



Newport Canal System – Pontoon Envelope Guideline

Introduction

The following document provides a guideline for determining appropriate dimensions for new pontoons within the Newport Canals.

The purpose of the Pontoon Envelope Guideline is to guide residents and pontoon suppliers when designing or upgrading their existing pontoon. The guideline has been prepared as a response to frequent pontoon groundings during lower tides that are caused by some siltation of the canal profile as well as inappropriately designed pontoons for the location. Some areas of the Canal system, in particular the canal sections built in the 1970s and 1980s, only allow for fairly small pontoons.

The property owner can choose not to use the guideline, however, it is then recommended that the pontoon is designed to allow for grounding instead (e.g. by installing a hinged connection) to avoid damage of the pontoon.

If Council is presented with a pontoon design for approval that is not in accordance with the guideline Council is likely to add a property note, so that subsequent property owners can be informed about the issue.

The pontoon envelopes included in this document are not intended to apply retrospectively for existing pontoons but are to be used when upgrading, replacing or installing a new pontoon. The purpose of this guideline is to encourage the installation of new pontoons that are less prone to damage through grounding.

Canal profiles

Newport canals have been built in stages, with a variety of canal profiles. Each profile requires a different pontoon design to ensure flotation on all tides.

A total of 13 different canal profiles have been identified. The location of the various profiles is shown in Figure 1.

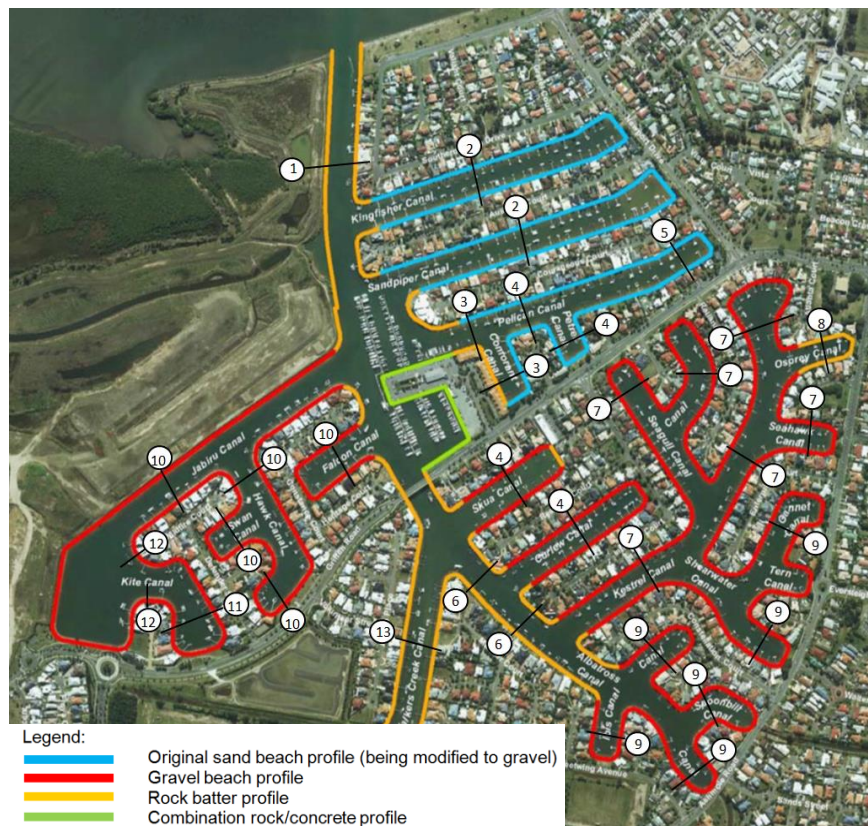


Figure 1: Canal system layout and profile location plan

For illustration purposes, a typical canal cross-section is shown in Figure 2. The orange line represents the constructed canal profile. The red line on top shows the canal profile inclusive of a 200mm siltation allowance. The pink line represents the quayline.

The quayline generally runs parallel to the canal boundary, however, the offset to the quayline will vary in each of the 13 canal profiles. The quayline represents the allowable outermost projection for pontoons, where they are permitted. Pontoons should always extend out to the quayline, but should never exceed this line during any given tide to allow safe navigation in the centre channel.

An example of an appropriate pontoon that would fit into this specific canal section during Lowest Astronomical Tide (LAT) is illustrated by the blue line.

The design drawing for a particular canal section can be requested from Council by contacting the Customer Service Centre on (07) 3205 0555 Monday to Friday, 8.30am - 5.00pm.

