HALLETT COVE SEA-SIDE POOL

CONCEPT DESIGN REPORT | 26TH MAY 2023



City of Marion
Hallett Cove Sea-side pool Concept Design
Cover Image | Proposed 50m Sea-side Pool
26th May 2023

CITY OF MARION

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CIVILLE

Water Research Laboratory UNSW

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NICOLE LARKIN DESIGN ARCHITECTURE

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'We live by the sea because of the two mysteries the sea is more forthcoming. There is more bounty, more possibility for us in a vista that moves, rolls, surges, twists, rears up and changes from minute to minute. The innate human feeling is that if you look out to sea long enough, something will turn up...'

Tim Winton, Land's Edge

Hallett Sea-Side Pool Concept Design
Option 2 - 25m Pool | Artist Impression

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01 Project Summary



Option 1 - 50m Sea-side Pool | Artist Impression



Option 2 - 50m Sea-side Pool | Artist Impression

Hallett Cove Sea-side pool | Project History
The initiative to develop a Sea-side pool at Hallett Cove originated from a community campaign during 2017 and 2018 which attracted 4,925 'supporters' and significant attention in the local media. Following this, federal MP David Speirs wrote to City of Marion (COM) in his capacity as Minister for Environment and Water with a proposal to collaborate on a study to investigate the feasibility of developing a sea-side pool at Hallett Cove.

Due to the high level of community enthusiasm for the idea, and to gain further understanding of the potential benefits of proposal, the City of Marion and the Department for Environment and Water jointly funded a feasibility study for the project. The City of Marion concurrently had undertaken a master-plan for Hallett Cove beach. All stages of the master-plan were completed apart from the embankment protection, as coastal monitoring indicated that stabilisation works to this area could be staged over time.

The initial feasibility study found that a sea-side pool had the potential to be constructed as both a means to stabilise and protect part of the embankment from future coastal erosion, along with providing a recreational asset for the community.

Proposal | 50m and 25m Options
Early in 2023, the City of Marion engaged a specialist team to develop a concept design for a proposed Sea-side pool at Hallett Cove. Two options have been prepared for the Council and Community and are presented in this report as follows;

- Option 1 - 50m Sea-side pool
- Option 2 - 25m Sea-side pool

Both options also include works to undertake some initial stages of embankment protection directly behind the proposed pool. Further embankment protection north and south of the pool is part of a broader, staged strategy for coastal protection works along Hallett Cove beach. This concept includes some initial works which are associated with the pool including new beach access.

Site Context | Hallett Cove Beach
Hallett Cove Beach is located 25kms south of Adelaide City Centre and is part of the COM local government area. To the north of the beach is Hallett Cove Conservation Park which is a site of high geological, cultural and aboriginal significance and is a protected area under South Australia legislation. Erratic granite boulders are scattered across the beach which were deposited by a glacier that moved through the area over 200 million years ago.

Hallett Cove Beach has also been a site of legacy development. A spate of beach shacks located along the original dunes to the beach were demolished following the 1970's. The original surf club which overlooks the beach has since been converted into The Boast-shed Cafe. Hallett Cove Beach is also part of a well established coastal walk. The Marion Coastal Walking Trail extends 7.2 km from Marino in the north, to the Hallett Headland Reserve at Hallett Cove in the south.

Natural coastal processes varies the amount of sand which accumulates and dissipates on Hallett Cove Beach, which otherwise comprises of large boulders along the foreshore. As such the beach at times can be difficult to navigate, particularly in order to gain access to the open ocean.

Concept Design | Project Brief
The brief provided by COM for the design of Sea-side pool at Hallett Cove is as follows;

Proposed Design | Option 01 - 50m Sea-side Pool
- 50m Lap Pool and associated pathways/seating (Max 1.6m depth)
- Childrens Pool (Max 1.0m depth)
- Intertidal habitat regeneration
- Amenities block and Parking
- Stepped concrete stabilisation (90m length of embankment)
- Beach Access
- Beach Hard-scaping for recreation and leisure

Proposed Design | Option 2 - 25m Sea-side Pool
- 25m Lap Pool and associated pathways/seating (Max 1.6m depth)
- Intertidal habitat regeneration
- Childrens Pool (Max 1.0m depth)
- Amenities block and Parking
- Stepped concrete stabilisation (90m length of embankment)
- Beach Access
- Beach Hard-scaping for recreation and leisure

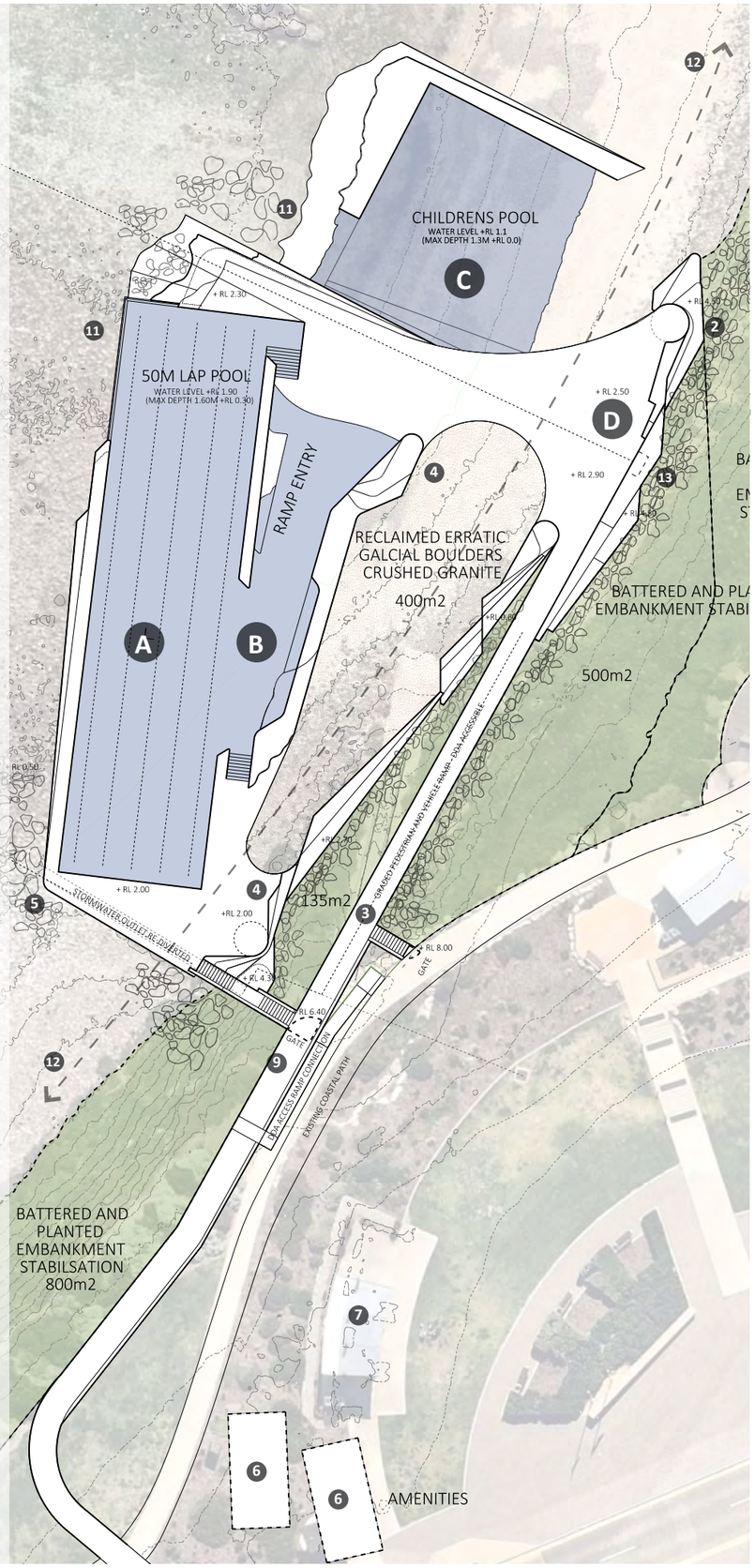
Proposed Location of the Pool
The southern area of Hallett Cove beach has been flagged for coastal protection works and stabilisation of the existing pathway beach access. As such, this area was identified as a preferred location for a new pool in the 2019 feasibility study. This area has also had recent upgrades to the reserve behind the beach including landscaping, a childrens playground, accessible pathways and BBQ/picnic pavilions. It is also in closest in proximity to public transport via bus stops and the train station. To the north and south of the proposed site are sites of geological, cultural and aboriginal significance, including Hallett Cove Conservation Park to the north and the mouth of the Field River to the south. The pool is located away from these areas to conserve both areas and avoid adverse impacts on their significance.

Pool Footprint
The proposed footprint of the pool in both options sits forward of the existing embankment. Ocean water is continuously pumped through the pool and circulates out over the top of the pool wall closest to the ocean known as a 'wet edge'. To permit this circulation, a section of the pool extends into the tidal zone. As the pool is detached from the embankment, this ensures visitors can continue to walk along the beach unrestricted at low and high tide.

Proposed Design | Key Moves
- Provide a community salt-water swimming enclosure
- Protect and stabilise part of the embankment against coastal hazards and sea level rise
- Provide protected swimming access
- Maintain beach foreshore access
- Increase intertidal habitat
- Minimise ongoing maintenance
- Protect and enhance the natural character of the beach and geological landscape
- Create inclusive beach access
- Frame key views and aspect towards the coastline
- Celebrate the geological significance of Hallett Cove

Landscape Character
The concept design options have been developed to frame the coastline of Hallett Cove and its iconic natural beauty. The pools are understated and simple concrete structures. The location of access paths, seating and the pools themselves frame key views towards the Headland, Hallett Cove Conservation Park and the coastline north and south. The concrete of the pool is proposed to be mixed through with a granite aggregate similar to the distinct erratic granite boulders which scatter the beach. The following report details features of the pool and how the design intent celebrates spectacular natural assets and geological significance of the area.

02 Option 01
50m Sea-side Pool



ZONING

The ocean pool is designed with four primary zones;

A A 50m lap pool with five lanes, to allow for fast, medium, slow and recreation/water jogging accessed stairs or a ramp entry. This has a shallow (1.3m) and deep end (1.6m) and sloping bottom which permits drainage and maintenance.

B A ramped, graded entry ramp sloping at 1:14, suitable for wheelchairs and people of all ability levels. The ramp also allows access for service vehicles such as bobcats for the clean-out and servicing of the pool. Either side of the ramp has benched seats at various heights for rehabilitation exercise and or recreation/leisure.

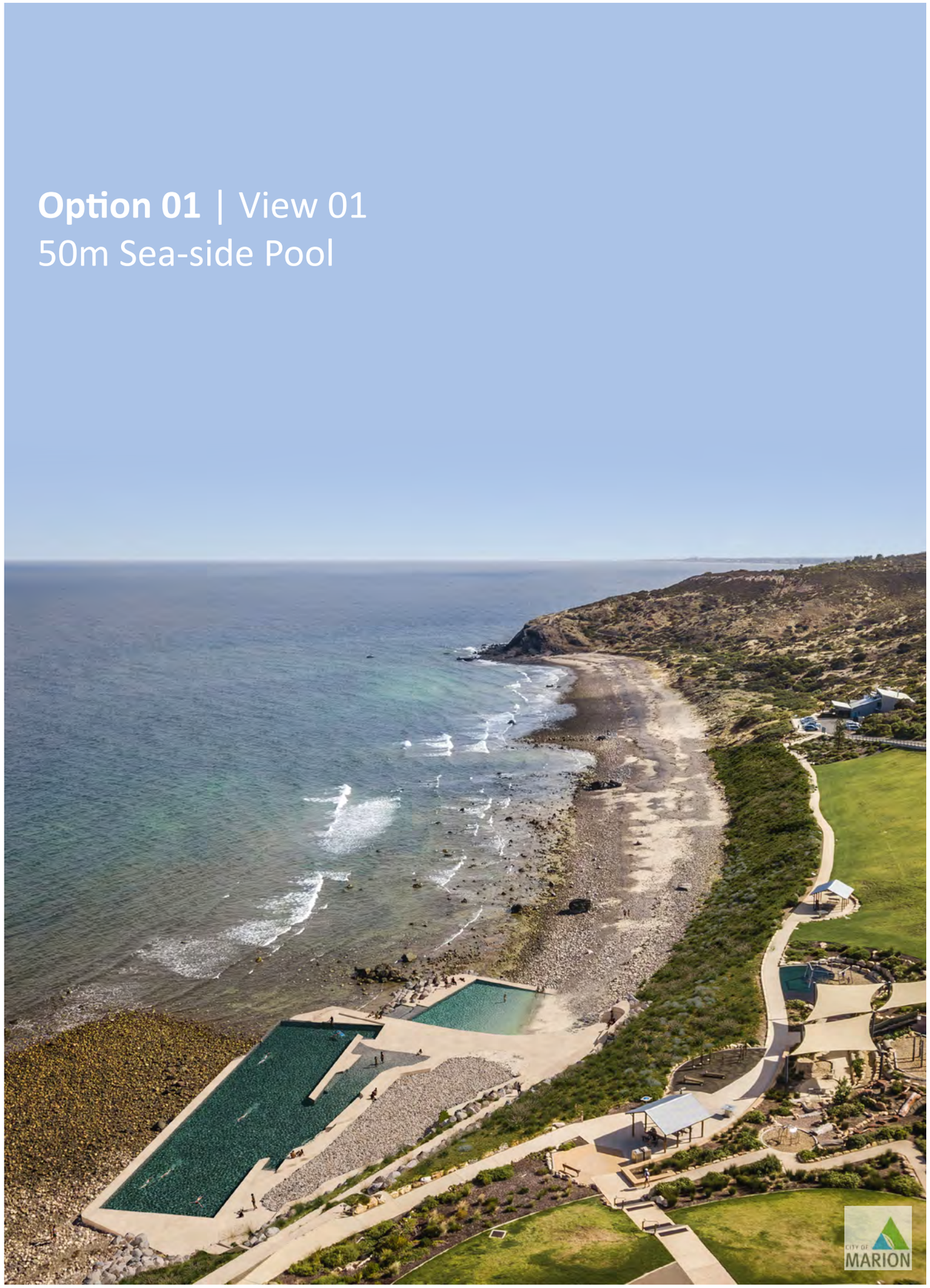
C Children's pool and wading zone accessed via zero grade ramp from beach. Proposed depth 1m maximum with 'live' granite rock platform and gravel bottom.

D Stepped concrete benches and concrete path leading down to the beach. This creates protected areas for swimmers to sit and place their belongings while looking over the pool for passive surveillance. Select seating areas face north to capture winter sun while being protected from cool winds as comfortable spaces in the shoulder seasons. Outdoor showers are also provided at beach level for swimmers.

1. Embankment Stablisation
2. Graded Ramp Access to Beach
3. Benched Concrete Seating
4. Diverted Storm-water Outlet
5. Proposed Toilet/Amenities
6. Existing BBQ Pavilion
7. Existing Playground
8. Proposed Access Gate
9. Proposed Water Supply Intake
10. Proposed Water Outflow
11. Foreshore access
12. Pool pump

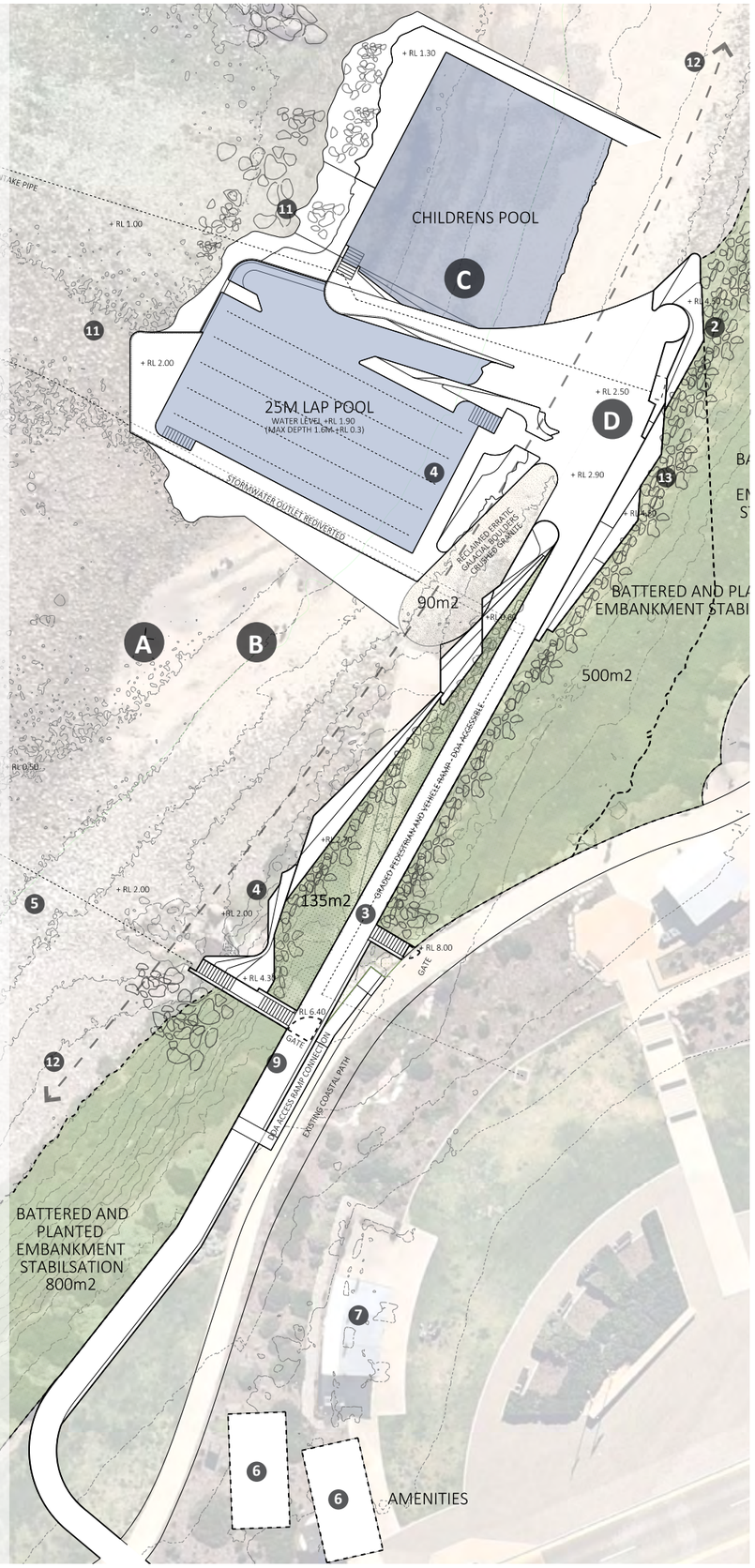
Hallett Cove Sea-side pool Concept Design - Site Plan Scale 1:500 | Option 1 50m Sea-side pool

Option 01 | View 01
50m Sea-side Pool



Hallett Cove Sea-side pool Concept Design- Artist Impression 01 | Option 1 50m Sea-side Pool

02 Option 02
25m Sea-side Pool



ZONING

The ocean pool is designed with four primary zones;

A A 25m lap pool with five lanes, to allow for fast, medium, slow and recreation/water jogging accessed stairs or a ramp entry. This has a shallow (1.3m) and deep end (1.6m) and sloping bottom which permits drainage and maintenance.

B A ramped, graded entry ramp sloping at 1:14, suitable for wheelchairs and people of all ability levels. The ramp also allows access for service vehicles such as bobcats for the clean-out and servicing of the pool. Either side of the ramp has benched seats at various heights for rehabilitation exercise and or recreation/leisure.

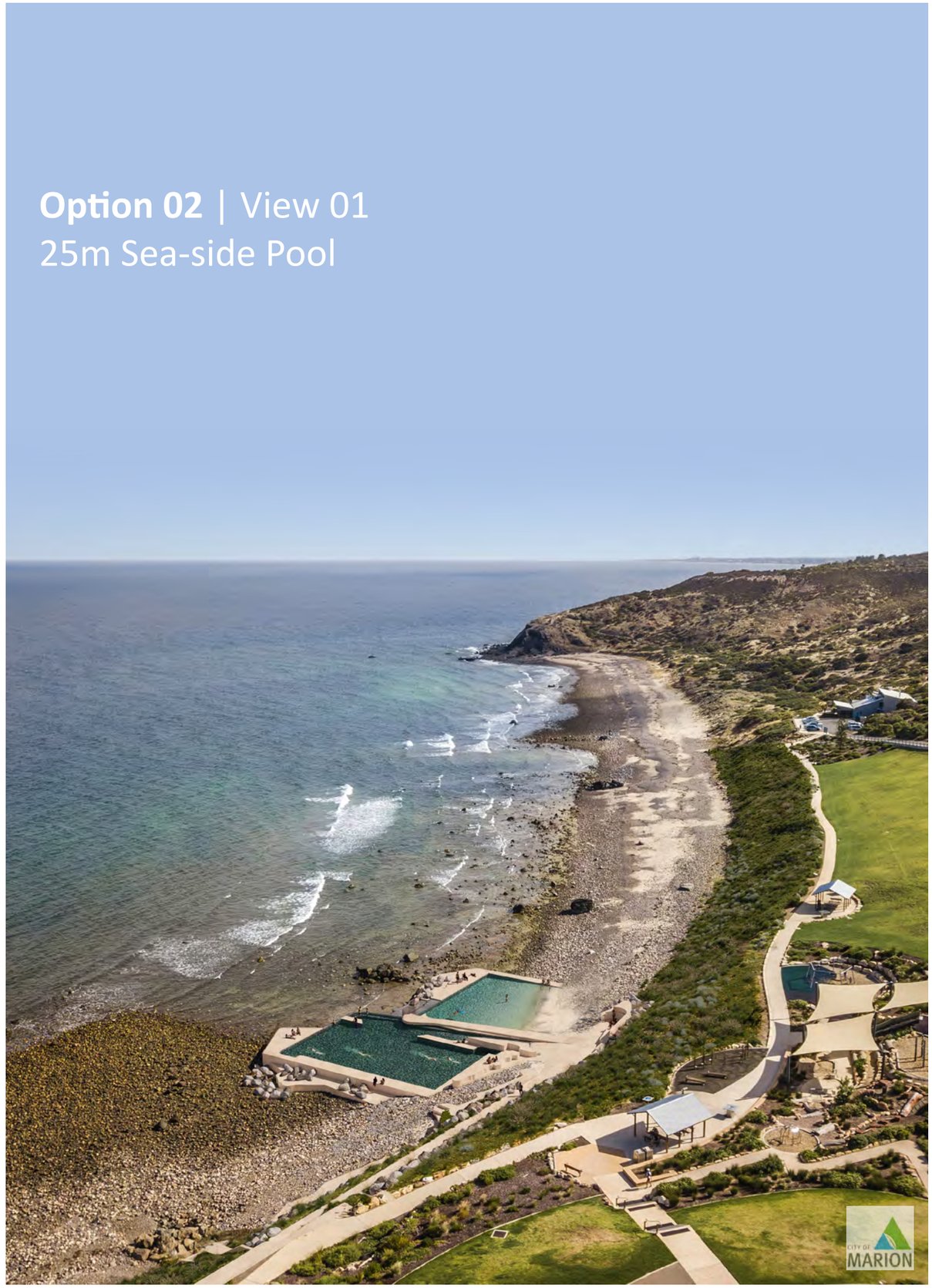
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9. Proposed Water Supply Intake
10. Proposed Water Outflow
11. Foreshore access
12. Pool pump

Hallett Cove Sea-side pool Concept Design - Site Plan Scale 1:500 | Option 2 25m Sea-side pool

Option 02 | View 01
25m Sea-side Pool



Hallett Cove Sea-side pool Concept Design- Artist Impression 01 | Option 2 25m Sea-side Pool

Option 01 | View 02
50m Sea-side Pool



Hallett Cove Sea-side pool Concept Design- Artist Impression 02 | Option 1 50m Sea-side pool

Option 01 | View 03
50m Sea-side Pool



Hallett Cove Sea-side pool Concept Design- Artist Impression 03 | Option 1 50m Sea-side pool

Option 02 | View 02
25m Sea-side Pool



Hallett Cove Sea-side pool Concept Design- Artist Impression 02 | Option 2 25m Sea-side pool

Option 02 | View 03
25m Sea-side Pool



Hallett Cove Sea-side pool Concept Design- Artist Impression 03 | Option 2 25m Sea-side pool

03 Concept Design
Summary of Options

Comparison | Option 1 and 2
A key difference between the two concept design options is the length of the lap pool. Surveys conducted by local councils in NSW indicate that generally 30% of ocean pool users swim laps at their local ocean pool. A 50m length is considered standard for competition and training as it is associated with a certain level of endurance and physical fitness, regardless of the pool which swimmers may use. The 50m lap length also presents a larger pool size and therefore accommodates more swimmers comfortably within the lanes. The 25m pool presents a smaller footprint and also slightly reduced capital and ongoing costs.


Option 1 50m Sea-side Pool | Artist Impression looking north


Option 2 25m Sea-side Pool | Artist Impression looking north

The concept design for Hallett Cove Sea-side Pool proposes two sea-side pool options, in addition to beach access and embankment protection works which are included as part of these options. A comparison of Option 1 (50m Pool) and Option 2 (25m Pool) is compiled in the table to the right. This includes advantages, considerations and costs. Aspects which the concept design achieves across both options is summarised below.

