



## Climate Change Adaptation Plan Choiseul Bay Township - Solomon Islands

**Australian  
Aid** 





## Synopsis

This summary report has been produced by BMT WBM Environmental Consultants in collaboration with Buckley Vann Town Planning and University of Queensland Department of Civil Engineering, under the Pacific Australia Climate Change Science and Adaptation Planning (PACCSAP) programme.

PACCSAP is an Australian aid funded program, managed by the Australian Government Department of the Environment and delivered in partnership with CSIRO and the Bureau of Meteorology. The PACCSAP program supports 14 Pacific Island Countries manage their future climate risk through improving the climate **science**, increasing **awareness** of climate change, and understanding future climate risks through **adaptation planning**.

The report provides an overview of the more comprehensive Climate Change Risk and Adaptation Assessment report prepared for this project, available on request from [internationaladaptation@environment.gov.au](mailto:internationaladaptation@environment.gov.au)

## Acknowledgements

All images contained in this report are courtesy of BMT WBM, Buckley Vann and University of Queensland, or stated otherwise.

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# 1. Introduction



*I know it's a long term project but it's a best thing to share ideas for the future of Choiseul province and Lauru people (Robert Pabulu, Taro)*

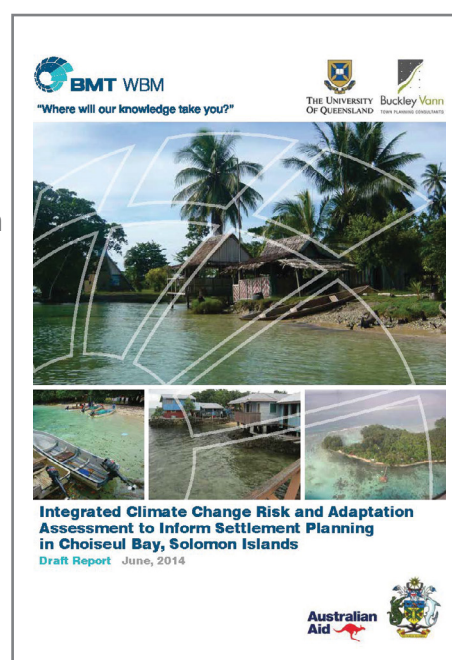


A comprehensive Climate Change Adaptation Plan that addresses future climate risk has been prepared for Choiseul Bay. The report titled *Integrated Climate Change Risk and Adaptation Assessment to Inform Settlement Planning in Choiseul Bay, Solomon Islands* (BMT WBM, 2014), identifies tsunamis, flooding due to storm surge, catchment flooding, coastal erosion and cyclones, and the risk associated with these hazards, along with management options.

Coastal hazards are a significant risk to Choiseul Bay. Proposed development and urban planning to meet the future growth of the Choiseul provincial capital needs to be informed by a sound understanding of the existing and future hazards affecting the region.

Good planning now for the future growth of Choiseul can avoid many of the future impacts.

This report provides an overview focusing on the practical actions (see Section 6) over the next few decades in order to mitigate existing and future climate change risks to Choiseul Bay communities.





## 2. About Choiseul Province

The Choiseul province capital is a small coral atoll called Taro Island, within Choiseul Bay. The majority of Taro Island is low-lying, less than two metres above mean sea level (MSL). Development over the past 20 years or so has resulted in rapid expansion of the urban footprint on Taro Island, and further growth of Taro is now limited by land constraints. Land on the adjacent mainland (known as Lot 9 and Lot 277) has been acquired from customary landowners by the Choiseul Provincial Government (CPG) and is earmarked for future urban expansion.





### 3. Climate Change Impacts

Taro Island, and neighbouring Supizae Island, are exposed to a range of natural coastal hazards, including tsunami, coastal storm and shoreline erosion. With sea level rise in particular, these coastal hazards are likely to intensify. The islands are also vulnerable to water shortages as rainwater tanks are the main supply of water for the residents. Future changes in rainfall patterns as a result of climate change may further limit water availability. Coastal hazards have been determined for time periods of 2014, 2030, 2055 and 2090 using projections based on the fifth assessment report of the Intergovernmental Panel on Climate Change (IPCC AR5, 2013) with reference to regional advice where available.

**Adopted sea level rise, based on IPCC AR5 RCP8.5 scenario: upper bound**

2030	+0.15m
2055	+0.38m
2090	+0.82m



Tsunamis represent the biggest coastal hazard risk to Choiseul Bay communities. This is because tsunamis can be generated relatively close, along the South Solomon Trench, about 100km from Choiseul. Tsunamis can also be generated from across the ocean (e.g. Japan, Chile).



A tsunami originating from an 8.1 magnitude earthquake in the South Solomon Trench occurred in April 2007, devastating coastal villages around Gizo with many lives lost. The Great East Japan tsunami in 2011 also affected the Solomon Islands, although the largest wave, of 1 metre in height, occurred at low tide, so little actual damage occurred.

Source Google Images, Neil Sands / AFP - Getty Images

### Approximate present day tsunami risk

Frequency of tsunami occurrence	Magnitude of local seismic event (approx.) – epicentre within about 100km from Taro Island	Approximate tsunami wave height at Taro Island
1 in 20 years, on average	7.9 Mw	2m
1 in 100 years, on average	8.2 Mw	3m
1 in 200 years, on average	8.3 Mw	4m
1 in 500 years, on average	8.5 Mw	5m

### Approximate present and future 1 in 100 year tsunami inundation levels

	Level of inundation on Taro Island, relative to Mean Sea Level (MSL) by a 1 in 100 year tsunami <sup>(1)</sup>
2014	3.1m
2030	3.3m
2055	3.5m
2090	3.9m

(1) Assumes tsunami occurs when tide is at mid-level (0m MSL)

Taro Island has approximately 2 hectares of land (or about 5% of the island) higher than 3m MSL, and less than 5000m<sup>2</sup> higher than 4m MSL, meaning there is limited space for refuge in 2014, and virtually no space by 2090.

Potential shoreline erosion due to sea level rise was estimated to be up to 50m on Taro Island and 100m on the mainland for a 2090 timeframe.



# 4. Risk Assessment

The most important and valued areas, assets and infrastructure on Taro Island and the mainland were identified through community and stakeholder consultation. Existing assets and infrastructure on Taro Island offer little resilience to tsunami or permanent shoreline retreat.

Risk is defined as the combination of the likelihood of a hazard occurring, and the consequence of impacts when a hazard event occurs.

