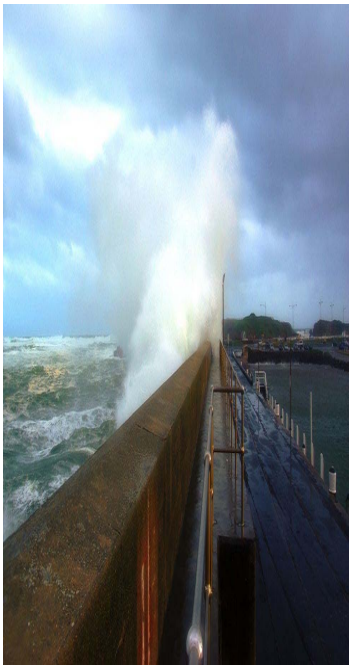
GHD Advisory



Port of Warrnambool Asset Management Plan

Warrnambool City Council

17 August 2018

GHD

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1. Introduction and Overview

1.1 Project Overview

The Port of Warrnambool (the Port) is a Government owned asset managed by Warrnambool City Council (WCC). Currently the major users of the port are commercial fishing, recreational fishing and the coast guard. The port precinct is a popular area for tourists and local recreation.

WCC has engaged GHD to develop an Asset Management Plan (AMP) for the Port in order to better understand and manage asset maintenance and capital spending into the future.

The development of this AMP included investigating a number of issues in some detail, some of which are described in standalone-reports.

The single largest and most complex asset of the port is the historic breakwater built in the 1890. As part of this project, GHD have conducted an inspection and assessment of the Breakwater, which is presented in a separate standalone report "*Port of Warrnambool Asset Management Plan - Breakwater Assessment*, GHD 2018".

WCC have also nominated a number of operational issues that need review and will inform the future management of the port. For example, swing moorings, vessel refuelling, waste disposal, dredging and traffic management. These issues are covered in the standalone report "*Port of Warrnambool Asset Management Plan – Review of Port Operations*, GHD 2018".

1.2 Overview of Asset Management Plan

1.2.1 AMP Development

This Asset Management Plan (AMP) has been developed by GHD asset management specialists with input from WCC infrastructure staff. The contents structure of this AMP has been aligned with ISO 55000 and the International Infrastructure Management Manual (IIMM).

1.2.2 Asset Management Objectives

The IIMM 2015 lists the key elements of Infrastructure Asset Management as follows:

- Providing a defined level of service and monitoring performance;
- Managing the impact of demand changes (growth as well as decline) through demand management, infrastructure investment and other strategies;
- Taking a lifecycle approach to developing cost-effective management strategies for the long-term that meet that defined level of service;
- Identifying, assessing and appropriately controlling risks; and
- Having a long-term financial plan which identifies required expenditure and how it will be funded.

Accordingly, the WCC's objective is to develop the Port of Warrnambool Asset Management Plan. The development of this AMP is to provide a methodology for the port assets into the future.

The AMP will also link asset/component data to financial plans. These financial plans and asset management plan is then integrated into corporate planning and the annual budget cycles.

1.2.3 Purpose of This Plan

WCC recognises that this AMP is the fundamental driver of services that impact directly on stakeholders.

A long-term planning approach is considered necessary given the large capital and operating expenditure expected, the long lives of the assets and the long lead times involved in planning for upgrades, replacements and the purchase or building of new assets. The sequencing and timing of works are developed through discussions with key stakeholders.

WCC desires to create a comprehensive AMP for its port related assets. The asset management plan will provide the following benefits to the WCC:

- Improved understanding of service level options, costs and risks
- Improved decision making based on a better understanding of the benefits and cost of alternatives
- Communicate and better justify renewal and maintenance funding requirements
- Demonstrable responsible ownership of assets
- Understanding future funding requirements
- Enhanced customer satisfaction
- Compliance with legislation

1.2.4 Plan Timeframe

This AMP covers a 15-year timeframe (2017/18 through to 2032/33). The plan assumes that port assets as a whole have an indefinite life and the main focus of the plan is on determining the strategies required for maintaining, rehabilitating and renewing components over the next 15 years. It is intended that this plan be reviewed every year with a major update every 3 to 5 years.

1.3 The Port of Warrnambool

1.3.1 Background

Figure 1 Aerial View of the Port of Warrnambool

The Port was designed by the eminent British harbour engineer Sir John Coode in 1879 and constructed between 1884 and 1890, and extended between 1910 and 1915. Warrnambool was the centre of a prosperous farming region from the 1840s, and following the construction of jetties in the 1850s the harbour was extensively used and was a regular stop on the coastal steamer route.

The Port consists of two parts: the concrete breakwater extending out into the bay, and the timber viaduct which once joined it to the shore, which now runs along the east side of the Merri River and is surrounded by land to the east. The breakwater is 30 ft. wide with a 15 ft. wide parapet with a walkway along the top. It is made up of a base of 32 ton concrete blocks with mass concrete above the waterline. The viaduct was originally a raised timber structure, but is now filled in below and to the sides with bluestone rubble, and there is an asphalt roadway, known as Viaduct Road, laid along the top. The area to the east of the viaduct which was once part of the harbour is now land, and a boat ramp, car park, café and sailing club have been constructed along the new shoreline.

Currently the major users of the port are commercial fishing, recreational fishing and the coast guard. The port precinct is a popular area for tourists and local recreation.

1.3.2 Port Management and Development

The Port of Warrnambool is owned by the State Government and the responsibility for port management rests with Department Economic Development, Jobs, Transport and Resources (DEDJTR). WCC is the local

port manager on behalf of DEDJTR appointed in accordance with the *Port Management (Local Ports) Regulations* 2015.

1.3.3 The Port at a Glance

While the breakwater itself is the major component of the port, there are a number of other asset types in place, as listed below. Locations of major assets are shown in Figure 2

- Aquarium (historic ruin)
- Beach access ramps
- Boat ramp
- Breakwater
- Drainage
- Dredged Area
- Fishing infrastructure
- Moorings
- Navigation infrastructure
- Rock revetment – Lady Bay (east) side
- Rock revetment – Stingray Bay/Merri River (west) side
- Seawall, stingray bay
- Services from Pentrobe Rd
- Timber jetties either side of boat ramp
- Viaduct (timber structure under road behind Stingray Bay revetment – you can see part of it exposed on the seaward side of the road)

Figure 2 Asset Locations

1.3.4 Replacement Costs

The port assets included in this AMP and their estimated current replacement values are summarised in Table 2. This reflects the replacement value of assets requiring renewal or replacement at the end of their useful lives:

Figure 3 Replacement Costs

Asset Type	Replacement Cost
Aquarium (historic ruin – maintain only)	$360,000
Beach access ramps	$12,000
Boat ramp	$1,280,000
Breakwater	$16,121,300
Drainage	$60,000
Fishing infrastructure	$560,000
Moorings	$52,500
Navigation infrastructure	$1,004,035
Rock revetment – Lady Bay (east) side	$186,000
Rock revetment – Stingray Bay/Merri River (west) side	$411,000
Seawall, stingray bay	$300,000
Services from Pentrobe Rd	$350,000
Timber jetties either side of boat ramp included	$1,200,000
Viaduct (this asset is not functional and is unlikely to be replaced)	$245,000
Grand Total	**$22,098,335**

1.3.5 Asset Condition

In preparation for this AMP, a visual condition audit was undertaken on the Port assets. Details of this audit and the scoring criteria are included in Section 4 – Life Cycle Management. The condition by percentage and value is shown below:

Figure 4 Assets Condition by Replacement Cost

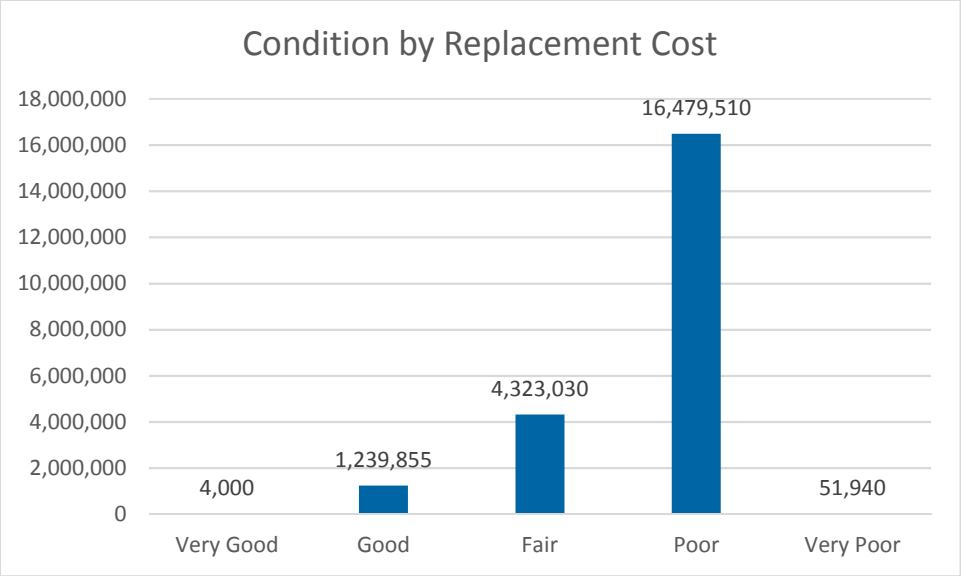


Figure 4 highlights the majority of the asset replacement cost over the next 15 years is in condition 4 – Poor. The detail behind this graph is in section 4 of this AMP.