Pool Amenity and Features
- Lap pool featuring 5 lanes for fast, medium slow and recreational activities
- Ramped entry into the pool with benched concrete seating for rehabilitation, recreation and as swimming 'perches'
- Wet edge to north eastern pool corner creating continuous visual connection to ocean
- Inter-tidal habitat generation to external walls
- Childrens Pool with 'live bottom' (Max 1.3m depth)
- Stepped concrete protection to 90m of embankment/beach access
- Planted out stablisation to 390m length of embankment through landscaping
- Graded ramp for vehicle and pedestrian access to the beach
- Stepped concrete benches for seating, recreation and leisure
- Graded ramp access into pool for swimmers and maintenance vehicles, this doubles as rehabilitation swimming zone
- Concrete bleachers providing pool-side seating
- Amenities block (Heron Way), outdoor showers (beach level)
- Parking (Option for 7 new spaces to Heron Way)

Safety
- Storm-water diverted to ensure separation from pool
- Pool walls stepped to eliminate fall from height
- Access managed via gates at ramp and stairways
- Recommendation to install Emergency Relay Beacons (ERBs) to alerts nearest Surf Lifesaving SA center

Coastal Protection
- Long term embankment stablisation via stepped concrete wall (90m in length) behind the pool (up to 4.5mAHD)
- Sea-side pool further protects length of embankment behind

Inclusive Access
- Graded, accessible ramp from street level down to beach level and into children's pool and lap pool
- Concrete bleachers for seating/rest perches
- Dignified access to lap lanes (along side of pool) for wheelchair users

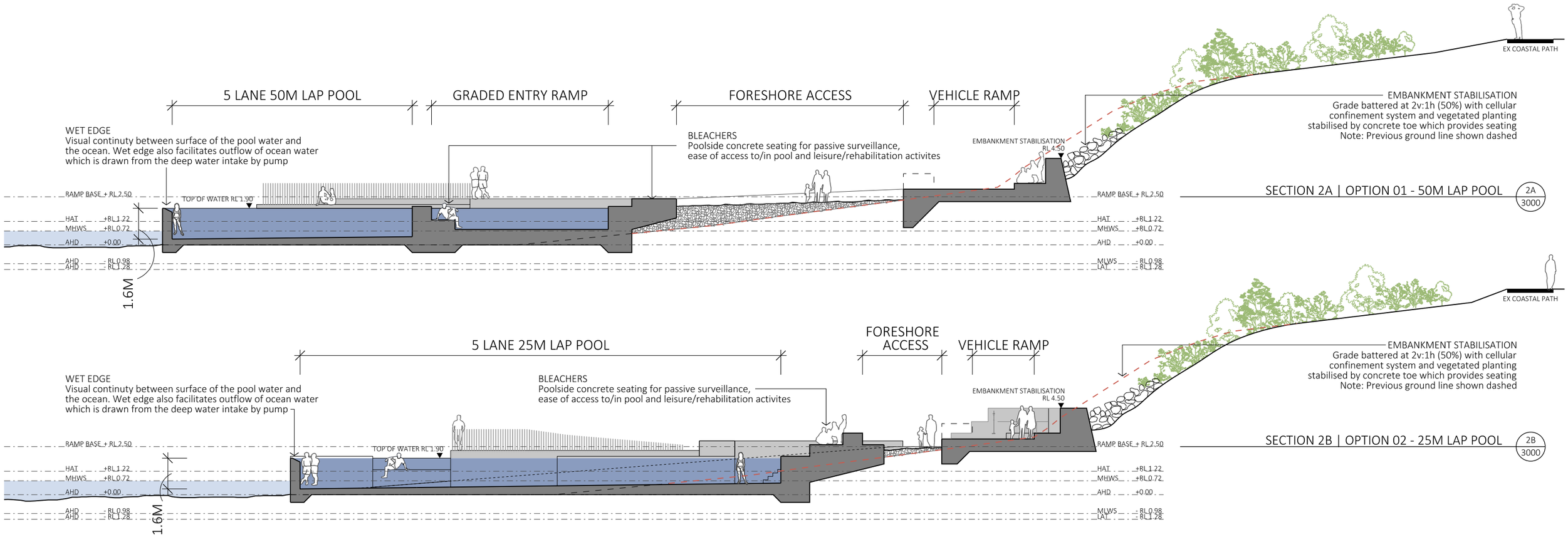
Cultural/Heritage Impact
- Field River Mouth to the south is identified as an area of indigenous significance to be conserved, pool site is located clear of this area
- Pool located on southern section of beach away from areas of geological and aboriginal significance to Conservation area
- Design makes provision for strategies to express geological and aboriginal significance

Environmental Impact
- Quality of water discharged managed by continual replenishment via a pumped system
- Pool outflow encourages local native bird species habitat during low tide
- Deep water intake for pump is located beyond-1m AHD and screened to mitigate against marine life entrapment
- Seaward external walls and childrens pool (proposed as 'live bottom' i.e.. not concrete) designed to host marine life. An extension of inter-tidal rock platform habitat

Landscape/Visual Impact
- Proposed beach access ramp angled to frame views of the northern headland (area of geological significance)
- Continuous visual connection to the water facilitated by wet edge to north eastern corner of lap pool
- Pool concrete material to integrate aggregate and pigment to reflect natural granite boulders of the rock platform

Beach Access and Embankment Protection (applies to both options)		
	Option 01 | 5 x 50m Lap lanes	**Option 02 | 5 x 25m Lap lanes**
Advantages	• Pool protects full 90m length of embankment behind • 50m standard lap length preferred for consistency in endurance and fitness/health benefits (30% of sea-side pool users partake in lap swimming) and permits pool to be use for competitive events • Storm-water outlet efficiently diverted for water quality control • Pool situated parallel to the contours of the beach • Public foreshore access enhanced • Orientation and location allows pool to remain in use through broader range of surf conditions and protects ramped entry behind lap lanes • Outflow from wet edge beneficially contributes to Hooded Plover habitat	• Smaller footprint • Reduced total project cost • Public foreshore access enhanced • Wet edge to end of ramp in the pool provide seating and frames views to headland at Black Point to the north • Lap lane for vision impaired swimmers (southern most lane) is protected, has good access and a continuous edge
Considerations	• Larger footprint • Greater total project cost • Channel to be excavated for deep water intake below rock platform • Maintenance of 50m pool more involved, marginal increase relative to 25m pool • Vision impaired users limited to using eastern most lap lane of pool as it is has a continuous edge. Lane is also most exposed to wave action, however it is largely protected by rock platform embankment	• Storm-water outlet indirectly diverted, at higher cost • To permit access for maintenance vehicles, long axis of pool must be at 90 degrees to beach • Pool protects approx. half of the 90m length of long term embankment stablisation • North eastern corner of pool more exposed to adverse swell and over-topping due to orientation • Channel to be excavated for deep water intake below rock platform • Base level of amenity provided for swimming activities • 25m lap length less preferred by swimmers for fitness
Cost – Capital	**$8.92M exclud. GST** (Includes Beach Access and Embankment Protection total cost $2.68m)	**$7.82M exclud. GST**
Cost – Ongoing	**$201K pa.** (Mid range)	**25m Pool $176K pa.** (Mid range)

Note: All figures are exclusive of GST and reflect current rates. They do not allow for escalation or additional costs such as approvals, consultancy fees or other associated project costs.



NICOLE LARKIN DESIGN | ARCHITECT 10687
ARCHITECTURE, COASTAL PLANNING + DESIGN
69 Darghan Street
Glebe NSW 2010
Sydney Australia
T +61 419 977 020
nlarkin.design@gmail.com
www.nicolelarkin.com

PRELIMINARY ONLY
NOT FOR CONSTRUCTION

Hallet Cove Ocean Pool Concept Design

Hallett Cove Beach
Adelaide, South Australia

Sections

SCALE	DRAWN	CHECKED	DATE	PROJECT	DRAWING	REVISION
1:200 @ A3	NL	NL	May 2023	2104	3000	C

04 Design Considerations
Proposed Pool Design



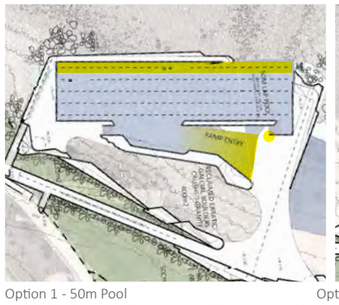


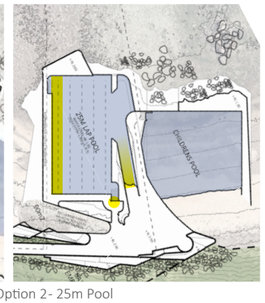
'Sun scoops' and fresh water showers at base of access ramp and benched seating built into embankment overlooks pool.

Lap Pool
Central to both pool options is a lap pool with 5 lanes (50m and 25m respectively). This is a minimum allowance to provide a lane each for fast, medium, slow, recreational and accessible lap swimming.

The accessible lane caters for swimmers with limited mobility or vision impairments. The lane is located to one side of the pool with a continuous edge. This permits vision impaired swimmers to more easily stay within their lane and for swimmers with varied abilities opportunities to grab the edge and rest. Sufficient space has been allowed at stairs and the ramped entry to the pool for wheelchair storage at these areas for dignified entry and safety.

The pool depth is 1.6M at the deep end and 1.3M at the shallow end. This allows for comfortable lap swimming with the ability to rest between laps at the shallow end and facilitates good drainage of the pool as needed.





Option 1 - 50m Pool
Option 2- 25m Pool
Highlighted areas indicate accessible entries and lap lanes within lap swimming zone

Childrens Pool
The Childrens pool is a 20x20m wading pool with a maximum depth of 1.0m. The pool has a zero grade entry and a 'live bottom', e.g. the bottom of the pool is founded on the rock platform and gently slopes downward into the water from the sand.

Benched seating is located along the side of the pool for passive surveillance and serves as a perch if swimmers are in distress.



Option 2 25m Sea-side Pool | Wet edge to the bottom of the entry ramp looking north

A 'wet edge' to the south eastern corner of the pool creates habitat for intertidal species on the sea-ward walls of the pool and is beneficial to local Hooded Plovers who nest in the area. The wet edge is a spill over for water that circulates through the pool. Visually it looks out to the horizon, creating a continuous connection between the pool water and ocean water beyond.

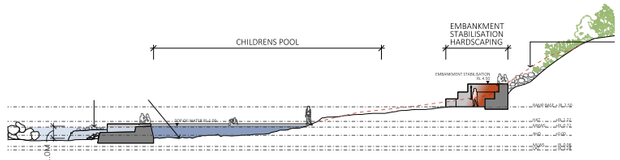
Ramp and Central Access
A central ramp provides access to the lap pool in both options. Either side of the ramp are benched concrete seats within the water for rehabilitation exercises. Concrete seating located beside the pool also creates opportunities for seating and recreation.

The ramp down into the pool provides ease of access for swimmers of varied abilities and permits maintenance vehicles to enter the pool to remove sand, wrack or boulders. In the 50m option, the pool acts as an additional buffer, protecting the ramp. In the 25m option the wet edge is located at the bottom of the ramp to take advantage of the spectacular aspect towards the north headland.

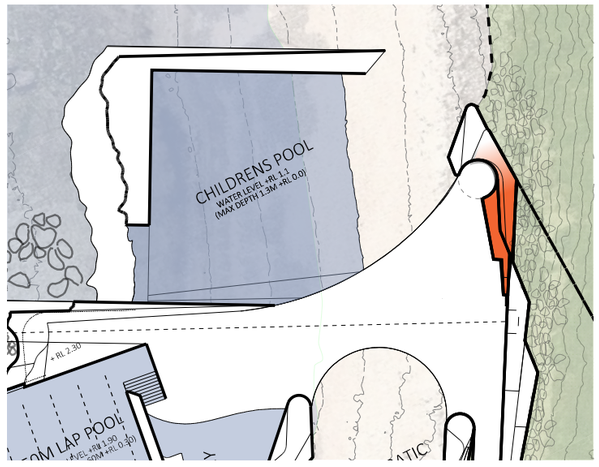
Pool-side Seating and Hard-scaping
Seating is provided both adjacent to the pool and in stepped benches along the embankment, which overlooks the proposed pool and beach. Seating along the embankment is designed to serve as 'sun scoops' which trap and absorb the warmth of the sun and re-radiate it back during the afternoon. 'Sun scoops' are also positioned to buffer from cool winds, serving to create comfortable thermal spaces through cooler months and extend the usability of the pool across the year. Beach level fresh water showers are co-located near the seating in these areas for convenience.

Benched concrete seating is also provided to reinforce passive surveillance looking towards the pool and beach. It also creates areas for recreation and congregation on the beach level which is currently a challenge due to the boulders which scatter the foreshore.

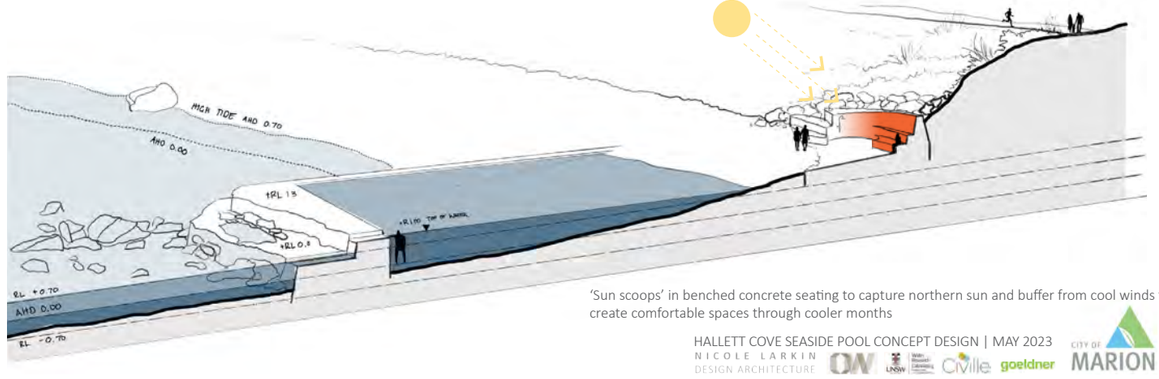
Foreshore Access
Public foreshore access is maintained by the location and siting of the pool, which does not sit hard up against the embankment. During high tide, this would otherwise restrict access along the beach. In both options the pool protects the embankment and foreshore access behind which remain above the high tide level in calm conditions. Access to the beach is improved by new stairs added to the south and the ramped driveway down to the beach which is DDA compliant for wheelchair and ambulant access.



A section through the Children's pool showing the gently sloped bottom, pool depth and how the pool looks onto existing erratic boulders which characterise Hallett Cove Beach



A section through the Children's pool showing the gently sloped bottom, pool depth and how the pool looks onto existing erratic boulders which characterise Hallett Cove Beach

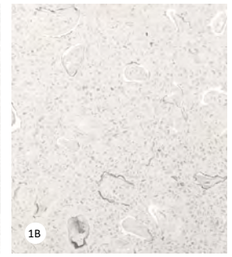


'Sun scoops' in benched concrete seating to capture northern sun and buffer from cool winds to create comfortable spaces through cooler months

04 Design Considerations
Materials



'Marray' Gunyama Park, Danièle Hromek + Collaborating team



Oyster Concrete, Barangaroo Pavilion



Curtin University, REALMstudios



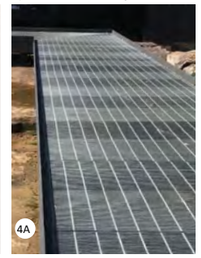
Edinburgh Gardens, GHD



'Arabando' The Rocks, Jonathan Jones



Signage, Currumbin Wildlife Sanctuary



Stainless Steel Grated Walkway



Ballast Point Park, McGreggor Coxall, Heritage Items embedded in Gabion Walls

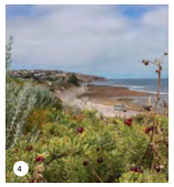




Terraced Concrete. Oriental Bay - Isthmus



Corten Balustrade. Oyster Concrete, Barangaroo Pavilion



Native Coastal Planting Species



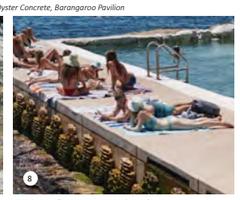
Promoting coastal bushland and habitat pockets



Coastal landscaping



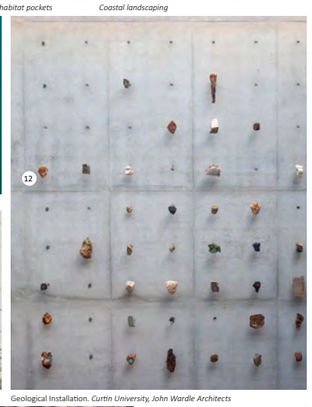
Contoured Concrete. Yaegan Square Aspect Studios



Living Seawalls. Fairy Bower Pool, Manly NSW



Terraced Concrete. Tahitai - Isthmus



Geological Installation. Curtin University, John Wardle Architects



Amenities Block. Archrival, Western Sydney



Textured Concrete and Bleachers. Unknown



Amenities Block. Unknown



Terraced Concrete. Oriental Bay - Isthmus



Living Seawalls.



Local Galacial Boulders



Local Glacial Boulders



Geological Installation. John Wardle Architects

CONCRETE | 1, 11, 14, 17, 19
Off form and in situ concrete with granite aggregate mix to match existing on site boulders

ERRATIC BOULDERS | 12, 20, 21, 22
Re-purposed granite boulders for hardscaping and to be featured in stepped concrete seatings

TEXTURED CONCRETE | 7, 9, 19
Textured surfaces in select locations to passively nominate traffic-able and non-trafficable areas

WEATHERED STEEL | 2, 3, 14
Coreten steel balustrading embracing robust environment and warm distinct colours of granite boulders

COASTAL NATIVE SPECIES | 4, 5 ,6
Embankment planting comprised of local native species to regenerate habitat

ECO-CONCRETE | 7, 8, 18
Concrete designed to host inter-tidal marine life to regenerate inter-tidal habitat

AMENITIES BLOCK | 13, 15, 16
Simple, robust materials used to screen while providing transparency towards key views

1. **FOOT PATH**
   Coastal walk track and ramp which leads down to sea-side pool

   1A | Place-names embedded into the concrete which are invisible until they become wet and are revealed by water.
   1B | Oysters Cast into pre-cast concrete. Note: these elements could reflect any items which are significant to the traditional owners from marine life to native plants

2. **LANDSCAPING AND DRAINAGE**
   Drainage, edging and perimeter to landscaping

   2A + 2B | Integrate drainage to interpret broader traditional owners stories of water and how it has shaped the land, while also managing storm-water across site and pathway
   2C | Potential to cast bronze elements into walls i.e.. significant local marine life

3. **SIGNAGE**
   Way-finding and signage

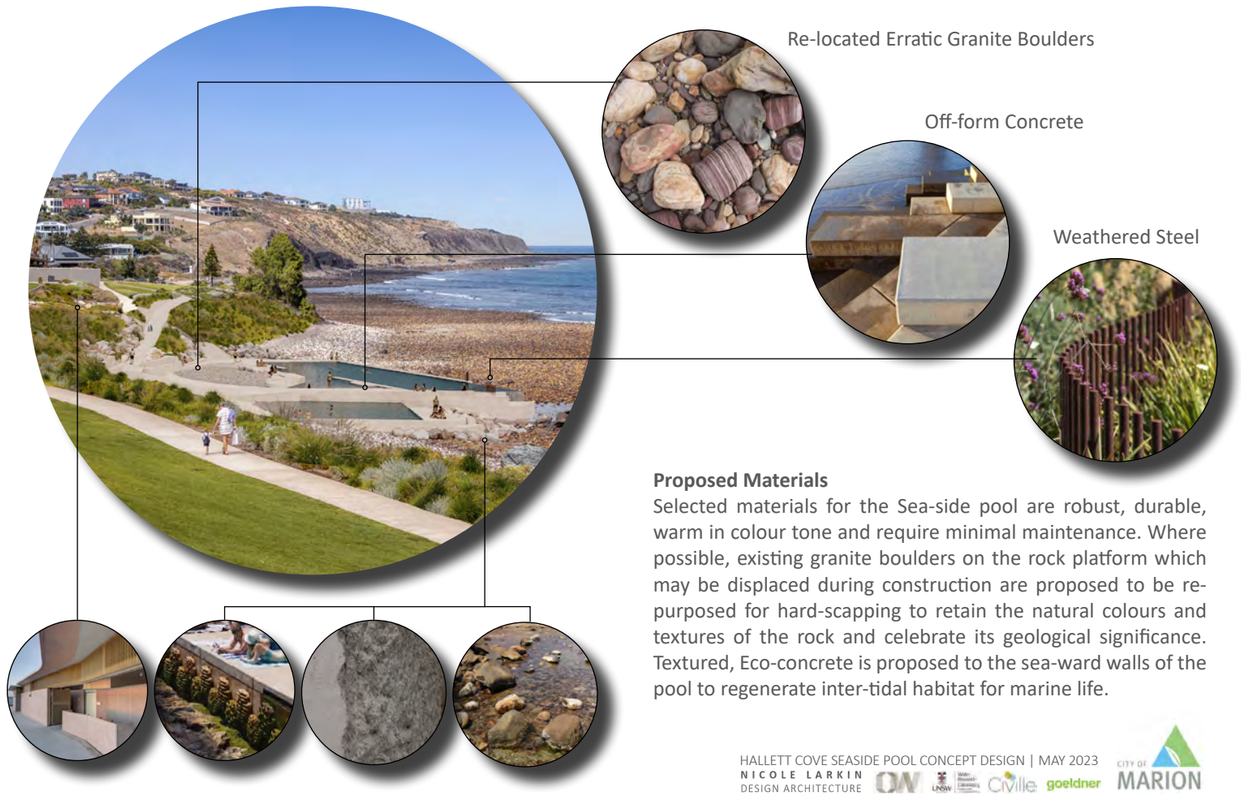
   3A | Signage which include traditional Place-names and histories

4. **AMENITIES BLOCK**
   Facade/walkways to amenities block

   4A | Potential to screen or clad amenities block or walkways with interpretive pattern

5. **RETAINING WALL**
   Retaining walls, seating and other hardscaping elements

   5A+B | Potential to embed interpretive elements in Gabion retaining walls



Proposed Materials
Selected materials for the Sea-side pool are robust, durable, warm in colour tone and require minimal maintenance. Where possible, existing granite boulders on the rock platform which may be displaced during construction are proposed to be re-purposed for hard-scapping to retain the natural colours and textures of the rock and celebrate its geological significance. Textured, Eco-concrete is proposed to the sea-ward walls of the pool to regenerate inter-tidal habitat for marine life.

04 Design Considerations
Coastal Engineering



Option 1 50m Sea-side pool | **High Tide MHWS (AHD +0.72m)**



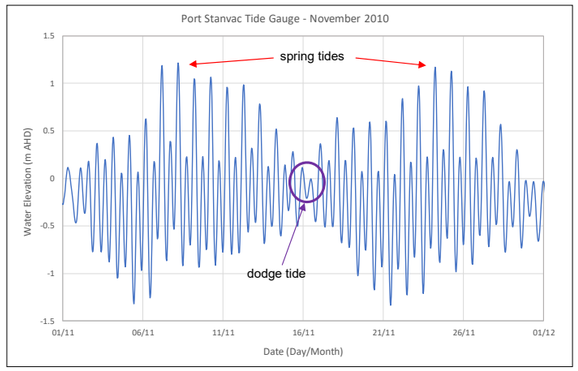
Option 2 25m Sea-side pool | **High Tide MHWS (AHD +0.72m)**

Proposed Pool Levels
The following table summarises proposed levels and depths for the pool with reference to the feasibility study recommendations. The top and base level of the pool has a significant impact on its safety, ease of maintenance and resilience to sea level rise.

	Feasibility Study	Concept Design
Wall Height	+1.5AHD	+1.9 AHD (Lap Pool) +1.0 AHD (Childrens Pool)
Pool Depth	1.0m-1.3m (Lap Pool) 0.7m (Childrens Pool)	1.3m-1.6m (Lap Pool) 1.0m (Childrens Pool)
Base Level	+0.2 AHD Minimum	+0.3 AHD (Lap Pool) +0.0 AHD (Childrens Pool)

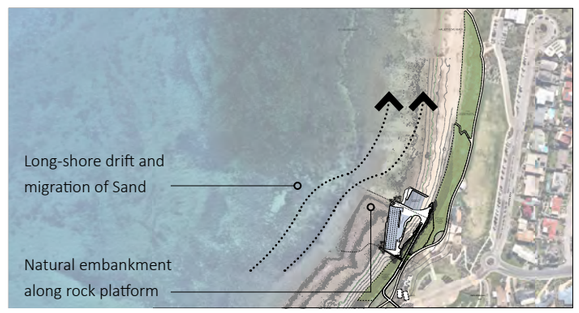
Over-topping
The proposed top of wall height +1.9m AHD positions the lap pool higher than recommended above. While over-topping is expected, this raised wall ensures swimming conditions in the pool remain comfortable and safe throughout most surf conditions. As with ocean pools and beaches elsewhere in Australia it is expected that the sea pool will not be in use during high or hazardous swell conditions. A pumped system with deep water intake is proposed for the pool, ensuring that water turnover is not solely reliant on natural flushing. This permits a higher sea-ward wall to minimise ingress of boulders, sand and wrack into the pool. The childrens pool is at a lower height as the pool base is the existing rock platform. The levels in this location restrict the sea-ward wall height if the pool depth is to remain a maximum of 1.0m.

Tides and Pool Drainage/Servicing
The lap pool base level (+0.3m AHD) is set above low tides levels, which naturally fluctuate across a given month. For example Mean Low Water Spring Tides are regularly below -0.5m AHD. Therefore the water level reliably and regularly drops to 800mm below the lowest point of the 50m pool, permitting it to be drained. It ensures this can occur on a regular basis and is not heavily constrained to small windows of time during the month or year for easy cleaning.