RISK

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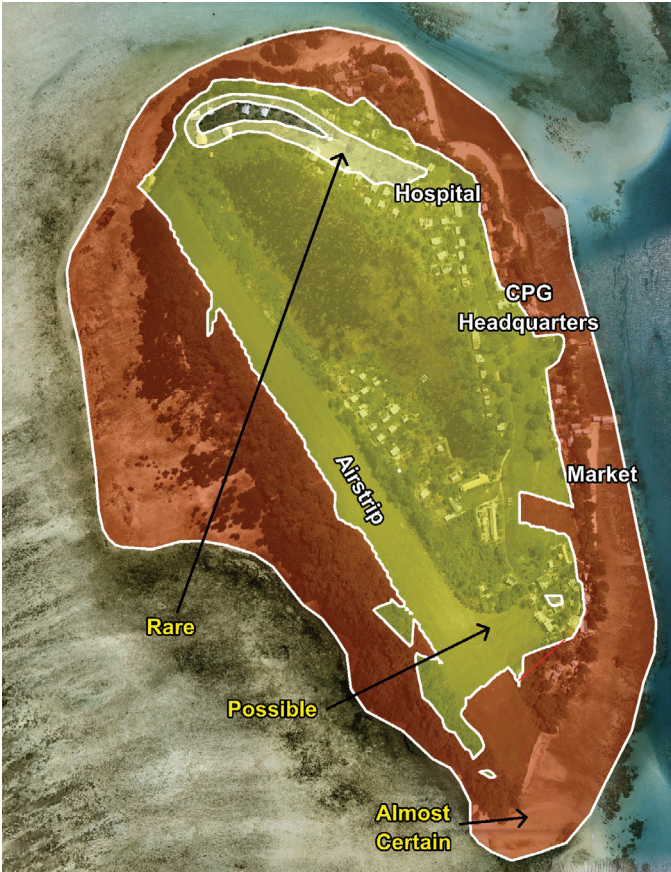
LIKELIHOOD

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CONSEQUENCE

The biggest and most ‘intolerable’ risks are associated with areas that have a greater likelihood of being affected, and those assets/infrastructure that are considered very important to the community. The highest risks in Choiseul Bay were identified as:

CPG headquarters	Market	Wharf	Mid island fuel depot
Telecommunications	Retail shops	Western edge of Taro Is	Residences
Hospital	Bank & Post Office	Medical incinerator	Guesthouses
Airstrip	Fisheries building	Septics	Water supply
Powerhouse	Light industrial area	Mangrove ecosystem	Road



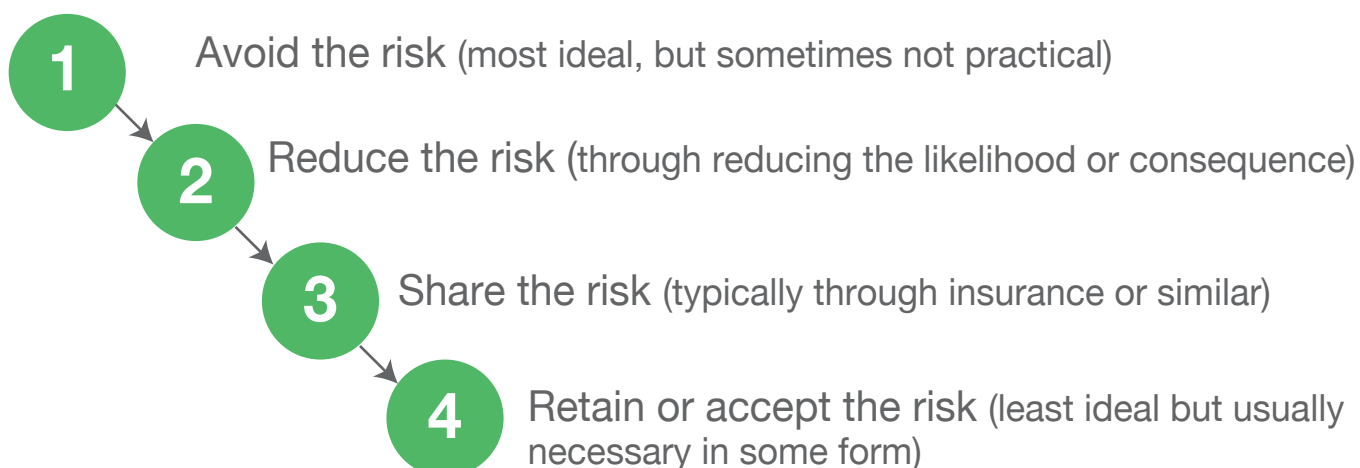
Tsunami risk at 2090



Risks will generally increase with time given that the likelihood of impact by the hazards (notably tsunami) increase due to climate change and sea level rise. High and extreme risks (i.e. intolerable risks) in the current - 2030 timeframe were considered highest priority for risk management.

## 5. Risk Management Options

Risk management typically advocates the following sequential risk reduction approaches:



Options identified for managing risks to existing assets and infrastructure in Choiseul Bay were categorised as:

- Protect / defend,
- Accommodate / retrofit, and
- Relocate / retreat.

Some of these options were suggested by community, while others were based on experience elsewhere in the Pacific and internationally.

Technical assessment of the various risk management options included consideration of implementation costs, community

acceptance, reversibility, longevity, construction viability and overall effectiveness. The most feasible and practical risk management options were identified and developed further as part of the adaptation action plan, as described in Section 6 below.





## 6. Action Plan

It will be impossible to fully mitigate risks on Taro Island in the short or long term. Only the progressive relocation to the mainland would address risks associated with present and future tsunami events and severe coastal storms

An adaption action plan has been developed for Choiseul Bay to manage future climate risks. The action plan has been designed to manage the impacts of climate change and other coastal-related risks until the existing development is progressively replaced and relocated to the mainland. It has five components:

1



### Emergency Response Plan

address the immediate threat and need for evacuation due to tsunamis or severe coastal storms inundating Taro Island and Supizae Island

2



### Asset and infrastructure management

minimise risk and damage or disruption to the community (covering both existing and future assets)

3



### Future development planning provisions

avoid and minimise risks to people and future assets and infrastructure

4



### Shoreline revegetation

restore natural environments to build resilience and reduce the impacts of wave and surge inundation

5



### Monitoring

understand what works and inform decision making in the future

## 6.1. Emergency Response Plan (Taro Island and Supizae Island)



Recent seismic activity around Choiseul (13th and 19th April 2014) triggered two mass evacuations of Taro Island and Supizae Island. A formal emergency response plan that learns from the recent experience would be beneficial by providing clear directions/instructions to authorities and the community in the event of a disaster.



Source: Google Images

An Emergency Response Plan should be prepared by the

National Disaster Management Office (NDMO) using procedures and protocols already established by NDMO, and facilitated through a Provincial Disaster Committee. It includes community workshops to develop locally appropriate responses, and suitable risk reduction options.

Participation in NDMO's annual tsunami evacuation drill ("Island Wave") would further increase awareness and preparedness of the community and the CPG in the event of a tsunami.

The Emergency Response Plan should be immediately engaged once an earthquake is felt by the local community, which may trigger a local tsunami, or once a tsunami is measured by Pacific Tsunami Warning Centre (PTWC) and a warning is broadcast through NDMO radio channels and the Solomon Islands Broadcasting Corporation (SIBC).

As a large local tsunami could strike Taro Island within a very short period of time after an earthquake (less than 20-30 minutes), the safest refuge for residents and visitors is on the highest ground on the island. Attempts to evacuate to the mainland could result in loss of life and should be discouraged.

A dedicated refuge centre is recommended to be constructed on the highest land on Taro Island. A similar refuge centre has recently been constructed at Tomboko in Guadalcanal. Appropriate community response during an emergency (e.g. where to go; what to take) should be detailed on billboard signage across Taro Island (especially targeting the island's daytime population of visitors to the markets and shops) and supported by a warning siren. A number of operational principles have been developed to guide the preparation of an Emergency Response Plan by the NDMO, and are presented in Table 9.2 of the report *Integrated Climate Change Risk and Adaptation Assessment to Inform Settlement Planning in Choiseul Bay, Solomon Islands* (BMT WBM, 2014).



