

INFORMED ADAPTION – A PRACTICAL WAY TO MANAGE A CHANGING COASTAL ZONE

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Abstract

The traditional Coastal Zone Management Plan (CZMP) approach focuses on either 'protect' or 'retreat' models neither of which proved acceptable to our community over a long consultative process. The view of our community was strengthened by the lack of any significant funding to implement coastal management measures from either the State or private entities. This highlighted that a more flexible approach to coastal management in our Local Government Area was required.

As a result, the Greater Taree Coastal Zone Management Plan was prepared under a new flexible management framework termed *Informed Adaption*. This framework allows landowners, community groups and public authorities to proactively implement measures to adapt to the risks of our changing coastline.

The *Informed Adaption* management framework is based on the following objectives:

- people want to be empowered to undertake actions themselves;
- people want a variety of tools that they could use to suit their own circumstances;
- community groups want the ability to seek solutions; and
- people want the ability to use their land for as long as practicable.

No single solution is proposed under this framework, but rather, a range of activities can be undertaken by landowners, community groups and public authorities. While empowering landowners to make decisions and act, *Informed Adaption* also places the responsibility and the risk associated with success or failure on those who choose to implement the management measures.

Informed Adaption presents opportunities for both Council and the community to manage the changing coastal zone and could be used as a model to achieve practical solutions that optimise outcomes for property owners, the broader community and the environment in general.

Introduction

The role of government in the management of a constantly changing coastal zone is complex. This is because coastal zone management outcomes are influenced by considerable social, economic and environmental impacts, thereby injecting political risk into any coastal zone management planning process (Gordon, 2014).

This has in turn resulted in a legislative and policy response that has been directed towards reducing risk to property and preventing personal injury as a result of coastal hazards. What has followed is a “can’t do” philosophy that has utilised the existing legislative framework to support an overly cautious and inflexible approach to coastal management through regulation, particularly to development, in an attempt to limit exposure to liability from government decision-making (Hawley, 2014).

This philosophy is at odds with the dynamic and evolving coastal systems that are required to be managed and often leads to less than optimal outcomes for property owners, the broader community and the environment in general.

After a six year journey developing management strategies that were cautious and inflexible with less than optimal outcomes, we reflected on what we had learnt and decided to prepare a new style of CZMP that provided a higher level of certainty for our community. We developed a new flexible management framework termed *Informed Adaption* that would support our community in their desire to: be proactive in adapting to the risk posed by coastal processes; maintain quality of life; and provide economic stimulus to those areas that are worst affected by coastal erosion.

Our Coastal Management History

Old Bar Beach is currently identified by the NSW Government as one of the worst hotspots for coastal erosion in NSW. There has been active erosion in this location for a number of decades, however it is only since the early 2000s that erosion has accelerated. In 2008, this resulted in the removal of three houses that were a risk to occupants and beach users.

Historically, Old Bar Beach has seen an average net loss of half a metre of dune per year, which has increased to one metre per year since the early 2000s. While a number of theories have been proposed for this acceleration, we are no closer to predicting the frequency of storm events and the intensity of the related erosion. There is a high level of scientific uncertainty surrounding the current erosion being experienced at Old Bar, however the one thing that we do know is that the current level of erosion puts private and public assets at risk and creates friction between private and public ownership. The changing profile of the beach also at times limits opportunity for beach users, particularly at high tide.

Since 2008, we have been through an exhaustive process with consultants, our community and the State Government. Following the identification of our coastal hazards and their associated risks, a number of coastal management measures were documented for different beaches. Two documents in particular, the Black Head to Crowdy Head – Coastline Hazard Definition Study (WorleyParsons 2010) and the Greater Taree Coastline Management Study – Black Head to Crowdy Head (WorleyParsons 2010) formed the basis of community consultation in late 2010.

We found consultation difficult as it was hard to engage people in conversations unless they were directly affected by coastal erosion. Additionally, the management measures proposed were extremely expensive to implement and were unaffordable without significant financial assistance. Therefore, no one solution was preferred above others.

As a way to move forward we prepared the draft Coastal Zone Management Plan for Greater Taree (WorleyParsons 2013), which included all of the management measures with a view that should funding become available, any of the measures could be implemented. However without funding to implement any protective measures, doing nothing became the most affordable option.