Tidal plane	Port Stanvac (m LAT)	Outer Harbor Adelaide (m AHD)	Port Stanvac (m AHD)
Highest astronomical tide	2.5	1.348	1.22
Mean high water springs	2.0	0.848	0.72
Australian Height Datum	1.28	0.000	0.00
Mean high water neaps	1.2	-0.152	-0.08
Mean sea level	1.2	-0.152	-0.08
Mean low water neaps	1.2	-0.152	-0.08
Mean low water springs	0.3	-1.152	-0.98
Lowest astronomical tide	0.0	-1.452	-1.28

(from Australian National Tide Tables, 2010 and BOM, 2010)
Table 7-1: Tidal planes for Port Adelaide



Sea Level Rise
The high base and top of wall level of the pool creates a buffer for incremental sea level rise over the design life of the pool (50 years for maritime structures). Per the feasibility study this could be expected to result in approx 0.35m sea level rise across that time period. The proposed levels of the pool ensure it can still be drained during most low tides with approx. 0.8m clearance between the pool bottom and low tide in current day terms. Not withstanding this, generally sea-side pools undergo refurbishment once every 20 years which is also an opportunity to raise levels, should the asset remain in use beyond its design life.

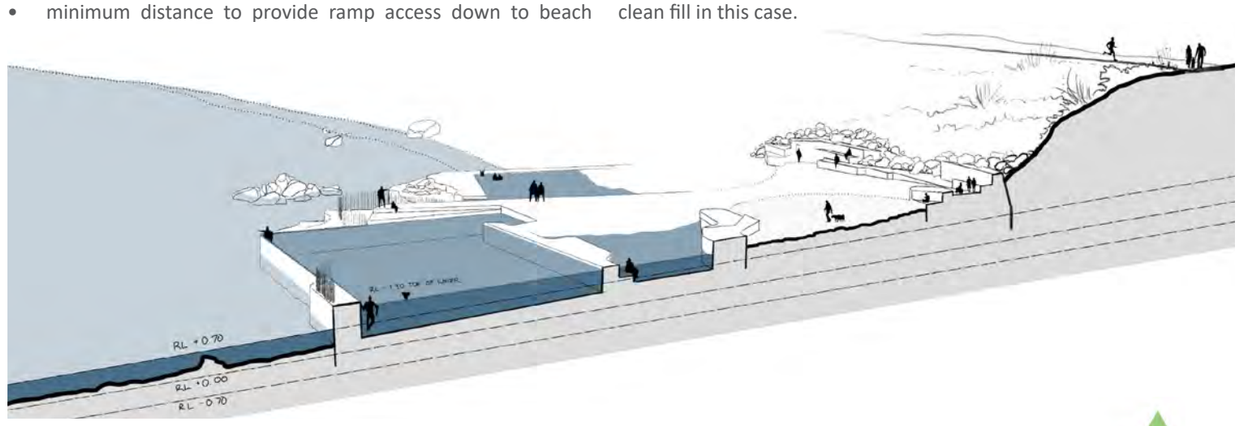
Littoral Drift
Both proposed options have been located to ensure no impact on littoral drift. The pool is located in the 'shadow' of an existing embankment on the boulder platform which situates it landward of northward long-shore drift and sand migration.

Pool Siting and Proposed Location
The proposed pool sits slightly south of the site nominated in the feasibility study. This is in response to the following factors;
- management of existing storm-water outfall at this location
- minimum distance to provide ramp access down to beach

Embankment Protection
Embankment protection along Hallett Cove Beach is part of a broader strategy for staged coastal protection works. The concept design focuses on a preliminary stage of stabilisation for the embankment and proposes a 90m stretch of hard stabilisation through stepped concrete benches and a vehicular access ramp down to the beach. This is located primarily behind the ocean pool and is expected to protect an additional 30-40m of embankment south of the pool.

	Feasibility Study	Concept Design
Concrete wall embankment protection	75m (Stepped Concrete seawall)	90m (Stepped Concrete seawall and ramp)

Coastal engineering input has suggested a minimum height of +4.5m AHD for the stepped concrete wall to provide sufficient protection to the embankment. Above this, rock boulders and vegetated planting is proposed to stabilise the remaining section of the embankment. Sections of the embankment require regrading as they are too steep to be successfully planted out. Costing takes into consideration that much of the embankment does not comprise of clean fill in this case.



Proposed Option 1 50m Sea-side Pool | Proposed levels

Coastal Engineering Design makes reference to original Feasibility Study for Hallett Cove Sea-side pool, South Australia (Prepared by UNSW WRL April 2019)

Coastal Engineering Design makes reference to original Feasibility Study for Hallett Cove Sea-side pool, South Australia (Prepared by UNSW WRL April 2019)

04 Design Considerations Hydraulic Design and Water Management



Option 1 50m Sea-side pool | **Mid Tide (AHD 0.00m)**



Option 2 25m Sea-side pool | **Mid Tide (AHD 0.00m)**

Water Quality Standards and Guidelines

As ocean pools are not ubiquitous in South Australia, specific guidance for water quality management is not readily available. The concept design instead is informed by the current *Australian Guidelines for Managing Risks in Recreational Water (NHMRC, 2008)*, *World Health Organisation's Guidelines for safe recreational water environments (WHO, 2003)* and follows a preventative approach to the management of recreational water assets. This includes the assessment and management of hazards and water quality to ensure 'suitability for recreation' purposes. The concept design also draws on the *South Australian Standard for the Operation of Swimming Pools and Spa Pools (SA OSPSP)* which provides guidance on the turnover rate for swimming pools.

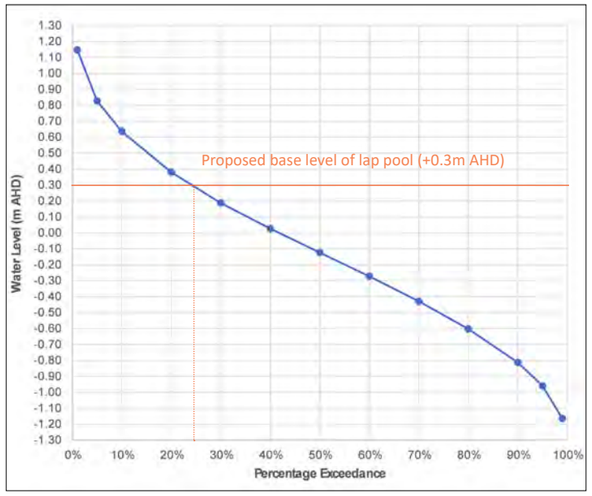
Water Quality at Hallett Cove

The SA EPA states that: *Beaches in Adelaide are safe and healthy for 98% of the time*. Studies show that Adelaide's coastal waters are generally safe for swimming three days after heavy rainfall events. As such, management of the proposed sea-side pool should include recommended exclusion periods following rain, similar to beaches in inlets. Existing features which impact on water quality in the vicinity of the proposed sea-side pool include:

- 1650mm diameter storm-water outlet, at the southern side of the proposed 50m pool, with a 146 hectare urban catchment.
- Field River outlet, approximately 350m south of the proposed pool, with a 36 km2 catchment.
- Waterfall Creek outlet, approximately 1km north of the proposed pool, with a 353 hectare urban catchment
- Christie's Beach wastewater outfall, approximately 5km to the south of the proposed pool

Tide Levels and Water Levels

Tide levels at Hallett Cove exceed RL -0.8m AHD 90% of the time. That is, 10% of the time the ocean water level at Hallett Cove is less than RL -0.8m AHD. This level is relevant to the operation of the intake for the pool pump supply and drainage of the pool. For reference, the base level of the lap pool is +0.3m AHD. This has been set based on analysis of water level exceedence so the pool can be drained in a majority of conditions, e.g. 75% of the time the water level is below the pool bottom. This ensures weekly or fortnightly draining of the pool is not heavily constrained by the tides.



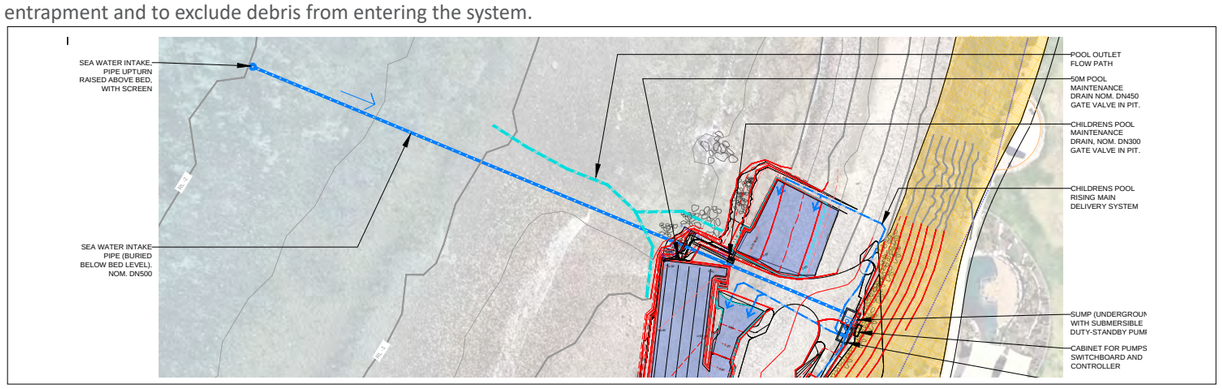
Pool Water Turnover

Principles from the *SA OSPSP* have inform the concept design for Hallett Cove sea-side pool. As such, water turn over is proposed to be continuous with pumped ocean water supplied to the pool from an intake in Gulf St Vincent. Based on these rates it is expected that once drained, the pool can be refilled within 4-6 hours and can be done overnight to minimise impact on day time usage.

Pool		South Australian standard		Higher standard	
	Estimated volume (m^3)	Turnover time (hrs)	Flow rate (L/s)	Turnover time (hrs)	Flow rate (L/s)
50m Pool	1050	6	49	2.5	117
Childrens pool	220	2	31	1	61
Total	**1270**		**79**		**178**

Seawater Intake

A number of options were considered for the water intake system with a view to ensuring sufficient water turnover and minimal construction cost. This is impacted by the location of the pool which does not extend significantly into the tidal zone per the client design brief. The water intake location is dictated by tide levels described previously, and must be located low enough to draw water during most low tides throughout the year (should the pool remain continuously pumped). Therefore the proposed system draws supply from a deep water intake point with a connecting pipeline concealed below the sea bed. It is expected that for a limited time frame (4-6 hours) on select days each month, the intake will not be submerged at low tide nor draw in water. However this has relatively minimal impact on the annual water turnover of the pool. The intake point is proposed to be screened to prevent marine life entrapment and to exclude debris from entering the system.



Proposed Pump System

The water intake pipeline is to be connected to a flooded underground pump sump near the driveway down to the pool. It is proposed that 2 identical submersible pumps be installed in a duty-standby arrangement. This will provide some flexibility in operation and redundancy, with both pumps having a duty of 90 L/s @ 4m head. During conditions of poor water quality the pumps may be deactivated so this is not drawn into the pool. The pump station is located adjacent to vehicle access to facilitate easy maintenance.

Storm-water Outlet Diversion

An existing 1650mm diameter storm-water outlet discharges to Hallett Cove Beach in the proposed location of the 50m pool and south of the proposed 25m pool. An extension to this storm-water drainage line is proposed to pass below the pool deck and discharge at the water side of the pool structure. This will ensure that during rainfall, storm-water runoff does not flow directly into the pool. It also removes the storm-water outlet from direct line of sight to beach-goers, foreshore walkers and swimmers visiting the pool, mitigating adverse visual impacts to the foreshore.

Environmental Impact

The proposed outflow of water from the pool is via a controlled over-topping point and outlet flow path. Environmental Impact reports have noted that Hooded Plovers nest in the area.

The outflow path is expected to benefit bird habitat and foraging in the local area, an improvement on the current storm-water outlet which attracts bird life. As water is proposed to be continuously supplied to the pool and turned over at a rate of 2.5 hours, the quality of return water is expected to be of minimal impact to surrounding marine ecology.

04 Design Considerations Landscape,Heritage, Geotechnical and Ecological Factors



Option 1 50m Sea-side pool | **Low Tide (AHD -0.98m)**

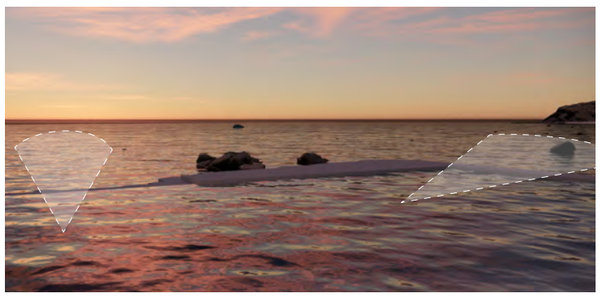


Option 2 25m Sea-side pool | **Low Tide (AHD -0.98m)**

Views and Landscape Character
Key views in Hallett Cove look towards natural assets including the coast and headland. They are primarily oblique looking north and south along the coastline, however the view out to the ocean and horizon is also a central feature. While the natural landscape character of the northern sections of the beach are well protected and conserved, the southern section has been heavily modified by legacy development and demolition. The proposed pool is located within areas of legacy development to ensure areas of remaining natural landscape are not impacted.

Framing significant views
The proposed pool and ramp access down to the beach are designed to frame the horizon and northern headland, creating views not just for swimmers but also for beach goers (see images to top right). An example of views from the pool is shown below. One side of the pool is a 'wet edge' which visually creates a continuous appearance of water from the pool surface to the ocean.

Impact on the Character of the Beach
The proposed pool sits within the existing boulder platform of the beach. While the pool extends out to meet the intertidal zone it does not intrude significantly into the water. Works to the embankment and associated landscaping regenerate planting along the otherwise bare slope. Collectively the proposed scheme protects and enhances the existing the character of the beach, restoring the embankment and remaining within the boulder platform.



Wet edge to Children's pool creating continuous visual connection to the water.



Extent of boulder platform shown dashed, proposed pool sits within this footprint. Arrow indicates collection of erratic glacial boulders maintained and framed by the proposed pool.

Protect and Enhance Geological Significance
Much of the geologically significant area at Hallett Cove is located on the northern headland. The proposed ocean pool is removed from these areas on the southern section of the beach. This area is characterised by a rocky platform scattered with erratic boulders dropped by the glacier that moved through this area. A collection of larger boulders in the vicinity of the proposed site are retained and framed by the proposed Children's pool.

Storm-water Outlet
An existing storm-water outlet on the beach channels run off from the surrounding area out to sea. This outlet is proposed to be diverted under the pool and out to sea, concealing the outlet to improve visual outcomes on the beach for visitors.



Existing storm-water outlet proposed to be re-directed and concealed by pool

Cultural Heritage Impact
'Aboriginal Cultural Heritage Survey of a Proposed Coastal Walkway Hallett Cove' Integrated Heritage Services - 2019
IHS undertook a study in 2019 for COM which primarily looked at areas of Aboriginal heritage significance at Hallett Cove. While the report focussed on areas further south than Hallett Cove beach, the report also touched on the proposed sea-pool. Areas around the mouth of the Field River (south of Hallett Cove beach) were found to have a likelihood for previously unrecorded and buried Aboriginal heritage sites, the beach was not. The report does note the sensitivity of the foreshore area along the beach however no concerns were raised as the proposed pool design was not yet available for feedback. Further consultation is expected to now be undertaken on the proposed concept designs summarised in this report.

Ecological Impact
'Flora and fauna assessment Coast Park – Hallett Cove' T & M Ecologists Pty Ltd- 2019
TME completed an ecological study for Hallett Cove Beach in 2019. The study found that a pair of vulnerable Hooded Plovers nest at the base of the embankment and mouth of the Field River. The area of the Hooded Plover habitat extends from the boulder platform at the mouth of the field river to the bend in Heron Way. The pool proposes to further encourage Plover habitat via the return water flow from the pool to the ocean and intertidal habitat to the seaward side of the sea-pool.

Impacts to the intertidal zone and surrounding reef require further investigation through detailed design and relate to the footprint of the pool, construction methodology and deep water intake pipe. Other impacts include the quality of discharged water from the pool. As the pump system is proposed to turn over the pool water at a high rate, the water quality is expected to remain high as it is discharged from the pool.

Environmental Impact
In contrast with municipal pools, sea-pools generally have a low environmental impact. The pool water is filled from the ocean, without the need or use of chemical treatment and it is not heated. The structure of the pool is open-air and simple, the pool walls provide a swimming enclosure which can operate alongside natural coastal processes. The proposed sea-side pool is located to ensure it does not interrupt natural longshore drift of sand south to north. Pool walls are designed to encourage intertidal habitat through proposed stepped 'platforms' to the seaward side of the structure which can host marine life and create protective structures for fish and crustaceans.

Geotechnical Impact
'Geotechnical and Environmental Investigation - Hallett Cove' Coffey Geotechnics 2013
CG undertook a geotechnical investigation which included a number of borehole samples taken above the embankment. The boreholes were back from the beach and do not extend into intertidal areas where the proposed pool is sited. As such, further investigations need to be undertaken to the proposed pool footprint in conjunction with further development of the proposed construction methodology to determine geological conditions and impacts.

04 Design Considerations
Standards, Codes and Safety

Ocean and sea-side pools in Australia are generally seen as extensions of the coast and foreshore. Much like our beaches, there are periods where hazardous surf conditions require the closure of an ocean pool with signage to communicate this to beach goers. Of the approximately 60 sea-side pools in NSW, less than five have dedicated lifeguards and/or fencing. Those that do typically charge an entry fee. Most are otherwise accessible 24 hours per day, 7 days per week. Sea-side pools are almost always safer than the neighbouring beach and rock shelves. A range of risk control measures are presented in this report, with a full hazard and safety assessment recommended if the project is to progress further.

An ocean pool has not been approved or built in Australia in over 50 years, although multiple new initiatives are currently underway. As such there is no specific standard or guidance for their required management and safety. In lieu of this, the concept design is informed by public health and safety regulations for pools, the National Construction Code and Australian Standards where applicable. It is also informed by contemporary practices and data gathered on servicing and management observed across NSW's 60 ocean pools which operate across varied scales and are managed by local councils.

Safety, Risk Management and Duty of Care
Safety and risk management is a primary consideration of the design and ongoing management of the proposed sea-side pool. As such a detailed assessment of the severity and likelihood of potential hazards is to be undertaken. This is an in depth process, requires co-ordination of technical aspects of the pool and is best undertaken once the project progresses to detailed design. The safety report produced for the project documents this assessment and is typically provided to Council's insurers for reference. It identifies specific hazards and how they are proposed to be mitigated or managed for the asset and addresses strategies for access and supervision of the pool.

Relevant Legislation and Regulations
The South Australian Public Health (SAPH) Act and Regulation deals with health and safety of pools in the state however tidal pools (which are naturally flushed) are exempt from these requirements. As such, the level of servicing for the pool will be dependent on whether it is seen as a public swimming facility or an extension of the ocean environment. As this concept design proposes to continuously supply sea water into the pool, further clarification is to be sought on how the pool is defined under this legislation. This is best determined during detailed design of the pool.

Nonetheless, the concept design observes requirements of the SAPH Regulation and Act where possible. The pool is not proposed to be chemically treated as water is circulated back into the ocean and would have adverse impacts on surrounding marine life.

Water quality is managed through adequate turn over rates. The Standard for the Operation of Swimming Pools (SOSWP) prescribes rates which have been referenced in the design of the pool and proposed pump system. In addition to this, maintenance and pool management included in this report recommends regular draining, cleaning and replenishing of the pool water to maintain water quality.

Relevant legislation, standards and guidelines include;
- **South Australian Public Health Act 2011**
- **South Australian Public Health Regulations 2013**
  Applies to swimming pools which are defined as a waterslide pool, wave pool, hydrotherapy pool or other similar structure designed for human use, other than—
  (b) a tidal pool or other similar structure where water flows in and out according to the operation of natural forces'.
  As such the level of servicing for will be dependent on an interpretation of the water circulation system for the proposed sea-side pool. This is better determined once the project progresses to detailed design.
- **Planning, Development and Infrastructure Act 2016**
- **Planning, Development and Infrastructure Regulation 2019**
  The regulation can require designated safety features (fences/ barriers) to be installed on swimming pools, as prescribed under the NCC for swimming pools - see below.
- **Standard for the Operation of Swimming Pools SA**
  See above. Further clarification is required to determine whether this standard applies.

National Construction Code (NCC) 2022
Under the SA provisions of the NCC (V1, G1P2);
1. Safety features for swimming pools including barriers are required where the pool is associated with Class 2, 3 or 4 buildings (apartments, residential buildings or dwellings)
2. The pool must have prominent and visible signage that assists persons to provide first aid and to perform CPR
3. A water recirculation system in a swimming pool with a depth of water more than 300 mm must comply with AS 1926.3

As such, barriers/fences are not required for the proposed pool

Proposed Operational Model and Supervision
Generally ea-side pools follow an operational model which provides public, 24/7 access to the pool. The pool is unsupervised and access to the pool is not restricted or fenced off (in part as this would undermine the landscape character of the beach). As a result sea-side pools are extremely efficient in comparison with municipal pools while offering a similar level of amenity. While no regulatory requirement exists for supervision, this is to be further assessed in conjunction with a detailed risk and hazard assessment to understand whether provision is to be made for lifeguards. This is best undertaken once the project progresses to detailed design.

Pool Barriers
A preliminary review of relevant legislation, standards and guidelines indicates that a continuous pool barrier is not required. However this is pending a detailed risk management and safety workshop with Council's insurance providers in attendance and is best undertaken once the project progresses to detailed design.

Surf Conditions
At Hallett Cove, the wave and tidal conditions are generally milder than NSW. The design of the pool for Hallett Cove, includes pumped sea water and a wall height of 1.9m AHD. This wall height will result in some wave over-topping into the pool, likely only high tides and high swell thereby improving pool safety under ambient conditions. During severe coastal storms and high tides it is expected that (similar to Adelaide's coastal beaches) the pool is closed with access restricted via gates at the ramp and stair down to the beach.

Water Quality
In addition to the pump system and regular maintenance of the pool, it is recommended that water quality of the pool is monitored for an initial period. Pathogen build up or contamination should be assessed particularly during warm weather. Monitoring undertaken following storms or heavy rain is also advised to give an indication of the quality of the seawater supplied to the pool. Should water quality drop, the pump system may be paused for a time so poor quality water is not drawn into the pool.

Passive Surveillance and Access Control
Proposed access down to the beach from Heron Way and the children's playground includes gates at stair ways and the vehicle ramp. In period of hazardous swell, gates can be locked to indicate closure of the pool and beach. The proposed pool location receives good passive surveillance from multiple vantage points along the coastal pathway at Hallett Cove Beach and the playground. This provides oversight in the case a swimmer is in distress and discourages anti-social loitering of an evening. It is also recommended that the pool include provision for an Emergency Relay Beacon (ERB). This device can be used to rapidly alert the nearest Surf Lifesaving center should assistance be required.

Fall From Height
The proposed outer walls of the pool are stepped to minimise zones where there is a fall greater than 1m in height. Where this could not be accommodated, balustrading has been proposed to protect from falls.

Emergency Vehicle Access
Contemporary practice for ocean and sea-side pools is to provide ramped access which allows an ambulance to drive down to the pool level. This is in the case a swimmer using the pool or the beach has a spinal injury. The wheel base of an ambulance has a minimum turning circle and maximum grade which the vehicle can traverse. These provisions have been allowed for in the concept design to ensure emergency vehicles have beach access.

Marine Life Management
Sea-side pools are 'live' environments where swimmers share the intertidal zone with active marine life. The pool enclosure provides safety from large marine life such as sharks but can also be a haven for smaller creatures which can be hazardous such as urchins and octopus. This does not pose significant risks (similar to the beach environment) and is proposed to be managed through public signage and maintenance works.

Design for Access and Mobility
Provisions of the Disability Discrimination Act and Australian Standard 1428.1 make provision for the inclusive and equitable access to the pool. The City of Marion also adheres to a Disability Access and Inclusion Plan as required by the SA State Government. The proposed design of the pool pro-actively meets these requirements. It provides inclusive access via a new ramp down to the beach level at a 1:14 grade for wheelchair users and those with an ambulant disability. The pool is designed for dignified access to the water, allowing sufficient space for wheel chairs to be stored next to lap lanes for example. A continuous edge is maintained along one of the five lap lanes to assist and guide vision impaired swimmers. Both the childrens pool and lap pool also have a sloped ramp entry to the pool for ease of access.

04 Design Considerations
Traffic Engineering

Existing Parking Capacity
In 2019 a feasibility study for a sea-side pool at Hallett Cove surveyed existing parking capacity in the area of the proposed pool. This was carried out in a high demand period in early January and identified that within 450m of the proposed sea-side pool a minimum total of 89 parking spaces out of 217 remained vacant during that period.

Anticipated Additional Demand
Based on the two design options prepared in this report (a 50m and 25m respectively) a benchmarking method has been used to calculate the anticipated number of additional visitors a pool will draw to the area. The benchmarking uses visitations figures from Sea-side pools in NSW to establish this and can be seen below. From this, the expected number of additional demand on parking can be extrapolated.

Traffic and Parking Provisions		Option 1 (50m)	Option 2 (25m)
Proposed Pool Area		1,073m2	705m2
Anticipated Visitors	Annually	46,600	30,618
	Weekly	1,120	736
	Daily	370	243
	2 Hours	74	49
Adequate Parking Provision			
Vehicle Occupancy		2.5 persons per vehicle	
Additional Parking Provision		**30 spaces**	**20 spaces**
	Existing		
Parking Vacancy Within 250m	13 Spaces	0 Spaces	0 Spaces
Parking Vacancy Within 450m	76 Spaces	59 Spaces	69 Spaces

Note: Figures reflect highest anticipated parking demand for the area. E.g. A fine day in early January either on a weekend or public holiday. Outside of this, existing parking capacity sufficiently meets the additional demand the pool may generate. Modelling assumes all arrivals are by car and is therefore conservative given proximity to existing public and active transport links.

	Time-frame	Option 1 (50m)	Option 2 (25m)
Additional Demand	**2 Hour period**	**+ 30 spaces**	**+ 20 spaces**
Total Vacant Spaces remaining within 450m Radius		**59 - 66 Spaces**	**69 - 76 Spaces**

Parking Option 01:
The additional demand is accommodated within existing car parking vacancy, allowing for visitors to park up to 450m from the pool

Parking Option 02:
Additional close proximity parking is provided along the Eastern bend of Heron Way. The existing 5 curb side spaces are upgraded to 90 degree parking to achieve an additional 7 spaces.