## 6.2. Asset and Infrastructure Management



The long term plan for the CPG is to relocate major assets/services to a new town development on Lot 9 and Lot 277 on the mainland. Before significant investment is made on repairing or replacing existing assets and infrastructure on Taro Island or Supizae Island, consideration should be given to construction of an alternative facility on the mainland, subject to suitable timing.



Works associated with the establishment of an entirely new township are significant. This includes major linear infrastructure (roads, power, water supply), public facilities (wharves, public buildings, schools, hospital, amenities) and private development (housing, business enterprises). Costs for undertaking these works are very high, and well beyond the financial capacity of the CPG. Additional funding will need to be allocated from the national development budget and sourced from private enterprise and other donors.

A dedicated 'Project Office' should be set up within the CPG to facilitate and administer the construction and development works. The Project Office would need to be funded and staffed by appropriately qualified and skilled personnel, covering town planning, engineering, project management and community engagement.

Some land negotiations still need to be finalised and a number of technical studies are required before new infrastructure can be designed and built on the mainland.

Actions that address management of existing and future assets and infrastructure have been categorised as follows:

**1**

Modifications to existing assets to improve resilience to risks

**2**

On-going maintenance of existing assets and infrastructure involving repair/replacement

**3**

Acquisition / construction of new works/assets on Taro Island / Supizae Island to improve resilience to risks

**4**

Construction of new works/assets on the mainland (Lot 9, Lot 277) to avoid risks.

## Modify existing assets

Action	Location	Timeframe or Trigger	Responsibility	Indicative Costs / Comments
Raise hospital back-up generator	Taro Hospital	Immediately	CPG	MEDIUM ~ SBD\$20-50,000. May be logistical challenge to lift the generator.
Raise sensitive equipment at least 1 metre off the ground within private and public buildings	Industrial buildings Government buildings Hospital Telecomm building Powerhouse Banks	Immediately	Property owner / business owner	LOW – MEDIUM Cost depends on the equipment (weight, size, function etc).
Raise retail goods in shops, markets at least 1 metre off the ground, where possible.	Retail shops Post office Taro Island market	Immediately	Property owner / landholder	LOW Provision of stands etc. would depend on the retail outlets
Move sensitive CPG paper archive files to an alternative storage facility	CPG admin building	Once new refuge centre has been built	CPG	LOW Moving files would take time, but costs would be minimal. Consider electronic scanning of documents at the same time to guarantee longevity.

## Repair/replace existing assets

Action	Location	Timeframe or Trigger	Responsibility	Indicative Costs / Comments
Undertake a 'dilapidation audit' of all existing buildings and infrastructure to determine remaining functional lifespans	Taro Island Supizae Island Mainland foreshores of Tarekukure	Immediately	CPG, in collaboration with asset owner.	MEDIUM ~ SBD\$200,000 if no existing internal capacity within CPG. To be carried out by qualified and experienced structural engineer.
Undertake follow-up audits of buildings and infrastructure on an as-needed basis to determine need for repair or replacement	Taro Island Supizae Island Mainland foreshores of Tarekukure	At least 5 years before the end of functional life as determined by initial dilapidation audit.	CPG, in collaboration with asset owner.	LOW As required, for specific buildings or infrastructure items only as they approach the end of their functional life
Repair or replace asset or infrastructure item as required.	Taro Island Supizae Island Mainland foreshores of Tarekukure	As required	Asset owner	VARIABLE Will depend on the building or infrastructure item. Only go ahead if the alternative of a new build on the mainland is not timely.



## New works/assets on Taro Island and Supizae Island

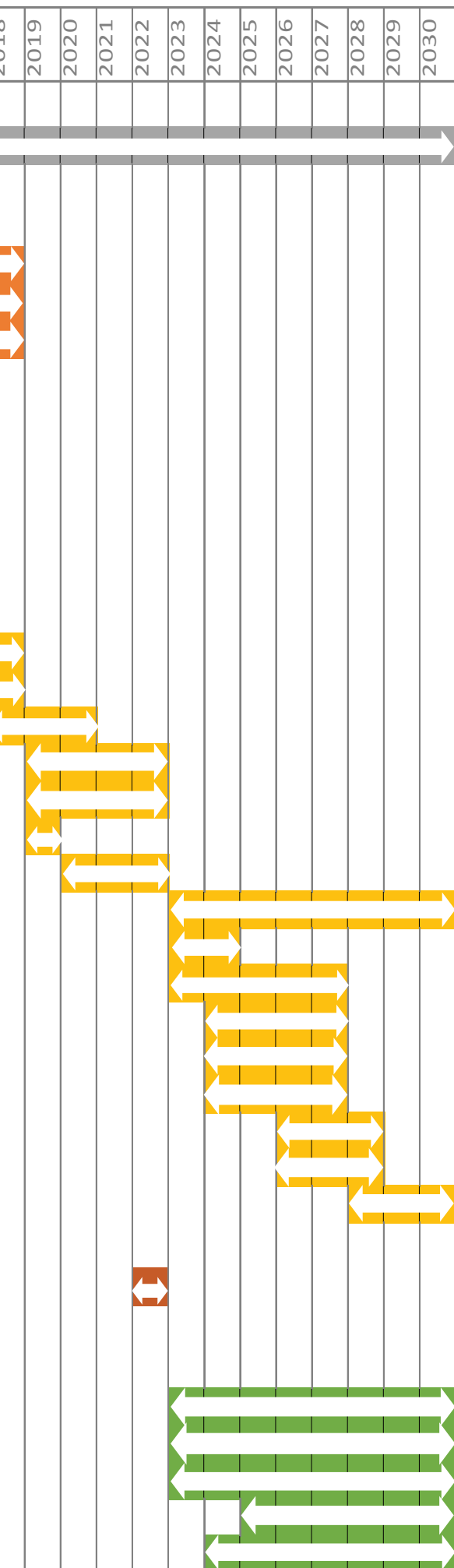
Action	Timeframe or Trigger	Responsibility	Indicative Costs / Comments	Details / Specifications
Sirens	Immediately	CPG	LOW ~SBD\$10,000	Sirens are to be used to inform the community to take shelter on the high ground on Taro Island.
Signage	Immediately	CPG	LOW ~SBD\$10,000	Billboard signage would raise awareness and provide instructions of where to go in the event of an earthquake (i.e. assemble on top of the hill at the Assembly Area).
Refuge centre on vacant land on top of hill (proximate to the church) on Taro Island	Immediately, following land negotiations.	CPG	MEDIUM – HIGH ~ SBD\$500,000+	Would involve a large skillion structure to provide protection from elements as well as some enclosed and lockable storage components. Include rainwater tank, solar panels, communications equipment, refrigeration (for back-up pharmacy), lighting, non-perishable food and medical supplies. To be designed and constructed to withstand an earthquake.
Refuge shelter on high land on Supizae Island	Immediately, following appropriate site selection, land negotiations and structure design.	CPG	MEDIUM – HIGH ~ SBD\$250,000+	The size would depend on how many people it is to accommodate. When not used for emergency refuge it could be utilised as a community facility (covered area with seating etc). Minimum ground level would be 3.5m MSL, or otherwise it could be an elevated structure. To be designed and constructed to withstand an earthquake.
Mobile back-up generator	Following construction of refuge centre on Taro Island.	CPG	MEDIUM ~SBD\$50,000	Minimum 5 – 10 KVa output.
Rainwater tanks	Opportunistically with new buildings or upgrading of existing systems as required.	Landholders	MEDIUM – HIGH ~SBD\$20,000 for large tank (10,000L), SBD\$10,000 for small tank (< 5000L)	Smaller tanks (2000 – 5000 litres) can be used on single dwellings, or larger if there is sufficient room and high demand.  Very large buildings, such as the new recreation building, could take up to 50kL storage (i.e. multiple tanks connected), and would require guttering and downpipes.
Mobile pharmacy	Immediately, following assessment of specific requirements of contents (quantity, range of medicines and other supplies)	CPG / Hospital	LOW Cost of assessment and transportable containers only	Some supplies and all medicines are degradable, and as such can only be packed on demand (and preferable kept cool). Specific circumstances will dictate how best the mobile pharmacy will operate. Relevant hospital staff should be engaged to ensure it is practical and effective.
Waste Management Facility at Mosquito Creek, Taro Island	Within 2 years	CPG	HIGH ~SBD\$2m+ initially then ~\$500k - \$1m annually for on-going management	This would involve purchasing of some equipment, undertaking some earthworks (bundling etc) and on-going site management of the waste facility. It should also include a recycling centre.

