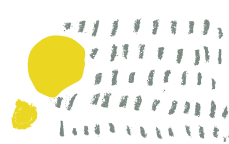




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JMD design



Client



Civil and structural



Accessway:	A road that provides the vehicular thoroughfare to a boat ramp or parking area.	Mean High Water Springs:	In waterway areas influenced by tides, the Mean High Water Level should be defined by the Mean High Water Springs (MHWS) tide condition. This water level should include an allowance for predicted sea level rise over the design life of the facility that is based on projections that are widely accepted by competent scientific opinion, or as stipulated in local regulations.
Crest Level:	The elevation of the transition between the boat ramp and manoeuvring area.	Mean Low Water Springs:	The average of all low water observations at the time of spring tide over a period of time.
Crossfall:	Slope of the manoeuvring area or access way perpendicular to the direction of travel. Direction of travel in the manoeuvring area is towards the boat ramp.	Mean Water Level:	The average sea surface elevation over a long period, preferably 18.6 years or more, or the average level which would exist in the absence of tides. In non-tidal areas this average water surface elevation would be determined from analysis of water level records or local knowledge.
Cut-off Wall:	A concrete wall built along the sides and/or bottom of a boat ramp to help protect it from being undermined.	Rigging:	The act of preparing a boat for launching, including removal of tie down straps.
Design Low Water Level:	The minimum operable water surface elevation over the intended life of a boat ramp defined to maximise usage of the boat ramp under the range of environmental conditions likely to be encountered at a site. In waterway areas influenced by tides, the Design Low Water Level should be defined by the Lowest Astronomical Tide (LAT) as determined from local tide surveys.	Scour:	The removal of material from around a structure by the force of moving water.
Design High Water Level:	The maximum operable water surface elevation over the intended life of a boat ramp defined to maximise usage of the boat ramp under the range of environmental conditions likely to be encountered at a site. This is used to set the crest level of a boat ramp so that it is not submerged during elevated water level and wave runup conditions. This water level should be defined in consultation with local authorities and include allowances for astronomical tide, storm surge, wave setup, freshwater flooding, and predicted sea level rise over the design life of the facility that is based on projections that are widely accepted by competent scientific opinion, or as stipulated in local regulations.	Tie Down:	The act of readying a boat for transportation on a road.
Design Vessel:	The largest sized vessel that is proposed to use the facility.	Toe Depth:	Depth of the vertically lowest point of the surface of a boat ramp.
Draft:	The vertical distance between a boats water line and the lowest part of the boat including hull fittings and motor.	Usable Berth Length:	The length of the berthing area at jetties and pontoons which provides at least 300mm Under Keel Clearance for the Design Vessel in a complying wave climate of 0.2m (refer Section 4.3) and soft bed conditions. For suitable water depth in non-complying wave climates and hard bed conditions see Clause 3.2 of AS 3962-2001.
Erosion:	Removal or loss of sediments.	Washdown:	The act of cleaning a boat, motor and/or trailer with freshwater following retrieval at a boat ramp.
Freeboard:	The vertical distance between the water surface and the deck of a floating structure including pontoons and vessels.	Source:	Extracted glossary of terms from the <i>NSW Boat Facilities Guidelines 2015</i> . Refer to the guidelines for full glossary of terms.
Highest Astronomincal Tide:	The highest level of water which can be predicted to occur under any combination of astronomical conditions.		
Longitudinal Grade:	Slope of the boat ramp, manoeuvring area or accessway parallel to direction of travel. Direction of travel in the manoeuvring area is towards the boat ramp.		
Lowest Astronomincal Tide:	The lowest tide level which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions.		
Manoeuvring Area:	The area at the top of the ramp that allows the driver of car and trailer combinations to align their combination before reversing down the ramp.		

Roads and Maritime Services (RMS) and Randwick City Council (RCC) have partnered to investigate and improve the Malabar Boat Ramp and surrounds with the aim of improving safety and enhancing the experience for recreational users.

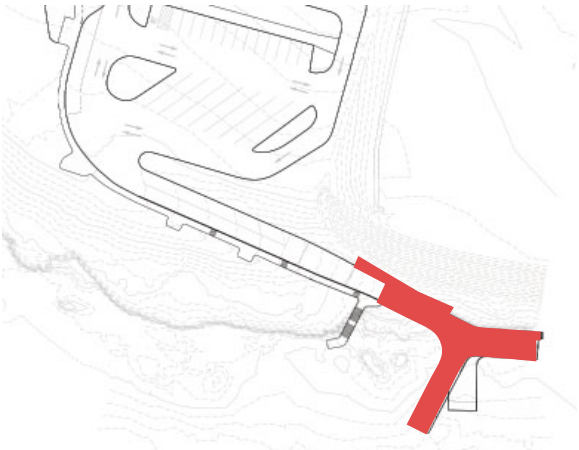
In August 2016 RCC undertook stakeholder and community consultation for improvement works of the site. Over 120 community members told RCC what they would like to see improved at the Malabar Boat Ramp to better meet the needs of the broader community.

The consultation and subsequent design process identified the following primary and ancillary works:

Primary works:

This includes works to the Malabar Boat Ramp in response to site conditions and assessment of the condition of the existing structure to improve access and mitigate safety concerns (refer to adjacent key plan for extent of works):