5 x Existing kerbside spaces
12 x New 90 degree parking spaces (Total increase +7 new spaces)

Impact on Vacancy/Availability of Parking
It it anticipated that the 50m pool option will increase parking demand by up to 30 car spaces and the 25m option will increase demand by up to 20 spaces. This increased demand can be accommodated by existing vacant car spaces within a 450m radius of the proposed pool, with up to 59 additional vacant spaces remaining. As such the impact on available parking is minimal. As an option, parking in close proximity to the pool could be further increased by adding 7 new spaces on the eastern bend of Heron Way. This would create a total of 66 vacant spaces within a 450m radius. However, demand can be met without these measures.

Benchmarking
The anticipated additional parking demand generated for Hallett Cove Sea-side Pool has also been measured against other recent Sea-side pool proposals for benchmarking purposes. Two proposals which included traffic impact reports are listed below.

- Ballina Sea-side pool +20 spaces
- Port Macquarie Sea-side pool +42 spaces

This estimated additional demand on parking is comparable with the rates shown above, which anticipates between 20-30 car parking spaces in periods where the area is likely to experience high demand.



Existing and proposed car parking capacity in the Hallett Cove precinct based on a 250m and 450m radius from the proposed Sea-side pool

05 Preliminary Cost Estimate

The following summarises the cost of a sea-side pool in addition to embankment protection and a new accessible ramp down to the beach. The embankment protection is one part of a broader strategy for ongoing, staged coastal protection works including an area to the north and south of the proposed pool along Hallett Cove Beach. For a full breakdown of costs please see the appendix.

Estimated Capital Cost for a Sea-side Pool at Hallett Cove

50m Sea-side Pool	**$8,925,169 excluding GST**
25m Sea-side Pool	**$7,820,646 excluding GST**

Concept Design Options | Scope of Works
For the purposes of the cost estimate, the following describes the scope of work which has been allowed for in each option;

Option 01 | 50m Sea-side Pool
50m Lap Pool (Max 1.6m depth)

Option 02 | 25m Sea-side Pool
25m Lap Pool (Max 1.6m depth)

- Associated pathways/seating
- Intertidal habitat regeneration
- Childrens Pool (Max 1.0m depth)
- Amenities block and parking
- Diverted storm-water outlet
- Pump system and deep water intake
- 90m Stepped concrete wall embankment stabilisation
- Beach access, lighting, signage and interpretive element
- Beach hard-scaping and seating for recreation and leisure

Assumptions
- Fill to be removed from embankment has been assumed to contain contamination e.g. asbestos
- Capital costs include construction works e.g. coffer dam but do not cover consultancy fees or other associated costs

Ongoing Operational Costs
Estimated annual costs for a sea-side pool are based on anticipated maintenance summarised in this report and are provided as a range in the appendix. The cost of running pumps is a key cost, both in electricity and pump maintenance. Estimates are benchmarked against ocean pools in NSW, noting that only some are continuously pumped and others rely solely on tides and natural flushing. Another impact on operational costs is whether the pool is supervised and is to be further assessed in conjunction with a detailed risk and hazard assessment best undertaken once the project progresses to detailed design. Generally, existing ocean pools in NSW have undergo capital upgrades every 20 years depending on their age and construction. As such, estimates provided for a 20 year period includes a sum to be accumulated towards upgrades such as replacement of balustrades pumps, pipework and/or wall reconstruction should it be required.

Note: All figures are exclusive of GST and reflect current rates. They do not allow for escalation or additional costs such as approvals, consultancy fees or other associated project costs.

Estimated Capital Costs

Item	Estimate
Option 1 - 50m Sea-side Pool	
Preliminaries and Margin	$1,589,570
Beach Access and Embankment Protection	$1,648,763
Children's Pool	$695,555
Amenities and Parking	$693,778
50m Sea-side pool	$2,512,469
Contingency (25%)	$1,785,034
Total Option 1 (excluding GST)	**$8,925,169**
Option 2 - 25m Sea-side Pool	
Preliminaries and Margin	$1,443,812
Beach Access and Embankment Protection	$1,648,763
Children's Pool	$695,555
Amenities and Parking	$693,778
25m Sea-side pool	$1,498,027
Contingency (25%)	$1,564,129
Total Option 2 (excluding GST)	**$7,820,646**

Beach Access and Embankment Protection (if undertaken separately to sea-side pool works)	
Preliminaries and Margin	*$494,629*
Direct Costs	*$1,648,763*
Contingency (25%)	*$535,848*
Access + Embankment Protection (excluding GST)	***$2,679,240***

Operating Costs (Mid Range est.)	Option 1 (50m)	Option 2 (25m)
Operating Costs (Annual)	$201,313	$176,519
Operating Costs (20 Year period)	$4,232,268	$3,710,811

Benchmarking Against NSW Sea-side pools	Costs P.A.
• Ulladulla Sea Pool (weekly replenished)	$71,543
• Huskission Sea Pool (pumped)	$55,000
• Wollongong (naturally flushed)	$44,222
• Wollongong (continuously pumped+supervised)	$320,000
• Wylie's Baths (naturally flushed+supervised)	$60,000
• Bronte Baths (continuously pumped)	$217,000

Right: Option 1 50m Sea-side Pool | Artist Impression



06 Maintenance and Ongoing Management

Frequency of Maintenance
Depending on local factors and the seasons, most sea-side pools are emptied and cleaned weekly, fortnightly or monthly. The concept design detailed in this report proposes a sea-side pool which is continually flushed. The proposed pool wall is also proposed to be set high (+1.9M AHD) to prevent ingress of sand or sea wrack into the pool. As such the high turnover and resulting water quality may allow for less frequent maintenance over time with monitoring of usage and seasonal changes in water quality. Regular maintenance is suggested to occur as follows;

	Summer	Winter
Drain/Refill	Weekly	Fortnightly
Pressure Wash	Every 4-6 weeks	Every 6-8 weeks
Substantial Clean Out	Following heavy storm or rain events	

Maintenance
A high-pressure device is used to remove algae build up from the walls, pool floor, ramps, stairs and railings. No chemicals are used, water supply is provided from mains water taps located near the pump housing. Sand and seaweed are swept to the drainage valve point in the pool and washed out to sea. The pool design proposes a low point of +0.3M AHD to permit draining of the pool in most low tide conditions.

Typical Maintenance (Weekly/Fortnightly)
- Removal of debris such as sea weed and sand from pool
- Emptying of the pool to replenish with fresh ocean water

Intermittent Maintenance (Every 4-8 weeks)
- Removal of marine growth to trafficable areas
- Pressure clean trafficable surfaces
- Maintenance on gates, pumps, etc.

Substantial Maintenance (As-needs basis)
- Sand, wrack and boulder removal from the pool
- Minor concrete patching and joint sealing
- Balustrade repair or replacement
- Pump refurbishment or replacement
- Lighting maintenance

Substantial Maintenance
Following storm events or periods of high swell sand, sea grass and boulders can be expected to get swept into the pool. The ramped access into the pool allows earth moving machinery such as a small bob cat to be employed as required to remove excess sand or debris in a safe and manageable way for maintenance crews.

Pump Maintenance
Occasionally crews need to clear the drainage valves when they are blocked with marine growth to allow the pool to empty. The pool is then drained as much as possible. Sometimes sand or weed build up, high tides and prevailing surf conditions (at the external drainage point) can make a full drain challenging. However as previously discussed the base level of the pool (+0.3m AHD) provides good clearance to low tides to ensure drainage is achievable in most conditions in a given month.

Timing
Generally most ocean pools are drained and re-filled on a low tide over night to minimise interruptions to use. Crews will begin draining the pool on an outgoing tide to allow sufficient time for cleaning and maintenance to occur. Following this the pool is then refilled via the pump system. The concept design pump turn over rate is anticipated to refill the 50m lap pool in a 4-6 hour period.

Design Life of the Pool and Significant Capital Upgrades
Structures located on the open ocean sustain a significant amount of wear and tear due to the harshness of the coastal environment. Generally, ocean pools in NSW have undergone significant capital upgrades every 20 years depending on their age and construction. Given that most of these structures are over a century old, it is expected that a contemporary ocean pool would significantly out perform this and remain durable for a longer period. Nonetheless, 20 year operational cost estimates provided in this report make allowance for this should upgrades or refurbishment be required. Some examples of significant upgrades include replacement of pump system and pipework, rebuilding walls which have cracked and lead to leaking or repairs to pool coping which has become rough and uncomfortable to walk on.



Hallett Sea-side pool, Proposed Sea-side pool Option 2 | Artist Impression

07 Recommended Next Steps

A new ocean pool has not been approved or built since the late 1960's in Australia. As such, proposals of this type are unlikely to follow a typical approval and procurement pathway given the unique nature of the project. Guidance is provided below on recommended next steps for the initiative, with the primary objective to obtain funding for future stages of the process. However, aspects of approvals, documentation, procurement and the construction process are likely to be novel. There are currently two similar initiatives for new ocean pools being undertaken in NSW and WA. Both projects are slightly more advanced than the proposal for Hallett Cove. As these projects progress they can serve as a case study or template for some of processes this project may follow should it progress further.

Stakeholder Engagement

Sea-side pool proposals which have successfully progressed on to obtain funding have demonstrated significant community support locally and on a state wide level. The concept design included in this report presents two options for the consideration of stakeholder groups and community engagement. Using this concept design the City of Marion may progress the project by undertaking stakeholder and community engagement to receive feedback and potentially nominate a preferred option.

Funding Pathways

Pending there is sufficient, demonstrated community support for the concept design, COM may choose to pursue funding for the next stage of the project. However it is noted that no commitment has been made to progress the project further than the concept design at this stage. Should it proceed, one potential pathway forward is to procure 'seed' funding the next stage of work. 'Seed' funding allows for further studies and schematic design documentation to be undertaken in order to obtain planning approval and prepare a project business case. Ideally, the project is then well placed to secure the remaining bulk of funding for construction. Where a planning approval has been obtained, it demonstrates the project is viable and 'shovel ready'. Time frames for an approval could be up to 2 years, therefore applications for subsequent funding could be made in 2025/6.

Subsequent funding for the remainder of the project is likely to cover full documentation, costing advice, tendering and construction of the proposed sea-side pool. COM may work with specialist consultants and contractors to develop a detailed scope of works involved with both the 'seed' funding and subsequent works further.

Coastal Protection Works

The proposal for a sea-side pool at Hallett Cove includes new beach access and protection works to the existing embankment along the foreshore. This forms part of a broader strategy for staged protection of the coast along Hallett Cove, which is potentially eligible for funding by the state or federal government. As an example, coastal protection works can receive funding through Coastal Protection Grants which are administered by the SA State government through the Department for Environment and Water.

Approvals and Schematic Design

Specialty statutory planning advice will form a central aspect of any approval process for an ocean or sea-side pool as this type of project is not likely to follow a typical planning pathway. The location of the pool involves various land owners and stakeholders including Crown Land and may be subject to Native Title assessments. The proposed site for the pool is zoned as 'Coastal Conservation' in the City of Marion Development Plan. Under this, the City of Marion have indicated a development application for construction of the pool would be required and would be assessed on merit, with a referral to the Coast Protection Board.

The proposed pool also falls under the Harbors and Navigation Act, 1993. Under this, land which comprises the seabed and foreshore to the high water mark is administered by the Minister for Transport. Any development approvals for a sea-side pool would therefore require consent from the Minister as a landowner should the project progress.

Further advice around land ownership is required should the project progress and clarity should be sought on which government entity is best placed to be lead proponent of the project.

Stakeholder Engagement

- Undertake community & stakeholder engagement
- Engage with elected members and State Government MPs for feedback
- Summarise and synthesise feedback, where possible nominating a preferred option from the two presented

First Nations Consultation

- Undertake consultation with the relevant local indigenous reference groups and local indigenous community
- Determine if a heritage management plan is required to proceed with the project
- Pursue opportunities to integrate County in the proposed design

Detailed Design

- Undertake detailed geotechnical assessment including boreholes to the proposed footprint of the preferred pool option
- Undertake safety and risk management workshop to confirm operation model, level of supervision and water quality requirements
- Undertake baseline monitoring program of the proposed seawater intake location to inform design of treatment processes of incoming seawater and establish baseline date for existing micro-organism at proposed pool water disposal location.
- Undertake updated in-detail surveying of foreshore in conjunction with LIDAR scan to aid design, documentation and preparation of graphic material
- Undertake investigation of specific and in-detail performance of proposed ocean pool further
- Develop proposed design for the purpose of approvals and revised costing including updated visualisations of proposed pool (tender and construction documentation to hold until approvals and funding are obtained for next stage)



Hallett Sea-side pool | Aerial photograph of Wombarra Ocean Pool, Illawarra Coast Nicole Larkin

Appendix

PART B Artist Impressions
Plan Drawings 1:500
Traffic Report
QS Report
Hydraulic Report
Hydraulic Drawings 1:600
Beach Access and Embankment Protection
Team Profile

Hallett Sea-Side Pool Concept Design
Option 2 - 25m Pool | Artist Impression

Proposed Design | View 01



Option 1 | 50m Sea-side pool

Hallett Cove Sea-side pool Concept Design- Artist Impression 01



Option 2 | 25m Sea-side pool

Proposed Design | View 02



Option 1 | 50m Sea-side pool

Hallett Cove Sea-side pool Concept Design- Artist Impression 02



Option 2 | 25m Sea-side pool

NICOLE LARKIN
DESIGN ARCHITECTURE

Proposed Design | View 03



Option 1 | 50m Sea-side pool

Hallett Cove Sea-side pool Concept Design- Artist Impression 03



Option 2 | 25m Sea-side pool

Concept Design

Option 1 | 50m Sea-side Pool

1. Embankment Stablisation (Soft Planting)
2. Embankment Stablisation (Concrete Retaining Wall and Boulders)
3. Graded Ramp Access to Beach (For Vehicles and Accessibility)
4. Benched Concrete Retaining Wall (Beach Level Recreational use)
5. Diverted Storm-water Outlet
6. Proposed Toilet/Amenities
7. Existing BBQ Pavilion
8. Existing Playground
9. Proposed Access Gate
10. Proposed Water Supply Intake
11. Proposed Water Outflow
12. Foreshore access
13. Pool pump

ZONING

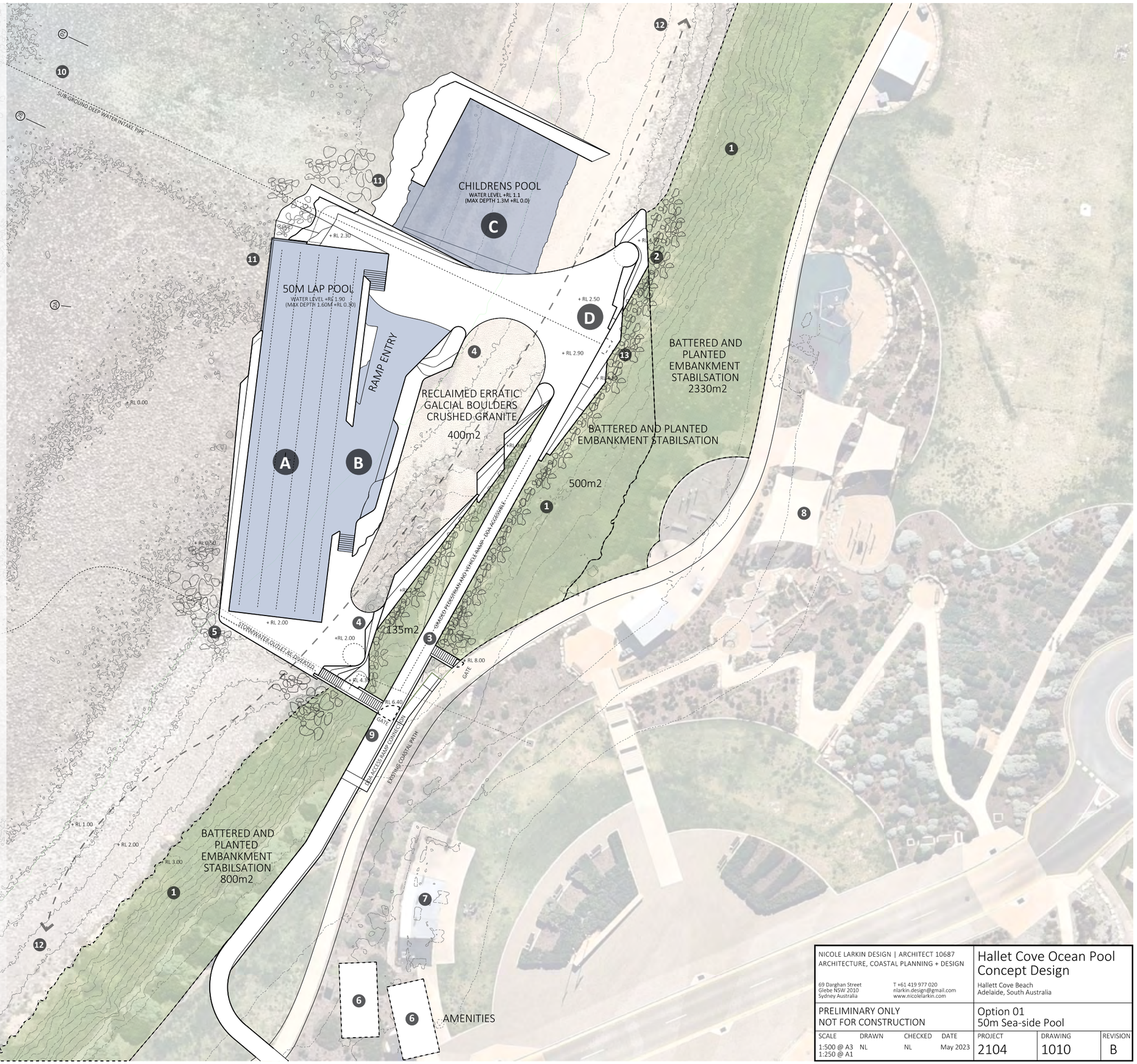
The ocean pool is designed with four primary zones;

A A 50m lap pool with five lanes, to allow for fast, medium, slow and recreation/water jogging accessed stairs or a ramp entry. This has a shallow (1.3m) and deep end (1.6m) and sloping bottom which permits drainage and maintenance.

B A ramped, graded entry ramp sloping at 1:14, suitable for wheelchairs and people of all ability levels. The ramp also allows access for service vehicles such as bobcats for the clean-out and servicing of the pool. Either side of the ramp has benched seats at various heights for rehabilitation exercise and or recreation/leisure.

C Children's pool and wading zone accessed via zero grade ramp from beach. Proposed depth 1m maximum with 'live' granite rock platform and gravel bottom.

D Stepped concrete benches and concrete path leading down to the beach. This creates protected areas for swimmers to sit and place their belongings while looking over the pool for passive surveillance. Select seating areas face north to capture winter sun while being protected from cool winds as comfortable spaces in the shoulder seasons. Outdoor showers are also provided at beach level for swimmers.



NICOLE LARKIN DESIGN | ARCHITECT 10687 ARCHITECTURE, COASTAL PLANNING + DESIGN 69 Darghan Street, Glebe NSW 2010, Sydney Australia T +61 419 977 020 nlarkin.design@gmail.com www.nicolelarkin.com	Hallet Cove Ocean Pool Concept Design Hallett Cove Beach Adelaide, South Australia
PRELIMINARY ONLY NOT FOR CONSTRUCTION	Option 01 50m Sea-side Pool

SCALE	DRAWN	CHECKED	DATE	PROJECT	DRAWING	REVISION
1:500 @ A3 1:250 @ A1	NL	NL	May 2023	2104	1010	B

Concept Design

Option 2 | 25m Sea-side Pool

1. Embankment Stablisation (Soft Planting)
2. Embankment Stablisation (Concrete Retaining Wall and Boulders)
3. Graded Ramp Access to Beach (For Vehicles and Accessibility)
4. Benched Concrete Retaining Wall (Beach Level Recreational use)
5. Diverted Storm-water Outlet
6. Proposed Toilet/Amenities
7. Existing BBQ Pavilion
8. Existing Playground
9. Proposed Access Gate
10. Proposed Water Supply Intake
11. Proposed Water Outflow
12. Foreshore access
13. Pool pump

ZONING

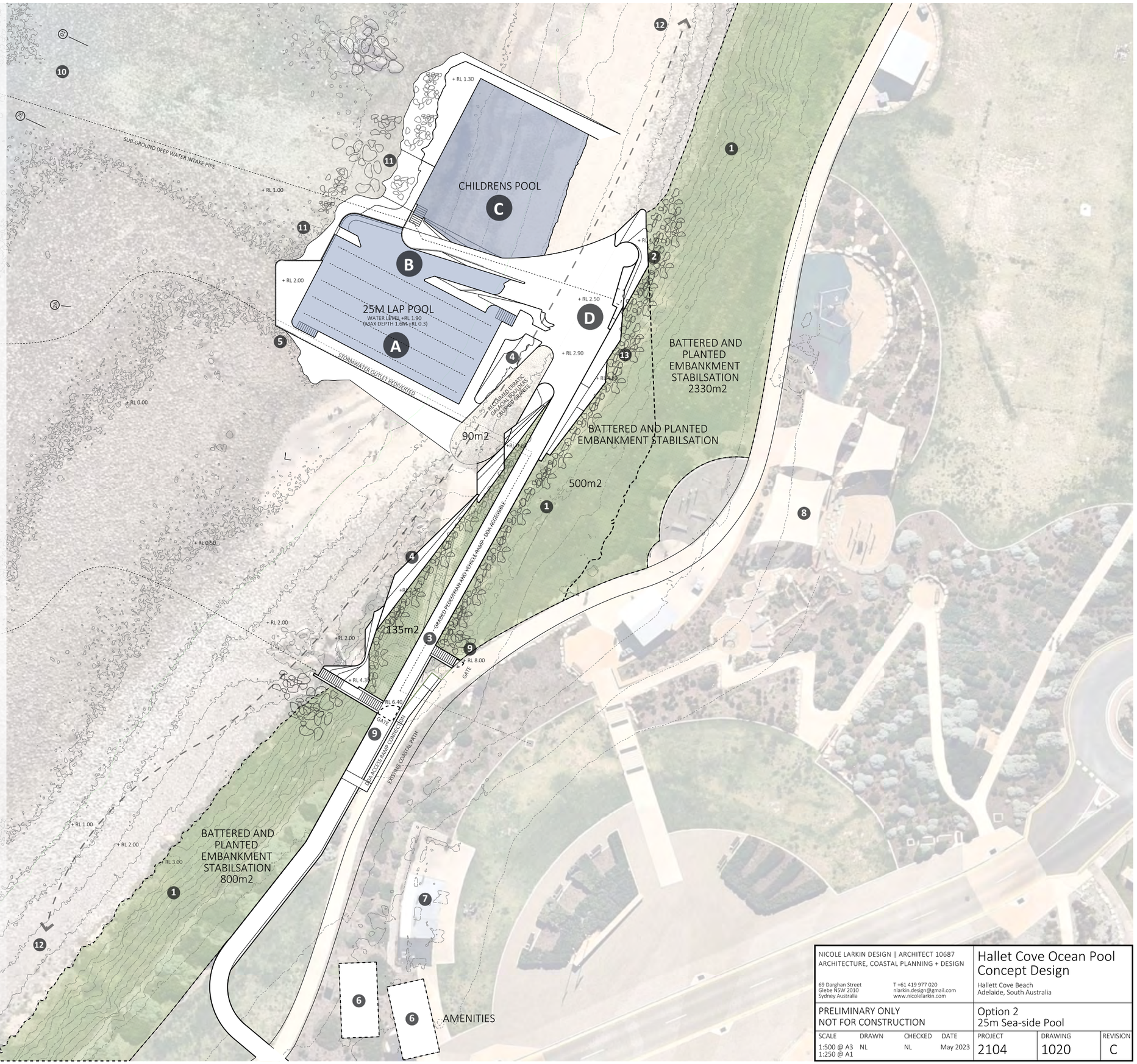
The ocean pool is designed with four primary zones;

A A 25m lap pool with five lanes, to allow for fast, medium, slow and recreation/water jogging accessed stairs or a ramp entry. This has a shallow (1.3m) and deep end (1.6m) and sloping bottom which permits drainage and maintenance.

B A ramped, graded entry ramp sloping at 1:14, suitable for wheelchairs and people of all ability levels. The ramp also allows access for service vehicles such as bobcats for the clean-out and servicing of the pool. Either side of the ramp has benched seats at various heights for rehabilitation exercise and or recreation/leisure.

C Children's pool and wading zone accessed via zero grade ramp from beach. Proposed depth 1m maximum with 'live' granite rock platform and gravel bottom.

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69 Darghan Street Glebe NSW 2010 Sydney Australia	T +61 419 977 020 nlarkin.design@gmail.com www.nicolelarkin.com		Hallet Cove Beach Adelaide, South Australia
PRELIMINARY ONLY NOT FOR CONSTRUCTION			Option 2 25m Sea-side Pool
SCALE	DRAWN	CHECKED / DATE	PROJECT / DRAWING / REVISION
1:500 @ A3 1:250 @ A1	NL	NL / May 2023	2104 / 1020 / C

Stantec Australia Pty Ltd
Level 5, 75 Hindmarsh Square
Adelaide SA 5000
Tel: +61 8 8201 9400
ABN 17 007 820 322 www.stantec.com/au

17 May 2023

Project No: 300304560

Nicole Larkin
Nicole Larkin Design

Dear Nicole

RE: Hallett Cove Ocean Pool – Parking Impact Assessment

Background

A proposed Ocean Pool is proposed to be located to the south of the Hallett Cove Beach, located adjacent the Heron Way Reserve. Stantec has been engaged by Nicole Larkin Design to undertake a parking impact assessment of the proposal.