**New works/assets on the mainland (Lot 9, Lot 277)**  
**(see also Gantt chart of construction program following the table)**

Action	Components / Locations	Timeframe or Trigger	Responsibility	Indicative Costs
Set-up and operate dedicated Project Office	Within CPG	Immediately	CPG, funding support through SIG	HIGH Salary and expenses for 1-2 people full-time for duration of project (minimum 15 years) ~SBD\$500,000 per year
Negotiate and acquire rights to gain access and use privately owned land	<ul style="list-style-type: none"> <li>Lot 9 water access (sea boundary)</li> <li>Lot 277 water access (sea boundary)</li> <li>Mangroves on northern side of Sui River</li> <li>Water, power, road corridors</li> </ul>	2014 – 2018 Start immediately following establishment of Project Office.	CPG and Project Office	UNKNOWN Staff time would have minimal expense (as included already) but acquisition cost for use of land is unknown (and dependent on negotiations).
Land surveys, feasibility assessments and environmental studies	<ul style="list-style-type: none"> <li>Land survey of Lot 277</li> <li>Water, wastewater, hydropower, road, wharves feasibility assessments</li> <li>Environmental Impact Assessments</li> <li>Subdivision design and preparation of planning framework/codes</li> </ul>	2014 to 2016 Start following establishment of Project Office	CPG and Project Office	HIGH SBD\$20+ million, not including detailed design of infrastructure
Public works	Design and construction of: <ul style="list-style-type: none"> <li>Wharves</li> <li>Roads</li> <li>Hospital and clinic</li> <li>Hydropower scheme</li> <li>Water supply scheme</li> <li>Wastewater and solid waste management scheme</li> <li>Government buildings (including new CPG headquarters)</li> <li>Government housing</li> <li>Schools</li> <li>Recreation areas and tracks</li> </ul>	2016 – 2030 Start following feasibility assessments and environmental impact assessments	CPG and Project Office	VERY HIGH SBD\$500+ million Typically design and construct contracts required for large infrastructure projects (possibly international contractors).
Allocation of private lands / allotments	Allocations on Lot 9 and Lot 277 in accordance with masterplan, subdivision design, zoning provisions in local planning scheme and development sequencing plan.	Approx 2022 Following final subdivision design and layout for Lot 9 and Lot 277	CPG and Project Office	MINIMAL Staff time only
Private works	Residential and business enterprises located within designated zones on Lot 9 and Lot 277 as per masterplan and local planning scheme. Development codes to outline deemed-to-comply provisions for acceptable development types	2023 onwards Start following allocation of private allotments	Landholders	VERY HIGH ~SBD\$200,000 per dwelling or business structure.



	2014	2015	2016	2017	2018
<b><u>Project Office</u></b>					
Set up project office with Project Manager and Project Officer to co-ordinate studies and works and source funding					
<b><u>Land Negotiations</u></b>					
Land negotiations for water access and sea boundary from Lot 9					
Land negotiations for water supply, power and road corridors					
Land negotiations for mangrove area on northern side of Sui River					
Land negotiations sea boundary for Lot 277					
<b><u>Studies and Assessments</u></b>					
Complete ground survey of Lot 277, with proposed school site to be done as priority					
Feasibility assessments for hydropower and water supply from Sui/Sorave R., road network and wharfs					
Environmental Impact Assessment for New Town Development and associated infrastructure					
<b><u>Public Works</u></b>					
Development of wharf/port area on Lot 9					
Upgrade of existing road (and bridge) between Lot 9 and Lot 277 (nalivoli highway)					
Design and construct new Choiseul Bay High School including accommodation on Lot 277					
Design and construct Hospital (provincial referral centre), medical incinerator and supporting housing on Lot 9					
Design and construct arterial road: Lot 9 with link to wharf and provincial road					
Design and construct hydropower scheme and mains distribution					
Design and construct water supply and mains distribution					
Design and construct wharf at sea boundary of Lot 277, with boat storage and rest area/shelter					
Design and construct arterial road: Lot 277 with link to wharf and provincial road					
Services construction to support general housing (road, water, sewerage, power) (staged implementation)					
Design and construct waste management facility on Taro Island and waste transfer station on Lot 277					
Design and construct CPG headquarters and administration centre with housing on Lot 277					
Construct other government department buildings and facilities with housing on Lot 277					
Construct Police station, courthouse, watchhouse with housing on Lot 277					
Construct primary school / pre school with housing on Lot 277					
Construct community centre, recreation facilities and public conveniences on Lot 277					
Construct community health clinic with housing on Lot 277					
Construct walking tracks / boardwalks between Lot 9 and Lot 277 (through mangroves)					
<b><u>Land allocation</u></b>					
Prepare subdivision design to accord with planning scheme, sequencing and staged land allocation process					
<b><u>Private works</u></b>					
Design and construct Telecom facility / repeater tower on Lot 9					
Construct light industrial premises on Lot 9 (staged)					
Construct retail shops and public conveniences on Lot 9					
General housing construction, Lot 277 (staged release of land)					
Construct post office, bank, retail shop, markets and churches on Lot 277					
Construct guesthouses, vocational centres on Lot 277 and Lot 9					



For a long-term target population in the order of 5,000, approximately 1,000 new houses will need to be constructed on the mainland, mostly on Lot 277



### 6.3. Future Development Planning Provisions



New development on Lot 9 and Lot 277 on the mainland, as well as continuing development of Taro Island and Supizae Island, must improve the community’s resilience to natural hazards and future climate change. All future development needs careful planning to ensure that houses and infrastructure are built in the right places and the right type of construction to meet community needs.

