CITY OF GREATER GEELONG

PLANNING RESPONSE TO SEA LEVEL RISE PLAN

PREPARED BY HANSEN PARTNERSHIP FOR THE MUNICIPAL ASSOCIATION OF VICTORIA | 2019

GREATER GEELONG MUNICIPAL PLAN

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Data for this project has been provided by the Victorian Government, Melbourne Water and local government. While the MAV has taken reasonable steps to ensure accuracy it makes no warranty as to the accuracy of the document.

The MAV is the statutory peak body for local government in Victoria. While this document aims to broadly reflect the views of local government around Port Phillip Bay, it does not purport to reflect the breadth of views of the individual councils.

The MAV acknowledges the contribution of project partners: Association of Bayside Municipalities; Department of Environment, Land, Water and Planning; Melbourne Water and local government (Cities of Bayside, Frankston, Greater Geelong, Hobsons Bay, Kingston, Melbourne, Port Phillip, Wyndham, Mornington Peninsula Shire Council and the Borough of Queenscliffe).

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1 INTRODUCTION

The purpose of this document is to provide the City of Greater Geelong with recommended planning responses to sea level rise and associated hazards (including inundation and erosion) that will occur as a result of climate change along the municipality's Port Phillip Bay coastline.

The report has been prepared as part of the Port Phillip Bay Coastal Planning Project, which is being undertaken by the Municipal Association of Victoria (MAV) in conjunction with the Association of Bayside Municipalities (ABM), an association of the ten municipalities that abut Port Phillip Bay. The aim of the project is to assist the ten Councils around Port Phillip Bay to develop a consistent approach to addressing climate change hazards in land use planning.

Three documents have been prepared as part of the project:

- *The Discussion Paper* which outlines the issues that arise in the development of a land use planning response and recommendations about a preferred approach. This includes clarifying what matters are relevant considerations and what are appropriate tools.
- *The Coastal Hazard Planning Guide* (the *Guide*) which document the process by which a municipal response to sea level rise should be prepared. This also includes confirmation of relevant benchmarks and principles to be used.
- The *Municipal Planning Response to Sea Level Rise* which sets out a municipality's planning response to coastal hazards that arise as a result of sea level rise. It will include a combination of planning policies, overlays and potentially zoning responses, including the identification of further work which may be required.

This *Municipal Planning Response* has been prepared in line with the *Guide* developed for that purpose.

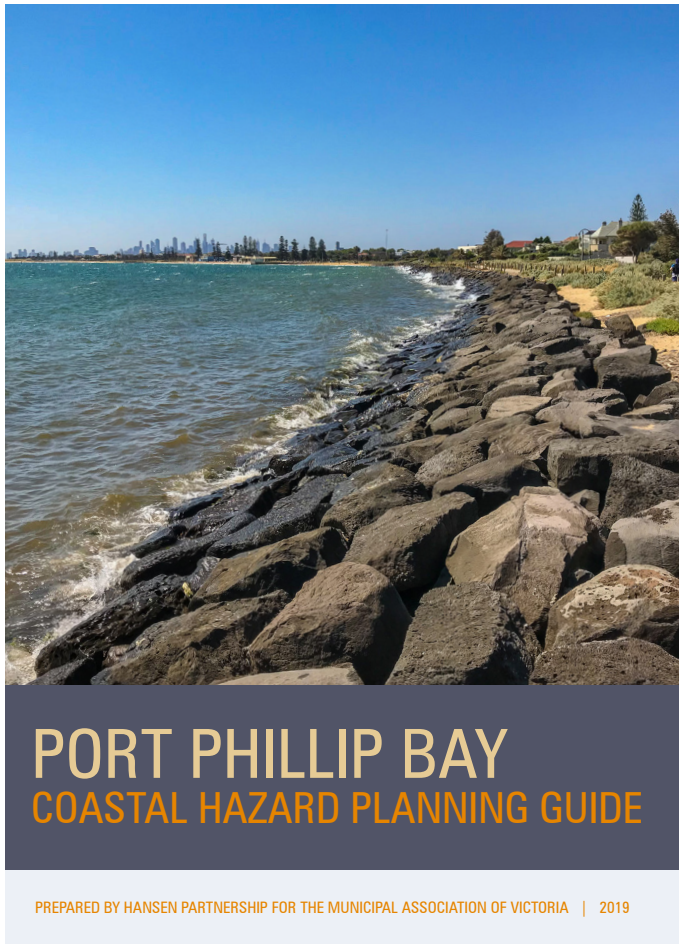

Figure 1 Port Phillip Bay Coastal Hazard Planning Guide (2018)

HOW WILL CLIMATE CHANGE AFFECT COASTAL AREAS?

The emission of greenhouse gases from human activity is having an impact on the world's climate. A changing climate brings with it changes to coastal environments. During this century, coastal environments will be subject to changes in sea temperatures, ocean acidification, altered rainfall patterns, storm surges and sea level rise as a result of climate change. Such changes are increasing the range, frequency and severity of hazards associated with coastal environments and require appropriate responses to manage their impacts. They are impacting on the use and development of land along the coastal fringe and in the case of Port Phillip Bay, on land along and near the foreshore, along rivers, creeks and estuaries feeding into the Bay.

The *Fifth Assessment Report* (2014) provided by the Intergovernmental Panel on Climate Change (IPCC) presented a range of projections of global sea level rise to 2100. Based on current emissions, the world is presently on track to meet the higher scenario identified in that report, which ranges from an increase of 0.52m to 0.98m. The IPCC is due to issue a *Sixth Assessment Report* in 2021/22, which will consider more fully the impacts of climate change on the world's oceans (a separate paper is being prepared, to be released in 2019).

Understanding the dynamic and combined effects of tides, storm surges, coastal processes, erosion and sea level rise, along with local conditions such as topography and geology, is important for assessing risks and impacts associated with coastal climate change.

WHAT ARE THE RISKS?

This *Municipal Plan* relate to the specific impacts of sea level rise on the Port Phillip Bay coastline of the City of Greater Geelong.

Broadly, the risks affecting the Port Phillip Bay coastline can be identified as falling into three categories:

Coastal inundation This risk includes areas which may be periodically or permanently inundated by water under sea level rise scenarios. Periodic inundation may be caused by the impacts of both higher tides and storm surges, and will affect areas not immediately abutting the coast, particularly where there are existing waterways. Some areas may also be impacted by swash zones, where land may not be inundated but be subject to water flowing through a property or area on an interim basis due to changes in wave action as a result of increased water levels. In addition, the saline nature of surface level coastal inundation (at ground level) may also need to be considered in any response to coastal inundation. Permanent inundation will occur where regularly occurring high tide levels (in non-storm situations) are increased by sea level rise.

Coastal erosion occurs when the shoreline is eroded away and moves inland as a consequence of sea level rise and storm surges. It may include the erosion of beaches, land at the rear of beaches or cliffs etc. Erosion is a naturally occurring process which is impacted on by a number of climatic factors. Erosion can be either long term or short term. Long-term erosion refers to a trend of erosion extending over several years and can be caused by a reduction in the annual offshore deposition of sand or in the rate of longshore deposition of sand. The geology of the coastline will influence the impact of erosion in different areas of the Bay.

Groundwater change & Salinity impacts as a result of sea level rise may also require a planning response. As sea levels rise the underground watertable, which extends inland from the shoreline, is also likely to rise. The watertable may not only increase in height but in salinity affecting groundwater and soils. This has the potential to impact on buildings, infrastructure and vegetation. It also has the potential to compromise existing drainage systems.

WHAT IS A PLANNING RESPONSE TO SEA LEVEL RISE

The purpose of the *Guidelines* and associated *Municipal Plans* prepared as part of this project is to focus on **planning responses** to sea level rise around Port Phillip Bay. Planning responses are generally responses that are implemented through a municipal planning scheme. A municipal planning scheme controls the use and development of land through a combination of policies, zones, overlays and particular provisions, and ultimately through the issuing of planning permits. There are two key types of planning responses:

- A land use response.
- A built form response.

ABM Councils under a 0.8m sea level rise scenario

Land use responses (strategic)

A **land use response** is a planning scheme response that imposes a limit or a restriction on the future use or redevelopment of land, the intensification of a future use of land, or a change of use of land in an area affected by sea level rise. Land use responses generally represent a strategic approach to planning and need to be underpinned by a robust evidence base. The severity of the restriction imposed by a land use response may vary along a sliding scale, as the severity of the risk increases. Examples of land use responses are:

- Limiting the amount or intensification of existing uses e.g. restricting or preventing the replacement of single dwellings with multi-dwelling developments.
- Restricting or preventing the establishment of sensitive uses that could result in more vulnerable users being potentially impacted i.e. schools, aged care, kindergartens etc.
- In an extreme case a land use response could lead to the rezoning or back-zoning of land.
- Preventing the rezoning of non-urban land to an urban zone.

Land use responses will generally be applied through local policy and / or a Local Floodplain Development Plan. In extreme cases the response may be to rezone land. In some areas the greatest impact may come from a strategic decision to avoid any rezoning which facilitates or encourages intensification of development.

For most land around Port Phillip Bay, a land use response is likely to be adopted where protection works do not exist or are not proposed to be put in place, and, where the level of risk means that a built form response is not appropriate.

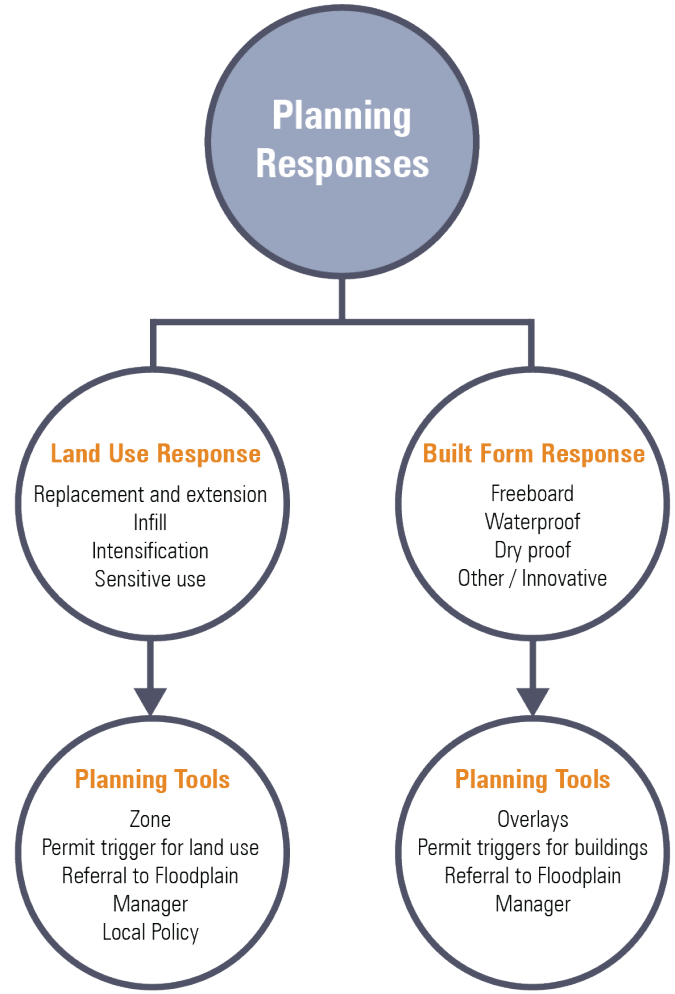

Figure 2 Potential planning responses

Built form responses

Built form responses comprise a range of different approaches. In general they are a planning scheme requirement (made possible through the introduction of permit triggers through overlays) that buildings be designed and constructed in a way that will protect them from the impacts of sea level rise. This may include a requirement to raise the floor level of a building above a designated sea level rise benchmark, construct a basement and ground level of buildings in a way that can be infrequently inundated by water without causing unacceptable levels of damage and risk, or water proofing basements and the ground levels of buildings. Other innovative ways of designing buildings to mitigate impacts associated with coastal inundation could also constitute a **built form response**. As the impacts of sea level rise become more apparent and more areas become affected, new and innovative building techniques are likely to emerge in response.

A built form response would most commonly be implemented by way of a planning scheme overlay. Built form responses are generally discretionary – the need for a building and works permit is triggered, to enable a full assessment of the risks and impacts of coastal climate change on a proposed development, before a permit is issued. In some cases controls can be framed to exempt works from needing a permit as long as they meet certain requirements. In others, it may be considered that the overall impacts of allowing the development are unacceptable and the permit will be refused.

As the depth of water increases a built form response may require buildings to be constructed at an increasing height above natural ground level. Accessibility, amenity and character issues may emerge due to his increased ground floor height. Where this occurs, other planning tools may be required to manage the conflict between achieving freeboard* levels and other planning matters to do with managing the overall height and design of buildings.

In considering built form responses, thought must be given to requirements under the *Building Act (1993)* and associated *Building Regulations 2018*. These regulations states that Council may specify a level for the surface of the lowest floor of a building on the site. Before specifying a floor level Council must:

(a) consult with the floodplain management authority for that site; and

(b) specify a level at least 300 mm above any flood levels declared under the Water Act 1989 or otherwise determined by the floodplain management authority, unless the floodplain management authority consents to a lower floor level.

It is noted the *Building Regulations* (which addresses flooding more broadly) identify a level of 300mm above flood levels. This level is adopted by the Corangamite Catchment Management Authority, which is the floodplain management authority for the majority of Greater Geelong. Melbourne Water has responsibility for a small area of land in the municipality. Melbourne Water adopts a 600mm buffer which considers the impact of storm surge and wave action as required by State Planning Policy when considering coastal inundation and sea level rise.

**Freeboard is the difference between the floor level of a building and the 100-year flood level.*

DEVELOPMENT TYPES

Examples of categories of redevelopment that are relevant to consider in determining the potential planning response include:

- **Replacement and extensions** - development that retains the existing land use pattern and existing intensity of development, and only allows for replacement buildings and extensions.
- **New single dwellings** - development that allows for a minor increase in new dwellings, consistent with the existing density of housing in an area, through the development of new single dwellings on existing vacant lots.
- **Infill development** - development that allows for a minor increase in new dwellings through the re-subdivision of existing larger residential lots (e.g. dual occupancies).
- **Intensification** - more significant than infill. It increases the number of dwellings, or the amount of commercial floor space, on a lot through medium or higher density redevelopment.
- **Vulnerable or hazardous uses** - the establishment of uses that result in the concentration of people in higher risk categories (e.g. children and the elderly). This category also includes emergency facilities and essential services, as well as, the establishment of uses which may pose a threat if impacted by erosion or inundation.

STEPS IN PREPARING A PLANNING RESPONSE TO SEA LEVEL RISE PLAN

Around Port Phillip Bay there is currently sufficient information to make property level assessments in areas subject to inundation, and, regional responses to address erosion risks. At this point in time there is insufficient information to address the emerging issue of groundwater and salinity change. This project proposes a staged approach to address known risks now (Stage 1) while developing a process to consider new information as it becomes available, consult with the community on values and adaptation approaches (Stage 2) and refine the planning approach in response to this (Stage 3).

A Stage 1 response is based on existing data and known risks. It involves the development of a municipal response to identify how to address these risks through the planning scheme, ultimately leading to a planning scheme amendment. This triggers a community consultation process around the controls that are applied (e.g. overlay and policy).

A Stage 2A response follows the release of new data on coastal climate change hazard risks. In this case it will be put into effect on the release of data from the Port Phillip Bay Coastal Hazard Assessment, and associated Victorian Government and agency responses to this.

A Stage 2B response follows the release of data and policy changes at the state level. It involves more detailed community consultation than the Stage 1 response, to determine community values, long-term mitigation actions, protection works and costs and community attitudes to these.

STAGE 1: ADDRESSING KNOWN RISKS

Apply overlay controls to trigger consideration of the issue and raise community awareness based on current data

STAGE 2A: NEW INFORMATION

Undertake a third pass assessment / Local Coastal Hazard Assessment to include dynamic modelling of inundation impacts and to identify erosion impacts

STAGE 2B: CONSULT THE COMMUNITY

Consult the community to set vision/s, identify acceptable risks and identify protection and adaptation works, including priorities and funding. This may be through an Adaptation Plan.

STAGE 3: REFINE THE PLANNING RESPONSE

Apply more tailored controls, local policy, additional design responses etc once science and protection / mitigation works are more fully understood.

Figure 3 Overall process for determining planning response

A Stage 3 response involves applying more tailored controls (e.g. zones, overlays and policies) based on science, and, community attitudes to mitigation/adaption responses where relevant.

Geelong is ahead of the other Councils involved in this project in planning for sea level rise. The council has prepared a Local Coastal Hazard Assessment and undertaken community consultation as part of the OurCoast project. The work completed as part of OurCoast and this project means that as opposed to the Stage 1 response for the rest of the municipalities, Geelong's *Municipal Plan* forms part of a Stage 3 response.

The process of preparing a *Municipal Planning Response to Sea Level Rise* involves the following six steps:

STEP 1: Describe the municipality context

STEP 2 - Identify the locations at risk

STEP 3 - Identify any protected areas

STEP 4 - Assess the land use impacts

STEP 5 - Determine the planning response

STEP 6 - Implement the planning response

Principles, Benchmarks and a consistent Planning Approach were developed as part of the Project. Those which are relevant to the planning response contained within this Plan are replicated on page 9.

PRINCIPLES, BENCHMARKS, & APPROACH

PRINCIPLES

- The best available data should be used to enable informed decisions to be made.
- Knowledge of sea level rise and available technology will change over time and planning controls should be updated to reflect any new modelling undertaken.
- Where possible streamlined processes should be put in place to allow this to occur efficiently. Planning for coastal hazards should be undertaken in partnership with Floodplain Management Authorities and DELWP.
- Planning should identify known risks and modelling of coastal hazards should be translated into planning policy.
- Interference with natural processes and indigenous flora and fauna should be minimised wherever possible, and development or protective works seeking to respond to coastal hazards should avoid/ minimise detrimental impacts on coastal processes.
- Long term planning responses to coastal hazards need to be accompanied by community engagement and undertaken in conjunction with consultation around any proposed physical protection works.

BENCHMARKS

- Statutory Planning should adopt a 0.8 m sea level rise at 2100.
- Strategic Planning should identify expected sea level rise beyond 2100 (at a rate of 14mm per year as per IPCC projections) to allow for the consideration of the longer term impacts of coastal hazards on the location of larger or more sensitive infrastructure (e.g. hospitals, schools, essential services etc)
- Adopt flood levels utilised by the Floodplain Management Authority (where available) in response to a 0.8m sea level rise as the relevant starting point where no coastal hazard assessment has been undertaken to set flood levels.

PLANNING APPROACH

- Planning overlays should be applied to trigger a planning permit for all land identified at risk of inundation through modeling undertaken by the Floodplain Management Authority.
- The level of control or restrictions included within the planning schemes should be commensurate with the level of understanding of risk (e.g. depth of inundation).
- Once a Coastal Hazard Assessment has been undertaken, use Flood Hazard Classes (see Appendix 2) to guide the appropriateness of strategic planning responses.
- Planning should recognise the different responses required for urban and non-urban land.
- Planning should recognise there may be areas around Port Phillip Bay (for example urban renewal areas) where a precinct based approach is appropriate.
- Planning should not presume 'protection' to be offered by physical works until such works have been confirmed as effective by the relevant Floodplain Management Authority and the level of protection documented.
- Planning controls should be applied to allow for consideration of erosion risk in identified areas once coastal hazard lines are detailed through any Coastal Hazard Assessment. No intensification of residential and commercial uses should occur in areas subject to coastal erosion risk, once such areas have been identified.
- Updates of planning controls should be undertaken if/ when new or revised planning tools becomes available.

2 MUNICIPAL CONTEXT

MUNICIPAL CONTEXT

Geelong is the main urban centre of the City of Greater Geelong. Geelong is Victoria's second largest city with a population of over 233,000 (2018). It is located on Corio Bay, at the southern end of Port Phillip Bay. The City of Greater Geelong takes in most of the Bellarine Peninsula, which includes a substantial coastline along Port Phillip Bay and also Bass Strait. The Bellarine Peninsula contains many small towns located along the foreshore of both Port Phillip Bay and Bass Strait. Geelong is the main urban centre of the municipality and Victoria's second largest city.

The Port Phillip Bay coastline of the City of Greater Geelong extends around 95 kilometres from Little River in the north, which is the municipal boundary with the City of Wyndham, to Edwards Point in the east, which is the municipal boundary with the Borough of Queenscliffe. The coastline includes inland areas to the west of Queenscliffe and Point Lonsdale that front the tidal estuary of Swan Bay (Figure 4, page 11).

The coastline of the municipality can be divided into three main sections:

- Urban Geelong.
- Bellarine Peninsula.
- Avalon Corridor

Urban Geelong is generally contained within Corio Bay. It extends from Limeburners Bay in the north to Point Henry in the east. The coastal condition around the bay generally involves elevated land behind low cliffs, with a generally rocky, pebbly or muddy shoreline.

Significant industrial and port uses abut most of the northern section of the Corio Bay foreshore, to the north of Rippleside, including the Port of Geelong.

South of Rippleside the foreshore generally comprises public reserves, with residential properties fronting adjoining roads that overlook Corio Bay.

The Geelong CBD waterfront is one of the major assets of urban Geelong. It is highly urbanised with public open space, recreation, tourism, hospitality and other uses. It includes Cunningham Pier, Steampacket Gardens, the Royal Geelong Yacht Club, Eastern Beach Sea Baths and Eastern Park, which is located on an elevated point overlooking Corio Bay.

East beyond Limeburners Point to Point Henry, foreshore uses include the East Geelong Golf Club, CSIRO Animal Health laboratory, the former Cheetham salt works site at Moolap and the former Alcoa Aluminium works at Point Henry. Beyond the golf club the land becomes very flat and low lying. The former salt pans are subject to tidal inundation and have high conservation values.

The **Bellarine Peninsula** is an attractive and highly valued rural area to the east of Geelong. It comprises a number of coastal settlements that are generally separated by farmland. The Peninsula has both ocean and bayside coastlines (only the Port Phillip Bay coastline is relevant to this project).

The Bellarine Peninsula is identified in State Planning Policy as a distinctive area and a significant landscape (Clause 11.03-5S). A localised planing policy has been prepared for the area and a specific local policy is contained in the

Figure 4 Aerial photograph of municipality

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Port Phillip Greater Geelong Coastal Inundation

Aerial Imagery

Legend

- Municipal Boundary
- Train Line / Station
- Main Road

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planning scheme (21.14). That policy seeks to protect the rural areas and highly significant landscapes of the Peninsula, and to contain existing townships within the urban growth boundaries set by structure plans.

Between Point Henry and Clifton Springs the coastline is predominately rural, except for small pockets of development that abut the foreshore at the northern end of local roads, and the Avila Road low density residential area. The land is low lying and flat. The land form in the vicinity of Clifton Springs is more elevated, with residential areas sitting atop low coastal cliffs. Beyond Clifton Springs the land form drops back to low level and is very flat along the coast to Point Richards, before again rising in the vicinity of Portarlington. From Portarlington east there is an almost continuous ribbon of residential development along the coast, connecting the towns of Portarlington, Indented Head and St Leonards.

Shallow sandy beaches define the coastline for much of the area east of Point Arlington. The Esplanade runs along the coast from Portarlington to St Leonards, separating a narrow coastal reserve from low lying residential properties on the opposite side of the road.

There are small commercial centres along the foreshore along the Esplanade in Portarlington and St Leonards.

Salt Lagoon, Edwards Point Swan Bay and Lake Victoria are significant conservation areas.

The **Avalon Corridor** to the north of Geelong is designated as an inter-urban break between Melbourne (Werribee) and Geelong. The Victorian Government is currently preparing a strategic framework plan for the corridor. The corridor is largely rural, interspersed with major strategic infrastructure such as Melbourne Water's Western Treatment Plan, Avalon Airport, regional waste disposal facilities, quarries, prisons and Commonwealth Defense land.

The northern 16 km of coastline is occupied by Melbourne Water's Western Treatment Plant. That area is very flat and low lying, with the largely inaccessible coastal fringe comprising a series of natural and artificial wetlands, lagoons and intertidal areas.

