Clarence Valley Council
Draft Clarence River Wharves Development Plan
Volume 2 Site and Stakeholder Considerations

August 2009

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1. Introduction

The CRWDP is comprised of two volumes:

- *Volume 1 – Development Plan*, briefly summarises the findings of the *Environmental Assessment, Condition Assessment* and *Stakeholder Consultation* phases and presents the *Conceptual Designs* of the proposed infrastructure; and
- This document, *Volume 2 – Site and Stakeholder Considerations* provides the context and background to Volume 1 by reporting the findings of the *Environmental Assessment, Condition Assessment* and *Stakeholder Consultation* phases.

2. Environmental Assessment

2.1 Scope of Assessment

A preliminary assessment of the environmental features of each site was undertaken to identify constraints and opportunities. The preliminary assessment considered riverbank stability, geotechnical, flooding, ecological, noise/air impacts, water quality, contamination, heritage and planning/ownership aspects.

The environmental assessment was limited to a site inspection and a review of available information. No detailed site investigations have been undertaken. The assessment was also limited to the construction and operation of the wharfs, which was assumed to include pontoons, piling and gangways only. The associated landscaping and civil works were not considered.

For reporting purposes, the Planning/Ownership aspects of the preliminary Environmental Assessment are presented in Chapter 3.

Note that works on individual sites arising form the CRWDP will still be subject to Part 5 of the Environmental Planning and Assessment Act, 1979. Accordingly a Review of Environmental Factors (REF) will be required to comply with the Act and ensure that CVC has met its responsibility to properly assess the environmental impacts of each proposal.

2.2 Assessment Methodology

2.2.1 River Bank Stability

The purpose of the riverbank stability assessment was to estimate the erosion risk adjacent to the current and proposed infrastructure. The assessment aimed to locate any areas of bank or riverside adjacent to the sites, which may be subject to degradation or altered processes as a result of the wharfs construction both directly and indirectly. This included assessment of the bank itself, the type, extent and depth of riparian vegetation, any informal pedestrian access to the water and the influence man made structures such as boat ramps, slipways and additional jetties may have on bank stability.

The assessment comprised the following tasks:

- A field investigation by a Senior Geomorphologist on 16 April 2009 that focused on identifying and mapping the extent of existing riverbank erosion. Photographic records of the riverbank were taken and the severity of erosion witnessed classified as per the categories detailed in Table 2-1.

Table 2-1 Erosion Categories and Description

Erosion Category	Description
Stable - natural	Banks are stable and are generally well vegetated with endemic species.
Stable - artificial	Banks have been stabilised artificially.

Erosion Category	Description
Minimally Active	Banks display minor, localised erosion or evidence of past erosion. Generally active only in high to extreme flow events.
Moderately Active	Banks exhibit minor to moderately severe erosion over lengths greater than 5 metres. Generally active in moderate to high flow events.
Highly Active	Banks exhibit moderate to severe erosion over lengths greater than 5 metres. Generally active over all flow events.

- Based on the field observations, an assessment of the processes contributing to any identified bank erosion, and their significance, was incorporated into a summary of the local environmental characteristics at each site; and
- Documented climate change predictions (by others) were used to assess potential impacts on future bank stability in a qualitative and assumptive manner.

2.2.2 Geotechnical

A desktop study was undertaken to assess:

- Geological and geomorphological setting of each site; and
- Local geotechnical aspects.

General geotechnical parameters or guidelines for concept design purposes were then developed.

Geotechnical data in the form of investigation reports and logs were sourced from CVC and the Roads and Traffic Authority NSW (RTA). Excluding the Yamba and Brushgrove sites, all proposed sites had available geotechnical data from a variety of investigations that are generally within 0.5 km of the proposed sites. The relevant data is summarised in the Assessment Findings section, and sources of the data listed in the References section at the back of the report. The datum used for reference is Australian Height Datum (AHD), and based on CVC-supplied shore survey data, the base of riverbed depth for each location is listed at the base of each geotechnical summary for the various wharf sites. In addition, verbal comments on installed piles or references to existing pile design information is also described.

2.2.3 Flooding

A field investigation was undertaken by a Senior Geomorphologist on 16 April 2009. A desktop review of site-specific hydrological data provided by CVC then followed.

Climate change effects were then considered utilising:

- AR4 - Climate Change 2007", IPCC 2007;
- Briefing: a post-IPCC AR4 update on sea-level rise.
- Antarctic Climate and Ecosystems, CRC 2007; and
- Climate Change Projections for the Wooli Wooli Estuary and Batemans Bay, CSIRO 2007.

2.2.4 Ecology/ Heritage/ Water Quality/Contamination

The assessments comprised the following:

- A site investigation by a Senior Environmental Scientist on 16 April 2009 and 30 May 2009;
- A desktop assessment of the relevant available information; and
- An AHIMS database search.

2.3 Assessment Findings

The assessment findings for each site are presented in Table 2-2 to Table 2-8. Photographs are presented in Appendix A. Figure 2-1 to Figure 2-8 inclusive depict the environmental features of each site. Further discussion regarding the overall geotechnical/geomophological setting and the effects of climate change follow these tables and figures.

With regards to Brushgrove, as per stakeholder requirements discussed in Chapter 5, two sites were investigated “Brushgrove Site 1 and “Brushgrove Site 2”. Some Environmental Assessment activities for the Yamba site were not completed because of the decision to defer this site pending the Department of Lands (DoL) finalisation of its Yamba Bay masterplan.

Table 2-2 Environmental Assessment Findings – Grafton

Item	Findings	Photo Ref.
River Bank Stability	The bank behind the existing floating pontoon is steep (50°) and somewhat concave. It is lined with reeds and rushes and other low level vegetation. It is currently minimally active however has the potential to become moderately active if disturbances occur. A very small (possibly quite old) rubble wall of around 30 metres in length lines the bank behind the reeds downstream of the current floating pontoon wharf. Further downstream of the reeds section there is a minimally active, silty/muddy beach approximately 70 metres long lined with shore gravel deposits that have been placed there by (Rowing Club/Grafton Council). This material is brought in periodically to maintain a beach suitable for use by the rowing club. Upstream of the pontoon wharf there is timber jetty structure protruding from fairly steep banks with just grass cover. These banks are minimally active but have the potential to become moderately active if further disturbances occur.	1 2
Geotechnical	The nearest sub-surface geotechnical data includes: ◗ Clarence River Bridge design drawing (circa 1922) – Bore No. 3 (drilled in 1910) on the northern riverbank encountered sand and gravel to sandstone bedrock at approximately 16.5 m (RL –16) ◗ 'Grafton Rail Viaduct Pier Rehabilitation' (North Bank) for ARTC - geotechnical studies undertaken for Pier 8 site in March 2004 included Rail Infrastructure Corporation Borehole 7245-1 (assumed collar at ~4 m AHD) with the following summarised profile intersected (with respect to approximate river level): – Approx. 0 m AHD to –9 m AHD; Clay & sand (low stiffness/density) – Approx. -9 m AHD to - -16 m AHD; Sand & gravel becoming medium dense to dense with SPT values of N = 17 to 38, increased Cone Penetrometer Test resistance below –9 m AHD. – It is noted that the resultant 12m deep concrete filled cased piles installed by contractors Hyatt Engineering were designed on skin friction, but apparently encountered dense sand near the base (pers. comm.. David Hyatt, Hyatt Engineering, 2009). It is noted that the depth of the sloping riverbed in the vicinity of the proposed piling position is at approximately –1.5 m AHD.	

Item	Findings						Photo Ref.
Flooding	1/100 year flood level m AHD	1/100 year water velocity m/s	1/20 year flood level m AHD	1/20 year water velocity m/s	1/5 year flood level m AHD	1/5 year water velocity m/s	
	8.2	0.5	8	0.4	6.1	0.5	
Ecology	An area of aquatic and emergent vegetation exists in the vicinity of the existing wharfs, including *typha orientalis, nymphoides sp., phragmites australis*, morning glory (*Ipomoea indica*), *crinum pedunculatum*. Riparian vegetation is limited to a few trees. The species or vegetation communities at the site are not listed as threatened by the TSC Act or EPBC Act and they are not expected to provide habitat for any threatened species.						3
Heritage	A search of the AHIMS database indicated that there are no known sites of aboriginal objects or places recorded in or near the location. The site has also been highly disturbed in the past, so it is considered unlikely that any items still exist, however, rivers were a popular gathering and camping place for aboriginals so it is possible that items do exist in the location. No heritage items are listed in the LEP or REP.						
Noise/Air	The construction of the wharf is likely to create noise issues, especially during the installation of the piles. The proposed wharf is also likely to attract watercraft. This has the potential to be a source of noise and air pollution, especially during water events when there would be an increased number of boats using the wharf. However, there is a limited number of sensitive receivers in the vicinity of the wharf site and it is expected that the impact from air and noise would be limited in duration and only affect the surrounding commercial land use which generally benefit from the events.						
Water Quality	Construction of the wharf may impact on water quality by disturbing sediments. Leaks and spills from the construction machinery may also occur. This is expected to be relatively short term impact and could be minimised by using appropriate construction techniques and having spill response equipment available during the construction. During operation, the wharf has the potential to attract more people and watercraft to the site. This could have an impact on water quality by increasing litter in the area and the potential for fuel spills/leaks from watercraft. It is expected that these impacts would be limited and could be minimised by implementing appropriate controls and rubbish facilities.						
Contamination	CVC has not listed the site as contaminated or potentially contaminated. The site inspection did not identify any issues of concern either but there is the potential for contamination from previous spills and leaks from vehicles or boats and the use of imported fill.						

1:1,300 (at A4)

0 10 20 40

Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56

N

LEGEND

Bank Condition

- Highly Active
- Minimally Active
- Stable - Artificial

GHD

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Clarence Valley Council
Clarence River Wharves
Development Plan

Job Number 22-14504
Revision A
Date 14 JUL 2009

Environmental Characteristics Grafton

Figure 2-1

G:\22\14504\GIS\Maps\2214504_Fig2_Grafton_20090713_A.mxd

Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 **T** 61 2 4979 9999 **F** 61 2 4979 9988 **E** ntlmail@ghd.com.au **W** www.ghd.com.au

Data Source: . Created by: rmholmewood, fmackay

Table 2-3 Environmental Assessment Findings – Ulmarra

Item	Findings						Photo Ref.
River Bank Stability	Upstream of the existing wharf location the bank is lined with approximately 25 metres of a near vertical pitched rock wall that is around 2 metres high. A horizontal concrete apron extends between 0.5-1.5 metres from the base of the rock wall. The bank is artificially stable and the existing protection is in good condition, although the concrete apron exhibits some deterioration. Upstream of this is a privately owned small jetty type structure built off a very steep bank (60°) protected with rubble. On the upstream side of the small jetty the bank continues at the same angle however is grass lined with phragmites growing in the water at the base of the bank. The reeds grow up to 5 metres from the bank and a sea grass can be seen just below the surface indicating that the bed surface shallows out. The bank is minimally active however has the potential to become moderately active. Downstream, the lower half of the bank is protected with large rock and the upper bank is well-vegetated. The bank is artificially stable and the existing protection is in good condition.						4 5
Geotechnical	The nearest sub-surface geotechnical data includes: ◗ 'Riverbank Stability Investigation' by Jeffrey & Katauskas (J & K) for Patterson Britton & Partners in August 1995 comprised eight (8) boreholes along the riverbank to 12 m depth. The proposed new wharf site is closest to J & K Borehole No. 5 (approximate collar RL 6.1m). This borehole intersected the following profile with respect to approximate river level): – Approx. 0 m AHD to –1.8 m AHD; Sand – low density (SPT values of N = 8) – Approx. –1.8 m AHD to –5.9 m AHD; Sand – medium dense (SPT values of N = 17 – 18) It is noted that the depth of the sloping riverbed in the vicinity of the proposed piling position is at approximately –2.5 m AHD.						
Flooding	1/100 year flood level m AHD	1/100 year water velocity m/s	1/20 year flood level m AHD	1/20 year water velocity m/s	1/5 year flood level m AHD	1/5 year water velocity m/s	
	6.4	1.1	6.1	1.2	4.9	1.0	

Item	Findings	Photo Ref.
Ecology	*Phragmites australis* dominates the water edge up and down river of the existing wharf. The riverbank in the location of the existing wharf has been completely cleared with limited riparian vegetation existing on adjacent properties. Flora and fauna are not considered to be a limitation to any works in the location of the existing wharf.	*6*
Heritage	A search of the AHIMS database indicated that there are no known sites of aboriginal objects or places recorded in or near the location. The site has also been highly disturbed in the past, so it is considered unlikely that any items still exist, however, rivers were a popular gathering and camping place for aboriginals so it is possible that items do exist in the location. No heritage items are listed in the LEP or REP.	
Noise/Air	The modification of the wharf is likely to create noise issues, especially during the installation of the piles. The proposed wharf is also likely to attract watercraft. This has the potential to be a source of noise and air pollution, especially during water events when there would be an increased number of boats using the wharf The nearest sensitive receiver is the house with river frontage approximately 30 m away. However, it is expected that the impact from air and noise would be short term and limited due to the largely commercial surrounding land use.	
Water Quality	Construction works may impact on water quality by disturbing sediments. Leaks and spills from the construction machinery may also occur. This is expected to be relatively short term impact and could be minimised by using appropriate construction techniques and having spill response equipment available during the construction. During operation, the wharf has the potential to attract more people and watercraft to the site. This could have an impact on water quality by increasing litter in the area and the potential for fuel spills/leaks from watercraft. It is expected that these impacts would be limited and could be minimised by implementing appropriate controls and rubbish facilities.	
Contamination	CVC has not listed the site as contaminated or potentially contaminated. The site inspection did not identify any issues of concern either but there is the potential for contamination from the use of imported fill.	