Planning for future development has involved formulating a:

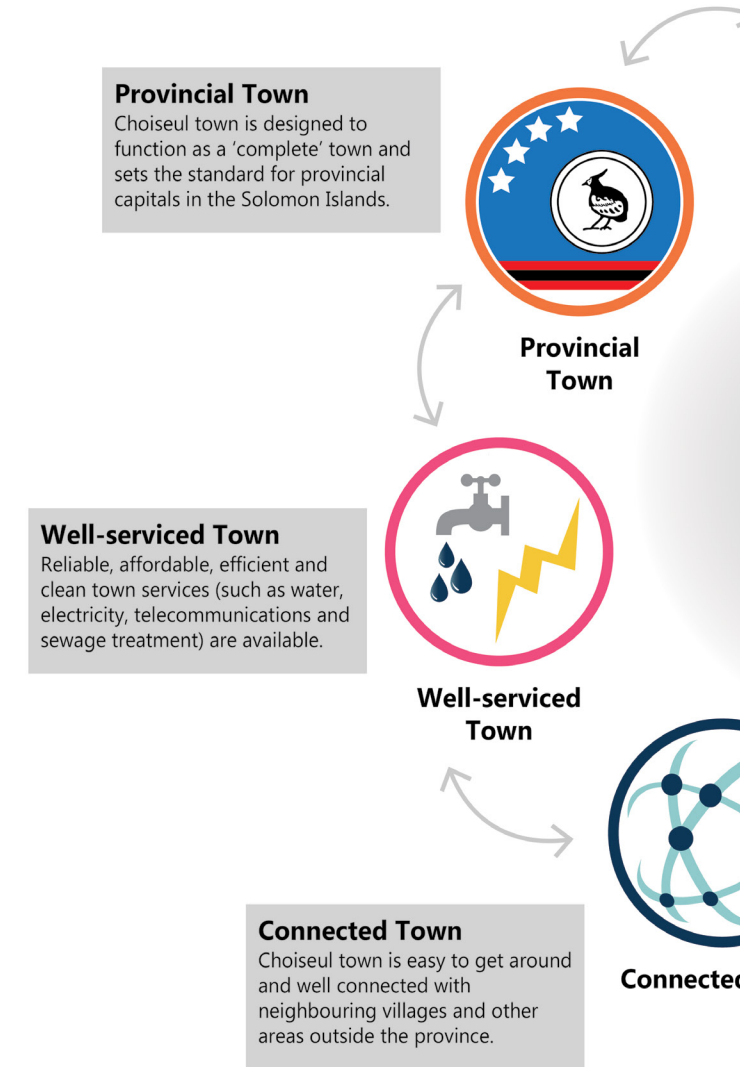
- **Vision** for the new township on the mainland;
- **Strategic Masterplan** outlining the shape and layout of the new township and
- **Draft Local Planning Scheme**, which details how to achieve the Masterplan.

#### Vision for the New Township

Following extensive consultation with the community, CPG and other stakeholders, a clear vision for the new township has emerged. The new township is to be *prosperous, safe, clean and green, living, connected, well serviced*, and a *proud provincial hub*. Importantly, the community saw the new township as being the ‘face’ of Choiseul and should set the standard for all other capitals across the Solomon Islands.



*This vision has been dreamed for about 5-10 years past (Roslen Veaveka, Save The Children, Taro)*



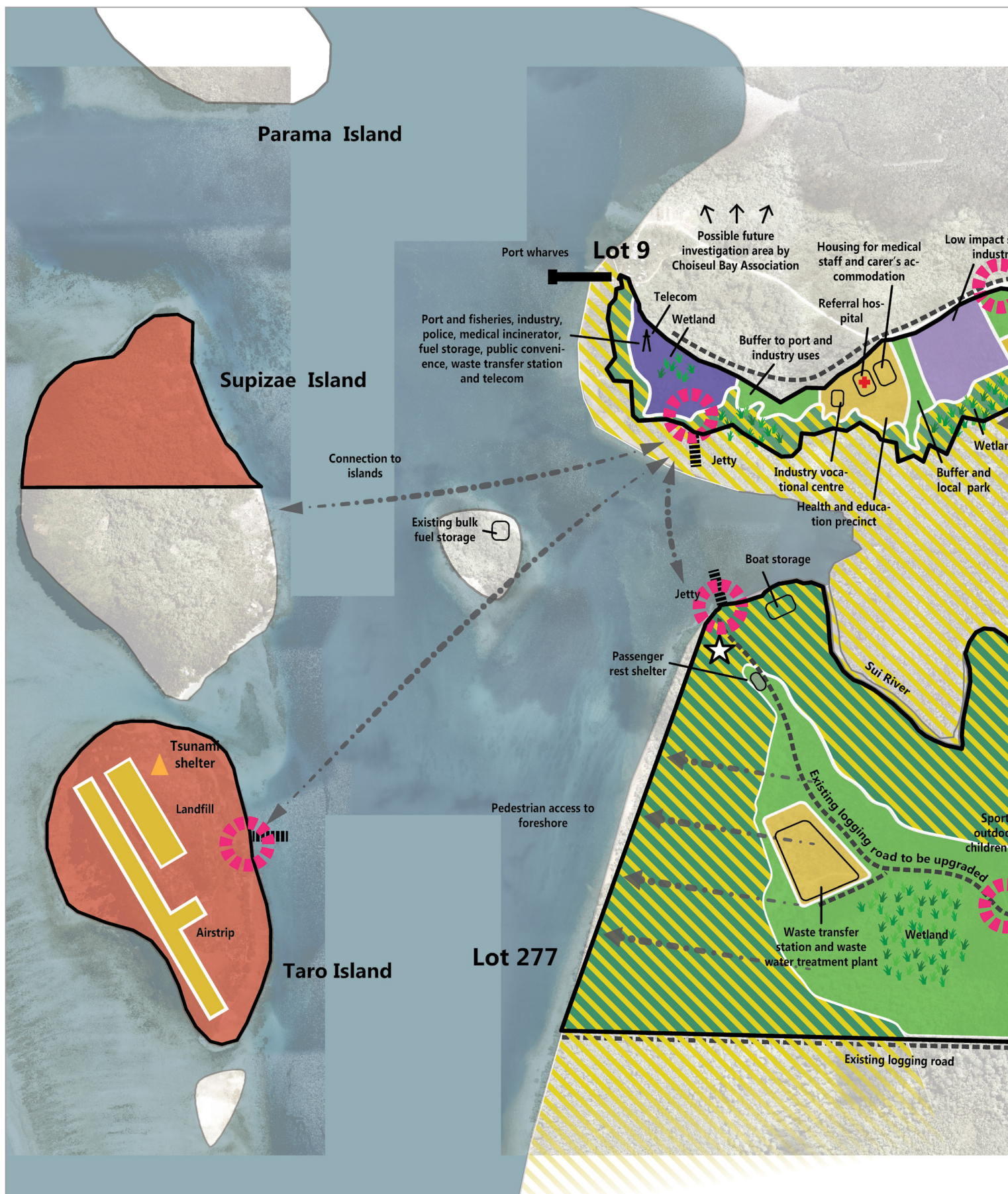


### Strategic Masterplan

Development of the Masterplan has identified what the best landuse for Lot 9 and Lot 277 would be. It has considered future tsunami inundation extents, land topography, environmental sensitivity and existing uses of the area (e.g. the existing Choiseul Bay Provincial Secondary School, government housing, logging roads, tambu sites). It has also accommodated the new town vision and the desires of the community, such as good access to deep water, connection with other villages and provision of important provincial services (e.g. a new referral hospital, secondary school, vocational centres and opportunities for new industrial enterprises). The Masterplan has also considered the practicalities of servicing the new town for power, water, wastewater, communications and transportation.

