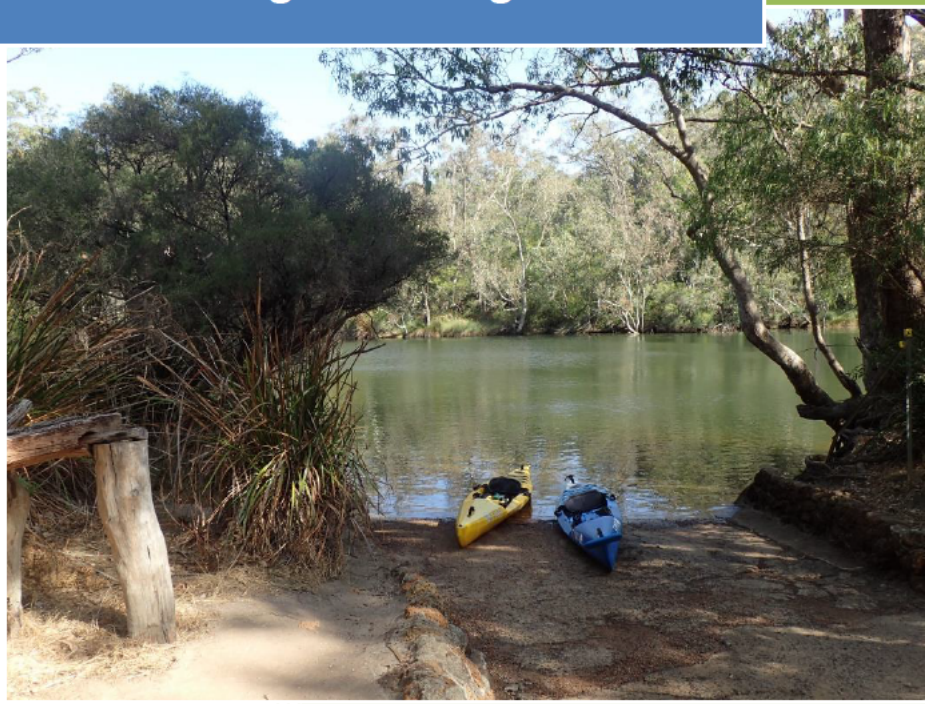
2020

Alexandra Bridge Foreshore Management Plan

For Shire of Augusta Margaret River



Vicki Winfield

Vicki Winfield & Associates Pty Ltd

Disclaimer:

Information presented in this report has been compiled with care, subject to constraints of time and resources. This is a Foreshore Management Plan, and proposals should be considered only as concepts and guidelines for further development by engineers or other specialists before construction, or are expected to be implemented by Shire of Augusta Margaret River staff who are familiar with the relevant park management and construction standards. No responsibility is accepted by the authors for any use or misuse of information contained in or omitted from this report. Corrections, additions and comments are welcome and should be addressed to the consultant, or the Shire of Augusta Margaret River.

Acknowledgements:

We acknowledge that we discuss the traditional land of the Noongar people, the custodians of the Region, and that we respect their spiritual relationship with the country.

Alexandra Bridge Foreshore Management Plan

1 Introduction

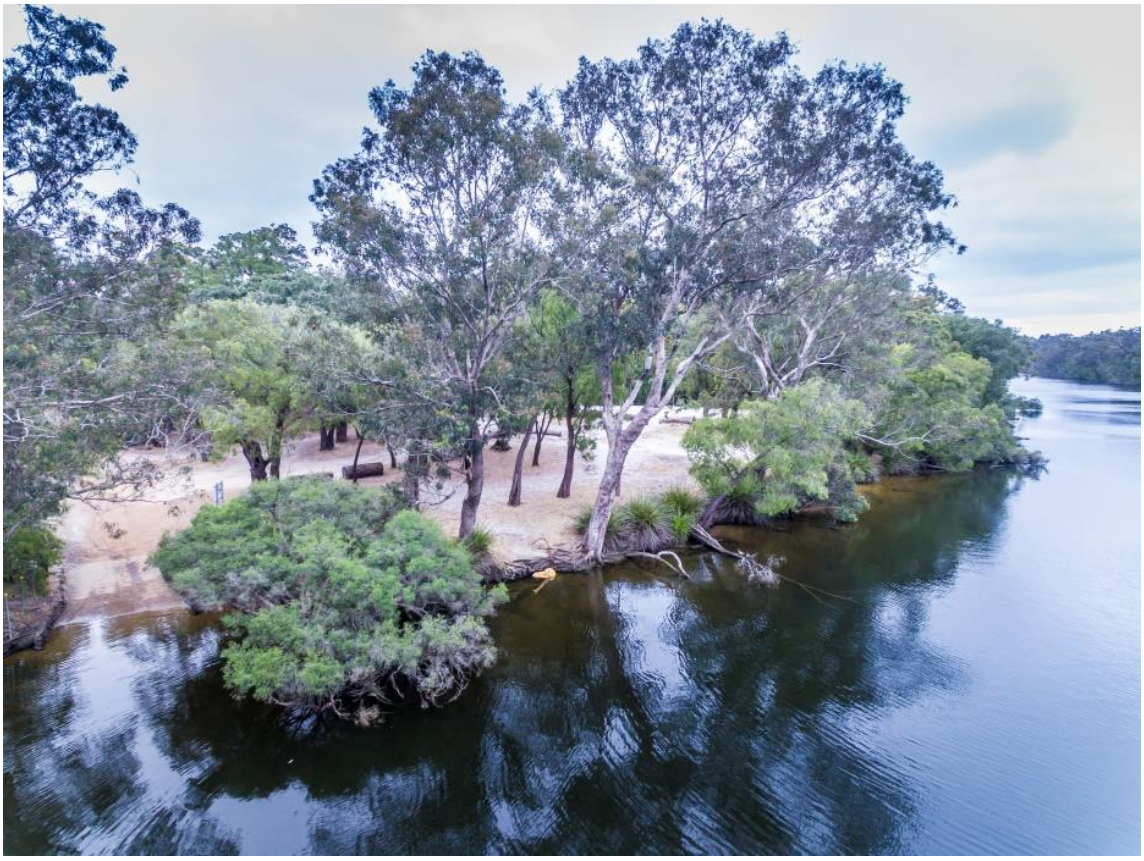
1.1 Vision

The Shire's vision for the foreshore is a relaxed informal natural environment that is popular with visitors and locals alike. However with the increasing use of the site more needs to be done to protect the natural and cultural values of the area, manage access to the water and ensure the site has adequate capacity for future use.

1.2 Background to the Project

Alexandra Bridge is a popular recreation area in the South West of Australia set on the banks of the Blackwood River 25km from Margaret River and Augusta. It is an attractive natural area, located in a rural countryside that has been popular with visitors since the 1970's. It has significant environmental and cultural values including an Environmentally Sensitive Area, Registered Aboriginal Sites and sites on the Augusta Margaret River Heritage Inventory including the Alexandra Bridge. The area is important to the local community as a recreation facility and a meeting place with boating, fishing, canoeing, swimming, BBQing and picnicking all occurring there.

Alexandra Bridge is managed by the Shire of Augusta Margaret River (SoAMR). The camping area was upgraded in 2016 and at this time the foreshore area was made day use only. Some reorganisation of the foreshore occurred but no new facilities were provided or work undertaken along the river's edge.



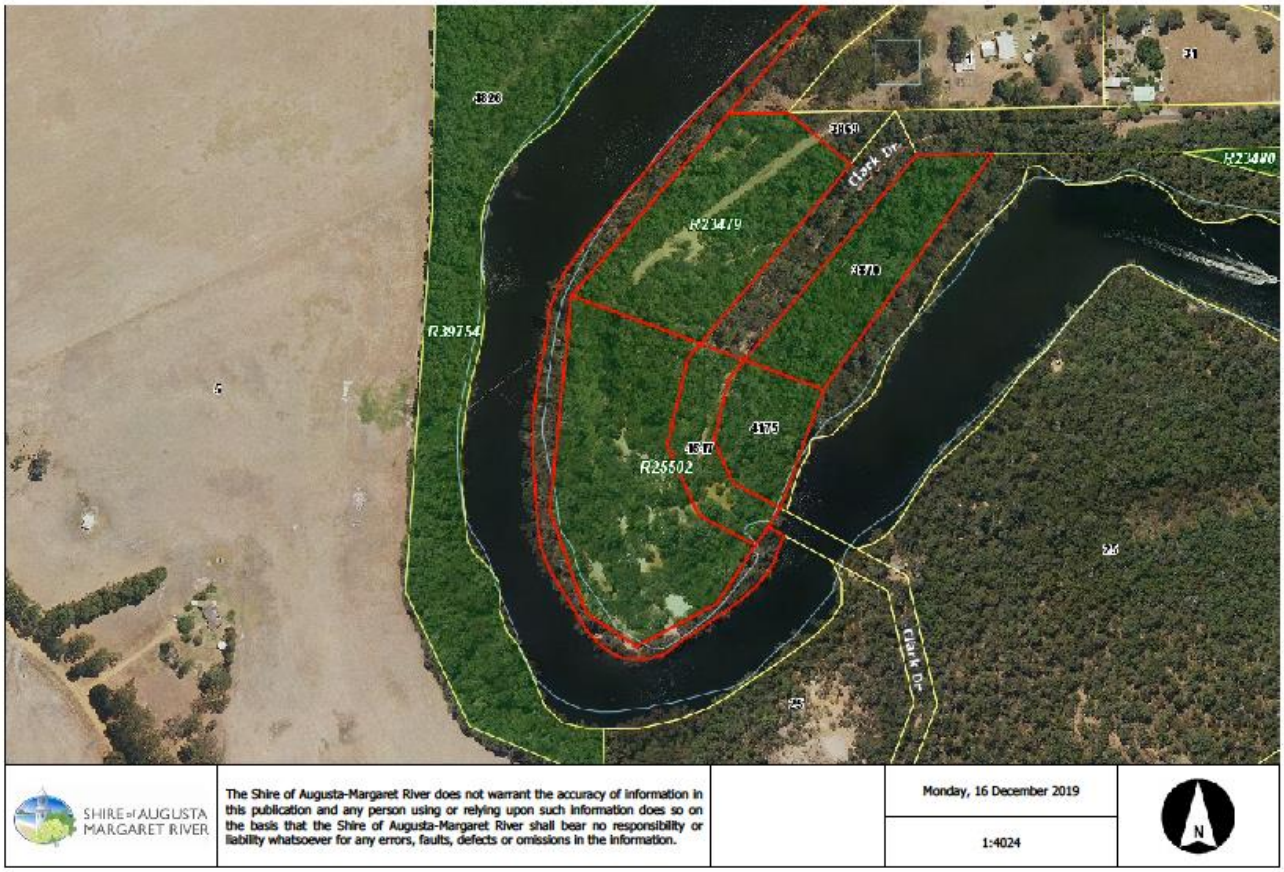
Alexandra Bridge Foreshore boat ramp and eastern shore **Photo: David Binks**

The Alexandra Bridge Campground Redevelopment and Management Plan prepared in 2016 provided concepts for expanding the campground and upgrading the foreshore see Drawing Number VWA – 03-2016 – 4 shown below. It also provides background information for both the campground and foreshore area with regard to site conditions, visitors, facilities, services, and management context. The SoAMR engaged Vicki Winfield & Associates Pty. Ltd. to review these concepts and engage with stakeholders to prepare a detailed foreshore/landscape management plan for the Alexandra Bridge Foreshore Precinct. The SoAMR also engaged Seashore Engineering to provide engineering input to the project.

Alexandra Bridge Foreshore - Concept Design as at 2016

1.3 Project Area

The project area consists of the foreshore area around the southern section of Shire Recreation Reserve 25502 at Alexandra Bridge as shown above. Much of this area is currently Unallocated Crown Land.



The extent of the Recreation Reserve at Alexandra Bridge

2 Consultation

2.1 Undalup Association Consultation

The Blackwood River and foreshore areas are important to the Undalup Association, the Bibbulmun – Wadandi Custodians of the Alexandra Bridge Area. They have previously provided direction to the SoAMR regarding the development of the campground and gave guidance regarding the development of the foreshore areas at a meeting on site on 20th February 2020. The custodians gave input to the draft concept plan for the foreshore areas on 14th September 2020 including support and recommendations for components of the plan. These directions are incorporated into the concepts and will continue to guide the project. The Undalup Association will continue to input to the project including undertaking monitoring and assisting with interpretation.

2.2 Community Consultation

The community was invited to provide input and direction to the project via a survey that was available digitally on the SoAMR website 'Have Your Say' section and as a hard copy at the Shire Offices and the Alexandra Bridge Campground, see Appendix 1. The website also advised of a workshop/drop in session to be held at the Alexandra Bridge Hall on 25th March from 2.30 until 6pm. However this was postponed due to the Covid 19 virus and ultimately became a site walk see below.

The draft concepts were subsequently made available for comment on the SoAMR website 'Have Your Say' section (120 views) and via the Alexandra Bridge facebook page and a site walk was held on 4th September 2020 with members of the local community.

2.2.1 Community Survey Results

From 23rd February to 24th April 52 people visited the survey on the 'Have your Say' website and 21 people completed the survey (including paper surveys from the campground). The campground was closed from mid March 2020 due to Covid 19 and so the views of campers are likely underrepresented. The results were as follows.

- Frequency of visits - 50% of respondents visited several times a year and visiting weekly, monthly or for the first time were each 15% and only 10% visited yearly.
- Special qualities – 90% of all respondents were attracted by the river and shady natural trees and 60% of respondents appreciated the peace and quiet, a third of respondents had used the area with their family for many years and appreciated the facilities, 24% valued the history and one respondent appreciated other values (unspecified).
- Activities –The most popular activities were relaxing/sitting by the river (71%), picnicking and BBQs (62%) and swimming (57%). Nearly half of visitors (48%) went boating and walking and nearly as many (43%) went canoeing/paddle boarding. 38% Of respondents camped in the adjacent campground and enjoyed the river as part of that experience, 33% fished from the shore, 29% fished from a boat and 24% bird watched.
- Facilities – The most important facilities for respondents were the shade trees (95%), the toilet (90%), picnic tables (81%), swimming access (76%) and BBQ facilities and shade shelters were important for 71% of respondents. For over half of respondents car parking and canoe launch (62%), the boat ramp (57%), boat trailer parking (52%) and walk trails less than 1 km (52%) were important. For 43% of respondents boat tie up places, stories about the place (interpretation) and fishing areas on the river bank were important with a few less interested in a shower (38%) and 33% interested in paths and viewing areas. Only 29% were interested in information and directional signage and wheel chair access and the playground was least popular at 24%. 10% were interested in other facilities but didn't specify what they were.
- Of the 8 respondents who advised where they were from 50% were from the metropolitan area, 38% from SoAMR and one respondent from Busselton.

- Of the 7 respondents who advised their age 5 were 60 – 69 and 2 were 70 – 79.

The responses to the open ended questions are contained in Appendix 2. Issues related to the foreshore included

- The state of the stairs and need for better swimming facilities (replace the jetty, a pontoon etc.)
- Problems with the existing boat ramp and getting in and out of boats and the need for boat tie up facilities (current tying up boats is contributing to river bank erosion).
- More picnic tables.
- Improve the toilets.
- Provide recycle bins.
- Request for views of the river from vans / vehicles.
- Requests for interpretation – flora, fauna, (fish, birds, vegetation, trees, bushes), Blackwood River and how far to places, Aboriginal history, settler and local history (Nillup, Warner Glen, Scott River).
- Keep the area natural.
- Need for fire management plan.
- More enforcement including speed limit on Clarke Road.

2.2.2 Workshop Feedback

The community workshop was postponed due to Covid 19 restrictions and although an online replacement was considered, due to the disruptions caused by the restrictions, Easter and other holidays this concept was not progressed.

2.2.3 Community Feedback to Draft Proposals

Feedback to the SoAMR website 'Have Your Say' page consisted of five submissions on the final concept plan, with four in favour of the proposal and one that did not support the pontoon. Improvements to the swimming area and boat ramp were supported as well as a need for improved serviceability of the BBQ and toilet facilities.

2.2.4 Community Site Walk

A site walk was held once draft proposals for the area had been developed and Covid 19 restrictions had eased in September 2020. Unfortunately this ended up clashing with another community event but those who did attend knew the area well and gave valuable feedback. Generally there was support for the proposals with specific suggestions for certain components of the area.

2.2.5 Augusta Historical Society

The Augusta Historical Museum (AHM) was contacted in mid March 2020 for input to the project, particularly advice on stories of the area that could be interpreted. The AHM advised there were people who could help but that they were constrained by the current Covid 19 restrictions and would contact us when they could.

2.2.6 Recfishwest

The Operations Manager of Recfishwest[1] confirmed the importance of Alexandra Bridge and the Blackwood River for recreational fishing and supported the ongoing provision of fishing access to the river, particularly the boat ramp, onshore fishing opportunities, and the retention of the naturalness of the area. The significant economic contribution of fishing ($2.4 billion per year) was advised and assistance was offered to discuss the plan further.

[1] Campbell Leyland , Operations Manager Recfishwest

2.2.7 Fishability

Mike Mc Mullen of Fishability visited the site on 18th May with Merryn Delaney of SoAMR and expressed interest in the project. He was going to contact the Fishability group based in Busselton for further input. They are supported by Recfishwest who may be able to assist with funding and the group has a strong volunteer support base.

2.3 Interagency Consultation

2.3.1 Department of Transport

The Department of Transport (DoT) is responsible for on water legislation and is involved with the provision of boat ramps, jetties etc. for boats to access the water. The Recreational Boating Funding Scheme (RBFS) provides both planning and capital funds see https://www.transport.wa.gov.au/imarine/grants-marine.asp . Discussions[2] relating to Alexandra Bridge included the following.

- Erosion from boat wash is more significant in narrow rivers or where boats pass close to the shore.
- Studies have been done which indicate a 5 knot speed limit results in significantly less erosion than an 8 knot speed limit.
- Changes to speed limits can be instigated by a formal request from the shire (or relevant management agency) to the DoT Bunbury office (or relevant local office).
- Designation of Motorised Vessels Prohibited Zones or Closed Waters is also via a formal request from the shire indicating the area to be closed and why. DoT does not monitor underwater hazards in such areas.
- Riverside structures that may be relevant / suitable for Alexandra Bridge can be found along the Collie River at Riviera Way in the City of Bunbury, Pratt Road in the Shire of Dardanup and Eastwell Road (the Elbow) in the Shire of Harvey. The total costings for removal of the existing ramp, installation of new ramp and finger jetty at the Elbow was just under $400,000.[3]

L: Eastwell Road boat ramp **R: Boat Ramp at Pratt Road with platform (where children standing)**

- Alongside jetties, floating pontoons, paddleboat ramps and canoe ramps can all be considered.
- Boating Guides are displayed as signs by boat ramps (or close to in a sign kiosk, see Ellis Street, Augusta) and are also available online and sometimes as a hard copy brochure. These and other

[2] Westgate Peter – DoT Operations Manager, Bunbury
Mather Chris – DoT Team Leader Navigational Safety, Maritime, Fremantle
[3] Josh Reagan – DoT Senior Regional Officer, Bunbury, Nov 2020

education and extension services (such as life jacket exchanges) are provided by ed.boat@transport.wa.gov.au (NB consultation that occurred during the preparation of the sign plan for the Alexandra Bridge Campground in stage 1 of the redevelopment at Alexandra Bridge, identified the need to contact the education section of DoT regarding the provision of marine information and interpretation for stage 2 development at Alexandra Bridge).

- Aboriginal interpretation sharing marine values is usually well received by the community and attracts visitors so that they are then more likely to read any associated regulatory information.
- Fishability is an organisation focused on providing access to fishing for less able persons, there is a group in Busselton.
- The Blessing of the Fleet Festival in Augusta which was to be held on the June long weekend but was cancelled due to Covid 19 restrictions could have been an opportunity to share proposals for the Alexandra Bridge area, and could be considered as a communication opportunity in the future.

L: Wheelchair ramp to a fishing platform, and

R: Informal trailer parking both at Eastwell Road

Mix of 'drive through' and 'nose in' trailer parking at Riviera Way boat ramp Bunbury

The SoAMR liaised with DoT in 2018 regards reducing the boat speed at Alexandra Bridge and DoT proposed and Shire of Augusta Margaret River Executive Leadership Team approved a reduction in speed as shown on the diagram below. DoT advised the proposals would be kept on file and SoAMR would be notified when a formal aquatic use review is to be conducted. DoT recently advised the review date is set for 2021.

5 Knot zone as proposed by DoT in 2018

2.3.2 Department of Primary Industries and Regional Development (DPIRD) Fisheries Department

Discussion with Department of Fisheries Officers[4] indicates black bream is the most important fish species at Alexandra Bridge with fish caught from boats or off the shore. Crabs are sometimes fished for but as the current Alexandra Bridge is the boundary with the upstream marron waters, crab nets cannot be taken beyond this point. Liaison with Recfish West was suggested and there is a bream fishing competition held on the Blackwood River but that is usually closer to Malloy Island.

Fish cleaning is not known to be an issue but whether the offal is put back in the river or disposed of in rubbish bins is not confirmed.

There is fish interpretation already on site see below and there have been discussions previously with the Undalup community regarding telling the dreamtime story of the black bream, but at this stage it is only a concept. It was advised that the Albany based interpretation officers Kylie Outhwaite and Tahryn Thompson would be available to assist with this project and consultation with these officers is currently underway.

The Department officers do not generally use the boat ramp at Alexandra Bridge; they come up by boat from Augusta.

L: Boating Guide by DoT **R: Fish interpretation by the boat ramp by DPIRD Fisheries Department**

[4] Jamieson Luke pers.com

2.3.3 Department of Planning Lands and Heritage

SoAMR consultation[5] with Department of Planning Lands and Heritage (DPLH) confirms that SoAMR can complete the concept planning phase for the redevelopment of the Alexandra Bridge Foreshore and then if SoAMR wanted to implement any Shire funded works within the UCL such as the construction of a swimming platform or installation of a picnic table, SoAMR would discuss the proposals with DPLH and proceed through the correct approval processes. Any changes to the land tenure will not be considered until Native Title has been determined.

DPLH also advised the Department's Land Management South team doesn't need to be involved in the concept plan's development process.

2.3.4 Department of Biodiversity Conservation and Attractions

The Department of Biodiversity Conservation and Attractions (DBCA) manages a variety of riverside foreshore areas. The relevant area managers have advised the following.

- The timber components of the Warren National Park[6] decks are inspected as part of the annual visitor risk inspection and the stainless steel subframes are inspected at intervals advised by the inspecting engineer, approximately every 5 years. Warren decks are for canoe launching and signs advise of no diving and river risk.
- At Glenoran Pool on the Donnelly River the jetty was removed.
- At Balbarrup Pool and swimming sites along the Blackwood River such as Chapman Pool and Warner Glen the water body is checked annually for submerged hazards by marine park rangers diving to check under the water[7]. The hazards are subsequently removed. Subsequent advice from DBCA[8] was that the inspections can use scuba or snorkel and the check list form used is in Appendix 3. Visitor Risk Management (VRM) is also provided at the sites. Swimming areas in the marine park are not routinely inspected by snorkel or scuba, however, Canal Rocks jetty and boat ramp and Hamelin ramp are routinely checked for hazards/damage. Swimming from or near a public jetty is dealt with in the Navigable Waters Regulations.
- The new standard DBCA picnic tables are a combination of steel frame and jarrah decking. The Bunbury prisons make the frames and the rough sawn jarrah is sourced from local mills and put together by DBCA.
- DBCA recommended maintaining facilities some distance from the river bank, planting of the foreshore with local endemic ground cover species (which DBCA can advise), vegetated drainage swales and suitable protection to minimize erosional water runoff directly into the river.
- DBCA advised there is an extremely important plant species in the Alexander Bridge area but it is located beyond the extent of the current works[9].

2.3.5 Department of Water and Environmental Regulation

Department of Water and Environmental Regulation (DWER) have a range of management responsibilities in the area. They provided[10] the following information for consideration and in due course the SoAMR will need to apply to DWER for permission to remove any trees and a permit to impact the Beds and Banks of the Blackwood River. Information supplied by DWER included the following.

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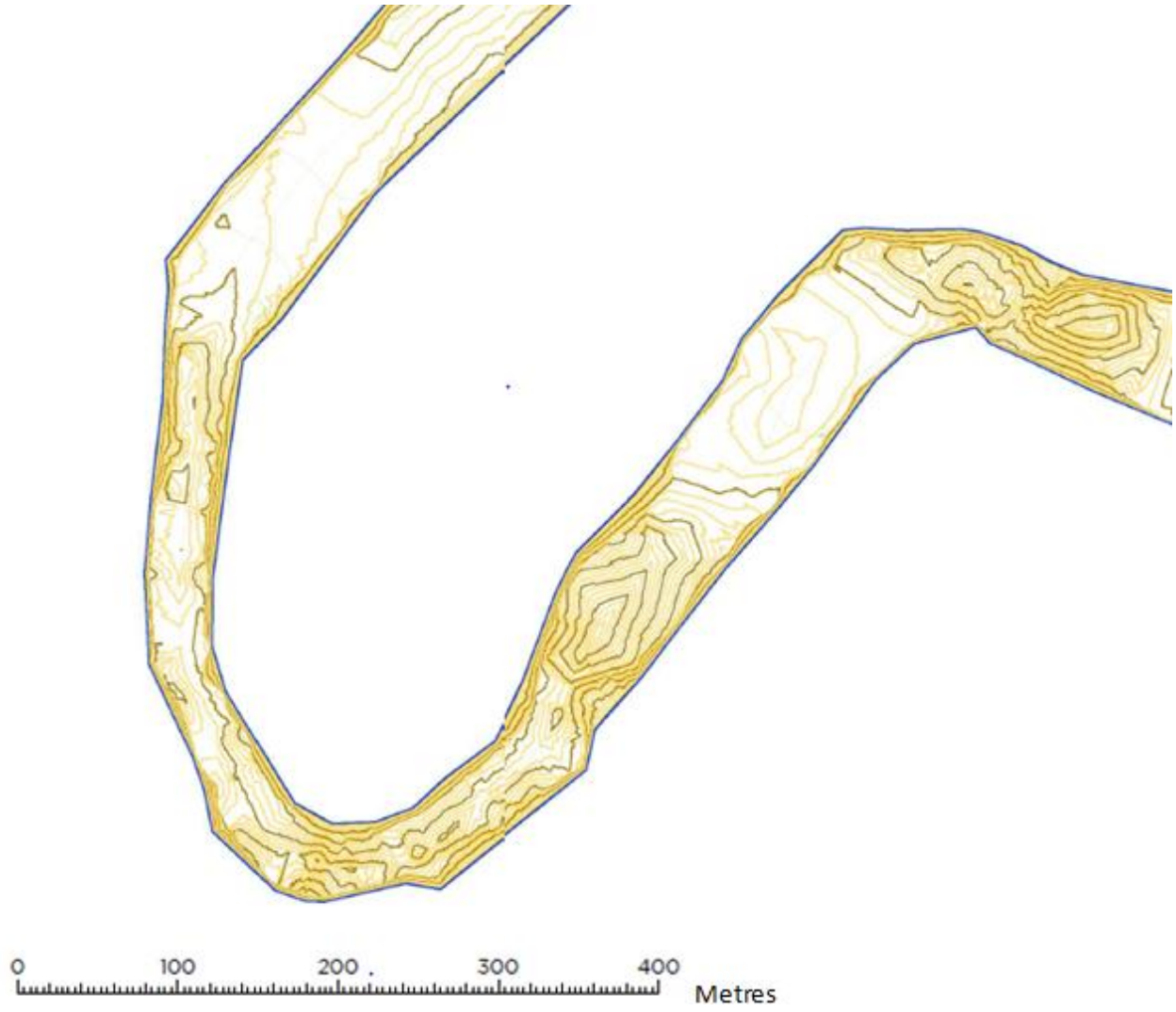
[5] Delaney, Merryn, discussion and email exchange with DPLH
[6] Foley, Tim, pers. com. DBCA Manjimup
[7] Goodwin Kane, pers. com. DBCA Busselton
[8] Graham, Fiona DBCA in email to John McKinney SoAMR
[9] Hanley, Peter Department Biodiversity Conservation and Attractions, Bunbury, pers. com. and email.
[10] Bev Thurlow Strategic Projects Manager, South West Region, Department water and Environmental Regulation.

- DWER have a water level monitoring site at the old Alexandra bridge ruins. This is located on the bank opposite the recreation area and attached to one of the old pylons. It is a temporary site so if works are proposed for the old bridge site it can be moved but DWER needs notifying well in advance of this happening.
- There is bathymetry information for the Hardy inlet up to Alexandra Bridge and beyond, see below. Further liaison will occur with DWER to see if this information can be integrated with the site survey information to give a combined plan for the terrestrial and marine environments.

