

MOOLAP coastal strategic framework PLAN



Background Report
July 2016

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Abbreviations

AEP	Annual Exceedance Probability
AHD	Australian Height Datum
ASS	Acid Sulfate Soils
BIOR	Biodiversity and Interactive Offset Report
CAMBA	Agreement between the Government of Australia and the Government of the People's Republic of China for the Protection of Migratory Birds and their Environment
CCMA	Corangamite Catchment Management Authority
CoGG	City of Greater Geelong
DEDJTR	Department of Economic Development, Jobs, Transport and Resources
DELWP	Department of Environment, Land, Water and Planning
DoE	Department of the Environment
EAAF	East Asian Australasian Flyway
EPA	Environment Protection Authority
<i>EP Act 1970</i>	<i>Environment Protection Act 1970</i>
<i>EPBC Act 1999</i>	<i>Environment Protection Biodiversity and Conservation Act 1999</i>
<i>FFG Act 1988</i>	<i>Flora and Fauna Guarantee Act 1988</i>
GQRUZ	Groundwater quality restricted use zones
HV	Heritage Victoria
JAMBA	Agreement between the Government of Australia and the Government of Japan for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment
PASS	Potential Acid Sulfate Soils
<i>P&E Act 1987</i>	<i>Planning and Environment Act 1987</i>
ROKAMBA	Agreement between the Government of Australia and the Government of the Republic of Korea on the Protection of Migratory Birds
SEPP	State Environmental Planning Policy
SLR	Sea Level Rise
VBA	Victorian Biodiversity Atlas
VCS	Victorian Coastal Strategy
VSS	Victorian Salt Study 2014

1.0 Introduction

1.1 What is the background report?

This background report has been prepared by the Department of Environment, Land, Water and Planning (DELWP), with input from various key government agencies including VicRoads, Department of Economic Development, Jobs, Transport and Resources (DEDJTR), the City of Greater Geelong and other stakeholders to provide the context for the Victorian Government's Moolap Coastal Strategic Framework Plan (the Moolap Plan).

The background report contains information on the site's physical and technical attributes, existing conditions and supply, opportunities and constraints, implications for potential development and a list of relevant Commonwealth, State and Local legislation and strategic plans. The information in this report has informed the development of the Discussion Paper. The report will help inform the draft Moolap Plan that will examine and evaluate potential land uses, development, improvement, protection and implementation within the study area.

The scope of issues addressed has been informed by:

- Submissions provided from the community, including land owners, organisations and the general public, through a robust community engagement process. The submissions provided valuable information about current issues and potential future uses for the study area
- State and local government departments and regional authorities and agencies
- Project team research.

1.2 What is in the background report?

The background report is structured around the five key themes of:

- Environment
- Economy
- Infrastructure and services
- Community
- Heritage

Each theme, and the subsequent sub-themes, includes information about:

- Relevant legislation, policies and strategies
- Background information
- Opportunities and constraints
- Overall development implications for the study area

These themes have been chosen as they encompass all of the major issues relevant to the study area and were the basis upon which community consultation was undertaken.

2.0 Study Area

The study area shown in Figure 1 is close to central Geelong, Avalon Airport and the Bellarine Peninsula. Figure 2 shows the study area is just five kilometres east of Geelong's Central Business District with Portarlington Road as its major arterial road. Figure 3 shows the site is more than 1200 hectares in size and extends from the tip of the Point Henry Peninsula in the north, extending to the boundary with the CSIRO to the west, Clifton Avenue is the boundary to the east and the Moolap Industrial Estate is the southern extent of the boundary.

The study area does not include residential areas to the south of Portarlington Road or the CSIRO's Australian Animal Health Laboratory (owned by the Commonwealth) as their future land-use is not in question, although interface issues will be considered within the Moolap Plan. Land east of Clifton Avenue is also not included as this area is addressed in the Leopold Structure Plan.

The study area includes:

- The former aluminum smelter site and rolling mill at the north end of the Point Henry peninsula
- Freehold land owned by Alcoa including wetlands, farming land and re-vegetated sites
- The Point Henry pier
- The former saltworks (part Crown land leased and part land owned by Ridley Corporation)
- Crown coastal foreshore land and coastal waters
- The Moolap industrial estate located to the south of Portarlington Road
- The Moolap industrial precinct generally east of Point Henry Road, including Dow Chemicals and Winchester.

Context map

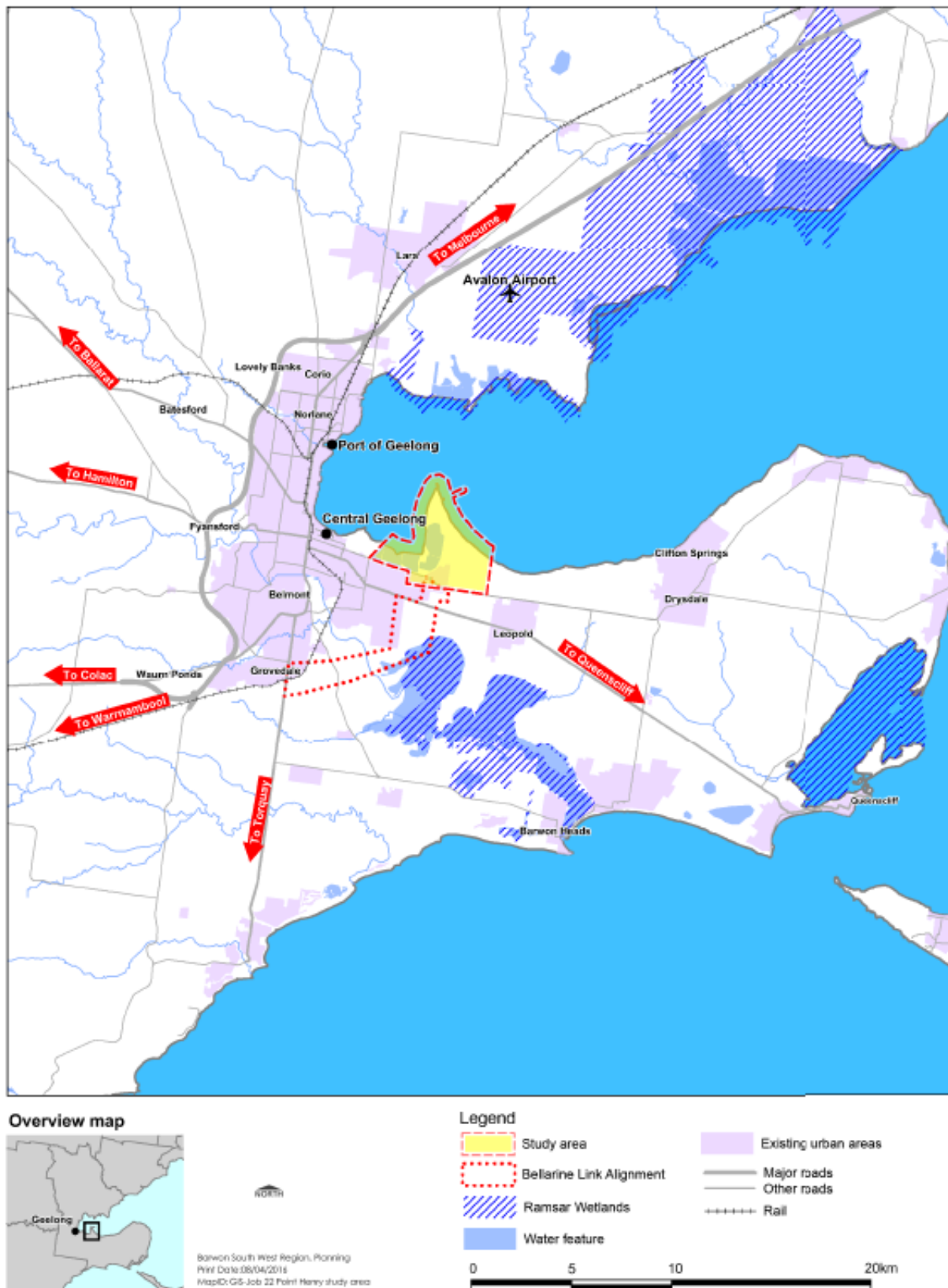
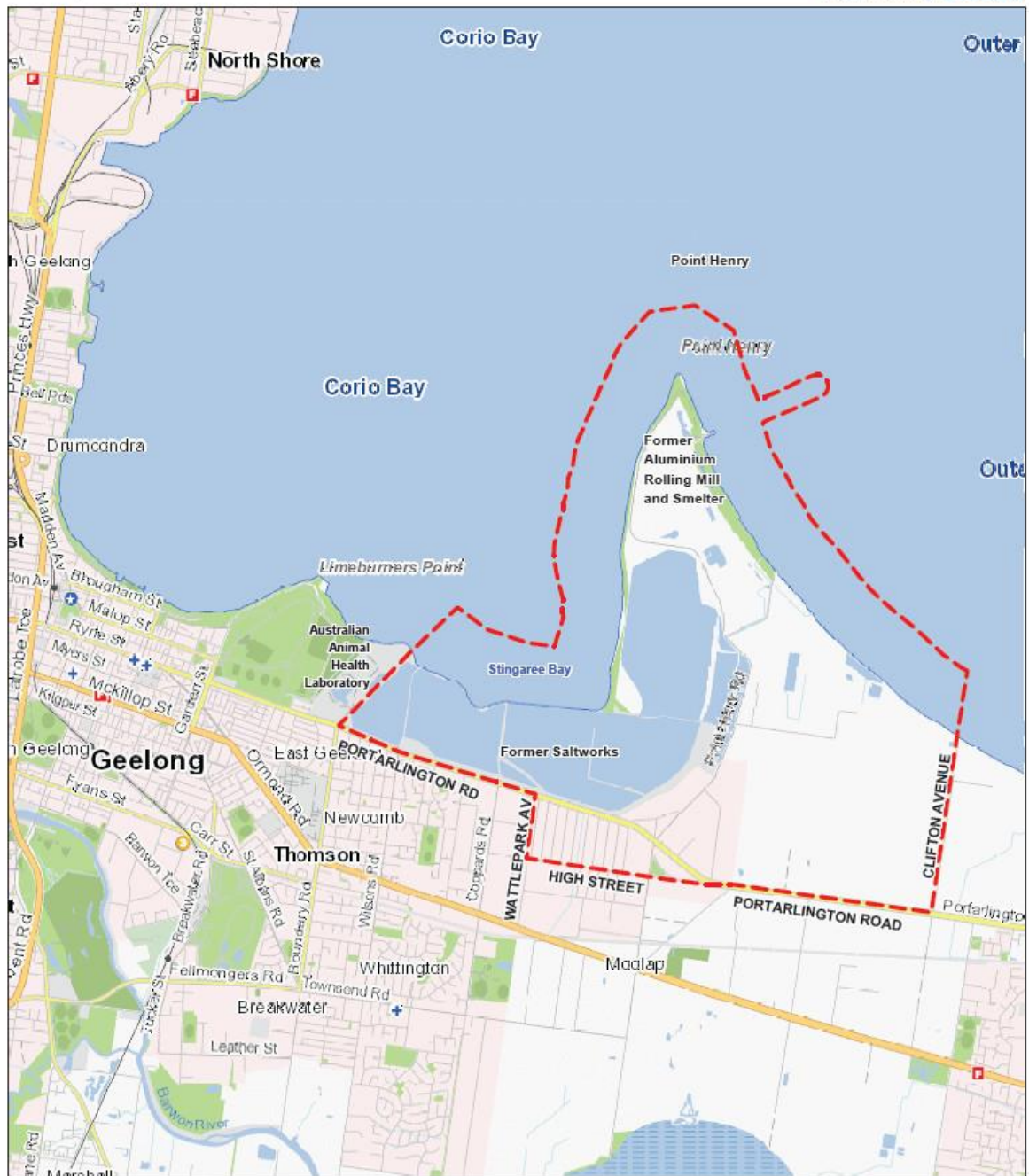


Figure 1: Study area within the context of Greater Geelong

Study Area - VicmapAPI



Overview map



Barwon South West Region, Planning
Print Date: 21/07/2015
MapID: G6-Job 22 Point Henry study area

Legend

 Study area boundary



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Figure 2: Study area within context of Geelong Central Business District

Study Area



Overview map



Barwon South West Region, Planning
Print Date: 28/11/2015
MapID: GIS-Job 22 Point Henry study area

Legend

 Study area boundary

0 1 2 4km

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Figure 3: Study Area 1200 hectares



Photo 1: Former smelter and rolling mill in foreground, freshwater to marine wetlands and farm land to the left side of the photo, industrial estates and former saltworks to the right side of the photo. Photo courtesy of Alcoa.

2.1 Land Ownership/Tenure

The former saltworks site is approximately 500 hectares in the south-west of the study area, consisting of evaporation and crystalline salt pans¹. The majority of the former saltworks (289 hectares) is immediately north of Portarlington Road. The site is Crown land and leased to Ridley Corporation until 2030. The remainder of the site further to the north and adjacent to the western shore of Point Henry Peninsula (176 hectares) is owned by Ridley Corporation (see Figure 4).

In 2012, Ridley Corporation proposed a redevelopment of the former saltworks for mixed density residential use, conservation reserve, employment and public land. This proposal triggered the need for an Environment Effects Statement (EES) under the *Environment Effects Act 1978*. It was determined to be a controlled action under the *Environmental Protection Biodiversity and Conservation Act 1999* (EPBC Act 1999) because of the potential impact on matters of national environmental significance.

Ports Pty Ltd, trustee of the Port of Geelong Unit Trust, owns the Point Henry pier. The company is jointly owned by Asciano Limited (owner of Pacific National and Patrick Stevedoring) and RREEF Infrastructure (Deutsche Bank Group). Geelong Port Pty Ltd, owned by Asciano is the operator of the Port of Geelong under a long-term agreement with Ports Pty Ltd. The Point Henry pier lease expires in 2095.

Alcoa is the major land owner within the study area with approximately 575 hectares that includes farming land within the south-east, freshwater to marine wetlands adjacent to the eastern shoreline and areas of foreshore land (see photo 1). Alcoa also has waste stabilisation ponds located between the salt pans and the rolling mill.

The study area includes privately owned industrial land including Winchester which owns 36 hectares of land and Dow Chemicals which owns 37 hectares.

The coastal foreshore reserve within the study area is predominantly Crown land however there are multiple leases and management arrangements on the land (see Figure 5) including:

- Alcoa leases four parcels (3E, 3F, 3G and 3H) of Crown coastal foreshore land for smelter operations with a lease that expires 2019; and two parcels (2006 and 2005) of Crown coastal foreshore land for the purpose of environmental management with an annually renewed lease.
- The Crown coastal foreshore land along the western shoreline, the point and the eastern shoreline north of the Point Henry pier is managed by the City of Greater Geelong.
- The eastern shoreline from the Point Henry pier south of Stodarts Lane is managed by Alcoa.
- The Crown coastal foreshore land along the eastern shoreline south of Stodarts Lane to Windmill Road is managed by the City of Greater Geelong.

The coastal foreshore land south of Windmill Road has several owners including Alcoa and Dow Chemicals.

¹ vhd.heritagecouncil.vic.gov.au/places/4820

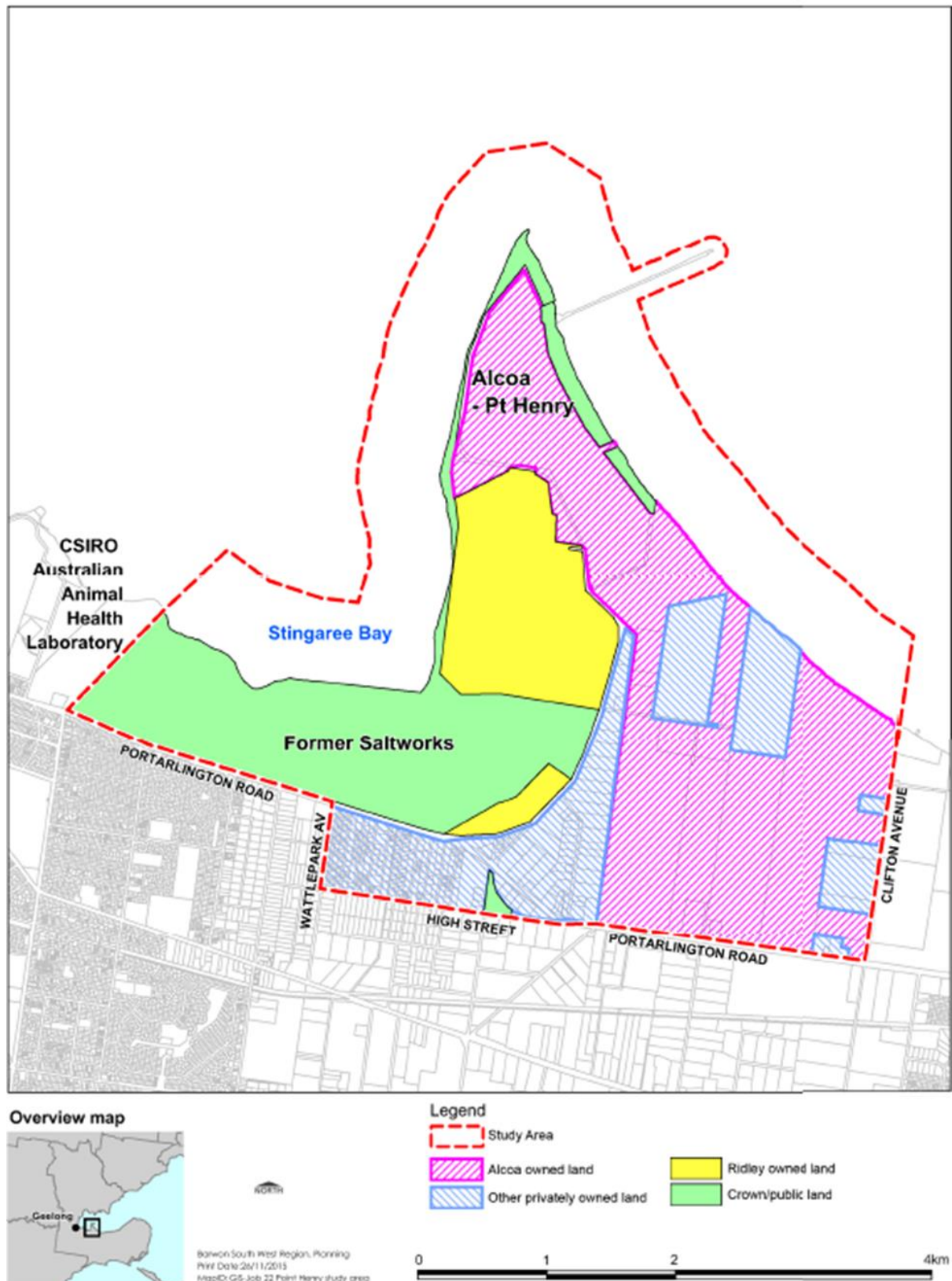


Figure 4: Ownership map

Land Tenure

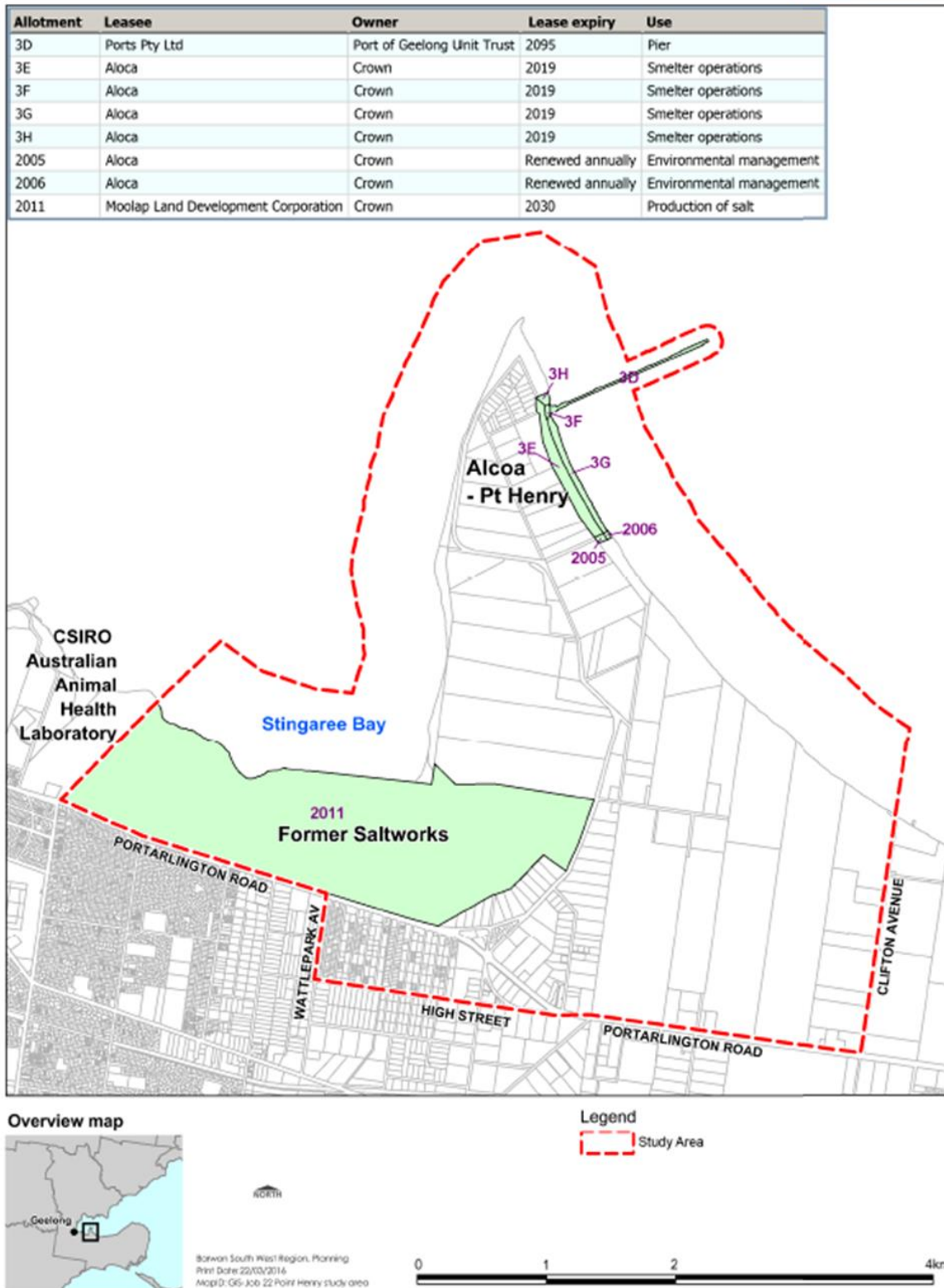


Figure 5 Leasing tenures

2.2 Existing Land Uses

Point Henry and the former saltworks area is in transition but there are still numerous and diverse land uses throughout the site.

