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Capel to Leschenault CHRMAP

Chapter Report: Risk Treatment – Benefit Distribution Analysis

Peron Naturaliste Partnership

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1 INTRODUCTION

It is internationally recognised that the mean sea level has been rising globally since the nineteenth century and is predicted to rise at an increasing rate in the future (IPCC 2021). Rising sea levels and intensifying storm activity will increase the risk of coastal inundation (temporary coastal flooding), storm erosion and long-term shoreline recession. State governments across Australia have introduced obligations that require local governments to consider and plan for these hazards. In Western Australia (WA), the governing policy is the Western Australian Planning Commission's (WAPC) State Planning Policy No. 2.6: State Coastal Planning Policy (WAPC, 2013, herein referred to as "SPP2.6"). SPP2.6 recommends that management authorities develop a Coastal Hazard Risk Management and Adaptation Plan (CHRMAP) for land use or development potentially vulnerable to coastal hazards. Specific guidelines have been developed to assist in this process (WAPC, 2019).

SPP2.6 requires adequate risk management planning is undertaken where existing or proposed development is in an area at risk of being affected by coastal hazards over the 100-years planning timeframe. SPP2.6 and the CHRMAP Guidelines provide the risk assessment framework to be applied to identify risks that are intolerable to the community, and other stakeholders such as local governments, indigenous and cultural interests, and private enterprise. Risk management measures are then developed according to the adaptation hierarchy outlined in SPP2.6.

The Peron Naturaliste Partnership (PNP) comprises membership of nine local government authorities. The PNP's Coastal Adaptation Pathways Project identified the coastal areas of Capel, Leschenault and Greater Bunbury as being particularly exposed to coastal hazards and climate change, which triggered the need for this CHRMAP. Therefore, the present study aims to investigate the nature and severity of coastal hazards that are likely to affect these regions from Capel to Leschenault over future planning horizons. Refer Figure 1-2 for locality, study area extent and management units.

This CHRMAP project aims to increase knowledge and understanding of coastal hazard risks and identify risk management and adaptation measures for implementation. The outcomes will be used to inform local and state government policies, strategies and plans, including (but not limited to), planning strategies, community strategic plans, drainage strategies, asset management plans, emergency management plans, and foreshore management plans. The project will adhere to the WAPC (2019) guidelines with scope and deliverables to be consistent with the objectives identified by these guidelines and SPP2.6. In addition, the project will identify the strategic direction for coastal adaptation scenarios from the present-day to 2120 (100 yrs. management time frame) and identify an implementation plan to achieve this direction. Overall, this CHRMAP will develop a flexible adaptation pathway for the region and serve as a key reference for management, planning and policy-making for the short-term (0-15 years), medium-term (15-30 years), and long-term (100 years).

Delivery of this project will occur over 9 stages (as summarised Figure 1-1), each of which represents a key hold point. The staged approached is developed according to the PNP's scope and is in line with the CHRMAP Guidelines (WAPC, 2019).

This report presents the Stage G Risk Treatment – Benefit Distribution Analysis Chapter Report, which assesses the proportion of private and public beneficiaries should protections options be implemented. The red bubble displayed in Figure 1-1 outlines Stage G in the context of the CHRMAP.