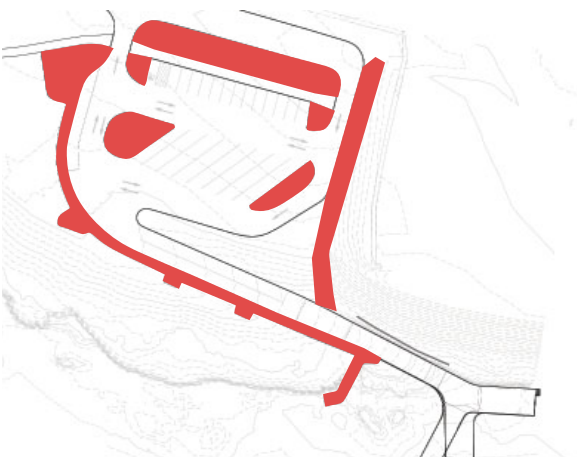
- Re-construct the boat ramp to *NSW Boat Facilities Guidelines 2015* to allow for safe access to Long Bay, including grade of ramp to be 1:7, width increased to 4.5m and deeper water access.
- Construct a manoeuvring/reversing area for vehicles and trailers on the lower rock shelf in line with *NSW Boat Facilities Guidelines 2015* (level of manoeuvring/reversing area to be confirmed based on discussions with RCC and RMS).
- Install a new give-way sign and queuing area to only allow one vehicle to use the boat ramp at any time.
- Repair southern side of existing ramp as it is currently showing signs of undermining between the kerb and the adjacent rock shelf.
- Install navigational lighting in consultation with RMS (location to be confirmed with RMS).
- Low speed zone to be proposed within Long Bay (to be confirmed with RMS)
- Construct a new reinforced concrete retaining wall to unstable embankment above the existing ramp as it is currently at risk of falling onto the ramp below.



Ancillary works:

This includes new ancillary works to the Malabar Boat Ramp surrounds in response to community consultation feedback (refer to adjacent key plan for extent of works):

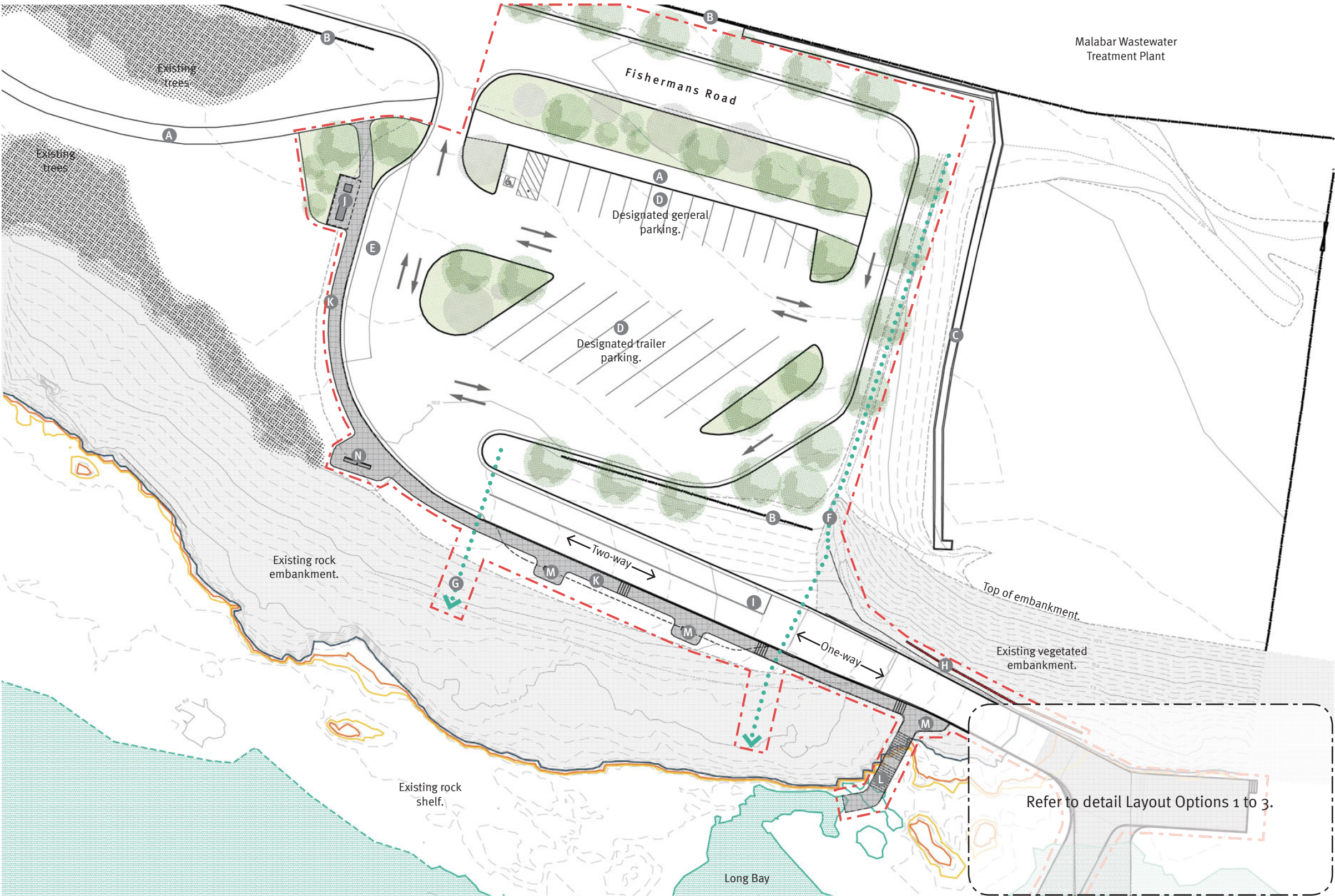
- Provide additional access to water for other users away from the boat ramp (swimmers, divers, snorkeling, fishing, kayaks, stand-up paddleboards).
- Construct a shelter with fish cleaning table and rubbish bins for fish waste in accordance with EPA requirements and as per *NSW Boat Facilities Guidelines 2015*.
- Upgrade existing drainage within the carpark to manage runoff from adjacent embankment and carpark.
- New stormwater infrastructure to capture runoff from eastern area of carpark and discharge into Long Bay.
- Introduce a restricted parking zone.
- Install signage and line marking for dedicated parking bays for vehicles with trailers in addition to general parking.
- Improve lighting to carpark and boat ramp.
- Provide facilities for picnic goers including seating, drinking fountains and rubbish bins.
- Install new native shade trees and understorey planting of native shrubs and groundcovers.
- Install way-finding signage



Malabar Boat Ramp

Overall Site Plan (includes primary and ancillary works)