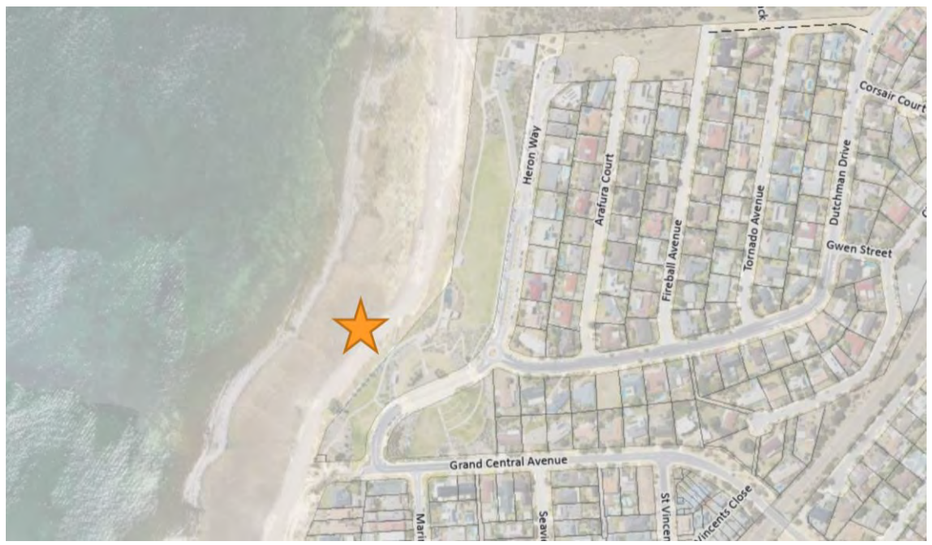
Subject Site

The subject site is located adjacent the Heron Way Reserve in Hallett Cove. The site is located on the beach, with the most direct vehicular access being provided via Heron Way.

The site is located within an Open Space zone of the South Australian Planning and Design Code. The site is currently a reserve/beach, and the surrounding properties include residential developments, with the exception of the Boatshed Café to the north.

The location of the subject site and the surrounding environs are shown in Figure 1.

Figure 1 –Subject Site and Surrounding Environs



Heron Way

Heron Way is a two-lane local road aligned in an approximate north-south direction adjacent the subject site. Heron Way is owned and maintained by the City of Marion. The road has a posted speed limit of 50 km/h and has a carriageway of varying width due to provision of on-street parking at various locations. Heron Way also provides connectivity for the bus route 683, with bus stops located adjacent the subject site.

Crash Statistics

A review of the reported crash history for the most recent five years (2017-2021) have been sourced from Location SA. During this time, there have not been any recorded incidents in the vicinity of the subject site.

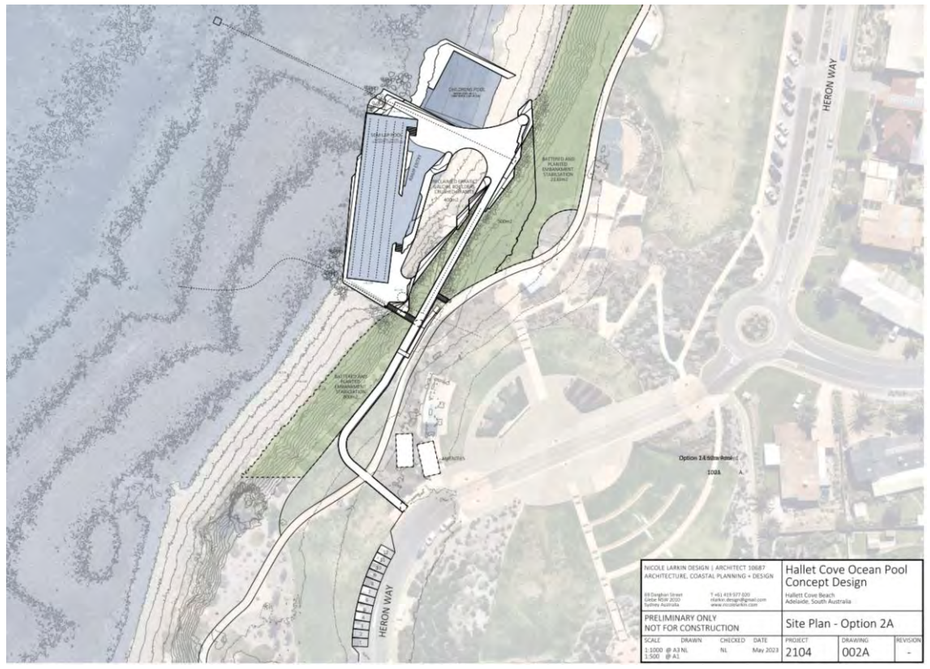
Proposed Development

The proposal includes an Ocean Pool and the associated pedestrian paths and linkages to the existing footpath network. Two options are being explored for implementation at the subject site. Each option proposes the addition of 12 90 degree parking spaces accessed directly off of Heron Way.

Option 2A

As part of Option 2A, the proposed ocean pool incorporates a 50m lap pool and children's pool, providing a total pool area of 1,073sq.m. The proposed Option 2A layout is shown in

Figure 2 –Option 2A Layout



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Option 2B

As part of Option 2B, the proposed ocean pool incorporates a 25m lap pool and children's pool, providing a total pool area of 705sq.m. The proposed Option 2B layout is shown in

Figure 3 –Option 2B Layout



Car Parking Assessment

Planning and Design Code

The car parking rates outlined within the Planning and Design Code do not specify a car parking rate for a dedicated ocean pool. There is a car parking rate for an Indoor Recreational Facility, which includes indoor swimming centres, as outlined below.

Figure 4 – Planning and Design Code Definition

Land Use Term (Column A)	Definition (Column B)	Includes (Column C)	Excludes (Column D)
Indoor recreation facility	Means a building designed or adapted primarily for recreation or fitness pursuits.	Bowling alley; Squash courts; Fitness centre; Gymnasium; Pilates studio; Yoga studio; Dance studio; Indoor swimming centre; Indoor trampoline centre; Indoor rock climbing centre; Indoor children's play centre; Indoor skating rink.	

It is noted that the proposed ocean pool will operate differently to a swimming pool, this is the closest rate that is applicable in the Planning and Design Code.

Based on this rate, the car parking rate for an Indoor Recreation Facility, is 4.5 car parking spaces per 100sq.mof total floor area.

Option 2A

Based on a pool area of 1,073sq.m this would equate to a parking requirement of 48 spaces.

Option 2B

Based on a pool area of 705sq.m, this would equate to a parking requirement of 32 spaces.

Empirical Parking Rates

Due to the nature of an ocean pool, there are multiple approaches to calculate the anticipated car parking demand for the development.

Empirical 1 – Aquatic Centre Rate

Stantec has empirical parking rates for two Aquatic Centres located in Victoria. While it is noted that an Aquatic Centre and an Ocean Pool will operate with different models, the car parking rate can be used as a benchmarking comparison.

Car Parking Rate: *3.76 spaces per 100sq.m of total floor area.*

Option 2A

Based on a pool area of 1,073sq.m this would equate to a parking requirement of 40 spaces.

Option 2B

Based on a pool area of 705sq.m, this would equate to a parking requirement of 27 spaces.

Empirical 2 – Swim Centre (Swimming Lessons)

Stantec has empirical parking rates for State Swim, which provide swimming lessons in South Australia. It is understood that the Ocean Pool is not anticipated to provide children swimming lessons, where swimming lessons can have a higher parking demand than other swimming locations. The below rate is for comparison.

Car Parking Rate:	*9.7 spaces per lane (7.76 spaces per 100sq.m of pool, based on 50m long by 2.5m wide lanes)*

Option 2A

Based on a pool area of 1,073sq.m this would equate to a parking requirement of 83 spaces.

Option 2B

Based on a pool area of 705sq.m, this would equate to a parking requirement of 55 spaces.

Empirical 3 – Benchmarking from Other Reports/Developments

Based on the initial information provided and the feasibility reports, various parking rates have been applied to Ocean Pool developments. It is noted that some of these rates are reflective of the rates outlined within the Planning and Design Code.

Car Parking Rates:	
Canberra	*5 spaces per 100sq.m of pool area*
Victoria	*5.6 spaces per 100sq.m of site area*
Gold Coast	*15 spaces plus 1 space per 100sq.m of Total Use area*
Tweed Shire Council	*1 space per 60sq.m of water surface*
North Sydney	*1 space per 100sq.m*
Approximate Average	*3.32 spaces per 100sq.m*

Option 2A

Based on a pool area of 1,073sq.m this would equate to a parking requirement of 36 spaces.

Option 2B

Based on a pool area of 705sq.m, this would equate to a parking requirement of 23 spaces.

Empirical 4 – High Level Parking Rate based on other Ocean Pool visitor numbers.

Stantec have been provided information from a feasibility assessment for an Ocean Pool facility located in Port Macquarie. The information outlined visitor numbers to various ocean pool developments located across NSW, as outlined below.

Figure 5 – Provided Ocean Pool Comparison Information

Table 9.1 Annual users of beaches and pools in various locations

Beach/Pool	Period	Pay or Free	Beach precinct (a) or gate data	Upscaled individual visits (b)	Pool visits % (c)	No of pool visits
Collaroy	2017-18	F	357,655	429,186	30%	128,756
Dee Why	2017-18	F	1,090,573	1,308,688	20%	261,738
North Curl Curl	2017-18	F	392,968	471,562	10%	47,156
South Curl Curl	2017-18	F	363,789	436,547	50%	218,273
Freshwater	2017-18	F	821,758	986,110	15%	147,916
Queenscliff	2017-18	F	611,264	733,517	20%	146,703
Town Beach	2018-19	F	308,502	370,202		
Flynns Beach	2018-19	F	150,733	180,880		
Forster ocean pool (d)	"recent"	F		100,000		100,000
Bondi Beach (e)	2014	F		3,500,000		
Bondi Icebergs (f)	"recent"	P				140,000
Wylie's Baths Coogee (g)	2017-18	P	50,000	82,000		82,000
Dawn Fraser Baths (g, h)	2016-17	P	40,886	101,800		101,800
Greenwich Baths	2015-16	P	32,605	60,000		60,000
Illawarra aquatic facilities	2016	P				128,000
Australian pool visits (i)	2016	P				106,000,000
Average per facility (i)	2016	P				99,000

Notes:

(a) Lifeguard data from Northern Beaches Council or Australian Lifeguard Services for October to April, or gate data from source.

(b) Beach data upscaled by 20% to account for users outside of patrol hours/season. Pool data upscaled to account for season passes (assumed 20 visits/year) and family passes (assumed to be 4 people).

(c) Delphic method, whereby two expert local life savers were polled and the results averaged.

(d) Daniel Aldridge Mid Coast Council quoted in Port Macquarie News 6/12/2018.

(e) 2014 data from Bondi Park, Beach and Pavilion Plan of Management.

(f) Paid entry, lap swimming only (SMH, 2019).

(g) Upscaling based on data for family tickets and season passes.

(h) 2016-2017 data from C Leisure (2017).

(i) Royal Life Saving Society (2017).

The information demonstrates that the visitation at ocean pools vary extensively, ranging from 47,000 to 261,000 visitors annually. The existing beach numbers associated with Hallett Cove is much lower than the beaches outlined

above, being in the order of 70,000 visitors per year and approximately 3,200 visitors per week (based on “Feasibility of Hallett Cove Ocean Pool” report Appendix C and D).

For the purpose of a parking assessment, the lower utilised of the above pools have been considered for the below assessment (less than 100,000 visitors per year). Based on the above, three locations could be utilised for comparison

Figure 6 – Ocean Pool Data Comparison

Site	Pool Area (approx.)	Annual Visitors (approx.)	Annual Visitors Estimate
Forster Ocean Pool	3,500 sq.m	100,000	28.57 visitors per sq.m of water
Dawn Fraser Baths	2,700 sq.m	101,800	37.70 visitors per sq.m of water
Wylies Baths	1,500 sq.m	82,000	54.67 visitors per sq.m of water
Greenwich Baths	1,800 sq.m	60,000	33.33 visitors per sq.m of water
North Curl Rockpool	750 sq.m	47,150	62.87 visitors per sq.m of water
		Average	43.43 visitors per sq.m

Option 2A

Utilising the above average for the purpose of this parking assessment, an ocean pool of 1,073sq.m could generate in the order of 46,600 visitors per year. This could be expected to result in the order of 1,120 persons per week during the summer months, with approximately 370 visitors per day, reflecting a third of weekly visitors to occur during a typical Saturday or Sunday daily period.

Due to the nature of the beach, and the average 2 hour duration of stay, it is anticipated that approximately 20% of the daily visitors would be on site at any one time. This would result in 74 visitors in the ocean pool at any one time.

Based on an average vehicle occupancy of 2.5 persons per vehicle, this would equate to a car parking requirement of 30 parking spaces.

Option 2B

Utilising the above average for the purpose of this parking assessment, an ocean pool of 705sq.m could generate in the order of 30,600 visitors per year. This could be expected to result in the order of 730 persons per week during the summer months, with approximately 240 visitors per day, reflecting a third of weekly visitors to occur during a typical Saturday or Sunday daily period.

Due to the nature of the beach, and the average 2 hour duration of stay, it is anticipated that approximately 20% of the daily visitors would be on site at any one time. This would result in 48 visitors in the ocean pool at any one time.

Based on an average vehicle occupancy of 2.5 persons per vehicle, this would equate to a car parking requirement of 20 parking spaces.

Summary

Based on the above, the benchmarking rates against existing ocean pools is considered to provide the anticipated parking demand associated with the anticipated development.

Option 2A

Based on the above, it could be expected that an ocean pool of 1,073sq.m could generate a parking requirement of 30 car parking spaces.

Option 2B

Based on the above, it could be expected that an ocean pool of 705sq.m could generate a parking requirement of 20 car parking spaces.

Car Parking Availability

Car parking surveys have been previously undertaken and are outlined within “Feasibility of Hallett Cove Ocean Pool” report Appendix D. The extend of the previous surveys is shown below.

Figure 7 – Previous Car Parking Survey Extent



Figure D.6 The scope of the car parking assessment

Figure 8 – Previous Car Parking Survey Example Data



Figure D.7 Example of survey method

A snapshot of results from the previous parking survey are shown below during the peak New Years period. It is noted that the vacant parking spaces are based on 85% of the parking spaces being available for beach/pool visitors. The remaining 25% of spaces are considered for residential use.

Figure 9 – Previous Car Parking Survey Data Snapshot

1st January

	Parks within 250 m of pool					Parks within 250-400 m of pool					
	Spaces	85%	FILLED	VACANT	2.5 vehicle	Spaces	85%	FILLED	VACANT	2.5 vehicle	Total extra
1100	168	143	76	67	167	103	88	7	81	201	368
1400	168	143	101	42	105	103	88	9	79	196	301
1700	168	143	78	65	162	103	88	15	73	181	343
2000	168	143	72	71	177	103	88	9	79	196	373

Table D.5 Car parking survey results (1 January 2019)

5th January

	Parks within 250 m of pool					Parks within 250-400 m of pool					
	Spaces	85%	FILLED	VACANT	2.5 vehicle	Spaces	85%	FILLED	VACANT	2.5 vehicle	Extra people
1100	168	143	130	13	33	103	88	12	76	189	221
1400	168	143	127	16	40	103	88	13	75	186	226
1700	168	143	87	56	140	103	88	13	75	186	326
2000	168	143	60	83	208	103	88	10	78	194	401

Table D.6 Car parking survey results (5 January 2019)

Based on the above, during the observed peak parking period, there were 13 parking spaces available within 250m of the ocean pool site, and 76 spaces within 400m. It is noted that this is during the New Years peak parking period. During a more typical period, there is anticipated to be additional spaces available for ocean pool visitors.

Option 2A

The parking assessment above indicates a parking requirement of 30 car parking spaces. Therefore, during this peak period, it could be expected that in the order of 17 vehicles would be required to park within the 250m to 400m range from the ocean pool. There would still be in the order of 59 spaces vacant during this peak period.

Option 2B

The parking assessment above indicates a parking requirement of 20 car parking spaces. Therefore, during this peak period, it could be expected that in the order of 7 vehicles would be required to park within the 250m to 400m range from the ocean pool. There would still be in the order of 69 spaces vacant during this peak period.

Additional Car Parking Layout

A high level concept layout has been prepared to provide 12 90 degree angle car parking in close proximity to the proposed ocean pool location. This arrangement would result in an increase of 7 car parking spaces compared to the existing parking provision. The provision of additional parking spaces, during the peak New Years period would only

result in between 0 vehicles (Option 2B) and 10 vehicles (Option 2A) being required to park within the 400m radius zone.

Figure 10 – Possible Car Parking Layout



Based on the above assessments, there is adequate capacity within the surrounding on-street car parking network to accommodate the car parking demands associated with the proposed ocean pool.

Conclusion

Following a review of the proposed ocean pool development adjacent the Heron Way Reserve, Hallett Cove, the following conclusions are made:

1. The proposal incorporates two options for an ocean pool development. Option 2A includes a pool area of 1,073sq.m and Option 2B includes a pool area of 705sq.m.
2. An empirical assessment has been undertaken for a range of parking rates that could be applied to the development. The benchmarking rates against existing ocean pools is considered to provide the anticipated parking demand associated with the anticipated development.
3. The anticipated parking requirement for the two options is as follows:
   a. Option 2A could generate a parking requirement of 30 car parking spaces.
   b. Option 2B could generate a parking requirement of 20 car parking spaces.
4. Car parking surveys have been previously undertaken and are outlined within “Feasibility of Hallett Cove Ocean Pool” report Appendix D. The parking surveys indicated there were 13 parking spaces available within 250m of the ocean pool site, and 76 spaces within 400m of the ocean pool. These were conducted during the New Years peak parking period, and car parking would be expected to be lower during typical operation period.
5. Based on the empirical parking assessment, the on-street car parking supply would be as follows:
   a. Option 2A could be expected to generate in the order of 17 vehicles to park within the 250m to 400m range from the ocean pool. There would still be in the order of 59 spaces vacant during this peak period.
   b. Option 2B could be expected to generate in the order of 7 vehicles to park within the 250m to 400m range from the ocean pool. There would still be in the order of 69 spaces vacant during this peak period.
6. A high level concept layout has been prepared to provide 12 90 degree angle car parking in close proximity to the proposed ocean pool location. This arrangement would result in an increase of 7 car parking spaces compared to the existing parking provision. The provision of additional parking spaces, during the peak New Years period would only result in between 0 vehicles (Option 2B) and 10 vehicles (Option 2A) being required to park within the 400m radius zone.
7. Based on the above assessments, there is adequate capacity within the surrounding on-street car parking network to accommodate the car parking demands associated with the proposed ocean pool.

NICOLE LARKIN DESIGN

Hallett Cove Ocean Pool

Basis of Capital and Operating Cost Estimate

10464-BOE-001

25 May 2023

Goeldner Consulting Pty Ltd
02 4926 1510
PO Box 460
KOTARA NSW 2289
info@goeldnerconsulting.com.au
www.goeldnerconsulting.com.au
ABN: 24 610 718 824

SYNOPSIS

This document has been prepared to support the development of the Capital and Operating Cost Estimates for the Hallett Cove Ocean Pool as defined in the conceptual documentation supplied by Nicole Larkin Design. The basis of the estimate in terms of methodology and process in determining the capital cost value are the prime areas of focus of this document.

Disclaimer

This report has been prepared on behalf of and for the exclusive use of Nicole Larkin Design, and is subject to and issued in accordance with the agreement between Nicole Larkin Design and Goeldner Consulting Pty Ltd. Goeldner Consulting Pty Ltd accepts no liability or responsibility whatsoever for it in respect of any use of or reliance upon this report by any third party. Copying this plan without the permission of Nicole Larkin Design and Goeldner Consulting Pty Ltd is not permitted.

REV	DESCRIPTION	ORIG	APPROVER	DATE	CLIENT APPROVAL	DATE
A	Issue for review	D. Simone	C Goeldner	25-05-23		

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NICOLE LARKIN DESIGN
HALLETT COVE OCEAN POOL
BASIS OF CAPITAL AND OPERATING COST ESTIMATE

1 CAPITAL COST ESTIMATE

1.1 Evaluation and Summary of the Estimate

The total P50 estimated cost of the overall project for each option as detailed in this document is summarised in Table 1 below. These amounts are based on May-2023 AUD dollars and represent 50/50 probability of overrun/underrun (excludes market forces, GST and escalation).

The estimate was prepared generally in accordance with the recommended practices of AACE International for a Class 5 estimate. Class 5 estimates have an expected accuracy range of -30% to +50%.

Table 1: Construction Cost Estimate Summary

Description	Option 1 50m Pool	Option 2 25m Pool	Beach Access Embankment Protection
Preliminaries and Margin	1,589,570	1,443,812	494,629
Embankment Protection	1,648,763	1,648,763	1,648,763
50m Ocean Pool and Hardscaping	2,229,887	1,498,027	0
Childrens Pool	695,555	695,555	0
Facilities	693,778	693,778	0
Sub Ground Intake & Stormwater Diversion	282,582	276,582	0
Subtotal	**7,140,135**	**6,256,517**	**2,143,392**
Allowance for 25% contingency	1,785,034	1,564,129	535,848
Total	**8,925,169**	**7,820,646**	**2,679,240**

Notes: All costs exclude GST

2 BASIS OF ESTIMATE

2.1 Purpose and Objective

The Cost Estimate was prepared by Goeldner Consulting to produce a Capital Cost Estimate with a target accuracy of -30% to +50% for the Hallett Cove Ocean Pool project based on Concept Design.

2.2 Scope of Work

The concept study involved the preparation of construction cost estimates for three options as summarised below. Detailed cost estimates for each option are included in Appendices 1-3 which provide further details on the scope of work for each option.

- Option 1:50m Pool

- 5 lane x 50m lap pool
- Childrens Pool with 'live bottom' (Max 1.3m depth)
- rehabilitation swimming zone
- Concrete bleachers providing pool-side seating
- Wet edge to north eastern pool corner creating continuous visual connection to ocean
- Long term protection to 90m of embankment/beach access
- Graded ramp for vehicle and pedestrian access to the beach
- Stepped concrete benches for seating, recreation and leisure
- Public lighting
- Graded ramp access into pool for swimmers and maintenance vehicles, this doubles as rehabilitation swimming zone
- Amenities block (Heron Way), outdoor showers (beach level)
- Parking (Option for 7 new spaces to Heron Way)

- Option 2B: 25m Pool

- 5 lane x 25m lap pool
- Childrens Pool with 'live bottom' (Max 1.3m depth)
- Long term protection to 90m of embankment/beach access
- Concrete bleachers providing pool-side seating
- Wet edge to north eastern pool corner creating continuous visual connection to ocean
- Graded ramp for vehicle and pedestrian access to the beach
- Stepped concrete benches for seating, recreation and leisure
- Public lighting
- Graded ramp access into pool for swimmers and maintenance vehicles, this doubles as rehabilitation swimming zone
- Amenities block (Heron Way), outdoor showers (beach level)
- Parking (Option for 7 new spaces to Heron Way)

Included in both Options: Embankment Protection and Beach Access

- Protection and stabilisation of existing embankment extending from the Boat-shed Cafe in the north to the south of the beach
- Long term protection to 90m of embankment/beach access
- Short term stabilisation to 390m length of embankment (through planting/landscaping)
- Graded ramp for vehicle and pedestrian access to the beach
- Stepped concrete benches for seating, recreation and leisure
- Public lighting

2.3 Qualifications and Assumptions

The following qualifications and assumptions were noted when preparing the Capital Cost Estimate:

- Estimate base date is May 2023.
- The estimate has been developed assuming the construction works will be awarded to a single head contractor via a competitive tender process.
- Construction works will be constructed during a standard 36hr working week and will be continuous without staging.
- The weather conditions are not of extreme proportions that may disrupt the continuance of safe work. No provision of 'force majeure' occurrences such as storms and resultant flooding or earthquakes are included in the cost estimate.
- We have assumed a temporary sandbag wall will provide adequate protection from waves/water during the construction phase and prevent stoppages in construction due to water ingress.
- All standards and procedures are in accordance with Australian Standards and codes of practice, together with good engineering practices.
- Estimate reflects the concept design documents supplied by Nicole Larkin Design.

- Estimate reflects the concept design documents supplied by Nicole Larkin Design.

2.4 Exclusions

- Investigation and Design costs
- Authority fees and approvals
- Property acquisitions
- Public utility adjustments
- Escalation beyond May 2023
- The impact of related concurrent projects which may affect the availability of skilled construction labour has not been assessed.
- Changes to labour or industrial relations laws.
- Impact of market forces on commodity pricing (e.g. concrete supply, oil price variation).
- No allowance for additional costs due to abnormal weather such as El Niño events.
- No allowance for improvements to existing infrastructure or services outside the battery limits of the project.
- No allowance has been included for extended periods of industrial unrest.
- Finance and interest charges for project duration.
- Goods and Services Tax (GST).
- Any environmental requirement not identified in this estimate.
- Any cultural heritage requirement not identified in this estimate.
- No allowance for sunk costs (e.g. Cost of this and previous studies etc.).

3 QUANTITY AND COST BASIS

3.1 Quantity Basis

All quantities used in the estimate are conceptual allowances only and have been based on conceptual drawings provided by Nicole Larkin Design.

3.2 Pricing

Rates for construction materials have been generally based on pricing from similar projects in Goeldner Consulting's database. Installation costs are based on a nominal 36-hour work week.

3.3 Contractor Preliminaries and Margin

An allowance for head contractor preliminary costs and margin has been included based on 30% of construction costs. Preliminary costs include items such as contractor mobilisation/demoblisation, site facilities, temporary services, temporary construction works, traffic control, surveying, project plans and documentation.

3.4 Escalation

No allowance has been included for escalation beyond the estimate base date.

