

# **Pelican Waters Northern Lake Management Plan**

2019 – 2029

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# Contents

<b>1</b>	<b>Introduction</b>	<b>4</b>
1.1	Purpose	4
1.2	Objectives	4
<b>2</b>	<b>Background</b>	<b>6</b>
2.1	Site overview	6
2.2	Assets	8
<b>3</b>	<b>Land tenure and statutory requirements</b>	<b>21</b>
3.1	History	21
3.2	Lake ownership details	22
3.3	Lake owner's responsibilities	22
3.4	Private landowners responsibilities	22
3.5	Legislation	22
<b>4</b>	<b>Lake purpose and function</b>	<b>23</b>
4.1	Intent for use	23
<b>5</b>	<b>Lake use</b>	<b>24</b>
5.1	Permitted uses	24
5.2	Permitted uses subject to approval	25
5.3	Prohibited uses and practices	26
5.4	Lock and weirs	27
5.5	Temporary restricted use	27
5.6	Abutting public land	27
5.7	Future development	27
<b>7</b>	<b>Incident, non-compliance and complaint management</b>	<b>30</b>
<b>8</b>	<b>Maintenance</b>	<b>31</b>
8.1	General	31
8.2	Maintenance management	32
8.3	Standards and specifications	35
<b>9</b>	<b>Contacts</b>	<b>36</b>
<b>10</b>	<b>Review</b>	<b>37</b>
<b>Appendix A :</b>	<b>Lock and weir design drawings</b>	
<b>Appendix B :</b>	<b>Salinity exchange overview plan</b>	
<b>Appendix C :</b>	<b>Typical revetment wall section</b>	
<b>Appendix D :</b>	<b>Approved design standards for pontoons, decks/stairs, jetties and boat ramps</b>	

# 1 Introduction

This Lake Management Plan has been prepared by Sunshine Coast Council to promote effective long-term management of the Northern Pelican Waters Lake system. It is a 10 year plan that supersedes the original Lake Management Plan developed by Cardno in 2011.

## 1.1 Purpose

The purpose of the Lake Management Plan is to:

- outline the rights and responsibilities of the lake owners, residents and users;
- develop an appropriate inspection and maintenance schedule to meet objectives and performance standards;
- provide guidelines and management actions for ensuring compliance with secondary contact water quality guidelines;
- provide guidelines for acceptable use of the lake such as sport and recreation; and
- define permitted uses subject to approval such as commercial operations and private structures.

## 1.2 Objectives

The objectives of the Lake Management Plan are specified in Table 1 below.

Table 1: Management plan objectives

Objective	Performance standard	Refer
Public use complies with guidelines outlined in this management plan	<ul style="list-style-type: none"> <li>Public, residents and sporting bodies are informed of acceptable uses, their rights and responsibilities</li> </ul>	Section 5
Water quality is maintained to a standard suitable for secondary contact recreation use <sup>1</sup>	<ul style="list-style-type: none"> <li>Compliance with water quality guidelines</li> <li>Effective operation and maintenance of salinity exchange system, weir and stormwater infrastructure</li> <li>Growth of undesirable marine organisms is absent or regulated</li> </ul>	Section 6
Amenity and visual quality of the lake is of an acceptable standard	<ul style="list-style-type: none"> <li>The lake is free of litter and debris and/or removed in a timely manner</li> <li>Growth of undesirable marine organisms is absent or regulated</li> <li>Structures are designed and located suitably</li> </ul>	Section 6 and 8
Lake assets are maintained in a structurally sound and safe condition	<ul style="list-style-type: none"> <li>Routine inspections and maintenance are undertaken in accordance with relevant schedules</li> <li>Funding adequate to maintain assets</li> </ul>	Section 8
The lake facilitates effective drainage of stormwater run-off	<ul style="list-style-type: none"> <li>Compliance with relevant design criteria</li> <li>Maintain lake to acceptable tolerances from design profile</li> <li>Effective operation and maintenance of weirs, revetment walls and stormwater pipes</li> </ul>	Section 8.2

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<sup>11</sup> Secondary contact recreation is any activity where only the limbs are regularly wet, and swallowing water is unusual. Examples of secondary contact recreation are boating, fishing, rowing, kayaking, dragon boating, wading etc.

## 2 Background

### 2.1 Site overview

Pelican Waters Northern Lake is a brackish artificial tidally restricted lake, 24 ha in area, built in accordance with the relevant planning approvals granted by the Department of Natural Resources and Mines, Environmental Protection Agency and the former Caloundra City Council.

The lake is defined as the area contained within the concrete revetment walls and beaches from the three inlet weirs adjacent to Tweddell Drive in the north (lotplan 966SP248483) to the lock and outlet weir structure adjacent to Columba Place in the south (lotplan 932SP179112). Figure 1 represents the Pelican Waters Northern Lake system and locality.

The inlet weirs regulate inflows, including flooding from the external catchments of Lamerough Creek and Duck Holes Creek. The structures also act as a barrage between the saline environment of the lake and the existing wetlands north of the development buffer zone.

The outlet weir acts as a barrage between the tidal waters of Lamerough Canal and the predominately steady-state water level of RL 0.60m AHD within the lake. High tides up to RL 0.85m AHD (HAT) over top the weir approximately one hundred (100) occasions per year.

Rock protection exists along areas of the bank where design velocities determined such protection was needed.

Stormwater drainage enters the lake from the adjoining land development through controlled outlet structures and pipes into the lake.

The land abutting the lake is primarily urban residential that has been progressively developed since the 1980s in accordance with a Development Control Plan.

Residents can navigate their registered motorised vessels to Lamerough Canal and Pumicestone Passage via the lock structure in the south.

Public access is available at designated places along the banks which have been created as public park or road reserve abutting the lake.