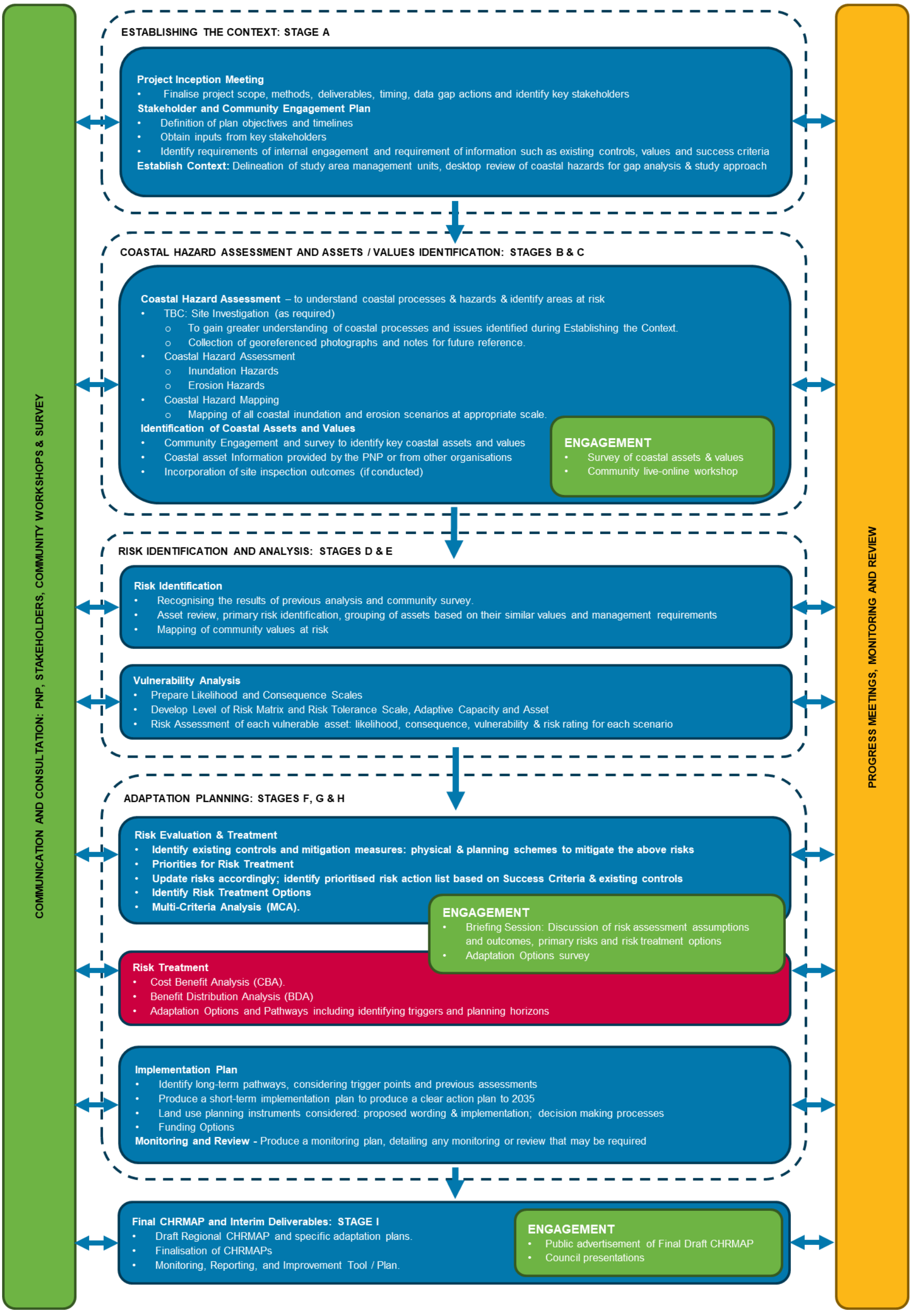

Figure 1-1 Methodology

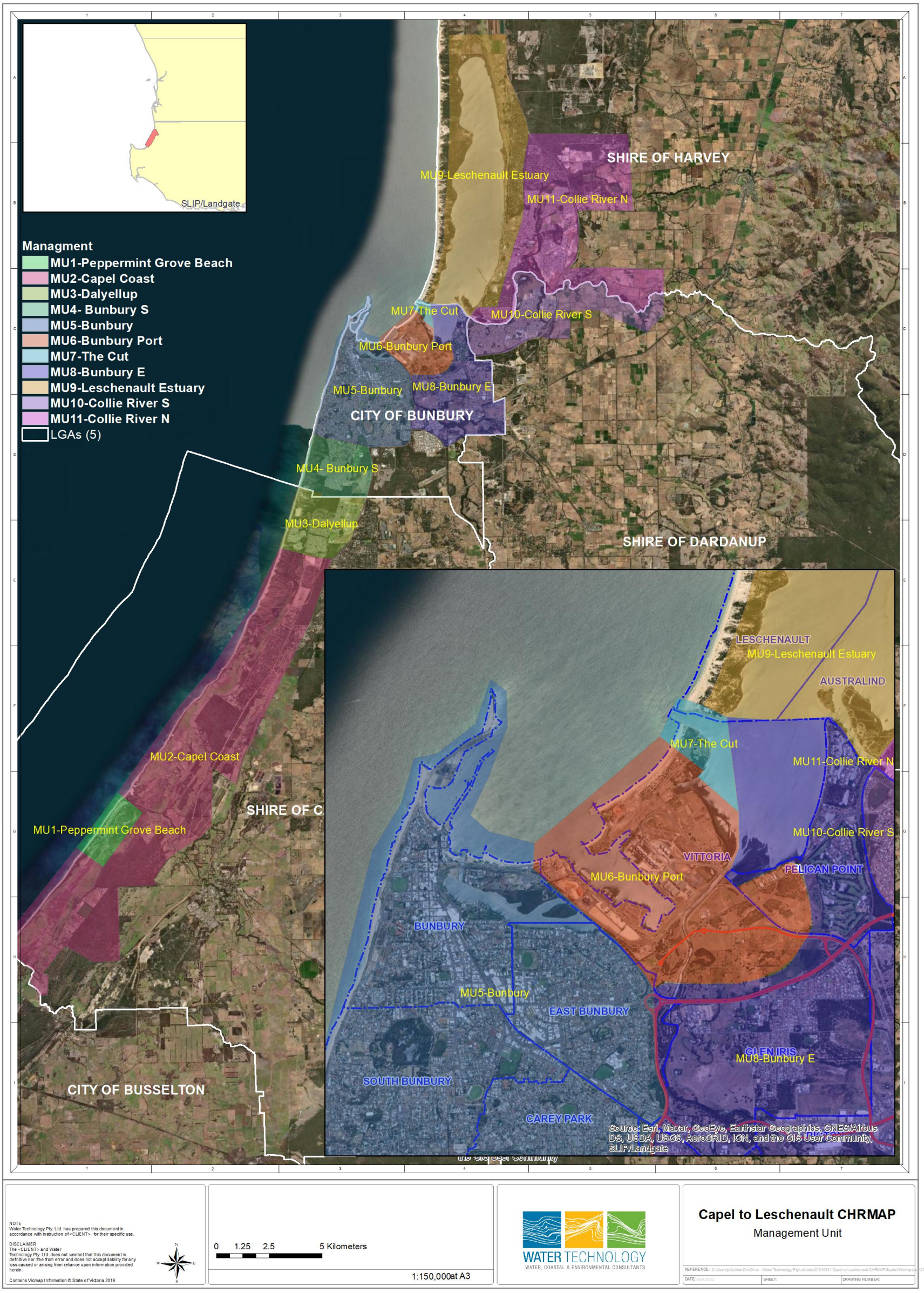

Figure 1-2 Study Area and Management Units (MU)

2 BACKGROUND

During the completion of the CBA and review of the preliminary results, Water Technology discussed possible options to proceed to Benefit Distribution Analysis (BDA), undertaken by sub-consultant Marsden Jacobs and Associates. Following several discussions, considering projected vulnerable assets, nature of hazards, tenure of land projected to be vulnerable, the following three options were selected:

- MU 1 and 2 - PR6 - Levies along the banks of the Capel River to minimise inundation. This option shall also consider inundation protection at Higgins Cut and the and the Minninup Drain outlet near Tatton Place in Stratham.
- MU 3 - PR2 - Groynes to protect Dalyellup, the Dalyellup Residual Waste Disposal Facility and the Bunbury Wastewater Treatment Plant to the north from erosion. Although this option has not scored positively in the CBA, its analysis in the BDA will still be valuable and provide further information about the selection of adaptation options.
- MU 5 - PR2 - Groynes to protect Bunbury Back Beach from erosion.