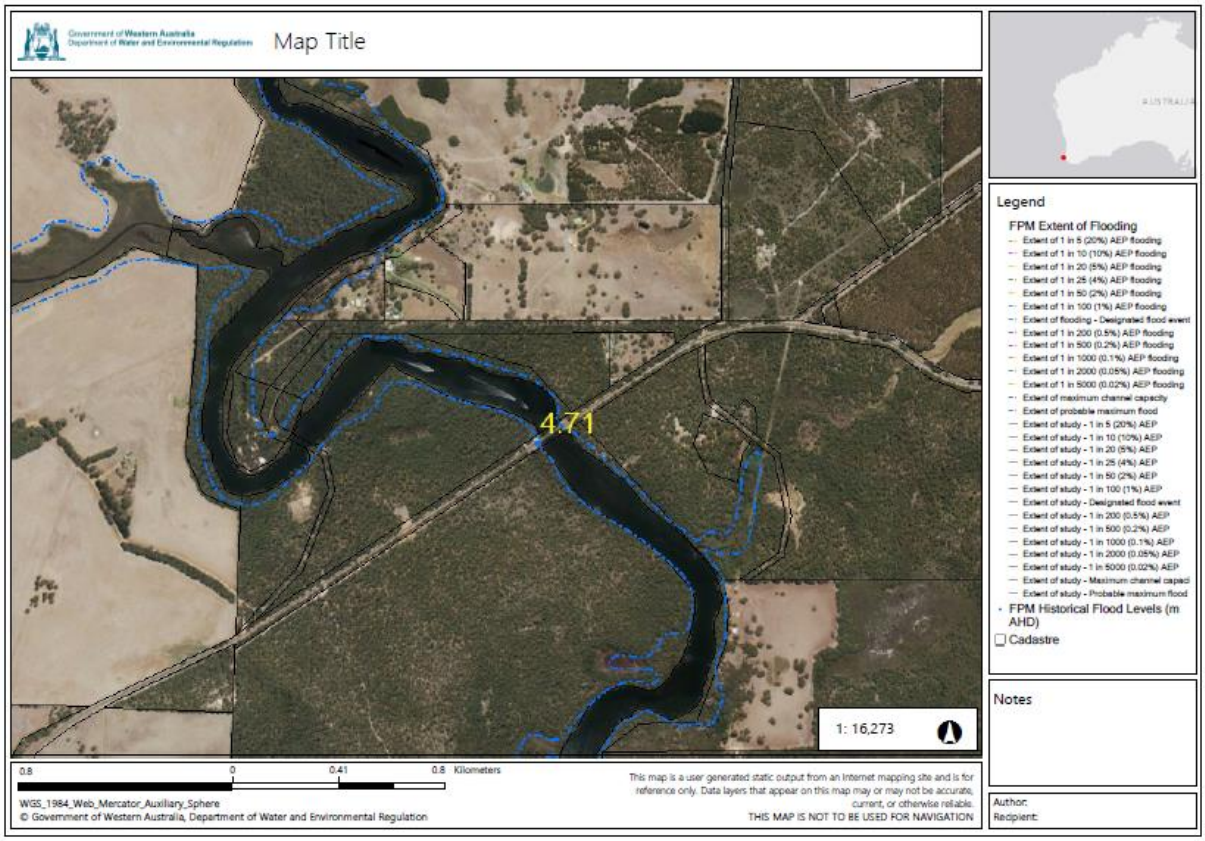


Bathymetry information around Bussell Point as supplied by DWER produced by RM Surveys

- There is one year's data from the Alexandra bridge site but the nearest long term site would be Hut Pool 609019 which has flood information back to 1983. However this might not be representative of the river at Alexandra Bridge but a value in AHD for the peak could be obtained if required.
- The Department of Water and Environmental Regulation provides advice and recommends guidelines for development on floodplains with the object of minimising flood risk and damage.
- The Blackwood River Flood Study (Augusta – Warner Glen Road Bridge) shows that the general area is affected during major flows with the following flood levels expected
    - 1 in 10 (10%) AEP 2.4 m AHD
    - 1 in 25 (4%) AEP 3.5 m AHD
    - 1 in 100 (1%) AEP 5.2 m AHD, possibly 5.25m AHD

The local topographical survey of the area will provide the most accurate assessment of where the flood line would reach[11]. It is worth noting that the faster moving water during major events will be on the outside of the bend, and the major erosion risks in the recreation area are related to boat wake.

- A surveyed peak flood level of 4.71 m AHD was recorded at the Alexander Bridge (road crossing) for the January 1982. See below



Extent of peak flood level of 4.71mAHD as supplied by DWER

- DWER floodplain management strategy for the area states:
  - Proposed development (i.e., filling, building, etc.) that is located outside of the floodplain is considered acceptable with respect to major flooding. However, a minimum habitable floor level of 5.7 m AHD is recommended to ensure adequate flood protection.
  - When development is proposed within the floodplain DWER assesses each proposal based on its merits and the factors examined include depth of flooding, velocity of flow, its obstructive effects on flow, possible structural and potential flood damage, difficulty in evacuation during major floods and its regional benefit.
- The above advice is related to major river flooding only and other planning issues, such as environmental and ecological considerations, may also need to be addressed.
- Priority with regard to protecting aquatic flora and fauna - Blackwood River has diverse aquatic fauna. Existing riparian vegetation is important to maintain trailing sedges and rushes to provide in-stream habitat, maintain water quality and maintain bank stability to support diverse aquatic fauna.

[11]Seewraj Krish, Planning Advice Program Manager, South West Region, Department of Water and Environmental Regulation, BUNBURY, WA .

Reducing access points to the river to protect riparian vegetation and bank stability is important (fencing would be ideal).

- Priority with regard to protecting terrestrial and riparian vegetation - mature trees and woodland vegetation provide habitat to Baudin's and Carnaby's cockatoos and should be retained as much as possible. Any proposal to clear vegetation or individual trees should be referred to DBCA species and communities branch for advice. Planning should aim to retain mature jarrah and marri trees (and wandoo if present). Banksia and hakea species provide a valued food source and are likely present in the understorey.
- Polices and guidelines exist around foreshore management (Water Notes – are available on the DWER website). Any vegetation clearing requires a permit (contact Adrian Wiley from Native Vegetation Clearing).

2.3.6 Department of Local Government, Sport and Cultural Industries

Department of Local Government, Sport and Cultural Industries (DLGSC)[12] supported the vision of retaining the naturalness of the Alexandra Bridge experience as low key experiences without 'the modern touch' are very popular. Floating launching points were supported as these are popular not only with canoeists and kayakers, but also stand up paddle boarders (travellers often have these as inflatable ones are available which are easy to transport). Identified swimming areas, pontoons, kayak areas are all popular. Walks are also well used particularly when associated with camp grounds.

2.4 Shire of Augusta Margaret River Manager Input

Discussions with managers within the Shire of Augusta Margaret River raised the following points for consideration.

Campground Managers

- Boat users and swimmers need separating to minimise the risk of swimmers being injured by propellers. Facility provision on the foreshore should encourage this separation.
- A family boating area.
- There is no clear location/wharf for loading boats and no set down area for boats getting ready for launching and emptying them afterwards.
- Boat trailer parking area probably has sufficient capacity.
- Clear paths and trails are needed connecting the foreshore to the campground to guide visitors and protect the environment.
- Fisheries in Busselton have been working on interpreting the story of the Black Bream and liaising with Wayne and Toni Webb on the content.
- Illegal camping on the foreshore is currently tolerated (as otherwise they will camp illegally elsewhere) but it is hoped the future development of the foreshore will discourage this camping. More signs will help.
- Groups, such as school groups can get special permission to camp on the foreshore.
- Concerns about the existing toilet block – re potential for the leach drain to contaminate the river and they are difficult to clean. In the opinion of the Holiday Parks team the existing old toilet block needs replacing (or perhaps removing altogether since there is another decent block up above and it is potentially in the flood-zone).
- Existing BBQ requires a lot of maintenance, particularly there are problems with the solar lighters and the gas bottles need replacing regularly.

[12] Jones, Troy,Regional Manager – Peel/South West, DLGSC

- Foreshore maintenance is done by the Caravan Parks team 2 – 3 times a week and they do the day-to-day work (but not weed spraying). Arbor Guy is consulted for a yearly walk through assessment of the trees and consequently does any necessary tree work, for which the Holiday Parks pay.
- Campground is running smoothly and paying for itself. More campsites would be welcomed. Odd person has a fire but rubbish is not a problem. Have been some problems with the water filter.

Parks and Gardens – Senior Technical Officer

- Parks and gardens carry out maintenance including weed spraying, rectifying storm damage, and about 2 times a year there is a 'busy bee' to bring the infrastructure such as furniture and structures up to standard.
- The play equipment is inspected every two years by a specialist. The swings are very popular.
- Playground is due for replacement. Since the swings have been in their current location they had to be taken down once to allow for a large machine (excavator or crane) to work on the foreshore.
- Existing shelter is acceptable and the timber posts are preferred to galvanised which corrodes. If metal is used it should be aluminium or stainless steel.
- A large picnic shelter providing undercover picnicking options would likely be popular especially in the winter months.
- The river areas are not currently checked for logs or underwater hazards.
- Timber is the preferred material for furniture (with stainless steel hardware and fixings).

2.5 Visitor Numbers

2.5.1 Campground Usage

The SoAMR keeps payment records for the Alexandra Bridge Campground and as it is understood there is a high degree of compliance, these figures are considered to give a relatively accurate indication of use levels.

Table 1 Number of Envelopes July 2018 – December 2019

Envelopes	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2017 -18							19	41	113	151	146	233	
2018 -19	282	219	257	189	129	72	31	45	103	140	176	206	1,849
2019 -20	273	233	239	226	123	75	40	56	111	128	190	222	1,916

Table 2 Number of Adults July 2018 – December 2019

Adults…….	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2017 -18							37	73	246	287	273	432	
2018 -19	583	436	516	412	180	140	61	88	201	306	350	397	3,670
2019 -20	617	441	509	400	287	145	82	106	201	254	343	401	3,786

Table 3 Number of Children July 2018 – December 2019

Children.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2017 -18							11	23	18	85	25	83	
2018 -19	127	29	39	69	13	12	4	9	26	16	27	52	423
2019 -20	129	25	55	68	10	15	29	7	22	34	22	54	470

The above figures indicate usage is increasing slightly and the majority of visitors are adults though in the January school holidays nearly 20% of visitors are children but overall it is closer to 10%. Visitation is low in the cold winter months with July the least popular month and January is the most popular summer month.

2.5.2 Traffic Counts

The SoAMR located a traffic counter on Clarke Drive in the vicinity of the Adelphi memorial from 23 November 2016 to 19 December 2016 see Appendix 4 for details. An analysis of the traffic count data indicates the following.

- Approximately 40 – 60 vehicles per day on weekdays with Saturday getting up to about 110 vehicles and around 100 on Sundays.
- Morning peak is 900 for Monday to Wednesday, 11.00 Thursday to Saturday and Sundays its 1000.
- On Fridays traffic continues to be busiest around lunch time with the afternoon peak at 1200, Thursdays and the weekend have a 1300 afternoon peak, Monday and Tuesday have a 1400 afternoon peak and Wednesdays has a late afternoon peak at 1600.
- 70% of the vehicles are short vehicles and an additional 15% are short vehicles towing a boat, caravan or trailer. A further 11% are two axle trucks or buses which would include motorhomes and there are a few larger vehicles up to a five axle articulated vehicle or rigid vehicle and trailer (1).

Casual observation by the consultant on the Sunday of the March 2020 long weekend between 1000 and 1100 indicated there were approximately 8 – 9 boat trailers on the foreshore at any one time which is likely the maximum number that can be expected when the traffic count figures are referred to. At that time it was also observed there were campers (tents, car based tent and a campervan) occupying most of the day use parking on the eastern section of the foreshore which is maybe why there was no day use in that area (also there are no facilities). Single vehicles tended to be parked in the western parking areas and boat trailers were mainly in the boat trailer parking area though a couple were in the vicinity of the turnaround near the toilet. A vehicle towing a camper trailer caravan was leaving the boat trailer area as we arrived.

3 Site Investigation

The context of the site is generally described in The Alexandra Bridge Campground Redevelopment and Management Plan 2016. Additional information has been sourced through consultation for this project so that the overall points to consider in relation to the development of the foreshore are noted below.

3.1 Landscape Character and Visual Qualities

The 'naturalness' and scenic quality of the area are some of its main attractions. The high scenic quality is due to

- the native vegetation with its diverse forms, lines, colours and textures;
- the valley landform with a variety of views;
- the presence of water and its ephemeral qualities and
- the relatively unobtrusive infrastructure.

Development proposals should aim to enhance these qualities and not detract from the naturalness.

3.2 The Blackwood River

The river is approximately 50-60m wide as it flows around Bussell Point and the banks on the outside of the bend are much steeper than the banks on the inside of the bend on Bussell Point, which is likely why boat access has been developed on the point. The bathymetry of the river is available from DWER see section 2.3.5. 'Steep undercut banks and damaged and degraded 'low-key' access structures are evident along the eastern foreshore'.[13] The river is part tidal / fresh water and as the site 'is about 25km from the Blackwood River ocean entrance and tidal signal is expected to be heavily moderated', but river flooding can be expected with a large upstream catchment.

The SoAMR advises flood levels are known to reach up to the second row of bricks from the top of the walls of the brick toilets which is about level 3.0 AHD. This means that most of the campground would be under water in a similar flood. The flood levels are provided by DWER, see section 2.3.5.

'The banks appear to be largely sand/clay material, with large trees effectively acting as local headlands, in terms of bank stabilisation and tree roots and foreshore vegetation providing substantial bank stabilisation'.[14]

The boat ramp is old style and low key and although quite narrow can take boats up to 7-8m and is deep enough for boats including ski boats with deep mounted propellers, but little dinghies are most common. Kayaks and other paddle craft are also popular. The ski area is 12km downstream of the bridge.

DWER advises the RFA mapping does not adequately map the riparian vegetation communities that exist within the flood zone of the Blackwood River and Alexandra Bridge is outside of the extent of the vegetation mapping that was done for the South West Yarragadee project. It is also outside the extent of vegetation health assessment that was undertaken by DWER as part of the South West groundwater areas allocation plan so information on wetland and riparian flora that should be considered could not be provided by DWER, but they advised there is a need to protect existing riparian and aquatic vegetation.

Riverine vegetation consisting of flooded gum (*Eucalyptus rudis*) and paperbark (*Melaleuca sp*.) was observed to occur along the edges of the river.

[13] Extract from Alexandra Bridge Campground – Foreshore Inspection by Stuart Barr of Shorecoastal.
[14] Extract from Alexandra Bridge Campground – Foreshore Inspection by Stuart Barr of Shorecoastal.

3.3 Aquatic Species

The river is part tidal / fresh water with fishing a popular activity - Black Bream (small to decent sized), Tailor, Whiting, Herring (further downstream) and freshwater species like Trout and Red Fin (Perch)[15] . Crabs can also be caught in pots. People fish from the banks, kayaks and boats.

DWER advised that the Blackwood River has diverse aquatic fauna. Existing riparian vegetation is important to maintain trailing sedges and rushes to provide in-stream habitat, maintain water quality and maintain bank stability to support diverse aquatic fauna. Reducing access points to the river to protect riparian vegetation and bank stability is important. DWER also advised a site 5km downstream of Alexandra Bridge had a healthy range of native fish species as follows.

- Western minnow
- Blue-spot goby
- South-western goby
- Western hardyhead
- Nightfish
- Western pygmy perch
- Freshwater cobbler
- Black bream
- Sea mullet
- Gilgie
- Smooth marron
- South-west glass shrimp

The following exotic species were sampled or found elsewhere in the subcatchment

- Gambusia
- Common carp
- Redfin perch

Other native freshwater – marine fish found in the river and its tributaries include

- Swan River goby
- Pouched lamprey

3.4 The Shore

Bussell Point (where the boat ramp is) consists of a low ridge approximately 5m above the river (at the entry to the campground), which slopes to the water's edge with slopes varying from 1:10 to 1:20 and some almost level areas of 1:50. There are dips and ridges resulting in undulating terrain and after heavy rain the depressions fill with water. To the north of the boat trailer park is a billabong, which filled with water in the 2016 winter rains, between the campground and the river but thick vegetation makes accessing this area difficult. The land is leveller adjacent to the river on the south western side of the point and these areas are particularly popular for picnicking and parking with camping further upslope. There is another deep hollow north east of the old toilets.

DWER advise the vegetation at Alexandra Bridge and surrounding area is Blackwood B8 - Woodland to open forest of *Eucalyptus marginata subsp. marginata-Corymbia calophylla-Xylomelum occidentale-Agonis*

[15] Refer http://www.4wdingaustralia.com/camping/wa-locations-camping/alexandra-bridge/attachment/the-local-possum-at-alexandra-bridge/ accessed 3.30pm 19th June 2016.

flexuosa on raised river terrace in the perhumid zone. Both Carnaby's (*Calyptorhynchus latirostris*) and Baudin's (*Calyptorhynchus baudinii*) cockatoo have been recorded at the site and are listed as Endangered fauna under State (Biodiversity Conservation Act 2016) and Federal (EPBC Act 1999) legislation. Species recordings in the area indicate that the existing woodland may be important feeding and potentially breeding habitat.

DBCA advised there is an extremely important plant species in the Alexander Bridge area but it is located beyond the extent of the current works.

There were (in 2016) a number of weed species on site including oats, grasses and other herbaceous species, Watsonia and a seedling loquat tree, but there has been some weed control since then.

The Alexandra Bridge area is defined as an Environmentally Sensitive Areas (ESA) requiring a Clearing Permit granted by DWER for any clearing, pruning or burning of vegetation.

As detailed in the Alexandra Bridge Campground Redevelopment and Management Plan 2016 'The vulnerable *Geocrinea alba* white bellied frog has specific habitat requirements with seasonally inundated floodplains of low flow creeks being the main one. It occurs on the west side of the river along small streams on private property and in the national park some 5km north west of the site, but not at Alexandra Bridge itself. The story of the frog may be of interest to visitors and liaison with DBCA and South West Catchments Council (SWCC) is required to see if this is appropriate and/or feasible.

Possums are likely in the campground and may seek out camper's food. Other wildlife probably occurs in the bush but the scent of dogs that are allowed in the campground will deter animals from coming close to the campground.

Birds are popular with visitors with swamphens and black ducks often seen exploring the campground when it is quiet, probably looking for scraps, wrens occur in the campground and a variety of birdlife can be expected on the river and in the areas of bush. Mosquitoes may be associated with the wetland areas in the relevant season'.

3.5 Aboriginal Significance

Cultural heritage management reports and assessments have been undertaken for the SoAMR by the local Bibbulmun – Wadandi custodians in association with consulting archaeologists but as these are confidential and for the use of the SoAMR and the Department of Aboriginal Affairs only, they are not referred to here. However it should be noted that there are Registered sites in the vicinity and the custodians will continue to be involved in the development and management of the area.

The significance of the area to the custodians is shared by Wayne Webb on the 'Welcome to Country' interpretation panel in the entry shelter.

'Many Aboriginal families in the South West Boodjara Region have remained closely connected to our country through several generations of change. The spirit of connection is something we are born with and it is not easy to explain except that as soon as we return to country we are overwhelmed by a need to take responsibility for our land and waters.

This strong djanga (spiritual connection) revolves around fresh water sources and our stories follow this bilya (river) as it traverses several diverse landscapes and ecosystems on its way to the sea.

Tribal groups still travel from inland to the coast annually to perform ceremonies. Traditionally they would follow this river.

All the way from the korda (heart) at Dumbelyung lakes the Goribilyiup (Blackwood River) provides a travel route to the coast.

Places like this campsite give us dartja (meat), murunge (fruits, berries and vegetables), djilgit (fish). Gabbi (water) and booner (wood for fire), karla (warmth), mia (shelter),nitji nala kalleep (this is our home fire), nala boodja (our country).

So please everyone enjoy your time here, respect nala boodja (our country), and take home kwabba kartalonga (good memories), and leave only djinna's (your footprints) behind.

Meela jinnung boorda yen jenna yen pibulmun-wadandi boodja (See you next time on pibulmun-wadandi country.'

3.6 Settler's History

The Augusta Margaret River Heritage Inventory records 2 sites for the Alexandra Bridge area one of which is Alexandra Bridge (the other is the Adelphi Memorial).

The Alexandra Bridge (Lot 4175, Reserve 25502) was built in 1897 and was named after the then Princess of Wales. It closed in 1969 when the new bridge was built and the area became a popular picnic and tourist spot. Unfortunately most of the bridge was washed away in a flood in 1982.

The significance of the bridge is moderate and includes

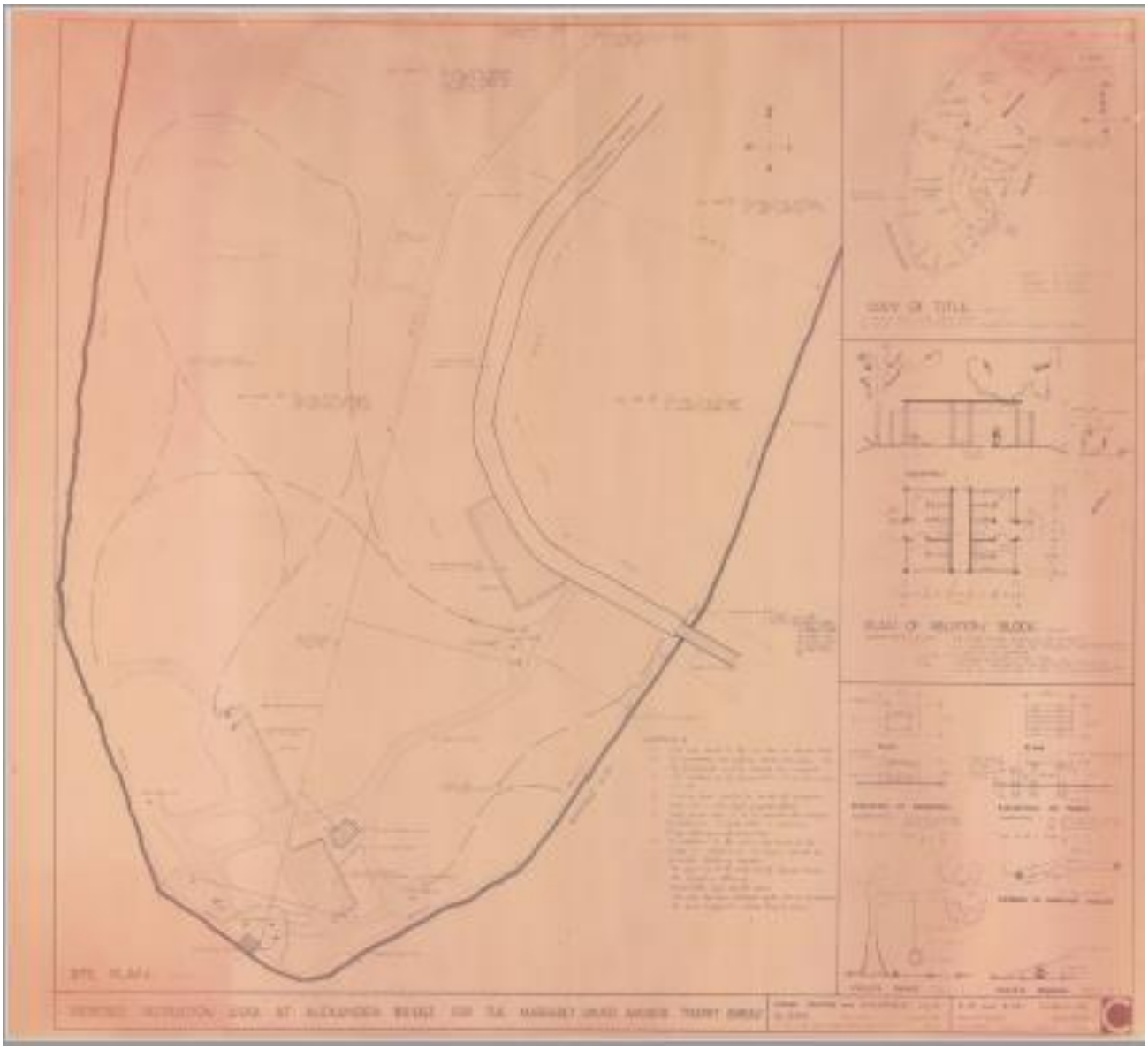
- It was the first major bridge to cross the Blackwood River.
- It is evidence of the opening up and closer settlement of the district in the late 19th century.
- It is a structure built by Wishart and Davies prominent building contractors in the region at the time who also built the Leeuwin Lighthouse and waterwheel.

The history associated with the bridge notes that the area became a popular picnic and tourist spot in 1969, and that in 1971 the 'Miss Flinders' was launched from Augusta and carried tourists to and from Alexandra Bridge .

Alexandra Bridge

In 1972 The Margaret River Augusta Tourist Bureau engaged Linear Drafting and Enterprises of South Perth and HM and EM Challis Builders of Augusta to prepare a plan for the proposed Recreation Area at Alexandra Bridge, see plan below. The plan includes proposals for parking areas, toilets, picnic areas with details of picnic tables and BBQs (they remained until August 2016) play equipment and nature walks. Some old toilets are noted for removal, a boat slip is noted on the site of the existing boat ramp and a jetty is located at the

site of the southern stairs. No mention is made of providing for camping, but expansion into Reserve 23479 is proposed.



1972 Plan for the development of recreation facilities at Alexandra Bridge

3.7 Infrastructure

The foreshore infrastructure that was in place in early 2020 is listed below.

Toilets – Pale brown brick with a green tin roof and flushing toilets are set on the foreshore. Male – 1 cubicle with pan and 1 double urinal. Female – 2 cubicles with pans. No disabled access. Napkin disposal unit – rubbish bin provided. Change table – not provided. Hand basins male and female and an outdoor shower and septics which need pumping out regularly.

More modern toilets that are disabled accessible are located in the campground near the entry road to the foreshore.

L: Existing toilets on the foreshore **R: Campground toilets with disabled parking and shed**

BBQ Shelter – A Landmark Peninsula shelter (4m x 4m and Woodland Grey roof colour) with a gas BBQ and solar powered ignition system is set on the foreshore near the swimming area. A smaller shelter (3m x 3m) in the same style and colour is used for interpretation and camper's registration at the main entry point on Clarke Road.

L: Interpretation / registration shelter **R: BBQ Shelter**

Tables – Two picnic tables remain of the original timber picnic tables (one has only one bench seat). They are associated with the swimming area.

L: Existing table **R: Disintegrating fish cleaning table**

Fish Cleaning Table – the timber fish cleaning table by the boat ramp is falling apart.

Vehicle barriers - Varied pine bollards and railings are used within the site and post and wire fencing protects revegetation areas on the foreshore. Also very large tree logs have been used to define the car parking area.

L: Varied vehicle barriers - logs and pine bollards and railings **R: Existing swing**

Swings – a swing structure is set in an area of sand for soft fall. It is old and to be replaced, the replacement swing set has already been purchased.

Rubbish – no rubbish bins are provided on the foreshore but two skip bins are set up on Clarke Road.

Boat Ramp – The low key boat ramp is discussed in more detail in section 3.8 but it should be noted it is narrow (some had difficulty backing between the edging rock walls) and has bare earth behind the walls from pedestrian use. There is no tie up point or easy access for those getting on and off the boat. Adults holding children had to climb over exposed tree roots. There are mature trees either side of the boat ramp. East is a near horizontal paperbark *Melaleuca sp*. and west is a multi-trunked flooded gum *Eucalyptus rudis* with exposed tree roots, likely making it unstable.

Foreshore stabilisation – a number of materials have been used to stabilise the foreshore including large logs, sometimes secured with posts and with associated geofabric behind. There is cemented rock work as well and timber frames infilled with sand forming steps are used to access the river's edge in three places. See Section 3.8.

Signs – a mix of signs can be found on the foreshore including DoT boating and skippers ticket signs, Fisheries Department signs, SoAMR diving risk signs and new directional signs and totems in accord with the sign style guide for Alexandra Bridge, these are discussed in more detail in Section 7.1.

3.8 Marine Engineer Assessment

Stuart Barr of Shore Coastal Engineering undertook a site inspection with SoAMR staff and VWA personnel on 25th March 2020 and prepared a Site Inspection Report see Appendix 5. This report is the basis for this section. VWA had prepared four preliminary concept designs (see section 5), as a starting point for discussions.

The report notes that although the riverbank is reasonably well vegetated there is widespread bank erosion associated with a number of factors including

- Public access management – The (bare) areas between the campground and the river;

- Design and maintenance of access structures – low cost structures that have undermined or failed;
- Design and maintenance of bank stabilisation structures – low cost 'nature based' structures of timber and cemented stone of variable success and
- Vessel impacts – wake and uncontrolled mooring and launching of tinnies and paddle craft.

The report records the following discussions for consideration

- There are some reasonable examples of successful use of logs for stabilisation see photos below. So this could be used elsewhere but considerations should be - toe scouring (should be prevented), material behind the logs will need retaining (geofabric should be used), the bank should be sloped (1:3 would take up too much space, 1:1 is adequate) and fencing for public access control.

L: Log with no scouring at toe or behind log, gentle bank and fence R: Log with second log for toe scouring

- River access structures require immediate maintenance in places (see below)

L: Undercut toe of access structure is hazardous for pedestrians R: Undercut cemented rock wall with void

- New river access structures require careful design. Compacted gravel steps with timber supports work reasonably well up slope but had typically failed in the lower more dynamic sections near the river interface.

