



# Lake Curalo Entrance Management Policy

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# Policy Name

Lake Curalo Entrance Management Policy (*Policy*).

## Objectives

This Policy provides a framework which assists in the management of the entrance to the Lake Curalo Estuary. This Policy aims to:

- Minimise interference with natural entrance opening processes and minimise associated impacts on ecological processes;
- Accommodate future climate change and sea level rise in particular;
- Minimise risks to public and private safety associated with excessive inundation of foreshores and associated infrastructure;
- Conserve or enhance the biological diversity and flora and fauna communities of the estuarine lakes systems;
- Clearly establish triggers (water level height) for initiating artificial entrance openings;
- Determine procedures to be initiated for entrance operations including entrance breakouts;
- Determine key responsibilities for management of the entrance; and
- Detail the procedure for monitoring of lake entrances.

Implementing this Policy will ensure that Council:

- Minimises the impacts to the public and private landholders resulting from inundation of assets, infrastructure and foreshore lands;
- Facilitates the vertical natural migration of riparian and estuarine ecological communities in response to sea level rise over the long term;
- Minimises impacts on local fisheries resources and other ecological species, where possible; and
- Enables continued existing use of fringing riparian lands for as long as practical.



# Review of Environmental Factors

A Review of Environmental Factors (REF) has been undertaken in the development of this Policy, and outlines the potential impacts of implementing the Policy on the estuary environment. Importantly, the REF also details the mitigation measures to be adopted in order to minimise potential impacts in accordance with the Environmental Planning and Assessment Act 1979, Part 5. The REF considered the economic, ecological, social and hydrological impacts of managing the Lake Curalo Estuary entrance to alleviate flooding, with the intention to return to a more natural opening regime in the long term.

Key findings from the REF included:

- Artificial opening of the entrance in line with this Policy may result in minor adverse impacts on sedimentation in the lower estuary, which may in turn impact on the system hydraulics and hydrology;
- Artificial opening of the entrance has the potential to have both positive and negative impacts on water quality at different areas of the estuary;
- The potential for scouring of seagrasses in the vicinity of the entrance will increase in frequency as entrance opening frequency is increased;
- Reduced inundation associated with entrance opening at lower water levels may have moderate negative impacts on a range of Endangered Ecological Communities;
- It is unlikely that implementation of the Policy would have any direct impact on any mammal species, however, if not implemented with appropriate measures, mechanical entrance works could have a significant impact on threatened bird species and also the Green and Golden Bell frog.
- No threatened species of fish are expected to be negatively impacted as a result of implementing the Policy, however, wider communities of aquatic fauna may be both positively and negatively impacted through processes such as potential assemblage changes, habitat shifts, and fish kills;
- While no reported Aboriginal objects or places will be impacted by the Policy, the areas of machine access should be monitored and an AHIP sought as a precautionary measure;
- The Policy will have both positive and negative impacts on a range of recreational activities including bushwalking, kayaking, boating and fishing. In particular, implementation of the Policy will have a positive impact on recreational use of adjacent sporting facilities;
- The Policy will have moderate positive impacts on commercial activities such as tourism, while there may be slight negative impacts on commercial fishing and prawning activities.

# Land to which this Policy Applies and Review Period

This Policy applies to lands located at the ocean entrance of Lake Curalo and the surrounding foreshore environments. The REF for management of the Lake Curalo entrance considered the wider Lake Curalo and catchment.

This Policy is to be reviewed and revised as necessary every 5 years.

## Climate Change

This policy applies the precautionary principle in considering the uncertainty associated with sea level rise projections and future greenhouse gas emissions, and acknowledges that trigger values for opening Lake Curalo will need to be revised with future sea level rise.

For strategic land use planning and development assessment purposes, Bega Valley Shire Council has applied sea level rise planning benchmarks of:

- 40cm rise by 2050; and
- 90cm rise by 2100.

These benchmarks need to be taken into account in managing existing and any future infrastructure around Lake Curalo. The benchmarks are consistent with the most credible information currently available for regional and global sea level rise projections for the two planning periods and align with the benchmarks previously adopted by the NSW Government through its *Sea Level Rise Policy Statement* (2009, now repealed) and the majority of other coastal Councils.

# Relevant Legislation

The Policy broadly complies with various State Government initiatives for environmental management of coastal lakes, and will be applied with full consideration of the following Federal and State legislation and Policies:

- Cmwltth Environmental Protection and Biodiversity Conservation Act 1999;
- NSW Environmental Planning & Assessment Act 1979;
- NSW Local Government Act 1993;
- NSW Coastal Protection Act 1979;
- NSW Fisheries Management Act 1994;
- NSW Crown Lands Act 1989;
- NSW Threatened Species Conservation Act 1995;
- National Parks and Wildlife Act 1974;
- NSW Marine Parks Act 1997 and Regulations 2009;
- State Environmental Planning Policy 71 – Coastal Protection;
- State Environmental Planning Policy (Infrastructure) 2007;
- State Environmental Planning Policy 14 – Coastal Wetlands;
- NSW Coastal Policy 1997;
- NSW Flood Prone Land Policy;
- NSW Government’s Floodplain Development Manual;
- NSW Guidelines for Preparing Coastal Zone Management Plans;
- Fisheries NSW Policy and guidelines for fish habitat conservation and management 2013.



# Entrance Management Principles

The Lake Curalo Entrance Management Policy will be conducted according to the general principles and philosophy set out below. These principles will largely be driven by the Lake Curalo Estuary Management Plan (EMP) and the actions within it.