3 BENEFIT DISTRIBUTION ANALYSIS SUMMARY

Sub-consultant Marsden Jacobs and Associates have produced a stand-alone report on their BDA work – see Appendix A. Their work used the CBA results prepared by Water Technology as their inputs and is summarised below.

3.1 Method

A BDA is undertaken to allocate the derived benefits from the options identified to the relevant stakeholder. The relevant stakeholders are all those who are expected to benefit from the protection of the identified area. Key beneficiaries include:

- Private landholders
- Local community (Direct users of the area under threat)
- Broader community (Indirect users)

It is important to identify the beneficiaries and accurately evaluate their individual share of benefits. This paves the way for the next step in the BDA: identifying funding options and a funding model. CHRMAP follows a "beneficiary pay principle" and, thus, requires the accurate allocation of the proportion of benefits to the beneficiaries.

In order to identify the full range of benefits and beneficiaries that will arise from climate interventions, it is firstly important to ensure the full range of uses and values are identified. The concept of total economic value (TEV, Figure 3-1) is a well-established and useful framework for identifying the various values associated with protected areas. This framework is a useful tool for economic valuation, which measures market and non-market values that people hold for the study area and can be applied to value coastal areas and other natural resources such as wetlands, parks etc.

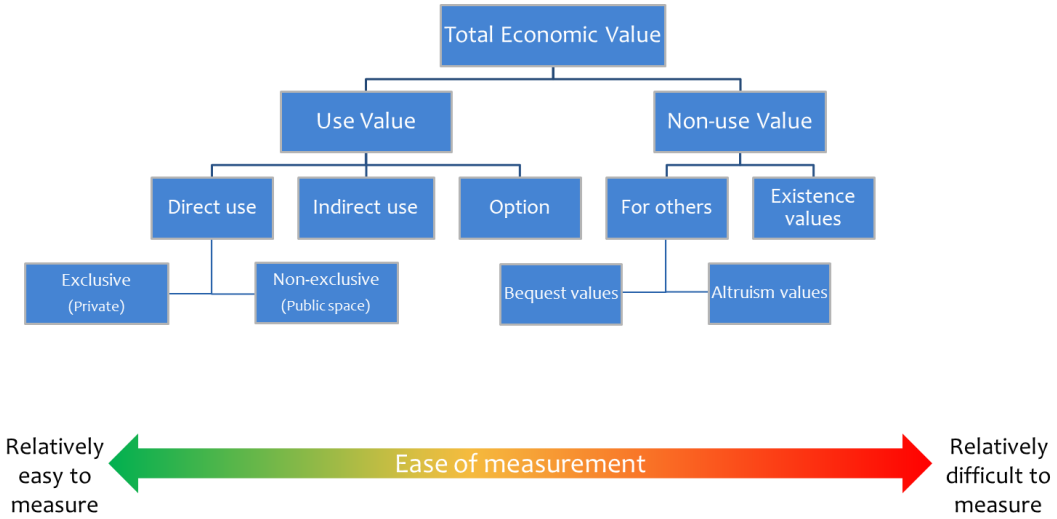

Figure 3-1 Total Economic Value Framework

The TEV framework provides a useful classification for the full range of community values. The basic premise of the framework is that the total economic value of an area is a function of its use and non-use values. The use values are made up of its direct use values, indirect use values, and option values. Non-use values typically include bequest and existence values.

The framework also helps to avoid double counting of ecosystem functions, intermediate services, and final services.

TEV includes both use values, which measure the value of using assets that are protected, and non-use values, which refer to an individual's willingness to contribute to the cost of protecting public assets (such as beaches and estuaries), even if the individual will not use the areas themselves.

