

PREPARED FOR: DOCUMENT: PROJECT: PROPERTY October 2018 Murrumbidgee Council Statement of Environmental Effects Darlington Point Boat Ramp Lot7312 DP1159328

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RICH RIVER IRRIGATION DEVELOPMENTS

**BAUER PRODUCTS** 

# 1 <u>Table of Contents</u>

1	INTRODUCTION4	
1.1	Purpose	4
1.2	Objectives	
1.3	Structure and Scope of Report	4
1.4	Methodology	4
1.5	Relevant Legislation & Planning	5
1.5	5.1 Environmental Planning and Assessment Act 1979	5
1.5	5.2 Crown Lands Act 1989	5
1.5	5.3 Roads Act 1993 & Marine Safety Act 1998	5
1.5	5.4 Protection of the Environmental Operations Act 1997	6
1.5	5.5 Other Acts taken into consideration	6
1.5	5.6 State Environmental Planning Policy (Infrastructure) 2007	
1.5	5.7 Murrumbidgee Local Environmental Plan 2013	
1.5	5.8 Other State Environmental Planning Policies	
1.5	5.9 Planning Controls in the Murrumbidgee Local Environmental Plan 2013.	11
2	OVERVIEW OF PROPOSED WORKS12	
2.1	Background	
2.2	Site Location	
2.3	Description of works	
AC	ccess Road from Lemetery Road to Boat Ramp	
BO	bat Kamp	
FIC D:	oating Pontoon	
	sadiity Access Ramp	
2		14
<b>ວ</b>	ENVIRUNMENTAL ASSESSMENT	10
3.1 2.2	Climate	
3.Z	Site Description and Land Use	
3.3 <b>3</b> 2	Biouversity	
5.3 2 2	2.2 Conoral Elora	
2 3	3.2 General Flora	
2 3	3.3 - Anneal Fauna	
2 3	2.5 Threatened Fauna	
3.3	3.6 Methodology	
3.3	3.7 Results and Conclusion	
3.4	Water	
3.4	4.1 Existing Environment	
3.4	4.2 Assessment	
3.4	4.3 Mitigation Measures	28
3.4	4.4 Conclusion	28
3.5	Odour and Air Quality	
3.5	5.1 Introduction	29
3.5	5.2 Existing Environment	29
3.5	5.3 Methodology	29
3.5	5.4 Assessment	29
3.5	5.5 Mitigation and Monitoring Measures	30
3.5	5.6 Conclusion	
3.6	Noise and Vibration	32
3.6	5.1 Introduction	
3.6	5.2 Existing Environment	
3.6	5.3 Methodology	32
3.6	5.4 Assessment	33
3.6	5.5 Mitigation Measures	33
3.6	b.6 Conclusion	
3.7	Heritage	
3.7	1.1 Non-Indigenous Heritage	

3.	7.2 Indigenous Heritage	34
3.8	Traffic and Access	
3.	8.1 Existing Environment	35
3.	8.1 Assessment	35
3.	8.2 Mitigation Measures	35
3.	8.3 Conclusion	
3.9	Visual	
3.	9.1 Existing Environment and Methodology	
3.	9.2 Assessment	
3.	9.3 Mitigation Measures	
3.9	9.4 Conclusion	
4	EROSION & SEDIMENT CONTROLS	
4.1	Works Standards	37
5	REHABILITATION	
5.	1.1 Vegetated Riparian Zone	38
5.	1.2 Channel Bed	39
6	MONITORING	
6.1	Erosion Controls	
6.2	Vegetation	39
7	REVIEW AND REVISION	
8	CONCLUSION	
8.1	Summary of Findings	40
8.2	Conclusion	41
9	APPENDICES	
9.1	Appendix 1 – NSW Property Planning Report	43
9.2	Appendix 2 – Proposal Plans	45
9.3	Appendix 3 – Threatened Species Assessment	47
9.4	Appendix 3 – Flood Assessment	49
9.5	Appendix 4 – Erosion and Sediment Control Methods	51
Di	iversion Drain and Bank (for 2Ha or less)	51
Si	ilt Fence Drawing	
50	ealment Dam	
R	OCK Check Dam	
Le	evel Spreader	
9.0	Appendix 5 – Cultural Heritage Due Diligence Assessment	

# **1** INTRODUCTION

# **1.1 Purpose**

The purpose of the Statement of Environmental Effects (SEE) is to describe the project works, outline the likely impacts of the proposal on the environment and identify mitigation measures that may be implemented to avoid or minimize potential adverse environmental impacts.

This SEE has also been prepared to meet the requirements of Schedule 1 of the *Environmental Planning and Assessment Regulations 2000,* stating "a development application must be accompanied by a Statement of *Environmental Effects (except for a designated development which is accompanied by an Environmental Impact Statement).* 

This report will assist with:

- Identification of the existing environment, the potential impacts and mitigation measures proposed to address any impacts identified,
- Identifying the riparian corridor and the vegetated riparian zone,
- Identifying the construction footprint and assist with minimising, protecting and rehabilitating the area of disturbance,
- Demonstrating that the works will not have a detrimental impact on the existing hydraulic, geomorphic and ecological functions of the watercourse,
- Identifying options considered and justify the final proposal,
- Ensuring that the natural geomorphic processes are maintained,
- Maintaining the natural hydrological regimes,
- Protecting the environment against scour,
- Monitoring and maintaining all disturbed areas,
- Provide erosion and sediment control measures, and
- Ensure the vegetation is protected and where required rehabilitated.

# 1.2 Objectives

The objectives of the project are as follows:

- Provide improved and safer access to the Murrumbidgee River,
- Provide disabled access to boats launched on the Murrumbidgee River,
- Incorporates the town, river and the existing levee bank with the potential to better link and extend a number of walking paths connecting the towns infrastructure,
- Promote water-based recreation activities,
- Minimize adverse environmental impact on the surrounding area, and
- Comply with relevant environmental legislation.

#### 1.3 Structure and Scope of Report

Section 1 of this document identified the objectives, methodology and relevant legislation, Section 2 outlines the background and general project details. Section 3 describes the existing environment, project impacts and mitigation measures. Section 4 describes the erosion and sediment control measures to be considered for the project, Section 5 details the Rehabilitation measures proposed, Section 6 details the monitoring obligations, Section 7 the review and revision process and Section 8 comprises a brief conclusion.

#### **1.4 Methodology**

The steps involved in preparing this SEE included:

- Review of documentation:
  - o Rich River Irrigation Developments surveyors design plans,
  - o Soil Assessment by South East Soil & Water,
  - Search of the following databases, registers and listings was conducted to identify potential issues:
  - NSW BioNet Atlas Flora Records,
    - NSW BioNet Atlas Fauna Records,

**Rich River Irrigation Developments** Statement of Environmental Effects October 2018 4 Murrumbidgee Council Darlington Point Boat Ramp

- o Australian Heritage Database,
- o NSW State Heritage Inventory,
- o Murrumbidgee Shire Council Heritage Listings, and
- NSW OEH Aboriginal Heritage Information Management System.
- Literature review was undertaken to determine issues relating to:
  - Local Environmental Plans zonings and general previsions,
  - o Regional Environmental Plans,
  - o State Environmental Planning Policies,
  - o Darlington Point Township Structure Plan, and
  - o Darlington Point and Coleambally's Control Plans, Strategic Plans and Policy.

