



# Sorrento

## Local Port Area Plan

August 2024



# Acknowledgement of Country

Aboriginal cultural landscapes form the core of Victoria's network of parks and reserves and have been modified over many thousands of years of occupation. They are reflections of how Aboriginal people engage with their world and experience their surroundings and are the product of thousands of generations of economic activity, material culture and settlement patterns. The landscapes we see today are influenced by the skills, knowledge, and activities of Aboriginal land managers. Parks Victoria acknowledges the Traditional Owners of these cultural landscapes, recognising their continuing connection to Victoria's parks and reserves and ongoing role in caring for Country.

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Level 10, 535 Bourke St, Melbourne

**Cover image:** Sorrento Pier



## Executive summary

Located on Bunurong Sea Country, Sorrento Pier is one of Port Phillip's iconic piers and provides the gateway for many tourism and recreational pursuits. The pier is a key commercial destination that is home to a range of licensed tour operators (LTOs) and supports the Queenscliff-Sorrento Ferry service. It also provides a venue for recreational activities (walking, fishing, and sightseeing).

This Local Port Area Plan (plan) sets the direction for the pier and surrounding water. Local Port Area Plans are delivered under the *Sustainable Local Ports Framework 2021* to help the Victorian Government prioritise investment and deliver critical local port infrastructure where it is needed most. The Sorrento Local Port Area Plan seeks to improve the safety and function of Sorrento Pier and ensure it continues to be a safe and thriving maritime precinct for many more years to come.

The plan provides direction for commercial and visitor berthing through the rehabilitation and future extension of Sorrento Pier head, integration with the ferry passenger terminal development, definition of existing channels to ensure compliance with the relevant Australian Standard and proposes possible future use options for the Sorrento Pier Shed.

The plan is based on technical investigations and studies, along with stakeholder and community engagement. The plan responds to identified aspirations, challenges and provides a place-based response to enhance Sorrento Pier.

The proposals in this plan will inform future funding bids and management actions through a future staged implementation approach.

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# 1 Introduction

Parks Victoria is appointed as the port manager for the local port of Port Phillip and as the Committee of Management for the Sorrento Pier. This plan has been developed to address the future of the pier and surrounding on-water activities.

## 1.1 Local Port Area Plan

The local port area plan focuses on actions which enhance the safety of on-water activities, in consideration of current commercial and recreational demands while anticipating future needs. The preparation of the plan involved a review of existing plans and condition reports, analysis of current and future demand, review of navigational safety and further technical assessments (e.g. heritage). Refer to *Appendix – Sorrento Local Port Area Plan Background Technical Report 2024* for a summary of these reports.

## 1.2 Study area

The pier is located on the southern side of Port Phillip Bay, situated north-west of the Sorrento town centre (Figure 1). The land to the south-west of the pier has a high recreational value as it links the pier with the township via road, pedestrian paths, contains the Sorrento foreshore, public toilets, seating, and access to Sorrento front beach and restaurants/cafes. The land to the north-west of the pier comprises a sheltered beach and a pedestrian path to the public boat ramp.

Searoad Ferries has a Crown land lease for the ferry passenger terminal and berthing infrastructure. They are currently undertaking a development of the terminal. Sorrento Pier provides pedestrian access to the proposed terminal.



Figure 1- Location of Sorrento Pier (Source: Melway Map 157)

The Sorrento Pier precinct is a bustling hub of different commercial and recreational activities. Figure 2 shows the study area for this plan and the existing features around the pier. Although out of scope for this plan, there are several notable features to be considered when planning for the future of Sorrento Pier:

- Searoad Ferries passenger terminal upgrade and vehicle queueing areas
- Public boat ramp and finger jetties connected to trailer parking area
- Swing moorings
- Car parking areas.





Figure 2 - Sorrento Pier Study Area and Context Map of Port Phillip (Aerial Image: Nearmap 2023)

### 1.3 Strategic context

The Victorian Government is committed to developing a long-term strategy for the future management and maintenance of local port infrastructure. This is being implemented through the *Sustainable Local Ports Framework 2021* (framework) that will help manage, maintain, and prioritise funding for these assets where it is needed the most.

The framework provides a consistent planning and decision-making pathway to support wider precinct planning through local port area plans. Four principles will be applied to prioritise future upgrades and improvements. These include Local Economy and Job Growth, Tourism and Recreation, Emergency Response Capabilities, and Community and Cultural Value.

### 1.4 Policy context

The objectives and principles of the *Marine and Coastal Act 2018* centre around the preservation and maintenance of the marine and coastal environment, with a focus on protecting the coast for future generations. In line with this, the Marine and Coastal Policy 2020 (Policy) has been established as a roadmap with a 15-year vision that envisions a 'healthy, dynamic and biodiverse marine and coastal environment that is valued in its own right and that benefits the Victorian community, now and in the future'. It serves as a strategic guide for planning processes, management approaches, as well as decision-making protocols.

Furthermore, the Policy is supported by the *Marine and Coastal Strategy 2022* (Strategy). This strategic framework outlines a series of prioritised actions to be undertaken over the course of the next five years to effectively achieve the objectives set forth in the Policy. The Strategy recognises that formal and informal collaboration is required for effective and integrated delivery. The Victorian Government, Traditional Owners, marine and coastal managers, local businesses, communities and individuals all have important roles and responsibilities in the joint implementation of this Strategy.

The Sorrento Local Port Area Plan utilises both the Marine and Coastal Policy 2020 and *Marine and Coastal Strategy 2022* as reference documents to lead the management of Victoria’s marine and coastal environment.

## 1.5 Purpose

The Sorrento Local Port Area Plan sets the vision, direction and opportunities for Sorrento Pier, creating value through balancing commercial and recreation uses. It provides high-level guidance to determine future layout and service provision to inform future investment at the site. The plan has been developed to improve the function, safety and sustainability of the pier as well as providing for future demand.

In addition to these on-water considerations, the plan acknowledges the importance of on-land uses to ensure an integrated approach with adjacent land managers. On land management is addressed in in the Mornington Peninsula Shire Council, *Sorrento Coastal and Marine Management Plan (December 2018)* and GHD *Sorrento Recreational Boating Precinct Plan (February 2011)*.

## 1.6 Vision

**Preserve the historical character of Sorrento Pier while enhancing safety, accessibility, and functionality for current and future commercial and recreational uses.**



Figure 3 – Sorrento Pier (AW Maritime, 2023)