At the same time the NSW Government commenced what has been termed, the 'coastal reforms'. Stage 1 of the reform is now complete and included changes to temporary protection works and sea level rise advice. Stage 2 of the reform, which supports a strategic approach to managing coastlines is currently being developed. During this period, conversations between the State and individual councils about CZMPs continued, but finalisation of our plan was placed on hold.

In 2013, the then NSW Minister for the Environment, The Hon. Robyn Parker MP attended a media briefing at Old Bar to announce additional funding to Council to prepare a study to determine a structural solution to protect public and private assets and was quoted as saying '*Planned Retreat is not an option for NSW*'.

In response, we embarked on a three month study with Royal HaskoningDHV and prepared the Old Bar Beach Coastal Protection Structure Design Investigation (RHDHV 2013). This study determined that the best structural solution to protect public and private land from erosion was a revetment wall. This wall would have needed to be built in four stages and if all stages were constructed would have cost in the order of \$48.1M.

The first two stages were identified as being the most critical and offered protection to private assets, public road and utilities infrastructure. These stages were estimated to cost \$15M. The third stage offered protection to State assets, including Old Bar Primary School at an estimated cost of \$8.8M and the last stage, which offered protection to the sewerage infiltration ponds was the most expensive at an estimated \$24.3M. The revetment wall had a design life of 60 years and incorporated a walkway/cycleway along the top. This allowed for public access to the foreshore as it is likely the beach in front of the wall would have been reduced and eventually lost over time.

Consultation with the Old Bar community was undertaken in late 2013 to explain the design and answer questions about its impact. The feedback was mixed ranging from those who wanted the revetment wall constructed to protect property, to those who opposed its construction based on the effect it would have on beach amenity. On the basis that '*Planned Retreat was not an option for NSW*' we revised our CZMP to incorporate the revetment wall as the preferred management measure at Old Bar (Addendum to Coastal Zone Management Plan 2014, RHDHV).

In light of the accelerated erosion being experienced since the original hazard/risk assessment was undertaken, we also undertook a Risk Assessment to Define Appropriate Development Setbacks and Controls in Relation to Coastline Hazards at Old Bar (RHDHV 2014). Management measures for the rest of the coastline remained unchanged, continuing to limit any future development in sensitive areas.

Further community consultation on the suite of documents making up the draft CZMP was undertaken in early 2014 and was again met with mixed reaction from the community. Those outside of Old Bar felt no need to be involved as they were still not affected by coastal erosion. Residents of Old Bar again provided mixed feedback centred

on either property protection or beach amenity consistent with the previous feedback mentioned above.

Council adopted the CZMP suite of documents at its Ordinary Meeting in May 2014 and these documents were sent to the NSW Minister for the Environment for Certification. In late 2014, the then NSW Minister for the Environment, The Hon. Rob Stokes MP, would not certify the plan as it stood, advising that following a cost-benefit analysis the NSW Government had decided that it would not fund a revetment wall at Old Bar. He further advised that he would certify the plan if it was re-written and re-lodged on the basis of Planned Retreat. The Minister also advised that from July 2015, all State funding for coastal management measures would only be allocated to those measures identified in certified CZMPs.

In late 2014, a number of conversations were had with the NSW Office of Environment and Heritage about the incentives that might be provided to encourage retreat under a policy of Planned Retreat. These incentives are the subject of Stage 2 coastal reform discussions, which are not scheduled to be finalised until the end of 2015. Without knowing the State's position on the provision of compensation to help landowners relocate under a policy of Planned Retreat, and therefore the outcome for residents of our community, we were unable to commit to such a policy position. This decision was made on the basis that without Stage 2 of coastal reform, Planned Retreat is little more than "do nothing" and provides less than optimal outcomes for property owners, the broader community and the environment in general.

Throughout this six year period the following coastal management options were identified for the Greater Taree coastline. These options have not progressed due to economic feasibility at each point in time.