L: Toe of steps in 2016 **Toe of same steps in 2020 – log has moved.**

- The boat ramp is an older 'low key' structure that is fit for purpose with reasonable maintenance. Any upgrades should consider widening the ramp to 4m (currently approx. 3.5m), straightening, inclusion of a floating finger jetty to improve amenity and safety of access to vessels and assist with adjacent bank stabilisation (undercut trees).

L: problems getting on and off boats and bank erosion **R: Narrow ramp, hard for backing, worn edges**

- Existing site for the boat ramp was preferred by the SoAMR at the time of the inspection as substantial works and costs would be required at any other site west of existing ramp as the banks appear to have been raised with fill. (When the survey was completed later, the fall at the river access associated with the boat trailer parking area - subsequently named River Access 1- was checked and found to be 2m from the top of the timber framed steps to the water level. As the required gradient on boat ramps is 1:8[16] this would require a ramp of 16m with a further 1.5m minimum, depending on the low water level for the river. There is the distance to do this between the river and the boat trailer parking area).
- River access structures downstream of the boat ramp (beyond Alexandra Bridge area) are relatively informal and bank stabilisation can largely be managed by public access management and some bank stabilisation.

[16] DOT, Guidelines for the Design of Boat Launching Facilities in Western Australia 25th below the Parallel, November 2009.

L and R: Malloy Island boat ramp

Other notes included in the report

- Discussion of the need to install additional jetties and pontoons for swimming and boating and the need to separate swimming and boating (especially power boating).
- In general, the site lends itself to floating jetty/pontoon structures with a suitable interface and bank abutment.
- Concepts of a canoe launch pontoon near the boat trailer parking area, a swimming pontoon at the main swimming location (near the swings), an extended floating finger jetty on the downstream side of the boat ramp, that wraps around the tree to allow temporary mooring of vessels were discussed. Further consideration in terms of concept and design development was required.

A couple of other points were made on site

- Marri is subject to marine pests and will not last long in the water, flooded gum is better and both woody debris and coir logs are useful for retaining banks.
- Type of foreshore protection used will be influenced by pedestrian access in the vicinity, ideally close the area to pedestrians, but if access is required the foreshore structure needs to be suitable for people to climb over.
- Swan River Trust has a foreshore protection guidelines publication.

Post the site inspection VWA sourced photos of 2016 river flood levels (see below). This flood covered all the logs and other uneven stabilising structures leaving only the timber framed steps, which could result in visiors/boat users not realising there were hazards along the water's edge just under the water.

L and R: 2016 floods

3.9 Reference to Swan River Trust Foreshore Protection Guidelines

A preliminary look at these guidelines[17] (available on https://www.dpaw.wa.gov.au/images/documents/conservation-management/riverpark/Management/Best%20management%20practices%20for%20foreshore%20stabilisation%20-%20Approaches%20and%20decision%20support%20framework.pdf) indicates that the first approach should be consideration of the 'do nothing' approach or 'managed retreat'. As stabilisation has already been installed some time ago this option would also require site works just to remove the existing logs and rock walling. Consequently the eight identified stabilisation techniques discussed in the Direct Shore Stabilisation Approaches of the guidelines were referred to. The logs already in place could be considered a ninth option (though with characteristics of options such as the timber walling and limestone walling) but are also referred to in the Indirect Shore Stabilisation Guidelines. The eight techniques discussed in the guidelines are listed below.

- Revegetation
- Coir logs
- Brush mattressing
- Log walling
- Cut limestone walling
- Gabions
- Rock revetments
- Geotextile revetments

In general the above list has the less expensive more natural treatments at the top of the list, but these need more gently sloping banks and lower levels of erosion. The harder treatments require more engineering to address the more extreme conditions and ensure the structures are stable and they are more expensive.

A quick review of the guidelines indicates there are some key considerations in the selection of a treatment including the following points.

- Slope – and if there is room to batter the bank back.
- Wave action/height – the amount of wave action influences the level of erosion and the height of waves directly influences the depth of toe scour.
- Water flows and velocity- influence erosion pressures and toe scouring, erosion and deposition elsewhere on the water body and erosion at the ends of any structure which is a location which often fails.
- Flood levels – these influence the amount of overtopping which is a common source of structure failure. The flood level height and frequency are considerations (it may be useful to measure the height of the existing logs at Alexandra Bridge that have stabilised banks behind as this height must be an effective height to enable the stabilisation to occur).
- Drainage – management of surface and subsurface flow.
- Trampling and vegetation loss causing erosion and removal of stabilising or re-establishing vegetation.

[17] Swan River Trust, Best Management Practices for Foreshore Stabilisation, Approaches and Decision Support Framework, December 2009.
Swan River Trust, Best Management Practices for Foreshore Stabilisation, Direct Shore Stabilisation Approaches, December 2009
Swan River Trust, Best Management Practices for Foreshore Stabilisation, Erosion control Matting, December 2009
Swan River Trust, Best Management Practices for Foreshore Stabilisation, Indirect Shore Stabilisation Approaches, December 2009

- Maintenance – appropriate regular checking and maintenance can postpone structure failure, which if it occurs will require significant rebuilding of the structures. A commitment to maintenance is required from the outset.
- Costs – are significant for all options.

To ensure the best decisions are made for Alexandra Bridge Foreshore it is recommended that any proposals put forward in this plan are reviewed by a marine engineer.

3.10 The River Banks in 2009

DWER was approached regarding the annual flood level at Alexandra Bridge as in the light of the above discussions it was considered the bank stabilisation structures should be at least the height of the annual flood level. However DWER[18] advised the stabilisation should extend to the top of the eroding bank. The complexities of stabilising foreshores were confirmed as well as the need to monitor and review previous works to learn what is effective in a situation and what failures need to be looked out for. DWER was able to provide some foreshore photos from 2009 which appear to have been taken prior to the installation of many of the current large logs. These are shown below together with 2020 photos of the same location (as best as can be determined using trees and other reference points) and comparison attempts to identify guidelines for the future.

L: Looking north of the rocked (north) access point (west of boat trailer parking) 2009 R: Same location 2020

The above photos show how without stabilisation or bank reinforcement and with continued use the bank is continuing to erode note how more tree roots are exposed in 2020 and the area of disturbance extends further inland. Also the trees along the water's edge have fallen in and there is no regeneration.

[18] Krish Seewraj, Planning Advice Program Manager, South West Region DWER


L: Looking south from rocked (north) access, in 2009 and R: Looking south in 2020

The above photos illustrate how the fill behind the logs has washed out over time. Inspection indicated fill had also washed out from behind the rock work. The photos below are of the southern end of this rockwork.


L: Southern end of above access point 2009 R: Same location in 2020

Frome the photos above it looks as though the bank has continued to erode a little and the clump of sedges has been trampled and is possibly falling into the water. The logs are holding back the bank to a degree but foot traffic is causing erosion and preventing revegetation despite the area being fenced off.


L: Looking south from south of the previous access point 2009 R: Looking north at same location 2020

The photos above are thought to be of a location south of the above access point, viewed from different ends due to the supporting posts looking like the same posts in each picture. The 2009 photo has a relatively stable sloping bank behind lower logs. Additional logs have been added in the 2020 photo to give a leveller area behind the logs, and there is fencing to restrict foot access. Although there is erosion occurring in the gap between the large logs the remainder of the bank behind the logs is stable.


L: Main swimming access (jetty now removed) looking north in 2009 R: Note fallen tree in 2020

The above photos show the bank around the tree (that has now fallen in the water) continuing to erode and recede. Installing the retaining wall has not protected the tree roots (and may even have caused more scour at its base). Access is not controlled and the tree is actually used by swimmers who climb out on it to jump in the water. Below the large logs appear to have stabilised the bank south of the previous jetty.


L: Main swimming access (jetty now removed) looking south in 2009 **R: Same view in 2020**


L: South of the old jetty, west of the boat ramp 2009 **R: Same view in 2020**

The above photos show how the combination of the log and excluding people with fencing has halted the bank erosion. However this section of bank has a different aspect to the above sections of bank and so may also have different erosion forces occurring. The sedges in the 2009 photo have gone in the 2020 photo; possibly because they had gone before the log was installed.

From comparing the above photos the following is suggested with regards to bank stabilisation.

- Without intervention and with current use patterns the banks will continue to erode, causing the shoreline to recede and trees and level land to be washed away.
- Exclusion of foot traffic from areas to be stabilised is essential.
- Logs can stop banks from eroding, particularly where they are high enough to create an area of level land/bank behind.
- Built structures such as rock walls, wooden retaining walls and combinations of low logs with rock fill behind have tended to fail and in so doing have created hazards for pedestrians trying to access the water.

4 Issues, Constraints and Opportunities

4.1 Summary of Key Issues

The following key issues have been identified on the foreshore and will need addressing in any proposals for the foreshore.

4.1.1 River Edge Erosion

The erosion along the river's edge is primarily caused by wake from boats and visitor pressure from visitors wanting to access the water or wanting to tie up boats and climb ashore. These pressures have caused the following impacts.

- Undercutting of banks resulting in trees falling in the water.
- Some of these trees have then been removed (stumps only remain in place). Perhaps these fallen trees should remain as a natural river system also has these fallen trees (refer Warren River) so they are likely part of the natural bank stabilisation process. However, they also provide (hazardous) climbing opportunities for those wanting to climb out over river.
- Undermining of previous foreshore stabilisation structures (logs and cemented stone walls) giving unstable structures and hazardous access for pedestrians to the water. These structures are along the western shore, there are no structures east of the boat ramp.
- 'Worn' river banks with vegetation removed by trampling and further inland there are large bare areas for parking which will give additional wash into the river.

4.1.2 Demand for Water Based Recreation

Provision of opportunities for water based recreation is required by the community. The social and economic benefits of these activities are acknowledged and supported but the environmental impacts and risks to visitors need managing. These impacts and risks are identified below.

- Some environmental impacts are discussed in section 4.1.1 above and the result of these impacts is less vegetation and associated fauna reducing the long term sustainability of the site.
- The erosion (and possibly the toilets see below) may be reducing water quality. There can be risks to visitors from swimming in untreated water bodies.
- Swimmers currently use areas that are also used by motor boats creating the potential for accidents.
- The boat ramp has no associated loading areas and is rather narrow.
- There are no places identified for tying up boats.
- The river's edge is currently hazardous to climb over in places.
- The community would like to see the previous jetty replaced.
- Submerged hazards cannot be seen from above the water.
- A rope swing is in place by the old bridge abutment.

4.1.3 Demand for Land Based Recreation

Shore based recreation activities such as picnicking may be associated with water based activities such as swimming or may be a direct result of the attraction of the river such as sitting watching the water or walking along the river's edge. The activities may also be indirectly due to the presence of the river such as the playground. Some issues with providing for these activities are listed below.

- The area is open and does not have defined spaces so it is unclear to the visitor how to move through or use the area.
- There are few picnic tables.
- The current playground is old and needs replacing.
- There are no facilities for less able people.

- Overhead hazards from trees are an issue that is currently managed but will need ongoing management.

4.1.4 The Toilets

The current brick toilets are functional and relatively unobtrusive but have the following issues.

- They are old and hard to clean.
- There are no facilities for disabled persons.
- The toilets are below high flood level.
- They have a septic system which needs pumping out regularly and may also be polluting the river.
- The location of the septic tanks and leach drain restrict the options for realigning the access roads.

4.2 Constraints

The key constraints with addressing the above issues and realising the vision for the area are listed below.

- Resources – although the SoAMR can resource both the day to day maintenance and the less frequent infrastructure maintenance requirements there is no funding currently available for new infrastructure and these requests for funds will be competing with other projects across the SoAMR.
- Some funding opportunities have specific requirements such as boating facility funding may require a specified number of boat trailer parking bays.
- The failed sections of bank stabilisation comprise a mix of large logs and cement rock walls which will be expensive and difficult to remove.
- The need to retain as much natural vegetation and existing trees as is feasible to increase the environmental values of this environmentally sensitive area.
- The need to maintain the naturalness of the site.
- The need to minimise future maintenance and ensure long term sustainability of proposed infrastructure.

4.3 Opportunities

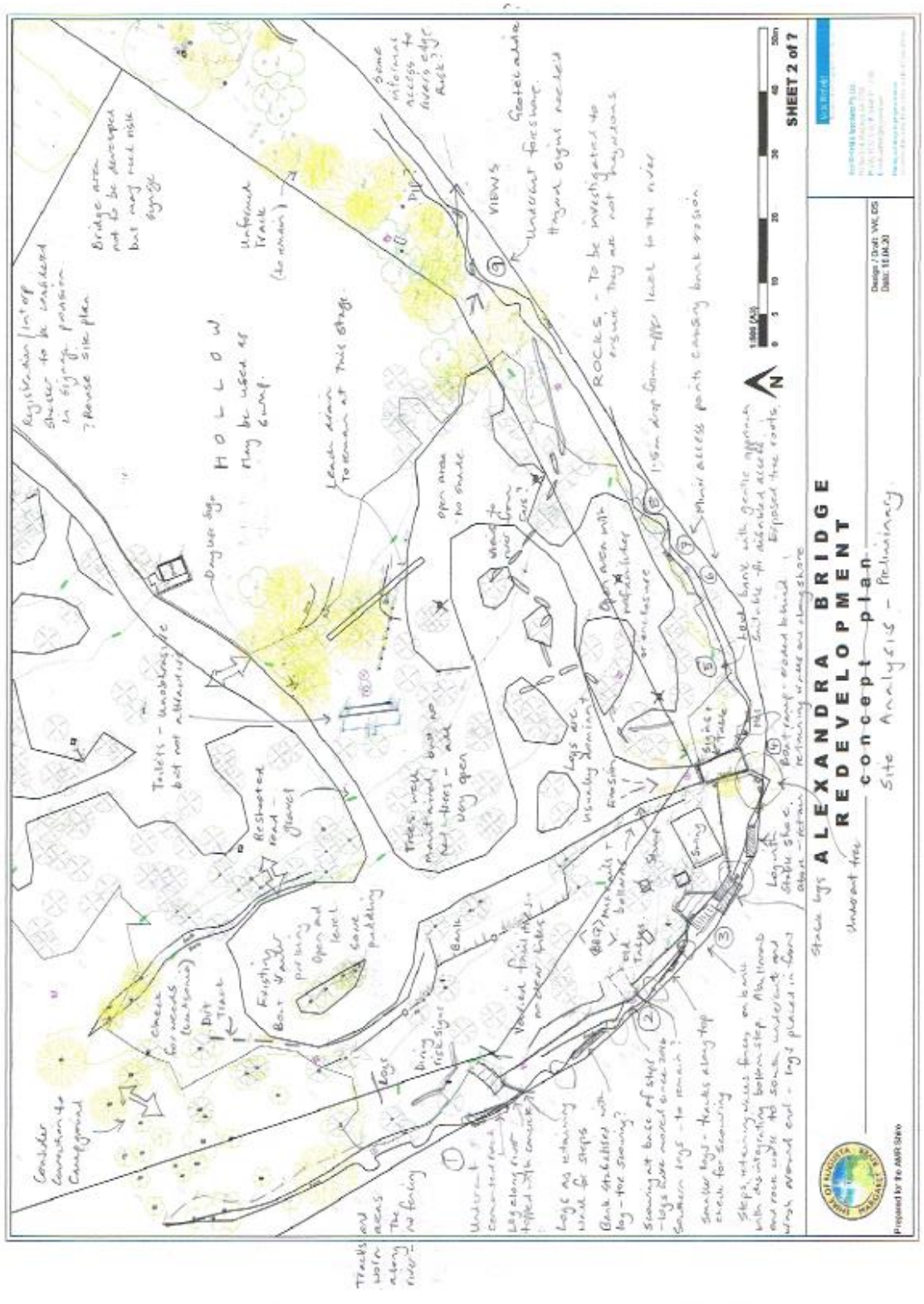
The following opportunities for realising the vision for the foreshore have been identified

- The area is highly valued by locals and visitors.
- There is support from the Undalup Association for foreshore protection works and potential river access points have been identified. Interpretation is also supported.
- There are existing river access points, some of which are degraded but these could be developed to provide safe visitor access and improved environmental outcomes. Gradients may even facilitate wheelchair access.
- An Aquatic Use Review is proposed by DoT for 2021 providing opportunity to adjust boating management (boat speeds, swimming areas etc.).
- Some sections of bank stabilisation have been successful.
- Sections of bank that are eroding but have no failed structures may be more feasible to stabilise.
- There is interest and support from a variety of government agencies giving potential for partnerships and working together.
- There are a variety of bank treatments that could be used for specific locations and to achieve specific outcomes.
- There is potential to increase both the environmental and amenity value of the area with tree and other plantings.
- There is potential to increase visitor appreciation of the area through the provision of information and interpretation.
- There are grants that could be applied for.

- There is an existing sign style guide for Alexandra Bridge.

4.4 Site Analysis

Some of the issues, constraints and opportunities together with some results of the investigations that will influence the development options are noted on the sketch of the Preliminary Site Analysis Map, see below.



5 Development Options

To encourage discussion and appreciation of the issues four concept sketches were prepared for the site as detailed below. Engineering input is required to confirm the feasibility of the road and parking layouts.

5.1 Option 1

This option is essentially the concepts that were prepared in 2016 modified to reflect fewer foreshore access points. The key components of this option are described below.

Boat Ramp – to remain where it is with no upgrades to the ramp but a rigging bay is to be created on the western side of the approach road.

Zoning for Swimming and Boating

- West of the boat ramp to be swimming only, no motor boats or boat tie up.
- East of the boat ramp, boating allowed with boat landing jetty provided.

River Access Structures – four new structures proposed

- Western access point associated with boat trailer parking – to be wide stairs with hand rail suitable for swimming and canoe launching.
- Main swimming access – wide stairs with hand rail.
- East of boat ramp – floating jetty for loading and unloading boats linked by boardwalk to boat ramp.
- Most eastern access - wide stairs with hand rail suitable for swimming and canoe launching.

Information and Interpretation

- Inclined panels associated with boat loading area.
- DoT and Fisheries Department to advise if their information can be at the boat loading jetty or needs to be at the boat ramp.
- Trailside artistic totems for interpreting plant and animal species.

Picnic Facilities

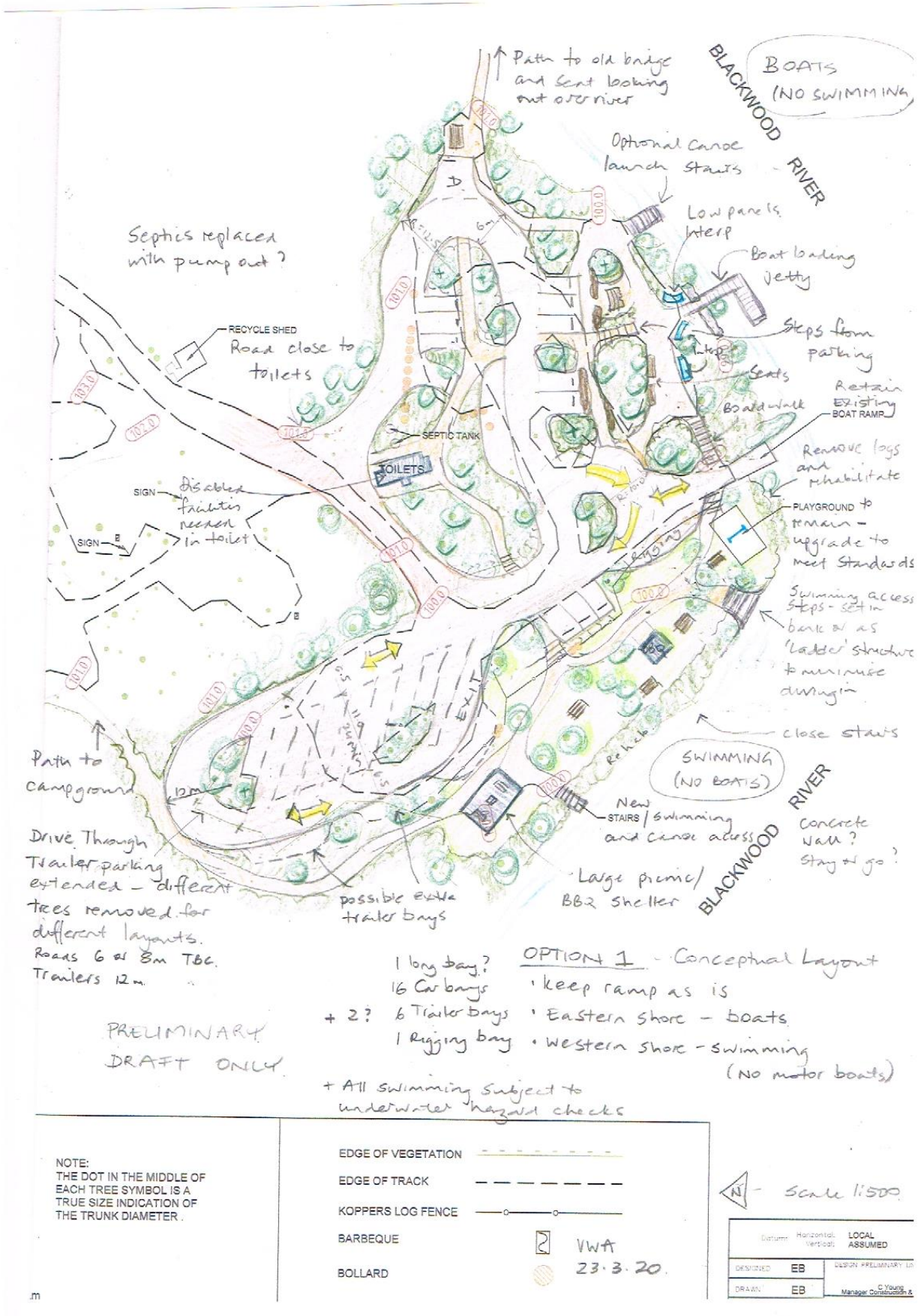
- Western shore to remain as the main focus with a large new picnic and BBQ shelter at the northern end by the boat trailer parking, additional picnic tables and a main path linking the river access structures and picnic facilities.
- Swings to remain near the main swimming area/boat ramp.
- Eastern shore to be developed with distinct picnic spaces and sitting spaces which connect to the river access structures and the car park. New planting to give interest and define the spaces.

Day Use Parking –

- Upper area has loop for easy circulation and 10 car bays including a disabled bay
- Loop connects to main access very close to toilets (engineer to check turning circles to set back as far as possible from building, may be too close to be safe), likely some tree removal.
- Above connection is on top of the leach drain and so will require new septic system.
- 3 car bays to remain close to existing BBQ shelter.

Boat Trailer Parking

- Loop circulation with 6 long bays and 3 car bays,
- 3 trees removed and 2 tree islands created one with existing trees the other with new trees.


Path to old bridge and seat looking out over river
BOATS (NO SWIMMING)
BLACKWOOD RIVER
Optional canoe launch stairs
Low panels interp
Boat loading jetty
Steps from parking
Seats
Boardwalk
Retain EXISTING BOAT RAMP
Remove logs and rehabilitate
PLAYGROUND to remain – upgrade to meet Standards
Swimming access steps - set in bank or as 'Ladder' structure to minimise damage in
close stairs
Septics replaced with pump out?
RECYCLE SHED
Road close to toilets
SEPTIC TANK
TOILETS
SIGN
Disabled facilities needed in toilet
SIGN
Path to campground
Drive Through Trailer parking extended – different trees removed for different layouts. Roads 6 or 8m TBC. Trailers 12m.
12m
possible extra trailer bays
EXIT
SWIMMING (NO BOATS)
New STAIRS / swimming and canoe access
Large picnic/ BBQ shelter
concrete wall? Stay or go?
1 long bay?
16 Car bays
+ 2? 6 Trailer bays
1 Rigging bay
OPTION 1 - Conceptual Layout
• keep ramp as is
• Eastern shore – boats
• Western shore – swimming (No motor boats)
+ All swimming subject to underwater hazard checks
PRELIMINARY DRAFT ONLY
NOTE:
THE DOT IN THE MIDDLE OF EACH TREE SYMBOL IS A TRUE SIZE INDICATION OF THE TRUNK DIAMETER.
EDGE OF VEGETATION
EDGE OF TRACK
KOPPERS LOG FENCE
BARBEQUE
BOLLARD
VWA
23.3.20
N
Scale 1:500
Datum
Horizontal:
Vertical:
LOCAL ASSUMED
DESIGNED EB
DRAWN EB
C Young Manager Construction &

5.2 Option 2

This option is similar to Option 1 except the upper car park has the exit road away from the toilets, allowing more parking spaces and the swimming (no boating) area is east of the boat ramp and the boating area is west of the boat ramp. The key components of this option are described below.

Boat Ramp – to remain where it is with no upgrades to the ramp but a rigging bay is to be created on the western side of the approach road.

Zoning for Swimming and Boating

- West of the boat ramp, boating allowed with boat tie up points (bollards/piles?) at the 2 river access points.
- East of the boat ramp to be swimming only, no motor boats or boat tie up, canoe launch allowed.

River Access Structures – four new structures proposed

- Western access point associated with boat trailer parking – to be wide stairs with hand rail suitable for canoe launching and boat tie up and loading.
- Main access – wide stairs with hand rail for boat tie up and loading, connected to boat ramp with direct stepped path and information node.
- East of boat ramp – disabled accessible fishing deck.
- Most eastern access - wide stairs with hand rail suitable for swimming and canoe launching.

Information and Interpretation

- Information node where swings currently are, with interpretation and fishing/boating information.
- DoT and Fisheries Department to advise if their information can be in the information node or needs to be at the boat ramp.
- Trailside artistic totems for interpreting plant and animal species.

Picnic Facilities

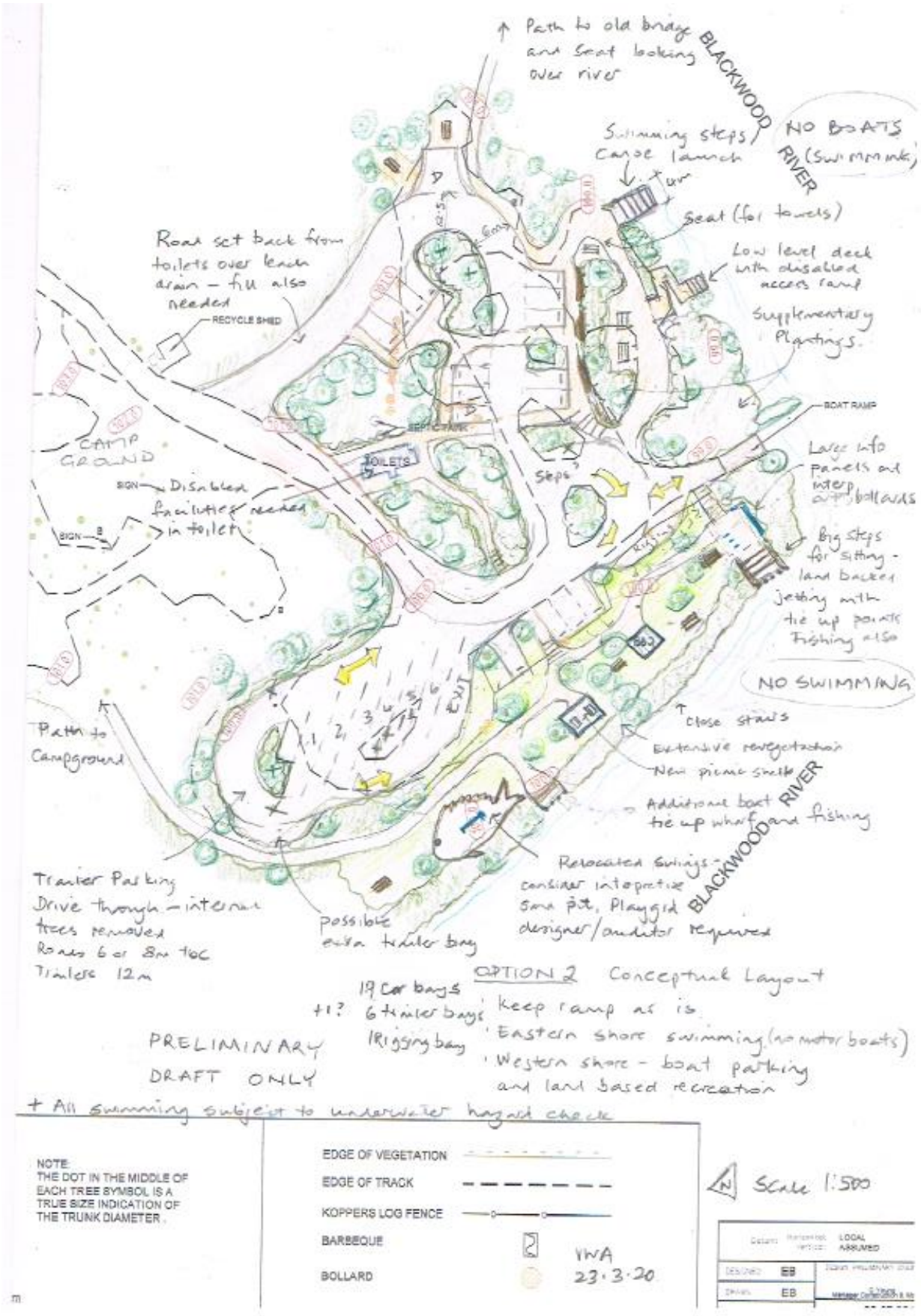
- Western shore to remain as main focus with a medium new picnic shelter near the BBQ shelter, additional picnic tables and a main path linking the river access structures and picnic facilities.
- Swings to be relocated north close to the boat trailer parking
- Eastern shore to be developed with distinct picnic spaces and sitting spaces which connect to the river access structures and the car park. New planting to give interest and define the spaces.