Rock / Concrete Bank and Cleared Vegetation

Phragmites

Good Access and Car park

Residential

©2008 Google

1:800 (at A4)

0 5 10 20

Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56

N

LEGEND

Bank Condition

Minimally Active

Stable - Artificial

GHD

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Clarence Valley Council
Clarence River Wharves
Development Plan

Job Number 22-1450414
Revision A
Date 14 JUL 2009

Environmental Characteristics
Ulmarra

Figure 2-2

G:\22\14504\GIS\Maps\2214504_Fig3_Ulmarra_20090713_A.mxd

Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 **T** 61 2 4979 9999 **F** 61 2 4979 9988 **E** ntlmail@ghd.com.au **W** www.ghd.com.au

Data Source: . Created by: rmholmewood, fmackay

Table 2-4 Environmental Assessment Findings – Brushgrove

Item	Findings						Photo Ref.
River Bank Stability	Site 1 - Downstream of boat ramp, the bank is artificially stable for about 15 metres as rubble protection for the currently existing privately owned floating pontoon wharf. Downstream of this is the abutment of the bridge joining Brushgrove and the mainland across the south-arm of the Clarence River. Upstream of the boat ramp phragmites inhabit a steep bank (60^{o}) which is moderately active.						10
	Site 2 - The proposed location at the upstream apex of Woodford Island, means that banks are exposed to the full force of flood flows. As a result, the banks are steep and show evidence of soil erosion following the recent high flows in May 2009. As a result, the majority of the bank here is considered moderately active and protective works are likely to be required.						11
Geotechnical	No sub-surface geotechnical data has been found for either site. It is not possible to predict the alluvial sediment profile, as the site is approximately midway between Ulmarra site (which has sand at depth) and Lawrence site (which has soft clays above possibly residual clay). The comments on riverbank stability are noted above in respect to the position being near the junction of the main Clarence River and the 'South Arm'. Based on this location, it is more likely that clay will be encountered, as the site has/is prone to active erosion, rather than deposition (generally coarser materials such as sands & gravel). It is noted that the depth of the sloping riverbed in the vicinity of the proposed piling position is at approximately –2.0 m AHD.						
Flooding		1/100 year flood level	1/100 year water velocity	1/20 year flood level	1/20 year water velocity	1/5 year flood level	1/5 year water velocity
		m AHD	m/s	m AHD	m/s	m AHD	m/s
	Site 1	5.9	0.3	5.3	1.5	4.1	1.1
	Site 2	5.9	0.6	5.3	1.1	4.2	0.9

Item	Findings	Photo Ref.
Ecology	Site 1 - Some Juncus sp. and *phragmites australis* exist upstream of the existing boat ramp with the only riparian vegetation being a *casuarina sp*. on the hotel site. Flora and fauna is therefore not considered to be a limitation to any works in the location of the existing boat ramp.	12
	Site 2- The bank is vegetated with a mixture of *casuarina sp*., camphor laurel and *phragmites australis*. A small stand of mangroves (*Aegiceras corniculatum*) is located on the northern end of the bank. It is unlikely that any of the trees provide significant fauna habitat. Flora and fauna is therefore not considered to be a limitation to any works, however, any impact on the mangroves will require approval by DPI-Fisheries under the Fisheries Management Act. It is therefore recommended that any structure/works is located away from the mangroves.	13
Heritage	A search of the AHIMS database indicated that there are no known sites of aboriginal objects or places recorded in or near the location. The site has also been highly disturbed in the past, so it is considered unlikely that any items still exist, however, rivers were a popular gathering and camping place for aboriginals so it is possible that items do exist in the location. No heritage items are listed in the LEP or REP.	
Noise/Air	The construction of the wharf is likely to create noise issues, especially during the installation of the piles. The proposed wharf is also likely to attract watercraft. This has the potential to be a source of noise and air pollution. However, there is a limited number of sensitive receivers in the vicinity of the proposed wharf site and it is expected that the impact from air and noise would be limited in duration and not create a significant impact.	
Water Quality	Attracting more visitors to the site could have an impact on water quality by increasing litter in the area and the potential for fuel spills/leaks from watercraft. It is expected that these impacts would be limited and could be minimised by implementing appropriate controls. Appropriate controls would also need to be implemented during construction to minimise impacts on water quality.	
Contamination	CVC has not listed the site as contaminated or potentially contaminated. The site inspection did not identify any issues of concern either but there is the potential for contamination from previous spills and leaks from vehicles or boats and the use of imported fill.	

1:700 (at A4)

0 3.75 7.5 15

Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56

N

LEGEND

Bank Condition

- Moderately Active
- Stable - Artificial

GHD

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Clarence Valley Council
Clarence River Wharves
Development Plan

Job Number	22-14504
Revision	A
Date	14 JUL 2009

Environmental Characteristics
Brushgrove Site 1

Figure 2-3

G:\22\14504\GIS\Maps\2214504_Fig5a_Brushgrove_20090707_A.mxd

Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 **T** 61 2 4979 9999 **F** 61 2 4979 9988 **E** ntlmail@ghd.com.au **W** www.ghd.com.au

Data Source: . Created by: rmholmewood, fmackay

1:1,000 (at A4)

0 10 20 40

Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56

N

LEGEND

Bank Condition

- Moderately Active
- Stable Natural

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Clarence Valley Council
Clarence River Wharves
Development Plan

Job Number 22-14504
Revision A
Date 14 JUL 2009

Environmental Characteristics
Brushgrove Site 2

Figure 2-4

G:\22\14504\GIS\Maps\2214504_Fig5b_Brushgrove2_20090713_A.mxd
Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 **T** 61 2 4979 9999 **F** 61 2 4979 9988 **E** ntlmail@ghd.com.au **W** www.ghd.com.au

Data Source: . Created by: rmholmewood, fmackay

Table 2-5 Environmental Assessment Findings – Lawrence

Item	Findings	Photo Ref.
River Bank Stability	Downstream of the existing wharf location the bank is protected by approximately 15 metres of rock pitching in poor condition. A short section of the protection has failed and fallen into the water. The bank of this failed section is vertical and is showing signs of erosion as it has receded and is set further back than the other protected areas. This area is moderately active. Further downstream of this section, the bank is minimally active with a large 'reed bed' fronting the existing rubble protection. Upstream of the existing wharf there are signs of failure of the rock pitched protection and the bank will become active here if left unattended. Upgrading or replacement of existing protection is recommended to stop any progress of bank recession.	7 8
Geotechnical	The nearest sub-surface geotechnical data includes: ◗ 'Preliminary Site Investigation for Proposed Wharfage at Chatsworth Island & Lawrence' for Maclean Shire Council in 2002. The geotechnical borehole BH2 drilled at Lawrence (assumed collar elevation 1 m AHD) for the existing solid wharf structure intersected the following profile (based on drillers logs) with respect to approximate river level: – Approx. 0 m AHD to –12 m AHD; Clay (& silt), sandy clay & clay (inferred very soft to soft consistency, recorded SPT values of N = 0 – 2 (hammer & rods apparently sinking under their own weight) – Approx. –12 m AHD to –15 m AHD; Clay with rock fragments, inferred stiff to very stiff consistency with SPT values of 36 – 53, refusal at highly weathered bedrock at 16.15 m drill depth. – It is noted that a construction drawing by McKenzie Burridge (Drawing No. 00-010) had a 'Pile Note' indicating a provisional target depth of approximately 13 m below the bank in stiff clays. ◗ Geotechnical Assessment for Memorial Park Boat Ramp by GHD LongMac (as part of GHD Design Report) in 2002. The field investigation comprised three shallow hand augered boreholes (BH1 – BH3) and Dynamic Cone Penetrometer (DCP) tests (D1 – D3) collared from the riverbank level (varying elevations of 0.8 m, 2.2 m & 3.0 m AHD). The boreholes and DCP's were shallow, with BH2 being the deepest coverage to 1.9 m (just above river level). Whilst these boreholes and tests aren't directly relevant to the riverbed sediment profile, the natural riverbank materials (below varying fill cover) comprised alluvial clays, sandy clays (low plasticity) and clayey sands with recorded consistency ranging from stiff to very	

Item	Findings	Photo Ref.
	stiff for the clays and medium dense sands, but with low SPT values (3 – 5 blows per 50 mm). It is noted that the surface of the alluvial soil profile typically has a relatively hard crust underlain by softer material. It is noted that the depth of the sloping riverbed in the vicinity of the proposed piling position is at approximately –2.5 m AHD.	
Flooding	1/100 year flood level m AHD: 5.4 1/100 year water velocity m/s: 0.1 1/20 year flood level m AHD: 4.7 1/20 year water velocity m/s: 0.1 1/5 year flood level m AHD: 3.6 1/5 year water velocity m/s: 0.2	
Ecology	An area of aquatic and emergent vegetation exists upstream and downstream of the existing wharf, including *typha orientalis* and *phragmites australis*. No riparian vegetation exists adjacent to the river bank or likely location of any wharf structure.	9
Heritage	A search of the AHIMS database indicated that there are no known sites of aboriginal objects or places recorded in or near the location. The site has also been highly disturbed in the past, so it is considered unlikely that any items still exist, however, rivers were a popular gathering and camping place for aboriginals so it is possible that items do exist in the location. No heritage items are listed in the location in the LEP or REP.	
Noise/Air	Any modifications to the existing wharf or a new wharf may be a source of noise but due to the likely short timeframe of construction and distance to sensitive receptors, this impact is unlikely to be significant. Any proposed modification is unlikely to attract a large number of additional watercraft and is expected to create limited changes to the air and noise environment.	
Water Quality	Construction of the wharf may impact on water quality by disturbing sediments. Leaks and spills from the construction machinery may also occur. This is expected to be relatively short term impact and could be minimised by using appropriate techniques and having spill response equipment available during the construction. During operation, the wharf is not expected to create any additional impacts than the current situation and it is expected that these impacts would be limited and could be minimised by implementing appropriate controls and rubbish facilities.	
Contamination	CVC has not listed the site as contaminated or potentially contaminated. The site inspection did not identify any issues of concern either but there is the potential for contamination from previous spills and leaks from vehicles or boats and the use of imported fill.	

1:1,100 (at A4)

0 10 20 40

Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56

N

LEGEND

Bank Condition

- Minimally Active
- Moderately Active
- Stable - Artificial

GHD

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Clarence Valley Council
Clarence River Wharves
Development Plan

Job Number 22-14504
Revision A
Date 14 JUL 2009

Environmental Characteristics
Lawrence

Figure 2-5

G:\22\14504\GIS\Maps\2214504_Fig4_Lawrence_20090713_A.mxd

Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 **T** 61 2 4979 9999 **F** 61 2 4979 9988 **E** ntlmail@ghd.com.au **W** www.ghd.com.au

Data Source: . Created by: rmholmewood, fmackay

Table 2-6 Environmental Assessment Findings – Maclean

Item	Findings	Phot Ref.
River Bank Stability	The entire lower bank in the vicinity of the existing pontoon is lined with large rock. The upper bank (levee) is grassed, graded and does not exhibit any signs of past erosion. The bank is artificially stable and the existing protection is in good condition	14 15
Geotechnical	The nearest sub-surface geotechnical data includes: ◗ 'Maclean Levee Investigation' by Coffey Geosciences for Clarence River County Council in May / June 2002. We have only been provided with a site plan and logs, and the nearest borehole to the proposed wharf site is DCP 5 (Section 7), which comprised Dynamic Cone Penetrometer (DCP) tests to 1 m depth in fill. Further south near the Fisheries Department building (just south of Argyle St) is Borehole BH2 (collar RL 2.13 m AHD). This borehole intersected the following profile with respect to approximate river level: – Approx. 0 m AHD to –1.9 m AHD; Estuarine Sand – loose – medium dense (SPT values of N = 5) – Approx. –1.9 m AHD to –6.9 m AHD; Estuarine Clayey Sand – loose–medium dense (SPT values of N = 2) – Approx. –6.9 m AHD to –10.4 m AHD; Sandy Clay (Possibly Residual Soil, inferred stiff to very stiff consistency, with Pocket Penetrometer test results of 150 – 300 kPa and SPT values ranging from 6 to 14) It is noted that the depth of the sloping riverbed in the vicinity of the proposed piling position is at approximately –3.0 m AHD.	
Flooding	1/100 year flood level m AHD: 3.8 1/100 year water velocity m/s: 1.5 1/20 year flood level m AHD: 3.3 1/20 year water velocity m/s: 1.5 1/5 year flood level m AHD: 2.5 1/5 year water velocity m/s: 1.4	
Ecology	The occasional *casuarina* sp. exists on the riverbank adjacent to the existing wharf. The weed morning glory is also present.	16

Item	Findings	Phot Ref.
	Flora and fauna is not considered to be a limitation to any works in the location of the existing wharf.	
Heritage	A search of the AHIMS database indicated that there are no known sites of aboriginal objects or places recorded in or near the location. The site has also been highly disturbed in the past, so it is considered unlikely that any items still exist, however, rivers were a popular gathering place and camps for aboriginals so it is possible that items do exist in the location. No heritage items are listed in the LEP or REP.	
Noise/Air	If the modifications attract more visitors, this has the potential to be a source of noise and air pollution, especially during large events when there would be a large number of boats using the wharf. However, it is expected that the impact from air and noise would be limited due to the surrounding commercial land use. Air and noise impacts from construction works are also likely to be short term and limited.	
Water Quality	Construction of the wharf may impact on water quality by disturbing sediments. Leaks and spills from the construction machinery may also occur. This is expected to be relatively short term impact and could be minimised by using appropriate techniques and having spill response equipment available during the construction. During operation, the wharf has the potential to attract more people and watercraft to the site. This could have an impact on water quality by increasing litter in the area and the potential for fuel spills/leaks from watercraft. It is expected that these impacts would be limited and could be minimised by implementing appropriate controls and rubbish facilities.	
Contamination	CVC has not listed the site as contaminated or potentially contaminated. The site inspection did not identify any issues of concern either but there is the potential for contamination from previous spills and leaks from vehicles or boats and the use of imported fill.	