The Strategic Masterplan was developed using input and suggestions from over 300 community members and stakeholders as part of an extensive consultation campaign






Above is the Strategic Masterplan for the proposed new town on Lot 9 and Lot 277.




# Strategic Plan

For Choiseul Bay Town and Taro Island

## Legend

 Local planning scheme area and land owned by CPG

### Zones


-  Limited Development
-  Environment and Conservation
-  Open Space and Recreation
-  Town Centre Core
-  Community Living
-  Port and Industry
-  Low Impact and Service Industry
-  Future Investigation
-  Special Purpose

 Natural Hazard Area and Coastal Vegetation

 Indicative Location of Key Land Uses

 Gateway Entrance

 Indicative Location for Market


 Indicative Location for Future Highway

 Existing Logging Road

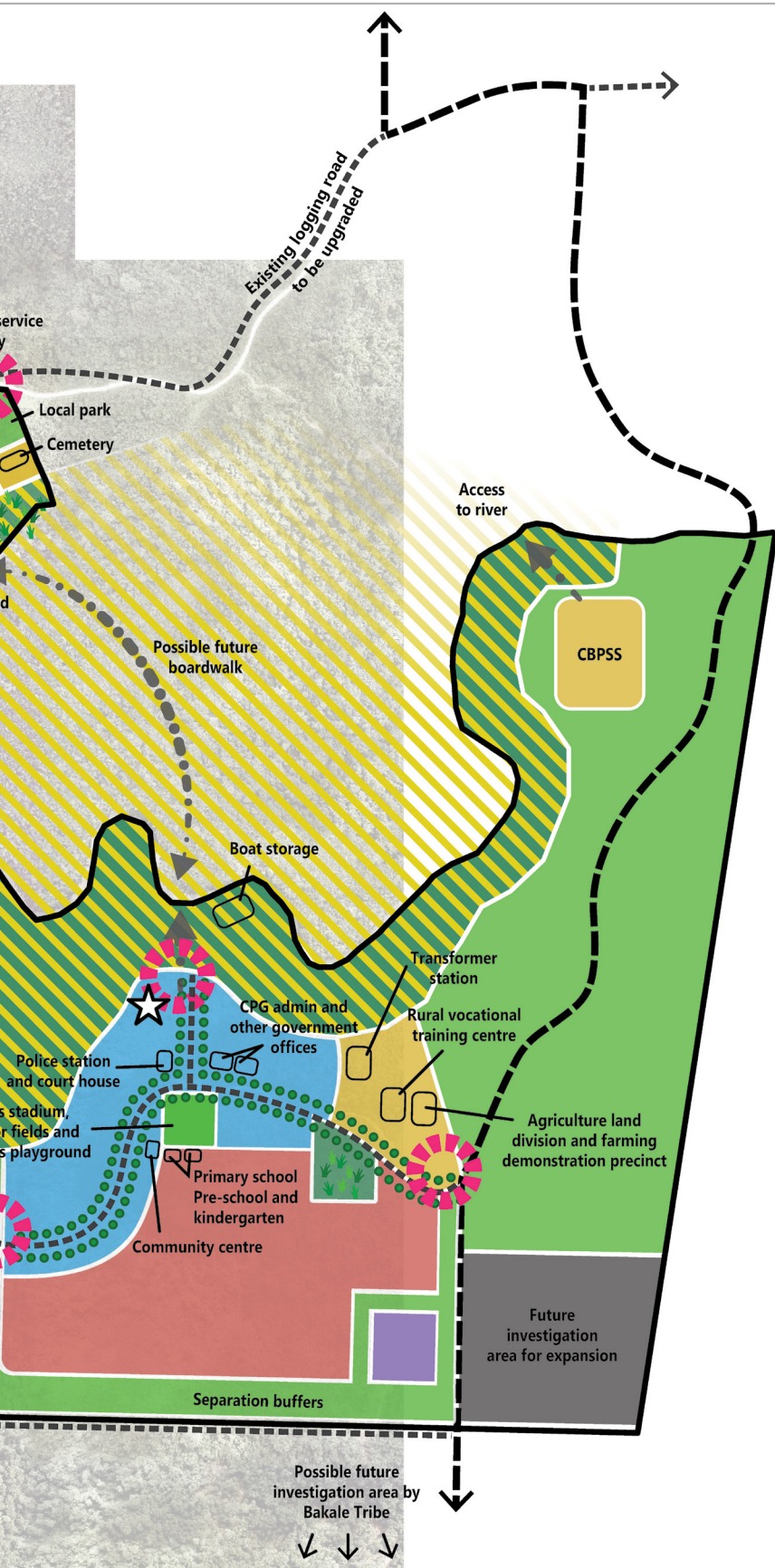
 Street Trees

 Key Access Routes

 Wetland

 Jetty Location (subject to detailed assessment)

 Tsunami Shelter



0 400 800 m

### Disclaimer

This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. The map layers displayed are compiled from various sources. Therefore, Buckley Vann gives no warranty in relation to the data displayed on this map (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data.



## Draft Local Planning Scheme for Choiseul Bay

A local Planning Scheme is a statutory planning document that details landuse zones for a Local Planning Area, along with the limitations and controls to be imposed on all future development within these zones.

A draft Local Planning Scheme has been prepared for the new township site on Lot 9 and Lot 277. It also covers Taro Island and the CPG-owned northern half of Supizae Island. The draft Local Planning Scheme needs to be gazetted, in accordance with the Solomon Islands *Town and Country Planning Act* (TCPA), before it becomes effective. Once gazetted, all future development needs to be undertaken in accordance with the local planning scheme and comply with the new planning codes and development controls outlined in the document. These codes and controls will ensure that future development is safe, fit-for-purpose, and reflects the vision and Masterplan for the new town as aspired by the community.

Under the TCPA, customary land and registered alienated land not owned by the CPG, is not included in the draft local planning scheme

There are nine landuse zones proposed in the draft Local Planning Scheme. The zones indicate the preferred locations for a range of land uses. Each of the nine zones is supported by a purpose statement, a list of permitted/prohibited development and specific development outcomes and requirements that achieve the purpose of the zone, such as building heights, setbacks and land allocations for key uses. The zones and their overall purpose include:

- **Town centre core:** provides a diverse mix of uses, employment opportunities and is the main place for business and community activities. It is the heart of the town and the only commercial and retail hub;
- **Low impact and service industry:** comprising a range of service and low impact industry uses to support local employment and economic development;
- **Port and industry:** supporting mainly port and port related industry uses, as well as a range of low and medium impact industrial development;
- **Community living:** providing for different types of housing and community facilities to meet the different needs and affordability of people in the community;
- **Special purpose:** allows for specific uses including health, education, airstrip, wastewater treatment, secondary school and cemetery;
- **Open space and recreation:** provides space and facilities for a range of both formal and informal sporting and recreation activities;
- **Environment and conservation:** protects area of natural, cultural and spiritual value as well as areas affected by natural hazards;
- **Limited development:** Taro Island and Supizae Island – development can continue in these areas, but is heavily constrained to manage existing and future risks, including tsunami impacts;
- **Future investigations:** reserves land that can be considered for future expansion of the town.

