines at Thompson Beach and Middle Beach as baseline studies,
- Analyse Coast Protection Board profile lines and assess changes<sup>16</sup>,
- Identify and describe human intervention in each cell.

<sup>13</sup> Belperio, A. P, 1993, Land subsidence and sea level rise in the Port Adelaide estuary.

<sup>14</sup> Bourman et al 2016, Coastal Landscapes of SA, University of Adelaide Press.

<sup>15</sup> Roche M.T, 1976, An investigation of the sedimentary processes in the Middle Beach area, St Vincent's Gulf, South Australia.

<sup>16</sup> We are waiting for advice from Coast and Marine Branch as to the last time these were surveyed. It is likely to be a considerable time ago (perhaps ten years?).

Personnel	Task	Rate	Days	Cost
Integrated	Capture survey profile lines at Middle Beach and Thompson Beach (wading profiles, 1km off shore)*	\$1200	1.5	\$1800
Integrated	Purchase aerial photography from Mapland**	Cost	-	\$ 850
Integrated	Orthorectify aerial photography, draw baseline year at 2020, compare shoreline changes.	\$1200	2.0	\$2400
Hesp	Analyse Coast Protection Board profile lines (and profiles collected at Thompson Beach and Middle Beach, see Task 3b.1 below)	\$1200	2.0	\$2400
Integrated	Identify human intervention (protection items before and after 2014 study), other interventions such as mangrove removal.	\$1200	0.5	\$ 600
Integrated	Report findings within cell templates	\$1200	1.0	\$1200
		<b>Total</b>	<b>7.0</b>	<b>\$9250</b>

\*This task will provide a baseline data set from which future comparisons can be made. The data collected over time will provide a basis to determine if the coast is accreting, receding or stable.

\*\*Mapland, DEW advises that available photography will cost \$857.00 (say \$850).

### Task 3b: Determine if the coast has accreted, eroded or is stable since 2013 (optional)

The key to effective decision making is the collection and analyse of relevant data. An additional assessment could be completed to establish if the coast is accreting, eroding or stable since the collection of the digital elevation model in 2013. Integrated Coasts proposed to use a drone to capture a terrain model of selected areas of the three locations (Webb/Parham, Thompson, Middle Beach) and then compare the same terrain from the digital elevation model in 2013. This would provide a comparison between the data sets of eight years separation.

Personnel	Task	Rate	Days	Cost
Integrated	Prepare equipment and flight paths for capture areas.	\$1200	1.0	\$1200
Integrated	Capture terrain model for selected areas at Webb / Parham, Thompson and Middle Beaches (2 personnel).	\$1200	2.0	\$2400
Integrated	Process and analyse the data and report findings.	\$1200	1.0	\$1200
		<b>Total</b>	<b>4.0</b>	<b>\$4800</b>

Project note: Integrated Coasts made enquiries about the 'deep survey benchmark' installed at Port Parham in 2015. However, DEW informs that while updated data was collected in 2020, the original data set was not of sufficient standard and therefore no comparisons can be made as yet as to whether any vertical land movement has been detected. Furthermore, DEW informs that to make any useful sense of the data, the data collected at Parham would need to be integrated with data collected from other locations around the northern section of the Gulf St Vincent.

#### Task 4: Analyse the coastal exposure (current and future)

##### Methodology:

- Create inundation mapping for Thompson Beach and Middle Beach\* in increments of 0.1m to 0.2m that takes into account flow paths and then identify:
  - Storm event 9 May 2016,
  - 1 in 100-year ARI event for 2020, 2050, 2100,
  - Monthly high-water event for 2020, 2050, 2100
- Analyse erosion outlook using two methods:
  - Using modified Bruun Rule and shoreline translation method developed by Hesp,
- Report findings into template.

Personnel	Task	Rate	Days	Cost
Integrated	Inundation modelling (Thompson, Middle)	\$1200	2.5	\$3000
Hesp	Erosion modelling (Hesp methodology)	\$1200	2.0	\$2400
Western	Report findings into template	\$1200	1.0	\$1200
		<b>Total</b>	<b>5.5</b>	<b>\$6600</b>

\*Sea-flood modelling has already been created for Webb Beach and Parham within other projects. This flood modelling can be incorporated into the cell templates.

#### Task 5: Analyse the impact of storm water runoff on to the coast

There is little or no storm water infrastructure for the four coastal settlements. Integrated Coasts main focus is upon coastal adaptation and therefore this task is divided into two main parts. The first part evaluates the likelihood of a confluence of a rain event with a sea-storm/flood event which may increase the impact of flooding within the settlements. The second section identifies how storm water flows and pools throughout the settlements. However, this second part of Task 5 should only be regarded as a 'first pass assessment' (including any engineering advice) as to possible ways to deal with storm water issues. Some of these issues will be easier than others. For example, storm water pools on George Street within Webb Beach. This matter is likely to be effectively dealt with by installing a pipe to the north and draining water into the inlet creek. On the other hand, water also pools within areas of Parham, but these are at much lower elevations and situated in locations that do not necessarily offer effective means for drainage.

##### Methodology:

- Evaluate reports by Tonkin Consulting that consider the possibility of confluence of rain and sea storm events for Port Adelaide region.
- Assess a significant rain event to identify where water pools and how long it pools within each settlement (take photographs).
- Use the photographs and digital elevation model to identify approximate catchment areas.
- Identify any areas where storm water may be scouring dunes or embankments (this is unlikely in Parham, Webb Beach, and Thompson Beach, but may occur at Middle Beach).

Personnel	Task	Rate	Days	Cost
Integrated	Review study (s) by Tonkin Consulting and report likely confluence of rain and sea events	\$1200	0.5	\$ 600
Integrated	Assess a rain event to identify where water pools and for what duration (estimated).	\$1200	2.0	\$2400
Integrated	Use the digital elevation model to record these pooling areas within the model and identify approximate catchment areas.	\$1200	2.0	\$2400
Integrated	Identify dunes, embankments or terrain that is scoured during rain events.	\$1200	1.0	\$1200
		<b>Total</b>	<b>5.5</b>	<b>\$6600</b>

## Task 6: Describe the impact of coastal hazards (2020 – 2100) and conduct formal risk assessment.

### Methodology:

- Within each minor cell, identify current and future coastal hazards in relation to:
  - Public assets
  - Private assets
  - Ecosystem disruption
  - Social disruption
- Conduct risk assessment using Integrated Coasts methodology that benchmarks each minor cell in relation to the entire South Australian coastline,
- Conduct risk assessment for each cell using Adelaide Plains Council risk management framework and assessment criteria and the four receiving environments noted above,
- Report findings into coastal study template.

Personnel	Task	Rate	Days	Cost
Western	Identify current and future coastal hazards in context of four receiving environments.	\$1200	1.0	\$1200
Western	Conduct risk assessment 2 (council framework)	\$1200	1.0	\$1200
Western	Report findings into study template	\$1200	0.5	\$ 600
		<b>Total</b>	<b>2.5</b>	<b>\$3000</b>

An example of the risk assessment template is included on the next page.