519,000

Some Riparian Vegetation

Limited Car Parking

Existing Wharf

Good Pedestrian Access

Commercial Landuse

© 2008 Google

519,000

1:1,000 (at A4)

0 10 20 40

Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56

N

LEGEND

Bank Condition

Stable - Artificial

GHD

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Clarence Valley Council
Clarence River Wharves
Development Plan

Job Number 22-14504
Revision A
Date 14 JUL 2009

Environmental Characteristics
Maclean

Figure 2-6

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Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 **T** 61 2 4979 9999 **F** 61 2 4979 9988 **E** ntlmail@ghd.com.au **W** www.ghd.com.au

Data Source: . Created by: rmholmewood, fmackay

Table 2-7 Environmental Assessment Findings – Harwood

Item	Findings	Phot Ref.
River Bank Stability	Downstream from the existing wharf there is 3-4 metres of highly active unprotected bank surrounding a storm water outlet. Further downstream of this the bank is artificially stable for approximately 15 metres consisting of rubble protection. The bank downstream from here is unprotected but vegetated with a gentle gradient (30°) and minimally active.	17 18
	Some fretting of the bank is evident in the area where the existing wharf connects with the bank. The fairly steep (45°), well vegetated bank is moderately active in locations.	19
	Upstream of the existing wharf, there is a boat ramp and old ferry docking location that is artificially stable.	20
	Immediately upstream of the boat ramp the bank is moderately steep (45°+) and well-vegetated with phragmites and grasses. This bank is minimally active, however, has the potential to become moderately active if disturbed. Siting a pontoon and facilities in this area would require further investigation to define bank stabilisation requirements.	
Geotechnical	The nearest sub-surface geotechnical data includes: ◗ 'Pacific Highway Upgrade Project; Wells Crossing to Illuka Road' – Geotechnical Investigation Report by Coffey Geosciences for Sinclair Knight Merz Pty Ltd in November 2008. Boreholes drilled in the vicinity of the Harwood Bridge indicated a deep buried bedrock surface ranging from RL –28 on the southern abutment to RL-64.4 in the middle of the river – the latter possibly coinciding with an incised palaeochannel located between the existing central channel and the northern shoreline. The Section 4 long section from the above report shows that the most relevant data in respect to the proposed wharf location on the northern bank of the river are boreholes R4/BH2 (collar at RL – 5.6 in riverbed just south of northern bank) and GBH113 (collar RL 1.5 just north of northern bank). These boreholes intersected an alternating profile of Holocene age estuarine clays (Unit FL3) and sands (Unit FL4), overlying a basement sand & gravel layer (Unit FL7). The following profile is interpreted from the above-listed boreholes with respect to approximate river level: – Approx. 0 m AHD to –3.7 m AHD; Estuarine Sand (FL4) – loose to very loose (very low SPT values) – Approx. –3.7 m AHD to –8.0 m AHD; Estuarine Clay (FL3) – very soft (SPT values of N = 0) – Approx. –8.0 m AHD to –15.0 m AHD; Estuarine Sand (FL4)– loose to very loose (very low SPT values)	

Item	Findings	Phot Ref.
	– Approx. –15.0 m AHD to –20.0 m AHD; Estuarine Clay (FL3)– very soft to soft (SPT values of N = 0) – Approx. –20.0 m AHD to –28.0 m AHD; Estuarine Sand (FL4) – loose to very loose, locally dense (SPT values 1 –22, increased Cone Penetrometer resistance in BH GBH113) – Approx. –28.0 m AHD to –30.0 m AHD; Estuarine Clay (FL3) – soft consistency – Approx. –30.0 m AHD to –37.0 m AHD; Estuarine Sand (FL4) – loose to medium dense – Approx. –37.0 m AHD to –38.5 m AHD; Estuarine Clay (FL3) - firm consistency – Approx – 37.0 m AHD to –63 m AHD; Basement Sand (FL7) – dense to very dense consistency It is noted that the depth of the sloping riverbed in the vicinity of the proposed piling position is at approximately –1.5 m AHD.	

Flooding	1/100 year flood level	1/100 year water velocity	1/20 year flood level	1/20 year water velocity	1/5 year flood level	1/5 year water velocity	
	m AHD	m/s	m AHD	m/s	m AHD	m/s	
	3.3	0.7	2.9	0.7	2.1	0.9	
Ecology	A fringing row of grey and river mangroves exists along the riverbank adjacent to the existing wharf. Some casuarina sp. are also growing on the river bank in this location. Upstream of the existing boat ramp there is the occasional mangrove but the area is dominated by *phragmites australis*. Any impact on the mangroves will require approval by DPI-Fisheries under the Fisheries Management Act. It is therefore recommended that any structure/works are located upriver of the boat ramp.						21 22
Heritage	A search of the AHIMS database indicated that there are no known sites of aboriginal objects or places recorded in or near the location. The site has also been highly disturbed in the past, so it is considered unlikely that any items still exist, however, rivers were a popular gathering and camping place for aboriginals so it is possible that items do exist in the location. No heritage items are listed in the LEP or REP.						
Noise/Air	The construction of the wharf is likely to create noise issues, especially during the installation of the piles. The proposed wharf is also likely to attract watercraft. This has the potential to be a source of noise and air pollution. However, there is a						

Item	Findings	Phot Ref.
	limited number of sensitive receivers in the vicinity of the wharf site and it is expected that the impact from air and noise would be limited in duration.	
Water Quality	Improvements to the wharf facilities has the potential to attract more people and watercraft to the site. This could have an impact on water quality by increasing litter in the area and the potential for fuel spills/leaks from watercraft. It is expected that these impacts would be limited and could be minimised by implementing appropriate controls. Appropriate controls would also need to be implemented during construction to minimise impacts on water quality.	
Contamination	CVC has not listed the site as contaminated or potentially contaminated. The site inspection did not identify any issues of concern either but there is the potential for contamination from previous spills and leaks from vehicles or boats and the use of imported fill.	

1:1,000 (at A4)

0 10 20 40

Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56

N

LEGEND

Bank Condition

- Highly Active
- Minimally Active
- Moderately Active
- Stable - Artificial

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Clarence Valley Council
Clarence River Wharves
Development Plan

Job Number 22-14504
Revision A
Date 14 JUL 2009

Environmental Characteristics
Harwood

Figure 2-7

G:\22\14504\GIS\Maps\2214504_Fig7_Harwood_20090713_A.mxd

Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 **T** 61 2 4979 9999 **F** 61 2 4979 9988 **E** ntlmail@ghd.com.au **W** www.ghd.com.au

Data Source: . Created by: rmholmewood, fmackay

Table 2-8 Environmental Assessment Findings – Yamba

Item	Findings						Photo Ref.
River Bank Stability	The bank is entirely rock lined and artificially stable. The new wharf can be located anywhere as rubble-lined banks are stable throughout. Need to take into account existing infrastructure e.g. oyster beds, other wharfs and access.						23
Geotechnical	Not assessed.						
Flooding	1/100 year flood level m AHD	1/100 year water velocity m/s	1/20 year flood level m AHD	1/20 year water velocity m/s	1/5 year flood level m AHD	1/5 year water velocity m/s	
	2.4	0.2	1.8	0.1	0.8	0.1	
Ecology	The occasional mangrove is located on the bank in the vicinity of the existing wharf but the area is mainly cleared. Providing the mangroves are avoided flora and fauna is not considered to be a limitation to any works.						24
Heritage	A search of the AHIMS database indicated that there are no known sites of aboriginal objects or places recorded in or near the location. The site has also been highly disturbed in the past, so it is considered unlikely that any items still exist, however, rivers were a popular gathering and camping place for aboriginals so it is possible that items do exist in the location. No heritage items are listed in the LEP or REP.						
Noise/Air	Any increase in the number of visitors has the potential to be a source of noise and air pollution, however, it is expected that this impact would be limited. Air and noise impacts from construction works are also likely to be short term and limited.						
Water Quality	Improvements to the wharf facilities has the potential to attract more people and watercraft to the site. This could have an impact on water quality by increasing litter in the area and the potential for fuel spills/leaks from watercraft. It is expected that these impacts would be limited and could be minimised by implementing appropriate controls. Appropriate controls would also need to be implemented during construction to minimise impacts on water quality.						

Item	Findings	Photo Ref.
Contamination	CVC has not listed the site as contaminated or potentially contaminated. The site inspection did not identify any issues of concern either but there is the potential for contamination from previous spills and leaks from vehicles or boats and the use of imported fill.	

1:1,100 (at A4)

0 10 20 40

Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56

N

LEGEND

Bank Condition

Stable - Artificial

GHD

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Clarence Valley Council
Clarence River Wharves
Development Plan

Job Number 22-14504
Revision A
Date 14 JUL 2009

Environmental Characteristics
Yamba

Figure 2-8

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Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 **T** 61 2 4979 9999 **F** 61 2 4979 9988 **E** ntlmail@ghd.com.au **W** www.ghd.com.au

Data Source: . Created by: rmholmewood, fmackay

2.3.1 Geological and Geomorphological Setting

The geology of the study area comprises Quaternary age alluvial and estuarine sediments of the Clarence River floodplain overlying the sedimentary bedrock of the Mesozoic age Clarence-Moreton Basin. Reference to the 'Maclean' and 'Grafton' 1:250,000 scale geological sheets indicates the following stratigraphic sequence (from oldest to youngest) occurs below the Quaternary sediments:

- Bundamba Group (includes Marburg Formation – includes conglomerate, sandstone, siltstone, coal);
- Walloon Coal Measures (shale, sandstone & coal);
- Kangaroo Creek Sandstone (quartz sandstone with some conglomerate); and
- Grafton Formation (sandstone, siltstone, claystone & coal).

The rocks of the younger Grafton Formation are most likely to occur below the town of Grafton, whereas the older rock units are present downstream of here (due to the regional dip of the stratigraphy).

There are apparently no published soil landscape maps for the study area coverage.

The geomorphology of the Clarence River floodplain is marked by generally flat terrain with riverbank elevations ranging from elevations of approximately 1 m AHD to 5 m AHD. There are numerous flood plain channels and ox-bow lake formations, as well as the 'south arm' of the main river between the Brushgrove and Maclean sites.

2.3.2 Climate Change and Sea Levels

The Intergovernmental Panel on Climate Change provides updates on climate change impacts every 6 to 7 years. The most recent update (IPCC, 2007) provides sea-level rise predictions for the period 2090 to 2100 compared to the average sea level for the period 1980 to 2000. According to IPCC (2007) the average global sea level rise (ignoring ice flow melt) may be between 0.18 m and 0.59 m by between the years 2090 to 2100. Including an ice flow melt component gives an adjusted range of 0.18 m to 0.79 m.

The variation in the sea-level rise estimates in the IPCC reports is a result of modelling different scenarios largely relating to predicted global development and likely greenhouse gas emissions. The upper limits of the model outputs represent 'business as usual' scenarios. It should be noted that the ACECRC (2008) highlight that recent measurements of sea levels indicate that sea level rise is tracking at rates equivalent to the upper limits as predicted by IPCC (2007). Further, ACECRC (2007) stress that global greenhouse gas emissions are currently exceeding those on which the upper limit scenario is based. Hence, it is prudent to adopt the upper limits for medium to long-term planning and management.

In respect to this, recent work by the CSIRO (2007) indicates that the mean sea level along the NSW coast may rise by more than the global average. Based on the above information, sea levels along the NSW coast may rise by between 0.18 m to 0.91 m between the years 2090 and 2100. This upper sea level rise limit of 0.91 corresponds to that used by Webb, McKeown and Associates (2008) in preparing the *Yamba Floodplain Risk Management Study*.

While IPCC (2007) does not report estimates for nearer future periods, previous reports provide sea level rise estimates for 2050. For example, IPCC (1995) estimates that average sea level will rise by between 0.08 and 0.428 metres by 2050, with a mid-range scenario of 0.225.

Further, the NSW DECC Draft Sea Level Rise Policy Statement (February, 2009) recommends adoption of 0.4 metres rise in average sea level by 2050.

2.4 Discussion and Recommendations

2.4.1 River Bank Stability

Most sites generally display stable and/or protected banks. The key exceptions are:

- Brushgrove Site 2 where the site location at the apex of Woodford Island is exposed to the full force of flood flows. Evidence of soil attrition along the bank was observed as a result of the recent 2009 flood event. It is recommended that protective works along the lower bank will be required if this location is progressed; and
- Lawrence where the existing rock pitched protection is failing in locations, especially in the vicinity of the existing jetty. It is recommended that the stability of the current protection at the proposed pontoon location be reviewed at the time of detail design if this location is progressed.

Additionally, at the proposed pontoon location at Harwood, upstream of the existing boat ramp, the bank at the time of inspection was densely vegetated with reeds and grasses and the extent and severity of any existing erosion could not be fully determined. However, the bank is steep, indicating that it may be unstable or become unstable in the future. Hence, bank protection works are also likely to be required at this location.

2.4.2 Geotechnical Concept Design Parameters

Due to the generally deep soft/loose sediments (as listed in Table 2-2 to Table 2-8), a potentially high cantilever loading to the pontoon piles will be applied intermittently during flood periods. Hence, in order to provide adequate socket of driven piles into more consolidated sediments, the following design parameters should be considered:

- Pile lengths will have a minimum depth below river level (AHD) of approximately 8 m (based on profiles listed in Table 2-2 to Table 2-8), with the range dictated by local conditions (possibly up to 20 m) – generally the estuarine sediments at locations Maclean & Harwood will be softer and less consolidated than further upstream.
- Piles should be preferably founded in sand (medium dense) rather than clay – due to the densification and cone of resistance of the former material caused during the pile driving.
- In sand sediments, a general target of medium dense material should be sufficient.
- In clay sediments (where unavoidable in the local profile) such as Lawrence, Maclean and possibly Brushgrove – a minimum target of 'stiff' clays should be achieved.

For preliminary design stage, it is recommended to confirm with investigation boreholes the conditions at Brushgrove (unknown at

present). Also, it is recommended to conduct trial piling at each site with a barge pile to obtain practical guidelines as to appropriate piling depths.

2.4.3 Climate Change Impacts on Bank Stability and Inundation

The wide mouth of the Clarence River mouth means that increases in sea levels will be largely transposed to tidal levels within the estuary and river. This could potentially result in an increased risk of inundation at the sites.

In respect to flooding, predicted sea-level rise will result in an increase in the level of flood events along the lower Clarence River. This will primarily result in an increase in the frequency and depth of inundation. Based on DECC (2009) it is recommended to apply a 0.4 metre increase to all flood levels reported in Table 2-2 to Table 2-8 to account for the influence of predicted sea level rise on flooding for 2050. Additionally, according to the CSIRO (2007), climate change may also increase design rainfalls by up to 30% by 2090 to 2100. This would also result in the increased frequency of inundation of the sites.

Higher tidal levels and increased frequency of higher floods would also result in an increase in the level and frequency at which processes that contribute to erosion (primarily flood flows, tidal flows, wave attack) operate on the bank. This is expected to be most significant along those sections of bank where current protection works do not extend to the top of bank and/or where they consist of poorly placed materials.

2.4.4 Ecology

The ecological values vary at each site. Most of the proposed locations have been cleared and now have a mixture of native and introduced aquatic and riparian vegetation species. However, mangroves exist at the proposed sites of Yamba, Harwood, Maclean and Brushgrove (Site 2). It is unlikely that any of the existing vegetation provides habitat for threatened fauna species. Flora and fauna is therefore not considered to be a limitation to any works, however, any impact on the mangroves will require approval by DPI-Fisheries under the Fisheries Management Act. It is therefore recommended that any structure/works is located away from the mangroves.

2.4.5 Heritage

A search of the AHIMS database and LEP and REP indicated that there are no known sites of aboriginal objects or places recorded in or near any of the proposed wharf locations. The sites have also been highly disturbed in the past, so it is considered unlikely that any items still exist, however, rivers were a popular gathering place and camps for aboriginals so it is possible that items do exist in the location.

No heritage items are listed in the LEP or REP.

2.4.6 Air and Noise

Any increase in the number of visitors has the potential to be a source of noise and air pollution, however, it is expected that this impact would be limited because it is likely to be short term and there are limited sensitive receptors in close proximity to the proposed wharf locations.

Air and noise impacts from construction works are also likely to be short term and limited.

2.4.7 Water Quality

Improvements to the wharf facilities have the potential to attract more people and watercraft to the site. This could have an impact on water quality by increasing litter in the area and the potential for fuel spills/leaks from watercraft. It is expected that these impacts would be limited and could be minimised by implementing appropriate controls.