- Legend**
- Extent of works.
 - Contours (500mm intervals).
 - HAT (highest astronomical tide): +2.32.
 - MHWS (mean high water springs): +1.60.
 - MLWS (mean low water springs): +1.30.
 - LAT (lowest astronomical tide): +0.00.
 - LAT (approximate alignment, outside survey extent): +0.00.
 - Existing trees to be retained.
 - A Existing concrete path to be retained.
 - B Existing fencing to be retained.
 - C Existing concrete block barrier (within Headland National Park).
 - D Existing carpark to be retained, upgraded to include line marking for parking bays (including vehicles with trailers), restricted parking signage improved lighting).
 - E Existing tie-down area upgraded to include line marking and signage.
 - F Existing drainage channel to be upgraded to manage runoff from adjacent embankment and carpark. New stormwater infrastructure to discharge runoff into Long Bay (subject to civil engineer design and environmental approvals).
 - G New stormwater infrastructure to capture runoff from eastern area of carpark and discharge into Long Bay (subject to civil engineer design and environmental approvals).
 - H New reinforced concrete retaining wall to unstable embankment (approximately 1.5m height, subject to structural engineer design).
 - I New give-way sign and waiting point (one vehicle and trailer only past this point).
 - J New shelter with fish cleaning table and rubbish bins for fish waste in accordance with EPA requirements.
 - K New reinforced concrete pathway, 1.5m width.
 - L New stair access for other users (swimmers, divers etc) and access to lower rock shelf away from boat ramp, reinforced concrete stairs with stainless steel handrail/balustrade as required.
 - M New seating area.
 - N Upgraded lookout area with new balustrade, seating and rubbish bin.
 - New native shade trees.
 - New understorey planting of native shrubs and groundcovers.



Plan

1:500 @ A3

0 2.5 5 10m



Option 1:

Opportunities:

- Alignment of existing boat ramp maintained.
- New manoeuvring area constructed at existing rock shelf level of +1.00 (subject to structural engineer design).
- New boat ramp constructed to 1:7 grade as required by *NSW Boat Ramp Facilities Guidelines 2015* (subject to structural engineer design).
- Toe of boat ramp extended from -0.57 to -1.25, as required by *NSW Boat Ramp Facilities Guidelines 2015*.
- Giveaway and queuing area located along existing access ramp.
- New stair access for other users located clear of boat ramp (subject to structural engineer design).
- New navigational lighting within Long Bay (location to be confirmed with RMS).
- Low speed zone within Long Bay (to be confirmed with RMS).
- New reinforced concrete retaining wall to unstable embankment (aproximately 1.5m height, subject to structural engineer design).

Constraints:

- Upgrade does not comply with *NSW Boat Ramp Facilities Guidelines 2015* as the manoeuvring area is located below HAT.
- Layout utilises existing boat ramp alignment and may not improve vehicle access manoeuvrability

Assumptions:

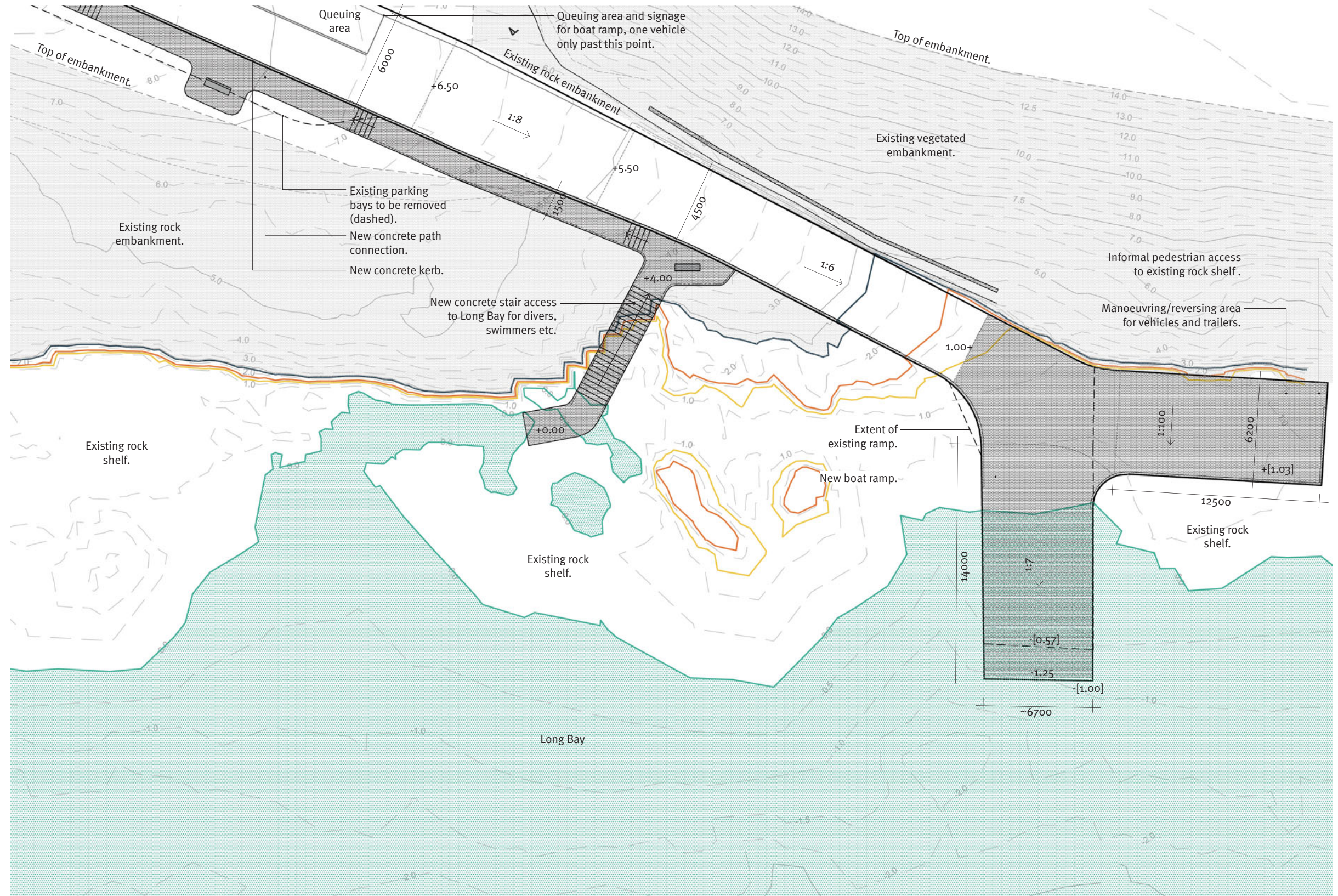
- Proposed works assumes rectification of drainage works from carpark and new retaining works associated with the existing unstable embankment - refer to overall site plan.