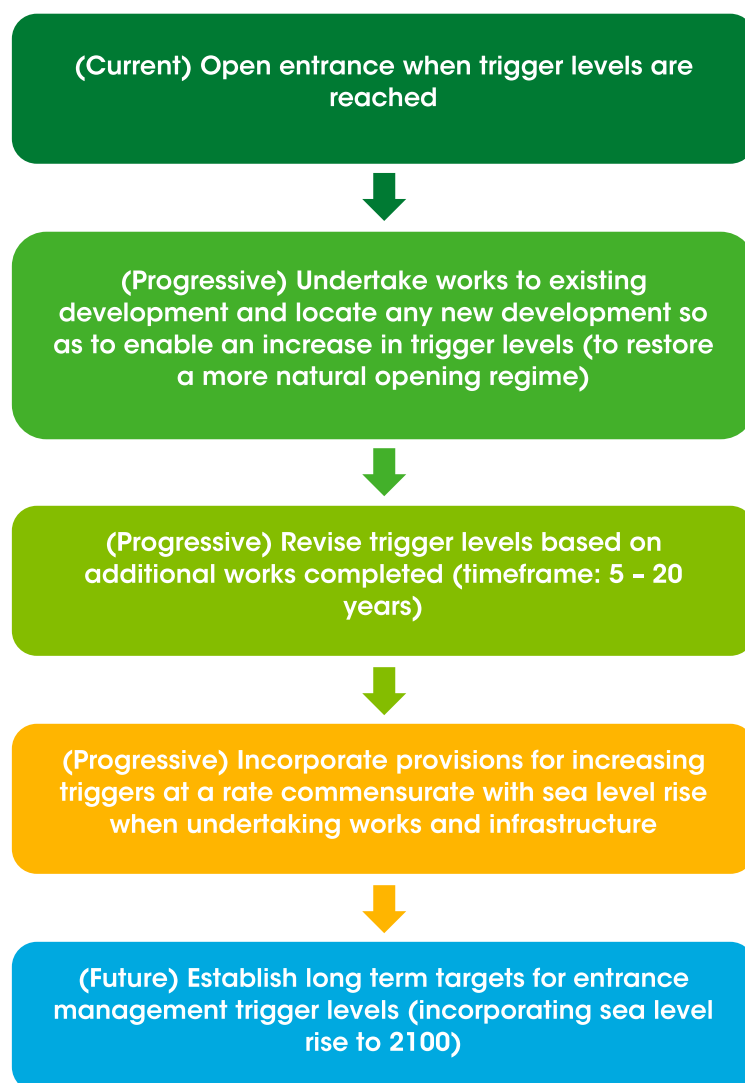


Figure 1: ICOLL Entrance Management Philosophy

## Monitoring

Water levels in Lake Curalo are monitored visually using a gauge-pole located in the estuary at the end of Aslings Beach Road. Levels are monitored electronically by Manly Hydraulics Laboratory through an automatic water level recorder which is located near the board walk at the end of Lakeside Drive. These can be viewed in real time via Manly Hydraulics Laboratory's web site at <http://new.mhl.nsw.gov.au/data/realtime/WaterLevel>

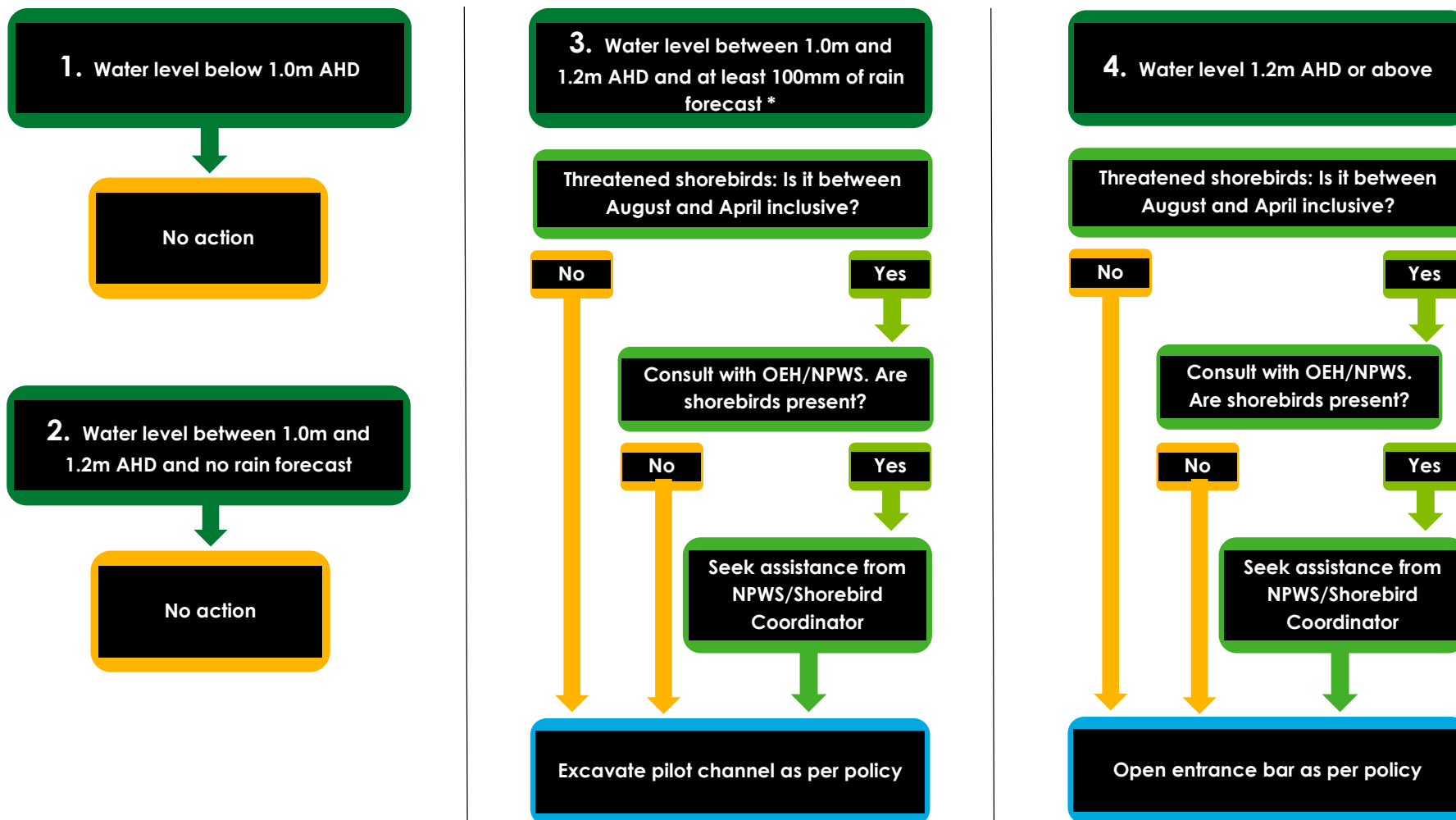
Monitoring of both mechanical and natural entrance openings will be undertaken by Bega Valley Shire Council, Environmental Services Section. As a minimum this monitoring will cover the details indicated on the Entrance Monitoring Form included in Appendix 3 of this Policy, which includes recording of any relevant impacts of mechanical openings.