Table 1: Coastal management options identified for the Greater Taree City Council coastline

Year	Location	Management option
2013 CZMP	Entire coastline	Planned retreat
		Property Purchase/Acquisition/ Partial Acquisition
	Diamond Beach	Geotextile bag seawall
		Buried Seawall – sand from creek to maintain beach amenity
		Buried Seawall – sand trucked in to maintain beach amenity
		Nourishment – sand from creek
		Nourishment – sand trucked in
		Groynes – sand from creek for beach amenity
		Groynes – sand trucked in for beach amenity
		Old Bar
	Revetment and nourishment to maintain beach amenity	
	Nourishment	
	Entrance structure and nourishment	
	Groyne field and nourishment	

		Offshore reef and nourishment
	Blackhead	Review adequacy of rock protection to SLSC
	Harrington	Maintain training wall
2014 CZMP Addendum	Old Bar	Rock revetment

What are the risks we are trying to manage?

Risks associated with our changing coastline

The highest risk posed by the changing coastline is the risk to public safety, particularly on open beaches during storm events. The Greater Taree Coast Emergency Action Plan (WorleyParsons 2011) has mitigated the impact that storms have on human life by providing a structured response that involves monitoring the severity of storm events to ensure appropriate action is taken. Actions include closing beach accesses and informing the public of the risk. If significant erosion or over-topping of dunes from waves occurs during a storm event, the State Emergency Service (SES) directly notifies residents and manages any evacuations.

The second-most significant risk posed by coastal erosion is the loss of private and public assets (land and structures). Depending on the location of the structures (relative to the dune scarp following a storm event), they may be at risk of collapse. If a structure is deemed to be at an unacceptable risk, the demolition or removal of the structure is required. Figure 1 shows a typical beach profile where built assets such as houses tend to be located.

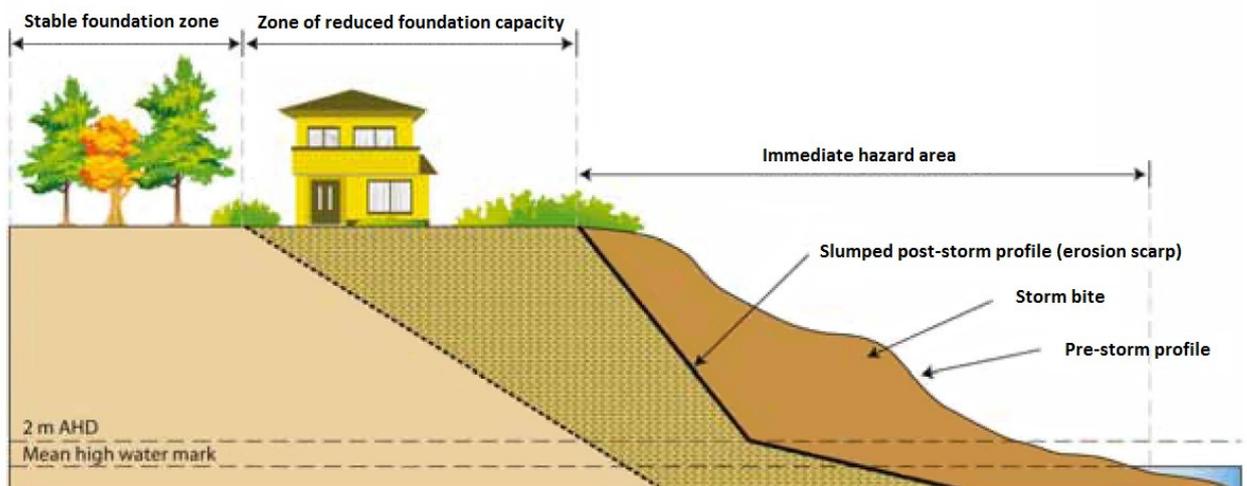


Figure 1: Typical beach profile with built assets

While the 'zone of reduced foundation capacity' has traditionally been used as a way to determine structures that may be at risk immediately following a storm event, we have found that structures built on a concrete slab maintain their integrity even when

protruding over the dune scarp by a metre. This was the case with the houses removed in Lewis Street, Old Bar in 2008.

Our experience tells us that the zone of reduced foundation capacity is more relevant to multi-level unit blocks. There are no multi-level unit blocks within our coastal areas at risk of erosion. Therefore, the risk is not associated with the dune crest reaching the zone of reduced foundation capacity, but instead, when erosion impacts on a structure to such an extent that its integrity is compromised. Monitoring of erosion provides time to consider the structural integrity of assets and order removal before the asset collapses.