Use of the lake system for recreational purposes is an added benefit and subject to guidelines outlined in this management plan.




Figure 1: Locality plan

## 2.2 Assets

The assets included in this management plan are specified in Table 2 below. Only assets managed and maintained by council are included.

Table 2: Lake assets

Assets	Description	Quantity
Weirs	<p data-bbox="371 439 1110 472">Broad crested weirs that assist in controlling lake water levels.</p>  <p>The first photograph shows a wide, shallow weir with a wooden post in the foreground and buildings in the background. The second photograph shows a metal walkway weir with railings supported by concrete pillars. The third photograph shows a concrete weir with a concrete walkway and surrounding vegetation.</p>	<p data-bbox="1316 439 1377 472">4</p> <p data-bbox="1316 483 1417 544">(approx. 129 m)</p>




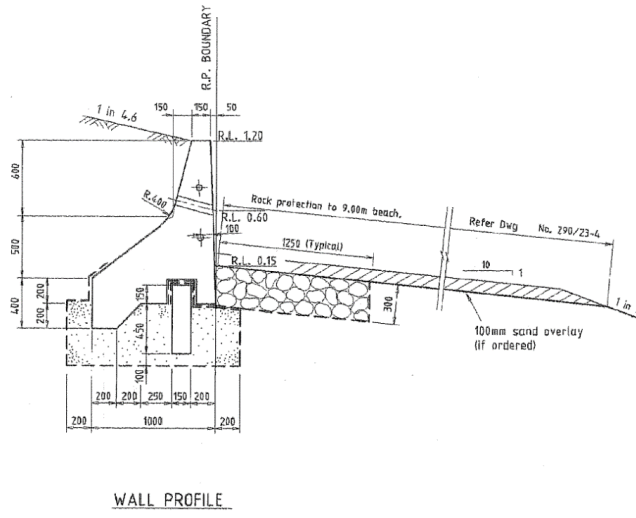
Lock


The navigation lock provides a mechanism whereby the difference in water level between the lake and the tidal canal can be traversed via limited watercraft (refer design drawings in Appendix A). Whilst there is no height limitation for registered motorised vessels using the lock, the downstream bridges and bridge within the lake will cause height restrictions. Only registered motorised vessels up to 15 metres in length, 4.5 metres in width and 2.0 metres draft can generally pass through safely at low tide.

1




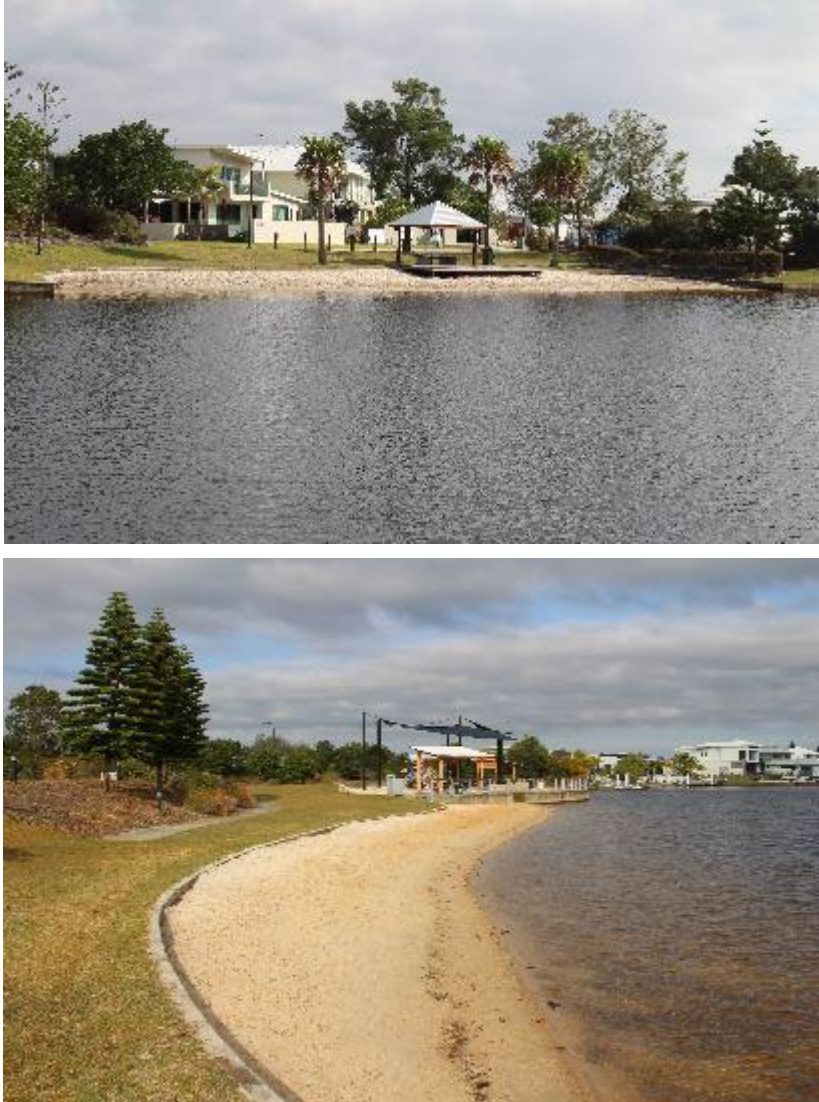
Assets	Description	Quantity
<p>Salinity exchange system</p>	<p>The water quality maintenance pumping system consists of an intake jetty located in the Pumicestone Passage at Golden Beach, an underground pumpwell, pumps and associated controls in Fraser Park, a pipeline, and outlet structures.</p> <p>An overview plan of the salinity exchange system is shown in Appendix B.</p> <p>Control board:</p>  <p>Inlet:</p> 	