## Entrance Management

The decision making process for artificially opening the Lake Curalo entrance is outlined in Figure 2. The detailed procedure for implementing an artificial opening of Lake Curalo is outlined in the relevant SWMS. The following conditions are required to initiate an opening of the entrance channel:

- Water levels at or above 1.2m AHD;
- Water levels between 1.0m and 1.2m AHD with at least 100mm of rain predicted to fall in the in the catchment.

**Note:** Trigger values are only for entrance management, not for landuse planning or development assessment (refer to BVSC Local Environment Plan for direction on this issue).



\* The decision for opening at lower levels is at the discretion of Council officers

Figure 2: Lake Curalo Entrance Management Decision Flow Chart

## Revising Breakout Levels and Works Required to Achieve Levels

This Policy advocates a minimal entrance intervention in the long term, with preference for returning to a “natural as possible” breakout regime. In order to achieve this, a number of measures will need to be considered. These are likely to include:

- Progressive raising of minimum floor levels for fringing development through changes to planning instruments;
- Progressive and opportunistic raising of assets to levels above 3.0 m AHD;
- Progressive and opportunistic removal of assets that are currently affected by inundation at levels at or slightly above 1.2 m AHD, with higher priority for assets close to or just above 1.2 m AHD;
- Other modification works that have the ability to alleviate impacts of extended inundation on existing assets;
- Maintaining a buffer of no new development within close horizontal proximity to and below an elevation of 3.0 m AHD around Lake Curalo.

Appendix 2 provides a series of maps and figures documenting the various assets and infrastructure that have the potential to be inundated during high lake water levels, and the level at which inundation would occur.

## Mitigation of Impacts to Threatened Shorebirds

A key finding of the REF undertaken for this Policy is that the proposed entrance management works have the potential to have direct impacts on resident and migratory threatened shorebirds. A number of mitigation measures have been incorporated into the entrance management process to minimise impacts to threatened shorebirds, including:

- Selection of an access route that where possible minimises the extent to which heavy machinery need to move through areas typically used by shorebirds;
- Consideration of the time of year with regards to key aspects of shorebird breeding cycle which occur from August through until April;
- If the entrance is to be opened between August and April (inclusive), initial consultation with local NPWS staff, and preferably the Shorebird Recovery Coordinator, to identify if shorebirds are present either in the general area for excavator access or for the lake entrance breakout zone. The monitoring undertaken as a part of the South Coast Shorebird Recovery Program will inform this process.
- If shorebirds are present in the area, seeking assistance from the Shorebird Recovery Coordinator to provide on-site adaptive management to minimise impacts to shorebirds. This may include localised adjustment in the access route, temporary movement of fencing and signs, and as a last resort, translocation of nests that would otherwise be impacted by machine access or entrance breakout.

In the case that the above measures cannot mitigate significant impacts to threatened shorebirds, further consultation between Council officers, OEH and NPWS staff will be required to establish a course of action.



# Penalties

Council has the authority to penalise persons opening the lake without appropriate authorisation under Section 623(1) of the Local Government Act 1993. In some circumstances it is also illegal under Fisheries legislation to conduct non-authorized opening of the lake entrance.

# Responsibility

Primary responsibility for implementing this Policy is with Bega Valley Shire Council, Environmental Services Section.

# Contacts

All key contacts will be advised of any intention to undertake entrance works prior to the activities. Key contacts regarding implementation of this Policy are shown in Table 1.