There are also incidents that occur infrequently, but have the potential to dramatically impact on our coastline. Devastating storm events similar to those that hit the NSW coastline in the early 1970s can cause significant erosion and result in the loss of buildings. These storm events cannot be predicted in timing or intensity and therefore planning for something that may only occur once in living memory is not supported by the *Informed Adaption* management framework.

Based on calculations from the abovementioned devastating storms, the potential maximum scarp movement that could occur during such a storm event has been calculated for each of the developed beaches along the Greater Taree coastline (see Table 2).

Risks associated with climate change

The sea level rise figures used to develop the *Informed Adaption* management framework were originally based on the figures produced by the CSIRO, which were used as the basis for the State Government's Sea Level Rise Policy Statement 2009 (no longer supported by the State). These were an increase above 1990 mean sea levels of 40cm by the year 2050 and a rise of 90cm by the year 2100.

If predictions prove correct then we will see significant coastal erosion by the year 2100 in a uniform manner behind each beach. As erosion intensifies, there is the potential for many houses and the property they are located on, to be lost as the sea moves westward. If the predictions on sea level rise are not realised then significant loss of the beach as well as public and private assets is unlikely to be experienced for much of our coastline.

Table 2: Maximum potential dune loss due to devastating storms

Location	Typical dune crest height (AHD)	Design storm cut volume ¹	Max. expected scarp movement ₂	Historical scarp movement ³
Black Head to Red Head	5 – 8m	220 m ³ /m	35m	Generally prograding beach, little evidence of storm cut in photogrammetry
Diamond Beach South	6 – 10m	220 m ³ /m	30m	Beach recession of up to 16m between 1970 and 1972

(south of caravan park)				
Diamond Beach North (north of caravan park)	9 – 11m	220 m ³ /m	20m	Little evidence of storm cut in photogrammetry
Saltwater Beach	6 – 8m	220 m ³ /m	30m	Little evidence of storm cut in photogrammetry
Wallabi Point to Old Bar Beach (south of SLSC)	7 – 10m	220 m ³ /m	25m	25m recession at Old Bar between 2004 and 2012
Old Bar SLSC to Farquhar Inlet (north of SLSC)	7 – 12m	180 m ³ /m	20m	Some recession at SLSC, but increases towards Farquhar Inlet
Manning Point Beach	6 – 10m	220 m ³ /m	30m	Shoreline retreat of up to 30m has occurred within 5 year periods
Harrington Beach	9 – 15m	220 m ³ /m	20m	Generally prograding, recession of up to 40m occurred between 1965 and 1972

Notes:

1. Maximum predicted storm cut volume for 100 year ARI storm. Refer to *Black Head to Crowdy Head Coastline Hazard Definition Study* (WorleyParsons 2010).
2. Estimated maximum landward movement of erosion scarp for design storm cut, from pre-storm scarp or dune crest.
3. Little information on the scarp movement due to a single storm is available due to a lack of reliable pre-storm and post-storm surveys. This information is based on photogrammetry with an interval of 2 to 10 years.

Risks associated with socio-economic impact

The primary location on our coastline experiencing notable impacts from coastal erosion is Old Bar Beach. This situation could change in the future if sea level rise has a corresponding erosion impact on other beaches.

In relation to Old Bar Beach, the NSW Office of Environment and Heritage engaged the Balmoral Group to undertake a cost benefit analysis that aimed to understand the socio-economic impact of various coastal management measures. While a number of economic outcomes were detailed, the social impact of the current situation was not addressed.

The direct economic impact on landowners relates to the loss of a significant asset, house and land and the subsequent need to move to another location. From a financial perspective not only does the landowner need to fund the acquisition of a house elsewhere, they also need to fund the demolition and removal of their existing house and any other structures present on their land.

There is little research in relation to the social impact of such events, however it is assumed that continued coastal erosion that results in loss of homes is likely to have an effect on personal and family networks not only within community, but potentially, within

individual households. The effect will vary dependent on the nature of ownership, whether the asset is the primary or sole home for family or an investment property; the connection of the property owner to the community and services within the immediate community; the age and stage of life of the property owner; disposable income, level of independence and isolation and; individual level of resilience.