Assets	Description	Quantity
Revetment walls	<p>Lake edge abutting public land only - required to maintain the stability of the lake edge, whilst contributing to the aesthetics and usefulness of the lake.</p> <p>The top of the revetment wall is approximately RL 1.2 m AHD.</p>	Approx. 1,920 m
		
Rock scour	<p>Rock scour provides protection to revetment walls and associated land assets.</p>	Approx. 6,541 m
 <p style="text-align: center;">WALL PROFILE</p>		

Assets	Description	Quantity
Pontoons	<p>Floating platforms built over the water to facilitate lake access and enjoyment. There are two pontoons in the lake, both located close to the lock.</p>	2
		


Assets	Description	Quantity
Viewing platform	Platforms built partially over or adjacent to the water to facilitate lake viewing and enjoyment.	7



Assets	Description	Quantity
<p>Foot/cycle bridge and boardwalks</p>	<p>Bridges and boardwalks to facilitate access and connectivity for amenity and enjoyment. The 3 foot/cycle bridges located within and adjacent to Lamerough Creek Environmental Reserve are built over weirs.</p>  <p>The top photograph shows a long wooden bridge with railings crossing a body of water. The bridge is supported by several concrete pillars. The surrounding area is lush with greenery and trees. The bottom photograph shows a wooden boardwalk winding through a forest of tall, thin trees. The boardwalk is made of dark wood and has a concrete base at the start. The forest is dense with green foliage.</p>	<p>5 (153 m)</p>



Assets	Description	Quantity
Constructed beaches	Beach artificially created to facilitate enjoyment of the lake foreshore areas.	4 (1,096m <sup>2</sup> )
		


Assets	Description	Quantity
<p>Waterway access</p>	<p>Infrastructure facilitating access from public land to the water, e.g. stairs and ramps. There is 1 access ramp for non-motorised watercraft.</p> 	<p>1</p>



Assets	Description	Quantity
<p>Gross pollutant trap (GPT)</p>	<p>Gross pollutant traps (GPT's) are provided at most outlets from stormwater drainage systems to the lake. The GPT's provide primary treatment to all road runoff and secondary treatment to surface runoff.</p> 	<p>20</p>

Assets	Description	Quantity
Stormwater drainage	<p>Stormwater pipes draining directly into the lake. Most are fitted with a GPT.</p> 	17
Lighting	<p>Lighting provided to assist watercraft access and navigation.</p> 	2

Assets	Description	Quantity
<p>Navigation aids</p>	<p>Aids to navigation are usually in the form of a channel marker, buoy or pile and may house a sign, light or beacon.</p> <p>There are 15 piles in total, with 5 either side of the southern weir.</p> <p>There are no channel markers or buoys.</p>  	<p>15</p>

Assets	Description	Quantity
Signs	Public signage associated with lake use and safety. 	13

## 3 Land tenure and statutory requirements

### 3.1 History

Pelican Waters Estate has been progressively developed since the mid-1980s.

An Environmental Impact Statement (EIS) on the project (as it was envisaged at that time) was prepared in 1984. In 1995 a major EIS was undertaken in relation to the proposed development of the Golf Course and associated residential areas. A further EIS was compiled in May 2001 for the development of two (2) separate non-tidal lakes with navigation locks associated with Stages 5 & 7 of the Pelican Waters Estate.

Based on the 1984 document, approval was given (by the then Department of Harbours and Marine) that a percentage of the proposed waterway area could be developed as a fully tidal canal, with the remaining waterway area to have either limited or no tidal connection. This decision was made to ensure that the increase in tidal compartment generated by the development would be within acceptable limits, in order that sediment transport processes and associated ecology in the Passage would not be affected. Canal development since 1984 has accounted for the majority of this allowable tidal compartment.

For this reason, the Northern Lake was constructed without direct tidal connection to Lamerough Canal. The lake was separated from the canal by an artificial weir with a crest level of 0.60 m AHD. Water quality was to be maintained by the pumping of estuarine water from Pumicestone Passage and circulation of this water through the lake system.

The overall project was regulated in strategic terms by Development Control Plan No. 2. The DCP provides detailed planning and land use controls for the Pelican Waters area. It also reviews development of other areas of Golden Beach to ensure that Pelican Waters is satisfactorily integrated into the existing urban area and community of Golden Beach without any adverse impacts. The DCP identifies various areas which are called Special Design Precincts (SDP) together with other designations such as medium or high density residential and provides a statement of intent and detailed land use and development guidelines for each precinct. The Northern Lake forms part of SDP3.

From 1946 the land was held in freehold title by the Henzell and Ford families (and their associated companies) and, as outlined earlier, developed in a series of stages. As the result of a series of development approvals (commencing with the Development Approvals granted by the Caloundra City Council on 27 October 2003 for Stages 5A, B and C and including a non-tidal waterway), the lake once constructed was to be developed and surrendered out of (then) parts of Lot 46 SP 138679 and Lot 10 SP147339 for recreational use and transferred into council's ownership.

Consistent with best environmental practice, council and Pelican Waters prepared a Lake Management Plan to control use and maintenance of the lake.

All adjoining reserves for park and environmental purposes have progressively been transferred to council since then.

### 3.2 Lake ownership details

Name: Sunshine Coast Regional Council

### 3.3 Lake owner's responsibilities

As owner, council is responsible for ensuring that the lake system and its infrastructure:

- is maintained to a safe and reasonable standard to the best of council's ability;
- provides adequate amenity for residents and general public; and
- facilitates effective drainage of stormwater run-off.

Facilitating water-based recreational use is not a responsibility of council, however guidelines are provided in this plan to allow for this additional community benefit of the lake (refer section 5).

### 3.4 Private landowners responsibilities

Private landowners abutting the lake are responsible for:

- their private property and infrastructure, including any constructed ramp, jetty, deck and/or pontoon;
- stormwater management within their property boundary;
- any pollution or run-off from their property that adversely affects lake water quality; and
- revetment walls fronting their property.