Day Use Parking

- Upper area has loop for easy circulation and 13 car bays including 2 disabled bays.
- Loop connects to main access away from toilets (engineer to check turning circles) likely needing tree removal and some fill.
- Above connection has some impact on the leach drain and so may require new septic system.
- 4 car bays to remain close to existing BBQ shelter

Boat Trailer Parking

- Loop circulation with 6 long bays and 1 car bay.
- 6 trees removed 1 tree island created with new trees.


Path to old bridge and seat looking over river
BLACKWOOD RIVER
NO BOATS (Swimming)
Swimming steps/ canoe launch
Seat (for towels)
Low level deck with disabled access ramp
Supplementary Plantings
Road set back from toilets over leach drain – fill also needed
RECYCLE SHED
BOAT RAMP
CAMP GROUND
SEPTIC TANK
TOILETS
Steps
Large info panels and interp bollards
SIGN – Disabled facilities needed in toilet
SIGN – B
Big steps for sitting – land based jetting with tie up points fishing also
NO SWIMMING
Close stairs
Path to Campground
Extensive revegetation
New picnic shelter
Additional boat tie up wharf and fishing
BLACKWOOD RIVER
Trailer Parking
Drive through – internal trees removed
Roads 6 or 8m toc
Trailers 12m
Relocated swings – consider interpretive sand pit, Playgrid designer/auditor required
possible extra trailer bay
OPTION 2 Conceptual Layout
19 car bays
+1? 6 trailer bays
1 Rigging bay
keep ramp as is
Eastern shore swimming (no motor boats)
Western shore – boat parking and land based recreation
PRELIMINARY DRAFT ONLY
+ All swimming subject to underwater hazard check
NOTE
THE DOT IN THE MIDDLE OF EACH TREE SYMBOL IS A TRUE SIZE INDICATION OF THE TRUNK DIAMETER.
EDGE OF VEGETATION
EDGE OF TRACK
KOPPERS LOG FENCE
BARBEQUE
BOLLARD
N
Scale 1:500
LOCAL ASSUMED
DESIGNED EB
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5.3 Option 3

This option relocates the boat ramp so it is closer to the boat trailer parking area, so more of the foreshore can be become parkland for recreation use and most of the river bank is available for swimming. The day use car parking is set east of the toilets, not connected to the boat ramp or trailer parking area. The key components of this option are described below.

Boat Ramp – to be relocated north west so it is directly accessible from the main access road. The ramp would need cutting into the river bank requiring considerable earthworks and some retaining structures. Existing failed foreshore stabilisation structures (logs and rock cement wall) would require removal and land backed loading jetties would be built either side of the ramp and would be suitable for boat tie up.

Zoning for Swimming and Boating

- Motor boats would only need to access the shore in the vicinity of the new boat ramp, enabling the rest of the foreshore to be swimming and canoeing priority areas.

River Access Structures – Four new structures proposed (including new boat ramp with loading jetties)

- New western boat ramp (near boat trailer parking) with land backed loading jetties, see above.
- Main swimming access – wide stairs with hand rail.
- Between new boat ramp and main swimming access – supplementary boat tie up if required off stairs and boat tie up structures (posts).
- Most eastern access - wide stairs with hand rail suitable for swimming and canoe launching.

Information and Interpretation

- New information node with seating near new boat ramp with DoT and Fisheries Department information.
- Information/interpretation node near day use parking and new picnic shelter.
- Trailside interpretation plaques along main route through the day use area.

Picnic facilities

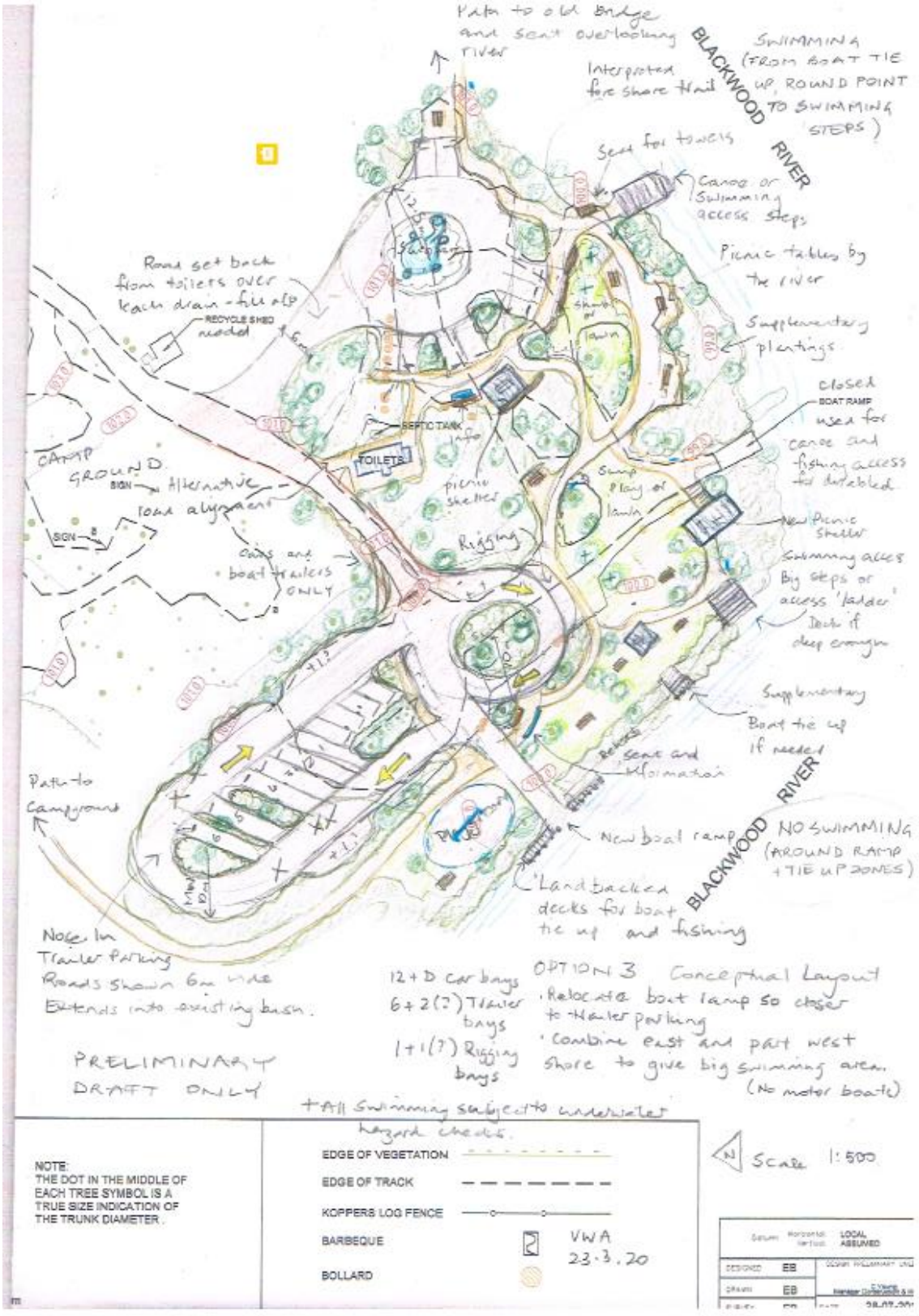
- One large parkland area to be created between the two parking areas with a central open area of lawn/dry grass and shade trees (may also be a low point and drainage basin in times of heavy rain).
- Playground/swings north of boat ramp, near the boat trailer parking.
- New picnic shelter near main swimming stairs, with views to the river and close to central play area.
- New elevated picnic shelter near day use parking that is disabled accessible.
- Elsewhere distinct picnic spaces and sitting spaces to be created which connect with paths to the river access structures, parking and additional picnic tables and seating. New planting to give interest and define the spaces and a main pedestrian through route to be defined with trailside interpretation and walk trail markers.

Day Use Parking

- Separate access off the main entry road east of the brick toilets with a loop and parking (9 bays of which 1 is disabled). Parking is high in the landscape so less likely to be flooded. Some tree removal and fill may be required.
- The above connection has some impact on the leach drain and so may require a new septic system.
- 5 car bays provided in the boat trailer parking.

Boat Trailer Parking

- Existing boat trailer parking area extended and combined with new loop for manoeuvring to the boat ramp and possibly a rigging bay. Loop circulation with 6 long bays and 5 car bays.
- 5 trees removed and approx. 5 tree islands created with existing and new trees providing shade.



5.4 Option 4

This option retains but redevelops the existing boat ramp, upgrades the boat trailer parking area and realigns and upgrades the car parking area so it is set back from the river to give more parkland space.

Boat Ramp – to remain where it is, widened a little and a floating jetty/wharf developed on the downstream side to give boat loading and boat tie up facilities. A boardwalk will connect this deck to the eastern picnic areas to avoid pedestrian conflict with boat launching vehicles. A rigging bay is proposed for the western side of the approach road.

Zoning for Swimming and Boating

- As there will be boat tie up associated with the boat ramp motor boats will only need to access the shore in the vicinity of the boat ramp, enabling the rest of the foreshore to be swimming and canoeing priority areas.

River Access Structures – In addition to the jetties/wharves above, 4 -5 new structures are proposed.

- Western access point near the boat trailer parking – to be wide stairs with hand rail suitable for canoe launching and could be boat tie up and loading depending on river zoning.
- Main access – wide stairs with hand rail for swimming and floating pontoon moored in the river.
- East of boat ramp – disabled accessible fishing deck if requested by Fishability or it could be an additional boat mooring location if extra capacity required.
- Most eastern access - wide stairs with hand rail suitable for swimming and canoe launching.

Information and Interpretation

- Information node where swings currently are, with interpretation and fishing/boating information and central square seat / platform table for viewing the river.
- DoT and Fisheries Department to advise if their information can be in the information node or needs to be at the boat ramp.
- Trailside plaques or artistic totems for interpreting plant and animal species or artwork on proposed structures.

Picnic facilities

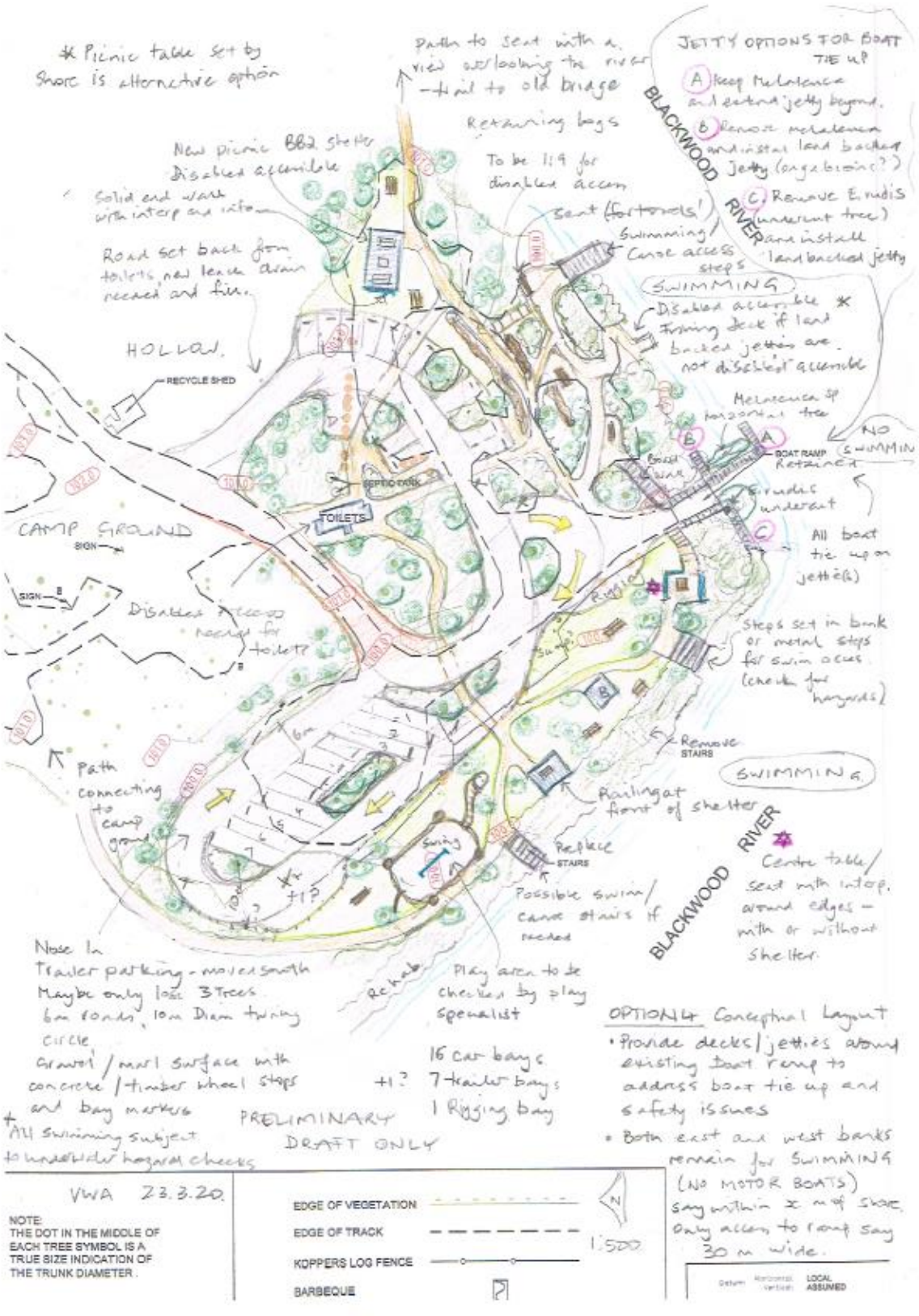
- Western shore to be upgraded with a medium new picnic shelter near the BBQ shelter (overlooking the river if feasible), additional picnic tables and a main path linking the river access structures, the information node, picnic facilities, swings and connecting to the campground.
- Swings to be relocated north close to the boat trailer parking.
- Eastern shore to be developed with distinct picnic spaces and sitting spaces which connect to the river access structures and the car park. New planting to give interest and define the spaces.
- New picnic / BBQ shelter set on the upper level close to the carpark with disabled facilities. Path to be provided at disabled grades linking the upper level to the Fishability fishing deck.

Day Use Parking

- Upper area has loop for easy circulation and 12 car bays including 1 disabled bay.
- Loop connects to main access away from toilets (engineer to check turning circles) likely needing tree removal and some fill.
- Above connection has some impact on the leach drain and so may require a new septic system.

Boat Trailer Parking

- Boat trailer parking area is extended to better link to the boat launching area and provide larger tree islands so only 2-3 trees to be removed (engineer to check layout and circulation).
- Loop circulation with 7 long bays and 4 car bays. Rigging bay provided close to boat ramp.



5.5 Discussion Outcomes

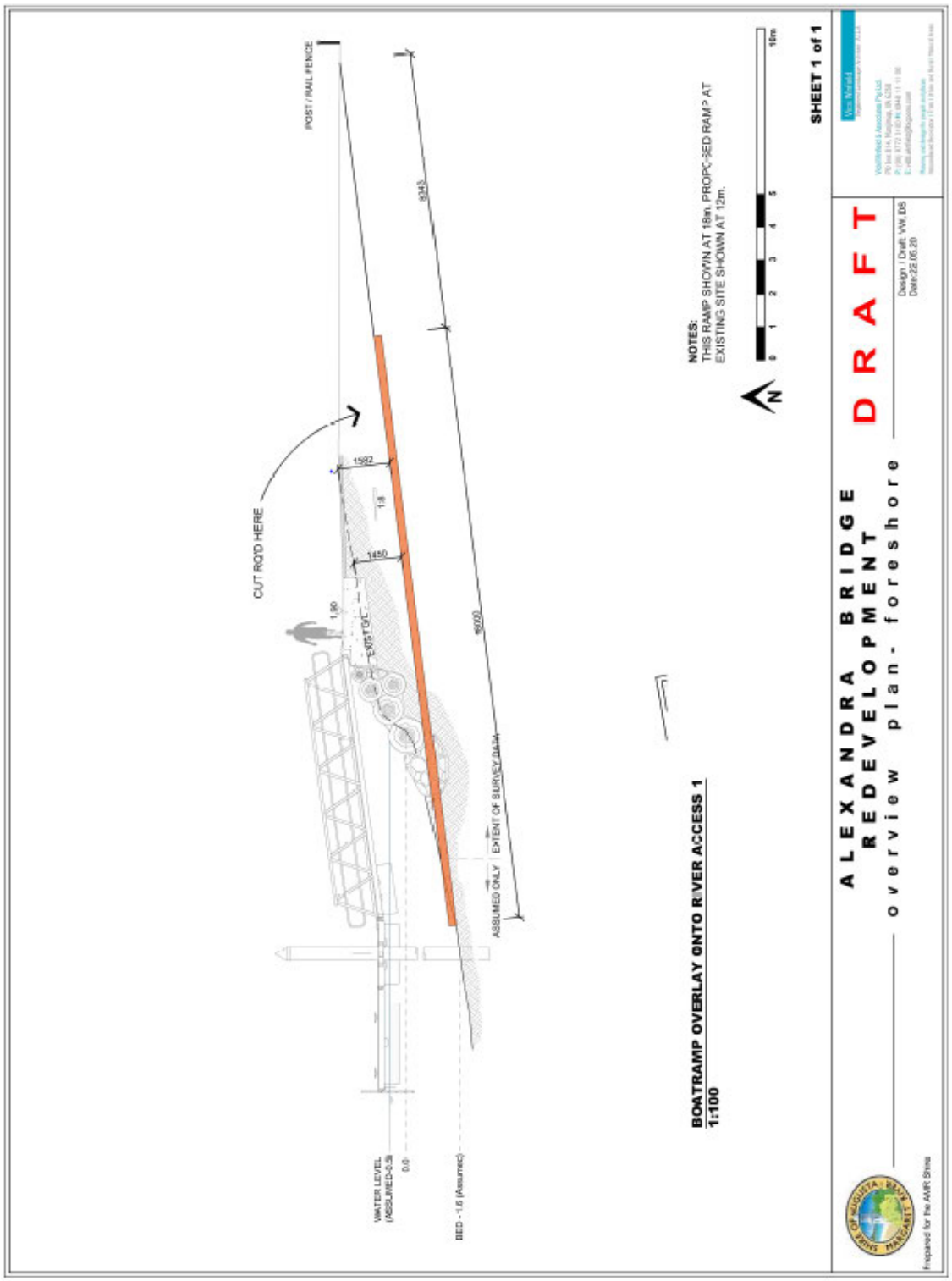
The above options were discussed and relocating the boat ramp to the north, closer to the boat trailer parking was acknowledged as having considerable benefits. Initially, primarily due to the expected scale of works associated with relocating the boat ramp to the northern location (River Access 1) by the boat trailer parking, it was decided to keep the boat ramp where it was. The overall discussions resulted in SoAMR giving the following direction for the foreshore proposals.

- The boat ramp is to remain in its current location but supplemented with tie up jetties.
- Option 4 boat trailer layout was preferred but it is to look as unstructured as is feasible to maintain the appearance of naturalness.
- Playground to be located as for Option 4, but detail design of playground to come later.
- New picnic shelter with picnic table to be as for Option 4.
- Existing sandpit area to become information/interpretation point and also viewing point for watching the swimming as long as the signage does not detract from the view or informal nature of the area.
- East of the boat ramp to be more secluded picnic spots defined by new plantings.
- Paths – clear links to the camp ground and toilet constructed with natural materials so as not to over formalise the area. Return walk trail (interpreted) along river, to the old bridge (just undeveloped track as is), up to the camping registration (if the track is not slippery) with an option to return to the boat ramp via the access road (as the access road is not too busy this should be suitable for walking – a second trail by the road is unlikely in the short term but may be considered long term). Access for the less able to the toilets, the interpretation, at least one BBQ, shaded seating and a viewing point, connected to a parking bay if feasible.
- The upper day use parking is not to be developed at this stage, as the current toilet is to be retained.

The following section 6 was initially prepared on the basis of the above directions however during the course of developing the concept design a couple more factors emerged which were considered before finalising the designs for the foreshore as follows

- Once the survey was available the likely gradients and extent of cut and fill for a boat ramp relocated to near the boat trailer parking was briefly looked at, see basic cross section on the next page illustrating the proposed canoe launch superimposed with a possible location for a boat ramp of gradient 1:8; the post rail fence shown is the edge of the current boat trailer parking.
- It became apparent the existing boat ramp essentially needed rebuilding and so the proposals involved 2 major jetty structures – a new boat ramp with finger jetty and a new canoe launch structure. If the boat ramp was relocated north the existing boat ramp could be used for launching canoes (though it would not be as easy for the elderly to launch their canoes) giving reduced costs.
- There was no room for a playground as the space previously allocated for play would be needed for rigging canoes.
- As Fishability is interested in having appropriate facilities at the site, the option for additional mooring capacity adjacent to the existing boat ramp was limited and so the overall mooring options would be limited to the finger jetty at the boat ramp, which would need to be quite big to provide enough capacity, this may require removing existing trees. As boat mooring is an activity that significantly impacts the foreshore (trampling and erosion) it is important it is appropriately addressed / provided for.
- There are no options for a larger picnic / BBQ shelter.
- For the existing and possible new boat ramp locations, boat manoeuvring / backing etc. and rigging areas needed closer investigation. Trailer parking circulation requirements were also critical as it is likely a number of trees and significant earthworks will be required to achieve Australian Standards.

- The zoning of boating and swimming areas would not be simple if the current boat ramp is retained – a couple of different zones would be required to support the proposed infrastructure.



Consequently relocating the boat ramp to the northern location just west of the existing boat trailer parking became the preferred option. The SoC engineer undertook a preliminary assessment of the new parking layouts and considered them feasible and so Option 3 became the preferred option and was further developed as a the concept plan which was presented to Council, the community and Undalup Association.

6 Proposed Development

The preliminary concept plan V3, as generally approved by Council, the community and Undalup Association by September 2020 is shown below.

Preliminary concept plan V3 as generally endorsed by the community mid 2020

The various elements are discussed in more detail in the following sections and are all subject to engineering and other specialist input before they can be confirmed as proposals.

In summary the concept plan aims to have boating on the north western bank and foreshore area with the southern area providing for activities such as swimming and canoe launching, a playground and open parkland for kicking a ball, and the eastern area will provide enclosed picnic spaces / sitting areas and access to the water for swimming and fishing. A pontoon will be set off the eastern shore which should keep swimmers away from the boating area and the need for buoys to exclude boats from the swimming area will be discussed with DoT but is not preferred as they will detract from the natural appearance.

6.1 River Bank Management Strategy

The proposed strategy for managing access to the river and ensuring the long term sustainability of the banks is summarised below.

- Reduce erosion from boats by reducing the boat speed to 5 knots. DoT is proposing an Aquatic Use Review for 2021 which will likely be the time to review boat speeds and swimming only areas.
- Managing wash from adjacent parking areas by facilitating on site filtration (with sumps and use of existing depressions) and slowing of flow over rip rap or through vegetation.
- Stabilising and defining river access points so that they are welcoming and easy to use so visitors are encouraged to use them. Knowledge of low water levels and flood levels to be incorporated into the designs and jetties and structures to be floating so that only one pile in the river is required. Areas between access points will be fenced and rehabilitated.
- Providing interpretation / education which explains why it is so important to let vegetation regrow along the banks (preventing erosion, and maintaining amenity and habitat).
- Using locations of existing access points so no new areas are disturbed and ensuring the redevelopment stabilises the access point and sustains it into the future.
- Rationalising access so some current access points can be closed and rehabilitated.
- Removing all failed and redundant structures and where possible reusing the material.
- Fencing and revegetating all areas to be protected and as needed using brushing to further restrict access.
- Retaining structures / logs that are effectively stabilising banks, supplementing these structures as required (particularly with toe reinforcing - either rock plus geofabric, or secured coir log).
- Installing new stabilising materials, especially coir logs, geofabric, coir/jute mesh and brush material as required.
- Existing logs are to be reused where feasible or sourced locally and any rocks that are to be brought in should be sourced locally as feasible.
- All proposals and this strategy are to be approved and refined by a marine engineer as VWA does not have knowledge of water velocity, tidal differentiation, impacts of floods etc.

6.2 River Access Point Proposals

6.2.1 River Access 1 (Northern Access) – New Boat Ramp

It is s proposed to relocate the boat ramp to west of the boat trailer parking, accessed via a new backing loop just south of the trailer parking area. Boat tie up places will be optimised (possibly with stairs either side of the ramp and a new finger jetty will be needed to facilitate getting on and off boats. The concepts and designs are to be prepared by a marine engineer but may include the following.

- New ramp at an even grade from car park to water (to be designed in accord with relevant standards). Sides of ramp to gently grade out at grades that can be grassed if feasible (remove existing timber retaining wall and railing and any angled logs). If batters cannot be achieved consider

using retaining logs 600mm diameter (high) or less (so railings are not required)or rip rap on geo fabric.

- Remove cemented rock and consider breaking it up and using as rip rap for toes of logs that are retaining foreshore banks.
- Foreshore to be stabilised with logs (can reuse logs that are there) under structures where feasible. Geofabric to be placed behind the logs, behind the joins in the logs and to extend beyond the log under toe rip rap. Bank above the log to be protected from pedestrian access and revegetated (as for existing bank to the south).

From a hydrological perspective the proposed boat ramp location is similar to the existing location, being on the inside of a major meander (river bend[19]). Therefore, there will be no increased erosion risk related to river flows unless the bank downstream of the ramp protrudes out further than the bank upstream of the ramp. This could result in localised eddies forming and the turbulence could create some local erosion, which will then be more susceptible to boat wake and river flows (during major events). The provision of bank protection would mitigate this risk, and as discussed above this to be provided in the form of rocks and logs.

L: Existing access looking north

R: Denmark floating jetty Launch

Northern access viewed from a drone **Photo Jeff Walker**

[19] Seewraj, Krish, Planning Advice Program Manager, South West Region, Department Water and Environmental Regulation, pers. com. and email.

6.2.2 River Access 2 – To be closed

Access point to be closed and rehabilitated.

- Remove loose logs and pole and place rocks, rubble or coir log at toe of remaining log.
- Remove timber steps and reshape bank so that erosion does not occur down the bank.
- Relocate fence back from foreshore and close access to the river.
- Lay jute mesh on bank, secure and plant through mesh on bare areas.
- Lay brushing/branches along the edge of the bank to restrict pedestrian access.