Table 1: Lake Curalo Entrance Management Policy - Contacts	
Organisation	Contact Details
Bega Valley Shire Council	Coastal Management Officer Name: Kyran Crane Number: (02) 6499 2164 Mobile: 0409111522 Email: kcrane@begavalley.nsw.gov.au
Office of Environment and Heritage	Senior Natural Resource Officer Name: Danny Wiecek Number: (02) 4224 4158 Mobile: 0402127205 Email: Daniel.Wiecek@environment.nsw.gov.au
Department of Industry and Investment (Fisheries)	Regional Assessment Officer Name: Jillian Reynolds Number: (02) 4428 3406 Mobile: 0429918575 Email: jillian.reynolds@dpi.nsw.gov.au
Threatened Species Unit Manager, South Branch, Queanbeyan	Number: (02) 6229 7188 Fax: (02) 6229 7001
Office of Environment and Heritage National Parks and Wildlife Service Merimbula	Number: (02) 6495 5000 Fax: (02) 6495 5055
National Parks and Wildlife Service Shorebird Coordinator	Name: Amy Harris Number: (02) 4476 0834 Mobile: 0427784052
Department of Lands (Nowra)	Area Manager Name: Grant Merinuk Number: (02) 4428 9100 Email: grant.merinuk@crownland.nsw.gov.au
Eden Local Aboriginal Land Council	Number: (02) 6495 7177
Eden Police Station	Number: (02) 6496 1444
Eden State Emergency Service	Number: (02) 6496 1676

# Authorisation

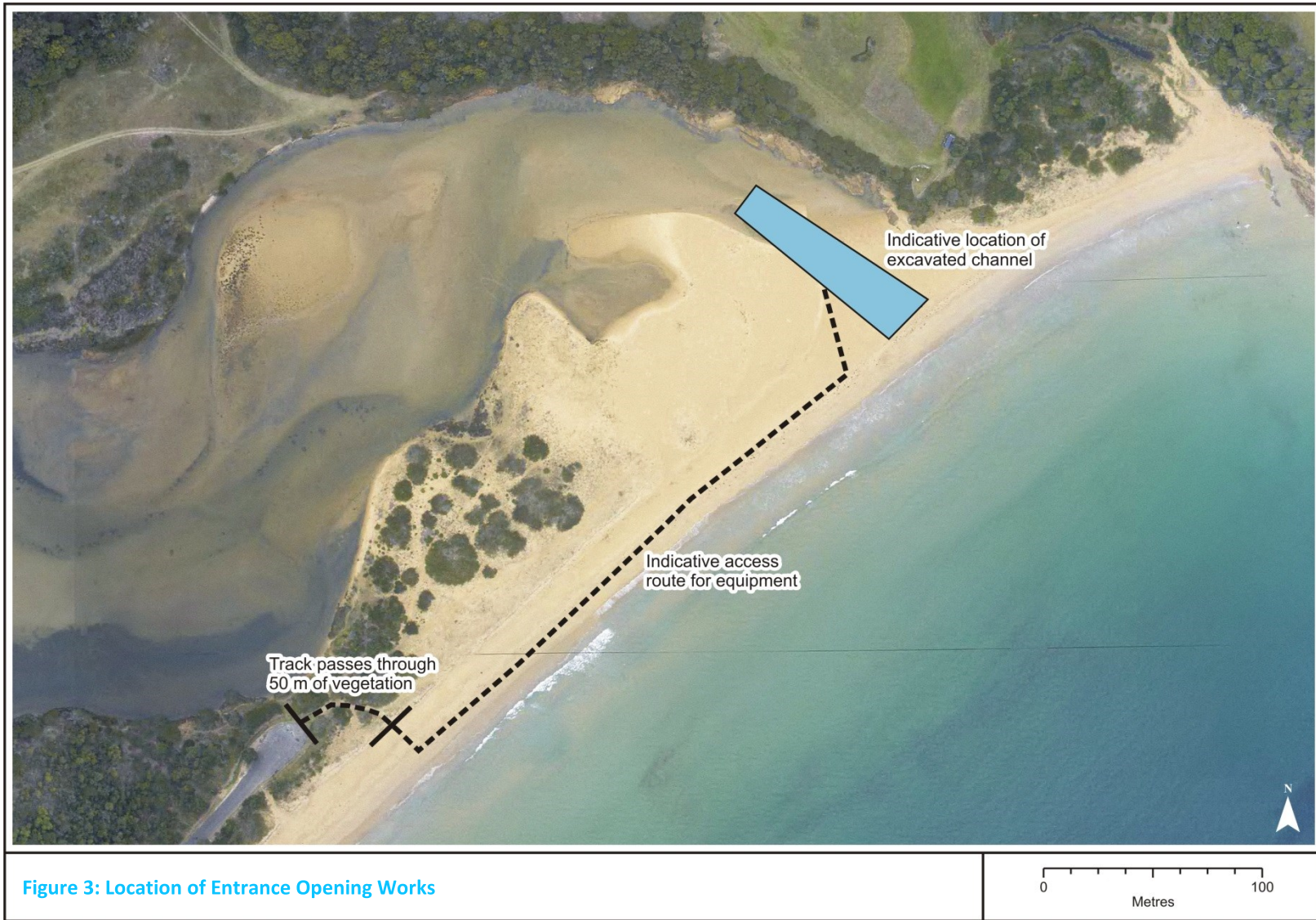
This Policy was adopted by council on: 14/12/2016

This Policy commenced on: 14/12/2016

This Policy is due for review on: 14/12/2021

# Amendments

This Policy was last amended on: 14/12/2016



# Appendix 1: Approval Checklist

The following is a list of potential legislation and permits/approvals that may be required for the carrying out of artificial entrance openings. Consent has been granted for a period of 5 years for all necessary approvals in line with this Policy and accompanying REF.