## 7-3 Risk assessment using Council's risk framework.

Aldinga Reef (10.2)

**Risk identification:** Erosion is currently, or may in the future, impact the base of soft coastal cliffs.

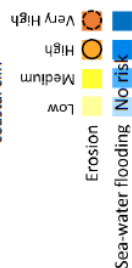
Coastal processes	Sandy shore backed by soft coastal cliffs. Ngalinga formation. End of Gordon Street – significant recession of cliff toe over last ten years (8 to 10m) has increased vertical slope. The top of the cliff has not undergone any significant recession (compared to 1979). Between Butterworth and Hume (in location of profile line) recession of vegetation line has been 24 to 34m overall (18-28m in the last ten years).
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**Are any strategies employed to mitigate the risk? No.**

Receiving environment		Coastal Context		Time	Likelihood	Consequence	Risk
Public infrastructure	The Esplanade Road, footpaths and carparks. At Gordon Street the footpath is setback 10-12m from the cliff edge. At Butterworth - Hume roads and carparks are set back 70-90m from shoreline.			current	Likely	Moderate	High
Private assets*	Private assets are positioned behind the Esplanade Road but only ~30m from cliff top. Loss of the access road is a risk. Loss of property/dwelling is possible.			2100	Almost certain	Catastrophic	Very high
Safety of people	The high steep cliffs in Gordon Street region make slides or falls more likely which could impact people below. GHD assigns individual risk for someone living in the area as 'unlikely' and societal risk as 'likely'.			current	No risk	No risk	No risk
				2100	Likely	Major	High
Ecosystem disruption	This assessment relates to large scale disruption to ecological systems.			current	Rare	Major	Moderate
				2100	Unlikely	Major	Moderate
				current	No risk	No risk	No risk
				2100	No risk	No risk	No risk

### Inherent Hazard Rating

Rocky beach backed by soft coastal cliff



### Erosion Hazard Rating

(current outlook 2020)



### Erosion Hazard Rating

(future outlook 2100)



\*Council not necessarily liable for private assets

Note: the assignment of future risk assumes that no action is taken to mitigate the risk apart from normal safety procedures.

Rain intensity and storm water impacts not assessed in this risk assessment

### Summary

Over the entire Onkaparinga region, this area of coast has undergone the most rapid recession/erosion over the last ten years. Scenario modelling demonstrates that the Gordon-Neva Street area is currently under attack in higher storm events and if seas rise as projected will routinely be impacted. This is likely to increase the slope of the soft sediments and cause the cliff toe to recede rapidly (there has been minimal recession of the cliff top). The vegetation line at Snapper Point has receded ~30m in the last ten years. This area is likely to continue to recede with projected sea level rise.



## Stage 2: Coastal adaptation strategy

### Task 7: Identify adaptation options and formulate the adaptation strategy.

#### Methodology

Using the findings from Stage 1 assess the various options for coastal adaptation (as described in Section 1 of this proposal):

- Avoidance
- Hold the line (protection)
- Accommodation
- Managed retreat
- Defer and monitor
- Loss acceptance (do nothing).

Assess the options created in the Coastal Settlements Adaptation Study (2013-2014) and identify:

- The options that have been implemented
- The options that have not been implemented
- Review the options that have not been implemented against the findings of this study and assess their currency.

Using the scenario analysis from Stage 1, identify the likely timing of intervention of options. Consult with Magryn and Associates (engineers) as required\*.

Make recommendations for the adaptation strategy in the following two time frames:

- Adaptation options should be designed to manage sea flood projections to 2050.
- The adaptation strategy should provide guidance to Council for the time period 2021 – 2031.

As noted in Section A, ongoing monitoring will provide the appropriate context from which to make adaptation decisions over the coming years and decades. This part of the work identifies the type of monitoring actions that are likely to be cost-effective for Council.

Personnel	Task	Rate	Days	Cost
Integrated	Use options analysis to identify suitable options including likely timing.	\$1200	2.0	\$2400
Integrated	Identify and report typical monitoring actions (this is not a monitoring plan)	\$1200	0.5	\$ 600
Integrated	Report conclusions into templates	\$1200	1.0	\$1200
		<b>Total</b>	<b>3.5</b>	<b>\$4200</b>

\*In past projects we have used a provisional sum for engineering consulting which is included in Task 8 below. This has generally proved to be adequate.

**Task 8: Identify options for managing storm water in the context of managing the coasts and in the context of sea level rises projected for 2050.**

Use the assessment from Stage 1 to formulate possible storm water management responses and provide preliminary designs\*. Take into account sea level rises projected for 2050.

Personnel	Task	Rate	Days	Cost
Engineer	Consult with engineer to ascertain alternative storm water management options and provide preliminary designs	\$1600*	1.0	\$1600
Western	Report conclusions into templates	\$1200	1.0	\$1200
		<b>Total</b>	<b>2.0</b>	<b>\$2800</b>

\*Magryn and Associates has agreed to provide technical advice and preliminary concept designs on an 'as required' basis and therefore the cost here is provisional.

**Task 9: Prepare adaptation proposals with preliminary design (if required).**

Proposal will be designed to manage sea level rise projects to 2050. The Coastal Settlements Adaptation Study (2013-14) identified protection items with some preliminary costs. These will be reviewed and either adopted into this project or alternative options identified. Proposals will be prioritised as:

- Requiring implementation and prioritised in time period 2021 to 2031,
- Requiring implementation subject to monitoring.

Personnel	Task	Rate	Days	Cost
Integrated	Consult with engineer about various options	\$1200	1.0	\$1200
Engineer	Engineer to prepare preliminary concept drawings and approximate costs (if required)	\$1600	2.0	\$3200*
Integrated	Report conclusions and drawings into templates	\$1200	1.0	\$1200
		<b>Total</b>	<b>4.0</b>	<b>\$5600</b>

\*Engineering costs are provided as a provisional sum (total allowance, 3 days).

**Task 10: Produce coastal adaptation study and strategy – cell reports (x3)**

Taking into account the first ten tasks produce and finalise the coastal adaptation study and strategy (note, amounts have been allocated for reporting throughout, therefore this sum is to finalise the reporting and conclude the project).

Personnel	Task	Rate	Days	Cost
Integrated	Produce coastal adaptation study main report and report templates	\$1200	3.0	\$3600
		<b>Total</b>	<b>3.0</b>	<b>\$3600</b>

## C. Fee Schedule

	Task Description	Personnel	Days	Unit price	Price (Ex GST)
Stage 1: Coastal Adaptation Study	1. Initiate the project and bring forward findings from previous study.	Integrated Coasts	1.0	\$1200	\$1200
	2. Analyse geomorphology and sea level rise trends	Integrated Coasts/ Hesp/ Coleman	5.0	\$1200	\$6000
	3a. Analyse coastal fabric of coast (core tasks)	Integrated Coasts/ Hesp*	7.0	\$1200	\$8400
	3b. Determine recent coastal trends using drone capture and DEM (2013) (optional)	Integrated Coasts	4.0	\$1200	\$4800
	4. Analyse coastal exposure (including erosion modelling)	Integrated Coasts/ Hesp	5.5	\$1200	\$6600
	5. Analyse and report storm water runoff.	Integrated Coasts	5.5	\$1200	\$6600
	6. Hazard identification and risk assessment	Integrated Coasts	2.5	\$1200	\$3000
	<b>Total</b>		<b>32.5</b>	<b>\$1200</b>	<b>\$37400</b>
Stage 2: Coastal Adaptation Strategy	7. Identify options and formulate the strategy	Integrated Coasts	3.5	\$1200	\$4200
	8. Identify options to manage storm water	Integrated Coasts/ engineer	2.0	*varies	\$2800
	9. Prepare adaptation proposals and preliminary designs	Integrated Coasts	4.0	*varies	\$5600
	10. Produce final coastal adaptation study and strategy within 3 cell reports.	Integrated Coasts	3.0	\$1200	\$3600
	<b>Total</b>		<b>12.5</b>		<b>\$16200</b>
	Plus aerial photography				<b>\$ 850</b>
	<b>Total Cost**</b>		<b>44.5</b>	Ex GST	<b>\$54450</b>

\*Charging rates:

Integrated Coasts      \$150 per hour/ \$1200 per day  
 Flinders University      \$150 per hour/ \$1200 per day  
 Magryn (engineer)      \$1500-1800 per day (depending on personnel)

\*\*Includes optional study at 3b for \$4800.