2.2.1 Existing Use - Industrial

Alcoa ceased operations at Point Henry in 2014. Physical decommissioning and remediation has commenced. Other industry within the study area includes the Moolap industrial precinct established in the 1960's and includes Winchester, Dow Chemicals, and approximately 25 additional businesses on the north side of Portarlington Road adjacent to Point Henry Road and Buckley Grove. Businesses on the northern side of Portarlington Road include steel fabricators, materials recycling, and landscape supply businesses selling sand, soil, manure, asphalt and concrete batching plants, and garden accessories.

Winchester Australia is Australia's only large scale commercial ammunition manufacturer and has resided on the site for 50 years. Its operations are wholesale distribution and manufacturing. The company employs between 58 and 68 people and operates under a Worksafe license for the storage and manufacture of explosives in accordance with the *Victorian Dangerous Goods (Explosives) Regulation 2011* which determines the separation distances for the storage of explosives. A series of waste stabilisation ponds for waste water treatment is located along Winchester's eastern boundary.

Dow Chemicals is a chemical engineering manufacturer manufacturing water based emulsions for paints and coatings applications. It employs approximately 85 staff and has a maximum design capacity of 60,000 tonnes per annum. Dow ships raw materials to Coode Island (West Melbourne) and transports by tanker to Moolap. The end products are taken back to Coode Island. The isolation from sensitive receptors is an advantage of the site. In accordance with *EPA Publication 1518 Recommended separation distances for industrial residual air emissions (March 2013)*, Dow Chemical's recommended separation distance is 2000m which applies to the production of >2000 tonnes per year of chemicals (other organic and inorganic hydrocarbon production). A waste stabilisation pond is located at the northern end of Dow's boundary adjacent to the coastline.

The Moolap Industrial Estate is south of Portarlington Road and has over 300 individual lots accommodating a range of smaller light industrial activities including mechanical repairs, cabinet making, engineering and a concrete batching plant.

2.2.2 Existing Use - Farming

Farming uses are confined to the south-east part of the study area. The majority of this land is owned by Alcoa and was essentially bought and used as a buffer to the former smelter and rolling mill. The land is currently used by and leased to small scale farmers for agricultural and rural purposes. An equestrian centre is located in this area and there are a few farm houses.

2.2.3 Existing Use - Pier

The Point Henry pier had exclusively serviced the aluminium smelter and rolling mill. Alcoa has committed to removing the conveyor and other infrastructure from the pier. The pier is currently used as a casual berth for a large trawler.

2.2.4 Existing Use – Former saltworks

The former saltworks are no longer used for the production of salt having ceased operation in 2007. The salt pans are acting as wetlands and hold some high ecological values for a number of endangered and threatened flora and fauna species.

2.2.5 Existing Use - Recreation

The Point Henry coastal foreshore has long been a recreational area particularly along the north-western shoreline, the point and the eastern shoreline south of the Point Henry pier. Dog walking, fishing, boating, duck shooting and kitesurfing are popular activities within the Crown coastal foreshore.

The Moolap Recreation Reserve is located on Moolap Station Road to the south of Portarlington Road. It is a local reserve and has tennis courts and a small picnic area.

2.3 Greater Geelong Planning Scheme

The *Greater Geelong Planning Scheme* designates land within the study area with a particular zone and overlay (see Figures 6 and 7). The various zones and overlays within the study area are as follows.

Industrial 1 Zone (IN1Z)

A large part of the study area is the *Industrial 1 Zone* which encourages industrial and warehouse uses. Industrial and warehouse uses do not require a planning permit where Clause 52.10 (Uses with Adverse Amenity Impacts) of the Greater Geelong Planning Scheme is not triggered. Offices, businesses selling goods and agriculture require a planning permit.

Farming Zone (FZ)

The *Farming Zone* provides for the use of the land for agriculture. The schedule to the zone includes minimum subdivision areas as well as minimum areas for construction of a dwelling both of which are 30 hectares.

Port Zone (PZ)

The *Port Zone* covers the Point Henry pier and provides for shipping, road and railway access and the development of each of Victoria's commercial trading ports as key areas of the State for the interchange storage and distribution of goods.

Public Conservation and Resource Zone (PCRZ)

The *Public Conservation and Resource Zone* covers the Crown coastal foreshore and parts of Corio Bay and protects and conserves the natural environment and natural processes for the historic, scientific, landscape, habitat and cultural values.

Special Use Zone- Schedule 1 (SUZ1) – Environmental Wetlands, Salt Production and Land-Based Aquaculture Activities

The *Special Use Zone* applies to the former saltworks, and is to:

- Provide for the use and development of land for salt production and land-based aquaculture.
- Recognise, protect and conserve identified significant environmental values which partly result from land management practices.

- *Encourage land management practices and rehabilitation that minimises adverse impact on the land's environmental values and significance.*

Design and Development Overlay (DDO20) – Schedule 20

The *DDO20* applies to the Industrial Zone within the study area and aims to improve the visual appearance of the site and minimise potential off-site effects on the public from any industry nearby.

Heritage Overlay (HO) – HO1583, HO1582 and HO322

HO1583 applies to the former Navigation Station at the north end of Point Henry Peninsula and within 20 metres of the building. The Greater Geelong Planning Scheme enables the consideration of otherwise prohibited uses.

The former Cheetham Saltworks is covered by *HO1582* and is included on the Victorian Heritage Register.

HO322 is the memorial to the founding of Geelong which applies to all land within 5 metres of the plaque.

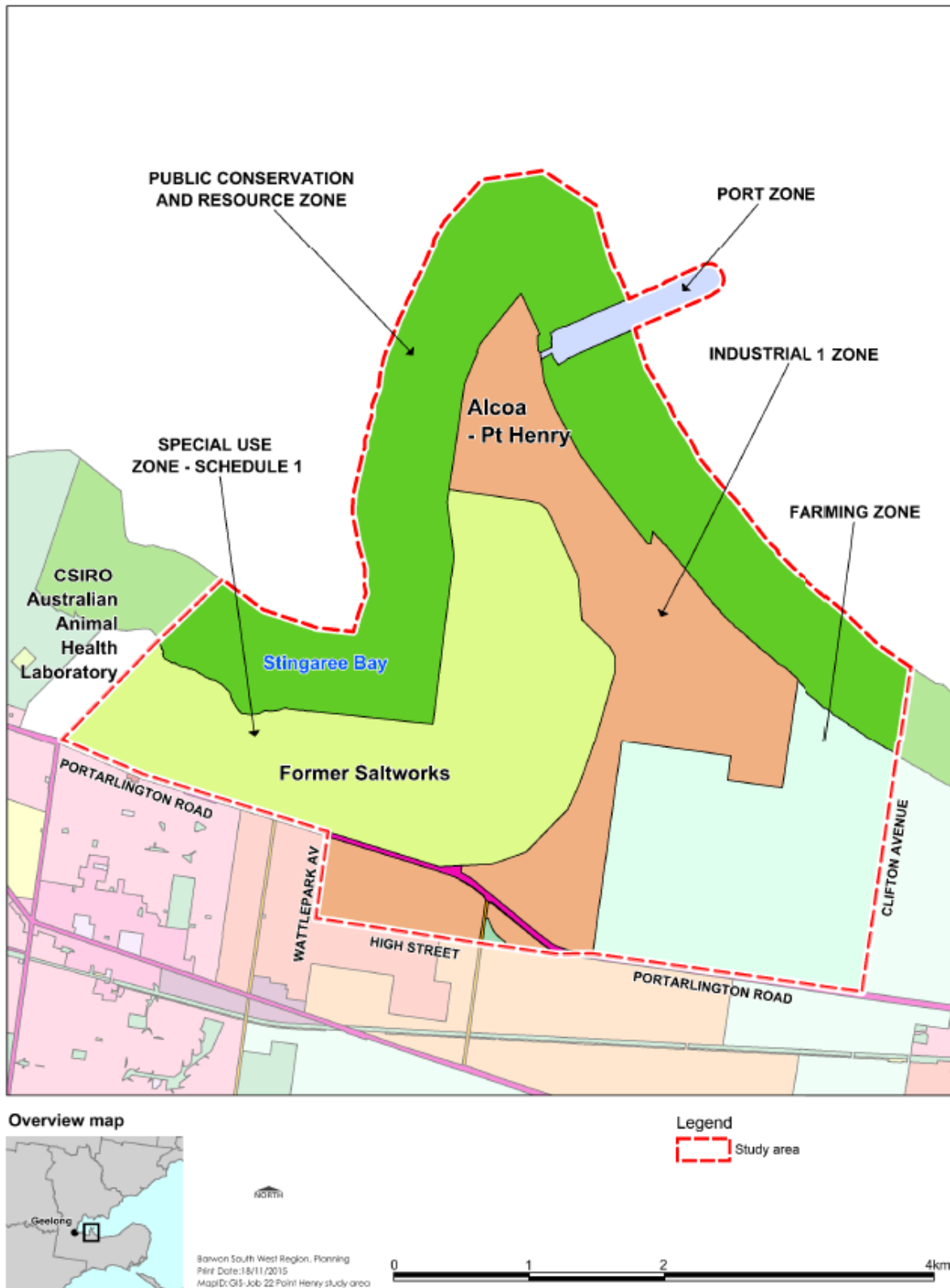
Environmental Significance Overlay- Schedule 2 (ESO2) - High Value Wetlands and Associated Habitat Protection

ESO2 (High Value Wetlands and Associated Habitat Protection) applies to the former saltworks site, Alcoa's freshwater to marine wetlands and other coastal foreshore land in the north of the study area.

Special Building Overlay (SBO)

The *Special Building Overlay* applies to parts of the Crown-owned area of the former saltworks and to the Moolap Industrial Estate. The purpose of the *Special Building Overlay* is to identify land in urban areas liable to inundation by overland flows from the urban drainage system as determined by or in consultation with the floodplain management authority, in this case Corangamite Catchment Management Authority.

Study Area - Zones



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Figure 6: Greater Geelong Planning Scheme Zones

Study Area - Overlays

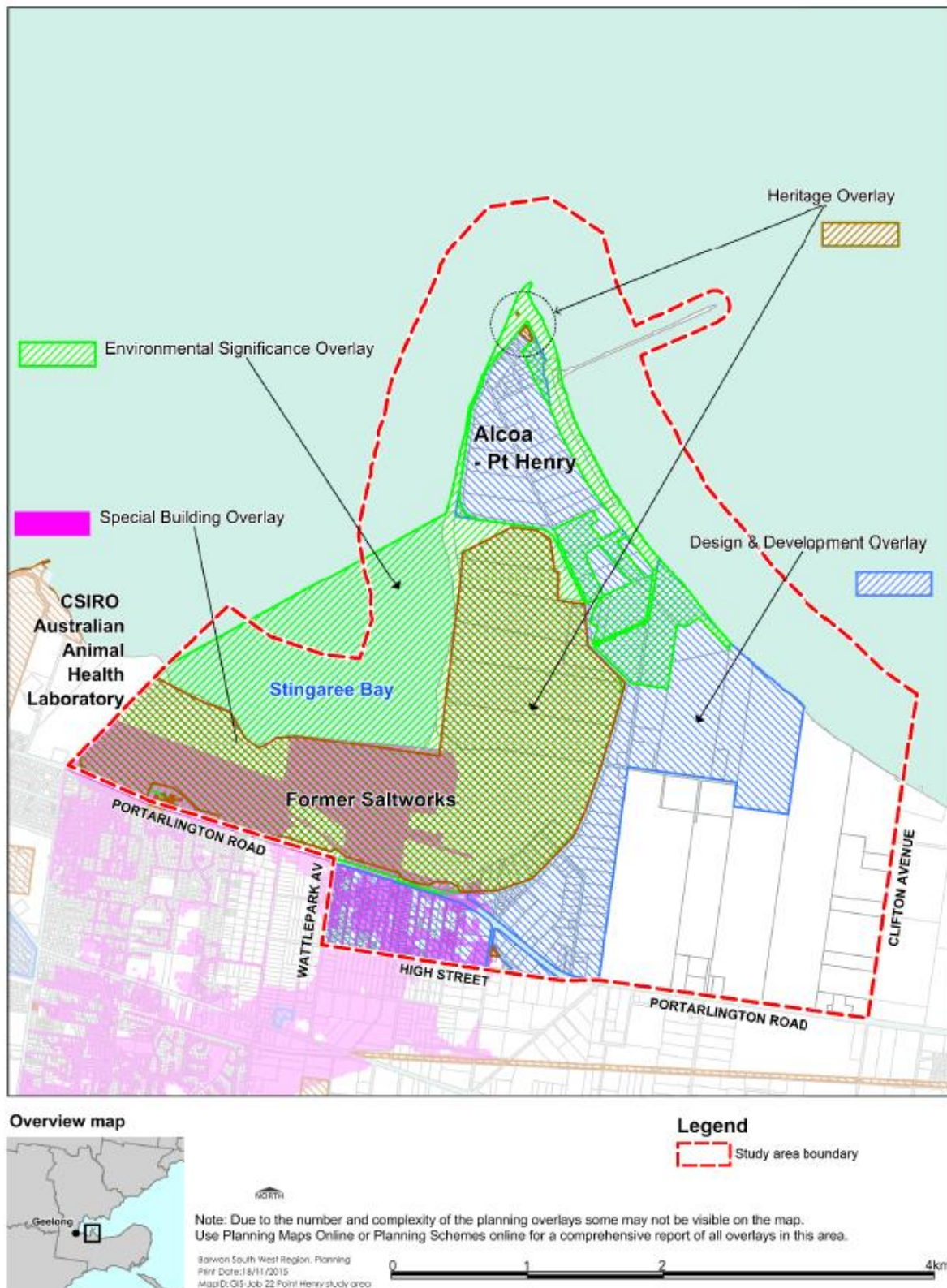


Figure 7: Greater Geelong Planning Scheme Overlays

3.0 Environment

This section will discuss the key topics in regard to the environment including Biodiversity, Site Contamination, Hydrology, Climate Change and Landscape Values of the study area.

3.1 Landscape

3.1.1 Relevant Legislation, Policy and Strategies

The legislation, policy documents and strategic plans relevant to landscape are:

State

Strategies

- *Victorian Coastal Strategy 2014*

Regional

Strategies

- *Central Regional Coastal Plan 2015-2020*
- *Corangamite Regional Catchment Strategy 2013-2019*

Local

Strategies

- *Point Henry Foreshore Management Plan 2006*

3.1.2 Topography and Geology

The topography of the study area varies from low lying land (<2 metres above sea level) within the former saltworks to the highest elevation in the study area which is the farmland in the south-east part of the study area which is greater than 10 metres above sea level. The elevated point where the smelter and rolling mill is located is 7-8 metres above sea level.

The foreshore zone is relatively narrow, with an average width of 50-60 metres on the western shoreline and 120 metres wide on the eastern shoreline. It has a total shoreline length of approximately 6.3 kilometres. The western shoreline changes from a steeply graded section which has been rock/rubble stabilised, to relatively flat coastline with low dunes and saltmarsh behind them.

With the exception of the shipping channels, the coastal waters of Stinagree Bay and Port Phillip Bay are both shallow, even up to 1 kilometre offshore there is a depth generally between one and three metres. The bay is consistently deeper on the eastern side of the peninsula.

The geomorphology of the study area is defined by the CCMA as being Volcanic Plains.

The Point Henry Foreshore Management Plan prepared by the City of Greater Geelong provides the best description of the natural landscape of Point Henry. It states:

Point Henry Peninsula is an elevated ridge of sand clays fringed by shallow beaches on the north and east and protected by rock/concrete walls on the west. North and east of Point Henry is one massive Holocene sedimentation that has built a succession of parallel beach ridges and development of an elongated spit and a sinuous offshore bar system that extends across the entrance to Corio Bay towards Point Lillias. This system is truncated by the

Hopetoun (shipping) Channel which was cut in 1861, to allow ships to enter Corio Bay. It is noted that the Point is recurving westwards, possibly due to the influence of wake from shipping.

Point Henry itself is an elongated shelly spit and is built on a basement of eroded clays and silts that form the Point Henry promontory, and there are visible outcrops at the base of the western shoreline. Point Henry, north of the Pier, is identified to be of regional geological and geomorphological significance as it is the longest elongate cusped spit in Port Phillip Bay, and the area to the east is the most extensive accumulation of clearly defined parallel ridge and lagoon systems in the Bay.

The clay platform along the western shoreline of Point Henry is noted as being of Regional geological and geomorphological significance as this is the only instance in Port Phillip Bay of a platform developing in unconsolidated clay materials. The platform extends along the western side and is a broad, horizontal intertidal platform cut in soft silt clay. The platform has a flat to gently concave surface which retains large pools at low tide.

3.1.3 Landscape Values

The study area has been highly disturbed and altered by industry and the salt evaporation pan development. The salt pan development and the sea wall (see photo 2) are a characteristic of the coast. The flat terrain of the peninsula makes long distance views dominant across the open plains particularly to the north and north-west where there are elevated views across Corio Bay to Geelong and the You Yang's (see photo 3).

Other values contributing to the area are the natural and derived saltmarsh growing particularly between the salt pans; and the man-made Point Henry freshwater to marine wetlands.

The smelter and rolling mill are located at the elevated point which makes the plant visually dominant. The two sets of transmission lines and the relatively flat land make this a dominant feature on the landscape also.

The Moolapio revegetation area and the wildlife corridor to the south-east of the study area also contribute to the landscape of the study area.



Photo 2: Sea wall



Photo 3: Outlook to the pier and You Yangs from the eastern foreshore.