If any maintenance of privately owned revetment walls are required, owners are advised to first speak with council staff and also refer to the following:

- *Sunshine Coast Council Residents' Handbook: Artificial Waterways*;
- standards in section 8.3; and
- recommended typical revetment wall section in Appendix C.

### 3.5 Legislation

The Lake Management Plan complies with the following statutory legislation and its associated regulations and policies:

- Local Government Act 2009
  - Sunshine Coast Council Local Laws
- Coastal Protection and Management Act 1995
- Planning Act 2016
- Environmental Protection Act 1994
- Waste Reduction and Recycling Act 2011
- Fisheries Act 1994
- Nature Conservation Act 1992
- Transport Operations (Marine Safety) Act 1994
- Transport Operations (Marine Pollution) Act 1995
- Aboriginal Cultural Heritage Act 2003

## 4 Lake purpose and function

### 4.1 Intent for use

The primary purpose of the lake is to provide amenity and visual quality for the surrounding Pelican Waters residential development. Additional benefits include water-based recreation and a range of passive recreation opportunities associated with an extensive park and pathways network.

The design intent also considered that the lake facilitate effective drainage of stormwater from the upstream catchment and urban run-off.

The cadastral boundary of the Pelican Waters Northern Lake is configured so that all revetment walls adjacent to private property are contained within adjacent private allotments and thus the responsibility of the individual land owner.

The lake has been designed to achieve a semi-saline state via pumping from Pumicestone Passage to assist in maintaining water quality.

The land abutting the lake has been generally developed for urban purposes and access to the lake for the public is available at specific locations around its perimeter as public road reserve or parkland. There is one facility for launching non-motorised watercraft only.

The lake is intended to be used by the community in a responsible way for their recreational enjoyment, with minimal adverse impact upon the amenity of those dwellings in proximity to the lake. Contact with the water is proposed as secondary contact only (e.g. kayaks, canoes and stand-up paddle board). Fishing is also allowed within the lake, except as precluded in section 5.3.

## 5 Lake use

Permitted and prohibited uses are detailed in the following section and must be adhered to at all times.

### 5.1 Permitted uses

Lake use is open to the general public or 'sports-based' user groups providing the use is a 'permitted use' as described below.

With the exception of enforcement/safety/disaster response craft in emergency situations, the maximum speed must not exceed 6 knots.

Access to the lake is provided via the navigation lock, from private dwellings with direct frontage to the lake, from parks or road reserve.

Council, as the owner, may from time to time utilise the lake and/or surrounding open space for public events (e.g. markets and public displays).

The following uses and/or actions are permitted in or on the lake:

- non-motorised watercraft (e.g. canoe, kayak, row boat and stand-up paddle board);
- wind powered sail craft;
- model boat;
- motor powered pleasure craft;
- recreational fishing, except as precluded in section 5.3;
- mobile structures (e.g. dry docks, seapens and float bricks) that are secured to an approved privately owned pontoon or jetty;
- approved maintenance, safety, disaster response and enforcement craft;
- approved construction craft (e.g. barges, dredges and support craft);
- use of lake water for fire control purposes (e.g. helicopter fire services); and
- any other activity prescribed by council from time to time.

**Please note:**

All lake users are encouraged to exercise a personal duty of care when accessing the lake system and/or participating in water-based recreation. Recreation in constructed tidal lakes has inherent risks, including but not limited to potentially hazardous marine creatures such as sharks and stingers.

The water quality in the lake is maintained to a secondary contact standard. At times post major rainfall events the water quality within the lake may be diminished below secondary contact standards (refer section 6 for an overview of council's water quality management of the lake).

Due to the above reasons, direct exposure through swimming is not advised.



## 5.2 Permitted uses subject to approval

### 5.2.1 Events, recreational clubs and commercial operations

Council may agree to allow certain low-use/low-impact events, group/club recreational activities and commercial operations to occur on the lake that do not negatively impact on surrounding residents and the overall amenity. The activity must be a permitted use as specified in section 5.1, including (but not limited to) water taxi, vessel hire and other water-based activities/events e.g. SUP lessons, dragon boat user groups, model boats etc. For such operations to be considered for approval, council requires a written submission detailing the type of activity and any potential impact the activity will have on surrounding residents, other users of the lake, water quality, council-owned assets and overall amenity.

Refer to council's [Community Land and Complementary Commercial Activity Policy](#) for more information.

### 5.2.2 Structures and permanent moorings within the lake

The location of private structures, namely a boat ramp, pontoon, deck or jetty for lot owners abutting the lake, must be approved by council. All works must comply with the standards outlined in the Planning Scheme Policy for Development Works within the current Sunshine Coast Planning Scheme.

A Quay Line Plan defines the allowable location of any structures available to an adjacent landowner. These areas have been described/defined in the design standards in Appendix C and outlined in the lease survey plans.

All works must be constructed in accordance with the Quay Line Plans.

#### 5.2.2.1 Tenure

Prior to any adjoining lot owner lodging an application for approval to construct a boat ramp, pontoon, deck or jetty on part of the lake, they must enter into a lease over the area containing the proposed structure or works and its appurtenances, from council. Council will charge an application fee and an annual lease fee for the leased area as determined by council from time to time. The lease term is a maximum of 10 years. If a lease over 10 years is desired, a Development Application for reconfiguring a lot is required (maximum of 30 years permitted).

The registration on title of the lease into the name of the adjoining lot owner, must be completed before any applications to council for the proposed structure may be made.

#### 5.2.2.2 Approval of works

Private boat ramps, pontoons, decks and jetties contained within the quay line designated area may be approved by council on application by that lot owner, subject to lodgement of engineering plans for the proposed structure and any/all conditions applied by council.