## D. Company information and expertise

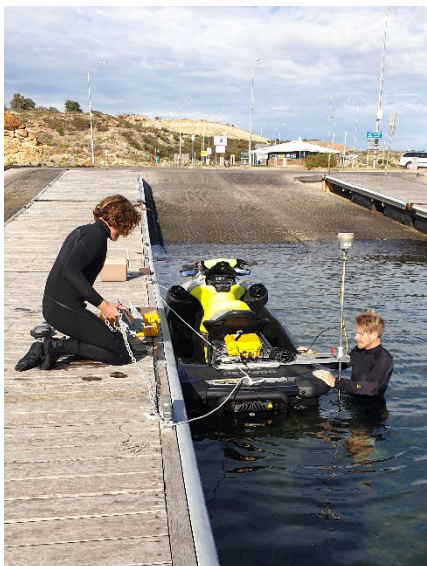
### 1. Company background and expertise

Mutual Projects Pty Ltd was initially a property development company that changed business strategy after its principal director, Mark Western obtained a Master of Urban and Regional Planning at University of South Australia in 2011. Integrated Coasts' point of distinction is that our sole focus is on coastal adaptation and monitoring of coasts within urban environments. As such we have completed various adaptation and monitoring tasks for, some of which are listed below.

#### About Integrated Coasts

For nearly ten years, Integrated Coasts sole focus has been on completing coastal adaptation projects for Councils and the data collection and modelling of storm events and tidal processes for Councils and the State Government. Integrated Coasts has also worked with organisations such as National Climate Change Adaptation Research Facility (Coast Adapt) which has broadened our understanding of coastal adaptation. Integrated Coasts is focussed on being 'in the field' and actively collecting and analysing data. Our field expertise includes:

- Terrain capture and analysis of beach profiles and sand volumes using drone technology,
- Bathymetric capture using jetski and sonar equipment,
- Tidal studies using tide gauges (some of which we have made ourselves),
- Capturing and analysing storm data using survey equipment, tide gauge, wind and wave buoy data.



Integrated Coasts has developed a unique set of tools and risk assessment processes. As such we do not just deliver a final report but deliver the foundations for Council to manage coastal adaptation over the long term. In particular we have developed a coastal adaptation reporting template that provides a consistent framework and a visual approach to assessment which is accessible for all stakeholders and community members to navigate. The template can also be added to over time by Council and other consultants as required. Examples of cell reports can be found at [Coastal Adaptation Strategy | Your Say Victor Harbor](#) and [Coastal Adaptation Study | Your Say Onkaparinga](#).

Over the last three years we have completed baseline assessment projects for over 60kms of the coastline in the vicinity of Gulf St Vincent and the Alexandrina and Victor Harbor regions. One counter-intuitive finding has been that for the most part, we do not see any significant 'sea level rise' signal in the data as yet. This is not to say that there are not problem 'hot spots', but rather that the impacts of sea level rise are likely to become problematic in the decades to come, and as noted above, this finding is congruent with the sea level rise projections for this century. Therefore, we are of the opinion that a Coastal Adaptation Study should be a baseline study, and an effective adaptation strategy will be largely dependent on effective monitoring of our coastlines over the coming decades.

In most projects Integrated Coasts utilises the service of scientists and/or engineers who have significant experience in coastal geomorphology and coastal processes that are likely to be relevant to each project.

### **Past projects**

- *DC Mallala Coastal Settlements Adaptation Study conducted from (2013-14)*

Mark Western was employed by University of South Australia and acted as lead consultant in the DC Mallala Coastal Settlements Adaptation Study. Work included the analysis of the digital elevation models, site inspections, data collection, presenter at workshops, adaptation planning and costing, obtaining engineering advice, and risk assessment.

- *Seawater flooding adaptation study for Yorke Peninsula coastal settlements (2015)*

Integrated Coasts was engaged as the lead consultant to undertake the Seawater Flooding Adaptation Study for Yorke Peninsula coastal settlements which included Clinton, Price, Pine Point and Coobowie. This project involved organising the capture of the data to create the Digital Elevation Model, site inspections, data collection, presenter at all workshops, adaptation costing, obtaining engineering advice, risk assessment, and report writing.

- *Community Emergency Management Plan for Middle Beach (2016)*

Integrated Coasts was engaged as part of a three-person team by Adelaide Plains Council to create the Community Emergency Management Plan for Middle Beach (SA). This project involved obtaining floor heights of all buildings in the settlement, flood risk mapping, identifying refuge points, a review of the STEDS sewer system, and community consultation.

- *Policy Review for Local Government of SA – SA Planning Policy Library and various Development Plans (2016).*

In his role as Senior Research Fellow (part time) at University of SA, Mark Western completed a review of current planning policy in the SA Planning Policy Library, Yorke Peninsula Council Development Plan, and DC Mallala Development Plan to ascertain the suitability of current policy to deal with the emerging problem of sea level rise.

- *Inundation Mapping for District Council of Barunga West and Yorke Peninsula Council (2017).*

Engaged by Legatus Group to produce sea flood risk mapping for seven towns within District Council of Barunga West and Yorke Peninsula Council. This project involved the engaging Airborne Research Australia to collect the data and create the digital elevation model. Integrated Coasts ground truthed the data to the permanent survey markers and created the flood mapping.

- *National Climate Change Adaptation Research Facility – Coast Adapt (2016-2017)*

NCCARF launched the coastal adaptation tool, Coast Adapt in 2017. To obtain feedback about the effectiveness of the tool, NCCARF has run ten test cases around Australia. Mark Western has acted as facilitator for two of these test cases at Robe Council and Sapphire Coast in NSW. Both test cases were showcased at the launch of Coast Adapt in 2017.

- *Storm analysis and flood mapping – State Government of SA and local Councils (2016-2018)*

The storm events of 2016 had significant impact around the State, in particular 9 May 2016. The State Government and various Councils (Adelaide Plains, Yorke Peninsula Council, Barunga West Council, Onkaparinga Council) engaged Integrated Coasts to research and model the impact of this event within a digital elevation model (DEM). The State Government used this data to as a way to check their own flood risk level assignments for these regions.

- *Coastal adaptation plan and coastal monitoring plan – City of Marion, 2018-2019.*

City of Marion engaged Integrated Coasts in a three staged process to produce its coastal adaptation plan and coastal monitoring plan. The main purpose of the study was to produce a baseline understanding of the coastline which included the capture and ground truthing of a high resolution 3D model for the coastline, historical comparative analysis, production of inundation/storm mapping, assessment of risks and vulnerabilities, and creation of two plans: coastal adaptation plan and coastal monitoring plan.