3.1.4 Landscape Opportunities and Constraints

3.1.4.1 Opportunities

- The site has a north facing aspect, 10km of coastline and views north to the You Yangs, west to Geelong and east to Port Philip Bay.
- The shallow shoreline provides opportunity to build on recreational assets of the point and the flat land, natural and non-natural wetlands, lagoons and ponds means the coastline could be utilised for public recreation, habitat protection and cultural heritage retention.
- The creative reuse of industrial infrastructure, buildings and surrounding landscapes has been successfully undertaken in other settings to enhance landscape values. By contrast, the removal of the disused industrial infrastructure at Point Henry may provide opportunity to improve vistas.
- The removal of the disused industrial infrastructure at Point Henry may provide opportunity for more expensive vistas.

3.1.4.2 Constraints

- Point Henry Peninsula is highly visible from surrounding areas in Avalon, Geelong, Leopold and Clifton Springs. Future built form, particularly at the point will need to carefully consider its impact on the views and vistas from surrounding areas.

3.2 Hydrology

3.2.1 Relevant Legislation, Policy and Strategies

The legislation, policy documents and strategic plans relevant to hydrology are:

State

Legislation

- *Coastal Management Act 1995*
- *Catchment and Land Protection Act 1994*
- *Environment Protection Act 1970*
- *State Environment Protection Policies (Groundwaters of Victoria)*
- *State Environment Protection Policies (Waters of Victoria)*
- *Water Act 1989*

State Planning Policies (Victorian Planning Provisions)

- *Clause 13.02-1 Floodplain management*
- *Clause 14.02-1 Catchment planning and management*
- *Clause 14.02-2 Water quality*
- *Clause 19.03-3 Stormwater*

Regional

Strategies

- *Corangamite Waterway Strategy 2014-2022*
- *Corangamite Regional Catchment Strategy 2013-2019*

Local

Strategies

- *Moolap Industrial Area Flood Management Plan 2004 (WBM Oceanics)*
- *Newcomb/Whittington Drainage/Flood Study 2011 (BMT/WBM)*
- *City of Greater Geelong Stormwater Management Plan (WBM Oceanics Australia, 2002)*

Greater Geelong Planning Scheme- Municipal Strategic Statement

- *Clause 21.05-2 Waterways*
- *Clause 21.05-7 Flooding*

3.2.2 Flooding

The City of Greater Geelong has commissioned two hydraulic modelling projects within the study area, as described in the reports:

- *Moolap Industrial Area Flood Management Plan (WBM Oceanics, 2004); and*
- *Newcomb/ Whittington Drainage/Flood Study (BMT/WBM, 2011).*

Both studies show the catchments and major outfalls through the former saltworks in the form of large open channels which hold permanent water and are affected by tides. The studies also show the 1% annual exceedance probability (AEP) flood extent which impacts much of the Moolap

Industrial Estate and the former saltworks site. The AEP is the probability of a particular rainfall amount for a specified duration being equalled or exceeded in any one year period.

The *Moolap Industrial Area Flood Management Plan 2004* had a recommended option to mitigate the extent of flooding by widening the channel through the salt works to 16-18 metres which has been constructed. One of the mitigation options involved the construction of a retarding basin upstream of the Moolap Industrial Estate. However, this was not recommended as an outcome of the plan and consequently has not been constructed.

The *Newcomb/ Whittington Drainage/Flood Study 2011* identified parts of the 480 hectare catchment has not been fully urbanised due to the drainage constraints of the catchments and history of flooding in the region. Other features of the Newcomb catchment mentioned in the *Newcomb/ Whittington Drainage/Flood Study 2011* include:

- The relatively flat grades present in the catchments have resulted in floodwaters that have a tendency to remain for extended periods after the rainfall event.
- Through the catchment many of the natural flow paths have been rendered ineffective due to the positioning of the streets in a grid style layout.

Figure 8 shows the 1% AEP flood extent of the study area as well as additional flood extents historically determined. The mapping shows the maximum 1% AEP flood extent over the catchments during the critical rainfall event, and excludes water depths less than 10mm. It should be noted there is no credible rainfall data available to suggest the critical rainfall event has occurred in these catchments. The Special Building Overlay (SBO) has been applied to the Greater Geelong Planning Scheme which reflects this 1% AEP flood extent and ensures that development is responsive to the existing flood risk, and an automated flood warning system has been implemented within the Moolap study area.

3.2.1 Water Quality

Port Phillip Bay is of significant social, economic and environmental value to Victoria. The greatest risks to the health of Port Phillip Bay are from influxes of nutrients and marine pest invasions. These risks can affect ecological processes both bay-wide and locally and have ecological impacts that already, or without action could become, irreversible even with the intervention of technology and science².

Plan Melbourne, the State Government's planning strategy for Melbourne's future, notes the link between the water quality of our waterways and bays and urban stormwater runoff.

Plan Melbourne Initiative 5.2.2 Protect the Values of our Waterways

The health of Melbourne's 8,400 kilometres of waterways and bays, and the biodiversity and ecosystems that rely on them, are crucial to our liveability and environment. Increasing urbanisation poses a significant threat to the environmental condition of waterways and hence to key waterway values such as the presence and health of platypus, fish, frogs, birds, invertebrates and vegetation. The condition of our waterways is primarily a consequence of the quantity, velocity and quality of urban stormwater run-off, and the discharge of wastewater.

² <http://www.depi.vic.gov.au/forestry-and-land-use/coasts/marine/bays-inlets-estuaries-and-lakes/port-phillip-bay>



Figure 8: 1% AEP flood extent and Special Building Overlay
(source: CoGG)

The City of Greater Geelong Stormwater Management Plan (WBM Oceanics Australia, 2002) was developed to identify improvements in environmental management of stormwater runoff from urban areas. It identified the Newcomb catchment as extending from Eastern Park to Point Henry. The Newcomb catchment includes residential and light industrial development which was subdivided pre-1980. The area is not sewered and the underground drainage has limited capacity. The outfall drains have limited grade, which when combined with elevated nutrient content has resulted in historic problems with algae and aquatic weed growth.

Table 4-2 of Volume I of the City of Greater Geelong Stormwater Management Plan (WBM Oceanics Australia, 2002) states in regards to the Newcomb catchment:

Septic and sewer leakage has been identified as a priority management issue within the Newcomb sub-catchment as the Moolap industrial area is not sewered.

Industrial land use in the Newcomb sub-catchment includes a mixture of large heavy industry and medium mixed industry. In accordance with the typically poor waste management practices exhibited in the area, industrial land use runoff represents a risk to the receiving environment values of Corio Bay and the marine and foreshore habitat including important sea grass communities.

As shown in Figure 9, drainage from the Moolap industrial precinct is to the eastern side of Point Henry Road with an outfall to Port Phillip Bay via the Point Henry freshwater to marine wetlands. The *City of Greater Geelong Stormwater Management Plan (WBM Oceanics, 2002) Volume IV* states that the stormwater being directed to the freshwater to marine wetlands has fewer threats to the bay as an Environmental Management Plan for the wetlands improved the quality of stormwater.

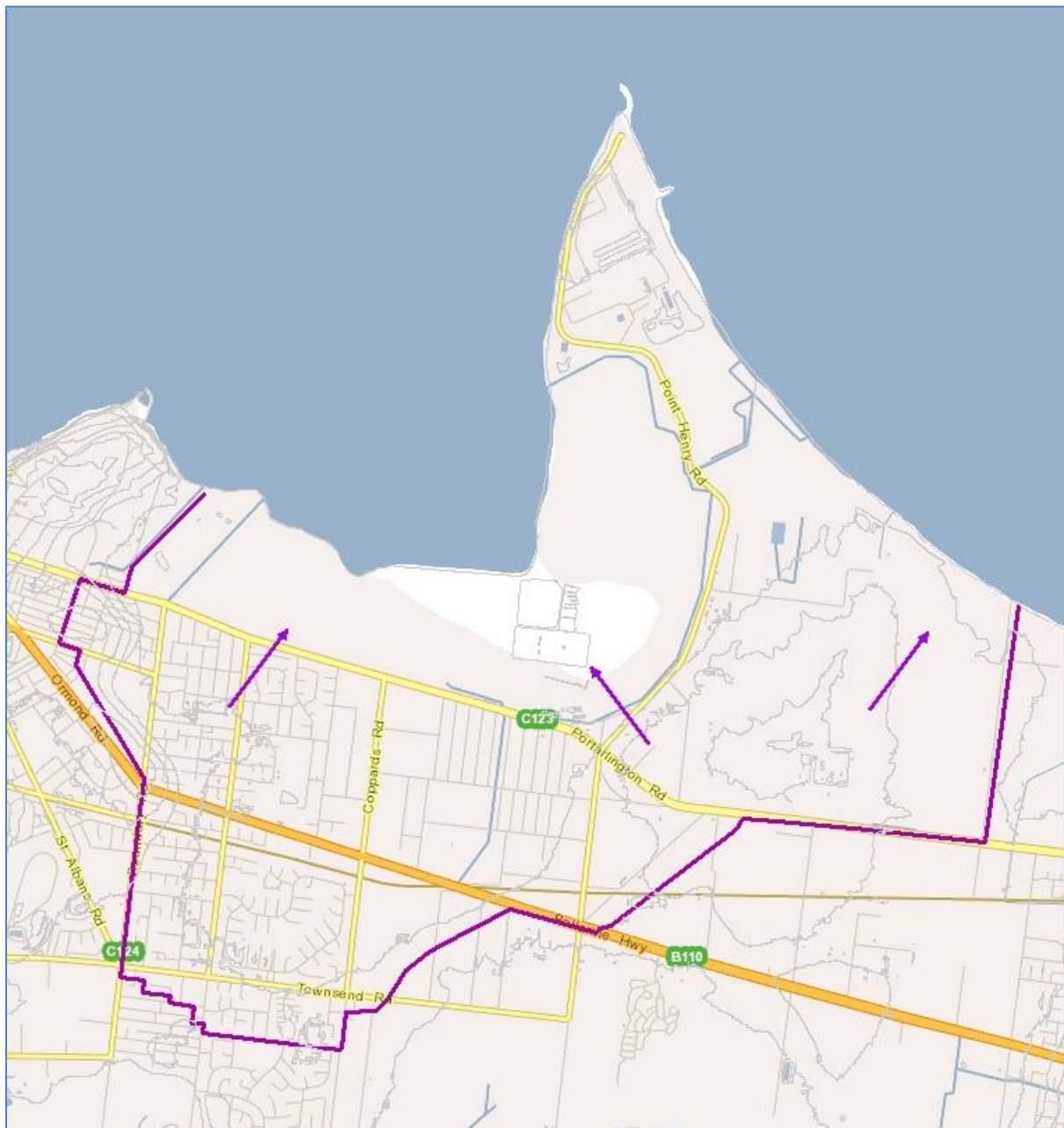


Figure 9: Catchment draining through study area
(source: CoGG)

3.2.2 Groundwater

Groundwater is water that collects or flows beneath the soil surface, filling the porous spaces in soil, sand, clay and rocks. Groundwater is generally accessed by using a bore or can come to the surface with natural springs.

Several Groundwater Quality Restricted Use Zones (GQRUZ) have been identified in Victoria. This is an area where following an environmental audit, there is remaining groundwater pollution usually as a result of previous industrial activity. A GQRUZ is identified when attempts have been made to clean up the groundwater and the EPA determines that restrictions should remain on how the water can be used without further treatment.

A GQRUZ has not been identified within the Moolap study area.

The EPA states that previous groundwater assessments beneath Point Henry have identified liquid non-aqueous phase hydrocarbon plume. The plume has been delineated and monitoring indicates that it is not spreading and is naturally attenuating. Alcoa are legally bound to inform the EPA if there is any noticeable change in the plume and if the plume or other contaminants pose any imminent risk to human health or the environment. The Clean-up Notice will further investigate this plume and also any other groundwater impacts due to Alcoa operations.

3.2.3 Sea water infiltration

The changing and varying ranges of water depths to the former saltworks were managed for the production of salt through a series of sea wall and levees along Stingaree Bay. When operational, the ponds were filled with sea water as required via a sluice system operated in tandem with a series of pumps, and a valve in the north of the site remained open to allow sea water to flood a number of the ponds depending on the strength of the tide. A modified pumping regime has continued within the site and is managed by Ridley.

The pond water is now more likely to be fresh to brackish in contrast to the saline to hypersaline condition present during salt production. Schedule 3 of the lease under Section 134 of the *Land Act 1958* pertaining to the Crown land leased by Ridley Corporation at Crown Allotment 2011 Parish of Moolap states:

Notwithstanding the requirements of Clause 16.7 (b) the Tenant upon informing the Minister may periodically cease salt production operations on the premises when the demand for salt can be demonstrated to be low and continued salt production would not be commercially viable. During such periodic cessation of operations the Tenant shall maintain adequate water flows to ensure the site's integrity and in support of the bird life using the premises as avian habitat.

3.2.4 Hydrology- Opportunities and Constraints

3.2.4.1 Opportunities

- Future development of the site provides an opportunity to address stormwater quality and discharge to the bay with more effective treatment systems.

3.2.4.2 Constraints

- Increased urbanisation of the study area without adequate stormwater containment and treatment devices will generate larger volumes of untreated stormwater runoff that will result in an adverse impact to the saline environments.

3.2.5 Overall Hydrology Implications for Study Area

1. Due to the amount of stormwater conveyed to the study area any development application and/or rezoning application is likely to require:

- *A site stormwater management plan*
- *A drainage feasibility report*
- *A water quality impact report*
- *A flood impact report including a full hydrologic and hydraulic assessment demonstrating no adverse impacts in the upstream catchments and identify opportunities that the new development may offer to improve coastal flooding vulnerability for predicted sea level rise.*

3.3 Biodiversity

3.3.1 Relevant Legislation, Policy and Strategies

The legislation, policy documents and strategic plans relevant to biodiversity are:

Commonwealth

Legislation

- *Environment Protection and Biodiversity Conservation Act 1999*

Conventions

- *Japan Australia Migratory Birds Agreement (JAMBA) 1974*
- *China Australia Migratory Birds Agreement (CAMBA) 1981*
- *Republic of Korea Australia Migratory Birds Agreement (ROKAMBA) 2007*
- *The Ramsar Convention (formally, the Convention on Wetlands of International Importance) 1971*
- *Bonn Convention on Migratory Species 1979*

Strategies

- *Wildlife Conservation Plan for Migratory Shorebirds*

State

Legislation

- *Flora and Fauna Guarantee Act 1988*
- *Planning & Environment Act 1987*
- *Wildlife Act 1975*
- *Victorian Environment Assessment Council Act 2001*
- *Catchment and Land Protection Act 1994*
- *Coastal Management Act 1995*
- *Environment Effects Act 1978*

Strategies

- *Victorian Coastal Strategy 2014*
- *Advisory list of threatened vertebrate fauna in Victoria 2013*
- *Advisory list of rare or threatened plants in Victoria 2014*

State Planning Policies (Victorian Planning Provisions)

- *Clause 11.04-5 Environment and water*
- *Clause 11.07-4 Environmental assets*
- *Clause 12.01-1 Protection of biodiversity*
- *Clause 12.01-2 Native vegetation management*
- *Clause 52.17 Native vegetation*

Regional

Strategies

- *Corangamite Marine and Coastal Biodiversity Strategy 2009*

- *Corangamite Regional Catchment Strategy 2013-2019*
- *Corio Bay Coastal Action Plan 2005*
- *Corangamite Catchment Management Plan*
- *Corangamite Wetland Strategy 2006-2011*
- *G21 Regional Growth Plan April 2013*

Local

Strategies

- *Point Henry Foreshore Management Plan 2006*
- *Geelong Wetlands Strategy*

Greater Geelong Planning Scheme- Municipal Strategic Statement

- *Clause 21.05-3 Biodiversity*
- *Clause 21.05-4 Coastal Environments*

3.3.2 Wetlands

Wetlands are highly diverse and productive ecosystems. They provide for conservation of biodiversity and ecological productivity. They are also part of natural wealth, providing a variety of ecosystem services to the benefit of our society, including:

- Flood control
- Groundwater replenishment
- Shoreline stabilization and storm protection
- Sediment and nutrient retention and export
- Climate change mitigation
- Water purification
- Reservoirs of biodiversity
- Recreation and tourism uses
- Cultural value³

The former saltworks are dominated by a series of interconnected evaporation and crystalliser ponds, separated by bunds with changing water levels. This has created extensive areas of shallow saline ponds of varying salinity that represent an important wetland utilised by a large number of avifauna, particularly migratory birds. There was ample provision for roosting on pond embankments and within the comparatively undisturbed beaches along the coast. When operating at full salt production, the former saltworks were a nationally important site for shorebirds.

The former saltworks wetlands form part of the wetlands network (see Figure 11) which includes the former saltworks at Avalon (5 km north), the Lake Connewarre wetlands complex (5 km south) and Swan Bay (22 km south-west of the study area).

The former saltworks wetlands have been listed in the Geelong Wetlands Strategy as one of 12 priority wetlands for the region. The overall goal of the Wetlands Strategy is to protect, enhance and manage the wetlands sustainably to ensure their diversity, their high biological values, and their conservation significance and to ensure the ecosystem service functions are maintained or restored.

³ Geelong Wetlands Strategy

The Corangamite Wetlands Strategy 2006-2011 also lists the *Moolap Salt Works* as major wetlands within the Corangamite Region.

The Point Henry Foreshore Management Plan 2006 reinforces the complexity of the wetlands site and foresaw that if the active management of water flows into and through the pond system was to cease, the habitat and ecological values of the saltworks would decline. The Ridley Corporation Ltd EES referral for the Geelong Saltfields Urban Renewal Project observed that since salt production ceased at Moolap it resulted in a significant reduction in habitat values for threatened avifauna due to the lack of available permanent ponds, reduction in the varying range of water depths and increases in pest plant and animals.

There are also a series of derived fresh water to marine wetlands which are parallel to the eastern shoreline (see Figure 10) and an area Alcoa used for the management and treatment of stormwater.

3.3.1 Migratory Birds

Geelong rests at the southern end of the East Asian Australasian Flyway (EAAF) which extends from Arctic Russia and North America to the southern limits of Australia and New Zealand. Fifty million migratory water birds use the route annually. They divide their time between breeding grounds in the northern hemisphere and their non-breeding grounds in the southern hemisphere where they occupy sites from October to April to rest and feed. The success of the return north depends on storing adequate energy and fat reserves.

The former saltworks in Moolap is attractive to the needs of avifauna due to the large areas of shallow saline water which is not affected by tides that would make water too deep for feeding. There is ample provision for resting on pond infrastructure in Moolap and birds are largely free from human and pest disturbance and use the open areas to watch for potential predators.

A search of the study area has provided a list of bird species to be found in the vicinity of the study area (see table 1). This table shows that at least 26 birds are protected by the *EPBC Act 1999* including migratory birds listed under the JAMBA, CAMBA and ROKAMBA Treaties and 14 birds are protected under the *FFG Act 1988*. Australia is a signatory to JAMBA, CAMBA and ROKAMBA which are agreements that are committed to taking appropriate measures to preserve and enhance the environment of migratory birds, in particular, by seeking means to prevent damage to such birds and their environment.

Table 1 also shows at least 41 of the birds to be found within the vicinity of the study area are within the *Advisory List of Threatened Vertebrate Fauna in Victoria* which has no direct legal requirements or consequences. Many of the species afforded protection under the *EPBC Act 1999* and the *FFG Act 1988* and on this advisory list.

For more than 30 years the Geelong Field Naturalists Club has conducted annual surveys of the birdlife and ecology of the Moolap saltworks. These surveys have found that on average more than 5000 birds from more than 68 species have used the Moolap saltworks annually. A summary of shorebird counts and significance from 2007 – 2016 can be seen in Appendix 8.1. Moolap has been found to support 0.1% and 1% of the total flyway population for some species recorded at the site.



Figure 10: Alcoa freshwater wetlands, freshwater to marine wetlands and former saltpans.