Between Point Wilson and Limeburners Bay to the south of Avalon Airport, the coastline is also low lying and flat. The area includes a large quarry, the Point Wilson Defense area, a fledgling aquaculture industry and abandoned salt pans. A small cluster of houses exist along the foreshore at the southern end of Avalon Road.

Environmental values

The Greater City of Geelong includes many wetland areas that make up one of the most important waterbird areas in Australia. Wetlands within the municipality have the highest concentration of migratory shorebirds in Victoria and a stunning array of other birdlife, the diversity of which rivals Australia's famous Kakadu region. The most significant and sensitive areas are recognised as being of international importance and are listed under the Ramsar Convention*.

Important coastal wetlands include:

- Western Treatment Plant
- Avalon Wetlands
- Limeburners Bay
- Point Henry
- Swan Bay, including the Edwards Point Wildlife Reserve.

**www.geelongaustralia.com.au/wetlands/article/item/8ce6771ae9c2e18.aspx.*

PLANNING POLICY FRAMEWORK

Key documents and policy which Council should refer to when assessing planning decisions are included below. See the *Discussion Paper* for a full description of these and other relevant documents.

Victorian Coastal Strategy (2014)

The key strategic document in planning for coastal areas is the *Victorian Coastal Strategy (2014)*. This document establishes State policy guidance in relation to the impacts of sea level rise within the Planning Policy Framework.

Victorian Coastal Strategy (2014) Planning for Sea Level Rise Guidelines (2017)

State Planning Policy

State planning policy outlined within the Planning Policy Framework of the Greater Geelong Planning Scheme presents formal State policy for climate change and sea level rise for the consideration of planning scheme amendments and planning permit applications lodged under the *Planning and Environment Act 1987*.

Clause 13.01: Climate Change Impacts provides direction on planning for hazards associated with climate change, including inundation and erosion (Clause 13.01-2S). Defined sea level rise benchmarks included in this clause are taken directly from the Victoria Coastal Strategy and include policy regarding the need to *"plan for sea level rise of not less than 0.8 metres by 2100"*. The clause allows for the use of an interim benchmark of 2040 in infill areas if desired. As outlined in the Discussion Paper and Guide the proximity of this date (21 years) means this interim benchmark is not proposed to inform the planning response.

Planning for Sea Level Rise Guidelines

The City of Greater Geelong is located within two Catchment Management Authority areas:

- The vast majority of the municipality is located in the Corangamite Catchment Management Authority Area.
- A small, non-urban part of the municipality's coastline between Little River and Point Wilson is located in the Port Phillip & Western Port Catchment Management Authority Area.

The Corangamite Catchment Management Authority is the Floodplain Management Authority for areas affected by inundation from sea level rise for the majority of the municipality. The authority refers to the *Guidelines for Coastal Catchment Management Authorities: assessing development in relation to sea level rise* (2012) when assessing referrals in coastal areas.

The Guidelines set out key matters for consideration and the process for assessing development applications. The Guidelines outline applicable benchmarks and freeboard levels.

Melbourne Water is the Flood Plain Management Authority for a small part of the City of Greater Geelong.

Their *Planning for Sea Level Rise Guidelines* apply to all coastal municipalities within the Port Phillip and Westernport Catchment. Endorsed by the Minister for Water in 2018 the Melbourne Water Guidelines are relevant to apply a consistent approach to planning responses across all Port Phillip Bay municipalities.

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Bellarine Peninsula Localised Planning Statement

The Bellarine Peninsula is one of four key distinctive areas identified by the Victorian Government. It was determined appropriate that localised planning statements were put in place for these areas. The purpose of a localised planning statement is to identify key valued attributes of those areas and to put in place objectives and strategies to ensure that they are preserved and enhanced. The statement focuses on agricultural land, rural landscapes, non-urban breaks between settlements (including Geelong), coastal settlements and the natural environment, especially the coastline, wetlands and vegetated areas. No reference is made in the policy to climate change or sea level rise.

Local Planning Policy

The Greater Geelong municipal strategic statement is both theme based and placed based. It includes policies for climate change under the general theme of the 'natural environment' (Clause 21.05-5). It includes a single policy and single strategy:

- *"plan for the impacts of climate change"*
- *"avoid land use and development within areas considered at risk of coastal erosion or inundation from flooding, storm surge or rising sea level"*.

Relevant place based policies include a specific policy for the Bellarine Peninsula (Clause 21.14), which includes general policies for all coastal towns on the Peninsula. Those policies generally summarise the key directions from the structure plans prepared for each town (see discussion following).

Under the heading 'Further Work' it identifies the need to work with the Borough of Queenscliffe in response to issues concerning coastal climate change.

Other Documents

Settlement Strategy

The municipal settlement strategy is an overarching document that examines long term population and housing needs for the municipality and identifies the role, function and boundaries of urban Geelong and other settlements within the municipality. Of most relevance to this project the strategy identifies:

- Settlement boundaries for Geelong and for all coastal townships on the Bellarine Peninsula.
- A non-urban break to the east of Geelong towards the Bellarine Peninsula, between Geelong and Leopold.
- The former Cheetham Salt Works site at Moolap and the Point Henry area, which have extensive frontage to Port Phillip Bay, as an investigation area.
- The Avalon Corridor as a non-urban break.

Climate Adaptation Strategy 2011

The purpose of the Climate Change Adaptation Strategy is to prepare Council and the community for the climate change impacts that are like to occur into the future (p8). The strategy identifies coastal planning as a priority work area (p24) in which greater information is required to assist Council, its planners and the community in better understanding the risks of climate change. It recommends incorporating consideration of climate change in coastal planning decisions through the use of existing planning tools.

Township Structure Plans

Local policy for the Bellarine Peninsula refers to development within each of the coastal townships on the Peninsula, being consistent with approved township structure plans. The following structure plans presently exist:

- Drysdale Clifton Springs Structure Plan 2010
- Port Arlington Structure Plan 2016
- Indented Head Structure Plan 2015
- St Leonards Structure Plan 2015
- Point Lonsdale Structure Plan 2011

The time over which the structure plans have been prepared varies from 2009 to 2016. State planning policy and available data regarding coastal hazards has changed over that time.

All structure plans refer to climate change and to the likelihood of coastal hazards along the Bellarine coastline, due to coastal erosion and inundation from sea level rise. All structure plans identify land subject to inundation from the combined effect of a 0.8m rise in sea level and combined storm surge. The data used to identify the inundation risk varies between the Victorian Coastal Inundation Data set, which is a high level second pass assessment undertaken by the Victorian Government, and a more recent third pass assessment prepared as part of the *Our Coast* project, depending on the timing of when the structure plan was prepared.

The structure plans identify land affected by sea level rise, however, they do not include planning policies regarding the future use and development of that land. Some, but not all plans, include a strategic direction identifying the need to ensure new development undertakes a coastal vulnerability assessment where potential impacts from climate change have been identified. Where affected land is in a residential zone, overarching policies for most townships continue to encourage consolidation and infill development.

The structure plans generally suggest more detailed work and community consultation is required before more rigorous planning policies and potentially planning controls are applied to areas at risk.

The Portarlington Structure Plan discusses the potential to include a LSIO over land subject to inundation from sea level rise. In relation to Ramblers Road to the west of Portarlington, one of the most affected areas in the municipality, it discusses the prospect of restrictive planning controls to limit future development.

St Leonards Structure Plan suggests the need to consider future actions including 'do nothing, retreat, protect' to manage development in parts of the town subject to inundation from sea level rise. Supporting policy is not included in the plan.

Key areas identified as being at risk from inundation from sea level rise within the various structure plans include:

- Portarlington - Low lying land to the west and to the east of Portarlington, in particular the Ramblers Road area to the west.
- Indented Head - The St Leonards coastline, which is likely to be subject to erosion and inundation, with the narrow section of foreshore between Salt Lake and the coast likely to be particularly affected (p16).
- St Leonards - Which will be affected by climate change including storm surges and sea level rise. Areas adjacent to the coast, including Salt Lagoon, Swan Bay, St Leonards Lake and the foreshore area will be the most affected by climate change. It comments that new development (particularly land within Growth Areas 1 and 2) will need to consider the impacts of climate change given stormwater will drain into these areas. (p80)
- Point Lonsdale - Residential zoned land to the south of Shell Road, including land occupied by the recent Lonsdale Lakes Development, and generally rural zoned land around Swan Lake, extending to Portarlington Road.

Avalon Corridor Framework Plan

The Department of Land Environment Water and Planning, City of Greater Geelong and City of Wyndham are currently working together to prepare a framework plan for the Avalon Corridor. The project responds to the strategic importance of the corridor for key state and regional level infrastructure. It recognises the environmental values and the role of the corridor as an interurban break between Melbourne and Geelong.

Our Coast

The Our Coast project, undertaken jointly by the City of Greater Geelong and the Borough of Queenscliffe, provides detailed existing information about the extent and the duration of inundation under six different sea level rise scenarios for the municipalities of Greater Geelong and Queenscliffe. The information contained in Our Coast is described in more detail in Section 3 of this report.

GREATER GEELONG MUNICIPAL PLAN

Coastal Management Plans (2004-2018)

The City of Greater Geelong manages numerous coastal reserves throughout the municipality. Port Phillip Bay foreshore areas managed by Council include:

- Avalon Beach*
- Eastern Beach / Eastern Park (north of Hearne Parade)
- Harvey Park, St Leonards
- Limeburners Bay / foreshore (including Shell foreshore)*
- Limeburners Point - boating facility
- Moorpanyal Park
- Point Henry Reserve (sections)
- Point Henry to Point Richards foreshore (sections)
- Rippleside foreshore
- Salt Lagoon St Leonards
- Steampacket jetties & structures
- St Helens foreshore
- Swan Bay car park
- Western Beach / Griffins Gully

(* Those with an astericks are of high conservation value)

Greater Geelong has a number of existing Coastal / Foreshore Management Plans (C/FMPs) that provide specific guidance for parts of the Port Phillip Bay coastline within the municipality. These include:

- Point Henry Foreshore Management Plan 2006
- Clifton Springs Coastal Management Plan 2008
- Beacon Point Reserve Master Plan
- Portarlington Safe Harbour Master Plan
- Northern Bellarine Foreshore Plan 2012
- Northern Bellarine Master Plan 2014)

The Clifton Springs Coastal Management Plan identifies sea level rise and coastal erosion as significant issues that needed to be address and makes recommendations in relation to such.

Bellarine Bayside Coastal Management manages the foreshore from Point Richards in Portarlington to Beach Road in St Leonards. Its management plan identifies sea level rise, high tides, storm events and beach and cliff erosion as key issues (p27). It includes as a key objective the preparation of directions to respond to the adverse impacts on coastal processes and to plan for climate change (p34), as well as an action to prepare and implement a Coastal Hazard Management Plan.

The City of Greater Geelong has representation on Bellarine Bayside Coastal Management.

CURRENT LAND USE ZONING & OVERLAYS

Zoning

Land use zoning along the Port Phillip Bay coastline of Greater Geelong is shown on Figure 5 (page 18).

Most of the foreshore is included in a Public Conservation & Resource Zone. Areas of Public Park and Recreation Zone generally exist adjacent to urban areas. The foreshore of the Port of Geelong is included in a Port Zone. These zones generally extend some 600m offshore.

A mix of urban and non-urban zones generally apply on the inland side of the foreshore, depending on the development of the area.

Overlays

Current overlays along the coastline are shown on Figure 6 (page 19). They include the following:

- An Environmental Significance Overlay 2 (High Value Wetlands and Associated Habitat Protection), applies to almost the entire Avalon Corridor foreshore and inland areas, the Moolap former salt works, and the Swan Bay and Edwards Point areas.
- DDO14 (Dwellings over 7.4m in Areas with Access and Views), applies to residential areas in most settlements in Bellarine Peninsula.
- DDO19 (Residential Coastal Frontages), applies to the first row of residential development along the coastline from Port Arlington to St Leonards.
- DDO9, applies to the Avila Road area and to Curlewis.
- HO1594, applies to the former Clifton Mineral Springs.
- Significant Landscape Overlay 14, applies to the rural areas between Clifton Springs and Portarlington.
- Heritage Overlay 1963, applies to the foreshore of Indented Head (Batman Park).
- The Point Wilson Defence Area is included in a DPO and DDO20 (which relate to industrial land generally).
- The Port and all other industrial zone is included in DDO20, which relates to industrial land generally.
- A heritage overlay applies to the former salt works land at Avalon.
- A heritage overlay applies to Eastern Beach and Eastern Park.
- Numerous heritage and design and development overlays apply to residential and commercial properties close to the foreshore throughout urban Geelong.

The only Land Subject to Inundation Overlay that presently applies to land near coastal areas in Greater Geelong is in the Avalon Corridor area, to the west of Avalon Airport.

A Special Building Overlay applies to:

- Extensive areas in the eastern parts of Portarlington.
- The Newcomb and Moolap area, over the former salt works land and extending a considerable distance inland, affecting both residential and industrial zoned properties.

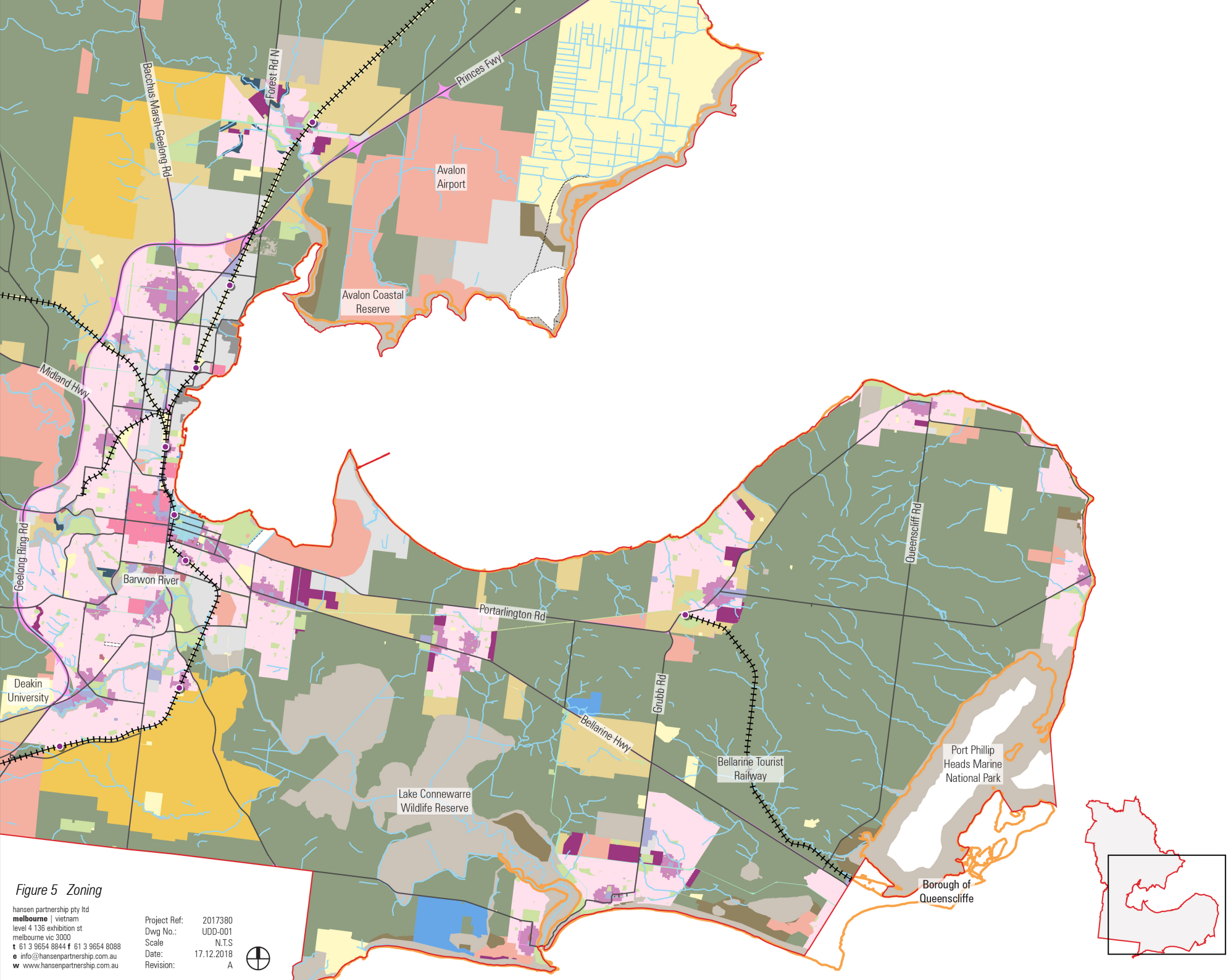

Figure 5 Zoning

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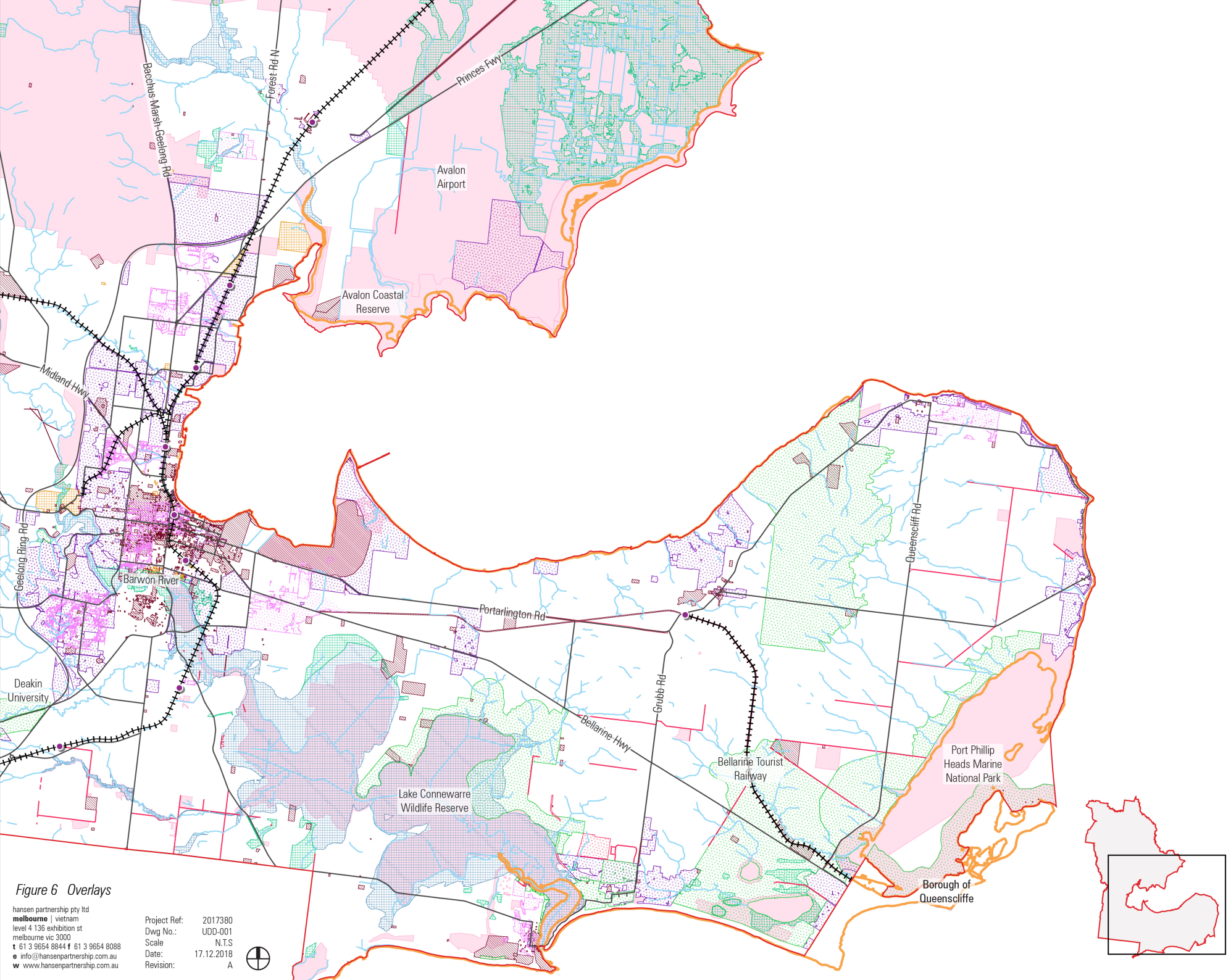
Port Phillip Greater Geelong Coastal Inundation

Zoning

Legend

- Municipal Boundary
- General Residential Zone
- Neighbourhood Residential Zone
- Residential Growth Zone
- Low Density Residential Zone
- Mixed Use Zone
- Industrial Zone
- Commercial Zone
- Public Park and Recreation Zone
- Public Conservation and Resource Zone
- Public Use Zone
- Special Use Zone
- Activity Centre Zone
- Comprehensive Development Zone
- Port Zone
- Urban Floodway Zone
- Urban Growth Zone
- Farming Zone
- Rural Conservation Zone
- Rural Living Zone
- Road Zone Category 1
- Road Zone Category 2
- Commonwealth Land
- Coastline
- Waterways
- Train Line / Station
- Main Road



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Port Phillip Greater Geelong Coastal Inundation

Overlays

Legend

- Municipal Boundary
- Flood Overlay
- Land Subject to Inundation Overlay
- Heritage Overlay
- Environmental Audit Overlay
- Environmental Significance Overlay
- Vegetation Protection Overlay
- Significant Landscape Overlay
- Special Building Overlay
- Design and Development Overlay
- Coastline
- Waterways
- Train Line / Station
- Main Road

Figure 6 Overlays

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EXISTING PHYSICAL WORKS AND PROGRAMS

There are a number of existing physical structures and programs that have the potential to provide direct or indirect protection against current and future coastal hazards. The extent to which these works will offer protection against sea level rise in the future has not been assessed at this time.

While some of these works have been documented, there is no comprehensive database of protection works within Greater Geelong. There is a commitment from the Victorian Government, as part of the implementation of the new *Coastal and Marine Act,* to re-document and prioritise works relating to public coastal protection assets.

A summary of existing works follows (See Figure 8, page 25):

- Sea wall construction largely occurs along the Geelong Waterfront and urban Geelong, and in places in the northern part of the Indented Head foreshore and in small sections at St Leonards.
- Significant works such as piers / jetties and breakwaters exist at the Port of Geelong, Point Wilson Defence Area, Port Arlington, St Leonards, Clifton Springs, Point Henry, Limeburners Point, the Geelong Waterfront and Rippleside.
- Groynes for sand stabilisation exist along the Indented Head and St Leonards foreshores, east of Clifton Springs and between Point Henry and Clifton Springs.
- Very little works exist in the Avalon Corridor area.

Existing bluestone sea wall along the Geelong Waterfront

Beach renourishment at Portarlington Swimming Beach

Sandbag groyne and rock revetment works at Clifton Springs

Dune repair works on The Esplande foreshore in St Leonards

COASTLINE MANAGEMENT

While Council manages a large part of the Port Phillip Bay coastline, significant portions are also controlled by appointed committees of management under the *Crown Lands Act*, by Parks Victoria, the Port of Geelong and private landowners (See Figure 7 on this page).

Council manages the majority of the foreshore of urban Geelong within Corio Bay, other than for the Port of Geelong, which is managed by the port authority.

Parks Victoria manages the majority of the foreshore within the Avalon Corridor, other than for the Western Treatment Plant, which is managed by Melbourne Water, and the Point Wilson Defence area, which is managed by the Commonwealth Government.

On the Bellarine Peninsula a significant part of the foreshore between Point Henry and Portarlington is in private ownership, except for the foreshore at Clifton Springs, which is managed by Council. Bellarine Bayside Coastal Management has responsibility for land from Portarlington to the base of Edwards Point, and Parks Victoria manages the environmentally sensitive foreshores of Edwards Point and the majority of Swan Bay.

The coordination of management actions across these different organisations will need to be considered. The appropriate management of private land will be challenging and liaison with landowners will need to commence in the short term for areas identified as being impacted by sea level rise. The management of these area will be complicated by State level direction that public funds should not be utilised to protect private property.

