Emu Point to Middleton Beach CHRMAP - Summary and Response to Submissions

December 2019

City of Albany

Western Australian Planning Commission

ACKNOWLEDGMENT

The CHRMAP process acknowledges the traditional custodians of the study area, the Minang people of the Noongar Nation. We recognise their cultural heritage, beliefs and relationship to the land, which continues to be important to Noongar people today. The ancestors of the Noongar people saw the shorelines of Albany rise and fall and they were able to adapt to an ever-changing landscape. We acknowledge the input of Aboriginal community members into this plan and pay our respects to Elders past, present and future.

Front cover image source: City of Albany

Summary

The City of Albany (The City) has undertaken development of a Coastal Hazard Risk Management and Adaptation Plan (CHRMAP) to provide strategic guidance on coordinated, integrated and sustainable planning and management for key coastal assets in the Emu Point to Middleton Beach area.

The CHRMAP is based on extensive technical background research and investigations, community and stakeholder values and inputs, recognition of strategic planning and governance interventions available to the City and the need for culturally and economically acceptable outcomes.

Seven highly valued assets are identified as requiring adaptation in the short term (0-10 years). The recommended adaptation options for the assets requiring short term management are:

- MU1 Beach: Sand nourishment.
- MU2 Foreshore: Avoid further development.
- MU2 Big4 Middleton Beach: Staged relocation of assets.
- MU2 Big 4 Middleton Beach: Protect - seawall.
- MU3 Griffiths Street Properties: Managed retreat, relocate assets.
- MU3 Emu Beach Holiday Park and Dual Use Path: Managed retreat of assets in the southern portion.
- MU3 Emu Beach Holiday Park and Dual Use Path: Renovation/expansion of groynes (geotextile sand container).
- MU4 Emu Point Foreshore Reserve: Maintain and enhance nearshore system – seagrass regeneration.
- MU4 Emu Point: Revetment and parkland development.
- MU5 Oyster Harbour Southeast Beach: Sand nourishment.

In addition, nine recommendations have been made for management and adaptation planning options that are relevant or may be relevant to all assets. The City of Albany will need to implement those recommendations regardless of the proposed adaptation option chosen per asset.

The CHRMAP and associated Implementation Plan were advertised for public comment between May 29 2019 and June 26 2019. The advertising phase received 125 submissions with more than 50% of submissions received from the Albany area and the balance predominantly received from the Perth Metropolitan, Peel and South West areas of the State.

The major themes of the feedback suggest an awareness of how important tourism is to the community, and the protection of tourism businesses was a strong driver for many of the respondents.

A significant proportion of the responses highlighted the connection the community and visitors have to the existing coastline and the beach experience, whilst some noted the impact of existing structures on the coastline as being quite negative.

The feedback also suggests that the City of Albany and the State Government still need to achieve greater understanding of the trade-offs of coastal management.

The feedback received implies that the draft CHRMAP makes recommendations that are generally well supported, with the exception of some assets which the community would prefer to have protected. The draft CHRMAP allows for the suggested protections, whilst also supporting progress toward a ‘no-regrets’ adaptation pathway where possible.

This flexibility is recommended by the State Government, and thus the alternative pathways should continue to be included in the CHRMAP.

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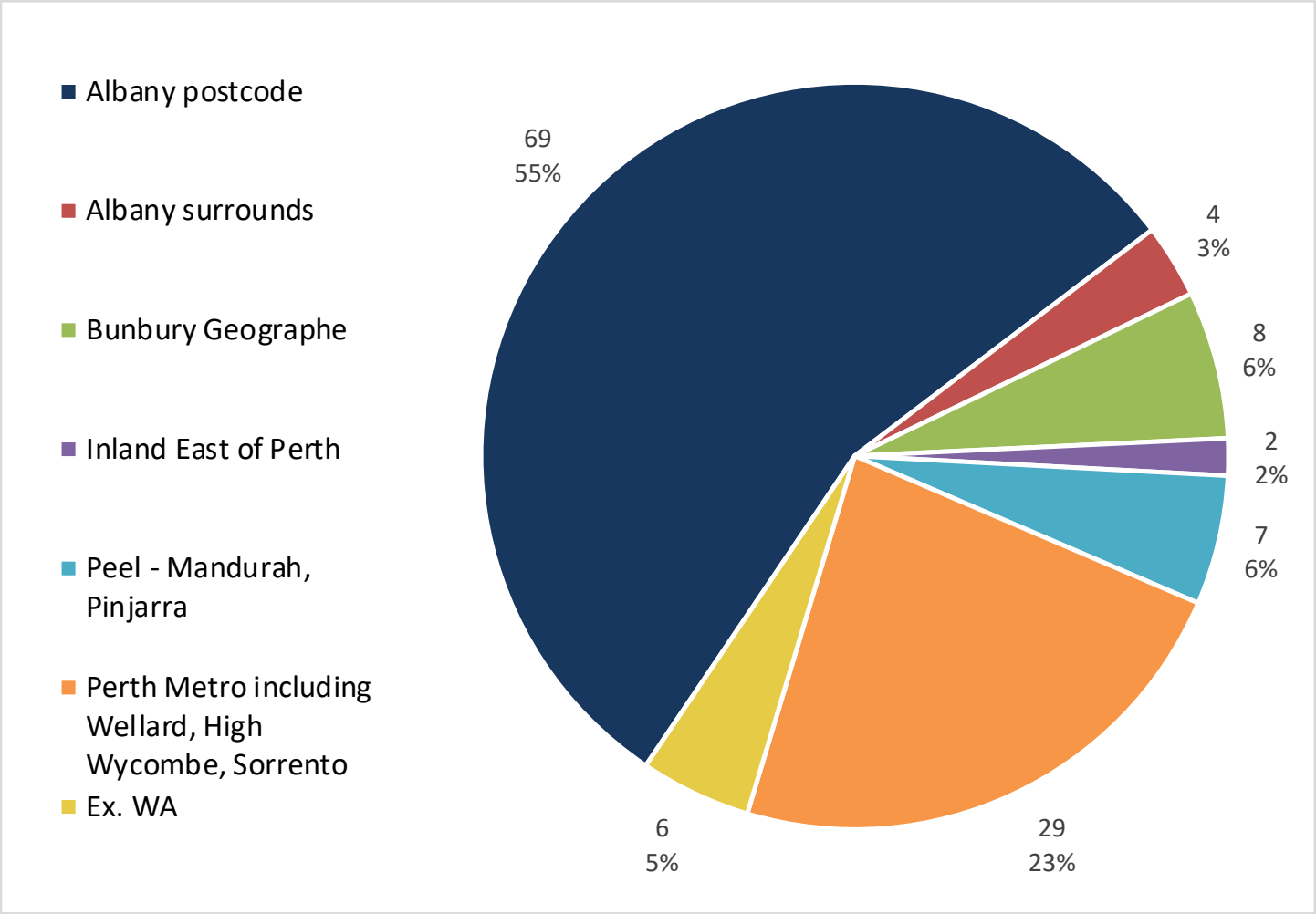
1. Submissions Analysis

The formal public advertising of the CHRMAP ran for 28 days and received 125 submissions. The origin of submissions is illustrated in Figure 1 and numbers are reported both in whole numbers (total from area) and in percetage of total submissions.

The 'Ex WA' category includes eastern states respondents and an isolated response from a Canadian resident. 'Inland East of Perth' includes Northam and Beverley.

Figure 1 - Origin of Submissions



Of the submissions received, the greatest proportion of submissions were received from 31-50 year olds (40.32%), followed by 51-70 years olds (28.23%). The lowest response rate was from those under 30 (up to 18 and 19-30), at just over 20% (see Figure 2).

Of the submissions received, a small majority were male (see Figure 3) and the vast majority of submissions came from users of Emu Point or Middleton Beach or both (Figure 4).

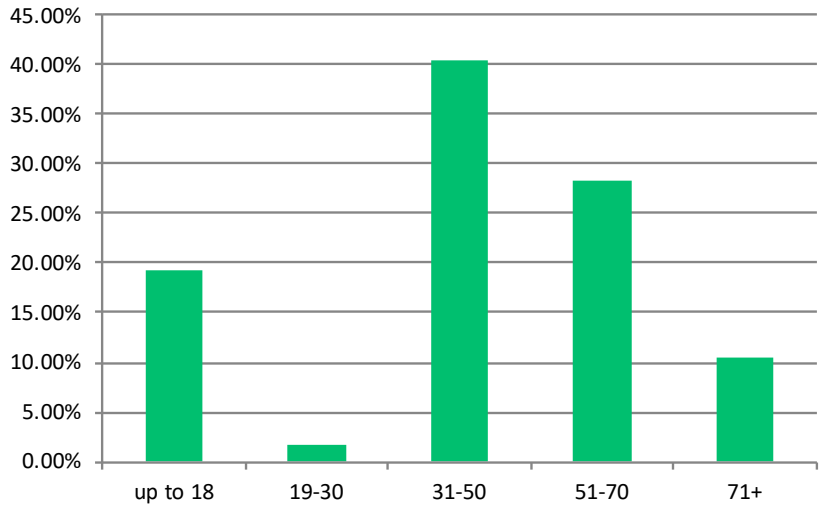


Figure 2 - Age Breakdown

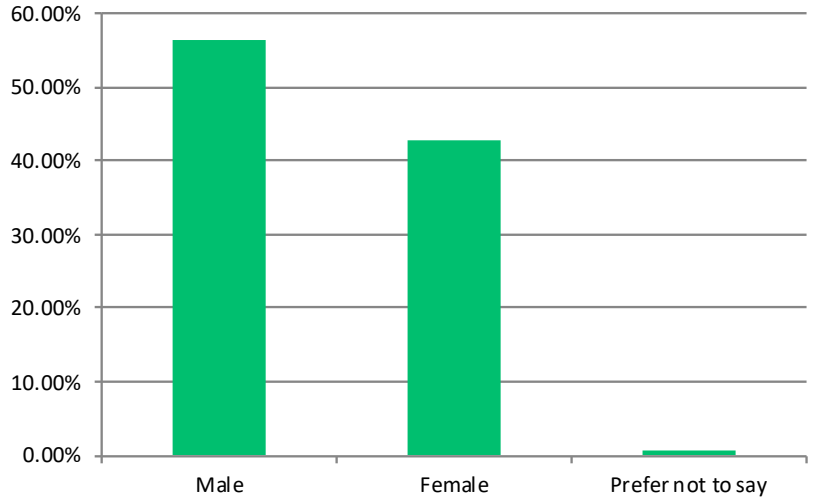


Figure 3 - Gender Breakdown

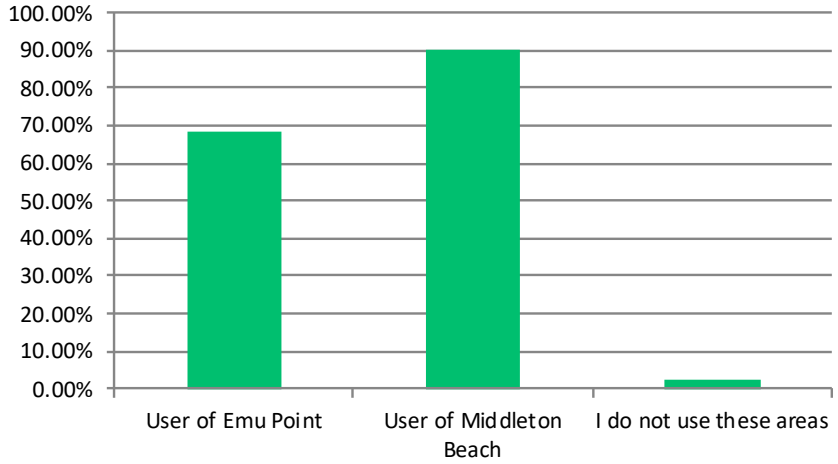


Figure 4 - User Group Profile

2. Summary of Feedback on Recommendations

The community was invited to provide feedback on each of the specific recommendations of the CHRMAP as well as more general feedback. This section provides a broad summary of the feedback on each recommendation/s for each vulnerable asset, as well as the management and adaptation planning recommendations. The full submission content received against each question is included (unedited) in Appendix A.

2.1 Ellen Cove Beach in Management Unit 1

Recommendation 10: Beach Nourishment

A total of 95 respondents answered this question. It is noted that 7 of the responses related to other management units or were more general in feedback and are considered in the specific management unit summary or in Section 2.9.

There was strong consensus in support of this recommendation with at least 81 (92%) of the respondents directly or indirectly supporting the recommendation.

A small number of responses indicated that they would prefer to 'do nothing' either for financial reasons or due to lack of support for the seawall (6 responses). A small number suggested that any solution is a short term solution and that eventually we will need to take greater action (4 responses), whilst 6 responses highlighted the need to make sure all action maintains the natural environment as much as possible. 7 responses suggested that the protection of the land for local business operators to continue to attract tourists is very important.

2.1.1 Recommended changes or improvements

The proposed recommendation is strongly supported. No changes to the Draft CHRMAP are proposed.

2.2 Foreshore Reserve in Management Unit 2

Recommendation 11: Avoid Further Development

A total of 96 respondents answered this question. It is noted that 10 of the responses related to other management units or were more general in feedback and are considered in the specific management unit summary or in Section 2.9.

There was general consensus in support of this recommendation with 62 (72%) of the respondents directly or indirectly supporting the recommendation.

13 responses suggested protecting development in this zone, as the recommendation suggested avoiding further development. It is assumed that respondents did not realise that this asset is largely undeveloped foreshore reserve (with the exception of some paths and public assets) and there is no substantial development to protect, so many of these comments are not relevant. A small number of these responses suggested building a seawall to protect the natural environment.

9 responses suggested the 'do nothing' option, whilst 5 responses suggested ensuring all action maintains the natural environment as much as possible.

It should be noted that building a seawall in front of the entire foreshore reserve to protect the natural environment of the foreshore would affect the natural coastal environment, and these two suggestions are contradictory. This is discussed further in Section 2.9.

2.2.1 Recommended changes or improvements

The proposed recommendation is generally supported. No changes to the Draft CHRMAP are proposed.

2.3 BIG4 Middleton Beach in Management Unit 2

Recommendation 12: Managed Retreat - staged relocation of assets *and/or* Recommendation 13: Protect - Seawall

A total of 104 respondents answered this question. It is noted that 6 of the responses related to other management units or were more general in feedback and are considered in the specific management unit summary or in Section 2.9.

There was general consensus in support of *Recommendation 13 - Protect - Seawall* with 59 responses (60%) supporting the seawall option. This is compared with 17 responses (17%) in support of *Recommendation 12 - Managed retreat - Staged Relocation of Assets.*

22 responses suggested doing nothing, and it is apparent from the feedback that there remains some opposition to building the seawall, despite respondents being in support of BIG 4 Middleton Beach remaining in its current location.

A number of responses suggested a strong preference for a buried seawall over an exposed seawall. Responses also suggested a perception that relocation is substantially more expensive than protection.

9 responses suggested the 'do nothing' option, whilst 5 responses suggested ensuring all action maintains the natural environment as much as possible.

It is apparent from the written feedback that a large number of respondents considered the relocation of the BIG4 caravan park highly undesirable. However, a number of these responses (9) made assumptions that the alternative recommendation would be too costly as the reason for their response, whilst other responses (14) appeared to indicate that relocation would close the business. In both cases it is clear that further detailed reading of the CHRMAP may have allowed more accurate feedback.

In addition, a number of submissions also suggested that there is no current risk to the caravan park and no action needs to be taken. A CHRMAP is essentially a risk-management approach to planning, and it is the role of the City of Albany to understand the likelihood of risk, and the impact of an event; the CHRMAP indicates that there is some limited risk to the site and some adaptation should be planned.

The CHRMAP recommends two alternative approaches to adaptation on the site. The 'managed retreat' recommendation removes the risk entirely and limits ongoing maintenance costs which will need to be borne by the City of Albany and, by extension, its ratepayers. This is a no-regrets option that removes any future obligation to protect the land with hard infrastructure.

The 'protect' recommendation is, however, a suitable alternative subject to detailed understanding of the costs and impacts to the natural coastal environment. Both can be progressed within the timeframes suggested by the CHRMAP and before a decision needs to be made.

2.3.1 Recommended changes or improvements

The current CHRMAP recommends progressing both options, which allows the City of Albany to make the best possible decision in the future when all detailed design and alternative relocation sites have been fully investigated. No changes to the Draft CHRMAP are proposed.

2.4 Properties on Griffiths Street in Management Unit 3

Recommendation 14: Managed Retreat - Relocate properties from Griffiths Street

A total of 74 respondents answered this question. It is noted that 6 of the responses related to other management units or were more general in feedback and are considered in the specific management unit summary or in Section 2.9.

There was some consensus in support of this recommendation with 33 responses supporting the proposed approach (48%). However, some 20 responses (29%) suggested doing nothing, whilst 30% suggested an alternative approach including protect options.

A number of written responses suggested that the protection of the beach in this location is important, and thus the houses should also be protected. Other responses noted the expense of relocating properties. A number of different suggestion were made as to how to compensate landowners who may be relocated.

Several responses made assumptions that relocating the properties would be more expensive than other alternatives, whilst other responses suggested that protecting the beach with a seawall or similar would also protect the houses. In both cases it is clear that further detailed reading of the CHRMAP, and understanding of the impacts of seawalls, may have allowed more accurate feedback.

It should be noted that building a seawall will have an impact on the natural environment and may result in the loss of the beach rather than protection of it. This is discussed further in Section 2.9.

2.4.1 Recommended changes or improvements

The proposed recommendation is supported. No changes to the Draft CHRMAP are proposed.

2.5 Emu Beach Holiday Park and Dual Use Path in Management Unit 3

Recommendation 15: Managed Retreat of assets in the Southern Portion and Recommendation 16: Renovation/Expansion of Groynes (Geotextile Sand Container)

A total of 97 respondents answered this question. It is noted that 9 of the responses related to other management units or were more general in feedback and are considered in the specific management unit summary or in Section 3.9.

There were two recommendations for this asset. 34 responses supported both recommendations (38%), whilst 36 supported the extension of the trial groynes specifically (40%). 21 (23%) of respondents suggested further investigations were required, with some encouraging the City to consider the longer term costs of proposals. 12 respondents (13%) urged the protection of the business in this location.

This question resulted in the most varied feedback across respondents, ranging from suggestions to remove all structures in the vicinity and allow the natural shoreline to re-establish to undertaking more substantial structural protection options. Across a number of submissions, and regardless of the recommended approach, respondents identified how important the coastal Dual Use Path is to them, and also acknowledged that the existing trial sandbag groynes seem to be working.

The CHRMAP recommends two alternative approaches to adaptation on the site. The 'managed retreat' recommendation removes the risk entirely and limits ongoing maintenance costs which will need to be borne by the City of Albany and, by extension, its ratepayers. This is a no-regrets option that removes any future obligation to protect the land with hard infrastructure.

The ‘protect’ recommendation is a suitable additional measure, subject to detailed understanding of the costs and impacts to the natural coastal environment. Both can be progressed within the timeframes suggested by the CHRMAP and before a decision needs to be made.

Notwithstanding, the submissions have indicated a strong desire to maintain the holiday park business in the area and there is an opportunity for the City to continue to engage with the adjacent businesses to identify alternative ‘protect’ measures.

2.5.1 Recommended changes or improvements

The current CHRMAP recommends progressing both options, which allows the City of Albany to make the best possible decision in the future when all detailed design and alternatives for relocation have been fully investigated. However, it is recommended that the City continues to consider alternative protect measures that would ensure ongoing use and enjoyment of the coastline and the adjacent businesses. It is recommended that the City also progress investigations into the upgrade of the existing protection structures (seawall/revetment), by including an additional recommendation:

Recommendation 17: MU3 Emu Beach Holiday Park - Upgrade existing protection structures.

and by renumbering all further recommendations.

2.6 Foreshore Reserve (Emu Point) in Management Unit 4

Recommendation 17: Seagrass replenishment program be continued and enhanced and Recommendation 18: Revetment be upgraded along with redevelopment of Foreshore Park and removal of Sandbag Revetment

A total of 81 respondents answered this question. It is noted that 2 of the responses related to other management units or were more general in feedback and are considered in the specific management unit summary or in Section 2.9.

There were two recommendations for this asset. There was strong consensus in support of this combined recommendation with at least 61 (77%) of the respondents directly or indirectly supporting the recommendation, whilst 10 supported the seagrass replenishment specifically (12%).

A small number of responses indicated that they would prefer to ‘do nothing’ further investigate options, maintain the environment or maintain local businesses (16% in total).

There was some general concern about the effectiveness of the seagrass replenishment option, based on the cost of this option.

2.6.1 Recommended changes or improvements

The proposed recommendation is strongly supported. No changes to the Draft CHRMAP are proposed.

2.7 Oyster Harbour South East Beach in Management Unit 5

Recommendation 19: Sand Nourishment

A total of 83 respondents answered this question. It is noted that 2 of the responses related to other management units or were more general in feedback and are considered in the specific management unit summary or in Section 2.9.

There was strong consensus in support of this recommendation with at least 70 (86%) of the respondents directly or indirectly supporting the recommendation. 11 respondents (13%) suggested either doing nothing or undertaking further investigation; predominantly stating that the cost of the sand nourishment is an unnecessary expense.

2.7.1 Recommended changes or improvements

The proposed recommendation is strongly supported. No changes to the Draft CHRMAP are proposed.

2.8 Management and adaptation planning recommendations

Recommendation s 1-9: Various (see draft CHRMAP)

A total of 59 respondents answered this question. Of these, 39 respondents (66%) supported the planning recommendations either directly or indirectly. 2 respondents suggested doing nothing across the study area, 4 respondents specifically suggested ensuring business continues to operate through protection, 3 responses supported the surf reef (see Section 2.9), 2 suggested the approach was a waste of money and 3 supported increased maintenance and a rates levy to support the measures.

2.8.1 Recommended changes or improvements

The proposed recommendations are generally supported. No changes to the Draft CHRMAP are proposed.

2.9 'Other' Comments and Additional Feedback

A total of 52 respondents answered the final question which sought any additional comments. Responses fell into a number of themes:

- Support for business and/or support for protection;
- Maintain the environment and/or support for managed retreat;
- Support for the surf reef; and
- 'Do nothing'.

In general, support for businesses and support for protection were aligned, with some 29 respondents suggesting that businesses and the beach should be protected via structures such as sea walls. Some of the 'do nothing' responses were also aligned with protection of the existing businesses.

Those respondents who indicated support for managed retreat were aligned with those submissions that sought to maintain the environment. In some cases the 'do nothing category was also linked to this general theme.

The surf reef was mentioned by a number of respondents in both this question and throughout the rest of the survey. Several submissions suggested that the surf reef would resolve the issues the CHRMAP is responding to, making the adaptation planning exercise unnecessary.

Several responses provided encouragement to the City of Albany for undertaking this extensive study required to develop the CHRMAP.

Amongst additional feedback were comments regarding existing maintenance requirements; e.g. erosion leading to trees falling over, the planting of local species where planting is proposed and a mix of suggested measures for protecting the existing natural amenity of the beachfront.

A relatively large number of responses suggested that protection of the assets via seawalls or similar hard structures would also protect the beach resulting in a positive outcome for all. This suggests more needs to be done to support the community's understanding of coastal processes and the long term results of protective structures. Similar to the impacts on the beach which have been experienced at Emu Point, protective structures typically result in an eventual loss of beach in front of the wall, having a greater impact on shared community assets such as the beach.

It is recommended that during detailed planning for the various adaptation options, a continued process of community education be implemented to illustrate more clearly the trade-offs of protection versus managed retreat.

2.9.1 Recommended changes or improvements

The feedback in this section does not substantially comment on elements of the CHRMAP or raise critical issues. No changes to the Draft CHRMAP are proposed.

3. Conclusions

The number of submissions received indicates that the community is passionate and engaged in long term beneficial outcomes for the study area. Combined with the detail in the submissions, the feedback received through the public engagement provides the City with a greater understanding of the community's values and expectations, which will help inform ongoing adaptation planning.

The feedback also helps support greater awareness of the City regarding the community's understanding of the trade-offs of coastal hazard planning, enabling better engagement and planning on future CHRMAP projects in the City as well as more detailed planning for adaptation measures within the Emu Point to Middleton Beach area.

It is apparent that there is a divergence of opinion within the feedback received, ranging from a desire to remove all protections and let the coastline return to its natural state all the way through to providing structural protections for the entire length of the coast in the study area. These views will need to be balanced during detailed planning for the adaptation of each at-risk asset.

The feedback received implies that the draft CHRMAP makes recommendations that are generally well supported, with the exception of some assets which the community would prefer to have protected. The draft CHRMAP allows for the suggested protections, whilst also supporting progress toward a 'no-regrets' adaptation pathway where possible. This flexibility is recommended by the State Government, and thus the alternative pathways should continue to be included in the CHRMAP.

Whilst no change is recommended to the CHRMAP, the feedback received will continue to shape the ongoing planning process.

Appendix A

Detailed Submissions

MU1 – Ellen Cove - In Management Unit 1 the asset at risk is the Beach. **Given that the Middleton Beach Buried Seawall is now fully funded, the recommendation for maintaining a sandy beach is: Recommendation 10: Beach Nourishment. What feedback would you provide about this recommendation?**	
Agreed	Its good to see investment into the area
Support	Okay
Ok	We need to keep our beaches
Support	agree
agree - highly valued zone - monitor and re evaluate prior to 2060	Only option I guess to keep a sandy beach
Agree with the recommendation. As it is the heart of the Middleton Beach activity centre, it is critical to maintain this section of beach.	The tail of the seawall in front of Emu Beach Holiday Park should be renovated and extended and incorporated into the Emu Point foreshore upgrade plans.
Appears sufficient. To a large extent the beach is nourished itself by natural cycles on that end (as can be seen in the Royal HaskoningDHV report on the subject).	I am sceptical about seawalls buried or otherwise, by corrupting the natural environment there will be flow on effects
The sand is already increasing, is further spending required? There is much more sand around the jetty than there was 20 years ago.	I understand the only requirement is beach nourishment which is the best possible outcome for this iconic site
use sand with a similar composition to stop erosion	Yes a sandy beach is essential
Worth trying	Agree - beach nourishment
the beach is currently being lost at times up to the dune base dying trees are toppling onto the beach at presentalthough not large they are not being removed and if washed out to seacould become a hazard for the boating community	Sand nourishment is only likely to work in the short term. Sourcing sand when other areas are also subject to erosion is likely to be problematic. Can sand be sourced from King George Sound?
Maintain sand nourishment	Leave nature alone to do its own thing.
Agree	nothing
Beach nourishment	Excellent news

MU1 – Ellen Cove - In Management Unit 1 the asset at risk is the Beach. **Given that the Middleton Beach Buried Seawall is now fully funded, the recommendation for maintaining a sandy beach is: Recommendation 10: Beach Nourishment. What feedback would you provide about this recommendation?**	
Because the seawall is funded does not mean it has general public support. I suspect there is not much support, particularly as we were not consulted on its expansion, and because it is only needed due to the relocation of the hotel site.	I agree. Humans have no control over the weather/storms and ocean occurrences. All we can do is maintain and restore what structures and beaches we want.
We recommend Beach nourishment so as for the Middleton Beach Big 4 Resort Park to remain	Leave the Rack on the beach at Ellen cove and sand nourish when required or place it on the dunes in MU2 and MU3
Agree with the recommendation	recommendation should be followed
I Think that this is only a stop-gap solution as eventually the beach will be pushed back due global warming weather effects and to rising waters due to Glacial melt.	if beach nourishment means that we can keep the beach as it is with the same structures and make it so that we can further develop the area fantastic - if it means that we have to relocate businesses then I don't support it
I think this is the more cost effective long term solution	Agree. Maintenance of this beach for as long as possible is vital.
I believe it should extend the length of the caravan park to protect this amazing tourism draw card to the region.	Seems like a good option to preserve the beach, people's hours and the businesses in the area.
This would only be necessary in extreme events and wont cost anything unless an extreme event happens.	take out the emu point rock walls and let nature fix what you have broken
In the aim of protecting the beach, please do with least amount of environmental impact or disturbance to local businesses.	Every thing that can be done to prevent further foreshore erosion should be the primary focus of the Management Plan
Agree with beach nourishment	Proceed
This is a popular beach and should be maintained	Sounds good
I would be supportive of this	Preserve the beach
Maintain the beach and the holiday parks.	Comfortable with this proposal to replace sand on the beach as required
Great idea	I support this recommendation
Sounds fine	Agree
protection through a buried seawall	Seem like a reasonable plan
Agreement with this recommendation	Seems a prudent approach
Protect the beach	The buried seawall should provide protection to the holiday park as well
Do not remove the seawall	I agree 100% with this approach.
Keeping it clean and 'healthy'	yep ongoing up keep is the way to go.