# 1.5 Relevant Legislation & Planning

#### 1.5.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act (EP&A Act)* and its associated regulations provide a framework for assessing environmental impacts and determining planning approvals for developments and activities in NSW.

#### **COMMENT**

Consideration should be given to the project with relation to the Standard Planning Instruments

#### 1.5.2 Crown Lands Act 1989

The *Crown Lands Act 1989* deals with the management of Crown land. This includes the conservation of natural resources wherever possible and the sustainable use and management of the land in question. The objects of this Act are to ensure that Crown land is managed for the benefit of the people of New South Wales.

#### **COMMENT**

Consultation has been undertaken with Ms Melva Robb – Group Leader NSW Department of Industry Griffith & Hay on the 5<sup>th</sup> July 2017. This consultation identified that the title is owned by the Crown but managed by the council for public recreation and is referred to as Public reserve number 68939. The project work meets the existing use. The direction relating to the progress of the project provided in email are: *"Should a DA not be required for this proposal, Owner's Consent would be a suitable manner for the Department to given consideration to the proposal impacting on Crown land and providing any likely conditions for Council to consider.* 

When ready to lodge, I suggest that you send a letter and any relevant plans/diagrams etc. to the Wagga Office (for the time being) at - wagga.crownlands@crownland.nsw.gov.au ".

#### 1.5.3 Roads Act 1993 & Marine Safety Act 1998

The *Roads Act 1993*, sets out procedures for opening and closing public roads, and establishes the authorities responsible for roads, ie the Roads and Maritime Services (RMS), the council of a local government area, Lord Howe Island Board or Crown Lands on behalf of the Minister Administering the Crown Lands Act 1989. Key Provisions include:

- road opening/closing applications made before 1 July 1993 will continue under the provisions of the prior Act which created them,
- road opening applications by councils will be lodged directly with NSW LRS, and
- only roads authorities may apply to close a road. Applications must be made to Crown Lands.

The *Marine Safety Act 1998*, ensures the safe operation of vessels on waterways and promotes the responsible operation of vessels to protect the safety and amenity of other users of those waters and the amenity of the occupiers of adjoining land. It also provides and effective framework to the enforcement of legislation and provides for the investigation of marine accidents and subsequent appropriate action arising from those investigations.

#### **COMMENT**

RMS has been involved with the project and consultation should continue to ensure that all requirements are met relating to the *Roads Act 1993* and the *Marine Safety Act 1998*.

# 1.5.4 Protection of the Environmental Operations Act 1997

There is a broad allocation of responsibilities under the Act between the EPA, local councils and other public authorities. The EPA is made the regulatory authority for:

- activities listed in Schedule 1 to the Act and the premises where they are carried out
- activities carried out by a State or public authority
- other activities in relation to which a licence regulating water pollution is issued

In nearly all other cases, the regulatory authority is the relevant local council.

#### Comment

Schedule 1 of the Act identifies Marinas and boat repairs. A scheduled activity however is identified as a boat mooring or storage with a capacity to handle more than 80 vessels at any time. This schedule also identifies road construction activities however only applies as to a road that is 5 kms in length in this situation and as a result is not applied to this project. It should be identified by council if the council or the EPA is the appropriate regulatory authority as the activities are to be carried out by a public authority.

#### **1.5.5** Other Acts taken into consideration

Act	Section in this
	document
Fisheries Management Act 1994	Section 3.3
Biodiversity Conservation Act 2017	Section 3.3
National Parks and Wildlife Act 1974	Section 3.7
Heritage Act 1977	Section 3.7
Native Title Act 1994	Section 3.7
<b>Environment Protection and Biodiversity Conservation Act 1999</b>	Section 3.3

# 1.5.6 State Environmental Planning Policy (Infrastructure) 2007

#### 1.5.6.1 SEPP (Infrastructure) aims

The Infrastructure SEPP has the following aims to facilitate the effective delivery of infrastructure across the state: (a) improving regulatory certainty and efficiency through a consistent planning regime for infrastructure and the provision of services, and

(b) providing greater flexibility in the location of infrastructure and service facilities, and

(c) allowing for the efficient development, redevelopment or disposal of surplus government owned land, and (d) identifying the environmental assessment category into which different types of infrastructure and services development fall (including identifying certain development of minimal environmental impact as exempt development), and

(e) identifying matters to be considered in the assessment of development adjacent to particular types of infrastructure development, and

(f) providing for consultation with relevant public authorities about certain development during the assessment process or prior to development commencing.

#### 1.5.6.2 Consultation

Division 1, section 16 describes consultations with public authorities other than councils. The items specific to this proposal are:

(1) A public authority, or a person acting on behalf of a public authority, must not carry out specified development that this Policy provides may be carried out without consent unless the authority or person has:

(a) given written notice of the intention to carry out the development (together with a scope of works) to the specified authority in relation to the development, and

(b) taken into consideration any response to the notice that is received from that authority within 21 days after the notice is given.

(2) For the purposes of subclause (1), the following development is **specified development** and the following authorities are **specified authorities** in relation to that development:

(e) development comprising a fixed or floating structure in or over navigable waters—Roads and Maritime Services,

# 1.5.6.3 Division 13 Port, wharf or boating facilities

The Murrumbidgee River is defined as a Recreational Waterway. As such, Section 68 – Development permitted without consent details the following:

(4) 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. However, such development may be carried out on land reserved under the National Parks and Wildlife Act 1974 only if the development is authorised by or under that Act.

**Note**: Wharf or boating facilities means a wharf or any of the following facilities associated with a wharf or boating that are not port facilities:

(a) facilities for the embarkation or disembarkation of passengers onto or from any vessels, including public ferry wharves,

(b) facilities for the loading or unloading of freight onto or from vessels and associated receival, land transport and storage facilities,

(c) wharves for commercial fishing operations,

- (d) refuelling, launching, berthing, mooring, storage or maintenance facilities for any vessel,
- (e) sea walls or training walls,

(f) administration buildings, communication, security and power supply facilities, roads, rail lines, pipelines, fencing, lighting or car parks.

#### 1.5.7 Murrumbidgee Local Environmental Plan 2013

The particular aims of the Murrumbidgee Local Environmental Plan (LEP), 2013 are as follows: (a) to protect, enhance and conserve agricultural and horticultural land through the proper management, development and conservation of natural and man-made resources,

(b) to encourage a range of housing, employment, recreation and community facilities to meet the needs of existing and future residents of Murrumbidgee,

(c) to promote the efficient and equitable provision of public services, infrastructure and amenities,

(d) to conserve the environmental heritage of the land to which this Plan applies.