Emergency measures in place, ensure that neither extreme events nor the gradual coastal erosion currently experienced are likely to pose a risk to life, however, the constant change and associated sense of loss has the potential to take a toll on mental health and subsequently the functionality of individuals and the family units affected. An increased demand on State and private health support services needs to be assumed.

Under current State policy there is no compensation or buy-back scheme available to landowners exposed to coastal erosion and as such the landowner must fund the full cost of the demolition / removal of a dwelling. It is also understood that the insurance industry does not cover the loss of assets from coastal erosion. Therefore, the impact on those who cannot afford the cost of moving and / or demolition is likely to be significant, particularly for those who are asset rich and cash poor.

An area experiencing coastal erosion will also be impacted at a community level. From an economic perspective, if an area is seen as being a risky proposition for investment due to coastal erosion, this will impact on house and land prices for the entire community and impact on business viability, particularly those dependent on the tourism trade which is highly dependent on the good reputation of an area. The loss of key community infrastructure, including roads, services, open space and community facilities in Old Bar is a reality and is likely to change the character of the seaside village significantly.

Localised response to the effects of coastal erosion puts an onus on communities and local authorities to tackle the issues affecting them. The potential is for increased disadvantage in regional coastal locations that already experience a level of isolation from the benefits of metropolitan living. It is recognised that without considerable support from the State, we are unlikely to be equipped to deal with the socio-economic issues facing our communities under threat from coastal erosion.

The Objectives and Management Strategy that support *Informed Adaption*

Local government is charged with the responsibility of strategic planning and development assessment in the coastal zone and also has responsibilities in relation to the dissemination of information regarding land and coastal protection works, and infrastructure and public assets in the coastal zone (Hawley, 2014).

To address these responsibilities, the *Informed Adaption* management framework was developed by expanding on the work of Gordon (2014) and presents a viable pragmatic approach to managing the coastal zone that balances the potential vulnerability of an area against property owner and community outcomes recognising that areas which are currently developed must be treated differently to green field sites.

The *Informed Adaption* management framework is based on the following objectives:

- people want to be empowered to undertake actions themselves;

- people want a variety of tools that they could use to suit their own circumstances;
- community groups want the ability to seek solutions; and
- people want the ability to use their land for as long as practicable.

The management strategies that underpin these objectives are:

- maximising the beneficial use of the coastal zone for as long as possible;
- a risk based approach to development that is underpinned by landowners taking responsibility for the success or failure of the works they propose;
- implementation of development controls to ensure that risk and responsibility are transferred to successive owners; and
- capitalising on the opportunities that may present as a result of the Stage 2 Coastal Reforms.

For *Informed Adaption* to work effectively Greater Taree City Council has recognised that it will need to maintain an active role in the coordination of all management actions, which will be achieved through collaboration with key stakeholders. It is also critical that Council takes an active role in monitoring all management actions, to ensure that they do not pose any further risk or generate offsite impacts.

The *Informed Adaption* Management Framework

Framework overview

The *Informed Adaption* management framework was developed to be flexible in response to the risk posed by a dynamic and changing coastline. *Informed Adaption* may be proactive or reactive and it enables landowners, community groups and public authorities to implement a range of management measures to adapt to the risk from coastal processes on land they own and to preserve the beach and dune amenity they value. This flexibility permits the Greater Taree Coastal Zone Management Plan to provide optimal outcomes for property owners, the broader community and the environment.

While empowering landowners to make decisions and act, *Informed Adaption* also places responsibility for success or failure on those who choose to implement the management measures. This means:

- if a landowner undertakes a management measure it is their responsibility for the success or failure of this management measure. For example if a landowner chooses to undertake beach nourishment with the aim of protecting their land from coastal erosion, they need to accept responsibility in relation to the possibility that the sand may be washed away during the next storm;
- if a landowner builds in an area likely to be affected by coastal erosion, they must accept that in the future the structure they build may need to be demolished should it be deemed an unacceptable risk; and

- future owners know from obtaining a section 149 Certificate for the property that the land is in an area potentially affected by coastal erosion and they need to accept this risk when they make their purchase.

Nobody is locked into preserving or maintaining property or structures should a decision be made to no longer do so. *Informed Adaption* is about being able to make decisions yourself about what is viable to adapt to coastal processes. Likewise, community groups and public authorities that undertake management measures are not locked into doing so in perpetuity. For example, Council may protect a road from coastal erosion while it remains physically practicable and financially feasible to do so but protection may not be maintained when this is no longer the case.