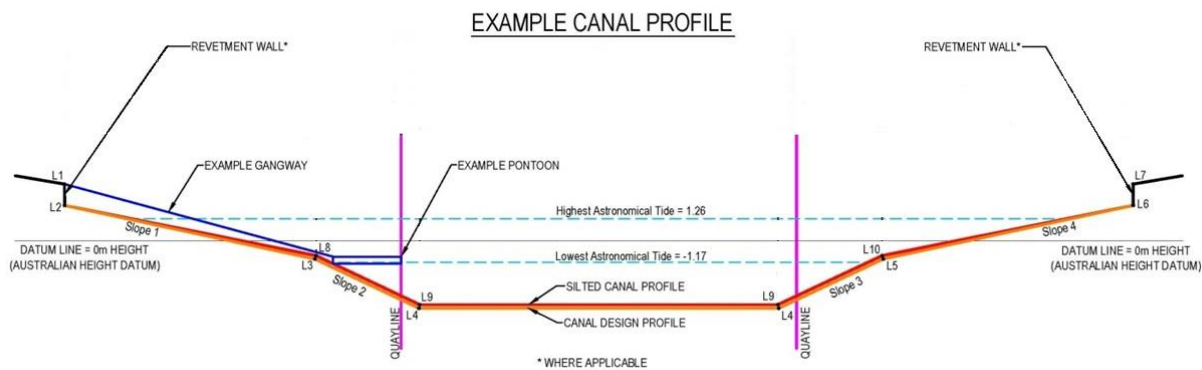


Figure 2: Example canal profile

Siltation allowance

Australian Standard No. 3962: “Guidelines for the design of marinas” (AS3962) applies to the design of elements and structures within the Newport canal system. AS3962 notes that an allowance for siltation has to be considered in the design. While there is no specific depth of siltation nominated in the Australian Standard, Council has adopted an allowance of 200mm to account for siltation in the Newport canal system in between dredging cycles.

How the pontoon envelopes were calculated

For each canal profile, the way in which the pontoon envelopes were calculated is best described by reference to the following sequence of figures.

An enlarged view of the pontoon area from Figure 2 is shown below in Figure 3 to Figure 5 for different drafts.

By way of example, for Canal Section 10, Figure 3 shows a pontoon with 0.1m draft; Figure 4, a pontoon with 0.3m draft and Figure 5, a pontoon with 0.5m draft. It can be seen that as the pontoon draft increases, the narrower the pontoon head that can be accommodated before grounding occurs.