## 2 Local Port Area Plan development approach

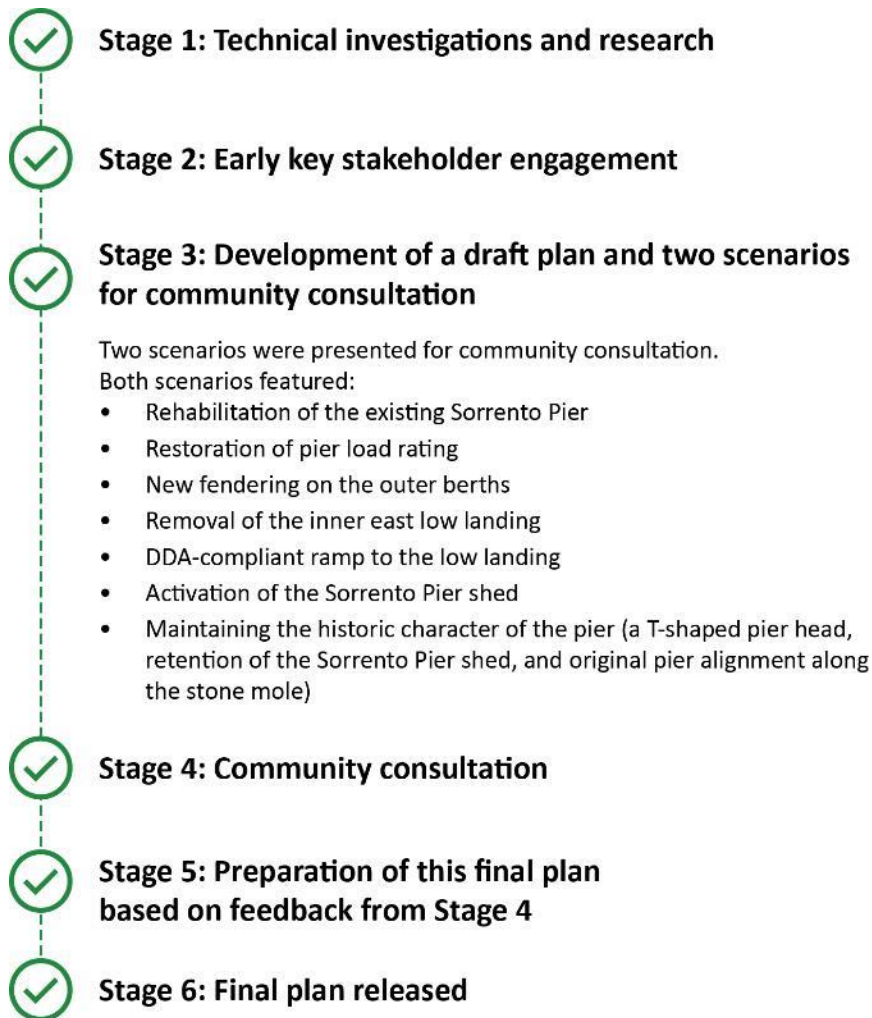


Figure 4 – Project schedule (Parks Victoria, 2024)



## 2.1 Community consultation overview

The development of this plan was guided by Project Reference Group (PRG). The PRG comprised representatives from Parks Victoria, Mornington Peninsula Shire Council, Better Boating Victoria, the Department of Transport and Planning, the Department of Energy, Environment and Climate Action, and Bunurong Land Council Aboriginal Corporation (BLCAC). BLCAC was unable to continue providing input into the development of the plan however Parks Victoria will continue to work with BLCAC on future planning and projects in this local port area.

Parks Victoria also met periodically with Searoad Ferries as a valued stakeholder to ensure the interface and functions of the ferry passenger terminal were considered in the plan.

Stakeholder and community input was sought at key stages in development of this plan.

- Stage 1 (August 2023): Key stakeholders and user groups were engaged to gather insights around current challenges, aspirations and ideas to help inform a draft plan. The outcomes of this Stage 1 consultation are summarised in *Sorrento - Stakeholder engagement key findings* (August 2023).
- Stage 2 (14 March to 11 April 2024): The purpose of this consultation was to seek community views on two scenarios and the draft plan to inform the final plan. Feedback was captured through survey participation on the Engage Victoria digital engagement platform, written submissions, and one-on-one meetings with key stakeholders.

Community feedback showed support for both scenarios. Parks Victoria is progressing with 'Scenario 2' to ensure future berthing demand does not impede on access to and use of the boat ramp and fairways. Following a review of the feedback, additional changes were made to Scenario 2 to ensure the final plan reflected community and stakeholder aspirations.

For a detailed summary of the insights and perspectives gathered during this consultation process, refer to the *Sorrento Local Port Area Plan Community Engagement Summary 2024*.

## 2.2 Considerations

Based on a review of existing condition reports and stakeholder consultation, the following considerations were identified. These considerations are numbered according to the figure below and are not listed in order of priority:

Consideration 1: Lack of vessel berthing to meet a rise in future commercial berthing demand and additional Licensed Tour Operators

Consideration 2: Fendering for large vessel berths is in poor condition

Consideration 3: No all-abilities ramp access to the western low landing

Consideration 4: Limitations for large vessels accessing the inner west berth due to shallow depths

Consideration 5: Opportunity to utilise Sorrento Pier Shed

Consideration 6: Condition of the Sorrento Pier, particularly the revetment masonry and unprotected timber piles

Consideration 7: Searoad Ferries passenger terminal development will restrict access to this area resulting in no berthing nor access to eastern low landing



Figure 5 - Sorrento Pier key considerations (AW Maritime, 2024)



## 2.3 The design criteria

The design criteria outlined below was developed to ensure that the plan addresses current site challenges and considers the future requirements of the primary users in the area.

### Sorrento Pier:

- Maintain the current level of service and T-shaped geometry of the existing pier.
- Rehabilitate the existing pier structure – prolong the remaining life of timber piles, replace deteriorated decking, kerbing and fendering on the outer berth.
- Remove the inner east low landing as the access is restricted and impacted by the Searoad Ferries passenger terminal development. Reinstall the decking at the same level as the main pier.
- Change to asphalt and restore load rating at the entrance of the pier. The current load rating at the approach timber (first section of pier) is 3t single axel and 6t double axel.
- Rehabilitate Sorrento Pier Shed to contemporary standards.
- Add fixed ramp at slope 1:14 to enable Disability Discrimination Act (DDA) compliant access to inner west low landing.
- Respond to future sea level rise which may result in a need to raise the level of the decking in the future.

### Berthing:

- Continue to provide berthing for existing Licenced Tour Operators (LTOs).
- Provide berthing on inner west low landing for vessels of maximum length 14m.
- Increase berthing to meet a rise in commercial berthing demand and additional LTOs based on current vessel lengths. This will be accommodated through an extension of the pier head (minimum of 20m to a maximum of 45m).
- Provide berthing for the Tall Ships (such as the Alma Doepel) which may visit several times per year for a short stay.

### Channels and Fairways:

- Ensure all channels and fairways meet the requirements of Australian Standards AS3962 (2020) Marina Design based on the design vessels for each area. This includes the Queenscliff-Sorrento ferry and Tall Ship Alma Doepel. The design has adopted the minimum widths to balance the navigable space.
- Provide a turning circle for the Queenscliff-Sorrento ferry to access its passenger terminal in accordance with PIANC Approach Channel guidelines.
- Ensure Sorrento Pier has clear navigation and access to Port Phillip.
- Ensure any proposed change to the pier does not impede access to the public boat ramp.