For lots that directly abut the lake, if part of a pontoon, deck or jetty is proposed to be located within 1.5 metres of the rear boundary of the lot, an application for relaxation under the Standard Building Law 1993, will also be required.

Construction of any permanent works must be approved by council and a private building certifier before any onsite work commences. Use of the works or structure must not commence until a final inspection and approval to use has been granted by the relevant authority. Failure to obtain the relevant approval or the carrying out of works to a lesser standard than required, may result in an order to remove the offending works.

The use of standard appropriate design structures is encouraged and provided in Appendix C.

#### 5.2.2.3 Exclusivity and restrictions

By the action of granting a lease over the mooring structure or works, exclusivity of use is secured to the adjacent lot owner to whom the lease was granted, to the exclusion of any other user of the lake.

### 5.3 Prohibited uses and practices

The following uses or actions are prohibited in the lake:

- events/recreational clubs/commercial operations (SCC approved permits excepted, refer section 5.2.1);
- construction of ramps/pontoons/decks/jetties (SCC approved structures excepted, refer section 5.2.2);
- temporary moorings<sup>2</sup> (SCC approved event/recreational club/commercial permits excepted, refer section 5.2.1);
- diving or jumping off any structure over or in the lake;
- fishing from the following public infrastructure:
  - bridge;
  - deck/boardwalk;
  - jetty;
  - pontoon;
  - weir; or
  - lock structure.
- motor powered craft navigating at speeds exceeding 6 knots (with the exception of approved enforcement/safety/disaster response craft in emergency situations);
- waterskiing, freestyling or wave jumping whilst operating any watercraft;
- living on watercraft whether temporarily, intermittently or permanently;
- the construction, reconstruction, refitting or undertaking of structural repairs on or to watercraft;
- unmarked fishing equipment (e.g. crab pots and fish traps);
- refuelling of watercraft;
- releasing, dumping or depositing of any wastes (including garden wastes), contaminants or other pollutants into the lake, adjoining waterways or in a place (e.g. road-side gutter or stormwater drain) where it could reasonably be expected to enter, blow or wash into the lake or adjoining waterways; and
- any other activity prescribed by council from time to time.

No public boat ramps are provided in the Pelican Waters Northern Lake.

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<sup>2</sup> Temporary moorings include the use of dry docks, seapens, float bricks etc. that are not secured to an approved pontoon or jetty.

## 5.4 Lock and weirs

The navigation lock allows registered motorised vessels of a size up to 15m in length, 4.5m in width and 2m draft to pass through safely at low tide. Whilst there is no height limitation for vessels using the lock, three main downstream bridges restrict height. These are the Loch Lamerough Bridge (immediately downstream of the lock) and the Bevan Henzell Bridge, providing 4.3m clearance at mean high water spring tides (MHWS). The Pelican Waters Boulevard Bridge (north of Westminster Avenue) provides a 3m clearance above the nominal lake level of RL 0.6m AHD. The water level in the lake is generally unaffected by tidal variation.

### 5.4.1 Lock access

The lock may only be accessed by using a lock access card or a Frequency Operated Button (FOB). Cards and FOBs can be purchased from the Caloundra and Maroochydore Office of the Sunshine Coast Council. An application form must be completed and the applicable fees need to be paid prior to the issue of the access card. For security and safety of both the lock and residents, a photo identification with permanent address must be attached to the application form.

All access cards include a 1-year replacement warranty.

The fees payable to obtain a lock access card can be found on council's website at <https://www.sunshinecoast.qld.gov.au/Pay-and-Apply/Fees-and-Charges>

#### 5.4.1.1 Faulty access card and FOBs

If an access card is faulty, the following applies:

1. access card and/or FOB to be returned to council;
2. application for replacement to be completed;
3. if item is more than 1 year old, pay replacement fee (refer link above);
4. if item is less than 1 year old and a test confirms the fault, no charge will apply; and
5. new item will be issued

Further enquiries may be made to council's Customer Services Centre staff on 1300 007 272 (local calls) or (07) 5475 7272 (outside local area and mobile phones).

## 5.5 Temporary restricted use

Council reserves the right to restrict lake use for a specific purpose at any time, if such action is required to either protect public health and safety or prevent pollution of the lake.

## 5.6 Abutting public land

Abutting public land is under the control of council. All normal activities that are permitted in parks and on roads are permitted on abutting public land fronting the lake except as may be restricted elsewhere in this Lake Management Plan, or by approved signs erected on such land.

## 5.7 Future development

No further development within the Lake or on adjacent public land is intended by council, unless determined necessary to support the primary purpose and function of the lake.

## 6 Water quality management

The lake system is best described as a lower catchment flow through system, i.e., an artificial waterway which acts as an estuary in some part, where the flow through rate is determined by a weir and salinity exchange system.

Influences on water quality in the lake system are therefore principally impacted by:

- sufficient salinity exchange;
- up-stream catchment practices;
- surrounding urban runoff (e.g. hydrocarbons, particulates, pesticides and herbicides);
- activities associated with vessel maintenance; and
- colonisation by marine organisms. Certain species may proliferate at times of elevated nutrient levels and cause other environment and human health risks (e.g. algal blooms)

Table 3 provides a framework to effectively manage these influences to ensure acceptable water quality is maintained.