MU1 – Ellen Cove - In Management Unit 1 the asset at risk is the Beach. **Given that the Middleton Beach Buried Seawall is now fully funded, the recommendation for maintaining a sandy beach is: Recommendation 10: Beach Nourishment. What feedback would you provide about this recommendation?**	
Go ahead and preserve the beach	Recommendation 10: Beach Nourishment
Yes	Its a good idea.
agreed	The seaweed looks bad
Sand is an area people really like at the beach to play on, run, sandcastles etc. So making sure its maintained and not overtaken by infrastructure is a good idea.	I think that it provides a short term solution without affecting the environment negatively. I feel as though it's not a permanent/long term solution to the problem. Overall, its a good idea if nothing else works.
i think it is a good idea and will help	it is good
This recommendation is good and will hopefully revive the beach.	Brilliant idea
I believe that the new reef is a great idea, tourist will boom and so will cash flow for local business. This will also give young people to opportunity to learn new surfing skill and give locals a new reason to visit Middleton beach.	Unfortunately, it was not left naturally, but now that it's in place I think that it is important that the sea wall gets maintained; In order that the beach doesn't get smelly.
people really enjoy the sand so care should be taken to make sure sand is still there	While I don't understand the term "beach nourishment", removal of the seaweed more often through summer would be nice
that it should be done	cool
:)	yes keep Middleton beach a sandy beach
Access to sand that matches the profile of the existing sand type is essential. Consider dredging options that are required for the port. Sand nourishment can have the affect of having sand build up in other areas within KGS which may affect positively or negatively eg , wider beach at Gull Rock; silting of navigation channels.	After seeing all the sand dug and moved from Ellen Cove over the years it does not surprise me that now the beach is protecting itself with a wall of seaweed. I am supportive of a sandy beach but it also needs to be balanced by a healthy ecosystem free of erosion and human interference.
As long as the beach stays clean and beautiful, I'm fine.	Great
Cool	It needs to be a sustainable solution. Not a bandaid
plant local species	Good idea
Go for it!	Totally agree.
No probs - fine	

MU2 - Foreshore - In Management Unit 2 the asset at risk is the Foreshore. **The recommendation for this asset is:Recommendation 11: Avoid Further Development.What feedback would you provide about this recommendation?**	
Agreed	Ok
Support	Okay
Ok	Yes, agree in avoiding further development. Keep it as a natural foreshore edge.
Support	there is probably no need for any further development in this area
1. Avoiding beachfront development, increasing dune vegetation and increasing density and mass of dunes, increasing and monitoring sea grass levels, Monitor storm activity. 2. Increasing carpark asset behind existing for ease of access to beach and potential relocation or extra amenities such as toilets and water stations for future assets such as surf reef	Disagree. All assets along Middleton Beach to Emu Point section are worth protecting. These areas are iconic and a draw card to Albany in their own right. It makes absolutely no sense to protect the Ellen Cove section, encourage development in the Middleton Beach Activity Centre, attract funding and develop a surf reef, and then write of all other beach assets. Likely would also impact CoA leaseholds and investment decisions along the whole stretch into the future.
I agree further development is not desirable, the foreshore is for the public not a privately owned operator	The buried seawalls should be protecting this space. Once things are put in place, there should be no reason to halt any development in the area.
agree	We need development at the foreshore
Sound	Agree
Keep machinery and cars off the beach, don't change what doesn't need to be changed.	There is no real threat as Middleton beach acreates after a storm event and has a large sand buffer which continues to grow.
We have been monitoring this area for the past 5+ years so there should be reasonable data on the cycles that we are exposed to. 100 years occurrences will occur, and these are so devastating that even new developments could be damaged. In these events we need to restore and replace.	Avoiding further development is a step backwards for Albany, Giving this beach accretes after a storm event there is no need for any action because its unlikely to erode, CHRMAP says otherwise but being based on three times the worst we have seen in Albany its unlikely… Also the beach accretes, No mention in the CHRMAP
Agree	Agree for the above reasons
This is also a general principle included in the plan, so shoudnt it be applied to all the coastline? I find this recommendation a bit strange for this Unit area when development is not expected/presently zoned. I support recommendation but feel it needs to apply to all of coastline subject to potential erosion.	Disagree. I believe this area has a lot more potential in attracting tourism and believe strategic development is something that should be open to consideration if the environmental impact can be minimized, to maximize the value gained from these protection works.
The Middleton Beach Big 4 Resort Park, as it is, is important to Albany as a holiday destination used by my family a number of times during the year	That seems like doing nothing and hope for the best?
Totally support Avoiding Further Development	Agree - avoid further development
This seems a sensible form of action.	no comment

MU2 - Foreshore - In Management Unit 2 the asset at risk is the Foreshore. **The recommendation for this asset is:Recommendation 11: Avoid Further Development.What feedback would you provide about this recommendation?**	
Would suggest to avoiding blanket no development, but that suitability robust and sustainable long term development be allowed.	if nothing is to be done to minimize the impact the C O A will also lose their walk /bike pathway a valuable asset used by many local /visitors alike
Given the nature of the problem no further development seems the sensible approach	I think to avoid further development would be detrimental to the town of Albany
would depend on the type of development and the environmental considerations given within the individual proposals	Makes sense in any coastal environment. The natural processes for erosion and accretion should be protected and that zone should not be developed.
Development shouldn't be stopped if prevention measures are in place to protect the coast.	Happy for no further development on the beach side of the road but don't stop development of the old hotel site
This is good, but you need to consider and protect existing development	Fine, if landowners are compensated for devaluation of their assets.
Retain what is there, preserve & protect	Agree
I support this recommendation	Agree with recommendation
Agree	The holiday park should be incorporated into any development plans.
ok for this	Sounds good
Agree	Agree
agreed the most appropriate course of action	Maintain current developments properly
Yes. Avoid further development.	Please enhance/maintain the seawall
Keep it as it is	Avoiding further development will help the beach
Hasn't development just started? I'd support no further development.	This is not looking to the future save the beach at all costs
Would think that there maybe other options which could help the beach and support development around the site	Not a good idea, as it is possible to maintain and improve the foreshore without nixing development.
Further develop the seawall for protection purposes. No further development (houses etc)	Depending on the success of containing the beach erosion, but on the face of it would seem prudent
Agree	Keep it open land park area
Poor decision. Avoiding further development will see the area deteriorate	Yes Avoid further development between golf course and emu point
Undecided	i think this is a good idea and is good for the foreshore
Leave existing facilities and do not carry out further development	Not agreed as the focus should be to prevent further erosion

MU2 - Foreshore - In Management Unit 2 the asset at risk is the Foreshore. **The recommendation for this asset is:Recommendation 11: Avoid Further Development.What feedback would you provide about this recommendation?**	
In my opinion the beach and dune erosion started after the 2nd groin was put in. If we think 50 years ago the erosion from Middleton to Emu Pt was to a minimum.	I believe that the new reef is a great idea, tourist will boom and so will cash flow for local business. This will also give young people to opportunity to learn new surfing skill and give locals a new reason to visit Middleton beach.
I disagree with this statement. We should have development, but it sould be planned and with protection for thye Foreshore in place.	I feel as if we should proceed in this development as its not going to get any better if we don't do anything.
development is vital to increasing tourism and maintaining the younger population. The foreshore needs to be a primary point of interest.	Unnecessary recommendation. If your maintenance infrastructure is effective then the foreshore should be able to be developed as per normal conditions.
Try to keep it natural	yeh would be good
Is there anything we could do? If not then go with it	:)
I would agree in terms of the beach itself and bushland. The surrounding site and potential development areas I think the more the development the better as long as its tasteful and maintains the "vibe" of the area.	Minimise development to minimise the impact of future storm eronsion and inundation. Progressive purchase of at risk assets to be considered with lease back options and relocation clauses.
gnarly	I think it is all right the way it is.
oh well a surf reef would be handy	I think that there's enough stuff on the foreshore.
good	Fair enough
No more development on the foreshore is a good plan, minimising construction will minimise water pollution	Development should be minimised is an effort to spread visitor populations accross all albany beaches
Cool	I agree with this recommendation.
consider future needs	Good idea
take out the emu point rock walls and let nature fix what you have broken	Excellent suggestion. We do not need any further development.
Stop [name and part comment removed]	we should do something about it and but an not allow anymore futher development
Well obviously, there are already heaps of people living in houses very close to the water, so it's kinda too late to avoid building near the coastline. Pretty much all of the land i can think of on the coast of Albany is either taken up by rich peoples houses or a National Park. So if that land is eroded, either only the trees and possums are affected, or the rich people who can pay for a brand new house anyway	

MU2 - BIG4 Middleton Beach - In Management Unit 2 the asset at risk is the BIG4 Caravan Park (Middleton Beach). **The recommendations for this asset are:Recommendation 12: Managed Retreat - staged relocation of assets.Recommendation 13: Protect - Seawall.What feedback would you provide about these recommendations?**	
I would urge against the relocation of assets. This seems to be a land grab for the council and an excuse to own the beachfront as opposed to the logical answer of a buried seawall, which is much less costly and more sensible	At Ellen Cove the construction of a buried sea wall to protect the hotel development site and the surf club has already been approved. Middleton Beach Holiday Park should have the same protection.
Support 12 when necessary	12
Managed Retreat	I support 13: seawall
Managed retreat and monitor closely, increase vegetation in front of caravan park and its extremities to naturally protect asset. NOvisual seawall such as at EP - Coastal Protection barrier if feasible should integrate with natural resources and become part of caravan park asset and not the foreshore or dunes	It would seem unviable financially to try and move such a large developed pristine caravan park it would be far better to protect the property with a buried sea wall the same as at Ellen Cove and protect all of the area to the surfers beach it would seem no protection would be needed until 2050 or even 2070
It is a loved and highly valued tourism asset, but as it is only leased I believe a gradual relocation of assets is more appropriate economically and environmentally than protecting the asset with a sea wall.	A buried seawall continuing on from the already funded one should be built. Moving this established business would have serious impact on tourism spending in the area, never mind the loss of jobs etc should the move not go ahead.
keep people off the dunes an plants, add more plants to the area	The caravan park should be relocated and the area opened up to the public
Agree	recommendation 12,
We need to build a seawall to protect the caravan parks.	Managed Retreat only long term solution. Don't lose more beach.
no comment	Do not retreat. Do not relocate.
A small seawall in the future may be required	Build the Seawall and keep the park where it is
do not relocate	Keep the caravan park, 100%
Managed Retreat	Recommendation 12
Protect with sea wall to give at least as long as possible to enjoy this asset would be a first reaction. Expert advice needed to calculate cost over length of time this would last. The character of the area might be changed so much by sea defences that it will lose its special appeal.	Concur, As much I enjoy my stays at the Big4, (and I have had several), It is inevitable that relocation will be required as the only way to protect the Campground. The use of trigger points will clearly provide the rate at which actions will be mandatory.
Agree - managed retreat Action other than this could wait and see what happens	Middleton beach would not be the same with the park in place. Preserve beach with beach wall.
Seawall needs to protect the caravan park. A relocation of the park would be a severely costly venture for all parties involved, not to mention a massive inconvenience to the caravan park	My family and i have been coming to the Big4 caravan park for the past 11 years and would hate to see it move,with the great work done and the seawall option it should stay where it is

MU2 - BIG4 Middleton Beach - In Management Unit 2 the asset at risk is the BIG4 Caravan Park (Middleton Beach). **The recommendations for this asset are:Recommendation 12: Managed Retreat - staged relocation of assets.Recommendation 13: Protect - Seawall.What feedback would you provide about these recommendations?**	
I think recommendation 12 would ultimately mean the end of an asset to the community while recommendation 13 would be simply an extension of an already approved approach	There is sufficient scrub break between water level at high tide and caravan park. No need to retreat caravan park. Give them guidance on how best to protect for medium to long term future
This park is a major drive for tourism and the local economy. There is no real threat to erosion as the beach has been accreting for years and rebuilds after a storm. When a detailed trigger point has been decided and if multiple storms erode the beach up to the trigger point a buried Seawall is the best option and needs to be installed, this might not be required for years but the option needs to be available. The town and the locals need to maintain this park.	I believe everything possible should be done to maintain this caravan park in its current location,It is an opportunity to provide unique and excellent accommodation for people at all levels ranging from a very basic tent site to relatively luxury living. The park is immaculately maintained and enjoys a reputation second to none for its position adjacent to the beach.Everything possible should be done to retain it in its current location and therefore we recommend 13 - protect with sea wall
Middleton Beach BIG4 caravan park is a true asset to the Albany region. It is well maintained and well utilised by local, interstate and international visitors. It needs to be supported and protected. I would prefer this to be done in the least environmental invasive way.	Disagree with the managed retreat recommendation. This are has had substantial development put in place to bring tourism to the region. I don't believe now is the time to retreat, it's the time to protect and sustainably manage as per Recommendation 13.
Protect the asset. The asset is a great location for tourists	The Sea wall is our only option so to retain the Big 4 Resort Park where it is now
These recommendations appear contrary and opposites. The use of a seawall seems to go against the general principles of the plan (avoid, managed retreat, protect in that order. I am not aware of the costs involved in relocation, but if it is possible, another site is available, and the present and future land is council owned, i favour relocation of the caravan park. Although inconvenient, it provides the best long term option. I would not support rates being used to fund protection of the caravan park.	The objective should be to retain the caravan park where it is, because of how good it is, and allows enjoyment of the beach. Albany, don't destroy a strength. Build a seawall buried. The recommendation depends on the likelihood of erosion. If the sand dunes do start to get washed away and are a threat, then trucks could bring in boulders/ concrete blocks as a temporary measure, use sand-bagging, other relief. Bunbury used to do something similar. It costs very little, and is only needed if there is a problem.
Do not retreat the BIG4 caravan park. It's an icon for the town, has a large history and attracts dozens of families every weekend to the Albany area. There is no other accomodation like it in Albany. It is the ONLY place we will stay. Everywhere else is considerably sub par in terms of amenities, quality and customer experience.	The relocation of the holiday parks would be too expensive and the parks could end up in a much less desirable location for holiday makers.A buried sea wall has no visual impact and after a major storm event the beach can be restored through artificial sand nourishment and natural accretion.Seawall to me is preferes option
I think protecting the assets that are all ready established is a much more practical solution than trying to move everything, and where would it go?	Seawall would be my preferred option relocation incurs considerable expense i would imagine and possible loss of income
Recommendation 13 - protect - seawall	Protection seems preferable
if protection is possible it is preferred, relocation would be far to costly	My preference would be Recommendation 13: Protect - Seawall
Enlarge seawall and protect current assets.ie. big4 park	Do not relocate. Recommendation 13

MU2 - BIG4 Middleton Beach - In Management Unit 2 the asset at risk is the BIG4 Caravan Park (Middleton Beach). **The recommendations for this asset are:Recommendation 12: Managed Retreat - staged relocation of assets.Recommendation 13: Protect - Seawall.What feedback would you provide about these recommendations?**	
seawall construction extended to take in all areas at risk	Prefer recommendation 13.
A managed retreat would be stupid!! this business brings so much to this town and supports the town in immeasurable ways, with the other park they employ over 60 people and support so many large and small businesses in town. to have a manged retreat to me is unworkable	Relocation of assets will result in a reduction of tourists. I stay at Middleton Beach each year and would reconsider Albany as a holiday location if Middleton Beach was not available. If the park can remain in its current form and the beach can be improved or protected using a seawall this would be the best outcome.
Disagree with managed retreat. Before I lived here I stayed there and have friends and family who continue to. It is a critical tourism asset and warrants protection. Despite statements to the contrary in the CHRMAP Implementation Plan and addenda, we have precedent for funding a seawall or similar at the Middleton Beach Activity Centre. I am sure Big4 and other investors would also be willing to chip in considering what it means for them. And at whose cost is the managed retreat? Would not be a good business decision on their part if they just accepted that over other options. Also, the CHRMAP documents do not provide sufficient justification for their reasoning for any option. And why wasn't a buried seawall considered here? Seems like not enough has been done to consider the implications on this... What if you lost Big4? What about future leaseholders of that site? What about other businesses in the area that receive business directly from Big4 visitors? And as above, how does this affect other investment you are making into the area (e.g. Mids and ASR)? There is also some comment that a seawall would encourage accelerated erosion down the beach. How so? This would only happen if it were in the water, wouldn't it? I don't see how this is possible and the consultants haven't done a good job at explaining why.	Managed retreat would be a disaster for Albany ending up another Esplanade site with dirty socks and no developers interested because of the lack of security to invest so they will invest in other regions that guarantee security in there lease. Protection with a buried seawall is the best thing for Albany and the community as there is so many benefices from the business. also the beach accretes in this area so losing the beach in front of the seawall will not happen. For the cost of the seawall its an investment to the city and pays for itself over and over in the future. Also the need of a seawall installation might not be required in the next 50 years as the beach is wider than ever before in front of the park.
	Would suggest that asset can likely not be relocated to a location without adversely affecting it's viability. Protection with a buried type seawall would provide longer term, more sustainable outcome.
	NO - this is the best caravan park I have ever stayed in - don't mess with this place! Yes, construct a Seawall to prevent encroachment from ocean, but please do not touch the caravan park
Seawall	Protect with Seawall
I don't agree with recommendation 12. Recommendation 13 may be a solution but surely there is plenty of warning of impending erosion or inundation extending to the caravan park due to the sand hill buffer zone so there would be plenty of time to implement this if or when the danger signs are starting to become apparent.	As a visitor to the holiday camp annually for ten years it will have a serious social impact on our family to lose such a desirable location to stay. We on average spend about $5000 for the two weeks we are in town. What will the multiple loss of families like ours to the area mean to the local economy?
The Seawall needs protecting and renovating to prevent further erosions	Recommendation 13: protect the seawall
Relocation is not a feasible plan, if anything it will lead to closure of the park.	Protect seawall
I think moving of the caravan park would lead to a decrease in tourism.	Seawall

MU2 - BIG4 Middleton Beach - In Management Unit 2 the asset at risk is the BIG4 Caravan Park (Middleton Beach). **The recommendations for this asset are:Recommendation 12: Managed Retreat - staged relocation of assets.Recommendation 13: Protect - Seawall.What feedback would you provide about these recommendations?**	
Believe recommendation 13 is the better option. If you relocate the assets you will remove the key reason this site is attractive as a destination. Keep the Big4 asset in its current location and protect the beach with a sea wall	Poor decision. Managed retreat will again see the caravan park become unviable given there are other options on allowing it to continue for many years to come.
If the park was to be moved this would likely ruin its appeal. We holiday there because it is on the beach. It would be good to have options that allow the park to stay	As much as I enjoy the big 4 holiday park, global warming will only continue to increase water levels. To keep investing in retaining walls will be futile. Let nature do its thing. Relocate big 4. With financial assistance
Keep and protect BIG Middleton Beach Caravan Park with fully funded seawall (buried or unobtrusive height) installed.	Definitely no managed retreat. Protect t he beach and allow Big 4 to continue developing
I think relocation of Big 4 is extreme. The cost of this would be excessive. It is a small well designed facility that does not impact greatly the sea wall.	Recommendation 13 is the best option, it is best not to disturb existing businesses.
Any concept which involves relocating the EMU point caravan park one of the best Caravan Parks in Australia given the level invested does not make any sense. The location of the Caravan Park also makes it special to all visitors	I diagree with Recommendation 12. The caravan park is a big draw for visitors tyo the region because of its location. Moving it would risk a reduction in visitor numbers. I agree with the SDeawall recommendation.
Protect seawall	Try & keep as it is
use a seawall if the weather gets really bad	protect
Protect with Sea wall. I have seen these working in many parts of the world. It would be a more economical option than Managed retreat let alone the flow on effects of removing the BIG 4. There already is enough barren wasted land down at Middleton the Big 4 is what keeps the economy turning down there, let alone another eyesore we can't have that again. So protect what we have in place already.	I believe that the new reef is a great idea, tourist will boom and so will cash flow for local business. This will also give young people to opportunity to learn new surfing skill and give locals a new reason to visit Middleton beach. The Big4 caravan park will become a bigger and business will be booming, although the bigger waves may effect the beach the new safety consearnes will be raised for nearby business' and house and we will be able to think of other ways to help locals out.
Protect Seawall	Protect the seawall
Protect with a Seawall, Moving this business would be a huge loss to the tourism industry in Albany WA. Also this is a family operated business, I wouldn't like to think that the City of Albany would support a relocated of Assets.	Strongly disagree to the relocation! If your infrastructure planning is accurate then the Holiday Park poses no threat to the beach front nor does the alleged sea level rise pose a threat to it.
Protect with a Seawall	keep caravan park accessible for tourists
disagree. relocation of assets will be delay the inevitable. a proper solution is required.	Move assets. No more seawalls please. We want sand not rocks.
N/A.	we should see what happens then go from there
i would do these as they will help protect the caravan park	I don't use Big 4

MU2 - BIG4 Middleton Beach - In Management Unit 2 the asset at risk is the BIG4 Caravan Park (Middleton Beach). **The recommendations for this asset are:Recommendation 12: Managed Retreat - staged relocation of assets.Recommendation 13: Protect - Seawall.What feedback would you provide about these recommendations?**	
It would be a great idea to build a seawall as that will protect the caravan park which will allow more tourists.	Avoid the seawall unless it is the only good option as it would be much harder to reverse
Reasonable	good
Before heading down the seawall pathway consider the potential positive affect of the planned artificial surf reef. While not trying to hold back the ocean, the wave energy will be spent much further offshore and therefore reducing the risk of shore erosion.	It would be a shame to have to relocate the caravan park as it I such a lovely position. How big would a sea wall have to be - if not too invasive I think this would be preferable.
I think a caravan park would be a great idea, this will attract more tourist; as long as it isn't too expensive.	I don't see why we'd need to relocate Big4 but protecting the seawall is a good idea.
Well first of all, don't change the golf course to fit in the holiday park. You don't need to spend more money than you already are on this problem. I have never been to the Big 4 holiday Park, because I live in Albany anyway, so I don't really know how much of an economic impact the holiday park has on Albany.	The construction of a sea wall is problematic. While protection of this asset seems attractive, the best long term solution is going to be relocation. If a seawall was the preferred option, who would pay for it and maintain it? Wouldn't it result in there eventually being no beach at all in that location? How would public access to the foreshore be maintained?
Cool	seawall
keep the big4, manage the surroundings and assets	Good
Would need to know where relocation is? Not enough information provided for me to make a comment	I have never agreed with resorts or hotels or even private housing being right up to the shore line of any beach. The shoreline should be preserved as public space and kept as natural as possible.

MU3 - Properties on Griffiths Street - In Management Unit 3 the asset at risk is the Properties on Griffiths Street. **The recommendation for these assets is: Recommendation 14: Managed Retreat - Relocate properties from Griffiths Street. What feedback would you provide about this recommendation?**	
As above	Managed retreat
Support when necessary	Support recommendation 14
Ok	Agree - managed retreat
Support	no comment
agree - monitor and manage. Increase vegetation on foreshore dunes and build dunes to protect asset behind.	No real threat as the beach accretes after a storm, if in the future a major series of storms erode the dune the property's should be brought for market value.
Beach Re nourishment	Disagree.
Okay, based on adequate evidence of risk increasing to a level that warrants action	Disagree = you have no way of knowing exactly how far to retreat
Relocation of private properties could be controversial and costly, but a better option for the environment	I disagree with this recommendation. We need to protect the beach - and therefore the houses.
it may be 30 to 50 yrs before the coast threatens these property's may be the decision should be made closer to the time	Same again protect what we have. Seawall. as properties come on the public market purchase them.
I'm not sure if this would be possible	No to relocation
what a stupid idea, really !	If a seawall is impractical the agree with recommendation 14
I imagine the property owners would disagree with this. Less so, but as for all other comments, I would recommend the whole stretch is protected into the future. Seems to me that the higher cost of protection and maintenance options far outweighs retreat/acceptance of lot options when considering the broader implications to homeowners, businesses, CoA, etc. If you are protecting other areas, storm surges from here could flow in and wash back down to the protected areas anyway, making the protection measures down there obsolete. And what about the golf course?	I believe that the new reef is a great idea, tourist will boom and so will cash flow for local business. This will also give young people to opportunity to learn new surfing skill and give locals a new reason to visit Middleton beach. The Big4 caravan park will become a bigger and business will be booming, although the bigger waves may effect the beach the new safety consearnes will be raised for nearby business' and house and we will be able to think of other ways to help locals out.
I agree it should be relocated	do not relocate
agree	I don't like the thought of any managed retreats
Ok - wait until necessary	No comment
This seems to be an extreme measure. Again, there is nothing to say when any major event could cause enough damage to threaten these homes, this is a lot of stress for home owners for their homes to potentially just sit there for years.	I disagree with the relocation of properties in the short term. I do not believe the assets should be protected by government works on Griffiths st at this stage. I believe it should be monitored and reassessed in 5 years.

MU3 - Properties on Griffiths Street - In Management Unit 3 the asset at risk is the Properties on Griffiths Street. **The recommendation for these assets is: Recommendation 14: Managed Retreat - Relocate properties from Griffiths Street. What feedback would you provide about this recommendation?**	
no relocation is needed just sustainable practices that will positively impact the area	That seems very unfair to those people.
Agree	Nil
Support wording in plan. I strongly support maintaining foreshore reserve, so like the need for relocation when a trigger point half way through reserve is reached. If seawalls are to be used at both ends of beach, we need to maintain beach environment in the central area, and the golf course allows us to retreat and retain a foreshore reserve,	I agree with this recommendation. However, I do not believe that the community should pay for the purchase of the properties. If they are at imminent risk, in my view, they become worthless.
No action required there's a large buffer and the beach also accretes after a storm event. In the case of a miracle storm event in the next 100 years it might be cheaper to buy the 5 houses for market value. Highly unlikely let the people be as this adds immense stress for no reason. (over conservative)	We should not allow any further development and only relocate properties when all the predicted doom and gloom actually starts to happen. Most of it is due to a predicted sea level rise which would affect far more important infrastructure than this if it actually happens.
As above for MU2.	use the seawall to stop the properties to get destroyed
as above	Build houses on stilts.
More cost effective to maintain protection of these properties. They are all expensive properties, the cost of reimbursing the owners will be prohibitive.	Moving properties is a good idea as it protects the houses and land but others may not want to move their houses.
notifying residents of the change going to occur	i would leave them if the are going to be ok otherwise move them to a new location
Moving the properties on Griffiths Street? Definitely implementing another Recommendation.	I think we should do something to stop having to move the people living on that street. That will take a lot more time and money.
Sounds good	We're gonna relocate a whole street's worth of properties??
we should do that and help them out with the redevelopment of them by maybe giving them money	Don't make the people move. If they are aware of the dangers, they will move on their own accord.
So long as land owners are suitable compensated	This is total overkill - and totally disruptive to the owners
Apply property caveats now.	No comment
I don't agree with the relocation of properties.	I don't think this is a good idea
Beachwall, do not relocate!	No good, too costly
No comment on this asset	Definitely relocate.
I support this recommendation	Nil feedback

MU3 - Properties on Griffiths Street - In Management Unit 3 the asset at risk is the Properties on Griffiths Street. **The recommendation for these assets is: Recommendation 14: Managed Retreat - Relocate properties from Griffiths Street. What feedback would you provide about this recommendation?**	
Donot retreat donot relocate. Protect proerties	Unnecessary.
Protect assets via staged enlargement of seawall.	I have no additional comments to make as the previous comments also apply .
Not the answer to the problem erosion will still hapen	Not sure
Not enough info	No managed retreat. Protect the beach
100% support as per above.	Do not relocate. Protect the properties
:)	good
Strongly disagree! Unnecessary upheaval for absolutely no gain to either the ecology or the persons residing in the area.	You want to uproot houses and families? Where will you put the houses, and how will you pay for it?
Purchase, lease back, risk and relocate assessement as part of lease. Again, consider the ptential positive impact of the artificial surf reef and the protential to extend the strategy to reduce the impact on the shoreline	Seems a little impractical to remove the expensive properties there - I can see the homeowners being pretty resistant.
Fair call if it is going to be a drain on taxpayers in the future.	nonsense. They are peoples homes and livelihoods
Not sure on this one. I feel the residents have priority on feedback.	management. purchase properties that arise for sale to manage retreat
Similar beachside location should be planned for these property owners.	