## 3 The proposed future use and function for Sorrento Pier

### 3.1 Features of the plan

The design features include:

- **Maintain the significance of the pier's historical character** by retention of the approach on the same alignment with T-head, and Sorrento Pier Shed.
- **Rehabilitate the existing Sorrento Pier.** The rehabilitation of the existing pier by repair of the timber decking, beams and piles.
- **Improve pier safety** by reducing potential conflict between increased pedestrian volume as a result of Searoad Ferries passenger terminal development, and authorised vehicles on the pier.
- **Remove the existing inner east low landing.** This involves the demolition of the existing inner east low landing and building a new deck level with the current pier deck.
- **Activate the Sorrento Pier Shed** via refurbishment of the interior while ensuring the external character is not diminished - minor works such as repainting, patch repair and assessment of existing services.
- **Western extension of the pier head** to enable additional berthing on the main pier and west low landing levels. Depending on the future demand, the extension could be to a maximum of 45m length to not impede on boat ramp fairways and access.
- **Widen the existing western low landing** to 3m to improve pedestrian flow.
- **Improve accessibility** by providing DDA compliant access via a fixed ramp with slope of 1:14 to the inner west low landing.
- **Improve navigational safety** on water and around the pier. This will be in the context of the ferry service, commercial vessel operations and on-water recreational uses. Prohibit swimming, snorkelling and scuba diving within the Searoads Ferries lease area, which includes underneath the ferry passenger terminal. Prohibit vessels in the area between the passenger terminal and the pier. Issue a Port Manager Direction that addresses the operation of the ferry and other vessels when the ferry is approaching or leaving its berth. Recreational fishing will continue to be permitted from the pier, with a requirement for fishing lines to be brought in when vessels are coming into berth.
- **Entrance channel widths** in accordance with Australia Standard AS3962 – 2020 Marina Design.
- **Turning circle for ferry** in accordance with PIANC guidelines. This may result in an adjustment to the boundary of the swing mooring ground.

The vessel matrix below outlines the proposed berthing capacity of the pier.

**Table 1 – Vessel Matrix for Sorrento Pier**

Sorrento Pier Vessel Matrix					
	Existing Pier	Pier Extension	Existing Landing	Low Landing Extension	Total
8.0 - 14.0m length vessels	3	3	2	3	11
14.0 - 21.0m length vessels	2	0	0	0	2
<b>Total</b>	<b>5</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>13</b>





## KEY FEATURES

- 1 Entrance channel width in accordance with Australian Standards AS3962 (2020)
- 2 Turning circle for ferry in accordance with PIANC Approach Channel guidelines
- 3 Remove inner east existing low landing and extend pier decking
- 4 Change to asphalt and restore load rating
- 5 Activation of Sorrento Pier Shed
- 6 Pile rehabilitation and deck replacement
- 7 Fixed ramp at slope 1:14 to enable DDA access to low landing
- 8 New fendering on the outer berths and low landing
- 9 Berthing for up to 14m design vessels
- 10 Berthing for up to 21m design vessels
- 11 Berthing for Queenscliff to Sorrento Ferry
- 12 Searoad Ferries terminal development
- 13 Pedestrian terminal access from Sorrento Pier

## LEGEND

- Entrance Channel
- Existing Pier Area
- Existing Low Landing
- Proposed Pier Extension.  
A maximum extension length of 45m to respond to future demand. Total maximum pier length is 133m.
- Proposed Low Landing Extension.  
A maximum extension length of 45m to respond to future demand. Total maximum low landing length is 79m.
- New Fendering

Figure 6 - Proposed future use and function of Sorrento Pier (AW Maritime, 2024)

## 4 Next steps

The proposals in this plan provide direction for Sorrento Pier and its surrounds which will inform future investment and management actions. Implementation of the proposed extension to the pier is subject to design development, further consultation with relevant stakeholders and attaining relevant statutory approvals. The environmental and heritage impacts of the pier extension will need to be assessed as part of this process.

Parks Victoria also plans to consult with the following:

- Searoad Ferries to determine where safe pedestrian access for ferry passengers can be accommodated.
- Mornington Peninsula Shire Council to improve pedestrian access pathways and wayfinding signage to the pier.

Priority actions:

- Define and establish the ferry turning area.
- Prepare and publish Port Manager Directions regarding the operation of the ferry and interaction with other vessels.
- Establish set asides under the Port Management (Local Port) Regulations to prohibit swimming, snorkelling and scuba diving within the Searoad Ferries lease area, which includes underneath the ferry passenger terminal. Prohibit vessels from entering the passenger terminal area (unless authorised).
- Investigate provision of utilities such as a sewer pump and water for commercial operators (e.g., user pays model), subject to future funding.
- Remove the inner eastern low landing subject to funding.
- Undertake a risk assessment and mitigation works regarding the interface with the Searoad Ferries passenger terminal development.

Longer-term actions

- Extension of the pier head subject to future demand and funding.
- Investigate infilling the section of pier approach to asphalt and restoring the load rating as recommended in this plan, subject to when the condition of that section requires asset replacement.



# Appendix – Sorrento Local Port Area Plan Background Technical Report

June 2024

## 1 Background

### 1.1 Land tenure and planning

The land located around Sorrento Pier comprises Crown land. The area has three different land managers:

1. Mornington Peninsula Shire Council (MPSC): appointed as a Committee of Management over the Foreshore Reserve including areas covering the access roads, public boat ramp, finger jetties, beach groyne, backshore, and land-based infrastructure.
2. Searoad Ferries: has a Crown Land Lease including land reclamation with roads, queuing area, building, rock revetment, berthing dolphins, and includes a triangle of water on the south-eastern side of the pier
3. Parks Victoria: is appointed as the committee of management under the *Crown Land (Reserves) Act 1978* for the area shaded green. Parks Victoria is also appointed as the port manager for the local port of Port Phillip. The port manager ensures port operations are safe, efficient, and effective, managing port infrastructure, and preparing and implementing Safety and Environment Management Plan.



Figure 1 – Land Managers (Aerial Image: MapShare 11/07/2023)

The Mornington Peninsula Shire planning scheme applies to the study area. The area is zoned Public Conservation and Resource Zone (PCRZ). The pier has an Environmental Significance Overlay – Schedule 25 – Port Phillip Coastal Area. In

addition, a Heritage Overlay applies to the pier and part of the foreshore. The area is also an area of Aboriginal Cultural Heritage Sensitivity.

## 1.2 Pier history

Sorrento is a historic seaside town and it was close to the place of first European settlement in Victoria. Before European ships disembarked at Sullivan Bay in 1803, Sorrento was inhabited by the Bunurong people, the traditional owners of the Nepean Peninsula and Mornington Peninsula region. The European convict settlement was short-lived and abandoned in 1804.

Hon. George Coppin saw the potential for Sorrento to become developed into a popular holiday destination from Melbourne. The Sorrento Pier was built in 1870 and the town was transformed. Coppin formed the 'Sorrento and Queenscliff Steam Navigation Company'. The paddle steamer *Golden Crown* was its first ship to run regular excursions from Port Melbourne to Sorrento and Queenscliff.

A horse-drawn tramway was initially built to transport holidaymakers from the pier up the hill to the Continental Hotel which was built in 1875. Coppin also built the Sorrento Sea Baths in 1875. Later a steam train enabled holiday makers to travel from the pier, along the main street to the Sorrento back beach, and this operated from 1890 to 1921 (refer to Figure 2). Coppin later founded the Bay Excursion Company and introduced luxury paddle steamers. Paddle steamers travelled between Melbourne and Sorrento until 1942. The largest paddle steamer was the *Weeroona* which could carry more than 1900 passengers; other paddle steamers included the *Ozone* and *Hygeia* (refer to Figure 3).