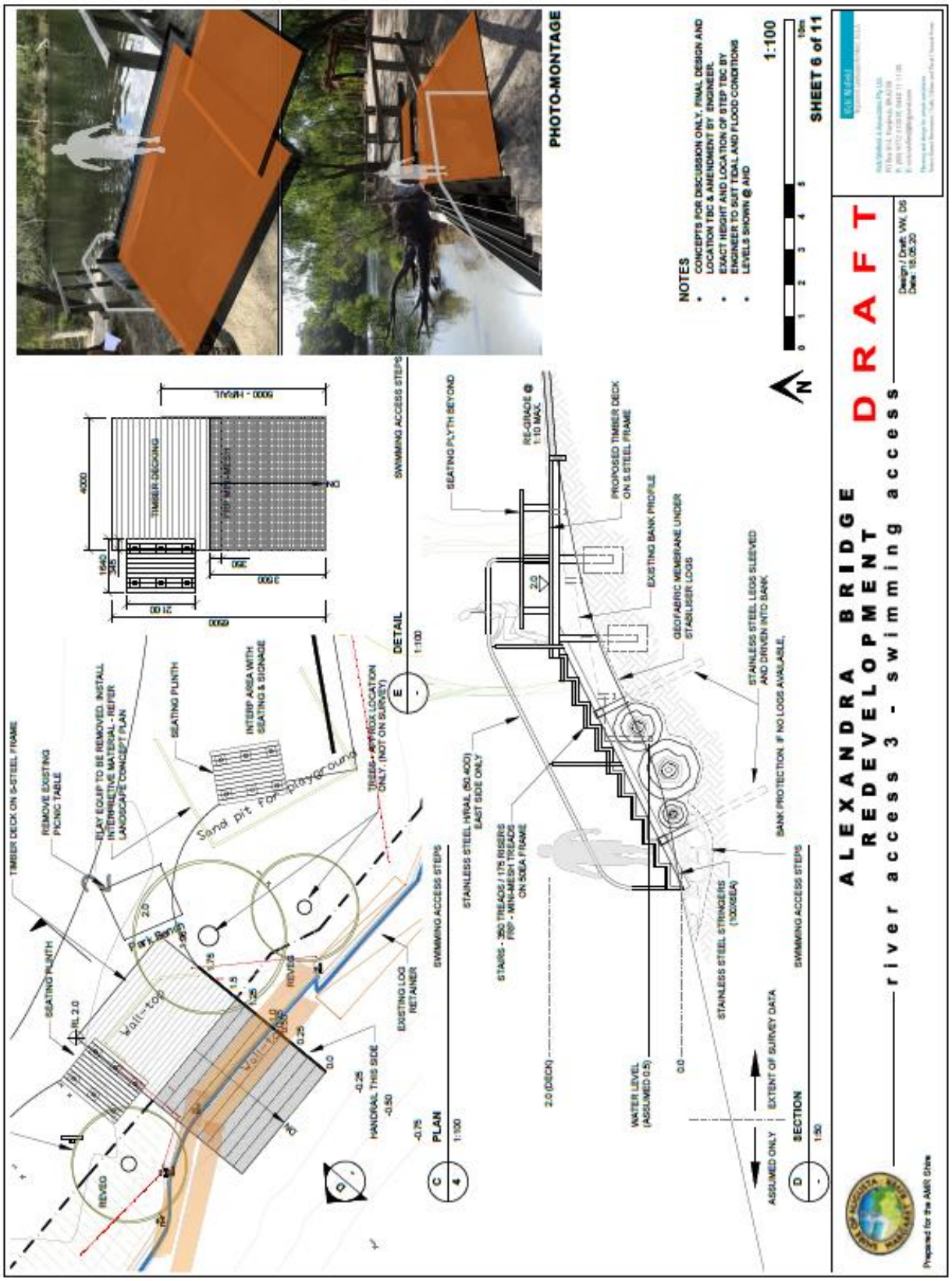
L: River Access 2 - to be closed

R: River Access 3 – Main swimming access

View to main swimming access – Access 3 **Photo Jeff Walker**

6.2.3 River Access 3 - Main Swimming Access

- This is the location of the previous jetty removed some time after 2009.
- The existing shallow steps and falling apart logs etc. at the base of existing stairs are to be removed, a retaining log placed out from the toe of the steps along the original shoreline (with geofabric behind and rubble at the toe) and back filled almost to the original bank/ground level.



Indicative ramp but steps now likely extend further into the river as old shoreline to be re-established

- The big log along the water line should stabilise the bank under the stairs (with geofabric behind, and rubble at toe) but this may give issues for driving the post into the banks, so a small log and toe reinforcement may suit better (will need securing) with jute above it or a coir log to hold the bank in place while it revegetates (sufficient light should come through the fibre reinforced plastic to enable plant growth).
- There will be more space at the upper level which will be mostly decked with the stairs (4m wide) taking off at the water line extending out into the river (accessing deeper water if feasible).
- Logs south of this will be retained (see photo above), but toe scouring may need addressing and visitor access excluded to the top of the logs (new steps to be used for sitting on, not these logs).


L and R: Deep Reach swimming access – similar proposed for Alexandra Bridge swimming access but with timber decking

6.2.4 River Access 4 –Canoe Launch Ramp

The existing boat ramp is to be retained and use for canoe launching.

- The ramp may need resurfacing (to be advised by marine engineer) but essentially the ramp will be retained as it is. Rubber or a softer material could be considered, but providing there is a grass rigging area nearby the existing hard surface should be acceptable.
- The worn banks either side will be revegetated, protective fencing may be needed in the short term and jute logs or similar may be needed to stabilise the trees either side of the ramp until new vegetation establishes.
- A map of the river showing where canoes can pull up for a picnic rest has been suggested by canoeists.


L: Existing boat ramp to be widened and straightened R: West wall

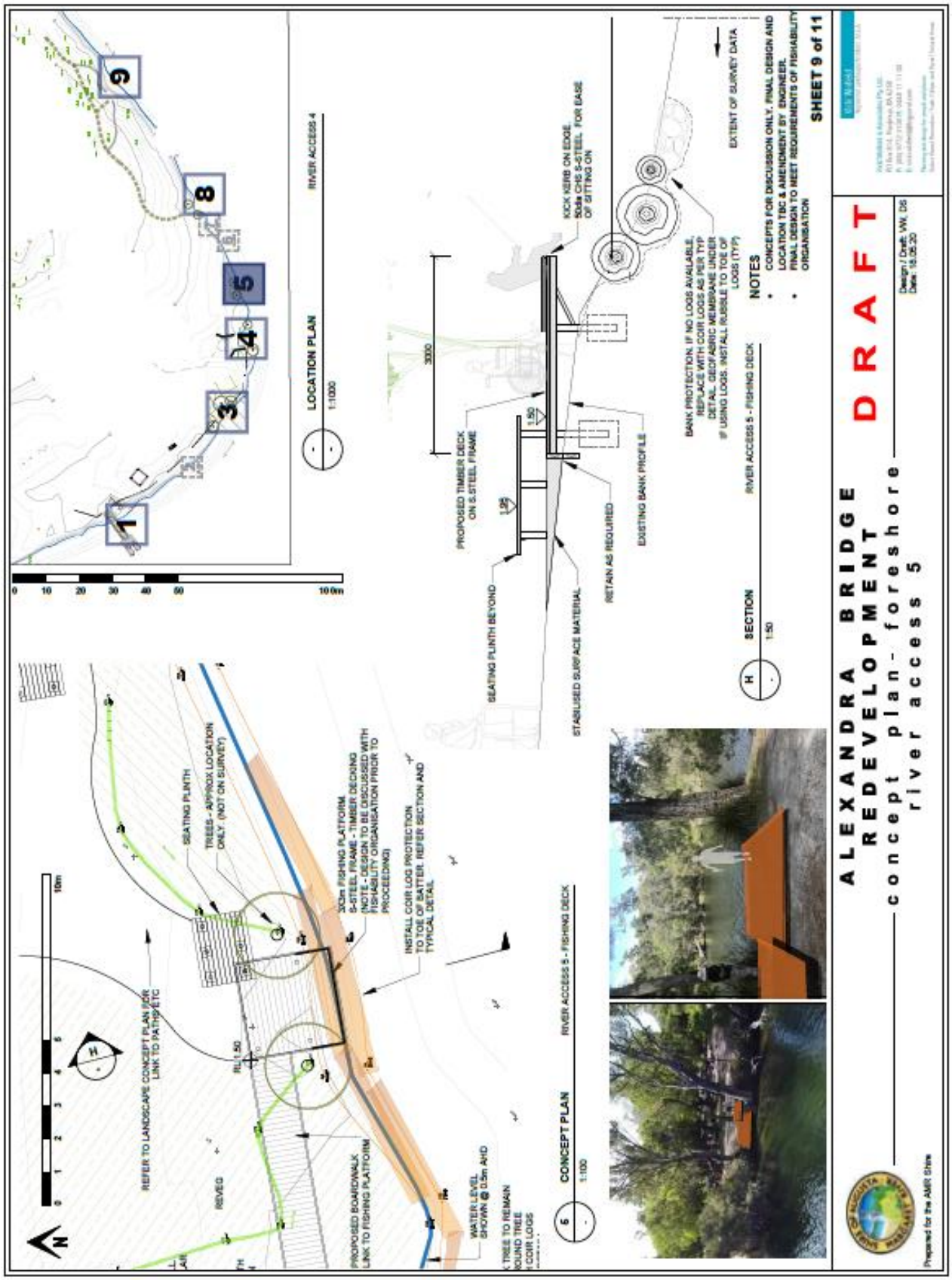
View north to Bussell Point, swimming access to left , boat ramp in centre and potential disabled fishing access or supplementary mooring location to the right (in front of the figures). Photo Jeff Walker

6.2.5 River Access 5 – Potential Disabled Access Deck

This existing access point needs to be stabilised and revegetated or developed as an access point and as the eastern area will now have a focus on day use with boat launching located on the western shore the provision of an access point is recommended.

- If the area is to be rehabilitated it requires coir logs set out from the existing root zone, secured and backfilled with granular material (shale) this should have jute matting laid, secured and planted to hold it in place. Levels, locations and quantities of coir logs will depend on low water and flood levels as will plant species selected and where they are planted. This coir log structure should continue along the eastern shore to stabilise River Access points 6, 7 and 8 and finish at the stable banks east of River Access 8. Logs may be required as well where the bank is over 500mm high, see section 6.2.3.
- If a disabled fishing deck is proposed this is to be approx. 3m by 2m steel framed cantilevered structure, probably with fibre reinforced plastic deck but could have a timber deck. Structure would need confirming with Fishability. Coir logs etc. will be needed as in the point above, to stabilise the foreshore.

L: Exposed roots to be protected and revegetated R: Low cantilevered deck at Nornalup



Indicative structure for Fishability deck, to be confirmed by engineer and Fishability representatives

6.2.6 River Access 6 and 7 – Rehabilitate

As River Access 5 may remain an access point and River Access 8 is proposed to have swimming stairs, River Access 6 and 7 are both proposed to be closed and rehabilitated. The coir logs are to form a continuous structure from River Access 5, past River Access 8 to stable banks associated with the rock outcrop in the river. The technique is to be the same as is described for rehabilitating River Access 5 above, but due to the steeper slope, brush and branches may also need to be laid over the area to be rehabilitated. If the banks are too steep to only use coir logs, timber logs with geofabric behind and rubble at the toe can be used to achieve the required height. The continuous line of coir logs will follow the original river edge and additional logs may be needed within the embayments at the toe of the bank. The area will be closed to visitors with fencing and additional planting.

L and R: River Access 6 to be closed and rehabilitated

L and R: River Access 7 to be closed and rehabilitated

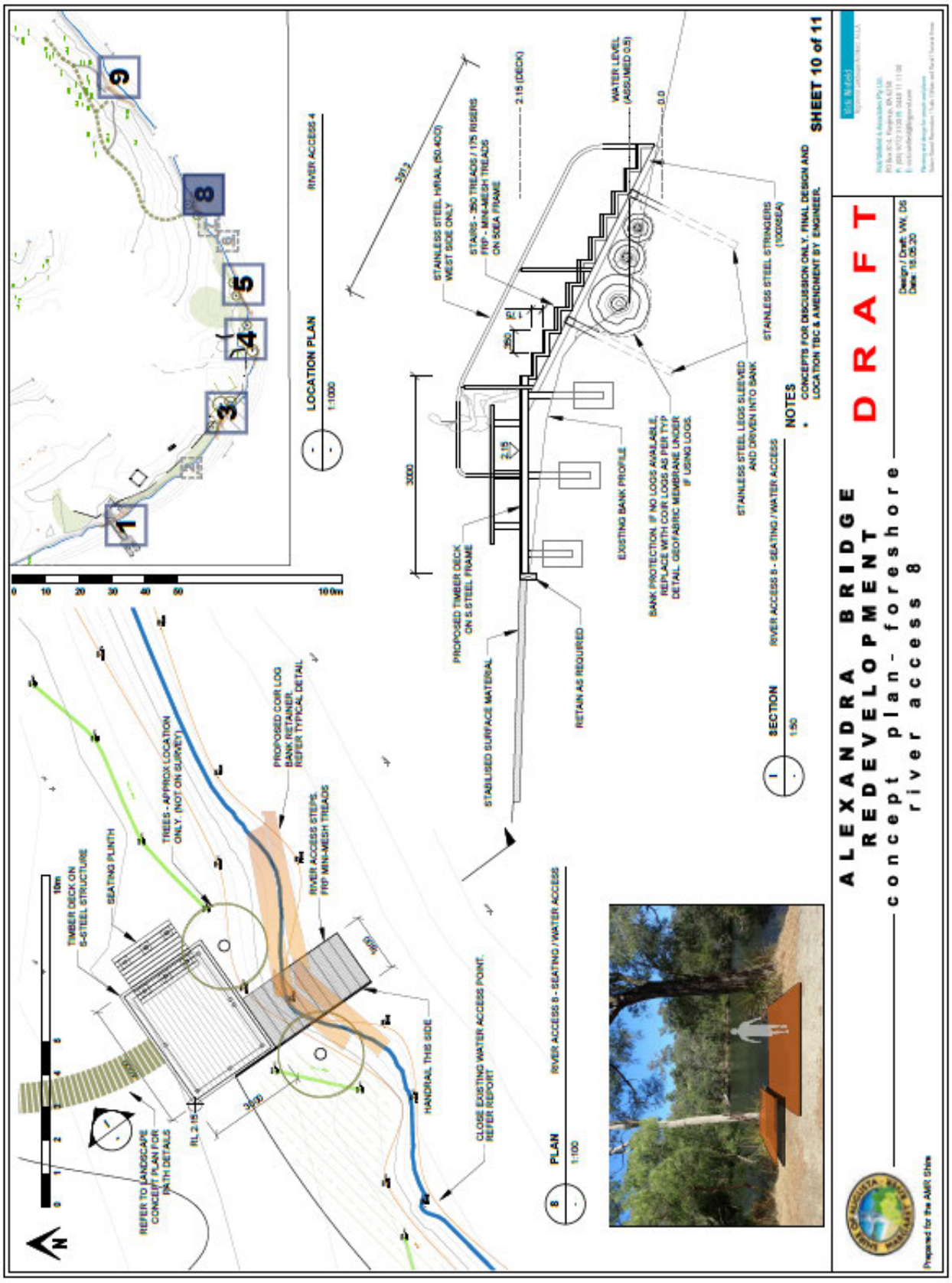
Eastern Shore - Rock outcrop on right, River Access 8 adjacent and centre Photo: Jeff Walker

6.2.7 River Access 8 – Eastern Swimming Access

The land has started to rise from the river and the bank here has a drop of about 1.5m, giving a steep slope down to the river that is currently eroding and it is proposed to formalise this access to provide an access point for those picnicking on the eastern foreshore. It is possible the eastern shore will become the focus for day use once the new boat ramp is installed and so these steps should be as wide as is feasible.

- The old shoreline will be re-established and the river's edge will be stabilised with coir logs and fill supplemented with jute matting, planting and brushing as described above.
- A gathering and sitting deck or open area is to be provided at the higher level.
- Safety of overhead trees to be checked and if any trees are to be removed a wider set of stairs may be feasible.
- River depths associated with the rock outcrop to be inspected.
- Swimming access / sitting stairs (with hand rail) to be provided from the deck to the water using the same design (but narrower unless trees are removed) as is used for the main swimming access location.

L: River Access 8 proposed sitting area R: Existing access requiring stairs over.



Indicative swimming stairs, likely wider than shown and extend further into river on re-established shoreline, to be confirmed by engineer.

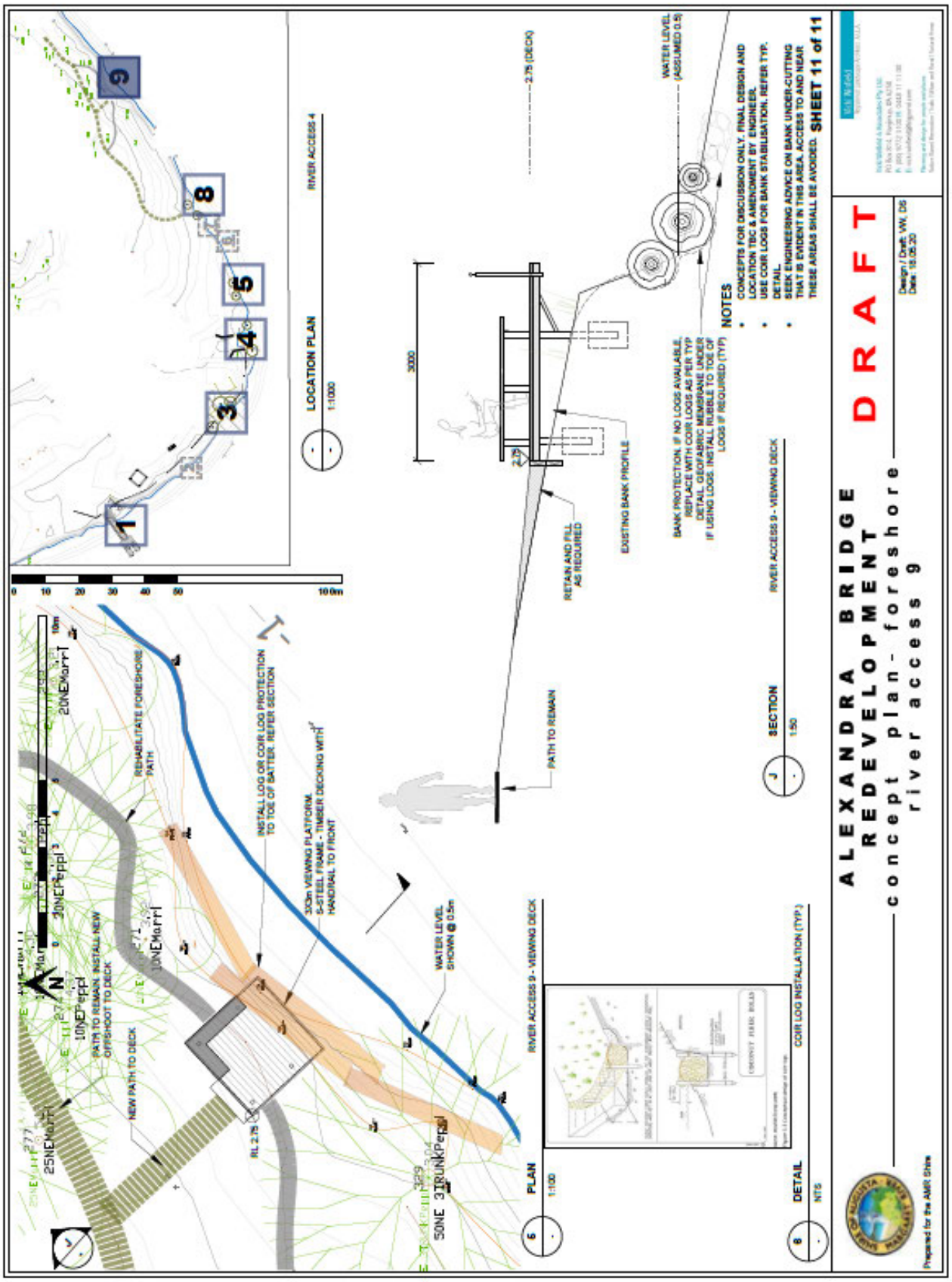
6.2.8 River Access 9 Viewing Point

East of River Access 9 is a stretch of foreshore that is not readily accessed by visitors which may be quite stable (due to the rock outcrop shown on aerial photos). This section of foreshore needs further investigation, probably from the water as the bank is so steep. Further east again is an eroded embayment, with undercutting on the headlands and a drop of 1.5 – 2.0m with the path close to the edge and access to the water.

L: Undercut foreshore **R: Existing track very close to edge of bank**

As this is some distance from the main use area no additional river access structures are proposed, though a viewing deck could be considered long term (but would need a geotechnical report). Instead it is proposed to align the path away from the bank edge and place a seat north of the path with views to the river, and if feasible to the old bridge. Some pruning or thinning of vegetation may be required to achieve the view.

L: River views from possible sitting area **R: River glimpses (could be strategically opened up) from walk**



Possible viewing deck for consideration long term.

6.3 River Bank Stabilisation

The most important aspect of stabilising banks is removing the causes of erosion and the strategies for achieving this are detailed in the previous section 6.1. and these management actions will go a long way to enabling the banks to stabilise themselves and establish reed beds and other vegetation with thick root matts that will hold the banks together. However there will still be some pressures from boat wake and some areas are badly eroding and will require remedial action and possibly supplementary planting to stabilise and become rehabilitated.

There are a number of publications available on the Parks and Wildlife website[20] with the publication 'Best management practices for foreshore stabilisation - Direct shore stabilisation approaches' [21] and 'Indirect shore stabilisation approaches' prepared by the Swan River Trust in 2009 having a range of treatments and 'Best management practices for foreshore stabilisation – Erosion Control Matting' in the same series details has how to use erosion control matting. It is recommended the SoAMR refer to these documents when installing erosion control and bank stabilisation infrastructure.

The following situations have been identified on the Alexandra Bridge foreshore and associated indicative recommendations have been made (based on reference to these publications and analysis of the site) with the preferred option to be selected by the SoAMR based on resources available, input from SoAMR engineers and input from a marine engineer. It should be noted that geofabric is recommended for behind all solid structures such as logs and this should extend under any toe scouring material and behind any joints in retaining logs. These recommendations should be approved by a marine engineer before they are implemented.

Identified situations and associated suggested foreshore stabilisation techniques for Alexandra Bridge Foreshore are detailed below.

6.3.1 Failed Infrastructure

For areas of failed infrastructure such as cemented rock walls and log structures that are coming apart the following treatments are suggested.

- Remove these structures and where feasible the materials are recycled (e.g. rock and concrete broken up and used to prevent toe scouring and logs reused as stabilising structures).
- As these structures are at high use points (River Access 1 and 3) it is proposed that new foreshore access structures (see location specific recommendations in section 6.2.) are installed to take the pressure off the river banks and the banks are stabilised with either logs and rock material or coir logs to prevent toe scouring, all underlain with secured geofabric. Coir logs alone can also be considered depending on engineering advice associated with the development of the structures.

6.3.2 Stabilised Foreshore

There are areas of foreshore that are stabilised with large logs and where foreshore access pressures have been excluded, enabling vegetation (at least weeds) to establish on the relatively gently sloping bank(less than 1:3) inland of the log.

- This situation can be found north of river access 2 and west of the boat ramp (though later inspections in September 2020 indicate this section may be failing). In these places it is

[20] https://www.dpaw.wa.gov.au/management/swan-canning-riverpark/ecosystem-health-and-management/habitat-protection-and-foreshore-management?showall=1

[21] https://www.dpaw.wa.gov.au/images/documents/conservation-management/riverpark/Management/Best%20management%20practices%20for%20foreshore%20stabilisation%20-%20Approaches%20and%20decision%20support%20framework.pdf

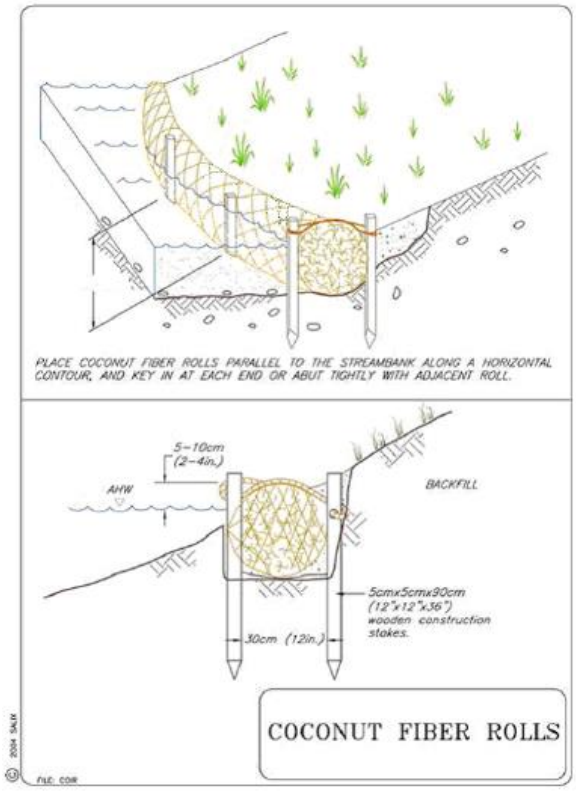
recommended the logs remain as they are but material to prevent toe scouring is installed as necessary, either rubble, coir log or even a smaller log.

- On top of the log/ behind the log where the ground is relatively stable the following can be installed depending on the individual situation. It may be that little is installed initially and the situation is monitored and treatments are only applied once the effect of new structures elsewhere along the shore can be appropriately taken into consideration. Optional treatments include the following.
    - Continuing to fence these areas to restrict access (this is probably why the areas are so stable).
    - Laying large branches (that are unlikely to move during a normal flood) along the land behind the log to restrict pedestrian access that might be occurring despite 'keep out' signage.
    - Laying jute mesh especially in areas where there is still some active erosion. The jute mesh lasts longer than coir and the open weave of the mesh enables small plants to be planted through it. The mesh acts as mulch and inhibits wind and water erosion. The mesh will need securing, ideally with natural materials such as wood pegs and twine that will break down in the long run. Corn starch pegs may also be available.
    - Planting stabilising local plants, either in the branches, through the mesh or just in the stable ground. Also any mulch will assist with their establishment and watering in the first summer will result in much better plant survival rates.

6.3.3 Actively Eroding Foreshore Areas with no Previous Stabilisation

Where the foreshore is actively eroding it is important to manage the cause of that erosion, see section 6.2. Once access is controlled, in areas where no stabilisation has previously occurred, the bank should be reinforced to the height of the natural ground level. The following treatments (or combinations of the treatments) are suggested.

- Controlling access may be sufficient and replanting with sedges may be all that is required for low banks, gently sloping banks, particularly where there is a root matt in place.
- Battering back the bank to 1:3 or less and stabilising with jute mesh and planting (see above). However this is not really an option as the foreshore area is limited. It may be possible to reinforce the lower portion of the bank with timber or coir logs and batter back and stabilise the top portion, say for banks about 1m in total. But battering will also destabilise what root matt is there.
- Where there is a low bank (300mm high) or just an eroded foreshore, coir logs can be installed at the toe of the back, possibly back filled with shale etc. and stabilised with jute mesh and planting.
- Where there is a steep bank over 300mm high, more than one coir log may be required and rock material at the toe of the banks should be considered. Where the bank is over 500mm high and certainly when there is a drop of 1m logs should be installed with material to resist toe scouring and geofabric, adequately secured, behind it all. Again backfilling with shale is recommended and stabilising with jute mesh. Need to check with a marine engineer what height of coir logs is acceptable when / are timber logs required and if geofabric is needed behind 2-3 coir logs?



Source: McCullah & Gray (2005)

Figure 3.5 Conceptual design of coir logs

Extract from Swan River Trust Stabilisation Guidelines

6.4 Roads and Parking Areas

Designated, well organised parking areas are required to adequately provide for parking, and to separate vehicles and pedestrians. It also enables optimal use of the open space, better management of drainage and erosion and maintenance of naturalness by reducing the footprint of vehicles and enabling trees to be protected and re-established. The layouts proposed on the Preliminary Concept Plan V3 are conceptual but require engineering input before implementation as standard road widths and turning circles are hard to achieve in some instances, particularly without tree removal and it is only an engineer that can authorise adjusting standards to save the trees even though this can maybe be justified due to low volumes of traffic, low speeds etc.

Vehicular access through the foreshore area is made up of the following elements.

6.4.1 Main Access Road

In Stage 1 – Campground Redevelopment, the main access road was widened and surfaced with lateritic gravel but it is still an informal road without crowning and drainage. The following is recommended.

- As all traffic enters and leaves the area via this road, widen the road to 6m running surface with a crown and side drains (the widening will likely require one or two trees to be removed).
- Ensure the runoff passes through a settling pond or filter basin before entering the river.

6.4.2 Boat Trailer Parking

It is proposed that the boat trailer parking remains in the existing area of informal boat trailer parking. However applying boat trailer parking standards and optimising the drive through format (to reduce the need for reversing) will require the removal of a number of trees. Consequently it is advised that engineering

input is sought to enable the adjustment of standards due to the low key nature of the site - the following should particularly be considered.

- DoT Standards require 7.5m wide perimeter access roads and 6.5m internal access roads. The concept shows 6.5m access road (there is only one loop so it is all a perimeter road) and it is suggested that 6m may be wide enough as it is only relatively small boats that are launched here.
- DoT standard shows an inside turning radius of 10m, but as the emergency service vehicle external turning radius is only 8.8m it is suggested an outside turning radius of 10m may be adequate, to be confirmed by an engineer.
- Bays are at 45 degrees angle.
- The outcome of the above considerations will influence how many trees have to be removed to achieve 6-8 boat trailer bays.
- Some new tree planting should be possible in the traffic islands.
- Boat trailer parking area to have a shale or limestone surface and if feasible to be drained to the low area to the north. If drainage to the north is not practical it should drain to a sump area for settling and filtering before the water enters the river.
- Bollards or logs will be needed to define the parking area and protect the tree/planting areas, a combination can be used as logs may not be practical for the more restricted planting areas.
- The straight edges of the planting areas adjacent to parking bays and the bays themselves should be defined with half buried logs or pine rounds laid flat. Wheel stops will be needed for the ends of 'nose in' bays, these could be logs as well, but concrete wheel stops may be more practical, last better and will visually blend in to the road surfacing material.
- The area will be signed as boat trailer parking area and canoe parking with any car bays being also suitable for those with roof top canoes.

6.4.3 Boat Ramp Manoeuvring Area

A new approach to the boat ramp south of the trailer parking area is required to facilitate access to the new boat ramp. This will need to be engineered to ensure it meets the required standard (turning circles and straight backing of 30m) and protects and retains as many trees as possible.