3.5 Contingency

An allowance for contingency has been included based on 25% of the project cost to provide an overall P50 construction cost estimate (50/50 probability of overrun/underrun).

3.6 Owners Costs

No allowance has been included for Owners costs. Owners costs may include, but are not limited to:

- Finance and capitalised interest for project duration.
- Land Acquisition Costs
- The Owners project team costs during the execution phase which includes travel and accommodation, miscellaneous business-related costs.
- Cost of obtaining statutory and regulatory approvals for construction.
- Owners insurances, including those during construction (e.g. public liability, contractor's all-risks, workers compensation, public and professional liability).
- 3rd Party Consulting costs.
- Industrial Relations consultant.
- Sunk Costs
- Local community compensation.

4 OPERATING COSTS

Goeldner Consulting has prepared an estimate of operating costs for each pool option based on review of financial data from existing pools/baths and assumptions regarding the operating strategy for the facility as summarised in Tables 2 and 3 below. A Low, Mid and High cost has been provided for each option to represent the potential range of costs that may be incurred depending on the final operating plan for the facility. The scope of items included in the operating cost estimate is as follows:

- Energy consumption of pool pumps (15kW for 50m pool, 10kW for 25m pool). Pumps operating 24hrs per day. Average electricity cosy $0.37/kW
- Public lighting based on 24kW per day
- Water consumption of outdoor showers based on 500L per day. Average water cost $2.95/L plus $500 per year fixed fee.
- Allowance for repairs and maintenance of pool and infrastructure factored from similar facilities including:
    - Landscaping making good
    - Minor concrete patching;
    - Balustrade/fencing repairs;
    - Painting;
    - Lane marking;
    - Pump/valve overhauls;
    - Pump/valve replacement;
    - Pipeline repairs and maintenance including screens;
    - Lighting maintenance;
    - Signage;
    - Joint sealing.
- 6 months of weekly cleaning and 6 months of fortnightly cleaning (Mid Case). Weekly clean assumes 3 persons x 8hrs at a rate of $55/hr plus $200/day consumables. Including:
    - Emptying of pool to remove dirty water
    - Sand and wrack removal
    - Cleaning and washing of walls
    - Removal of barnacles and other growth
    - Pool refill
    - General sweeping and rubbish removal
- Supervision/management. One day per week (Mid Case) based on $100,000 per year full time.
- Major remediation after 20 years, factored from similar projects.

Note: Operating costs of the public amenities and carpark are excluded.

NICOLE LARKIN DESIGN
HALLETT COVE OCEAN POOL
BASIS OF CAPITAL AND OPERATING COST ESTIMATE

Table 2: Operating Costs - Option 1 (50m pool)

	Yearly Cost			20 Year Cost		
OPTION 1 (50m)	Low	Mid	High	Low	Mid	High
Electricity Services	25,863	51,726	93,107	517,260	1,034,520	1,862,136
Water Services	274	547	985	5,473	10,945	19,701
Repairs and Cleaning	38,712	129,040	232,272	774,241	2,580,803	4,645,445
Management	10,000	20,000	40,000	200,000	400,000	800,000
Pool Refurbishment				144,200	206,000	309,000
TOTAL	**74,849**	**201,313**	**366,364**	**1,641,173**	**4,232,268**	**7,636,282**

Table 3: Operating Costs - Option 2 (25m pool)

	Yearly Cost			20 Year Cost		
OPTION 2 (25M)	Low	Mid	High	Low	Mid	High
Electricity Services	17,782	35,564	64,016	355,644	711,288	1,280,318
Water Services	274	547	985	5,473	10,945	19,701
Repairs and Cleaning	36,122	120,407	216,733	722,442	2,408,141	4,334,654
Management	10,000	20,000	40,000	200,000	400,000	800,000
Pool Refurbishment				126,355	180,507	270,760
TOTAL	**64,178**	**176,519**	**321,734**	**1,409,914**	**3,710,881**	**6,705,434**

Appendix 1 Estimate Details – Beach Access and Embankment Protection

Goeldner Consulting **10464-EST-001-A**

ESTIMATE DETAILS
Hallet Cove Ocean Pool
Beach Access and Embankment Protection

Description	Unit	Quantity	Rate	TOTAL
PRELIMINARIES AND MARGIN				
Allowance for contractor preliminaries and margin including mobilisation, demobilisation, insurances, project management, management plans and the like	Item	1	494,629	494,629
PRELIMINARIES AND MARGIN				**494,629**
DIRECT COSTS				
Embankment Protection				
Earthworks				
Allowance for sandbag cofferdam wall	m	140	1,800	252,000
Embankment excavation for stabilisation	m3	757	64	48,576
Battered and planted embankment stabilisation	m2	5,850	60	351,000
Rock armouring at bottom of embankment stabilisation, site won rock	m3	300	65	19,500
Allowance for disposal of asbestos material	tonne	1,363	200	272,600
Earthworks				**943,676**
Concrete				
Concrete rates include for coloured concrete/aggregate mix				
Graded pedestrian and vehicle ramp	m3	80	2,070	165,619
DDA access ramp connection	m3	4	2,070	8,281
Concrete bleachers	m3	152	2,565	389,897
Stairs and landings	m3	5	2,512	12,558
Stair walls/balustrade	m3	6	3,910	23,462
Concrete				**599,817**
Blockwork				
Coloured concrete block retaining walls including concrete foortings core filling and bar reinforcement	m2	54	505	27,270
Blockwork				**27,270**
Miscellaneous				
Allowance to for lighting of acess paths	ea	5	10,000	50,000
Allowance for general signage	Item	1	5,000	5,000
Allowance for artwork	Item	1	20,000	20,000
Allowance to supply and install gate to road access	Item	1	3,000	3,000
Miscellaneous				**78,000**
Embankment Protection				**1,648,763**
DIRECT COSTS				**1,648,763**
CONTINGENCY				
Allowance for 25% contingency	Item	1	535,848	535,848
CONTINGENCY				**535,848**
TOTAL				**2,679,240**

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Appendix 2 Estimate Details – Option 1 (50m Sea-side Pool)

Goeldner Consulting **10464-EST-002-B**

ESTIMATE DETAILS
Hallett Cove Ocean Pool
Option 1 (50m Sea-side Pool)

Description	Unit	Quantity	Rate	TOTAL
PRELIMINARIES AND MARGIN				
Allowance for contractor preliminaries and margin including mobilisation, demobilisation, insurances, project management, management plans and the like	Item	1	1,589,570	1,589,570
PRELIMINARIES AND MARGIN				**1,589,570**
DIRECT COSTS				
Embankment Protection				
Earthworks				
Allowance for sandbag cofferdam wall	m	140	1,800	252,000
Embankment excavation for stabilisation	m3	757	64	48,576
Battered and planted embankment stabilisation	m2	5,850	60	351,000
Rock armouring at bottom of embankment stabilisation, site won rock	m3	300	65	19,500
Allowance for disposal of asbestos material	tonne	1,363	200	272,600
Earthworks				**943,676**
Concrete				
Concrete rates include for coloured concrete/aggregate mix				
Graded pedestrian and vehicle ramp	m3	80	2,070	165,619
DDA access ramp connection	m3	4	2,070	8,281
Concrete bleachers	m3	152	2,565	389,897
Stairs and landings	m3	5	2,512	12,558
Stair walls/balustrade	m3	6	3,910	23,462
Concrete				**599,817**
Blockwork				
Coloured concrete block retaining walls including concrete foortings core filling and bar reinforcement	m2	54	505	27,270
Blockwork				**27,270**
Miscellaneous				
Allowance to for lighting of acess paths	ea	5	10,000	50,000
Allowance for general signage	Item	1	5,000	5,000
Allowance for artwork	Item	1	20,000	20,000
Allowance to supply and install gate to road access	Item	1	3,000	3,000
Miscellaneous				**78,000**
Embankment Protection				**1,648,763**
50m Ocean Pool and Hardscaping				
Earthworks				
Reclaimed erratic glacial boulders crushed granite	m3	200	89	17,895
Excavation for pool	m3	98	64	6,289
Earthworks				**24,184**
Concrete				
Concrete bleachers	m3	152	2,565	389,897
Pool surrounds	m3	705	1,560	1,100,121
300mm thick pool base slab	m3	191	1,916	365,955
Wet edge wall	m3	9	4,266	38,393
Pool stairs	m3	9	4,000	36,002
Concrete				**1,930,368**
Piling				
Supply and install of continguous pile wall	m2	234	989	231,426
Piling				**231,426**

Description	Unit	Quantity	Rate	TOTAL
Fencing				
Supply and install fences	m	33	502	16,564
Fencing				**16,564**
Piping				
Supply rising main, 300mm HDPE	m	115	115	13,225
Pool maintenance drain	m	25	115	2,875
Maintenance drain gate valve	ea	1	6,245	6,245
Piping				**22,345**
Miscellaneous				
Allowance for 50m pool lane ropes	m	250	20	5,000
Miscellaneous				**5,000**
50m Ocean Pool and Hardscaping				**2,229,887**
Childrens Pool				
Insitu Reinforced Concrete				
Childrens pool concrete structure	m3	246	2,303	566,562
Insitu Reinforced Concrete				**566,562**
Piling				
Supply and install of continguous pile wall	m2	117	989	115,713
Piling				**115,713**
Miscellaneous				
Pool maintenance drain	m	25	115	2,875
Maintenance drain gate valve	ea	1	6,245	6,245
Supply rising main, 225mm HDPE	m	52	80	4,160
Miscellaneous				**13,280**
Childrens Pool				**695,555**
Facilities				
Amenities				
Amenities	m2	98	6,066	594,468
Allowance for amenities service connections	Item	1	50,000	50,000
Allowance for fresh water showers including pipework	ea	2	6,000	12,000
Amenities				**656,468**
Car Parking				
Demolition of existing kerb	m	35	14	477
Excavation for new paving and footpath	m3	64	64	4,107
Supply and place DGB 200mm thick	m3	22	111	2,443
Supply and place 40mm of AC10	m2	109	35	3,815
Supply and place SF kerb	m	41	49	2,028
Allowance for line marking	Item	1	500	500
Supply and install new concrete pathway	m3	17	1,408	23,940
Car Parking				**37,310**
Facilities				**693,778**
Sub Ground Intake & Stormwater Diversion				
Trenching for sub-ground deep water intake pipe	m	55	1,120	61,600
Supply and install sub-ground deep water intake pipe - 500dia HDPE pipe	m	55	399	21,919

Description	Unit	Quantity	Rate	TOTAL
Sub-ground deep water intake structure - 257 stainless steel	Item	1	10,000	10,000
Allowance for intake pumps including filter - 2x 15kW	Item	2	19,682	39,363
Allowance for pump station	Item	1	50,000	50,000
Allowance for electrical supply to pump station within 50m	Item	1	10,000	10,000
Supply and install stormwater culvert 2700W 900H	m	17	4,600	78,200
Remove existing culvert headwall	Item	1	2,500	2,500
Supply and install junction pit	Item	1	9,000	9,000
Sub Ground Intake & Stormwater Diversion				**282,582**
DIRECT COSTS				**5,550,565**
CONTINGENCY				
Allowance for 25% contingency	Item	1	1,785,034	1,785,034
CONTINGENCY				**1,785,034**
TOTAL				**8,925,169**

HALLETT COVE SEASIDE POOL CONCEPT DESIGN | MAY 2023 CG Temporary licence
NICOLE LARKIN DESIGN ARCHITECTURE

Appendix 3 Estimate Details – Option 2 (25m Sea-side Pool)

Goeldner Consulting **10464-EST-003-A**

ESTIMATE DETAILS
Hallet Cove Ocean Pool
Option 2 (25m Sea-side Pool)

Description	Unit	Quantity	Rate	TOTAL
PRELIMINARIES AND MARGIN				
Allowance for contractor preliminaries and margin including mobilisation, demobilisation, insurances, project management, management plans and the like	Item	1	1,443,812	1,443,812
PRELIMINARIES AND MARGIN				**1,443,812**
DIRECT COSTS				
Embankment Protection				
Earthworks				
Allowance for sandbag cofferdam wall	m	140	1,800	252,000
Embankment excavation for stabilisation	m3	757	64	48,576
Battered and planted embankment stabilisation	m2	5,850	60	351,000
Rock armouring at bottom of embankment stabilisation, site won rock	m3	300	65	19,500
Allowance for disposal of asbestos material	tonne	1,363	200	272,600
Earthworks				**943,676**
Concrete				
Concrete rates include for coloured concrete/aggregate mix				
Graded pedestrian and vehicle ramp	m3	80	2,070	165,619
DDA access ramp connection	m3	4	2,070	8,281
Concrete bleachers	m3	152	2,565	389,897
Stairs and landings	m3	5	2,512	12,558
Stair walls/balustrade	m3	6	3,910	23,462
Concrete				**599,817**
Blockwork				
Coloured concrete block retaining walls including concrete foortings core filling and bar reinforcement	m2	54	505	27,270
Blockwork				**27,270**
Miscellaneous				
Allowance to for lighting of acess paths	ea	5	10,000	50,000
Allowance for general signage	Item	1	5,000	5,000
Allowance for artwork	Item	1	20,000	20,000
Allowance to supply and install gate to road access	Item	1	3,000	3,000
Miscellaneous				**78,000**
Embankment Protection				**1,648,763**
25m Ocean Pool and Hardscaping				
Earthworks				
Reclaimed erratic galacial boulders crushed granite	m3	27	89	2,416
Excavation for pool	m3	197	64	12,641
Earthworks				**15,057**
Concrete				
Concrete bleachers	m3	166	2,565	425,809
Pool surrounds	m3	357	1,560	557,083
300mm thick pool base slab	m3	116	1,916	222,255
Wet edge wall	m3	10	4,266	42,659
Pool stairs	m3	9	4,000	36,002
Concrete				**1,283,808**

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Description	Unit	Quantity	Rate	TOTAL
Piling				
Supply and install of continguous pile wall	m2	159	989	157,251
Piling				**157,251**
Fencing				
Supply and install fences	m	34	502	17,066
Fencing				**17,066**
Piping				
Supply rising main, 300mm HDPE	m	115	115	13,225
Pool maintenance drain	m	25	115	2,875
Maintenance drain gate valve	ea	1	6,245	6,245
Piping				**22,345**
Miscellaneous				
Allowance for 25m pool lane ropes	m	125	20	2,500
Miscellaneous				**2,500**
25m Ocean Pool and Hardscaping				**1,498,027**
Childrens Pool				
Insitu Reinforced Concrete				
Childrens pool concrete structure	m3	246	2,303	566,562
Insitu Reinforced Concrete				**566,562**
Piling				
Supply and install of continguous pile wall	m2	117	989	115,713
Piling				**115,713**
Miscellaneous				
Pool maintenance drain	m	25	115	2,875
Maintenance drain gate valve	ea	1	6,245	6,245
Supply rising main, 225mm HDPE	m	52	80	4,160
Miscellaneous				**13,280**
Childrens Pool				**695,555**
Facilities				
Amenities				
Amenities	m2	98	6,066	594,468
Allowance for amenities service connections	Item	1	50,000	50,000
Allowance for fresh water showers including pipework	ea	2	6,000	12,000
Amenities				**656,468**
Car Parking				
Demolition of existing kerb	m	35	14	477
Excavation for new paving and footpath	m3	64	64	4,107
Supply and place DGB 200mm thick	m3	22	111	2,443
Supply and place 40mm of AC10	m2	109	35	3,815
Supply and place SF kerb	m	41	49	2,028
Allowance for line marking	Item	1	500	500

Description	Unit	Quantity	Rate	TOTAL
Supply and install new concrete pathway	m3	17	1,408	23,940
Car Parking				**37,310**
Facilities				**693,778**
Sub Ground Intake & Stormwater Diversion				
Trenching for sub-ground deep water intake pipe	m	55	1,120	61,600
Supply and install sub-ground deep water intake pipe - 500dia HDPE pipe	m	55	399	21,919
Sub-ground deep water intake structure - 257 stainless steel	Item	1	10,000	10,000
Allowance for intake pumps including filter - 2x 10kW	Item	2	16,682	33,363
Allowance for pump station	Item	1	50,000	50,000
Allowance for electrical supply to pump station within 50m	Item	1	10,000	10,000
Supply and install stormwater culvert 2700W 900H	m	17	4,600	78,200
Remove existing culvert headwall	Item	1	2,500	2,500
Supply and install junction pit	Item	1	9,000	9,000
Sub Ground Intake & Stormwater Diversion				**276,582**
DIRECT COSTS				**4,812,705**
CONTINGENCY				
Allowance for 25% contingency	Item	1	1,564,129	1,564,129
CONTINGENCY				**1,564,129**
TOTAL				**7,820,646**



HALLET COVE OCEAN POOL

HYDRAULIC CONCEPT DESIGN REPORT

MAY 2023

Civille

Project name: Hallett Cove Ocean Pool – Hydraulic concept design report

Project number: 2305

Date: 25 May 2023

Report contact: Andrew McMillan, Civille

Report authors:
Andrew McMillan, Civille

DOCUMENT HISTORY AND STATUS

Revision	Status	Date	Checked
A	Draft	18/5/2023	DK
B	For concept report	25/5/2023	DK

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1 INTRODUCTION

An ocean swimming pool is being investigated for Hallett Cove by the City of Marion following strong community interest.

Based on discussions with Nicole Larkin Design and the project team, the key objectives for the hydraulic systems include:

- Maintain suitable water quality in the pool/s at all times.
- Allow for ease of maintenance.
- To have flexible operational control.

2 BACKGROUND INFORMATION

This section includes key site information and data that is relevant to the concept hydraulic design for the pool.

2.1 TERRAIN AND BATHYMETRY

Site terrain and bathymetry information has been taken from:

- 3D aerial survey
- Bathymetric survey
- Ground survey

2.2 WATER LEVELS

An analysis of local water levels has been completed to inform the concept design development of the seawater supply for the proposed ocean pool.

Water level monitoring data at a 1 hour frequency for Port Stanvac for 1992 to 2010 has been obtained. A sample of the water level data is provided in Figure 1 showing that the low tide water level typically fluctuates between RL -0.4 m AHD and -1.4m AHD. The associated tidal planes are included in Table 1.

Table 1: Tidal Planes for port Adelaide (WRL, 2020)

Tidal plane	Outer Harbor Adelaide (m LAT)	Port Stanvac (m LAT)	Outer Harbor Adelaide (m AHD)	Port Stanvac (m AHD)
Highest astronomical tide	2.8	2.5	1.348	1.22
Mean high water springs	2.3	2.0	0.848	0.72
Australian Height Datum	1.45	1.28	0.000	0.00
Mean high water neaps	1.3	1.2	-0.152	-0.08
Mean sea level	1.3	1.2	-0.152	-0.08
Mean low water neaps	1.3	1.2	-0.152	-0.08
Mean low water springs	0.3	0.3	-1.152	-0.98
Lowest astronomical tide	0.00	0.0	-1.452	-1.28

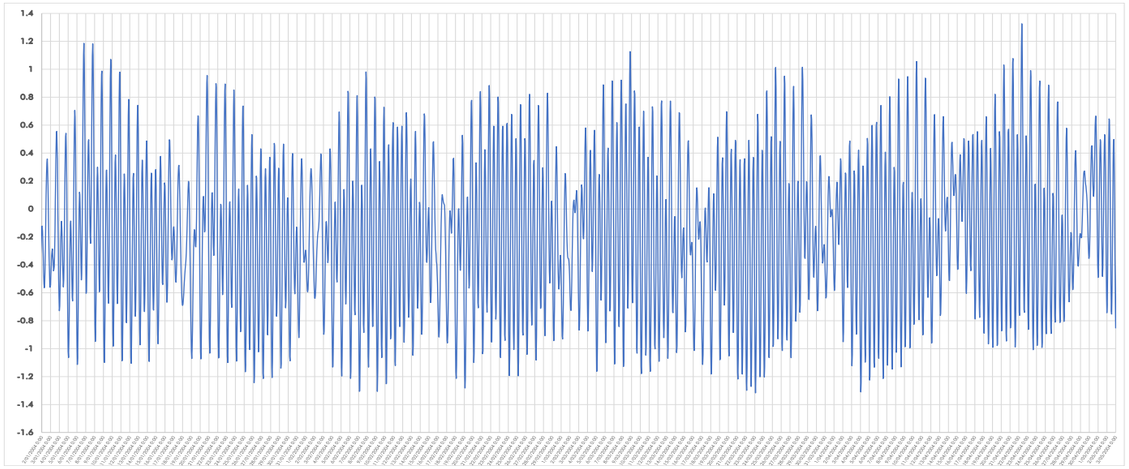


Figure 1 Water levels over 3 months

Data from 2004 to 2010 was used to develop the water level exceedance curve provided in Figure 2. This chart provides important information relevant to the operation of the pumped pool seawater supply system as discussed in Section 3. For reference, note that the data shows that the water level at Hallett Cove exceeds RL -0.8m AHD 90% of the time. That is, 10% of the time the sea water level at Hallett Cove is less than RL -0.8m AHD.

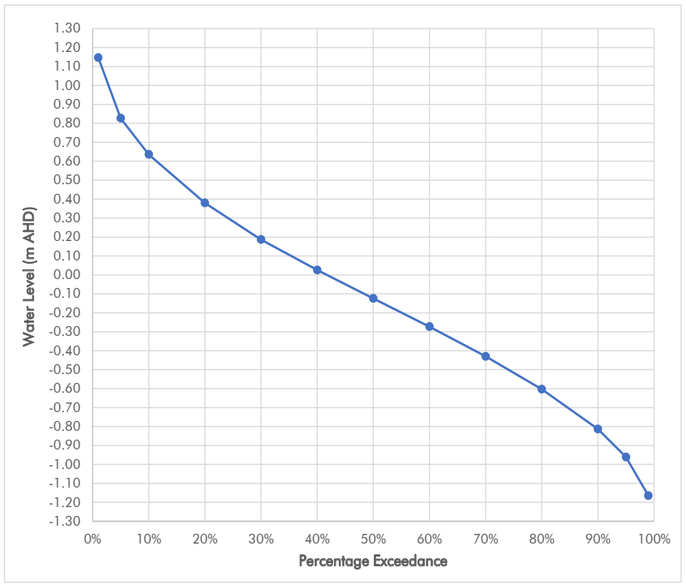


Figure 2 Water level exceedance curve

2.3 WATER QUALITY

The South Australian EPA state that:

> *Beaches in Adelaide are safe and healthy for 98% of the time. However, the water quality at beaches can be impacted by rainfall which flush stormwater into the sea leaving discoloured water especially around drains.*

> *Studies (Corbin and Gaylard 2005) have shown that with respect to microbiology (faecal micro-organisms), Adelaide's coastal waters are generally safe for swimming three days after heavy rainfall events. Invariably discharges after heavy rainfall result in poor water clarity for Adelaide's coastal waters.*

The current Australian *Guidelines for Managing Risks in Recreational Water* (NHMRC, 2008), in common with the World Health Organisation's *Guidelines for safe recreational water environments* (WHO, 2003), recommend a preventative approach to the management of recreational water with assessment and management of identified hazards, as well as assessment of water quality to produce a 'suitability for recreation' classification. For microbial quality of recreational water, the guideline includes that "Preventative risk management practices should be adopted to ensure that designated recreational waters are protected against direct contamination with fresh faecal material, particularly of human and domesticated animal origin".

The *Australian and New Zealand Guidelines for Fresh and Marine Waters* (ANZECC, 2000) also include water quality guidelines for recreational water quality and aesthetics. The ANZECC guidelines for primary contact recreation are shown in Table 2.

Table 2: ANZECC water quality guidelines

Parameter	Primary contact recreation
Faecal coliforms	Median over bathing season should not exceed 150 organisms/100mL.
Enterococci	Median over bathing season should not exceed 35 organisms/100mL.

The microbial water quality assessment categories (based on 95th percentiles) are:

A: <= 40 enterococci / 100mL
B: 41-200 enterococci / 100mL
C: 201-500 enterococci / 100mL
D: > 500 enterococci / 100mL

Each category represents a higher likelihood of gastrointestinal illness, and a category D site would be recommended to not be used for swimming.

The South Australian water quality objective for primary contact recreation in metropolitan coastal waters is:

> *Enterococci <200 orgs/100 mL (95 percentile)*
> *The 95 percentile allows for the objective value to be exceeded for 5% of the time, which may occur, for example, for short periods following rainfall events causing stormwater discharges, particularly in the vicinity of the discharge points. For this reason the SA Health Commission has signage advising against contact recreation (bathing, swimming) in the vicinity when the water is coloured, which usually occurs with stormwater outflows.*

Local microbiological water quality data is not available but some previous data for Brighton is provided in Figure 3. The 90th percentile for enterococci was 14 cells/100mL which indicates good water quality for the data collected.

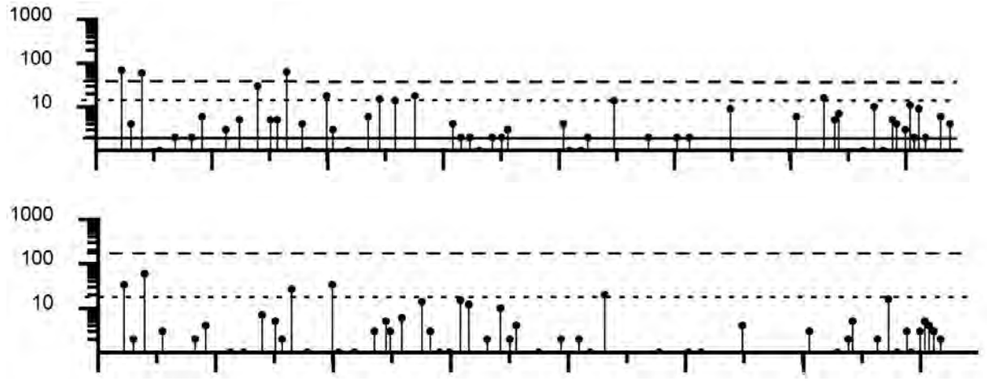


Figure 3 1995-2002 Enterococci (top) and faecal coliforms (bottom) cells/100mL time series plot for Brighton (EPA, 2004)

There are several local features that may impact on water quality in the vicinity of the proposed ocean pool:

- 1650mm diameter stormwater outlet, at the southern side of the proposed 50m pool, with a 146 hectare urban catchment.
- Field River outlet, approximately 350m south of the proposed pool, with a 36 km^2 catchment.
- Waterfall Creek outlet, approximately 1km north of the proposed pool, with a 353 hectare urban catchment
- Christie's Beach wastewater outfall, approximately 5km to the south of the proposed pool

The water quality at Hallett Cove is influenced by these features and swimming exclusion periods should be recommended after rainfall. A water quality monitoring program at Hallett Cove is recommended to gain an understanding of the time taken for water quality in the nearshore zone to be restored after rainfall. This can inform whether or for how long the pool pump should be turned off after large rainfall events.