Back Lake Entrance Management Policy – Approval Checklist		
Relevant Act	Approvals Required	Approval Body
Crown Lands Act 1989	Approval to carry out activities on Crown Land	Department of Lands
NSW Fisheries Management Act 1994	Permit for destruction of marine vegetation, if applicable Permit for dredging and reclamation <sup>1</sup>	DPI (NSW Fisheries)
Threatened Species Conservation Act 1995	Species Impact Statement (SIS), if applicable <sup>2</sup>	OEH
National Parks and Wildlife Act 1974	Aboriginal Heritage Impact Permit (AHIP) (precautionary)	OEH

Notes:

1. Dredging permit under section 200 of the FM Act 1994 not required as long as dredging has been authorised under the Crown Lands Act and the Department of Lands consults with NSW Fisheries prior to authorising.
2. Based on the REF undertaken for the entrance management works, a SIS would only be required in the case that impacts to shorebirds from a mechanical entrance opening cannot be suitably managed and mitigated through the identified mitigation measures.

# Appendix 2: Assets at Risk of Inundation

In developing this Entrance Management Policy and establishing suitable trigger levels for artificially opening Lake Curalo, a survey of both public and private assets at risk of inundation was undertaken by Council and OEH. These assets are mapped and charted in the following figures.











# Curalo Lagoon

## East

3.00 m +  
Expected natural opening range

Metres AHD

2.37 m - Front of reception building at Eden Tourist Park [CLETP06]

2.18 m - Laundry slab at Eden Tourist Park [CLETP10]

2.67 m - Ground level at cabin 19, Eden Tourist Park [CLETP07]

2.23 m - Slab of BBQ area at Eden Tourist Park [CLETP02]

2.17 m - Bottom of shower slab at Eden Tourist Park [CLETP01]

2.16 m - Low point in road at Eden Tourist Park [CLETP04]

2

1.18 m - Low point on Eden Cove walking track [CLECW03]

1.03 m - Low point on Eden Cove walking track [CLECW01]

1.20 m - Proposed trigger level

1

0.91 m - Foreshore at Eden Tourist Park [CLETP09]

0

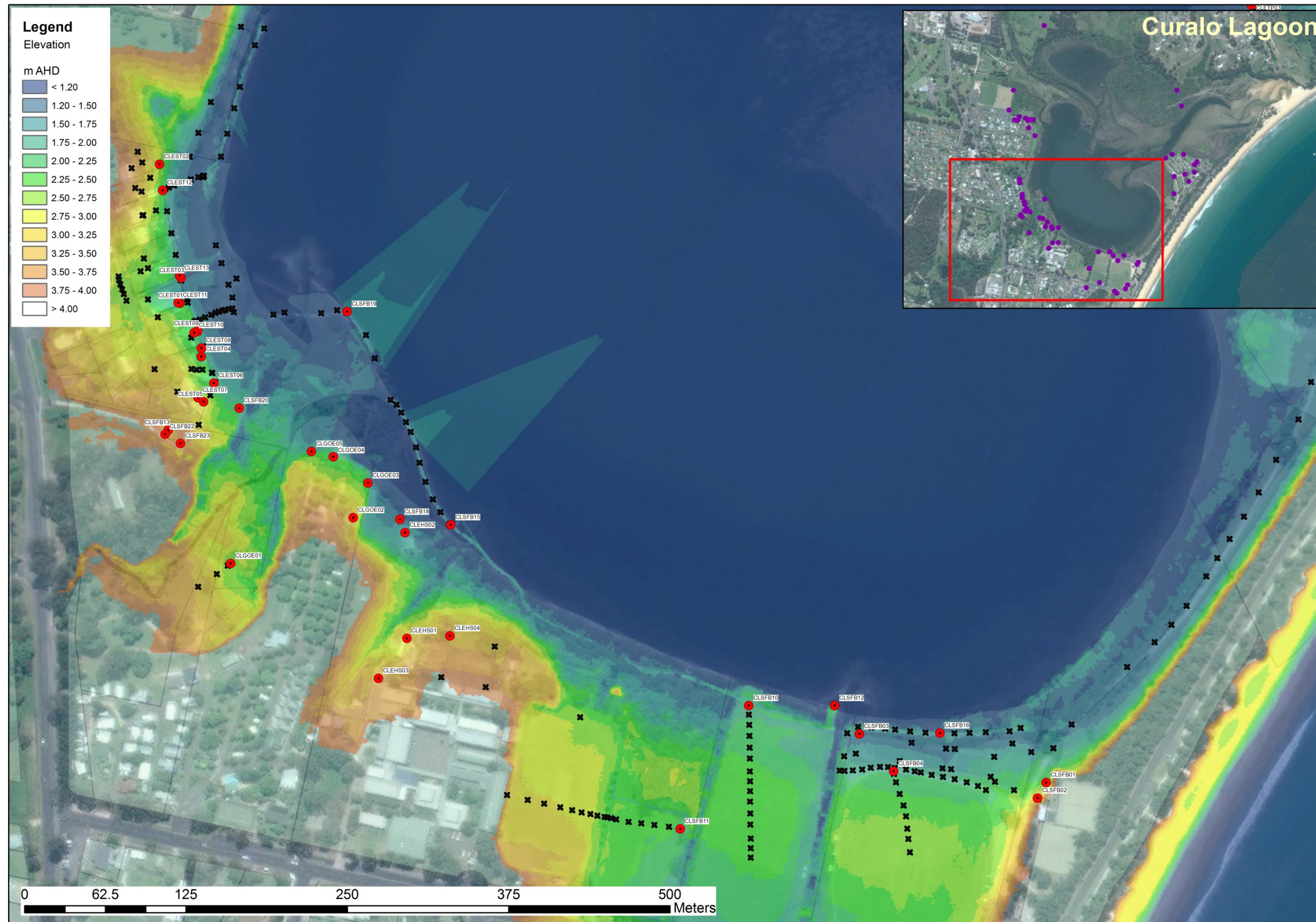
**NOTE :** \* Opening Level is subject to a number of other considerations such as season, continuing rainfall, approvals gained etc. See Entrance Management Policy for details.