- This may require some cutting into the banks and timber or concrete steps may be needed once the levels have been determined to connect to the nearby paths and signage and interpretation.
- Surfacing materials, bollards etc. to be as for the boat trailer parking area.
- Gradients and formation to be determined by an engineer and drainage / stormwater filtered before it enters the river, possibly by using the main open space area as a sump.
- Perimeter and planting area to be defined with bollards or logs, once protected these areas can have supplementary shrub and tree planting.
- Rigging area to be provided on the south side of the boat ramp approach if feasible
- Central trees to be protected and additional trees / shrubs planted in the island.
- The current boat ramp access and manoeuvring will need rehabilitating as parkland with any road material removed, ripping or similar to reduce compaction and reshaping to accommodate drainage and provide an attractive landform for visitor use. Picnic tables and possibly sitting logs grouped to give community areas will be located on site once the earthworks are complete.

6.4.4 Upper Level Day Use Parking

The existing upper level parking area is to be accessed by a new road link east of the toilets (once the septic drain is no longer needed) so vehicles are not driving through the central area of parkland. It is to remain a shale surface, with the parking bays more clearly defined and the logs generally moved down slope, part buried and used as retaining structures.

- The turnaround will likely have a high point in the centre to enable water to drain out radially into the hollow to the north, the surrounding planting areas or be channelled towards the river through the use area.
- The centre of the turnaround is to have the hardstand excavated and removed and backfilled with clean topsoil, protected with logs or bollards and planted with peppermints.
- Parking bays will have log or concrete wheel stops as for the trailer parking area. The 3 bays southwest of the turnaround will be installed when the eastern picnic area is developed and the bays west of this and south of the existing access track will also be removed at this time to create the pad for the shelter and to enable the correct grades to be established for the paths. This will give approximately 8 bays in the interim until the whole day use parking is redeveloped.
- Most of the upper parking area, the turnaround, the bays and the connecting paths adjacent to the bays are to be at the 3.0m AHD level.
- The large logs are to be relocated along the edge of the 3.0m high area part buried in the ground (approx. 0.5m) with approx. 0.5m of sand retained behind the log and approx. 0.1remaining above the upper ground level as a kerb (top of log should not be more than 600mm above the lower level). Logs to be butted against each other and geofabric placed behind the join to prevent fill seeping through the join to the lower level.
- South of the upper level there is to be a path at disabled access grades that links the upper level to the lower level. A second row of retaining logs may be required at the high end of this path, but the level change to the lower picnic level can likely be accommodated by a bank.
- Below the accessible path will be a picnic terrace with secluded picnic nooks for use by small groups. Alternatively it can be used by a larger group using all the tables and a wood fired BBQ would provide a focal point.
- Shrub planting will reinforce the enclosures and additional vegetation will be planted along the foreshore and protected by a fence.

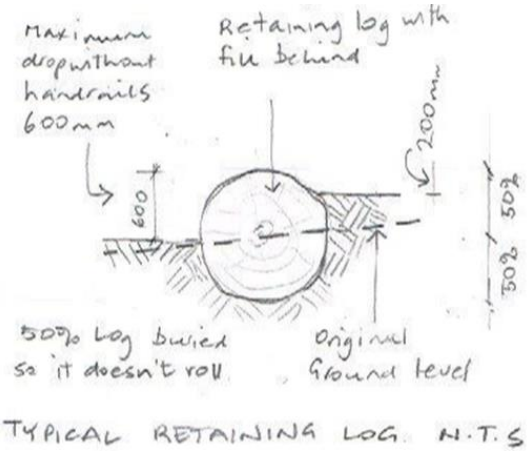
6.4.5 Vehicle Barriers

A range of vehicle barriers are proposed for directing and guiding vehicles. Care must be taken to select the appropriate barrier and the following should be considered when selecting and locating barriers.

- Gaps should be less than 1.5m to restrict vehicle movement, so bollards should be at 1.5m centres.
- Barriers behind backing vehicles need to be very tall (1.5m) for vehicles such as 4WD to see them and so should be used with care. Kerbs are often useful in these situations but as kerbs will not be used at this site, low logs of similar height may be appropriate as they should not damage a vehicle.
- A mix of bollards and rails looks disjointed and so should be avoided if feasible.
- Rails and logs are also barriers for pedestrians, so if pedestrians will be moving through an area, bollards are more appropriate vehicle barriers.

The following are proposed

- Concrete wheel stops at the front of car bays to guide vehicles where to park.
- Timber bollards for tight spaces particularly where mixed in with growing, vertical tree trunks. Old timbers or bush poles would be suitable if available but as this is unlikely, pine bollards may be more practical and they are already in use on the site.
- Long sections of timber such as pine poles or bush poles are proposed for marking bays in the boat trailer area, see section 6.4.2. This should be the same material as is used for bollards.
- Logs – these already dominate the site. Smaller logs are suggested for some areas, with pegs to secure them, but the large logs are proposed for retaining or stabilising the foreshore, see typical retaining log diagram below for logs set across the contour and details on the structures concepts drawings (all to be approved by engineers).



L: Existing Large logs dominating the site

6.5 Paths

A hierarchy of paths is proposed for the foreshore as follows. The general locations are shown on the preliminary concept plan and the detailed construction details will be developed in association with the detailed car parking plans prepared by engineers.

- Tracks – with a natural surface approximately 600mm wide. The tracks will need monitoring for erosion and grade reversals installed as necessary to take the water off the track. The bushes will also need pruning back off the track for safety reasons and the prunings can be mulched and used to surface the track. If the track starts to show signs of wear and the root mat is worn through, natural mulch can be spread, a minimum of 50mm thick to stabilise the trail.
- Paths – limestone paths 1.2m wide will be the main pedestrian routes through the site. Crushed limestone, compacted to give a smooth surface, should be used, 50 - 100mm thick with a crowned surface where the path is on level ground and it may have an even cross fall going across slopes so the water is drained to the downhill side. Grade reversals will be required where paths go up slopes almost at right angles to the contour, so the water does not channel down the path.
- Totally accessible walk – wider paths (1.5 m) with a firm even surface (of compacted, crushed limestone, concrete or asphalt) will be provided to link key facilities so there are opportunities for less able persons to use the site.
- The roads are already signed as shared pedestrian vehicle zones so can be used by pedestrians but where feasible a separate pedestrian path will be provided to minimise the potential for conflict and to improve the walking experience.

L: Limestone path at Martin's Tank **R: Grade reversal (dip in centre of picture that will shed water)**

6.6 Toilets

The toilets are to be reviewed by the SoAMR and likely replaced so they provide for disabled persons and are easier to clean. The septics need replacing by a pumpout system to avoid any leaching into the river and so the road and parking network can be expanded and use the area of the current leach drain (the toilets are already regularly pumped out).

In the interim consideration can be given to painting the roof and trim either in Woodland Grey to match the shelter rooves (preferred option) or the green from the signs. Art work is not recommended for the walls until the toilets are upgraded or it will draw attention to the oldness of the toilets. Painting the brick walls is not recommended as that becomes an ongoing maintenance item and the present brown brick colour is quite unobtrusive.

6.7 Shelter(s)

Shelters are proposed to be of a design that matches the existing foreshore and fee collection shelters, which is a Landmark Peninsula skillion shelter, with a skillion roof in colourbond Woodland Grey colour with timber posts and trims, and a concrete floor. A larger shelter (6m x 4m) is proposed for an elevated position (and views to the river) near the day use car park that will have a picnic table and BBQ (this could be relocated from the foreshore) or 2 picnic tables. This table should be suitable for wheelchair use and be free standing so it is easier to access (DBCA Conto's table may be suitable, steel frames can be made in Collie and timber sourced locally).

An additional smaller shelter (4m x 4m) may be located near the new boat ramp, with a picnic setting and a railing at the front so people can lean on it and look over the river and they are discouraged from walking from the shelter down the bank. The existing shelter will be retained, though the BBQ may be replaced with a picnic setting.



L: New larger landmark shelter C: Shelter only to have one fence at front R: Contos picnic table for shelter

6.8 Furniture

6.8.1 Picnic Tables

It is proposed that DBCAstandard picnic tables are used (see photo below) providing the SoAMR can source the timber (the metal frames are made by the Bunbury Prison). If these tables are not a practical option there are commercially available alternatives such as the ones from Exteria and Landmark shown above and below. If stainless steel is required for the metal work, this needs advising by the SoAMR. Individual tables and bench seats as shown for Contos above will be used in the picnic shelter(s) and the combination table and bench unit shown below will be used elsewhere. There will be concrete floors in the shelters but concrete pads will not be supplied under individual tables enabling them to be more easily repositioned

later, they will however be secured with concrete footings. The remaining old original table will possibly be retained for interest.

6.8.2 Platform Bench

A platform bench is proposed for the information node as it can have a variety of uses such as waiting, viewing, picnicking etc. This will be detailed as part of the information node and again the need for stainless steel metal work needs confirming.

L: DBCA standard table **C: R: Exteria Grove 6 Table Setting[22]** **R: Campgound BBQ**

L: Platform bench for swimming platforms **C: Platform bench and BBQ at Contos** **R: Exteria Metro bench**

6.8.3 BBQs

The existing gas BBQ in the shelter is to be retained or relocated to the new large shelter but needs reviewing and the maintenance issues addressing. A wood BBQ is proposed for the eastern picnic area in a location that will suit use by groups. As BBQs and fire are already being managed in the campground it is proposed that the provision of a BBQ for day users will encourage more visitors in winter. The BBQ is to be the same style as those used in the camp ground and it too is produced by the Bunbury Prison. Should a new gas BBQ be required a disabled accessible one should be provided.

6.8.4 Take your Rubbish Home

No bins will be provided and visitors will be encouraged to take their rubbish home. There are skip bins near the entrance to the camp ground that can be used, but if rubbish is taken home there is less for management to take away.

[22] https://www.exteria.com.au/products/urban-furniture/outdoor-table-settings/

6.8.5 Lighting

No lighting will be provided. If the area is to be used at night visitors can bring their own temporary lighting such as torches which will be part of the experience. Lighting reduces the naturalness of an area, can be considered as a form of pollution and has the potential to change the patterns of wildlife.

6.9 Playground / Interpretive Play Structures

The community feedback indicated a playground was not a priority, but other informal comment indicates it is popular and the current location by the swimming access point enables parents to keep an eye on the children that are swimming while pushing younger children on the swing. As boat launching will no longer be occurring in this area there will be no cars nearby to cause risk to children and so it is proposed the swing is retained, though moved north a little to allow for more regeneration on the point. It is understood a new swing set has already been purchased.

L: Wood sculptures similar to these of local animals can be interpretation and play features

The provision of carved wooden animals has been suggested by Undalup Association as nature based play structures which can also be used for interpretation. If set in sand these can provide for children that are not swimming. It is suggested that 3 of these sculptures are provided, two in the eastern picnic area and one in the new open area, but the positions should be reviewed once the new spaces are created.

The swings and proposed wood structures should be assessed by a playground specialist and advise sought on installation to ensure they are in accord with current Australian Standards.

6.10 Information Nodes

As the site now has 2 arrival points – the boat launching area and the day use picnic area, there will now be 2 information nodes.

The day use information node will be disabled accessible and near the larger picnic shelter. A smaller platform bench (see 6.8.3 above) is recommended for here as it is a likely waiting space and will encourage people to pause and read the interpretation and information. The information node by the new boat ramp will likely have steps on two of its three access points and space is more limited so no seating is proposed. The nodes should have a hard surface to enable wheelchair access, compacted limestone would be adequate, however the steps connecting the node to the boat ramp will need to at least have concrete risers, backfilled with limestone, but they could also be concrete, installed at the same time as the boat ramp. They need to be robust steps as timber risers would not last long.

Free standing panels are proposed as shelters are already proposed / existing near both locations and so are not considered necessary. These panels could also have art works integrated with the information panels. The panels will have trees behind them so they are not obtrusive and will not be blocking any views.

L: Standalone panels and seats in Fitzgerald River National Park R: Multi agency structure at Coalmine

6.11 Planting

Planting is proposed for a number of specific reasons as noted below and because it improves the overall amenity of the area by providing shade, shelter, enclosure, visual interest, habitat and food for wildlife, stabilisation of soil and filtering of nutrients (wetland plantings) and in a small way it sequesters carbon helping mitigate climate change. However consideration must also be given to safety aspects such as allergic reactions to some plants and many people are allergic to bees, so bee attracting low shrubs should be avoided near pedestrian areas. Also plants can block out views and break visual connections if care is not taken with species selection.

Local species are recommended but they must be practical for the locations in which they are used or they will be removed in the long run. Particularly shrubs must not grow too big and trees should not be prone to branch drop.

6.11.1 Trees

As many of the existing trees are mature and are likely stressed from compaction and lower rainfall it is recommended new trees are planted wherever feasible so the tree canopy is sustained long term. Plantings will be specified by SoAMR Environment Officer but the following tree species are suggested for consideration.

Western Australian Peppermint *Agonis flexuosa* suggested for up slope areas but care should be taken in parking areas as they drop resin.

Paperbark *Melaleuca sp*. Suggested for pedestrian areas close to the river and for the parking areas as it is a smaller tree that is not so likely to drop branches and has an attractive papery trunk and white flowers.

Flooded Gum *Eucalyptus rudis*. This tree is along the edge of the river, but it is a large tree prone to branch drop. It is recommended for revegetation areas where pedestrians are excluded and there are no vehicles.

There are also steps that can be taken to sustain existing trees such as protecting their root zones from pedestrian and vehicle traffic and minimising fill over root zones and impacts from construction. Where feasible, trees have been included in planting areas that will be mulched but elsewhere, such as in open areas, the spreading of 100mm of mulch on tree root zones is likely to be beneficial to the trees long term. Advice should be sought from the arborist who can maybe give guidance on an individual tree basis.

L: Steps with concrete risers at Mt. Lindesay C – R: Hypocalyma sp. Darwinia sp. and rushes / sedges

6.11.2 Shrub Planting

Within the day use areas there are a number of banks that are to be planted with shrubs, to hold the bank in place and to provided interest and enclosure. In general spreading plants approximately 500mm high should be selected for these areas, possibly prostrate *Darwinia citriodora* and *Hypocalyma angustifolia.* Other suitable local plant species should be identified in consultation with local specialists.

6.11.3 Foreshore Revegetation

Specialist input will be obtained for the plant species to be used for stabilising the foreshore. Some of the trees and shrubs noted above may be appropriate but specialist riverine vegetation will also be required for bank stabilisation and protection such as reeds and rushes.

6.11.4 Lawn Areas

The central and western areas will be dry grass. Bare and new areas of grass will need grass to be established, ideally late autumn when the soil is still warm and wet. The areas will likely need runners rotary hoeing in (local couch) and / or seeding. Turf / grass specialists should be consulted to ensure practical methods and appropriate species are used.

7 Management and Maintenance

7.1 Existing Management

The foreshore area is already actively managed and regularly maintained by the SoAMR and this existing management is noted below. Section 7.2 discusses the increases in management and maintenance that will likely be required, due to the proposed infrastructure so they can be considered as part of the new works.

7.1.1 Visitor Management

Management signage is already in place on the foreshore with the signage at the toilets advising a number of do's and don'ts. This signage is supported by management programs (e.g. fire and emergency management plans and local government regulations) and supplementary signage such as the no diving signs. The management notice addresses the following points.

- Camping issues such as generator noise and dump points.
- Campfires and the need to bring your own firewood, this will be relevant for the proposed wood BBQ.
- Dogs
- Rubbish
- Swimming

- Fishing
- Feeding wildlife
- Fire and emergency (the assembly point is on the foreshore).

L: Existing management sign on the toilet wall **R: Existing no diving signs**

7.1.2 Maintenance

The SoAMR currently maintains the site on a regular basis with the toilets being cleaned in association with the campground maintenance and less frequent infrastructure maintenance is also programed. Overhead hazards (falling branches) are also managed on a regular basis.

7.1.3 Weed control

Weed control currently occurs at the site but this will need increasing prior to earthworks and rehabilitation to ensure weeds do not spread during construction and they do not compete with new plantings.

7.1.4 Boating and Fishing

Section 2.3.2 illustrates the Department of Transport Boating Guide and the DPIRD Fisheries Department guide that are located by the boat ramp. In addition to these signs there are signs which warn of boating hazards and regulations. See below.

L and C: Boat ramp signage by DoT C: River risk signage at Balbarrup Pool R: Standard and vehicle totems

7.1.5 Traffic management

A number of signs already manage and direct traffic, see above and below. However people still camp on the foreshore at times and so the no camping signage may need increasing.

L: Water access point C: Shared vehicle pedestrian zone C: Boat Trailer Parking R: Day Use only

7.2 Additional Management Required To Support The Foreshore Upgrade

Increases in visitor numbers may increase day to day maintenance to a degree but generally it is expected this can be accommodated in exisiting management programs. However there are a number of issues that will require attention either as part of the site development or on an ongoing basis. These are discussed below.

7.2.1 Foreshore Stabilisation

Whatever foreshore stabilisation techniques are used it is important that resources are allocated for regular checking and maintenance as without maintenance failure of the treatments is much more likely. For example if a coir log works lose it may result in the collapse of that section of bank in the short to medium term, but if it can be secured the vegetation may have time to establish to stabilise the bank long term.

7.2.2 Structure Maintenance

If engineered structures are installed on the foreshore they will need regular checking by an engineer, likely every one or two years, but the engineer can advise the necessary frequency. Use of stainless steel and other long lasting materials will reduce ongoing maintenance; though will initially be more expensive.

7.2.3 Pontoon Management

If a pontoon is considered for the river a management strategy will be required to manage the pontoon in times of flood (it may be taken out of the water in winter, however summer storms are also common). This strategy should be developed prior to installing the pontoon.

7.2.4 River Risk Management

Under water hazard management - As structures are being installed thereby encouraging visitors to use those particular sections of the river, checking for underwater hazards will be required on a regular basis (possibly annually) see Appendix 3 DBCA Underwater Hazard Checklist .

Water quality hazard - Water quality monitoring is another management responsibility associated with the provision of water based recreation. The guidelines for managing recreational contact with water are the National Health and Medical Research Council,2008; Guidelines for Managing Risks in Recreational Water (NHMRC Guidelines) and the Department of Health (DoH) implements the general principles of the NHMRC Guidelines. Water Body Managers (WBM) are required to provide/fulfil a duty of care based upon the NHMRC Guidelines/DoH recommendations for recreational/environmental waters.

Motor boat hazard – as boat motors are hazardous for swimmers, swimming areas should be kept free of motor boats. It is recommended that swimming areas are gazetted as part of the aquatic use review and the development of the foreshore identifies these zones and provides swimming access and boat launching ramps in appropriate locations to reinforce the zoning.

Drowning and general river risks - In addition to managing the above hazards and risks it is recommended more information is provided on how to avoid river risks in a similar format to the risk advice provided by DBCA, see photo above with the boating signs. Pontoon etiquette may also be required.

7.2.5 Traffic Management

As parking areas are being increased and more regulated it is likely some additional signage will be required and this should be identified as part of the design process associated with the engineering assessment of the proposed works. It is recommended that totems are used wherever feasible (and in accord with relevant standards) to reduce the overall visual impact of the signage. Large totems (250mm x 250mm symbol) were used in the campground and engineering approval to use them in the parking areas should be obtained.

7.2.6 Planting Maintenance

Areas of new planting will require maintenance even if local plants are used. Initially it is likely some replacement planting will be needed and long term removal of dead material and rubbish that's blown in will be required. If the year the plants are planted is a very dry one some watering should be considered for the first year. Perhaps the community Bush Fire Brigade could do a water pumping/drawing training session and then water the plants (unless the river water is too salty).

7.2.7 Tree Hazards

As new structures are developed and furniture is installed under existing trees it is recommended the risk associated with these trees is reassessed by an arborist and appropriate management action taken (tree surgery or remove the structure/furniture as necessary) to reduce risk to acceptable levels.

7.2.8 Visitor Management

The existing visitor management signage (the 'Happy Visitors' sign on the toilets and elsewhere) addresses most management issues on the foreshore but should be reviewed by SoAMR in the context of the foreshore redevelopment.

8 Signage and Interpretation

8.1 Existing Signs

The existing signs are listed in Table 4 below and located on Signs Preliminary Sketch V3 at the end of this section. Most of these will be retained and as most of the existing signage is quite new only a few new signs should/will be required to address specific issues. Signs should be in accord with the sign style guide 'Alexandra Bridge – Stage 1 Sign Plan' prepared by VWA in 2017 for the Shire of Augusta Margaret River.

Table 4 Existing Signs

For sign locations refer Signs Preliminary Sketch V3 at the end of this section.

Sign No.	Sign Type	Symbols /reference	Comment / Recommendation
1	Processed graphic 300 x 400mm on round galv. post 60mm.OD and 3.2m long, with steel cap and brackets to attach sign	Water Point Keep Clear at All Times	
2	Shared Vehicle Pedestrian Zone (1 post standard road sign format)	Provided by Assets Team	
3	'Things you Must Know Sheet – Happy Visitors'. 400 x 600mm sign for attaching to toilet walls, doors etc.	Signs in each toilet building, numbers tbc	Review in context of foreshore development
4	Processed Graphic 950mm x 420mm (2 post Aluminium, DPaW style, painted)	Day Use Area sign with Woodland Grey painted back and PMS 575 Green posts. Symbols No Caravans, Boat launch, BBQ in shelter and arrow	Relocate or replace as needed when day use parking reorganised
5	Vehicle Totem with 250 x 250mm symbols	RC3 Caravan and Camping, A1 Arrow and ONE WAY Symbol Arrow Right, per MRWA Standards (by Jasons)	
6	Boat Trailer Parking sign	Previous blue and white format	Replace with new sign
7	No diving signs on round galv. post 60mm.OD and 3.2m long, with steel cap and brackets to attach sign	Black and yellow hazard signs and red slash sign	Review need for these signs once new visitor risk signage is in place.
8	Processed graphic 300 x 400 on round galv. post 60mm.OD and 3.2m long, with steel cap and brackets to attach sign	Assembly Area	Will likely need relocating.
9	Processed graphic on 2 galv. posts	Boating Guide	DoT Update in 2021 Review and relocate to new boat ramp
10	Processed graphic on galv. post	Overhead Power lines	DoT? Update in 2021 Review and relocate to new boat ramp
11	Processed graphic on galv. post	No jet skis	DoT Update in 2021 Review and relocate to new boat ramp
12	Processed graphic on galv. post	Boating Speed limit	DoT Update in 2021 Review

			and relocate to new boat ramp
13	Processed graphic on galv. post	Fish nursery	Fisheries Department - Replace with new sign and relocate to new boat ramp, see interpretation section
14	Standard Totem (750mm high) with 150 v 150mm symbol	D2 Wheelchair Assisted Facility	Relocated to new disabled bay
	Skippers Ticket sign – has gone		DoT, (was on a stump previously)

8.2 Proposed Signs

The following issues have been identified which (will) need addressing by signage.

- Camping on the foreshore.
- Diving into the water (still occurring despite existing signage).
- Pontoon etiquette.
- Control access to the foreshore and encourage regeneration.
- Tying up of boats all along the foreshore (positively identify where boats can be tied up).

In addition to signs and/or totems required to address the above, additional signage will be required for the following facilities.

- Identify the additional disabled bays
- Identify rigging bays
- Identify canoe access points
- Identify boat trailer parking area and advise no camping there
- Direct visitors to boat ramp, canoe ramp, toilets, trailer parking, parking, trails etc.

The table below gives an indication of what signs may be required but this will need amending once the car parks are confirmed and symbols etc. will need specifying where available and/or new ones designing.

Table 2 Proposed Signs

Sign No.	**Sign Type**	**Symbols /reference** (to be confirmed by graphic designer)	**Comment / Recommendation**
15 - 16	Standard Totem (750mm high) with 150 v 150mm symbol	D2 Wheelchair Assisted Facility	Relocate existing totem
17	Standard Totem (750mm high) with 150 v 150mm symbol	Rigging bay and canoe set down	
18	Processed Graphic 950mm x 420mm (2 post Aluminium, DPaW style, painted)	Boat Launch and Parking sign with Woodland Grey painted back and PMS 575 Green posts. Symbols boat trailer parking, boat launch, canoe launch, no caravans or camping	
19	Vehicle Totem (s) with 250 x 250mm symbols or maybe processed graphic	Boat launch, P and directional arrows, per MRWA Standards (by Jasons)	

20	Standard Totem (750mm high) with 150 v 150mm symbols	No camping with positive symbol such as to swimming deck	
21-22	Standard Totem (750mm high) with 150 v 150mm symbols	No camping with positive symbol such as to picnic table	
23 -25	Standard Totem (750mm high) with 150 v 150mm symbols	No boat mooring and regeneration symbol	Indicative locations only
26 - 28	Standard Totem (750mm high) with 150 v 150mm symbols	No walking and regeneration symbol	Indicative locations only
29	'River Safety' 400 x 600mm sign for attaching to post close to ramp – canoe launch	Standard river safety sign with customised canoe launch safety	
30 - 31	'River Safety' 400 x 600mm sign for attaching to structure or on post close to structure – swimming access and pontoon etiquette	Standard river safety sign with customised swimming safety and pontoon etiquette	
32	'River Safety' 400 x 600mm sign for attaching to structure or on post close to structure – boat launching and no swimming access	Standard river safety sign with customised boat launching and swimming safety	
33	'River Safety' 400 x 600mm sign for attaching to post close to structure – fishing code	Standard river safety sign with customised fishing safety for Fishability deck	
34 - 35	Standard Totem (750mm high) with 150 v 150mm symbols	No camping with positive symbol such as to picnic table	
36	Processed Graphic 950mm x 420mm (2 post Aluminium, DPaW style, painted)	Directional sign to Day Use Area with arrow to left and Boat Launch Area with arrow up. Woodland Grey painted back and PMS 575 Green posts.	Relocate or replace as needed when day use parking reorganised
37	Processed Graphic 950mm x 420mm (2 post Aluminium, DPaW style, painted)	Day Use Area sign with Woodland Grey painted back and PMS 575 Green posts. Symbols , BBQ in shelter, picnic table, swimming access, no caravans or camping	Replace graphic on sign 4
38	Fisheries regulatory signage	TBA Fisheries	By Fisheries Dept. To be panel in interpretation node
39	DoT Boating guide	TBA DoT	By DoT alongside ramp

8.3 Existing Interpretation and information

The existing information shelter contains information that is applicable to the whole of the Alexandra Bridge recreation area. It includes a Welcome to Country and interpretation of natural and historical values as well as a site map, with camping registration and an 'explore the local area' map, see Appendix 6.

Unfortunately some visitors may not stop and read the interpretation so it is proposed that the walk trail will go past/ include the entry shelter to encourage visitors to enjoy the stories provided.

There is also a boating guide and fish nursery information provided at the boat ramp that is site specific for Alexandra Bridge but in a format that is used throughout the South West.

The community survey indicated there was interest in more information about the area; see Appendix 2 for the comments. History and environmental values of the area were requested particularly information about the river, including how far it is to other places. The Undalup Association was keen to share the Aboriginal significance of the area with visitors and suggested art and sculpture be used as a creative way of attracting visitor interest and sharing information. There is also a need to increase visitor understanding of the importance of a stable, well vegetated river bank so they will keep off it and go at lower boat speeds to enable it to regenerate, perhaps…. 'please slow down and keep to the access ways to protect the river bank'.

8.4 Proposed Interpretation and Information

Objectives:

- Increasing visitor awareness and understanding of the values and regulatory content.
- Increasing visitor enjoyment.
- Minimising visitor/neighbour impacts.

The interpretation will need developing in association with a number of key stakeholders including Undalup Association, the local Alexandra Bridge Community, the Augusta Historical Society, Fisheries Department and possibly Department of Transport and Department of Water and Environmental Regulation.

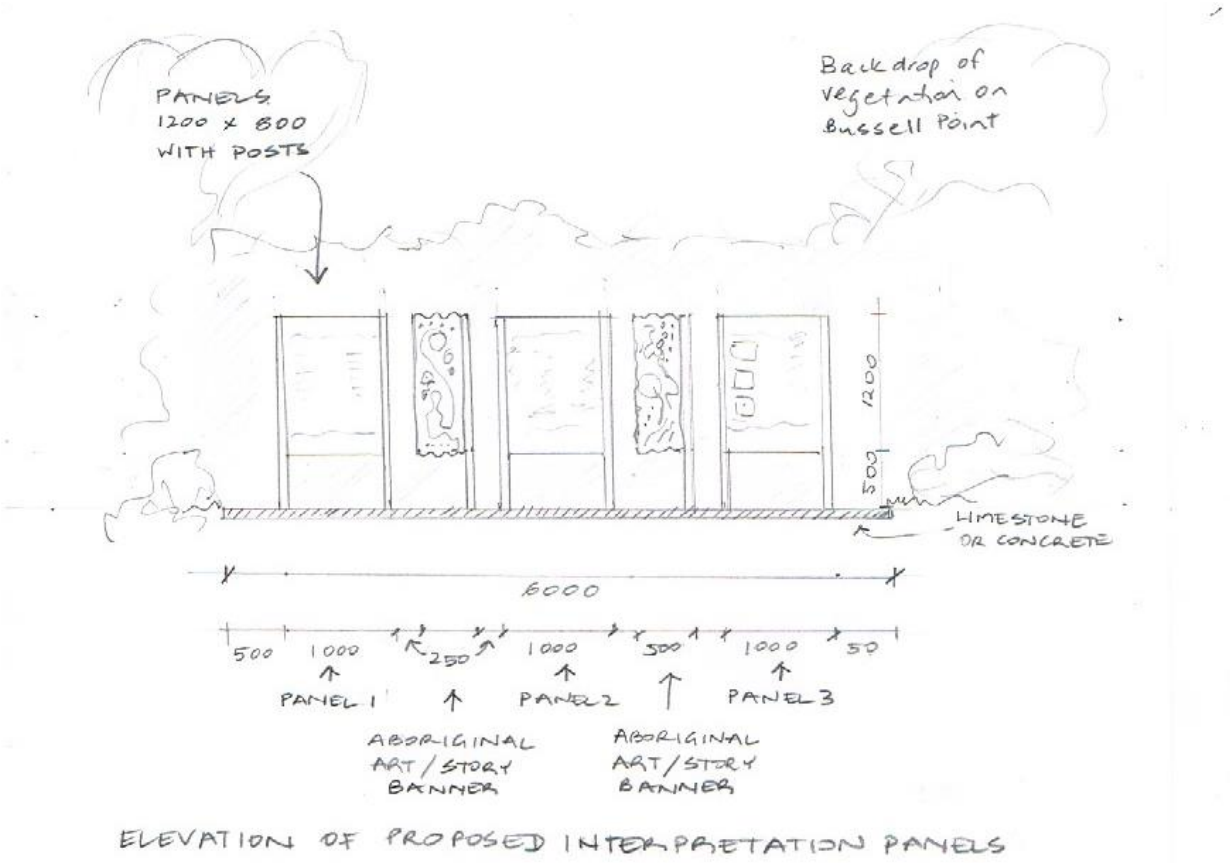
The following locations have been identified for information and interpretation.