Figure 5 Estimated Replacement Cost by Year

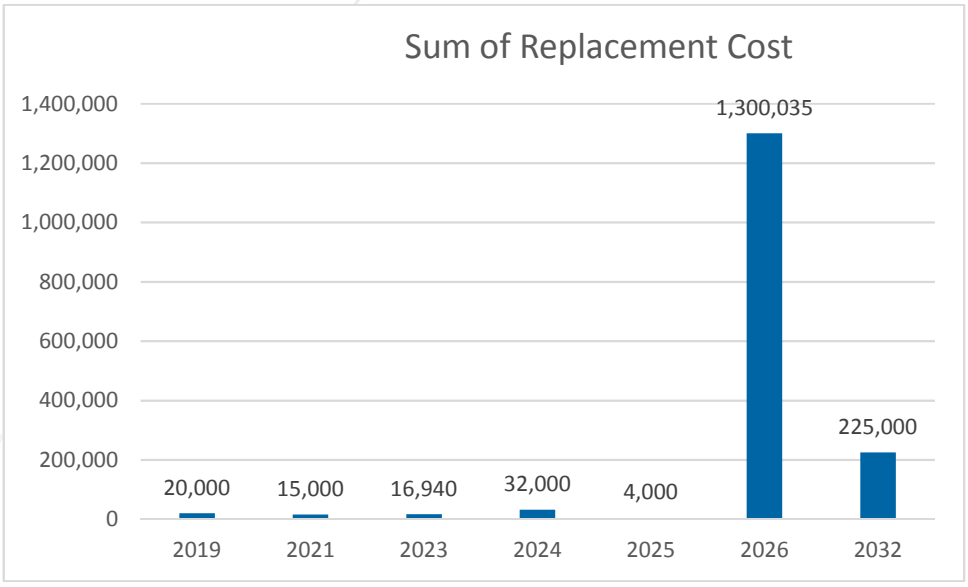


Figure 5 demonstrates the yearly replacement cost over the 15 year window. Where years are not shown eg 2020 no assets were identified as requiring replacement. The detail behind this graph is in section 4 of this AMP.

Figure 6 Number of Assets in Each Condition

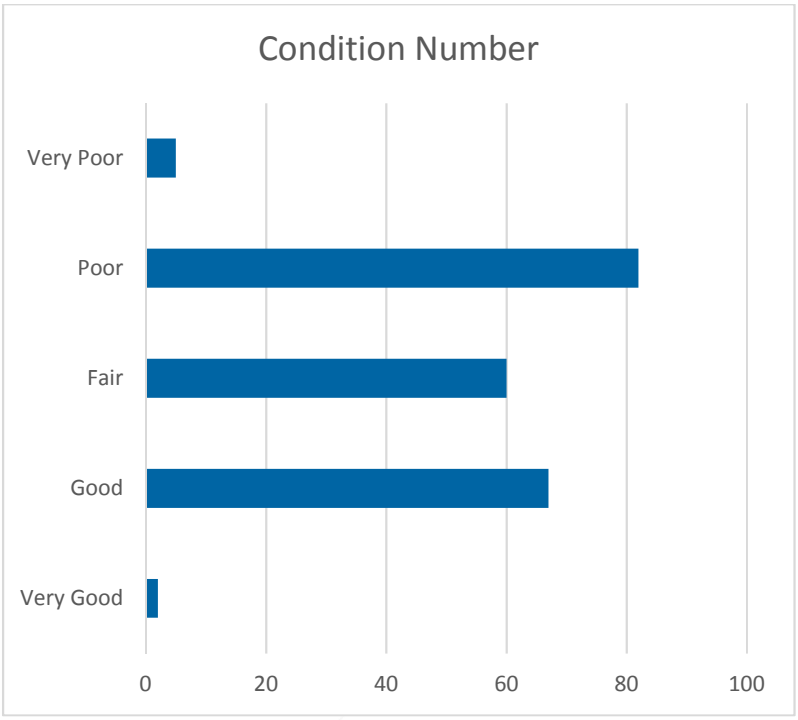


Figure 6 highlights the number of assets in each condition grade. The detail behind this graph is in section 4 of this AMP.

2. Levels of Service and Stakeholder Consultation

2.1 Customer Research and Expectations

Asset Management (AM) planning enables the balance to be determined between levels of service and the cost of the service (the price/quality relationship). This relationship is then evaluated in consultation with stakeholders to determine the levels of service they are prepared to pay for.

Defined Levels of Service (LoS) can then be used to:

- Inform stakeholders of the current level of service provided and any proposed changes to level of service and the associated costs
- Measure performance against defined LoS
- Develop AM strategies to deliver LoS
- Identify the costs and benefits of services offered
- Enable stakeholders to assess suitability, affordability and equity of the services offered.

One of the basic cornerstones of sound asset management is:

To provide the levels of service that the current and future stakeholders want and are prepared to pay for.

LoS therefore provide the platform for all decisions relating to infrastructure management. Before developing detailed asset management strategies, WCC needs to agree the LoS with stakeholders with consideration given to the following:

- Planned outcomes
- Legislative requirements
- Technical constraints

A master plan has been produced titled “Warrnambool Harbour Master Plan. The development of this plan involved public consultation and stakeholder engagement. It was undertaken during August and September 2017.

The master plan consultation covered the following themes;

- Parking and circulation
- Boat ramp and facilities
- Walkers, cyclists, swimmers, horses, tourists
- Environmental

Numerous responses were provided and can be seen in the Warrnambool Harbour Master Plan.

3. Growth and Demand

Planning for future growth and demand is imperative to provide economically sustained services to meet the future needs of WCC and its stakeholders.

This section describes the key growth and demand trends for the Port assets and the strategies that WCC will adopt to manage the growth and demand.

Growth and demand planning allows for the identification and quantification of areas within the Port that are likely to experience significant pressures. Although growth and demand are considered together in this section, it is worth noting that they do have different implications regarding the on-going function/delivery of the services.

Growth is typically described as an increase in the quantity of any of the following:

- Number of activities
- Increase in economic activity

Demand refers to the factors that influence demand for an asset, goods or service, for instance:

- Commercial/Industrial growth and development
- Property utilisation
- Changes to government policy or priorities
- Emerging technologies or innovation
- Events
- Seasonal factors

3.1 Demand Management Plan

The Warrnambool Harbour Master Plan outlines various demands as written in section 7 of the plan. The immediate term actions include;

- Extend northern car park including double length parking bays for horse floats and long vehicles. Realign the existing coastal trail to connect the path with the proposed car park and provide a wider coastal buffer to stabilise existing dunes.
- Construct upgraded facilities for horse wash down and waste at the rear of the car park.
- Construct a 3 lane boat launch including new road configuration to allow for queuing areas and improved circulation. Upgrade existing jetty to the north and construct a 2 level jetty and mooring facilities to the south.
- Undertake an assessment to identify short and long term requirements and upgrades to maintain the breakwater.
- Improve existing beach launch, address erosion issues and clean up contamination
- Provide fish cleaning facilities (interim treatment)
- Navigation aid to upgrade

4. Life Cycle Management

This Lifecycle Management (LCM) section provides the broad strategies and work programmes required to achieve the Levels of Service and Growth and Demand needs set out in Section 2 and 3 of this plan.

This section examines the lifecycle management of the Port assets managed by WCC.

The following aspects of lifecycle management are covered:

- Asset Value and Replacement
- Asset Condition
- Asset Defects
- Expenditure Forecasts
- Key Issues

4.1 Background Data

WCC has responsibility for maintenance of the Port assets. The breakwater is the major asset but there are a number of associated assets that form this AMP. The table below shows the asset types and sub types as identified from the site inspections. The full list of assets identified, there description, location and condition are given in Appendix B.

Figure 7 Asset Types and Sub Types

Asset Type	Asset Sub Type
Aquarium (historic ruin)	Domes
Beach access ramps	Vehicle Access Ramp
	Pedestrian Access
Boat ramp	Causeway (Paved Access To The Ramp Built On Fill)
	Ramp (The Section Sloping Down Into The Water. Concrete And Steel Structure)
Breakwater	Bollards
	Handrails
	Ladders
	Lights
	Low Level Timber Landing On Northern Side
	Parapet

	Stairs
	Timber Fenders
	Walkways
	Sea wall west (Lady bay side, from root of breakwater to aquarium)
Drainage	Pipes
	Pits
Dredged Area	Channel
Fishing infrastructure	Boat Wash Down
	Fish Cleaning Tables
	Weigh Station
	Pavement around weigh station boat ramp area
Moorings	3 moorings (location unknown – condition not assessed)
Navigation infrastructure	2 Leading Lights On Hill (Include The Modern Lights Attached To The Historic Lighthouses (Visible In Top Photo)
	Light On Breakwater
	Lighthouses (Buildings)
Rock revetment – Lady Bay (east) side	Rock Walls
Rock revetment – Stingray Bay/Merri River (west) side	Rock Walls
Seawall, stingray bay	Seawall
Services from Pentrobe Rd	Sewage
	Water
	Drainage and shower
	Telstra

	Drainage
	Electricity
Timber jetties either side of boat ramp	Timber jetty north
	Timber jetty south
Viaduct	Viaduct (timber structure under road behind Stingray Bay revetment – you can see small part exposed on the seaward side of the road, condition not assessed but assumed poor)