Water Technology completed an analysis of the shoreline from aerial photographs taken between 1935 and 2015 shown in Figure 5. These photographs illustrate the predominantly anthropogenic (man-made) changes to the coastline in the vicinity of the pier. The 2015 shoreline (blue dashed line) and 1935 (yellow dashed line) shorelines are displayed on each figure to highlight the relative changes across the years. The red line represents the shoreline at the time of the image. The photographs highlight the Sorrento Pier has maintained the same T-shaped pier over the years. While the land-based supporting infrastructure has changed over time, the pier itself has remained the same length offshore. A reconstruction of the pier took place sometime between 1998 and 2002, which included nine meters at the south-eastern end being removed, and a new extension of the same length added to the north-western end (Bryce Raworth, 2023). More recently, maintenance work in 2022 involved replacing certain timber components, installing steel ladders and fibreglass reinforced grid mesh decking on the western low landing.

The Sorrento Pier is significant due to its historical associations with ferry and recreational uses that have contributed to the development of Sorrento as a seaside resort town. However, its architectural and aesthetic significance has been reduced by the demolition of parts of the timber structure and changes in the surrounding area caused by the construction of an adjacent ferry terminal (Bryce Raworth, 2023).



Figure 2 - Sorrento Pier Postcard ca. 1905 (Source: SLVIC)



Figure 3 - Paddle Steamer SS Hygeia at Sorrento Pier ca. 1912 (Source: SLVIC)



Figure 4 - Sorrento Pier c1920-1954 (Source: SLVIC Rose Stereograph)



The pier still maintains its historical character, with the timber T-head and goods shed (known as the Sorrento Pier Shed by the locals) as well as the original alignment along the stone mole (refer to Figure 4). The Sorrento Foreshore Precinct document also mentions that both submerged and above-water timber jetty structures are important features of the precinct. Additionally, the Shire of Flinders Heritage Study 1992 suggests preserving the pier's historical character in its recommendations.

Given these findings, there is an expectation to retain the T-head in its present form (but with potential for like-for-like rebuilding or repairs) and the original pier alignment retained (Bryce Raworth, 2023).



Figure 5 - Sorrento Shoreline Changes from 1935 to 2015 (Source: Water Technology)

The 1995 aerial photograph shows the construction of the Sorrento public boat ramp and associated carpark on reclaimed land to the north-west of the pier. The 2005 aerial photograph shows the land reclamation at the pier entrance to support the operations of the Sorrento-Queenscliff ferry. In more recent times, as shown in Figure 6, the area has shown limited change besides the accretion on the beach on the eastern side of the pier between the rock groyne and the pier.

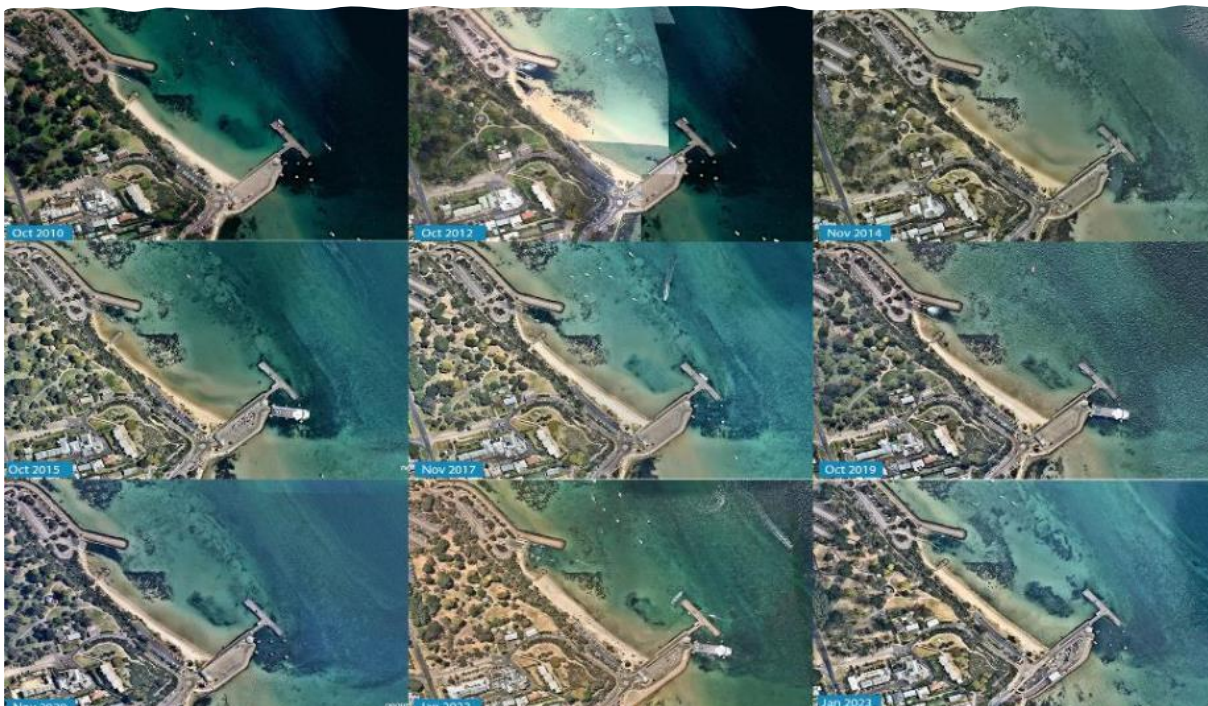


Figure 6 - Aerial Photographs of Sorrento from 2010 to 2022 (Aerial Images: Nearmap)



## 2 Existing conditions

### 2.1 Local port features

The shoreline of Sorrento around the pier has been significantly modified over time. The ferry terminal on the eastern side of the pier is constructed on reclaimed land and surrounded by a rock revetment. The ferry terminal area is only accessible for ferry passengers and is fenced to prohibit public access. Immediately south of the terminal are public concrete terraced steps which act as a seawall. Approximately 400m west of the pier is a public boat ramp which has also been constructed on reclaimed land with a rock breakwater and nearby rock groyne. The area between the boat ramp and the pier comprises a car park area and pedestrian path, with a sheltered sandy beach in front known as Sorrento West Beach.