8.4.1 The New Boat Ramp

The current boat ramp has the boating guide and fish nursery information together with some regulatory boating signs either side of the ramp. The regulatory signage will likely need retaining by the side of the new ramp and probably the boating guide. It is suggested consideration is given to the total effect of the signage when it is relocated to the new ramp. The boating guide and other signage will likely need reviewing after the preparation of the aquatic use review in 2021 and so this might be a good time to review the overall provision of DOT information at the boat ramp.

Liaison has occurred with the Fisheries Department who have provided a wealth of information about the Black Bream and the new style of fishing guide.

A new interpretation / information node is proposed for the southern side of the top of the boat ramp. It will overlook the boat ramp (as the ramp will be lower than existing ground levels, and be accessed from the north and east by steps and a disabled accessible path links the node to the main picnic area. A picnic shelter may be considered for nearby, but is not a priority so the panels will be free standing and exposed to the weather. Three 1200mm by 800mm panels set vertically are proposed with two 'banners' of laser cut art between, see below.



Preliminary discussions regarding the interpretation have been held with Undalup Association and DPIRD Fisheries Department and further discussion with the Augusta Historical Society and local community is also needed as the interpretation is developed. The following themes are proposed for the panels.

- Panel 1 – The fish nursery (replacing existing fish nursery panel) which incorporates the need to look after the nursery and the fringing vegetation (where fish live) by sticking to the paths and river access points so the banks can regenerate.
- Panel 2 – DPIRD Recreational Fishing in WA Panel
- Panel 3 – The Black Bream - Black Bream Dreaming… Noongar story/ - Black Bream Wars: The campaign to oust the commercial fisherman in the 2000s -Restocking success – juvenile release program.

8.4.2 The Day Use Arrival Information / Interpretation node

An information/interpretation node is proposed for between the new upper level picnic shelter and the toilet block just off the main day use parking area. It will have a bench seat for those that are waiting or congregating there which should encourage visitors to pause and read the interpretation. Again three 1200mm by 800mm panels set vertically are proposed with two 'banners' of laser cut art between.

The following themes are proposed for the panels

- Panel 4 -The story of *Agonis flexuosa* – habitat for ring tail possums and need for canopy connectivity and possum boxes, Aboriginal use, distribution and threat of myrtle rust etc.
- Panel 5 – Site orientation map- welcome to the day use area, history of the site, Bussells, recreational area created in early 70's, getting off the school bus and heading to the river (especially if there are photos of this past use).

- Panel 6 -the River - the catchment and salt and fresh water story. Also profiles of the river - what lies beneath and what lives there - nutrient effects and amelioration efforts.

8.4.3 The Main Arrival / Camp Registration Shelter

As the layout of the foreshore area will be changed quite significantly it may be necessary to update the site map panel in the arrival shelter on Clarke Road.

8.4.4 Proposed Canoe Launch Ramp

This area will no longer be a focus for information however canoeists who recently used the area said that a map of locations along the river where canoes could easily pull up so the paddlers could get out for a break or have a picnic, would be very useful. There may already be a canoeing guide for the river but the river does not feature on the Trails WA website. Canoe safety information may also be appropriate for this location and SoAMR may want to investigate this further if it is considered appropriate.

8.4.5 The Foreshore Trail

A trail, (which needs its own name) is proposed for much of the foreshore and 600mm x 400mm inclined interpretation panels or totems with art work could be used along the trail to interpret features.

Three trailhead panels (600mm x 400mm inclined panels) are proposed for the following locations.

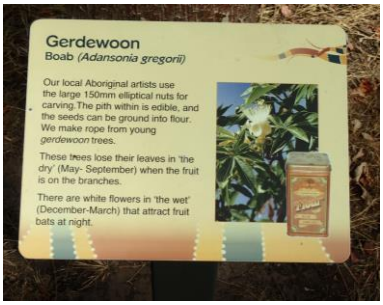
- Where the trail leaves campground.
- The north side of the new boat ramp for those arriving and parking in the boat trailer parking area
- Where the trail leaves the day use parking area to head east along the river.

Potential stories include

- The story of the Miss Flinders (1972) near the main swimming area (where the jetty used to be).
- Cockatubes – structures for cockatoos to nest in.
- Environmental issues - such as Myrtle Rust which would have a significant impact t this site.
- Elsewhere the stories of plants and animals can be told (viewing seat a possible location).

The basic format for each plant or animal featured along the trail would be

- Common name, scientific name, Noongar name e.g. Peppermint - Agonis flexuosa –“wannil” - the most common tree species across the South West
- Habitat/Distribution
- Noongar uses
- Touch/smell



L: Large laser cut metal panel C: Artistic totem C: Inclined panel R: Bush tucker panel

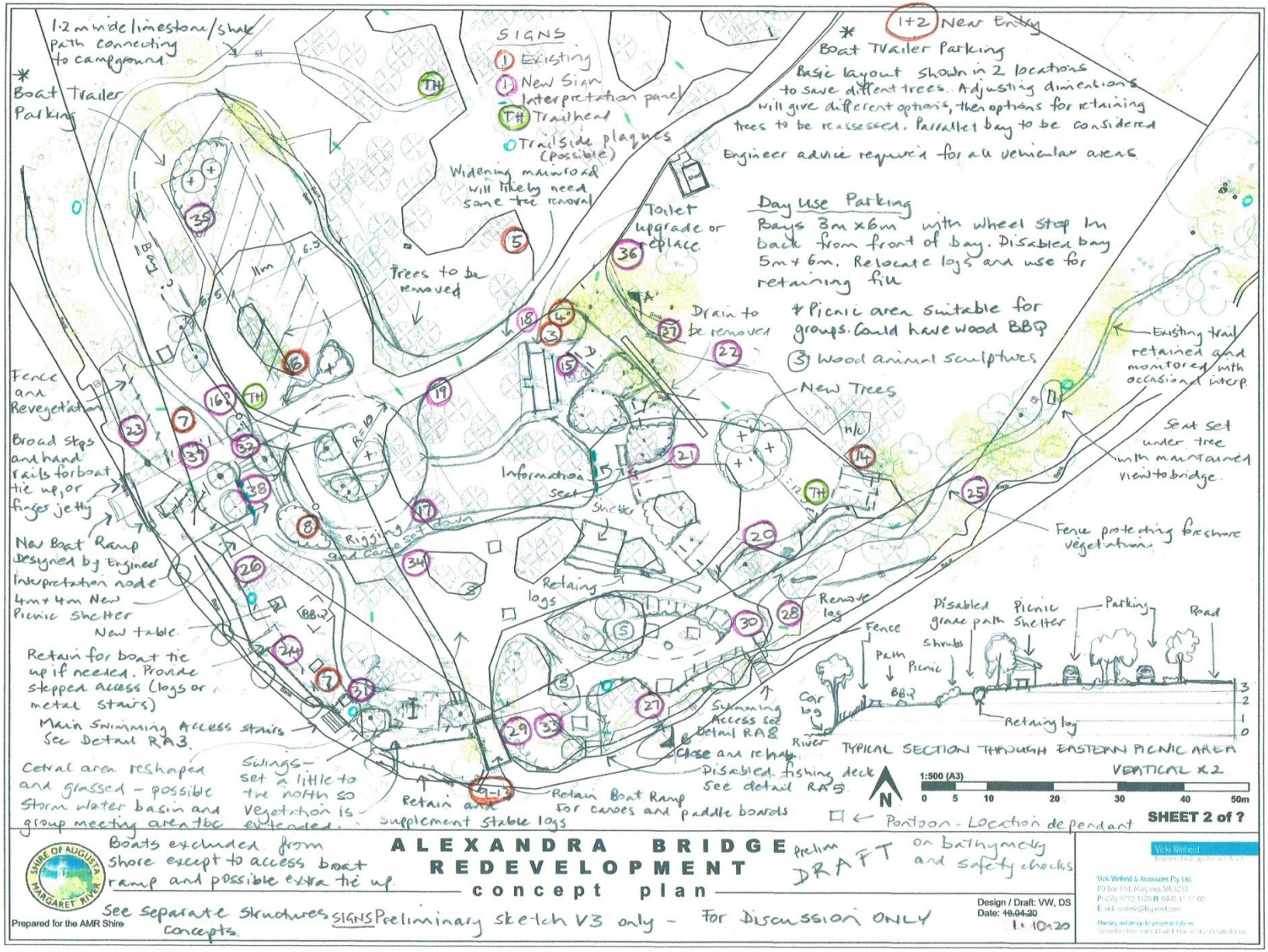
8.4.6 Artwork

Art and sculpture can be important components of interpretation or storytelling and there are some opportunities for using art in telling the stories of Alexandra Bridge.

- Development of art work or motives by Aboriginal artists (to complement the interpretation themes, so maybe fish or marine creatures) that could be used as
    - Steel cut out art work/frieze/screen set between posts of the larger interpretation panels on the short side so it can be viewed from both sides and could have the sun shining through it. see photo of Fitzgerald River National Park interpretation.
    - Similar art work could be used as 'banners' on a single post set between standard interpretation panels.
    - A motif from the art work could be incorporated into the graphics of standard panels.
    - Artistic totems to reinforce the stories being told on the totems.
- Creation of large wooden animal sculptures, possibly with associated interpretation that would tell stories but also be used by children for playing.

It is suggested that the process of creating the art also identifies how best it might be used; this may be a separate sub project.

The preliminary sign concept / location plan is shown on the next page.


1·2 m wide limestone/shale path connecting to campground
Boat Trailer Parking
SIGNS
Existing
New Sign
Interpretation panel
TH Trailhead
Trailside plaques (possible)
Widening mainroad will likely need some tree removal
Trees to be removed
Toilet upgrade or replace
1+2 New Entry
Boat Trailer Parking
Basic layout shown in 2 locations to save different trees. Adjusting dimensions will give different options, then options for retaining trees to be reassessed. Parrallel bay to be considered
Engineer advice required for all vehicular areas
Day Use Parking
Bays 3m x 6m with wheel stop 1m back from front of bay. Disabled bay 5m x 6m. Relocate logs and use for retaining fill
Drain to be removed
* Picnic area suitable for groups. Could have wood BBQ
(5) Wood animal sculptures
New Trees
Existing trail retained and monitored with occasional interp.
Seat set under tree with maintained view to bridge.
Fence and Revegetation
Broad steps and hand rails for boat tie up, or finger jetty
New Boat Ramp designed by Engineer
Interpretation node 4m x 4m New Picnic Shelter
New table
Retain for boat tie up if needed. Provide stepped access (logs or metal stairs)
Main Swimming Access stairs See Detail RA3.
Information Shelter
Rigging and canoe set down
Retaining logs
Remove logs
Fence protecting foreshore vegetation
Swimming Access see Detail RA8
Close and rehab
Disabled fishing deck see detail RA5
Retain Boat Ramp for canoes and paddle boards
Retain and supplement Stable logs
Swings – set a little to the north so vegetation is extended.
Cetral area reshaped and grassed – possible Storm water basin and group meeting area tbc
Boats excluded from shore except to access boat ramp and possible extra tie up.
See separate structures concepts.
SIGNS Preliminary sketch V3 only – For DISCUSSION ONLY
Fence
Path
Picnic
BBQ
Car log
River
Disabled grade path
Picnic Shelter
Parking
Road
Shrubs
Retaining log
TYPICAL SECTION THROUGH EASTERN PICNIC AREA
VERTICAL X 2
1:500 (A3)
0 5 10 20 30 40 50m
N
Pontoon – Location dependant
ALEXANDRA BRIDGE REDEVELOPMENT
concept plan
Prelim DRAFT
on bathymetry and safety checks
SHIRE OF AUGUSTA MARGARET RIVER
Prepared for the AMR Shire
Design / Draft: VW, DS
Date: ~~10.04.20~~ 1·10·20
SHEET 2 of ?
Vicki Winfield
Vicki Winfield & Associates Pty Ltd.

9 Costs and Staging

9.1 Staging Framework

Discussions on 4th September 2020 confirmed the need for design by engineers of the vehicle and parking areas and the river access structures. Once these designs are complete the proposed staging should be as follows.

Stage 1 – Eastern day use area including the pontoon and new swimming access structure

Stage 2 – New boat ramp and associated boat trailer parking and manoeuvring area and new swimming access structure at the western swimming area

Stage 3 – New toilets including decommissioning and removal of the existing toilets and the design and procurement of new toilets.

Stage 4 – Redeveloping the day use car park, establishing the new central parkland areas and repurposing the existing boat ramp for canoe and paddleboard launching.

The interpretation and signage proposals will need developing and specifying as projects in their own right. The signs and panels can then all be produced and progressively installed (preferred approach, certainly with the interpretation as there will be cost savings in terms of production supervision etc.) or can be progressively produced when they are needed for installation.

Foreshore stabilisation and particularly use of a large machine to move logs around would be best done as one operation, however it will likely be done in 2 stages, the eastern and western sections so some visitor access to the river is maintained at all times.

There will also be some works that are ongoing such as weed removal.

It is understood that the SoAMR will be implementing most of the works 'in house'. The costs below are often based on contract rates or price so it is recommended the SoAMR staff review the cost estimate particularly those items that that will be implemented by the SoAMR construction teams.

9.2 Indicative Unit Costs and Quantities

The costs below are at best indicative and the table should really only be used as a worksheet for developing more accurate cost estimates as more information is available (construction procedures, details, quantities etc.). If a detailed cost estimate is required a quantity surveyor should be engaged.

Table 5 Indicative Costs (some Optional) and Quantities

Item	Indicative Rate Ex GST	Unit Rate Ex GST	Quantity	Total
Project Management				
Engineer Design –vehicle areas (site plan to include path system as well)	SoAMR advises approx. $10k			$10,000
Engineer Design –prelim. design for river access structures	See above			See above
Artist Input (possibly for incorporating into interpretation structures, using in the graphic design and developing animal play sculptures)	Will depend on the scope of artwork to be produced			TBC
Playground Specialist (for siting the swing and advising and siting the play sculptures)	Likely undertaken by SoAMR in house			NA

Weed Removal	By SoAMR on an annual basis in preparation for road and revegetation works	Say $2k per annum	5	$10,000
Roads and Car Parks				
Clearing, forming and surfacing	TBA by engineer, likely shale surface			$50,000
Wheel stops - concrete	$125 each supply and install	$125	Approx. 14	$1,750
Timber poles set in gravel to mark long bays	Say 15m pine logs at $10/m and installation per bay	Say $200 per bay	Approx 5	$1,000
Bollards (pine) at 1.5m centres where logs can't be used	Supply and install	Say $100 each	Say 20	$2,000
Paths				
Crushed limestone paths	Say $15 per m2 supply and lay Paths 1.2m wide $18/lm (campground to boat ramp 120lm) (Backing area to toilet 35lm) Paths 1.5m wide $22.5/lm (main paths linking day use to new and old boat ramps 90lm) Day use picnic area and links to car park say 500m2 Eastern swimming access to lookout Paths 1.2m wide	1.2m paths = $18/lm 1.5m paths = $22.5/lm Paths and picnic etc. $15/lm $18/lm	120lm plus 25lm 90lm Say 500 60lm	$2,160 $630 $2,025 $7,500 $1,080
Steps to boat ramp Information node (concrete riser and limestone infill)		$1k per flight	2	$2,000
Bush tracks	Cutting back vegetation and minor hand work and / or mulching			Say $500
Tree assessment and surgery	Tree assessment by arborist Tree surgery	$3k $5k	1	$3,000 $5,000
River Access Structures	Approx. $2k per m2 plus one off detail design $10k (TBC by engineer)	Detail design	1	$10,000
Boat Ramp	Ramp at the Elbow was $400k some years ago but closer to Bunbury	$400	1	$400,000
Steps at main swimming area	Steps plus deck is 26m2 = $52k Plinth seat $3-4k	$55k	1	$55,000
Fishability deck	Platform 9m2 plus plinth seat $3-4k	$21k	1	$21,000
Eastern swimming steps	Steps plus deck 18m2 = $36k Plinth seat $3-4k	$40k	1	$40,000
Pontoon	Inspect river bed and remove hazards Supply and install	$5k $20k	1	$25,000
Foreshore stabilisation				
Large machine (loader?) for moving logs. A backhoe may also be required for manoeuvring the logs once they	Say $300/hour for both machines say $2,500 per day Say 2 days east (inc. day use area)	$2.5k per day	4	$10,000

are in place.	and west			
Handwork to 'finish off'	1 day at each site	$1k	2	$2,000
Coir logs, jute matting etc. Refer https://www.allstakesupply.com.au/ (eastern states)	300mm diam. x 3m long approx. $130 each Coir mesh 2m x 25m 700gm approx. $220 Jute mesh 1.2m x 68m approx. $140 Labour	$130ea $140	30 3	Say $4,000 Say $500 $2,000
Geotextile matting (fabric spec. TBA by engineer or supplier) Indicative cost only	$5 per m2 to supply and lay. Behind logs, allow strips 2m wide x 3m long behind each join so $30 per log (2m x 50m roll 100gm/m2 $180 from All Stakes Supply)	$30 per log join	20 log joins	$600
Fencing – pine posts, plain wire (3 strands) plus horsesiter top wire plus installation, say 120m TBC	Possibly some re use of existing fence and materials. Posts approx. 150mm diam. 1.8m long approx. $20 delivered at 5m centres wire Horse siter wire $150 for 420m, Soft tensile 3.15mm wire 150m @ $50, say materials $6 per m Labour 2 days @ $1k per day say $20 per m	$25/m	120m	Say $3,000
Plantings (by community) approx. 150m shoreline and say plant 5m wide with say 3 plants per m2	Say planting with cell stock and volunteers $5 per m2 If paying for labour or using tube stock say $10/m2	$10/m2	750m2	$7,500
Amenity Earthworks				
Terracing of eastern picnic area	Machine (Bobcat, Loader or backhoe) $200 per hour for 1/2 a day also some handwork	$200 / hour	4 hours	$1,000
Amenity Plantings				
Shade trees – in grass areas or prominent areas such as traffic islands	Supply $50 - $150 depending on size of tree. Plant and water in say $50 per tree	Say $100 per tree	Say 20	$2,000
Shrub (and trees of small size) planting and mulching with mulch supplied for transport cost only by SoAMR	Planting of tube stock at 1m centres, water in and mulch 50mm thick	Say 600m2	Say $10/m2	$6,000
Establish dry grass in central area incl. cultivation				$1,000
Amenity mulching - finishing off	Supply and spread mulch, finish off by hand.			$2,000
Shelters				
Landmark K302 Peninsula 4.0m x 4.0m skillion roof shelter and pine posts Table with separate seats and table for easy access, price depends on quality $3 -$5.5k	Supply and delivery $8.6k Concrete floor $1.6k, Install say $5k Table $5.5k	$21k	1	$21,000
Landmark K309 Peninsula 6.0m x 4.0m skillion roof shelter with inground pine	Supply and delivery $7.6k Concrete floor $2.4k, Install say $5k Table	$21k plus $10k for	1	$31,000

posts. Table as above	$5.5k New BBQ $10k	BBQ		
Toilet – Decommissioning, removal, new design and construction by SoAMR	TBA by SoAMR		1	Say $200,000
Furniture				
Tables galv. pipe frame with jarrah slats. DBCA design (prisons frame, others to supply and fix jarrah) approx. $2.5k Exteria Grove 6	Supply and delivery approx. $1.5k ea plus installation $500	$2.5k $2k	8	$16,000
Bench Exteria Metro seat	Supply and delivery approx. $600 ea plus installation $500	$1.1k	2	$2,200
Wood BBQ	DBCA style purchased from Bunbury prison and installed	$500	1	$500
Install new swing	Swing already purchased, refurbish sand as necessary and relocate slightly, new steps to canoe launch			$3,000
Art work (Optional)				
Production of designs and motifs to complement the interpretation themes	Commissioning an artist to create the art. Use of the art will be incorporated as appropriate into the interpretation costs below.	TBA	TBA	TBA
Creation of large, wood, animal sculptures	Commissioning an artist and producing the sculpture (the artist may construct the sculptures)	TBA	TBA	TBA
Installing the sculptures	Engaging a playground specialist to input to the design and to install the art in accord with current playground standards – likely in sand areas.	TBA	TBA	TBA
Signs				
Large processed graphic signs (directional and site identification	Design, produce, install	$1.3k ea	3	$3,900
Vehicle totems 1 symbol e.g. disabled bay, long vehicles, m/c (used instead of tall traffic signs)	Approx. $350 - $400	$350	1	$350
Directional totems for pedestrians	Approx. $250 ea supply and install	$250	14	$3,500
Visitor risk signage	300 x 400mm on post or nearby structure	$350	5	$1,750
Allowance for relocating signs				$500
Additional vehicle totems or traffic signs TBA by engineer				$1,000
Interpretation				
Standard 800mm x 1200mm panels set vertically in accord with the sign style guide	Research and writing ($1k), graphic design ($1k), sign printing vinyl ($500), frame ($800), install ($400)	$3.7k	5	$18,500 With laser cut art will be extra.
Possibly complimentary banners		TBA	TBA	TBA

(400mm x 1200mm on 100mm posts), friezes or similar				
Revised site map for entry shelter once works are complete - standard 800mm x 1200mm panel	Research and writing ($1,000), Graphic Design ($1,000), sign printing vinyl ($500)	$2.5k	1	$2,500
Inclined Trailhead panels 400mm x 600mm	Research and writing ($300) and Graphic Design ($400), sign printing ($400), Frame ($700) Install ($200)	$700 plus $1,300 each sign	3 (the same)	$4,600
Inclined trailside panels 400mm x 300mm for along the trail	Research and writing ($300) and Graphic Design ($300) sign printing vinyl ($350), Frame ($600), Install ($200)	$1.75k ea	6	$10,500
Alternative trailside totems to compliment banners if used.	Research and writing, graphic design and bespoke laser cut plinths	$3.3k ea	6	

9.3 Staged Works and Associated Indicative Costs

The cost estimates below are based on allocating the indicative costs in the previous section to the staging framework in section 9.3. If funding is to be sought on the basis of these costs it is essential the 10% contingency is applied and outsourcing the construction will likely require another 10 – 20%.

The engineering design costs of $10,000 Ex GST, for roads, carparks and structures concepts are not included below.

Table 6 Indicative Costs for Stage 1 – Eastern Day Use Area Including the Pontoon and New Swimming Access Structure

Item	Indicative Cost Ex GST
Weed removal	$1,000 pa
Tree assessment and surgery	$4,000
Paths (crushed limestone)	$7,500
Foreshore stabilisation (Including all log moving)	$15,000
Terracing (in association with log removal)	$1,000
Amenity planting	$5,000
Shelter 6m x 4m (with disabled accessible table and new gas BBQ)	$31,000
Tables x4	$8,000
Bench seat for arrival node	$1,100
Wood BBQ	$500
Detail design of all river access structures	$10,000
Eastern Swimming access stairs	$40,000
Fishability deck	$21,000
Pontoon	$25,000
Interpretation node 3 panels	$11,100
Signage – 6 totems (1,500) and 2 river risk signage($700)	$2,200
SUBTOTAL	$183,400
10% Contingency	$18,340
TOTAL	$201,740

Table 7 Indicative Costs for Stage 2 – New Boat Ramp and Associated Boat Trailer Parking and Manoeuvring Area and New Swimming Access Structure at the Western Swimming Area

Item	Indicative Cost Ex GST
Weed removal	$1,000 pa
Tree assessment and surgery	$4,000
Boat trailer parking area and ramp access	$27,750
New boat ramp	$400,000
Paths (crushed limestone)	$2,790
Steps to information node	$2,000
Foreshore stabilisation (including all log moving)	$15,000
Amenity planting	$3,000
Shelter 4m x 4m (with disabled accessible table)	$21,000
Tables x2	$4,000
Western swimming access stairs	$55,000
Install swing	$3,000
Interpretation node 2 panels	$7,400
Signage – 2 small trailhead($3,300) 6 totems ($1,500)and 3 river risk signage ($1,050), relocation ($500), Large totem ($350)	$6,700
SUBTOTAL	$552,640
10% Contingency	$55,264
TOTAL	$607,904

Table 8 Indicative Costs for Stage 3 – New Toilets Including Decommissioning and Removal of the Existing Toilets and the Design and Procurement of New Toilets.

Item	Indicative Cost Ex GST
Decommissioning, removal, new design and construction by SoAMR	Approx. $200,000

Table 9 Indicative Costs for Stage 4 – Redeveloping the Day Use Car Park, Establishing the New Parkland and Repurposing the Existing Boat Ramp for Canoe and Paddleboard Launching

Item	Indicative Cost Ex GST
Day use car park	$27,000
Amenity planting and finishing off	$2,000
Dry grass	$1,000
Tables 2	$4,000
Signage – 1 small trailhead ($1,300) 2 totems ($500), 3 large processed graphic ($3,900), revised entry sign ($2,500), additional road signage ($1,000)	$9,200
Eastern swimming access to lookout Path 1.2m wide limestone	$1,080
Bench seat at lookout	$1,100
Bush track tidy up	$500
Trailside interpretation and viewing bench seat	$10,500
Wooden animal sculptures 3 say $5,000 each and setting in sand ($500 each)	$16,500
SUBTOTAL	$72,880
10% Contingency	$7,288
TOTAL	$80,168

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Appendix 1 Community Survey Form

Alexandra Bridge Foreshore Plan

Your Say Augusta Margaret River

Alexandra Bridge Foreshore Survey

Please take a few moments to complete this survey. We are also hosting a community workshop on Wednesday 25th March, 2.30 - 4pm at the Alexandra Bridge Hall. Please come along to learn more about this plan. We want to hear about how you use the foreshore and what observations you have made about the site. The hall will be attended until 6pm so you cannot make the meeting feel free to drop by later in the evening to provide your input.

Feed back can also be given at anytime via the survey on the your say page or hardcopies are located in the camp registration shelter at Alexandra Bridge campground and the Augusta and Margaret River Shire offices.

How often do you visit Alexandra Bridge foreshore area?

(Choose all that apply)

- ☐ Weekly
- ☐ Monthly
- ☐ Several times per year
- ☐ Yearly
- ☐ This is my first visit

What do you like about the place and what makes it special to you?

(select as many as are appropriate)

(Choose all that apply)

- ☐ The river
- ☐ The shady natural trees
- ☐ The history
- ☐ Used by the family for many years
- ☐ The facilities
- ☐ Peace and quiet
- ☐ Other (please specify)

How do you use the Alexandra Bridge foreshore?

(select as many as are appropriate)

(Choose all that apply)

- ☐ Picnic/BBQ
- ☐ Bird watching
- ☐ Boating (motorised)
- ☐ Canoeing/paddle board
- ☐ Fishing (from boat)
- ☐ Fishing (from shore)
- ☐ Swimming
- ☐ Walking
- ☐ Camp in the camp ground and enjoying the foreshore as part of the camping experience
- ☐ relaxing/sitting by river
- ☐ Other (please specify)

Are there any issues that you think need to be addressed in this plan?

Page 1 of 2

Alexandra Bridge Foreshore Plan

Your Say Augusta Margaret River

What facilities are important to you on the foreshore?

(select as many as are appropriate)

(Choose all that apply)

- [ ] Picnic table
- [ ] BBQ facilies
- [ ] Car parking
- [ ] Boat trailer parking
- [ ] Shade shelter
- [ ] Shade trees
- [ ] Information and directional signage
- [ ] Stories about the place (interpretation)
- [ ] Wheel chair access
- [ ] Paths
- [ ] Walk trails less than 1km
- [ ] Playground
- [ ] Boatramp
- [ ] canoe launch
- [ ] viewing areas
- [ ] fishing areas on the river bank
- [ ] swimming access
- [ ] boat tie up places
- [ ] toilet
- [ ] shower
- [ ] Other (please specify)

We can use signage to tell stories about this place. What stories or information would you like shared along the foreshore?