- *Coastal adaptation strategy and community engagement – Alexandrina Council, 2018-2020.*

Alexandrina engaged Integrated Coasts initially to produce a coastal adaptation strategy for its ocean coastline. This project was expanded in 2019 to include an assessment of the settlements within the Murray River estuary. The project involved historical comparison of the shoreline position, erosion assessment, inundation assessment, storm impact assessment and creation of an adaptation strategy. The final stage of the project was to communicate the findings of the project to the community in five presentations.

- *Coastal scoping study – City of Onkaparinga, 2019-2020.*

Integrated Coasts was engaged to produce a baseline study for the coastline of City of Onkaparinga. This project involved assessment of three storms, installation of a tide gauge at Southport, tidal monitoring project, historical analysis of shoreline position, analysis of 32 Coast Protection Board profile lines, production of sea-flood risk mapping, risk assessment, and recommendations.

- *Coastal Adaptation Study and Coastal Adaptation Strategy – City of Victor Harbor 2021.*

Integrated Coasts was engaged to produce a baseline study for the coastline of City of Onkaparinga. This project involved assessment of three storms, installation of a tide gauge at Southport, tidal monitoring project, historical analysis of shoreline position, analysis of 32 Coast Protection Board profile lines, production of sea-flood risk mapping, risk assessment, and recommendations.

- *Sea flood risk mapping for Drain L (Robe Lakes) for District Council of Robe, 2021.*

It has long been suspected that a larger sea-flood may be able to flow through Drain L and through various lakes and impact the township. This project incrementally flood mapped the inlet and lakes and quantified the likely risk to the township.

- *Analysis of coastal risk and identification of adaptation options for Mutton Cove, Department of Environment and Water, 2021.*

Located on Le Fevre Peninsula, the levee around Mutton Cove was breached in the flood event of 9 May 2016. This project researched the history of Mutton Cove, assessed current site condition, assessed current and future sea-flood risk, and considered various mitigation options before making final recommendations.

- *Coastal Monitoring Project, City of Marion (current project, 2021-2022)*

Subsequent to the coastal adaptation study completed in 2017-2018, Integrated Coasts has a two year contract to conduct coastal monitoring for the City of Marion coastline.

Monitoring tasks include: terrain capture and comparison using drone technology, analysis of the impact of storms, capture bathymetry using jetski and sonar, periodic inspection of cliff areas using drone video, and manage a citizen science project (2022).

## 2. Referees

	<b>Business Name &amp; Contact Person</b>	<b>Contact Phone &amp; Email</b>	<b>Details of Work Performed</b>
1	City of Victor Harbor, Lee Jeffery	ljeffery@victor.sa.gov.au  0402 421004	Coastal adaptation study and coastal adaptation strategy, presentations to staff and elected members (2021)
2	Yorke Peninsula Council, Stephen Goldsworthy	<a href="mailto:Stephen.goldsworthy@yorke.sa.gov.au">Stephen.goldsworthy@yorke.sa.gov.au</a>  0427 187839	Seawater flooding adaptation study (2015, 2017), Legatus sea flood risk mapping project (2015). Presentations to elected members.
3	City of Onkaparinga, Nina Keath	<a href="mailto:Nina.keath@onkaparinga.sa.gov.au">Nina.keath@onkaparinga.sa.gov.au</a>  08 83840596	Coastal Scoping Study (2019-2021), presentation to elected members, and staff workshop.

### 3. Key Staff and Subcontractors

#### Mark Western (Integrated Coasts)

Mark Western (Integrated Coasts) is the lead consultant for the project and responsible for its management and overall direction. Mark will undertake the sea-flood mapping, historical aerial photographic assessment, risk assessment, and liaise with the Council and other stakeholders, produce the final report.

##### Qualifications and memberships:

- Master of Urban and Regional Planning (University of SA)
- Member of Planning Institute of Australia (member 11031)
- Member of Australian Coastal Society.

Mark has had extensive experience managing major coastal projects over the last ten years and has created an adaptation study approach that has been utilised at Marion, Onkaparinga, Alexandrina and Victor Harbor Councils.

##### Experience:

See pages **22-25**.



#### Professor Patrick Hesp (Flinders University)

Professor Patrick Hesp will be responsible for overseeing the historical shoreline and profile analysis and producing an erosion outlook for the coastal settlements.

##### Qualifications:

- B.A. ; M.A. (Hons); 1974; 1976. Massey University, NZ
- PhD; 1982. University of Sydney, NSW, Australia
- DSc. 2013 Massey University, New Zealand.

##### Experience:

Professor Patrick Hesp is an international expert in coastal dune dynamics, geomorphology, restoration and management. He has experience working with geomorphology, coastal dynamics, ecology, archaeology and management of NZ, Aust., USA, Mexican, S. African, Namibian, SE Asian, Brazilian, Netherlands, Portuguese, French, Italian and Chinese coastal systems. He has conducted environmental impact assessment, environmental change, land use planning and management, land resource assessment.

Professor Hesp has worked with Integrated Coasts as a vital contributor to projects for City of Onkaparinga, City of Victor Harbor and Alexandrina Council and a brief CV is included on the following page.



## EXECUTIVE CV: PATRICK A. HESP

STRATEGIC PROFESSOR COASTAL STUDIES, SotE, FLINDERS UNIVERSITY

### EDUCATION

B.A.; M.A. (Hons); 1974; 1976. Massey University, NZ

Ph.D.: 1982. University of Sydney, NSW, Australia

DSc. 2013. Massey University, New Zealand

### ADMINISTRATIVE EXPERIENCE

WA Dept Agriculture State Rep on the WA Coastal Coordinating Committee

Member NSW National Parks Research Advisory Committee

Environmental Manager, Rottneet Island, WA

Executive Committee, School of P.E.P, Massey Univ., NZ

Doctoral Research Committee, Massey University

Director, Coastal and Environmental Services P/L, NZ

Graduate Director, Dept. Geography & Anthropology, LSU

Executive Committee, Dept. Geography & Anthropology, LSU

Chair, Dept of Geography and Anthropology, LSU (2010-2012)

Deputy Dean Research, School of Environ., Flinders Univ., SA

Member, State Coast Protection Board, South Australia



### RESEARCH PUBLICATIONS

**260 Publications (220 Refereed) including:**

Books: 6

Chapters in Books: 29

Refereed articles: 128

Edited Volumes: 11

Instructional CD-Rom: 1

Special Publications: 3

Refereed Technical Reports: 31

Refereed Conference Papers: 21

Technical Reports: 34

Conference papers: 6

Encyclopedias: 3

**H-index: 40 i10 Index: 99 5640 citations (Mar, 2017)**

Researchgate score 95% higher than all members.

### RESEARCH EXPERIENCE

- International expert in coastal dune dynamics, geomorphology, restoration and management.
- Geomorphology, coastal dynamics, ecology, archaeology and management of NZ, Aust., USA, Mexican, S. African, Namibian, SE Asian, Brazilian, Netherlands, Portuguese, French, Italian and Chinese coastal systems.
- Aeolian and desert dune dynamics, and management.
- Environmental impact assessment, environmental change, land use planning and management, land resource assessment.
- Holocene and Quaternary geology and geomorphology of coastal barriers.