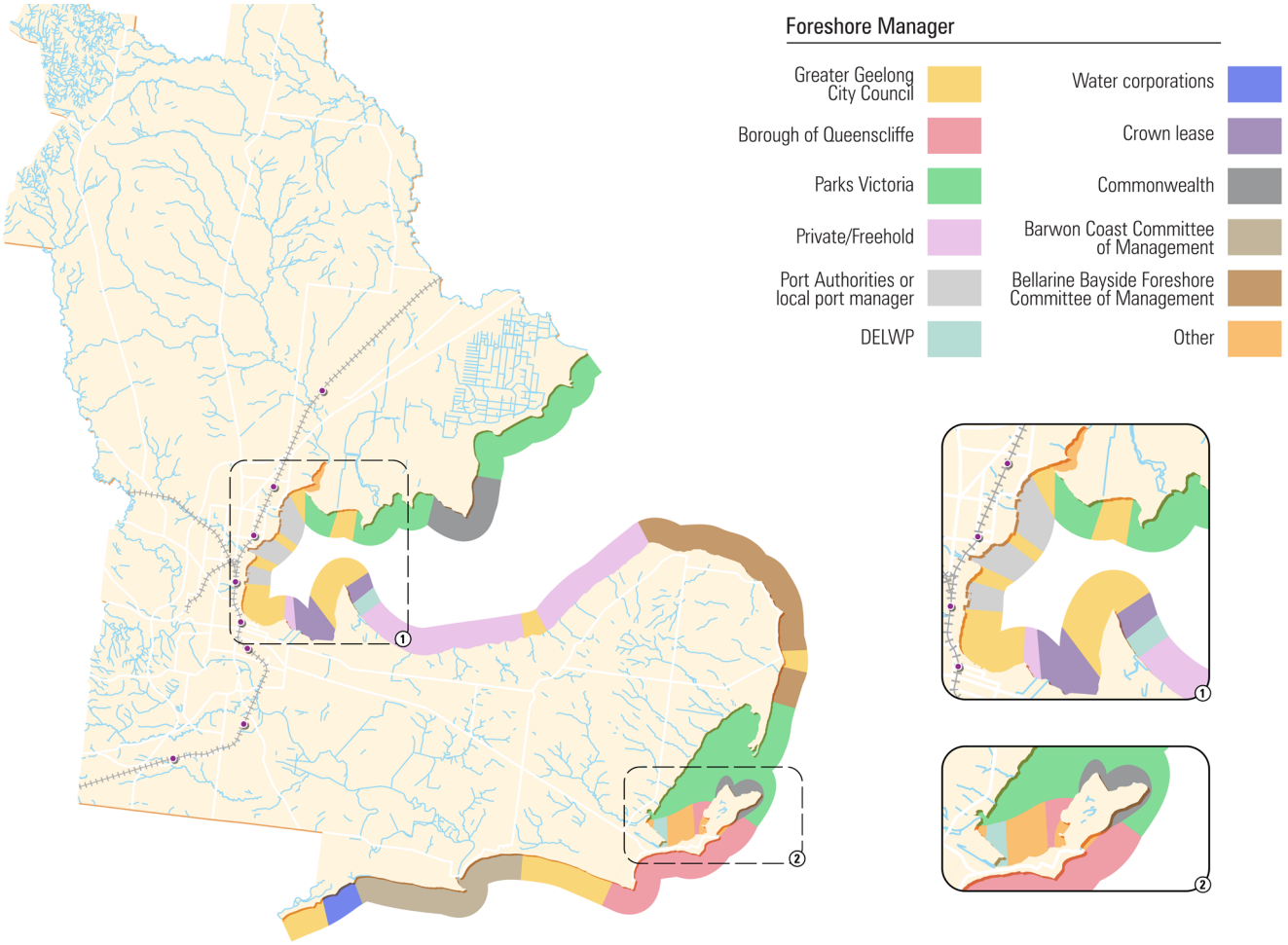

Figure 7 Coastline Management

3 LOCATIONS AT RISK

In planning for sea level rise and determining the most appropriate planning response, the first step is to identify the locations which are potentially at risk.

Unlike other municipalities around Port Phillip Bay, a detailed local coastal hazard assessment has been undertaken for the Greater City of Geelong and the Borough of Queenscliffe.

The *Our Coast* project, undertaken jointly by the City of Greater Geelong and the Borough of Queenscliffe, provides detailed existing information about the extent and the duration of inundation under six different sea level rise scenarios for the two municipalities. This data constitutes a third pass and is the main data source used in this Plan.

The Victorian Government is currently undertaking a coastal hazard assessment for the whole of Port Phillip Bay. That work is not expected to be completed until mid 2020. The coastal hazard assessment will reassess and update the information provided by *Our Coast* for Greater Geelong and Queenscliffe where necessary.

Other data sources that map inundation in Port Phillip Bay include the Victorian Government's Victorian Coastal Inundation Dataset (second pass assessment) and Melbourne Water's data set which has mapped inundation for the small part of the municipality to the north of Point Wilson.

The following section provides details on the available information and maps the locations at risk. These areas may be refined in the future as more detailed assessments are undertaken following the release of data from the Port Phillip Bay Coastal Hazard Assessment. Existing data is sufficiently robust to justify a Stage 1 Planning Response (see Figure 3, page 8).

COASTAL INUNDATION

Figure 8 (Coastal Conditions, page 9) shows areas at risk of periodic inundation as a result of a sea level rise of a 0.8 metres and also 1.1 metres, using data from *Our Coast*.

A sea level rise of 0.8 metres is consistent with State Planning Policy. A sea level rise of 1.1 metres is also identified to illustrate areas that may be at risk in the longer term, or if projections for sea level rise are revised upwards.

Figure 8 also shows land that is at risk of permanent inundation, based on the *Victorian Coastal Inundation Dataset* (VCID), as *Our Coast* does not identify land that is at risk of permanent inundation as a result of sea level rise.

Our Coast

Our Coast applies to both the Bass Strait coastline and the Port Phillip Bay coastline of the municipalities Greater Geelong and Queenscliffe. It includes:

- An online portal that provides a summary of the project and access to project outputs and resources (*ourcoast.com.au*).
- The *Bellarine Peninsula - Corio Bay Coastal Hazard Assessment - Summary Inundation Report Summary and Full Reports*
- *Coastal Inundation Options Report.*
- Visualisations for key towns affected by sea level rise.

The project focuses on inundation from sea level rise. It includes details about the extent and the duration of inundation, but not the depth of inundation. It does not address coastal erosion or ground water / salinity.

It identifies six different sea level rise scenarios in combination with a 1% AEP storm event:

- 0.0m sea level rise (relative to 1990 as a baseline)
- 0.2m sea level rise
- 0.5m sea level rise
- 0.8m sea level rise
- 1.1m sea level rise
- 1.4m sea level rise

The project has mapped and prepared visualisations for each of these scenarios and described and assessed the impacts on nine separate 'compartments' or localities into which the coastline has been divided. The compartments which abut Port Phillip Bay include:

- Point Lonsdale to Point Edwards
- Point Edwards to Portarlington
- Portarlington to Point Henry
- Stingaree Bay to Geelong (South Corio)
- North Corio Bay to Point Wilson

The mapping also includes:

- The location of assets in each locality.
- A climate risk overview statement for each locality.

The mapping identifies the extent of inundation resulting from a 0.8m sea level rise, including a 1% AEP storm event. It does not show the extent of inundation that might occur a result of sea level rise, without a storm event, which has been taken to represent land at risk from permanent inundation. The *Victorian Coastal Inundation Data Set* provides that information.

The mapping has not taken into account the effectiveness or otherwise of any physical protection works that exists along the coastline. The effectiveness of any such works on mitigating potential inundation risks will need to be further investigated in the future.

Victorian Coastal Inundation Dataset (VCID)

The *Victorian Coastal Inundation Dataset* (VCID) provides data maps of coastal inundation based on second pass assessment. It details the spatial extent of land affected by inundation at varying sea level rise scenarios. Similar to the data from *Our Coast*, the data includes areas that will be affected by periodic inundation from a sea level rise of 0.8m by 2100 measured at a 1% AEP occurrence. It also identifies land that will be permanently inundated as a result of sea level rise e.g. land that will be regularly inundated at high tide in non storm conditions. The permanent inundation element of the data is based on the standard tidal range grid modelled by the National Tidal Centre (NTC), which is used to model the mean high water mark and represents the mapped coastline. This data set is used to identify land likely to be permanently inundated.

COASTAL EROSION

The most vulnerable areas likely to be subject to coastal erosion along the Greater Geelong coastline have been identified by DELWP's Coastal Erosion Vulnerability mapping, which identifies coastal erosion vulnerability bands for the Victorian coast. The areas that are identified as being at 'high' or 'very high' risk of erosion are mapped on Figure 8 (page 25).

This existing Coastal Erosion Vulnerability mapping is general and is applicable for consideration at a regional scale. At a property level there are still questions about the use of the data (see Discussion Paper). The data does, however, provide an understanding of which areas of Greater Geelong are most likely to be at risk from the impacts of coastal erosion. It has the potential to be used by Council in considering what information it requires to assess a planning permit application.

More detailed information about the extent, severity and timing of coastal erosion will be available following the completion the *Port Phillip Bay Coastal Hazard Assessment*.

The most vulnerable areas likely to be subject to coastal erosion are located along the north facing beaches of the Bellarine Peninsula coastline. They include:

- The coastline generally from Point Henry to Port Arlington
- The eastern foreshore of Edwards Point.

GROUNDWATER AND SALINITY

Groundwater and salinity changes as a result of rising sea levels is an emerging issue. Rising water tables can exacerbate inundation as it is generally not prevented by protection measures such as levees. Currently there is very limited information on affected land within the municipality.

Consequences of rising groundwater also relate to drainage capacity issues for submerged drainage outlets, saturated soils increasing runoff, and impacts of increased exposure to salinity for infrastructure and building footings.

The Port Phillip Bay Coastal Hazard Assessment will be gathering data on groundwater change which will highlight areas where increased salinity and/or flooding impacts from groundwater recharge may occur within the municipality. Potential issues such as those associated with contaminated land (e.g. land that may have been re-mediated through capping) can then be identified and strategies put in place to address these. It is understood at this stage the information will be at a scale that is useful for regional assessments (second pass).

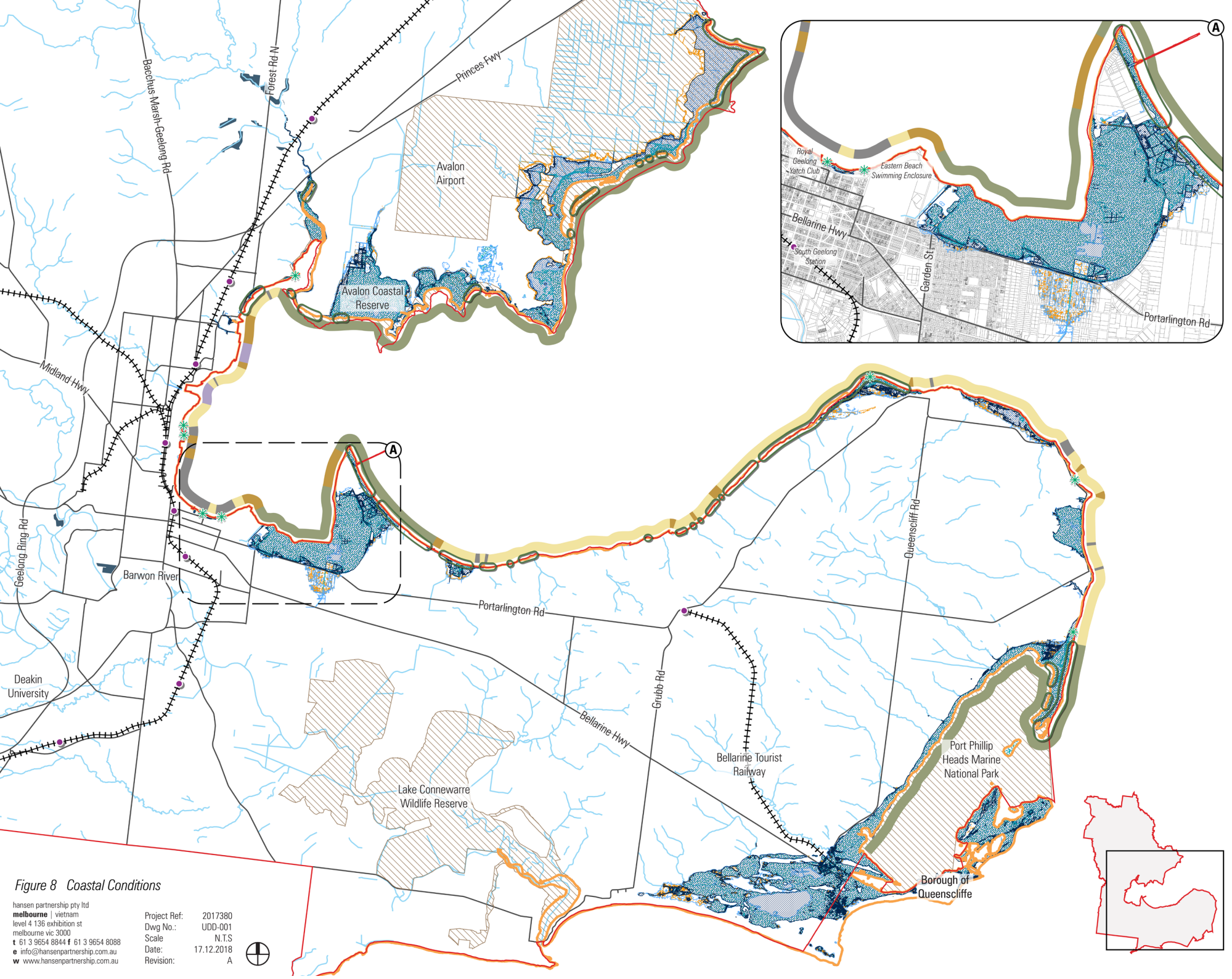

Figure 8 Coastal Conditions

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Port Phillip Greater Geelong Coastal Inundation

Coastal Conditions

Legend

- Municipal Boundary
- Coastline
- High Coastal Erosion Vulnerability
- Coastal Infrastructure
- Ramsar Wetlands
- Urban Floodway Zone
- Waterways
- VCID - Periodic (0.8m SLR)
- VCID - Permanent (0.8m SLR)
- Our Coast / Melbourne Water Inundation Mapping (0.8m SLR)
- Our Coast / Melbourne Water Inundation Mapping (0.8m SLR)
- Train Line / Station
- Main Road

Coastal Interface

- Seawall
- Rock Revetment
- Wetland
- Port
- Beach

4 PROTECTED AREAS

The approach taken in this project in relation to identifying planning responses to sea level rise, is to apply an overlay to areas identified as being at risk, as identified in currently available data sources. In relation to inundation, a LSIO is proposed to be applied, unless the catchment management authority is satisfied that an area is protected from inundation, as explained in the *Discussion Paper*. A LSIO will trigger the need for a planning permit and referral of the application to the relevant catchment management authority, to allow an assessment of the risks posed by sea level rise to be undertaken.

In situations where a Council or other agency has made a commitment to protect an area from inundation, but the protection works are not yet in place, the opportunity exists to defer the need for a planning permit under the LSIO. This is to avoid the need for buildings to be adapted to respond to sea level rise (e.g. by increasing floor level heights), in situations where a commitment has been made to protect and area, and hence remove the need for such adaptation works in the longer term.

This opportunity will only apply if the floodplain management authority is completely satisfied that a Council or other agency is 'certain' to implement protection works that will be effective.

There are no areas within Greater Geelong that Melbourne Water has identified as being protected, or planned to be protected, from sea level rise to the degree that there would be no need to consider a planning response at this time (see Discussion Paper for further information).

This is confirmed by the general alignment of Melbourne Water's dataset with that generated as part of the Victorian Coastal Inundation Dataset.

Council has undertaken some works to protect high risk areas subject to coastal erosions and sea level rise in places on the Bellarine Peninsula. To date this work has involved individual projects, rather than being part of a broader strategic framework responding to sea level rise.

It is recommended a coastal climate change adaptation plan is prepared by the Victorian Government and / or Council to identify what actions may be required to protect areas or to mitigate against the risks of sea level rise.

5 LAND USE IMPACTS

This section identifies land use characteristics and associated impacts of at risk from coastal hazards.

The current and future use of land subject to coastal hazards needs to be understood before an appropriate planning response can be determined. There are a range of matters that need to be considered, including:

- How much land will be affected?
- What is the zoning of the land affected?
- How many dwellings and businesses will be affected?
- What key facilities, environmental assets, strategic development sites and items of infrastructure will be affected?

LAND USE IMPACT SUMMARY

Maps provided in the previous chapter identify locations at risk. While there may be minor impacts across other parts of the municipality, this section summarises key areas at risk from the impacts of sea level rise.

Coastal Inundation

Areas at risk within the municipality from periodic inundation as a consequence of a combined 0.8 metre sea level rise storm surge include the following:

1. Foreshore reserves along Port Phillip Bay generally, but particularly between Portarlington and Edwards Point.
2. Point Lonsdale, west of Fellows Road, including the Lonsdale Lakes development.
3. The Swan Bay foreshore, including low lying Rural Conservation zoned land in the vicinity of Yarra Creek Lane.
4. Edwards Point Wildlife Reserve.
5. Residential properties to the south of St Leonards towards Edwards Point, generally to the east of Ord Street, at the southern end of Cliff Street, and south of the alignment of Monaco Avenue.
6. St Leonards Lake Reserve.
7. Salt Lagoon at Indented Head, including residential properties to the north and south of the lagoon, and between the lagoon and the Bay.
8. Residential properties along the foreshore from near Grassy Point / Andersons Reserve in Indented Head, extending along The Esplanade to near Mercer Street in Portarlington.
9. The Point Richards area to the west of Portarlington, including a small number of residential properties to the east of Sproat Street, the whole of the caravan park and parts of the Portarlington Recreation Reserve.
10. Residential properties in Ramblers Road and Point Richards Road to the west of Portarlington.
11. The foreshore between Clifton Avenue and Alexander Avenue in Leopold, extending inland to include parts of the Sands Caravan Park in Alexander Avenue, the Pelican Shores Village in Clifton Avenue and a proposed tourism resort between those two streets.
12. Extensive wetland areas (former salt works) at Point Henry and Moolap, generally restricted to areas to the north of Portarlington Road. A row of residential properties would be affected at 0.8 metres between Boundary Road and Wilsons Road. Parts of the CSIRO site will also be affected.
13. The Geelong waterfront, between Eastern Beach, extending to the west of Cunningham Pier, and Rippleside Beach.
14. Foreshore areas in Corio Bay north of Refinery Pier, extending inland along Hovells Creek.
15. Extensive low lying areas around Limeburners Bay, extending along the coast south of Avalon Airport, through Point Wilson and along the foreshore of the Western Treatment Plant.
16. Residential properties along the Avalon Foreshore Road.

In relation to the foreshore areas and beaches, Council, Parks Victoria, Bellarine Bayside Coastal Management will need to carefully consider the impacts and responses to sea level rise when they are updating or preparing new Coastal Management Plans or foreshore masterplans.

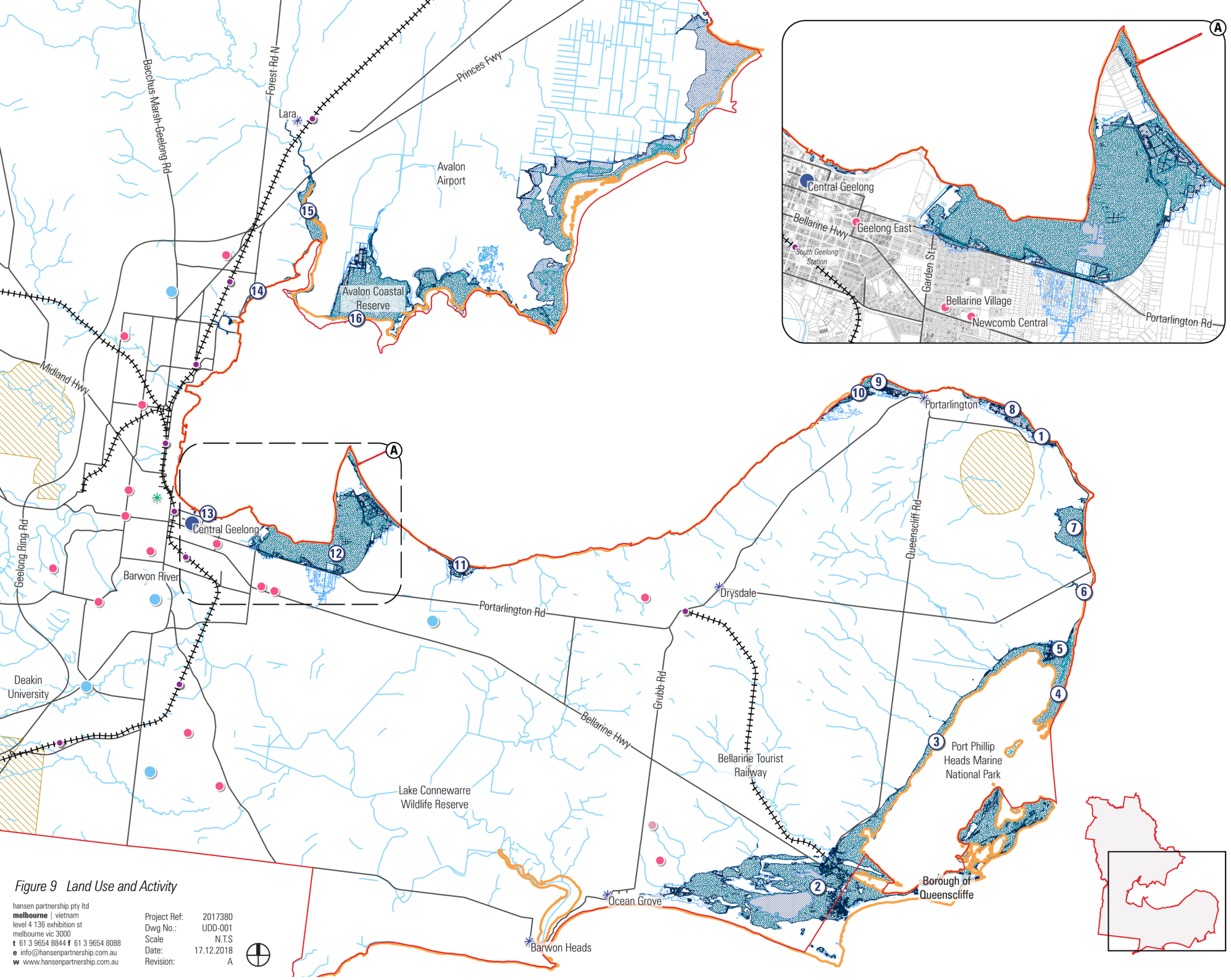

Figure 9 Land Use and Activity

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Port Phillip Greater Geelong Coastal Inundation

Land Use and Activity

Legend

- Municipal Boundary
- Regional Centre
- Sub-Regional Centre
- Community Centre
- Neighbourhood Centre
- Potential Neighbourhood Centre
- Town Centre
- Homemaker Precinct
- Major Resources
- VCID - Periodic (0.8m SLR)
- VCID - Permanent (0.8m SLR)
- Our Coast / Melbourne Water Inundation Mapping (0.8m SLR)
- Coastline
- Waterways
- Train Line / Station
- Main Road

Localities

1. Foreshore Reserves
2. Point Lonsdale
3. Swan Bay Foreshore
4. Edwards Point
5. St Leonards South
6. St Leonards Lake Reserve
7. Salt Lagoon
8. The Esplanade
9. Point Richards
10. Ramblers Road/ Point Richards Road
11. Leopold Foreshore
12. Moolap/ Point Henry
13. Geelong Waterfront
14. Corio Bay North
15. Limeburners Bay
16. Avalon Foreshore Road

Point Lonsdale, west of Fellows Road

Fellows Road in Point Lonsdale is the municipal boundary between the City of Greater Geelong and the Borough of Queenscliffe. A mix of newer and older established residential areas exists to the west of Fellows Road, south of Shell Road. The relatively recent Lonsdale Lakes development exists on the south side of the Bellarine Highway, at the western entry to Point Lonsdale.

Inundation data identifies that a significant area of land extending between Swan Bay and Lake Victoria will be affected by both periodic and permanent inundation, as a consequence of a 0.8 metre sea level rise, including large parts of the residential areas.