Existing and future landowners who are reliant on the protection of the road (in the above example) for the protection of their own property, knowingly take on the risk of owning such property and having to remove structures when they come under threat if Council decides that it will no longer protect the road.

Management measures

There are three types of management measures that can be undertaken using the *Informed Adaption* management framework: non-permanent, semi-permanent and permanent.

Non-permanent

These types of management measures do not require consent from any public authority and can be undertaken by:

- private landowners on private land;
- community groups on public land following the issue of an approval from either Council or Crown Lands as required; and
- public authorities on public land.

Non-permanent management measures are actions that have negligible impact on the environment or a neighbour's property. Examples include:

- planting of native vegetation;
- placement of geotextile fabric material along the eroding face of the dunes;
- placement of permeable materials, such as branches along the scarp of the dune; and
- placement of sand, known as beach nourishment.

Temporary coastal protection works under the *Coastal Protection Act 1979*, such as the installation of sand filled geotextile bags can be undertaken at authorised locations (Old Bar Beach) but need to comply with the relevant Code of Practice and associated Guide – see the NSW Office of Environment and Heritage's website for further information www.environment.nsw.gov.au.

Any sand used as part of temporary coastal protection works also needs to conform to the sand material requirements under section 9 of the *Guide to the Statutory Requirements for Temporary Coastal Protection Works 2013* available on the NSW Office of Environment and Heritage's website www.environment.nsw.gov.au.

Semi-permanent

This category of management measure requires development consent when undertaken by private landowners on private land and relevant approvals when undertaken by public authorities on public land. Landowners should seek advice from Council before considering such management measures.

When implementing any semi-permanent structures, consideration must be given to:

- management of end effects;
- maintenance; and
- ease of removal should it be required.

Examples of semi-permanent management measures include:

- the installation of sand filled geotextile bags by private owners on private land; and
- the installation of sand filled geotextile bags by a public authority to protect a road on public land.

Permanent

Permanent structures are permitted with development consent when undertaken by private landowners on private land and with relevant approvals when undertaken by public authorities on public land. Landowners should seek advice from Council before considering such management measures.

When implementing any permanent structures, consideration must be given to:

- design continuity;
- management of end effects;
- maintenance access and funding for maintenance; and
- augmentation at end of design life or when maintenance becomes unacceptable.

Examples of permanent structures include:

- augmentation of existing rock seawalls;
- construction of new rock seawalls; and
- artificial reefs.

Consent Authority

Under Division 25 of Part 3 of State Environmental Planning Policy – Infrastructure the NSW Coastal Panel has a statutory role in relation to coastal protection works on the open coast or at the entrance to estuaries. In addition, public authorities proposing new works must notify the panel before carrying out these works and take the panel's response into consideration.

This role does not apply where the proposed works are in relation to emergency coastal protection works. Similarly, if the NSW Minister for Planning has certified a CZMP applicable to the location the local Council becomes the consent authority following certification of the plan. In all other instances the Council is the consent authority on private land.

Existing development

A key principle of the *Informed Adaption* management framework is that current and future owners must accept the risk of living in an area potentially affected by coastal hazards if they choose to stay in, or to relocate to any locality within the coastal hazard risk zone.

It is and will also continue to be Council's responsibility to determine when a structure is at risk of collapse or is a risk to beach users. If the structure is in immediate risk of collapse the Council will issue an emergency Order to demolish/remove the structure. To ensure that this responsibility is met the Council will undertake an active role in the monitoring of coastal assets following erosion events.

A direct result of this monitoring role will be to identify when assets reach a position close to the dune crest even though they may not yet be deemed at risk of collapse or a risk to beach users. It will then be Council's responsibility to advise the asset owners of the potential risk posed by future erosion events. This will enable asset owners to make preparations should the need arise to remove/demolish the asset in the future.

Future development

Seaward of the foreshore building line/immediate hazard line

The foreshore building line/immediate hazard line reflects the line of best fit for the current location of housing in coastal settlements and the immediate hazard line outside of these settlements.