MU3 - Emu Beach Holiday Park and dual use path - In Management Unit 3 the assets at risk are the Emu Beach Holiday Park and dual use path. **The recommendations for these assets are: Recommendation 15: Managed Retreat of assets in the Southern Portion. Recommendation 16: Renovation/Expansion of Groynes (Geotextile Sand Container). What feedback would you provide about these recommendations?**	
I would be against all managed relocations. I am unsure why this is an option	Ok
Support when necessary	Support both
Agree managed retreat of Southern assets expand groyne to mimic Geotexile arrangement - remove current degrading geotextile sand bagging - remove eroded bank and realign foreshore to suit natural erosion pattern . Increase dune mass & vegetation in front of CP and realign footpaths	Agree with the gradual relocation of assets. Upgrade of the foreshore and create a public open space. Would be nice not to have too many groynes or structures on the foreshore, but understand it is required for protect. Is there an option to integrate structures into the built form of the public open space?
I support expansion of protection but not the method. A proper seawall using sensitive materials - not geotextile sand containers or gravel-stone rocks - would be appropriate	Better to protect and keep this valuable infrastructure. To move it ? Where? who pays ?
Managed retreat will mean the lose of a vital tourist provider and have a negative effect on the Albany economy and tourism for Albany and the region. businesses which are positively geared and producing income for the area should be helped to grow in turn this creates a better social environment for the residents of Albany. The property should be protected.	More effort needs to be paid to renovating the present seawall groyne and sandbag structures to maintain the beach area that is now available. Extra effort should also be paid to the seagrass area with perhaps some underwater structure to lessen the impact of winterstorms on the foreshore. Placing sand in the ocean is of little use, but some man-made reef would assist to reduce the swells as well as protect the seagrass and the infrastructure on the coast.
Disagree with both. I would recommend more expensive but effective options such as natural nearshore breakwaters as discussed in the more detailed background documents. And why wasn't a buried seawall considered here? Please enlighten us how the managed retreat would work? Retreat where? There is no land left. And at whose expense? No option is provided for retreat as was for the Middleton Beach Holiday Park, and even there the suggestion to go to the Golf Course is not well justified. At whose cost? What agreements are in place? How will the community react? All seems a little silly to me. Protect your leaseholders. Protect our assets. Work with private business to make sure we can keep them and keep our beautiful coastline.	Managed retreat would trigger a good quality developing Holiday park to stop moving forward with the times and run the parks lean investing any of the profits in other regions with security.. Albany will suffer if it lost the Two best parks in town along with the 40 - 50 jobs and beneficiary's (Cafes ,Restaurants, Shops, Tours, City assets and staff that work for these businesses) Protecting this park by upgrading the protection it has and NOT REMOVING SEAWALL TAIL AND SANDBAGS . The city should be maintaining coastal protection and not removing it as it says in the CHRMAP. The costs for protecting this park is an investment to the city as a CBA will demonstrate.
not sure what this means	recommendation 15 agree
Groynes don't seem to have worked too well so far	Support
Again, the retreat option is completely unfeasible for a business. The city should plan to protect their assets for the long term.	Stop renovating the area and leave it be, it can naturally fix itself but we need to leave it alone
I strongly agree with Recommendation 16. The Groyne and sand bags need to be maintained.	I would recommend against relocating the assets. Retain the attraction of being close to the beach

MU3 - Emu Beach Holiday Park and dual use path - In Management Unit 3 the assets at risk are the Emu Beach Holiday Park and dual use path. **The recommendations for these assets are: Recommendation 15: Managed Retreat of assets in the Southern Portion. Recommendation 16: Renovation/Expansion of Groynes (Geotextile Sand Container). What feedback would you provide about these recommendations?**	
Use of groynes along whole section might be more suitable?	My preference would be Recommendation 16
This park is the biggest tourism provider for Albany putting through the highest number of guests in Albany. It has the capacity in the future under the business and concept plans to deliver an experience that will draw tourists from other regions to Albany for there Holidays and getaways. This park has been brought and operated under protection from a Seawall and the sandbags and it would be unexceptable to remove the protection this park has, as described in MU4 and MU3. Managed retreat option will cease the business plan and likely trigger investment to look at other options leaving the park to run down which will cost jobs and impact local businesses, it is a negative approach to the Albany economy and tourism. On the other hand maintaining the protection by enhancing the Seawall has a positive affect on the park and other businesses and retains local jobs. It is not that difficult to repair the Seawall tail and tail it in on the south west side of the park boundary enhancing the beach and access without the need for sandbags. This will secure investment into the park and Albany giving tourist even more reasons to visit our region. If the city is going to spend 19m on protecting Rose garden and there amenity block plus water Corp pumping station what is another 2m in protecting Big4 Emu Beach. Also the 6-12m on seagrass should be put into enhancing the Seawall and parkland in front of the park before its spent on seagrass as the seagrass doesn't score well on effectiveness.	To me Emu Beach Holiday Park is the most at risk asset currently as the is very little to protect it and seasonal erosion continues along that section of the beach. The Geotextile Sand groynes in this area have been a disaster and are now both a hazard to beach walkers and the environment. The bags have broken, there are pieces of the geotextile fabric that have broken off and are buried along the shore line and drifted out to sea. This area of the beach needs URGENT attention. The existing bags need to be REMOVED and replaced with a more stabile enduring structure. I don't consider these Geotextile Sand Containers have been of any benefit to this area. Just an ugly and dangerous hazard!
	I feel the caravan park boundaries should be relocated, given these are so close to the coast, are on council land, and can be amended by council in the lease. Without such a change we will create a pinch point for public use, amenity, foreshore vegetation and trails in this location. The renovation is a bit vague and i feel this needs specific community engagement to allow people to understand and comment.
	Disagree with the managed retreat recommendation 15. This are has had substantial development put in place to bring tourism to the region. I don't believe now is the time to retreat, it's the time to protect and sustainably manage as per Recommendation 16, and modify the Groynes to become more effective in the management of erosion.
Geo textiles seem to be a short term solution Expansion of Groynes should be more cost effective looking long term	Relocation will be required, in fact i would hazard a guess that the whole EMU beach are is at risk from the threats noted above
Again disagree with managed retreat of the asset. The geotextile grounds have worked and should be renovated.	We use that path daily when riding or walking to Emu point and love it, it also needs to stay but if realigning is needed it should be done as long as it stays in some form
While not a user of The Emu Point Big 4 Resort Park, I think the expansion of the Groynes would be my preferred option as they have protected Emu Point ever since the major storm many years ago that eroded the whole point	I disagree with Recommendation 15 for the same reason as disagreeing with the recommendation to move the other caravan park. I favour renovation and expansion of the Groynes.
RECOMMENDATION 15	Build a seawall. Build it properly and don't mess it up with groynes again
Remove the groynes and let mother nature take care of the coastline - it will come back of its own accord eventually	Assets are key economic sources(tourist), without them will see a big tourist dropoff. Protecting them is in the regions best interest.
Agree with both recommendation 15 and 16	Recommendation 16 Renovation/expansion of Groynes

MU3 - Emu Beach Holiday Park and dual use path - In Management Unit 3 the assets at risk are the Emu Beach Holiday Park and dual use path. **The recommendations for these assets are: Recommendation 15: Managed Retreat of assets in the Southern Portion. Recommendation 16: Renovation/Expansion of Groynes (Geotextile Sand Container). What feedback would you provide about these recommendations?**	
Minor expansion of groynes when required	Sand Re Nourishment
renovate	Recommend avoid relocation of assets and accept recommendation 16
Recommendation 16 at all costs	Not 15. Go with 16.
Needs intensive discusdion	Recommendation 16: renovation/expansion of groynes
I believe that the new reef is a great idea, tourist will boom and so will cash flow for local business. This will also give young people to opportunity to learn new surfing skill and give locals a new reason to visit Middleton beach. The Big4 caravan park will become a bigger and business will be booming, although the bigger waves may effect the beach the new safety consearnes will be raised for nearby business' and house and we will be able to think of other ways to help locals out.	Recommendation 16 is continuing a stragey that will continue to require investment. This strategy is about holding back the ocean. When Lockyer Shoal was healthy with seagrass then the wave energy was spent well offshore on the shoal and Emu Beach was just that, a beach. replenishment of seagrass on the shoal and consider the possibility or an artificial reef to assist with the replenishment of the shoal and the protection of the shore from high energy wave events
Retreat. Let nature take its course. People will continue to find spaces to walk	I am happy as long as there is a way to Emu point from Middleton beach on foot/cycle
Keep and protect Emu Beach Caravan Park .	None
I think moving assets will result in a reduction of tourism	Donot retreat. Exand groins
Groynes	Renovate
As i said earlier i don't like the proposed managed retreat - this park brings so much to the community - I think both parks are unrivalled in quality and are stand out parks - i doubt any other parks bring in as much revenue to the town in both tourist dollars and in rates and lease fees	Well, groynes look really ugly, so I would prefer it if they didn't happen. But they also might work, so if you do end up doing the groynes, please tell us beforehand so we can take photos of our beach while its still beautiful.
Not familiar with this area	Recommendation 16 is the best option,
Renovate the seawall	No comment
There are already groynes there with some tweaking they would function a lot better	Seems reasonable
Recommendation 16	Recommendation 16 preferred.
Don't agree that 15 is required. Agree that 16 is good if or when it is necessary	definitely renovate and extend groynes
Renovation/Expansion of Groynes is greatly favoured. Please let us all enjoy this amazing area for as long as possible.	sandbags are a bandaid. . . . take out the emu point groins that have caused all the problems to start with

MU3 - Emu Beach Holiday Park and dual use path - In Management Unit 3 the assets at risk are the Emu Beach Holiday Park and dual use path. **The recommendations for these assets are: Recommendation 15: Managed Retreat of assets in the Southern Portion. Recommendation 16: Renovation/Expansion of Groynes (Geotextile Sand Container). What feedback would you provide about these recommendations?**	
Renovation and expansion of groynes is best solution to save the beach and the caravan park	The groynes should never have been installed to begin with, but now that they are, I don't see much alternative given the environmental impact they have already had.
oke	Sounds good
It would be a shame to lose the dual use path.	use groynes to stop the water from getting through
Prevent the erosion should be the primary focus	Recommendation 16.
Renovation of groynes is a must	but the expansion to the groyne walls
Strongly agree! The existing groin has saved much of the beach and a further expansion will only serve to compound this effect.	Strongly agree! The existing groin has saved much of the beach and a further expansion will only serve to compound this effect.
We are regular users of the dual use path whilst holidaying in town. Sad loss of amenity.	To be managed in conjunction with the Holiday Park's wishes. Refer my response to 7 MU2
I think existing accommodations should be retained or possibly upgraded to be more environmentally friendly. Expansion of groynes if absolutely necessary to protect the area	No body should own any direct access paths to any beaches. In fact I thought that they couldn't own exclusive access to any beaches? As for paths I do love walking along the path from midds to emu point and without it there would be erosion so I hope it remains
I think it is a great idea	Recommendation 16
I would prefer to see renovation and expansion of groynes. Do not remove any protection already in place.	I think the geotextile sand containers appear to work very well. Therefore I feel recommendation 16 is preferable.
Same as Q8.	The existing groynes are terribly butt ugly in coffee rock. PLEASE beautify!
I don't know enough about groynes	I support these recommendations.
i would do these because they will help extremely with the process	We love the dual use path but don't build more rock groynes.
Expansion of Groynes would be good	I don't really understand but don't remove the path please.
:)	good
Sounds good	

MU4 - Foreshore Reserve - In Management Unit 4 the asset at risk is the Foreshore Reserve. **The recommendations for this asset are: Recommendation 17: Seagrass replenishment program be continued and enhanced. Recommendation 18: Revetment be upgraded along with redevelopment of Foreshore Park and removal of Sandbag Revetment. What feedback would you provide about these recommendations?**	
I think that the park is fine. I suppose though that it all depends in what is involved in the redevelopment	Remove sandbags as they are causing more problems towards the beach site. don't upgrade as it will cause more damage
Support - seagrass nice but could be a waste of money	agree
Ok	recommendation 17, allow the natural environment to take over
Support	Support
agree - seagrass development, monitoring and support for increasing capacity of future plantings that with increase density of grass and protecting the sea floor. Agree - Upgrades done with coastal engineering and professional technical expertise to protect foreshore and structural assets	I support 17: Seagrass replenishment, however, personal observation over years shows it comes and goes for no apparent external reason, suggesting nature at work. Will replenishment last? I support upgrading of the revetment, but using materials with more aesthetic value than the rocks that have been used to date or the sand bags.
whatever will protect the reserve the best	Agree recommendation 17 and 18
Recommendation 18 is much better. Seagrass sounds like it's not even guaranteed to help, and it then takes 50 years to replenish, at further cost. Upgrades will be cheaper in the long run.	Seagrass replenishment an absolute must. +++ These sandbags in this location have been a disaster. This area is under seasonal erosion and battering and will need a far more substantial revetment to protect it.
sea grass is a great idea but it is not effective also the backwash from the Seawall wall in a storm will erode the seagrass, money spent on seagrass should be put into redesigning the Seawall tail and maintaining protection in front of Big4 Emu Beach before waisted on seagrss as there is a lot more to benefit from protecting the park and maintaining the beach towards Midds. The sandbag revetments should not be removed unless it is incorporated into a new Seawall, maintain the sandbags until the funding is available to put long term protection in place. Park landing the foreshore is a great idea but their is little point if Big4 emu beach is under retreat as it would be a mess for years	Removing Sand bag revetment will accelerate erosion in front of Big4 Emu Beach triggering managed retreat which is a massive loss to Albany. (Lack of security to invest in the Park loss of jobs etc) Sandbags should only be removed if the seawall structures are extended to stabilise the erosion in front of the park. Also money that is forecast for the seagrass should be spent on maintaining the seawall and extended in front of Big4 Emu Beach and not removing it, clearly it states that the effectiveness of seagrass is unknown and it is likely to be lost in a major storm event (potential waste of Capital) All other structures in this area are stable are stable in the short term and don't need upgrading triggering a rapid rushed decision (although it states this in the CHRMAP only one engineer opinion should have multiple) this will give the City more time to raise the finance
I agree with both, and believe the monitoing equipment has been installed for a long enough period of time to get a true picture of the coastal movement. The revetment upgrade being rolled in to a foreshore redevelopment makes sense.	Protect with a Seawall, Moving this business would be a huge loss to the tourism industry in Albany WA. Also this is a family operated business, I wouldn't like to think that the City of Albany would support a relocated of Assets.
Similar thoughts as previous question. Integrate revetment structures with built elements in the public open space	Agree with both recommendations. The current sandbags in this area are a public safety hazard and should be removed as part of a redesign of the area.

MU4 - Foreshore Reserve - In Management Unit 4 the asset at risk is the Foreshore Reserve. **The recommendations for this asset are: Recommendation 17: Seagrass replenishment program be continued and enhanced. Recommendation 18: Revetment be upgraded along with redevelopment of Foreshore Park and removal of Sandbag Revetment. What feedback would you provide about these recommendations?**	
If Seagrass would protect assets along the coast that might be OK however to plant seagrass would be a waste of money as if there is another big storm it will wash out again like it did in 1984 and it would be a waste of time and effort a revetment upgrade is the best way forward as this will protect assets behind it . If sand bags are to be removed then some other form of protection needs to be considered otherwise you will be going backwards and making the erosion issues worse .	support works that maintain wide foreshore reserve for continued public use and amenity. suggest works have targetted community engagement if agreed in principle by council. I support seagrass regeneration for all the coast, through trial planting, conditions on develoment funding such work. I would like to see off shore protection works be considered, , not just seawalls, as seawalls result in loss of beach, not creation of beaches. We need to restore a beach environment here.
As mentioned in the previous feedback, the assistance for the seagrass regrowth and the reduction of the strength of ocean swells by the use of some undersea structure should be considered. The alteration of the present seawall and movement of the dual usage pathway will only see further erosion at the end of the wall, as has been shown in the past 25 years of sea wall extensions.	Agree with seawall options. Should be buried to minimise visual impact. Seagrass replenishment should work too. Again though, it is difficult to properly understand the reasoning in the reports. They make statements of what we should be doing without really saying or justifying why (and this considers all addenda also). As for all above though. Protect, do not write off our built and natural assets.
Agree recommendations 17	Agree with recommendations
SUPPORT RECOMMENDATION RECOMMENDATION 17 SUPPPPORT RECOMMENDATION 18	Both recommendations would appear to be a sensible and more permanent approach to the issue
no comment	recommendation 17
Seagrass replenishment recommendation 17	Sand Re nourishment
sandbag movement at East End shows not a good option	Agree with recommendations
As above, this too will be be under threat as the ocean only need to break through the sand bank to inundate the area. Man made dykes, have, unfortunately a propensity for failure as maintenace seem to often be neglected for fincial reasons - i.e. no money in the budget this year.	I believe that the new reef is a great idea, tourist will boom and so will cash flow for local business. This will also give young people to opportunity to learn new surfing skill and give locals a new reason to visit Middleton beach. The Big4 caravan park will become a bigger and business will be booming, although the bigger waves may effect the beach the new safety consearnes will be raised for nearby business' and house and we will be able to think of other ways to help locals out.
No comment	Recommendation 17
I think continuing with seagrass is the way to go.	Protect foreshore
Agree with 17. Agree with 18.	I agree with both recommendations.
Recommendation 18: Revetment be upgraded along with redevelopment of Foreshore Park and removal of Sandbag Revetment is the best solution.	Build a proper seawall. We need to preserve what we have. This land is important to the area it what makes Emu Pt so great we need to preserve this asset.

MU4 - Foreshore Reserve - In Management Unit 4 the asset at risk is the Foreshore Reserve. **The recommendations for this asset are: Recommendation 17: Seagrass replenishment program be continued and enhanced. Recommendation 18: Revetment be upgraded along with redevelopment of Foreshore Park and removal of Sandbag Revetment. What feedback would you provide about these recommendations?**	
Encourage natural scrub growth and be prepared for land sinkage vs ocean rising	Agree and support
Agree	Continue with recommendations 17 and 18continue with recommendation 19
Agree	Refer to previous responses
The foreshore reserve should be preserved.	Unsure on this one.
A wise recommendation	Replenish the seagrass
No comment on this	
My preference is Recommendation 18	I have no feedback
Sounds fine	Same as previous question.
17	Agree
Go with 17. Repleenish sandbag revetment	Recommendation 17
Recommendation 17 is the best option	Recommendation 17 is the best
They both that sound like the best options especially the sea grass replenishment program	Agreement with both however with consideration given to the significant use of this area by the general population.
agreed.	Ok
Sounds good. To protect foreshore	but the sea grass replenishment so that it is natural
do both of these as they will help save them	none
Foreshore reserve will help things	nah the groyne is good
looking after the seagrass would be good	good
Do not remove the sandbags! The sea grass can replenish around/near the bags without disrupting them. Waste of money!	17....YES 18...consider offshore reef combined with seagrass replenishment as a more sustainable strategy. Not trying to stop the option....just modify its impact.
I think it's a great idea, in order for the seagrass to be maintained. it will help the environment	Recommendation 17 is excellent and I feel should be implemented. I would also be happy with recommendation 18 being implemented.
Sounds good.	agree
If you remove the sandbags, I sure hope you re-use them somewhere else. A sandbag saved is a sandbag earned.	That area need to be returned to a more natural state and have an intelligent researched environmentally friendly interventions regardless of costs.

MU4 - Foreshore Reserve - In Management Unit 4 the asset at risk is the Foreshore Reserve. **The recommendations for this asset are: Recommendation 17: Seagrass replenishment program be continued and enhanced. Recommendation 18: Revetment be upgraded along with redevelopment of Foreshore Park and removal of Sandbag Revetment. What feedback would you provide about these recommendations?**	
Agree. I believe there is potential for some beach to return here. I grew up at Emu Pt in the 70's. If the first groyne hadn't been put in place we would very likely have a beach now and not these ugly groynes. Please beautify.... a lot.	Seagrass replenishment is more of a research project than a real effective action. I wouldn't be counting on it. I support upgrading the revetment and enhancing the foreshore area.
sure	Sounds like a reasonable response
No issues with doing this.	Foreshore park would be nice

MU5 - Oyster Harbour South East Beach - In Management Unit 5 the asset at risk is the Oyster Harbour Southeast Beach. The recommendation for this asset to maintain a sandy beach is: Recommendation 19: Sand Nourishment. What feedback would you provide about this recommendation?	
Agree	Ok
Support when necessary	yes
Ok	Sand Re nourishment
Support if necessary	Agreed
No issue with this if it becomes necessary	Grea
No	No comment on this
Agree	I support this recommendation
Agree	Yes. Agree with sand nourishment.
Agree	Agree
Agree - Sand Nourishment , Monitor area as to sand movement - increase seagrass	agree with recommendation
Sounds like a good idea to me	Okay
Seems somewhat appropriate. I would consider progressively walling the lot though. Protect all assets at all costs or risk losing businesses and visitors.	Similar to Middleton Beach foreshore, this beach is an important asset to the community and tourism. Agree with recommendations to protect the asset.
agree	I think with the position of this area beach nourishment would work fine
agree	Keep similar sediments coming to the area, regularly
Support - don't see great risk	Worth trying
SUPPORT RECOMMENDATION 19	Maintain sand nourishment
Agree - sand nourishment	agree.
Leave it alone and let mother nature take her course.	I think that's a good recommendation
Happy with this	Responses above
See q 11.	Continue as it is
Sounds fine	Sand nourishment
Agree	Yes
Agree	I agree.
Not sure	Keep maintaining what's already in place

MU5 - Oyster Harbour South East Beach - In Management Unit 5 the asset at risk is the Oyster Harbour Southeast Beach. The recommendation for this asset to maintain a sandy beach is: Recommendation 19: Sand Nourishment. What feedback would you provide about this recommendation?	
Agree as it is a well used facility	Recommendation 19: Sand Nourishment
Continue with recommendation 19	good idea
Agree. It experiences the less amount of significant erosion. Sand nourishment will maintain this asset.	support, subject to knowing where sand is being transported from, and is noncontaminated.
Strongly agree. That is an area extensively used by the public. Safe and child friendly.	Nourish it with what exactly? Waste of money!
Comments as above	Yes...with sutable type sand
Also an area my family loves and an asset that Albany should keep	Yep
may be acceptable	Cool
Spending money on adding sand to a beach sounds silly. Taking sand from elsewhere will only disturb that ecosystem.	none
Sand nourishment works short term and has a high price tag, a second opinion from coastal engineers should be looked into across the implementation plan before it goes to the councillors.	use the groyne is better than sand nurishment
agreed.	good
Good	Sand nourishment is better that more rocks!
i would do this so the beach can stay sandy	As above
Just make heaps of jetty's so we can use them and they also stop the erosion	agree
Yes this will give the beach more sand and will hopefully help out the beach.	sure
I believe that the new reef is a great idea, tourist will boom and so will cash flow for local business. This will also give young people to opportunity to learn new surfing skill and give locals a new reason to visit Middleton beach. The Big4 caravan park will become a bigger and business will be booming, although the bigger waves may effect the beach the new safety consearnes will be raised for nearby business' and house and we will be able to think of other ways to help locals out.	Sounds good to me
	Is this a sustainable solution?
	Great idea.
	Sounds good.
Sounds good	Yes please. As much beach as possible.
do that	I support this recommendation.

The CHRMAP contains 6 [9] overarching recommendations in regards to the Planning Framework. **These are: 1: Local Planning Strategy - Investigation Area; 2: Local Planning Scheme Special Control Area; 3: City Infrastructure Asset Planning; 4: Resilience Planning and Monitoring; 5: Sand Nourishment Investigation; 6: Rates Levy Investigation; 7: Lease Land Management; 8: Purchase of Property Investigation; 9: Emergency Management Plan. What feedback would you provide about these recommendations?**	
It is obvious to me that this is a land grab of prime land. By making the owners of the current land move means there will be more abundance of "council land " that in the future could be sold for a lot more than what today's purchase price would be	There are not enough hours in the day for the average ratepayer to read all of this matter. Perhaps you could budget to pay us for doing this. You might then get some meaningful input.
Agree all need to be reviewed and appropriate actions put in place for implementation over time. Certainly need t be careful with your review of lease land management considering the value of these businesses. I really can't stress enough the importance of considering protection for all options. And always ask yourself, who is going to pay for the option? Does it make good business sense for them to foot the bill? Are other more potentially capital intensive options better in the long term when it comes to mitigating risk? Be very careful accepting the recommendations of consultants when insufficient justification is provided to support. Read between the lines. The CHRMAP reports, this survey and all other investigation into the matter demonstrates considerable writer bias toward the recommended options.	Public access and environmental protection should come before private gain: that is any alterations should be made to protect public access and environment not private interests. The caravan parks are relocatable and that is the preferred option that is least intrusive to public access and enjoyment of this beautiful area. Visitors come to this area to enjoy the access to beach and foreshore. Relocating caravan parks would not impact on this, where as altering the beach and foreshore would alter the level of environmental integrity and public enjoyment forever. Let's relocate what is relocatable and preserve what is not. Point 7 needs to include restrictions and planning for relocation in any lease renewals.
I COUNTED 9 NOT 6 , BUT SUPPORT 1 THROUGH 9	key areas could be 3/4/5/9
a waste of time and money	No Comment
have read and agree with all of above, and feel such an approach needs to be applied to all similar areas eg goode beach, robinson, little grove. There is a contradiction here with the listed recommendations, and the contents of the CHRMAP. I feel the lease boundary of the EMU point caravan park should be amended, and this is supported by the above general recommendation 7, but not included in the site specific recommendations. There are other examples of contradictions between these recommendations, and the site specific recommendations, and certainly council recent decisions.	Be aware that engineers need to be conservative so that they are not sued in the current litigious environment, as I guess the council is also. However, many of these things can be planned for and only implemented when necessary in the future. Apart from the rock armouring at Emu Point and the erosion of the beach back to the sea wall at Ellen Cove, there is a very low probability that one storm can damage important infrastructure behind the sand dunes in the majority of Middleton Beach. Sea rise in the future will affect all coastal areas and ports/cities if it eventuates as predicted so this small section of coast will be pretty insignificant for the council if it is impacted by sea level changes.
none	Nil
Ok	nothing at this stage
these recommendations are based on governance and should be investigated with experts and prior knowledge. ?? Seabed Management and Planning	This is a environmental disaster which is man made. Please learn from the mistakes made. Emu Point is a valuable asset treat it as such
It is an extremely complex but comprehensive framework with the involvement of many City directorates. It appears the City is on top of it all!	No species need to be controlled, we need to allow nature to go untouched or we will ruin it

The CHRMAP contains 6 [9] overarching recommendations in regards to the Planning Framework. **These are: 1: Local Planning Strategy - Investigation Area; 2: Local Planning Scheme Special Control Area; 3: City Infrastructure Asset Planning; 4: Resilience Planning and Monitoring; 5: Sand Nourishment Investigation; 6: Rates Levy Investigation; 7: Lease Land Management; 8: Purchase of Property Investigation; 9: Emergency Management Plan. What feedback would you provide about these recommendations?**	
Protection policies are key	none.
no comment	Seems to cover a good range.
I have no feedback	Massive question not appropriate in this forum
More costs to justify something that no one can give an accurate time frame for. Millions and millions could be spent, and we won't know if anything is/has worked until it happens.	The city collects a large amount of rates and lease from affected property's inside the Hazard line, this money needs to be reinvested into protecting the assets that generate the income and Jobs for the community.
All of the above	Sounds good
1,2,4,5,6,8	They all sound very good to protect and look after our coasts
Yes	do these as they will help
2/3/4/9	They are good recommendations
The city collect approx 1 million dollars from leases and rates a year from property's affected in the CHRMAP that money should be put aside for coastal defences until it comes a time assets are safe.	It is very important for The Middleton Beach Big 4 Resort Park to remain in its present position due to it being a major tourism destination and also for its importance to the economy of Albany.
No comment to make	thanks for consultation
Compare your management plans with best practices that have worked in similar situations around the world. More research.	Agree providing the key aim is to protect the EMU Point Caravan Park and to facilitate its further development into a world class facility
Ok	Yes
Comprehensive but misses the opportunity to consider the impact of nearshore artificial reefs (eg the proposed artificial surf reef) as a positive means of dispersing and decreasing the wave energy on the vulnerable shoreline.	Number one recommendation i would put forward is to enshrine sufficient funds to not only build the infrastructure but to ensure funding for maintenance is included in any project plan. Else this will only be a stop-gat plan to get to the next major undertaking.
Retain what you have, replenish. Losing this area would be a real shame	I support these recommendations.
See q11	Keep up the good work.
I think any movement of assets or changes that would reduce the ease of use would reduce tourism	Don't try to fix things that aren't broken by employing more plate shufflers! Stop wasting rate payers money on unnecessary tasks.
n/a	if something bad happens then oh well we will just fix it
Sounds good	good

The CHRMAP contains 6 [9] overarching recommendations in regards to the Planning Framework. **These are: 1: Local Planning Strategy - Investigation Area; 2: Local Planning Scheme Special Control Area; 3: City Infrastructure Asset Planning; 4: Resilience Planning and Monitoring; 5: Sand Nourishment Investigation; 6: Rates Levy Investigation; 7: Lease Land Management; 8: Purchase of Property Investigation; 9: Emergency Management Plan. What feedback would you provide about these recommendations?**	
no all good	I think the plan is great
none	Sounds alright.
If the city did actually follow these guidelines, I think all the plans will run smoothly	Too confusing
I agree with all of these recommendations.	They all seem very important roles for the council to adopt. I also feel it is important that suggestions are open for community comment.
It has areas that have well been thought out but it is a lot to take in during this survey in short period of time	Thorough and once implemented please improve the amenity and appeal of the whole area from Ellen Cove to Emu Pt. PLUS get cracking on a surf reef at surfers beach.
I believe that the new reef is a great idea, tourist will boom and so will cash flow for local business. This will also give young people to opportunity to learn new surfing skill and give locals a new reason to visit Middleton beach. The Big4 caravan park will become a bigger and business will be booming, although the bigger waves may effect the beach the new safety consearnes will be raised for nearby business' and house and we will be able to think of other ways to help locals out.	That's way too much reading - just preserve the area for future generations while improving infrastructure and encouraging tourism.
Everything seems to be good. I just am concerned about the Griffiths St and other property purchase.	Rates levy is not an option. They are already high. Think about bed tax or other coastal user focussed strategies.

Do you have any additional comments about the Emu Point to Middleton Beach CHRMAP?	
Yes as above. If on current council land e.g. surfclub you can have a buried seawall then why is it different for land not currently managed or owned by the council. The obvious choice is to continue with the buried seawall as has already been carried out at the surfclub	The beach is the selling point of these areas- if you don't allow for development and access you will lose tourism. Accommodation in Albany is poor enough as it is- better to not get rid of the accommodation that is actually attractive to families. In saying this it will be worth inputting sea wall etc to maintain what is there.
No	No
No	no
Fantastic to see the City of Albany planning for short term and long term. Well done	No
Please protect the beach and existing developments as they provide joy for all who use them. I would seek other beach side accommodation elsewhere in WA for our family holidays, if we can't access these sites at Emu point and Middleton Beach	The businesses being asked to relocate instead of being protected is ludicrous. The City should be planning to protect the rate payers and businesses so they can keep a steady income from rates and rent. The money spent would be reimbursed within a decade.
As per question 14	IT APPEARS THAT A VERY THOROUGH ASSESSMENT HAS BEEN DONE .
A very thorough and comprehensive body of work. An amazing amount of work has gone into creating it.	I sincerely hope a public benefit and environmental protection focus will be the outcome.
The CBA undertaken in the CHRMAP process seams to be incomplete as it has not factored in the income from properties which are positively geared and creating income for the city and so is not giving a true indication to the value of those assets	We absolutely love coming to Albany every year and its great to see the council working on a positive plan , Middleton Beach and both of these parks need to stay as they are
We need to protect and keep these structures, to move them is ridiculous.	A lot of money has been wasted - let mother nature run her course
It needs to be done sustainably and in the correct interest of the environment and species that live in it	The rock wall from Firth St to Emu Point channel must stay in place. Funds must be set aside to ensure this wall is stabilised and not being undermined
Managed retreat is not an acceptable option for the two Big4 parks as the benefits to the region are massive as displayed in a cost benefit analysis, the option should be removed from the implementation plan and if required the protection option adopted. Also the erosion problem at Emu Point is a man made problem and it will take a man made engineering solution to fix it and not the compromise of loosing major tourism assets	By splitting the 'assets' into small areas, no weight is given to the value of the foreshore as a continuous vegetated corridor for ecological and public amenity purposes. The proposed seawalls in a couple of places will dissect this reserve. The strategic value of the reserve as a ecological corridor needs included and used in the assessment of the options.
I believe these 2 areas of Albany are of far too great a significance to the region to even consider retreat. I believe the cost of relocation would be as crippling as the dent to the tourism industry that encompasses these 2 iconic Albany holiday destinations. I believe a lot can be learned from these 2 particular sites in regards to future planning, but that The CoA should continue to monitor and strategically manage the foreshore, with the protection of these valuable sites for generations as a priority.	This is a very attractive area (which i walked end to end) and it shoul be protect as long as economically possible while the planning for asset relocation, land use and land reservation for future relocation is carried out in parallel with the short term initiative. In general I found this to be well thought out plan that gives guidance to future actions

Do you have any additional comments about the Emu Point to Middleton Beach CHRMAP?	
I think protecting what we have is very important for Albany	don't destroy what we have just enhance this area.
The current rock revetments and the rock walls parallel to the shore also need research into their structural condition. The sand behind these walls (land side) has been washed away leaving large gaps and holes. Please look at these structures and maintain them before they start to collapse. This 1.5 km of rock wall protects the Rose Garden Caravan Park and the Elizabeth Johnson Reserve the channel and Point. It also gives us a lovely walk/cycle area looking out over King George Sound which is enjoyed by thousands. We need to protect, restore and maintain these structures. At the moment I consider sections of these rock walls vulnerable to partial collapse.	I have followed this process for a long time now and can see a lot of misleading information in the implementation plan that will confuse the public in there decision making process. Also noticed that the CAP scores have been manipulated to get the desired outcome that the consultants wanted... RELOCATE ASSETS... SPP 2.6 is not always relevant under these circumstances because its an investment to protect income producing assets and relocating assets will cost the community, City and tourist. Over 90% of tourist that visit the beachfront parks stay there because of its location and direct beach access if the parks are relocated the tourist will not just go to another park in town as they don't offer the same product instead they will go to another region i.e. Busselton or Dunsborough potentially loosing up to 40 to 50 thousand people per year
this is a stupid submission and i think it will be detrimental to the entire area - it is so widely utilised by so many. to change it would set Albany and tourism back 20-30 years	The owners of Middleton Beach Caravan Park have over the last 15 + years have continually planted vegetation, watered and maintained the beach side of the park
	Hard structures do not work
Eventual inundation would seem inevitable, but please do everything possible to preserve it for as long as possible. We love this area.	Start provisioning for future costs now and keep in a trust account. It's already a very expensive location.
I feel that more needs to be done to save the BIG4 caravan parks right in the firing line. They are 10% of the towns accommodation provider and 2 waterfront family holiday destinations for tourists and need to be saved.	Tourist interest in Albany is growing, if the City wishes to maintain that growth close consideration needs to be made to the current assets in the area and the impact it will have on tourism if they no longer exist in their current form.
This area is a beautiful place to visit and is used by locals and tourists. I think changes must be measured and taking into account cost, upgrade of existing facilities and use by the public.	Protect everything. I have no doubt in my mind that it will be extremely regrettable if you do not. This affects all of our futures. This is not something to be taken lightly. Think very, very carefully before you make any firm decisions.
Any relocation of the existing Holiday Parks would be detrimental to to owners of these businesses i would imagine so a buried seawall would be my preferred option.	Middleton Beach is the reason we come to Albany at least twice a year. They must be preserved.
Both Caravan Parks are a major tourism attraction for Western Australians, interstate and overseas visitors. Having these parks with direct beach access should be retained - great for families.	Buy removing the seawalls it will destroy a lot of assets. The 2 caravan parks alone bring a huge amount of money into the albany region. Also both parks employ a large number of staff fulltime. By removing the seawalls it will have a huge economic impact.
Management Plans should always focus on protecting existing well developed Tourist facilities. This Park attracts many international tourists who speak highly about it.	Albany should do everything it can to allow people to stay close to the ocean. There is no imperative for urgent action.
It seems a prudent approach	We enjoyed the Middleton Beach area as is but only staid 3 night.