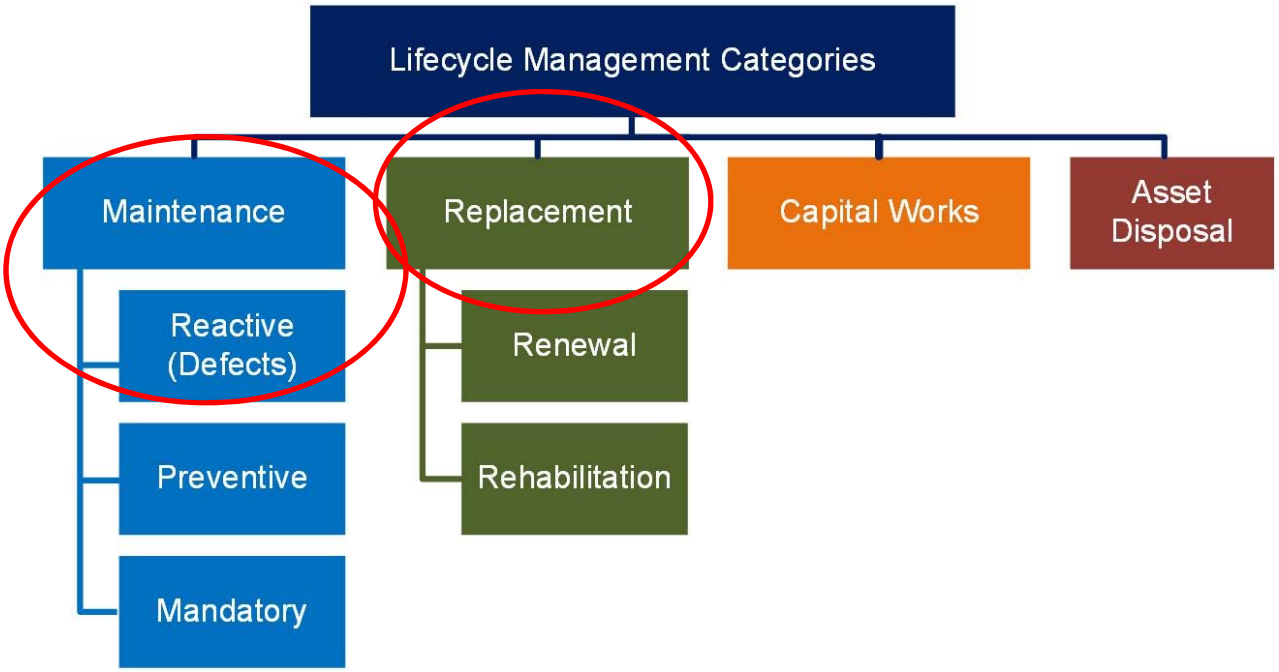
4.2 Lifecycle Categories

The lifecycle of the Port assets can be categorised into four main areas:

- Maintaining the existing assets
- Replacing the existing assets
- Growing the asset base through enhancing the service delivery or service demand
- Disposing of assets when they reach the end of their useful life or fail to deliver the level of service required

The figure below illustrates the following components of lifecycle management categories:

Figure 8 Lifecycle Management Categories



This version of the AMP covers maintenance (defects) and replacement as highlighted above. This aligns with the scope of work of this project commission.

4.3 Maintenance Plan

Operations and maintenance strategies cover the policies that will determine how the Port will be operated and maintained on a day-to-day basis to consistently achieve the optimum use of the assets.

Figure 9 Maintenance Categories

Mandatory Maintenance	Maintenance issues of a cyclic nature that are required to ensure legislative compliance. This includes task like maintenance of fire protection equipment and safety/compliance testing and tasks.
Preventative Maintenance	Maintenance issues which can be scheduled to occur during the designated year for actioning, for example painting and annual cleaning.
Reactive Maintenance	Reactive action to correct asset malfunctions and failures on an as required basis

This AMP address the Reactive Maintenance category only. This could also be known as “defects”.

4.4 Renewal Replacement Plan

Renewal expenditure includes the renewal or rehabilitation of assets to restore an asset to its original level of service i.e. capacity or the required condition. Required levels of expenditure on the cyclic asset replacement programme will vary from year to year, and will reflect:

- The age profile of the assets
- The condition /performance profile of the assets
- The ongoing maintenance demand
- The differing economic/useful lives of individual assets comprising the overall system of assets

Figure 10 Replacement Categories

Renewal	Renewal strategies are designed to provide for the progressive replacement of individual assets that have reached the end of their useful life. This is managed at a rate that maintains the standard and value of the network as a whole.
Rehabilitation	Rehabilitation strategies allow existing assets to be restored to their original service potential through reconditioning, rehabilitation or refurbishment of component parts.

Failure to maintain an adequate cyclic renewal programme will be reflected in a decline in the overall standard of the Port assets. Where the actual programme falls below the cumulative budget target, the shortfall will be reflected in the depreciation of the overall value of the Port, resulting in a lower LoS and the need for more reactive maintenance.

Rehabilitation of the Breakwater will be required in the next few years (refer sections 4.8, 4.9, 4.10). The council currently provides unmetered power and water on the breakwater used by commercial fisherman. In the event the Breakwater rehabilitation or harbour redevelopment this arrangement would be reviewed.

4.5 Creation/Acquisition/Augmentation Plan

Capital works involves the creation of new assets, or works, which upgrade or improve an existing asset beyond its current capacity or performance in response to demand or increased service delivery. While WCC recognises that asset renewal/rehabilitation and upgrades can occur simultaneously, it is important to note that the purpose of asset renewal is to prevent a decline in the service potential of the assets.

Asset renewal *is concerned with maintaining the condition of the assets and current service levels.*

Asset development *is concerned with the service improvements, measured by asset performance.*

Figure 11 Capital Works Categories

Growth in service Demand	Any asset development that is required as a result of growth or increased demand
Enhancing Service Delivery	Any asset development that is required as a result of a change in service levels

4.6 Disposal plan

Disposal is the retirement or sale of assets whether surplus or superseded by new or improved systems. Assets may become surplus to requirements for any of the following reasons:

- Under utilisation
- Obsolescence
- Undeveloped
- Provision exceeds required level of service
- Assets replaced before its predicted economic life
- Uneconomic to upgrade or operate
- Policy changes
- Service provided by other means (e.g. private sector involvement)
- Potential risk of ownership (financial, environmental, legal, social, vandalism)

Obsolete assets may not be replaced if they deteriorate to the point where they cannot be maintained.

The timber viaduct structure under viaduct road cannot be accessed for inspection and maintenance. It is expected that this will fail progressively over time which could result in potholes in the road. Potholes will be filled and patched as necessary to maintain the road, but the viaduct structure will not be repaired or replaced. If these works impact on the historic wooden structure then Heritage Victoria should be consulted to review heritage impacts.

4.7 Asset by Condition

It is critical that WCC has clear knowledge of the condition of their assets and how they are performing. Condition data has been captured during the recent site inspection, which will enabled WCC to understand future expenditure patterns and make management decisions. The development and continued use of condition assessment data will allow preparation of verifiable predictive decay curves for particular asset

types and permit prediction of remaining life. Consideration is also given to economic influences in the adopted life for the asset type.

4.7.1 Condition Assessment

The condition assessment model below is the basis of assessing the asset condition of the Port assets.

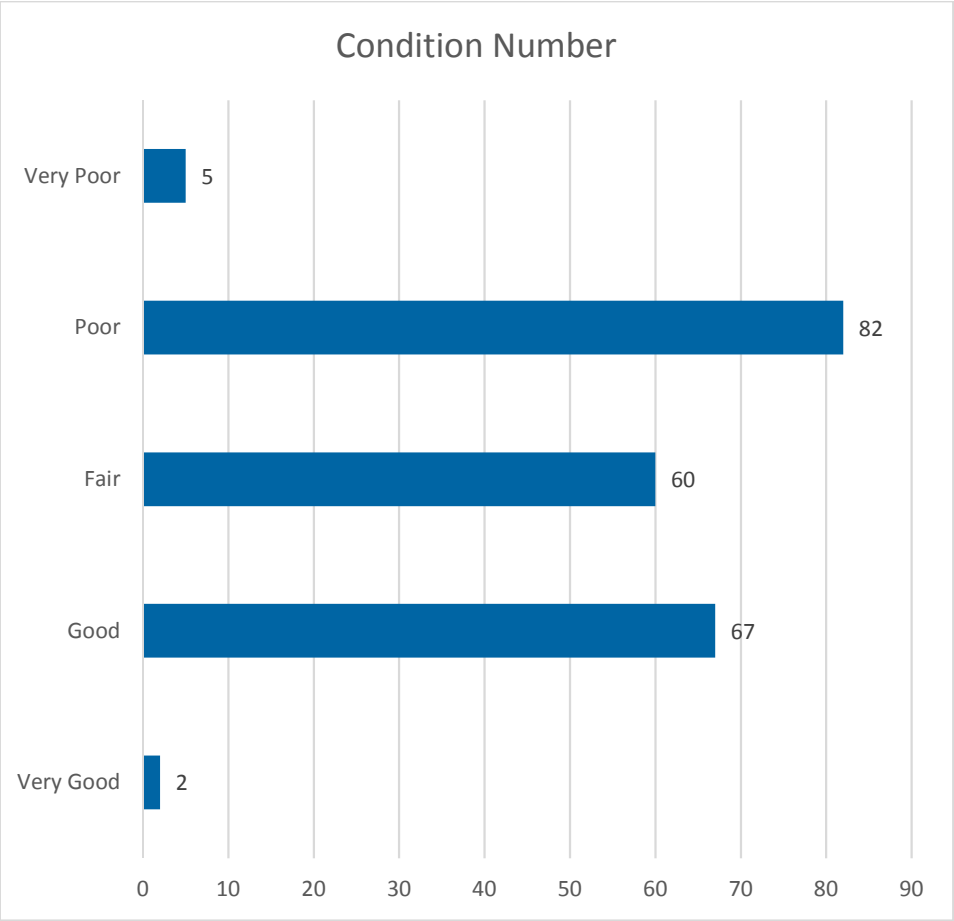
Figure 12 Condition Matrix

Grade	Condition	Description of Condition
1	Very Good	Very good condition, only programmed maintenance.
2	Good	Good Condition, only minor work required (if any)
3	Fair	Moderate condition, programmed maintenance and reactive maintenance necessary.
4	Poor	Poor condition, significant renewal necessary.
5	Very Poor	Very poor condition, major replacement necessary.