Assets indicated by the blue boxes are lower than proposed lake opening level.











# Curalo Lagoon

## South 1

Metres AHD

3.09 m - Approx floor level of shed and house at No. 20 Emblen St [CLEST07]

**3.00 m +**  
Expected natural opening range

2.37 m - Floor level of garage at No. 16 Emblen St [CLEST10]

2.07 m - Back fence boundary ground level at Garden of Eden Caravan Park [CLGOE04]

1.72-2.74 m - Backyards and fences begin to inundate at No. 2, 2A, 10, 12, 16, 18 and 20, Emblen St [CLEST01, CLEST02, CLEST06, CLEST08, CLEST09, CLEST12, CLEST13]

1.15 m - Storm water pipe, top of culvert [CLEST03]

0.84 m - Foreshore at Eden Tourist Park [CLETP03]



3.00 m - Garden shed at No. 20 Emblen St [CLEST05]

2.56 m - Low point between fence and path at Garden of Eden Caravan Park [CLGOE01]

2.17 m - Ground level at back of house at No. 18 Emblen St [CLEST04]

2.05 m - Back fence boundary ground level at Garden of Eden Caravan Park [CLGOE05]

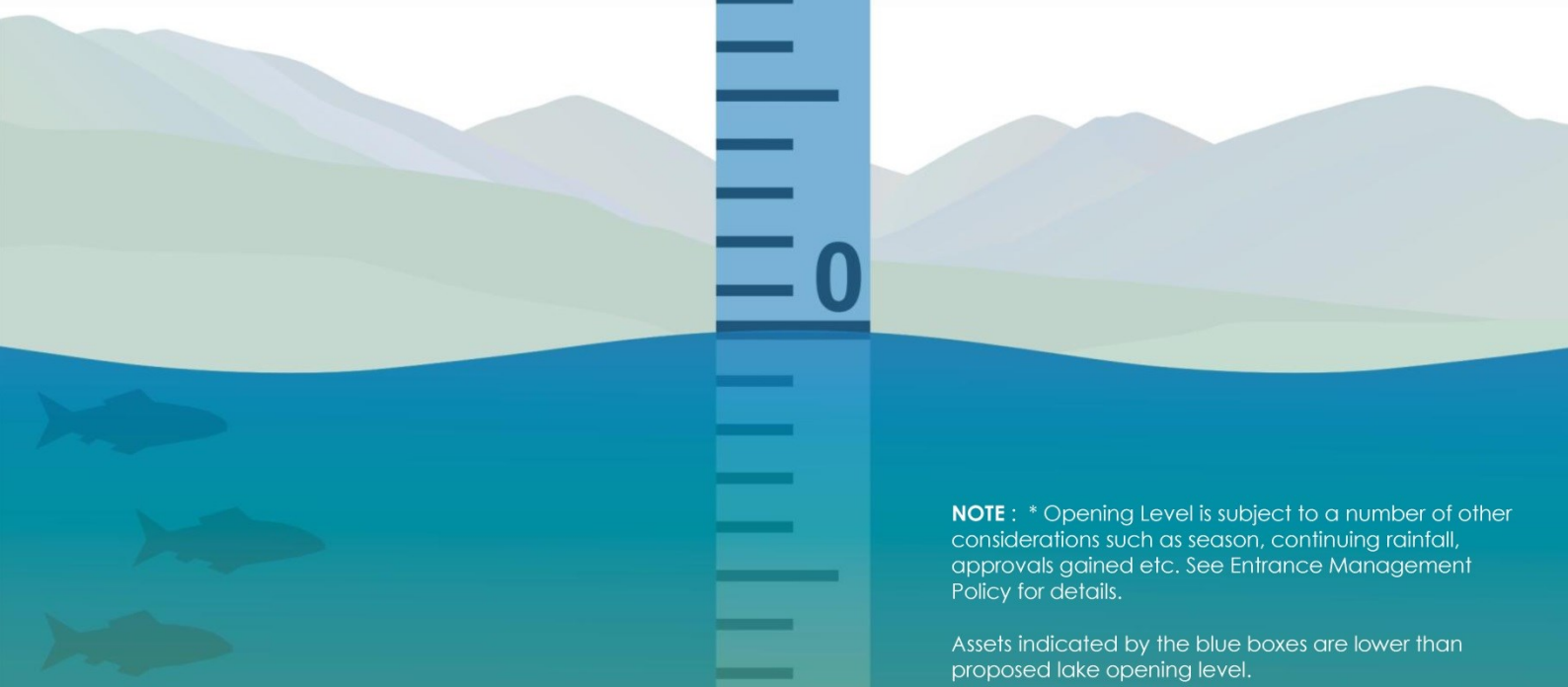
2.04 m - Floor level of toilet block at Eden Tourist Park [CLETP08]