Port Phillip Bay (Western Shoreline) and Bellarine Peninsula, VIC



Figure 11: Ramsar wetlands and waterbodies near the study area.
Source: Department of the Environment

Common Name	Scientific Name	FFG	Advisory List	EPBC	Treaty
Australasian Bittern	<i>Botaurus poiciloptilus</i>	Listed	Endangered	Endangered	
Australasian Shoveler	<i>Anas rhynchotis</i>		Vulnerable		
Australian Pratincole	<i>Stiltia isabella</i>		Near threatened		
Baillon's Crake	<i>Porzana pusilla palustris</i>	Listed	Vulnerable		
Black-tailed Godwit	<i>Limosa limosa</i>		Vulnerable		1, 2, 3, 4
Brolga	<i>Grus rubicunda</i>	Listed	Vulnerable		
Brown Treecreeper (south-eastern ssp.)	<i>Climacteris picumnus victoriae</i>		Near threatened		
Caspian Tern	<i>Hydroprogne caspia</i>	Listed	Near threatened		2, 3
Cattle Egret	<i>Ardea ibis</i>				Removed
Common Greenshank	<i>Tringa nebularia</i>		Vulnerable		1, 2, 3, 4
Common Sandpiper	<i>Actitis hypoleucos</i>		Vulnerable		1, 2, 3, 4
Common Tern	<i>Sterna hirundo</i>				2, 3, 4
Common Redshank*	<i>Tringa totanus</i>				4
Curlew Sandpiper	<i>Calidris ferruginea</i>		Endangered	Critically Endangered	1, 2, 3, 4
Double-banded Plover	<i>Charadrius bicinctus</i>				1
Eastern Curlew	<i>Numenius madagascariensis</i>		Vulnerable	Critically Endangered	1, 2, 3, 4
Eastern Great Egret	<i>Ardea modesta</i>	Listed	Vulnerable		Removed
Fairy Tern	<i>Sternula nereis nereis</i>	Listed	Endangered	Vulnerable	
Great Knot	<i>Calidris tenuirostris</i>		Critically Endangered		1, 2, 3, 4
Greater Sand Plover*	<i>Charadrius leschenaultii</i>		Critically Endangered	Vulnerable	4
Grey Plover*	<i>Pluvialis squatarola</i>		Endangered		2, 3, 4
Hardhead	<i>Aythya australis</i>		Vulnerable		
Hooded Robin	<i>Melanodryas cucullata cucullata</i>	Listed	Near threatened		
Intermediate Egret	<i>Ardea intermedia</i>	Listed	Endangered		
Latham's Snipe	<i>Gallinago hardwickii</i>	Nominated	Near threatened		1, 2, 3, 4

Common Name	Scientific Name	FFG	Advisory List	EPBC	Treaty
Lesser Sand Plover*	<i>Charadrius monogolus</i>		<i>Critically Endangered</i>	<i>Endangered</i>	4
Lewin's Rail	<i>Lewinia pectoralis pectoralis</i>	<i>Listed</i>	<i>Vulnerable</i>		
Little Egret	<i>Egretta garzetta nigripes</i>	<i>Listed</i>	<i>Endangered</i>		
Little Tern	<i>Sternula albifrons sinensis</i>	<i>Listed</i>	<i>Vulnerable</i>		1, 2, 3, 4
Magpie Goose	<i>Anseranas semipalmata</i>	<i>Listed</i>	<i>Near threatened</i>		
Marsh Sandpiper	<i>Tringa stagnatilis</i>		<i>Vulnerable</i>		1, 2, 3, 4
Musk Duck	<i>Biziura lobata</i>		<i>Vulnerable</i>		
Orange-bellied Parrot	<i>Neophema chrysogaster</i>	<i>Listed</i>	<i>Critically endangered</i>	<i>Critically Endangered</i>	
Pacific Golden Plover	<i>Pluvialis fulva</i>		<i>Vulnerable</i>		1, 2, 3, 4
Pacific Gull	<i>Larus pacificus pacificus</i>		<i>Near threatened</i>		
Pectoral Sandpiper	<i>Calidris melanotos</i>		<i>Near threatened</i>		1, 3, 4
Pied Cormorant	<i>Phalacrocorax varius</i>		<i>Near threatened</i>		
Red Knot*	<i>Calidris canutus</i>		<i>Endangered</i>	<i>Endangered</i>	2, 4,
Red-necked Stint	<i>Calidris ruficollis</i>				1, 2, 3, 4
Royal Spoonbill	<i>Platalea regia</i>		<i>Near threatened</i>		
Ruddy Turnstone*	<i>Arenaria interpres</i>		<i>Vulnerable</i>		2, 4
Sharp-tailed Sandpiper	<i>Calidris acuminata</i>				1, 2, 3, 4
Sooty Oystercatcher*	<i>Haematopus fuliginosus</i>		<i>Near Threatened</i>		
Southern Elephant Seal	<i>Mirounga leonina</i>			<i>Vulnerable</i>	
Spotted Harrier	<i>Circus assimilis</i>		<i>Near threatened</i>		
Terek Sandpiper	<i>Xenus cinereus</i>	<i>Listed</i>	<i>Endangered</i>		
Whiskered Tern	<i>Chlidonias hybridus javanicus</i>		<i>Near threatened</i>		
White-faced Storm-Petrel	<i>Pelagodroma marina</i>		<i>Vulnerable</i>		

Table 1: Combined list of threatened fauna species from EPBC, FFGA, International Agreements, and Victorian Advisory List.

*** species included from Birdlife Australia submission**

1=Bonn, 2=CAMBA, 3=JAMBA, 4=ROKAMBA.

3.3.2 Vegetation

Ecological Vegetation Classes (EVC's) are the standard unit for classifying vegetation types in the Victoria. EVC's are described through a combination of floristics, lifeforms and ecological characteristics and through an inferred fidelity to particular environmental attributes. Each EVC includes a collection of floristic communities that occur across a biogeographic range, and although differing in species, have similar habitat and ecological processes operating. The study area is within the Otway Plain Bioregion, with two main vegetation communities represented on site shown on the DELWP Biodiversity Interactive Map 3.2, 2005 EVC dataset being *Coastal Alkaline Scrub* (EVC858) and the *Coastal saltmarsh/ mangrove saltmarsh mosaic* (EVC302) (see figure 12). These EVC's are not listed as threatened by the *Flora and Fauna Act 1988 (FFG Act 1988)*. A third vegetation community *Plains Grassy Woodland* (EVC55) which includes the Moolapio site is shown heavily in the 1750 EVC dataset as being present but now only covers a small area within the 2005 EVC map. This EVC is listed under the *FFG Act 1988*.

At the Commonwealth level the ecological communities are defined differently to Victoria. The *Natural Temperate Grassland of the Victorian Volcanic Plain*, including species similar to EVC55, is critically endangered under the *EPBC Act 1999* and the *Subtropical and Temperate Coastal Saltmarsh*, which includes species similar to EVC302, is vulnerable under the *EPBC Act 1999*.

Table 2 is a list of several plant species from the Victorian Biodiversity Atlas that can be found within *Advisory list of rare or threatened plants in Victoria 2014*. Two flora species which are known to exist in the Moolapio re-vegetation area and are listed as vulnerable species within the *EPBC Act 1999* have also been included in the table.

The saltmarsh communities are assumed to be either in-situ, which is those not destroyed during industrial or saltworks operations or halophyte (salt tolerant) communities (derived communities) that developed on novel topographic ecological conditions after saltmarsh infrastructure (bunds) were constructed. Although the derived saltmarsh may or may not qualify as saltmarsh vegetation under the *EPBC Act 1999*, it is generally agreed that derived saltmarsh have the same floristic composition and structure and faunal habitat values as 'natural' saltmarsh and support several threatened plant species.

Common Name	Scientific Name	FFG	Advisory List	EPBC
Creeping Rush	<i>Juncus revolutus</i>		<i>Rare in Victoria</i>	
Marsh Saltbush	<i>Atriplex paludosa</i> susp. <i>paludosa</i>		<i>Rare in Victoria</i>	
Salt Lawrencia	<i>Lawrencia spicata</i>		<i>Rare in Victoria</i>	
Coast Saltwort	<i>Salso tragus</i> sabs. <i>pontica</i>		<i>Rear in Victoria</i>	
Hoary Sunray	<i>Leucochrysum</i> <i>albicans</i> var. <i>tricolor</i>			<i>Endangered</i>
Button Wrinklewort	<i>Rutidosia</i> <i>leptorhynchoides</i>	<i>Listed</i>	<i>Endangered in Victoria</i>	<i>Endangered</i>
Coast Hollyhock	<i>Malva preissiana</i> s.s (white		<i>Vulnerable in Victoria.</i>	

Common Name	Scientific Name	FFG	Advisory List	EPBC
	<i>flowered coastal form)</i>			

Table 2: Rare or threatened species

Source: DELWP

Seagrass meadow is found extensively around the Point Henry area (see figure 12). The dominant species composition is *Zostera*, *Heterozostera* or *Dwarf Grass-wrack*. The invertebrate's species that feed on the seagrass are important food sources for wading birds and other species that use the associated mudflats within the study area. The seagrass meadows also provide nursery habitat for a range of fish species targeted by recreation fishers, including flathead and whiting.

A partnership between Greening Australia (Victoria) and Alcoa created approximately 11 hectares of reconstructed native grassland (known as the Moolapio Project) at 551-569 Portarlington Road, Moolap (see Figure 13). The extent of restoration, both in physical size and species composition, means the site is likely to meet the requirements of the *EPBC Act 1999* listed vegetation community *Natural Temperate Grassland of the Victorian Volcanic Plain*. It supports 2 flora species being Button Wrinklewort (*Rutidosis leptorhynchoides*) and Hoary Sunray (*Leucochrysum albicans* var. *tricolor*) listed as Endangered under the *EPBC Act 1999* and meets the requirements of the *FFG Act 1988* listed *Western (Basalt) Plains Grassland Community*.

Ecological Vegetation Classes and Seagrass

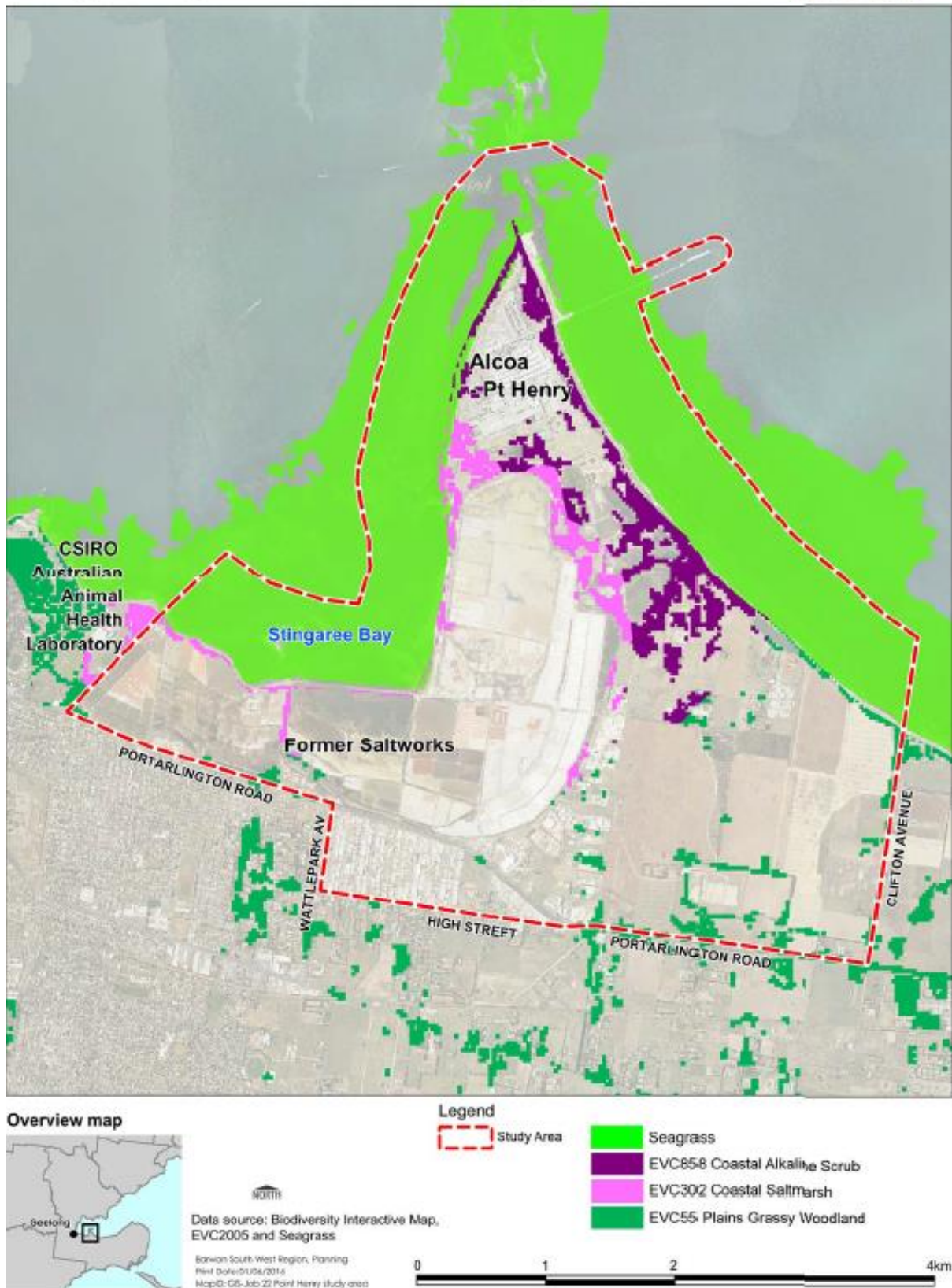


Figure 12: Ecological Vegetation Classes and Seagrass

3.3.3 Biodiversity - Opportunities and Constraints

3.3.3.1 Opportunities

- Improvement of the management of hydrological flows into the former saltworks may enhance the wetlands and optimise the habitats for a range of different bird species.
- Identify locations for developing patch connections and vegetation linkages.
- Explore opportunities for the use of covenants on private land to secure biodiversity values. Secured Plains Grassland offsets on the Victorian Volcanic Plain have an average of \$155,000 per habitat hectare.

3.3.3.2 Constraints

- The presence of endangered, threatened and vulnerable species and communities within the study area may limit or constrain some types of development.
- Additional development in the Moolap area may adversely impact the environmental condition and water quality of the wetlands which in turn can compromise the ability of the wetlands to provide ecosystem services⁴ and suitable habitat for marine life and migratory birds and vegetation

3.3.4 Overall Biodiversity Implications for Study Area

1. Remnant biodiversity values are present in the area and these will require consideration when determining future land use options through the Commonwealth *EPBC Act 1999* or the *Planning and Environment Act 1987*. A referral under the *Victorian Environment Effects Act 1978* may require an Environmental Effects Statement to be prepared.

⁴ Victorian Coastal Strategy 2014



Figure 13: Location of Moolapio Project within Study Area

3.4 Site Contamination

3.4.1 Relevant Legislation, Policy and Strategies

The legislation, policy documents and strategic plans relevant to site contamination are:

State

Legislation

- *Environment Protection Act 1970*
- *State Environment Protection Policies (Prevention and Management of Contaminated Land)*

Strategies

- *Siting, Design, Operation and Rehabilitation of Landfills- Best Practice Environmental Management (EPA Publication 788)*
- *Ministerial Direction No. 1 - Potentially Contaminated Land*
- *Victorian Best Practice Guidelines for Assessing and Managing Acid Sulfate Soils 2010*
- *Coastal Acid Sulfate Soils Strategy 2009*

State Planning Policies (Victorian Planning Provisions)

- *Clause 13.03-1 Use of contaminated and potentially contaminated land*

3.4.2 Contamination

The aluminium smelter and rolling mill operated for more than fifty years. The EPA has stated that during this time a range of waste products including sewage treatment plant and general industrial waste has been produced.

On 25 March 2015 the EPA issued Alcoa with a Statutory Clean Up Notice under section 62A of the *EPA Act 1970*. This requires Alcoa to manage land and groundwater contamination at the Point Henry site into the next phase of shutdown and preparation for future use⁵. The requirements of the clean-up notice include:

- Completing an environmental site assessment determining extent of contamination in soil and groundwater on and from the premises by 1 December 2016.
- If any contamination that poses an unacceptable risk to the environment is found during the course of the environmental site assessment, Alcoa must develop and implement a clean-up plan to manage that contamination.
- Engage an EPA-appointed Environmental Auditor to commence environmental auditing of the premises, to inform the next phase of clean-up at the site in accordance with section 53X of the *EPA Act 1970*.

There are three landfills on the Alcoa site which are now capped. Landfill 1 was used from 1961-1980s for general waste, asbestos and processed waste. Landfill 2 and 3 were constructed in the mid-1980s with both being used for processed waste rather than waste or asbestos (see Figure 14).

There have been three Audit Reports identified within the study area by the EPA as shown in Figure 14 and includes the current Environmental Site Assessment underway by Alcoa. The second audit report is for a site at the north end of Buckley Grove and required an audit under Section 53V of the

⁵ <http://www.epa.vic.gov.au/about-us/news-centre/news-and-updates/news/2015/april/01/epa-issues-alcoa-with-clean-up-notice-for-point-henry-site>

EPA 1970 for air emissions management. This site is no longer operating. The third audit report is for a site at the southern part of Buckley Grove and resulted in a 53X statement under the *EPA* 1970 which was completed and stated that the land was suitable for industrial use subject to conditions.

There are two priority sites registered within the study area shown in Figure 14. One is near landfill 2 which is the subject of the current clean up notice for Alcoa and the second is near Hays Road. This is a clean-up notice requiring the removal of asbestos contaminated material with appropriate approval.

A spoil ground from the dredging of the Hopetoun Channel is located in Stingaree Bay (see Figure 14) outside the study boundary.

There is potential contamination of land and groundwater in both the Moolap Industrial Estate and the Moolap industrial precinct. Industrial, commercial and farming sites all have potential levels of contamination, dependent on the type of use and the historic management practices on site. The degree of remediation work required is determined by the nature of the contamination, the surrounding environment and the use of the land.

3.4.3 Acid Sulfate Soils

Acid sulfate soils (ASS) have $\text{pH} < 3.5$ and contain iron sulphides (pyrite, FeS_2) or mono-sulphides (FeS). They are usually dark grey in colour, soft and can be clay or sand. Acid sulfate soils can overlie Potential Acid Sulfate Soils (PASS) which are iron sulphides contained in waterlogged sediments with a pH 6.5-7.5. The waterlogging prevents oxidation and production of sulphuric acid. ASS can be found below or above high tide level but are generally no more than five metres above high tide level.

When iron sulphides are exposed to air (drained, excavated or disturbed) they produce sulphuric acid. Runoff and leachate from acid sulfate soil can release aluminium, iron and other metals that can adversely impact upon aquatic communities, agricultural practices and engineering works.

The impacts of ASS can be numerous and impacts vary depending on type and make-up of the sites. Some impacts may include:

- Making some soils toxic to plant growth causing scalding (similar to salinity)
- Sulphuric acid corrodes concrete, iron and steel foundations and piping
- Acid waters can cause rust coloured stains and slimes
- Plastic corrugated drainage becomes blocked by iron oxides
- Drainage waters can release sufficient sulphuric acid and Aluminium to cause fish disease and mortality
- Acid waters can mobilise aluminium and heavy metals such as Cadmium which can be adsorbed by fish and aquatic life
- Effects on aquaculture industries
- Poor quality stock water
- Bitumen road failure
- Irreversible soil shrinkage
- Low bearing capacity of soils
- Human health problems: algae, heavy metals in drinking water, dermatitis, eye inflammations

- Arsenic toxicity.

The CSIRO report '*Investigating the potential risk of acid sulfate soils on proposed development in the City of Greater Geelong*' (2005) identified the potential risk areas and carried out tests in these areas which included Point Henry. Two tests were undertaken and one of these test results was considered marginal in terms of potential risk. The CSIRO surmised that as there is potential for infrastructure to be affected by ASS the risks should therefore be checked before major development occurs. The Atlas of Australian Acid Sulfate Soils prepared by the CSIRO shows ASS approximately 1 kilometre offshore throughout the entire Port Phillip, Corio Bay and the Outer Harbour.

The CSIRO mapping of ASS captured within the Corangamite Catchment Management Authority mapping database is the best information regarding the probability of ASS occurring within the study area shown in figure 15.

3.4.4 Site Contamination - Opportunities and Constraints

3.4.4.1 Opportunities

- Contaminated sites can generally be cleaned up and informed by land use decisions. Landfills can commonly remain in place and be worked around in land use decisions for e.g. sports grounds, public open space and golf courses.

3.4.4.2 Constraints

- Previous industrial uses on the site may make some uses in particular areas impractical.
- Land within the study area including the former saltworks, farming and industry land may have some contamination of their site.
- ASS could be a major constraint for development at this site.