Condition assessment results are provided in the spread sheets in Appendix B. The overall condition of the visually-assessed Port assets can be classified as in fair to poor condition. There are however some assets in good condition.

The graph below indicates the number of assets in each condition category. This indicates that 40% of the assets inspected are in Poor to Very Poor condition.

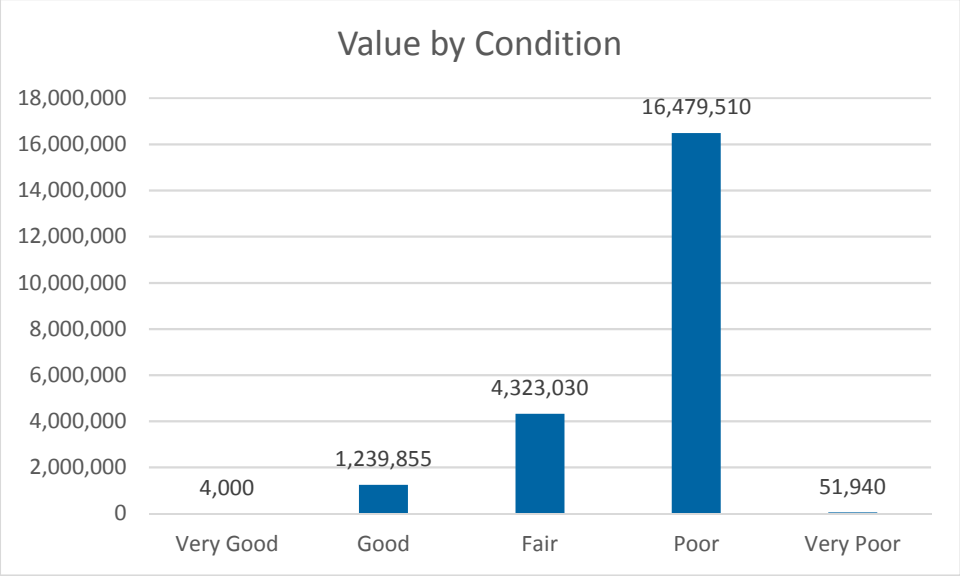
Figure 13 Assets by Condition



This table lists the asset sub types, their condition and the quantity in that condition.

Count of AssetCondition	Colum					
Row Labels	Fair	Good	Poor	Very Good	Very Poor	Grand Total
Boat Wash Down	1					1
Bollards			19			19
Causeway (Paved Access To The Ramp Built On Fill)	1					1
Fish Cleaning Tables			1			1
Handrails		5				5
Ladders	12					12
Light On Breakwater		1				1
Lighthouses (Buildings)	2					2
Lights		18				18
Low Level Timber Landing On Northern Side	1		1			2
Parapet	12	6	26		2	46
Pipes					1	1
Pits	1	2				3
Ramp (The Section Sloping Down Into The Water. Concrete And Steel Structure)	1					1
Sewage From Pentrobe Rd		2				2
Stairs	1	2	2			5
Timber Fenders	1		2		2	5
Vehicle Access Ramp			1			1
Walkways	17		23			40
Water	1	3				4
Weigh Station		1				1
Domes		3				3
Drainage and shower		2				2
Telstra		5				5
Drainage		5				5
Sea wall west (lady bay side)	1					1
Timber jetty north			1			1
Seawall	2					2
Electricity		5				5
Pavement around weigh station boat ramp area			1			1
Timber jetty south			1			1
Rock Walls	4	7	1			12
Viaduct			4			4
Pedestrian Access				1		1
2 Leading Lights On Hill (Include The Modern Lights Attached To The Historic Lighthouses	2					2
Grand Total	**60**	**67**	**83**	**1**	**5**	**216**

Figure 14 Value by Condition



The table below highlights the asset sub type, their condition and replacement cost

Very Good	**$4,000**
Pedestrian Access	$4,000
Good	**$1,239,855**
Domes	$360,000
Drainage	$75,000
Drainage and shower	$35,000
Electricity	$75,000
Handrails	$10,000
Light On Breakwater	$27,000
Lights	$72,000
Parapet	$50,820
Pits	$30,000
Rock Walls	$276,000
Sewage From Pentrobe Rd	$30,000
Stairs	$100,000
Telstra	$75,000
Water	$45,000
Weigh Station	$6,000
Fair	**$4,323,030**
Leading Lights On Hill	$4,000
Boat Wash Down	$200,000
Causeway (Paved Access To The Ramp Built On Fill)	$130,000
Ladders	$6,000
Lighthouses (Buildings)	$1,000,000
Low Level Timber Landing On Northern Side	$200,000
Parapet	$101,640
Pits	$15,000
Ramp (The Section Sloping Down Into The Water. Concrete And Steel Structure)	$1,150,000
Rock Walls	$240,000
Sea wall west (lady bay side)	$33,880
Seawall	$300,000
Stairs	$50,000
Timber Fenders	$10,000
Walkways	$867,510
Water	$15,000
Poor	**$16,479,510**
Bollards	$9,500
Fish Cleaning Tables	$561,000
Low Level Timber Landing On Northern Side	$100,000
Parapet	$220,220
Pavement around weigh station boat ramp area	$350,000
Rock Walls	$90,000
Stairs	$100,000
Timber Fenders	$20,000
Timber jetty north	$600,000
Timber jetty south	$600,000
Vehicle Access Ramp	$8,000
Viaduct	$245,000
Walkways	$14,132,790
Very Poor	**$51,940**
Parapet	$16,940
Pipes	$15,000
Timber Fenders	$20,000
Grand Total	**$22,098,335**

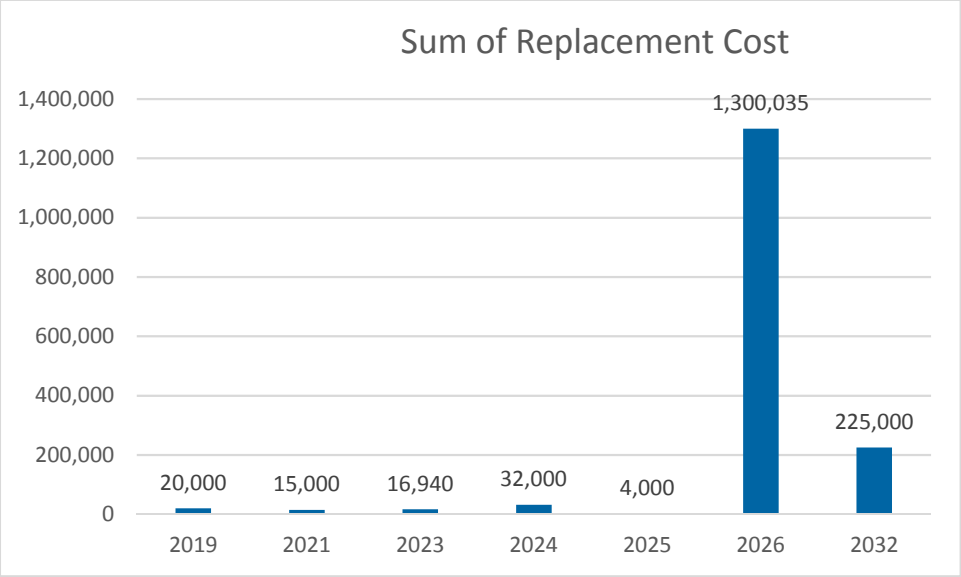
4.8 Asset by Value

The following graph illustrates the estimated end of life dates for the Port assets with the associated gross replacement cost. This gives an indication of when significant expenditure will be required to renew assets. This is only showing the next 15 year window.

The condition assessment has forecasted $598,000 of renewals/replacements of the assessed components over the next 15-year period. Business cases will be required for all works over $5m (Breakwater repair and boat ramp options or enclosed harbour). The main costs that contributed to the expenditure spikes over the forecast period include;

- 2026: Low Level Timber Landing On Northern Side of Breakwater (older section at eastern end)
- 2026: Timber jetty north side of boat ramp
- 2026: Timber jetty south side of boat ramp

Figure 15 15 Year Spend



Year	2019	2021	2023	2024	2025	2026	2032
Sum of Estimated Renewal Cost	20,000	15,000	16,940	32,000	4,000	1,300,035	225,000

The table below shows the asset sub types, the year of replacement and the cost involved (expenditure).