Table 3: Water quality management overview

<b>Objective</b>	Water quality is maintained to a standard suitable for secondary contact recreation
<b>Performance standards</b>	<ul style="list-style-type: none"> <li>• Water quality is maintained in accordance with scheduled water quality objectives for secondary contact recreation in the <a href="#">Environmental Protection (Water and Wetland Biodiversity) Policy 2019</a> and <a href="#">Guidelines for Managing Risks in Recreational Water (NHMRC 2008)</a></li> <li>• Reactive water quality sampling is in accordance with the methods prescribed in the <a href="#">Queensland Monitoring and Sampling Manual (2018)</a></li> <li>• Growth of undesirable marine organisms is absent or regulated</li> </ul>
<b>Management controls</b>	<ol style="list-style-type: none"> <li>1. Maintain impervious and/or vegetated overland flow paths in accordance with routine inspection and maintenance schedules</li> <li>2. Maintain stormwater drainage systems and GPTs in accordance with routine inspection and maintenance schedules</li> <li>3. Maintain weir and salinity exchange system in accordance with routine inspection and maintenance schedules</li> <li>4. Educate residents and public to reduce pollutant run-off and/or input (e.g. signage, residents' handbook and website)</li> <li>5. Live water quality testing undertaken at 3 locations via remote sensors (physical and chemical analysis to inform effective pump operation)</li> </ol>
<b>Corrective action</b>	<ul style="list-style-type: none"> <li>• Respond to issues negatively affecting water quality in a timely manner</li> <li>• Erection of temporary signage if determined necessary</li> <li>• If the relevant water quality guidelines are exceeded, or a trend of declining water quality develops over an extended period, it will be considered to indicate the need for reassessment of the appropriateness and effectiveness of existing water quality management controls</li> <li>• Adjust pumping operation in accordance with water quality parameters recorded via remote sensors</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>• Visual monitoring to be undertaken concurrent with routine inspections and/or maintenance schedules</li> <li>• Live water quality testing records</li> <li>• Water quality sampling will be undertaken on a reactive basis if requested and determined necessary</li> </ul>

	<ul style="list-style-type: none"> <li>• Maintain customer service request records and incident/non-compliance register</li> </ul>
<b>Reporting</b>	The results of monitoring will be made available to the public at council's discretion and by request only
<b>Responsibility</b>	SCC

## 7 Incident, non-compliance and complaint management

Table 4: Incident, non-compliance and complaint management overview

<b>Objective</b>	To ensure prompt and efficient response to pollution, incidents, complaints and non-compliance
<b>Performance standards</b>	<ul style="list-style-type: none"> <li>• Prompt removal of pollution spillages from waterways with minimum risk to the public and the environment</li> <li>• All incidents, complaints and non-compliance are dealt with promptly and efficiently, in accordance with council's Compliance and Enforcement Policy 2018 (or referred to the relevant agency if not already outlined in the policy)</li> <li>• Appropriate investigations are undertaken to determine the source of pollution and the cause of environmental incidents (e.g. oil spills, fish kills and algal blooms)</li> </ul>
<b>Management controls</b>	<ol style="list-style-type: none"> <li>1. Adherence to asset management plans</li> <li>2. Asset inspections and routine maintenance schedules met</li> <li>3. Adherence to water quality management procedures (refer section 6)</li> <li>4. Sufficient signage to communicate safety matters and prohibitions outlined in this management plan (refer section 5.3)</li> </ol>
<b>Corrective action</b>	<ul style="list-style-type: none"> <li>• Pollution spill, fish kill or other environmental incident - report to the Department of Environment and Science to ensure that appropriate investigations and testing are undertaken</li> <li>• Address and/or rectify incident, complaint and/or non-compliance</li> <li>• Review customer service requests and incident/non-compliance register and implement improvement to processes and/or signage where deemed necessary</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>• Follow up monitoring to be undertaken in the event of an environmental incident</li> <li>• Maintain customer service request records and incident/non-compliance register</li> </ul>
<b>Reporting</b>	Complete the appropriate incident report/debrief when required or requested
<b>Responsibility</b>	SCC

## 8 Maintenance

### 8.1 General

Maintenance of the lake and its assets are the responsibility of council and includes routine, planned and reactive maintenance work activities.

Maintenance work is managed through an asset management system and includes activities such as inspection, assessing condition, prioritising, scheduling, actioning the work and reporting what was done to develop a maintenance history and improve maintenance and service delivery performance.

Routine maintenance is performed on a regular cycle to upkeep visual amenity and/or replacement of components/sub-components of assets. This work generally falls below the capital threshold. Planned maintenance comprises larger scale repair work (below the capital threshold) or asset renewal (capital work). Reactive maintenance is unplanned repair work carried out in response to service requests and management/supervisory directions.

Types of maintenance may include:

- on-going maintenance of the navigation lock and inlet/outlet weirs;
- on-going maintenance of the salinity exchange system;
- removal of siltation from bed and banks of the lake, as required, to ensure that it does not become a constraint on the function of the lake;
- removal of debris, rubbish and undesirable marine organisms/weeds from the lake and public foreshore areas;
- maintaining the revetment walls where they front public lands;
- maintaining scour that supports all revetment walls; and
- maintaining navigation aids within the lake etc.

Refer Table 5 which outlines the entire maintenance framework and regimes.

## 8.2 Maintenance management

The following section provides an overview of the maintenance framework for lake features and public assets to meet specific management plan objectives outlined in Table 1.