3.4.5 Overall Site Contamination Implications for Study Area

1. Alcoa is required to produce an Environmental Site Assessment in accordance with the *EP Act 1970*.
2. ASS needs to be considered further at the strategic planning stage with an Environmental Management Plan describing acceptable environmental outcomes
3. Future use within the study area should be driven by Ministers Direction 1 and SEPP (Prevention and Management of Contaminated Land).



Figure 14: Alcoa landfills, EPA audit reports and EPA priority sites

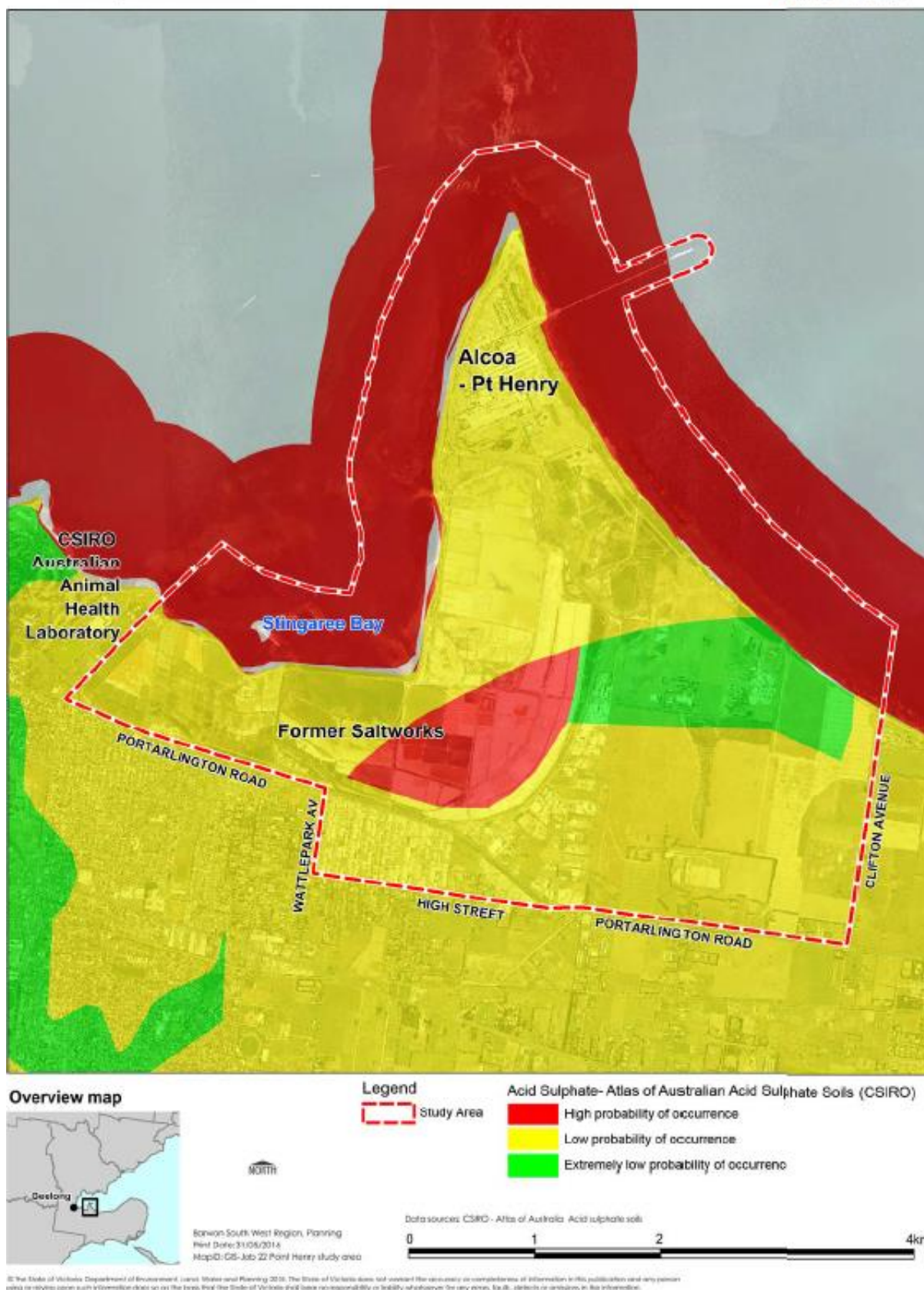


Figure 15: Probability of Acid Sulfate Soils

Source: Soil Health Knowledgebase (Corangamite Catchment Management Authority)

3.5 Climate Change

3.5.1 Relevant Legislation, Policy and Strategies

The legislation, policy and strategies relevant to climate change are:

State

Legislation

- *Climate Change Act 2010*
- *Coastal Management Act 1995*
- *Catchment and Land Protection Act 1994*

Strategies

- *Victorian Climate Change Adaptation Plan*
- *Victorian Coastal Strategy 2014*
- *Planning Practice Note 53 Managing coastal hazards and the coastal impacts of climate change 2015*

State Planning Policies (Victorian Planning Provisions)

- *Clause 13.01-1 Coastal inundation and erosion*

Regional

Strategies

- *Central Regional Coastal Plan 2015-2020*
- *Corangamite National Resource Management Plan for Climate Change 2016*
- *City of Greater Geelong 2015 Inundation Report Bellarine Peninsula-Corio Bay Local Coastal Hazard Assessment December 2015*

Local

Greater Geelong Planning Scheme- Municipal Strategic Statement

- *Clause 21.05-5 Climate change*

3.5.2 Current Climate

The study area generally has a moderate oceanic climate with warm to hot summers, mild springs and autumns and cool winters. It experiences average annual rainfall of 500-600mm per year.

Climate change is already being experienced in Victoria, with a rise in temperature and fall in rainfall across the State since 1950. The sea level around the Victorian coast is approximately 225mm higher than in 1880 whilst water storages are down by an average of 23 per cent⁶.

3.5.3 Impacts of climate change

Victoria is facing a warmer and drier future, resulting in:

- harsher fire weather and longer fire seasons
- fewer frosts
- more frequent and more intense downpours
- more hot days and warm spells

⁶ www.climatechange.vic.gov.au/understand

- less rainfall in winter and spring south of the Great Dividing Range; less rainfall in autumn, winter and spring north of the Great Dividing Range
- sea storm surges and coastal erosion that are expected to increase with sea level rise
- inundation of low lying coastal environments⁷.

The Geelong region has already become warmer and drier, as shown in Figure 17 and is a climate trend likely to continue into the future.

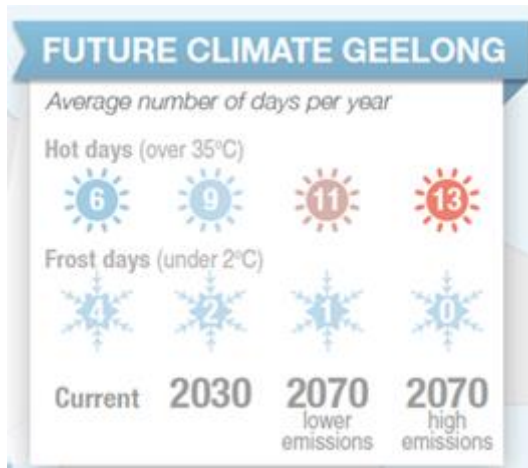


Figure 16: Future climate in Geelong

Source: Climate ready Victoria Barwon South West, Victoria State Government

3.5.4 Sea Level Rise

Victoria's low lying coastal areas are at risk from rising sea levels, storm surges and flooding which will exacerbate present day coastal hazards of inundation and erosion. Rising sea levels and extreme weather events can threaten coastal infrastructure, houses and beaches, with flow on effects to transport, tourism and the natural environment.

Exactly how sea level rise will affect us is not universally understood. While sea level rise can be projected into the future, it is more difficult to understand the combined impact and interaction of the dynamic elements of sea level rise and other consequences of a changing climate and coastal movement. This necessitates a precautionary approach to intervention with coastal processes and although intervention may be warranted in some situations, natural processes are the preferred response to coastal hazards and changes.⁸

Principle 2 of the *Victorian Coastal Strategy 2014* (VCS) is to “undertake planning and provide clear direction for the future”. The desired outcomes are to be clearly risk averse when it comes to development near the coast:

1. Sea level rise and storm surge planning policy benchmarks and tools are updated in light of emerging scientific evidence
2. Development within sand dunes and in low lying coastal areas is avoided
3. Areas vulnerable to coastal hazards as a consequence of a changing climate are better understood

⁷ www.climatechange.vic.gov.au/understand

⁸ Victorian Coastal Strategy 2014

4. *Natural coastal processes are adopted as the preferred form of defence against possible impacts of a changing climate*
5. *New development, reuse and redevelopment avoid areas subject to coastal hazards, do not interfere with natural coastal processes and accommodate biodiversity and adaptation.*

Planning Practice Note 53 *Managing coastal hazards and the coastal impacts of climate change* August 2015 has similar principals, specifically:

- *Development of coastal areas outside of existing settlements and in non-urban areas should be sited and designed in a way that does not unnecessarily expose future communities and assets to coastal hazard risk over its intended lifespan.*
- *Given the current body of knowledge and information an important principle is the need to avoid future development in areas that are likely to be impacted by projected coastal hazards under climate change.*
- *The need to establish appropriate setbacks to avoid a projected permanent hazard event and/or withstand a temporary event.*

The VCS suggests that planning benchmarks for Victoria should be:

- *To plan for a sea level rise of not less than 0.8 metres by 2100*
- *To plan for sea level rise of not less than 0.2 metres by 2040 for urban infill areas.*

As outlined in the VCS, all decisions for the study area will need to consider the planning benefits and sea level rise projections.

The *City of Greater Geelong 2015 Inundation Report Bellarine Peninsula-Corio Bay Local Coastal Hazard Assessment December 2015 (2015 Inundation Report)* found that due to the ground elevation being very low, inundation is a key hazard in the study area. In a 1% AEP event with a 0.8m sea level rise (SLR) scenario, properties around Point Henry, Newcomb and Moolap are likely impacted by inundation (see Figure 17).

The *2015 Inundation Report* assesses the probability and impact of the 1% annual exceedance probability (AEP) wave height and storm-tide level occurring concurrently, which produces the 1% AEP storm surge level. The *2015 Inundation Report* estimates the current 1% AEP storm surge level to be 1.03m AHD. By adopting the year 2100 SLR of 0.8 m on top of 1.03m AHD, a 2100 1% AEP storm surge level of 1.83m is estimated (see Table 3).

	0 m SLR	0.2 m SLR	0.5m SLR	0.8m SLR	1.1 m SLR	1.4 m SLR
Storm-tide level	1.03	1.23	1.53	1.83	2.13	2.43

Table 3: Design storm-tide levels for Geelong

Source: City of Greater Geelong 2015 Inundation Report Bellarine Peninsula-Corio Bay Local Coastal Hazard Assessment December 2015

3.5.5 Coastal Adaptation

A common management response to coastal hazards such as erosion, sea level rise, storm surge and inundation is to build 'coastal armouring' structures along the coastline such as seawalls, breakwaters and groynes which have an initial and on-going cost associated over the lifespan of the structure. However due to the increased severity and frequency of storm surge and coastal

inundation, relying on these structures may no longer be cost effective and there could be a need to turn to land use reforms and a policy of managed retreat from shorelines.

Coastal armouring temporarily protects property and infrastructure from SLR while managed retreat policies avoid disasters by building resilience, preventing or limiting coastal development in vulnerable locations and reducing the impact of coastal hazards on infrastructure⁹.

Managed retreat is reasonable at sites where it favours the creation of intertidal habitats that can provide habitats for native fauna and opportunities for carbon sequestration. It is also a long term process that requires careful consideration and the involvement of stakeholders.

Table 4 outlines the costs and benefits of coastal armouring versus planned retreat scenario.

Coastal Armouring		Planned Retreat
Direct costs	<ul style="list-style-type: none"> ➤ Full lifecycle costs on built infrastructure ➤ Loss of environmental values including potential loss of amenity and recreational activity 	<ul style="list-style-type: none"> ➤ Business impact if business relocated out of municipality ➤ Costs of removal of any infrastructure ➤ Damage or loss of built assets due to inundation over the timeframe of analysis ➤ Loss of income if residents are assumed to leave municipality
Direct benefits	<ul style="list-style-type: none"> ➤ Avoided costs of damage to infrastructure 	<ul style="list-style-type: none"> ➤ Avoided costs of new infrastructure ➤ Avoided costs of damage to infrastructure ➤ Gains in environmental value and ecosystem services.
Positive externalities	<ul style="list-style-type: none"> ➤ Impact on property prices as a result of assurance infrastructure provides 	<ul style="list-style-type: none"> ➤ Increases in populations of bird species ➤ Larger area of high conservation value ➤ Cleaner beaches encouraging increased visitation ➤ Improved public health

Table 4: Coastal armouring vs planned retreat

3.5.6 Erosion

Sea and coastal waters are dynamic with connected physical, chemical and biological processes. Erosion of beaches and cliffs, inundation and storm surge have always been present and require consideration in planning and managing the coast.¹⁰

Both the western and eastern sides of the study area are experiencing erosion mainly due to the reduction in sand supply rather than by wave action. The sand movement at Point Henry has been interrupted since the cutting of Hopetoun Channel resulting in the tip of Point Henry being eroded and realigned from its original shape. The construction of Point Henry pier prevents sand from

⁹ Anne Siders, Managed Coastal Retreat: A Handbook of Tools. Case Studies and Lessons Learned, Columbia Centre for Climate Change Law, Columbia Law School (2013).

¹⁰ Victorian Coastal Strategy 2014

flowing in its natural flow path and is therefore building up on the north side of the pier. It may be necessary to bypass the pier to allow the sand to travel further south along the beach. The western side of the point has also experienced erosion due to reduction in sand supply but has been stabilised with a rock/concrete sea wall, and will require ongoing monitoring¹¹.

The *2015 Inundation Report* states that coastal erosion is a less significant hazard than inundation in this area due to the low wave energy conditions. Although the shoreline is very narrow with little to no dune formation to protect the hinterland, there is minimal sediment transport in the area due to a lack of material and low wave action.

3.5.7 Blue Carbon

Vegetated coastal habitats—seagrasses, saltmarshes and mangroves—have recently been identified as one of the most effective carbon sinks on the planet. Such habitats can bury carbon at a rate 35-57 times faster than tropical rainforests and can store carbon for thousands of years. Recent global data estimate that vegetated coastal habitats contribute 50% of the carbon burial in the oceans – termed “blue carbon”. These features make vegetated coastal habitats ideal candidates for carbon offset programs and nature-based climate mitigation initiatives¹².

Blue carbon ecosystems provide benefits and services beyond carbon sinking, for example habitats restored for blue carbon present opportunities for climate change adaptation including protection from storms and sea level rise, prevention of shoreline erosion, regulation of coastal water quality, provision of habitat for commercially important fisheries and endangered marine species and food security for many coastal communities.

There are extensive areas of seagrass around the Point Henry area as shown in figure 12 which have the potential for blue carbon sequestration.

¹¹ Point Henry Foreshore Management Plan 2006

¹² The distribution and abundance of blue carbon within Corangamite, A report for the Corangamite Catchment Management Authority Feb 2015

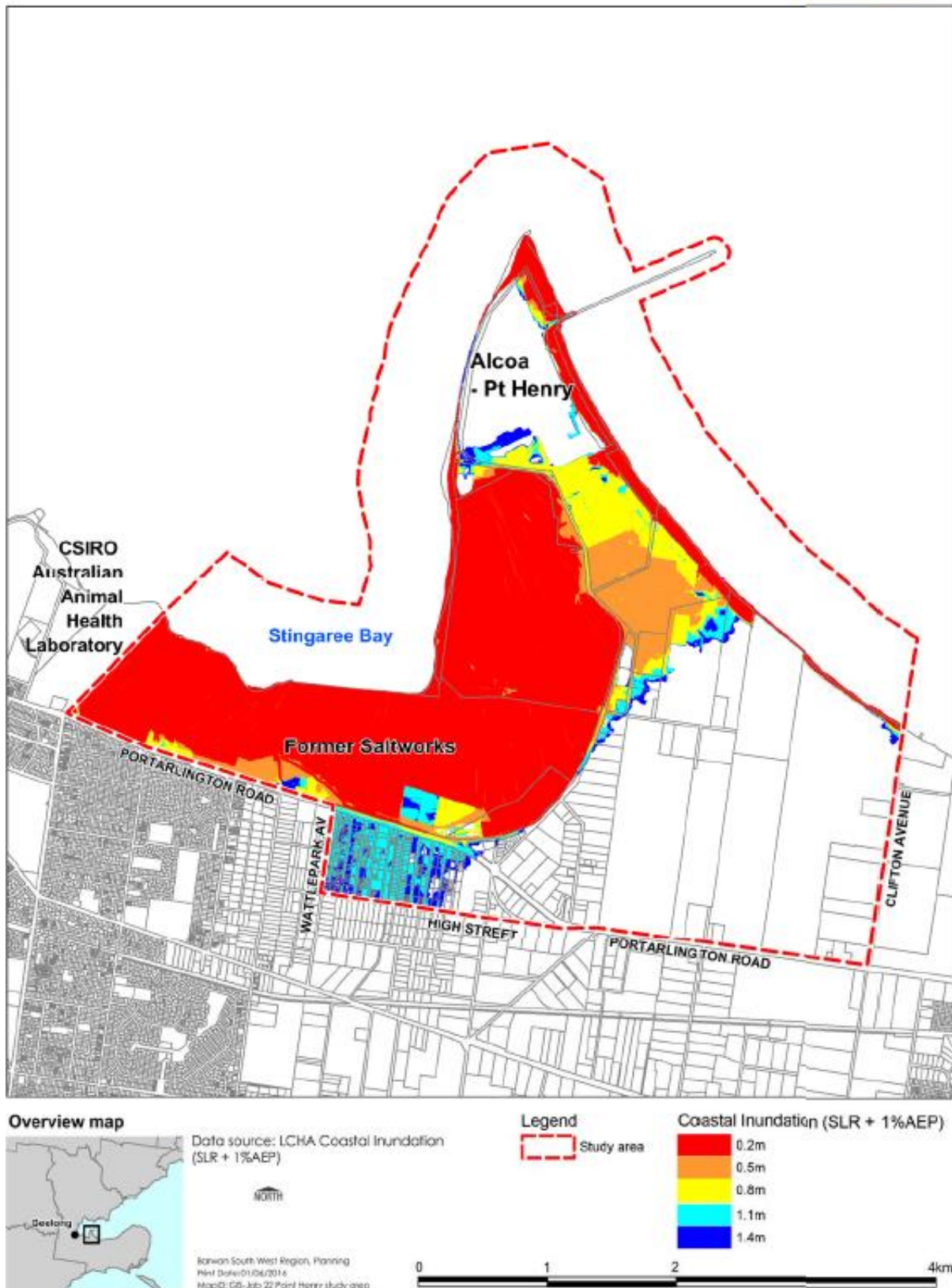


Figure 17: Sea level rise and inundation
Source: City of Greater Geelong 2015 Inundation Report Bellarine Peninsula-Corio Bay Local Coastal Hazard Assessment December 2015

3.5.8 Climate Change - Opportunities and Constraints

3.5.8.1 Opportunities

- A changing climate may necessitate the creation of new economic sectors.
- Sea level rise may provide opportunities for improved biodiversity outcomes.
- A case study by Macreadie and Ewers identified the potential value of blue carbon equivalents within the study area could range between approximately \$900 million (conservative estimate) and \$2.8 billion (high estimate) dollars over the next 100 years at \$23/tonne of CO₂ equivalents¹³.
- Projected sea level rise scenarios provide an opportunity to assess the best adaptation options in relation to armouring and retreating when making land use decisions.

3.5.8.2 Constraints

- Impacts from sea level rise, storm surges and inundation will be significant for the study area.
- The rates and impacts of climate change cannot be definitively identified.
- Investment in the existing seawall or other protective structures along the coastline will have establishment and ongoing costs.
- Removing coastal seagrasses and saltmarshes for development along the coast poses a high risk of carbon release.

¹³ Estimated blue carbon offset value from Moolap Salt Fields wetland rehabilitation, Macreadie and Ewers

4.0 Economy

This section will discuss the key issues in regard to the economy including economic development and employment of the study area.