Appropriate controls would also need to be implemented during construction to minimise impacts on water quality.

2.4.8 Contamination

CVC has not listed any of the sites as contaminated or potentially contaminated. The site inspection did not identify any sites of concern either but there is the potential for contamination from previous spills and leaks from vehicles or boats and the use of imported fill.

3. Planning/Ownership

3.1 Assessment Methodology

To determine the planning and ownership issues associated with the proposed works, the relevant legislation was reviewed and ownership of each site confirmed. The DoL were consulted with to confirm approval/licensing requirements. To determine the occurrence of Native Title claims, the National Native Title Tribunal web site was consulted. A copy of the draft CRWDP was sent to the Native Title claimants for consideration.

3.2 Assessment Findings

3.2.1 Property Description and Ownership

The seven sites nominated for closer investigation affect property that includes road reserves, Crown land reserves and land owned by CVC. Details of are shown in Table 3-1.

Table 3-1 Property Description and Ownership

Site	Property Description*	Ownership
Grafton	Part Local Road Reserve (Prince Street) and part Lot 7001 DP 1054597, Lot 702 DP 92916, lot 20 DP 879077.	CVC; Crown Land with CVC as Reserve Trust Manager
Ulmarra	Part Local Road Reserve (Coldstream Street) and part Lot 19 DP 1093396	Crown Land with CVC as Reserve Trust Manager
Brushgrove Site 1	Local Road Reserve (Inmon Lane)	CVC
Brushgrove Site 2	Island End Park Reserve 90732. Covering Lot 7013 DP 92605, Brushgrove	Crown Land with CVC as Reserve Trust Manager
Lawrence	Crown Reserve, plus Lots 9 and 12 DP 758604.	Crown Land with CVC as Reserve Trust Manager
Maclean	Lot 365 DP 751388, Lot 7022 DP 1113908, Lot 429 DP 729433.	Crown Land with CVC as Reserve Trust Manager
Harwood	Local Road Reserve (River Street)	CVC
Yamba	Lot 7042 DP 1023322, Lots 203 and 202 DP 727454.	Crown Land with CVC as Reserve Trust Manager

* Note that all sites include the bed of the river to some extent and this is typically Crown Land

3.2.2 Native Title

As at April 2009 only one Native Title application was registered under Commonwealth legislation. The claimant application was made by the Yaegl People and was for the waters of the Clarence River from the point at which it enters the sea at Yamba upstream to the Harwood bridge. This claim is described as Federal Court File number NSD6052/98 and Tribunal File Number NC96/38. It was filed in November 1996 and is still in mediation.

Only the wharf originally proposed as part of this Development Plan for Yamba is within the area of this Native Title claim and the location for this wharf is now recommended to be determined through the foreshore management plan for Yamba bay (a separate process being undertaken by DoL). Notwithstanding this, the Yaegl People have been consulted as part of the exhibition of this Development Plan and their response will be considered as part of finalising individual concepts for specific sites.

3.2.3 Legislation

Commonwealth Legislation

Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) applies to proposed development that may have a significant impact on a matter of national environmental significance or on Commonwealth land. The Act establishes those matters of national environmental significance that need to be considered when developments are proposed. These matters will require assessment in a Review of Environmental Factors (REF) to be prepared at the time that specific facilities are being considered.

State and Regional Planning

Environmental Planning and Assessment Act 1979

In New South Wales, assessment of proposed development or activities are prescribed by the Environmental Planning and Assessment Act 1979 (EP&A Act) and the Environmental Planning and Assessment Regulations 2000 (EP&A Act Regulations).

Environmental assessment is undertaken under Part 3A, Part 4 or Part 5 of the EP&A Act:

- Part 3A – is for a 'major project' that requires the ministerial approval;
- Part 4 – where development consent is required from a consent authority; and
- Part 5 – where development consent is not required and a determination to approve the activity is made by a determining authority.

Assessment under Part 5 of the EP&A Act 1979

All seven locations identified by CVC as potential locations for a wharf facility are zoned under various Local Environmental Plans (LEP's). However, these have been superseded by State Environmental Planning Policy (Infrastructure) (described below) and this means the proposed development does not require development consent.

As the proposal constitutes an "activity" for the purposes of Section 110 of the EP&A Act, being carried out by (or on behalf of) a public authority, assessment under Part 5 of the EP&A Act is required.

Under the terms of the EP&A Act, the determining authority (ie CVC), must consider the likely environmental impact of each of the wharves that are proposed. This is usually done through a Review of Environmental Factors (REF) that provides information as specified in Clause 111 of the EP&A Act. If the assessment concludes that there is not likely to be a significant effect on the environment, the proposal can proceed, subject to any safeguards outlined in the REF.

Other Acts

Numerous other Acts apply to the site and/or proposed works. Table 3-2 provides a summary of the main Acts and the relevance to the proposal.

Table 3-2 Summary of Relevant Acts

Legislation	Key Requirements	Relevance to the Proposed Activities
Coastal Protection Act 1979	Section 38 of the Act states that a public authority requires concurrence of the Minister for certain development in the coastal zone.	The wharves are proposed to occur within the coastal zone. Under Section 44 of the Act concurrence is not required from the Minister to carry out the proposed activity as it is not inconsistent with the principles of ESD.
Threatened Species Conservation Act 1995	The Act requires any threatened plant or animal species, populations or ecological communities associated with a proposed development to be identified and that acceptable recovery and management strategies are implemented a likely significant impact would occur.	The wharves should be located to avoid impacts on threatened species, as necessary. As such, no impact on threatened species is likely to occur.
Heritage Act 1977	Approval must be gained from the Heritage Council when making changes to a heritage place listed on the State Heritage Register, or when excavating any land in NSW where you might disturb an archaeological relic.	No known heritage items will be adversely affected by the project.

Legislation	Key Requirements	Relevance to the Proposed Activities
National Parks and Wildlife Act 1974	The Act aims to prevent the unnecessary or unwarranted destruction of relics and the active protection and conservation of relics of high cultural significance.	The wharves should be located to avoid impacts on relics of any type.
Native Vegetation Conservation Act 2003	The Native Vegetation Conservation Act 2003 requires development approval from the relevant Catchment Management Authority for the clearing of any natural vegetation. Approval can only be granted under this act for proposals that improve or maintain environmental outcomes	No significant vegetation is proposed to be removed as a result of the proposal. Also, approval is not required if an activity is carried out by a determining authority within the meaning of Part 5 of the EP&A Act, and the determining authority has complied with that Part of the EP&A Act.
Protection of the Environment Operations Act 1997	The Act enforces licences and approvals formerly required under separate Acts relating to air, water and noise pollution and waste management with a single integrated licence. Development requires a license under the act, should it meet the assessment criteria outlined within Schedule 1 of the EPA-licensed activities.	A license under the Act is not considered necessary.

Legislation	Key Requirements	Relevance to the Proposed Activities
Water Management Act 2000.	The objectives of this Act are to provide for the sustainable and integrated management of the water sources of the State for the benefit of both present and future generations. Certain activities are required to be consistent with the environment protection provisions of a water management plan. Certain activities are defined as controlled activity and ordinarily require a permit.	No water management plan applies to the localities chosen for wharf facilities. The CVC is exempt from the requirement for a controlled activity approval (CAA) as per clause 39A of the *Water Regulation 2004* as an amendment to the WM Act. Clause 39A states that public authorities are exempt from section 91E (1) of the Act in relation to all controlled activities that they carry out in, on or under waterfront land.
Contaminated Land Management Act 1997	Provides a regime for investigating and, where appropriate, remediation of land affected by contamination, which represents a significant risk of harm to human health or the environment.	If the construction works uncovers contaminated land, it must be assessed and managed in accordance with the Act.
Roads Act 1993	Section 138 of the Roads Act 1993 requires that a person obtain the consent of the appropriate roads authority for the erection of a structure, or the carrying out of a work in, on or over a public road, or the digging up or disturbance of the surface of a public road. If the applicant is a public authority, the roads authority must consult with the applicant before deciding whether or not to grant consent or concurrence.	This may be relevant if any of the sites finally chosen are part of a public road. An approval may be required under the Act, at the time of construction.
Crown Lands Act 1989	Governs the use of Crown land.	A licence will be required in relation to the use of all Crown lands affected by the proposed wharves.

Legislation	Key Requirements	Relevance to the Proposed Activities
Fisheries Management Act 1994	The Act seeks to preserve fish stocks and key fish habitats, including threatened species, populations and ecological communities. A further object of the Act is to promote sustainable fishing.	The proposal does not involve dredging or reclamation works and mangroves and marine vegetation is unlikely to be removed or damaged due to the activity. Approval is not required under the Act.
Rural Fires Act 1997	The Act manages bushfire within the State and regulates development in bushfire prone areas.	The proposal is not for subdivision and is not a special fire protection purpose. Approval is not required under the Act.

State Environmental Planning Policies

State Environmental Planning Policy (Infrastructure)

The State Environmental Planning Policy (Infrastructure) 2007 assists the NSW Government, local councils and the communities they support by simplifying the process for providing infrastructure in areas such as education, hospitals, roads, railways, emergency services, water supply and electricity delivery. According to this SEPP:

"*Development for the purpose of wharf or boating facilities may be carried out by, or on behalf of, a public authority without consent on any land….*" (clause 68).

Wharf or boating facilities means a wharf, or facilities associated with a wharf or boating that are not port facilities.

State Environmental Planning Policy No. 71 – Coastal Protection

State Environmental Planning Policy No. 71 aims to:

- Foster a strategic and consistent approach to coastal planning and management
- Ensure that the coastal zone is managed and protected in accordance with ecologically sustainable development principles
- Facilitate the assessment of development proposals, and assess each proposal on its individual merits
- Set out matters for consideration by councils and consent authorities
- Develop a review process for significant coastal development proposals, which includes development proposed in sensitive locations
- Create a 'master plan' (now DCP) process to ensure developments in the coastal zone are consistent with the SEPP's provisions

This policy identifies State significant development in the coastal zone and requires certain development applications to carry out development in sensitive coastal locations to be referred to the Director-General for comment. Additionally, it identifies master plan requirements for certain development in the coastal zone.

As the proposal will be assessed under Part 5 of the EP&A Act development consent is not being sought and as such there is no

requirement for concurrence from the Director-General. However, it is considered that the proposal complies with the principals of SEPP 71.

North Coast Regional Environmental Plan 1989

The North Coast Regional Environmental Plan 1988 (REP) applies to the study area. The REP primarily identifies requirements for the preparation of Local Environmental Plans and for development assessment within the North Coast Region. The proposal will be assessed under Part 5 of the EP&A Act and it is considered that it is consistent with the Objectives of the REP. It should be noted that as of July 2009 the REP is deemed to be a State Environmental Planning Policy. However, for the purposes of this Development Plan, this has no effect.

Other Relevant Policies

NSW Coastal Policy

The 1997 NSW Coastal Policy responds to the fundamental challenge to provide for population growth and economic development without placing the natural, cultural, spiritual and heritage values of the coastal environment at risk. To achieve suitable forms of growth the Policy has a strong integrating philosophy based on the principles of ecologically sustainable development (DoP, 2007).

The Policy addresses a number of key coastal themes including:

- population growth in terms of physical locations and absolute limits;
- coastal water quality issues, especially in estuaries;
- disturbance of acid sulfate soils;
- establishing an adequate, comprehensive and representative system of reserves;
- better integration of the range of government agencies and community organisations involved in coastal planning and management;
- Indigenous and European cultural heritage; and
- integration of the principles of ecologically sustainable development into coastal zone management and decision making (DoP, 2007).

The intent of the coastal policy is to be considered by CVC in the REF process. Key environmental impacts of the activity for each site will be identified and, where required, appropriate mitigation methods will be proposed to effectively manage potential environmental impact. The proposal should be able to accord with the intent of the NSW Coastal Policy.

Local Legislation

Although State Environmental Planning Policy (Infrastructure) applies and wharves and jetties don't require development consent it is still useful to know what land is zoned and whether wharves and jetties would otherwise have been permitted. The objectives and aims of each zone also indicate the Council's intent for that locality. The seven sites are covered by three Local Environmental Plans being Maclean LEP 2001, Grafton LEP 1988 and Ulmarra LEP 1992.

Grafton Local Environmental Plan 1988

Grafton

The preferred site in Grafton spans two zones being Zone No 3 (a) (Business Zone) and Zone No 6 (a) (Public Recreation Zone) – refer Figure 3-1.

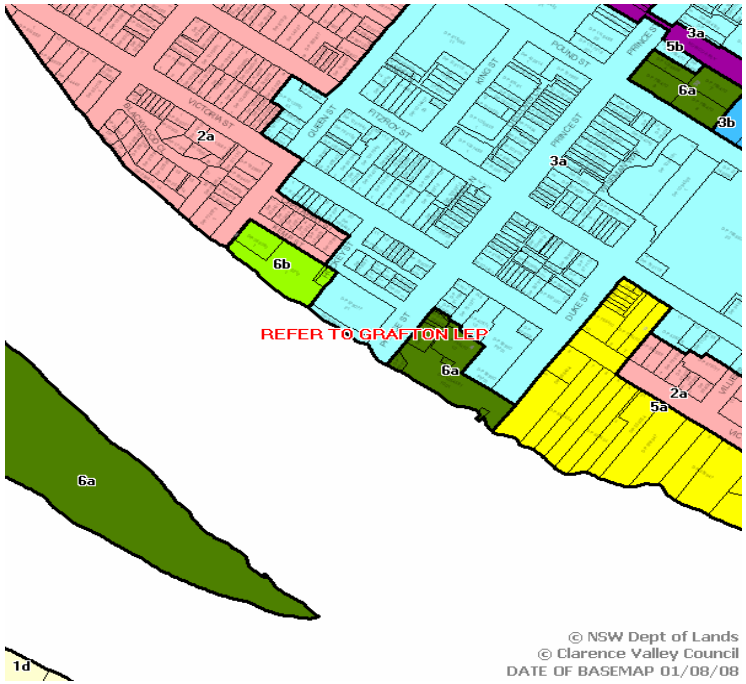

Figure 3-1 Grafton Zoning

Zone No 3 (a) (Business Zone)

1 Objectives of zone

The objectives of this zone are:

(a) to allow for retail, commercial, high density residential and restricted service and light industrial uses,

(b) to control land use location and character within the commercial area by development control plans, and

(c) to define the main area for business and commercial activity within the City of Grafton.

Jetties and wharves are permitted uses in the 3(a) Business zone.

Zone No 6 (a) (Public Recreation Zone).

1 Objectives of zone

The objectives of this zone are:

(a) to identify land which is used or intended for use for the purposes of open space or public or recreation, and

(b) to allow for alternative uses of these sites for community purposes compatible with surrounding areas to allow for increased economical use of community facilities.

Jetties and wharves are permitted uses in the 6(a) Public Recreation zone.