Sum of EstimatedReplacementCost	Column Labels						
Row Labels	**2019**	**2021**	**2023**	**2024**	**2025**	**2026**	**2032**
Boat Wash Down							$200,000
Bollards							
Causeway (Paved Access To The Ramp Built On Fill)							
Fish Cleaning Tables				$4,000			
Handrails							
Ladders							
Light On Breakwater						$35	
Lighthouses (Buildings)							
Lights							
Low Level Timber Landing On Northern Side						$100,000	
Parapet			$16,940				
Pipes		$15,000					
Pits							
Ramp (The Section Sloping Down Into The Water. Concrete And Steel Structure)							
Sewage From Pentrobe Rd							
Stairs							
Timber Fenders	$20,000			$20,000			$10,000
Vehicle Access Ramp				$8,000			
Walkways							
Water							$15,000
Weigh Station							
Domes							
Drainage and shower							
Telstra							
Drainage							
Sea wall west (lady bay side)							
Timber jetty north						$100,000	
Seawall							
Electricity							
Pavement around weigh station boat ramp area							
Timber jetty south						$100,000	
Rock Walls							
Viaduct							
Pedestrian Access							
2 Leading Lights On Hill (Include The Modern Lights Attached To The Historic Lighthouses					$4,000		
Grand Total	**$20,000**	**$15,000**	**$16,940**	**$32,000**	**$4,000**	**$300,035**	**$225,000**

4.9 Reactive Maintenance (defects)

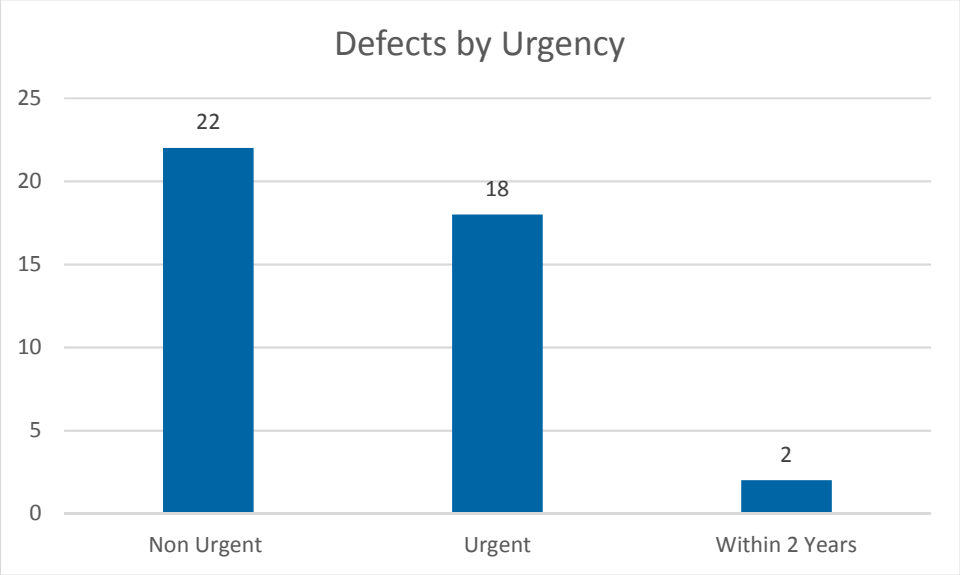
The following section identifies rectification works that are required to address defects noted during the recent inspections. Defects were prioritised based on urgency such as:

- Urgent
- Within 2 Years
- Not Urgent

Of note is the inclusion of the rock armouring. This is a significant cost and shows as the major spikes of expenditure. We have shown it over a 2 year period.

The rock armouring is recommended on the sea side of the breakwater from sea bed, to above the high water level (to match the existing armouring). The armour would extend from the existing armour (at approximately bollard 6) to the end of the wall close to the aquarium.

Figure 16 Number of Defects by Urgency



Urgency	Quantity
Not Urgent	22
Urgent	18
Within 2 Years	2

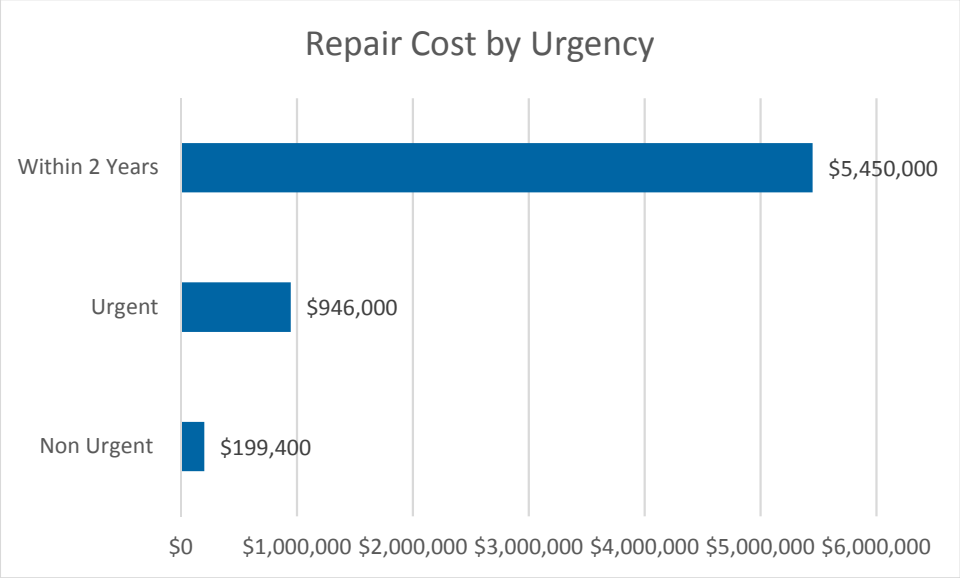
The defects identified were prioritised as Urgent, Within 2 years or Non Urgent. The graph above shows the number of defects in each category. The table below highlights the defects identified as Urgent.

Dredging (2018)
Dredge maintenance strategy and coastal management act
Dredging (2019
Dredge maintenance strategy and coastal management act
Low Level Timber Landing On Northern Side
Timbers cracking, splitting and warping. Jetty appears to be sloping and heaving on the sea side
Parapet
Cracking and delaminaiton to reinforced concrete capping beam. Exposure of reinforcement and loss of concrete block sections/erosion of concrete block face
Cracking and spalling of mortar. Loss of mortar from joints
Cracking and spalling of mortar. Loss of mortar from joints. Opening of joints and large section loss from blocks. Cracking to capping beam and loss of concrete block sections/erosion of concrete block face
Cracking and spalling of mortar. Loss of mortar from joints. Opening up of joints. Large section loss from blocks
Cracking to capping beam and loss of concrete block sections/erosion of concrete block face. Significant cracking spalling section loss and displacement of large sections of parapet
Cracking to capping beam exposure of reinforcement and loss of concrete block sections/erosion of concrete block face
General cracking and spalling to parapet render. Loss of concrete fines on main blocks. Voids forming at the main joints. Some loosening concrete with potential to fall. Delamination of most render surfaces
General cracking and spalling to parapet render. Loss of concrete fines on main blocks. Voids forming at the main joints. Some loosening concrete with potential to fall. Voids at base of wall with spray breaching.
General cracking and spalling to reinforced concrete wall. Evidence of reinforcement corrosion visible through larger cracks (in the order of 0.5 mm width). Some loosening/spalling concrete with potential to fall. Delamination of most render surfaces
General cracking to reinfoced concrete wall. Some evidence of reinfocement corrosion (rust staining) visible on the front surface
Significant cracking and spalling of reinforced concrete facia wall. Evidence of reinforcemet corrosion visible through (rust staining) larger cracks (estimated over 3 mm in some locations). Some loosening concrete with potential to fall. Delamination of most concrete surfaces
Sea wall west (lady bay side)
Cracking and spalling of sea wall render

4.10 Cost of Defects

The graph below indicates the estimated cost to repair by urgency. Items in the urgent category are repairs to the parapet, facia wall, and other surfaces on the breakwater, more detail on these repairs is given in the *Breakwater Assessment* report (GHD 2018). The major item in category of “within 2 years” is the extension of the rock armour along the seaside of the breakwater from existing armour at bollard 6 to the wall end at the aquarium.

Figure 17 Repair Costs by Urgency



The table below shows the assets covering each category and the estimated cost of repair.