Do you have any additional comments about the Emu Point to Middleton Beach CHRMAP?	
A map with this survey would have been a good idea with the locations as per the questions.	The development brings in significant tourism to the region and removing valuable land will have a negative impact on our region.
This repair should be priority before its to late to improve the beach linee	It's good that we are looking after the coastal environments.
Area should be maintained as much ad possible as it is . People enjoy the area as is. It needs to be ptotected as much as possible.	please undo what has already been broken. nature takes care of herself. she doesn't need to be 'managed' or 'tamed'
I believe that the COA should repair and renovate the seawall in front of Emu point and also protect Emu Beach with a buried seawall the same as what is being done for the Surf Club and Ellen cove development. I believe it is important not to remove the existing seawall tail, as I believe that will damage the bike trail, beach and existing properties behind that.	Have a competition for high schools in Albany to see who can come up with the best idea. We have the most imaginative minds, so if we come up with something actually good, then you can give the winner the prize money and have a good solution to the problem. We are the minds of tomorrow. We are your future employees. We are the future of Albany.
This stretch of coast is of very high value to the community and planning to protect assets while retaining the resource is to be commended. I think my comments re artificial reef as a management structure have already been said.	Leave the Holiday Parks alone! Albany will notice a MASSIVE decrease in tourist activity if the local council selfishly decides to relocate them. Please use our rate payers funds for activities and service upgrades in the town that truly need to be done!
Make this survey shorter please!	Re seal the bike path, trim some trees and maybe add better illumination in some parts
nah all good cheers	No thanks
:)	nope
The State government cannot walk away from coastal hazard management by getting local governments to do these hazard projects. Also, greater leadership needs to be shown by the Australian government as coastal erosion is going to affect so many parts of Australia.	

BIG4 HOLIDAY PARKS

Briefing Note

on the Implications of the CHRMAP Implementation Plan for Big4 Holiday Parks, the natural and built assets from Middleton Beach Foreshore to Emu Point and their associated economic benefits

July 2019

Prepared by:

keston technologies

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Executive Summary

The recently-completed Coastal Hazard Risk Management and Adaptation Plan (CHRMAP) aims to provide strategic guidance on planning and management for key coastal assets from Emu Point to Middleton Beach. The draft CHRMAP Implementation Plan leads readers to favourably consider options that centre on the managed retreat of existing assets and the acceptance of the loss of foreshore from Middleton Beach to Emu Point over the next 100 years as a result of storm surges and erosion.

The Shuttleworth family own and operate the Big4 Middleton Beach Holiday Park and the Big4 Emu Beach Holiday Park under the Big4 Holiday Parks franchise, both of which are directly affected by the CHRMAP recommendations. However, the CHRMAP Implementation Plan fails to consider the economic value of the Big4 assets and the wider tourism impact that would result from their relocation or loss. As a result, Big4 has commissioned this briefing note in order to challenge the direction that the Implementation Plan is taking and to undertake broader economic analyses that include the benefits of retaining existing beach assets. These assets, both natural and built, are iconic to the region and attract and facilitate visitation and tourism activity. The Shuttleworth's argue that they should be protected as critical tourism drivers and that the costs of protection are clearly justified by the value of the benefits to the city and the region.

Critique of the CHRMAP Implementation Plan

The CHRMAP Implementation Plan has been reviewed and several concerns have been identified:

- During the development of the plan, consultations were only undertaken with local residents and broadly exclude consideration of visitors to Albany and the region.
- The plan does not consider the considerable investment already committed to significant developments such as the Middleton Beach Foreshore Enhancement project and Artificial Surf Reef project. Acceptance of the loss of coastline in the Emu Point to Middleton Beach area will have a substantial negative impact on the projected economic and social benefits of these projects.
- The rationale used in the Implementation plan lacks sufficient justification and takes a mainly qualitative approach to the assessments of options, despite having conducted some economic analyses in the wider CHRMAP process.
- The Implementation Plan estimates the costs of preferred or most preferred options. These costs do not, however, align well with the costs listed or used in analyses in the Final Draft Adaption Plan and Master Appendices.
- Although an option for relocation is considered for the Middleton Beach Holiday Park (through taking over a portion of the Albany Golf Course, which is highly unlikely to be considered favourably by the community and is unknown to be possible at all given the golf courses heritage status), no option for retreat is provided for the Emu Beach Holiday Park and no available land of the required size in the area is available to do so.
- There are several statements and considerations throughout the CHRMAP documents which have influenced the final recommendations and scoring outcomes, but which are poorly justified.
- The margins between protection and non-protection options are too small to provide a firm basis for the final recommendations without further consideration.

The initial analysis of options in the CHRMAP Implementation Plan was based on a community workshop and a multi-criteria analysis (MCA). Community preference in the case of the Middleton Beach Holiday Park (outside of the avoidance of future development) were for a rock or sandbag seawall. For the Emu Beach Holiday Park, the community-preferred options were: continued nearshore groynes and seawall revetments. In this case, the relocation of assets was scored the worst. (No consideration was taken of the options for buried seawalls, such as is being implemented (for part of the foreshore) in the Middleton Beach Foreshore Enhancement Project.)

Furthermore, a (partial) cost-benefit analysis (CBA) was undertaken early in the CHRMAP process to assess the benefits and costs of each option. Although it is unclear how benefit values were calculated (and it appears unlikely that the value of tourism and the loss of critical tourism infrastructure were factored in), a seawall was found to be the most viable option for Middleton Beach and groynes for Emu Beach.

Despite these community and CBA-based preferences, the CHRMAP team undertook a 'Technical MCA' process. With little justification, many of the community preferences were reversed, with the relocation of assets as being preferred in both cases. In short, options which have become "preferred" in the final recommendations received far worse BCRs and NPVs than these options and the basis of the final CHRMAP recommendations appear to be based solely on the technical qualitative scoring system and do not align with the community preferences.

The economic value of the Big4 holiday parks

The Big4 holiday parks have been identified as among the most important strategic tourist sites in the region:

- Together, the Big4 sites provide around a quarter of Albany's total estimated tourist accommodation beds. In total, the holiday parks record 141,149 guest nights per annum and are anchor facilities to neighbouring businesses and the wider tourism precincts at both sites.
- These guests are estimated to spend approximately $27.1 million in the region each year, with a larger overall economic impact through the ripple effect.
- Feedback consistently identifies location (to use or be close to the beach) as determining where to stay.
- The combined marketing spends of the holiday parks are approximately $125,000 per annum.

The Shuttleworth's have plans for expansion developments at both sites over the next five years, with the required capital investment reserved and concept plans developed. However, progression of these investments has been halted pending clarification on the recommendations in the Implementation Plan. Continued uncertainty will result in a year on year loss of new tourism potential, the flow-on effects to neighbouring businesses (e.g. restaurants, bars and cafes) and the concomitant economic impacts for the city and region. Furthermore, should the CHRMAP recommendations be adopted, the Shuttleworth's will be forced to re-evaluate their operations. Ultimately, this is likely to result in the cessation of operations and relocation to an alternative stretch of coastline outside of the region that offers greater assurance of long-term ongoing viability and associated financial returns. The loss of one leaseholder would likely encourage others to leave the precincts due to the diminution of long-term business prospects and this could have considerable financial implications to the City of Albany, given the approximate $1m in lease revenue per annum in the area.

Cost-benefit analyses

The purpose of this briefing note is to provide more detailed and transparent cost-benefit analyses rather than to disprove the calculations previously conducted in the CHRMAP process. The analyses include the value of asset protection from the retention of critical tourism and accommodation infrastructure, as well as the implications of losing these assets completely (as would be likely if the certainty of asset protection cannot be provided). Consequently, various new models have been developed, including:

- Managed retreat for Big4 Middleton Beach Holiday Park;
- Unprotected assets at Big4 Middleton Beach;
- A rock seawall at Big4 Middleton Beach;
- A GSC buried seawall at Big4 Middleton Beach;
- A managed retreat for Big4 Emu Beach Holiday Park;
- Continued groyne trials for Emu Beach Foreshore;
- Seawall/revetments for Emu Beach Foreshore;
- A buried seawall for Emu Beach Holiday Park; and
- Loss of Big4 assets from protection & cost uncertainties.

The results of the cost-benefit analyses clearly demonstrate that the benefits of asset protection are greater in all cases than the benefits of loss of asset or retreat (and loss of beach amenity). Protection of assets produce positive NPVs (+14m to +$22m) while managed retreats produce negative NPVs (−$16m to −$47m) and loss of assets a highly negative NPV (−$98m). For Middleton Beach and Emu Beach, buried seawalls provide the highest NPV (+$16.8m and +$21.9m respectively) and are therefore likely to be the more desirable options, even despite higher cost compared with a visible seawall in the case of Middleton Beach (+$14m).

Additional Consultation and Study

M P Rogers & Associates, coastal engineering consultants based in Perth, were also engaged by the Shuttleworth's to provide advice on the CHRMAP outcomes and an opinion of probable cost for buried seawalls at Middleton Beach and Emu Beach to conduct a more robust analysis of options than completed during the CHRMAP process. As detailed in the supporting letter, M P Rogers also noted several critical discrepancies in the Implementation Plan and its addenda.

Conclusions

The analyses undertaken in this briefing note provide clear evidence that the final CHRMAP recommendations for managed retreat should not be adopted and that the protection of all Middleton and Emu Beach assets is far preferable to the acceptance of loss of beach amenity. Rejecting the current recommendations in the draft Implementation Plan for managed retreat, or any other measure that does not directly protect the natural and built assets within the area, will ensure that Big4 Holiday Parks, other impacted operators, and the City of Albany can work together to protect critical tourism assets along this vital part of the coastline. This will then facilitate the ongoing development of these tourism assets to retain existing and attract new visitors with the associated economic returns for Albany and the region.

1 Introduction/Context

1.1 CHRMAP Background

The City of Albany has engaged various economic and environmental consultants to develop a Coastal Hazard Risk Management and Adaptation Plan (CHRMAP) that will provide strategic guidance on coordinated, integrated and sustainable planning and management for key coastal assets in the Emu Point to Middleton Beach area. The draft Emu Point to Middleton Beach Coastal Hazard Risk Management Adaptation Plan - Implementation Plan (hereafter referred to as the Implementation Plan) was released in June 2019, with the submission distributed for public comment in late-June 2019. The CHRMAP has been developed based on the Western Australian Planning Commission (WAPC) CHRMAP guideline document (WAPC, 2014), which provides a risk management approach to dealing with the forecasted impacts from coastal hazards in the future. This approach aims to enable the community of Albany to proactively plan for change and manage its impacts over the long-term.

The Implementation Plan is based on technical background research and investigation, community and stakeholder consultations and existing strategic planning. It is intended to recognise the need for culturally and economically acceptable outcomes. It follows and accompanies the March 2019 release of the wider Emu Point to Middleton Beach Coastal Hazard Risk Management Adaptation Plan (hereafter referred to as the Adaptation Plan). Further detail of the background research and processes is also available in the Emu Point to Middleton Beach Coastal Hazard Risk Management Adaptation Plan Master Appendices (hereafter referred to as the Master Appendices).

The assessment of adaptation options was undertaken with broad stakeholder engagement, using tools such as multi-criteria analysis to illustrate the relative risks, capital and maintenance costs, environmental impacts, social and amenity impacts, reversibility and effectiveness. The implementation strategy also recommends key strategic planning, statutory planning, and policy or governance interventions that are relevant to all assets, including those at risk over the longer-term.

1.2 CHRMAP Implications

The final recommendations and indicative preferred options outlined in the Implementation Plan centre on the managed retreat of existing assets and the acceptance of the loss of foreshore from Middleton Beach to Emu Point over the next 100 years as a result of storm surges and erosion. It is forecast that low risk and impact events will begin to damage beach amenity by 2030, with high risk and impact events impacting by 2050. All sites are currently considered vulnerable.

The Shuttleworth family own and operate the Big4 Middleton Beach Holiday Park and the Big4 Emu Beach Holiday Park under franchise of Big4 Holiday Parks (hereafter Big4), both of which are directly affected by Implementation Plan recommendations. Together, the Big4 sites provide almost a quarter (325 not including additional caravan/camping amenity) of Albany's 1,370 total estimated tourist accommodation beds (ABS, 8635.0 - Tourist Accommodation, Australia, 2015-16). In total, the holiday parks record 141,149 guest nights per annum and are anchor facilities to neighbouring businesses and the wider tourism precincts at both sites. The Shuttleworth's have plans for expansion developments at both sites over the next five years, with the required capital investment reserved and concept plans already developed. However, progression of these investments has been halted pending clarification on the recommendations in the Implementation Plan. A level of certainty as to the future of these assets is required before Big4 can proceed with these developments; continued uncertainty will result in a year on year loss of new tourism potential, the flow-on effects to neighbouring businesses (e.g. restaurants, bars and cafes) and the concomitant economic impacts for the city and region.

The Implementation Plan does not consider the economic value of the Big4 assets or the wider tourism impact of their relocation or loss. During the development of the Implementation Plan, consultations were only undertaken with local residents and excluded consideration of visitors to Albany and the region. Furthermore, the Implementation Plan does not consider the considerable investment already committed to significant

developments such as the Middleton Beach Foreshore Enhancement project and Artificial Surf Reef project. Acceptance of the loss of the coastline in the Emu Point to Middleton Beach area will have a substantial negative impact on the projected economic and social benefits of these projects over time.

Through the Middleton Beach Foreshore Enhancement project, plans are already underway to protect part of the Middleton Beach foreshore with a buried seawall, with funding secured from state and federal government sources. This contrasts with the Implementation Plan's assertion that attracting such funding for seawall projects would be difficult. Further funding applications could in fact be even more attractive to government in being able to leverage private investment from Big4, or other operators, for asset protection and enhancement.

This briefing note challenges the recommendations made in the Implementation Plan to focus on the managed retreat of existing assets and the acceptance of the loss of foreshore from Middleton Beach to Emu Point. The analysis in this report demonstrates the benefits of retaining existing beach assets in the area (inclusive of, and focusing on, the economic value of the Big4 accommodation sites). In contrast, the rationale used in the Implementation plan lacks sufficient justification and takes a mainly qualitative approach to the assessments of options, despite having conducted some economic analyses in the wider CHRMAP process. Beach assets along this stretch of coastline, both natural and built, are iconic to the region and attract and facilitate visitation and tourism activity. The Shuttleworth's argue that these assets should be protected as critical tourism drivers, and that the costs of protection are plainly justified by the value of the benefits of those assets to the city and the region.

The recommendations in the Implementation Plan appear to shift costs from broader joint federal, state and local public sector and private investment to solely private responsibility. Every indication is that the cost of managed retreat (relocation) of Big4 assets, as suggested in the plan, would need to be borne by the Shuttleworth's. Although an option for relocation is considered in the Implementation Plan for the Middleton Beach Holiday Park (through taking over a portion of the Albany Golf Course, which is highly unlikely to be considered favourably by the community and uncertain if achievable given the Golf Course's heritage status), no option for retreat is provided for the Emu Beach Holiday Park and no available land of the required size in the area is available to do so. It is noted that the final Implementation Plan did again include the option for a seawall (rock) at Big4 Middleton Beach, where the originally released draft omitted this option completely. However, the general process and recommendations still appear to steer readers to conclude managed retreat is preferred for all cases along the study area coastline.

Consequently, should these recommendations be adopted, or otherwise certainty provided that they would not be, Big4 will be forced to re-evaluate its investment options. This would ultimately result in the cessation of operations and relocation to an alternative stretch of coastline outside of the Great Southern region that offers greater assurance of long-term ongoing viability and associated financial returns. Furthermore, the loss of one leaseholder would likely encourage others to leave the precincts due to the diminution of long-term business prospects. This could have considerable financial implications to the City of Albany, given the approximate $1m in lease revenue per annum in the area. The acceptance of coastal land asset decline may also impact City of Albany's landholder insurance premiums or make them uninsurable.

Protection developments are not expected to be required for some time, however, with the lower risk and impact events not expected to 2030 and then increasing gradually to 2050. This should allow considerable time for the planning and implementation of coastal asset protection strategies such as seawall developments. This is confirmed by M P Rogers & Associates in its supporting letter on the CHRMAP process and recommendations; "*…it is anticipated that construction of the seawall would be completed only when a trigger is reached. Based on the results of the Coastal Hazard Mapping, it is unlikely that this trigger would be reached until at least around 2050. Given this timing, it may be possible to establish a funding mechanism in the interim to provide for this construction, when required.*" Providing certainty that Middleton Beach to Emu Point coastal assets will be protected into the future will in the short-term reinitiate Big4's development plans and, along with other planned City of Albany coastline developments, encourage additional wider investment into the area.

2 CHRMAP Indications and Issues

Although the CHRMAP Implementation Plan does not make specific recommendations on which option should be accepted, it does direct readers to consider managed retreat of assets as the most desirable option in most cases. This includes acceptance of gradual decline in beach amenity due to erosion and storm surges, as well as suggesting a preference for natural measures over built protection infrastructure.

2.1 The Community Advisory Panel Process

As detailed in the Adaptation Plan, the principal directions for the consideration of recommendations and options were based on a Community Advisory Panel (CAP) workshop. The CAP was convened to develop the scoring and measurement values for a multi-criteria analysis (MCA) to assess the positive and negative aspects of the shortlisted adaptation options for each asset with high or extreme vulnerability at 2030. The MCA framework was developed with this group, and in consultation with the City of Albany, and incorporates the key community and stakeholder values/priorities identified from stakeholder engagement. The seven broad criteria considered were:

- **Capital cost –** intended to identify the City's financial capability to implement the adaptation option. In particular, whether the City has the capacity to undertake the works independently or if it will require external funding/support (e.g. by state or federal government).
- **Maintenance costs –** intended to broadly identify the financial liability of maintaining the adaptation option. Maintenance considers the full life of the option.
- **Environmental impact –** considers impacts on natural assets and the potential for subsequent environmental impact, (e.g. generation of down-drift erosion from the construction of a seawall). This takes into consideration the work undertaken by RHDHV (2017) to identify the underlying coastal processes within the area.
- **Social/amenity impact –** community – intended to take into consideration the community values identified by the stakeholder engagement activities – the valued assets survey and targeted stakeholder workshops.
- **Social/amenity impact –** property – intended to take into consideration the community values associated with the possible impact, loss or damage to private property or privately-operated leasehold land.
- **Reversibility –** intended to identify the flexibility of an action to allow a broad range of future options in the context of the hierarchy of controls identified in SPP 2.6.
- **Effectiveness –** intended to identify the likelihood of the option in reducing the impact of coastal hazards.

CAP participants were provided an opportunity to discuss the measurement values in small groups before summary feedback was collated and an agreed measurement value set for each criterion. In some cases, the group did not fully achieve consensus. However, the final scoring criteria were determined by the CHRMAP consultants with the intention to provide greater insight into community values and a logical/measurable basis for assessing each option.

The final output of this part of the CAP was a measurement matrix for each of the criteria. The matrix defines a numerical value between 1 and 5 for different outcomes associated with each option. A score of '1' would be an option which results in a low negative impact (or a positive impact) against that criterion, whilst a score of '5' would be an option which results in a high negative impact against that criterion. After developing the MCA criteria measurement values, the CAP produced a final score for each of the adaptation options for at-risk assets. The results for Middleton Beach Holiday Park and Emu Beach Holiday Park are summarised as follows:

Table 1. CAP scoring - Middleton Beach Holiday Park

Criteria	Avoid Further Development	Leave Assets Unprotected	Relocate Assets	Seawall (Rock)	Seawall (Sandbags)
Maintenance Cost	1	3	3	1	2
Environmental Impact	2.3	3.6	2.3	3.4	3.5
Social Impact - Residential Not Protected	2.9	3.7	3.1	2.1	2.3
Social Impact - Residential Protected Already					
Social Impact - Business Property					

Social Impact (Community)	2.4	3.7	3.1	2.9	3.1
Reversibility	2.7	3.4	3.4	4.1	3.3
Effectiveness	2.9	3.5	2.2	2.8	2.8
Total Combined	**14.2**	**20.9**	**17.1**	**16.3**	**17**
Scores given in report	14.2	20.8	17.3	16.3	17.1
Difference	*0*	*-0.1*	*0.2*	*0*	*0.1*

Table 2. CAP scoring - Emu Beach Holiday Park

Criteria	Relocate Assets	Sand Nourishment	Nearshore breakwaters	Groynes	Seawall Revetments
Maintenance Cost	4	5	3	2	2
Environmental Impact	3.4	2.8	3	3.2	3.7
Social Impact - Residential Not Protected	4.2	3.4	2.8	2.8	2.8
Social Impact - Residential Protected Already					
Social Impact - Business Property					
Social Impact (Community)	3.3	3.2	3.1	3.1	3.2
Reversibility	3.1	1.9	3.4	3.7	3.4
Effectiveness	3.6	4	2.9	3.1	3.1
Total Combined	**21.6**	**20.3**	**18.2**	**17.9**	**18.2**
Scores given in report	23.9	21.3	22.1	20.9	21.3
Difference	*2.3*	*1*	*3.9*	*3*	*3.1*

As can be seen in these tables, community preference in the case of the Middleton Beach Holiday Park is considered to the avoidance of future development. Given that this is not an option (for long-term and investment purposes and protection of accommodation infrastructure), the next best options were for a rock or sandbag seawall. No consideration was taken of the option for a buried seawall, such as is being implemented (for part of the foreshore) in the Middleton Beach Foreshore Enhancement Project. However, even visible seawall structures were rated by the community as preferable to relocation or leaving assets unprotected.

For the Emu Beach Holiday Park, the community-preferred options were: continued sandbag/groyne trials, nearshore breakwaters, and seawall revetments. In this case, the relocation of assets was scored the worst.

It is also noted that the total combined scores in the Adaptation Plan do not match the sum of individual criteria. Small margins of error (such as for the Middleton Beach Holiday Park) may be attributable to rounding; however, larger margins for the Emu Beach Holiday Park are unjustified given that some are over 3 points (18%) out. Even small tweaks to these totals would change scores in the technical weighting model (see below).

2.2 Technical MCA Process

Following the CAP analysis, the consultant team undertook a testing process comparing the CAP scoring with the criteria values provided by the CAP. The team deemed it clear from this analysis that, when undertaking the scoring process, individual preferences often overrode the agreed scoring criteria. This was thought to indicate strongly held values associated with the natural coastline experience, skewing most adaptation preferences away from any man-made structures.

After reviewing the variation across scores, which was noted to regularly see individuals score against their own criteria measurement values, the project team completed a second MCA using the CAP criteria and measurement values. The main observation of the technical analysis of the options was that effectiveness and reversibility were often scored incorrectly, compared to the CAP criteria and measurement values.

Outcomes for the technical MCA process are summarised as follows:

Table 3. Technical MCA scoring - Middleton Beach Holiday Park

Criteria	Avoid Further Development	Leave Assets Unprotected	Relocate Assets	Seawall (Rock)	Seawall (Sandbags)
Maintenance Cost	1	3	3	1	2
Environmental Impact	2	4	2	4	4
Social Impact - Residential Not Protected	3	3	4	1	1
Social Impact - Residential Protected Already					
Social Impact - Business Property					
Social Impact (Community)	1	3	1	4	4
Reversibility	1	1	1	4	3
Effectiveness	3	3	2	1	1
Total Combined	**11**	**17**	**13**	**15**	**15**

Table 4. Technical MCA scoring - Emu Beach Holiday Park

Criteria	Relocate Assets	Sand Nourishment	Nearshore breakwaters	Groynes	Seawall Revetments
Maintenance Cost	4	5	3	3	2
Environmental Impact	2	2	4	4	4
Social Impact - Residential Not Protected	4	2	1	1	1
Social Impact - Residential Protected Already					
Social Impact - Business Property					
Social Impact (Community)	1	2	3	3	2
Reversibility	1	1	4	4	4
Effectiveness	1	4	1	4	1
Total Combined	**13**	**16**	**16**	**19**	**14**

As can be seen, the relocation of assets is now indicated as being preferred in both cases (disregarding the avoidance of further development option for Middleton Beach). However, beyond the opening paragraph in this section of the Adaptation Plan, little additional justification is provided to support the change in priorities or the methodology behind it (i.e. the weighting/values used and why). This lack of transparency is indicative of bias. The final scores also appear to have been rounded, as no weighting process on the CAP scores could naturally result in such round scores for all fields. It is therefore difficult to appreciate tangible value as rounding may create larger outcome margins, particularly for scores identified as equal in the documented results.

Furthermore, MP Rogers & Associates determined in their supporting letter that the technical MCA process has significantly adjusted community social impact scoring (see Table 1 and 4 in the supporting document). M P Rogers assert that; "*Of all the criteria that were assessed, it seems intuitive that the rating of the social impacts should be the one item that would be carried through into the overall scoring for the options. As it stands, it is not apparent what function the Community Advisory Panel actually played in the assessment of the options, as across all management units the scores by the Project Team were used to choose the preferred adaptation options, with there being little correlation between the criteria scores provided by the Community Advisory Panel and the Project Team.*"

On reversibility, M P Rogers also infer the inaccuracy of the suggestion that seawalls are irreversible; "*From an engineering perspective, it is important to realise that the construction of a seawall is not irreversible. Structures can always be removed in the future and the site remediated. There would obviously be demolition costs associated with any such decision, but these costs would ideally be considered as part of a whole of life cost benefit analysis if it were contemplated that a structure be removed in the future.*"

Changes in the resulting scores associated with reversibility and community impact significantly impact the total combine score outcomes.

2.3 Previous Cost-Benefit Analysis

Although not clearly considered in the process and final recommendations, a cost-benefit analysis (CBA) was completed as part of the early CHRMAP process to assess the benefits and costs of each adaptation option. The CBA was conducted to compare option benefits against whole life costs, both in terms of present values; however, the available information is insufficient to assess how benefit values were calculated, and it is not clear that the value of tourism or the resulting loss of critical tourism and accommodation infrastructure were factored in. Regardless, it is assumed that all options are on equal footing. Although no options were identified as having a positive economic return, a higher NPV (net present value) and BCR (benefit cost ratio) indicates a preferred option. The following table breaks down key results from the analysis for Middleton Beach Holiday Park and wider Emu Beach Foreshore (which includes Emu Beach Holiday Park).

Table 5. (Partial) cost-benefit analysis included in the early CHRMAP process

Option	Total Costs (millions)	Total Benefits (millions)	BCR	NPV
Middleton Beach Holiday Park				
Leave assets unprotected	1.1	0.2	0.2	-0.9
Relocate assets	1.2	0.3	0.2	-0.9
Seawall – rock	0.4	0.2	0.5	-0.2
Emu Beach Foreshores				
Relocate assets	8.5	0.7	0.1	-7.8
Maintain and enhance nearshore system	2.9	0.4	0.2	-2.5
Nearshore breakwaters	3.2	0.7	0.2	-2.5
Groynes	1.1	0.5	0.5	-0.5
Seawall	2.5	0.5	0.2	-2.0

Based on this analysis, a seawall would be the most viable for Middleton Beach and groynes for Emu Beach. Options which have become "preferred" in the final recommendations received far worse BCRs and NPVs than these options.

The basis of the final CHRMAP recommendations also appear to be founded solely on the technical qualitative scoring system, and do not appear to consider the cost-benefit analysis that was conducted, which is now only visible within Appendix H (page 152) of the Master Appendices document.

In this briefing note, more detailed and transparent cost-benefit analyses have been undertaken based on the available information. This provides more evidence that the final CHRMAP recommendations should not be adopted and that the protection of all Middleton and Emu Beach assets is far preferable to managed retreat and acceptance of loss of beach amenity (see Section 5).

2.4 Option Cost Discrepancies

The Implementation Plan itself only estimates the costs of preferred or most preferred options. These costs do not, however, align well with the costs listed or used in analyses in the Final Draft Adaption Plan and Master Appendices. For example, the Implementation Plan estimates the approximate cost of managed retreat for Middleton Beach Holiday Park at $6-8 million. This contrasts with the Master Appendices (Appendix D – Scoring Spreadsheet (including cost)), where capital costs for this option are stated as $5.8 million and maintenance costs (assuming over a 100 year study period) are $11.6 million. Furthermore, both values are contradicted by Appendix I – Suite of Preferred Options, which suggest the $6-8 million is spread throughout the 100 year period. Similarly, the seawall for Middleton Beach Holiday Park is indicated as costing $5-6 million over the 100 year period in Appendix I (with $1-2 million capital costs and $3-4 million maintenance), whereas in Appendix D it is listed as $1.7 million in capital and $2.46 million in maintenance).

In the interests of preparing a more accurate analysis of options' cost and benefit, the more detailed costs in Appendix D of the Master Appendices (which were also those provided for the community to make decisions on criteria scores) have been used for the cost-benefit analysis in this briefing note (Section 5).