The following additional local provisions have also been taken into account.

#### 1.5.7.1 Land Zones

This project is located in the land zone of E3 – Environmental Management. The objectives of this zone are as follows:

- To protect, manage and restore areas with special ecological, scientific, cultural or aesthetic values.
- To provide for a limited range of development that does not have an adverse effect on those values.
- To ensure development is compatible with the flood hazard and riparian corridor of the Murrumbidgee River.

Works that are permitted with consent in this zone include the following works related to this project:

Boat launching ramps; Boat sheds; Building identification signs; Environmental protection works; Jetties; Roads; and Water recreation structures.

#### 1.5.7.2 Earthworks

The following is identified within the section 6.1 of the Murrumbidgee LEP:

(3) Before granting development consent for earthworks (or for development involving ancillary earthworks), the consent authority must consider the following matters:

(a) the likely disruption of, or any detrimental effect on, drainage patterns and soil stability in the locality of the development,

(b) the effect of the development on the likely future use or redevelopment of the land,

(c) the quality of the fill or the soil to be excavated, or both,

- (d) the effect of the development on the existing and likely amenity of adjoining properties,
- (e) the source of any fill material and the destination of any excavated material,

(f) the likelihood of disturbing relics,

(g) the proximity to, and potential for adverse impacts on, any waterway, drinking water catchment or environmentally sensitive area,

(h) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.

Note. The National Parks and Wildlife Act 1974, particularly section 86, deals with harming Aboriginal objects.

#### **COMMENT**

As is demonstrated in the following section **3.4** the project will not disrupt or have an effect on soil stability, drainage patterns, drinking water catchments or waterways in the vicinity of the locality. The project will not have an effect on the development or future development of land as is it compliments existing land uses.

Section 3.7 addresses the assessment undertaken to assess the disturbance of relics.

This document has been prepared to identify appropriate measures to avoid, minimize and mitigate any impacts from the development.

#### 1.5.7.3 Riparian Lands and Watercourses

The land proposed for the boat ramp, access road and car park is shown below together with the Riparian Lands and Watercourses overlay. It can be seen that this overlay incorporates the part of the project area. Further information relating to this is discussed in section **3.4.1.2**.



#### 1.5.7.4 Groundwater Vulnerability

The land proposed for the boat ramp, access road and car park is shown below together with the Groundwater Vulnerability overlay. It can be seen that this overlay incorporates the entire title and project area. Further information relating to this is discussed in section **3.4.1.4**.



# 1.5.7.5 Terrestrial Biodiversity

The land proposed for the boat ramp, access road and car park is shown below together with the Terrestrial Biodiversity overlay in green. It can be seen that the overlay area encompasses the whole project title. This is further discussed in section **3.3** below.



# 1.5.7.6 Wetlands

The land proposed for the boat ramp, access road and car park is shown below together with the Wetlands overlay in shaded green. It can be seen that the overlay area encompasses the whole project title. This is further discussed in section **3.3** below.



# 1.5.7.7 Other Overlays

Other overlays have been examined but do not relate to the project area. These include:

- Acid Sulfate Soils,
- Additional Rural Village Land,
- Drinking Water Catchment,
- Environmental Conservation Area,
- Native Vegetation Protection, and
- Salinity.

#### 1.5.8 Other State Environmental Planning Policies

A table has been provided below showing all the State Environmental Planning Policies identified in the NSW Property Planning Report and their relationship to the project.

Number	Title	Relevant	Comment
	Affordable Rental Housing 2009	No	Not relevant
	Building Sustainability Index (BASIX) 2004	No	Not relevant
	Exempt and Complying Development Codes 2009	No	Project is not exempt
	Housing for Seniors or people with a Disability 2004	No	Not relevant
	Infrastructure 2007	Yes	See Above
	Mining, Petroleum Production and	No	Not relevant
	Extractive Industries		
	Miscellaneous Consent Provisions	No	Not relevant
1	Development Standards	No	Not applied
21	Caravan Parks	No	Not relevant
30	Intensive Agriculture	No	Not relevant
33	Hazardous and Offensive Development	No	No defined as a hazardous or offensive
			development
36	Manufactured Home Estates	No	Not relevant

Number	Title	Relevant	Comment
50	Canal Estate Development	No	Not relevant
55	Remediation of Land	No	The site is not listed in the NSW EPA contaminated land register and site inspections and known history of land use of the site indicates that the overall risk for contamination to be present as a result of historic or current land use is low.
62	Sustainable Aquiculture	No	Not relevant
64	Advertising and Signage	Yes	Council is the consent authority and RMS has also been consulted with relation to safety signage in the area.
65	Design Quality of Residential Apartment Development	No	Not relevant
	Rural Lands 2008	Yes	This project aligns with the provisions of this policy as it will not contradict the aims of this policy.
	Vegetation in Non-Rural Areas 2017	Yes	See Section 3.3

# **1.5.9** Planning Controls in the Murrumbidgee Local Environmental Plan 2013.

# Aims of Plan

(a) to protect, enhance and conserve agricultural and horticultural land through the proper management, development and conservation of natural and man-made resources,

(b) to encourage a range of housing, employment, recreation and community facilities to meet the needs of existing and future residents of Murrumbidgee,

(c) to promote the efficient and equitable provision of public services, infrastructure and amenities,

(d) to conserve the environmental heritage of the land to which this Plan applies.

#### Land Zoning – Environmental Management

The objectives of the zone are as follows:

- To protect, manage and restore areas with special ecological, scientific, cultural or aesthetic values.
- To provide for a limited range of development that does not have an adverse effect on those values.
- To ensure development is compatible with the flood hazard and riparian corridor of the Murrumbidgee River.

#### Land Zoning – Recreational Waterways

- To protect the ecological, scenic and recreation values of recreational waterways.
- To allow for water-based recreation and related uses.
- To provide for sustainable fishing industries and recreational fishing.

#### *Comment*

The project is an allowable activity within the relevant zones and meets the above objectives and aims of the *Murrumbidgee Local Environment Plan 2013*.

# **2 OVERVIEW OF PROPOSED WORKS**

# 2.1 Background

The proposal is part of the future of Darlington Point and provides many opportunities to better integrate one of the towns greatest assets – the Murrumbidgee River with the existing infrastructure within the town. The project will lay the foundations for other potential opportunities within the town and will provide a safer and improved access for boats and the public to the river. This proposal importantly also allows disabled access to boating facilities and as such the recreational waterway.

The existing boat ramp is located on the north side of the Murrumbidgee River, opposite the township and has several disadvantages. This site is becoming unsafe for people to access and use being problematic launching boats in the river. The boat ramp infrastructure at this location is also nearing the end of its life and is likely to require an upgrade. Over recent years that has also been an influx of tourists particularly with the popularity of the "Darlington Point Riverina Classic Catch and Release Fishing Competition".