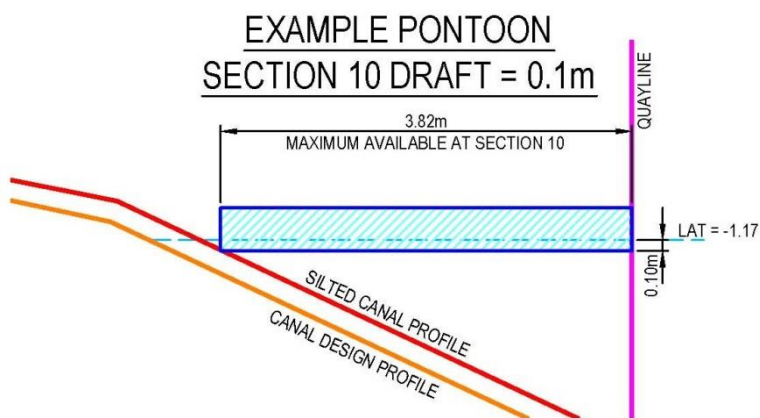


Figure 3 Enlarged view of pontoon section with 0.1 draft pontoon

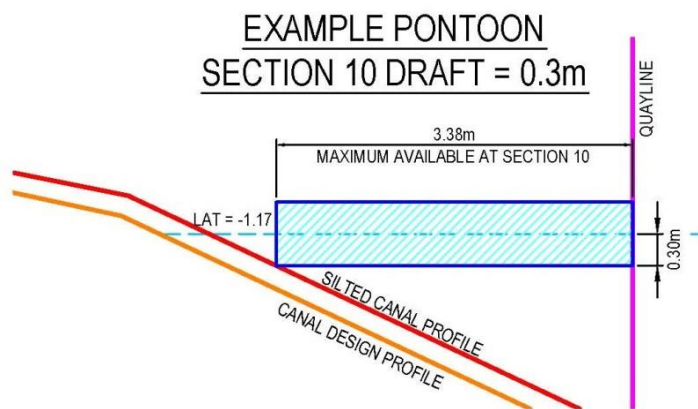


Figure 4 Enlarged view of pontoon section with 0.3 draft pontoon

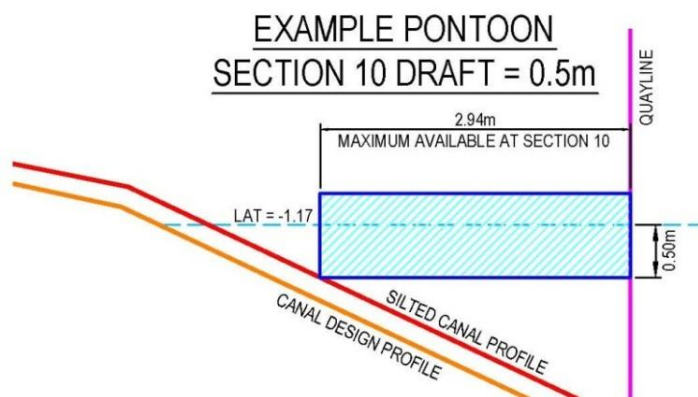


Figure 5 Enlarged view of pontoon section with 0.5 draft pontoon

Figure 6 superimposes Figure 3 to Figure 5 to illustrate that the bigger the pontoon draft, the narrower the pontoon width due to the restrictions of the canal profile and the quayline.

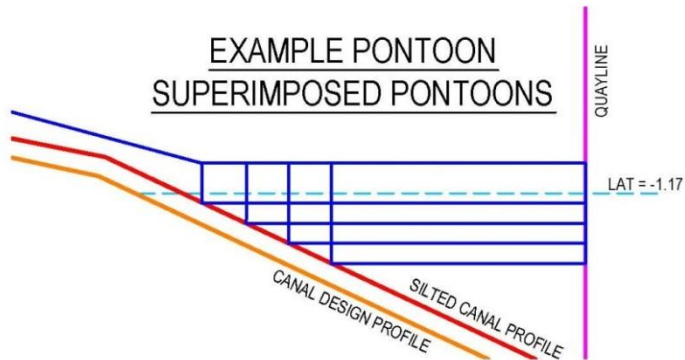


Figure 6 Enlarged view of pontoon section, superimposed pontoons of varying draft

For Canal Section 10, based on the above analysis, a pontoon envelope can be drawn as shown in Figure 7. A pontoon with a draft of 0.1m would fit into the pontoon envelope and could be built with a maximum width of 3.82m. Alternatively a pontoon with a draft of 0.5m can only be a maximum of 2.94m wide.

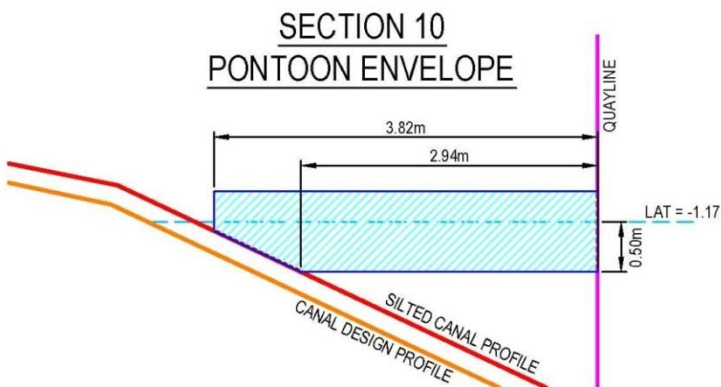


Figure 7 Pontoon envelope for Section 10

It should be noted that due to the variation in canal profiles across the Newport canal system, there is considerable variation in the size of pontoon envelopes for the various canal profiles.

Pontoon envelope dimensions

Pontoon envelope dimensions for each canal profile are provided in Table 1. In relation to this table it should be noted that:

1. Calculations make allowance for 200mm of siltation
2. Maximum width is always measured from the quayline
3. The table cannot be directly used for non-piled pontoons
4. Linear interpolation can be used for pontoon drafts in between the presented values