Table 5: Maintenance framework overview

Feature / asset	Performance standard	Performance indicator	Comments / considerations	Inspection frequency	Routine maintenance frequency	Responsibility
<b>Waterway feature</b>						
Litter, debris etc.	Waterways are free of litter and debris that are impacting on amenity, health and/or safety	a) Inspection and maintenance schedules met b) Reactive works undertaken in a timely manner c) No complaints	<ul style="list-style-type: none"> <li>Officers undertaking litter removal should ensure that appropriate precautions are taken against hazardous objects such as discarded hypodermic syringes</li> <li>Collected litter should be recorded in AMDI database and disposed of at council's refuse tip</li> <li>A public education programme should be considered by council if litter is a persistent problem</li> <li>If fishing equipment (e.g. crab pot or fish trap) is found either unmarked and/or in state of disrepair to a point of it being non-functional then it shall be removed as marine litter (report to DAFF for their agency to remove)</li> </ul>	Monthly	Monthly	SCC Waterways team  Engagement with Response Services where required for litter investigation
Undesirable marine organisms / weeds	Growth of undesirable marine organisms is absent or regulated	a) Inspection schedule met b) Reactive works undertaken in a timely manner c) No complaints	<ul style="list-style-type: none"> <li>Any vegetation or plant material, living or dead, located below the level of the highest astronomical tide (Approximately RL 1.05m AHD) is classified as "marine vegetation" under the Fisheries Act. Refer to relevant fisheries accepted development requirements before undertaking any works involving marine vegetation</li> <li>Although herbicides are a possible means of weed control, only herbicides registered for use in aquatic environments should be used</li> <li>All removed vegetation should be disposed of at council's refuse tip</li> <li>In the event of algal blooms, refer to <a href="#">Queensland Harmful Algal Bloom Response Plan 2014</a>. Appropriate laboratory testing should be undertaken to determine the species present and likely cause of the outbreak. If testing indicates the presence of toxic species, specialist advice should be sought regarding any necessary health precautions.</li> </ul>	6 monthly	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Lakes and Wetlands team
Lake profile	Lake is maintained to acceptable tolerances from design profile	a) Survey completed as scheduled b) Maintenance is undertaken in a timely manner before degradation of waterway profile affects vessel movement or the stability of revetment walls c) No complaints	<ul style="list-style-type: none"> <li>Appropriate geotechnical and chemical testing should be undertaken of material proposed to be dredged or excavated in maintenance operations</li> <li>Approvals to undertake dredging, or other excavation, within a waterway are required under the Planning Act 2016, Coastal Protection and Management Act 1995 (Tidal Works) and the Environmental Protection Act 1994 (ERA 16) (dependant on volume of material to be managed)</li> </ul>	7 yearly	No routine maintenance performed. Any required works are determined based on visual observation and 7 yearly lake survey	SCC Coast & Canals team
Constructed beaches	Accessible, safe and provides adequate amenity and visual quality	a) Open for use 90% of the time b) Clear of marine fouling and debris c) Safe d) Inspection schedule met e) Reactive works undertaken in a timely manner f) No complaints	<ul style="list-style-type: none"> <li>Weeding is performed by physical / mechanical means, no herbicides to be used</li> <li>Sand profiles are maintained as designed</li> </ul>	Annually	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Coast & Canals team
<b>Infrastructure</b>						
Weirs	The system is operating as designed and	a) Structures are not impeded by marine growth or sedimentation	Refer Appendix A for weir design.	6 monthly	Annually	SCC Coast & Canals team



Feature / asset	Performance standard	Performance indicator	Comments / considerations	Inspection frequency	Routine maintenance frequency	Responsibility
	providing effective drainage of stormwater run-off	b) Inspection and maintenance schedules met c) Reactive works undertaken in a timely manner d) No complaints	Underwater inspections of the structures are likely to be required, approximately every 6-12 months. A qualified commercial diver should be employed for this work and the required safety measures implemented			Contractor
Lock	Provides effective and safe access for marine vessels transporting in and out of the lake system	a) Inspection and maintenance schedules met b) Reactive works undertaken in a timely manner c) No complaints from lock access card holders	Contractor to perform work in accordance with maintenance procedures. Refer Section 5.4.1 for more information on lock access and cards.	Fortnightly	Annually	SCC Coast & Canals team Contractor
Tidal exchange system	The system is operating as designed and providing sufficient saline water inflow	a) Water is turned over every 30 days b) Inlet and outlet structures are not impeded by marine growth or sedimentation c) Inspection and maintenance schedules met d) Reactive works undertaken in a timely manner e) No complaints	Underwater inspections of the structures are likely to be required, approximately every 6-12 months. This applies particularly to the inlet structure. A qualified commercial diver should be employed for this work and the required safety measures implemented	6 monthly	Annually	SCC Coast & Canals team
Revetment walls	Revetments are maintained in a suitable condition to provide satisfactory protection to adjacent land and assets	a) Structure maintained to design b) Inspection schedules met c) Reactive works undertaken in a timely manner d) No complaints	<ul style="list-style-type: none"> <li>The stability of revetment walls and other concrete structures is heavily reliant on the condition of the associated scour (see scour maintenance below)</li> <li>The maintenance of revetments is the responsibility of the abutting landowner (i.e. council for public land only). However, council are responsible for the associated scour and thus must ensure it is adequate to protect private landowners' revetment</li> </ul>	Annually	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Coast & Canals team
Scour	Scour are maintained in a suitable condition to provide satisfactory protection to revetment walls	a) Structure maintained to design b) Inspection schedules met c) Reactive works undertaken in a timely manner d) No complaints	<ul style="list-style-type: none"> <li>The stability of revetment walls and other concrete structures can be rapidly compromised due to the loss of foundation support if the associated scour are not well maintained</li> <li>Council are responsible for maintaining all scour including those abutting private land</li> </ul>	Annually	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Coast & Canals team
Stormwater outlets	Provides effective drainage of stormwater run-off	a) Structure maintained to design standards b) Inspection and maintenance schedules met c) Reactive works undertaken in a timely manner d) No complaints	Piping failures, resulting in loss of support behind and beneath stormwater drainage outlet structures can result in rapid deterioration of these structures. This damage can quickly spread to adjacent revetment walls. It is important, for the longevity of these structures, to ensure that piping problems are promptly addressed	Annually	Annually	SCC Stormwater Services team
GPT's	Provides an effective pollutant trap to minimise litter, debris and sediment from entering the lake system	a) Structure maintained to design b) Inspection and maintenance schedules met c) Reactive works undertaken in a timely manner d) No complaints	Refer to manufacturer for design standard details	Monthly	Annually	SCC Stormwater Services team