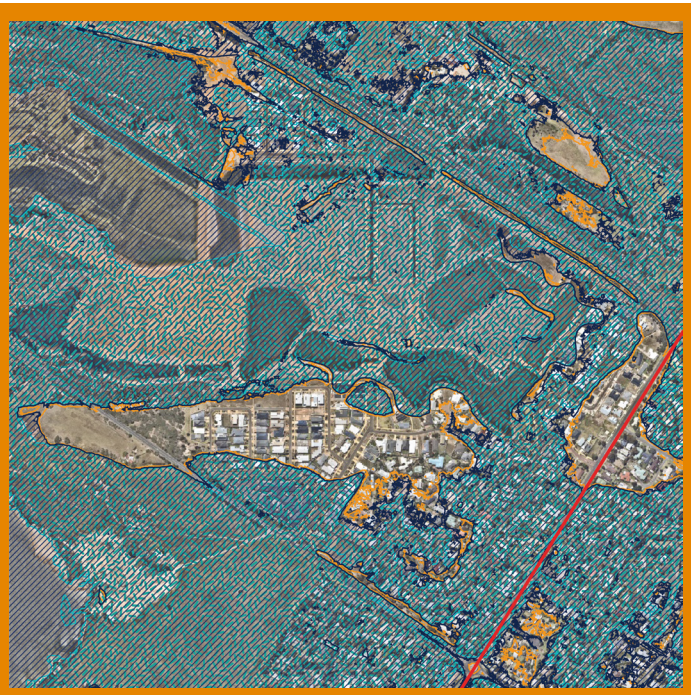


Figure 10 Point Lonsdale impacted areas aerial

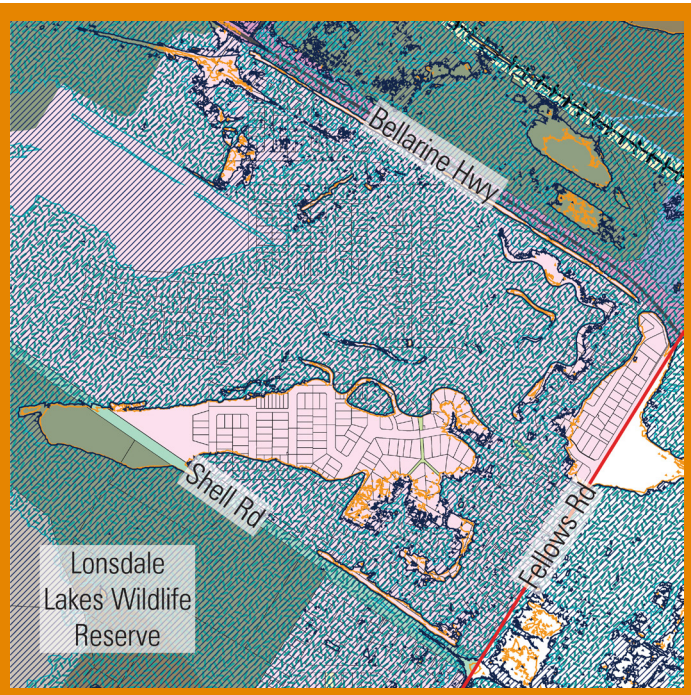
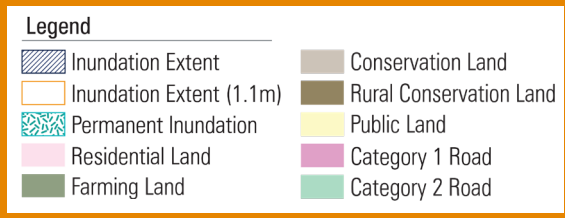


Figure 11 Point Lonsdale land use impacts



Swan Bay

The entire Swan Bay foreshore will be affected by inundation at a 0.8 metre sea level rise. This will extend onto privately owned plan abutting Swan Bay in places. Impacts will generally be low as most land along the foreshore is either existing wetlands, or is included in a Rural Conservation or a Farming Zone land. A small number of dwellings will be affected in the Yarram Creek Lane area. The eastern edge of the Swan Bay Holiday Park is likely to be affected.

Edwards Point / St Leonards South

The whole of the Edwards Point Wildlife Reserve will be affected by periodic inundation and large parts will be affect by permanent inundation at a sea level rise of 0.8 metres.

Existing residential properties in the southern parts of St Leonards, towards Edwards Point, will be affected by periodic inundation. This applies to properties generally to the east of Ord Street, at the southern end of Cliff Street and south of the alignment of Monaco Avenue. Pockets of land within these areas are likely to be affected by permanent inundation, particularly the eastern parts of residential properties fronting the Port Phillip Bay foreshore, to the east of Bell Parade and its southerly alignment.

Residential properties with direct abuttal to the foreshore to the east of Ord Street, are at risk of being affected by coastal erosion.

Figure 12 Edwards Point / St Leonards South impacted areas aerial

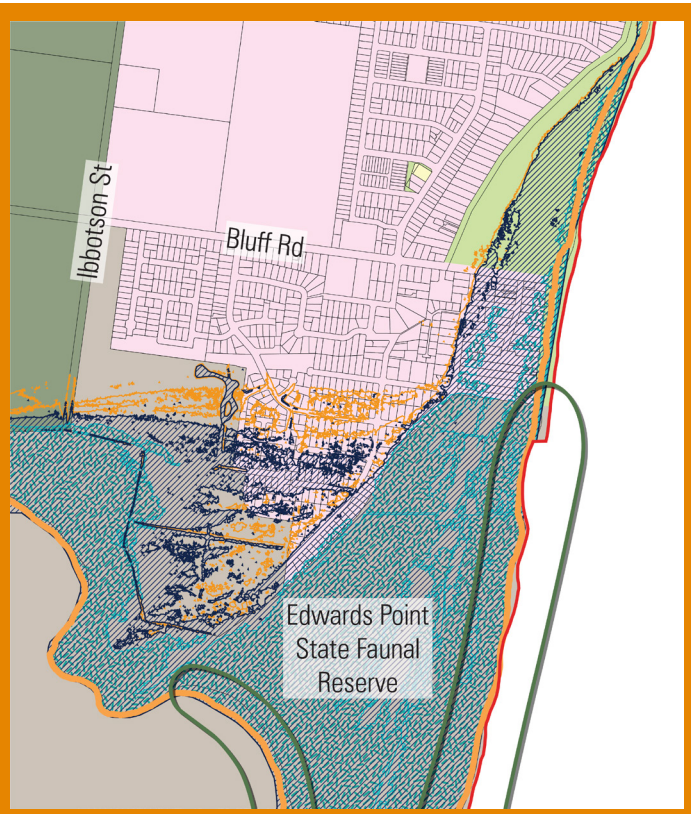


Figure 13 Edwards Point / St Leonards South land use impacts

Legend

- Inundation Extent
- Inundation Extent (1.1m)
- Permanent Inundation
- High Risk Erosion Area
- Residential Land
- Park/Reserve Land
- Conservation Land
- Farming Land

Salt Lagoon

The beach at Salt Lagoon is very narrow and eroding. Residential properties to the east of The Esplanade are located in a low lying land and have been inundated in the past. (*Our Coast Inundation Summary Report*, p23).

Residential properties along The Esplanade from south of Second Avenue in the south, to the north of Dosseter Road in the north, will be subject to periodic inundation. Many will be subject to permanent inundation. The beach, The Esplanade and Salt Lagoon are all at risk of permanent inundation at a sea level rise of 0.8 metres.

St Leonards Lake

The waterbody and informal recreation areas associated with St Leonards Lake Reserve will be affected by periodic inundation with a sea level rise of 0.8 metres. The Len Trewin Reserve will not be affected.

Figure 14 Salt Lagoon impacted areas aerial

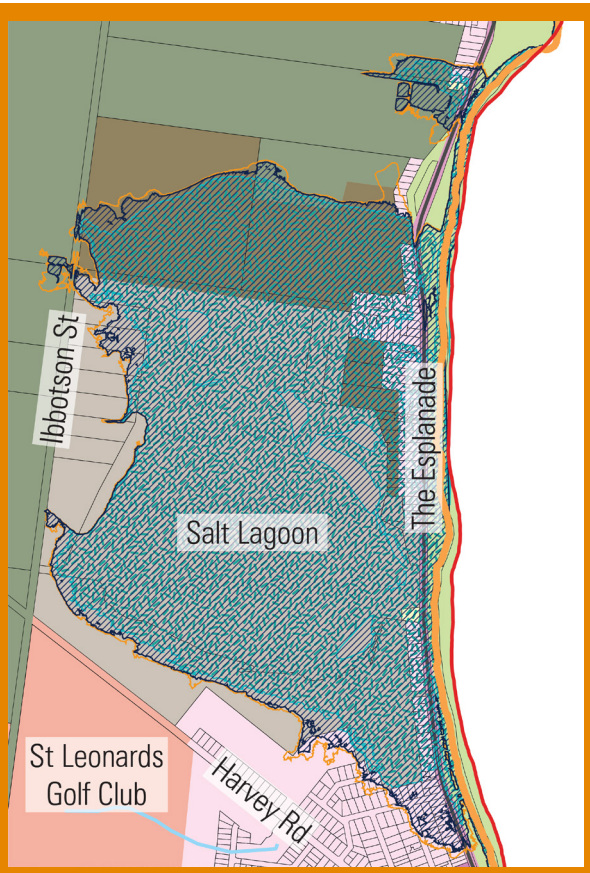


Figure 15 Salt Lagoon land use impacts

Legend

- Inundation Extent
- Inundation Extent (1.1m)
- Permanent Inundation
- Residential Land
- Park/Reserve Land
- Farming Land
- Conservation Land
- Rural Conservation Land
- Category 1 Road

The Esplanade, Indented Head to Portarlington

Residential properties along the The Esplanade and along some of the roads running parallel to the rear of The Esplanade, from near Point George in the northern part of Indented Head, to Mercer Street in Portarlington, will be affected by periodic inundation.

A small number of residential properties to the east of Grassy Point Road are at risk of being affected by permanent inundation.

Figure 16 The Esplanade impacted areas aerial

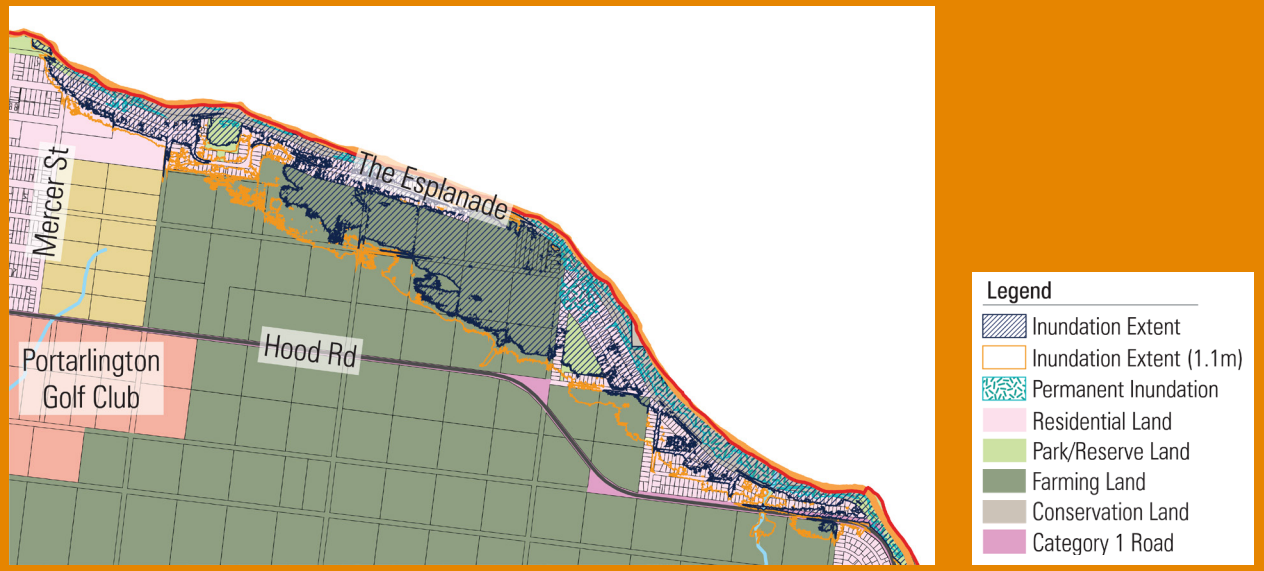


Figure 17 The Esplanade land use impacts

Ramblers Road / Point Richards, Portarlington

Point Richards is a low lying area to the west of Portarlington. A caravan park runs along much of the foreshore, with the Bellarine Minature Railway located at the point itself. The Portarlington Flora and Fauna and Recreation Reserves exists inland of these uses.

The whole of the caravan park, a small number of residential properties to the east of Sproat Street and the northern parts of the reserve will be affected by periodic inundation. The western parts of the caravan park and the miniature railway are at risk of being permanently inundated.

The Ramblers Road residential subdivision exists to the west of Point Richards. It comprises a single road with houses along both sides. A single row of houses extends inland along the west side of Point Richards Road. The majority of lots in Point Richards Road will be affected by periodic inundation, with lots at the eastern and far western ends at risk of being affected by permanent inundation. Periodic inundation will extend inland and affect the northern most dwellings along Point Richards Road. Lots abutting the foreshore are likely to be at risk from coastal erosion.

Figure 18 Ramblers Road / Point Richards impacted areas aerial

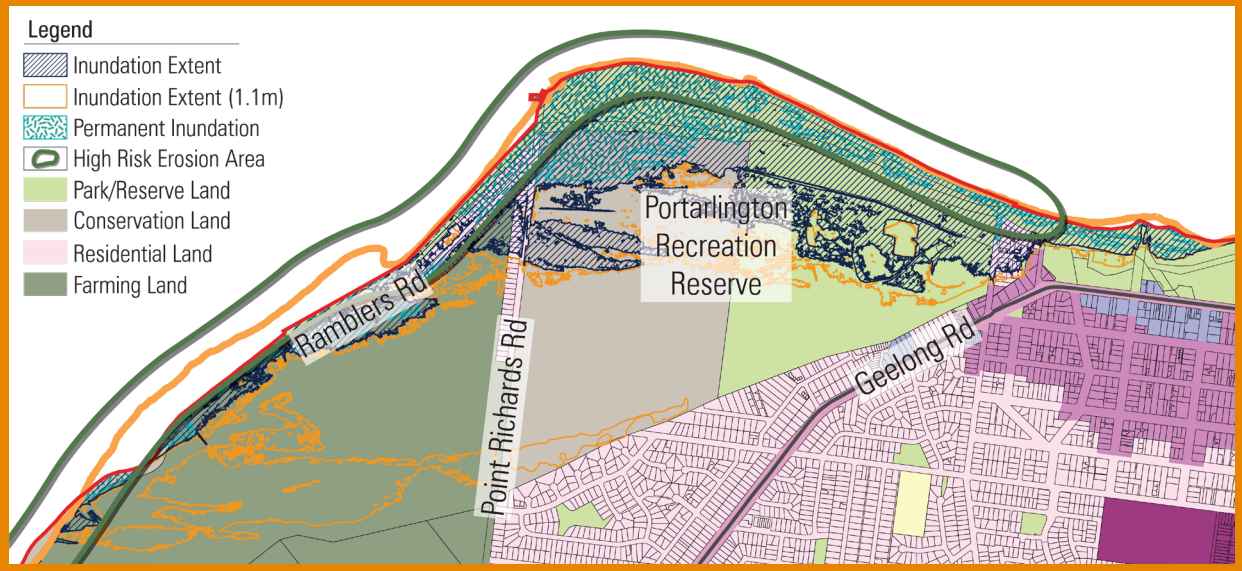


Figure 19 Ramblers Road / Point Richards land use impacts

Leopold Foreshore

The only location where inundation is expected to extend inland between Clifton Springs and Point Henry is between Clifton Avenue and Alexander Avenue. The Sands Caravan Park in Alexander Avenue and Pelican Shores Village in Clifton Avenue, will be partly affected by periodic inundation. A proposed tourism resort site between these two streets will be more significantly affected, by both periodic and permanent inundation. Properties directly abutting the foreshore are likely to be at risk from coastal erosion.

Figure 20 Leopold Foreshore impacted areas aerial

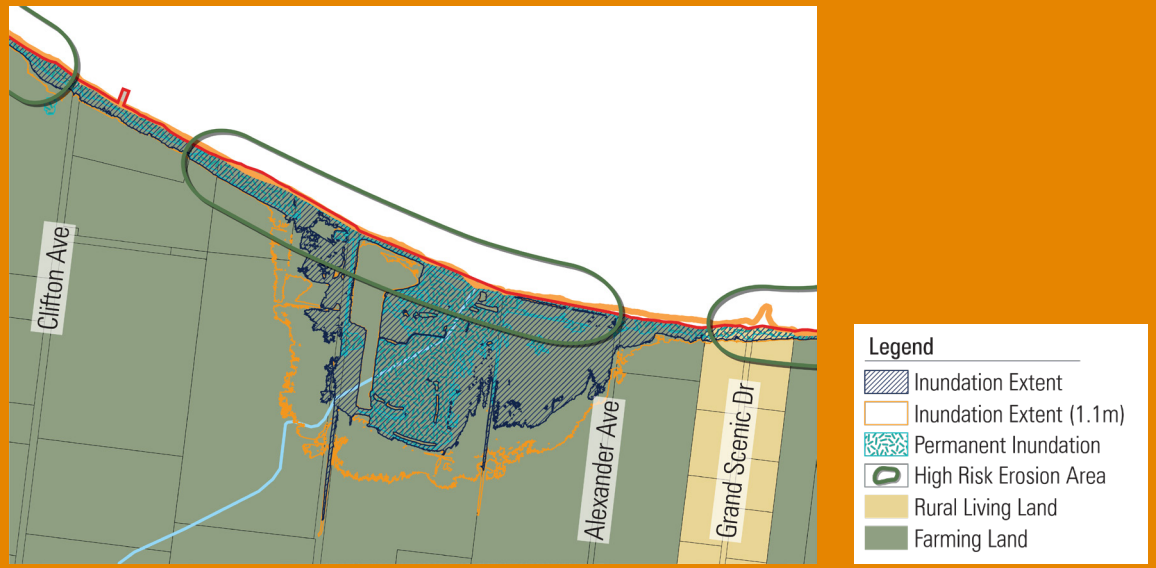


Figure 21 Leopold Foreshore land use impacts

Moolap and Point Henry

Extensive wetland areas (former salt works) exist at Point Henry and Moolap. These areas will be affected by both temporary and permanent inundation, generally extending inland to Portarlington Road. Low lying residential and industrial areas to the south of Portarlington Road are not identified as being affected by a 0.8 metre sea level rise, but would be affected by a sea level rise of 1.1 metres. A row of residential properties would be affected at 0.8 metres, between Boundary Road and Wilsons Road. Parts of the CSIRO site that fronts the Bay will also be affected.

The former salt pans and Alcoa site are identified as an investigation area and major development proposals have been mooted for this area in the past.

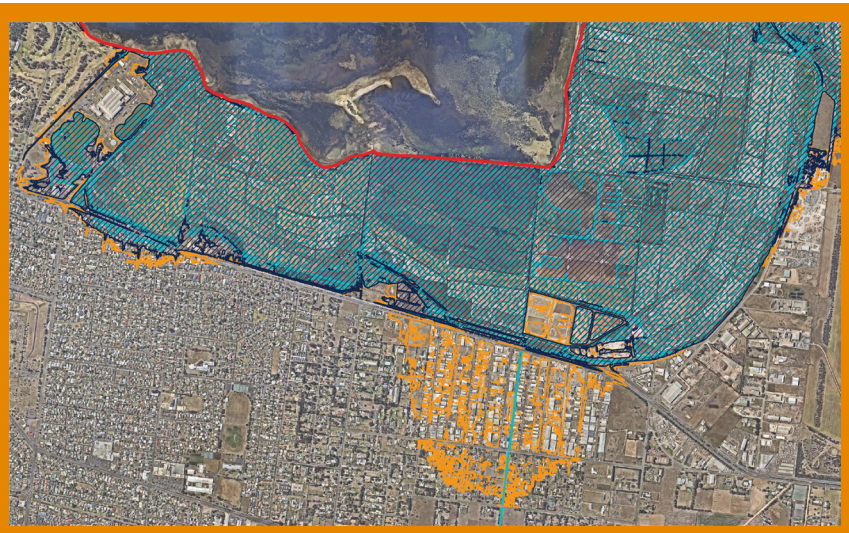


Figure 22 Moolap / Point Henry impacted areas aerial

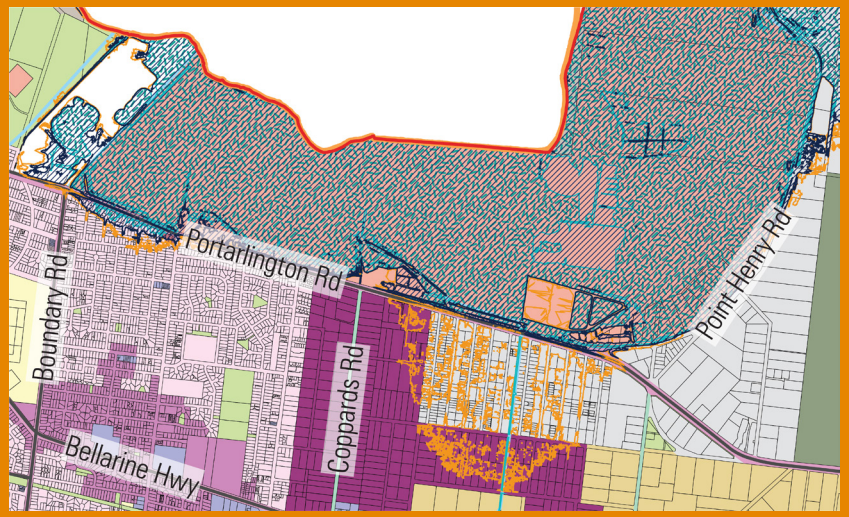


Figure 23 Moolap / Point Henry land use impacts

Geelong Waterfront

The Geelong waterfront, between Eastern Beach and Cunninghamn Pier, is the main focal point for formalised tourism and recreation activities on the Port Phillip Bay foreshore of the municipality. The area is located directly adjacent to the Geelong City Centre. It includes Cunningham Pier, Steampacket Gardens, the Royal Geelong Yacht Club and the Eastern Beach Sea Baths. The sandy beach at Eastern Beach will be affected by periodic and permanent inundation. Periodic inundation is likely to extend into the car park at the rear of the beach and will also affect the Royal Geelong Yacht Club and small areas around Steampacket Gardens.

Further to the north, Rippleside Beach will be affected by both periodic and permanent inundation.