This proposal includes the installation of a new boat ramp, removable floating pontoon and walkway to allow access to maritime vessels, car and trailer parking area and a more appealing and user-friendly area for locals and tourists to access the river and its environment. This project is in line with the current Darlington Point Structure Plan and is located close to the town and other open space recreational areas and will provide the foundation for other associated open space areas and uses.

The site has been selected taking into account many factors. These are as follows:

- Location. The site is located within an already disturbed area adjoining the existing levee bank and close to the township and other recreational open space areas,
- **Vegetation**. A limited amount of vegetation of low value will require removal as part of the project works and there is unlikely to be a loss of habitat as part of the project works,
- Soils. The site offers manageable soils for construction,
- Pollution. There is no potential for pollution,
- **Surrounding land uses and residences**. There is minimal lasting impact on surrounding residents and receptors however will also be incorporated into existing and proposed recreational areas within the township, and
- Heritage. The site has no identified heritage or archaeological sites that would be disturbed during the development.

The proposal has the ability to provide the following benefits:

- The project provides an opportunity to provide better connections with the town,
- It supports a growing demand for water recreation activities such as boating and fishing, including the annual Darlington Point fishing competition;
- Incorporates the town and river and the existing levee bank with the potential to better link and extend a number of walking paths connecting the towns infrastructure,
- It will better promote water based recreation activities,
- The proposal is expected to provide economic benefits through tourism and improved township appeal, and
- The potential environmental impacts of the proposed development are considered as minimal.

This SEE is proposed to cover works relating to the above described project. And in summary, the proposal is not predicted to have any significant environmental impact.

#### 2.2 Site Location

This project is located in New South Wales on the east side of Darlington Point, the south side of the Murrumbidgee River (opposite the existing caravan park), and the west side of a stand of remnant native vegetation and agricultural farming area. The project adjoins the existing Darlington Point flood levee protection bank works and is ancillary to other recreational areas within the rural township.

Table 1 - Land details of the project					
Details	Specific related to project site				
Lot number	7312				
Deposited Plan	1159328				
Local Shire	Murrumbidgee Council				
LEP Zone - Land	E3 – Environmental Management				
LEP Zone – Water	W2 – Recreational Waterway				
Catchment Area	Murrumbidgee				
IBRA Region	Riverina				
IBRA Sub Region	Murrumbidgee				
Traditional Owners/Land Council	Griffith Local Aboriginal Land Council				
Land Stature	Crown land managed by council for public recreation				
Area of project	0.5ha				
GPS Reference	MGA Zone 55 E: 408436 N: 6174271				



Figure 1 - Locality plan showing project location

# 2.3 Description of works

This proposal is in the process of being tendered. The successful tenderer will be responsible for the construction and completion of the Works under contract as per the Drawings and the Specifications (See **appendix 1**).

The proposed works shall as shown on the Drawings and set out in the specification and generally comprise the following:

#### Access Road from Cemetery Road to Boat Ramp

 Construction of unsealed road pavement as specified approximately 256m long x 7.6m wide from Cemetery Road including unsealed trailer turn-around area,

**Rich River Irrigation Developments** Statement of Environmental Effects October 2018

13 Murrumbidgee Council Darlington Point Boat Ramp

- Construction of a sealed road and angled carparking pavement approximately 105m long x 18.7m wide with AG drains on one side,
- Construction of approximately 55m long concrete paved roadway including approximately 19m wide trailer turn-around area with AG drains on one side,
- Open drain relocation and construction of associated underground drainage pipes, pits and headwalls,
- Construction of steel and concrete sleeper retaining walls,
- Associated tree removal, earthworks, subgrade treatments & pavements, Type 2 rock beaching, post & rail fencing, signage and line-marking,

# **Boat Ramp**

- Construction of approximately 40m long x 8m wide concrete boat ramp and adjoining 2.3m wide concrete access pathway,
- Associated tree removal, concrete piling, earthworks, subgrade treatments, rock armouring and Type 2 beaching,
- Construction of steel and concrete sleeper retaining walls,

# **Floating Pontoon**

- Supply and installation of 17 custom fabricated and hinged aluminium walkway sections ranging from 3.4m to 6.3m in length (approximately 85m overall length) and supported by Polyurethane filled Polyethylene floatation pontoons as detailed,
- Supply and installation of aluminium access ramp to pontoon walkway,
- Supply and installation of 10 galvanised steel piles as detailed

# **Disability Access Ramp**

- Construction of approximately 45m x 3m wide all abilities access reinforced concrete ramp between existing pathway and top of boat ramp;
- Associated earthworks and rock beaching.

# General

- Levelling topsoiling and seeding of proposed picnic area ready for installation of shelter and picnic settings by others,
- Construction of safety railings adjacent parking area as specified,
- Full site management, including setting out, construction management, clean-up and disposal off-site of all surplus materials and debris resulting from the construction activities and reinstatement of disturbed areas including re-sowing of disturbed areas with approved native species,
- Supply of marked up 'as-constructed' drawings.

A copy of the overview plan and the Bill of Quantities is shown below.



Figure 2 - Overview plan of project

Specific details of the size and dimensions of the project are shown in the table below.

Item	Description of Works	Quantity	Unit
No.			
1.0	GENERAL:		
1.1	Site Establishment		
1.1.1	Site Establishment and Management. (Including Site hut, Portable toilet and Rubbish skip)		Item
1.2	Project Set Out		
1.2.1	Survey setout and re-establishment of pegs as required.		Item
1.3	Vegetation Removal		
1.3.1	Tree removal.	8	No.
1.4	Site Cleanup		

	T	able	2	- Project	earthworks	detail
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Item	<b>Description of Works</b>	Quantity	Unit
1.4.1	Post construction site clean-up including removal and		Item
	reinstatement of all disturbed areas including supply and		
	spreading of topsoil and reseeding excepting areas		
	adjacent roadway and boat ramp as included below.		
1.5	Post Construction Survey and As-Constructed Plans		
	Post construction survey and report including supply of		
1.5.1	marked up Works as Constructed Plans for:		16
1.5.1	Roadworks & Drainage		Item
1.5.2	Boat ramp and Pontoon Structure		Item
2.0	ROAD & DRAINAGE WORKS: (Including Carpark Area)		
2.1	Earthworks	2 550	m2
2.1.1	stockpiling/spreading, trimming of subgrade.	2,550	m2
2.1.2	Cut (solid)	330	m3
2.1.3	Fill to design levels and grades. (solid)	1318	m3
2.2	Road Pavements		
	Road Pavement – to supply, place and compact:-		-
2.2.1	(a) Sub-base - 200mm depth - PSG - Stabilised with 1.5% Triple Blend.	2519	m2
2.2.2	(b) Basecourse (Sealed Road) - 150mm depth of 50%	1879	m2
	Blend.		
2.2.3	(c) Basecourse (Unsealed Road) - 150mm depth of 50%	2136	m2
	mix PSG & Class 2 FCR - Stabilised with 1.5% Triple Blend.		
	Bituminous Sealing - including supply, place, cover and		
	compacting of aggregate:-		
2.2.3	(a) 7mm Primerseal	1879	m2
2.2.4	(b) 14//mm I wo coat final seal.	1879	m2
2.2.5	Concrete Pavement - including supply and place:-		0.40
	reinforced with single layer of SI 81 reinforcing including	636	640
	edge beams as specified.		
2.3	Drainage		
	Drainage Pipelines, Drainage Pits and Headwalls –		
	including supply, excavation, bedding, placing and		
2.3.1	100mm slotted & socked AG Drain laid in 20mm	126	lin. m
2.011	screenings		
2.3.2	DN225mm SN8-SCJ PVC Pipe FCR Backfill	32	lin. m
2.3.3	DN900mm SN8-SCJ PVC Pipe Earth Backfill	6	lin. m
2.3.4	Double Sided Side Entry Pit to suit open earth drain. Pits - 600x600x800 deep with trafficable lid.	3	No.
2.3.5	Standard concrete end wall to suit DN 225mm pipe	2	No.
2.3.6	Standard concrete end wall to suit DN 900mm pipe	2	No.
2.3.7	Fill existing open drain.	144	m3
2.3.8	Excavate new earthen drain.	120	m3
2.4	Reinstatement of Road & Drainage Works		
2.4.1	Reinstate, topsoil and seed disturbed areas adjacent to		Item
1	road		