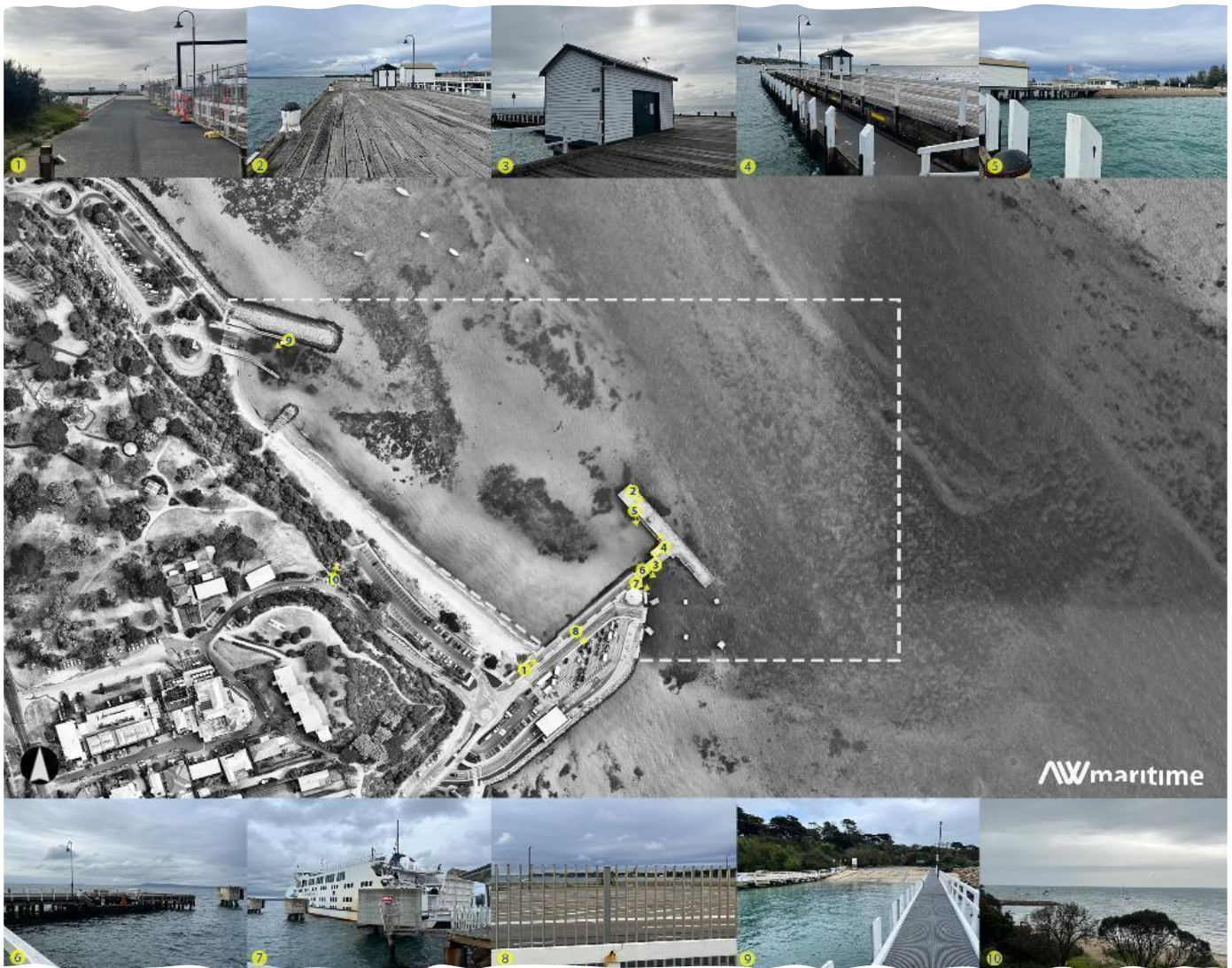


Figure 7- Existing Conditions of Sorrento Harbour

### 2.2 Bathymetric survey

The most recent bathymetric survey was completed in October 2020 by Farren Group. The survey had good coverage around the pier extending westward along the Sorrento foreshore to Point King. The survey shows the presence of a deeper channel (6.0m+) approximately 50m offshore from the pier. The results of this survey will be discussed in subsequent sections relative to the infrastructure.

A desktop review of aerial photographs between 2020 and 2023 indicated minimal change in seabed depths over the past three years around the Sorrento Pier.

## 2.3 Metocean conditions

The wave conditions in Port Phillip Bay originate from wind-generated waves. During summer, the wind at Sorrento comes predominantly from the south to southwest directions. During winter, when the wind is stronger, the wind comes predominantly from the north and the north-west. Water Technology completed a wave climate modelling study as part of a coastal assessment in 2016. The representative conditions at Sorrento were concluded:

- Mud Islands and The Sands reduce wave energy from wind generated waves from the north.
- The area is protected from strongest winds from north-west and southwest due to its geographical location.
- Conditions are typically calm, with over 80% of wave heights less than 0.1m
- Waves are predominantly from the north-northeast to east direction with rare north-easterly waves reaching up to 0.9m in summer and easterly waves of up to 0.7m in winter
- Wave periods at the site are generally less than six seconds.

Australian Standard 3962: 2020 Marina Design recommends that for marinas to experience a good wave climate the significant wave height shall be less than 0.3m within the marina and that the wave peak period is <2 seconds peak period. While Sorrento does not appear to be a “marina” it does meet the criteria under the definition of AS3962(2020) as a pier designed to provide berthing for vessels for recreation and commercial activity. While Water Technology did not model the 0.3m criteria specifically, they did state that conditions are typically calm, with over 80% of wave heights less than 0.1m so it could be concluded the wave climate at the pier is suitable for berthing.

## 2.4 Coastal process and sedimentation

The net regional direction of sediment transport is from north-west to southeast along the coastline. The sediment transport is driven by long period swells which diffract through The Rip into Port Phillip Bay. The boat ramp and ferry terminal land reclamations provide some wave protection to their adjacent beaches from these swells.

The Sorrento West Beach is relatively stable (AME, 2016). The alignment of the beach is consistent and appears to be the result of waves approaching from the north. There is evidence of waves diffracting around the breakwater head of the boat ramp resulting in a slight build up against the rock groyne at the north-west end of the beach. Due to the predominant longshore sediment movement from west to east across the site, there is a narrowing of the beach at the northern end of the car park and a retention of sand on the western side of the pier.

A beach renourishment program was implemented for Sorrento West Beach 2015-16 and the positive impact of those works can be seen in the November 2017 aerial photograph in Figure 6 with a widened beach. There is no evidence of significant changes to the shoreline alignment or nearshore bathymetry since the land reclamation associated with development of the terminal.

## 2.5 Sea level rise

The Marine and Coastal Policy (2020) requires designers to design for sea level rise of not less than 0.8 metres by 2100, and to allow for the combined effects of tides, storm surges, flooding, and coastal processes when assessing coastal hazard risks. Consistent with this policy, the following sea level rise scenarios should be considered for Sorrento Pier.

The term storm tide refers to coastal water levels produced by the combination of astronomical and meteorological ocean water level forcing. The meteorological component of the storm tide is commonly referred to as storm surge and collectively describes the variation in coastal water levels in response to atmospheric pressure fluctuations and wind setup.

Estimates of extreme coastal water levels have been developed for Port Phillip Bay by the CSIRO (2009) for various planning and sea level scenarios at Sorrento which were later reviewed and updated by Water Technology (2016) for the Sorrento Ferry Terminal Upgrade. The levels were based on a 1% Annual Exceedance Probability (AEP) (1-in-100 year) modelling. The storm tide levels for Sorrento have been adopted for this study and are based on the climate change scenario which combines sea level rise (IPCC 2007 A1F1) with an increase in wind speeds.

**Table 1- Sea Level Rise scenarios and Extreme Water Levels**

	Current	2040 High	2070 High	2100 High
Mean Sea Level (MSL)	0m AHD	MSL +0.20m	MSL +0.47m	MSL +0.82m
MHHW	0.4m AHD	0.6m AHD	0.9m AHD	1.2m AHD
HAT	0.5m AHD	0.7m AHD	1.1m AHD	1.3m AHD
Storm Tide Level 1% AEP (Water Technology, 2016)	MSL +1.30m (2016)	MSL +1.40m	MSL +1.70m	MSL + 2.10m
Storm Tide Level 1% AEP (CSIRO, 2009)	MSL +1.0m (2009)	MSL +1.25m (2030)	MSL +1.66m	MSL +2.10m

**Table 2- Deck and Floor Levels of Sorrento Pier**

	Australian Height Datum (AHD)	Chart Datum (CD)
Proposed Searoad Ferries Terminal Building ground floor	2.60m AHD	3.12m CD
Existing Sorrento Pier deck level provided by Parks Victoria	2.20m AHD	2.72m CD
MSL (2100, 1% AEP extreme water level)	2.10m AHD	2.62m CD
MSL (2070, 1% AEP extreme water level)	1.70m AHD	2.22m CD
MSL (2040, 1% AEP extreme water level)	1.40m AHD	1.92m CD
MSL	0.00m AHD	0.52m CD

Table 1 and Table 2 suggest under a 1% AEP storm tide level for various sea level rise scenarios the mean sea levels are elevated but inundation to the pier deck would not occur. However, during high tides and storm events part of the pier would be inundated by waves and spray.