Row Labels	Sum of EstimatedCostofRectification
Non Urgent	**$199,400**
Actually FAIR. Slight Loss of wearing surface. Looks reasonably even, perhaps slightly raised around edge of tram tracks.	$5,900
FAIR. Slight Loss of wearing surface.	$35,400
Loss of wearing surface. Pitting of concrete surface. General cracking. Separation at joints. Loss of concrete fines. Multiple surface finishes and age of concrete. Uneven surfaces are a trip hazard.	$35,000
Loss of wearing surface. Pitting of concrete surface. General cracking. Separation at joints. Loss of concrete fines. Multiple surface finishes and age of concrete. Uneven surfaces are a trip hazard. Aggregate very exposed in center of pathway.	$17,500
Loss of wearing surface. Pitting of concrete surface. General cracking. Separation at joints. Loss of concrete fines. Multiple surface finishes and age of concrete. Uneven surfaces are a trip hazard. Aggregate very exposed in parts of pathway.	$52,500
Slight Loss of wearing surface.	$5,900
Slight Loss of wearing surface. Pot holing. Deterioration around tram tracks. Uneven surface (lifted around each track).	$47,200
Urgent	**$946,000**
Cracking and delaminaiton to reinforced concrete capping beam. Exposure of reinforcement and loss of concrete block sections/erosion of concrete block face	$11,000
Cracking and spalling of mortar. Loss of mortar from joints	$8,000
Cracking and spalling of mortar. Loss of mortar from joints. Opening of joints and large section loss from blocks. Cracking to capping beam and loss of concrete block sections/erosion of concrete block face	$8,000
Cracking and spalling of mortar. Loss of mortar from joints. Opening up of joints. Large section loss from blocks	$16,000
Cracking and spalling of sea wall render	
Cracking to capping beam and loss of concrete block sections/erosion of concrete block face. Significant cracking spalling section loss and displacement of large sections of parapet	
Cracking to capping beam exposure of reinforcement and loss of concrete block sections/erosion of concrete block face	$16,000
Dredge maintenance strategy and coastal management act	$700,000
General cracking and spalling to parapet render. Loss of concrete fines on main blocks. Voids forming at the main joints. Some loosening concrete with potential to fall. Delamination of most render surfaces	$22,000
General cracking and spalling to parapet render. Loss of concrete fines on main blocks. Voids forming at the main joints. Some loosening concrete with potential to fall. Voids at base of wall with spray breaching.	$11,000
General cracking and spalling to reinforced concrete wall. Evidence of reinforcement corrosion visible through larger cracks (in the order of 0.5 mm width). Some loosening/spalling concrete with potential to fall. Delamination of most render surfaces	$11,000
General cracking to reinfoced concrete wall. Some evidence of reinfocement corrosion (rust staining) visible on the front surface	$11,000
Significant cracking and spalling of reinforced concrete facia wall. Evidence of reinforcemet corrosion visible through (rust staining) larger cracks (estimated over 3 mm in some locations). Some loosening concrete with potential to fall. Delamination of most concrete surfaces	$11,000
Timbers cracking, splitting and warping. Jetty appears to be sloping and heaving on the sea side	$121,000
Within 2 Years	**$5,450,000**
Breakwater deterioration. Placement of rock armouring along the seaside of the breakwater wall from existing armour at bollard 6 to the wall end at the aquarium	$5,400,000
Dredge maintenance strategy and coastal management act	$50,000
Grand Total	**$6,595,400**

5. Risk Management

Risk management is a process used to identify the specific business risks, together with any possible risks associated with the provision and management of the Port assets. This can be used to determine the direct and indirect costs associated with these risks, and form a priority-based action plan to address them.

The outcome of this evaluation is to be used to:

- Emphasize the importance of continuing to provide services and manage inherent risks
- Continually identify improvements required to avoid risk events, or minimise their impact or to realise identified opportunities

A Risk is defined in AS/NZS ISO 31000:2009 – Risk management – Principles and guidelines, as:

“Effect of Uncertainty on Objectives”

Effect: Deviation from the expected – positive or negative.

Objectives: Can have different aspects and can apply at different levels.

Risks: Often characterised by reference to potential events and consequences, and is often expressed in terms of a combination of the consequences of an event and the associated likelihood.

Uncertainty: The state, even partial, of deficiency of information related to, understanding or knowledge of an event, its consequence, or likelihood.

A risk assessment for the port assets was conducted in a workshop with GHD and Council representatives using Warrnambool City Council’s risk matrix system (refer Appendix A). The assessment considered risks associated with asset condition and deterioration as well as asset use and management within a planning timeframe of 15 years.

No.	ASSET	EVENT	LIKLEYHOOD (next 15 years)	CONSEQUENCE								MITIGATION		RISK	
				Financial	Safety & People	Natural Environment	Buissness Interuption (Council and private buissness)	Community/Govt/Public Image & Reputation	Legal/Govenance and Compliance	Public Disruption	**highest consequence**	Controls in place	Effectivness (controls in place)	**(based on current controls in place)**	Proposed further controls to be implimented
1	Breakwater	Major structureal failure in the landward part breakwater (between aquariums and outer end of lower landing, CH0 to 240). In this section there are areas of undermining, voids and significant cracks on the seaward face below water level (2017 Elstone diving inspection). Sections of the wall could collapse causing injury and preventing acess to the rest of the breakwater, lower landing or carpark adacent to aquariums.	Possible	Major	Major		Moderate	Major		Major	Major	monitoring and structural assessment	fair	High	Trial ground penetrating radar to detect voids place rock berm on seawad side to reduce loading
2	Breakwater	collapse/dinintergration of breakwater head (last 100). This area is founded on sand and experienced considerable settlement shortly after construction. There are large cracks in on both seaward and landward faces. Collapse would result in loss of navigation light, and may allow more wave energy to reach the boat ramp, but otherwise would not adversely affect activities on the breakwater	Possible	Minor	Major			Major		Moderate	Major	monitoring and structural assessment	Fair	High	
3	Breakwater	Deck failure in trunk Breakwater, CH100 to 240, corresponding to area of lower landing. In this section there are areas of undermining, voids and significant cracks below water level on the seaward side (2017 Elstone diving inspection). If large voides are present under deck a crane, fuel tanker or other vechile could punch trough. This could result in injury as well as loss of acess for the fishing fleet and loss of public access to the majority of the breakwater length.	Possible	Minor	Major					Moderate	Major	monitoring and structural assessment	Fair	High	using ground penetrating radar to detect voids
4	Breakwater	Falls from steep stairs between main deck and parapet level	Almost Certain		Moderate			Modeate	Moderate		Moderate	handrails, lighting and signage in palce	Good	High	
5	Breakwater	Deteriorating main deck surface and upper and lower parapet walls surface, including cracking and spalling of concrete, rusting of steel rails, clogging of drains. This deterioation could cause trips and falls, or damage to vechiles.	Almost Certain		Moderate			Minor			Moderate	lighting in place	Fair	High	
6	Breakwater	Drowning or injury resulting from fall from main deck into water. Currently no handrails or safety barriesrs on nothern side of main deck.	Unlikley		Major			Major			Major	ladders providing emergency egress from water, spacing varies, up to 140m.	Fair	Medium	signage advising public not to access breakwater durring storms
7	Moorings	Failure of one of 15 moorings in port (3 owned by the Council) resulting in unattended vessel coming addrift and damaging other vessels before washing up on beach where it could be a hazard to beach users.	Rare	Minor	Minor	Insignificant - Chance of spills very low because all vessels in port are strongly built and likley to survive grounding on beach intact.		Moderate		Modeate - closure of part of beach	Moderate	Annual mooring inspection by diver	Excellent	Low	
8	Boat Ramp	Waste from fish cleaning at ramp washed onto beach and into water. Attracts rays, seals and ocasional shark.	Almost Certain			Insignificant			Minor		Minor	dedicated bin provided in tuna season and for fishing competitions	Fair	Medium	

No.	ASSET	EVENT	LIKLEYHOOD (next 15 years)	CONSEQUENCE								MITIGATION		RISK	
				Financial	Safety & People	Natural Environment	Buissness Interuption (Council and private buissness)	Community/Govt/Public Image & Reputation	Legal/Govenance and Compliance	Public Disruption	**highest consequence**	Controls in place	Effectivness (controls in place)	**(based on current controls in place)**	Proposed further controls to be implimented
9	Boat Ramp	Structural failure of boat ramp, timber jetties or causeway could cause injury to users or damage to vechiles. Note missing rock and voids in armouring either side of causeway.	Unlikley	Minor	Minor			Moderate			Moderate	structure is well understood, regularly inspected and maintained	Good	Low	
10	Boat Ramp	Allignment and of ramp and configuration of harbour mean that the ramp is exposed to surge from swell and long period waves. This surge means that boats can move suddenly and unpredictable, users could loose their footing and be trapped between boats and side walls.	Likley		Moderate			Moderate - Issues are well understood by local			Moderate	signage wave baffels on sides of ramp	Poor	High	Masterplan seeking funding to address Rinstate program of configuration
11	Vechile Access Ramp	The main vechile and pedetrian access ramp to the beach (close to the pavilion) consists of a flexible matt over sand. Storms waves can wash sand away from the toe and sides of the ramp, resulting in an uneven surface and large step which is a hazard to pedestians and vechiles. Worksafe have issued a notice to make safe.	Almost Certain		Minor		Minor			Minor	Minor	Ramp is inspected after storms and reconstructed 6 to 10 times per year	fair	Medium	
12	Pedestrian Access Ramp	Ramp at the north end of carpark, used by pedestrians and horses. Surface? Similar issues to vechile access ramp - sand level fluctuatoon can cause drops and uneven surface	Almost Certain		Minor		Minor			Minor	Minor	Ramp is inspected after storms and reconstructed 6 to 10 times per year	fair	Medium	Masterplan to provide separate pedestrain and horse access
13	Sewer rising main and pump station	pump failure resulting in tempory loss of service to pavillion and public toilets (in the order of 1 to 2 hours)	Likley				Moderate				Moderate	failure would be quickly identifed and maintinence services are on call. Local holding tank in place?	Good	Medium	install telemtered monitoring system so failure can be identified quicker and rectified
14	Viaduct Rd	340m long timber viaduct (jetty) structure supporting western carrigeway of Viaduct Rd. Built 1890, in filled with sand and protected by rock revetment on Merri River side in apox. 1958. The revetment prevents visual inspection of the structure and it is not known to what extent this structure still supports the roar and what condition it is in. The structure could fail durring a storm or withthe passage of a heavey vechile. Consequence would be subsidance of the road and possible damage to a vechile. Eastern carrigeway would likley be unaffected so acess to the port precinct would not be totally cut off.	Possible	Minor	Minor		Minor	Minor			Minor	Road is closed durring major storms	Fair	Low	inspect viaduct. Check for voids under road and fill if required
15	Viaduct Rd	Waves overtop the revetment and wash over road in storms every 5 to 10 years. Rocks from revetment are also thrown onto road. This can result in damage to pavement and closure of carrigeway for repairs. Eastern carrigeway less likley to be unaffected so acess to the port precinct would not be totally cut off	Likley	Minor	Minor		Minor	Minor			Minor	Road is closed durring major storms	Good	Medium	Inspect rock revetment and repair as required
16	Merri River Revetment	Rock Revetment built on Merri River side of viaduct c.1958. Durring storms armour rock form revetment can be dislodged and thrown over road. Dislodgement of multiple armoer rocks from one area could lead to rapid erosion of material behind revetment, undermining the road and damage to the viaduct structure.	Possible	Minor							Minor	inspect after storms and repair as needed	Good	Low	