Item	Description of Works	Quantity	Unit
2.5	Hardwood Post and Rail Barrier Fence		
2.5.1	Supply and install treated hardwood post & rail barrier	63	lin. m
	fence adjacent to road and angle park at future picnic		
	area		
3.0	BOAT RAMP CONSTRUCTION:		
3.1	Cofferdam and Dewatering		
3.1.1	Steel sheet pile coffer dam installation and removal.		Item
3.1.2	Dewatering:- (Initial and continued throughout ramp construction)		ltem
3.2	Boat Ramp		
	Base Preparation		
3.2.1	Excavation. (Cut)	350.75	m3
3.2.2	Concrete pile supply and installation - 300x300x6000 long.	6	No.
3.2.3	Crushed rock supply, spread & compact - Class 2 FCR.	45.5	m3
	Concreting		
3.2.4	Formation of base for slab including formwork.		Item
3.2.5	Concrete 40MPa.	81	m3
3.2.6	Reinforcement - SL81 mesh and N12 Deformed bar.		Item
3.2.7	Concrete laying and finishing.		Item
	Rock Work		
3.2.8	Rock armouring (Scour protection)	45	m2
3.2.9	Beaching (Type 2) Supply and install including Geofabric.	210	m2
3.3	Retaining Walls (Max 1m high)		
	Retaining wall supply and installation:-		
3.3.1	(a) 150UB18 Galvanised UB x 3m long.	16	No.
3.3.2	(b) Concrete sleepers - 200x75x2000 long.	75	No.
3.3.3	(c) Install AG Drain, backfill screenings and compacted pervious fill	30	m length
4.0	ACCESS WALKWAY AND PONTOON		
4.1	Concrete Access Walkway		
4.1.1	Excavate and supply, place and compact - Class 2 FCR	19	m3
4.1.2	Reinforcement - Supply and place- SL81 mesh.	185	m2
4.1.3	Concrete 25MPa Supply, place and finish including formwork	19	m3
4.2	Floating Pontoon		
	Pontoon modules - Supply and install including marine grade aluminium frames, decking and handrails as per Drawings:		
4.2.1	6 Float units x 6.0 to 6.3m long	9	No.
4.2.2	4 Float Units x 3.4 5.8m long	8	No.
	Piling - Supply and installation. (Length's as per drawings)		
4.2.3	DN300x10mm thick galvanised steel piles	5	No.
4.2.4	DN200x6mm thick galvanised steel piles	5	No.
4.2.5	Marine grade aluminium access walkway - Supply and install as per Drawings.	1	No.

The construction methodology, erosion and sediment control works will be determined by the successful tendered as part of the project works.

# **3 ENVIRONMENTAL ASSESSMENT**

# 3.1 Climate

The climate in the Darlington Point area can be described as a semi-arid climate under the Koppen climate classification with hot summers and cool winters. Extreme temperatures at Griffith Airport AWS have ranged from 46.0 °C on 23 January 2001 to -5.9°C on 17<sup>th</sup> July 1977. During a heatwave on 10<sup>th</sup> February 2017 temperatures reached 45.8°C, a new record high for February.

Table 3 - Table showing climate data (Griffith Airport)													
Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
<b>Record High</b>	46.0	45.8	40.2	36.1	28.6	25.0	23.6	30.0	38.2	39.2	43.0	44.0	46.0
Avg High	32.8	32.1	28.8	24.0	19.3	15.5	14.4	16.5	19.8	23.8	28.0	30.8	23.8
Avg Low	16.9	17.3	14.2	10.2	7.2	4.5	3.5	3.9	5.8	8.9	12.5	15.1	10.0
<b>Record Low</b>	6.8	6.6	4.2	0.0	-2.0	-4.0	-5.9	-4.8	-2.2	0.6	1.8	4.2	-5.9
Avg rainfall	33.2	26.5	32.9	27.8	35.7	34.1	33.5	35.9	33.2	39.2	32.4	32.7	397.3
Avg rainfall	4.2	3.7	3.9	4.6	6.4	7.6	9.4	9.0	7.5	6.4	5.3	4.9	72.9
days													
Avg	28	34	37	41	53	63	62	54	47	37	35	31	43.5
afternoon													
humidity													
Avg daily	9.6	8.8	6.6	3.9	2.0	1.3	1.3	2.0	3.3	5.2	7.5	9.2	5.1
evaporation													

# 3.2 Site Description and Land Use

The site consists of a generally modified riverine floodplain. There is an existing levee bank and a vehicle access track located within the Vegetated Riparian Zone (VRZ) of the project area. The existing embankment upstream of the site contains vegetation typically found in this area. The area where works are proposed and downstream of the site have been completely modified with no vegetation remaining.



Figure 3 - Photo showing proposed site looking across the Murrumbidgee River



Figure 4 - Photo showing project site looking upstream



Figure 5 - Photo looking south from River at existing access and road



Figure 6 - Photo looking downstream of project site

The VRZ at this project site covers a distance of 40 meters from the high bank of the water course of which only one side is taken into consideration due to the project works. This 40m area has been nominated in accordance with the Riparian corridor matrix in the Guidelines for vegetation management plans on waterfront land (NSW Office of Water 2012).

The proposed project site is a small area and the activity associated with the development will be confined to the site. The footprint of the proposed development, including the parking area and boat ramp will be approximately 0.5 hectares.

# 3.3 Biodiversity

#### 3.3.1 Existing Environment

The site and existing land use is that of a Riverine Riparian environment that has been previously disturbed as part of the construction of the Darlington Point Levee bank works. Located within the site are 8 River Red-gum juvenile trees that will require removal as part of the proposed works. None of these trees for removal are large old trees or contain hollows.