2.5 Other Considerations

There are a number of other statements and considerations throughout all the CHRMAP documents which have influenced the final recommendations and scoring outcomes, but which have been poorly justified. For example, there are brief statements of concern that a seawall at Middleton Beach Holiday Park would either generate down-drift erosion or wash out the beach directly in front of the seawall (e.g. Appendix F of the Master Appendices on page 41 and multi-criteria analysis descriptions on page 131 of the Adaptation Plan). There is no further justification as to how or why such effects would be likely, however. In contrast, M P Rogers & Associates were engaged by the Shuttleworth's to provide additional expert advice on the CHRMAP process and indicative cost assessments for buried seawall options that were omitted from the CHRMAP process. As stated by M P Rogers; "*Potential for Accelerated Erosion on Shoreline South of the Seawall It is broadly accepted that sediment is typically transported along Middleton Beach towards Ellen Cove. As a result, a structure that blocks the sediment movement along the beach could potentially cause an adverse shoreline response on the downdrift side of the structure. Nevertheless, seawalls are not overly effective at preventing sediment transport along the coastline. Seawalls only really contribute to trapping of sediment when they protrude some distance into the water to a depth which is sufficient to block most of the transport within the active zone. It is not anticipated that this would occur within a 50 year planning horizon.*"

Furthermore, the Royal Haskoning DHV Emu Point to Middleton Beach Coastal Adaptation and Protection Strategy suggests the opposite effects in the same location (Section 5.2.1). It demonstrates that there has been a significant increase in dune vegetation and shoreline stability over the last 34 years with almost two and a half times as much dune system than was present before the storm of 1984 (a one in 100 year ARI event) which caused considerable erosion, including the loss of beach and foreshore. The report clearly demonstrates that there is an onshore sediment supply which is nourishing the Ellen cove Middleton beach area (MU1 and MU2 CHRMAP) and has been doing so for many years. The dune system directly in front of BIG4 Middleton Beach Holiday Park is currently in a very stable position and would more than likely improve with the current accretion in the years to come in the absence of a storm similar to that in 1984. Following such an event, natural accretion cycles would resume, and the beach would be restored, with or without the inclusion of a seawall which would only serve to protect the assets behind it during such an event. Further evidence and detail of this process is provided by M P Rogers in statements on beach regeneration after storm event and Figure 1 in the supporting letter.

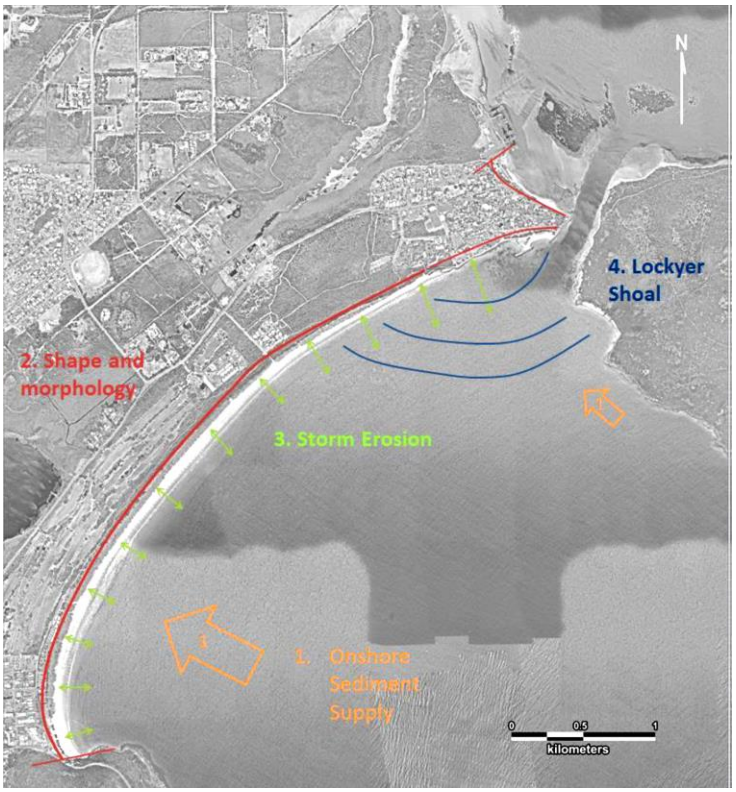

Figure 1. Conceptual coastal processes model (overview) for this study area. (from section 5.2.1 Emu Point to Middleton Beach Coastal Adaptation and Protection Strategy M&APA1558R001D001)

As previously stated, despite being preceded by decisions to develop a buried seawall at Middleton Beach Foreshore, the CHRMAP plans do not actually consider the potential of a buried seawall. This option has been preferred in numerous other developments (e.g. the Middleton Beach Foreshore Enhancement project, Seabird near Geraldton and in front of the new surf club at City Beach in Perth). As a result, the seawall options provided in the CHRMAP suggest a negative impact on the environment and the natural vista and the restriction of public access (with no additional evidence or justification provided). The provision of only raised seawall options to the community for consultation and scoring may well have impacted the decisions and final outcomes. Providing an option for a buried seawall may have changed the outcome, particularly given that even the raised seawall option was amongst the most preferred options for the community.

For Emu Beach Holiday Park, the Implementation Plan indicates managed retreat as a preferred option stating that "*there are numerous options within the existing site within which to utilise the available site whilst also improving the coastline and coastal experience of the park*". However, no justification or further detail is provided. The only cleared spaces available for future development are those that have recently been cleared of permanent dwellings by Big4, but which are at high risk of future erosion with the business as usual scenarios. As can be seen in the figures below, no option for retreat is identified within the existing site. No other option has been defined, nor does one appear to be available, anywhere else within the Emu Point area; i.e. no option exists for managed retreat or location. Furthermore, the original Appendices, Adaptation Plan and Draft Implementation Plan all suggested the removal of the tail of the existing revetment to accelerate erosion within the park boundaries (Figure 2), despite clear community preferences for enhancing revetments in the area. M P Rogers confirm the negative impact of removing the "Tail" of the existing rock revetment. The final Implementation Plan showed the first contrasting image that removed this factor. The state of erosion demonstrated in the updated image (Figure 3) now draws a line perfectly cutting around the Emu Beach Holiday Park boundary, though it is not entirely clear what level of hydrological study was conducted to arrive at this conclusion, if any.

Figure 2. Previous area identified at risk of erosion

Figure 3. Updated area identified as a risk of erosion

3 Direct Value of Big4 Holiday Parks

Big4 Holiday Park's economic contributions to the City of Albany and Great Southern region makes BIG4 Middleton Beach and BIG4 Emu Beach significant income-producing, tourism-facilitating economic development assets for the community, local businesses and City of Albany. The following list outlines the principal benefits from these assets, and have been used to inform the cost-benefit analyses summarised in Section 5 of this briefing note:

1. 30% of all visitors to Albany per annum not staying with friends or relatives (e.g. staying in caravan parks, hotels and motels) choose to stay in caravan parks, according to reports from Tourism Research Australia (TRA).
2. BIG4 Middleton Beach Holiday Park and BIG4 Emu Beach Holiday Park account for around 15% of the total market of visitors in Albany not staying with friends or relatives (TRA report).
3. Combined, BIG4 Middleton Beach Holiday Park and BIG4 Emu Beach Holiday Park make payments to the City of Albany (lease payments/rates/other licence and permit fees) of approximately $195,000 per annum.

4. Annual check-ins at BIG4 Middleton Beach Holiday Park amount to 21,692, which equates to 62,691 guest nights per annum. (Average length of stay is 2.89).
5. Annual check-ins at BIG4 Emu Beach Holiday Park amount to 21,378, which equates to 78,458 guest nights per annum. (Average length of stay is 3.67).
6. Combined, annual check-ins for both properties are 43,070, which equates to a total of 141,149 guest nights per annum (on average equates to approximately 387 people on site each day of the year).
7. Each guest contributes approximately $1.45 per night to the City of Albany through lease and rates payments. (Calculated by including combined payments to the city $195,000, divided by guest nights of 134,372.)
8. According to Local Government Area Profiles, 2017, Albany report produced by TRA, the average spend per night for Domestic Overnight Visitors is $192. Therefore, 43,070 guests (141,149 guest nights) would spend approximately $27.1 million in the region each year. (Reference: Local Government Area Profiles, 2017, Albany (C) Western Australia, Tourism Research Australia.)
9. According to the "Source of Business Report" which includes direct bookings only, for BIG4 Middleton Beach Holiday Park, 18.24% or 3,904 of the 21,692 new arrivals stated that they stayed at the property because of its location. Online reviews, social media comments as well as verbal feedback consistently identify location (desire to use or be close to the beach area) as a determining factor for choosing where to stay. Note: these guests have not been included in the recent City of Albany CHRMAP Survey which targeted local residents only.
10. Combined wages and superannuation for BIG4 Middleton Beach Holiday Park and BIG4 Emu Beach Holiday Park for year ending 2017 amount to $1.597 million.
11. The combined marketing spends for BIG4 Middleton Beach Holiday Park and BIG4 Emu Beach Holiday Park are approximately $125,000 per annum. This includes direct advertising throughout Australia and into the target market sector. The biggest segment of the business is the family market. This market is looking for a family experience in a safe and natural environment and expect well-maintained and modern facilities. This means that the Albany region has to be marketed equally as much as the property in order to attract guests that possibly would holiday at a different Australian destination or in many cases overseas. In addition, marketing conducted by BIG4 Holiday Parks of Australia delivers an estimated $1.20 worth of exposure for every dollar spent on franchise fees. This organisation markets both nationally and internationally to target markets to bring guests to the properties and the region. In promoting each individual property, they promote the region as a destination.
12. Accommodation Offering: BIG4 Middleton Beach Holiday Park and BIG4 Emu Beach Holiday Park have a total of 78 accommodation units for tourists and approximately 240 sites for caravan and camping as follows:
    - 21 x 2 and 3 bedroom fully self-contained holiday homes and chalets (rated 4.5 stars),
    - 49 x 2 and 1 bedroom fully self-contained chalets and apartments rated (4 stars),
    - 8 x 1 bed motel rooms, semi-contained (rated 3.5 stars),
    - Total number of beds: 325,
    - All star ratings have been conducted by Star Ratings and administered by the Tourism Council WA.

Furthermore, in 2008 the state government requested some councils around WA to produce a Tourism Accommodation Planning Strategy. This strategy was mainly directed at caravan parks because many freehold caravan parks, especially on the coast, were being sold off and the tourism task force had concerns that there would not be enough parks to meet the tourism demands of the future. In this strategy, **BIG4 Middleton Beach Holiday Park was identified as one of the most important strategic tourist sites in Western Australia**. "*With increasing pressure being placed on freehold land parcels located on beachfront within the remainder of the state to be developed for residential purposes or for apartments, this site provides one of the few remaining high quality caravan park sites in the state with direct beach access*" (Reference: Second Draft, Tourism Accommodation Planning Strategy – Meeting Tourism Demands to 2020 January 2010 page 59).

It should be noted that the above factors were recorded in 2017/18 and 2018/19 financial years. Since then, lease costs have increased to approximately $220,000 and park visitation has also increased. As this analysis already demonstrates clear benefit for the protection of assets using the more conservative 2017/18 and 2018/19 figures, it is not necessary to adjust the models; which would demonstrate an even greater NPV and BCR for protection.

4 Direct Financial Implications of Loss

Big4 has capital reserved and has concept plans developed for large expansions of the accommodation assets at both Middleton Beach and Emu Beach. However, both sites have been identified in the Implementation Plan recommendations as more suitable for relocation than protection (despite recent inclusion of the rock seawall option for Middleton Beach). As a result, all expansion plans have now been halted pending the outcomes of final CHRMAP Implementation Plan recommendations and adoption by the City of Albany Council.

However, as outlined in the sections above, the Implementation Plan and supplementary documentation:

- Do not provide sufficient justification for the recommendations,
- Do not provide viable options that ensure long-term business viability and return on investment, and
- The margins between protection and non-protection options are too small to provide a firm basis for the final recommendations without further consideration.

Certainty that Big4 assets will be protected in the future from erosion and storm surge risks is required to resume the expansion plans for the holiday parks. Working with the City of Albany, the Shuttleworth's would then begin to reserve capital for future protection measures to supplement investment by other affected businesses and the City of Albany in the required capital and ongoing maintenance costs. Without certainty, however, the proposed developments will not commence and the Shuttleworth's will revaluate their position and best options for a return on investment. At this stage, acceptance of the loss of beach amenity and managed retreat of Big4 assets is not deemed a viable business opportunity, and the capital earmarked for future developments would instead likely be invested in relocation outside of the Great Southern region (i.e. to locations more financially viable and sustainable over the long-term). This would result in the complete loss of Big4 assets and beds within the City of Albany (23.7% of all available beds - ABS, 8635.0 - Tourist Accommodation, Australia, 2015-16) together with the considerable caravan and tenting capacity. Page 40 of the Master Appendices (Appendix F – Suite of Adaptation Options) also notes that *"the cost of relocation may be unviable and result in loss of Caravan Park for the City"*.

As a result of this, lease, rate and other associated income would be lost to the City of Albany, totalling approximately $195,000 per annum ($87,500 for Middleton Beach and $107,500 for Emu Beach) in the 2018/19 financial year (recently increasing to $220,000). In addition, Albany and the region would also lose considerable marketing value add (approximately $125,000 per annum). Over the next decade, in today's dollar value, lease and other associated income losses (excluding marketing value) would total $2.2m, or $22 over the 100-year study period. Appendix I on page 186 of the CHRMAP Master Appendices confirms that the managed retreat of assets option for Middleton Beach does not consider the loss of rates revenue to the City of Albany. Furthermore, the loss of one leaseholder may encourage others to leave the precincts due to the diminution of long-term business prospects. For example, the loss of 141,149 visitor nights in direct walking distance of a number of cafes, bars and restaurants is likely to considerably reduce business income and viability for those businesses. The result of additional lessee losses could have considerable financial implications to the City of Albany, given the approximate $1m in lease revenue per annum in the area. The reasons behind the vacation of the sites would also likely deter prospective tenants from assuming the leases.

It should also be noted that accepting the CHRMAP Implementation Plan recommendations, with the gradual decline of beach amenity, land erosion and storm surge risks, would also impact the City of Albany's insurance. For example, insurers may increase premiums significantly over time or refuse to continue insuring sites in the area. It is highly unlikely that the acceptance of medium to long-term loss of land and assets would not impact insurer decisions to this effect.

5 Wider Economic Implications – Cost-Benefit Analyses

Cost-benefit analysis is a useful economic tool to evaluate the case for a project or proposal against the *status quo*. Importantly, it allows for an assessment in economic terms of intangible values. The impacts of a proposal for investment or intervention in a market are measured in terms of the economic, social and environmental costs and benefits. Costs represent the public's willingness-to-pay to avoid the resulting consequences of the intervention, whereas benefits reflect the public's willingness-to-pay for the consequences. The evaluation of a particular proposal considers the effects on the community as a whole, in order to give a 'global' perspective. As far as possible, costs and benefits are expressed in monetary terms, although assigning monetary values to some intangible effects can prove difficult. The primary purpose of the analysis is to identify the social net benefit of a specific intervention or investment proposal. Essentially, the cost-benefit process aims to determine whether the total estimated benefits resulting from a proposal exceed the estimated costs, and therefore, whether the project would result in an economically efficient allocation of resources.

The following rules apply when interpreting and using the economic indicators for decision making:

- If the Benefit Cost Ratio (BCR) is greater than 1, a project is socially/economically beneficial.
- If the BCR is less than 1, a project is not socially/economically beneficial.
- If the Net Present Value (NPV) is greater than 0, a project is socially/economically beneficial.
- If the NPV is less than 0, a project is not socially/economically beneficial.

Further background to cost-benefit analysis is provided in Appendix B of this briefing note.

5.1 Methodology

As stated in Section 2.3, the cost-benefit analysis conducted by JBP Scientists and Engineers (Appendix H of the CHRMAP Master Appendices) lacks transparency in the evaluation methodology and justification of the costs and benefits included. Based on the available information, it appears unlikely that the value of tourism or the resulting loss of critical tourism and accommodation infrastructure have been factored into the analyses. It is also unclear whether the benefit of mitigating against capital and maintenance costs of unprotected assets has been calculated against the cost of the various protection measures. On this basis alone, an NPV greater than $0 and BCR greater than 1 can be achieved with the more expensive protection options. This does not factor in any additional tourism that will result from new developments that will go ahead given the certainty of protection. This would serve to further improve the NPV and BCR.

An example model was developed to evaluate the capital costs of buried seawall options for Middleton Beach and Emu Beach, as well as the ongoing maintenance requirements (OPC calculated by M P Rogers & Associates). Even with these high ongoing costs, an NPV of $3.36m and BCR of 2.05 was estimated based on mitigating the requirement for unprotected asset capital costs and maintenance, as well as the capital value of new developments (see Appendix A for detailed model). Note that the benefits of mitigated unprotected asset capital costs are spread over the study period rather than as a one-off fixed cost. For more conservative analysis, the cost benefit models in this briefing note consider initial protection requirements from 2030, the beginning of the at-risk period identified in the Implementation Plan, however it should be noted that M P Rogers consider the likelihood of needing to implement protective measures before 2050 as low.

The purpose of this briefing note, and the cost-benefit analyses included in it, are not to disprove the calculations previously conducted for the overall systems however, but rather to demonstrate the value of asset protection from the retention of critical tourism and accommodation infrastructure, as well as the implications of losing these assets completely (as would be likely if the certainty of asset protection cannot be provided). Consequently, various new models have been developed, including:

- A managed retreat for Big 4 Middleton Beach Holiday Park;
- Unprotected assets at Big4 Middleton Beach Holiday Park;
- A rock seawall at Big4 Middleton Beach Holiday Park;
- A buried seawall at Big4 Middleton Beach Holiday Park;
- A managed retreat for Big4 Emu Beach Holiday Park;
- Continued sandbag/groyne trials for Emu Beach Foreshore (costs not available at local Big4 level);
- Seawall/revetments for Emu Beach Foreshore (costs not available at local Big4 level);
- A buried seawall at Emu Beach Holiday Park; and
- The loss of both Big4 assets as a result of future protection and cost uncertainties.

Due to the availability of cost data provided in the CHRMAP documents, some costs for Emu Beach Holiday Park were calculated for the wider Emu Beach foreshore but benefits included only for Emu Beach Holiday Park. Therefore, the estimated benefits from asset protection are likely to be even greater (as the cost of protection would be distributed over other assets along the foreshore and other businesses would accrue additional benefits).

5.2 Costs in the Cost-Benefit Analyses

The costs in the analyses include the capital costs (one off) and ongoing maintenance costs (spread over 100 years) for each option. Cost indications and spreads are based on the CHRMAP plans and appendices. In the interest of providing a fairer and more conservative analysis, in all possible cases the costs were taken from Appendix D of the Master Appendices (Scoring Spreadsheet including Costs). This was the only source that included costs for all options and was also assumed to have been the initial cost indications provided to attendees at community consultation workshops. All costs and benefits are in today's dollar value. Costs are summarised as follows:

Table 6. Costs in the cost-benefit analyses

Option	Capital	Maintenance
Middleton managed retreat	$5,818,000	$11,636,000
Middleton unprotected assets	$7,882,000	$15,764,000
Middleton rock seawall	$1,737,000	$2,462,000
Middleton buried seawall[(a)]	$3,157,350	$6,539,925[(b)]
Emu Beach managed retreat	$6,000,000	$12,000,000[(c)]
Emu Beach sandbag/groynes	$2,825,000	$5,650,000
Emu Beach seawall/revetments	$6,484,000	$12,968,000
Emu Beach buried seawall	$2,363,970	$4,843,073[(b)]
Loss of Big4 assets	$195,000 (loss of CoA lease/rate income p.a.)	$125,000 (loss of marketing value p.a.)

[(a)] As the CHRMAP options did not cover a buried seawall and do not provide background to cost assumptions, the Shuttleworth's engaged M P Rogers & Associates, coastal engineering consultants, to provide expert advice. To be consistent with the information provided in the CHRMAP, costs have been provided to ensure protection over a 100-year planning horizon.
[(b)] As detailed in the M P Rogers supporting letter, maintenance costs include the cost of seawall replacement at end of life (50 years) and10% of the capital cost per decade.
[(c)] Costs of maintenance for this option were not provided. CHRMAP indicative capital costs were similar to Middleton Beach, so ongoing maintenance was also based on the Middleton Beach managed retreat option.

5.3 Benefits in the Cost-Benefit Analyses

The key benefits included in cost-benefit analyses are:

- The primary economic benefits or disbenefits from encouraged new development (e.g. with certainty of protection or over time after managed retreat) and potential impacts of loss of beach amenity or accommodation, leading to increased/decreased visitation and spend in the region (visitors from outside the region only), and
- Indirect benefits through the 'ripple' effect.

There are likely to be additional cost-benefit factors associated with other planned developments (e.g. Middleton Beach Foreshore Enhancement project and Artificial Surf Reef project) which would be impacted by the various options. However, these factors are not included in the analysis. Other benefits could also have been included, such as:

- Social benefits of the wider beach system amenity (Middleton Beach to Emu Point), including contribution to community wellbeing, cohesion and quality of life which are particularly relevant to rural and regional contexts.
- The balanced integration of social and economic dimensions, which is a vital first step towards community wellbeing and sustainability.

However, it is difficult to estimate these in monetary terms in a robust way. Although estimates of this valuation can indeed be developed, this has not been included in the cost-benefit calculations, which focus on the 'harder' economic benefits.

The cost-benefit analyses are not intended to be fully rigorous at a state level. In particular, they take into account the primary and secondary benefits to the regional economy that at a state level may not be appropriate. This is because the impacts are highly distributional, with the beach precincts creating high levels of community benefits for the local and regional economy.

5.4 Assumptions

The value of the benefits/disbenefits vary depending on the option and inputs. All factors, including the current visitor nights and projected new visitor nights from development are based on the values presented in Section 3 and/or from demonstrated Albany visitor statistics (TourismWA and ABS), such as an average 50% occupancy rate across accommodation, the number of available beds in Albany (1,370), and Big4's current contribution to total available beds (23.7% or 325). Key assumptions include:

- Number of years to Big4 vacating the sites, where applicable, due to uncertainty of future protection/return on investment;
- The capital and 100 year maintenance costs of each option;
- The number of visitor nights for Big4 assets (141,149);
- Visitor loss, where applicable, due to loss of beds, relocation factors, and loss of beach amenity (e.g. due to erosion);
- The gradual impact of erosion and loss of beach amenity;
- The average visitor spend per night ($192);
- The number of new visitor nights resulting from expansion of Big4 (planned developments for both parks);
- The number of years before new Big4 developments are initiated; and
- Years to reach a steady state in new visitation resulting from Big4 expansion.

5.5 Calculations

Cost-benefit calculations have been performed in order to assess the attractiveness of the various options. All detailed model and factor assumptions are provided in Appendix A. The following table summarises the outcomes for each option. Due to the complexity of the models, with some having a negative benefit (disbenefit) dominating, the BCR is an unreliable indicator and the NPV is the most robust basis for comparison.

Table 7. Cost-benefit results

Option	NPV
Middleton managed retreat	–$16,182,258
Middleton unprotected assets	–$97,107,789

Middleton rock seawall	+$13,987,181
Middleton buried seawall	+$16,837,656
Emu Beach managed retreat	–$46,749,598
Emu Beach sandbag/groynes	–$3,295,431
Emu Beach seawall/revetments	+$14,956,106
Emu Beach buried seawall	+21,994,767
Loss of Big4 assets	–$97,837,372

As can be seen, the benefits of asset protection are greater in all cases than the benefits of loss of asset or retreat (and loss of beach amenity). Buried seawalls for both Middleton Beach and Emu Beach Holiday Parks provide the highest NPV and are therefore likely to be the more desirable options despite higher cost compared with a visible seawall (in the case of Middleton Beach). As indicated by the community consultations and CHRMAP options analysis, the visual obstruction of raised seawalls may not be well received. For Emu Beach, the cost of both revetments and sandbag/groyne trials are greater than that of a buried seawall, and it is unclear why such an option was not clearly considered for Emu Beach as part of the CHRMAP process.

5.6 Sensitivity Testing

Due to the volume of options and strong indication of lost benefit for non-protective measures, sensitivity analysis is only performed for the four options with a positive NPV. The results of the sensitivity tests are given in Table 8 and Table 9.

Table 8. Sensitivity tests on the Middleton Beach Holiday Park cost-benefit analyses

Variable	Value	Middleton Rock Seawall	Middleton Buried Seawall
		NPV ($000)	NPV ($000)
Additional visitor nights from new developments	2%	+6,520	+5,638
	4%	**+13,987**	+13,104
	5%	+17,721	**+16,838**
	10%	+36,387	+35,505
Spend by overnight visitors	$100	+6,832	+7,893
	$150	+10,720	+12,754
	$192	**+13,987**	**+16,838**
	$250	+18,498	+22,477
The number of years to steady state	0	+14,561	+17,555
	10	**+13,987**	**+16,838**
	20	+12,100	+14,479
	30	+10,649	+12,665
Multiplier effect	1.0 (no effect)	+6,872	+7,944
	1.5	+10,782	+12,831
	1.91	**+13,987**	**+16,838**
Discount rate	4%	+22,120	+26,699
	7%	**+13,987**	**+16,838**
	10%	+9,308	+11,103

Table 9. Sensitivity tests on the Emu Beach Holiday Park cost-benefit analyses

Variable	Value	Emu Beach Seawall / Revetments	Emu Beach Buried Seawall
		NPV ($000)	NPV ($000)
Additional visitor nights from new developments	2%	+5,611	+7,978
	4%	**+14,956**	+17,322
	5%	+19,628	**+21,995**
	10%	+42,990	+45,356
	$100	+6,001	+10,801

Spend by overnight visitors	$150	+10,868	+16,884
	$192	**+14,956**	**+21,995**
	$250	+20,602	+29,052
The number of years to steady state	0	+15,674	+22,893
	10	**+14,956**	**+21,995**
	20	+12,595	+19,043
	30	+10,778	+16,772
Multiplier effect	1.0 (no effect)	+6,052	+10,864
	1.5	+10,944	+16,980
	1.91	**+14,956**	**+21,995**
Discount rate	4%	+24,006	+34,740
	7%	**+14,956**	**+21,995**
	10%	+9,840	+14,652

- The NPV is sensitive to the additional visitor nights attracted as a result of Big4 expansions, but even with less than a 0.8% increase on current volumes the calculations remain positive:

Middleton Rock Seawall	Middleton Buried Seawall	Emu Seawall/Revetment	Emu Buried Seawall
≥0.3% increase required	≥0.5% increase required	≥0.8% increase required	≥0.3% increase required

- The NPV is also sensitive to the value of overnight visitor spend; however, even at less than $39 the calculations remain positive:

Middleton Rock Seawall	Middleton Buried Seawall	Emu Seawall/Revetment	Emu Buried Seawall
≥$13 required	≥$19 required	≥$39 required	≥$12 required

- Even with only a 1.6% visitor night increase and low $100 per night spend for the most affected option (seawall/revetment for Emu Beach), the calculations remain positive (NPV $160,406).

Further tests looked at the sensitivity of the results to the discount rate. The rate assumed in the cost-benefit analyses (7%) may not reflect the true social opportunity cost of capital. However, even with a discount rate of 10%, the conclusions of the analyses remain unchanged.

6 Conclusions

Although preference is shown to buried seawall options through cost-benefit modelling, the purpose of this briefing note is not to dictate which protection measure should be adopted, but rather to demonstrate the value of protecting all assets along the coast between Middleton Beach and Emu Point and to stress the cost of losing such assets over time. The longer-term impacts of potential storm surge (2030) and erosion (2050) on unprotected assets will be highly damaging to the economy of the City of Albany and Great Southern region. However, the shorter-term potential of losing current large-scale, viable and economically-stimulating accommodation options is of more immediate concern.

Rejecting the current recommendations in the Draft Implementation Plan for managed retreat, or any other measure that does not directly protect the natural and built assets within the area, will ensure that Big4 Holiday Parks (the Shuttleworth family), other impacted operators, and the City of Albany can work together to protect critical tourism assets along this vital part of the coastline. This will then facilitate the ongoing development of these tourism assets to retain existing and attract new visitors with the associated economic returns for Albany and the region.