Ulmarra Local Environmental Plan 1992

Ulmarra

The preferred site in Ulmarra is zoned No 2 Village zone – refer Figure 3-2.

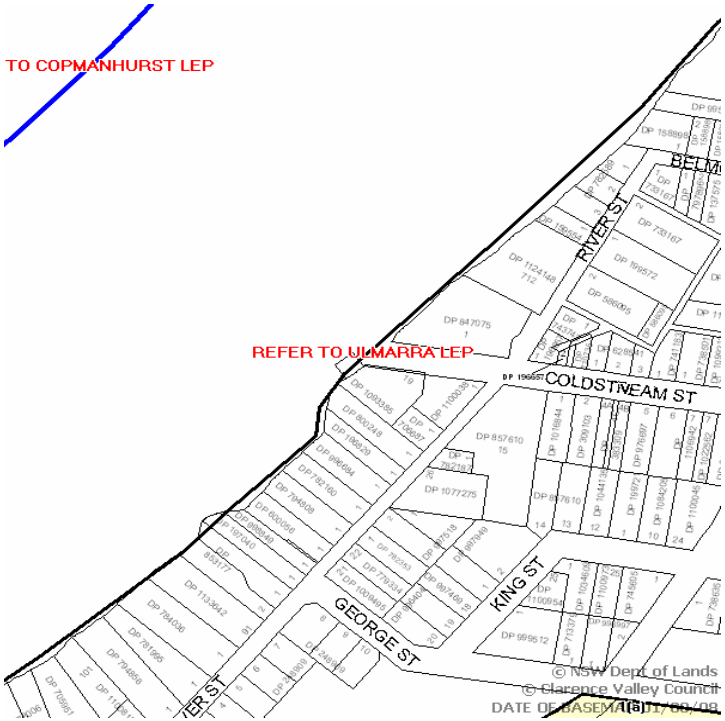

Figure 3-2 Ulmarra Zoning

Zone No 2 (Village Zone)

1 Objectives of zone

The objectives of this zone are:

(a) to recognise existing villages,

(b) to enable the future expansion and development of land within this zone for residential, commercial, special or tourist use and other urban purposes,

(c) to ensure, in the case of areas not provided with reticulated water or a sewerage service, that development is at a density appropriate to the capacity of the land to absorb such development, and

(d) to enable the development of the land for other purposes where it can be demonstrated by the applicant for development consent that suitable land or buildings for the proposed purpose are not available elsewhere and that such a use will not detrimentally affect the amenity of existing or proposed nearby development.

Jetties and wharves are permitted uses in the No 2 Village zone.

Maclean Local Environmental Plan 2001

Brushgrove Site 2

The preferred site in Brushgrove is zoned 6 (a) Open Space – refer to Figure 3-3.

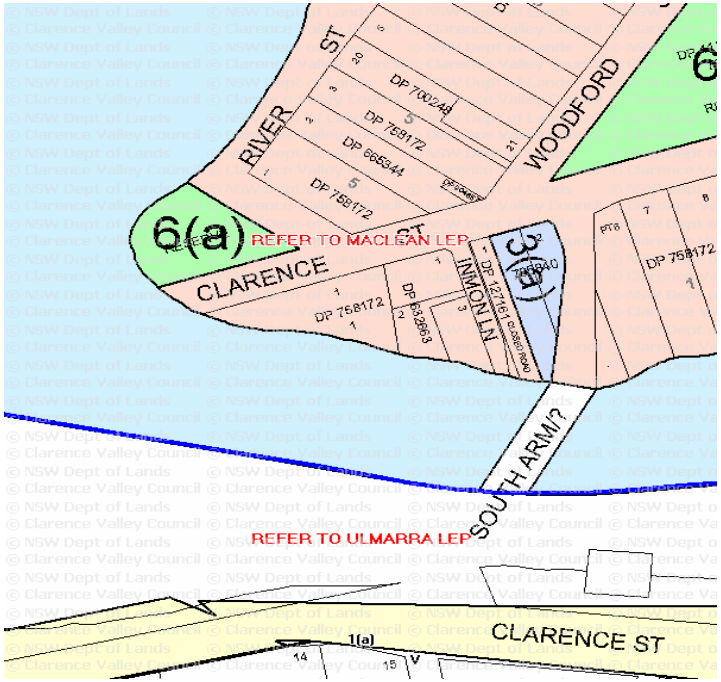

Figure 3-3 Brushgrove Zoning

1 Aim of zone

The primary aim of this zone is to set aside land that is currently used or is available to be used for the purposes of public open space.

2 Objectives of zone

The particular objectives of this zone are:

(a) to ensure that there is adequate provision of open space to meet the present open space and recreational needs of all residents, and

(b) to enable the development of land within this zone for purposes associated with recreation, and

(c) to provide opportunities to enhance the total environmental quality of the local government area of Maclean, and

(d) to ensure that there is adequate provision of both active and passive open space to serve the present and future recreational needs of residents and visitors.

Jetties and wharves are permitted uses in the 6(a) Open Space Zone.

Lawrence

The preferred site in Lawrence is zoned 6 (a) Open Space – refer Figure 3-4.

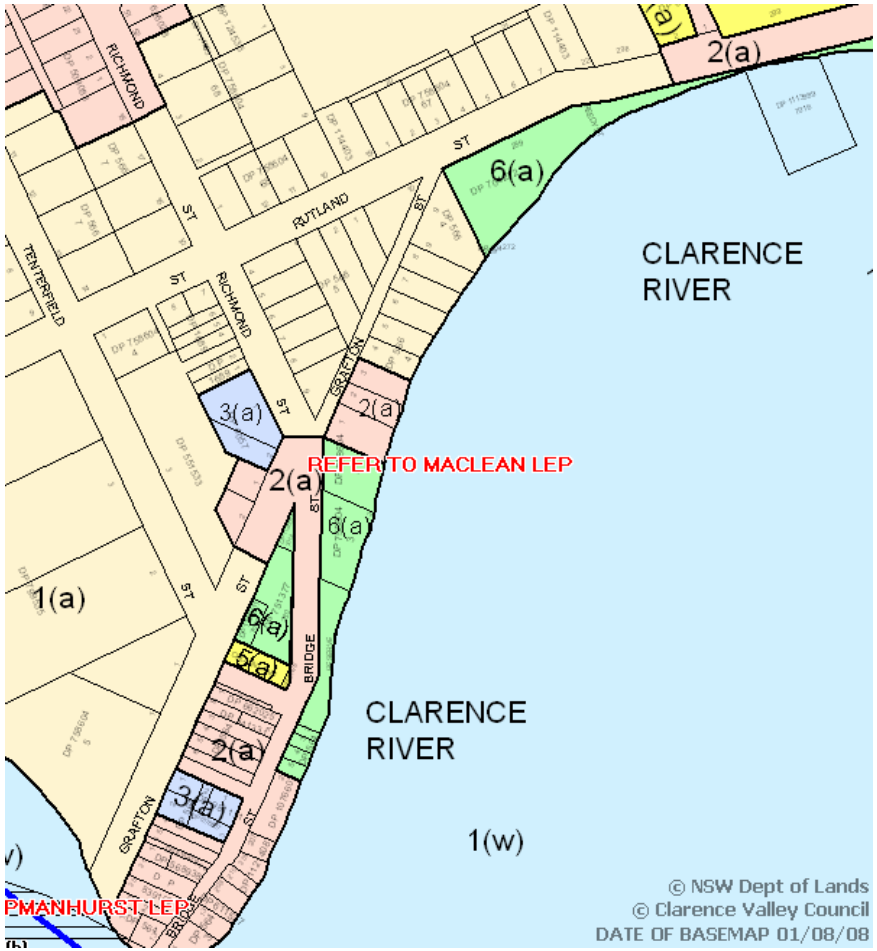

Figure 3-4 Lawrence Zoning

1 Aim of zone

The primary aim of this zone is to set aside land that is currently used or is available to be used for the purposes of public open space.

2 Objectives of zone

The particular objectives of this zone are:

(a) to ensure that there is adequate provision of open space to meet the present open space and recreational needs of all residents, and

(b) to enable the development of land within this zone for purposes associated with recreation, and

(c) to provide opportunities to enhance the total environmental quality of the local government area of Maclean, and

(d) to ensure that there is adequate provision of both active and passive open space to serve the present and future recreational needs of residents and visitors.

Jetties and wharves are permitted uses in the 6(a) Open Space Zone.

Harwood

The preferred site in Harwood is zoned 2 (a) Residential (Low Density)- refer to Figure 3-5.

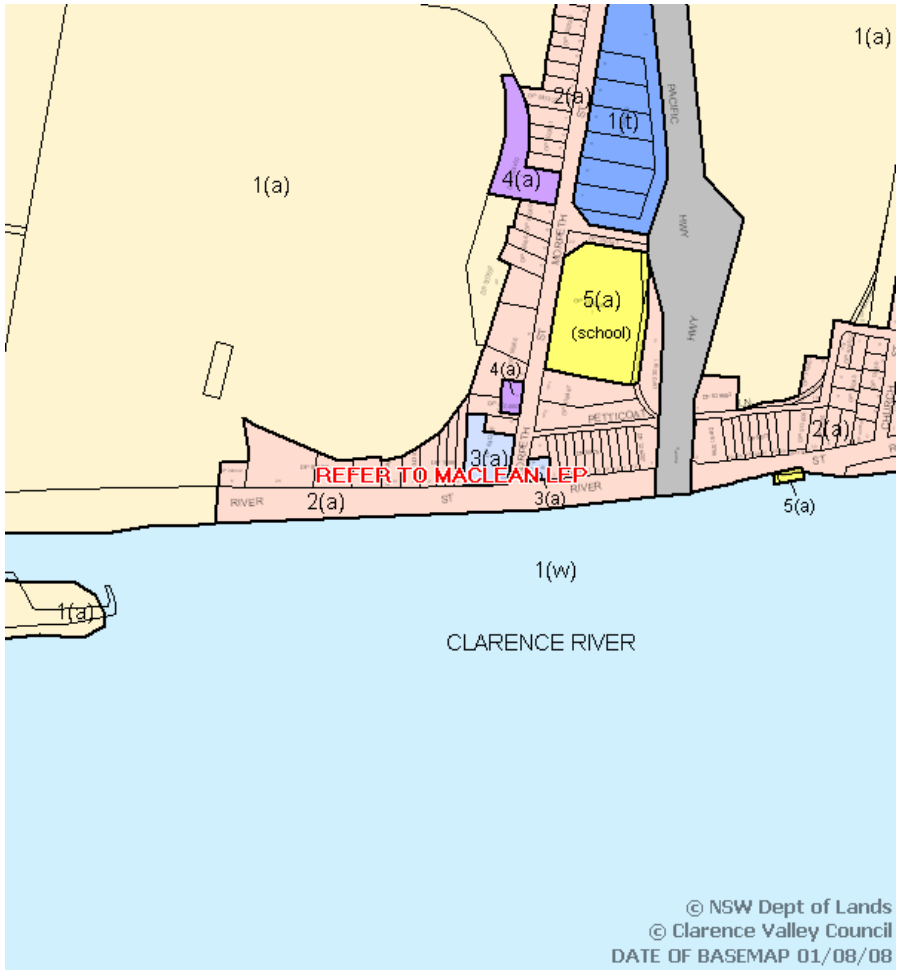

Figure 3-5 Harwood Zoning

1 Aim of zone

The primary aim of this zone is to enable the provision of housing, characterised by low density residential development.

2 Objectives of zone

The particular objectives of this zone are to enable:

(a) the provision of low density housing, and

(b) a residential environment free from any adverse impact from commercial and industrial uses, and

(c) the provision of community uses, such as child care centres, of a compatible scale, bulk, height and design, which do not detract from the amenity and character of the residential area, and

(d) adequate provision for water and effluent disposal.

Jetties and wharves are permitted uses in the 2 (a) Environmental Protection Residential (Low Density) zone.

Maclean

The preferred site in Maclean is zoned 6 (a) Open Space – refer to Figure 3-6.

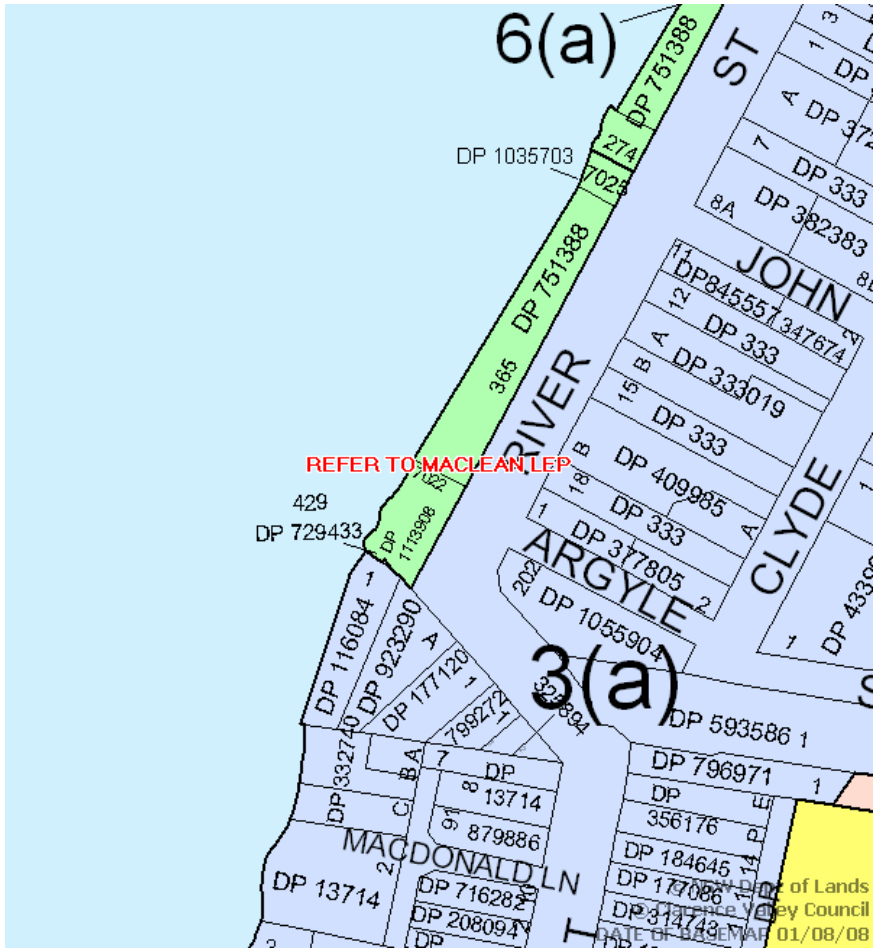

Figure 3-6 Maclean Zoning

1 Aim of zone

The primary aim of this zone is to set aside land that is currently used or is available to be used for the purposes of public open space.