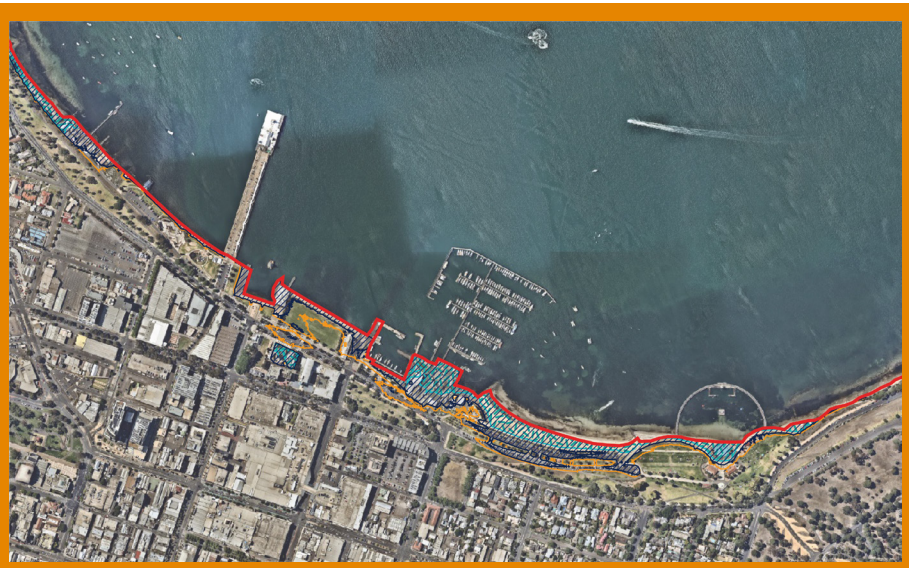


Figure 24 Geelong Waterfront impacted areas aerial

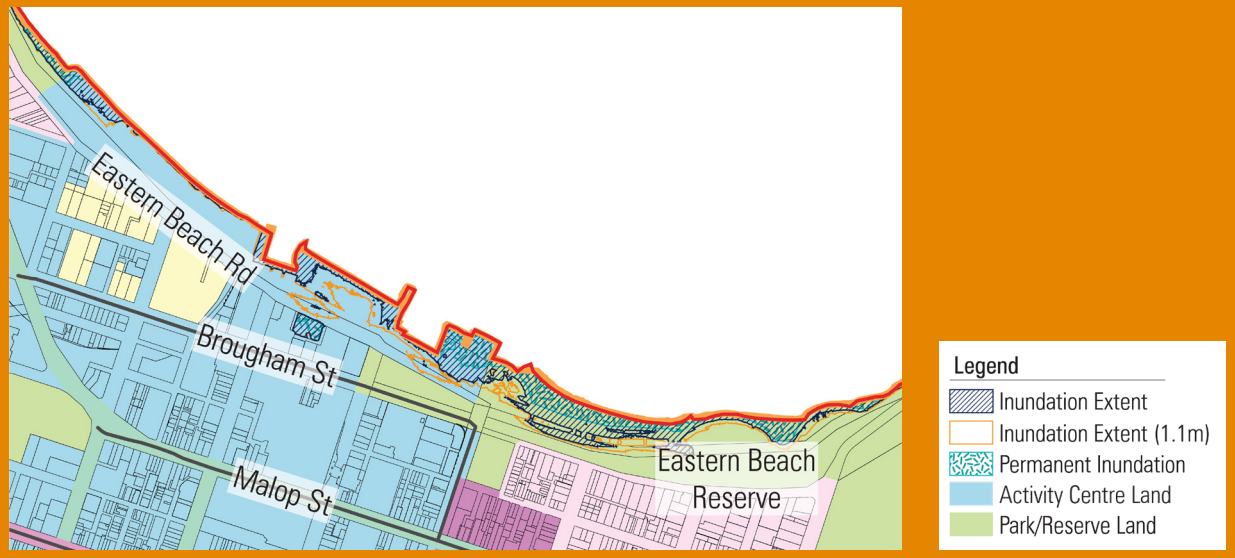


Figure 25 Geelong Waterfront land use impacts

Avalon

Extensive areas of land will experience both periodic and permanent inundation with a 0.8m sea level rise, along the coastline east of Avalon Road. Much of this land is non-urban and is sparsely developed. Affected areas will include the former Cheetham salt works, the Point Wilson Explosive Area and the Western Treatment Plant.

Dwellings along the Avalon Foreshore Road will be affected by both periodic and permanent inundation. They may also be at risk from coastal erosion.

Corio

A narrow strip of land largely confined to the foreshore reserve will be affected to the north of Refinery Pier. Inundation is expected to extend up Hovell's Creek to the Princes Freeway and will affect much of Limeburners Lagoon Nature Reserve and the Hovell Creek Reserve.

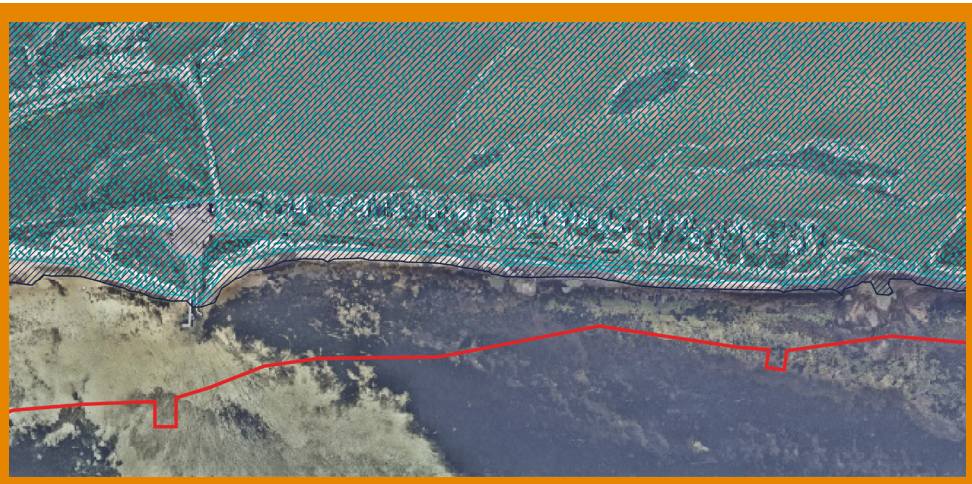


Figure 26 Avalon Foreshore Road impacted areas aerial

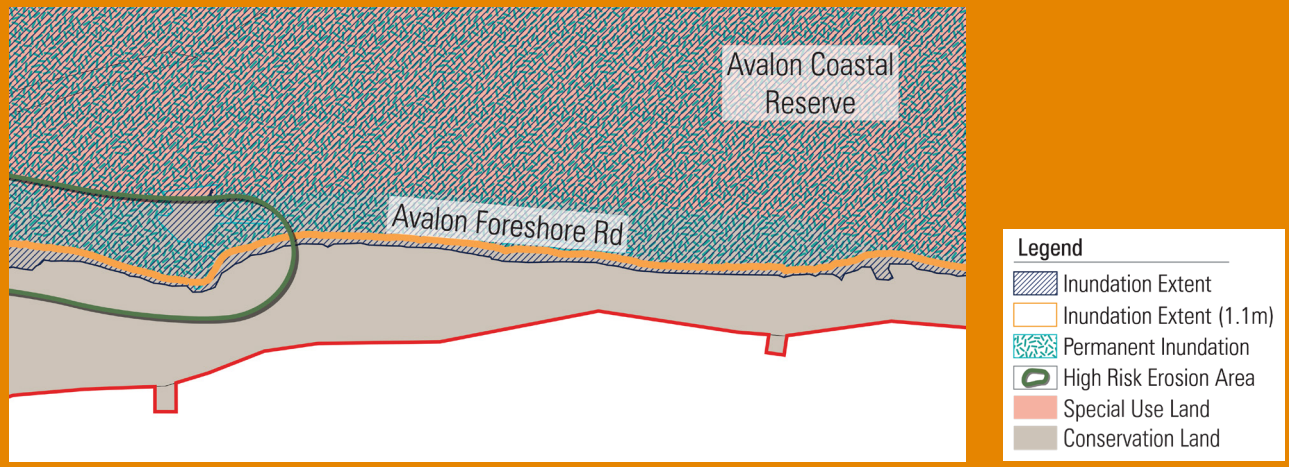


Figure 27 Avalon Foreshore Road land use impacts

Coastal Erosion

Areas identified through the existing Coastal Erosion Vulnerability Mapping as being potentially 'high' or 'very high' risk areas for coastal erosion are shown on Figure 8 (page 25). These areas include:

- The foreshore of Edwards point.
- The foreshore generally from Richards Point west to Clifton Springs, including the Ramblers Road area.
- The foreshore from Point Henry east to about Grand Scenic Drive.
- The foreshore of the Western Treatment Plant.

Of the above areas, those which have a abuttal to private properties developed for residential, urban or more intense purposes, which are like to be at risk of coastal erosion include:

- A small number of properties in St Leonards, south of Ord Street.
- Properties along Ramblers Road, Portarlington.
- Properties between Clifton Avenue and Alexander Avenue, Leopold.

Erosion within the municipality will be exacerbated by sea level rise. Further detail about erosion in the municipality will become available following the release of data from the Port Phillip Bay Coastal Hazard Assessment.

IMPACT SUMMARY

The following tables provide an overview of the number of properties impacted by coastal hazards in the municipality based on existing data sources.

SCALE OF IMPACT : INUNDATION	
Land Use Zoning	**Number of private properties**
Residential	*1,930*
Commercial	*2*
Industrial	*49*
Rural	*242*
Special Use	*43*
Activity Centre	*9*
Port	***6***
Total	**2,281**

SCALE OF IMPACT : EROSION	
Land Use Zoning	**Number of private properties**
Residential	*96*
Industrial	*6*
Rural	*38*
Port	*3*
Total	**143**

Total number of private properties at risk of inundation:

2,281 properties

Note: many of these properties are only marginally impacted by flooding (i.e the majority of the lot remains free from inundation). In such cases formalisation of the mapping layer by relevant authorities as part of the planning scheme amendment process may reduce the number of newly affected properties.

Total number of private properties at risk of erosion:

143 properties

Note: the number of properties identified as being impacted by coastal erosion is indicative only and there are likely to be additional properties impacted beyond those identified in the table above that are identified through the Port Phillip Bay Coastal Hazard Assessment.

6 THE PLANNING RESPONSE

Geelong is ahead of the other bayside municipalities involved in this project and has already prepared a Local Coastal Hazard Assessment and undertaken community consultation as part of the OurCoast project. Council has also prepared a draft planning scheme amendment. The work completed as part of OurCoast and this project means that as opposed to the Stage 1 response for the rest of the municipalities, Geelong's *Municipal Plan* forms part of a Stage 3 response as outlined on page 8.

This project identifies a range of further possible land use and building form responses that may be appropriate to apply in the future. These are outlined in the flow charts contained within the *Guidelines* and included in Appendix 1.

Current data identifies areas at risk of inundation from a 0.8m sea level rise. The appropriate planning response in these areas is the application of overlay and/or policy controls. In relation to coastal erosion, given the preliminary nature of current data, a high level policy response is proposed, in preference to the application of an overlay.

This document identifies areas at 'high' or 'very high' erosion risk under the current second pass assessment. This information provides the opportunity for Council to consider the areas at highest risk in the assessment of any planning applications within these areas. Indicative numbers of properties affected are outlined on Page 39 (this figure only includes lots with immediate abuttal to foreshore areas which are in private ownership). The impacts of coastal erosion on private properties should be reviewed following the release of Port Phillip Bay Coastal Hazard Assessment data.

No planning response is proposed in relation to groundwater rise and salinity at this time. As noted in the *Discussion Paper*, salinity associated with land based inundation (as distinct from groundwater) can be addressed through the application of flood related overlays. Further planning responses may be required once a greater understanding of the impacts on groundwater have been developed through the *Port Phillip Bay Coastal Hazard Assessment*.

STAGE 3 PLANNING RESPONSE RECOMMENDATIONS

Application of an Land Subject to Inundation Overlay to land affected by coastal inundation

In line with the overarching planning responses outlined in both the *Discussion Paper* and the *Guidelines*, and following the conclusions of the OurCoast project, a new schedule (Schedule 2) to the LSIO is recommended to be introduced into the Greater Geelong Planning Scheme.

The overlay should be applied to all land identified at risk of inundation with a 0.8 metre sea level rise. The extent of land to be covered by this overlay is shown in Appendix 3.

Council has prepared a draft planning scheme amendment which includes a LSIO schedule (see Appendix 3). The draft schedule is generally consistent with that proposed in other bayside municipalities as part of this project which is included in Appendix 4 for comparison.

Amendment to Clause 21.05 (Natural Environment)

It is recommended a local policy is introduced into the planning scheme to support overlay controls for identified hazards.

Following the work of the OurCoast project, Council has recommended amending Clause 21.05 (Natural Environment) to included new objectives and strategies relating to the coastal impacts of climate change and reference to the *Bellarine Peninsula - Corio Bay Local Coastal Hazard Assessment Dec 2015, undertaken as part of Our Coast*. The draft policy is provided in Appendix 3.

That policy is generally consistent with that recommended for other bayside municipalities involved in this project (Appendix 4).

RECOMMENDED LOCALITY BASED RESPONSES

Foreshore areas and beaches, and associated river and creek inlets

A Land Subject to Inundation Overlay to be applied to this land in order to ensure a consistent understanding of the extent of inundation across the municipality. Given this land is in public ownership the development of community buildings or community infrastructure may be suitable for planning permit exemptions provided any works are undertaken in line with the principles of the Victorian Coastal Strategy. This would be reflected in the applicable LSIO schedule. The LSIO would however, trigger a permit for private bathing boxes and other related infrastructure.

Conservation area and areas with natural values

A LSIO will be applied to conservation and natural environmental areas. This will trigger a referral to the Corangamite Catchment Management Authority or Melbourne Water, which will determine an appropriate response based on the specifics of each site and the proposed development. This will apply to:

- Lake Victoria (Lonsdale Lakes Nature Conservation Reserve).
- Edwards Point Wildlife Reserve.
- St Leonards Lake Reserve.
- Salt Lagoon Nature Reserve.
- Richards Point Flora and Fauna Reserve.
- Cheetham Salt Works Moolap.
- Limeburners Lagoon Flora and Fauna Reserve.
- Hovells Creek.
- Cheetham Salt Works Avalon.
- Western Treatment Plan.

Residential areas west of Fellows Road, Point Lonsdale

A LSIO to be applied to residential zoned land to the west of Fellows Road. This will trigger a referral to the Corangamite Catchment Management Authority. The CMA will determine an appropriate response based on the specifics of each site and the proposed development.

Planning permit applications within those parts of this area potentially affected by permanent inundation, will need to consider not only the advice of the Corangamite Catchment Management Authority, but also broader considerations under State Planning Policy.

The Lonsdale Lakes Development in this area, is a relatively recent residential subdivision that is still under construction. A flood assessment was undertaken as part of the design phase of the development and minimum floor level requirements were determined. A further more detailed risk assessment should be undertaken for this area. Depending on the outcome of that assessment, consideration could be given to it being included in an special investigation area, and being excluded from the LSIO.

The LSIO to also apply to Farming zoned land at the rear of residential zoned areas. No expansion of the boundaries of the existing residential zone or intensification of land uses should be permitted in this area.

Swan Bay

A LSIO to be applied to Rural Conservation and Farming zoned land around Swan Bay. This will trigger a referral to the Corangamite Catchment Management Authority. The CMA will determine an appropriate response based on the specifics of each site and the proposed development. Generally non-urban zoned land subject to inundation from sea level rise should not be rezoned for urban purposes. No intensification of land uses should be permitted in this area.

Residential land a St Leonards South

A LSIO to be applied to residential zoned land affected by coastal inundation in the southern parts of St Leonards. This will trigger a referral to the Corangamite Catchment Management Authority. The CMA will determine an appropriate response based on the specifics of each site and the proposed development.

Planning permit applications within areas potentially affected by permanent inundation, will need to consider not only the advice of the Corangamite Catchment Management Authority, but also broader considerations under State Planning Policy.

Residential properties fronting the beach, generally to the west of Bell Parade and its southerly extension, may be subject to a 'high' to 'very high' risk of coastal erosion. It is not proposed to apply an EMO to these areas until such time as further detailed investigations have been undertaken as part of the Port Phillip Bay Coastal Hazard Assessment. However, Council should require a coastal erosion risk assessment to accompany for any planning permit applications in relation to those properties.

Salt Lagoon

A LSIO to be applied to residential zoned land affected by coastal inundation in the vicinity of Salt Lagoon. This will trigger a referral to the Corangamite Catchment Management Authority. The CMA will determine an appropriate response based on the specifics of each site and the proposed development.

Much of this area is identified as being subject to permanent inundation. Planning permit applications within areas potentially affected by permanent inundation, will need to consider not only the advice of the Corangamite Catchment Management Authority, but also broader considerations under State Planning Policy.

The Esplanade, Indented Head to Portarlington

A LSIO to be applied to residential zoned land in this area. This will trigger a referral to the Corangamite Catchment Management Authority. The CMA will determine an appropriate response based on the specifics of each site and the proposed development.

A small number of properties in this area are identified as affected by permanent inundation. Planning permit applications within areas potentially affected by permanent inundation, will need to consider not only the advice of the Corangamite Catchment Management Authority, but also broader consideration under State Planning Policy.

The LSIO to also apply to Farming zoned land at the rear of the residential zoned areas. No expansion of the boundaries of the existing residential zone or intensification of land uses should be permitted in this area.

Ramblers Road / Point Richards, Portarlington

A LSIO to be applied to land affected by coastal inundation in the Ramblers Road and Point Richard area. This will trigger a referral to the Corangamite Catchment Management Authority. The CMA will determine an appropriate response based on the specifics of each site and the proposed development.

A small number of properties in this area are identified as affected by permanent inundation. Planning permit applications within areas potentially affected by permanent inundation, will need to consider not only the advice of the Corangamite Catchment Management Authority, but also broader considerations under State Planning Policy.

Residential properties fronting the beach on the north side of Ramblers Road, may be subject to a 'high' to 'very high' risk of coastal erosion. It is not proposed to apply an EMO to these properties until such time as further detailed investigations have been undertaken through the Port Phillip Bay Coastal Hazard Assessment. However, Council should require a coastal erosion risk assessment for any planning permit applications related to those properties.

Leopold Foreshore

A LSIO to be applied to residential zoned land in this area. This will trigger a referral to the Corangamite Catchment Management Authority. The CMA will determine an appropriate response based on the specifics of each site and the proposed development.

A small number of properties in this area are identified as affected by permanent inundation. Planning permit applications within areas potentially affected by permanent inundation, will need to consider not only the advice of the Corangamite Catchment Management Authority, but also broader considerations under State Planning Policy.

Properties fronting the beach throughout this area may be subject to a 'high' to 'very high' risk of coastal erosion. It is not proposed to apply an EMO to these properties until such time as further detailed investigations have been undertaken through the Coastal Hazard Assessment (CHA). However, Council should require a coastal erosion risk assessment for any planning permit applications related to those properties, under proposed changes to local policy.

No expansion of the development should occur in areas affected by inundation from sea level rise or potential erosion risks in this area.

Moolap and Point Henry

A LSIO to be applied to this area. This will trigger a referral to the Corangamite Catchment Management Authority. The CMA will determine an appropriate response based on the specifics of each site and the proposed development.

This area is identified as an investigation area in the planning scheme has been subject to major redevelopment proposals. Given its low lying nature, high ecological values and risks from inundation due to sea level rise, any development proposals would need to be accompanied by a site specific coastal hazard assessment and adaptation plan, as well as numerous other planning related assessments.

If a proposal emerges that gains planning support, it would be appropriate to include the affected land in a special investigation area. Inclusion of the land in a special investigation area would enable site specific requirements to be considered in relation to addressing risks from sea level rise.

In the absence of a comprehensive redevelopment proposal incorporating an coastal hazard assessment and adaptation plan, uses proposed on private land affected by inundation that would increase the number of vulnerable people or result in increased hazard risks, should be discouraged, especially in areas affected by permanent inundation.

A significant portion of this area is identified as affected by permanent inundation. Planning permit applications within those parts of this area affected by permanent inundation, will need to consider not only the advice of the Corangamite Catchment Management Authority, but also broader considerations under State Planning Policy.

Avalon

A LSIO to be applied to substantial areas of land in the Avalon Area, most of which comprises farming zoned land, former salt works, wetlands and low lying land associated with the Western Treatment Plant.

The LSIO to also be applied to existing dwellings / shacks located within a Pubic Conservation and Resource Zone at Avalon Beach Road. This will trigger a referral to the Corangamite Catchment Management Authority. The CMA will determine an appropriate response based on the specifics of each site and the proposed development.

The properties along Avalon Beach Road are at risk from permanent inundation. Planning permit applications for properties potentially affected by permanent inundation, will need to consider not only the advice of the Corangamite Catchment Management Authority, but also broader considerations under State Planning Policy.

No expansion of the development should occur in areas affected by inundation from sea level rise or potential erosion risks in this area.

FUTURE PLANNING RESPONSES

There are likely to be other planning responses that may be required following the release of data from the Port Phillip Bay Coastal Hazard Assessment and further consultation with the Greater Geelong community around adaptation planning (building on the current Stage 3 response). Some of the further work needed to support such future amendments is outlined in the following chapter.

In particular, a number of areas are identified as being at 'high' and 'very high' risk of erosion. Concerns with the accuracy and level of detail provided by the current second pass dataset (see *Discussion Paper*) mean that application of an Erosion Management Overlay (EMO) is not recommended as part of this planning response. The areas identified as subject to 'high' and 'very high' erosion risk are likely to represent a minimum number of properties at risk. Currently no information is available about the distance to which erosion may progress inland from the coast.

A greater understanding of the extent of erosion is likely to be identified as part of the Port Phillip Bay Coastal Hazard Assessment. In the interim, the existing State and proposed local planning policy, can be used as justification for the consideration of erosion risk in these areas, when planning permits are being considered.

7 IMPLEMENTATION

This section sets out how any planning responses should be implemented. Responses are divided between those which should be implemented immediately (Stage 3 Planning Responses) and those which should be implemented as part of further work undertaken by Council. In addition, a number of other relevant recommendation are also included.

STAGE 3 PLANNING RECOMMENDATIONS

It is recommended that the Stage 3 planning responses outlined in the previous chapter are introduced into the Greater Geelong Planning Scheme as part of a Planning Scheme Amendment. This amendment would include:

- Introduction of a new Schedule to the Land Subject to Inundation Overlay and associated mapping.
- Introduction of new Local Policy at Clause 21.05 (Natural Environment).

Ideally it would be recommended that this amendment be undertaken as part of a 'group' amendment with the other nine Bayside councils, to implement a consistent response to sea level rise across all ten Port Phillip Bay municipalities. However, given that Greater Geelong is in a position to undertake an amendment process immediately, based on a different set of data, it is understood that Council is willing to act sooner than the other councils.

POTENTIAL FUTURE PLANNING RECOMMENDATIONS

Introduction of an Incorporated Local Floodplain Development Plan

As management of inundation across the municipality becomes more sophisticated as greater details of the risks of sea level rise emerge, establishing a transparent planning response which does not compromise the function of the planning scheme will become increasingly important.

The introduction of a Local Floodplain Development Plan (LFDP) as an Incorporated Document into the Greater Geelong Planning Scheme in the future, may be an appropriate way to communicate the relevant strategic context needed to assist decision makers in determining planning permit applications in areas affected by sea level rise.

A LFDP can provide clear policy guidance and appropriate planning controls and requirements, for both land use and built form planning responses.

As further policy positions are prepared and more detailed directions established for different parts of the municipality, the content of the LFDP can be changed and amended over time.

It is understood that Council is not proposing to introduce a LFDP as part of the package of proposed amendments following the work of the OurCoast project.

The indicative content of the generic LFDP recommended for the other bayside municipalities as part of a Stage 1 Planning Response has been included in Appendix 4.

Bellarine Peninsula Township Structure Plans

Some of the key areas identified as being impacted by sea level rise through the preparation of this Municipal Plan are the townships and intervening residential areas on the Bellarine Peninsula.

All townships on the Bellarine Peninsula have existing structure plans. The structure plans generally address the issue of climate change related hazards and sea level rise, but do not included planning policies or controls about the type or intensity of development that should occur in those areas, if in fact new development should occur at all.

The structure plans should be reviewed to incorporate the findings of this Plan, and to incorporate the findings of other more detailed studies into coastal hazards and risks, as the information becomes available. Township structure plans provide an ideal planning tool to include future land use planning and built form policies and directions in relation to areas affected by coastal hazards at the township level.

Review of Lonsdale Lakes development controls

The Lonsdale Lakes Development, when initially designed, took into consideration the low lying nature of the land. Overland flow paths and retarding basin's were incorporated into the design of the subdivision and a minimum floor level of 2.35m was included as a requirement in DPO21, which applies to the land. Inundation data identifies that the majority of the Lonsdale Lakes development will be affected by periodic and permanent inundation associated with a 0.8m sea level rise (i.e. a water level of 2.4 metres AHD). The 2.35m floor level identified for the estate does not equate to the level that would be required to achieve an appropriate freeboard above the level that would result for a 0.8 metre sea level rise. The minimum floor level requirements for the estate should be reviewed.

OTHER RECOMMENDATIONS

Foreshore areas

Greater Geelong is well advanced in identifying and planning for those foreshore areas for which they have management control (noting the range of other parties who manage parts of the foreshore within the municipality).