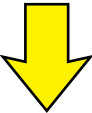





The draft Local Planning Scheme also provides direction on the infrastructure requirements to support future development, including water supply, sewerage and wastewater treatment, electricity, telecommunications, stormwater management, solid waste management, transport network, public parks and land for community facilities. Sub-division provisions within the draft Local Planning scheme provide guidance on how to achieve good lot layout and design to create places that are well-connected, safe, linked to urban services and sensitive to site features.


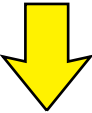

The draft Local Planning Scheme discourages any new works or development on Taro Island and Supizae Island, and encourages investment and transition to the new township site on the mainland.





Actions in order of priority, to finalise the draft local planning scheme.

Step	Action	Timeframe or Trigger	Responsibility
1 	CPG Provincial Assembly to write to the SIG Minister requesting declaration of a Local Planning Area in accordance with the TCPA.	Immediately	CPG, led by Chief Planning Officer
2 	CPG and Provincial Assembly review draft local planning scheme and supporting planning study report, for endorsement of policy content and direction.	Immediately	CPG, led by Chief Planning Officer
3 	Minister considers request and publishes notice in gazette declaring the area to be a Local Planning Area.	Following receipt of request from the CPG for declaration of Local Planning Area. Estimated timeframe - 1 month.	SIG Minister
4 	CPG submits draft local planning scheme and supporting planning study report for approval by the SIG Minister.	Immediately following notification from Minister of declaration of Local Planning Area and notice in gazette.	CPG, led by Chief Planning Officer
5 	SIG Minister approves draft local planning scheme to commence public notification.	Following receipt of draft local planning scheme and planning study report from CPG. Estimated timeframe for Ministerial approval – 1 month.	SIG Minister
6 	CPG undertakes public notification of the draft Local Planning Scheme and supporting planning study report, in accordance with the requirements of section 11 of the TCPA, including a public notification period of at least one month.	Following approval from Minister to commence notification.  Allow at least 1 month for public notification including publishing a notice in a locally circulating newspaper.	CPG, led by Chief Planning Officer

Step	Action	Timeframe or Trigger	Responsibility
7 	CPG considers objections and representations received during the public notification of the draft local planning scheme and makes changes as required.	Following completion of statutory public notification period. Allow 1 month for CPG technical officers to consider submissions and make changes to draft local planning scheme to respond to submissions.	CPG, led by Chief Planning Officer
8 	CPG Provincial Assembly considers and endorses amended draft local planning scheme and submits draft local planning scheme to Minister for approval, including a statement of compliance with TCPA requirements.	Following consideration of submissions by CPG technical officers. Estimated time - 1 month.	CPG, led by Chief Planning Officer
9 	Minister publishes a notice in the gazette and a notice in at least one locally circulating newspaper of the approval of the Local Planning Scheme.	Estimated time – 1 month.	SIG Minister
10	Local Planning Scheme takes effect from the date of the notice published in the gazette.	Planning scheme has statutory effect and can be implemented from date of gazettal.	CPG implements local planning scheme through development assessment process.

Section 8 of the Town and Country Planning Act (TCPA) requires a planning study of the Local Planning Area to be undertaken as soon as practical after the Ministerial declaration of a Local Planning Area. It is recommended the CPG use or adapt chapter 10 of the *Integrated Climate Change Risk and Adaptation Assessment to Inform Settlement Planning in Choiseul Bay* report (BMT WBM, 2014), as the basis of the planning study to satisfy the requirements of the TCPA



Subject to available funding, it is expected that the relocation of services and facilities from Taro Island to the mainland will occur before 2030. Provisions are included in the draft local planning scheme to ensure that any new development proposed on Taro Island or Supizae Island in the interim period is carefully considered and appropriately designed. If new development cannot be avoided or deferred, then it needs to be designed to be 'higher and stronger' to better accommodate the risk of impacts from tsunami events.





## 6.4. Shoreline Revegetation



Shoreline revegetation on Taro Island (and Supizae Island and the mainland to a lesser degree) aims to provide the following benefits:

- Enhance the environmental values of the island;
- Maximise the buffer between existing development and the ocean;
- Attenuate storm and tsunami inundation;
- Attract sediment accumulation to help limit shoreline erosion; and
- Improve resilience to future changes as a result of sea level rise and other changes in climate variables.



Source: Government of Kiribati

Actions to be taken to revegetate shorelines around Taro Island on an as-needs basis.

### Shoreline Revegetation Works

Action	Location	Timeframe or Trigger	Responsibility	Indicative Costs
Form a volunteer community group that has an interest in environmental rehabilitation / protection	Taro Island	Immediately	CPG	MINIMAL Staff time only
<p>Provide co-ordination, resources and direction to community group to:</p> <ul style="list-style-type: none"> <li>• Clean-up existing areas that are degraded (removing weeds, rubbish etc)</li> <li>• Plant new trees to enhance habitat (mangroves in intertidal areas, dunal species behind shorelines)</li> </ul>	<p>Taro Island, prioritised locations based on need, including:</p> <ul style="list-style-type: none"> <li>• Western edge;</li> <li>• In front of market;</li> <li>• In front of light industrial area;</li> <li>• In front of southern residences and guesthouses;</li> <li>• At ends of airstrip.</li> </ul> <p>Areas on Supizae Island and the mainland to be considered in the future once program is established and working well.</p>	Following formation of community group, sourcing of funding and internal resourcing in CPG to provide direction and co-ordination to community efforts.	CPG (possibly supported by local funding agencies)	<p>LOW - MEDIUM</p> <p>Staff time only plus costs for basic equipment and some materials, including seedlings (preferably established as part of a community nursery using local stock).</p> <p>Could consider incentives for participation in the volunteer community group.</p> <p>~SBD\$50,000 per year</p>
Undertake community education regarding the role community group and the value of the rehabilitation (including providing a buffer to storms and tsunami inundation), as well as education on preventing environmental degradation.	Taro Island, and Choiseul Province more generally	Within 1 – 2 years.	CPG (possibly supported by MECDM and/or MPGIS and local funding agencies)	<p>LOW – MEDIUM</p> <p>Costs associated with development of materials (possibly similar materials used in other provinces) as well as printing, distribution, presentations etc.</p> <p>~SBD\$50,000 per year</p>



## 6.5. Monitoring



Monitoring is important as it helps you learn from the past. Monitoring collects information on what has been done and how effective it has been. It provides very useful information that can guide future decisions and enables decision makers take into account specific triggers or thresholds for implementing adaptation actions.

For monitoring to be successful, relevant managers and authorities need to support a long term commitment to implementing specific monitoring programs, and use the results of the monitoring to guide future decisions

In the context of Choiseul Bay and the decisions that are to be made over the coming years (which represent capital investment of well over SBD\$1 billion), the cost of implementing monitoring programs would be minor. Monitoring should focus on:

- (1) Condition of existing assets and infrastructure; and
- (2) Impacts of a changing coastal environment (as a result of sea level rise and changes to other climate



The table below details specific monitoring tasks that are to be undertaken.