3 CONCEPT DESIGN

3.1 POOL WATER TURNOVER

The South Australian *Standard for the Operation of Swimming Pools and Spa Pools* provides guidance on the turnover rate for swimming pools. Whilst this guideline is generally applied to pools with a recirculation and treatment (e.g. chlorination) system, the same principles should apply for the Hallett Cove ocean pool, with the difference being that the water pumped into the pool is clean water from Gulf St Vincent instead of a treatment system.

The water volume for the proposed pools was calculated based on the concept designs. The guideline turnover rates for South Australia and resulting required flow rates are provided Table 3. The turnover rates in the South Australian guidelines are relatively low, and Table 3 also shows flow rates for a higher standard based on other Australian states' guidelines.

Table 3: Flow rates for pool turnover

Pool		South Australian standard		Higher standard	
	Estimated volume (m^3)	Turnover time (hrs)	Flow rate (L/s)	Turnover time (hrs)	Flow rate (L/s)
Option 1 : 50m Pool + Childrens Pool					
50m Pool	1050	6	49	2.5	117
Childrens pool	220	2	31	1	61
Total	**1270**		**79**		**178**
Option 2 : 25m Pool + Childrens Pool					
25m Pool	500	6	23	2.5	56
Childrens pool	200	2	28	1	56
Total	**700**		**51**		**111**

The base of the 50m/25m pool has been designed at a level that will allow for gravity drainage of the pool in most tidal conditions. The lowest point in the 50m/25m is at RL 0.3m AHD, and the tidal water levels are below this level around 75 % of the time. The resulting pool water surface level of RL 1.9m AHD means that the pool will need to have water pumped into it to provide the required turnover.

3.2 SEAWATER INTAKE

To achieve a continuous turnover of water in the pool in accordance with the intent of the South Australian *Standard for the Operation of Swimming Pools*, seawater should ideally be able to be pumped into the pool throughout all low tides.

A preliminary model was developed using the 1 hour water level data to assess how a depth constraint on the seawater intake would affect the operation of the pump. The results of this model are provided in Table 4. The model indicates that even if the pump was to be switched off below the 'mean low water level' there would be regular periods of around 3 – 6 hours where the pump was not operational.

Table 4: Model results for pump outage during low tides (approximate)

Pump cut-out level (m AHD)	Percentage of low tides where pump cuts out	For low tides where pump switches off, average time period where pump is non-operational (hrs)
-0.5	76%	4.2
-0.6	67%	3.7
-0.7	57%	3.2
-0.8	45%	2.9
-0.9	33%	2.5
-1	22%	2.2
-1.1	12%	1.9
-1.2	5%	1.6

Several options have been considered for the seawater intake:

i. A pump well on the side of the proposed pool structure with an opening invert level at the existing bed level of RL -0.5m AHD.

ii. A pump well on the side of the proposed pool structure with an opening invert level of around RL -1.3m AHD, with excavation/dredging of the nearshore zone to form a channel that allows water to flow to the intake.

iii. An offshore intake structure with buried pipeline extending to an onshore pump station.

'Option i' is not recommended as there would be regular extended periods of 3 – 6 hours during low tide where water could not be pumped into the pool. When this coincides with high bather load (e.g. summer weekend) the water quality in the pool could deteriorate and lead to increased risk of potential health impacts.

'Option ii' (refer Figure 4) may be feasible but the potential ecological and other impacts would require further assessment. This option may also have higher maintenance requirements as the dredged/excavated channel would fill with sand/pebbles/weed and require periodic re-dredging. The pool outflow water would also need to be diverted to prevent it from being recirculated back into the pool. That is, the position of the seawater intake should ensure that 'fresh' water is being delivered to the pool.

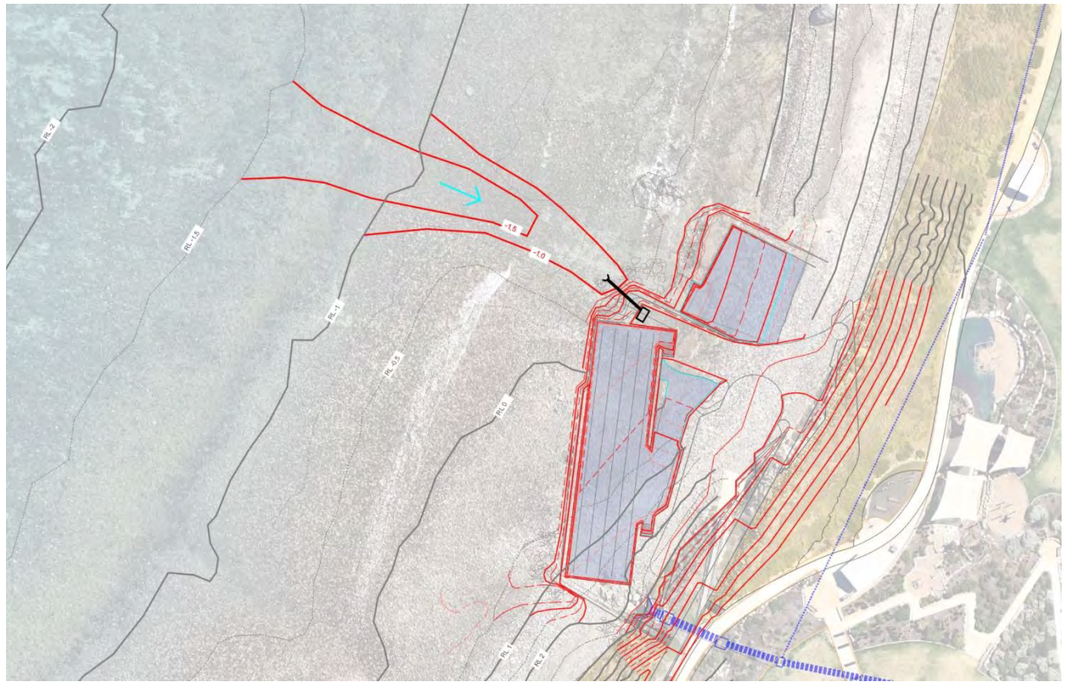


Figure 4 Option ii - seawater intake near pool with excavated channel

'Option iii' is recommended (as shown in the appended concept drawings), with the design intent that the intake structure and connecting pipeline are at a depth that will allow water to be pumped into the pool thoughout all low tides, ensuring water quality in the pool is maintained at all times.

Some other considerations for an offshore intake include:

- the seawater intake should be at least 50m from the stormwater outlet, based on NSW Beachwatch guideline
- The intake structure and pipeline should be sized for the maximum anticipated flow rate, with allwance for some growth/fouling
- The depth of the intake should provide submergence to allow for headloss through the pipeline, avoid a vortex on the water surface
- The intake should be raised above the sea floor, a screen to exclude large debris, and sufficiently large to ensure low intake velocity.
- Providing a fall from the intake *towards* the pump sump should allow for entrained sand/weed to be transported to the pump station, from which it would need to be periodically removed. This approach will also allow for accommodation of a slightly greater headloss and a smaller intake pipe diameter.

3.3 PUMP STATION

The water intake pipeline is to be connected to a flooded underground pump sump near the embankment. This location will allow maintenance/service vehicles to access the pump station at any time without interfering with the use of the swimming pool.

It is proposed that 2 identical submersible pumps be installed in a duty-standby arrangement. This will provide some flexibility in operation and redundancy.

With both pumps having equal duty, of 90 L/s @ 4m head for Option 1, or 55 L/s @ 4m head for Option 2:

- Pump A and Pump B can operate in an alternating arrangement to divide the load.
- Pump A can pump continuously if Pump B fails, until Pump B is repaired.
- Pump B can pump continuously if Pump A fails, until Pump A is repaired.
- Pump A and Pump B can operate simultaneously to provide a higher flow rate for reduced turnover time in periods of peak bather loading, or when the pool is being refilled after emptying for maintenance draining.

At this stage submersible pumps are proposed to avoid priming issues and an above-ground building, but a dry mounted end-suction pump may also be considered during detailed design.

Pumps may be selected for a lower flow rate (i.e. South Australian guideline turnover rate in Table 3). If the pipeline and pump-well are sized suitably, additional pumps could be added in future if higher flow rates are required.

As noted in Section 2.3 the pumps may be deactivated during conditions of poor seawater quality, such as after large rainfall events or if there is a sewage overflow in the local catchment.

3.4 STORMWATER EXTENSION

An existing 1650mm diameter stormwater outlet discharges to the beach in the proposed location of the 50m pool. A box culvert extension to this stormwater drainage line is proposed to pass below the pool deck and discharge at the water side of the pool structure.

The extension of the stormwater line will ensure that during rainfall events stormwater runoff does not flow directly into the 50m swimming pool.

3.5 PROVISIONS FOR MAINTENANCE

Valves and pipework are proposed as shown in the plans to allow either pool to be drained individually.

The low base level of the children's pool (existing natural rocky base to be used as a 'living' pool base) means that it can only be fully drained during low tide.

Mains water taps are to be provided at the poolside for connection of high-pressure jetting equipment.

4 FURTHER INVESTIGATIONS AND ANALYSIS

A number of further investigations are recommended to progress the design of the ocean pool.

4.1 RISK ASSESSMENT AND SANITARY ASSESSMENT

A comprehensive risk assessment should be carried out during the design stage to inform and develop the detailed designs.

Guidance on the application of the NHMRC guidelines for beaches is available from Beachwatch (NSW Office of Environment and heritage). It promotes a risk management approach to recreational water, with microbial risks to be assessed based on a sanitary inspection and microbial water quality monitoring. Beaches are classified based on a combination of their sanitary inspection category and microbial assessment category.

As part of the suitability assessment for swimming sites Beachwatch includes a sanitary assessment process including the following:

> *There are five key steps to a sanitary inspection:*
>
> 1. *Define the swimming area and catchment.*
> 2. *Identify sources of faecal contamination and gather information on the frequency, duration and intensity of impact. Information may be sourced from:*
>   a. *Desktop study, including, maps, reports and published data*
>   b. *Field inspections*
>   c. *Reconnaissance surveys*
>   d. *Interviews with information holders.*
> 3. *Assess likelihood for each identified source of faecal contamination*
> 4. *Determine the sanitary inspection category for the site (overall likelihood)*
> 5. *Hold a workshop or meeting with stakeholders to review pollution sources and likelihood assessment.*
>
> (OEH, 2011, p.27)

Noting that Hallett Cove has been closed to swimmers in the past due to sewage discharge to the beach (SOE, 2008), this type of assessment would investigate any designed sewer overflow points in the upstream catchment. In addition to this confirm if there is any modelling to estimate the frequency of sewer overflows in the catchment.

4.2 GEOTECHNICAL

Geotechnical investigations are required to gain information on site conditions for design of the pool structure and the seawater intake pipeline.

4.3 WATER QUALITY MONITORING

Water quality monitoring should be carried out during dry and wet weather with samples taken from the stormwater outlet and from the nearshore zone near the proposed seawater intake structure.

A water quality monitoring program can provide data to inform pool/beach users on the period of time after rain where swimming should be avoided.

4.4 SEAWATER INTAKE ASSESSMENT

Further assessment should confirm the feasibility of the seawater intake structure and pipeline.

Geotechnical information including for the sea bed is required to inform the pipeline design and construction methodology.

Coastal engineering and morphology advice should be obtained for design and appropriate serviceability of the intake structure.

Advice should be sought on how impacts on marine ecology from the intake structure and pipeline can be minimised.

The shallow water depth at the intake structure may cause a navigational hazard to watercraft, a marker may be necessary.

4.5 MAINTENANCE

It is recommended that the maintenance requirements of the ocean pool should be thoroughly considered, and check that the client (City of Marion Council) is comfortable taking these on for the long-term.

Sand and seaweed may be deposited in the pool. Ocean pools are typically emptied and cleaned weekly in summer and fortnightly in winter.

4.6 CONSTRUCTION

Construction impacts would need to be carefully managed. A temporary cofferdam may be required to allow construction of the ocean pool. Any dewatering would need to be in accordance with South Australian Environmental regulations.

REFERENCES

Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand (ANZECC and ARMCANZ). 2000. Australian and New Zealand Guidelines for Fresh and Marine Waters.

EPA South Australia (2020) https://www.epa.sa.gov.au/environmental_info/water_quality/water_quality_monitoring/beach_water_advice

EPA South Australia (2004) Ambient *Water Quality of the Gulf St Vincent Metropolitan Coastal Waters*

EPA South Australia (2005) *Water Quality of Adelaide's Metropolitan Coastal Waters - a community summary*

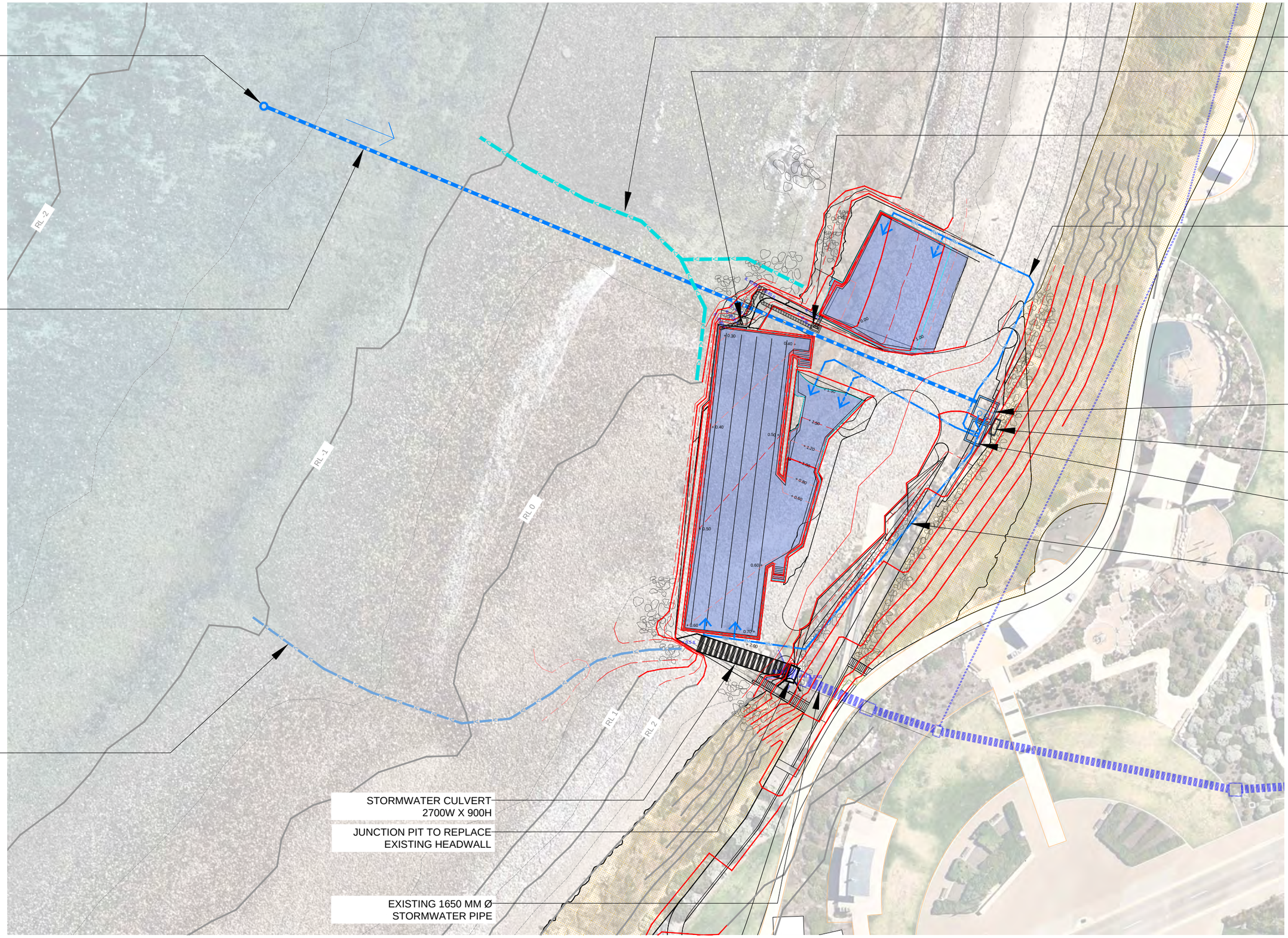
NHMRC (2008) Guidelines for Managing Risks in Recreational Water

Office of Environment and Heritage NSW (2011) Beachwatch programs: Protocol for assessment and management of microbial risks in recreational waters.

Southfront (2013) Hallett Cove Creeks Stormwater Management Plan

WHO (2003) Guidelines for safe recreational water environments.

APPENDIX A HYDRAULIC CONCEPT DRAWINGS



Civille
104/27-39 Abercrombie St
Chippendale NSW 2008
ABN: 25 635 133 854
www.civille.com.au

Client
NICOLE LARKIN DESIGN

Project Name
HALLETT COVE

Project No.
2242

Address
HALLETT COVE, S.A.

Notes
PIPE ALIGNMENTS SHOWN INDICATIVELY, TO BE FURTHER ASSESSED AND DEVELOPED DURING DETAILED DESIGN

Issue Log

A	DRAFT	AMM	15/05/2023
B	REVISED DRAFT	AMM	19/05/2023
C	CONCEPT REPORT	AMM	25/05/2023

Rev	Revision Description	By / Checked	Date

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1: 600 @ A3

North

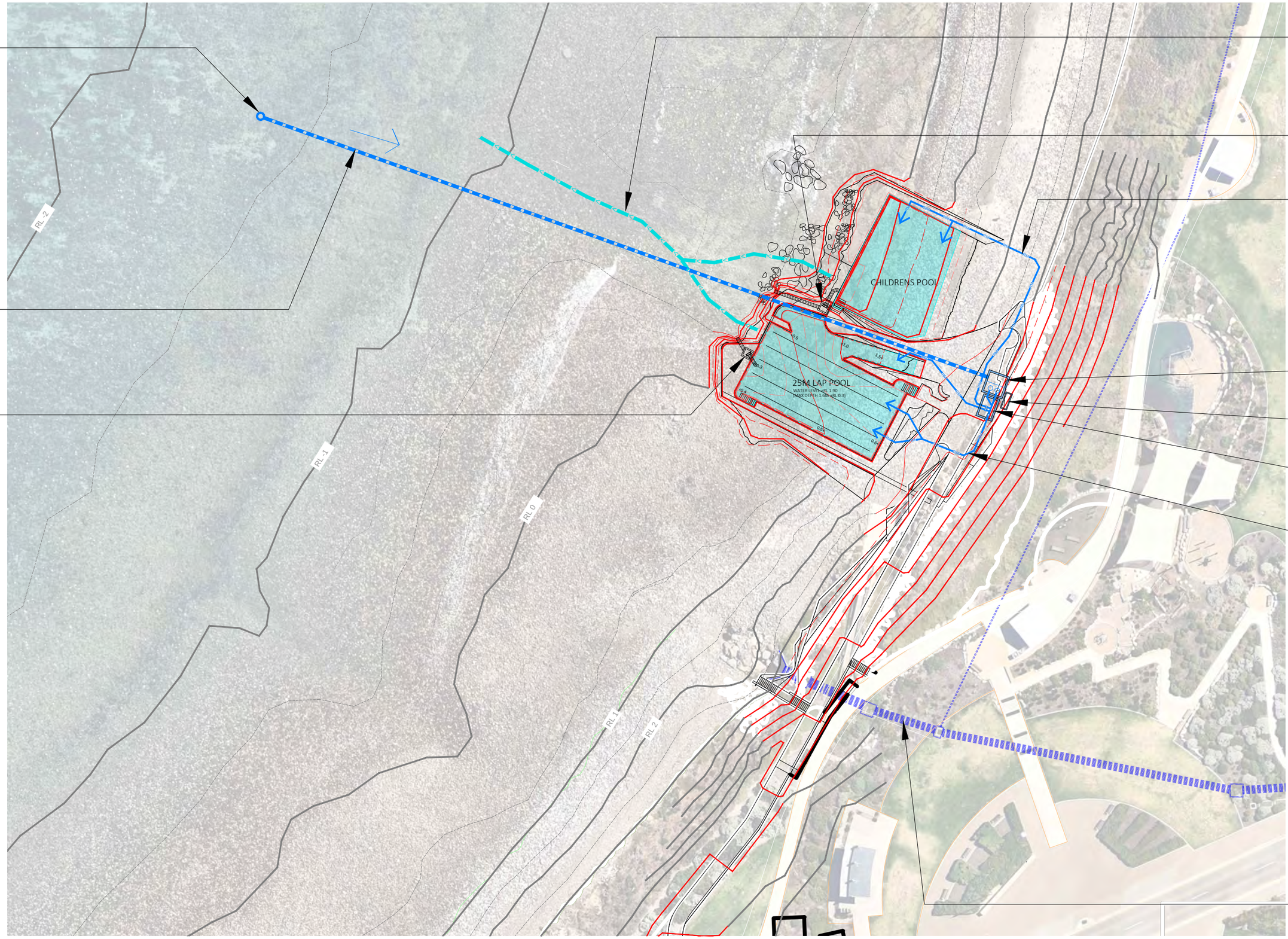
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Phase
Concept Development

Sheet Title
HYDRAULICS CONCEPT PLAN - 50M

Sheet No. C01

Rev C



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Chippendale NSW 2008
ABN: 25 635 133 854
www.civille.com.au

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NICOLE LARKIN DESIGN

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Scale
1: 300 @ A1
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All dimensions are in metres unless otherwise noted. Do not scale from this drawing.