THowever, there may be merit in Council considering the preparation of a longer term strategy that considers the future of the range of community facilities and assets located on the foreshore (as well as the foreshore spaces themselves) and the preparation of a coordinated approach to ensuring they are managed through any adaptation process (see below). This will likely require the support of Victorian Government considering it is a Port Phillip Bay wide issue.

Once more detailed information on erosion risks are understood (through the Port Phillip Bay Coastal Hazard Assessment), additional planning controls may be needed for foreshore areas, to discourage the location of assets in areas that are particularly vulnerable to erosion risk.

It will also be necessary to update to existing coastal management plans following the completion of the *Port Phillip Bay Coastal Hazard Assessment*, as this data will allow for more specific responses for the varying foreshore areas to be developed.

Updating coastal reserve masterplans is particularly relevant for those parts of the coastal reserve that directly abut residential properties at risk of inundation. Council may wish to consider the mitigation potential of landscaping and other interventions on land, when updating masterplans.

Adaptation Planning

As noted in the *Discussion Paper*, while acknowledging planning is one of the critical first steps, it is clear that responding to coastal hazards will need a broader adaptation response. Within the context of Port Phillip Bay (given existing development and the strategic importance of the city), it is possible the response may involve extensive and expensive physical works to protect some areas from the impacts of sea level rise. Council, in conjunction with the Corangamite Catchment Management Authority, Melbourne Water (where relevant), Parks Victoria and the Victorian Government, will need to consider broader adaptation responses, including what physical protection or mitigation works will be required to respond to sea level rise.

Decisions on the extent, lifespan and effectiveness of such works may have implications on the planning responses appropriate to apply to affected areas. Community input into decisions about how, when and where physical works can and should be implemented will be critical, particularly given the likely costs involved. Protection works may include hard engineering works such as levies, sea walls or groynes, or soft engineering works such as beach re-nourishment projects, mangroves or the transformation of streets and public spaces to mitigate impacts. However, best practice trends emphasise the appropriateness of integrating soft infrastructure, that works with rather than against natural processes and systems.

Interaction between stormwater drainage and sea level rise

Sea level rise has the potential to cause the backup of water in the existing stormwater drainage systems, and may exacerbate inland flooding as it becomes more difficult for stormwater to be discharged to the Bay. These impacts are not identified in coastal inundation modelling done to date.

Council and other relevant agencies will need to assess the impacts of seal level rise on existing stormwater drainage systems, identify areas that may be at risk from inundation, and consider adaptation plans to respond to the findings of the assessments.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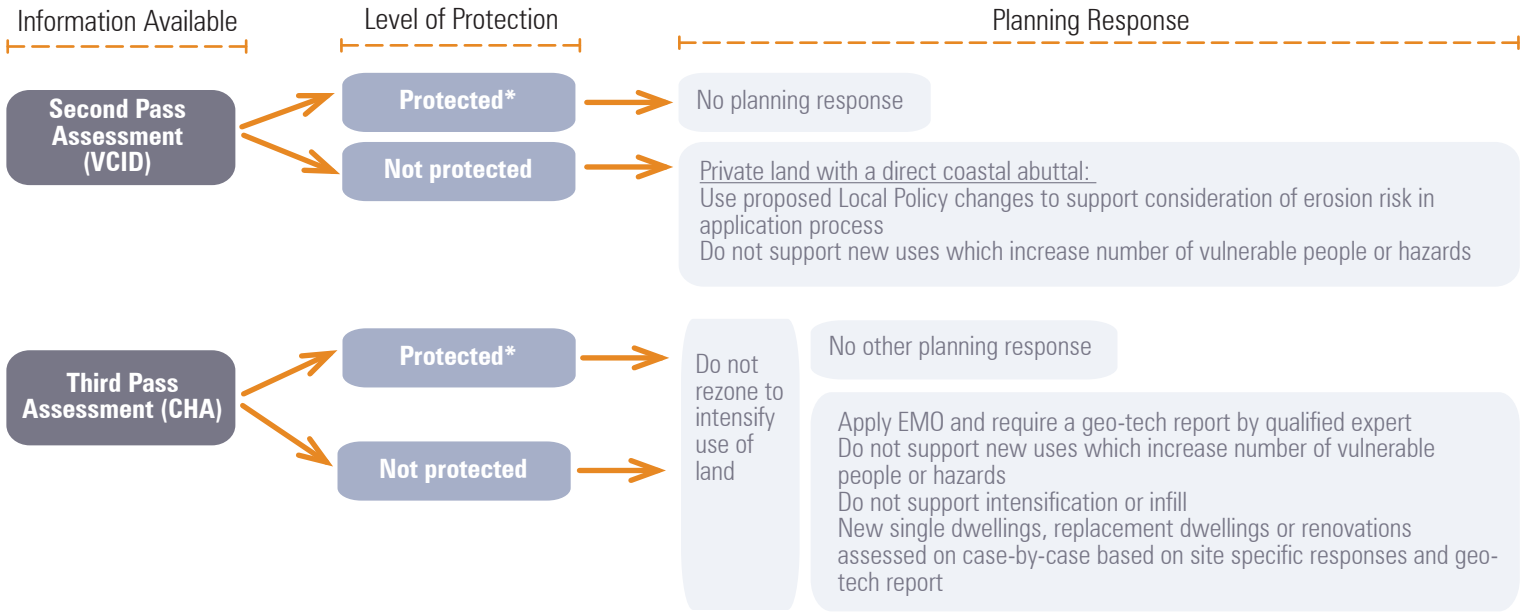
APPENDIX 1: PLANNING RESPONSES FLOW CHARTS

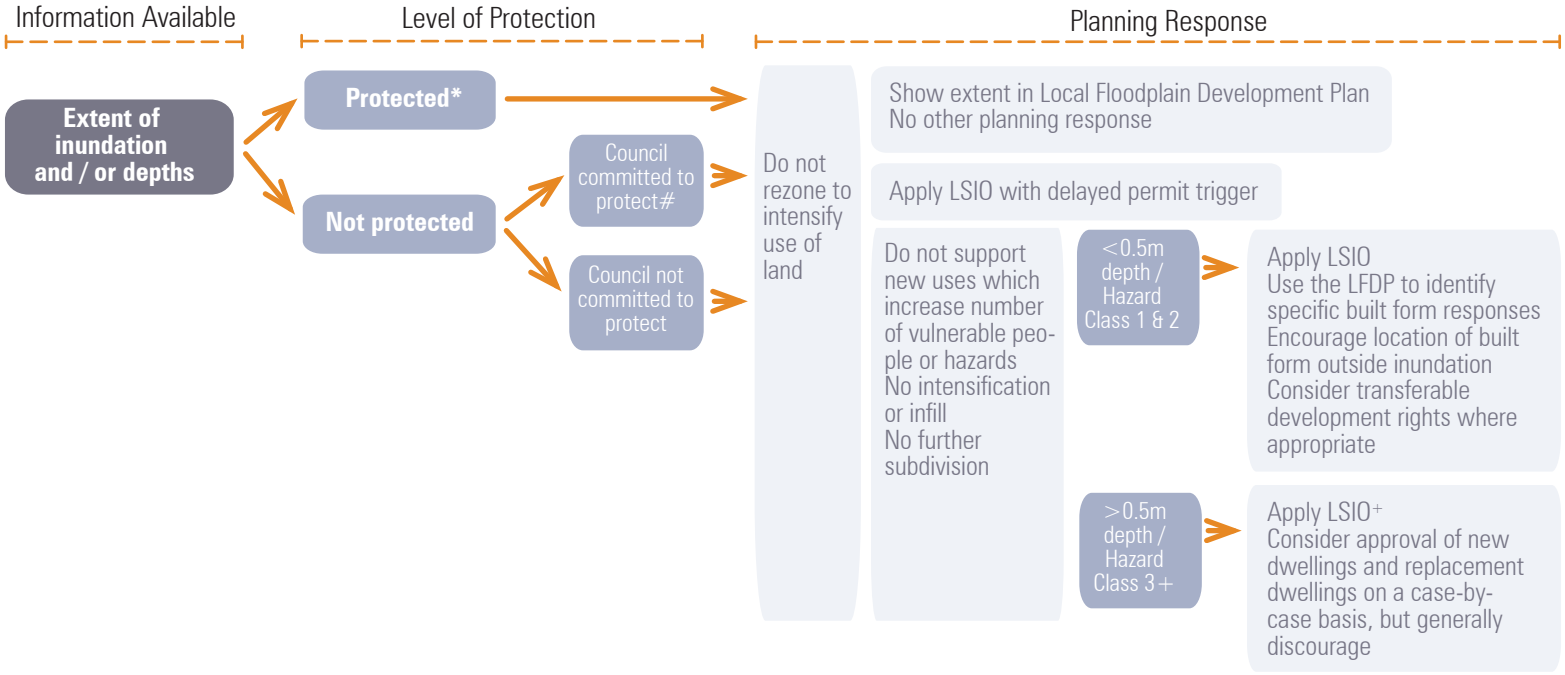
COASTAL EROSION



PERMANENT INUNDATION (urban & non-urban)

** Protected to the satisfaction of the Floodplain Management Authority based on acceptable standards of risk*

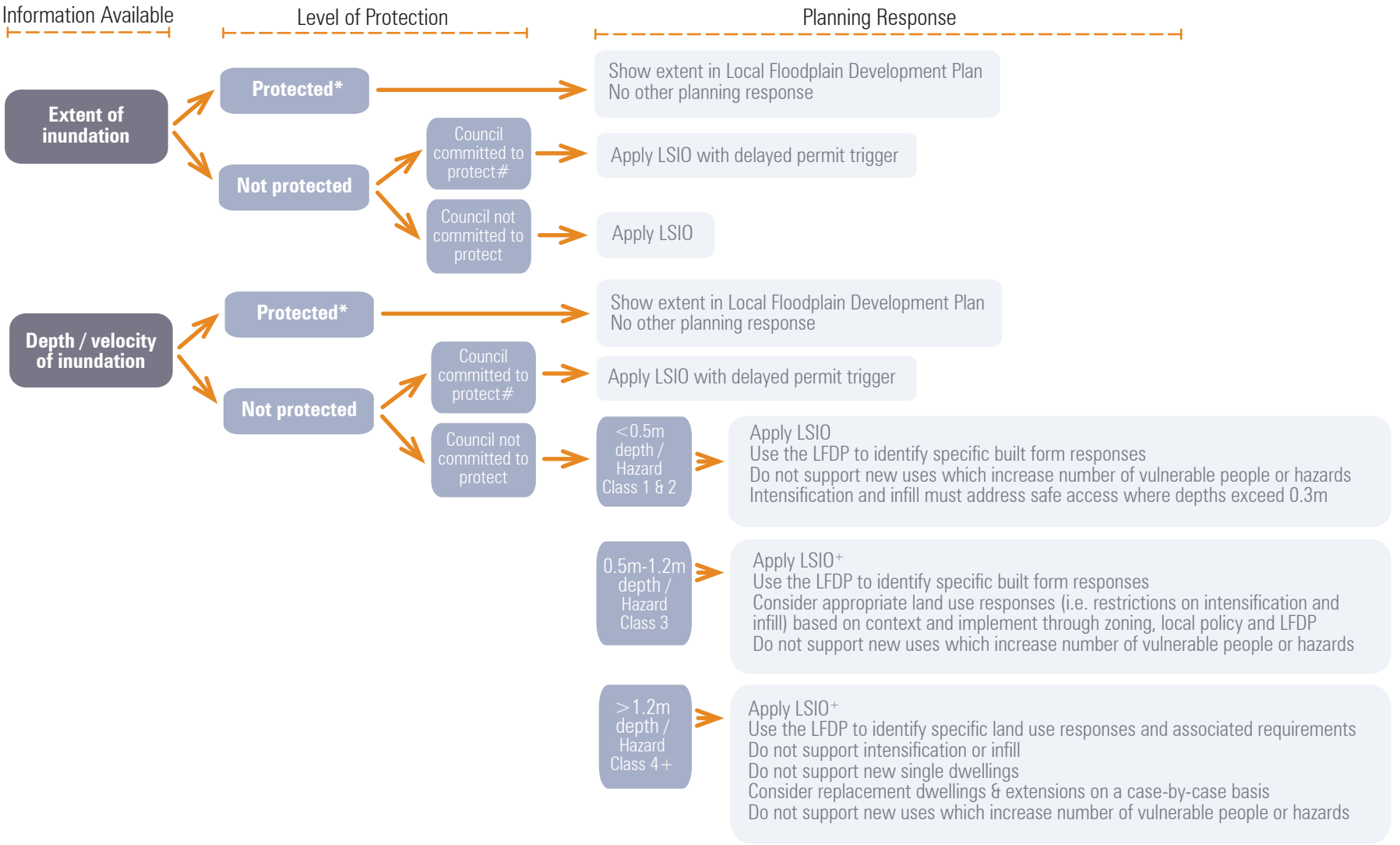
PERIODIC INUNDATION (non-urban)



** Protected to the satisfaction of the Floodplain Management Authority based on acceptable standards of risk*
#Formal Council position to protect and area/s taken and agreed by Floodplain Management Authority
+ Or Floodway Overlay if preferred by Floodplain Management Authority

GREATER GEELONG MUNICIPAL PLAN

PERIODIC INUNDATION (urban)



** Protected to the satisfaction of the Floodplain Management Authority based on acceptable standards of risk*
 # Formal Council position to protect and area/s taken and agreed by Floodplain Management Authority
+ Or Floodway Overlay if preferred by Floodplain Management Authority

APPENDIX 2: FLOOD HAZARD CLASSES

While an understanding of the 'extent' of area affected in each municipality is important, the severity of the risk will be relevant for determining appropriate planning responses. In relation to inundation, the level of risk is primarily influenced by:

- The depth of inundation.
- The velocity of flow.
- The duration of inundation.

An understanding of how such information may be used to inform planning responses, can be derived using risk hazard profiles that have been prepared for riverine flooding. Such profiles are contained in the Federal Government's *'Technical flood risk management guideline: Flood hazard'* (Attorney-Generals Department 2014). They are used by Melbourne Water and most flood management agencies around Australia. Whilst not prepared specifically for coastal inundation, they provide a basis for identifying risks associated with water of a certain depth and velocity of flow.

Key features of the risk curves relevant to deciding on planning responses are:

- 0 metres to 0.5 metres in depth - generally safe for people, although safe access may be impacted above 0.3m.
- 0.5 metres to 1.2 metres in depth - becoming unsafe for people such as the young and the elderly.
- 1.2 metres plus - unsafe for people.

These benchmarks are considered to be appropriate to use as a basis for determining when land use responses (i.e. consideration of reduction in density etc.) will be appropriate to consider, as opposed to 'built form' responses. Once detailed information is available about depths of access roads etc. these matters may also need to be considered on a site-by-site basis. In particular, the appropriateness of current guidelines relating to the management of access (which seek to restrict infill where access is impacted by depth of greater than 0.3m).

Further details are outlined within the *Discussion Paper*.

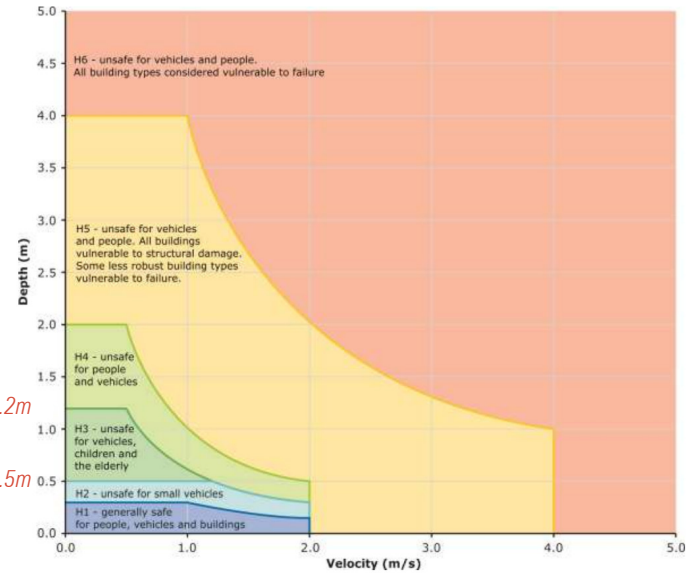


Figure 28 Flood Hazard Classes

APPENDIX 3: PROPOSED PLANNING SCHEME AMENDMENT

--/--/20--
C394ggee

SCHEDULE 2 TO CLAUSE 44.04 LAND SUBJECT TO INUNDATION OVERLAY

Shown on the planning scheme map as **LSIO2**

COASTAL INUNDATION AND HAZARD

1.0 Land subject to inundation objectives to be achieved

--/--/20--
C394ggee

To protect land vulnerable to coastal inundation from inappropriate development.

To plan for projected sea level rises to ensure that the community and assets are not exposed to an unacceptable level of risk associated with the coastal impacts of climate change.

To identify land in coastal areas that may be inundated by the combined effects of the 1% Average Event Probability (AEP) flood event plus 0.8 metre sea level rise.

To ensure that any new development is suitably designed to ensure that it is compatible with the identified flood hazard and local drainage characteristics.

2.0 Statement of risk

--/--/20--
C394ggee

A number of areas in the municipality are susceptible to flooding, via the flooding of waterways, stormwater runoff and coastal inundation, which have the potential to result in significant adverse economic, social and environmental impacts. Areas of coastal inundation and hazard have been identified in the *Bellarine Peninsula - Corio Bay Local Coastal Hazard Assessment - Inundation Report,* Cardno for City of Greater Geelong (2015) which is the source of mapping in this overlay.

3.0 Permit requirement

--/--/20--
C394ggee

A permit is not required to construct a building or carry out works for:

- An extension to an existing dwelling, provided the gross floor area of the extension does not exceed 20 square metres.
- Outbuildings and works normal to an existing dwelling including a deck or verandah that do not exceed 20 square metres, landscaping, a pergola, driveway, carport, barbeques and water tank.
- Agricultural and farm buildings less than 100 square metres in gross floor area.
- A building which is open on all sides including a domestic shed, animal enclosure, stockyard or agricultural shed.
- An upper storey extension to an existing building within the existing building footprint.
- A footpath, bicycle path, boardwalk, tennis court or sports ground provided that they are constructed at ground level.
- An in-ground domestic swimming pool or spa and associated mechanical and fencing equipment where the excavated spoil is removed and the perimeter edging of the pool is finished at natural ground level.
- An elevated boardwalk, provided that the new surface levels are above the applicable levels set by the relevant floodplain management authority.
- Repairs and routine maintenance of existing fences if the fence design and materials remain the same.
- A radio mast, telecommunications tower, antenna, power pole or light pole.
- An outdoor advertising sign/structure.
- Earthworks that do not change the rate of flow or the discharge point of water across a property boundary.

- Works carried out by any water authority to maintain and replace infrastructure related to sewer and water supply.
- Works carried out under the *Coastal Management Act 1995* or the *Crown Land (Reserves) Act 1978* that have had regard to the Bellarine Peninsula – Corio Bay Local Coastal Hazard Assessment and are conducted by a public land manager or a coastal committee under the *Coastal Management Act 1995*.

4.0 Application requirements

--/--/20--
C394ggee

The following application requirements apply to an application for a permit under Clause 44.04, in addition to those specified in Clause 44.04 and elsewhere in the scheme and must accompany an application, as appropriate, to the satisfaction of the responsible authority:

- A location plan drawn to scale, showing the boundaries and dimensions of the site, surrounding uses, the layout of existing and proposed buildings and works and the distance to coast or estuary.
- Elevation plans taken by or under the direction and supervision of a licensed land surveyor showing natural ground level, finished ground level and the floor levels of any existing and proposed buildings in relation to both AHD and the level as nominated by the relevant floodplain management authority at 2100.
- A detailed site plan with 0.5 metre contours showing the layout of existing and proposed buildings and works, watercourses, access roads, vegetation and all infrastructure that may be affected by flooding, sea level rise or coastal inundation, taken by or under the direction and supervision of a licensed land surveyor.
- An outline of actions or measures required, if any, to the siting and design of the buildings or works, or in association with the use and occupation of all aspects of the proposal in order to reduce the risk to individuals, property, infrastructure and the environment over the predicted life of the buildings or works. These actions may include the consideration of adaptation options such as planned retreat, setbacks, accommodation of changes through floor heights, site and land forming and drainage works.

5.0 Decision guidelines

--/--/20--
C394ggee

The following decision guidelines apply to an application for a permit under Clause 44.04, in addition to those specified in Clause 44.04 and elsewhere in the scheme which must be considered, as appropriate, by the responsible authority:

- The views of the Corangamite Catchment Management Authority
- *Bellarine Peninsula - Corio Bay Local Coastal Hazard Assessment - Inundation Report,* Cardno for City of Greater Geelong (Dec 2015)

21.05 NATURAL ENVIRONMENT

C394

21.05-1 Key issues and influences

28/01/2010
C129(Part 1)

The municipality includes a rich diversity of flora and fauna, including rare and unique species and communities, major waterways, large coastal areas and complex freshwater and marine wetlands.

Remnant vegetation across the municipality is conservatively estimated to be approximately 5% of that which existed pre European settlement.

Many of the municipality's significant natural environments are protected by international and national agreements and legislation.

Urban and rural growth has had a direct impact on the municipality's natural environments and the flora and fauna that they sustain. There is a need to protect and enhance the natural environment and provide for more sustainable development.

The extensive coastline is an important natural feature of the municipality, which is vulnerable to the impacts of urban development, climate change and natural processes.

A number of areas in the municipality are susceptible to flooding, via the flooding of waterways, stormwater runoff and coastal inundation, which have the potential to result in significant adverse economic, social and environmental impacts.

Areas of coastal inundation and hazard have been identified in the Bellarine – Corio Bay Local Coastal Hazard Assessment 2016 and mapped in the LSIO.

A number of areas in the municipality are susceptible to wildfire hazard, including some grasslands around Lara, the foothills of the Brisbane Ranges, and parts of the Anakie township.

21.05-2 Waterways

28/01/2010
C129(Part 1)

Objectives

- To protect, maintain and enhance waterways, rivers, wetlands and groundwater.
- To protect connectivity between waterways and wetlands.
- To reduce the amount of runoff from urban development and improve the quality of stormwater runoff entering waterways, estuarine and marine waters.

Strategies

- Ensure that land use and development avoids isolating wetlands and provides for connective water flows and vegetative links.
- Ensure waterways and wetlands are not drained or adversely affected as a result of development.
- Ensure development provides for appropriate buffer setbacks and fencing to waterways and wetlands.
- Ensure identified groundwater catchments are protected from surface contamination.
- Effectively manage stormwater runoff from development.

21.05-3 Biodiversity

28/01/2010
C129(Part 1)

Objective

- To protect, maintain and enhance the biodiversity of the municipality.

Strategies

- Ensure that land use and development enhances areas of native vegetation and other habitats.
- Ensure that land use and development minimises the fragmentation of areas of native vegetation and other habitats.
- Ensure habitats of indigenous species are protected from the impacts of land use and development.
- Ensure that land use and development does not aggravate existing salinity impacts or lead to the generation of newly affected areas, particularly through rising groundwater levels.

21.05-4 Coastal environments

28/01/2010
C129(Part 1)

Objectives

- To protect, maintain and enhance the coast, estuaries and marine environment.
- To respect and manage coastal processes.

Strategies

- Focus urban coastal development within existing urban settlements.
- Prevent lineal urban sprawl along the coast.
- Avoid the loss of, and wherever possible increase, public access to the foreshore environment.
- Restrict development on primary dunes.
- Ensure the potential for existence of acid sulphate soils adjacent to coastal and wetland locations is considered.
- Limit the number of stormwater outlets to the coast.
- Setback future land use and development from coastal areas, estuaries and coastal wetlands to provide a buffer which is adequate to accommodate coastal recession and the landward migration of coastal wetland vegetation communities such as mangroves and salt marshes.

21.05-5 Climate change

C394t 1)

Objective

- To plan for and adapt to the impacts of climate change.
- To ensure that the community and assets are not exposed to an unacceptable level of risk associated with the coastal impacts of climate change.

Strategy

- Avoid land use and development within areas considered at risk of coastal erosion or inundation from flooding, storm surge or rising sea levels.
- Consider the coastal impacts of climate change in strategic planning and public land management.

21.05-6 Natural resource management

28/01/2010
C129(Part 1)

Objectives

- To use non-renewable resources more efficiently.
- To increase the use of renewable resources.