## 2.6 Sorrento Pier

Sorrento Pier is a focus point of the area with an important history. The pier currently supports a wide range of users and activities:

- Promenading and walking
- Pedestrian access to the Sorrento-Queenscliff ferry ticket kiosk
- Short-term alongside berthing for commercial tour operators (fishing and wildlife charters)
- Short-term public alongside berthing for recreational users
- Recreational fishing
- Swimming.

The pier has maintained the same T-shape over the past 100 years. The pier head is divided into three distinct zones. There is a high landing area at the northern end of the pier head, a wide low landing on the inner western side, and a short low landing on the inner eastern side. The inner berths are via low landings which step down

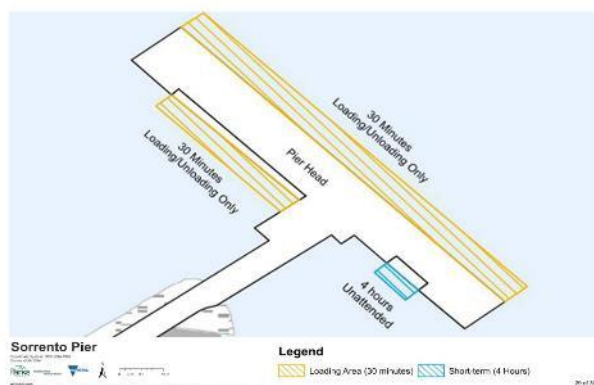


Figure 8 - Sorrento Pier Berthing Map (Parks Victoria, August 2020)

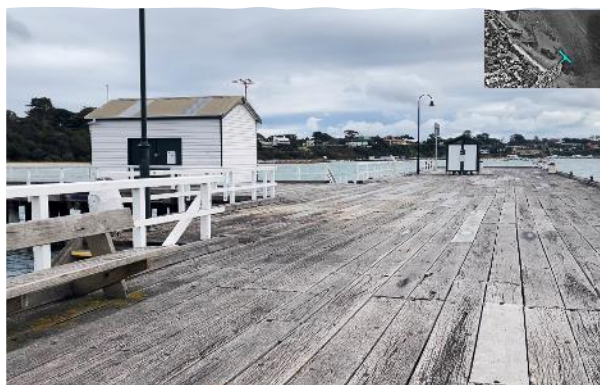


Figure 9 - Central Section of Sorrento Pier Head, June 2023



approximately 1.0m from the pier deck height. The low landings are only accessible via stairs which means they do not meet DDA compliance.

The pier enables alongside short-term berthing on outer and inner sides as shown in the berthing map in Figure 8. Each berth has specific time restrictions for berthing activities such as loading and unloading. The northern and western berth of the wharf allow for only 30 minutes berthing, whereas on the eastern side up to four hours are permitted. The berths are:

- Outer north berth is 88m long with depths >2.5m CD and often >3.0m CD.
- Inner west berth is 34m long accessed via low landing, with depths up to 1.8m and 1.9m CD. These depths would limit accessibility for some commercial vessels based on Table 3.
- Inner east berth is 9m long accessed via low landing, with depths up to 2.3m CD. The berth approach limits vessel size as there is only 10m width between the pier and the ferry dolphin, refer Figure 8 and Figure 11. This low landing will be affected by the new Searoad Ferry Terminal discussed later.

The pier currently supports the vessel loading and unloading of several Licensed Tour Operators (LTO) companies who rely on Sorrento Pier for their business operations, refer Table 3. There are no permanent berth holders at Sorrento Pier so LTOs do not have exclusive access to any berths and must follow the short-term berthing limits shown in Figure 8. The current practice is the LTOs schedule their tour start and finish times around each other to avoid conflicts. The LTOs pay an annual license fee to operate on state waters (Port Phillip). Fishing charters are exempt from LTO requirements.

**Table 3 – Current Sorrento Pier Operators**

Company	Activity	Vessel Capacity
Moonraker Dolphin Swims (LTO)	Seal and Dolphin Tours	Length: 21m, Beam: 5.48m, Draft: 1.4m
Polperro Dolphin Swims (LTO)	Seal and Dolphin Tours	Length: 13.6m, Beam: 4.6m, Draft: 2.0m
WaterMaarq (LTO)	Seal and Dolphin Boat Tours and PADI Free Diving	Vessel Apollo – Gemini, length 8.5m RIB, with capacity for 12 pax & 2 crew.  Vessel: Kavorca, length 6.0m RIB 8 pax and 2 crew.
Pro Red Fishing Charters	Fishing Charters	Length: 25ft or 7.6m (8 pax)
Rip Charters	Fishing Charters	Length: 42ft or 12.8m (12 pax)
Pro-Line Charters	Fishing Charters	Length: 60ft or 18.3m (20 pax)
GameRec	Fishing Charters	Length: 36ft or 11m (13 pax)



Figure 10 - West Low Landing, June 2023

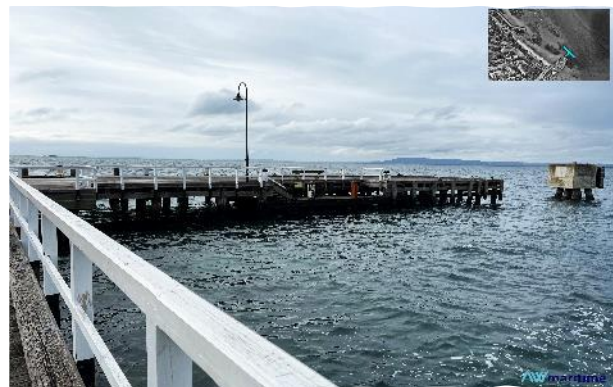


Figure 11 - East Low Landing, June 2023

Company	Activity	Vessel Capacity
Authorised Mooring Contractor	Commercial Operator – authorised mooring contractor	Total of 8 swing moorings for his vessels and for clients' vessels. Vessels range from 3.0m – 7.0m length

The traditional character of the pier is maintained, as seen in the timber decking, existing light poles, seating area and even the shed and shelter. The pier head serves as a space for fishermen, a turnaround point for pier promenading and vessel berthing.

## 2.7 Sorrento Pier Shed

Sorrento Pier Shed also known as the goods shed (Bryce Raworth, 2023) on the main walkway has been a feature of the pier for over 100 years. The structure and form of the shed appear to have remained consistent over the time. The shed is supported independently from the pier with the structural timber support in good to fair condition. The dimensions of the shed are approximately 5.5m x 3.5m with an access door to the pier.

Parks Victoria confirms the shed is currently used by a number of LTOs as a change facility and for storage.