4.1 Economic Development and Employment

4.1.1 Relevant Legislation, Policy and Strategies

The legislation, policy documents and strategic plans relevant to economic development and employment are:

State

Strategies

- *Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria January 2016*

State Planning Policies (Victorian Planning Provisions)

- *Clause 17.02-1 Industrial land development*
- *Clause 17.03-3 Maritime Precincts*
- *Clause 18.03-1 Planning for ports*
- *Clause 18.03-2 Planning for port environs*

Regional

Strategies

- *Geelong Economic Development Strategy 2005-2010*
- *Greater Geelong and the Bellarine Tourism Development Plan 2016*
- *Port of Geelong Development Strategy 2013*
- *Port of Geelong Land Use Strategy*
- *Geelong Port City 2050*
- *Recreational Boating Facilities Framework*
- *G21 Economic Development Strategy*
- *G21 Residential Land Supply Monitoring Update June 2015*
- *G21 Industrial Land Supply Monitoring Update June 2015*
- *G21 Regional Growth Plan April 2013*

Local

Strategies

- *City of Greater Geelong Retail Strategy 2006*
- *City of Greater Geelong Retail Strategy 2006*

Greater Geelong Planning Scheme- Municipal Strategic Statement

- *Clause 21.07-2 Industry*
- *Clause 21.07-4 Economic Growth Sectors*

4.1.2 Victoria's Economy

While manufacturing was once Victoria's largest sector, accounting for 16.2 per cent of nominal gross state product (GSP) in 1992-93, it is now the State's third largest sector (see Table 5). Victoria's largest sector in 2012-13 - financial and insurance services - represented only 9.8 per cent of nominal GSP, highlighting Victoria's more diverse industry base. Victoria's structural diversity is in contrast to states which are heavily reliant on a single industry to drive economic growth. For example, mining represents 29.2 per cent of the Western Australian economy¹⁴.

Victoria is a mid-sized economy that is larger than Singapore, New Zealand and most of South-East Asia. It has experienced strong growth over the past decade, increasing by an average of 2.4% annually over the ten years to June 2014. Victoria accounts for 22% of Australia's total Gross Domestic Product (GDP) and responsible for 23% of Australia's export of services in 2013-14.¹⁵

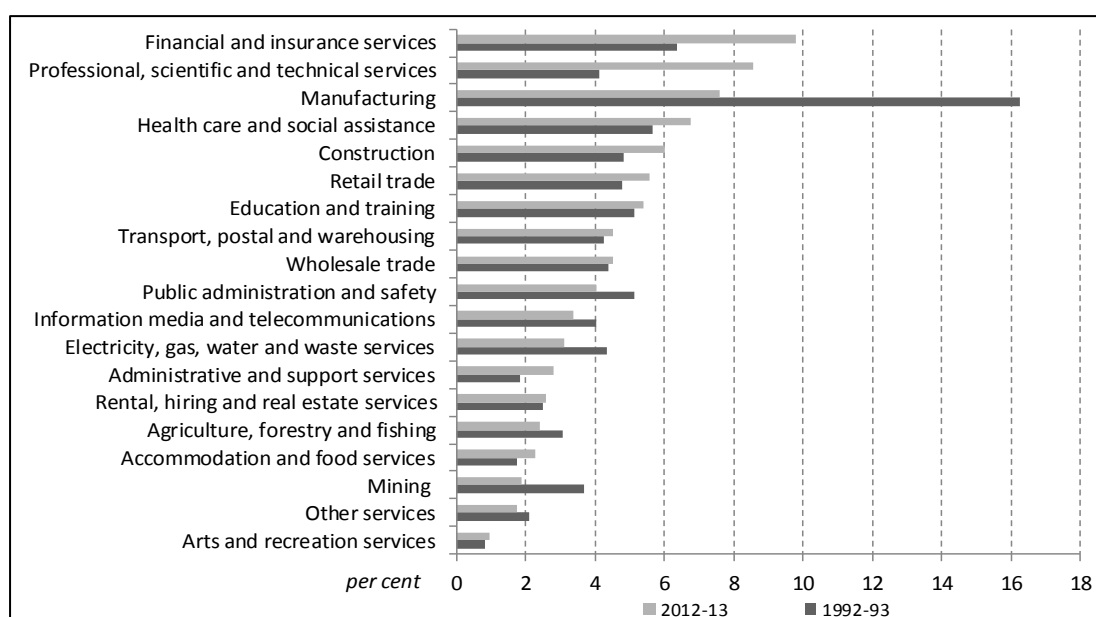


Table 5: Victorian Industry Gross Value Added as a Share of Nominal GDP.
Source- Department of Treasury and Finance; Australian Bureau of Statistics -

4.1.3 Geelong's Strategic Position

Geelong is a strategically located city with proximity to large population centres in Melbourne and ideally positioned to access markets across Australia and the globe. Geelong can reach 4.4 million people within a 140km radius and Geelong's population of 225,000 with an annual population growth of 1.7% per annum is projected to reach 300,000 by 2031¹⁶.

¹⁴ Department of Treasury and Finance, Australian Bureau of Statistics

¹⁵ www.invest.vic.gov.au/resources/statistics/economic-indicators

¹⁶ www.enterprisegeelong.com.au/sites/default/invest_geelong-web.pdf

Major Industry Sectors by Employment (City of Greater Geelong)	Jobs	% of Workforce	Value Added*	
			\$	%
Health Care & Social Assistance	12,586	16%	\$954m	10%
Retail Trade	11,355	14%	\$691m	7%
Manufacturing	10,154	13%	\$1,849m	19%
Education & Training	8,482	11%	\$753m	8%
Accommodation & Food Services	5,439	7%	\$280m	3%
Construction	5,328	7%	\$614m	6%
Public Administration & Safety	4,093	5%	\$426m	4%
Prof. Scientific & Tech. Services	3,954	5%	\$465m	5%

*Source: ABS2011 Census & REMPLAN, Jan 2015. *Contribution to Gross Regional Product. This is not a full listing of all industry sectors.*

Table 6: Major industry sectors by employment (City of Greater Geelong)¹⁷

Geelong's strategic position is based on:

- Proximity to Princes Highway West/Princes Freeway which forms part of the National land transport network
- Standard and broad gauge rail connection which connects the Port of Geelong to South-West Victoria as far as Warrnambool and to Melbourne with broad gauge rail and to the north with standard gauge rail connections.
- Avalon Airport is located 20 kilometres from Geelong and has a runway capable of landing A380's, is curfew free and has a passenger terminal capable of handling over 2 million passengers a year.
- The Port of Geelong is a bulk and break bulk handling facility located on Corio Bay providing access to Bass Strait and is Victoria's second busiest port. Handling 121 million tonnes of trade each year in a variety of bulk cargoes including petroleum products grains and woodchips¹⁸.
- Proximity to Significant State tourism assets for example Bells Beach, The Otway Ranges and The Great Ocean Road.

4.1.4 Geelong's Employment

The major industry sectors by employment in the City of Greater Geelong are shown in Table 6.

There has been considerable employment change within Geelong over the past three years. In May 2013, Ford Australia announced the closure of Ford Geelong. On 1 August 2014, Alcoa's Point Henry Smelter closed, affecting approximately 500 employees and 145 contractors. Production ceased at the Point Henry Rolling Mill on 19 December 2014 resulting in the loss of 273 jobs. In addition, an estimated 300 jobs have been lost in 110 businesses in the Alcoa supply chain. The Alcoa Anglesea Power Station closed on 15 June 2015 with a loss of approximately 80 employees. In addition there has been approximately another 1,000 job losses in the Geelong region since 2013 in the aviation,

¹⁷ www.enterprisegeelong.com.au/sites/default/files/GEELONG%20FAST%20FACTS_2015_FINAL.PDF

¹⁸ http://enterprisegeelong.com.au/sites/default/files/invest_geelong-web.pdf

retail, manufacturing and industrial sectors¹⁹. These closures are part of the ongoing structural shift that has been taking place in the Victorian economy over the past two decades.

4.1.5 Residential Land Supply

The *G21 Residential Land Supply Monitoring Update June 2015* by Spatial Economics shows that there have been noteworthy changes in the stock/composition of undeveloped residential land parcels, projected dwelling demand, lot construction and years of residential land supply.

The update states that at March 2013 it was reported across the municipal area of Geelong that there was a broadhectare/major infill potential of 48,244 of which 28,024 lots were zoned to support residential lot/dwelling construction. As at March 2015, the total broadhectare/major infill residential stock increased to 58,625. This increase in residential land supply is primarily due to the inclusion of approximately 1,100 hectares of land for residential development purposes in Lovely Banks. The stock of zoned lots has increased from 28,000 to 38,200. Based on the State Government's population projections (VIF2014) and projections undertaken for the City of Greater Geelong (I.D Consulting 2015) there is 24 to 25 years of zoned broadhectare residential land supply. There is also an additional 13 years of supply in terms of future broadhectare land supply stocks.

4.1.6 Industrial Land Supply

The G21 Regional Growth Plan Implementation Plan provides a statement regarding the industrial areas of Moolap:

Greater Geelong has significant levels of Industrial supply; however, inner urban areas such as 'South Geelong' and 'Central Geelong' while having significant levels of supply, it is anticipated that these industrial precincts will slowly exhaust supply levels over time given limited capacity to expand. It is considered that the industrial stocks located in Moolap, Ocean Grove and Portarlington are sufficient to meet the local service industry requirements across the Bellarine Peninsula subregion in the medium to longer term.

The *G21 Industrial Land Supply Monitoring Update June 2015* by Spatial Economics shows there was a total of 2,826 hectares of zoned industrial land stocks of which 640 hectares were assessed as available (supply) for industrial purpose development in Geelong. From 2006 to 2015 on an average annual basis, 9.5 hectares per annum of industrial land have been consumed. In the last 2 years however only 4.75 hectares in total has been consumed at a rate of 2.4 hectares per year. The *G21 Industrial Land Supply Monitoring Update June 2015* by Spatial Economics has made a determination that there is calculated to be in excess of 25 years industrial zoned land across the municipality of Geelong based on the average annual rate of land consumption in the period 2004 to 2015. In terms of the additional unzoned industrial land stocks it is estimate that there is an additional 11 years on top of the 25 years.

4.1.7 Tourism Development

Tourism in Geelong and the Bellarine is worth \$640 million per annum and supports over 4,700 jobs²⁰. The Greater Geelong and the Bellarine Tourism Development Plan January 2016 (Development Plan) estimates the Geelong Urban subregion attracted a total of 2.3 million visitors in 2014 including 458,853 overnight visitors. The Development Plan states Geelong Urban has an

¹⁹ BSW BITS Sessions Report DELWP

²⁰ Greater Geelong and the Bellarine Tourism Development Plan January 2016

opportunity in re-purposing industrial infrastructure into experimental products as demonstrated by the antique precinct in North Geelong, Gordon Tafe and Deakin University, Little Creatures Brewery in South Geelong and Boom Gallery in Newtown. The Development Plan also states that Geelong has tourism development opportunities for a convention and exhibition centre, experiential accommodation, 5 Star Hotel, a sports events market and a cruise boat market.

4.1.8 Energy Production

Wind production

According to the Victorian Wind Atlas 2003 by the Sustainable Energy Authority, the study area has moderate wind speeds with a modelled average wind speed of between 5.8 and 7.2 metres per second. The highest average wind speeds in Victoria can be found along the exposed southerly coast, in central Victoria and in Victoria's alpine regions. The study area has access to the electricity network, low tree cover, and has a large supply of freehold land which are positives but to urban development, the prominence of the landscape and the moderate wind speeds are negatives for a wind farm in this location.

Wind production under current legislation would not be possible due to local provisions within the Greater Geelong Planning Scheme. The Victorian Governments *Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria January 2016* include the following:

Wind energy facilities should not lead to unacceptable impacts on critical environmental, cultural or landscape values. Critical values are those protected under Commonwealth or Victorian Legislation and assets of State or Regional significance, mapped and recognised through planning schemes.

- *Wind energy facilities are not permitted in National Parks and Ramsar Wetland and within five kilometres of major regional cities and centres.*

Algal biofuels

Geelong Sustainability has stated that algal biofuels could be a science based renewable fuel resource with significant potential economic benefit in the shallow Stingaree Bay. Algal biofuels potential lies with the high productivity of algal biomass that can be grown in an area. Some researchers say algae would be 10 or even 100 times more productive than traditional bioenergy feed stocks- while avoiding the food priority issue for the diminishing stock of arable land.

Waste to Energy

Waste to energy produces green power while disposing of landfill waste and reducing CO₂'s. With three landfills, farming land and existing industry within the study area, there is potential for the burning of waste, the growing of vegetables in greenhouses, and energy production. Only partial remediation of the land will be required for waste to energy production.

4.1.9 The Port of Geelong

The Port of Geelong has ageing assets and the industries in the North Geelong area are in transition with the closure of the Ford Manufacturing facility.

The analysis of market potential for the Port of Geelong indicated that if all of the nominally identified trades were captured and retained in Geelong then the tonnage through the Port of Geelong would grow from 12.5 million tonnes in 2011-12 to approximately 50-60 million tonnes by 2050, becoming south-east Australia's dominant bulk commodity port. Currently there are almost

800 ship visits to Geelong per year. Every additional ship visit to Geelong generates approximately \$560,000 in economic output and every hundred ship visits generates approximately 170 jobs in Geelong²¹.

The Port of Geelong has a channel suitable for Handymax- Supramax or partial loaded Panamax class shipping (the main channel has a declared depth of 12.3 metres providing access for vessels of 10.8m draft at all tides and up to 11.7m with tidal assistance). However, the channel is unable to accommodate vessels with a beam greater than 45m. See figure 18 for a display of the shipping channels of Geelong. On land the Geelong Port currently has access for B double and truck trailer combinations, broad and standard gauge trains.

The Point Henry Pier is 1.2km long and has various crane infrastructure at the end of the pier to assist in the loading and unloading of stock and includes a conveyor belt. Front end loading/unloading is inconvenient and slow for most vessels particularly those with dry bulk where multiple unloading positions is preferred. Infrastructure would need to be added to the Point Henry pier to allow for more efficient loading/unloading. To attract additional vessels, the channel will also require dredging as the Point Henry Channel is only 11.3 metres deep which is shallower than all other channels in Geelong (12.3 metres). Additionally it may be beneficial to modify the Point Henry Pier to allow space for the turning of vessels.

The Port of Geelong Development Strategy (2013) includes a Point Henry Precinct *“focused on the importation of raw product to Alcoa’s smelter, but may have the potential to accommodate other bulk commodities in the surrounding area.”* It also states that future opportunities for bulk trade in the industrial zoned land in the area should be considered.

The Geelong Port City 2050 (2013) sought to identify infrastructure and planning issues to support Geelong Port's long-term growth and the economic contribution this would make to Geelong's economy. At the time of publication, the smelter and rolling mill were in continued operation.

4.1.10 Retail and commercial

Geelong’s retail hierarchy outlined in the City of Greater Geelong Retail Strategy 2006 defines the type and extent of retail provision for activity centres, having regard for retail competition and the extent of the surrounding catchment. Moolap is not specifically mentioned in this strategy, and is not included as a potential activity centre. The strategy discourages out-of-centre development in cases where such development may undermine the retail activity centre hierarchy.

²¹ Geelong Port City 2050

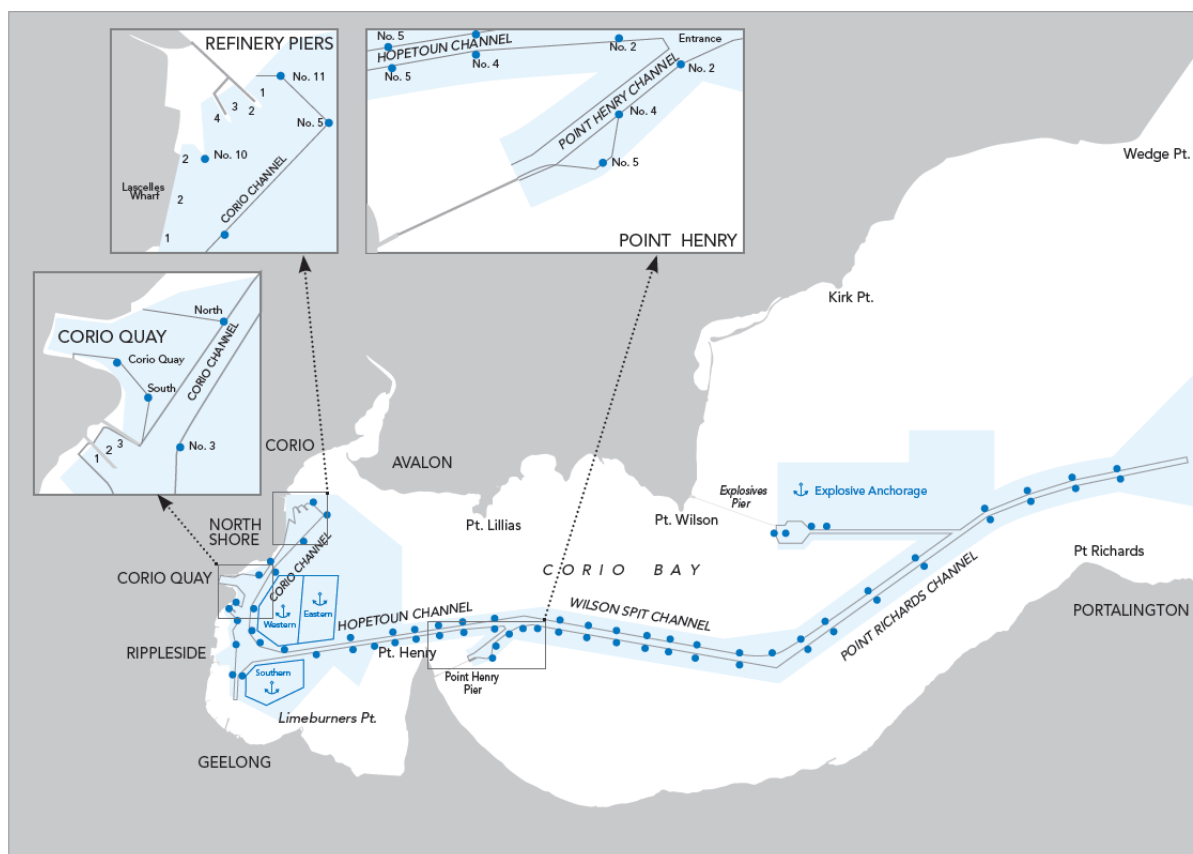


Figure 18: Shipping channels of Geelong.
Source-Port of Geelong Development Strategy 2013

4.1.11 Marina and Boating Development

The maritime industry is an important element of Australia's economy, contributing \$9 billion directly to Australia's Gross Domestic product in 2012-13, equivalent to 0.6 per cent of the Australian economy²².

The City of Greater Geelong 2007 Osborne House Precinct Masterplan and Feasibility Report stated that Victoria currently lacks the facilities to provide for the servicing and maintenance needs of the recreational boat and small commercial boat markets and for the maintenance of larger vessels such as ferries, port tugs and large fishing boats, with many of these services being provided interstate. A marine precinct was proposed in 2007 for the Osborne House precinct in North Geelong, however this did not proceed.

Recreational boating is an important activity for a growing number of Victorians, and delivers economic benefit to coastal communities. It is particularly significant in the central coastal region where Port Phillip and Western Port Bays offer diverse boating opportunities.

The Central Coastal Board's *Recreational Boating Facilities Framework 2014* consolidates information on the current state and preferred future of recreational boating facilities and identifies boat ramps, marinas, safe havens, jetties and yacht clubs. Point Henry Peninsula is used by small water craft launching however there is no mention of any facilities update, management issues or planning principles for Point Henry within the framework.

²² The economic contribution of the Australian maritime industry 2015, Price Waterhouse Coopers.

The *Corio Bay Coastal Action Plan 2005* states that one of the issues of the Point Henry Precinct is the management and protection of flora and fauna including seagrass beds in areas of industrial development. One of the actions within the *Corio Bay Coastal Action Plan 2005* is to include the prohibition of vehicle and formal boat launching from the point, directing boat launching to Limeburner Point.

There has been no formal push for any boating facilities within the study area. This could be due to past industrial activities at Point Henry but also the environmental values identified within the site. The *Recreational Boating Facilities Framework 2014* states that investment opportunities must be considered in the context of future growth corridors, recognition of the value of the marine environment and the need for shared access to the coast. The upcoming Regional Coastal Action Plan is an opportunity for the Central Coastal Board to refine their outcomes for recreational boating in Victoria.