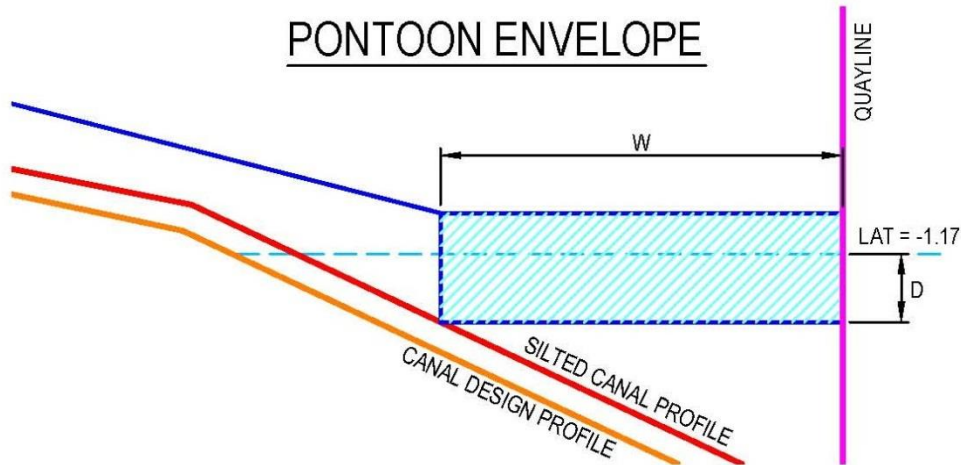


Figure 8: Pontoon envelope showing W and D dimensions referred in Table 1

Table 1: Pontoon envelope dimensions

Cross section	Canal Name(s)	Pontoon Draft 'D' (metres)				
		0.1	0.2	0.3	0.4	0.5
		Maximum pontoon width 'W' (metres)				
1	Albatross	10.2	10.1	9.7	8.9	8.0
2	Kingfisher, Sandpiper	2.8	2.5	2.2	1.9	1.7
3	Cormorant - rock canal side (west)	11.4	11.1	10.9	10.6	10.3
4	Pelican (west end), Petrel, Skua, Curlew, Cormorant	2.3	2.1	1.8	1.6	1.4
5	Pelican (east end)	1.4	1.2	1.1	0.9	0.8
6	Albatross - SW Canal side	8.5	8.2	7.9	7.6	7.3
6	Albatross - NE Canal side	7.7	7.5	7.2	6.9	6.6
7	Seagull, Heron, Kestrel, Seahawk	2.4	2.1	1.9	1.7	1.5
8	Osprey	3.4	3.1	2.8	2.5	2.2
9	Shearwater, Gannet, Tern, Ibis, Seaeagle, Spoonbill, Albatross	1.8	1.6	1.4	1.1	0.9
10	Jabiru, Swan, Hawk, Falcon	3.8	3.6	3.4	3.2	2.9
11	Kite	5.2	5.0	4.8	4.5	4.3
12	Jabiru	7.5	7.3	7.0	6.8	6.6
13	Walkers Creek	4.6	4.1	3.7	3.3	2.8

Comments

Council understands that some pontoon dimensions presented in Table 1 are fairly narrow. However, the available pontoon envelope is a result of the existing canal profile in Newport.

The first sections of Newport Canals have been built in the late 1970s with the newer sections built in the 1990s. The canal profiles have been adjusted over the time to accommodate changing demands such as bigger vessels and pontoons. Therefore there are some canal sections within Newport Canals that can easily accommodate larger pontoons, whereas others cannot.

Council received many complaints about grounding pontoons. After investigating those pontoon groundings it became clear that often the pontoon is not suitable for the existing canal profile. This means that the pontoon would ground during low tides even without any siltation allowance. This prompted Council to inform pontoon suppliers and residents of Newport Canal of this situation. As a result the Newport Pontoon Envelope has been prepared.

Council appreciates that the available width for pontoons can be very small in some canal sections but this is mainly governed by the available canal profile on site.

Council wants to protect residents from experiencing grounding problems with this guideline by advising of the constraints on site. The purpose of this guideline is to inform residents of these restrictions to avoid the installation of new pontoons that might be unsuitable for the location and therefore might ground on the canal design profile. To minimise the potential for damage to a pontoon, this guideline suggests that new pontoons should be designed to fit inside the 'pontoon envelope' described herein.

The opportunity exists to explore alternative pontoon designs that allow the pontoon to ground during low tides without damages occurring.

Additional notes

The following general notes are provided to assist with interpretation of the pontoon envelope - Table 1.

The illustrations provided above and the pontoon envelope (Table 1) are only valid for piled pontoons and do not apply to non-piled pontoons. Suitable alternative designs can be developed for non-piled pontoons if they safely accommodate grounding and are certified by a qualified engineer.