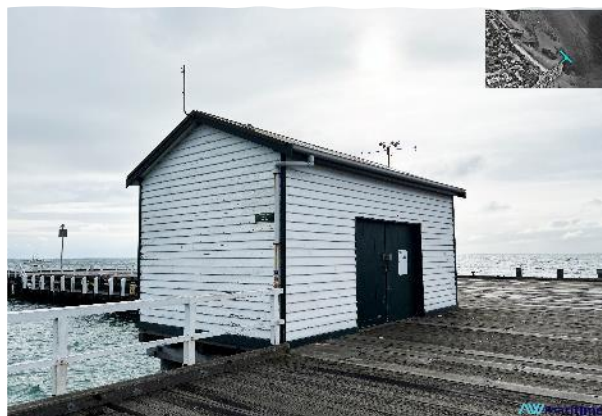


Figure 12- Sorrento Pier Shed, June 2023

## 2.8 Navigation and channels

The October 2020 bathymetric survey shows the presence of a naturally deep channel (6.0m+) approximately 50m offshore from the pier which provides sufficient draft for all recreational and commercial vessels using the pier. The depths are not guaranteed by Parks Victoria, however around the pier depths are in the order of 2.0m to 3.5m CD. There is a leading line (marked by two aids to navigation on the pier) within the Sorrento Channel at 169.8°, between channel marks #1(Starboard) & #2(Port), that directs vessel operators to the Sorrento Pier.

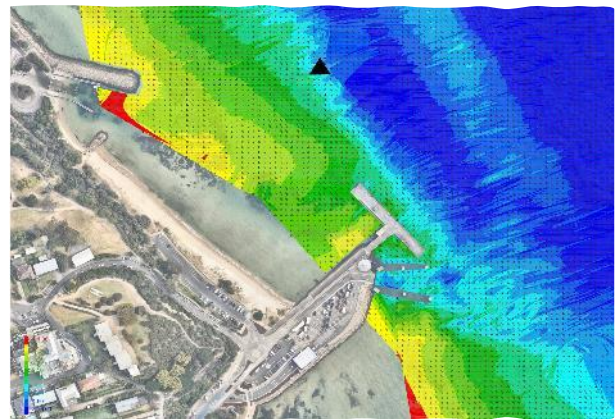
*Australian Standard AS3692: 2020 Guidelines for design of marinas* defines the minimum width of an entrance channel should be the greatest of three criteria: 20m, L+2 or 5B.

**Table 4 – Entrance Channel Widths for Recreational design vessels based on AS3692:2020**

Sorrento Boat Type	Boat Length (L)	Average Boat Beam (B)	Vessel Draft (m)	Preferred D+UKC	Minimum Width (5B or 20m)	Preferred (6B or 30m)
Recreational	8m	3.4m	0.7m	1.7m	17.0m	20.4m
Recreational	10m	3.9m	0.9m	1.9m	19.5m	23.4m
Recreational	12m	4.4m	1.0m	2.0m	22.0m	26.4m

**Table 5 – Entrance Channel Widths for known Commercial design vessels based on AS3692:2020**

Sorrento Boat Type	Boat Length (L)	Average Boat Beam (B)	Vessel Draft (m)	Preferred D+UKC	Minimum Width (5B or 20m)	Preferred (6B or 30m)
Commercial	7.6m	3.1m	0.7m	1.7m	15.5m	18.6m
Commercial	11m	4.3m	1.0m	2.0m	21.5m	25.8m
Commercial	12.8m	4.4m	1.02m	2.02m	22.0m	26.4m
Commercial	18.3m	5.4m	1.24m	2.24m	27.0m	30.0m
Alma Doepel	45m	8.1m	2.4	2.9m*	47.0m	30.0m



				(0.5m UKC)		
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AWM has analysed the depths and channel widths current available based on the current design vessels and concludes:

- Based on identified design vessels and usual conditions, there are currently no issues with outer north berth for vessels with length of 8m-21m
- Tall Ship Alma Doepel requires draft of 2.9m, which can be accommodated in the outer north berths which range from 3.2m to 3.5m C.D.
- The inner west landing berth has shallow spots of 1.8m and 1.9m CD which may prevent some commercial vessels from choosing this berth.
- The inner east pier inner landing berth is restricted with an approach width of 10m due to the ferry dolphin.
- There are shallow depths of 0.8m CD at the end of the nearby public boat ramp which are unavoidable to ramp users so this may limit the size of vessels using the ramp in all tides and/or require motors to be raised. The ramp appears suited for vessels 8.0m or less.

Figure 13 - Hydrographic Survey around Pier (Source: Farren Land Surveys, October 2020)

## 2.9 Sorrento ferry berth and terminal

The Sorrento-Queenscliff Ferry route has a long association with the area. While the ferry berth and terminal are not within the specified scope, its interface with Sorrento Pier needs to be considered particularly the key access points. The current tenant Peninsula Searoad Transport Pty Ltd trading as Searoad Ferries has been operating the car and passenger ferry service since 1987. There are two ferries which regularly service the route and the journey takes 40 minutes:

- MV Sorrento: 61m length, 17.4m beam, 2.3m draft (80 cars, 700 pax)
- MV Queenscliff: 60m length, 16.4m beam, draft 2.3m (80 cars, 700 pax)



Figure 14 – Queenscliff - Sorrento Ferry Berth, June 2023



Searoad Ferries has a dedicated lease for their land and mooring dolphin area and the area is fenced off from the public. Their operations are independent of Parks Victoria however they currently rely on the pier for pedestrian access to their ticket kiosk and for foot passengers to enter the secure area.

Searoad Ferries is currently building a new ferry terminal with an architectural render showing the proposed works in Figure 15. The development includes:

- Construction of a new two storey ferry terminal with cafes and toilets open to the public. A peak season kiosk at the pier entrance will also be constructed. This may influence the future use of Sorrento Pier Shed.
- Alteration of the lease boundary enabling the construction of the terminal building alongside the inner east low landing. This removes the need for the inner east low landing and availability for berthing.
- Terminal building levels to accommodate future sea level rises. The Finished Floor Level (FFL) for the ground floor of ferry terminal is FFL 2.6m while the deck level of Sorrento Pier is 0.75m below at FFL 1.85m (F2 Architecture, 2023)
- Continued reliance on Sorrento Pier for pedestrian access to the new ferry terminal.



Figure 15 - Proposed Sorrento Terminal (F2 Architecture, 2016)

## 2.10 Sorrento public boat ramp

A nearby three-lane recreational public boat launch ramp with finger jetties is managed by MPSC. The ramp is protected by a breakwater on the northern side of the ramp which enables boats to launch and retrieve in sheltered waters. The boat ramp will continue providing for recreational uses, and this has been considered in planning for the future of Sorrento Pier.

## 2.11 Swing moorings

Swing moorings have been part of Sorrento for many years. Swing moorings offer a low-cost option for people to store vessels on the water. There are two allocated swing mooring grounds located east and west of the pier. There are currently 197 swing moorings in Sorrento West and 218 moorings in Sorrento East, all of which are managed by Parks Victoria.



Figure 16 - Sorrento public boat ramp, June 2023

A few items to mention about the current mooring layout:

- Weather exposure – the swing mooring grounds have no harbour wave protection however metocean conditions concluded that conditions are typically calm, with over 80% of wave heights less than 0.1m
- Overlapping mooring positions – based on the GPS coordinates Parks Victoria has on record, some moorings are near each other and spaced such that some swing circles overlap (based on a 10m radius swing circle). This is due to authorised mooring agents not providing accurate plots.
- Proximity to boat ramp – the existing Sorrento West swing moorings do not present a navigational hazard to boat ramp users and there is sufficient channel width available for recreational boaters.
- Proximity to pier - the distance between the swing mooring grounds and the pier should ensure it doesn't impede access or impact on entrance channels/fairways. Some of the existing swing mooring coordinates for Sorrento West and Sorrento East are located outside the declared mooring grounds. This may be an operational issue to be considered by Parks Victoria in the future.