Legend

- | | |
|----------|---|
| + [1.20] | Existing levels. |
| + 1.20 | Proposed levels. |
| — | Major contours. |
| — 5.0 — | Minor contours. |
| — | HAT (highest astronomical tide): +2.32. |
| — | MHWS (mean high water springs): +1.60. |
| — | MLWS (mean low water springs): +1.30. |
| — | LAT (lowest astronomical tide): +0.00. |
| | Water level below LAT +0.00. |
| | Existing embankment. |
| | New work. |
| | New kerb. |
| | New balustrade/barrier. |
| | New reinforced concrete retaining wall. |

Malabar Boat Ramp

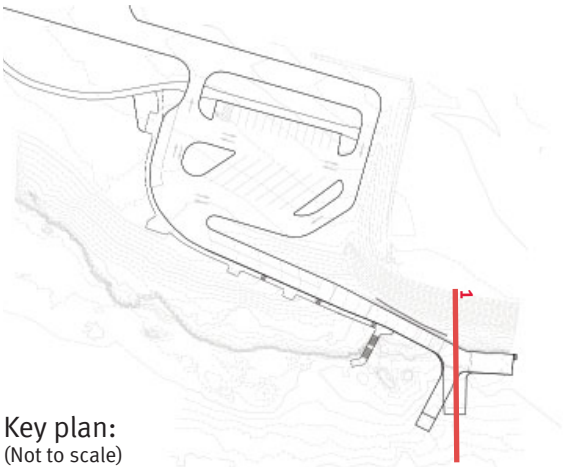
Layout Option 1 - Works to existing ramp



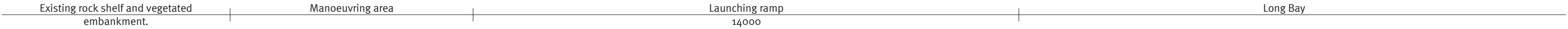
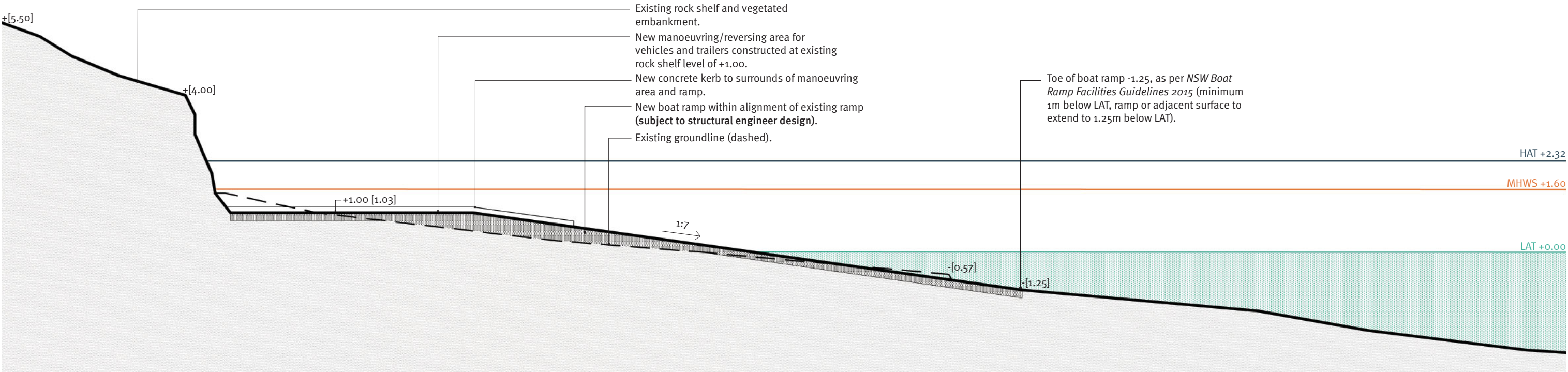
Plan

1:250 @ A3





Key plan:
(Not to scale)



Section 1
1:100 @ A3



Malabar Boat Ramp

Layout Option 2 - New ramp at existing rock shelf level

Option 2:

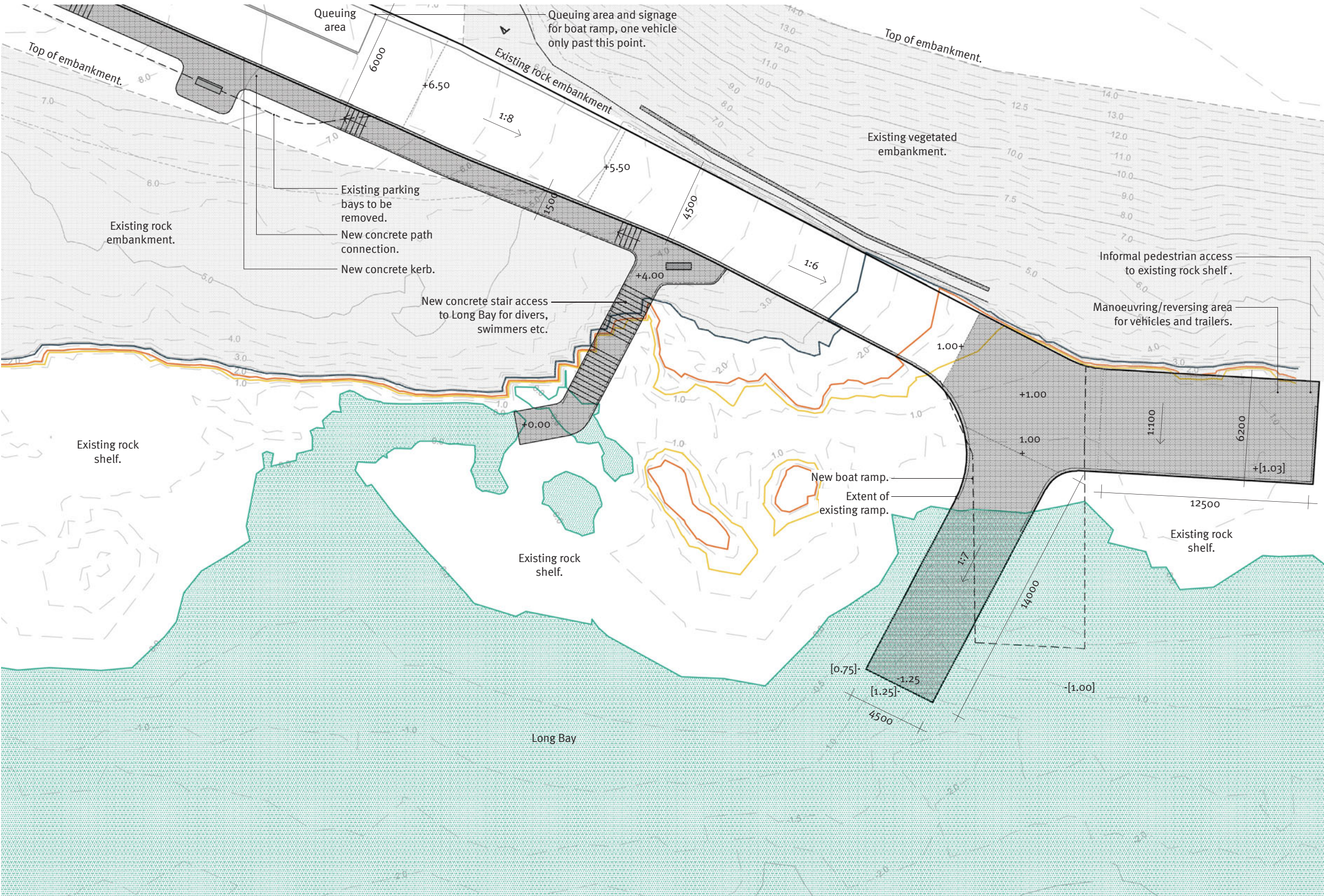
- Opportunities:**
- New manoeuvring area constructed at existing rock shelf level of +1.00 (subject to structural engineer design).
 - New boat ramp structure re-oriented to provide for improved reversing/access from manoeuvring area to deeper water.
 - New boat ramp constructed to 1:7 grade as required by *NSW Boat Ramp Facilities Guidelines 2015* (subject to structural engineer design).
 - Toe of boat ramp extended from -0.57 to -1.25, as required by *NSW Boat Ramp Facilities Guidelines 2015*.
 - Giveaway and queuing area located along existing access ramp.
 - New stair access for other users located clear of boat ramp (subject to structural engineer design).
 - New navigational lighting within Long Bay (location to be confirmed with RMS).
 - Low speed zone within Long Bay (to be confirmed with RMS).
 - New reinforced concrete retaining wall to unstable embankment (aproximately 1.5m height, subject to structural engineer design).

- Constraints:**
- Upgrade does not comply with *NSW Boat Ramp Facilities Guidelines 2015* as the manoeuvring area is located below HAT.

- Assumptions:**
- Proposed works assumes rectification of drainage works from carpark and new retaining works associated with the existing unstable embankment - refer to overall site plan.

Legend

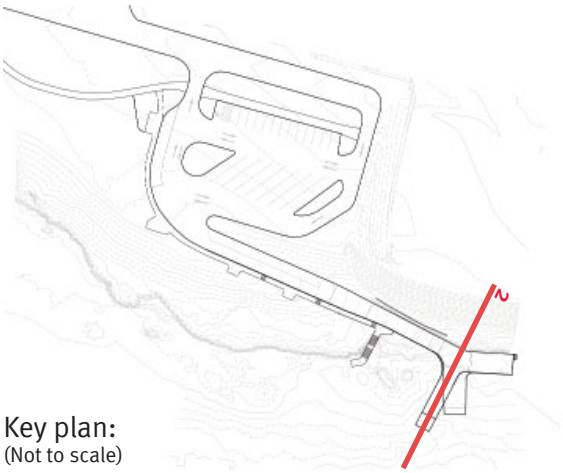
- | | |
|---|---|
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| + 1.20 | Proposed levels. |
| — — — | Major contours. |
| — 5.0 — | Minor contours. |
| — — — | HAT (highest astronomical tide): +2.32. |
| — — — | MHWS (mean high water springs): +1.60. |
| — — — | MLWS (mean low water springs): +1.30. |
| — — — | LAT (lowest astronomical tide): +0.00. |
| Water level below LAT +0.00. | |
| Existing embankment. | |
| New work. | |
| New kerb. | |
| New balustrade/barrier. | |
| New reinforced concrete retaining wall. | |