State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 does apply to this project as the area of the project is zoned E3. Section 10 states the following:

(1) A council may issue a permit to a landholder to clear vegetation to which this Part applies in any non-rural area of the State.

(2) A permit cannot be granted to clear native vegetation in any non-rural area of the State that exceeds the biodiversity offsets scheme threshold.

(3) A permit under this Part cannot allow the clearing of vegetation:

(a) that is or forms part of a heritage item or that is within a heritage conservation area, or

(b) that is or forms part of an Aboriginal object or that is within an Aboriginal place of heritage significance, unless the council is satisfied that the proposed activity:

(c) is of a minor nature or is for the maintenance of the heritage item, Aboriginal object, Aboriginal place of heritage significance or heritage conservation area, and

**Rich River Irrigation Developments** Statement of Environmental Effects October 2018

20 Murrumbidgee Council Darlington Point Boat Ramp (d) would not adversely affect the heritage significance of the heritage item, Aboriginal object, Aboriginal place of heritage significance or heritage conservation area. (4) A permit may be granted under this Part subject to any conditions specified in the permit.

Clause 6.3 of the Murrumbidgee LEP relates to Terrestrial Biodiversity. The objectives of this clause are

1) To maintain terrestrial biodiversity by:

(a) protecting native fauna and flora, and
(b) protecting the ecological processes necessary for their continued existence, and
(c) encouraging the conservation and recovery of native fauna and flora and their habitats.

#### 3.3.2 General Flora

As stated above, the proposed development area is a degraded riverine environment that has been historically disturbed through other infrastructure projects. This area consists mainly of River Red Gum juvenile vegetation scattered amongst some very large old trees. The lower strata of vegetation consist mainly of introduced weed species.

#### 3.3.3 Threatened Flora

Records of threatened flora species, populations or ecological communities known to occur within a 10km radius of the site were obtained from the BioNet Altlas website. An Additional search was also undertaken under the *EPBC Act* to obtain records of protected species within 10kms of the site.

This Bionet search listed 1 flora species as recorded within 10kms of the project site. The EPBC Protected matters report identified 3 species. 5 threatened ecological communities have also been identified through both searches.

#### 3.3.4 General Fauna

As stated above the project sites is a highly modified landscape that has been historically disturbed. The existing standing vegetation consists mainly of younger mature trees with no hollows identified. The groundcover consists mainly of introduced weed species. Native groundcover is therefore limited and has unlikely habitat potential.

#### 3.3.5 Threatened Fauna

There are 18 records of threatened fauna species identified within a 10km radius of the site which were obtained from the BioNet Atlas website and 13 additional identified within the EPBC search. Of these 23 were birds, 1 frog, 3 fish and 4 are mammals.

#### 3.3.6 Methodology

The Biodiversity Offsets Scheme Entry Tool has been utilised to establish if the project lies within an area mapped as high biodiversity values and if the project proposal exceeds the area threshold. It has also been identified through the NSW Planning portal that the *Vegetation in Non-Rural areas SEPP* does apply to this project.

#### Area clearing threshold

The site is one that is been historically modified. It has been developed for other town infrastructure in the form of a levee bank with significant works in the area disturbing the site. There are 8 standing remnant trees within the project site and the groundcover consists of a heavy burden of introduced weeds and grasses. The entire project site encompasses an area of 0.5Ha.

#### **Biodiversity Values Map threshold**

The project areas are adjoining but the vegetation for removal is not covered by land identified on the biodiversity values map.

#### Biodiversity Offsets Scheme Entry Tool

Mapping of the project area was undertaken using this (BOSET) tool. This report provided (and attached in the Threatened Species Assessment) displays the following results:

Date of Calculation	04/05/2018 12:17PM	BAM Required
Total Digitised Area	0.08 ha	
Minimum Lot Size Method	Lot Size	
Minimum Lot Size	1.71 ha	
Area Threshold	0.5 ha	
Area of native vegetation cleared	Unknown #	Unknown #
Impact on biodiversity values land map	No	No

# whilst the area of Native Vegetation to be cleared cannot be identified by the BOSET, it can be clearly seen within this report that there are 8 trees to be removed. These trees have cover an area of less than 0.5ha – being under the area threshold. Based on this, this report has progressed based on the project not exceeding the threshold.

#### Test of significance

As the project does not exceed the Biodiversity Offset Scheme Threshold, a 'test of significance' is required to determine whether impacts other than those associated with clearing native vegetation will have a significant impact on biodiversity – specifically threatened species.

The existing '7-part test' guidelines have been utilised for this report. To undertake the 7 part test the following method has been utilised.

A desktop assessment was undertaken to identify threatened flora and fauna species, populations and ecological communities listed under the *Biodiversity Conservation Act 2016* Schedules 1-4, and MNES listed under the *EPBC Act* that may be affected by the proposal. Records provided in the *TSC Act* and *FM Act* have also been considered as part of this assessment. Database records pertaining to the study area and locality (i.e. within a 10km radius of the proposal footprint) and the Riverina – Murrumbidgee IBRA Sub-region were reviewed and included:

- NSW Office of Environment and Heritage (OEH) Wildlife Atlas database (NSW BioNET) (licensed) for records of threatened species and endangered ecological communities listed under the *TSC Act* that have been recorded in the locality (OEH 2017; data supplied by OEH on 4<sup>th</sup> May 2018.
- Australian Government Department of Environment and Energy- Protected Matters Online Search Tool for MNES listed under the *EPBC Act* and predicted to occur within 10km radius of the project (DEE 2018; database queried on 4<sup>th</sup> May 2018).
- OEH threatened species profiles online database (OEH 2018).
- DEE online species profiles and threats database (DEE 2018).
- Broad-scale vegetation mapping of south-east NSW to identify threatened ecological communities mapped as occurring within the locality of the site.
- NSW OEH NSW (Mitchell) Land scape V3.1.

Following collation of database records and species and community profiles, a 'likelihood of occurrence' assessment was prepared with reference to the broad habitats contained within the study area. This was further refined following a site visit and assessment of any possible habitat present.

A likelihood of occurrence ranking was attributed to threatened biota and migratory species based on the framework outlined in **Appendix 3 – Threatened Species Assessment.** 

# 3.3.7 Results and Conclusion

This appended assessment of the proposed project site to a 10km radius and the written inclusion of the EPBC Protected Matters Report considers threatened species likely to occur within the sub-region and has shown that there have been species to be considered within the broader area as part of this test.

A review of each of these species, populations and community's listed above, has considered their requirements with relation to environment, habitat and food source and the results show that the impact of this project would be limited.

There are 8 juvenile River Red-gum trees that are proposed to be removed as part of the project construction activities however they are small in growth and do not contain hollows. The removal of these trees and general construction activities have not identified impacts to threatened species, populations of communities.

**Rich River Irrigation Developments** Statement of Environmental Effects October 2018

22 Murrumbidgee Council Darlington Point Boat Ramp

# 3.4 Water

# 3.4.1 Existing Environment

# 3.4.1.1 Surface Water

The project site is located within the catchment of the Murrumbidgee River, which covers 84,000 square kilometers of southern NSW and is specifically located on the Murrumbidgee River adjoining the existing levee bank. There is a long term streamflow gauge at Murrumbidgee River at Darlington Point (410021) located within the township.