1.93 m - Back camping area at Garden of Eden Caravan Park [CLGOE03]

1.82 m - Floor level of garage at No. 12 Emblen St [CLEST11]

1.60 m - Sewer pumping station floor at Eden Tourist Park [CLETP05]

**1.20 m - Proposed trigger level**



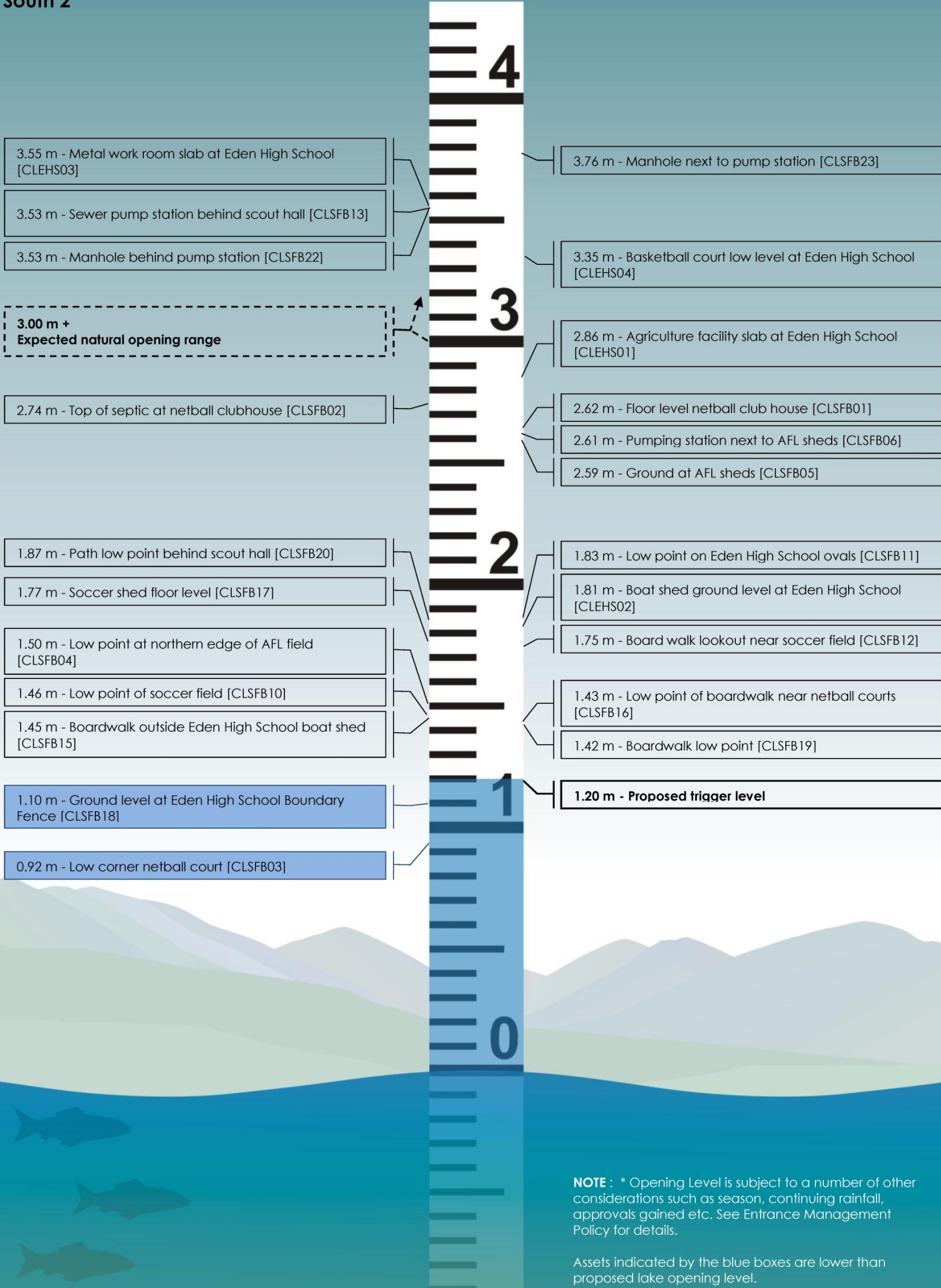
**NOTE :** \* Opening Level is subject to a number of other considerations such as season, continuing rainfall, approvals gained etc. See Entrance Management Policy for details.

Assets indicated by the blue boxes are lower than proposed lake opening level.

# Curalo Lagoon

## South 2

Metres AHD



**NOTE :** \* Opening Level is subject to a number of other considerations such as season, continuing rainfall, approvals gained etc. See Entrance Management Policy for details.

Assets indicated by the blue boxes are lower than proposed lake opening level.