6. Financial Forecasts

To undertake a sustainable, long-term approach to asset management, it is essential to prepare long-term financial forecasts. This allows a long term view of how the asset will be managed, how much this will cost and when additional funding may be required to meet expected service levels. These financial forecasts are a culmination of the previously discussed aspects of the Asset Management Plan such as:

- Levels of Service
- Growth and Demand Management
- Lifecycle Management
- Condition Ratings
- The above forms the basis of the long-term funding requirements.

Expenditure projections within this plan have been classified as replacement (renewal) or maintenance (defects).

These are discussed below.

Replacement (Renewals)

Renewal expenditure includes rehabilitation and replacement of assets to restore an asset to its original level of service, i.e. capacity or the required condition. Renewals expenditure forecasts cover the cost of asset renewal through its whole lifecycle through to disposal of the asset.

Renewal expenditure is work that restores an existing asset to its original level of service, i.e. capacity or the required condition.

Maintenance (Defects)

Maintenance expenditure that is required for the day-to-day operation of the Port assets whilst maintaining the current levels of service and optimising asset lives.

Assumptions

The following general assumptions have been made in preparing the 15-year expenditure forecasts:

- All expenditure is stated in dollar values as at June 2018 with no allowance made for inflation over the 15-year planning period.
- Maintenance and renewal allocations have been based on preserving current levels of service. No significant optimisation works have been allowed for.
- Remaining lives for assets are based on a visual condition assessment
- Cost estimates are based on +/- 50% and should not be used for quoting purposes

The most significant potential changes to the financial projections shown will result from the factors below:

- Changes in the desired level of service and service standards, particularly through growth in demand.
- Assumptions have been made as to the useful lives and estimated remaining lives of the asset categories and their components based on current local knowledge and experience, historical

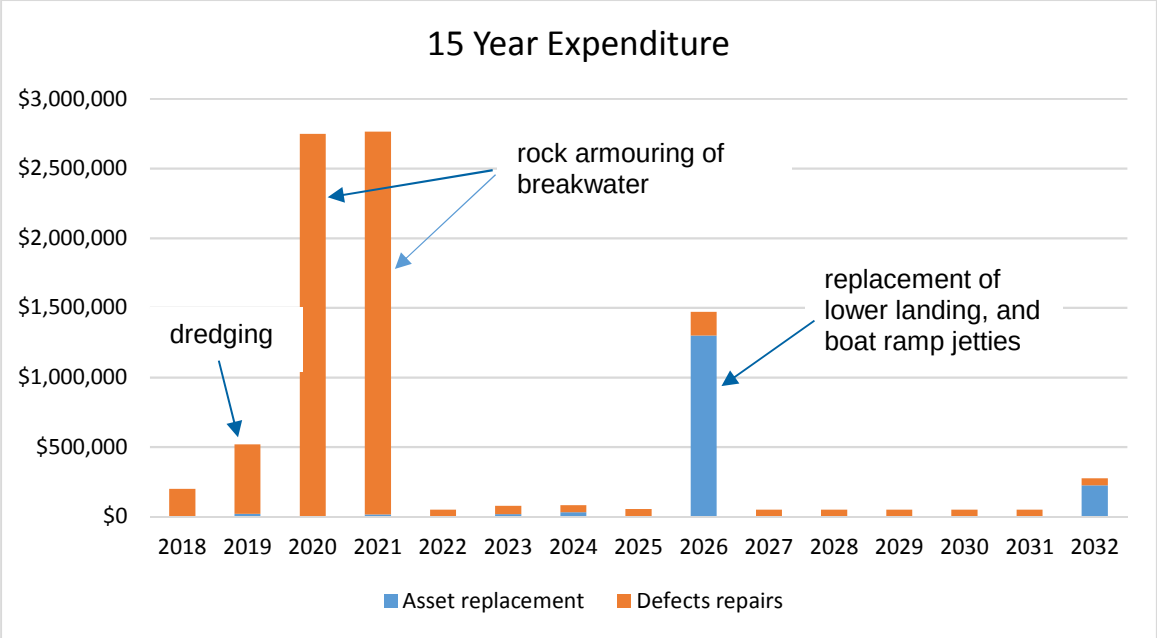
trends, and predictive modelling outputs. These are routinely reviewed and the accuracy improved based on real time assessments of asset deterioration.

- Changes in contract rates above inflation due to market or other external influences.

Expenditure Details

For the purposes of this graph, urgent defects have been shown in year 1 (2018, 2019), within 2 years defects in year 2 and 3 (2020, 2021) while Non Urgent have been shown over the balance of the 15 years. These years are at the discretion of WCC.

Figure 18 Expenditure



	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Replacement		$20,000		$15,000		$16,940	$32,000	$4,000	$1,300,035						$225,000
Defects	$200,000	$500,000	$2,750,000	$2,750,000	$50,000	$61,000	$50,000	$50,000	$171,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
Total	$200,000	$520,000	$2,750,000	$2,765,000	$50,000	$77,940	$82,000	$54,000	$1,471,035	$50,000	$50,000	$50,000	$50,000	$50,000	$275,000

This graph demonstrates the 15 year expenditure covering asset replacement and maintenance (defect repair).

Years 2020 and 2021 are costs to replace / extend the rock armour along the breakwater. Year 2026 is described in section 4.8. For a full view of the asset condition assessment details, please refer to Appendix B.

7. Processes Practices and Improvement Plan

This plan is a living document, which is relevant and integral to daily activity. To ensure the plan remains useful and relevant the following on-going process of AMP monitoring and review activity should be undertaken:

- Formal adoption of the AMP by WCC
- Review, develop and formally adopt levels of service to meet stakeholder expectations
- Revise AMP annually to incorporate and document changes to works programmes, outcome of service level reviews and new knowledge resulting from the AMP improvement programme.
- Quality assurance audits of AM information to ensure the integrity and cost effectiveness of data collected.
- Peer review and external audits to assess the effectiveness with which this plan meets corporate objectives. Periodic internal audits should be undertaken to assess the adequacy of Asset Management processes, systems and data and external audits should be undertaken to measure Asset Management performance against 'best practice'.

The purpose of the Improvement Plan is to:

- Identify and develop implementation of Asset Management planning processes. This includes
    - The cycle of asset management plan monitoring, review, revision and audit to improve the effectiveness of asset management plan outputs and compliance with audit criteria, legislative requirements and best appropriate practice
    - The definition of service standards reflecting community and stakeholder outcomes through consultation. The asset management plan is used to identify service level options and costs, and the delivery of services is a key objective of asset management planning.
    - Identify and prioritise ways to cost-effectively improve the quality of the AMP, and therefore decision making and service delivery.
    - Identify indicative time-scales, priorities, human and financial resources required to achieve Asset Management planning objectives.

7.1 Asset Management Improvement Plan

AMP Section	Improvement
Introduction and Overview	Nil identified
Levels of Service and Stakeholder Consultation	While a number of issues through the master plan were identified, there needs to be proactive targets set.

AMP Section	Improvement
	The use of customer complaints is a reactive process. Complaints can't be compared to targets as described above
Growth and Demand	The master plan highlighted some demands but nothing suggesting these will be implemented
Life Cycle Management	Nil identified
Risk Management	Review to determine if any risks have been missed
Financial Forecasts	Nil identified
Processes Practices and Improvement Plan	Align the management of improvement plans with other WCC AMP's

GHD Advisory

Appendices

Appendix A - Warrnambool City Council Risk Matrix System

Risk Likelihood Descriptors

Likelihood Level	Likelihood Descriptor (& Rating Factor)	Probability Description
A	**ALMOST CERTAIN**	• The event will occur on a frequent basis is expected to occur in most circumstances • High level of recorded incidents and / or very strong anecdotal evidence • Great opportunity, reason or means to occur • Strong likelihood of recurrence • More than 80% chance of occuring
B	**LIKELY**	• Considerable opportunity, reason or means to occur • Regular recorded incidents and strong anecdotal evidence • Anecdotal evidence indicates medium frequency • Considerable opportunity to occur • Between 50 - 80% chance of occuring
C	**POSSIBLE**	• The event may occur at some time • Few, infrequent, random recorded incidents or little anecdotal evidence • Very few incidents in associated organisations or comparable facilities • Some opportunity, reason or means to occur • Between 30 - 50 % chance of occuring
D	**UNLIKELY**	• The event could occur at some time • Very few recorded or known incidents • No recent incidents in associated organisations or facilities • Little opportunity, reason or means to occur • Between 10 - 30% chance of occuring
E	**RARE**	• The event will only occur in exceptional circumstances • No recorded or known incidents • Little opportunity for occurrence • Less than 10% chance of occurring