2 Objectives of zone

The particular objectives of this zone are:

(a) to ensure that there is adequate provision of open space to meet the present open space and recreational needs of all residents, and

(b) to enable the development of land within this zone for purposes associated with recreation, and

(c) to provide opportunities to enhance the total environmental quality of the local government area of Maclean, and

(d) to ensure that there is adequate provision of both active and passive open space to serve the present and future recreational needs of residents and visitors.

Jetties and wharves are permitted uses in the 6(a) Open Space Zone.

Yamba

The preferred site in Yamba site is zoned 7 (c) Environmental Protection (Coastal Foreshore) – refer to Figure 3-7.

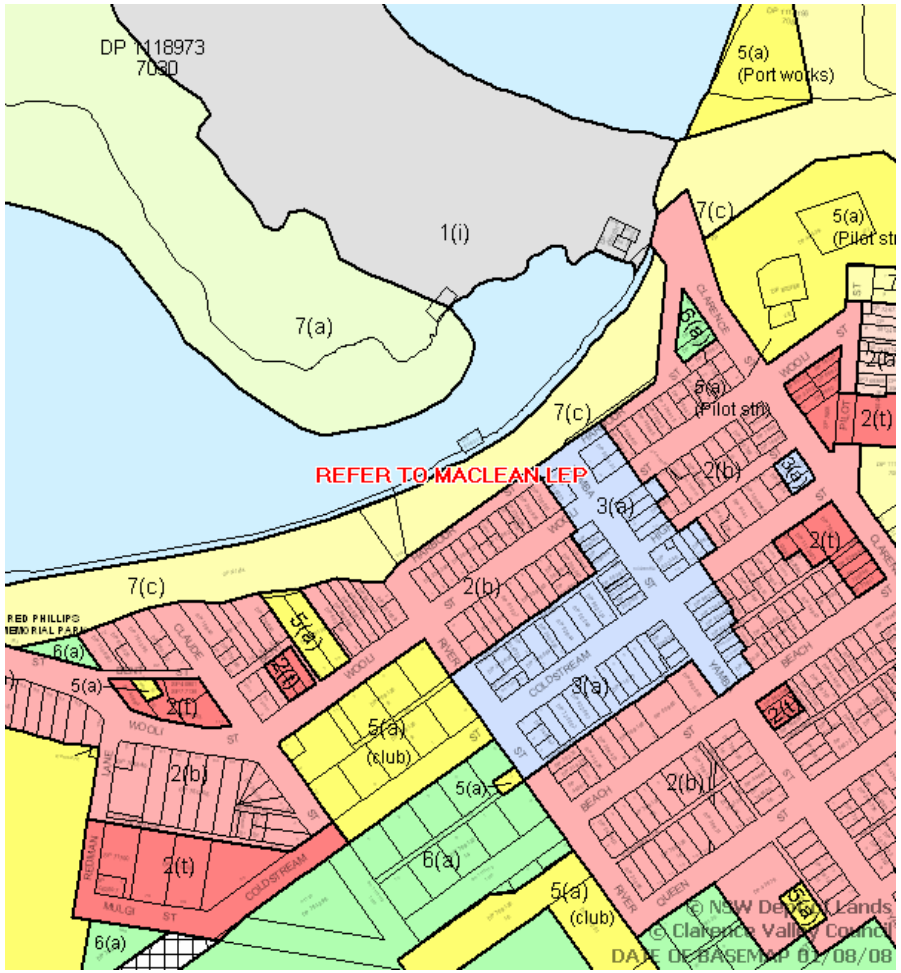

Figure 3-7 Yamba Zoning

1 Aim of zone

The aim of this zone is to identify and protect environmentally sensitive coastal land.

2 Objectives of zone

The objectives of this zone are:

(a) to enable development for certain purposes where such development does not have a detrimental effect on the habitat, landscape or scenic quality of the locality, and

(b) to prevent development which would adversely affect, or be adversely affected in both the long and short term by, coastal processes, and

(c) to protect coastal ecosystem diversity and stability.

Jetties and wharves are permitted uses in the 7 (c) Environmental Protection (Coastal Foreshore) zone.

3.3 Discussion and Recommendations

The locations of the proposed structures are all either Crown Land or CVC land or a combination of both. The bed of the river in which the pylons will be located is Crown land. It is important that lease arrangements be made with the DoL once locations and concepts are finalised.

Any structures proposed within the area affected by the Yaegl People Native Title claim (below the Harwood bridge) will need to be formally notified to them.

SEPP Infrastructure, 2007 ensures that all sites will be dealt with under Part 5 of the Environmental Planning and Assessment Act, 1979. A Review of Environmental Factors undertaken either individually or collectively will be needed for the sites prior to commencement of the project to ensure that the environmental impacts are fully considered.

It is recommended that the location and size of the proposed wharf structure for Yamba be resolved through the Yamba Bay Masterplan process being undertaken by the DoL. It is noted that the current owner of the Yamba Marina has indicated support for working with Council and the DoL to find a suitable site for a public wharf.

4. Condition Assessment

4.1 Scope of Assessment

To ascertain the augmentation potential and condition of the existing wharf/pontoon infrastructure, a Condition Assessment was undertaken at the Grafton, Ulmarra, Lawrence, Maclean, Harwood and Yamba site. Whilst the assessment focused on structural engineering aspects of the infrastructure, any obvious safety hazards were also noted.

4.2 Assessment Methodology

A Principal Structural Engineer conducted a non-obtrusive visual inspection of the infrastructure on 16 April 2009. The inspection was undertaken from ground or platform level. Overall dimensions of each structure were noted and photographic records were taken of any anomalies/defects.

4.3 Assessment Findings

The findings of the Condition Assessment are presented in Table 4-1 to Table 4-7 inclusive. Photographic records are in Appendix B.

Table 4-1 Condition Assessment Findings – Grafton Pontoon

Item	Findings	Photo Ref.
Description and Approximate Dimensions	Floating 10m x 3m concrete-topped pontoon. Top 300 mm above water level. 2 no. 400mm dia. painted steel piles in galv. steel guides at landward rear corners. 10m long galv. steel gangway. 3 no. tie-ups	1 2
Approximate Age	10 years	
Anomalies/Defects	Damaged pile paint system within tidal zone. 2 no. broken tie-ups.	3 4

Table 4-2 Condition Assessment Findings – Grafton (Timber Wharf)

Item	Findings	Photo Ref.
Description and Approximate Dimensions	Fixed timber 5.4m x 10.6m wharf. Front 3.4m x 3.2m section set 400 mm lower that top level. Galv. steel handrailing at sides. Potable and (lockable) electricity source.	5, 6
Approximate Age	> 20 years	
Anomalies/Defects	Heavily weathered and split decking,	7, 8, 9, 10,

Item	Findings	Photo Ref.
	joists, bearers and piers. Several trip hazards. Corroded handrail – non-continuous in sections. Corroded fixings within tidal zone.	11 12, 13 14

Table 4-3 Condition Assessment Findings – Ulmarra

Item	Findings	Photo Ref.
Description and Approximate Dimensions	Fixed timber 6 m x 6.6 m wharf with additional 4 m x 2.2 m side section 1.3m lower than top level. Timber decking, joists and bearers. 3 no. 240 mm square reinforced concrete piers (lower section has 2 no. 380 mm dia. timber piles). All have 160 mm and 110 mm rubber 'fender' on seaward face. Timber handrails at sides. Steel ladder at front.	15
Approximate Age	Generally > 30 years. Some relatively new elements.	
Anomalies/Defects	Seaward bearer and joist ends weathered and moderately split.	16, 17

Item	Findings	Photo Ref.
	Significant spalling to tops of concrete piers. Minor corrosion to fixings in tidal zone. Minor splitting to decking timbers Stair overrun too short - unsafe	16 18 19 20

Table 4-4 Condition Assessment Findings – Lawrence

Item	Findings	Photo Ref.
Description and Approximate Dimensions	Fixed timber 12.4 m x 4.8 m wharf with additional 5 m x 1.7 m steel side section 400 mm lower than top level. 8 no. 400 mm dia. timber piles. Galv. steel handrail to downstream side of main wharf and landward side of lower section.	21, 22
Approximate Age	15 years	
Anomalies/Defects	Minor surface corrosion to handrail baseplate.	23

Table 4-5 Condition Assessment Findings – Maclean

Item	Findings	Photo Ref.
Description and Approximate Dimensions	Floating 25m x 2m concrete- and timber-topped pontoon. Top 300 mm above water level.	24
	3 no. 350mm dia. timber piles in stainless steel guides within deck at landward side.	25
	7 m long aluminium gangway.	26
	12 no. tie-ups.	
	Potable and (lockable) electricity source.	
Approximate Age	> 10 years	
Anomalies/Defects	Non-slip paint to timber panelling worn in several areas.	27
		28
	2 mm wide shrinkage cracking to concrete decking	29, 30
	Painting to pile worn within tidal zone. Some shallow damage to piles – requires greasing.	

Table 4-6 Condition Assessment Findings – Harwood

Item	Findings	Photo Ref.
Description and Approximate Dimensions	Fixed timber 5.2m x 2.3m wharf with 11m long timber walkway from bank.	31, 32
	Front 3.3m x 0.9m galvanised steel stair section set 1m lower that top level.	33
	3 no. 380mm dia. timber piles at front. 9 no. 150mm dia. PVC encased concrete piers to wharf and walkway.	
	Timber handrails to all sides excluding front lower section.	
Approximate Age	> 10 years	
Anomalies/Defects	Moderate corrosion to steel fixings in tidal/splash zone. Minor corrosion to steel fixings above tidal/splash zone.	34, 35
	Moderate splitting to top of main timber piles	36
		37
	Minor weathering and splitting of timber deck timbers.	

Table 4-7 Condition Assessment Findings – Yamba*

Item	Findings	Photo Ref.
Description and Approximate Dimensions	Floating concrete-topped pontoon. 2 no. reinforced concrete piles in steel guides at sides near landward edge. 4 no. timber fender piles at seaward face. Galv. steel gangway. 4 no. tie-ups.	38 39
Approximate Age	5 years	
Anomalies/Defects	Minor shrinkage cracking to concrete deck. Minor cracking to timber fender piles.	40 41

Note: *The pontoon was recently constructed by Superior Jetties who advised that drawings are available for the structure. Investigation of the Yamba site was halted whilst awaiting these drawings – refer Chapter 5. No overall measurements were taken.

4.4 Discussion and Recommendations

The pontoons at Grafton, Maclean and Yamba and timber structure at Lawrence appear to be in good condition and require only minimal maintenance to correct the issues noted.

The timber structures at Harwood and Ulmarra are in fair condition. Both structures have moderately weathered and split timbers and corroded fixings. These items will require routine maintenance and/or replacement in the medium term (5-10 years). The spalling of the concrete piers at Ulmarra is significant and requires immediate attention.

The timber structure at Grafton is in poor condition. Most timbers are weathered and split. The hand railing and fixings are corroded. Even with routine maintenance the expected serviceable life of the structure is expected to be less than 10 years without major replacement works. Given the nature of the wharf and likely significant expense of the replacement works, this is not considered practicable.

Therefore, assuming that appropriate maintenance and/or repairs are undertaken, all structures with the exception of Grafton timber wharf are considered suitable for augmentation works. The structural capacity to withstand any additional loading will to be confirmed beforehand via calculation.

5. Stakeholder Consultation

5.1 Agency Meetings

5.1.1 NSW Department of Lands

Summary of discussion with Program Manager, Land Management, North Coast.

- In relation to the prospective wharf sites:
  - DoL is commencing preparation of a foreshore master plan for Yamba Bay shortly and would prefer that the wharf position be determined as part of their process.
  - Brushgrove, Harwood, Maclean and Grafton – No specific comments.
  - Lawrence – Difficult access to this facility. Prefer a floating pontoon in this location. Disabled access is important.
- Other matters:
  - A single licence for the wharves on Crown Land with all facilities subject to the same licence and this would be subject to a single charge that can be negotiated with CVC.
  - Native Title is an issue for public works at the time of construction (subsection 'k' of Native Title Act).
  - Need to be sure that none of the sites are registered under AHIMS.

5.1.2 NSW Maritime

Summary of discussion with Regional Manager, NSW Maritime:

- Would like to attend the Focus Groups meetings as an 'observer'.
- Supportive of a pump-out facility near Maclean or Lawrence as well as Grafton/Yamba.
- Concerned that Chatsworth, Ferry Point and South Grafton are not included in GHDs scope of works. Referred to the CRW recommendations.
- Harwood - need to be aware of ships turning downstream of bridge.
- Grafton/Harwood - need to be aware of RTA Pacific Highway upgrade plans.
- Wharves/pontoons need to be designed for disabled access (eg: 1:14 ramps or less for 85% of tide etc) if NSW Maritime are to co-fund construction.
- Public Wharves Act - 9 passengers or more, structure needs to be approved by NSW Maritime.

5.1.3 Department of State and Regional Development

No response at the time of writing this CRWDP.

5.1.4 Northern Rivers Regional Development Board

NRRDB's Executive Director indicated support for maritime infrastructure improvements on the Clarence River.

5.1.5 Tourism NSW

No response at the time of writing this CRWDP.

5.1.6 NSW Department of Planning

No response at the time of writing this CRWDP.

5.2 Focus Group Meetings

5.2.1 Round 1

Stakeholders nominated by CVC were invited to attend either of two initial focus group meetings conducted by GHD on the 13 and 14 May 2009. Detailed notes from these meetings and a list of who attended are attached at Appendix C.

The major points to arise from both of these meetings are as follows:

General Matters

All structures should be designed so that they are useable to a majority of watercraft from kayaks through to cruisers and yachts. Floating pontoons were favoured consistently over fixed wharves by all users.

All structures should be accessible to people with disabilities, the aged and those with prams and small children. Ramp angles, steps, stable pontoons, non slip surfaces, wheelchair turning areas are all key issues.

Security lighting (solar), fresh water and garbage bins are key services for all structures (on or nearby). Power, fuel and fire extinguishers are not widely supported. Pump out facilities are acknowledged as needed, but caution about maintenance, abuse and cost.

Management of boats overstaying at public wharves, provision for multiple boats to access at once, making the space on the inside of pontoons useable, and installing low maintenance facilities were all raised as issues.

Specific Sites

Grafton had limited support for additional facilities because of potential interference with the rowing course; adequacy of existing structures; inability to get yachts under the Grafton Bridge; preference for cruisers to use swing moorings off shore; lack of use of major structures in South Grafton.

A preference was expressed for a site at Pound Street, that could be accessed by yachts and yet was closer to town than the Kirschener Street wharf. A Fry Street location was also nominated.