### GRANTS

**Total Grants 1985 to present:**

**\$6,822,701.00**

*To 1995: \$586,000*

*1995-2002 (NZ period): \$193,500*

*2003-12 (USA period): \$5,541,201*

**Recent/Current:**

\$USA 798,853 Petrobras, Brazil:

\$USA 440,000 NSF (2008-2016):

\$360,000 ARC (2014-2017), Aust:

\$40,000 Spanish Govt. R&D (2017)

\$5,000 USA Fed Govt (2016)

\$290,000 LIEF ARC Grant (2017)

### AWARDS -HONOURS

R.J. Russell Award, AAG.

R.J. Russell Professor, LSU.

LSU Faculty Excellence Award.

2 x 'Rainmaker' LSU's top 100.

LSU Distinguished Faculty Award.

Fulbright Research Fellow.

Obama Govt. Conservation Award, USA.

Emeritus Professor, LSU.

China Academy Sciences Award

14 Keynote Addresses.

7 Visiting Professorships.

School of the Environment, SSN, Flinders University, Bedford Park, SA 5041

Mobile: 0417982346 Work: (08) 82013538

## Peri Coleman (Delta Environmental Consulting)

Peri Coleman has a long association with the samphire and saltmarsh environments of the northern part of Gulf St Vincent, including coastal areas within Adelaide Plains Council. She will take specific role in this project to provide the history and environmental circumstances of the growth of mangroves in the region, and in particular Middle Beach.

### Qualifications:

- Master of Applied Science (Environmental management and restoration), Charles Sturt University
- Graduate Diploma in Environmental Management, Charles Sturt University.
- Undergraduate studies in biology, teaching and communication.

### Experience:

Peri has extensive experience in identifying marine and terrestrial flora and fauna of the mainland states and Tasmania, conducting biological surveys, and producing reports and educational materials. Her main interests include conducting biological surveys, taxonomic work, preparation of herbarium and museum vouchers, saltmarsh rehabilitation projects, scientific illustration and desktop publishing, solar salt field design, operations and biology, developing environmental education programs & environmental management plans, and undertaking wetland, mangrove and saltmarsh studies.

During her long service on the South Australian Coast Protection Board (2000-2019), she represented the Board on committees including the Adelaide Coastal Waters Study, the Adelaide Coastal Waters Quality Improvement Plan Steering Committee, the Estuary Policy Group and the Sea Level Rise Advisory Committee.

(Abridged CV, full CV available on request)

## Joram Downes (Integrated Coasts)

Joram Downes has recently graduated with a Bachelor of Environmental Science specialising in coasts and oceans. Joram has significant expertise in collection and analysis of coastal data within the digital environment. He is proficient at drone capture, bathymetry capture, and analysis of tidal and storm data.

### Qualifications and memberships:

- Bachelor of Environmental Science (Flinders University)

## Magryn and Associates (engineers)

Joram Downes has recently graduated with a Bachelor of Environmental Science specialising in coasts and oceans. Joram has significant expertise in collection and analysis of coastal data within the digital environment



## ENGINEERING SOLUTIONS FOR OVER 20 YEARS



SMALL ENOUGH TO  
CARE AND DELIVER A  
PERSONALISED SERVICE  
YET LARGE ENOUGH AND  
WITH THE PROFESSIONAL  
SKILLS TO SUCCESSFULLY  
TACKLE COMPLEX  
ENGINEERING PROJECTS  
AND DELIVER  
INNOVATIVE SOLUTIONS.

That's what sets Magryn & Associates apart and sees us increasingly viewed as a medium-size consultancy of choice – across Australia and beyond our borders – for those seeking solutions in a multitude of key engineering disciplines.

In the two decades since Terry Magryn established the company back in 1994, we've grown with each passing year and today boast seven highly-qualified and experienced engineers – ably led by Terry as the principal engineer – and a support team of in-house technical officers, drafters and administrative personnel.

### Our key services include:

- **Domestic Services** – where our focus is on new houses, house additions, building additions, retaining walls, cracked houses and underpinning, stormwater design, driveway design, balustrade and fence design and general advice on domestic engineering issues
- **Commercial Services** – embracing industrial buildings, light steel framed sheds and hangars, precast concrete or tilt up buildings, office buildings and service station design
- **General Structural and Civil Services** – which address countless structural engineering challenges from engineering for artist works to cradles that support large vessels; takes in stormwater, retaining walls, roadway, pavement and hardstand design and covers tensile shade structures

EXECUTIVE OVERVIEW





- **Coastal Services** – which encompass structures such as boat ramps and boat launching facilities, rock seawalls, breakwaters and jetties, as well as assessing and reporting on environmental matters like coastal erosion and flooding assessment and offering a raft of investigative and hydrographic survey work

- **Mining Services** – where general structural engineering for mine applications is complemented by more specific and specialised activity in areas such as raisebore shaft collars, ore bins and ore pass chutes



- **Forensic Engineering Services** – dedicated to identifying and providing solutions to general structural engineering problems such as building cracking and stormwater and flooding issues


More recently – and as part of our commitment to professional development – we've entered into a formal program with Australia's engineering peak body, Engineers Australia, to provide pathways for our engineers to achieve Chartered Professional Engineer (C.P.Eng) status, which not only recognises both academic qualifications and experience but is increasingly required by engineers before they may sign off on or certify designs.

Whatever your requirement, we encourage you to contact Magryn & Associates and learn how, through innovative though practical engineering solutions, we can make a positive difference.

#### **Contact Magryn & Associates**

##### **Terry Magryn**

(O) 08 8295 8677  
(M) 0407 713 712  
(E) [terry@magryn.com.au](mailto:terry@magryn.com.au)

 <b>Adelaide Plains Council</b>	<b>7.1</b>	<b>Committee Resolutions</b>
	<b>Department:</b>  <b>Report Author:</b>	<b>Infrastructure and Environment</b>  <b>General Manager – Infrastructure and Environment</b>
<b>Date: 1 December 2021</b>	<b>Document No:</b>	<b>D21/51937</b>

## **OVERVIEW**

The purpose of this report is to provide an update in relation to the status of Committee resolutions currently being actioned, for Members' information and monitoring.

**Attachment 1** provides a list of *ongoing* Committee Resolutions from February 2020, Resolutions that have been completed since the last Committee Meeting and *all* Committee Resolutions from the 4 August 2021 meeting.