Risk Consequence Descriptors

Consequences Level & Description	Financial (budget overruns, direct costs, legal costs, 3rd party damage)	Safety & People (Staff & Public)	Natural Environment	Business Interruption to Council or private business	Community /Govt / Public Image & Reputation	Legal/Governance and Compliance	Public Disruption (Social, Cultural, Assets, Heritage)	Project Quality	Project Time Test
5 EXTREME	• Loss event >than $20 Mil to Council • Significant failures in a Major Project or Service Program cause cost blow-outs by more than 50% of budget	• Multiple fatalities • Pandemic affect on public and or staff health	• Irreversible ecosystem damage to a significant area /environmental feature of the municipality caused by Council to such an extent that the surrounding natural environment is changed forever in a negative manner e.g. destruction of Lady Bay	• Threatens Organisation viability e.g. ○ Collapse of a major IT system leading to unrecoverable loss of core data ○ Permanent loss of a Major Building or Facility ○ Disruption or loss to all or the majority of corporate services, or Critical Services provided to key stakeholders e.g. HACC Services outside of their maximum allowable downtime (see BCP terminology)	• Government action including prosecutions, and removal of Councillors / senior Officers • Adverse national or international media attention relating to Council's actions or inactions for more than 1 month	• Very serious litigation e.g. class actions resulting in significant prosecution and penalty for Council as a whole which would have long term negative impacts on Council's financial and/or reputational stability	• Significant regional economic impact leading to multiple closures of local businesses and consequent financial impact on the community as a whole • Significant and long-lasting impact on the community at large • Permanent loss of significant numbers of structures or items of cultural significance	Major deficiencies with all project deliverables. No requirements met	Project failure. Cannot be completed in time or budget
4 MAJOR	• Loss event >than $5 Mil < $20 Mil to Council • Significant failures in a Major Project or Service Program cause cost blow-outs by > 25% < 50% of budget	• Single fatality • Permanent disability to member of staff caused through work injury •Permanent disability to member of public caused through injury • Serious health impact on several members of public / staff causing hospitalisation as an inpatient to > 10 persons	• Very serious long-term environmental impairment of local eco system functions • Significant pollution / damage requiring restoration work to local environment E.g.: large harmful chemical spill direct to waterway	• Significant Impact on long term Business Drivers and Operations e.g. ○ Collapse of a major IT system leading to more than 30 days downtime ○ Permanent loss of a Minor Building or Facility or disruption to a Major Building or Facility for more than 30 days ○ Disruption of an Important Service provided to key stakeholders outside of their maximum allowable downtime (see BCP terminology)	• Adverse national media attention relating to Council's actions or inactions for > 1 week < 1 month • Government interest including investigations / or non-scheduled audits	• Major breach of legislation / litigation involving court action with possible significant civil or criminal charges resulting in jail time for senior staff	• Major economic impact on district's businesses causing some closures and concern amongst most local businesses • Significant long term adverse effect on a large group of residents • Significant permanent damage to a number of structures or items of cultural significance	A majority of key requirements may not be met	Severe impact on Project milestones. Critical path affected
3 MODERATE	• Loss event >than $1 Mil < $5 Mil • Significant failures in a Major Project or Service Program cause cost blow-outs by > 10% < 25% of budget	• Moderate injury/illness to staff >10 days lost time to one or more persons • Moderate health impact on members of public (1 or more) requiring attendance at hospital	• Serious medium-term environmental impairment of local eco system functions • Pollution / damage requiring restoration work to local environment Eg:oil tanker spill on roadway caused by Council	• Major Impact on short term Business Operations e.g. ○ Interruption to the IT system leading to more than 7 days but less than 30 days downtime ○ Disruption to a Major Building or Facility for more than 7 days but less than 30 days ○ Disruption of an Non-Essential Service provided to key stakeholders outside of their maximum allowable downtime (see BCP	• Adverse local media attention relating to Council's actions or inactions for > 1 week • Key stakeholder attention causing adverse impact on staff and/or Council	• Serious breach of legislation • Investigation or report to authority leading to possible prosecution and/or moderate fine • Litigation e.g. formal court action for a breach of legislation or non-compliance leading to moderate fines or reprimands	• Moderate economic impact on community businesses causing financial loss to most of them • Some disruption to a wider group within the community • Minor permanent damage to structures or items of cultural significance	Some key requirements not met	Significant impact on project milestones. Critical path can be recovered
2 MINOR	• Loss event >than $50,000 < $1 Mil to Council • Failures in a Major Project or Service Program cause cost blow-outs by > 5% < 10% of budget	• Moderate injury/illness to staff < 10 days lost time to one or more persons • Minor health impact on member of public/ staff not requiring medical attention	• Short-term environmental impairment of local eco system functions • Pollution / damage requiring restoration work to localised area Eg: waste treatment plant at Saleyards overflow	• Inconvenient but no real ongoing business impact e.g. ○ Interruption to the IT system leading to more than 1 day but less than 7 days downtime ○ Disruption to a Major Building or Facility for more than 1 day but less than 7 days ○ Disruption of a Service provided to key	• Attention from the general media and/or heightened concern by local community. • Criticism by key stakeholders other than Government causing minor concerns amongst staff and/or Council	• Breaches of legislation or licence • Legal issues e.g. non-compliance to statutory requirements with some negative consequences	• Minor economic impact causing isolated cases of financial loss to local businesses • Inconvenience to a small group of residents • Mostly repairable damage to structures or items of cultural significance	A key requirement may not be met	Minimal impact on Project milestaones
1 INSIGNIFICANT	• Loss event < than $50,000 to Council • Minor failures in a Major Project or Service Program cause cost blow-outs by < 5% of budget	• 1sts Aid / no medical treatment required • Negligible health impact on member of public or staff	• Pollution / damage requiring local clean up	• Interruption to the IT system leading to downtime of less than a day • Disruption to a Major Building or Facility for more less than a day • Inconveinience to a Service provided to key stakeholders for less than a day	• Minor, adverse local public complaints	• Non-compliance / Minor legal issues e.g. non-compliance to statutory reporting requirements with little to no ramifications	• Low economic impact causing some concern but little financial impact to local businesses • Very little disruption or very localised disruption to some members of the community • Repairable damage to items of cultural significance	Some non key requirements not met	Insignificant impact on project milestaones

Risk Assessment Matrix

Controls: Excellent — Likelihood

Impact	E - Rare	D - Unlikely	C - Possible	B - Likely	A - Almost Certain
5 - Extreme	Medium	Medium	Medium	High	High
4 - Major	Low	Low	Medium	Medium	High
3 - Moderate	Low	Low	Low	Medium	Medium
2 - Minor	Low	Low	Low	Low	Low
1 -Insignificant	Low	Low	Low	Low	Low

CONTROLS: GOOD — Likelihood

IMPACT	E - Rare	D - Unlikely	C - Possible	B - Likely	A - Almost Certain
5 - EXTREME	High	High	High	Extreme	Extreme
4 - MAJOR	Medium	Medium	High	High	High
3 - MODERATE	Low	Low	Medium	Medium	High
2 - MINOR	Low	Low	Low	Medium	Medium
1 -INSIGNIFICANT	Low	Low	Low	Low	Low

CONTROLS: FAIR — Likelihood

IMPACT	E - Rare	D - Unlikely	C - Possible	B - Likely	A - Almost Certain
5 - Extreme	High	High	High	Extreme	Extreme
4 - Major	Medium	Medium	High	Extreme	Extreme
3 - Moderate	Medium	Medium	Medium	High	High
2 - Minor	Low	Low	Low	Medium	Medium
1 -Insignificant	Low	Low	Low	Low	Low

PTO

Controls: Poor — Likelihood

Impact	E - Rare	D - Unlikely	C - Possible	B - Likely	A - Almost Certain
5 - Extreme	Extreme	Extreme	Extreme	Extreme	Extreme
4 - Major	High	High	Extreme	Extreme	Extreme
3 - Moderate	Medium	Medium	High	High	Extreme
2 - Minor	Low	Low	Medium	High	High
1 -Insignificant	Low	Low	Low	Medium	Medium

Risk Requirements

Residual Rating Range	
Extreme	Risks requiring immediate senior management action and monitoring. A risk treatment plan must be established
High	Risk requiring management action. A risk treatment plan must be established
Medium	Risks should be monitored in conjunction with a review of existing mitigation activities
Low	No immediate action required. Managed by routine procedures

Appendix B – Condition Assessment and Defect Spreadsheets

Refer to attached spread sheets:

- Port of Warrnambool – Condition Assessment – Rev 2.xlsx
- Port of Warrnambool - Defect Register – Rev 2.xlsx

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Rev. No.	Author	Reviewer Name	Signature	Approved for Issue Name	Signature	Date
A - Draft	H. Lancaster					24/3/2018
B - Draft	H. Lancaster	C. Taylor				18/5/2018
C - Draft	H. Lancaster	C. Taylor				15/6/2018
0 – Draft	H. Lancaster	C. Taylor				1/8/2018
1 – Final	H. Lancaster	C. Taylor		R. Hill		9/8/2018
2 - Final	H. Lancaster	C. Taylor		R. Hill		17/8/2018

GHD Advisory