The pontoon envelope data has been based on the available design drawings for the canal. However, as-constructed details might vary from the design profile and therefore the presented data is indicative only.

Levels are shown in metres relative to Australian Height Datum (m AHD), which is approximately equivalent to mean sea level (-0.06m AHD). Dimensions are shown in metres (m).

Every pontoon needs to be designed by a suitably qualified engineer and must consider stability amongst a range of factors.

Pontoons should be designed in the fully laden condition during Lowest Astronomical Tide (LAT) with suitable allowance for siltation, waves and boat wash. The pontoon design should cater for all water levels including Lowest Astronomical Tide (LAT), Highest Astronomical Tide (HAT), storm tide and flooding. For further design advice for pontoon stability and other factors, refer to Australian Standard AS3962 - "Guidelines for design of marinas".

It is important to note that allotment revetment walls have been designed solely based on the earth pressure from the soil and do not allow for any additional loading onto the wall. Therefore no additional loading associated with a pontoon should be placed onto the revetment wall (e.g. from the gangway) without prior assessment by a suitably qualified engineer.

The maximum allowable vessel and pontoon is generally determined by the length of the quayline for the property, less 3.0m (1.5 m inset from each end). The maximum allowable design vessel is also determined by the canal restrictions such as water depth, channel width and safe vessel operation and manoeuvrability. The recommended design vessel for the Newport canals is for yachts no larger than 8m and power boats no larger than 20m, both with a maximum draft of 1.5m. However, it is advised that Maritime Safety Queensland or equivalent agency be consulted with regard to these dimensional constraints.

For all pontoons, the constraining factor is the inner (shoreline) canal profile level, inclusive of siltation.

The pontoon envelopes have been determined by reference to a particular canal profile. It is noted that special attention will be required for the envelopes where the canal profile is located in a transition zone occurring between different profile sections.

Non-piled pontoon heads

The illustrations provided above and the pontoon envelope (Table 1) are only valid for piled pontoons.

Piled pontoons move up and down vertically with the tides. Non-piled pontoons will move downwards and inwards with a receding tide and upwards and outwards with an incoming tide. The pontoon envelope for non-piled pontoons is similar; however the pontoon will not extend out to the quayline during LAT. The drawing below shows how the pontoon envelope drawing can be adopted for a non-piled pontoon design.

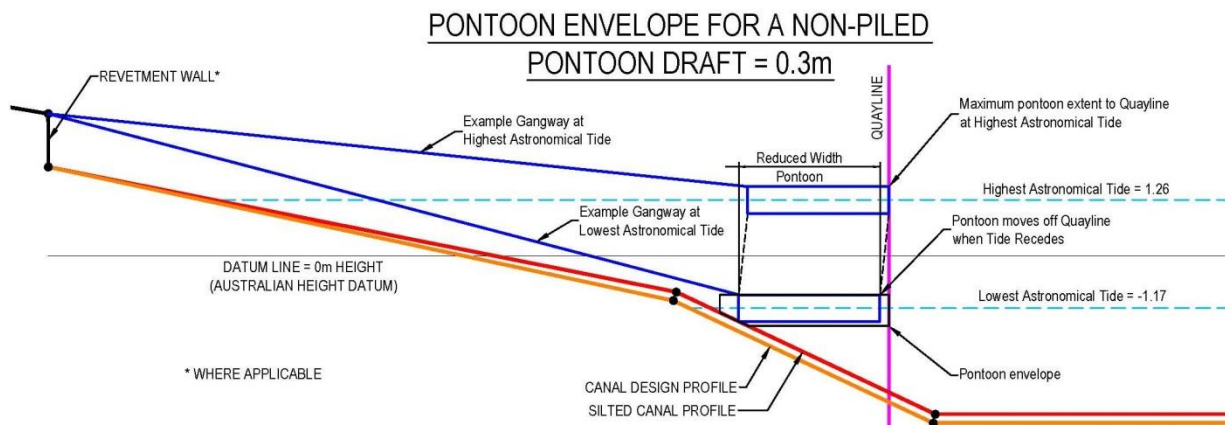


Figure 9: Pontoon envelope for non-piled pontoon

Because the pontoon moves inwards during lower tides, the resulting available pontoon width reduces by the amount the pontoon moves inwards during LAT. The non-piled pontoon should be designed so that it does not extend over the quayline during any water level.

Depending on the hinge arrangement used, it may be acceptable for a non-piled pontoon to exceed the pontoon envelope dimensions. A suitable qualified engineer can confirm if this is an option for the site.