Yamba was problematic for both focus groups as the existing site is dominated by the local ferry and Yamba Bay is difficult for yachts and larger boats to use and manoeuvre in. A preference was expressed for working in a public /private partnership that would have access to marina facilities and therefore be closer to fuel, the existing pump-out facility and services.

Brushgrove was not supported by either focus group in its current location due to poor public access, steep banks at the preferred location, dangerous overhead powerlines that have caused serious issues in the past with yacht masts, poor anchoring opportunities, and

poor condition of boat ramp. A site at the end of Clarence Street that has a large public reserve was nominated and supported as a better location for all types of boats, yet still easily accessible to the village of Brushgrove. This site is Lot 7013 DP 92605 (Reserve 90732).

The sites at **Harwood**, **Maclean**, **Lawrence** and **Ulmarra** are all generally supported for additional facilities and specific comments are contained in the notes at Appendix C.

One focus group ranked the revised site at Brushgrove (Clarence street) and the Harwood site as being the two structures that should be built first if limited funds are available.

5.2.2 Round 2

The stakeholders nominated by CVC were invited to attend either of two second round focus group meetings conducted by GHD on the 8 and 9 July 2009. At these meetings the preliminary conceptual designs prepared by GHD were presented and discussed. The following is a summary of that feed back. A list of attendees is provided in Appendix C.

Grafton

- Interested in depth of water at outside of pontoon.
- Inside platform should be at water level or above to avoid a tinny hitting it. Should be brightly painted for visibility.
- Still prefer a Pound Street location to favour yachts.
- Pound Street is a good location for a sewer pump out if it is to be located at Grafton.
- Be careful with the 3 metre pontoon as it may stick out into the rowing course. Need to check that it does not.

Ulmarra

- Need to be mindful of not extending onto the frontage of the neighbouring property.
- Maybe move the pontoon towards the existing jetty. Try to keep its length
- Agree that pontoon length is important – stay at 25 metres, just move it to avoid the private land upstream.
- Ulmarra would also be a good spot when sewer is eventually hooked up to have a pump out facility.

Brushgrove

- People who will use it on a regular basis are fishermen and skiers. This site is not that good for them, because its too far from the boat ramp.
- Community also needs a smaller pontoon near the Cowper boat ramp to be used by fishermen and skiers. It was agreed that funding could still be sought for a small pontoon near this ramp.
- The site at the tip of the Clarence street reserve is still supported.
- Should have steps as well as the wheelchair ramp. Agreed that this would make sense.
- Otherwise okay.

Lawrence

- All okay. Is good that it is close to the boat ramp.

Harwood

- All okay
- 3 metres is the narrowest the pontoon should be if they are all meant to be used by disabled persons.
- Set down platform should be on the down river side to avoid debris. (They mostly are).

Maclean

- All okay

Yamba

Acknowledged the advice that Council will work with DoL to identify a suitable site.

Iluka

- Why wasn't Iluka in the mix?

A wharf is currently proposed in the vicinity of the Sedgers Reef Hotel. Water depth is also an issue in parts of the harbour.

6. References

Control Testing Laboratories (1999) – *Preliminary Site Investigation, Proposed Wharfage at Chatsworth Island & Lawrence* – Letter Report for Maclean Shire Council.

Clarence River Historical Society (2005), *Planning and Construction of the Clarence River Bridge – Appendix C, Transactions of the Institution, The Clarence River Bridge.*

Coffey Geosciences Pty Ltd (2002) – *Maclean Levee Investigation,* boreholes logs and SPT data extracted from report to Clarence River County Council.

Coffey Geotechnics ((2008) - *Pacific Highway Upgrade Project – Wells Crossing to Iluka Road Final Geotechnical Investigation Report – Section 4 (CH 61000 to CH 70900),* report to Sinclair Knight Merz Pty Ltd.

Geological Survey of NSW (1971) - *Grafton 1:250,000 Geological Series Sheet SH56-6.*

Geological Survey of NSW (1970) - *Maclean 1:250,000 Geological Series Sheet SH56-7.*

GHD-LongMac (2002) - *Geotechnical Assessment Memorial Park Boat Ramp, Lawrence,* report for Maclean Shire Council.

Intergovernmental Panel on Climate Change (1995), *Climate Change 1995 - The Science of Climate Change, Cambridge University Press.*

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Jeffrey and Katauskas Pty Ltd (1995), *River Bank Stability Investigation, Clarence River, Ulmarra,* logs and site plan extracted from report for Patterson Britton and Partners Pty Ltd.

Webb McKeown and Associates, October 2008, *Yamba Floodplain Risk Management Study*.

Rail Infrastructure Corporation, Geotechnical Report (2004) – *Grafton Viaduct, 696.587 km – Borehole Logs and Testing*, report for Australian Rail & Track Corporation (ARTC).

WBM Oceanics Australia, (March 2004), *Lower Clarence River Flood Study Review,* Volumes 1 and 2.