Appendix A: Detailed Cost-Benefit Models

A1: Asset Protection vs Unprotected Assets – Direct Capital/Maintenance Cost Model

Cost Variables

Capital cost of initial seawall - buried (Emu Beach)	$	2,363,970
Ongoing maintenance requirements (spread over 100 years), including seawall replacement at 50 years	$	4,843,073
Capital cost of initial seawall - buried (Middleton Beach)	$	3,157,350
Ongoing maintenance requirements (spread over 100 years), including seawall replacement at 50 years	$	6,539,925

Benefit Variables

Capital cost of unprotected assets (each)	$	7,882,000
Maintenance costs of unprotected assets (each)	$	15,764,000
Value of new developments (Capital)		$3,000,000
Years to full impact of storm surges and beach erosion		11

Year		Direct Costs			Direct Benefit				*Total benefits ($)*	Net Benefits ($)	Discounted Net Benefits ($)
		Capital Cost	Maintenance	Total Costs ($)	No new capital development requirments	No new maintenacne requirments	Value of new developments	Total Benefit			
1	2020	$0	$0	$0	$14,331	$28,662	$600,000	642,993	642,993	$642,993	$600,928
2	2021	$0	$0	$0	$28,662	$57,324	$600,000	685,985	685,985	$685,985	$599,166
3	2022	$0	$0	$0	$42,993	$85,985	$600,000	728,978	$728,978	$728,978	$595,063
4	2023	$0	$0	$0	$57,324	$114,647	$600,000	771,971	$771,971	$771,971	$588,933
5	2024	$0	$0	$0	$71,655	$143,309	$600,000	814,964	$814,964	$814,964	$581,058
6	2025	$0	$0	$0	$85,985	$171,971	$0	257,956	$257,956	$257,956	$171,887
7	2026	$0	$0	$0	$100,316	$200,633	$0	300,949	$300,949	$300,949	$187,416
8	2027	$0	$0	$0	$114,647	$229,295	$0	343,942	$343,942	$343,942	$200,177
9	2028	$0	$0	$0	$128,978	$257,956	$0	386,935	$386,935	$386,935	$210,467
10	2029	$0	$0	$0	$143,309	$286,618	$0	429,927	$429,927	$429,927	$218,553
11	2030	$ 5,521,320	$0	$5,521,320	$157,640	$315,280	$0	472,920	$472,920	-$5,048,400	-$2,398,458
12	2031	$0	$113,830	$113,830	$157,640	$315,280	$0	472,920	$472,920	$359,090	$159,440
13	2032	$0	$113,830	$113,830	$157,640	$315,280	$0	472,920	$472,920	$359,090	$149,010
14	2033	$0	$113,830	$113,830	$157,640	$315,280	$0	472,920	$472,920	$359,090	$139,261
15	2034	$0	$113,830	$113,830	$157,640	$315,280	$0	472,920	$472,920	$359,090	$130,151
16	2035	$0	$113,830	$113,830	$157,640	$315,280	$0	472,920	$472,920	$359,090	$121,636
17	2036	$0	$113,830	$113,830	$157,640	$315,280	$0	472,920	$472,920	$359,090	$113,679
18	2037	$0	$113,830	$113,830	$157,640	$315,280	$0	472,920	$472,920	$359,090	$106,242
19	2038	$0	$113,830	$113,830	$157,640	$315,280	$0	472,920	$472,920	$359,090	$99,291
20	2039	$0	$113,830	$113,830	$157,640	$315,280	$0	472,920	$472,920	$359,090	$92,796
21	2040	$0	$113,830	$113,830	$157,640	$315,280	$0	472,920	$472,920	$359,090	$86,725
22	2041	$0	$113,830	$113,830	$157,640	$315,280	$0	472,920	$472,920	$359,090	$81,051
23	2042	$0	$113,830	$113,830	$157,640	$315,280	$0	472,920	$472,920	$359,090	$75,749
24	2043	$0	$113,830	$113,830	$157,640	$315,280	$0	472,920	$472,920	$359,090	$70,793
25	2044	$0	$113,830	$113,830	$157,640	$315,280	$0	472,920	$472,920	$359,090	$66,162
26	2045	$0	$113,830	$113,830	$157,640	$315,280	$0	472,920	$472,920	$359,090	$61,834
27	2046	$0	$113,830	$113,830	$157,640	$315,280	$0	472,920	$472,920	$359,090	$57,788
28	2047	$0	$113,830	$113,830	$157,640	$315,280	$0	472,920	$472,920	$359,090	$54,008
29	2048	$0	$113,830	$113,830	$157,640	$315,280	$0	472,920	$472,920	$359,090	$50,475
30	2049	$0	$113,830	$113,830	$157,640	$315,280	$0	472,920	$472,920	$359,090	$47,173
31	2050	$0	$113,830	$113,830	$157,640	$315,280	$0	472,920	$472,920	$359,090	$44,087

Disc. Rate: 7.0%

NPV: $3,362,540 **BCR:** 2.05

A2: Big4 Middleton Beach Managed Retreat

Cost Variables

Years to Big4 relocating		10
Delay to new Big4 developments		20
Capital cost of managed retreat	$	5,818,000
Ongoing maintenance requirements (spread over 100 years)	$	11,636,000

Visitation

Number of Big4 visitor nights		62,691
New visitor nights as result of new Big4 developments /expansion over time		4%
Years to steady state from model start date (due to new developments)		31
% visitors lost due to relocation factor and lost beach amenity		20%
Years including gradual impact of bech erosion		31
Average visitor spend per night	$	192

	Year	Direct Costs			Direct Benefits			Community benefit from Tourism (Multiplier)	*Total benefits ($)*	Net Benefits ($)	Discounted Net Benefits ($)
		Capital Cost	Maintenance	Total Costs ($)	Lost Visitors	New Development Visitors	Total Visitor Spend ($)				
1	2020	$0	$0	$0	-	-	$0	$0	$0	$0	$0
2	2021	$0	$0	$0	-	-	$0	$0	$0	$0	$0
3	2022	$0	$0	$0	-	-	$0	$0	$0	$0	$0
4	2023	$0	$0	$0	-	-	$0	$0	$0	$0	$0
5	2024	$0	$0	$0	-	-	$0	$0	$0	$0	$0
6	2025	$0	$0	$0	-	-	$0	$0	$0	$0	$0
7	2026	$0	$0	$0	-	-	$0	$0	$0	$0	$0
8	2027	$0	$0	$0	-	-	$0	$0	$0	$0	$0
9	2028	$0	$0	$0	-	-	$0	$0	$0	$0	$0
10	2029	$0	$0	$0	-	-	$0	$0	$0	$0	$0
11	2030	$5,818,000	$0	$5,818,000	-	-	$0	$0	$0	-$5,818,000	-$2,764,090
12	2031	$0	$116,360	$116,360	- 4,853	-	-$931,871	-$848,003	-$1,779,874	-$1,896,234	-$841,951
13	2032	$0	$116,360	$116,360	- 5,258	-	-$1,009,527	-$918,670	-$1,928,197	-$2,044,557	-$848,419
14	2033	$0	$116,360	$116,360	- 5,662	-	-$1,087,183	-$989,337	-$2,076,520	-$2,192,880	-$850,437
15	2034	$0	$116,360	$116,360	- 6,067	-	-$1,164,839	-$1,060,004	-$2,224,843	-$2,341,203	-$848,560
16	2035	$0	$116,360	$116,360	- 6,471	-	-$1,242,495	-$1,130,671	-$2,373,166	-$2,489,526	-$843,289
17	2036	$0	$116,360	$116,360	- 6,876	-	-$1,320,151	-$1,201,338	-$2,521,489	-$2,637,849	-$835,075
18	2037	$0	$116,360	$116,360	- 7,280	-	-$1,397,807	-$1,272,004	-$2,669,812	-$2,786,172	-$824,328
19	2038	$0	$116,360	$116,360	- 7,685	-	-$1,475,463	-$1,342,671	-$2,818,134	-$2,934,494	-$811,412
20	2039	$0	$116,360	$116,360	- 8,089	-	-$1,553,119	-$1,413,338	-$2,966,457	-$3,082,817	-$796,659
21	2040	$0	$116,360	$116,360	- 8,494	2,025	-$1,241,898	-$1,130,127	-$2,372,025	-$2,488,385	-$600,978
22	2041	$0	$116,360	$116,360	- 8,898	2,074	-$1,310,295	-$1,192,368	-$2,502,663	-$2,619,023	-$591,148
23	2042	$0	$116,360	$116,360	- 9,303	2,122	-$1,378,692	-$1,254,610	-$2,633,301	-$2,749,661	-$580,032
24	2043	$0	$116,360	$116,360	- 9,707	2,170	-$1,447,089	-$1,316,851	-$2,763,939	-$2,880,299	-$567,841
25	2044	$0	$116,360	$116,360	- 10,111	2,218	-$1,515,486	-$1,379,092	-$2,894,578	-$3,010,938	-$554,763
26	2045	$0	$116,360	$116,360	- 10,516	2,267	-$1,583,883	-$1,441,333	-$3,025,216	-$3,141,576	-$540,965
27	2046	$0	$116,360	$116,360	- 10,920	2,315	-$1,652,280	-$1,503,574	-$3,155,854	-$3,272,214	-$526,599
28	2047	$0	$116,360	$116,360	- 11,325	2,363	-$1,720,677	-$1,565,816	-$3,286,492	-$3,402,852	-$511,797
29	2048	$0	$116,360	$116,360	- 11,729	2,411	-$1,789,074	-$1,628,057	-$3,417,131	-$3,533,491	-$496,677
30	2049	$0	$116,360	$116,360	- 12,134	2,459	-$1,857,471	-$1,690,298	-$3,547,769	-$3,664,129	-$481,346
31	2050	$0	$116,360	$116,360	- 12,538	2,508	-$1,925,868	-$1,752,539	-$3,678,407	-$3,794,767	-$465,895

Disc. Rate: **7.0%**

NPV: **-$16,182,258**

Tourism multiplier: 1.91

Community Benefit: 100%

A3: Big4 Middleton Beach Unprotected Assets

Key Variables

Years to Big4 potentially incurring capital and maintenance costs		10
Delay to new Big4 developments		32
Capital cost of leaving assets unprotected	$	7,882,000
Ongoing maintenance requirements (spread over 100 years)	$	15,764,000

Visitation

Number of Big4 visitor nights		62,691
Additonal visitor nights as result of new Big4 developments		0%
% visitors lost due declining assets and beach amenity		80%
Years including gradual impact of bech erosion		31
Average visitor spend per night	$	192

Year		Direct Costs			Direct Benefits			Community benefit from Tourism (Multiplier)	*Total benefits ($)*	Net Benefits ($)	Discounted Net Benefits ($)
		Capital Cost	Maintenance	Total Costs ($)	Lost Visitors	New Development Visitors	Total Visitor Spend ($)				
1	2020	$0	$0	$0	-	-	$0	$0	$0	$0	$0
2	2021	$0	$0	$0	-	-	$0	$0	$0	$0	$0
3	2022	$0	$0	$0	-	-	$0	$0	$0	$0	$0
4	2023	$0	$0	$0	-	-	$0	$0	$0	$0	$0
5	2024	$0	$0	$0	-	-	$0	$0	$0	$0	$0
6	2025	$0	$0	$0	-	-	$0	$0	$0	$0	$0
7	2026	$0	$0	$0	-	-	$0	$0	$0	$0	$0
8	2027	$0	$0	$0	-	-	$0	$0	$0	$0	$0
9	2028	$0	$0	$0	-	-	$0	$0	$0	$0	$0
10	2029	$0	$0	$0	-	-	$0	$0	$0	$0	$0
11	2030	$7,882,000	$0	$7,882,000	-	-	$0	$0	$0	-$7,882,000	-$3,744,681
12	2031	$0	$157,640	$157,640	- 19,414	-	-$9,629,338	-$8,762,697	-$18,392,035	-$18,549,675	-$8,236,277
13	2032	$0	$157,640	$157,640	- 21,032	-	-$9,629,338	-$8,762,697	-$18,392,035	-$18,549,675	-$7,697,456
14	2033	$0	$157,640	$157,640	- 22,650	-	-$9,629,338	-$8,762,697	-$18,392,035	-$18,549,675	-$7,193,884
15	2034	$0	$157,640	$157,640	- 24,267	-	-$9,629,338	-$8,762,697	-$18,392,035	-$18,549,675	-$6,723,256
16	2035	$0	$157,640	$157,640	- 25,885	-	-$9,629,338	-$8,762,697	-$18,392,035	-$18,549,675	-$6,283,417
17	2036	$0	$157,640	$157,640	- 27,503	-	-$9,629,338	-$8,762,697	-$18,392,035	-$18,549,675	-$5,872,352
18	2037	$0	$157,640	$157,640	- 29,121	-	-$9,629,338	-$8,762,697	-$18,392,035	-$18,549,675	-$5,488,179
19	2038	$0	$157,640	$157,640	- 30,739	-	-$9,629,338	-$8,762,697	-$18,392,035	-$18,549,675	-$5,129,140
20	2039	$0	$157,640	$157,640	- 32,357	-	-$9,629,338	-$8,762,697	-$18,392,035	-$18,549,675	-$4,793,588
21	2040	$0	$157,640	$157,640	- 33,974	-	-$9,629,338	-$8,762,697	-$18,392,035	-$18,549,675	-$4,479,989
22	2041	$0	$157,640	$157,640	- 35,592	-	-$9,629,338	-$8,762,697	-$18,392,035	-$18,549,675	-$4,186,906
23	2042	$0	$157,640	$157,640	- 37,210	-	-$9,629,338	-$8,762,697	-$18,392,035	-$18,549,675	-$3,912,996
24	2043	$0	$157,640	$157,640	- 38,828	-	-$9,629,338	-$8,762,697	-$18,392,035	-$18,549,675	-$3,657,006
25	2044	$0	$157,640	$157,640	- 40,446	-	-$9,629,338	-$8,762,697	-$18,392,035	-$18,549,675	-$3,417,762
26	2045	$0	$157,640	$157,640	- 42,064	-	-$9,629,338	-$8,762,697	-$18,392,035	-$18,549,675	-$3,194,170
27	2046	$0	$157,640	$157,640	- 43,681	-	-$9,629,338	-$8,762,697	-$18,392,035	-$18,549,675	-$2,985,206
28	2047	$0	$157,640	$157,640	- 45,299	-	-$9,629,338	-$8,762,697	-$18,392,035	-$18,549,675	-$2,789,912
29	2048	$0	$157,640	$157,640	- 46,917	-	-$9,629,338	-$8,762,697	-$18,392,035	-$18,549,675	-$2,607,395
30	2049	$0	$157,640	$157,640	- 48,535	-	-$9,629,338	-$8,762,697	-$18,392,035	-$18,549,675	-$2,436,817
31	2050	$0	$157,640	$157,640	- 50,153	-	-$9,629,338	-$8,762,697	-$18,392,035	-$18,549,675	-$2,277,399

Disc. Rate: **7.0%**

NPV: **-$97,107,789**

Tourism multiplier: 1.91

Community Benefit: 100%

A4: Big4 Middleton Beach Seawall – Rock

Key Variables

Years to Big4 potentially incurring capital and maintenance costs		10
Delay to new Big4 developments		5
Capital cost of seawall	$	1,731,000
Ongoing maintenance requirements (spread over 100 years)	$	2,462,000

Visitation

Number of Big4 visitor nights		62,691
Additonal visitor nights as result of new Big4 developments		4%
Years to reach a steady state (new visitors)		10
Average visitor spend per night	$	192

Year		Direct Costs					Community benefit from Tourism (Multiplier)	*Total benefits ($)*	Net Benefits ($)	Discounted Net Benefits ($)
		Capital Cost	Maintenance	Total Costs ($)	New Development Visitors	Total Visitor Spend ($)				
1	2020	$0	$0	$0	-	$0	$0	$0	$0	$0
2	2021	$0	$0	$0	-	$0	$0	$0	$0	$0
3	2022	$0	$0	$0	-	$0	$0	$0	$0	$0
4	2023	$0	$0	$0	-	$0	$0	$0	$0	$0
5	2024	$0	$0	$0	-	$0	$0	$0	$0	$0
6	2025	$0	$0	$0	1,505	$770,347	$701,016	$1,471,363	$1,471,363	$980,431
7	2026	$0	$0	$0	1,755	$818,494	$744,829	$1,563,323	$1,563,323	$973,559
8	2027	$0	$0	$0	2,006	$866,640	$788,643	$1,655,283	$1,655,283	$963,390
9	2028	$0	$0	$0	2,257	$914,787	$832,456	$1,747,243	$1,747,243	$950,385
10	2029	$0	$0	$0	2,508	$962,934	$876,270	$1,839,203	$1,839,203	$934,958
11	2030	$1,731,000	$0	$1,731,000	2,508	$962,934	$876,270	$1,839,203	$108,203	$51,407
12	2031	$0	$24,620	$24,620	2,508	$962,934	$876,270	$1,839,203	$1,814,583	$805,697
13	2032	$0	$24,620	$24,620	2,508	$962,934	$876,270	$1,839,203	$1,814,583	$752,988
14	2033	$0	$24,620	$24,620	2,508	$962,934	$876,270	$1,839,203	$1,814,583	$703,727
15	2034	$0	$24,620	$24,620	2,508	$962,934	$876,270	$1,839,203	$1,814,583	$657,689
16	2035	$0	$24,620	$24,620	2,508	$962,934	$876,270	$1,839,203	$1,814,583	$614,662
17	2036	$0	$24,620	$24,620	2,508	$962,934	$876,270	$1,839,203	$1,814,583	$574,451
18	2037	$0	$24,620	$24,620	2,508	$962,934	$876,270	$1,839,203	$1,814,583	$536,870
19	2038	$0	$24,620	$24,620	2,508	$962,934	$876,270	$1,839,203	$1,814,583	$501,747
20	2039	$0	$24,620	$24,620	2,508	$962,934	$876,270	$1,839,203	$1,814,583	$468,923
21	2040	$0	$24,620	$24,620	2,508	$962,934	$876,270	$1,839,203	$1,814,583	$438,246
22	2041	$0	$24,620	$24,620	2,508	$962,934	$876,270	$1,839,203	$1,814,583	$409,575
23	2042	$0	$24,620	$24,620	2,508	$962,934	$876,270	$1,839,203	$1,814,583	$382,781
24	2043	$0	$24,620	$24,620	2,508	$962,934	$876,270	$1,839,203	$1,814,583	$357,739
25	2044	$0	$24,620	$24,620	2,508	$962,934	$876,270	$1,839,203	$1,814,583	$334,336
26	2045	$0	$24,620	$24,620	2,508	$962,934	$876,270	$1,839,203	$1,814,583	$312,463
27	2046	$0	$24,620	$24,620	2,508	$962,934	$876,270	$1,839,203	$1,814,583	$292,022
28	2047	$0	$24,620	$24,620	2,508	$962,934	$876,270	$1,839,203	$1,814,583	$272,917
29	2048	$0	$24,620	$24,620	2,508	$962,934	$876,270	$1,839,203	$1,814,583	$255,063
30	2049	$0	$24,620	$24,620	2,508	$962,934	$876,270	$1,839,203	$1,814,583	$238,377
31	2050	$0	$24,620	$24,620	2,508	$962,934	$876,270	$1,839,203	$1,814,583	$222,782

Disc. Rate:	**7.0%**			Tourism multiplier:	1.91
NPV:	**$13,987,181**	**BCR:**	**15.78**	Community Benefit:	100%

A5: Big4 Middleton Beach Seawall – Buried

Key Variables

Years to Big4 potentially incurring capital and maintenance costs		10
Delay to new Big4 developments		5
Capital cost of seawall	$	3,157,350
Ongoing maintenance requirements (spread over 100 years)	$	6,539,925

Visitation

Number of Big4 visitor nights		62,691
Additonal visitor nights as result of new Big4 developments		5%
Years to reach a steady state (new visitors)		10
Average visitor spend per night	$	192

Year		Direct Costs								
		Capital Cost	Maintenance	Total Costs ($)	New Development Visitors	Total Visitor Spend ($)	Community benefit from Tourism (Multiplier)	*Total benefits ($)*	Net Benefits ($)	Discounted Net Benefits ($)
1	2020	$0	$0	$0	-	$0	$0	$0	$0	$0
2	2021	$0	$0	$0	-	$0	$0	$0	$0	$0
3	2022	$0	$0	$0	-	$0	$0	$0	$0	$0
4	2023	$0	$0	$0	-	$0	$0	$0	$0	$0
5	2024	$0	$0	$0	-	$0	$0	$0	$0	$0
6	2025	$0	$0	$0	1,881	$962,934	$876,270	$1,839,203	$1,839,203	$1,225,539
7	2026	$0	$0	$0	2,194	$1,023,117	$931,037	$1,954,154	$1,954,154	$1,216,949
8	2027	$0	$0	$0	2,508	$1,083,300	$985,803	$2,069,104	$2,069,104	$1,204,237
9	2028	$0	$0	$0	2,821	$1,143,484	$1,040,570	$2,184,054	$2,184,054	$1,187,981
10	2029	$0	$0	$0	3,135	$1,203,667	$1,095,337	$2,299,004	$2,299,004	$1,168,697
11	2030	$3,157,350	$0	$3,157,350	3,135	$1,203,667	$1,095,337	$2,299,004	-$858,346	-$407,794
12	2031	$0	$65,399	$65,399	3,135	$1,203,667	$1,095,337	$2,299,004	$2,233,605	$991,747
13	2032	$0	$65,399	$65,399	3,135	$1,203,667	$1,095,337	$2,299,004	$2,233,605	$926,867
14	2033	$0	$65,399	$65,399	3,135	$1,203,667	$1,095,337	$2,299,004	$2,233,605	$866,231
15	2034	$0	$65,399	$65,399	3,135	$1,203,667	$1,095,337	$2,299,004	$2,233,605	$809,561
16	2035	$0	$65,399	$65,399	3,135	$1,203,667	$1,095,337	$2,299,004	$2,233,605	$756,599
17	2036	$0	$65,399	$65,399	3,135	$1,203,667	$1,095,337	$2,299,004	$2,233,605	$707,102
18	2037	$0	$65,399	$65,399	3,135	$1,203,667	$1,095,337	$2,299,004	$2,233,605	$660,843
19	2038	$0	$65,399	$65,399	3,135	$1,203,667	$1,095,337	$2,299,004	$2,233,605	$617,610
20	2039	$0	$65,399	$65,399	3,135	$1,203,667	$1,095,337	$2,299,004	$2,233,605	$577,206
21	2040	$0	$65,399	$65,399	3,135	$1,203,667	$1,095,337	$2,299,004	$2,233,605	$539,445
22	2041	$0	$65,399	$65,399	3,135	$1,203,667	$1,095,337	$2,299,004	$2,233,605	$504,154
23	2042	$0	$65,399	$65,399	3,135	$1,203,667	$1,095,337	$2,299,004	$2,233,605	$471,172
24	2043	$0	$65,399	$65,399	3,135	$1,203,667	$1,095,337	$2,299,004	$2,233,605	$440,348
25	2044	$0	$65,399	$65,399	3,135	$1,203,667	$1,095,337	$2,299,004	$2,233,605	$411,540
26	2045	$0	$65,399	$65,399	3,135	$1,203,667	$1,095,337	$2,299,004	$2,233,605	$384,617
27	2046	$0	$65,399	$65,399	3,135	$1,203,667	$1,095,337	$2,299,004	$2,233,605	$359,455
28	2047	$0	$65,399	$65,399	3,135	$1,203,667	$1,095,337	$2,299,004	$2,233,605	$335,939
29	2048	$0	$65,399	$65,399	3,135	$1,203,667	$1,095,337	$2,299,004	$2,233,605	$313,962
30	2049	$0	$65,399	$65,399	3,135	$1,203,667	$1,095,337	$2,299,004	$2,233,605	$293,422
31	2050	$0	$65,399	$65,399	3,135	$1,203,667	$1,095,337	$2,299,004	$2,233,605	$274,226

Disc. Rate:	**7.0%**			Tourism multiplier:	1.91
NPV:	**$16,837,656**	**BCR:**	**10.20**	Community Benefit:	100%

A6: Big4 Emu Beach Managed Retreat

Key Variables

Years to Big4 relocating		10
Delay to new Big4 developments		20
Capital cost of managed retreat	$	6,000,000
Ongoing maintenance requirements (spread over 100 years)	$	12,000,000

Visitation

Number of Big4 visitor nights		78,458
New visitor nights as result of new Big4 developments /expansion over time		4%
Years to steady state from model start date (due to new developments)		31
% visitors lost due to relocation factor and lost beach amenity		50%
Years including gradual impact of bech erosion		31
Average visitor spend per night	$	192

Year		Direct Costs			Direct Benefits			Community benefit from Tourism (Multiplier)	*Total benefits ($)*	Net Benefits ($)	Discounted Net Benefits ($)
		Capital Cost	Maintenance	Total Costs ($)	Lost Visitors	New Development Visitors	Total Visitor Spend ($)				
1	2020	$0	$0	$0	-	-	$0	$0	$0	$0	$0
2	2021	$0	$0	$0	-	-	$0	$0	$0	$0	$0
3	2022	$0	$0	$0	-	-	$0	$0	$0	$0	$0
4	2023	$0	$0	$0	-	-	$0	$0	$0	$0	$0
5	2024	$0	$0	$0	-	-	$0	$0	$0	$0	$0
6	2025	$0	$0	$0	-	-	$0	$0	$0	$0	$0
7	2026	$0	$0	$0	-	-	$0	$0	$0	$0	$0
8	2027	$0	$0	$0	-	-	$0	$0	$0	$0	$0
9	2028	$0	$0	$0	-	-	$0	$0	$0	$0	$0
10	2029	$0	$0	$0	-	-	$0	$0	$0	$0	$0
11	2030	$6,000,000	$0	$6,000,000	-	-	$0	$0	$0	-$6,000,000	-$2,850,557
12	2031	$0	$120,000	$120,000	- 15,185	-	-$2,915,601	-$2,653,196	-$5,568,797	-$5,688,797	-$2,525,894
13	2032	$0	$120,000	$120,000	- 16,451	-	-$3,158,567	-$2,874,296	-$6,032,863	-$6,152,863	-$2,553,220
14	2033	$0	$120,000	$120,000	- 17,716	-	-$3,401,534	-$3,095,396	-$6,496,930	-$6,616,930	-$2,566,159
15	2034	$0	$120,000	$120,000	- 18,982	-	-$3,644,501	-$3,316,496	-$6,960,996	-$7,080,996	-$2,566,479
16	2035	$0	$120,000	$120,000	- 20,247	-	-$3,887,467	-$3,537,595	-$7,425,063	-$7,545,063	-$2,555,774
17	2036	$0	$120,000	$120,000	- 21,513	-	-$4,130,434	-$3,758,695	-$7,889,129	-$8,009,129	-$2,535,485
18	2037	$0	$120,000	$120,000	- 22,778	-	-$4,373,401	-$3,979,795	-$8,353,195	-$8,473,195	-$2,506,913
19	2038	$0	$120,000	$120,000	- 24,044	-	-$4,616,367	-$4,200,894	-$8,817,262	-$8,937,262	-$2,471,227
20	2039	$0	$120,000	$120,000	- 25,309	-	-$4,859,334	-$4,421,994	-$9,281,328	-$9,401,328	-$2,429,482
21	2040	$0	$120,000	$120,000	- 26,574	2,126	-$4,694,117	-$4,271,646	-$8,965,763	-$9,085,763	-$2,194,331
22	2041	$0	$120,000	$120,000	- 27,840	2,227	-$4,917,646	-$4,475,058	-$9,392,704	-$9,512,704	-$2,147,143
23	2042	$0	$120,000	$120,000	- 29,105	2,328	-$5,141,176	-$4,678,470	-$9,819,645	-$9,939,645	-$2,096,737
24	2043	$0	$120,000	$120,000	- 30,371	2,430	-$5,364,705	-$4,881,882	-$10,246,586	-$10,366,586	-$2,043,737
25	2044	$0	$120,000	$120,000	- 31,636	2,531	-$5,588,234	-$5,085,293	-$10,673,528	-$10,793,528	-$1,988,699
26	2045	$0	$120,000	$120,000	- 32,902	2,632	-$5,811,764	-$5,288,705	-$11,100,469	-$11,220,469	-$1,932,114
27	2046	$0	$120,000	$120,000	- 34,167	2,733	-$6,035,293	-$5,492,117	-$11,527,410	-$11,647,410	-$1,874,422
28	2047	$0	$120,000	$120,000	- 35,433	2,835	-$6,258,822	-$5,695,528	-$11,954,351	-$12,074,351	-$1,816,009
29	2048	$0	$120,000	$120,000	- 36,698	2,936	-$6,482,352	-$5,898,940	-$12,381,292	-$12,501,292	-$1,757,217
30	2049	$0	$120,000	$120,000	- 37,964	3,037	-$6,705,881	-$6,102,352	-$12,808,233	-$12,928,233	-$1,698,345
31	2050	$0	$120,000	$120,000	- 39,229	3,138	-$6,929,411	-$6,305,764	-$13,235,174	-$13,355,174	-$1,639,655

Disc. Rate: **7.0%**

NPV: **-$46,749,598**

Tourism multiplier: 1.91

Community Benefit: 100%

A7: Big4 Emu Beach Continued Sandbag/Groyne Trial

Key Variables

Years to CoA required capital and maintenance costs		0
Delay to new Big4 developments		31
Capital cost of continued sandbag/groyne trials	$	2,825,000
Ongoing maintenance requirements (spread over 100 years)	$	5,650,000

Visitation

Number of Big4 visitor nights		78,458
Additonal visitor nights as result of new Big4 developments		0%
Years to reach a steady state (new visitors)		10
Average visitor spend per night	$	192

Year		Direct Costs			Direct Benefits			Community benefit from Tourism (Multiplier)	*Total benefits ($)*	Net Benefits ($)	Discounted Net Benefits ($)
		Capital Cost	Maintenance	Total Costs ($)	Lost Visitors	New Development Visitors	Total Visitor Spend ($)				
1	2020	$2,825,000	$0	$2,825,000	-	-	$0	$0	$0	-$2,825,000	-$2,640,187
2	2021	$0	$56,500	$56,500	-	-	$0	$0	$0	-$56,500	-$49,349
3	2022	$0	$56,500	$56,500	-	-	$0	$0	$0	-$56,500	-$46,121
4	2023	$0	$56,500	$56,500	-	-	$0	$0	$0	-$56,500	-$43,104
5	2024	$0	$56,500	$56,500	-	-	$0	$0	$0	-$56,500	-$40,284
6	2025	$0	$56,500	$56,500	-	-	$0	$0	$0	-$56,500	-$37,648
7	2026	$0	$56,500	$56,500	-	-	$0	$0	$0	-$56,500	-$35,185
8	2027	$0	$56,500	$56,500	-	-	$0	$0	$0	-$56,500	-$32,884
9	2028	$0	$56,500	$56,500	-	-	$0	$0	$0	-$56,500	-$30,732
10	2029	$0	$56,500	$56,500	-	-	$0	$0	$0	-$56,500	-$28,722
11	2030	$0	$56,500	$56,500	-	-	$0	$0	$0	-$56,500	-$26,843
12	2031	$0	$56,500	$56,500	-	-	$0	$0	$0	-$56,500	-$25,087
13	2032	$0	$56,500	$56,500	-	-	$0	$0	$0	-$56,500	-$23,445
14	2033	$0	$56,500	$56,500	-	-	$0	$0	$0	-$56,500	-$21,912
15	2034	$0	$56,500	$56,500	-	-	$0	$0	$0	-$56,500	-$20,478
16	2035	$0	$56,500	$56,500	-	-	$0	$0	$0	-$56,500	-$19,139
17	2036	$0	$56,500	$56,500	-	-	$0	$0	$0	-$56,500	-$17,886
18	2037	$0	$56,500	$56,500	-	-	$0	$0	$0	-$56,500	-$16,716
19	2038	$0	$56,500	$56,500	-	-	$0	$0	$0	-$56,500	-$15,623
20	2039	$0	$56,500	$56,500	-	-	$0	$0	$0	-$56,500	-$14,601
21	2040	$0	$56,500	$56,500	-	-	$0	$0	$0	-$56,500	-$13,645
22	2041	$0	$56,500	$56,500	-	-	$0	$0	$0	-$56,500	-$12,753
23	2042	$0	$56,500	$56,500	-	-	$0	$0	$0	-$56,500	-$11,918
24	2043	$0	$56,500	$56,500	-	-	$0	$0	$0	-$56,500	-$11,139
25	2044	$0	$56,500	$56,500	-	-	$0	$0	$0	-$56,500	-$10,410
26	2045	$0	$56,500	$56,500	-	-	$0	$0	$0	-$56,500	-$9,729
27	2046	$0	$56,500	$56,500	-	-	$0	$0	$0	-$56,500	-$9,093
28	2047	$0	$56,500	$56,500	-	-	$0	$0	$0	-$56,500	-$8,498
29	2048	$0	$56,500	$56,500	-	-	$0	$0	$0	-$56,500	-$7,942
30	2049	$0	$56,500	$56,500	-	-	$0	$0	$0	-$56,500	-$7,422
31	2050	$0	$56,500	$56,500	-	-	$0	$0	$0	-$56,500	-$6,937