# Curalo Lagoon

## North West

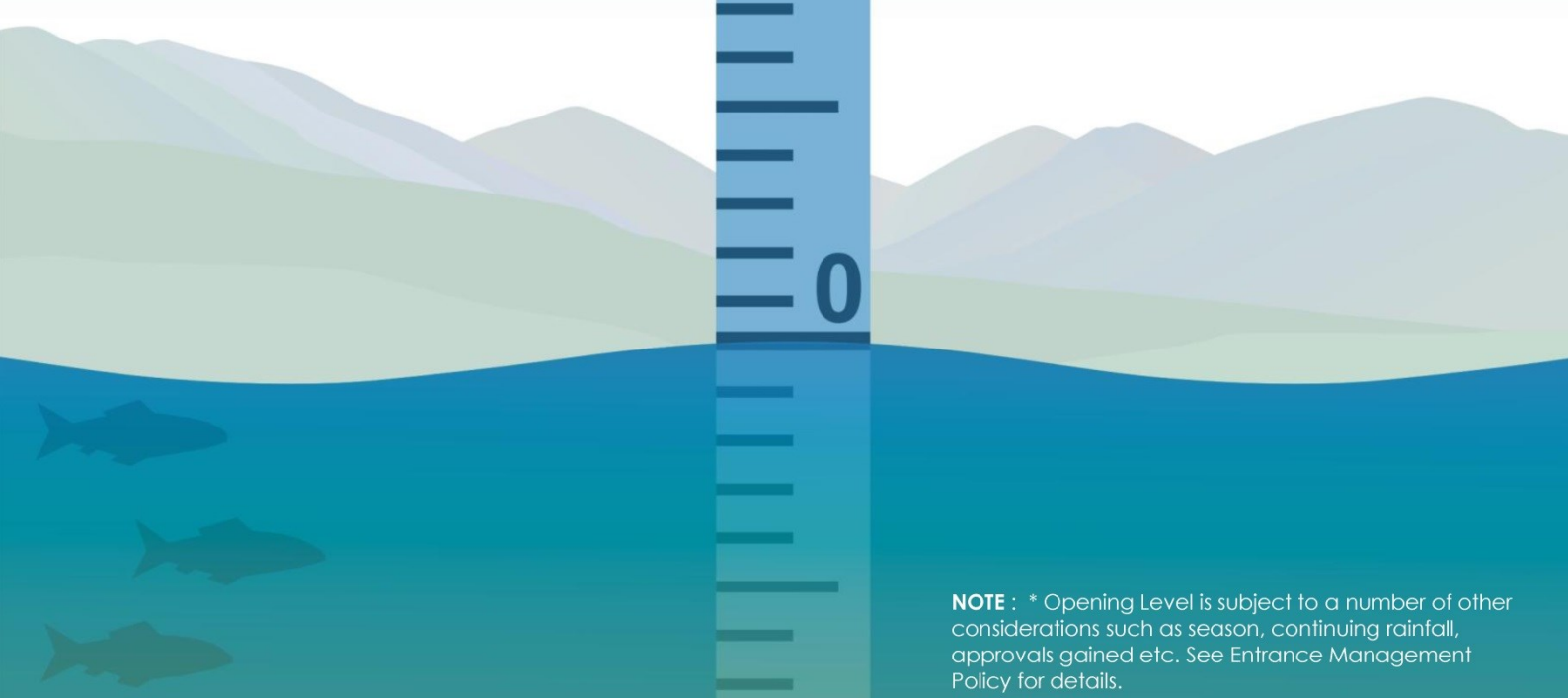
Metres AHD

**3.00 m +**  
Expected natural opening range

- 2.79 m - Low point at back of lower George brown oval [CLGBO02]
- 2.75 m - Carport slab level at No. 37 Lakeside Drv. [CLLSD10]
- 2.50 m - Middle of road (Lake Side Dve) [CLLSD01]
- 2.21 m - Sewer manhole (ED\_RR1) of Lakeside Drv. [CLLSD06]
- 2.12 m - Base of water filling station [CLSFB07]
- 2.04 m - Back corner of yard at 41 Lakeside Drv. [CLLSD02]
- 1.75 m - Low point of road between field and cemetery [CLSF08]
- 1.61 m - Low point in footpath beside Lakeside Drv. [CLLSD08]



- 3.16 m - Front bottom corner of house at No. 31 Lakeside Drive [CLLSD04]
- 2.67 m - Top of sewer pumping station off Lakeside Drv. [CLLSD05]
- 2.44 m - Back fence level at No. 37 Lakeside Drv. [CLLSD09]
- 2.37 m - Low point along back fence of George Brown Oval [CLGBO01]
- 2.16 m - Back shed floor height at No. 41 Lakeside Drv. [CLLSD03]
- 1.79 m - Sewer manhole (ED\_RR1A) off Lakeside Drv. [CLLSD07]
- 1.51 m - Paddock adjacent to end of Eden Cove walking track [CLECW02]
- 1.20 m - Proposed trigger level**



**NOTE :** \* Opening Level is subject to a number of other considerations such as season, continuing rainfall, approvals gained etc. See Entrance Management Policy for details.



# Appendix 3: Lake Curalo Entrance Monitoring Form

Entrance Monitoring Form								
Opening Date	Natural (N) or Artificial (A)	Height of Dune (m AHD)	Location of Breach	Lake Water Level (m AHD)	Time	Channel Dimensions		
						Length (m)	Width (m)	Depth (m)
Notes and Impacts of Opening:					Initial Breach			
					Ongoing Channel Development			
					Full Breakout			
Final Dimensions								
Closing Date:								
Wave Height/Direction: .....					Preceding Rainfall: .....			
Wind Strength/Direction: .....								