#### 3.4.1.2 Flooding

The Murrumbidgee LEP has the following requirements with respect to flooding:

(1) (a)to minimise the flood risk to life and property associated with the use of land,

(b) to allow development on land that is compatible with the land's flood hazard, taking into account projected changes as a result of climate change,

(c) to avoid significant adverse impacts on flood behavior and the environment.

(2) This clause applies to land at or below the flood planning level.

(4) A word or expression used in this clause has the same meaning as it has in the Floodplain Development Manual (ISBN 0 7347 5476 0) published by the NSW Government in April 2005, unless it is otherwise defined in this clause.
(5) In this clause: flood planning level means the level of a 1:100 ARI (average recurrent interval) flood event plus 0.5 metre freeboard.

The project site is not located in a Floodplain Management Plan area. To determine if the project is at or below the flood planning level, surveys undertaken by Rich River Irrigation (RRID) have been utilised.

A 2012 flood level identified in the appended Flood Study undertaken by Cardno in December 2017 (**Appendix 4**) identifies the 1% AEP height at Darlington Point was 125.55AHD. The natural surface levels at the project site are 122.00m AHD at the top of the proposed boat ramp, car park and turning circle and 123.00AHD at the commencement of the access road. This establishes that the site is within a flood prone area.

#### 3.4.1.3 Riparian Land and Watercourses

The Murrumbidgee LEP has the following requirements with respect to riparian lands and watercourses: (1) The objective of this clause is to protect and maintain the following:

(a) water quality within watercourses,

- (b) the stability of the bed and banks of watercourses,
- (c) aquatic and riparian habitats,
- (d) ecological processes within watercourses and riparian areas.

(2) This clause applies to all of the following:

(a) identified as "Riparian Land and Watercourse" on the Riparian Lands and Watercourses Map,

(b) all land that is within 40 metres of the top of the bank of each watercourse on land identified as "Riparian Land and Watercourse" on that map.

This project is located within the Riparian Lands and Watercourses Map and as such is subject to the above considerations.

#### 3.4.1.4 Groundwater

This site is identified within the groundwater vulnerability overlay of the Murrumbidgee LEP. The objectives of clause 7.4 Groundwater Vulnerability are as follows:

(a) to maintain the hydrological functions of key groundwater systems,

(b) to protect vulnerable groundwater resources from depletion and contamination as a result of development.

The area subject to this proposal has been identified within the overlay of Groundwater Vulnerability. As a result, further investigations have been undertaken on the local groundwater network and their dependent ecosystems.

There are 5 monitoring bores located within the vicinity of the project with their locations shown below. A search on the NSW DPI-water's Groundwater map on the 28<sup>st</sup> August 2018 showed the following distances to the monitoring bores:

Table 4 - Ground water bores in the vicinity of the project		
Bore	Distance	Direction
GW042111	11.5kms	North
GW040579	1.8kms	South south west
GW030489	10.8kms	South east
GW040582	8.5kms	South south west
GW040573	8.5kms	West



Figure 7 - Image showing location of Groundwater monitoring bores in the vicinity of project site.

# 3.4.2 Assessment

# 3.4.2.1 Surface Water & Riparian Land and Watercourses

The potential sources of water pollution from activities within the project site would be as follows:

- Construction activities within the river,
- Local soil erosion during rain-fall events within the project footprint during construction,
- Surface water run-off from stockpile areas if required, and
- Surface run-off from rehabilitated areas prior to full stabilization.

Prior to the commencement of works, the successful tenderer, will be required to provide an Erosion and Sediment Control Plan that adequately addresses and manages sediment control measures during the construction and rehabilitation period. These methods must be in line with the items identified in **Section 4** and industry accepted Landcom methods. (**Appendix 4**)

#### 3.4.2.2 Flooding

The appended Flood Assessment identified that the 1% AEP flood level is 2.75m above the proposed finished height of the top of the ramp and car parking area. The appended flood report describes the results of the assessment as follows:

The design plans for the amended approach road and boat ramp were assessed and there are only minor changes to the natural surface proposed for the development location. A cross section of the changes at the boat ramp are shown in the attached report Figure 4-9. There is a small portion of cut where the boat ramp is located but for the majority of the area there is minimal change to the existing surface. This area of cut is the equivalent to 1 to 2 grid cells within the model space and these have been lowered in the design surface.

On the access road there are areas of cut and fill which involve changing the surface by approximately +/- 200 mm.

To assess the design, the ground surface of the model was adjusted to reflect the changes proposed. As discussed these changes were not large ground level changes but more smoothing of the natural surface to accommodate roads, carparks and the boat ramp itself.

The hydraulic model was run for the bank full, 20%, 5% and 1% AEP events and the peak flood levels compared. Overall the maximum changes observed with less than 1 cm due to the high depths of water associated with the area.

# For the bank full scenario there is a slight change in the flood extent due to the boat ramp but this is extremely localised.

The proposed walkway and pontoon could however have the ability to affect or be affected by flood flows. These structures as a result have designed to be removed in during these times. Consequently, this proposal is in line with the aims and objects of the Murrumbidgee LEP including:

- The project work is compatible with the flood hazard of the land,
- The project is not likely to significantly adversely affect flood behaviour resulting in detrimental increases in the potential flood affectation of other development or properties,
- The walkway and pontoon incorporate appropriate measures to manage risk to life from flood,
- The works are not likely to significantly adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses, and
- The work is not likely to result in unsustainable social and economic costs to the community as a consequence of flooding.

#### 3.4.2.3 Groundwater

#### **Existing Groundwater Network**

A review of the groundwater bores in the vicinity has been undertaken. This assessment shows the general trends of the water tables in the regions with their historic and current depths. The below graphs show the water table readings for Summer being taken in February each year and the Winter being taken in August each year recording the effects of the irrigation season and winter rainfall on the groundwater network in the region.





Figure 9 (above) - Graph showing winter ground water levels 2007-2015



Figure 10 (above) - Graph showing all Ground Water levels 2007-2015

As can be seen from the graphs above, the local ground water levels are generally remaining stable to slightly rising. The regional water tables are reactive to rainfall inflows but do not seem to be greatly influenced by irrigation practices. The current water table levels in the area are approximately 10m below the surface closest to the project site.

# Groundwater Quality

The NSW Office of Water in 2011 published the Murrumbidgee Catchment Overview shown below in **Figure 11**. The area in the region of the project shows the groundwater quality as good and of low salinity.