- Alteration of the lease boundary enabling the construction of the terminal building alongside the inner east low landing. This removes the need for the inner east low landing and availability for berthing.
- Terminal building levels to accommodate future sea level rises. The Finished Floor Level (FFL) for the ground floor of ferry terminal is FFL 2.6m while the deck level of Sorrento Pier is 0.75m below at FFL 1.85m (F2 Architecture, 2023)
- Providing for the ferry turning circle will result in an adjustment to the boundary of the swing mooring ground.

## 3 Economic and demand analysis

### 3.1 Demographics

Sorrento is part of the Mornington Peninsula Shire Council. The population in Mornington Peninsula has increased by 37,162 people over the span of ten years (ABS, 2021) and is now home to 169,600 people. The population of the Mornington Peninsula is ageing and the ratio of population aged 55+ has increased markedly with a third of the population now in that age bracket (ABS, 2021).

The employment rate in Sorrento is currently at 1,908 (3.08%) out of 62,311 for the whole region of Mornington Peninsula. The construction industry makes the greatest contribution to the economic output for this area with 44.4%. The industry sectors with the largest employment are construction 25.9%, followed by Accommodation & Food Services 14.5% and then Retail Trade with 13.5%. Industries related to on-water activities such as Tourism contribute 10.6%, Arts and Recreation Services 3.9%. Tourism supports an estimated 203 jobs in Point Nepean (Remplan, 2023).

### 3.2 Sorrento business survey

The MPSC conducted a Mornington Peninsula Business Survey 2021-2022 with a data summary published specific to Sorrento Township. Most businesses who replied to the survey in Sorrento employ less than five staff with the main industries in the area being retail (56%), and then accommodation, cafes and restaurants (15%). Sorrento businesses reported that their biggest challenges for the next 12 months was engaging staff and increasing revenue. Business confidence was positive, rating confidence levels six of out ten or higher. Most businesses (63%) felt their business income would increase over the next twelve months.

### 3.3 Seasonal demand

Sorrento is a township which experiences seasonal fluctuations in population and tourists due to the area being a popular destination for holiday homes and holidaymakers from Melbourne. The traditional high season is generally experienced from Christmas Day to the Australia Day long weekend, and then weekends up to Easter.

A Portsea Pier Visitor Monitoring Study (Parks Victoria, 2015) undertook video monitoring of pier visitation in 2015 with the objective to determine visitor numbers and patterns during the peak summer period and low winter period. The study showed weekends were the busiest times, with average visitation on weekends being more than double that of weekdays. The average length of stay varied from 10 minutes to 1 hour. Visitation was consistent through the day with peaks in mid-afternoon. The summer visitation numbers were, on average, 3-5 times that of the visitation in winter. While these statistics are specific to Portsea Pier, a similar pattern would be expected at Sorrento Pier as it is only 4km away.

### 3.4 Future demand and commercial opportunities

Sorrento Pier has an important maritime history and was important to development of the Sorrento township. The pier is a waterfront focal point currently providing infrastructure for ferry operations between Queenscliff-Sorrento and enabling an embarkation point for commercial tour operators. The economic data for the area suggests there is an increasing domestic local visitor economy with day trips very popular in MPSC.

With the development of the new Sorrento Ferry Terminal by Searoad Ferries this will change both amenity of Sorrento Pier and the visual outlook with a modern two-storey building. The ferry terminal will enable the public to access tourist information, indoor café, outdoor café, museum, souvenirs and toilets. The data suggests this increased offering would attract additional visitation from local residents and tourists to the area.

Although this LPAP focusses on the future of Sorrento Pier, AWM believes there are potential commercialisation opportunities for Parks Victoria to consider in future:

- Dedicated permit berthing for LTOs
- Provision of marine fuel dock (e.g. fuel supply) servicing commercial boats. The closest marine fuel docks to Sorrento are Queenscliff Harbour and Martha Cove Marina.



- Provision of sewerage pump out facilities for commercial boats
- Acknowledgement of the pier's importance in development of the Sorrento (e.g. plaques, walking tours)
- Utilisation of the sheltered waters on western side of the pier for paid activities:
  - Boat hire: self-drive boats for fishing or recreational boating, aquadonuts
  - Non-motorised watercraft hire: kayaks, stand up paddle boards
  - Art installation like a floating forest buoys
- Creation of an Instagram-worthy installation like letters "I ♥ SORRENTO"
- Utilisation of the Sorrento Pier Shed after contemporary upgrade:
  - Kiosk selling coffees and ice-creams
  - Retail offering for bait, fishing tackle and rod hire
  - Storage for recreational tour operations
  - Ticket booth for tours, water activities and rentals
  - Admin office for fuel and sewerage pump out facilities if provided

## 4 References

### 4.1 Reports

No.	Title	Author	Date
1	Searoad Ferries Sorrento Terminal Upgrade Coastal Assessment	Water Technology	August 2016
2	<i>Sorrento West Beach Renourishment Coastal Report</i>	AME	March 2016
3	<i>Mornington Peninsula Shire Council: Sorrento Recreational Boating Precinct Plan</i>	GHD	February 2011
4	<i>Sorrento Coastal and Marine Management Plan</i>	Mornington Peninsula Shire Council	December 2018
5	Morning Peninsula Planning Scheme Amendment C209- Sorrento Ferry Terminal	Craig Czarny, Hansen Partnership	October 2017
6	<i>The Effect of Climate Change on Extreme Sea Levels in Port Phillip Bay</i>	McInnes K., O’Grady J. & Macadam I. CSIRO Marine and Atmospheric Research	November 2009
7	Australian Standards 2962 (2020) Marina Design	Standards Australia	July 2020
8	<i>Port Phillip Bay Sea Level Managing Better- Now</i>	Association of Bayside Municipalities	July 2014
9	<i>Setting side areas in the Local Port of Port Phillip</i>	Parks Victoria	August 2020
10	<i>Setting side areas in the Local Port of Port Phillip and Western Port</i>	Parks Victoria	January 2019
11	Marine and Coastal Policy	The State of Victoria Department of Environment, Land, Water and Planning	March 2020
12	<i>Spendmapp Monthly Report April 2023 Local Government Area: Mornington Peninsula Shire</i>	Geografia Pty Ltd	April 2023
13	<i>Quarterly Economic Snapshot</i>	Geografia Pty Ltd	April 2023
14	<i>Mornington Peninsula Visitation Data Year Ending March 2023</i>	Mornington Peninsula Shire	March 2023
15	Mornington Peninsula Business Survey	Mornington Peninsula Shire	April 2023
16	<i>Portsea Pier Visitor Monitoring</i>	Parks Victoria	2015
17	<i>Heritage Review of Sorrento Pier</i>	Bryce Raworth	July 2023
18	<i>Shire of Flinders Heritage Study: Inventory of Significant Places</i>	Context Pty Ltd	1992, updated 1997
19	<i>Heritage Information: Piers and Jetties of Port Phillip</i>	Robin Crocker & Associates	July 2004
20	<i>Sorrento – Stakeholder engagement key findings</i>	Parks Victoria	August 2023