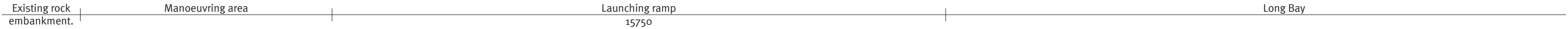
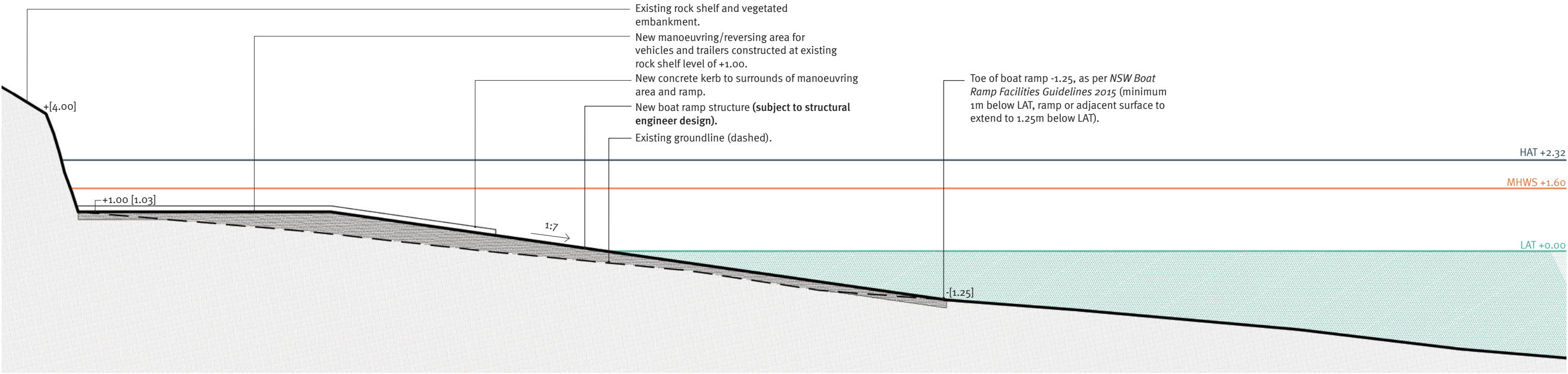
Plan

1:250 @ A3





Key plan:
(Not to scale)



Section 2
1:100 @ A3



Malabar Boat Ramp

Layout Option 3 - New ramp at MHWS level

Option 3:

Opportunities:

- New manoeuvring area constructed at MHWS level of +1.60 (subject to structural engineer design).
- New boat ramp structure re-oriented to provide for improved reversing/access from manoeuvring area to deeper water.
- New boat ramp constructed to 1:7 grade as required by *NSW Boat Ramp Facilities Guidelines 2015* (subject to structural engineer design).
- Toe of boat ramp extended from -0.57 to -1.25, as required by *NSW Boat Ramp Facilities Guidelines 2015*.
- Giveaway and queuing area located along existing access ramp.
- New stair access for other users located clear of boat ramp (subject to structural engineer design).
- New navigational lighting within Long Bay (location to be confirmed with RMS).
- Low speed zone within Long Bay (to be confirmed with RMS).
- New reinforced concrete retaining wall to unstable embankment (aproximately 1.5m height, subject to structural engineer design).

Constraints:

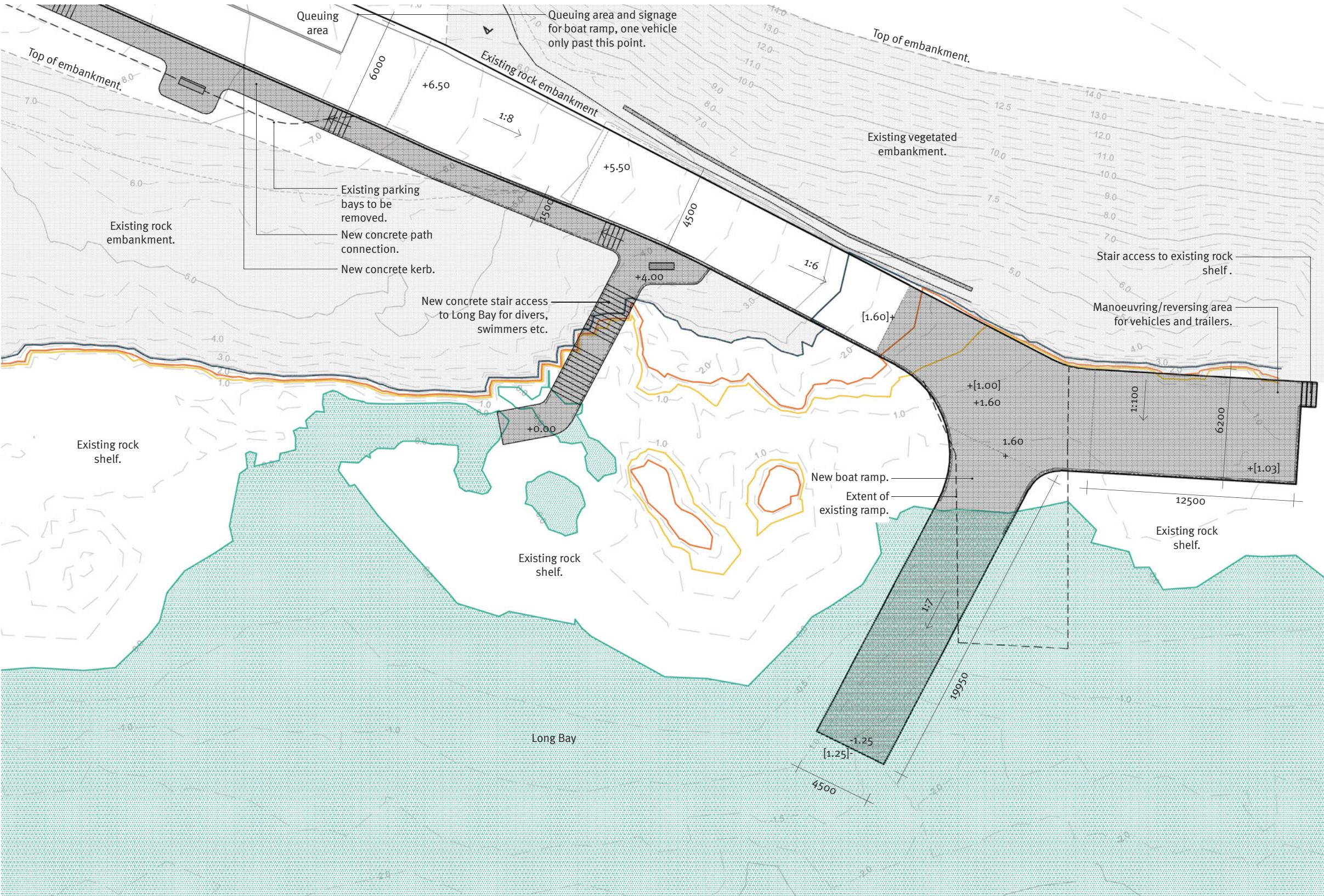
- Upgrade does not comply with *NSW Boat Ramp Facilities Guidelines 2015* as the manoeuvring area is located below HAT.