## **RECOMMENDATION**

**"that the Infrastructure and Environment Committee, having considered Item 7.1 – *Committee Resolutions*, dated 1 December 2021, receives and notes the report."**

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## **Attachments**

1. Resolution Register

## **References**

### Legislation

Local Government Act 1999

### Other

N/A

**Infrastructure & Environment Committee - Ongoing Resolutions**

Meeting Date	Item Number	Title	Resolution Description	Resolution Number	Status/Comments ('Deferred, Ongoing, Agenda, Completed')
10-Feb-20	8.4	Community Empowerment Model for Facility Management	“that the Infrastructure and Environment Committee, having considered Item 8.4 – Community Empowerment Model for Facility Management, dated 10 February 2020, receives and notes this report and recommends that Management carry out further costings and consultation to better assess the likelihood of success in implementing a Community Empowerment model for facility management.”	2020/011	Ongoing
03-Sep-20	13.2	Mallala CWMS Augmentation	“that the Infrastructure and Environment Committee, having considered Item 13.2 – Mallala CWMS Augmentation, dated 3 September 2020, receives and notes the report and in doing so recommends to Council that it instruct the Chief Executive Officer to continue to negotiate with the developer with a view to having the Gracewood development connect into the existing Mallala CWMS, subject to the parties entering into a suitable legal instrument to ensure that Council’s financial risks are mitigated.”	2020/034	Agenda - 1 December 2021
15-Jun-21	2.1	Confirmation of Minutes	“that the minutes of the Infrastructure and Environment Committee meeting held on Monday 14 December 2020 (MB Folios 54 to 57, inclusive), be accepted as read and confirmed.”	2021/001	Complete
15-Jun-21	6.1	Committee Resolutions	“that the Infrastructure and Environment Committee, having considered Item 6.1 – Committee Resolutions, dated 15 March 2021, receives and notes the report.”	2021/002	Complete
15-Jun-21	7.1	Committee Resolutions	“that the Committee, having considered Item 7.1 – Draft 2021-2025 – 4 Year Capital Program, dated 15 March 2021, receives and notes the report and in doing so recommends to Council that it adopt the draft 2021-2025, 4 Year Capital Renewal Program as presented at Attachment 1 to this Report.”	2021/003	Complete

**Infrastructure & Environment Committee - Resolutions from 4 August 2021**

Meeting Date	Item Number	Title	Resolution Description	Resolution Number	Status/ Comments ('Deferred, Ongoing, Agenda, Completed')
4-Aug-21	2.1	Confirmation of Minutes	"that the minutes of the Infrastructure and Environment Committee meeting held on Tuesday 15 June 2021 (MB Folios 63 to 70, inclusive), be accepted as read and confirmed."	2021/0020	Complete
4-Aug-21	6.1	Committee Resolutions	"that the Infrastructure and Environment Committee, having considered Item 6.1 – Committee Resolutions, dated 4 August 2021, receives and notes the report."	2021/021	Complete
4-Aug-21	7.1	Draft Infrastructure Asset Management Strategy, and Plans	"that Council, having considered Item 7.1 – Draft Infrastructure Asset Management Strategy, and Plans, dated 4 August 2021, receives and notes the report and in doing so, recommends to Council that it release the draft Infrastructure Asset Management Strategy and Plans for public consultation in accordance with Council's Public Consultation Policy."	2021/022	Complete
4-Aug-21	7.2	Policy Review – Asset Management Policy	"that Infrastructure and Environment Committee, having considered Item 7.2 – Policy Review – Asset Management Policy dated 4 August 2021, receives and notes the report and in doing so recommends to Council that it adopts the revised Asset Management Policy as presented in Attachment 1 to this report."	2021/023	Complete
4-Aug-21	7.3	Wasleys Bridge Remediation Options	"that Infrastructure and Environment Committee, having considered Item 7.3 – Wasleys Bridge Remediation Options, dated 4 August 2021, receives and notes the report and in doing so recommends to Council that it: 1. Acknowledge the Tonkin Consulting Report- Wasleys Bridge Assessment, Load Capacity Assessment, presented as Attachment 1 to this Report, which strongly recommends the lowering of the Wasleys Bridge load limit from 12 tonne to 6.5 tonne and 2. In acknowledging 1 above, lower the tonnage capacity of Wasleys Road Bridge to 6.5 tonne and implement measures to ensure single vehicle access at any one time."	2021/024	Complete
4-Aug-21	7.3	Wasleys Bridge Remediation Options	"that the Infrastructure and Environment Committee, having considered Item 7.3 – Wasleys Bridge Remediation Options, dated 4 August 2021, recommends that management bring back a further report to the Infrastructure and Environment Committee that deals with alternative options for the river crossing."	2021/025	Agenda - 1 December 2021





- c. Request that DIT review the speed limit on Mallala Road with a view to reducing from 80kph to 50kph in the area where the roundabout is to be constructed until such time as it is constructed; and*
- d. That items identified in point b and c above be completed by Friday 22 January 2021."*

**CARRIED**

Following the above resolution of Council in September 2020, Management sent a written response outlining resolutions 2020/347 to the Department of Infrastructure and Transport - Director, Network Planning Transport Network and Investment Strategy, Andrew Excell. On 23 December 2020 a written response was received from the Department of Infrastructure and Transport (DIT).

#### Discussion

Since receiving the correspondence from DIT, the proposed 60km/h part time speed limit on Mallala Road and associated signage has been implemented.

Management have met on a fortnightly basis to discuss the project to ensure that the project continues to move forward, mindful that funding that Adelaide Plains Council has secured through Heavy Vehicle Safety and Productivity Program Round 7 (\$439,500) needs to be finalised before November 2022. Further to this, Hon John Dawkins MLC recently enquired about the status of the Mallala Road Roundabout and received a response from Hon Corey Wingard MP Minister Infrastructure and Transport outlining that the roundabout would be delivered by the end of 2021.

The project is currently at land acquisition stage, this being a DIT responsibility as outlined within Deed of Variation endorsed by Council at its September 2020 meeting.

A draft Developer Deed of Agreement to undertake works on State Roads has been forwarded to Hickinbotham for review, once this has been executed, DIT Land Acquisition team will progress their required documentation to the Minister to begin the process. Furthermore the DIT has been working with Hickinbotham and MFY to progress final and interim designs (in the event that Land Acquisition moves slowly) with Hickinbotham currently procuring interim designs.

Most recently, the Hickinbotham Group has sent written correspondence to the Hon Corey Wingard MP outlining that expediting the construction of the roundabout a road safety initiative is now critical, and is presented as **Attachment 1** to this Report. Mayor Mark Wasley, on behalf of Council, will similarly send correspondence to the Minister outlining Council's concerns.

## Conclusion

A further report will be presented to the Infrastructure and Environment Committee, upon more information being gathered.

## **RECOMMENDATION**

***“that the Infrastructure and Environment Committee, having considered Item 7.2 – *Mallala Road Roundabout*, dated 1 December 2021, receives and notes the report.”***

---

## **Attachments**

1. Correspondence to Hon Corey Wingard MP.

## **References**

### Legislation

*Local Government Act 1999*

*The Highways Act 1926*

### Council Policies/Plans

*Annual Business Plan and Budget*

25 North Tce, Hackney  
South Australia 5069

PO Box 63 Stepney  
South Australia 5069

Telephone (08) 8366 0000  
Facsimile (08) 8362 7812

[www.hickinbotham.com.au](http://www.hickinbotham.com.au)  
[info@hickinbotham.com.au](mailto:info@hickinbotham.com.au)

HICK2021-27

8 November 2021

Hon Corey Wingard MP  
Minister for infrastructure and Transport  
GPO Box 668  
ADELAIDE SA 5001

Dear Minister Wingard

Corey,

## **Proposed Roundabout at Two Wells and Request for Public Transport**

Following our discussion at a recent industry event regarding the Hickinbotham Group development at Two Wells, I wanted to write to you in further detail.

As you are aware, Hickinbotham has two developments at Two Wells being Eden and Liberty that will include approximately 3,000 homes for 9,700 residents when complete. The value of the project to the SA economy will be approximately \$1.2 billion when complete.

### Proposed Roundabout

As part of the development, a roundabout is required at the intersection of Mallala Road, Old Port Wakefield Road and Meaney Road. There is a tripartite agreement between Hickinbotham, DIT and Adelaide Plains Council relating to this roundabout, which, in accordance with the Infrastructure Deed, is being funded by the Hickinbotham Group and Council.