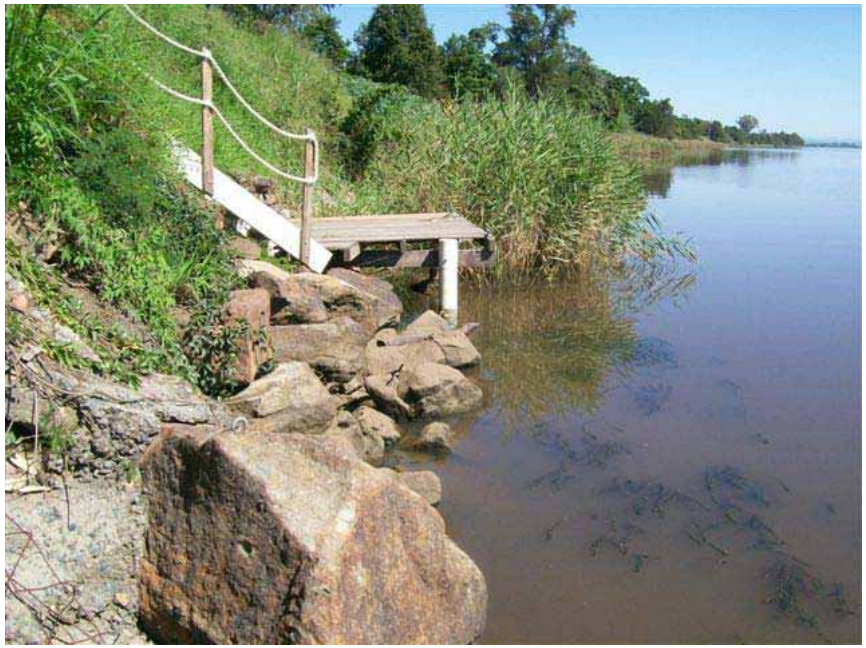
Appendix A

Environmental Assessment Photographs

Photograph A 1

Photograph A 2

Photograph A 3



Photograph A 4

Photograph A 5

Photograph A 6

Photograph A 7

Photograph A 8

Photograph A 9

Photograph A 10

Photograph A 11

Photograph A 12

Photograph A 13

Photograph A 14

Photograph A 15

Photograph A 16

Photograph A 17

Photograph A 18

Photograph A 19

Photograph A 20

Photograph A 21

Photograph A 22

Photograph A 23

Photograph A 24

Appendix B

Condition Assessment Photographs

Photograph B 1

Photograph B 2

Photograph B 3

Photograph B 4

Photograph B 5

Photograph B 6

Photograph B 7

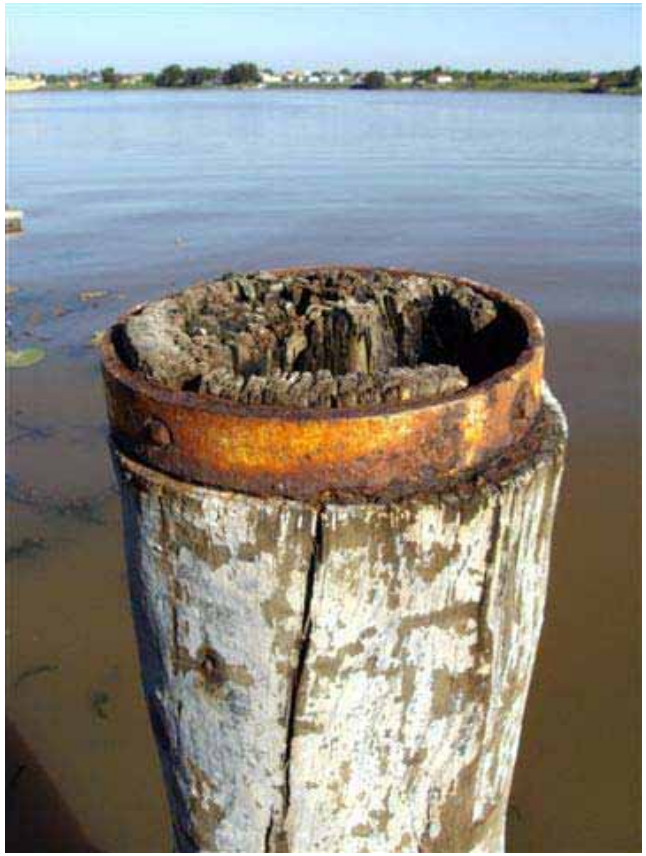
Photograph B 8

Photograph B 9

Photograph B 10

Photograph B 11

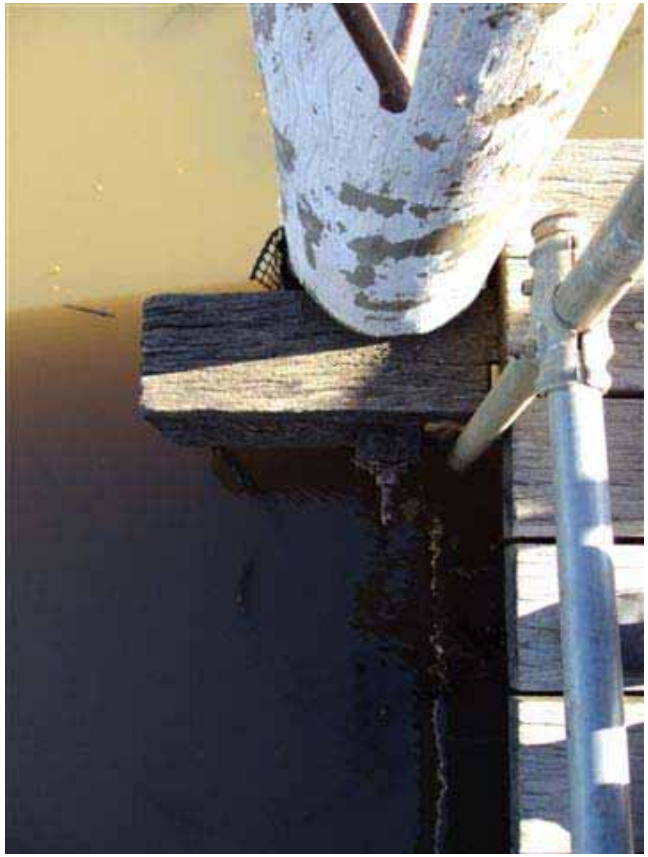
Photograph B 12



Photograph B 13

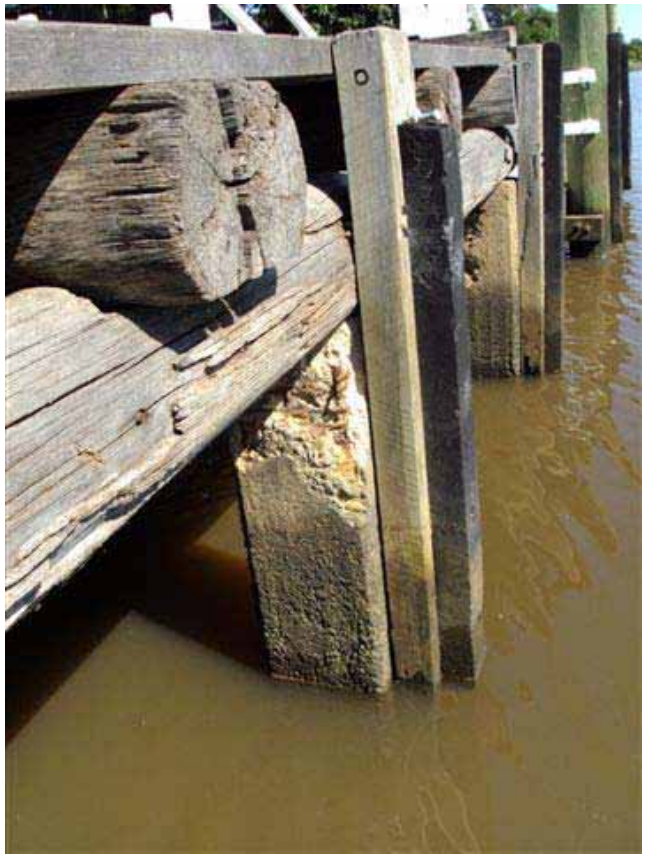
Photograph B 14

Photograph B 15



Photograph B 16

Photograph B 17



Photograph B 18

Photograph B 19

Photograph B 20

Photograph B 21

Photograph B 22

Photograph B 23

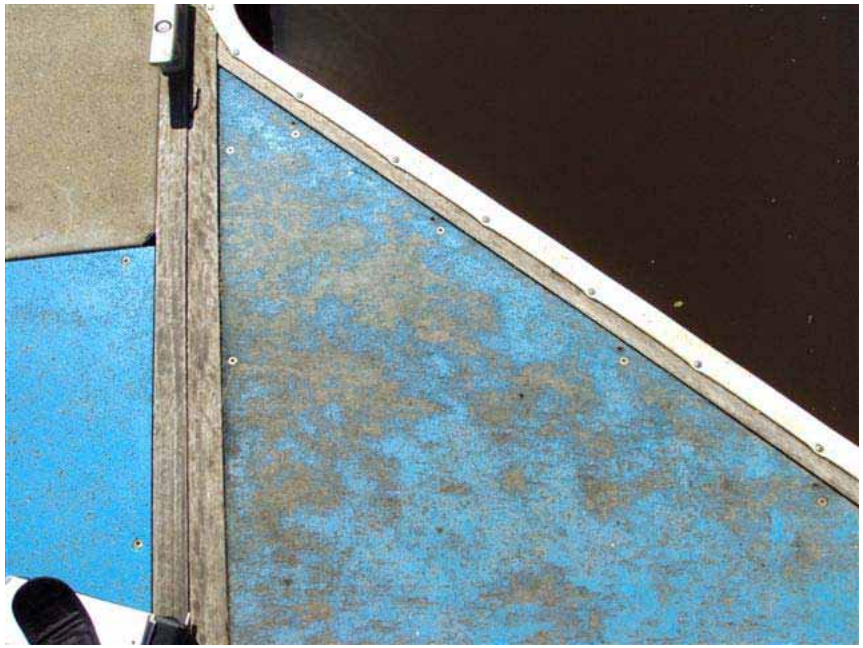
Photograph B 24

Photograph B 25

Photograph B 26

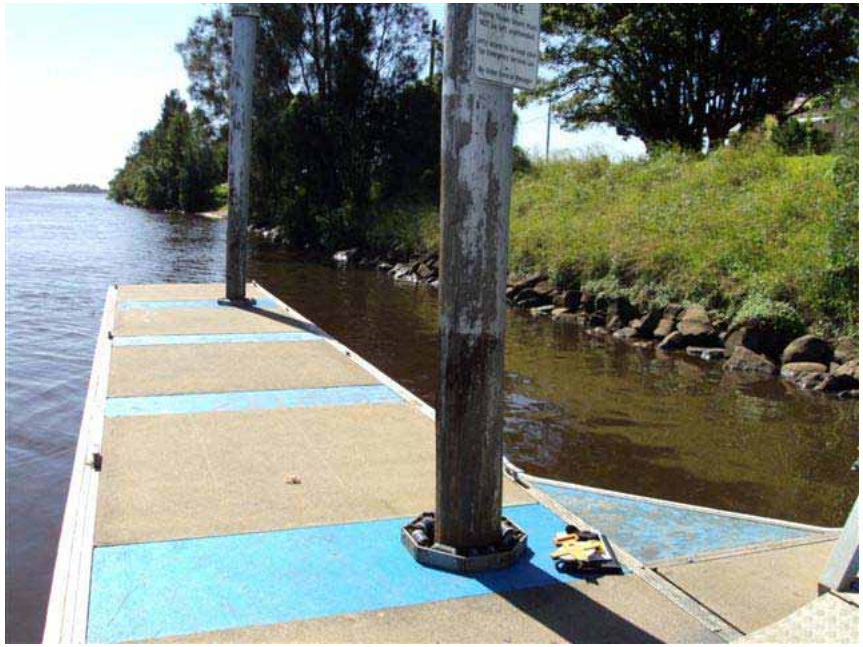
Photograph B 27

Photograph B 28

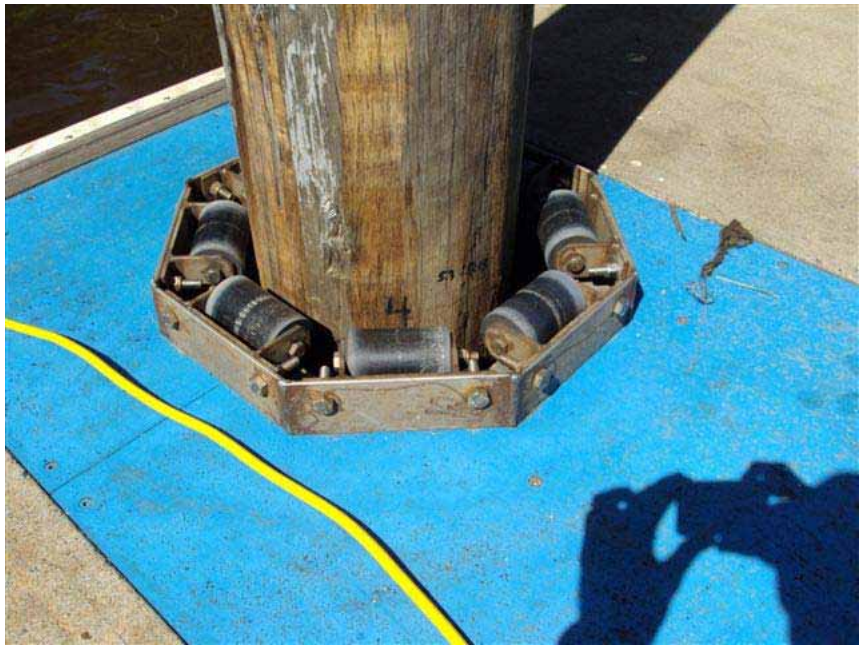


Photograph B 29

Photograph B 30



Photograph B 31



Photograph B 32

Photograph B 33

Photograph B 34

Photograph B 35

Photograph B 36

Photograph B 37

Photograph B 38

Photograph B 39

Photograph B 40

Appendix C

Focus Group Session 1 Notes and Focus Group Session Attendees Lists

Focus Group Session 1

Grafton

(Held at Vines Café at Grafton 13 May 2009)

Attendees

Name	Company Name
Robert Fish	Clarence River Sailing Club
Karl Cooksley	Clarence River Sailing Club
Darrel Grogan	Ulmarra Progress Association/Rooftops B & B
Sandra Grogan	Ulmarra Progress Association/Rooftops B & B
Jeremy Challacombe	Grafton Chamber of Commerce/Northern Rivers Tourism
John Brien	Roches Hotel / Grafton Rowing Club
Dennis Darke	Grafton Rowing Club
Tony Gallagher	Grafton Rowing Club
Terri Aeschlimann	Brushgrove Hotel Fishing Club
Gwen Newberry	Brushgrove Hotel Fishing Club
Alex Purvis	Clarence River Yacht Club
Martin Jacob	Clarence River Yacht Club

Yamba

What are the issues with the site?

- Competing interests
- Current wharf is used by ferry and it is dominant
- Maintenance free / low maintenance whatever you choose

What infrastructure is needed at each site?

- Don't really have any comment on structure
- Should be Yamba Yacht Club that decides

Harwood

What are the issues with the site?

- Mangroves are prevalent
- Could put a pontoon upstream separate from the jetty and closer to the ramp
- Sailing yachts may have problems getting under the **new** Harwood Bridge (proposed)

What infrastructure is needed at each site?

- Smaller floating facility would do because of lesser use – also difficult location to moor due to being very open in a wide stretch of river with big tide movement.

Maclean

What are the issues with the site?

- Not well publicised by its location (its not easy to see)
- Security is an issue – no eyes on the street
- Poor place to anchor, so jetty is only option
- Very popular because of shops
- Could easily double it in size and still be well used

What infrastructure is needed at each site?

- Double the jetty (it's a proper double sided one)
- Put it away from the big tree
- More boats may reduce security problem

Lawrence

What are the issues with the site?

- Fixed wharf is difficult to access at low tide
- Very open to wind exposure
- Floating jetties are good for rowing boats too
- Flood is a big issue here
- Bank instability

What infrastructure is needed at each site?

- Floating wharf running parallel with the bank

Ulmarra

What are the issues with the site?

- Solid structure – gets covered by floods – does not move with the tide
- It's plenty deep enough at this site
- Grassed bank is steep and needs to be terraced to allow safer access
- Storm water dumps directly over the grassed area
- Significant wave action at the Ulmarra site
- Exposed to westerly winds
- Ladder on the jetty is missing hand holds
- No sewerage at Ulmarra (septic only)
- Waste is an issue (garbage)
- Water tap near the jetty would be good
- Solar lighting is a good idea, but power is not needed

What infrastructure is needed at each site?

- Floating pontoon preferred
- Could extend the existing structure up stream
- 5-7 berth running parallel to the bank with fingers out into the river

Brushgrove

What are the issues with the site?

- Park at the end of Clarence Street is a better location for yacht mooring because there are 11kv overhead powerlines at Brushgrove (10.9m clearance) – recent incident with a yacht was a close call. Any structures that will attract yachts in near these lines is dangerous
- Question of ownership of the lane next to the pub
- Poor holding of anchors in this location
- Crown land on Cowper side should be considered near old boat ramp
- Sailing boats should be able to access the water at the end of Clarence Street
- Clarence Point is exposed to the south
- Cowper site could also have a floating pontoon near the boat ramp (but needs a new boat ramp too)

What infrastructure is needed at each site?

- Needs water, toilets, electricity
- Floating pontoon

Grafton

What are the issues with the site?

- End of Pound Street, “Maclean” style pontoon, would suit keel boats (floating pontoons)
- Need signage and directions to shops etc
- About 100+ yachts visit Grafton each year and cant get under the bridge
- Siltation and weeds on the foreshore adjacent to the Grafton Sailing Club (upstream of bridge) will soon make it impossible to access the river at this point. These weeds need to be addressed by an engineering solution.
- Previous river cruises used the rowing club to access the sewerage system, this could be done again subject to negotiation, if a pump out location is required at Grafton
- South Grafton wharves are not used because of security and location, don’t make the same mistake at Prince Street.
- Need to protect the world class rowing course that exists at Grafton. Additional wharf is not required in the vicinity of the rowing club.

What infrastructure is needed at each site?

- Some users consider there is sufficient infrastructure at Prince Street
- Rowers would like a starters point/stand at 1000m and 2000m mark
- Rowing club do not endorse any structures at Prince Street that jut out further than the existing wharves

- Cruisers prefer to move in deep water on a swing mooring and not tie up to the jetty with their main boat. Prefer to go into shore via a tender as it is secure to leave the main boat out in the river.

Maclean

(Held at Maclean Bowling Club 14 May 2009)

Attendees

Name	Company Name
Simon Willmore	Maclean Chamber of Commerce
Peter Sutton	Yamba Marina
Bob Lillington	Yamba Kayak
Di Jones	Rockfish Cruises
Peter Jones	Rockfish Cruises
Karen Toms	Calypso Caravan Park (JKT & Sons Pty Ltd)
Liane Kay	Brushgrove Hotel (Kay Australia Pty Ltd)
Dean Kay	Brushgrove Hotel

Yamba

What are the issues with the site?

- Large fender piers adjacent to the existing Yamba/River Street pontoon are a problem to most boats
- Plan for the renewed marina includes up to 300ft of “public” wharves – which could have public space as part of this
- Issues with low tide, and yachts having to wait to berth in Yamba Bay
- Difficult for yachts to turn around in Yamba Bay
- Renewed marina will provided additional car parking
- Supervision of the proposed site is an issue
- Pump-out is a problem – current marina offers it but it is not well used. Maybe it will be used if it was free (or subsidised by Government). A boaters subsidy would be a lot cheaper than building a new pump out and then having to maintain it.
- Extend the pump-out for Yamba marina out to the outer-side of Yamba Bay for public use is an option

What infrastructure is needed at each site?

- Don’t need additional facilities in Yamba Bay other than as part of the renewed marina

Harwood

What are the issues with the site?

- Mangroves
- Bank instability
- Some interest in a structure east of the bridge for yachts (but it's a bit industrial)
- The existing jetty is unstable when bumped by the ferry and may be structurally unsound
- Second priority in terms of the seven sites proposed

What infrastructure is needed at each site?

- Needs a floating pontoon (18m at least)
- Preferably 2.5m of depth at low tide
- Need drinking water, not power
- Security lights for this site (and for all of them)

Maclean

What are the issues with the site?

- Overstaying on the existing structure is an issue. Should think about removing power
- Lack of security – can't see the pontoon from the street
- Some homeless people live around tis area
- Needs security lighting
- Lost a wharf near the Court house
- Is the 'Andrew Baker' waterfront proposal going to go ahead and will it supersede the need for a new wharf?

What infrastructure is needed at each site?

- Could double the size of the existing pontoon, its very popular
- Could build a whole new wharf at the Court house
- Not suitable for fingers going out into the river, it runs too fast

Lawrence

What are the issues with the site?

- Too far from the Lawrence Hotel (but is close to the general store)
- Bank needs to be restabilised
- Solid wharf is no good at low tide
- Need access for kayaks/canoes

What infrastructure is needed at each site?

- Needs a floating pontoon, say 18m+ - maybe one, then one at a later date
- Finger wharves, difficult to deal with in big tides, strong winds, not recommended
- On the inside of the pontoons need to have a space to get in and out of kayaks and canoes. This small feature could be used on all wharves to make them friendly to unpowered craft

Ulmarra

What are the issues with the site?

- Fixed jetty is hopeless to access at low tide
- Look at running a wharf up steam parallel with the bank
- Ladder at this wharf is hopeless

What infrastructure is needed at each site?

- Floating pontoon, 20m
- Use existing fixed wharf as a starting point

Brushgrove

What are the issues with the site?

- Don't like the old ferry ramp site
- Prefer the end of Clarence Street
- Big park, needs to be used
- No sewerage at Brushgrove (septics only)
- If there are priorities, then Brushgrove first. It really needs to be more easily accessed as a river village

What infrastructure is needed at each site?

- Good 20m floating pontoon
- Need security lighting, as a safety issue.

Grafton

What are the issues with the site?

- Grafton bridge is a big "stopper" to yachts, other than the smallest trailer sailors
- Prince Street has merit as a site for facilities
- Fry Street boat ramp has merit as an alternate site down stream of the bridge
- Issues with Dovedale residents and noise on any site downstream of the bridge that is close enough to town to be attractive. Kirchener street site is too far away from town.
- Don't really need more facilities at Prince Street, what is there is good

What infrastructure is needed at each site?

Nothing recommended

6.1 Additional Comments

Note: Susan Howland (CVC Community Development Officer (Aged /Disability) gave an apology for the stakeholder meeting but offered the following comments:

The relatively new pontoon at Yamba (River street) has some issues that should be avoided in any other new structures. These include the step at the top of the ramp where it joins the bank; the location of the ramp at the end of the pontoon rather than the middle, (which causes it to tip when you get to the bottom); the small ramp onto the ferry is too

short and steep; the pontoon has poor manoeuvrability for wheelchairs etc; non slip surfaces on all parts are vital; consideration needs to be given to prams, strollers, walking aids as well as wheel chairs.

Accessibility also needs to extend to the land surface leading down to the wharf and this should have been a site selection criteria. Or if sites are to be moved then it should be considered.

Big River Sailing Club at Harwood have an “accessible sailing” program which is becoming very popular and their needs should be considered, particularly with the Harwood wharf proposal.

The project is going to be raised at the next two access committee meetings and any feedback will be provided.

Focus Group Session 2

Grafton

(Held at Vines Café at Grafton 8 July 2009)

Attendees

Name	Company Name
Darryl Grogen	Ulmarra and District Progress Association
Richard Dunning	Department of Lands
Bruce Newberry	Brushgrove Fishing Club
Terri Aeschlimann	Brushgrove Fishing Club
Perry McLeod	Brushgrove Fishing Club
Karl Cooksley	Clarence River Sailing Club
Robert Fish	Clarence River Sailing Club
Jeremy Challacombe	Grafton Chamber of Commerce
Alex Purvis	Clarence River Yacht Club
Gwen Newberry	Brushgrove Fishing Club

Maclean

(Held at Maclean Bowling Club 9 July 2009)

Attendees

Name	Company Name
Susan Willmore	Maclean Chamber of Commerce
Graeme Lockyer	Illuka Chamber of Commerce
Liane Kay	Brushgrove Hotel
Dean Kay	Brushgrove Hotel
Peter Jones	Rockfish Cruises
Di Jones	Rockfish Cruises
Susan Howland	Big River Sailing Club / Access Committee
Bob Lillington	Yamba Kayak

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