On the left-hand side of the TEV framework there are values for the exclusive direct use of assets – such as private land. The value the community places on these assets may be impacted by the market price paid for private land. For all the other uses, there is no direct market value for the benefit obtained. These are often referred to as non-market values.

Applying the different types of values identified in the TEV framework, the 9 asset categories and their value type were assessed based on the TEV framework to determine an appropriate valuation method for each category, and their beneficiaries. The CBA base case results were used to determine the economic impact and apportion it to each asset category for each MU.

3.2 Results

Table 3-1 summarises the percentage of total benefits for each asset category for each MU. Results are highly variable across the different MU's.

Table 3-1 Percentage of total benefits for each asset category at each MU

Asset Category	MU 1 & 2	MU 3	MU 5
Roads	6%	0%	23%
Residential	3%	11%	2%
Commercial	1%	2%	1%
Public and Community	3%	6%	2%
Foreshore – Developed	0%	1%	45%
Foreshore – Undeveloped	0%	17%	17%
Environmental	68%	64%	11%
Agricultural / Rural	5%	0%	0%
Aboriginal Heritage	14%	0%	0%

Table 3-2 to Table 3-10 below summarise the financial contributions required from the custodians of each asset category to implement the preferred treatment options set out in the CBA. Note the Environmental asset category was largely informed by DBCA data. It includes habitat areas potentially suitable for Matters of National Environmental Significance (such as Carnaby's Cockatoo's and Western Ringtail Possums), Threatened and Priority Ecological Communities, and known locations of threatened flora.

For each of the stakeholders identified as a key beneficiary for each asset category, the financial contribution that would be required as a singular payment and the annuity payment that would be required if the funds were collected over a 15-year period and at 7% discount rate. 15 years is an arbitrary period – but it aligns with the duration between the first three assessment periods (2020, 2035, 2050). If funds started to be collected now, the projects would be largely funded ahead of the 2035 timeframe for implementation. Ahead of 2035, the risks and work required for 2050 could be reviewed, and then annuity payments could be required for 15 years to ensure any activities undertaken at that time were also funded ahead of work commencing.

3.2.1 Peppermint Grove Beach and Capel Coast Inundation Risk - MU1 and MU2

Table 3-2 Private asset categories – Annual funds to be collected per property for 15 years for each timeframe for number of properties protected.

Asset Category	2020	2035	2050	2120
Residential	$1,396	-	-	$2
Commercial	$1,047	-	-	-
Agricultural / Rural	$52	$19	$7	$1

Table 3-3 Local community asset categories

Asset Category	Total funds to be collected	Annuity (15 years)
Public and Community	$79,026	$8,677
Foreshore – Undeveloped	$1,593	$175
Total	$80,619	$8,852

Table 3-4 Broader community asset categories

Asset Category	Total funds to be collected	Annuity (15 years)
Roads	$163,542	$17,956
Environmental	$1,750,742	$192,222
Aboriginal Heritage	$362,624	$39,814
Total	$2,276,908	$249,992

3.2.2 Dalyellup Erosion Risk - MU3

Table 3-5 Private asset categories – Annual funds to be collected per property for 15 years for each timeframe for number of properties protected.

Asset Category	2020	2035	2050	2120
Residential	-	$31,124	-	$99
Commercial	-	$23,343	-	-
Agricultural / Rural	-	-	-	-

Table 3-6 Local community asset categories

Asset Category	Total funds to be collected	Annuity (15 years)
Public and Community	$647,749	$71,119
Foreshore – Undeveloped	$68,076	$7,474
Foreshore – Developed	$1,926,599	$211,530
Total	$2,642,423	$290,124

Table 3-7 Broader community asset categories

Asset Category	Total funds to be collected	Annuity (15 years)
Environmental	$7,245,106	$795,473.73

3.2.3 Bunbury Erosion Risk - MU5

Table 3-8 Private asset categories – Annual funds to be collected per property for 15 years for each timeframe for number of properties protected.