This roundabout project has been underway since 2014 when the original design was proposed. Upon commencement of the construction process in 2018, DIT sought to increase the scope of the design to provide for future use by heavy vehicles such as road trains which were not required when the original construction plans were approved by DIT. This has necessitated the redesign of the project by DIT and the updating of the Infrastructure Deeds to facilitate the contribution by DIT for the over-and-above works required to deliver the expanded infrastructure.

Despite delays that are primarily related to additional land acquisition requirements (which are a direct result of the increased design criteria which necessitated a larger roundabout), the design for the facility has now progressed and we are hopeful tenders can soon be called.

We would like to commend Andy Excell and his team for working with us and pursuing a resolution of this matter despite the considerable constraints and delays that have occurred.

We look forward to the land acquisition process being resolved by DIT as soon as possible as there is now considerable concern by Xavier College Two Wells campus, located on the Liberty development, and Council that the delay is causing road safety issues at the existing intersection. This intersection, which is used for access to Xavier College, was designed for low traffic volumes and the rapidly progressing housing development is resulting in significant traffic growth. Accordingly, **expediting the construction of this road safety initiative is critical and we look forward to working with the DIT to finalise the design and commence work on this infrastructure as soon as possible.**

### Public Transport Request

On another note, the only bus service available to residents of Two Wells that travels to Adelaide CBD leaves at approximately 9:00am and returns to Two Wells at approximately 4:00pm. Over the next 18 months, we expect the town's population will increase by over 1,000 people from a current level of 2,743.

We have sold all 269 of the available housing lots at the Eden development and almost 200 of the lots at our Liberty development. The majority of houses are being built for local families already living in the area or for residents who will be moving in over the next 18 months.

Liberty is home to Xavier College's Two Wells campus, which opened this year and currently has 187 students. The campus is proposing to expand to up to 400 students next year as Catholic Education is fast tracking the next stage of works.

On behalf of local residents, I am writing to request the expansion of the existing public transport routes to provide a more convenient service for commuters to and from the Adelaide CBD and also to provide Two Wells residents with accessibility to local community services and Xavier College students the ability to commute to and from school conveniently.

We are committed to developing communities which have a high level of amenity. A key component of planning for a more sustainable future is to reduce the reliance on motor vehicles by developing walkable communities and creating public transport routes to service these communities. The developments have been designed to be very "walkable" but in order to offer residents a full range of services in and around their district, we feel it is essential for a convenient bus service to be incorporated into the township.

We appreciate any assistance you can offer. If you would like to discuss these matters, please feel free to contact me at any time on 0409 836676.


Yours sincerely,

**Hickinbotham Group**



**Ruth Vagnarelli**  
Design Director

Cc: Dr Neil McGoran, Director Catholic Education  
Mr James Miller, Ceo Adelaide Plains Council

 <b>Adelaide Plains Council</b>	<b>7.3</b>	<b>Undergrounding of Power – Two Wells Main Street</b>
	<b>Department:</b>  <b>Report Author:</b>	<b>Infrastructure and Environment</b>  <b>Asset Engineer</b>
<b>Date: 1 December 2021</b>	<b>Document Ref:</b>	<b>D21/51924</b>

## **OVERVIEW**

### Purpose

The purpose of this report is to provide the Infrastructure and Environment Committee (the Committee) information on the investigations and conceptual scoping currently being undertaken into the undergrounding of power in the Two Wells main street – Old Port Wakefield Road.

### Background

Generally, Power Line Environment Committee (PLEC) funding is managed by SAPN, and if successful the grant involves a 1/3 Council contribution, a 1/3 SAPN contribution and 1/3 State Government contribution. This, however, is contingent on SAPN undertaking the management and the budget, of all civil works and all of the electrical works, being categorised as non-contestable.

As part of the Council's Two Wells Main Street Public Realm Upgrade, stobie poles are proposed to be removed between Gawler Road and Drew Street. These stobie poles carry high voltage (HV) power and Low Voltage (LV) power along Old Port Wakefield Road. Apart from transmission of HV the stobie poles also supply local residents and business with NBN and low voltage (LV) power via pole mounted transformers. SAPN grant PLEC funding for projects of this nature, and there are various mechanisms for implementation which will impact how the grant funding is applied for by Council. An advanced approach to SAPN's PLEC department may also move our proposal in front of other submissions by managing SAPN's civil risk and design proposal.

### Discussion

Management engaged a consultant, Wallbridge Gilbert Aztec (WGA), to undertake a concept design of a HV underground "backbone" with strategically located pad mounted transformers, and is presented as **Attachment 1** to this Report. This will allow for additional capacity to support future development opportunities.

Having received some preliminary feedback from SAPN regarding this concept design, Management invited two SAPN accredited civil contractors to provide indicative costs for contestable civil works

only. These costings will be included as a budget allowance in discussions to be held soon between Management the consultant and the SAPN PLEC Manager.

There is a risk that in order to satisfy the PLEC funding requirement of “like for like” infrastructure the three new pad-mounted transformers may have to be deleted from the initial scope of works. However, with nearby access to the HV cable these transformers can be installed as required, by Council / Developers to facilitate growth.

Following this meeting, SAPN will review the suitability of the project for PLEC funding. Thereafter, if the project meets the PLEC criteria, SAPN will cost the electrical component to determine PLEC funding component. Once PLEC costs/funding is confirmed and agreed by all parties, SAPN drawings will be finalised, suitable for tendering.

#### Conclusion

A further report will be presented to the Infrastructure and Environment Committee, after the final costings have been prepared and PLEC funding suitability has been confirmed.

### **RECOMMENDATION**

**“that the Infrastructure and Environment Committee, having considered Item 7.3 – *Undergrounding of Power - Two Wells*, dated 1 December 2021, receives and notes the report.”**

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### **Attachments**

1. Wallbridge Gilbert Aztec concept design of a HV underground “backbone”.

### **References**

#### Legislation

*Local Government Act 1999*

#### Council Policies/Plans

*Infrastructure and Asset Management Plan*

*Long Term Financial Plan*













Most recently, discussions with LGA CWMS Program Manager indicate that the feasibility study has now been reviewed by the EPA and SA Health and will be presented to the CWMS management committee meeting for consideration in November and then to the CWMS Board in January.

With significant residential growth within the Two Wells Township it is timely that this feasibility study is undertaken and will ensure that Council provide a suitable system for the existing township. Furthermore with the current rapid residential growth, an increase demand for Main Street upgrades will be sought after, a CWMS service would support those upgrades occurring.

### Conclusion

A further report will be presented to the Infrastructure and Environment Committee, upon more information being gathered.

## **RECOMMENDATION**

***“that the Infrastructure and Environment Committee, having considered Item 7.4 – Two Wells CWMS Project, dated 1 December 2021, receives and notes the report.”***

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## **Attachments**

Nil

## **References**

### Legislation

*Local Government Act 1999*

### Council Policies/Plans

*Council Strategic Plan*

*Infrastructure and Asset Management Plan*

*Long Term Financial Plan*



agreement for Stage 2 and beyond, regarding future Waste Water Treatment Plant upgrades, future additional winter lagoon storage and future recycled water return infrastructure.