4.1.12 Economic Development and Employment - Opportunities and Constraints

4.1.12.1 Opportunities

- The study area has the potential to create greater economic value due to its strategic location and by unlocking previously underutilised land for jobs, investment or housing. These economic opportunities could include:
 - Potential manufacturing, high value or heavy industry opportunities.
 - Industrial development with port related services or bulk port purposes if channel constraints are addressed.
 - Boating tourism like ferry and cruise ships and recreational destination for fishing and boating.
 - Major tourism attractors and associated development for example art galleries, museums, casino, convention centre, theme park and a major hotel.
 - A range of renewable energy options across the site including wind power, waste to energy and algal bio-fuels.
- Opportunity to lift the Newcomb and Moolap area in terms of job opportunity, amenity and social infrastructure.

4.1.12.2 Constraints

- The study area has no direct access to rail or to the national transport network requiring a large amount of investment.
- The Point Henry pier was custom-designed for Alcoa's use and despite its significant length, has a number of limitations with regards to reuse opportunities that would potentially require costly retrofitting.
- Any new retail development at Point Henry will consider the Geelong retail centre hierarchy, including central Geelong and nearby neighbourhood and town centres.

4.1.13 Overall Economic Development and Employment- Implications for Study Area

1. The ownership of the Point Henry pier is separate from the ownership of the adjoining land. Consequently any future use of the pier may require an agreement to be made with the owner of the adjoining land in order to enable land-based access to the pier.

5.0 Infrastructure

This section will discuss the key issues in regard to the infrastructure and services including stormwater, sewer, water, roads, electricity, and gas and port infrastructure.

5.1 Infrastructure and services

5.1.1 Relevant Legislation, Policy and Strategies

The legislation, policy and strategies relevant to infrastructure and services are:

State

Strategies

- *Plan Melbourne Metropolitan Planning Strategy*

State Planning Policies (Victorian Planning Provisions)

- *Clause 19.03-2 Water supply, sewerage and drainage*

Government Policy

- *Victorian Labor will commit \$4 million to undertake a detailed corridor planning study and determine the alignment required to extend the Geelong Ring Road into the Bellarine Peninsula.*

Regional

Strategies

- *G21 Road Transport Plan 2016 - 2026*
- *G21 Public Transport Strategy*
- *G21 Regional Growth Plan April 2013*

Local

Strategies

- *Central Geelong Action Plan 2013*
- *Geelong Port City 2050 (Geelong Port and Land Freight Infrastructure Plan)*
- *Victorian Integrated Transport Model*
- *City of Greater Geelong Stormwater Management Plan 2002 Volume I and IV (WBM Oceanics)*

Greater Geelong Planning Scheme- Municipal Strategic Statement

- *Clause 21.08-2 Transport*

5.1.2 Stormwater

The City of Greater Geelong is the Drainage Authority for the study area. Stormwater infrastructure is located in the Moolap Industrial Estate, the former saltworks and Hays Road areas with a combination of underground and open drains. There are five major drainage outlets to the bay which can be seen in figure 20. First is adjacent to CSIRO which originates near Wilsons Road, second is opposite Coppards Road originating from the main drain through the Moolap Industrial Estate, and the third is at the northern end of the former saltworks which runs parallel and takes water from Point Henry Road. The fourth and fifth outlets are on Alcoa land and drain out through

the fresh water to marine wetlands to the eastern side of the Point Henry Peninsula. The drains along the seaward side of both Portarlington Road and Point Henry Road were constructed to collect stormwater runoff and direct it to larger drains for shoreline discharge thus preventing contamination of the salt brine²³. The outfall drains permanently hold water and are influenced by tides and as described in the hydrology section of this background report as having limited capacity hence there is flooding in the area during heavy rainfall.



Photo 4: Open drain conveying stormwater through former saltworks with the two 220kW electricity lines in the background.

5.1.3 Sewerage

The study area including the Moolap Industrial Estate is not serviced by reticulated sewer. The nearest sewers are located in the adjacent suburb of Newcomb. Barwon Water have stated that any significant expansion of sewerage provision to the study area would require the installation of a new sewerage pump station and transfer pipeline from the site to the sewerage outfall drain near the Geelong Racecourse in East Geelong²⁴. Careful consideration of sewerage servicing solutions will be required at this location due to the challenges of low elevation, flat topography, high saline water table, potential for environmental issues such as contaminated or acid sulfate soils.

The lack of a reticulated sewerage system in the Moolap Industrial Estate means the effluent is disposed of on-site. The majority of the industrial uses in the Moolap Industrial Estate are relatively

²³ Point Henry Project. A landscape and environmental development strategy for the Point Henry area, Geelong, Victoria.

²⁴ Geelong Eastern Boundary Review 2009

small scale and not high water producing industries. In general, on site wastewater management systems provide treatment from premises that generate flows less than 5000L/day. As flooding is regular in the area, the effectiveness of the on-site effluent disposal systems is severely compromised and ground water contamination can and has occurred.

5.1.4 Water

Reticulated water supply generally is provided to all properties along existing roads within the study area. Barwon Water have advised that a large diameter (300mm) AC mains was installed to service the smelter and rolling mill facility running from the water main at Portarlington Road and follows Point Henry Road towards Alcoa. Until the extent and scale of any future development is known, it is difficult to predict the existing water mains ability to cater for development. It is likely augmentations and extensions to the system would be required to supply new development in the area.

5.1.5 Electricity

The existing electricity supply to Point Henry is made up of two 220kV lines which run through the centre of the study area to the Alcoa owned terminal station. This is a 300MW capacity dual fed (highly secure) terminal station with a replacement value of \$100 million. On 20 March 1969 Alcoa's own brown coal fired Anglesea Power Station was brought on line.²⁵ With 150 MW capacity the power station is connected to the smelter by around 30 km of 220kV Alcoa owned transmission lines and was the source of 40% of Alcoa's power load. The Anglesea Power Station ceased operating in August 2015. The eastern most 220kV terminal line is owned by AusNet Services and originates from the Geelong Terminal Station at Anakie Road, Norlane. The two terminal lines converge near the intersection of Coppards Road and Woods Road in St Albans Park, where AusNet Services owns a site set aside for a future terminal station known as East Geelong Terminal Station (EGTS). The total width of the easement from the EGTS to Point Henry is 55 metres. AusNet Services have stated there are no plans to dismantle the AusNet Services line as it is currently operating and providing service to the Point Henry site albeit at a reduced capacity. The line will be retained to service possible future development east of EGTS. The future of the Anglesea to Point Henry transmission lines has not been determined.

5.1.6 Gas

The gas pipeline traverses Portarlington and Point Henry Roads to the former Alcoa smelter and rolling mill. The pipeline has a diameter of 250mm and a maximum allowable operating pressure of 2760 kPa.²⁶ Pipeline License 57 has a 204 metre safety buffer applied to either side of the pipeline. The capacity of the gas supply to the site may be a key consideration to attract heavy industries.

5.1.7 Road Networks

Portarlington Road is a declared arterial road which travels east-west from Central Geelong to Drysdale and is the southern border for much of the study area. Point Henry Road intersects with Portarlington Road and travels through the centre of the Point Henry Peninsula just eastward of the former saltworks, wraps around the point and ends at the northern side of the Point Henry Pier. At times Point Henry Road is only 1.6 metres AHD. Within the study area, there are also Council owned

²⁵ Geelong's Electric Supply- September 1970. Arklay and I. Sayer

²⁶ Ausnet services

local roads including Buckley Grove, Stodarts Lane, Windmill Road, Hays Road and the roads within the Moolap Industrial Estate between Wattlepark Ave and Grandview Parade including High Street.

Table 7 below shows the average daily traffic counts on the major State roads in Central Geelong of which over 15% are estimated to be trucks. Ryrie Street and McKillop Street are two of the major east-west routes of Geelong. The average daily traffic counts using the Bellarine Highway and Portarlington Road are over 55,000 of which over 8% are trucks. An increase in population and/or industrial uses to the east of Geelong, the Bellarine Peninsula or the study area will likely increase the amount of traffic using Portarlington Road and the Bellarine Highway and be reflected in an increase of traffic and trucks using major east-west routes in Central Geelong unless there is a viable east-west alternative.

Location	Latest Actual Counts
Ryrie Street (btw Swanston Street and Yarra Street) Vic Roads ID: 169072	20,000 (2014)
McKillop Street (btw Swanston Street and Yarra Street) Vic Roads ID: 164235	14,600 (2014)
Portarlington Road (btw Moolap Station Road and Boundary Road) Vic Roads ID: 172280	31,000 (2013)
Bellarine Highway (btw Moolap Station Road and Boundary Road) Vic Roads ID: 164138	24,000 (2014)

Table 7: Two way actual daily traffic
Source: VicRoads

The following traffic forecasts were extracted from the Victorian Integrated Transport Model (VITM). These forecasts do not assume any proposed land use changes in Moolap. Traffic forecasts on the *Portarlington Road from Boundary Road to Moolap Station Road* are:

- 2031 (modelled) = 31,640 vehicles per day (vpd)
- 2046 (modelled*) = 29,240 vpd

The Bellarine Highway is outside the study area but is only one kilometre to the south of Portarlington Road and is also a major arterial road linking Central Geelong to the Bellarine Peninsula. Traffic forecasts on the *Bellarine Highway from Boundary Road and Moolap Station Road* are:

- 2031 (modelled) = 33,680 vpd
- 2046 (modelled*) = 34,030 vpd

*Assumes that an alternative east-west corridor (Bellarine Road Link) has been constructed to the Geelong Ring Road. The traffic forecast on this Bellarine Road Link is shown below:

- 2046 (modelled) = 20,560 vpd

The figures above show that a Bellarine Link would halt the growing traffic on Portarlington Road and Bellarine Highway and presumably the roads within Central Geelong. The Bellarine Road Link to the Geelong Ring Road was detailed in the Geelong Ring Road – East West Corridor Review (2011) and the Greater Geelong Arterial Roads Study 1997 which includes options for the Ring Road connection to Portarlington Road at Moolap. The G21 Geelong Ring Road Connections has a project aim to determine the alignment between Barwon Heads Road and Moolap Station Road. See Figure 19 for a potential Bellarine Link corridor.

5.1.8 Rail

The Bellarine Rail Trail is located less than a kilometre to the south of Portarlington Road and is a 35 kilometre walking and cycling trail that links South Geelong to Queenscliff following the alignment of the historical Geelong-Queenscliff Railway Line. The railway line ran from 1879 to 1976 for goods, passenger and military traffic. A tourist steam train still runs between Drysdale and Queenscliff with a 16 kilometre eastern section. The rail alignment close to the study area may be an important asset if this rail line was reintroduced and a spur line into the study area could be a possibility.



Photo 5: Point Henry pier.

5.1.1 Shipping Infrastructure/Port Access

The Point Henry Pier is 1.2km long, located to the north-east of the Point Henry Peninsula and has various crane infrastructure at the end of the pier to assist in the unloading of raw materials and includes a conveyor belt. The pier is custom built to support the smelter and rolling mill and it is commonly understood that the pier was built 1.2km long to access deep water with this being a cheaper option than dredging to the shoreline. Ships moor to the very end of the pier as this is the deepest point and this is where the vessels are loaded and unloaded. The Point Henry Channel is 11.3 metres deep, shallower than all other channels in Geelong that are 12.3 metres. The Point Henry Channel will require dredging for this pier to be of value to some larger vessels.

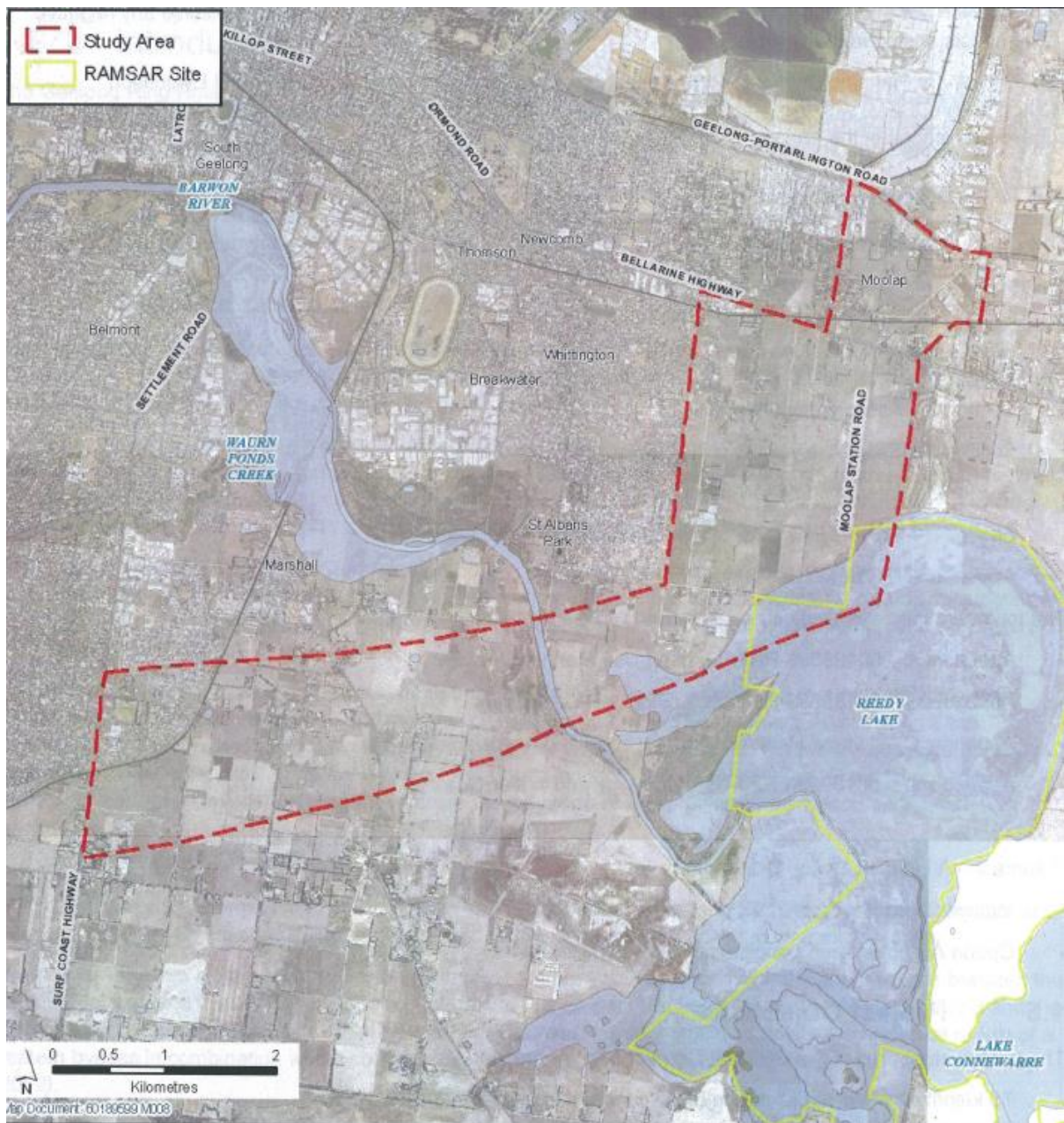


Figure 19: Bellarine Road Link Planning Study Area (potential alignment)
Source-VicRoads



Figure 20: Existing Infrastructure within the study area

5.1.2 Existing Infrastructure and Services - Opportunities and Constraints

5.1.2.1 Opportunities

- The terminal station and transmission lines within the study area are major pieces of infrastructure with opportunity for reuse.
- Development within this area could be the catalyst for the construction of:
 - The Bellarine Road Link
 - Construction of the disused Geelong to Queenscliff rail corridor for passenger or freight services
 - Upgrades to the Point Henry pier for reuse.
- Reticulated sewer could result in much more intensive development.

5.1.2.2 Constraints

- The Point Henry pier is custom built for smelter and rolling mill applications and would most likely require considerable upgrades for reuse.
- Point Henry Road is low lying (approximately 1.6m AHD in some points) and under threat from sea level rise and storm surge.
- Additional truck traffic and vehicle traffic generated by the study area contributes to amenity issues within central Geelong.
- The generally flat and low lying topography means large areas of land maybe required for management of stormwater flows.
- Safety buffer/easements of 210 metres to the gas pipeline and up to 55 metres for the transmission lines.

6.0 Community

This section will discuss key community issues including recreation, open space, community facilities and integration with surrounding areas.

6.1 Recreation, Community Facilities and Integration with the Surrounds

6.1.1 Relevant Legislation, Policy and Strategies

The legislation, policy documents and strategic plans relevant to recreation, facilities and integration with the surrounds are:

State

Legislation

- *Coastal Management Act 1995*
- *Planning and Environment Act 1987*

Strategies

- *Victorian Coastal Strategy 2014*

State Planning Policies (Victorian Planning Provisions)

- *Clause 11.03-1 Open space planning*
- *Clause 11.07-3 Connected communities*
- *Clause 19.02-1 Health facilities*
- *Clause 19.02 Education facilities*
- *Clause 19.02-3 Cultural facilities*
- *Clause 19.02-4 Development of social and cultural infrastructure*
- *Clause 52.01 Public Open Space and Subdivision*

Regional

Strategies

- *Corio Bay Coastal Action Plan 2005*
- *Central Regional Coastal Plan*
- *Central Coastal Board Recreational Boating Facilities Framework*

Local

Strategies

- *City of Greater Geelong Open Space Strategy*

Greater Geelong Planning Scheme- Municipal Strategic Statement

- *Clause 21.08-3 Development contributions*
- *Clause 21.08-4 Open Space*
- *Clause 21.08-5 Accessibility*

6.1.2 Recreation and Open Space

The Crown owns the majority of the coastal foreshore land within the study area and much of this is available for public use and access. The most popular public areas are the north-west foreshore of

Point Henry, the point and the eastern foreshore of Point Henry. Because of the public access and the protected nature of Point Henry it is suitable for active and passive recreational pursuits.

The most popular pursuits are bird watching contributing to the character and passive enjoyment of the area. Other passive recreational activities are beach walking, taking in the views to the You Yang's and Central Geelong, watching ships, and dog walking. There are some walking tracks located at Point Henry but none throughout the rest of the study area. Active recreation includes fishing as there is access to launch very small watercraft including tinnies and small sailing craft like kayaks/canoes from both the eastern and western shorelines. Sail boarders, kite surfers and wind surfers launch from the western shoreline at the northern end near the point or mid-way along the western shoreline south of the Alcoa stormwater outfall given the shallow water and good beach.

Game bird hunting is also a popular activity within the study area. Duck hunters are active each year within Corio Bay from Clifton Ave back to the Point Henry pier. Hunters are permitted to stand on the foreshore during the declared period for the purpose of hunting ducks.

The *Corio Bay Coastal Action Plan 2005* recommends the prohibition of vehicles and formal boat launching from Point Henry and directs boat launching to Limeburners Point in order to protect the point from damage to vegetation and the peaceful enjoyment of the site and safety.

6.1.3 Community Facilities

The Moolap Recreation Reserve is located on Moolap Station Road to the south of Portarlington Road. It is a local reserve and contains tennis courts and a small picnic area. There are no other substantial community facilities within the study area with the exception of a toilet block which is located in the north-west of Point Henry.

6.1.4 Integration with Surrounding Areas

The Point Henry pier allows for limited connections from the sea however the predominant connections are via Point Henry Road to Portarlington Road to the south, east and west.

The location of the CSIRO laboratory may prevent integration of the coastal foreshore land to the adjoining land to the west including Limeburners Point and the Eastern Gardens. Access to the study area from the west is only via Portarlington Road.

Crown coastal foreshore land does not extend all the way to the south-east of the study area. Hays Road which heads east from Point Henry Road is not accessible past Dow Chemicals. Clifton Avenue provides access to the foreshore however there is no linear path along the coast. In addition, the foreshore land between Clifton Avenue and Point Henry pier is privately owned/leased, making public access difficult. Integration to the east therefore is also only via Portarlington Road.

The most effective integration between the study area and the surrounding land is to the south via the intersection of Portarlington Road and Moolap Station Road. This is a busy intersection however and is used predominantly by vehicles with very few pedestrians noted.

There is no public access to the leased and privately owned former saltworks land.

6.1.5 Mosquitos

Mosquitos are the major pest to human occupation and recreation within the study area. They can transmit debilitating disease including Ross River Virus, Barmah Forest Virus and can impact people's ability to enjoy an active outdoor lifestyle.