Assumptions:

- Proposed works assumes rectification of drainage works from carpark and new retaining works associated with the existing unstable embankment - refer to overall site plan.

Legend

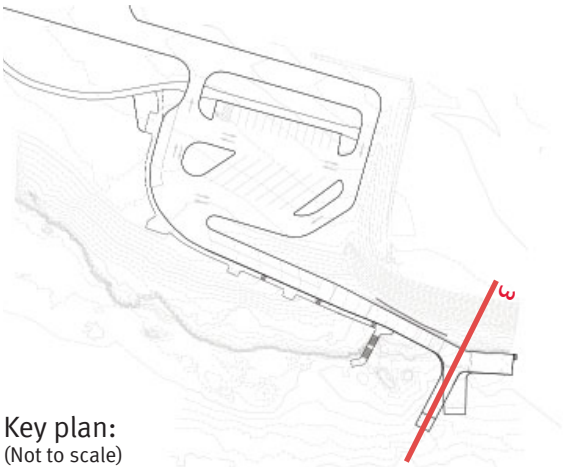
- | | |
|---|---|
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| + 1.20 | Proposed levels. |
| — — — | Major contours. |
| — 5.0 — | Minor contours. |
| — — — | HAT (highest astronomical tide): +2.32. |
| — — — | MHWS (mean high water springs): +1.60. |
| — — — | MLWS (mean low water springs): +1.30. |
| — — — | LAT (lowest astronomical tide): +0.00. |
| Water level below LAT +0.00. | |
| Existing embankment. | |
| New work. | |
| New kerb. | |
| New balustrade/barrier. | |
| New reinforced concrete retaining wall. | |



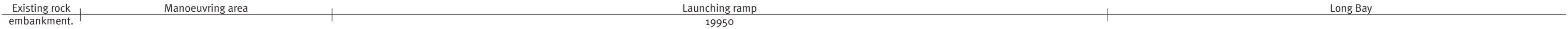
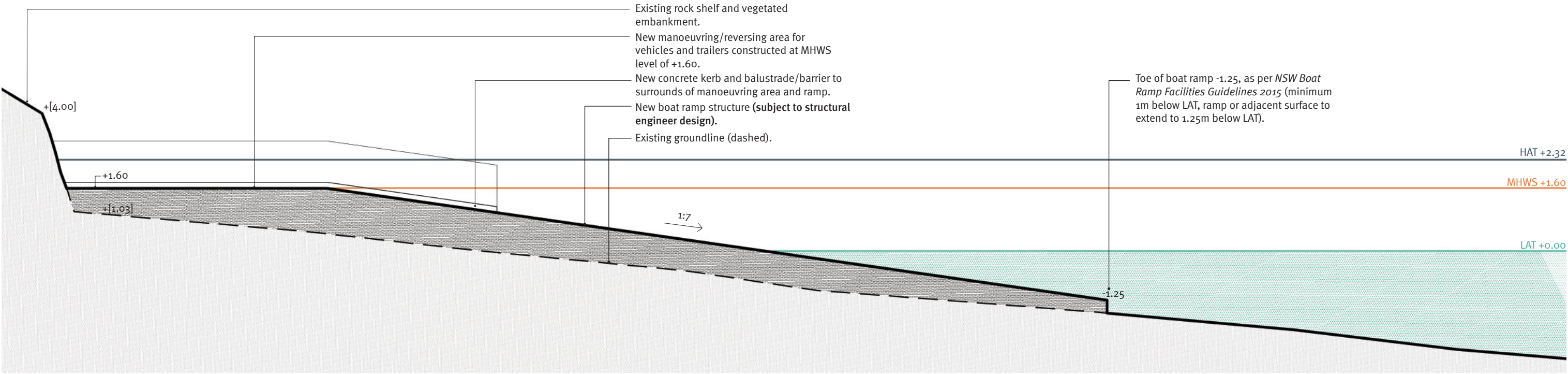
Plan

1:250 @ A3





Key plan:
(Not to scale)