Disc. Rate:	**7.0%**			Tourism multiplier:	1.91
NPV:	**-$3,295,431**	**BCR:**	**0.00**	Community Benefit:	100%

A8: Big4 Emu Beach Seawall / Revetments

Key Variables

Years to CoA incurring capital and maintenance costs		10
Delay to new Big4 developments		5
Capital cost of maintaining/enhancing seagrass/nearshore systems	$	6,484,000
Ongoing maintenance requirements (spread over 100 years)	$	12,968,000

Visitation

Number of Big4 visitor nights		78,458
Additonal visitor nights as result of new Big4 developments		4%
Years to reach a steady state (new visitors)		10
Average visitor spend per night	$	192

Year		Direct Costs			Direct Benefits			Community benefit from Tourism (Multiplier)	*Total benefits ($)*	Net Benefits ($)	Discounted Net Benefits ($)
		Capital Cost	Maintenance	Total Costs ($)	Lost Visitors	New Development Visitors	Total Visitor Spend ($)				
1	2020	$0	$0	$0	-	-	$0	$0	$0	$0	$0
2	2021	$0	$0	$0	-	-	$0	$0	$0	$0	$0
3	2022	$0	$0	$0	-	-	$0	$0	$0	$0	$0
4	2023	$0	$0	$0	-	-	$0	$0	$0	$0	$0
5	2024	$0	$0	$0	-	-	$0	$0	$0	$0	$0
6	2025	$0	$0	$0	1,883	1,883	$964,092	$877,324	$1,841,416	$1,841,416	$1,227,013
7	2026	$0	$0	$0	2,197	2,197	$1,024,348	$932,156	$1,956,504	$1,956,504	$1,218,412
8	2027	$0	$0	$0	2,511	2,511	$1,084,603	$986,989	$2,071,592	$2,071,592	$1,205,686
9	2028	$0	$0	$0	2,824	2,824	$1,144,859	$1,041,822	$2,186,681	$2,186,681	$1,189,410
10	2029	$0	$0	$0	3,138	3,138	$1,205,115	$1,096,655	$2,301,769	$2,301,769	$1,170,103
11	2030	$6,484,000	$0	$6,484,000	3,138	3,138	$1,205,115	$1,096,655	$2,301,769	-$4,182,231	-$1,986,948
12	2031	$0	$129,680	$129,680	3,138	3,138	$1,205,115	$1,096,655	$2,301,769	$2,172,089	$964,434
13	2032	$0	$129,680	$129,680	3,138	3,138	$1,205,115	$1,096,655	$2,301,769	$2,172,089	$901,340
14	2033	$0	$129,680	$129,680	3,138	3,138	$1,205,115	$1,096,655	$2,301,769	$2,172,089	$842,374
15	2034	$0	$129,680	$129,680	3,138	3,138	$1,205,115	$1,096,655	$2,301,769	$2,172,089	$787,265
16	2035	$0	$129,680	$129,680	3,138	3,138	$1,205,115	$1,096,655	$2,301,769	$2,172,089	$735,762
17	2036	$0	$129,680	$129,680	3,138	3,138	$1,205,115	$1,096,655	$2,301,769	$2,172,089	$687,628
18	2037	$0	$129,680	$129,680	3,138	3,138	$1,205,115	$1,096,655	$2,301,769	$2,172,089	$642,643
19	2038	$0	$129,680	$129,680	3,138	3,138	$1,205,115	$1,096,655	$2,301,769	$2,172,089	$600,601
20	2039	$0	$129,680	$129,680	3,138	3,138	$1,205,115	$1,096,655	$2,301,769	$2,172,089	$561,309
21	2040	$0	$129,680	$129,680	3,138	3,138	$1,205,115	$1,096,655	$2,301,769	$2,172,089	$524,588
22	2041	$0	$129,680	$129,680	3,138	3,138	$1,205,115	$1,096,655	$2,301,769	$2,172,089	$490,269
23	2042	$0	$129,680	$129,680	3,138	3,138	$1,205,115	$1,096,655	$2,301,769	$2,172,089	$458,195
24	2043	$0	$129,680	$129,680	3,138	3,138	$1,205,115	$1,096,655	$2,301,769	$2,172,089	$428,220
25	2044	$0	$129,680	$129,680	3,138	3,138	$1,205,115	$1,096,655	$2,301,769	$2,172,089	$400,206
26	2045	$0	$129,680	$129,680	3,138	3,138	$1,205,115	$1,096,655	$2,301,769	$2,172,089	$374,024
27	2046	$0	$129,680	$129,680	3,138	3,138	$1,205,115	$1,096,655	$2,301,769	$2,172,089	$349,555
28	2047	$0	$129,680	$129,680	3,138	3,138	$1,205,115	$1,096,655	$2,301,769	$2,172,089	$326,687
29	2048	$0	$129,680	$129,680	3,138	3,138	$1,205,115	$1,096,655	$2,301,769	$2,172,089	$305,315
30	2049	$0	$129,680	$129,680	3,138	3,138	$1,205,115	$1,096,655	$2,301,769	$2,172,089	$285,341
31	2050	$0	$129,680	$129,680	3,138	3,138	$1,205,115	$1,096,655	$2,301,769	$2,172,089	$266,674

Disc. Rate:	**7.0%**			Tourism multiplier:	1.91
NPV:	**$14,956,106**	**BCR:**	**5.01**	Community Benefit:	100%

A9: Big4 Emu Beach Buried Seawall

Key Variables

Years to CoA incurring capital and maintenance costs		10
Delay to new Big4 developments		5
Capital cost of buried seawall (Emu Beach)	$	2,363,970
Ongoing maintenance requirements (spread over 100 years)	$	4,843,073

Visitation

Number of Big4 visitor nights		78,458
Additonal visitor nights as result of new Big4 developments		5%
Years to reach a steady state (new visitors)		10
Average visitor spend per night	$	192

Year		Direct Costs			Direct Benefits			Community benefit from Tourism (Multiplier)	*Total benefits ($)*	Net Benefits ($)	Discounted Net Benefits ($)
		Capital Cost	Maintenance	Total Costs ($)	Lost Visitors	New Development Visitors	Total Visitor Spend ($)				
1	2020	$0	$0	$0	-	-	$0	$0	$0	$0	$0
2	2021	$0	$0	$0	-	-	$0	$0	$0	$0	$0
3	2022	$0	$0	$0	-	-	$0	$0	$0	$0	$0
4	2023	$0	$0	$0	-	-	$0	$0	$0	$0	$0
5	2024	$0	$0	$0	-	-	$0	$0	$0	$0	$0
6	2025	$0	$0	$0	2,354	2,354	$1,205,115	$1,096,655	$2,301,769	$2,301,769	$1,533,766
7	2026	$0	$0	$0	2,746	2,746	$1,280,435	$1,165,195	$2,445,630	$2,445,630	$1,523,015
8	2027	$0	$0	$0	3,138	3,138	$1,355,754	$1,233,736	$2,589,491	$2,589,491	$1,507,107
9	2028	$0	$0	$0	3,531	3,531	$1,431,074	$1,302,277	$2,733,351	$2,733,351	$1,486,762
10	2029	$0	$0	$0	3,923	3,923	$1,506,394	$1,370,818	$2,877,212	$2,877,212	$1,462,629
11	2030	$2,363,970	$0	$2,363,970	3,923	3,923	$1,506,394	$1,370,818	$2,877,212	$513,242	$243,837
12	2031	$0	$48,431	$48,431	3,923	3,923	$1,506,394	$1,370,818	$2,877,212	$2,828,781	$1,256,013
13	2032	$0	$48,431	$48,431	3,923	3,923	$1,506,394	$1,370,818	$2,877,212	$2,828,781	$1,173,844
14	2033	$0	$48,431	$48,431	3,923	3,923	$1,506,394	$1,370,818	$2,877,212	$2,828,781	$1,097,050
15	2034	$0	$48,431	$48,431	3,923	3,923	$1,506,394	$1,370,818	$2,877,212	$2,828,781	$1,025,280
16	2035	$0	$48,431	$48,431	3,923	3,923	$1,506,394	$1,370,818	$2,877,212	$2,828,781	$958,206
17	2036	$0	$48,431	$48,431	3,923	3,923	$1,506,394	$1,370,818	$2,877,212	$2,828,781	$895,520
18	2037	$0	$48,431	$48,431	3,923	3,923	$1,506,394	$1,370,818	$2,877,212	$2,828,781	$836,934
19	2038	$0	$48,431	$48,431	3,923	3,923	$1,506,394	$1,370,818	$2,877,212	$2,828,781	$782,182
20	2039	$0	$48,431	$48,431	3,923	3,923	$1,506,394	$1,370,818	$2,877,212	$2,828,781	$731,011
21	2040	$0	$48,431	$48,431	3,923	3,923	$1,506,394	$1,370,818	$2,877,212	$2,828,781	$683,188
22	2041	$0	$48,431	$48,431	3,923	3,923	$1,506,394	$1,370,818	$2,877,212	$2,828,781	$638,493
23	2042	$0	$48,431	$48,431	3,923	3,923	$1,506,394	$1,370,818	$2,877,212	$2,828,781	$596,723
24	2043	$0	$48,431	$48,431	3,923	3,923	$1,506,394	$1,370,818	$2,877,212	$2,828,781	$557,685
25	2044	$0	$48,431	$48,431	3,923	3,923	$1,506,394	$1,370,818	$2,877,212	$2,828,781	$521,201
26	2045	$0	$48,431	$48,431	3,923	3,923	$1,506,394	$1,370,818	$2,877,212	$2,828,781	$487,103
27	2046	$0	$48,431	$48,431	3,923	3,923	$1,506,394	$1,370,818	$2,877,212	$2,828,781	$455,237
28	2047	$0	$48,431	$48,431	3,923	3,923	$1,506,394	$1,370,818	$2,877,212	$2,828,781	$425,455
29	2048	$0	$48,431	$48,431	3,923	3,923	$1,506,394	$1,370,818	$2,877,212	$2,828,781	$397,621
30	2049	$0	$48,431	$48,431	3,923	3,923	$1,506,394	$1,370,818	$2,877,212	$2,828,781	$371,609
31	2050	$0	$48,431	$48,431	3,923	3,923	$1,506,394	$1,370,818	$2,877,212	$2,828,781	$347,298

Disc. Rate: **7.0%**
NPV: **$21,994,767**
BCR: **17.09**
Tourism multiplier: 1.91
Community Benefit: 100%

A10: Complete Loss of Both Big4 Assets

Cost Variables

Years to Big4 leaving Albany		5
Absorbed cost of lease and other payments (if no new lessee can be found	$	195,000
Cost of additonal marketing / loss absrbed by CoA or other parties)	$	125,000

Visitation

Number of Big4 visitor nights		141,149
% visitors lost due to loss of beds		23.7%
Average visitor spend per night	$	192

Year		Direct Costs			Direct Benefits		Community benefit from Tourism (Multiplier)	*Total benefits ($)*	Net Benefits ($)	Discounted Net Benefits ($)
		Loss of Lease Income ($)	Loss of Marketing ($)	Total Costs ($)	Lost Visitors	Lost Visitor Spend ($)				
1	2020	$0	$0	$0	-	$0	$0	$0	$0	$0
2	2021	$0	$0	$0	-	$0	$0	$0	$0	$0
3	2022	$0	$0	$0	-	$0	$0	$0	$0	$0
4	2023	$0	$0	$0	-	$0	$0	$0	$0	$0
5	2024	$0	$0	$0	-	$0	$0	$0	$0	$0
6	2025	$0	$0	$0	-	$0	$0	$0	$0	$0
7	2026	$195,000	$125,000	$320,000	- 33,484	-$6,428,976	-$5,850,368	-$12,279,345	-$12,599,345	-$7,846,239
8	2027	$195,000	$125,000	$320,000	- 33,484	-$6,428,976	-$5,850,368	-$12,279,345	-$12,599,345	-$7,332,933
9	2028	$195,000	$125,000	$320,000	- 33,484	-$6,428,976	-$5,850,368	-$12,279,345	-$12,599,345	-$6,853,209
10	2029	$195,000	$125,000	$320,000	- 33,484	-$6,428,976	-$5,850,368	-$12,279,345	-$12,599,345	-$6,404,868
11	2030	$195,000	$125,000	$320,000	- 33,484	-$6,428,976	-$5,850,368	-$12,279,345	-$12,599,345	-$5,985,858
12	2031	$195,000	$125,000	$320,000	- 33,484	-$6,428,976	-$5,850,368	-$12,279,345	-$12,599,345	-$5,594,260
13	2032	$195,000	$125,000	$320,000	- 33,484	-$6,428,976	-$5,850,368	-$12,279,345	-$12,599,345	-$5,228,280
14	2033	$195,000	$125,000	$320,000	- 33,484	-$6,428,976	-$5,850,368	-$12,279,345	-$12,599,345	-$4,886,243
15	2034	$195,000	$125,000	$320,000	- 33,484	-$6,428,976	-$5,850,368	-$12,279,345	-$12,599,345	-$4,566,582
16	2035	$195,000	$125,000	$320,000	- 33,484	-$6,428,976	-$5,850,368	-$12,279,345	-$12,599,345	-$4,267,834
17	2036	$195,000	$125,000	$320,000	- 33,484	-$6,428,976	-$5,850,368	-$12,279,345	-$12,599,345	-$3,988,630
18	2037	$195,000	$125,000	$320,000	- 33,484	-$6,428,976	-$5,850,368	-$12,279,345	-$12,599,345	-$3,727,692
19	2038	$195,000	$125,000	$320,000	- 33,484	-$6,428,976	-$5,850,368	-$12,279,345	-$12,599,345	-$3,483,824
20	2039	$195,000	$125,000	$320,000	- 33,484	-$6,428,976	-$5,850,368	-$12,279,345	-$12,599,345	-$3,255,910
21	2040	$195,000	$125,000	$320,000	- 33,484	-$6,428,976	-$5,850,368	-$12,279,345	-$12,599,345	-$3,042,907
22	2041	$195,000	$125,000	$320,000	- 33,484	-$6,428,976	-$5,850,368	-$12,279,345	-$12,599,345	-$2,843,838
23	2042	$195,000	$125,000	$320,000	- 33,484	-$6,428,976	-$5,850,368	-$12,279,345	-$12,599,345	-$2,657,793
24	2043	$195,000	$125,000	$320,000	- 33,484	-$6,428,976	-$5,850,368	-$12,279,345	-$12,599,345	-$2,483,918
25	2044	$195,000	$125,000	$320,000	- 33,484	-$6,428,976	-$5,850,368	-$12,279,345	-$12,599,345	-$2,321,419
26	2045	$195,000	$125,000	$320,000	- 33,484	-$6,428,976	-$5,850,368	-$12,279,345	-$12,599,345	-$2,169,550
27	2046	$195,000	$125,000	$320,000	- 33,484	-$6,428,976	-$5,850,368	-$12,279,345	-$12,599,345	-$2,027,617
28	2047	$195,000	$125,000	$320,000	- 33,484	-$6,428,976	-$5,850,368	-$12,279,345	-$12,599,345	-$1,894,969
29	2048	$195,000	$125,000	$320,000	- 33,484	-$6,428,976	-$5,850,368	-$12,279,345	-$12,599,345	-$1,770,999
30	2049	$195,000	$125,000	$320,000	- 33,484	-$6,428,976	-$5,850,368	-$12,279,345	-$12,599,345	-$1,655,140
31	2050	$195,000	$125,000	$320,000	- 33,484	-$6,428,976	-$5,850,368	-$12,279,345	-$12,599,345	-$1,546,859

Disc. Rate:	**7.0%**			Tourism multiplier:	1.91
NPV:	**-$97,837,372**	**BCR:**	**-38.37**	Community Benefit:	100%

Appendix B: Background to the Cost-Benefit Analysis

Background

Cost-benefit analysis is a useful economic tool to evaluate the case for a project or proposal against the *status quo*. Importantly, it allows for an assessment in economic terms of intangible values. The impacts of a proposal for investment or intervention in a market are measured in terms of the economic, social and environmental costs and benefits. Costs represent the public's willingness-to-pay to avoid the resulting consequences of the intervention, whereas benefits reflect the public's willingness-to-pay for the consequences. The evaluation of a particular proposal considers the effects on the community as a whole, in order to give a 'global' perspective. As far as possible, costs and benefits are expressed in monetary terms, although assigning monetary values to some intangible effects can prove difficult. The primary purpose of the analysis is to identify the social net benefit of a specific intervention or investment proposal. Essentially, the cost-benefit process aims to determine whether the total estimated benefits resulting from a proposal exceed the estimated costs, and therefore, whether the project would result in an economically efficient allocation of resources.

Assessing Net benefits

In order to assess the overall value of the net benefits of an investment proposal, three measures are most commonly used. These measures are outlined below:

- **Net Present Value**: The net present value (NPV) of an investment scheme is the sum of the discounted net benefits. The net benefits are simply the expected total costs of a project in one year, subtracted from the expected total benefits in that same year. The stream of net benefits is then discounted to present day values using a discount rate. A reasonable starting point for a discount rate is the government's borrowing rate, i.e. the cost of funds to the government. Note, however, that such a discount rate does not generally reflect the true social opportunity cost of capital, i.e. the return on funds that could be realized by an alternative project or program. The sum of the discounted net benefits will give the net present value of the project. If the NPV is greater than zero, then the estimated total benefit exceeds the estimated total cost and the project will be socially beneficial. A project should go ahead if the NPV is greater than or equal to zero (NPV ≥ 0).
- **Internal Rate of Return**: The internal rate of return (IRR) measures the yield on investment. It is the interest rate that when substituted into the NPV formula gives an NPV of zero. When the NPV is zero, the IRR is equal to the discount rate and so a positive IRR implies that the project will earn more than the discount rate, or cost of capital. It is an indicator of the efficiency of an investment proposal, whereas the NPV indicates the magnitude of the net benefits that are expected to be generated from the proposal. A particular investment project is socially beneficial if the IRR exceeds the rate of return that is estimated to flow from alternative investments.
- **Benefit-Cost Ratio**: The benefit-cost ratio (BCR) is simply a measure of the present value of the benefits of a proposal divided by the present value of the capital or non-recurrent costs. If the BCR of a project is greater than one, the NPV will be greater than zero and so the project will be socially beneficial.

Efficiency Concepts

The benefits resulting from a proposed project are valued in terms of the public's **willingness-to-pay** for them. A consumer's willingness-to-pay for a good or service consists of two elements: actual expenditure and consumer surplus.

- **Consumer surplus** measures the benefit to a consumer of being able to purchase a product or service at a lower price than what they would have been willing to pay. Consumer surplus is maximized when there is allocative efficiency.
- **Allocative efficiency** refers to the overall efficient allocation of resources. The term refers to the situation where resources are allocated in a way that maximizes net benefit. Allocative efficiency is maximized where the benefit to an individual of consuming the last unit of a good is equal to the cost of consuming that unit, i.e. marginal benefit equals marginal cost.
- **Productive Efficiency** is used to describe the situation where a set of goods or services are produced at the lowest possible cost.
- The costs resulting from a proposed project are valued according to other people's willingness-to-pay for the resources involved. That is, the **opportunity cost** of the resources involved in a particular project.
- **Opportunity cost** refers to the value of a resource in its best alternative use. For example, when evaluating the case for a particular investment scheme, the benefits that may result from investing the resources elsewhere should be assessed. The benefit of investment elsewhere is equal to the opportunity cost of the proposed investment scheme. Note that, the costs of employing a resource should be considered 'sunk' if the opportunity cost is equal to zero.

Distributional impacts

The impacts would be expected to be highly distributional. In order to fully capture the distributional impacts in this case, the local economic benefits for the regions surrounding the development will be taken into consideration, including their local multiplier effects. While taking a state-level view of the impacts may not merit inclusion of local economy multipliers, this approach would mask the highly distributional impacts of the closure of regional primary development.

Assumptions

Discount Rate

Infrastructure Australia requires that cost-benefit analyses are presented for the following real discount rates:

- 4 per cent;
- 7 per cent (central estimate); and
- 10 per cent.

The debate on which rate should be used to discount future benefits and costs in cost-benefit analysis has been ongoing for many decades, and there are a range of estimation methods. However, the 7 percent central estimate proposed by Infrastructure Australia (and sensitivity testing) is in accordance with the majority of national, state and territory guidelines on cost-benefit analysis and is based on the opportunity cost of capital in the market sector. The Office of Best Practice Regulation 2014 cost-benefit analysis guidelines require use of an annual real discount rate of 7 percent[1].

Timeline

A period of 31 years has been assumed for the cost-benefit analyses, corresponding to a reasonable assessment of the time before high risk events begin to seriously affect the study area, subject to legislative changes in the meantime.

Multipliers

The multiplier effect refers to the idea that a rise in direct spending in an economy can cause a subsequent rise in secondary spending, leading to an increase in income which exceeds the original rise in direct spending. The multiplier effect is illustrated in the Keynesian Multiplier Model. In cost-benefit analyses, multipliers are often excluded as the impacts at state-level generally balance out if expenditure is merely shifted from one place to another. However, in the current analyses, local multipliers have been retained in order to fully capture the distributional impacts on the local regional economy. A variety of multipliers could be used, depending on the method of measurement and the geographical scope of the multiplier. In this analysis, a conservative multiplier of 1.91 has been used for the flow-on tourism impacts in the local economies surrounding the development.

Inflation

Inflation has not been included in the calculations. The costs and benefits are at today's rates. The exception is where capital costs have been escalated, based on the fact that construction costs are increasing much faster than CPI.

[1] *Commonwealth Office of Best Practice Regulation (2014) OBPR Guidance Note – Cost-Benefit Analysis.*

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16 July 2019

Mr Simon Shuttleworth
Big4 Middleton Beach Holiday Park
28 Flinders Parade
Albany WA 6330

Dear Simon

BIG 4 HOLIDAY PARKS – REVIEW OF FINAL DRAFT CHRMAP (

Previously we provided you with some comments on the draft version (dated 21 March 2019) of the Emu Point to Middleton Beach Coastal Hazard Risk Management and Adaptation Plan (CHRMAP). These comments were presented in our letter dated 9 May 2019, and were provided to help assist you with your review of the document and its recommendations as they relate to the Big4 Holiday Parks at Middleton Beach and Emu Point.

Following our initial advice, we have been provided with a copy of the CHRMAP Implementation Plan (dated 16 May 2019). We have also reviewed an assessment of the economic benefits associated with the recommendations of the CHRMAP Implementation Plan. This economic benefits assessment has been completed by Keston Technologies. Following review of these documents we provide the following additional comments.

BIG4 Middleton Beach – MU2
The advice provided in our previous letter appears to still be relevant, in particular the statement within the CHRMAP Implementation Plan that the MCA criteria developed by the community favoured managed retreat of existing assets. Scoring of the MCA by the community actually favoured protection through construction of a seawall.

Further support for the construction of a seawall is provided through review of the cost-benefit analysis completed by Keston Technologies. This analysis found that construction of a seawall to protect the existing asset was by far the most beneficial outcome. It is acknowledged that the level of detail within the cost-benefit analysis completed by Keston Technologies is well beyond that completed for the CHRMAP. Therefore, in light of this information, a stronger case for protection of BIG4 Middleton Beach could potentially be made within the CHRMAP Implementation Plan.

The Implementation Plan notes the requirement for monitoring of the shoreline to understand any changes to the coastal erosion risk profile over time. Such monitoring is supported and would identify when construction of the protection would be necessary. It is noted that, aside from the cost-benefit of delaying the construction of any protection until it is actually required, the other key benefit is that the structure could be designed to accommodate the conditions that would be experienced over the relevant planning timeframe. For example, assuming a 50 year design life for a structure, construction of any structure now would mean that the structure may only be suitable until around 2070. However, if the structure is not required until 2060, then a 50 year design life would mean that the structure would be suitable until around 2110.

BIG4 Emu Point – MU3
The Implementation Plan for Emu Point still refers to the Managed Retreat of assets as the preferred option, even though this was rated by the community as the least preferred option. This was discussed

in further detail within our previous letter. In light of these rankings and previous discussion provided, it seems remiss for the Implementation Plan to not be considering the option for protection of existing assets through construction of a seawall. In particular, it is noted that, whilst there may be aesthetic issues associated with the existing seawall, these issues could potentially be resolved through implementation of an improved landscaping plan within the foreshore area to enhance user amenity and recreation opportunities. One need look no further than the Busselton foreshore as an example of where landscaping and recreational spaces can be provided behind coastal protection structures to great effect. The cost-benefit analysis by Keston Technologies also found that construction of a seawall to protect BIG4 Emu Point was by far the most beneficial outcome.

The recommended adaptation option within the Implementation Plan seeks to remove a section of the existing seawall and realign it . This removal and realignment is likely to have a significant impact on the shoreline alignment within this area, and rapid shoreline changes are likely to occur. This is noted briefly within the document and is shown in Figure 33 of the CHRMAP Implementation Plan.

Given the above, there is compelling information to suggest that a seawall option should be considered within the Implementation Plan. There would be two different options available for the construction of a seawall. One option would be to construct a seawall some distance seaward of the BIG4 park boundary in order to ensure that a foreshore space is available in the future to provide the necessary amenity and recreational opportunities. The other option would be to construct a seawall along the approximate alignment of the boundary to the park. This option would maximise the area available on the beach at the expense of the foreshore recreational space. These potential alignments are shown in Figure 1 below in orange and pink respectively, and have been overlayed on the recommended adaptation approach layout within the Implementation Plan.

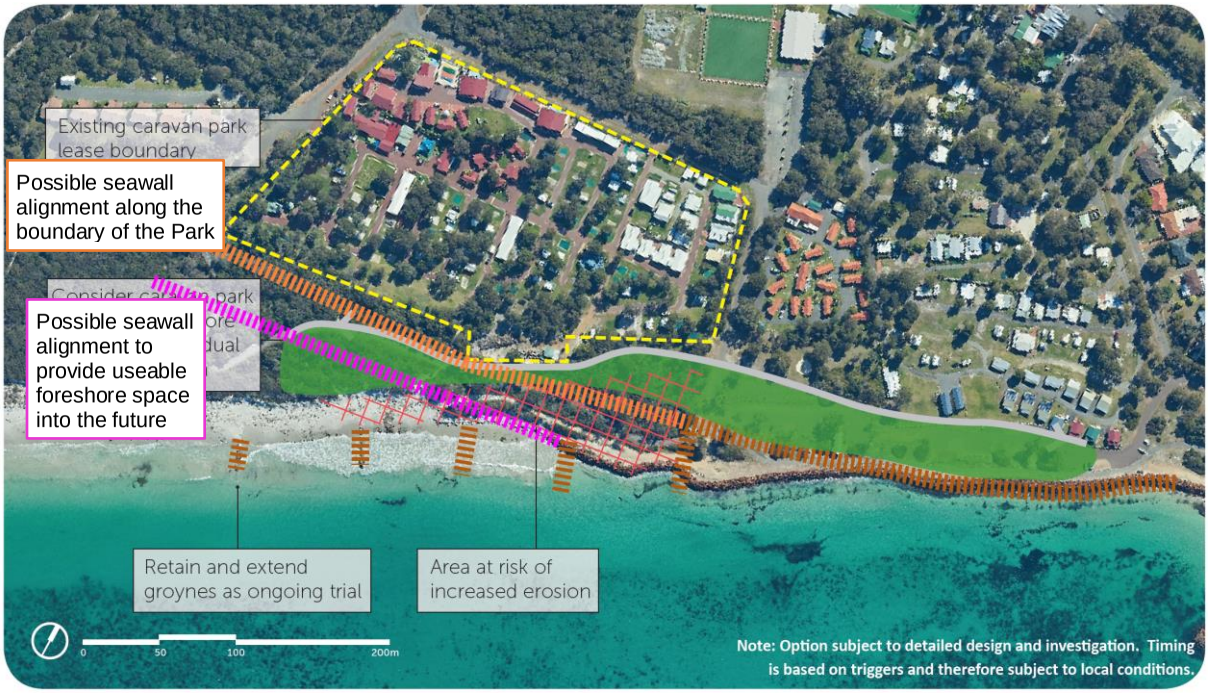

Figure 1 Potential Alignment of Seawall Options Overlayed on Recommended Adaptation Plan within the CHRMAP Implementation Plan

Similar to the situation with the seawall protection of BIG4 Middleton Beach, any such coastal protection scheme could be constructed when the coastal erosion threat is realised, as determined through the proposed monitoring program. In this location, a staged approach to the construction would also make sense given the cost-benefits and flexibility that it allows for future management, including ensuring that the design life of the structure is appropriately maximised.

Depending on the alignment of the seawall that was chosen, material from the existing seawall could either be reused in the construction, or the existing wall could be retrofitted to achieve the necessary design requirements. Such retrofitting could include placement of an additional layer, or layers, of armour over the structure, as well as increasing the crest height to reduce overtopping rates or construction of an additional toe to prevent scour.

We trust the information provided above is useful for you when considering the recommendations of the CHRMAP Implementation Plan. Please do not hesitate to contact the undersigned should you have any further queries.

Yours sincerely

for and on behalf of
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9 May 2019

Mr Simon Shuttleworth
Big4 Middleton Beach Holiday Park
28 Flinders Parade
Albany WA 6330

Dear Simon

BIG 4 HOLIDAY PARKS – ASSISTANCE WITH CHRMAP RESPONSES

As requested, we have reviewed the Emu Point to Middleton Beach Coastal Hazard Risk Management Adaptation Plan (CHRMAP) and provide the following information to assist you with your consideration of the document and its recommendations.

Information has been presented for both Big4 Middleton Beach and Big4 Emu Point.

BIG4 Middleton Beach – MU2

Assessment of Preferred Adaptation Option

A range of different adaptation options were assessed for the future coastal adaptation of Big4 Middleton Beach. These options were assessed using the multi-criteria analysis (MCA) that was developed for this project. Separate assessments were completed by both the Community Advisory Panel as well as by the Project Team, with the project team assessment termed the Technical Score.

The MCA identified the preference to *Avoid Further Development* across the broader management unit, but noted that the treatment of existing infrastructure, in particular Big4 Middleton Beach, needs to be considered separately.

Interestingly, as discussed in the CHRMAP, MCA ratings from the Community Advisory Panel and the Project Team differed in their preference for the treatment of this asset. The Community Advisory Panel identified the *Seawall (Rock)* as being the preferred option for the protection of this asset, whilst the Project Team identified the *Relocate Assets* option as being preferred. A level of justification for this difference is discussed, however the key point of difference between the ratings is in the scores provided by the Project Team for the *Social Impact (Community)* criteria of the MCA. The overall ratings table (Table 8.5 within the CHRMAP) is provided below.