Feature / asset	Performance standard	Performance indicator	Comments / considerations	Inspection frequency	Routine maintenance frequency	Responsibility
		e) Minimal litter, debris and sediment entering the lake directly from stormwater outlets				
Viewing platform	Accessible and safe, providing additional enjoyment of the lake amenity	a) Structure maintained to design b) Open for use 90% of the time c) Inspection schedule met d) Reactive works undertaken in a timely manner e) No complaints		6 monthly	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Transport Infrastructure team
Jetty/pontoon	Accessible, user-friendly and safe, providing additional access and enjoyment of the lake	a) Structure maintained to design b) Open for use 90% of the time c) Clear of marine fouling and debris d) Inspection schedule met e) Reactive works undertaken in a timely manner f) No complaints		Annually	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Coast & Canals team
Waterway accesses	Accessible, user-friendly and safe, providing additional access and enjoyment of the lake	a) Structure maintained to design b) Open for use 90% of the time c) Clear of marine fouling and debris d) Inspection schedule met e) Reactive works undertaken in a timely manner f) No complaints		Annually	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Coast & Canals team
Signs	Signs are reader-friendly, clearly visible, safe, and do not impact on the visual qualities of the lake	a) Structure maintained to design b) Inspection schedule met c) Reactive works undertaken in a timely manner d) Vessel operators are compliant with marine safety laws e) No complaints	If non-compliance and/or complaints register indicate a growing trend of users whom are not complying with regulations, assess suitability of all forms of public education, including signage. Implement any improvements where determined necessary (see more section 7)	Annually	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Coast & Canals team
Navigation aids	Effectively assist vessel operators to safely navigate the lake, without negatively impacting on vessel traffic or amenity	a) Structure maintained to design b) Inspection schedule met c) Reactive works undertaken in a timely manner d) No complaints or on-water incidents		Annually	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Coast & Canals team
Lighting	Effectively assist vessel operators to safely launch, exit and/or navigate the lake, without negatively impacting on vessel traffic or amenity	a) Structure maintained to design b) Inspection schedule met c) Reactive works undertaken in a timely manner d) No complaints or on-water incidents		Annually	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Coast & Canals team

## 8.3 Standards and specifications

Maintenance work is carried out in accordance with the following standards and specifications:

1. Building Code of Australia
  - a) BCA Vol 2 Part 3.1.2.0 – Drainage (AS 3500.3.2)
  - b) BCA Vol 2 Part 3.1.2.2 (d) – Excavation and Piling near Sewers and Drains
  - c) BCA Vol 2 Part 3.1.1 – Earthworks
2. Australian Standards
  - a) AS 1141: Methods for sampling and testing aggregates
  - b) AS 1428: Design for Access and Mobility
  - c) AS 1604: Treatment of piles
  - d) AS 1664.1: Aluminium Structures Code
  - e) AS 1665: Welding
  - f) AS 1170.1 and 1170.2: Loading Codes
  - g) AS 1650 Galvanising
  - h) AS 1720: Timber Structures Code
  - i) AS 2159: Piling Code
  - j) AS 2239: Galvanic (Sacrificial) Anodes for Cathodic protection
  - k) AS 2312 Two Pack Epoxy Paints
  - l) AS 2832.3 Guide to the Cathodic protection of metals-fixed immersed structures.
  - m) AS 3500: Part 3.2, Stormwater Drainage – Acceptable Solutions
  - n) AS 3600: Concrete Structures Code
  - o) AS 3700: Masonry Structures Code
  - p) AS 3706: Geotextiles Methods of test
  - q) AS/NZ 3004: Marinas and Recreational Boats
  - r) ANZECC: Guidelines for fresh and Marine Water Quality
  - s) AS 3962: Guidelines for Design of Marinas Code
  - t) AS 4110: Steel Structures Code
  - u) AS 4133: Methods of testing rocks for engineering purposes
  - v) AS 4997: Guidelines for the design of maritime structures
3. SEQ Restoration Framework, Guideline & Manual
4. Healthy Waterways – Water sensitive Urban Design – Technical Design Guidelines for SEQ
5. Healthy Waterways – Water by Design Construction and Establishment Guidelines
6. Any other relevant regulations, policies, codes and/or guidelines that fall under the Acts listed in section 3.4

## 9 Contacts

Entity	Contact details	Enquiry type
Sunshine Coast Council - Customer Service	(07) 5475 7272 1300 007 272	All
Maritime Safety Queensland	(07) 5373 2310 A/H (07) 3305 1700	Marine safety and marine pollution, including oil spills
Mooloolaba Coast Guard	Radio: 88-90, 16-67-21-73-80 (07) 5444 3222	Marine safety
Sunshine Coast District Water Police	(07) 5457 6711 A/H 0438 200 705	Search and rescue, on-water criminal matters and marine safety complaints
Queensland Boating and Fisheries Patrol	(07) 5444 4599 (Mooloolaba)	Marine safety and fisheries complaints
Department of Environment & Science	1300 130 372	Involving pollution, environmental harm, fish kills and marine strandings
Department of Agriculture and Fisheries	(07) 3404 6999	Involving marine plants
RSPCA QLD	1300 ANIMAL (1300 264 625)	Involving injured wildlife. Will likely be attended by Queensland Parks and Wildlife Service (QPWS)

## 10 Review

This document may be reviewed and updated as determined necessary by council in response to new information, challenges in implementation or changing external factors such as technology, land use, the environment, legislation and community values.

## **Appendix A: Lock and weir design drawings**

## **Appendix B: Salinity exchange overview plan**

## Appendix C: Typical revetment wall section



**Appendix D: Approved design standards for pontoons, decks/stairs, jetties and boat ramps**



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