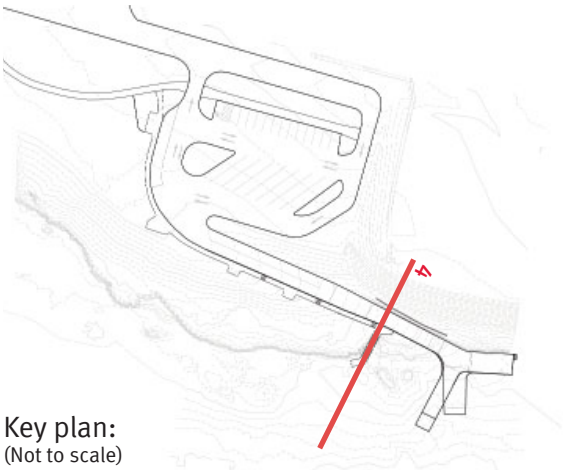


Section 3
1:100 @ A3

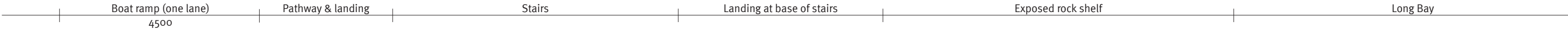
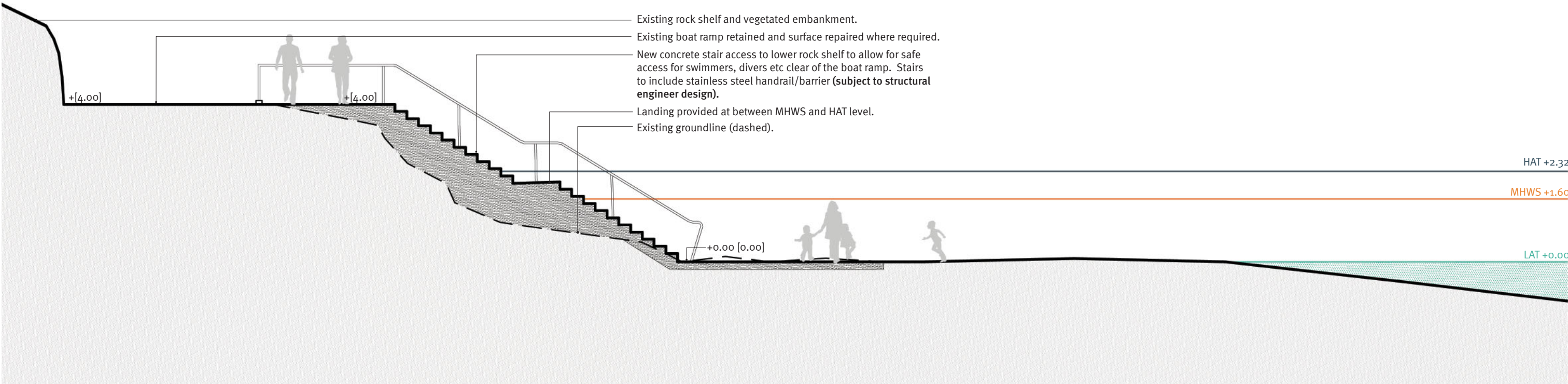


Malabar Boat Ramp

New stair access separate to boat ramp
(Applies to all options)



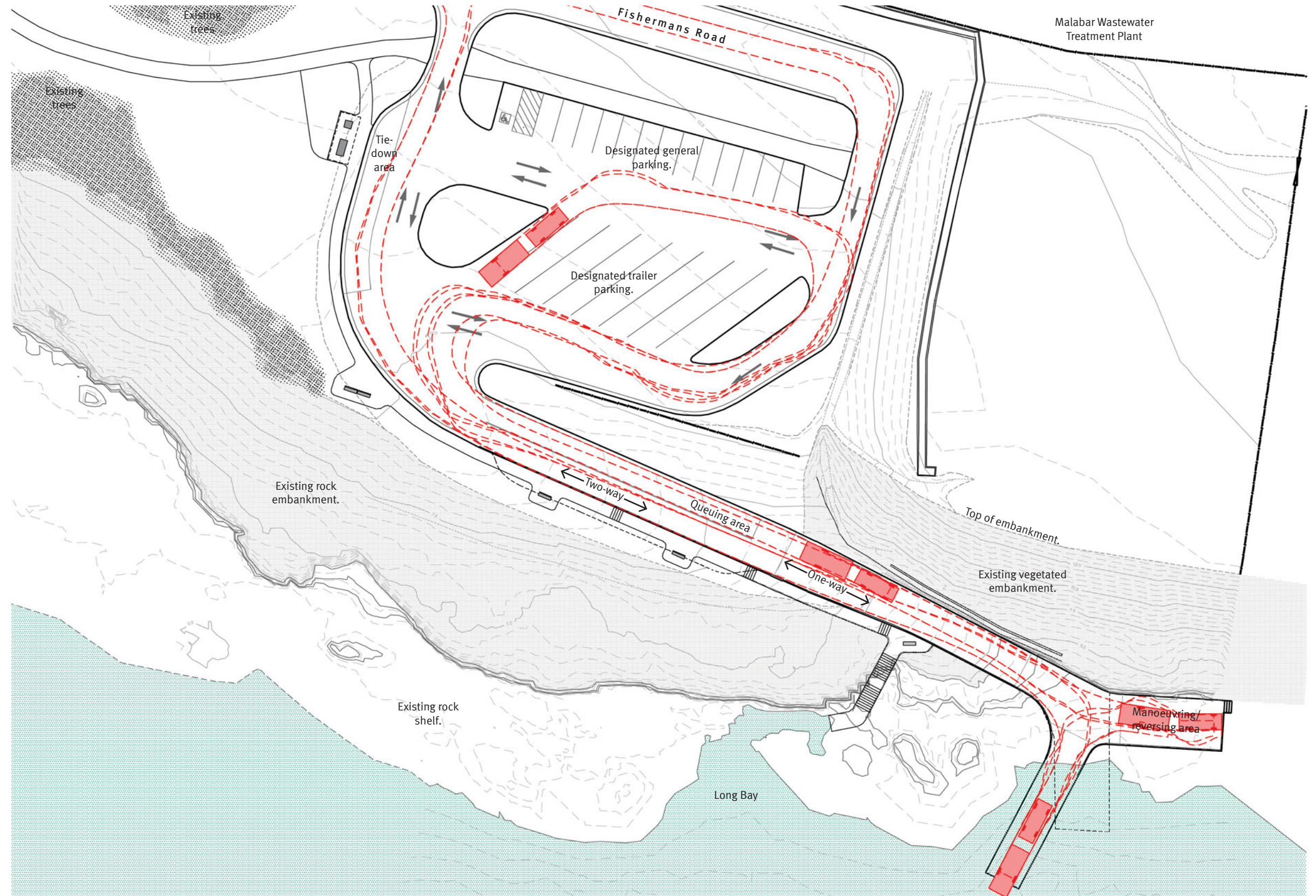
Key plan:
(Not to scale)



Section 4
1:100 @ A3

Malabar Boat Ramp

Overall Site Plan - Vehicle access swept paths



Plan
1:500 @ A3

- Legend**
- Contours (500mm intervals)
 - Water level below LAT +0.00.
 - Swept paths demonstrating movements and access to boat ramp for standard vehicle and 6.1m long boat trailer