In this area:

- all management measures can be undertaken;
- construction of public authority assets are permitted; however
- construction of private assets such as houses, sheds, pools and the like are not permitted

No subdivision (whether Torrens, Community or Strata) is permitted seaward of the foreshore building line/immediate hazard line, unless it is to facilitate the conversion of private land to public land or is an amendment between boundaries provided that the amendment does not result in the creation of additional lots.

No change of zoning to increase development potential is permitted seaward of the foreshore building line/immediate hazard line.

Within the Coastal hazard risk zone

The coastal hazard risk zone comprises the area of land between the 2100 year coastal hazard line/acceptable risk line and the foreshore building line/immediate hazard line. Development is permitted in this area at the landowner's risk. By developing in this area, landowners accept that they may ultimately have to demolish or remove the structure if the coastline continues to recede.

All development proposals submitted in relation to land within the coastal hazard risk zone must be accompanied by a *Risk Management Plan* that demonstrates that the landowner is aware of the risks applicable to the land. The complexity of the *Risk Management Plan* will be dependent on the size and location of the development and therefore proponents are encouraged to seek advice from Council prior to preparing their proposal.

The *Risk Management Plan* must include:

- an acknowledgement of the risk of developing in this area;
- details indicating how the identified risks will be managed (this could be as simple as detailing how the structure can be demolished or removed in the future); and
- if development is of a scale that has the potential to generate offsite impacts, evidence of how these impacts have been considered and addressed.

Section 88E of the *Conveyancing Act 1919* enables Council to impose a public positive covenant on any land. This will not only serve as a mechanism to link the *Risk Management Plan* outcomes to each allotment in perpetuity, but will also have the added benefit of making future purchasers aware of the risk through the conveyancing process.

If the property is reassessed in the future as being west of the coastal hazard risk zone following a reassessment of the coastal erosion hazard then this public positive covenant can be removed.

No subdivision (whether Torrens, Strata or Community) is permitted in this area, unless it is to facilitate the conversion of private land to public land, or does not result in additional lots.

No change of zoning to increase development potential is permitted within the coastal hazard risk zone.

Public Positive Covenants

The imposition of public positive covenants through the development assessment process is critical to the success of the *Informed Adaption* management framework.

A public positive covenant is created under s.88E of the *Conveyancing Act 1919* and imposes obligations on the owner of the land burdened in favour of a prescribed authority, in this case the Council. These obligations include:

- carrying out specified work on or with respect to the land, or
- the provision of services on or to the land or other land in its vicinity, or
- the maintenance, repair and/or insurance of any structure or work on the land (Land and Property Information, 2015).

It may also impose any term or condition with respect to the performance (or failure to perform) of any such obligation.

Section 88E provides that a prescribed authority may impose a public positive covenant on any land not vested in the authority, whether or not the public positive covenant is annexed to other land (Land and Property Information, 2015). The prescribed authority having the benefit of the covenant has certain powers of entry and is able to carry out the obligations imposed by the covenant and may recover expenses if the owner fails to meet those obligations (see s.88F(2) *Conveyancing Act 1919*).

Public positive covenants allow Council to link the owners acceptance of the risk of development (acknowledged via a risk management plan) to a legislative mechanism which provides certainty in terms of the required actions to address these risks in perpetuity. They allow the risk to be transferred to subsequent owners and provide a mechanism for councils to carry out work and cover the expense should the owner be unwilling to meet their obligations.

Conclusions

To achieve optimal outcomes for property owners, the broader community and the environment a more flexible management framework than the traditional 'protect' or 'retreat' models of coastal zone management is required. Proactively managing the risks associated with the coastal zone and providing opportunities for action within it is fundamental to achieving these outcomes.

As Gordon (2014) said

“Development involving public and private assets and infrastructure should be risk managed to accommodate the ambulatory nature of the coast yet balance it against the communities desire to “enjoy” usage and beneficial occupation of areas of the coast that may be under present and/or future threats”.

The *Informed Adaption* management framework proactively manages these risks and permits a range of activities to be undertaken by landowners, community groups and public authorities. While empowering landowners to make decisions and act, *Informed*

Adaption also places the responsibility and the risk associated with success or failure on those who choose to implement the management measures.

The concept moves away from the scientifically and regulatory conservative traditional approaches to coastal zone management and provides a meaningful framework for regulators to achieve optimal outcomes for property owners, the broader community and the environment in general that are consistent with the coastal policy directives of the State.

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