### Monitoring Works

Action	Location	Timeframe and Frequency	Responsibility	Indicative Costs
<b><u>Asset condition:</u></b> Initial dilapidation assessment and then on-going assessments of asset condition	Existing assets on Taro Island, Supizae Island and the Tarekukure (mainland) foreshore	Immediately, and then as-required	CPG and landholders (asset owners)	See previous table
<b><u>Coastal erosion:</u></b> Undertake periodic beach profiling at approximately 50 – 100 metre intervals along key parts of the shoreline. This could be done using simple sighting poles or basic laser level survey equipment.	Hot spots for coastal erosion include: <ul style="list-style-type: none"> <li>• Foreshore behind existing jetties (Taro Island and Tarekukure)</li> <li>• Shoreline in front of Taro Island markets</li> <li>• Shoreline in front of Taro Island light industrial area</li> <li>• Western edge of Taro Island</li> </ul>	Starting immediately and continuing at 12 monthly intervals, as well as after any significant coastal storm or tsunami event.	CPG	LOW Small cost for initial set-up, then just labour cost. Occasional input from a coastal engineer would be required to review results and interpret outcomes. ~SBD\$50,000 for set-up and equipment.
<b><u>Coastal inundation:</u></b> When high ocean events occur, capture data on lateral extents of inundation, depths of inundation and directions of flow, at various key locations. Use surveyed benchmarks / posts to determine water levels.	Taro Island – especially low-lying areas behind coastal fringes, the light industrial area and around Mosquito Creek. Supizae Island Mainland foreshores and mangrove fringes	Opportunistically when coastal inundation occurs, noting times and weather conditions at time of event	CPG	MINIMAL Labour costs only. Occasional input from a coastal/flood engineer would be required to review results and interpret outcomes.
Re-run risk assessment based on monitoring results and revise management response if risk level changes (i.e. increase or decrease in level of risk).	As per original risk assessment	5 years.	CPG	LOW - MEDIUM SBD \$100 – 200,000 for international risk consultant, or alternatively use CPG staff specifically trained in the process



## 7. Next Steps

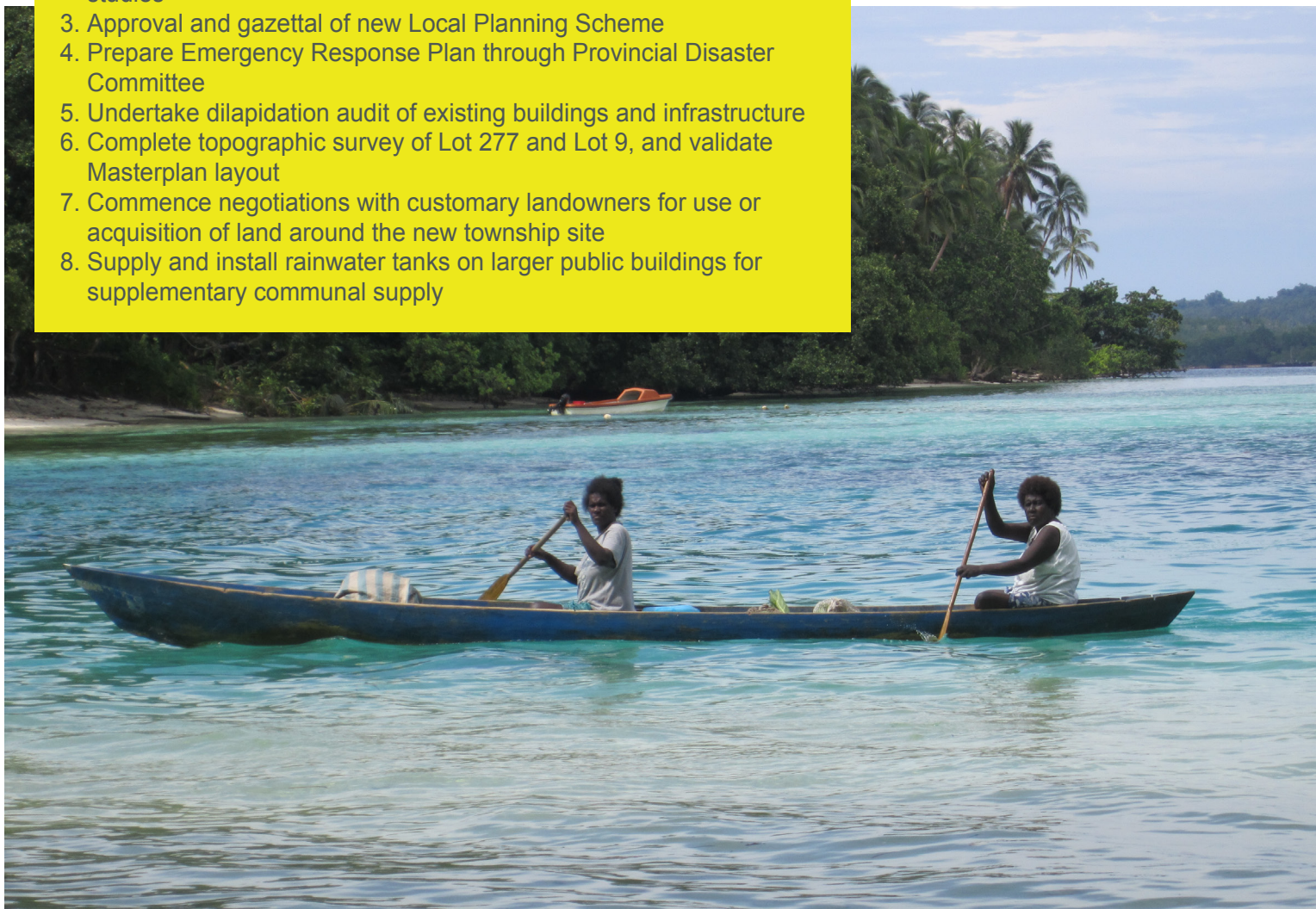
Existing development around Choiseul Bay, including the current provincial capital of Taro, is at risk from tsunami and other major coastal hazards. With climate change and projected sea level rise, risks will increase and will become progressively more intolerable.

The Climate Change Adaptation Plan prepared for Choiseul Bay maps out a path for managing these risks through specific actions addressing existing development and communities, supported by new planning provisions to manage and regulate future development and facilitate the relocation of the population and associated services and infrastructure to safer lands on the adjacent mainland.

Responsibility is now in the hands of the CPG, with support from SIG departments and development partners, to implement the Climate Change Adaptation Plan and thus take the first steps towards improving community resilience and managing the coastal climate change risks facing Choiseul Bay.

The first actions that should be implemented by the CPG are:

1. Follow-up community and stakeholder consultation regarding the Masterplan and Adaptation Plan
2. Set-up Project Office and start sourcing funds for further works and studies
3. Approval and gazettal of new Local Planning Scheme
4. Prepare Emergency Response Plan through Provincial Disaster Committee
5. Undertake dilapidation audit of existing buildings and infrastructure
6. Complete topographic survey of Lot 277 and Lot 9, and validate Masterplan layout
7. Commence negotiations with customary landowners for use or acquisition of land around the new township site
8. Supply and install rainwater tanks on larger public buildings for supplementary communal supply





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