The City of Greater Geelong mosquito management provides a regular spraying program. Figure 21 shows the current aerial treatment for mosquito management (red outline) and current ground treatment near potential breeding sites (green markers).



Figure 21: Mosquito aerial (red) and ground treatment (green) areas.
Source: City of Greater Geelong

6.1.6 Recreation, Community Facilities and Integration with the Surrounds Opportunities and Constraints

6.1.6.1 Opportunities

- The acquisition of privately owned coastal foreshore land (and retention of existing Crown land) would result in an increase to publically accessible land and offer significant passive and active opportunities for the community. This acquisition and retention could protect many of the ecological values and culturally sensitive areas of coastal foreshore land.

- Despite barriers to all adjoining coastal foreshore land for e.g. CSIRO, the study area could link to main activity areas like Eastern Park and Central Geelong with an elevated offshore pathway such as that at Western Beach in Geelong.

6.1.6.2 Constraints

- Public access to coastal foreshore land in the former saltworks is restricted as this land is leased and privately owned.

7.0 Heritage

This section will discuss the key issues in regard to heritage including Aboriginal cultural heritage and post European settlement heritage.

7.1 Aboriginal Cultural Heritage

7.1.1 Relevant Legislation, Policy and Strategies

The legislation, policy and strategies relevant to Aboriginal Cultural Heritage are:

Commonwealth

Legislation

- *Native Title Act 1993*
- *Aboriginal and Torres Strait Islander Protection Act 1984*

State

Legislation

- *Aboriginal Heritage Act 2006*
- *Aboriginal Heritage Regulations 2007*

State Planning Policies (Victorian Planning Provisions)

- *Clause 15.03-2 Aboriginal cultural heritage*

Local

- *Karreenga Aboriginal Action Plan 2014-2017*

7.1.2 Aboriginal Cultural Heritage of Study Area

The Wathaurung Aboriginal Corporation (Wathaurung) is the registered Aboriginal party for the subject site. The identity of the clan who occupied Point Henry is not precisely known but it is likely to be the Bengalat Baling, the Bellarine Peninsula people. It is assumed they were mobile hunters, fisherman and gatherers and moved according to subsistence requirements, trading and social obligations²⁷.

Given the abundant food source of fish along the coast and the Wathaurung dependent upon fishing in summer and autumn and hunting during winter and spring²⁸ there is a very high likelihood that Aboriginal cultural heritage could be encountered. This is validated by the amount of registered Aboriginal places within and outside the study area as a result of limited investigation.

7.1.3 Cultural Heritage Sensitivity

The majority of the study area is within a Cultural Heritage Sensitivity area (see figure 22) which is the trigger for further investigation of the site prior to any development approvals. The study area has several registered Aboriginal places including tree scars and artefact scatters with only a small part of the study area having been surveyed. This is an indication and reflection that it is likely that more areas of sensitivity will be found with further investigation.

²⁷ Aboriginal Ethnographic and Land Use History Aboriginal Affairs Victoria

²⁸ Aboriginal Archaeological Investigations in the Barwon Drainage Basin AAV Occasional Report No 50. 1999

7.1.4 Native Title

There have been no native title claims within the study area. The majority is privately owned land and although the public land has not been extinguished as potential native title land a claim is unlikely as there needs to be proof of the land having an ongoing link with the Aboriginal people. The Crown land of the former saltworks has been extinguished from native title.

7.1.5 Aboriginal Cultural Heritage - Opportunities and Constraints

7.1.5.1 Opportunities

- Incorporating cultural heritage values into the earliest and most strategic phases of planning considerations will allow for meaningful best practice outcomes.
- The retention of existing public open space and the creation of new public space may result in the protection of aboriginal cultural heritage sites and/or offer significant passive and active opportunities for the community.

7.1.5.2 Constraints

- Development of the former saltworks may reveal significant Aboriginal heritage remnants beneath the saltpans and make this a challenging site to develop.

7.1.6 Overall Aboriginal Cultural Heritage - Implications for Study Area

1. As part of any development application, a Cultural Heritage Management Plan (CHMP) may need to be prepared.
2. Any development opportunities on the site should be discussed with the Wathaurung Aboriginal Corporation.
3. Prior to future use being known, a well-considered predictive model for Aboriginal cultural heritage throughout the study area will provide good guidance for strategic planning decisions.

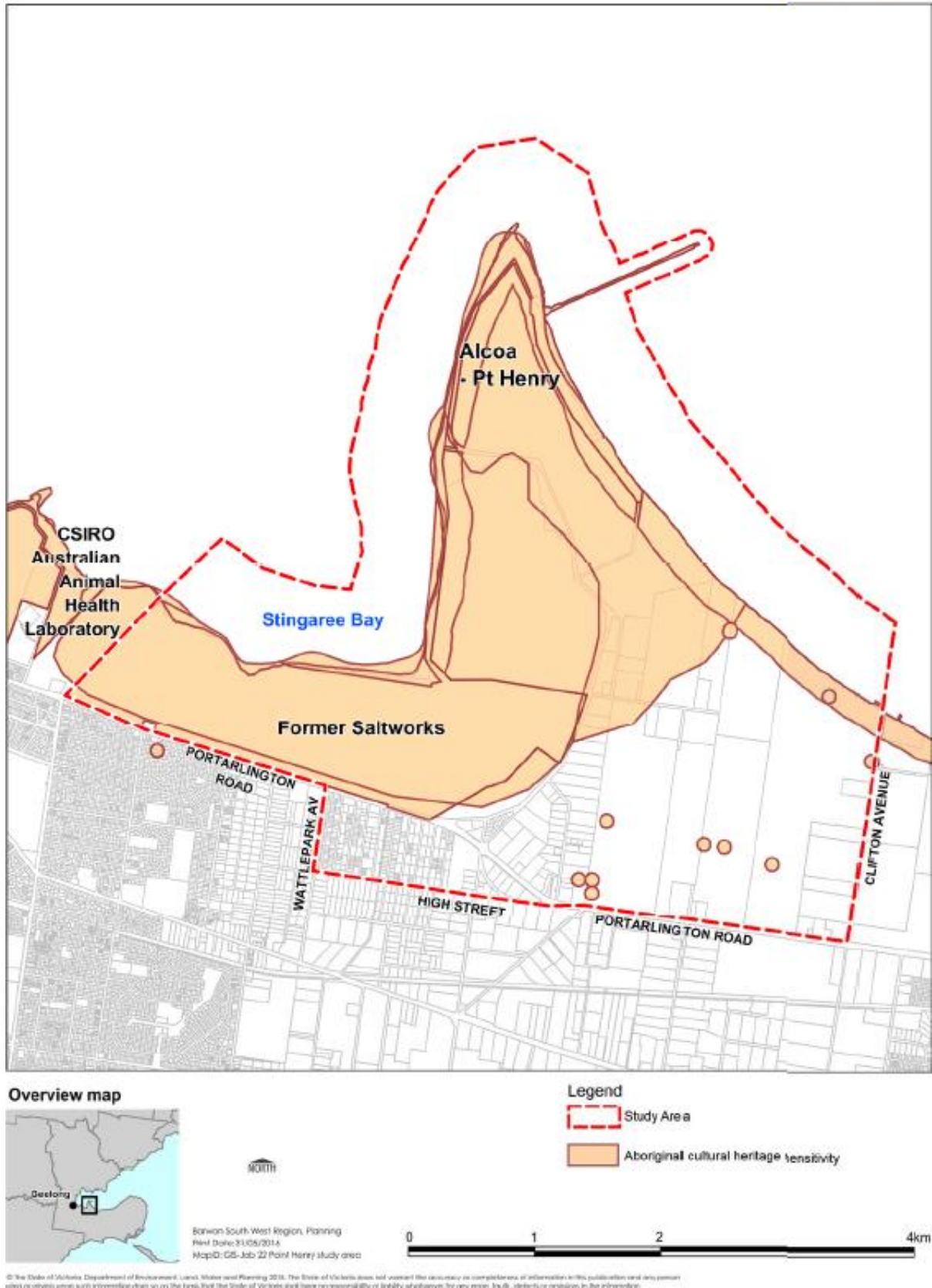


Figure 22: Aboriginal Cultural Heritage Sensitivity

7.2 Post European Settlement Heritage

7.2.1 Relevant Legislation, Policy and Strategies

State

Legislation

- *Heritage Act 1995*
- *Planning and Environment Act 1987*

Local

Greater Geelong Planning Scheme- Municipal Strategic Statement

- *Clause 21.06-5 Heritage and Identity*
- *Clause 22.09 Cultural Heritage*

7.2.2 Post European History

European settlement of the area dates from the 1840s, with the land initially used for farming and grazing. The area was used as the first landing for Geelong by the vessel *Francis Feeling* in April 1836 to unload sheep. A sand bar between Point Henry and Point Lillias prohibited entry to larger vessels into Geelong, which had to anchor and discharge cargo onto the beach at Point Henry before a pier was later built. The sand bar from Point Henry and Point Lillias was an important feature for early graziers, who ran and swam stock across the bar in the early 1840s.²⁹

Point Henry was often described as a sea of masts, as larger vessels unable to enter the inner port of Corio Bay anchored there. Initial dredging for the Hopetoun channel began in 1881 and completed in 1883. The first tea gardens at Point Henry were established in 1849 and were advertised as a paradise and in 1854 a regular service was run between Point Henry and Geelong by the small steamer *Diamond*.³⁰ Point Henry had a chequered history as a tea garden and recreation area and changed ownership many times until the late 1890's. In 1890 Point Henry attracted 22,000 tourists from Melbourne and 50,000 from Geelong.

Richard Cheetham, a manufacturing chemist arrived in Australia in 1862, with some knowledge of the salt gathering industry in Southern Europe, and made initial attempts at evaporative salt production on French Island in the early 1870's. He realised the potential for producing salt on large flat areas of the Victorian coastline, using solar evaporation of seawater and in 1888 leased 650 acres (263 hectares) of land at Point Henry and constructed a saltworks which was largely modelled on examples in the south of France. His initial 21 year lease at Geelong from the government was extended to 99 years in 1892, and the company became known as 'Richard Cheetham and Company, Victorian Salines'³¹.

7.2.3 Heritage Controls

Heritage Overlay Local Government

H01583 applies to the former Navigation Station at the north end of Point Henry. Development of the building and within 20 metres of the building requires a planning permit. The Heritage Overlay outlines requirements for paint colours and development and enables the consideration of otherwise prohibited uses.

²⁹ Heritage Inventory Report H7721-0408

³⁰ Heritage Inventory Report H7721-0408

³¹ Victorian Heritage Database place details- Cheetham Saltworks H1157

H0322 Memorial to the founding of Geelong is adjacent to Point Henry Road and applies to the extent of all the land within 5 metres of the plaque.

H01582 Cheetham Salt Works covers the entire salt works which are located to the south-west and west of the study area and enables the consideration of otherwise prohibited uses.

Heritage Victoria State Government

The *Heritage Act 1995* is administered by Heritage Victoria. It is the Victorian Government's key cultural heritage legislation. The Act identifies and protects heritage places and objects that are of significance to Victoria including:

- Historic archaeological sites and artefacts
- Historic building, structure and precincts
- Gardens, trees and cemeteries
- Cultural landscapes
- Ship wrecks and relics

The Act establishes the Victorian Heritage Register, the Heritage Inventory and the Heritage Council of Victoria.

Cheetham Saltworks H1157 is listed within the Victorian Heritage Register which outlines that the Cheetham Saltworks in Moolap is significant at the State level for the following reasons:

The Cheetham Saltworks, Moolap is historically significant for its associations with the early and highly important salt industry in Victoria. It was the first successful solar saltworks established in Victoria and the extensive industrial site demonstrates the early evolution of the salt industry. Cheetham Salts continued as an important and prominent Victorian industry throughout the 20th century. [Criterion A]

The Cheetham Saltworks, Moolap has the potential to contain historical archaeological deposits, features and/or objects associated with the use and occupation of saltworks, particularly in the industrial complex of buildings and structures. These have the potential to reveal further information about the operation of salt production in Victoria. [Criterion C]

The Cheetham Saltworks, Moolap is an extensive site which displays the typical characteristics of this particular industry. Despite the lack of original buildings, the site is an important remnant of the salt industry as it clearly demonstrates the important processes of salt production in its extensive network of salt pans. [Criterion D]

Cheetham Saltworks, Moolap demonstrates a high degree of technical achievement in its successful introduction, application and modification of the salt gathering processes already in use in Europe in the late 19th century. Important remaining components of the industry include an extensive basalt sea-wall and extensive areas of evaporative and crystalliser pans. [Criterion F]

The founder of the Cheetham Saltworks, Richard Cheetham, was a pioneer in the Victorian salt industry, a prominent Geelong industrialist and resident and the original owner of a business which became the pre-eminent producer of salt products on Victoria. [Criterion H]

Cheetham Saltworks is also a Heritage Inventory Site H7721-0024 along with a number of other identified heritage inventory sites within the study area (see figure 23). A heritage inventory site is a

site that has not had its significance confirmed but needs consideration if there is to be any further development in the area. A number of heritage inventory sites have been identified for example jetties that were constructed on the east and west side of the point to service associated land facilities including tea gardens, a quarantine station, pilot services and lighterage business. Heritage Victoria states that the traces of a couple of early jetties can be seen in Google Earth imagery indicating that there are archaeological deposits in the waters surrounding the point. Some of the heritage inventory items can be seen at figure 23 and others are listed below.

- H7721-0408 Point Henry Maritime Heritage Precinct
- H7721-0415 Point Henry East Pier/Boat Landing (Quarantine Jetty)
- H7721-0414 Old Pilot Jetty
- H7721-0410 California Tea Gardens/Henshaw's Victoria Tea Garden and Pier
- H7721-0408 Kossaks Jetty/Bellarine Tea Gardens
- H7721-0409 New Western Jetty
- H7721-0411 Sinclairs Jetty West
- H7721-0416 New Eastern Long Jetty
- H7221-0417 New Steamboat Pier/Sinclairs Pier
- Ship Channel #1/ North Channel
- Irish Channel/South Channel
- Boat Channel

7.2.4 Post European Settlement Heritage - Opportunities and Constraints

7.2.4.1 Opportunities

- There is an opportunity to formally acknowledge the significance of Point Henry as the site of the first landing of European settlement in Geelong as well as the study site's maritime history.
- The navigation station could be retained and repurposed as part of any future development.

7.2.4.2 Constraints

- The extent of the Victorian Heritage Register protects the whole former saltworks site. The purpose of this listing is not to prevent any further development on this site, but to enable control of possible adverse impacts on the heritage significance.

7.2.5 Overall Post European Settlement Heritage - Implications for Study Area

1. The former saltworks have State and local heritage significance and any development of this area must consider the historical values of the site.
2. An archaeological assessment of Point Henry is required to locate early shore based facilities in relation to the jetties, and to provide a sound basis upon which to consider any of the heritage inventory sites.

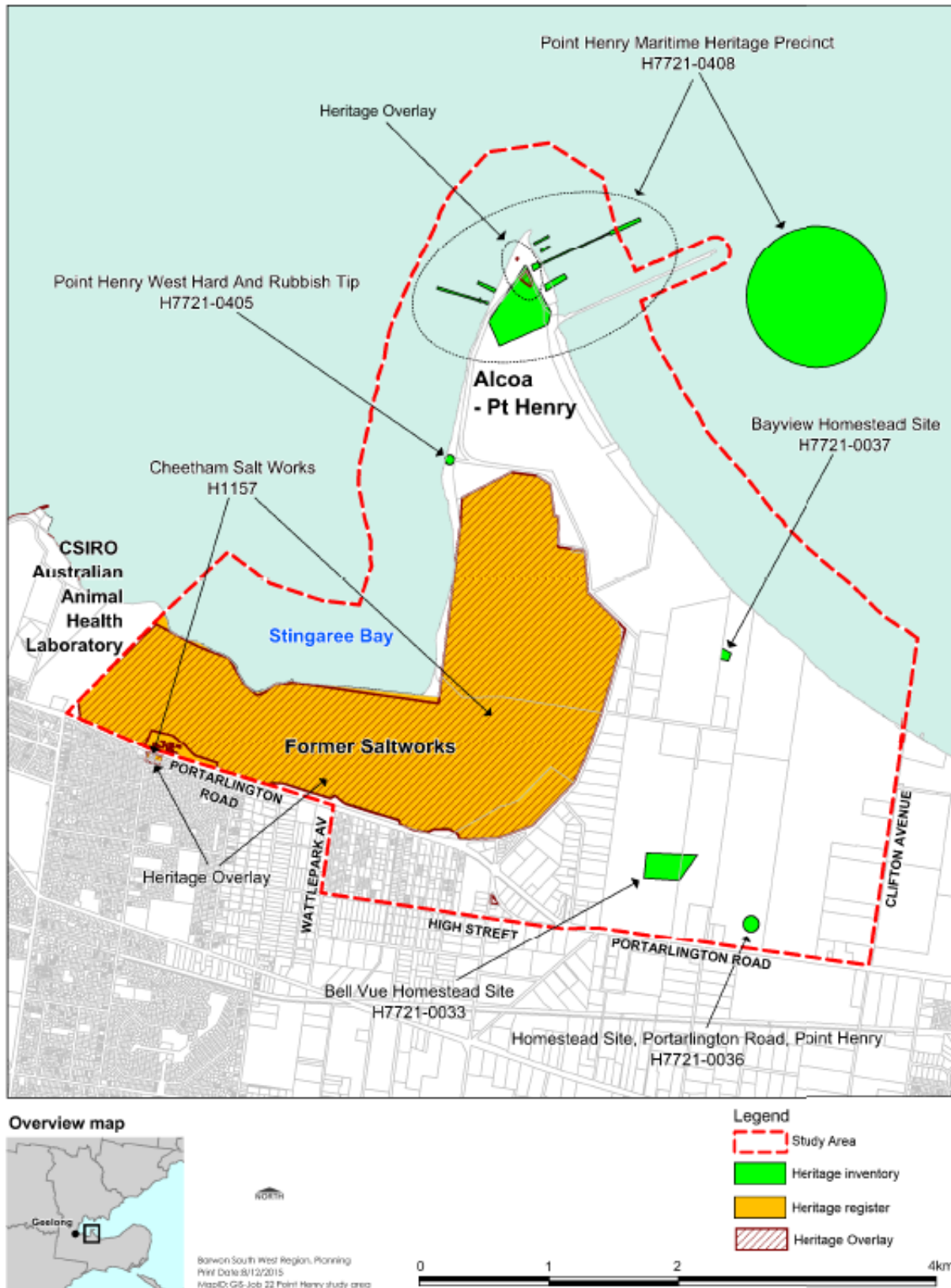


Figure 23: Local Heritage, Registered Victorian Heritage Sites and Inventory Sites

8.0 Appendix

8.1 Shorebird counts 2007-16

Shorebirds counted	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Ave
Sharp-tailed Sandpiper	1757	694	192	697	5	240	379	360	249	79	463
Red-necked Stint	1717	1416	810	287	2365	1441	1122	1615	1263	1593	1363
Double-banded Plover*		65	93	204	205		0		0	na	57
Marsh Sandpiper	126	34	19	1	9			98	166		45
Common Greenshank	65	18	24	40	46	12	21	45	56	6	33
Banded Stilt	5200					842	645	38		88	681
Curlew Sandpiper	543	179	211	209	645	21	2	190	222	2	222
Black-winged Stint	387	21	26	75	2	63	88	85	121		87
Red-necked Avocet	3			10		313	111	24	243	9	71
Masked-Lapwing	193	185	97	69	91	50	85	139	139	183	123
Red-capped Plover	30	84	107	133	110	145	108	181	140	108	115
Aust Pied Oystercatcher	14	21	17	20	17	16	13	14	9	10	15
Latham's Snipe	25	2		2	7					1	4
Bar-tailed Godwit	21					2					2
Black-fronted Dotterel	6	2	8	7	5	2		2	5		4
Red-Kneed Dotterel		1		2		9	7	4	1		2
Sooty Oystercatcher			1	1	1	1		2	1	1	1
Unidentified wader		1			44				300		36
TOTAL summer count	10087	2658	1512	1535	3347	3157	2581	2797	2915	2080	

Table 8: Summary of shorebird counts and significance 2007-16

Source: Geelong Field Naturalists Club Inc.

Red: >1% of flyway population

Blue: <0.1% of flyway population

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