Table 1 MCA Rating Table for Big4 Middleton Beach (Table 8.5 from CHRMAP)

	Community Advisory Panel Scores					Technical Scores				
Criteria	Avoid Further Development	Leave Assets Unprotected	Relocate Assets	Seawall (rock)	Seawall (sandbags)	Avoid Further Development	Leave Assets Unprotected	Relocate Assets	Seawall (rock)	Seawall (sandbags)
Maintenance Cost	1	3	3	1	2	1	3	3	1	2
Environmental Impact	2.3	3.6	2.3	3.4	3.5	2	4	2	4	4
Social Impact - Residential not protected	2.9	3.7	3.1	2.1	2.3	3	3	4	1	1
Social Impact - Residential protected already										
Social Impact - Business property										
Social Impact (community)	2.4	3.7	3.1	2.9	3.1	1	3	1	4	4
Reversibility	2.7	3.4	3.4	4.1	3.3	1	1	1	4	3
Effectiveness	2.9	3.5	2.2	2.8	2.8	3	3	2	1	1
TOTAL COMBINED	**14.2**	**20.8**	**17.3**	**16.3**	**17.1**	**11**	**17**	**13**	**15**	**15**

It is understood and acknowledged that in some cases there is a requirement for the technical experts to essentially overrule the outcomes from a community assessment. This is sometimes required when considering items such as cost or technical effectiveness of an option which the community may not have the necessary experience or expertise to fully consider. However, in this instance it seems odd that the Project Team has effectively overruled the Community Advisory Panel rating for a criterion that was established to directly gauge the impact of the proposal on the community. Of all the criteria that were assessed, it seems intuitive that the rating of the social impacts should be the one item that would be carried through into the overall scoring for the options. As it stands, it is not apparent what function the Community Advisory Panel actually played in the assessment of the options, as across all management units the scores by the Project Team were used to chose the preferred adaptation options, with there being little correlation between the criteria scores provided by the Community Advisory Panel and the Project Team.

It is discussed within the CHRMAP that the ratings applied by the Project Team for the *Social Impact (Community)* rating at Big4 Middleton Beach were to take account of the values developed by the community which rated the coastal amenity of the beach as one of the most valued assets. Whilst that is true, the rating scale also gave the same weighting to the requirement to:

> *"retain social/community/businesses (to drive economy)*
> *= community benefit overall;*
> *= community focal points/meeting place".*

As a result, it could reasonably be expected that the Community Advisory Panel considered more than just the beach when completing their rankings. This seems all the more likely when considering the fact that the community actually rated the *Seawall (Rock)* option to be slightly better than the *Relocate Assets* option.

Given the above, further consideration should perhaps be given to the ratings for these options, as the significance of these ratings alone is enough to change the preferred adaptation pathway. For instance, the Project Team scores for the other criteria in the MCA (i.e. excluding the *Social Impact (Community)*) sum to 12 for the *Relocate Assets* option and 11 for the *Seawall (Rock)* option. Therefore, if the *Social Impact (Community)* criteria were ranked the same, as essentially indicated by the Community Advisory Panel, then the preferred adaptation approach would be the *Seawall (Rock)* option. This would also accord with the outcomes of the Community Advisory Panel's own assessment.

Further Information on the Seawall (Rock) Option

The CHRMAP acknowledges that the information regarding the various coastal protection options that are considered is quite high level. This is not uncommon for a CHRMAP assessment. However, a more detailed review may help to provide improved clarity about the *Seawall (Rock)* option should it be considered as the preferred adaptation option for this location.

Further details in response to queries received from you are provided below.

- Relative Likelihood of Coastal Erosion Risk
  The CHRMAP has been based on the results of an erosion assessment that has been completed to the requirements of State Planning Policy 2.6 – the State Coastal Planning Policy (SPP2.6). Estimation of future shoreline change is highly uncertain and in recognition of this fact SPP2.6 adopts an assessment methodology that is deliberately and justifiably conservative and advocates the use of the precautionary principle. As a result, the coastal hazard lines should not be considered to be predictions of future shoreline change, but rather lines which have a low risk of being realised over their respective planning horizons. Resultingly, these lines are appropriate for use in developing coastal adaptation plans and (relatively) worst case timeframes for implementation, but actual triggers for change should be linked to shoreline observations. This means that adaptation measures are only implemented when required, which, at the very least, provides cost benefits.

- Beach Regeneration after Storm Event
  Generally the combination of higher, steeper waves and elevated water levels that occur during severe storm events results in erosion of higher portions of the beach profile that are not normally vulnerable to wave attack. The eroded material is typically transported offshore, forming bars, which help to break the incident waves and limit further beach erosion. However, once conditions return to normal, energy from background swell waves rebuilds the beach – although the timescales for rebuilding the beach are typically much longer than the timescales for storm erosion.

  This is demonstrated in Figure 1, which shows the changes that occurred to Middleton Beach as a result of the severe storm event that was experienced in 1984. This figure demonstrates that while significant erosion was experienced, the beach recovery was relatively quick and complete.

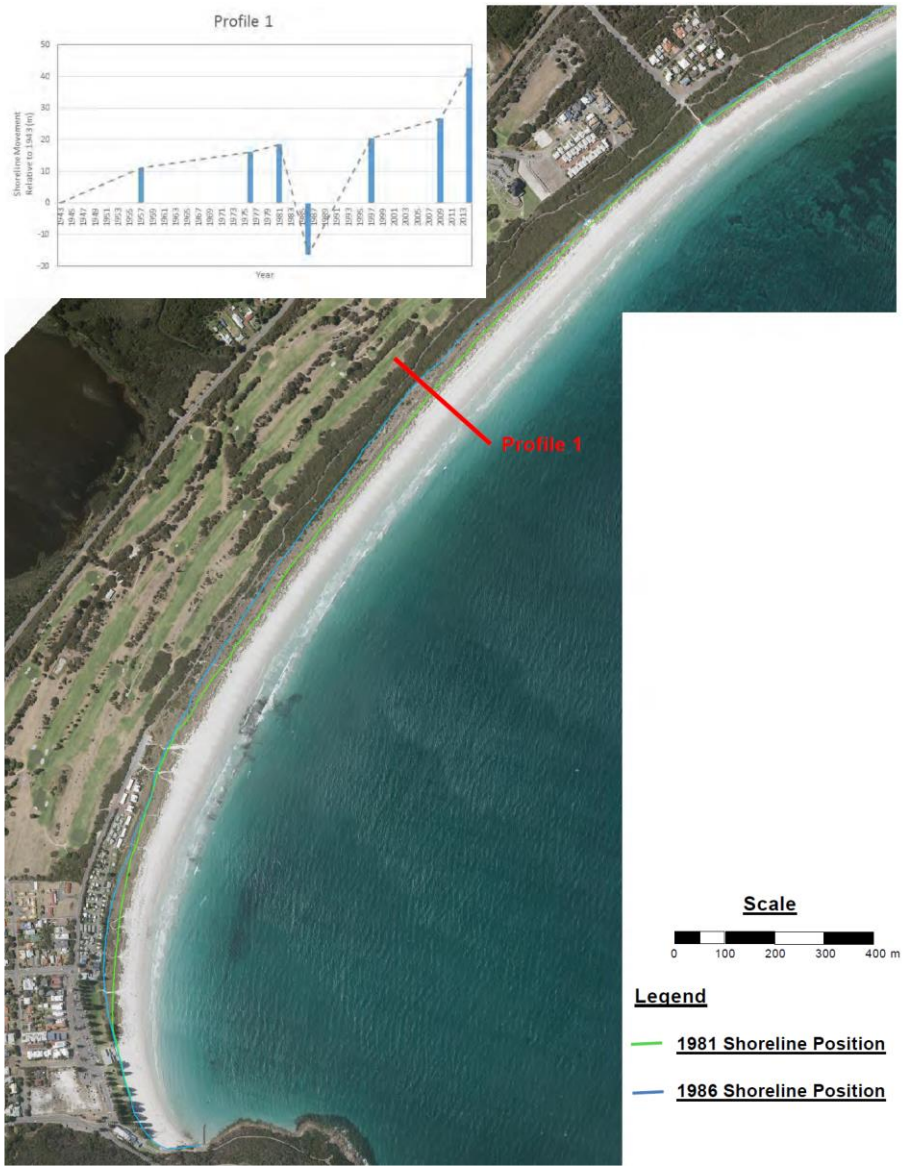

Figure 1 Extent of Erosion Along Middleton Beach Caused by 1984 Storm

The significance of this observation is twofold when considering the potential construction of a seawall to protect Big4 Middleton Beach.

1. First, if the shoreline retreats as a result of sea level rise, then at some point in the future the impact of severe storm events could uncover the seawall, however it is expected that the shoreline would recover over time and a beach would initially be maintained in front of the seawall.

2. When considering any triggers for coastal adaptation, including the possible construction of a seawall, the trigger should be reviewed against the mechanism that has led to the trigger being reached or exceeded. For example, the current trigger within the CHRMAP suggests that management actions need to be completed if the shoreline retreats to within 35 m of the site – based on an allowance for severe storm erosion. However, Figure 1 shows that if the shoreline were to experience erosion as a result of a severe storm, then this trigger could be reached, yet the shoreline would quickly rebound, meaning that any trigger exceedance would be reversed. As a result, it is suggested that any trigger for

adaptation works be linked to an assessment of whether the driving factor in the trigger exceedance was chronic or acute erosion effects. Where acute (storm) erosion effects are the key driver, the decision on triggering adaptation requirements should be based on review by an experienced coastal engineer to determine the level of risk to the infrastructure using available survey and other information. If the trigger is exceeded by chronic erosion then the likelihood of reversal of the erosion is unlikely and adaptation measures should be implemented.

On review of the Coastal Hazard Mapping for this site, it is not anticipated that a trigger based on chronic erosion of the shoreline would be experienced until at least around 2050. This is on the basis that the coastal hazard lines include an allowance for the potential impacts of severe storm erosion, and it is not until around 2050 that the hazard mapping suggests that the shoreline would have receded enough to allow the design storm event to impact the site (noting that if a severe erosion event was to occur before this time, it is expected that the shoreline would recover quite quickly, as observed in 1984).

- Timing for Seawall Construction and Beach Access
  As discussed previously, it is anticipated that construction of the seawall would be completed when a trigger is reached. Based on the results of the Coastal Hazard Mapping, it is unlikely that this trigger would be reached until at least around 2050. Given this timing, it may be possible to establish a funding mechanism in the interim to provide for this construction, when required.

  When initially constructed, the seawall would still be approximately 30 m from the seaward edge of the dunes. Therefore, it is anticipated that the seawall would be constructed and then buried before the area is revegetated. This construction approach is preferred in most instances, as it means that the seawall is in place and provides protection to assets, yet is buried and does not inhibit beach access until such time as the seawall is completely exposed.

- Potential for Accelerated Erosion on Shoreline South of the Seawall
  It is broadly accepted that sediment is typically transported along Middleton Beach towards Ellen Cove. As a result, a structure that blocks the sediment movement along the beach could potentially cause an adverse shoreline response on the downdrift side of the structure. Nevertheless, seawalls are not overly effective at preventing sediment transport along the coastline. Seawalls only really contribute to trapping of sediment when they protrude some distance into the water to a depth which is sufficient to block most of the transport within the active zone. It is not anticipated that this would occur within a 50 year planning horizon.

- Reversibility of Seawall Construction
  From an engineering perspective, it is important to realise that the construction of a seawall is not irreversible. Structures can always be removed in the future and the site remediated. There would obviously be demolition costs associated with any such decision, but these costs would ideally be considered as part of a whole of life cost benefit analysis if it were contemplated that a structure be removed in the future.

- Cost Estimate for Seawall Construction

  To help provide context to the review of the options, we have prepared a more detailed estimate of the costs associated with seawall construction and maintenance. These estimates have been prepared to provide an indication of the cost to construct and maintain a seawall over its lifetime. To be consistent with the information provided in the CHRMAP, costs have been provided to ensure protection over a 100 year planning horizon.

  A staged approach has been assumed for the seawall construction. This approach would see the seawall constructed to be able to withstand the conditions (and potential shoreline location indicated by the 50 year coastal hazard line) initially once a trigger is reached, before being upgraded after approximately 50 years to be able to withstand the conditions to the end of the 100 year planning horizon. This approach is noted as being potentially conservative given the previous discussion about the conservatism within the coastal hazard lines, but is reasonable for coastal planning.

  One key element of this proposed approach is that the retrofitting of the seawall after approximately 50 years requires the seawall to be adequately founded to prevent toe scour from becoming an issue. As a result, the initial construction cost estimate allows for the construction of the toe at a suitable depth for the entirety of the planning horizon. The construction cost estimate for the initial seawall construction is provided in Table 2.

Table 2 Construction Cost Estimate for Initial Seawall Construction Fronting Big4 Middleton Beach

Item	Activity	Quantity	Units	Unit Rate	Subtotal	Total for Item
1	**Preliminaries, Supervision, Mobilisation & Demobilisation**					$ 200,000
1.1	Site establishment, insurances and BCITF	1	Item	$ 25,000	$ 25,000	
1.2	Management and supervision, survey, testing etc	1	Item	$ 65,000	$ 65,000	
1.3	Mobilisation to site	1	Item	$ 55,000	$ 55,000	
1.4	Demobilisation and site clean up	1	Item	$ 55,000	$ 55,000	
2	**Rock Seawall Construction**					$ 2,807,000
2.1	Excavate natural surface to enable the construction of the coastal protection structures	27,000	m3	$ 4.00	$ 108,000	
2.2	Trim slope, supply and place geotextile	8,500	m2	$ 20	$ 170,000	
2.3	Supply and place filter material	5,100	m3	$ 130	$ 663,000	
2.4	Supply and place class I granite armour	15,000	t	$ 115	$ 1,725,000	
2.5	Backfill site to original dune profile	27,000	m3	$ 4.00	$ 108,000	
2.6	Dune stabilisation and planting	5,500	m2	$ 6	$ 33,000	
	Subtotal 1				$ 3,007,000	$ 3,007,000
	Management & Design Fees	5	%		$ 150,350	$ 150,350
	Total Estimated Cost (exc. GST)				$ 3,157,350	$ 3,157,350

The cost of the upgrade to the seawall after approximately 50 years is provided in Table 3. These upgrade works would involve the placement of an additional layer of larger armour rock over the top of the existing structure. This additional layer of larger armour would provide the necessary increase in crest height (from 3.2 mAHD initially to 5.4 mAHD after retrofitting) and armour weight to be able to withstand impact from larger waves.

Table 3 Construction Cost Estimate for Construction of Seawall Upgrade Fronting Big4 Middleton Beach after Approximately 50 years

Item	Activity	Quantity	Units	Unit Rate	Subtotal	Total for Item
1	**Preliminaries, Supervision, Mobilisation & Demobilisation**					$ 190,000
1.1	Site establishment, insurances and BCITF	1	Item	$ 35,000	$ 35,000	
1.2	Management and supervision, survey, testing etc	1	Item	$ 65,000	$ 65,000	
1.3	Mobilisation to site	1	Item	$ 45,000	$ 45,000	
1.4	Demobilisation and site clean up	1	Item	$ 45,000	$ 45,000	
2	**Rock Seawall Construction**					$ 2,960,000
2.1	Supply and place granite armour - class I	4,000	t	$ 115	$ 460,000	
2.2	Supply and place granite armour - class II	20,000	t	$ 125	$ 2,500,000	
	Subtotal 1				$ 3,150,000	$ 3,150,000
	Management & Design Fees	5	%		$ 157,500	$ 157,500
	Total Estimated Cost (exc. GST)				$ 3,307,500	$ 3,307,500

Maintenance of the structure will also need to be completed throughout its life to ensure that it continues to function. This maintenance would be required after the structure becomes exposed to regular wave action. This is not expected to occur at least within the coming 2 to 3 decades. Thereafter, the maintenance cost would generally be expected to be in the order of 10% of the capital cost per decade.

BIG4 Emu Point – MU3

Assessment of Preferred Adaptation Option

As seen with the assessment of the preferred management option for Big4 Middleton Beach, there are conflicting outcomes from the MCA's completed by the Community Advisory Panel and the Project Team. The most surprising result from this is that the option that was rated as the worst option by the Community Advisory Panel (*Relocate Assets / Sandbag Trial*) has been rated as the best option by the Project Team and has subsequently been adopted as the recommended adaptation option. Once more, there appears to be a misalignment between the community scores and those of the Project Team.

Table 4 MCA Rating Table for Big4 Emu Point (Table 8.7 from CHRMAP)

	Community Advisory Panel Scores					Technical Scores				
Criteria	Relocate Assets/ Sandbag Trial	Sand Nourishment	Nearshore Structures Breakwaters	Nearshore Structures - Groynes	Seawalls/ revetments	Relocate Assets/ Sandbag Trial	Sand Nourishment	Nearshore Structures Break- waters	Nearshore Structures - Groynes	Seawalls/ revetments
Maintenance Cost	4	5	3	2	2	4	5	3	2	2
Environmental Impact	3.4	2.8	3.0	3.2	3.7	2	2	4	4	4
Social Impact - Residential not protected	4.2	3.4	2.8	2.8	2.8	4	2	1	1	1
Social Impact - Residential protected already										
Social Impact - Business property										
Social Impact (community)	3.3	3.2	3.1	3.1	3.2	1	2	3	4	2
Reversibility	3.1	1.9	3.4	3.7	3.4	1	1	4	4	4
Effectiveness	3.6	4.0	2.9	3.1	3.1	1	4	1	4	1
TOTAL COMBINED	**23.9**	**21.3**	**22.1**	**20.9**	**21.3**	**13**	**16**	**16**	**19**	**14**

Similar to the Big4 Middleton Beach assessment, the justification for the Project Team to overrule the results from the Community Advisory Panel is stated as the interpretation of the community values associated with the preservation of the beach. Once more, it may be that this line of thinking is not necessarily correct, as there are other items that are ranked within the assessment matrix for *Social Impact (Community)* which are not just about beach retention. The community sentiment in this regard is arguably, therefore, best assessed by the community.

Given the Community Advisory Panel rated the *Social Impact (Community)* criteria for the *Relocate Assets / Sandbag Trial* as the poorest outcome, if this was changed within the Project Team scores it would mean that *Seawalls/Revetments* would be the favoured option. This would accord reasonably well with the results from the Community Advisory Panel, which rated *Seawalls/Revetments* as the equal second best option.

On the basis of the above information it would seem that the *Seawalls/Revetments* option would provide the best balance between the outcomes of the assessments completed by the Community Advisory Panel and the Project Team.

Further Relevant Information

As requested, we have prepared the following information in response to queries raised regarding the coastal adaptation approach and the methodology used in arriving at this outcome.

- Condition Rating for the Existing Rock Revetment at Emu Point
  The CHRMAP rates the condition of the existing rock revetment at Emu Point as Poor and assumes a remaining design life of 5 years. Whilst the documents that discuss the detailed condition ratings of these structures were not available for review, review of recent imagery of the structures does not appear to support this rating. A selection of photographs of the structure are shown below, though numerous other more detailed photographs were also reviewed.

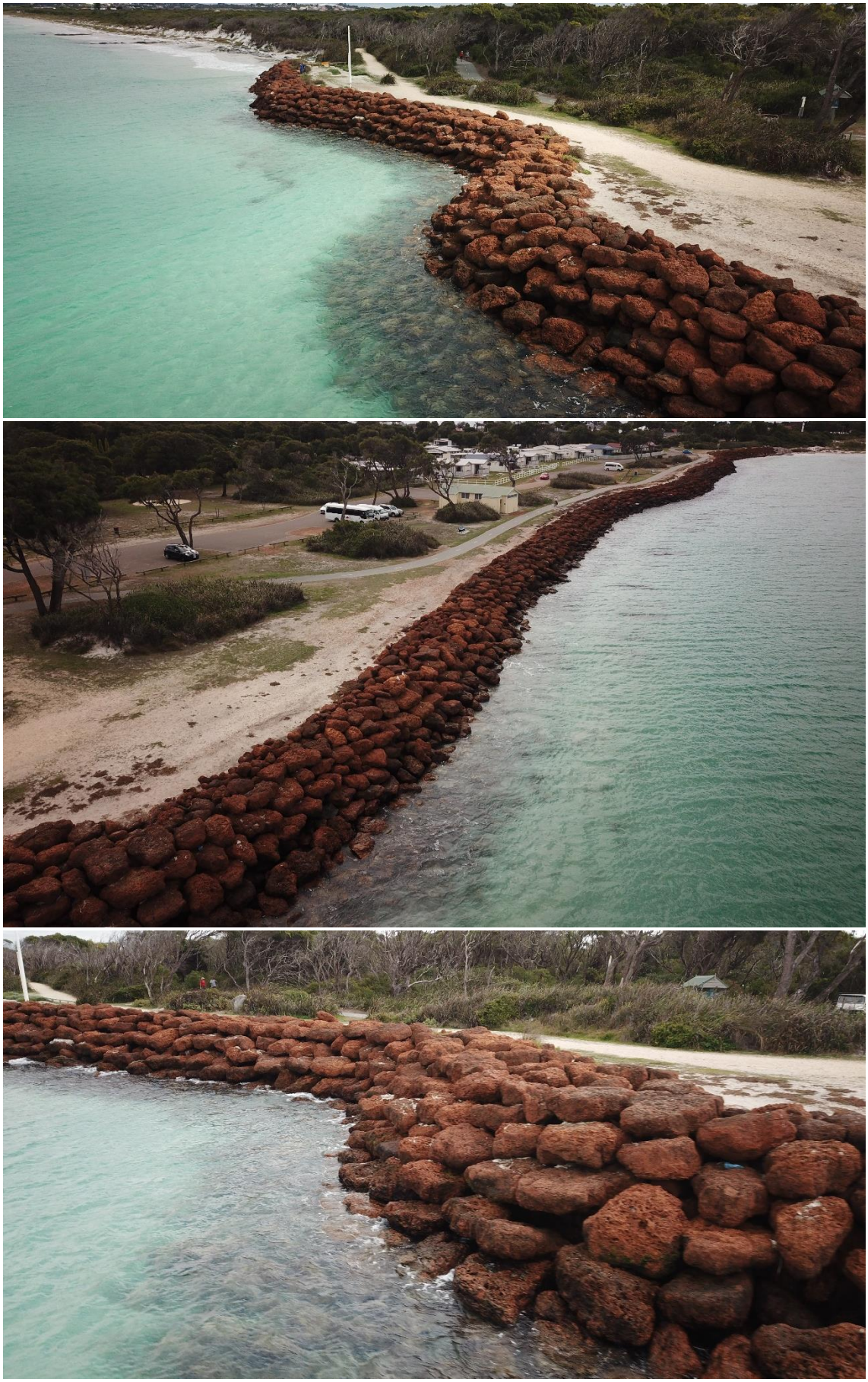

Figure 2 Photographs of existing Rock Revetment at Emu Point

Guidance on assessing the condition of rubble mound structures, such as this one, is provided in *Condition and Performance Rating Procedures for Rubble Breakwaters and Jetties* (USACE 1998). This system recommends that the condition and functional ratings of a structure's condition consider a range of structural defects including the following:

1. Breach or loss of crest elevation.
2. Core exposure or loss.
3. Armour movement or loss.
4. Loss of armour interlocking.
5. Armour defects, weathering and undersize armour.
6. Slope defects.

From review of the photographs very few of these defects can actually be seen along the structure. For instance, there is little evidence of settlement of the crest, exposure of the core or large defects associated with armour loss or movement. Some areas of the structure that require maintenance were identified, however there is nothing to suggest that a failure of the structure would be imminent within the next 5 years. In fact, one of the strengths of rubble mound structures is their robustness and ability to provide protection even after experiencing some damage. Given this fact it is considered extremely unlikely that the structure would fail within the next 5 years.

- Impact of Removing the "Tail" of the Existing Rock Revetment
  Options that have been assessed for Big4 Emu Point contemplate the removal of the "tail" of the existing revetment. These options also identify an area of increased erosion risk associated with the removal of this structure. This risk of increased erosion is very real and is likely to be experienced if the structure is removed. This increased risk of erosion would result from the realignment of the unprotected shoreline and would occur as the existing shoreline – protected by the revetment – is currently much further seaward than could be achieved without protection. Removing the "tail' of the existing revetment would therefore increase the risk exposure of Big4 Emu Point to coastal erosion.

  It is noted that the option preferred by the Project Team for this location is the *Relocate Assets / Sandbag Trial*. This option includes continuing with the trial of sandbag (geosynthetic sand containers or GSC's) groynes in this location. Whilst these groynes may help to stabilise the beach to some extent, large realignment of the shoreline would still be expected with the removal of the revetment "tail". Furthermore, these groynes would not provide any direct protection against the impact of cross shore erosion events (storms), thus Big4 Emu Point would still be at increased risk of coastal erosion.

- Timing for Seawall Construction and Beach Access
  Similar to Big4 Middleton Beach, it is anticipated that construction of the seawall would be completed when a trigger is reached. Based on the results of the Coastal Hazard Mapping, it is unlikely that this trigger would be reached until at around 2050. Given this timing, it may be possible to establish a funding mechanism in the interim to provide for this construction, when required.

When initially constructed, the seawall would still be approximately 30 m from the seaward edge of the dunes. Therefore, it is anticipated that the seawall would be constructed and then buried before the area is revegetated. This construction approach is preferred in most instances, as it means that the seawall is in place and provides protection to assets, yet is buried and does not inhibit beach access until such time as the seawall is completely exposed.

- Cost Estimate for Seawall Construction

  To help provide context to the review of the options, we have prepared a more detailed estimate of the costs associated with seawall construction and maintenance. These estimates have been prepared to provide an indication of the cost to construct and maintain a seawall over its lifetime. To be consistent with the information provided in the CHRMAP, costs have been provided to ensure protection over a 100 year planning horizon.

  For the purposes of preparing this construction cost estimate it has been assumed that seawall protection would be required along the entire frontage of Big4 Emu Point. This assumption has been made on the basis that any upgrade to the existing seawall would need to be similar to that proposed, therefore these costs represent the total cost expected for this section of coastline. It is anticipated that the seawall would be constructed as close to the boundary of the park as possible to provide the widest foreshore area for as long as possible.

  As for Big4 Middleton Beach, a staged approach has been assumed for seawall construction fronting Big4 Emu Point. This approach would see the seawall constructed to be able to withstand the conditions (and potential shoreline location indicated by the 50 year coastal hazard line) initially, before being upgraded after approximately 50 years to be able to withstand the conditions to the end of the 100 year planning horizon. This approach is noted as being potentially conservative given the previous discussion about the conservatism within the coastal hazard lines, but is reasonable for coastal planning.

  One key element of this proposed approach is that the retrofitting of the seawall after approximately 50 years requires the seawall to be adequately founded to prevent toe scour from becoming an issue. As a result, the initial construction cost estimate allows for the construction of the toe at a suitable depth for the entirety of the planning horizon. The construction cost estimate for the initial seawall construction is provided in Table 5.

Table 5 Construction Cost Estimate for Initial Seawall Construction Fronting Big4 Emu Point

Item	Activity	Quantity	Units	Unit Rate	Subtotal	Total for Item
1	**Preliminaries, Supervision, Mobilisation & Demobilisation**					$ 200,000
1.1	Site establishment, insurances and BCITF	1	Item	$ 25,000	$ 25,000	
1.2	Management and supervision, survey, testing etc	1	Item	$ 65,000	$ 65,000	
1.3	Mobilisation to site	1	Item	$ 55,000	$ 55,000	
1.4	Demobilisation and site clean up	1	Item	$ 55,000	$ 55,000	
2	**Rock Seawall Construction**					$ 2,051,400
2.1	Excavate natural surface to enable the construction of the coastal protection structures	20,000	m3	$ 4.00	$ 80,000	
2.2	Trim slope, supply and place geotextile	6,100	m2	$ 20	$ 122,000	
2.3	Supply and place filter material	3,700	m3	$ 130	$ 481,000	
2.4	Supply and place class I granite armour	11,000	t	$ 115	$ 1,265,000	
2.5	Backfill site to original dune profile	20,000	m3	$ 4.00	$ 80,000	
2.6	Dune stabilisation and planting	3,900	m2	$ 6	$ 23,400	
	Subtotal 1				$ 2,251,400	$ 2,251,400
	Management & Design Fees	5	%		$ 112,570	$ 112,570
	Total Estimated Cost (exc. GST)				$ 2,363,970	$ 2,363,970

The cost of the upgrade to the seawall after approximately 50 years is provided in Table 6. These upgrade works would involve the placement of an additional layer of larger armour rock over the top of the existing structure. This additional layer of larger armour would provide the necessary increase in crest height and armour weight to be able to withstand impact from larger waves.

Table 6 Construction Cost Estimate for Construction of Seawall Upgrade Fronting Big4 Emu Point after Approximately 50 years

Item	Activity	Quantity	Units	Unit Rate	Subtotal	Total for Item
1	**Preliminaries, Supervision, Mobilisation & Demobilisation**					$ 190,000
1.1	Site establishment, insurances and BCITF	1	Item	$ 35,000	$ 35,000	
1.2	Management and supervision, survey, testing etc	1	Item	$ 65,000	$ 65,000	
1.3	Mobilisation to site	1	Item	$ 45,000	$ 45,000	
1.4	Demobilisation and site clean up	1	Item	$ 45,000	$ 45,000	
2	**Rock Seawall Construction**					$ 2,134,500
2.1	Supply and place granite armour - class 1	2,800	t	$ 115	$ 322,000	
2.2	Supply and place granite armour - class 11	14,500	t	$ 125	$ 1,812,500	
	Subtotal 1				$ 2,324,500	$ 2,324,500
	Management & Design Fees	5	%		$ 116,225	$ 116,225
	Total Estimated Cost (exc. GST)				$ 2,440,725	$ 2,440,725

Maintenance of the structure will also need to be completed throughout its life to ensure that it continues to function. This maintenance would be required after the structure becomes exposed to regular wave action. This is not expected to occur at least within the coming 2 to 3 decades. Thereafter, the maintenance cost would generally be expected to be in the order of 10% of the capital cost per decade.

Conclusion

The above information has been prepared to provide you with our professional opinion on items within the CHRMAP in response to queries that have been raised. Please note that this review has not dealt with the economic aspects of the assessment – the cost benefit analysis – as it is understood that you are seeking separate advice on this matter.

We trust the information contained within this advice assists you in your broader review of the CHRMAP document and welcome any further queries that you may have.

Yours sincerely

for and on behalf of
m p rogers & associates pl

References

Royal HaskoningDHV, 2017. *Emu Point to Middleton Beach Coastal Adaptation and Protection Strategy*. Prepared for City of Albany

United States Army Corps of Engineers (USACE) 1998. *Condition and Performance Rating Procedures for Rubble Breakwaters and Jetties*. USACE, Washington.