Do you have anything else you would like to share to help develop this plan?

Appendix 2 Survey Comments

Comments from Visitor Survey

Q 4 Are there any issues that need to be addressed by the plan

- The state of the stairs. Area made user friendly for the kids that utilise after school in summer. Maybe a pontoon for jumping diving off in deeper water. Access to water easier for elderly people
- Erosion and loss of trees, picnic area could be improved with a few more tables. Lots of boats tied up along the river bank adding to erosion.
- More parking, recycling bins
- increasing the number of camping sites for tourist to use the local surrounding businesses
- There needs to be better access for boating and the jetty replaced. Since removed the banks are being eroded more from boats bumping up to them to get passengers in. It is nigh on impossible to get someone with any mobility issue into a boat now and i have seen many people slip on the banks and injure themselves trying to climb into the boat. Kids don't enjoy going so much anymore as the jetty is gone which they loved to jump off and swim up too. It's quite sad.
- Removal of old amenity block or thorough renovation
- We enjoy the fact that it is dog friendly as our very well-mannered dog enjoys camping with us. We are responsible dog owners. We think the serenity of the area is beautiful and although prefer Chapman Pool Campsite because of the privacy of each site, we do like the great facilities at Alexandre Bridge. Well done on the toilets, BBQ area and ramp for our canoes. I think the Grandkids miss the swing off the branch into the water which broke last year. A small jetty and water swing would be a good idea but please don't over develop the area spoiling its natural beauty.
- Is it possible to improve facility for River Swimming
- Extra tables and seats in day visit area.
- It would be nice to be able to get a site where you can see the river from van as you once could.

Q6 We can use signage to tell stories about this place. What stories or information would you like shared along the foreshore?

- Limited signage needed, don't want signs all over the area as we enjoy the area for its natural beauty. Some info could be incorporated in clever ways such as on the picnic tables or on bollards. The history of the area is interesting and information about the Blackwood River.
- Wildlife, fauna, distance/route to other parts of river
- Include the surrounding history of Nillup, Warner Glen & Scott river etc.
- Types of trees, bushes etc.
- Historical and nature information.
- What birds and fish and other animals live around the area.
- The names of some species of flora and fauna, any historical stories and significance.
- Information about fish species, birds, vegetation. Fire warning
- Aboriginal history and settler history
- The history of the area. Types of birds and animals that frequent the area.
- All info (History)

Q7. Do you have anything else you would like to share to help develop this plan?

- Alexander Bridge camping ground is a fabulous quite area that our family have used for over 40 years for BBQs, boat launching and swimming. Keeping it underdeveloped and natural is part of its charm.
- A lot of people complain about the cost when there is no hot water for showering more signage as a lot of tourist call into our shop Nillup General Store and ask where it is as they drive past signage. The opportunity for local business in the area to advertise (since the camping site have dropped our business has decreased by 85% and we can't' afford to open now on the weekends and we had to lay off an employee because of this situation. Nigel & Natasha Woods Nillup General Store & Rural Traders 1483 Brockman Hwy Nillup WA 6288 Phone 97582269
- Fire control and fire management plan. Speed limit on Clark Drive. Upgraded Clark Drive. Designated caretaker in busy periods. More ranger visits. Protection of flora and fauna
- Please please, please put the jetty back. This is the main thing families and kids miss the most.
- Would like to see the area kept close to how it is now. Looking natural.
- This is a very well maintained campground. Although not used this visit, the availability of fire pits is great, very good clean loos. We will be back.
- After first visit we will have a better idea but it look fabulous.

Appendix 3 VRM Checklist for Underwater Hazards – DBCA

Department of Biodiversity, Conservation and Attractions

PARKS AND WILDLIFE SERVICE

VRM Hazard Identification and Maintenance Report

ASSESSOR _____ Date: / /

Facility/ Feature	Hazard Yes-No-N/A	Comments & Description
Water Visibility Nil, <3m, Good		
Sediment on bottom (easily muddying the water)		
Water Temp		
Water Depth		
Water Current		
Slippery Banks		
Water Falls		
Rapids		
Submerged obstacles (trees, rocks, limbs)		
Underwater hazards – swim throughs, ledges, caves, jagged rocks		
Rope swings		
Trees being jumped out of		
Banks being jumped from		
Fishing tackle		
Glass bottles		
Drink cans		
Historical debris		
Jetties/ platforms		
Canoe launching facilities		
River crossings Guide posts in place, culvert pipes		
Ladders for entry/ exit		
Bank retaining structures		

Page 2 of 3

Appendix 4 Clark Drive Traffic Data

The Clark Drive Traffic Data as supplied by Doug Sims Technical Officer, Assets & Admin, Shire of Augusta Margaret River.

Traffic Counter Location

Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-1376
Site: Clark Drive SLK 1.3.0.1WE
Description: **1.3 km off Brockman Hwy**
Filter time: **9:53 Wednesday, 23 November 2016 => 15:24 Monday, 19 December 2016**
Scheme: Vehicle classification (AustRoads94)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages 1 - 5	Averages 1 - 7
Hour									
0000-0100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0100-0200	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1
0200-0300	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
0300-0400	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0400-0500	0.0	0.0	0.0	0.5	0.0	0.5	0.0	0.1	0.2
0500-0600	0.0	0.0	0.0	0.3	0.0	0.3	0.3	0.1	0.1
0600-0700	0.3	1.0	0.7	0.5	0.3	1.0	0.5	0.5	0.6
0700-0800	2.0	1.7	0.7	2.0	0.5	1.5	1.8	1.4	1.5
0800-0900	3.8	3.3	1.7	3.3	1.8	4.0	7.3	2.8	3.7
0900-1000	**5.3**	**7.7**	**4.3**	3.8	3.8	7.5	8.8	4.8	5.8
1000-1100	4.5	6.0	4.0	5.3	6.3	12.3	**17.0**	5.2	**8.0**
1100-1200	3.0	6.3	2.8	**6.3**	**7.8**	**17.8**	10.5	**5.2**	7.8
1200-1300	4.0	3.0	4.0	6.3	**9.8**	10.0	12.3	5.5	7.2
1300-1400	3.0	9.7	3.0	**7.3**	6.3	**15.0**	**12.8**	**5.6**	**8.1**
1400-1500	**4.8**	**11.7**	3.5	2.0	4.3	11.3	9.0	4.9	6.4
1500-1600	4.0	4.3	2.8	2.3	5.8	9.0	5.5	3.8	4.8
1600-1700	3.0	2.7	**5.0**	4.0	6.5	9.8	8.0	4.4	5.8
1700-1800	3.3	1.7	1.3	3.0	3.0	7.0	3.3	2.4	3.3
1800-1900	1.0	0.7	0.8	1.3	4.0	3.3	1.8	1.6	1.9
1900-2000	0.7	0.0	0.5	1.5	1.5	2.5	0.0	0.9	1.0
2000-2100	0.3	0.7	0.3	0.0	0.5	0.8	0.5	0.3	0.4
2100-2200	0.0	0.0	0.0	0.0	0.8	0.5	0.0	0.2	0.2
2200-2300	0.0	0.0	0.5	0.0	0.5	0.0	0.0	0.2	0.2
2300-2400	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Totals									
0700-1900	41.6	58.7	33.6	46.5	59.5	108.3	97.8	47.6	64.1
0600-2200	42.8	60.3	35.0	48.5	62.5	113.0	98.8	49.4	66.3
0600-0000	42.8	60.3	35.5	48.5	63.0	113.0	98.8	49.7	66.5
0000-0000	43.6	60.3	35.5	49.3	63.0	113.8	99.3	50.0	66.9
AM Peak	0900	0900	0900	1100	1100	1100	1000		
	5.3	7.7	4.3	6.3	7.8	17.8	17.0		
PM Peak	1400	1400	1600	1300	1200	1300	1300		
	4.8	11.7	5.0	7.3	9.8	15.0	12.8		

This report show the type of vehicles and percentage of vehicle types (plus some additional info on speed)

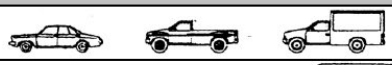
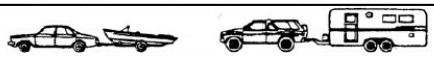
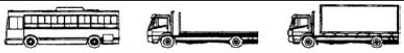
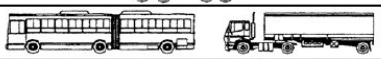
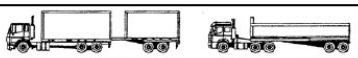
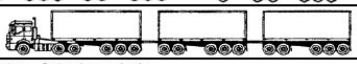
Class Speed Matrix

ClassMatrix-1378
Site: Clark Drive SLK 1.3.0.1WE
Description: **1.3 km off Brockman Hwy**
Filter time: **9:53 Wednesday, 23 November 2016 => 15:24 Monday, 19 December 2016**
Scheme: Vehicle classification (AustRoads94)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100)

Speed (km/h)	Class												Speed Totals	
	SV 1	SVT 2	TB2 3	TB3 4	T4 5	ART3 6	ART4 7	ART5 8	ART6 9	BD 10	DRT 11	TRT 12		
10 - 20	11	2	3	.	.	.	.	.	.	.	.	.	16	0.9%
20 - 30	82	15	20	.	.	.	1	.	.	.	.	.	118	6.6%
30 - 40	287	82	61	1	.	5	14	.	.	.	.	.	450	25.2%
40 - 50	474	111	70	5	1	14	9	1	.	.	.	.	685	38.3%
50 - 60	308	38	38	2	1	10	1	.	.	.	.	.	398	22.3%
60 - 70	78	13	8	.	.	3	.	.	.	.	.	.	102	5.7%
70 - 80	14	.	2	.	.	.	.	.	.	.	.	.	16	0.9%
80 - 90	2	.	.	.	.	.	.	.	.	.	.	.	2	0.1%
90 - 100	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
100 - 110	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
110 - 120	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
120 - 130	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
130 - 140	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
140 - 150	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
150 - 160	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
Class Totals	1256	261	202	8	2	32	25	1	0	0	0	0	1787	
	70.3%	14.6%	11.3%	0.4%	0.1%	1.8%	1.4%	0.1%	0.0%	0.0%	0.0%	0.0%		

Below is an explanation of the vehicle types.

AUSTROADS Vehicle Classification System

Level 1 Length (indicative) Type	Level 2 Axles and Axle Groups Axles	Groups	Level 3 Vehicle Type Typical Description	AUSTROADS Classification Class	Parameters	Typical Configuration
			LIGHT VEHICLES			
Short up to 5.5m		1 or 2	**Short** Sedan, Wagon, 4WD, Utility, Light Van, Bicycle, Motorcycle, etc	1	d(1) ≤ 3.2m and axles = 2	
	3, 4 or 5	3	**Short - Towing** Trailer, Caravan, Boat, etc	2	groups = 3 d(1) ≥ 2.1m, d(1) ≤ 3.2m, d(2) ≥ 2.1m and axles = 3, 4 or 5	
			HEAVY VEHICLES			
Medium 5.5m to 14.5m	2	2	**Two Axle Truck or Bus**	3	d(1) > 3.2m and axles = 2	
	3	2	**Three Axle Truck or Bus**	4	axles = 3 and groups = 2	
	> 3	2	**Four Axle Truck**	5	axles > 3 and groups = 2	
Long 11.5m to 19.0m	3	3	**Three Axle Articulated** Three axle articulated vehicle, or Rigid vehicle and trailer	6	d(1) > 3.2m, axles = 3 and groups = 3	
	4	> 2	**Four Axle Articulated** Four axle articulated vehicle, or Rigid vehicle and trailer	7	d(2) < 2.1m or d(1) < 2.1m or d(1) > 3.2m axles = 4 and groups > 2	
	5	> 2	**Five Axle Articulated** Five axle articulated vehicle, or Rigid vehicle and trailer	8	d(2) < 2.1m or d(1) < 2.1m or d(1) > 3.2m axles = 5 and groups > 2	
	≥ 6	> 2	**Six Axle Articulated** Six axle articulated vehicle, or Rigid vehicle and trailer	9	axles = 6 and groups > 2 or axles > 6 and groups = 3	
Medium Combination 17.5m to 36.5m	> 6	4	**B Double** B Double, or Heavy truck and trailer	10	groups = 4 and axles > 6	
	> 6	5 or 6	**Double Road Train** Double road train, or Medium articulated vehicle and one dog trailer (M.A.D.)	11	groups = 5 or 6 and axles > 6	
Large Combination Over 33.0m	> 6	> 6	**Triple Road Train** Triple road train, or Heavy truck and three trailers	12	groups > 6 and axles > 6	

Definitions:
Group: Axle group, where adjacent axles are less than 2.1m apart
Groups: Number of axle groups
Axles: Number of axles (maximum axle spacing of 10.0m)
d(1): Distance between first and second axle
d(2): Distance between second and third axle

Appendix 5 Shore Coastal Engineering Report

SHORE COASTAL

SITE INSPECTION REPORT No.01	**Alexandra Bridge Campground - Foreshore Inspection (Project No. 2003)**	Date: Wednesday 25/03/2020 Time: 10:00-12:30
Client	Shire of Augusta Margaret River	
Inspection by:	Stuart Barr (Seashore)	
Synopsis	Inspection of Alexandra Bridge Campground on the eastern foreshore of the Blackwood river. Shire have been developing concepts for upgrades to public access to the foreshore for swimming and boating at the recreational campground. Steep undercut banks and damaged and degraded 'low-key' access structures are evident along the eastern foreshore.	
Contract Personnel	Merryn Delaney, John McKinney (AMRSC), Vicky Winfield, Doug (Vicki Winfield & Assoc, Landscape Architects)	
Weather	Fine weather.	
Observations - Coastal Geomorphology /Processes	The site is located on the inner bend of a heavily meandering section of the Blackwood River, the largest river in the southwest. The campground is about 25km from Blackwood River ocean entrance and tidal signal expected to be heavily moderated. River flooding can be expected with a large upstream catchment. The site is a recreational campground managed by the Shire. The riverbank is reasonably well vegetated with large trees overhanging the river, however there is widespread bank erosion evident associated with a number of factors including: • Public Access Management: Erosion associated with partially controlled access between the campground and the river for swimming and boating. • Design and Maintenance of Access Structures: There appears to be the progressive development of relatively low cost river access structures, however these structures have been undermined and/or failed. • Design and Maintenance of Bank Stabilisation Structures: As per river access, there appears to be the progressive development of relatively low cost 'nature based' bank protection structures with the wide use of timber logs and local use of cemented stone structures to variable success. • Vessel Impacts: Erosion associated with boat wakes and uncontrolled mooring and launching of small vessels, including small 'tinnies' and paddle craft. There appears to have been some re-shaping and raising of the levels in the main public recreational area, which requires larger access structures and makes bank stabilisation more difficult. The banks appear to be largely sandy/clay material, with large trees effectively acting as local headlands in terms of bank stabilisation, and	

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SITE INSPECTION REPORT No.01	Alexandra Bridge Campground - Foreshore Inspection (Project No. 2003)	Date: Wednesday 25/03/2020 Time: 10:00-12:30
	tree roots and foreshore vegetation providing substantial bank stabilisation.	
Design Considerations (Coastal Adaptation)	Four concepts have been developed for upgrade to the campground by landscape architects (Vick Winfield) for the Shire. A key aspect of these concepts is river access and bank stabilisation. The following was discussed onsite and should be noted by the Shire: • There are reasonable examples of the successful use of logs for bank stabilisation onsite (e.g. River Access 2, photo b.) that could be applied to other areas. Key considerations include toe depth/scour protection, retention of material behind the logs, a sloped upper bank and fencing for public access control. Geofabric should be used to improve soil retention behind structures. • River access structures require immediate maintenance in places. • The design of any new river access structures requires careful consideration of the river interface. The compacted gravel steps with timber supports worked reasonably in the upper sections, but had typically failed in the lower, more dynamic sections near the river interface. • The boat ramp is an older 'low-key' structure that is fit for purpose with reasonable maintenance. Any upgrades should consider marginally widening to ramp to ~4.0m and straightening, inclusion of a floating finger jetty to improve amenity and safety of access to vessels, and adjacent bank stabilisation. • The existing site for the boat ramp is preferred by the Shire, as substantial works and costs would be required at any alternate site. • River access sites downstream of the boat ramp are relatively informal and bank stabilisation can largely be managed by public access management and some localised bank stabilisation.	

General Notes:
There was general discussion onsite of the four landscaping concepts, in particular the installation of additional jetties and pontoons for swimming and boating, and separation between swimming and boating activities.

In general, the site lends itself to floating jetty/pontoon structures with a suitable interface and bank abutment. Concepts of a canoe launch pontoon (River Access 1), swimming pontoon (River Access 3) and an extended floating finger jetty on the downstream side of the boat ramp, that wraps around the tree to allow temporary mooring of vessels was discussed.

Further consideration is required in concept and design development. Survey was being undertaken by the Shire during the inspection and would allow design of any replacement river access or bank stabilisation structures.

SHORE COASTAL

SITE INSPECTION REPORT No.01	Alexandra Bridge Campground - Foreshore Inspection (Project No. 2003)	Date: Wednesday 25/03/2020 Time: 10:00-12:30

Campground (R25502) located on an inner bank of a meandering section of the Blackwood River, about 25km from the ocean entrance at Augusta (AMRSC Intramaps 2018).

Campground adjacent to Blackwood River and approximate location of existing boat ramp and main river access points for swimming and boating.

SHORE COASTAL

SITE INSPECTION REPORT No.01	Alexandra Bridge Campground - Foreshore Inspection (Project No. 2003)	Date: Wednesday 25/03/2020 Time: 10:00-12:30

River Access 1 including a) compacted gravel stairs with timber supports and relatively steep sloped gravel bank, b) vertical undercut banks upstream which are sites of temporary boat mooring, and c) degraded cemented stone retaining wall with timber logs. Large void in wall in one area.

SHORE COASTAL

SITE INSPECTION REPORT No.01	Alexandra Bridge Campground - Foreshore Inspection (Project No. 2003)	Date: Wednesday 25/03/2020 Time: 10:00-12:30

River Access 2 including a) compacted gravel stairs with timber supports b) stabilised bank to the north using timber logs, sloped upper embankment and fencing for managing pedestrian access, and c) undercutting of stairs and bank erosion.

SHORE COASTAL

SITE INSPECTION REPORT No.01	Alexandra Bridge Campground - Foreshore Inspection (Project No. 2003)	Date: Wednesday 25/03/2020 Time: 10:00-12:30

River Access 3 including a) compacted gravel stairs with timber supports, timber retaining walls and handrails, b) failed lower stair and undercutting of timber retaining wall on upstream side, and c) timber logs for bank protection downstream.

SHORE COASTAL

SITE INSPECTION REPORT No.01	Alexandra Bridge Campground - Foreshore Inspection (Project No. 2003)	Date: Wednesday 25/03/2020 Time: 10:00-12:30

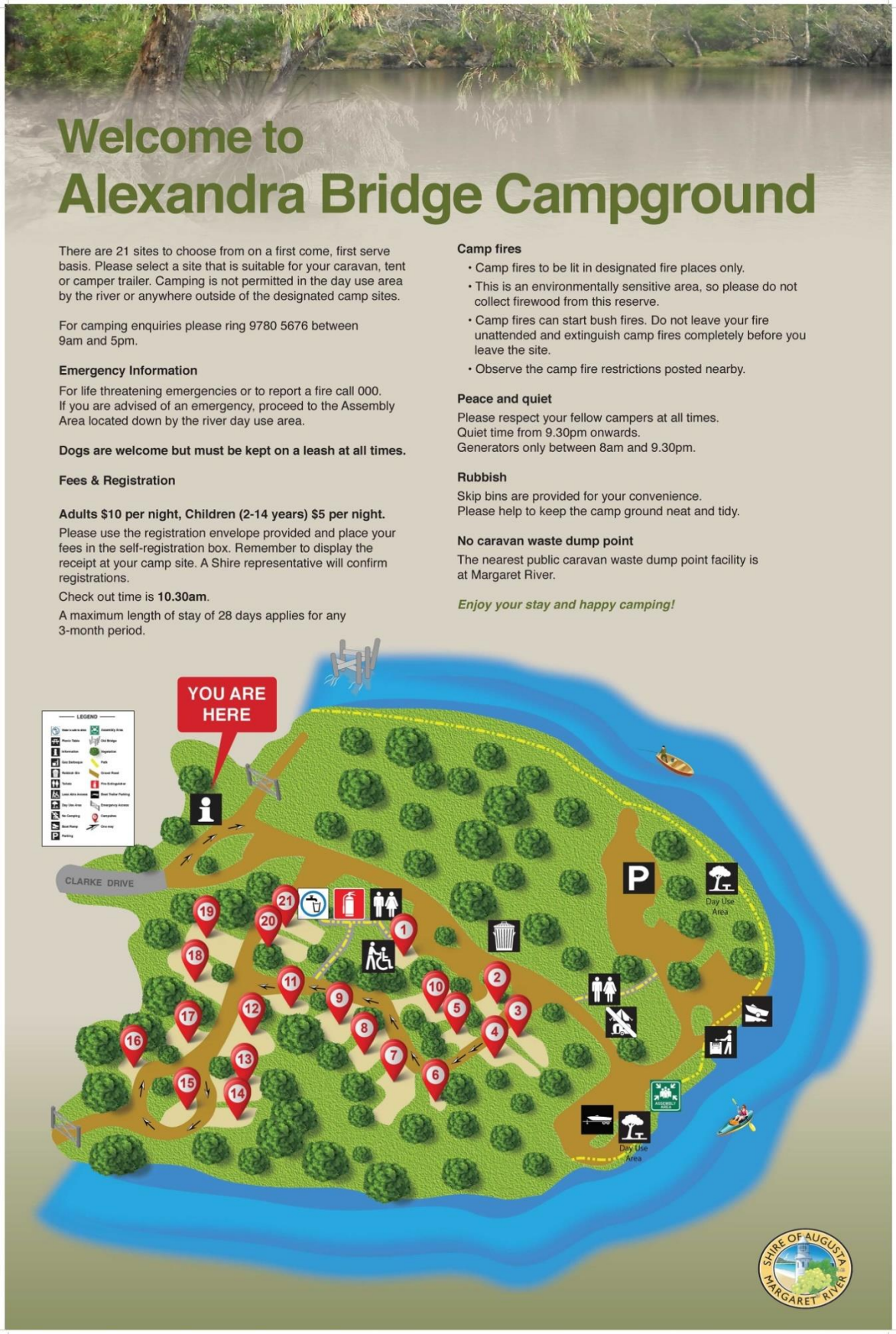
Boat ramp including a) relatively narrow (~3.5m) wide insitu concrete boat ramp and low cemented stone retaining walls of variable alignment, b) overhanging tree downstream and c) undercut bank near large tree upstream.

SHORE COASTAL

SITE INSPECTION REPORT No.01	Alexandra Bridge Campground - Foreshore Inspection (Project No. 2003)	Date: Wednesday 25/03/2020 Time: 10:00-12:30

Downstream river banks showing variable elevation, embankment undercutting and informal access.

Appendix 6 Existing Interpretation Panels



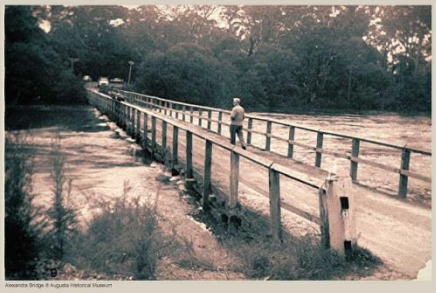
Old Alexandra Bridge

The story behind the skeleton

Where you are standing was once the Brockman Highway. The timber structure on the opposite bank of the river is the remains of a magnificent timber bridge.

Alexandra Bridge, named after the then Princess of Wales, was built in 1897 by Wishart and Davies. It was 104m long with seventeen 6.5m spans. The deepest section of the water is around 6m much of the time but can rise above 11m in flood.

It was the first major bridge across the Blackwood River, used as a main link bridge on what is now the Brockman Highway to places east, and to service settlers and the local timber industry.



Alexandra Bridge © Augusta Historical Museum

Group Settlement Truck 1920s © Augusta Historical Museum

When the new Alexandra Bridge was built on a new alignment of the Brockman Highway in 1969, the old bridge was kept as a tourist attraction and became a popular picnic and camping area. Unfortunately most of the old bridge was washed away by floods in 1982.

Davies and Wishart also built the Cape Leeuwin Lighthouse. M C Davies was a timber industry pioneer in this district and John Wishart, a building contractor, built many important wooden structures around Australia including jetties at Albany, Esperance, Carnarvon and Broome, the Guildford Bridge in Perth and the extension to Busselton jetty.

Campground Wildlife

The campsite has both riverside vegetation and marri (*Corymbia calophylla*) WA peppermint (*Agonis flexuosa*) woodland.

These are some birds you might get to see at close range, they may even visit your campsite:

Western Rosella and Red-capped Parrot,
Splendid Fairy-wren, Red-winged Fairy-wren and White-browed Scrubwren, White-breasted Robin, Scarlet Robin.

In summer the Red-tailed Black and Baudin's Black-Cockatoos will feed on marri "honky nuts" high up in the trees.

Down by the river look out for Grey Teal, Black Duck, Wood Ducks and grebes, Purple Swamphen and Australasian Darter.
You might also see Red-eared Firetail, Grey Butcherbird, Black-faced Woodswallow, Golden Whistler, Sacred Kingfisher.

You may see brushtail possums around your camp.
Please do not feed them: **Please do not feed any wildlife!**

Explore!

Day trips from Alexandra Bridge

Follow the M C Davies history trail:

Maurice Coleman Davies (1835 -1913) was a notable business pioneer of the Karridale and Augusta District; other timber industry areas in the South West of WA, and the pastoral industry of the Kimberley region. Davies built bridges and railways in South Australia in partnership with Baillie and Wishart before coming to WA in 1878 to source timber. He took up timber leases near Collie, and then started milling karri nearby at Kudardup, then Karridale and Boranup in the 1880s.

He developed markets all over the British Commonwealth for his timber; exported it through the two ports he built at Hamelin Bay and Flinders Bay (Augusta) and created townships around the mills and ports. His partnership with John Wishart also built Cape Leeuwin lighthouse, as well as Alexandra Bridge.

You can learn more about the M C Davies story at the Augusta Historical Museum, and follow a self-drive circuit to see some remnants of the timber industry and ports era – including famous Boranup forest which has regrown from being harvested in the 1890s.

M C Davies' company amalgamated with others in 1902 to form Millars Jarrah and Karri Co, which continued at other locations until the 1980s.

Suggested M C Davies self-drive circuit and stops:

- Augusta Historical Museum
- M C Davies Park
- Flinders Bay heritage picnic area and Rails to Sails Memorial
- Cape Leeuwin Lighthouse & old waterwheel
- Hamelin Bay
- Boranup Drive (check out information shelter at northern end of drive)

There are other attractions along the route including Jewel Cave and a little further on Lake Cave; and plenty of places to swim, surf or fish and wineries and cafes to visit.

The Shire of Augusta Margaret River also has camping sites at Flinders Bay and Turner caravan parks in Augusta.

Welcome to Country

Many Aboriginal families in the South West Boodjara Region have remained closely connected to their country through several generations of change. This spirit of connection is something we are born with and it is not easy to explain, except that as soon as we return to country we are overwhelmed by a need to take responsibility for our land and waters.

This strong ***djanga*** *(spiritual connection)* - revolves around fresh water sources and our stories follow this ***bilya*** *(river)* as it traverses several diverse landscapes and ecosystems on its way to the sea.

Tribal groups still travel from inland to the coast annually to perform ceremonies. Traditionally they would follow this river.

All the way from the ***korda*** *(heart)* at Dumbelyung lakes the ***goribilyiup*** *(Blackwood River)* provides a ***biddi*** *(travel route)* to ***wattern*** *(the ocean).*

Places like this campsite give us ***dartja*** *(meat)*, ***murunge*** *(fruits, berries and vegetables)*, ***djilgit*** *(fish)*. ***Gabbi*** *(water)*, ***and booner*** *(wood for fire)* ***karla*** *(warmth)* ***mia*** *(shelter)*, ***nitji nala kalleep*** *(this is our home fire)*, ***nala boodja*** (our country).

So please, everyone enjoy your time here, respect ***nala boodja*** *(our country)*, and take home ***kwabba kartalonga*** *(good memories)* - and leave only ***djinnas*** *(your footprints)* behind.

Generations of our family have stayed "on country", great great grandfather Sam Isaacs worked for M C Davies at Hamelin Bay.

Meela jinnung boorda yen jenna yen pibulmun-wadandi boodja
See you next time on pibulmun-wadandi country.

Wayne Webb

About the South West Boodjara Region

The lands of wadandi- dwordenup language group of the pibulmun nation are known as South West Boodjara region. There are a number of significant sites in the region, including caves, some of which are the place of mythological beings, ceremonial sites, rock art, paintings and artefacts.