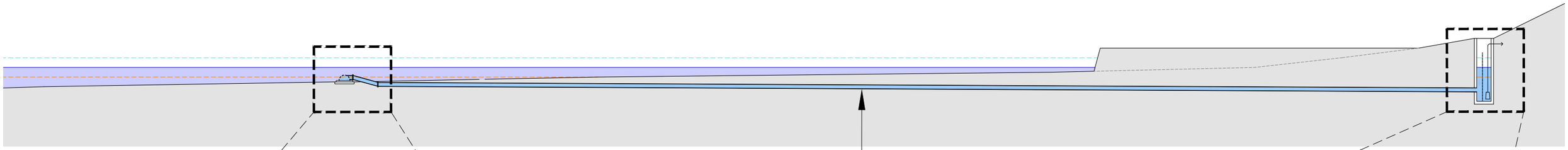
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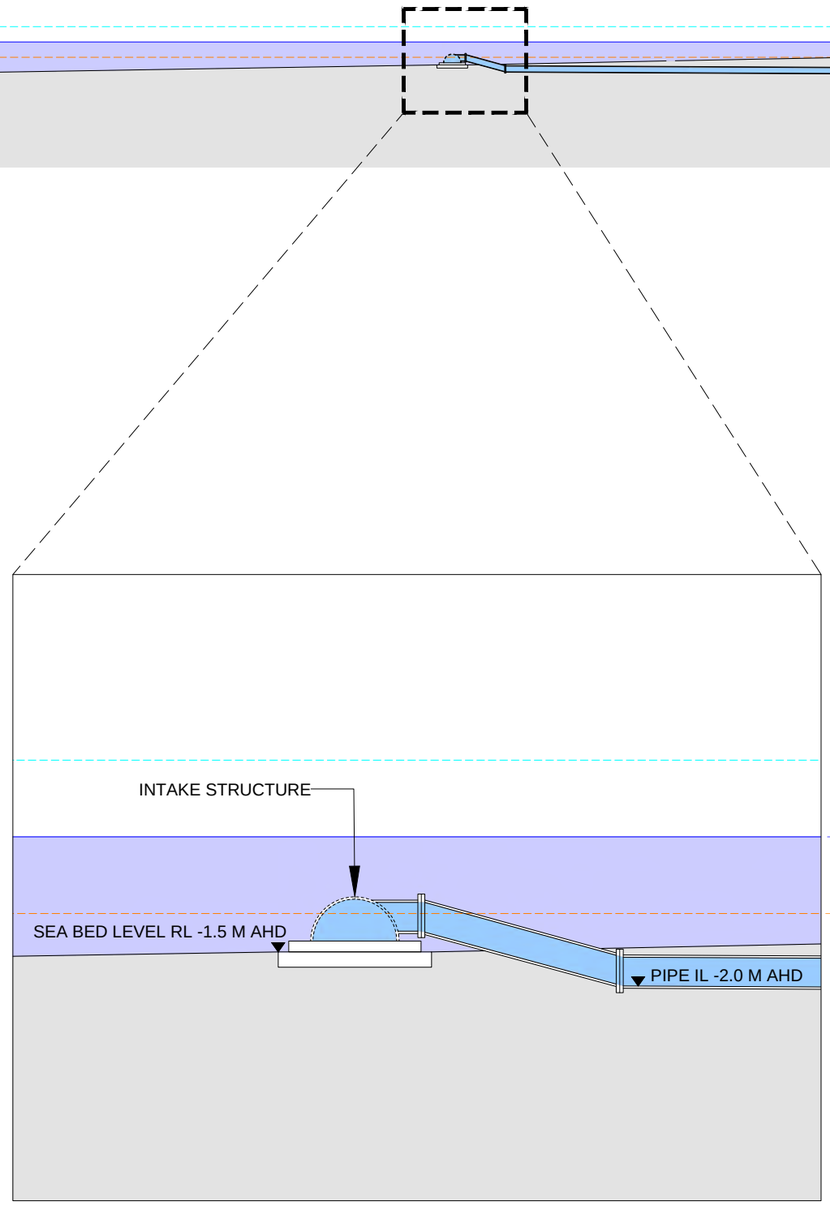
Phase
Concept Development

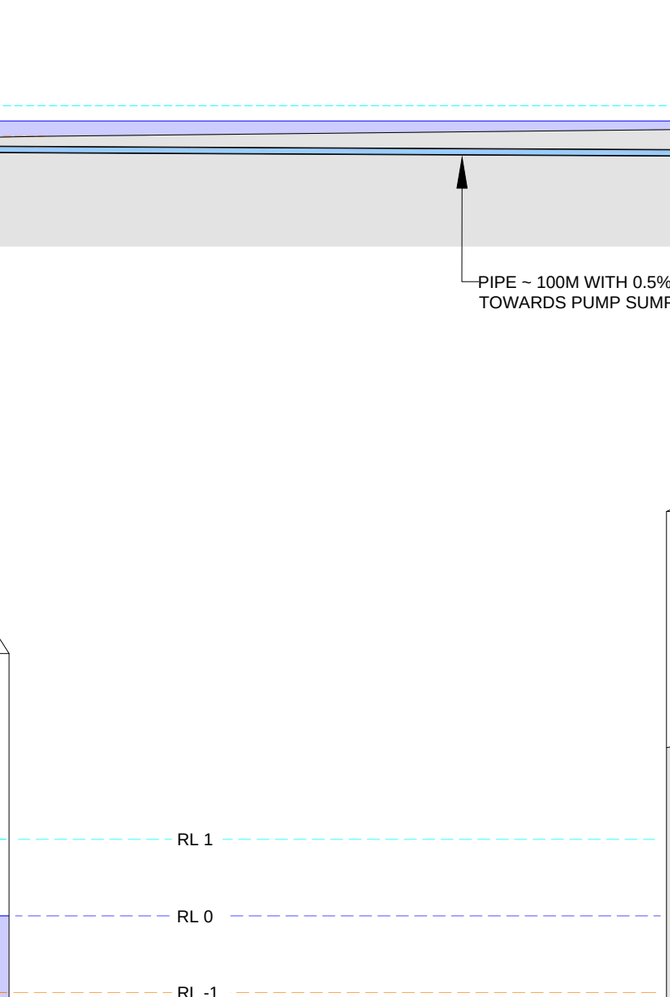
Sheet Title
HYDRAULICS CONCEPT PLAN - 25M

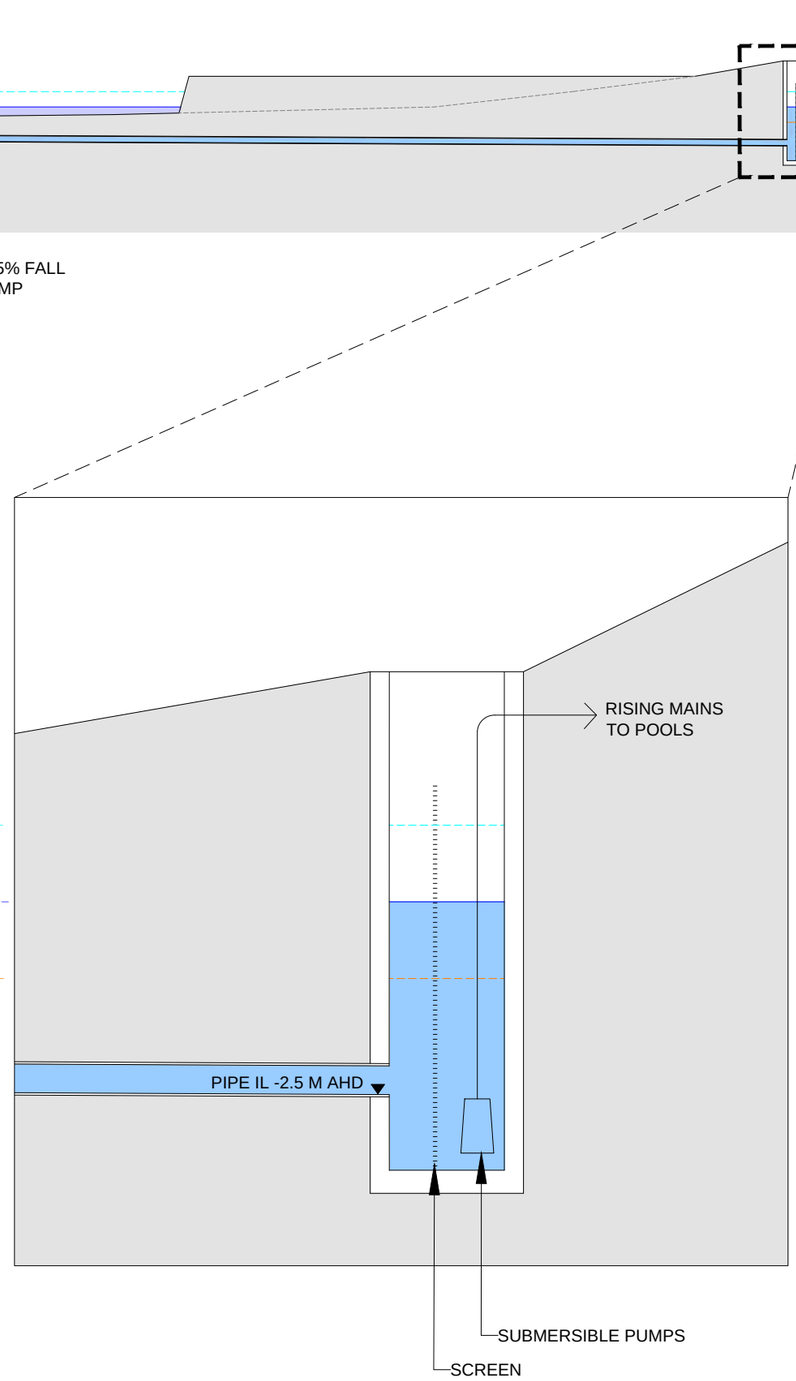
Sheet No.
C02

Rev
C









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Client
NICOLE LARKIN DESIGN

Project Name
HALLETT COVE

Project No.
2242

Address
HALLETT COVE, S.A.

Notes
DETAILS SHOWN INDICATIVELY ONLY, TO BE FURTHER ASSESSED AND DEVELOPED DURING DETAILED DESIGN

Issue Log

A	DRAFT	AMM	15/05/2023
B	REVISED DRAFT	AMM	19/05/2023
C	CONCEPT REPORT	AMM	25/05/2023

Rev	Revision Description	By / Checked	Date

Scale

North

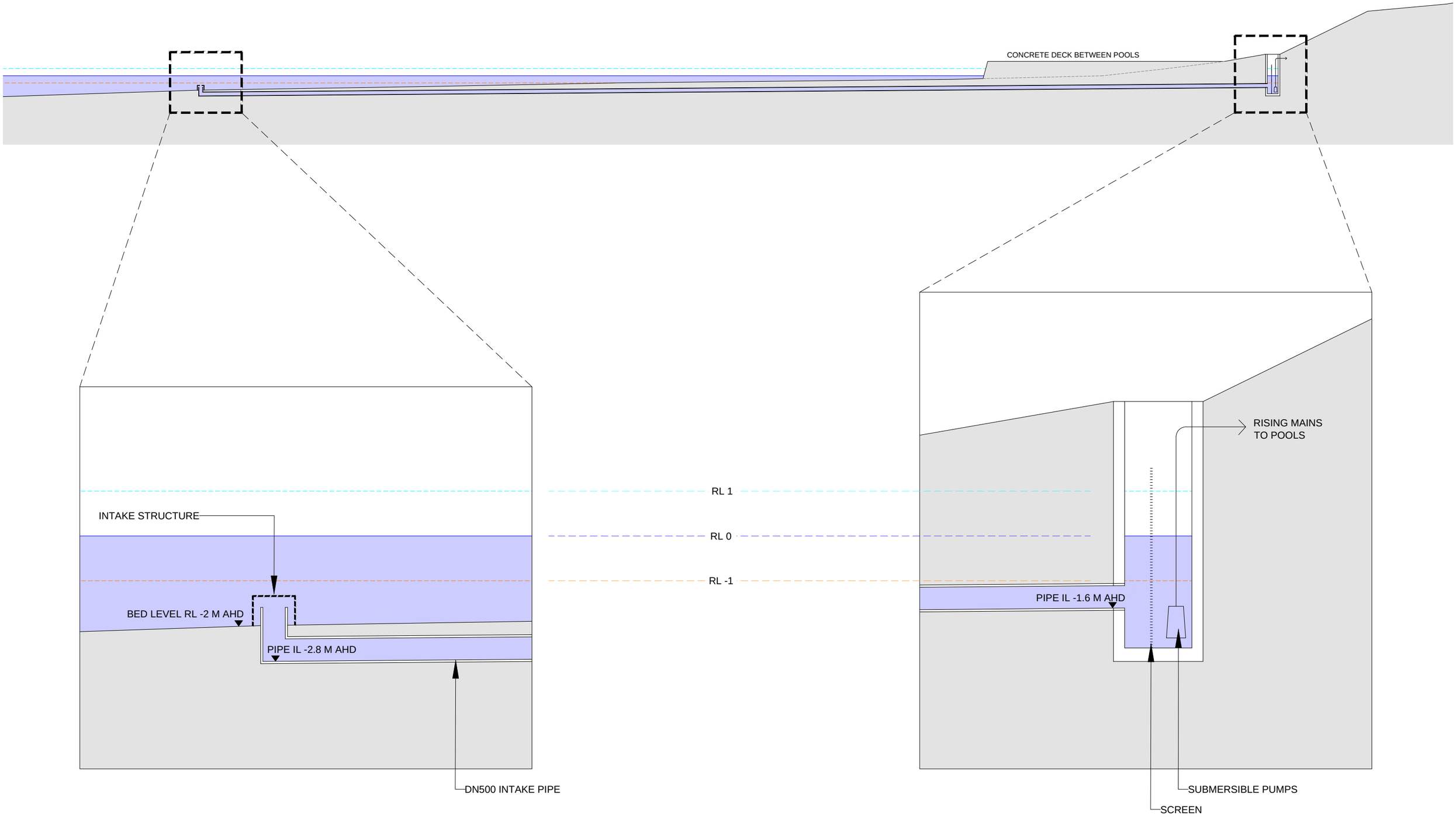
All dimensions are in metres unless otherwise noted. Do not scale from this drawing.

Phase
Concept Development

Sheet Title
INTAKE PIPE INDICATIVE

Sheet No.
C03

Rev
C



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Client
NICOLE LARKIN DESIGN

Project Name
HALLETT COVE

Project No.
2242

Address
HALLETT COVE, S.A.

Notes
DETAILS SHOWN INDICATIVELY ONLY, TO BE FURTHER ASSESSED AND DEVELOPED DURING DETAILED DESIGN

Issue Log

Rev	Revision Description	By / Checked	Date
A	DRAFT	AMM	15/05/2023
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C	CONCEPT REPORT	AMM	25/05/2023

Scale

North

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Do not scale from this drawing.

Phase
Concept Development

Sheet Title
INTAKE PIPE INDICATIVE ALTERNATE

Sheet No.
C04

Rev
C

Beach Access and Embankment Protection

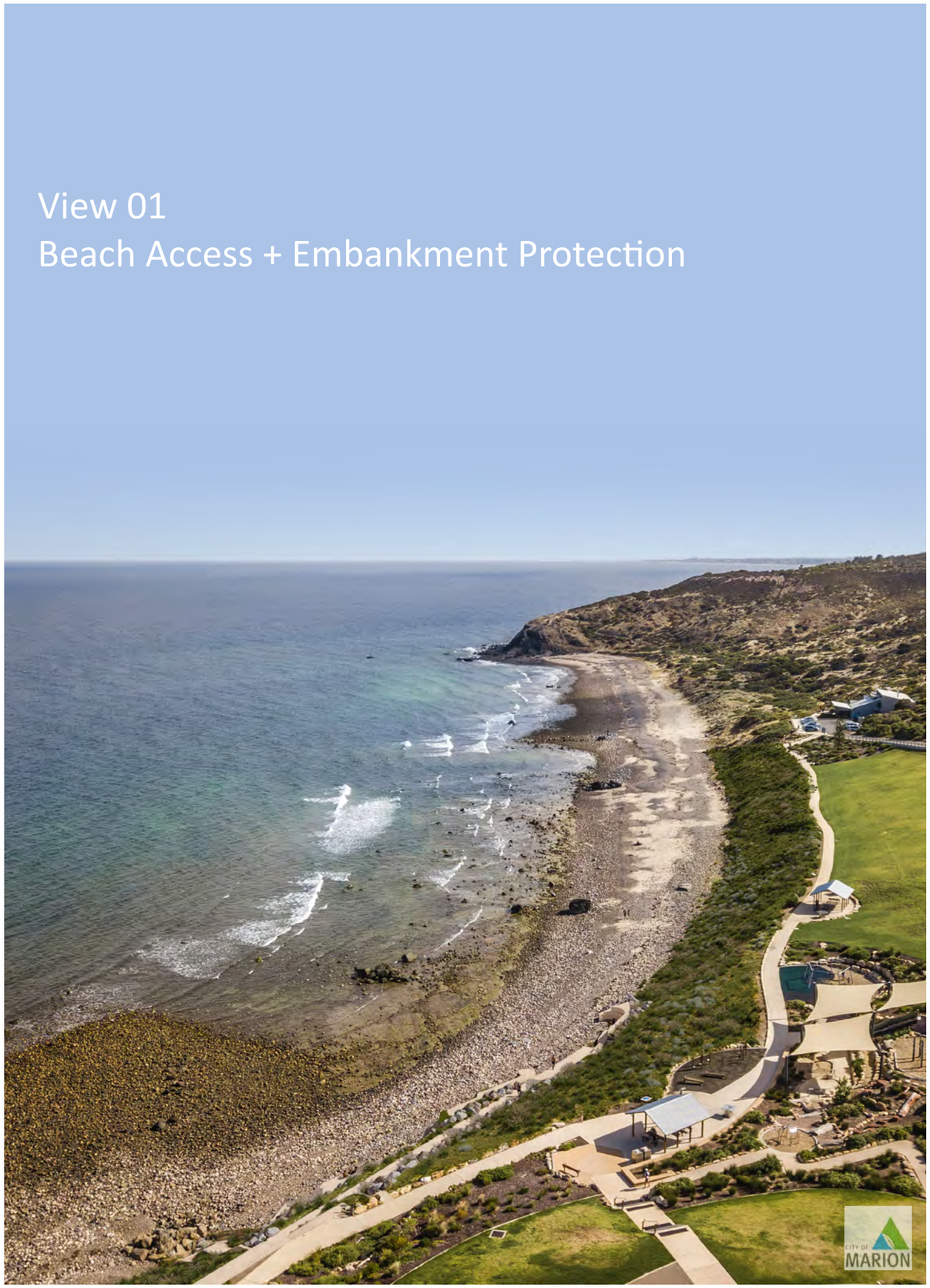
1. Embankment Stablisation (Soft Planting)
2. Embankment Stablisation (Concrete Retaining Wall and Boulders)
3. Graded Ramp Access to Beach (For Vehicles and Accessibility)
4. Benched Concrete Retaining Wall (Beach Level Recreational use)
5. Existing Storm-water Outlet
6. Existing Toilet/Amenities
7. Existing BBQ Pavilion
8. Existing Playground
9. Existing Accessible Parking
10. Boat-shed Cafe
11. Hallett Cove Conservation Park



NICOLE LARKIN DESIGN | ARCHITECT 10687 ARCHITECTURE, COASTAL PLANNING + DESIGN 69 Darghan Street, Glebe NSW 2037, Sydney Australia T +61 439 977 020 nlarkin.design@gmail.com www.nicolelarkin.com				Hallet Cove Ocean Pool Concept Design Hallett Cove Beach Adelaide, South Australia	
PRELIMINARY ONLY NOT FOR CONSTRUCTION				Site Plan - Beach Access and Embankment Protection	
SCALE	DRAWN	CHECKED	DATE	PROJECT	DRAWING / REVISION
1:1000 @ A3 1:500 @ A1	NL	NL	May 2023	2104	0001 / B

Hallett Cove Sea-side pool Concept Design - Site Plan Note: Not to Scale | Option 1 Embankment Protection

View 01
Beach Access + Embankment Protection



Hallett Cove Sea-side pool Concept Design- Artist Impression 01 | Option 1 Embankment Protection

View 02
Beach Access + Embankment Protection



Hallett Cove Sea-side pool Concept Design- Artist Impression 02 | Embankment Protection

View 03
Beach Access + Embankment Protection



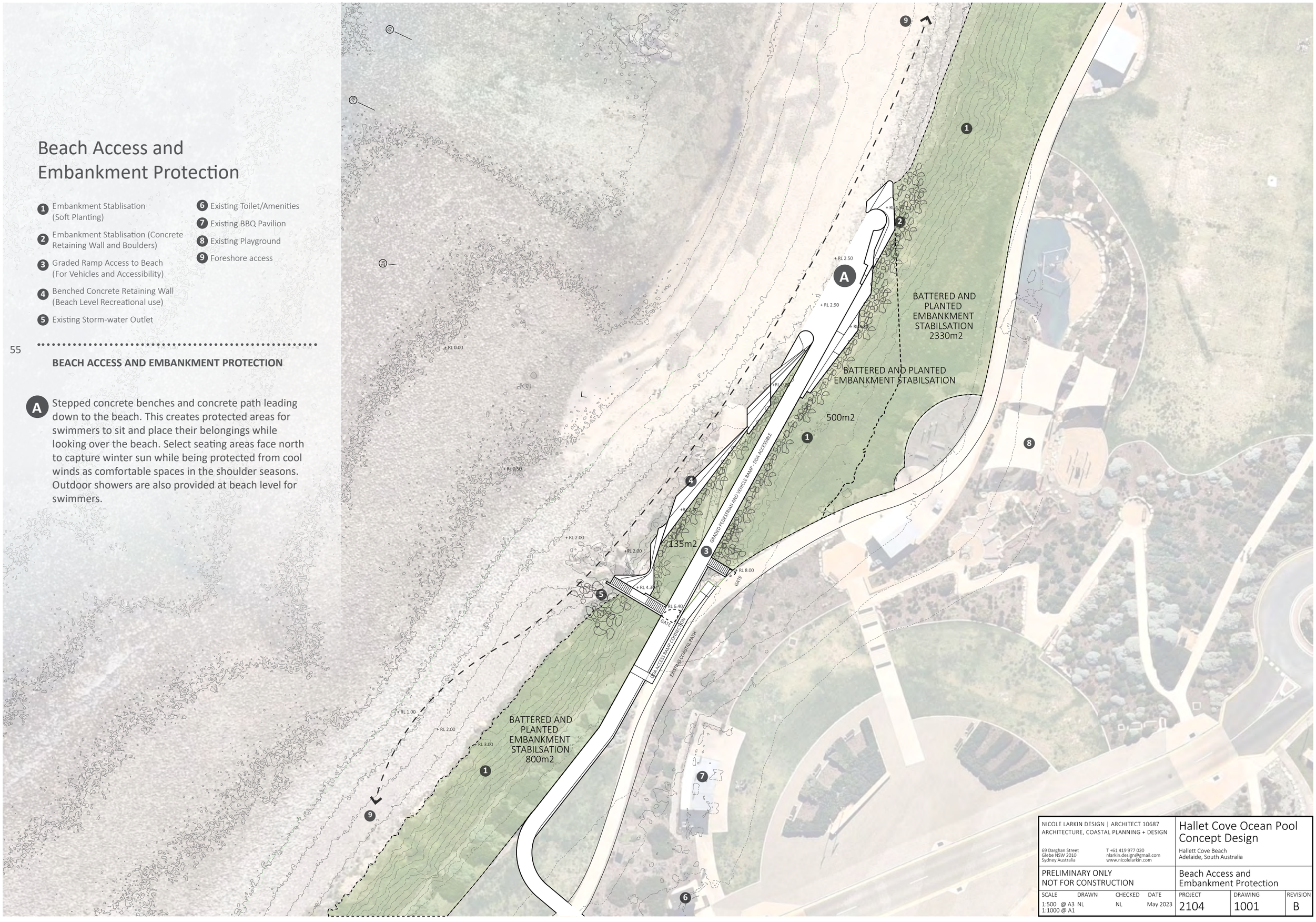
Hallett Cove Sea-side pool Concept Design- Artist Impression 03 | Embankment Protection

Beach Access and Embankment Protection

1. Embankment Stablisation (Soft Planting)
2. Embankment Stablisation (Concrete Retaining Wall and Boulders)
3. Graded Ramp Access to Beach (For Vehicles and Accessibility)
4. Benched Concrete Retaining Wall (Beach Level Recreational use)
5. Existing Storm-water Outlet
6. Existing Toilet/Amenities
7. Existing BBQ Pavilion
8. Existing Playground
9. Foreshore access

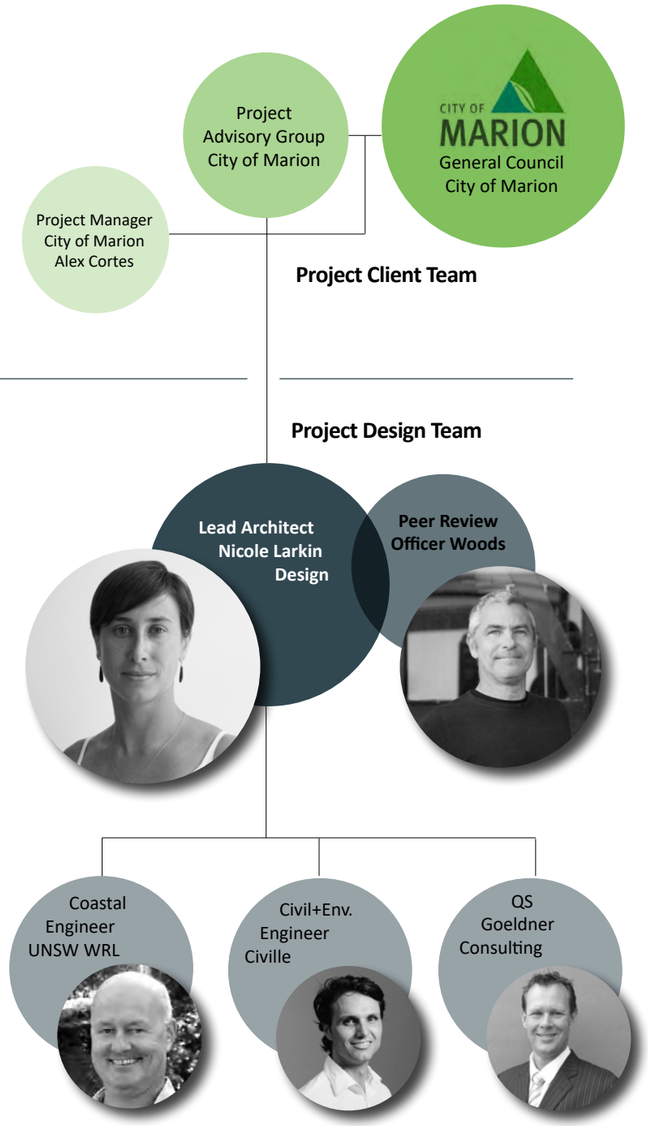
BEACH ACCESS AND EMBANKMENT PROTECTION

A Stepped concrete benches and concrete path leading down to the beach. This creates protected areas for swimmers to sit and place their belongings while looking over the beach. Select seating areas face north to capture winter sun while being protected from cool winds as comfortable spaces in the shoulder seasons. Outdoor showers are also provided at beach level for swimmers.



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PRELIMINARY ONLY NOT FOR CONSTRUCTION				Beach Access and Embankment Protection		
SCALE 1:500 @ A3 1:1000 @ A1	DRAWN NL	CHECKED NL	DATE May 2023	PROJECT 2104	DRAWING 1001	REVISION B

Team Profile



Experts Collaborating for Best Practice Outcomes

The team for this project is a collection of expert engineering and design professionals who collaborate together to bring leading expertise and experience in sea-side pool design, management and planning to their work. Collectively, the team have had involvement with significant proposals to upgrade existing sea-side pool and propose new pools around Australia. Our role in these projects has furnished us with a detailed understanding of sea-side pool design and planning.

Project Team Structure

The design team's input is co-ordinated and led by Nicole Larkin, a registered architect practising in NSW. Technical advice and feedback from specialist engineering consultants James Carley, Andrew McMillan and Craig Goeldner shapes the project parameters and informs the proposed design. A peer design review is overseen by Officer Woods Architects, who also have experience in sea-side pool design and a strong background in delivering community infrastructure. Each role serves to ensure the best case design outcomes are achieved on the project.

Key Personnel and Roles

Nicole Larkin
Architect 10687
Sea-side pool Design Specialist

Role: Team Lead
Co-ordinate team input, lead development of concept design deliverables and serve as point of Contact

Trent Woods
Architect 2036
Community Workshop Presentation Lead

Role: Peer Review
Provide a peer review to development of concept design. Present concept design at community workshop

James Carley
Chartered Engineer
Coastal Engineer/Sea-side pool Specialist

Role: Technical Input
Provide coastal engineering input on proposed design. Present concept design at community workshop

Andrew McMillan
Civil Engineer
Environ. Engineer
Water Management

Role: Technical Input
Provide input and advice on hydraulic strategy and pump provision

Craig Goeldner
Civil Engineer
Registered Quantity Surveyor (AAIQS)

Role: Technical Input
Provide high level cost estimate of the sea-side pool concept design