Council staff met with Gracewood / Moto Projects representatives on 31 August 2021 and then again on 23 September 2021. Council have not had any updates since.

At both meetings Council staff reiterated the importance of undertaking a risk assessment regarding the viability of the ultimate Gracewood development, and also confirmed that Council staff would like to have input into this risk assessment.

### Conclusion

Council have yet to receive any update regarding the risk assessment which is required in order to address Council's resolution 2020/307.

A further report will be presented to the Infrastructure and Environment Committee, upon further discussion with the developer regarding the risk assessment and the infrastructure agreement regarding CWMS augmentation costs.

### **RECOMMENDATION**

***"that the Infrastructure and Environment Committee, having considered Item 7.5 – Gracewood Land Division – Mallala, dated 1 December 2021, receives and notes the report."***

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### **Attachments**

Nil

### **References**

#### Legislation

*Local Government Act 1999*

#### Council Policies/Plans

*Community Wastewater Management System Policy*



**3. Apply for Bridge Renewal Program – Round 6, with Council’s contribution to be confirmed upon determination of the application.”**

**CARRIED**

Discussion

Management have subsequently met to discuss alternative options for a river crossing at the River Light, Wasleys Road.

There are indeed various factors to consider, and investigations to undertake, including but not limited to:

- Site Selection and Accessibility, including:
  - Physical access, traffic and safety
  - Ownership – private vs council
  - Heritage – overlays, historic significance
  - Environmental concerns – materiality, local flora and fauna
- Development Approval – engineering design, water course permit, native vegetation clearance
- Public Safety – Access gradients, surface treatments and emergency management controls (culverts would not cater for 1:100 event)
- Budget – The extent of costs associated with the above are currently unknown and, in any event, these costs are unbudgeted.

Noting above, consideration has been given to range of alternative options to allow the Light River, Wasleys Road to be utilised by vehicles greater than 6.5 tonne. Two configurations were assessed internally and preliminary budget estimates (+/- 30%) provided. The options are estimates only and will require further investigations and budget allocations to engage a suitably qualified consultant to further scope and ensure there are no adverse hydraulic impacts associated with any of them.

- A clear span bridge costing \$4.5 million to cater for 1:100 event
- A set of 4 by 2.7 metre high culverts costing \$0.8 million

For context, the newly built Gerald Roberts Road bridge over Greenock Creek, near Seppeltsfield, within Light Regional Council is an example of what could be achieved at the Light River, Wasleys Road. This project had a budget of \$500,000.





An existing alternative option for a river crossing at the River Light, is Redbanks Road. Redbanks Road is accessible to vehicles over 6.5tonne and is a Department of Infrastructure and Transport controlled road network. The route is presented as **Attachment 1** to this Report.

### Conclusion

This report is provided for Members' information as per Council resolution 2021/025.

### **RECOMMENDATION**

***“that the Infrastructure and Environment Committee, having considered Item 7.6 – River Light Alternative Crossing – Wasleys Road, Mallala, dated 1 December 2021, receives and notes the report.”***

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## **Attachments**

1. Redbanks Road - Existing alternative option route.

## **References**

### Legislation

*Local Government Act 1999*

### Council Policies/Plans

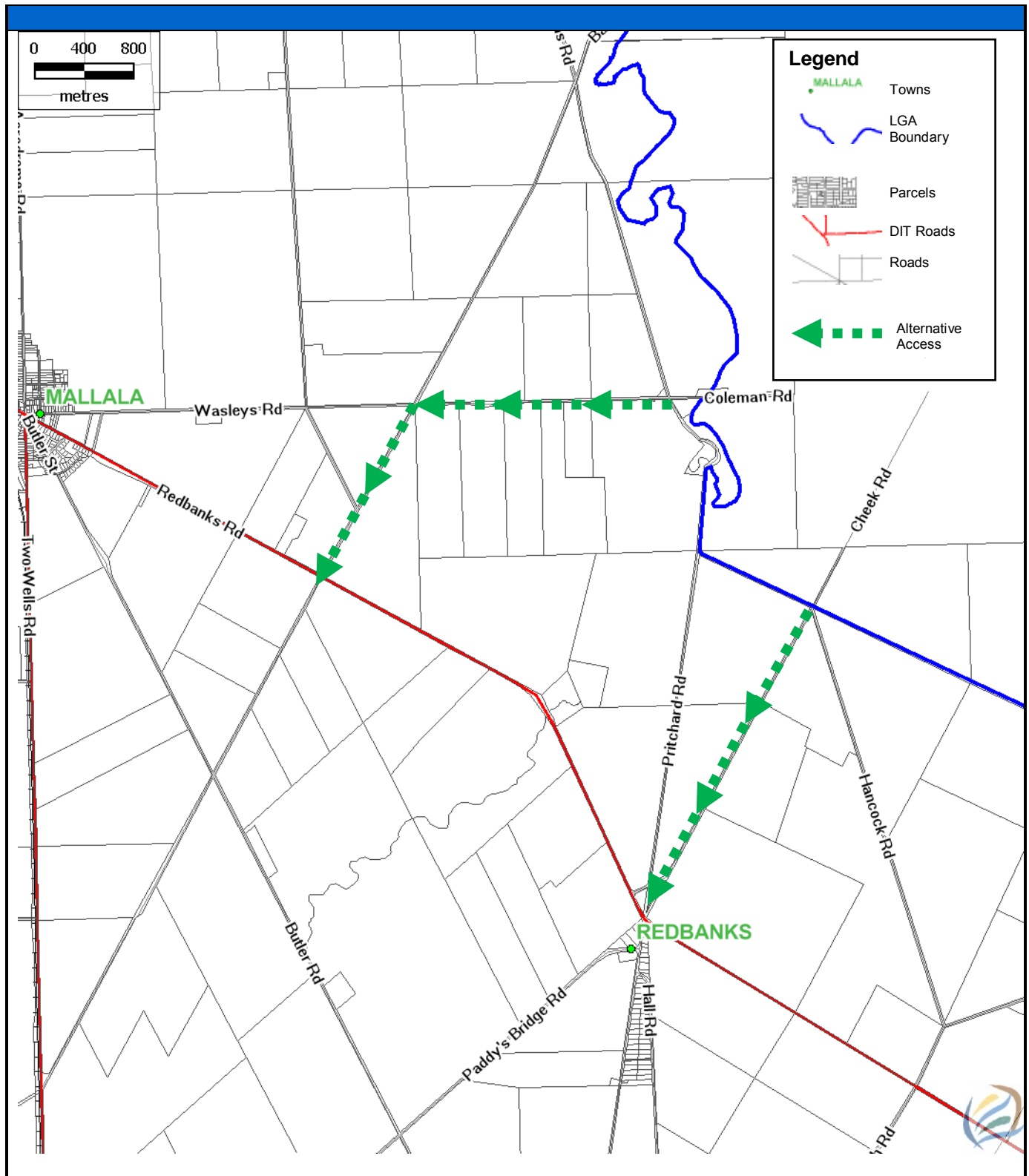
*Infrastructure and Asset Management Plan*

*Long Term Financial Plan*





## ADELAIDE PLAINS COUNCIL



### Contact Details

Adelaide Plains Council  
PO Box 18, Mallala, SA 5502  
T: 08 8527 0200  
F: 08 8527 2242  
E: [info@apc.sa.gov.au](mailto:info@apc.sa.gov.au)

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