Strategies

- Encourage all land use and development to incorporate best practice Water Sensitive Urban Design (WSUD) principles.
- Encourage planting of low water use vegetation, particularly indigenous vegetation.
- Encourage the installation of alternative, renewable energy supply systems.
- Encourage the installation of alternative water supply systems, including the use of recycled water where appropriate.
- Encourage development to incorporate best practice energy efficiency design principles and measures.

21.05-7 Flooding

28/01/2010
C129(Part 1)

Objectives

- To protect floodplains.
- To minimise the potential for damage and risks to public safety and property from flooding.

Strategies

- Ensure that land use and development is compatible with flood prone land.
- Discourage land use and development in floodplains where flood function may be impaired.
- Recognise flood hazards associated with waterways and ensure the free passage of water whilst protecting development from flooding impacts.

21.05-8 Wildfire

28/01/2010
C129(Part 1)

Objective

- To minimise the impacts of wildfire.

Strategies

- Identify areas at risk of wildfire.
- Ensure that development in identified areas considers the impacts of wildfire.

21.05-9 Implementation

C394

These strategies will be implemented by:

- Using policy and exercise of discretion

Where appropriate, requiring the preparation of Stormwater Management Plans and/or Construction Management Plans which provide for the protection of receiving waterways.

Where appropriate, require applications for marine based development, including aquaculture development, to provide an environmental assessment.

Utilise indigenous species in revegetation programs on public land, including roadsides to improve the overall biodiversity of the municipality.

Ensure urban development on the Bellarine Peninsula complies with structure plan maps as detailed in Clause 21.14.

Further Work

Prepare and implement an updated flood study for Lara.

Work with the Corangamite Catchment Management Authority and the Department of Primary Industries to implement the Salinity Management Overlay Project, which may also include the protection of primary salinity sites via the Environmental Significance Overlay.

Work with the Corangamite Catchment Management Authority and the relevant state agency to implement the Erosion Management Overlay Project.

Investigate the application of the Environmental Significance Overlay to contributory value wetlands.

Investigate the application of the Environmental Significance Overlay or Vegetation Protection Overlay to areas identified as Biodiversity Sites and/or Primary Biodiversity Conservation Zones.

Work with the Department of Environment, Land, Water and Planning to investigate the application of appropriate planning provision(s) to the coastal fringe.

Work with the Department of Environment, Land, Water and Planning to investigate the application of appropriate planning provision(s) to areas identified as containing Bellarine Yellow Gum and Coastal Moonah Woodland.

References

Bellarine Peninsula – Corio Bay Local Coastal Hazard Assessment, Cardno for City of Greater Geleong, December 2015

City of Greater Geelong Environment Management Strategy 2006 - 2011, City of Greater Geelong, 2006.

Geelong Wetland Strategy, City of Greater Geelong, 2006.

Geelong Biodiversity Strategy, City of Greater Geelong, 2003.

Corio Bay Coastal Action Plan, Central Coastal Board and the City of Greater Geelong, 2005.

Corangamite Regional Catchment Strategy2013-2019, Corangamite CMA, 2013.

City of Greater Geelong Stormwater Management Plan, City of Greater Geelong, 2002.

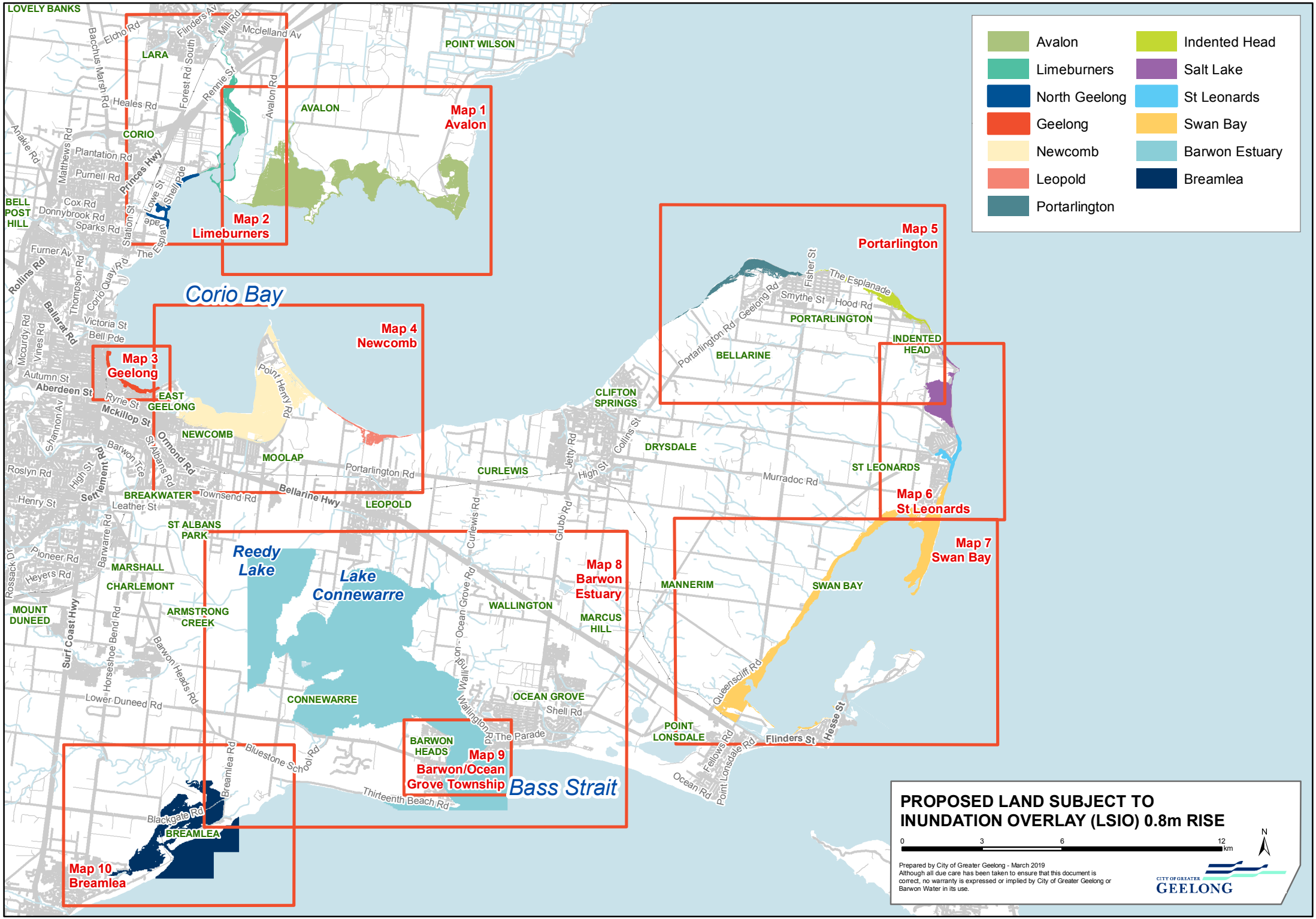
Central West Victoria Regional Coastal Action Plan, Western Coastal Board, 2003.

Central West Victoria Estuaries Coastal Action Plan, Western Coastal Board, 2005.

Geelong Flood Mitigation Strategy, Gutteridge Haskins & Davey Pty Ltd for City of Greater Geelong, May 1997.

Geelong Regional Floodland Study, Geelong Regional Commission, June 1979.

Hovells Creek, Lara: Flooding – December 10, 1988, prepared by Technical Services Department Shire of Corio, January 1990.


Avalon
Limeburners
North Geelong
Geelong
Newcomb
Leopold
Portarlington
Indented Head
Salt Lake
St Leonards
Swan Bay
Barwon Estuary
Breamlea
Map 1 Avalon
Map 2 Limeburners
Map 3 Geelong
Map 4 Newcomb
Map 5 Portarlington
Map 6 St Leonards
Map 7 Swan Bay
Map 8 Barwon Estuary
Map 9 Barwon/Ocean Grove Township
Map 10 Breamlea
Corio Bay
Reedy Lake
Lake Connewarre
Bass Strait
LOVELY BANKS
LARA
POINT WILSON
AVALON
CORIO
BELL POST HILL
EAST GEELONG
NEWCOMB
MOOLAP
BREAKWATER
LEOPOLD
CURLEWIS
CLIFTON SPRINGS
DRYSDALE
BELLARINE
PORTARLINGTON
INDENTED HEAD
ST LEONARDS
MANNERIM
SWAN BAY
POINT LONSDALE
ST ALBANS PARK
MARSHALL
CHARLEMONT
MOUNT DUNEED
ARMSTRONG CREEK
WALLINGTON
MARCUS HILL
CONNEWARRE
OCEAN GROVE
BARWON HEADS
BREAMLEA
Princes Hwy
Surf Coast Hwy
Bellarine Hwy
Portarlington Rd
Ocean Grove - Wallington Rd
PROPOSED LAND SUBJECT TO INUNDATION OVERLAY (LSIO) 0.8m RISE
0 3 6 12 km
N
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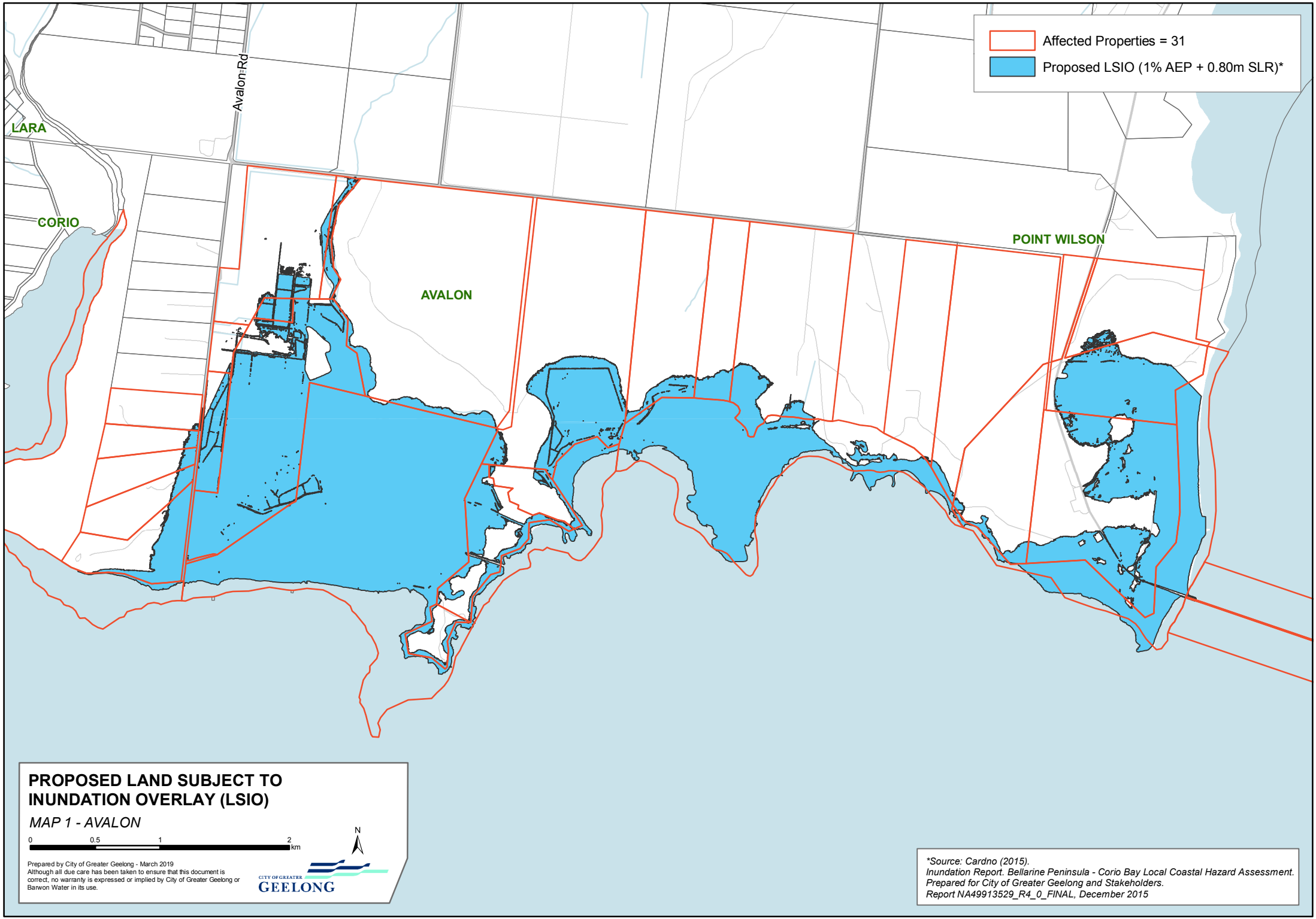
CITY OF GREATER GEELONG


Affected Properties = 31
Proposed LSIO (1% AEP + 0.80m SLR)*
Avalon Rd
LARA
CORIO
AVALON
POINT WILSON
PROPOSED LAND SUBJECT TO INUNDATION OVERLAY (LSIO)
MAP 1 - AVALON
0
0.5
1
2
km
N
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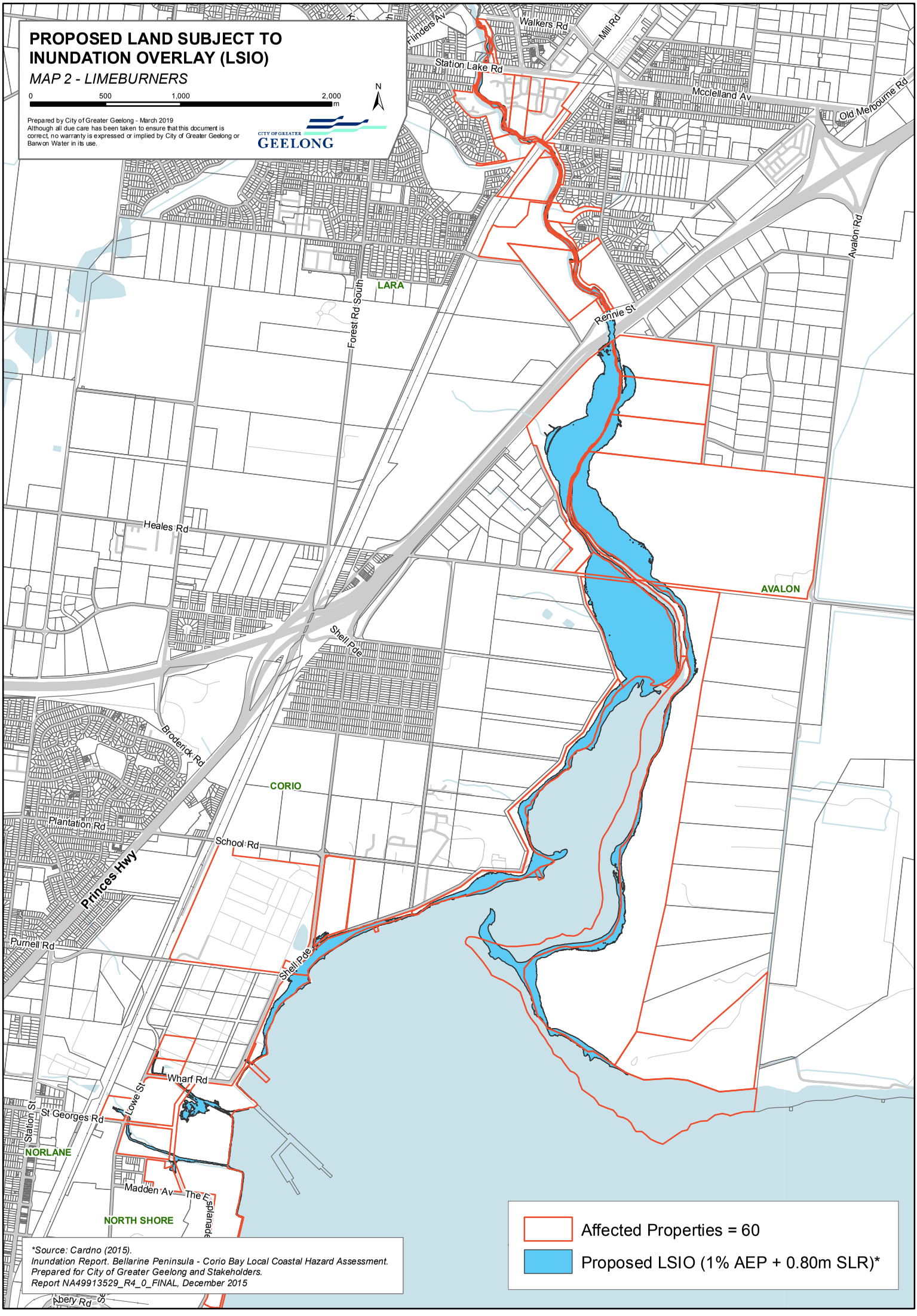
CITY OF GREATER GEELONG
*Source: Cardno (2015).
Inundation Report. Bellarine Peninsula - Corio Bay Local Coastal Hazard Assessment.
Prepared for City of Greater Geelong and Stakeholders.
Report NA49913529_R4_0_FINAL, December 2015


PROPOSED LAND SUBJECT TO INUNDATION OVERLAY (LSIO)
MAP 2 - LIMEBURNERS
0
500
1,000
2,000
m
N
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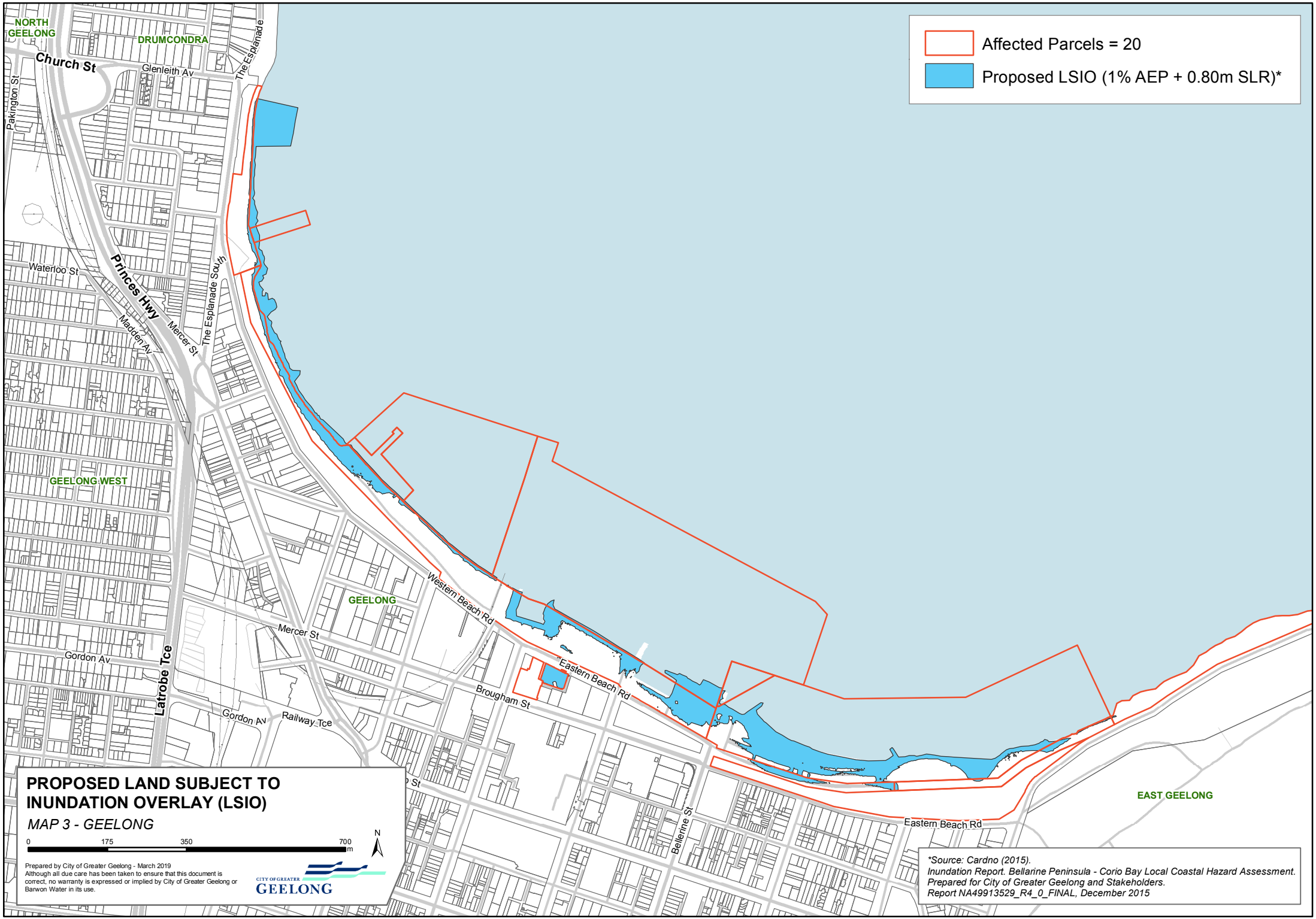
CITY OF GREATER GEELONG
Flinders Av
Walkers Rd
Mill Rd
Station Lake Rd
Mcclelland Av
Old Melbourne Rd
Avalon Rd
LARA
Forest Rd South
Rennie St
Heales Rd
AVALON
Shell Pde
Broderick Rd
CORIO
Plantation Rd
School Rd
Princes Hwy
Purnell Rd
Shell Pde
Wharf Rd
Lowe St
Station St
St Georges Rd
NORLANE
Madden Av
The Esplanade
NORTH SHORE
Abery Rd
*Source: Cardno (2015).
Inundation Report. Bellarine Peninsula - Corio Bay Local Coastal Hazard Assessment.
Prepared for City of Greater Geelong and Stakeholders.
Report NA49913529_R4_0_FINAL, December 2015
Affected Properties = 60
Proposed LSIO (1% AEP + 0.80m SLR)*