Asset Category	2020	2035	2050	2120
Residential	-	$9,659	$3,501	$31
Commercial	$19,987	-	$2,626	$23

Table 3-9 Local community asset categories

Asset Category	Total funds to be collected	Annuity (15 years)
Public and Community	$1,133,001	$124,397
Foreshore – Undeveloped	$32,206,592	$3,536,111
Foreshore – Developed	$12,268,686	$1,347,036
Total	$45,608,279	$5,007,544

Table 3-10 Broader community asset categories

Asset Category	Total funds to be collected	Annuity (15 years)
Roads	$16,766,838	$1,840,909
Environmental	$7,738,666	$849,664
Aboriginal Heritage	$1,119	$123
Total	$24,506,622	$2,690,695

3.3 Discussion

The BDA has found that the allocation of beneficiaries when forecasting coastal management works is a complicated process. The process provides information to assist decision-makers with information about the approximate proportion of beneficiaries between private and public parties. Table 3-11 defines potential funding sources and collection methods for each asset category.

Table 3-11 Potential funding sources and collection methods

Asset Category	Funding Source	Collection Method
Roads	WA Taxpayers	State Government grant
Residential	Property owners	Special levy on relevant properties - collected through rates
Commercial	Property owners	Special levy on relevant properties - collected through rates
Public and Community	Indirect users	Added to all rate payers
Foreshore - Developed	Direct users	Added to all rate payers
Foreshore - Undeveloped	Rate payers	Added to all rate payers
Environmental	WA Taxpayers	State Government grant
Agricultural / Rural	Property owners	Special levy on relevant properties - collected through rates
Aboriginal Heritage	WA Taxpayers	State Government grant

Table 3-12 presents a summary of the annuity funds proposed to be collected from the local community via each relevant LGA, against the total expected rates revenue for 2022/23. Results are markedly different between the Shire of Capel and City of Bunbury.

Table 3-12 Comparison of required funds to LGA rate base

Management Unit	LGA	Annuity funds to be collected from local community	Total expected rates for 2022/23	Percentage of annual rates
MU1 & 2	Shire of Capel	$8,691	$14,179,504	0.06%
MU3	Shire of Capel	$285,677	$14,179,504	2.01%
MU5	City of Bunbury	$5,007,544	$42,800,000	11.70%

As set out above. a number of the indicative funds required appear to be relatively small compared to the value delivered and the overall cost. However, the proposed interventions for MU3 do pass significant costs (e.g. $31,000) onto a small number of private beneficiaries. The costs are well below the value of the benefit delivered but may not be within the capacity of the property owners to pay. In these instances, further consultation may be necessary to establish a suitable approach to apportioning and collecting these funds.

The benefits and the distribution analysis provided here form a starting point toward the development of the coastal protection works in the identified areas in the Capel-Bunbury region. The recommended next steps for the coastal protection of the region are as follows:

- A preliminary design and costing of the proposed works analysed as part of the CBA to determine the performance and cost of the works
- A detailed CBA and BDA, based on the inputs from the preliminary design as well as analysis of the full range of uses of environmental assets and refined value estimation.
- A feasibility analysis of the proposed design.

Based on the analysis MJA recommends that:

1. The recommended options are progressed to a further level of design and costing (e.g., move towards Functional design)
2. The benefit values used in the CBA and the allocation of benefits to stakeholder groups should be tested for this location and these assets through specialised surveys of users (such as contingent valuation or choice modelling surveys) and analysis of asset use.
3. The funding approach in the BDA is consulted upon with stakeholders
4. The CBA and BDA should be revised and expanded to reflect updated costings, improved knowledge of risks (e.g., Probabilistic approach to identifying hazard lines and impacts) and the full range of benefits

4 NEXT STEPS

The next stage for the project is to incorporate the findings of the CBA and BDA into the implementation recommendations for each MU. This work will be presented in the Stage H Implementation Chapter Report.

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APPENDIX A
BENEFIT DISTRIBUTION ANALYSIS - DRAFT REPORT (7/2/2023) – MARSDEN JACOBS AND ASSOCIATES

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