Affected Parcels = 20
Proposed LSIO (1% AEP + 0.80m SLR)*
NORTH GEELONG
DRUMCONDRA
Church St
Glenleith Av
The Esplanade
Pakington St
Waterloo St
Princes Hwy
Madden Av
Mercer St
The Esplanade South
GEELONG WEST
GEELONG
Western Beach Rd
Mercer St
Gordon Av
Latrobe Tce
Eastern Beach Rd
Brougham St
Railway Tce
Bellarine St
EAST GEELONG
Eastern Beach Rd
PROPOSED LAND SUBJECT TO INUNDATION OVERLAY (LSIO)
MAP 3 - GEELONG
0 175 350 700 m
N
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*Source: Cardno (2015).
Inundation Report. Bellarine Peninsula - Corio Bay Local Coastal Hazard Assessment.
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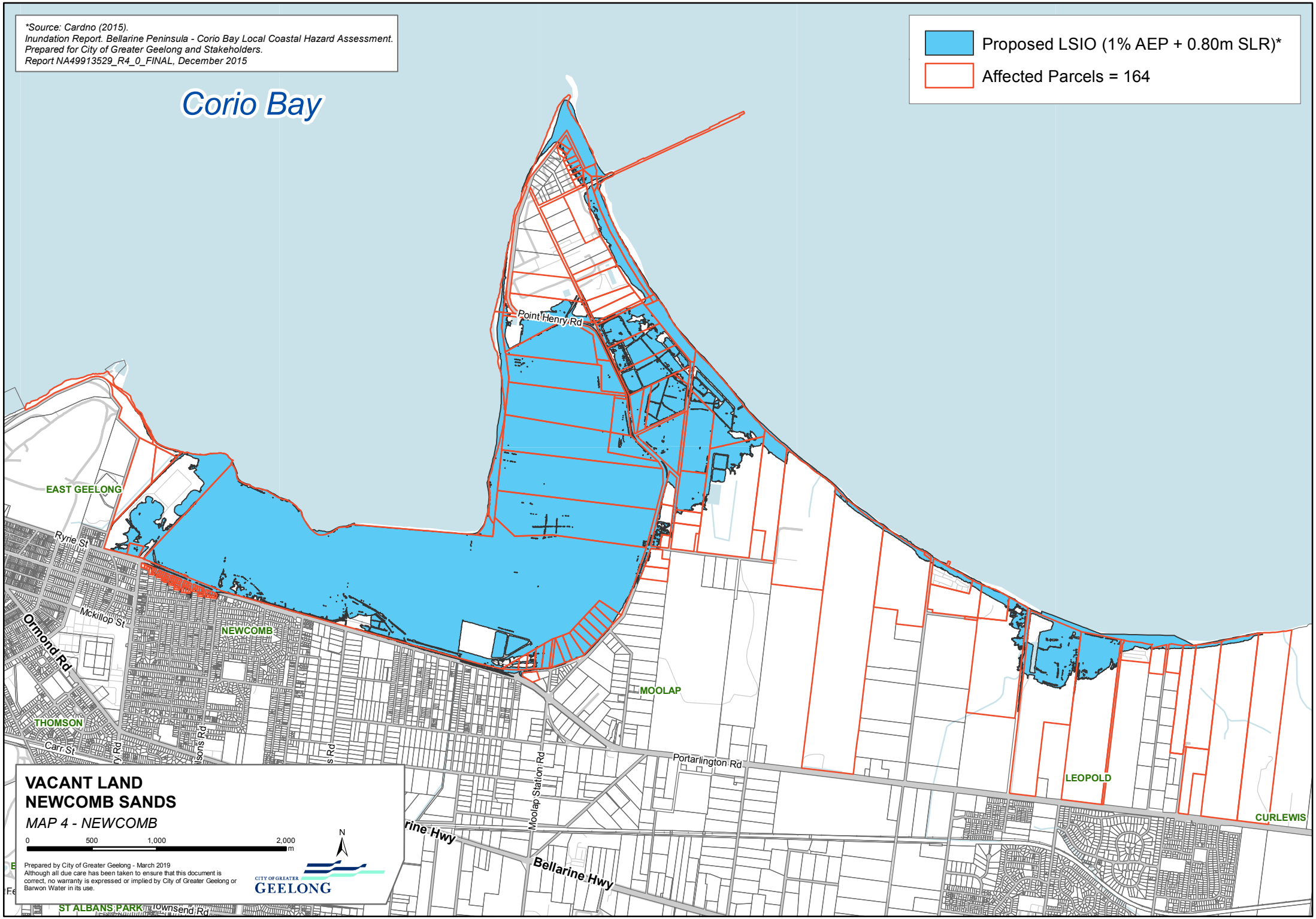
*Source: Cardno (2015).
Inundation Report. Bellarine Peninsula - Corio Bay Local Coastal Hazard Assessment.
Prepared for City of Greater Geelong and Stakeholders.
Report NA49913529_R4_0_FINAL, December 2015
Corio Bay
Proposed LSIO (1% AEP + 0.80m SLR)*
Affected Parcels = 164
Point Henry Rd
EAST GEELONG
Ryrie St
Mckillop St
Ormond Rd
NEWCOMB
THOMSON
Carr St
MOOLAP
Moolap Station Rd
Portarlington Rd
LEOPOLD
CURLEWIS
Bellarine Hwy
ST ALBANS PARK
Townsend Rd
VACANT LAND
NEWCOMB SANDS
MAP 4 - NEWCOMB
0
500
1,000
2,000
m
N
Prepared by City of Greater Geelong - March 2019
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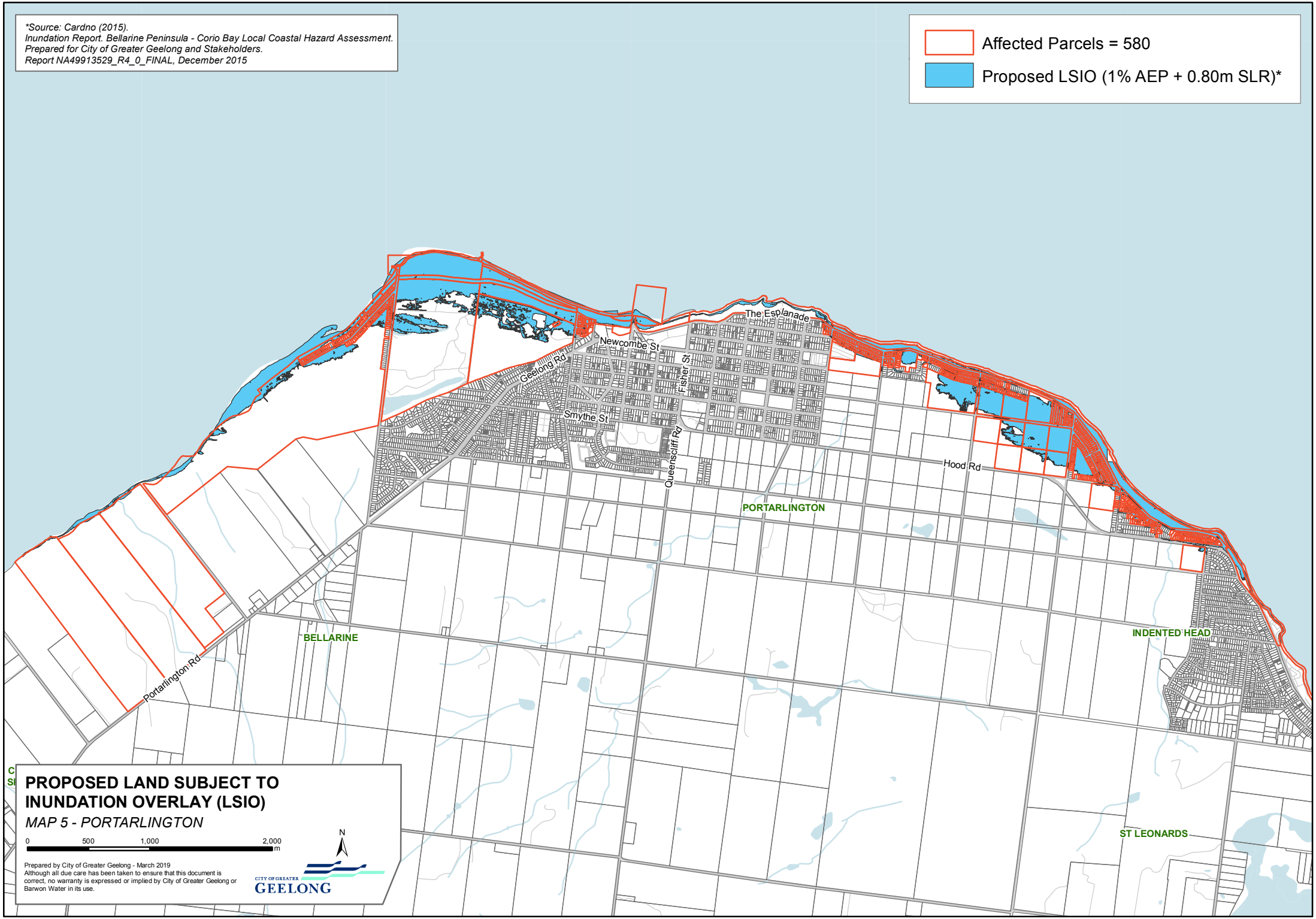
*Source: Cardno (2015).
Inundation Report. Bellarine Peninsula - Corio Bay Local Coastal Hazard Assessment.
Prepared for City of Greater Geelong and Stakeholders.
Report NA49913529_R4_0_FINAL, December 2015

Affected Parcels = 580

Proposed LSIO (1% AEP + 0.80m SLR)*



PROPOSED LAND SUBJECT TO INUNDATION OVERLAY (LSIO)

MAP 5 - PORTARLINGTON

0 500 1,000 2,000 m

N

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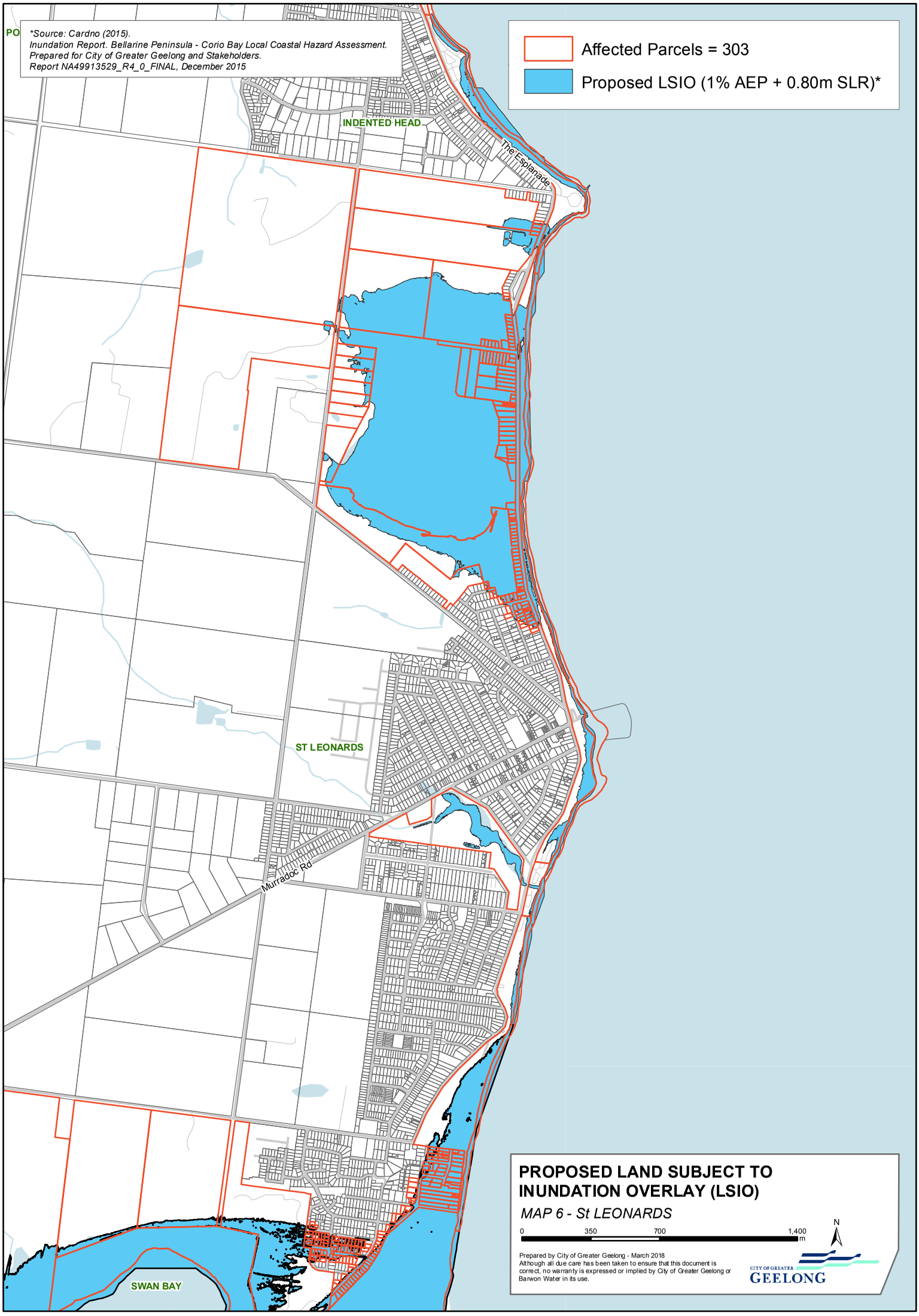
PO
*Source: Cardno (2015).
Inundation Report. Bellarine Peninsula - Corio Bay Local Coastal Hazard Assessment.
Prepared for City of Greater Geelong and Stakeholders.
Report NA49913529_R4_0_FINAL, December 2015
Affected Parcels = 303
Proposed LSIO (1% AEP + 0.80m SLR)*
INDENTED HEAD
The Esplanade
ST LEONARDS
Murradoc Rd
SWAN BAY
PROPOSED LAND SUBJECT TO INUNDATION OVERLAY (LSIO)
MAP 6 - St LEONARDS
0
350
700
1,400
m
N
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CITY OF GREATER GEELONG

PROPOSED LAND SUBJECT TO INUNDATION OVERLAY (LSIO)

MAP 7 - SWAN BAY

0 500 1,000 2,000 m

N

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CITY OF GREATER GEELONG

*Source: Cardno (2015).
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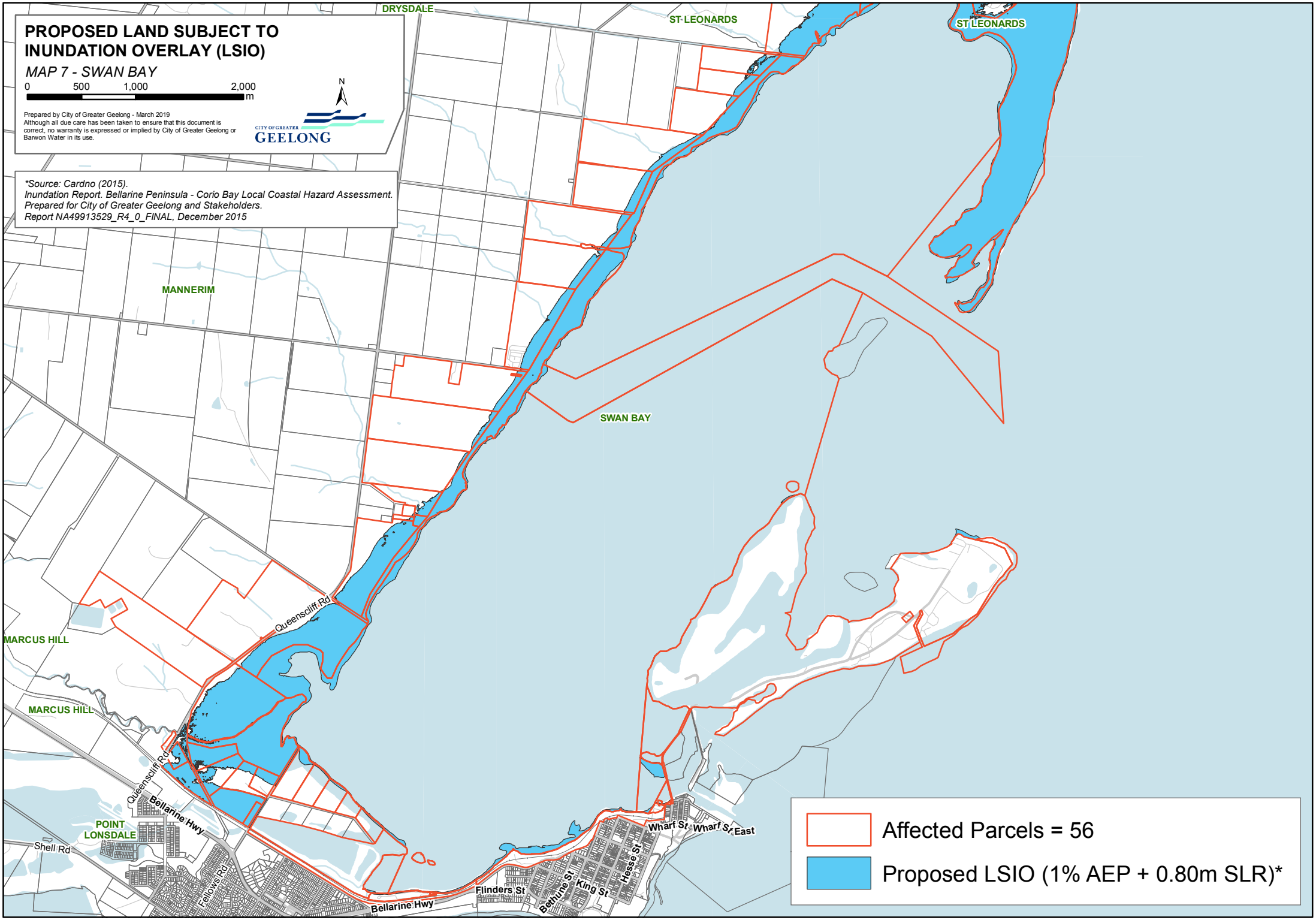
Report NA49913529_R4_0_FINAL, December 2015



APPENDIX 4: PROPOSED PLANNING SCHEME AMENDMENT FOR OTHER NINE MUNICIPALITIES

Overarching Recommendation – The following Planning Scheme Amendment is applied as a generic 'VC' amendment to ensure consistency. Individual Council approaches can then be introduced though the Stage 3 Planning Response following consultation and the completion of the third pass assessment.

Overlays

Land impacted by inundation at 0.8m SLR

Application of an LSIO in all areas identified on Melbourne Water mapping. These areas for further investigation will be highlighted on relevant mapping in each Municipal Plan

- Note: Melbourne Water to review some identified 'further investigation' areas (i.e. Frankston)
- Note: Special Investigation Areas to be excluded where a 'precinct-based' approach has been endorsed (i.e. Fishermans Bend)

This Overlay would have a different schedule number than any existing LSIO schedule which applies to riverine inundation within each municipality. Where there is an overlap between riverine and coastal inundation two schedules may apply to a single property. Both would require referral to the relevant FMA but the matters requiring consideration would be different. This distinction is important given implications of level of change over time (i.e SLR will continue to increase for centuries), duration of inundation and the saline nature of coastal inundation as well as different permit triggers application requirements etc proposed.

Structure / content of the relevant overlay likely to be as follows but would be refined through the drafting process:

Objectives to be achieved

- Generic

Statement of risk

- Generic, as considered by LSIO review currently underway

Permit Requirement

- Permit exclusions for a range of minor works should be included, having regard to lesser importance of flows and flood storage associated with coastal inundation
- Permit exclusion for works undertaken by public land managers in accordance with relevant legislation and the VCS. Permits would be required for privately owned bathing boxes or fishing shacks on public land
- Permit exclusion for works within areas identified in LFDP as being committed for protection by XX to the satisfaction of the FMA. This exclusion is applicable for a period of 10 years (until XX) to allow for the documentation and funding of identified works.

Application requirement

- Application requirements as agreed by Melbourne Water / Councils
- Specific application requirements should be included to require a tailored Design Response in designated Activity Centres i.e. An application for land within a designated Activity Centre must be accompanied by a Design Statement and associated plans which demonstrate a response to the identified flood level which also considers objectives for planning within activity centres such as access and activation of street frontages.
- An opportunity for applicants to provide documentation with their application that links the anticipated date of impact on their property with the anticipated economic life of their proposed development and provides a related design response may also be considered for inclusion in this Overlay.
- Application must identify a response to any relevant policy outlined within the 'Council name LFDP'

Decision guidelines

- Generic, and only include where there are decision guidelines required which do not duplicate those identified in the parent clause which are:
  - *The Municipal Planning Strategy and the Planning Policy Framework .*
  - *Any local floodplain development plan.*
  - *Any comments from the relevant floodplain management authority.*
  - *The existing use and development of the land.*
  - *Whether the proposed use or development could be located on flood-free land or land with a lesser flood hazard outside this overlay.*
  - *The susceptibility of the development to flooding and flood damage.*
  - *The potential flood risk to life, health and safety associated with the development. Flood risk factors to consider include: – The frequency, duration, extent, depth and velocity of flooding of the site and accessway. – The flood warning time available.*
  - *The danger to the occupants of the development, other floodplain residents and emergency personnel if the site or accessway is flooded.*
  - *The effect of the development on redirecting or obstructing floodwater, stormwater or drainage water and the effect of the development on reducing flood storage and increasing flood levels and flow velocities.*
  - *The effect of the development on river health values including wetlands, natural habitat, stream stability, erosion, environmental flows, water quality and sites of scientific significance. Any other matters specified in a schedule to this overlay*
- Whether there has been a Council resolution of commitment to undertake works to protect this area from the impacts of SLR to the satisfaction of the floodplain management authority
- Whether the area is subject to a 'precinct-based' approach to protection / mitigation

Local Policy

The restructure of the Victorian Planning Framework through VC148 has changed somewhat the tools available. The MPS is very much focused around strategic direction rather than the identification of constraints etc. As such, each scheme is proposed to have a 'generic' Local Policy applied at this stage.

This Local Policy would sit under 13.01-2S (i.e. be 13.01-2L) and generic contents are anticipated as follows:

Applies to

- All land within the municipality impacted by coastal inundation or erosion through relevant mapping or within the 'Council name' LFDP

Objectives

- Generic, and only where there are objectives which do not duplicate those identified in State Policy which is:
  - *To plan for and manage the potential coastal impacts of climate change*

Strategies

- Generic, and only where there are objectives which do not duplication those identified in State Policy which are:

- *Plan for sea level rise of not less than 0.8 metres by 2100 and allow for the combined effects of tides, storm surges, coastal processes and local conditions such as topography and geology when assessing risks and coastal impacts associated with climate change.*
- *Ensure that land subject to coastal hazards is identified and appropriately managed to ensure that future development is not at risk.*
- *Ensure that development or protective works that seek to respond to coastal hazard risks avoid detrimental impacts on coastal processes.*
- *Avoid development in identified coastal hazard areas susceptible to inundation (both river and coastal), erosion, landslip/landslide, acid sulfate soils, bushfire and geotechnical risk.*

- These would include:
  - Clear direction not to use the 2040 option
  - Application of the LSIO to all land identified by the Floodplain Management Authority as impacted by coastal inundation at 0.8m SLR
  - Identification of land impacted under higher SLR scenarios (1.1m SLR) through a LFDP
  - Avoidance of land use or development in areas impacted under higher SLR scenarios (1.1m) which increases vulnerable populations or introduces potential hazard risks (i.e. aged care, petrol stations)
  - Do not support any intensification of land use on land identified as subject to permanent inundation under a 0.8m SLR scenario.
  - Consideration of erosion risk to any privately held properties which have an immediate abuttal to a coastal foreshore area identified though DEWLP second pass assessment of coastal erosion as being at high or very high risk of erosion.
  - Do not support uses which increase vulnerable populations or introduces potential hazard risks (i.e. aged care, petrol stations) in areas identified at high risk of erosion
  - Recognising net community benefit and obligations under other legislation in consideration of community facilities within foreshore areas.

  These generic policies could (and should) be supplemented by more locally relevant policy during Stage 3 Planning Response following community consultation and third pass assessment.

Guidelines

- Reference to consideration of the 'Council name' LFDP
- Views of the Floodplain Management Authority
- Impacts of broader drainage systems and infrastructure

Policy Documents

- Incorporated: LFDP
- Background: MW SLR guidelines, Our Coast, other documents as relevant

Incorporated Document – Local Floodplain Development Plan

A generic and simple version of a LFDP should be included in each scheme. This will not include significant detail at this stage but should establish the structure and broad content to allow for this to be updated through any Stage 3 Planning Response once community consultation and additional scientific modelling have been undertaken. Content is largely drawn form the Guidelines and relevant Municipal Plans and is not anticipated to require significant further work.

The use of this document to include more detailed policy and guidance is consistent with the SMART planning reforms and the relevant Practice Notes. It also allows for the combination of consideration of a range of issues relating to both use and development of land in a way which is not possible otherwise (i.e. restricting land uses in significantly affected areas). It also allows for detail to be provided around decision making in areas affected in the longer term and the inclusion of mapping of these areas.

Each LFDP would be structured as follows:

Application

- Generic, i.e. applies to the municipality of X. Should also include statement that applications under (listed) flood provisions should be consistent with this LFDP

Flood history

- Brief summary but primarily to identify that coastal inundation is an emerging issue (Councils may wish to later 'bulk up' this section)

Flood Information

- Include map of area impacted by 0.8m SLR (extent of LSIO)
- Include map of area impacted by 0.8m SLR but excluded from LSIO mapping due to protection works endorsed by FMA
- Include map of areas permanently inundated under a 0.8m SLR
- Include map of area impacted by 1.1m SLR (100 year timeframe i.e. theoretical impact at 2120)

Flood Impacts

- Brief summary of content in each Municipal Plan prepared as part of this project

Development Requirements

- 'Generic' requirements for land that is in rural areas in LSIO
- 'Generic' requirements for land that is in urban areas in LSIO
- 'Generic' requirements for land that is permanently inundated
- 'Generic' requirements for land that is impacted by 1.1m SLR

(as set out in Guidelines and agreed by Council and the FMAs)

Regional Policy

An option also exists for all Councils to agree a 'regional policy' which specifically related to the Impacts of SLR on Port Phillip Bay and for this to be included in the relevant ten planning schemes. This could be included as per 'Great Ocean Road policy' etc (see Annexe 4 of the Ministerial Direction on Form and Content).