Figure 11 - Groundwater Quality in the Murrumbidgee Catchment

#### 3.4.3 Mitigation Measures

Table 5 - Water mitigation measures			
Potential Impact	Timing	Safeguard	
Surface Water Quality	Pre-construction/ Construction	Erosion and Sediment control measures will be implemented and maintained in accordance with the relevant section of <i>Managing Urban</i> <i>Stormwater: Soil and Construction Volume 1</i> (Landcom, 2004). Works are only to occur during low River levels Appropriate measures are to be put in place to manage silt mobilisation during boat ramp installation.	
	Construction	Rehabilitation works are to be undertaken as soon as practicable to stabilise disturbed surface areas.	
	Operation	Maintain vegetation cover over areas adjoining access roads and car parks to prevent ongoing erosion.	
		Storage, refuelling and maintenance of plant and equipment is to be undertaken in an impervious bunded area or away from the site. Vehicle wash down is to be undertaken in the designated bunded wash down area away from	
Contamination of surface and groundwater	Construction	the site. Daily construction plant maintenance checks will be undertaken to ensure that no oil, fuel or other liquids are leaking. Checks are to be undertaken by qualified staff and will be trained in the management of accidental spills.	
		An emergency spill kit will be kept on site with all staff aware of location and use.	
Surface Water pondage/	Pre-construction	Ensure adequate connection of drainage to adjoining drainage for early construction works.	
inadequate drainage	Construction	Ensure Erosion and Sediment controls are suitable for site, maintained and monitored.	
	Construction	Works will not be proposed during predicted or traditional times of high river levels.	
Flood Impacts	Operation	All pontoon and walkway infrastructure is to be removed in times of very high, fast flowing river levels.	

#### 3.4.4 Conclusion

The above assessment and associated mitigation measures are provided to ensure that the development is unlikely to have an effect on the water quality and flows within the Murrumbidgee River, the stability of the bed and banks is maintained and will not increase water extraction from the watercourse.

This flood investigation examined the design events for the Murrumbidgee River is association with Darlington Point and the proposed boat ramp. The main purpose of this investigation was to understand the flood risk to the structure and any potential impacts on the flood behavior due to the proposed works. The investigation showed that the area where the proposed boat ramp is to be located is significantly inundated in the design events as it is located outside the Darlington Point levee. Depth for these events are over 5 m in depth. However, as a result of the large depths during flood events there is little impact to the flood behavior through the area modified as part of the boat

ramp design. The floating pontoons and walkway will be removed during times of high river levels and will not significantly affect the flood behavior.

Groundwater is also unlikely to be affected or contaminated as the local water table level is approximately 10m below the surface in the vicinity of the project site.

# 3.5 Odour and Air Quality

#### 3.5.1 Introduction

This section addresses issues relating to air quality and the project works. Odour is not considered a key issue for this proposal as there are no works relating to effluent. This section addresses other relevant matters relating to air quality with emphasis on dust and minor vehicle emissions.

The project site is situated in a rural village where the existing air quality is regarded as good. While no air monitoring was conducted for this SEE, it is likely that the existing main contributors to atmospheric pollution in the area would be minor vehicle exhaust emission and dust, predominantly from traffic travelling along unsealed farm tracks and from typical agricultural practices on adjoining cleared land.

#### 3.5.2 Existing Environment

The prevailing wind directions around the development site are from the south and south west. Published information on existing air quality within the locality is limited, with no known monitoring sites in the vicinity. However, as the development site is situated within a rural area with no major sources of air pollution, the local air quality is likely to be good and concentrations of pollutants are unlikely to exceed air quality criteria.

#### 3.5.3 Methodology

Dust generation or particulate matter is the main air quality issue relevant to the project particularly the construction activities. Particulate matter refers to a category of airborne particulates, typically less than 30 microns ( $\mu$ m) in diameter and ranging down to 0.1 $\mu$ m. This type of dust is termed Total Suspended Particulates (TSP).

Emissions of particulate matter less than  $10\mu m$  (termed as  $PM_{10}$  and  $PM_{2.5}$  in the following subsections) are considered to be an important influence on human health as it has the ability to penetrate the respiratory system and can cause cardiovascular and respiratory diseases, pulmonary and heart diseases as well as reduced lung capacity.

Particles that are too large to remain in suspension in the air are referred to as 'deposited dust' and are typically greater than 35µm in diameter. Even these particles lack the ability to cause significant harm to human health, they can contribute to reductions in amenity and therefore are considered as part of this section.

Pollutant	<b>Averaging Period</b>	Maximum Concentration	Source
Particles as PM <sub>10</sub>	1 day	50 μg/m³	NEPM
Particles as PM <sub>2.5</sub>	1 day	50 μg/m³	NEPM
Deposited Dust	Annual	Max 4 g/m <sup>2</sup>	NSW DECCW
Deposited Dust	Annual	Max increase of 2 g/m <sup>2</sup>	NSW DECCW

Table 6 – NSW Dust Criteria for Ambient and Deposited Dust Levels

#### 3.5.4 Assessment

# 3.5.4.1 Potential Sources of Air Contaminants

#### **Construction Sources**

A wide range of construction activities can generate dust, and these are usually visible and readily identifiable. The potentially significant sources of airborne particulates from the sites have been assessed as being limited to:

- Dust lift off from exposed earthen areas, open areas or rehabilitated surfaces,
- Dust lift off from stockpiles (topsoil), and
- Dust lift off from haul roads and tracks resulting from light vehicle and earthmoving traffic.

The majority of any airborne particulates from the sites are likely to be visible dust. Proposed activities that would generate particulate matter include the following:

- Construction activities (scrapers, graders, excavators),
- Vehicle movements on unsealed roads,
- Rehabilitation activities, and
- Wind erosion from:
  - o Exposed earthworks,
  - o Exposed rehabilitation areas, and
  - o Stockpile site.

# 3.5.4.2 Potential Construction Impacts

#### Impact on Amenity

In dry, windy conditions particulates can be lifted from open or disturbed areas resulting in visible dust emissions. Most airborne particulates that originate from these sources are larger than  $PM_{10}$  and are associated with nuisance rather than public health problems. The larger particles tend to settle back to the ground within a short range (<300m) from the source. Dust emissions of this type can cause reduced amenity of an area and reduced visibility for road traffic, potentially creating unsafe driving conditions.

# Impact on Vegetation

Dust may have physical effects on plants such as: blockage and damage to stomata, shading, abrasion of leaf surface or cuticle, and cumulative effects, e.g. drought stress on already stressed species (*NSW Minerals Council 2000*). There are no dust deposition guidelines relating to health or condition rating of plant species. The effect of soil erosion can render an area incapable of promoting vegetation growth, which affects rehabilitation programs.

# Vehicle Emissions

The operation of construction plant and equipment will result in additional exhaust emissions in the area. The number of vehicles, plant and equipment to be used as part of the construction phase is considered to be low and would not substantially increase emissions. Mitigation measures described below will be implemented to minimise these impacts.

# Sensitive Receivers in the vicinity of the Project

The project site is adjoining the rural township of Darlington Point with the nearest residence being approximately 30ms from the project site also being located with a buffer of the existing levee bank between the project work area and the residence. The majority of the prevailing winds in the area are from the south and south west travelling In a north east direction from the project site and away from the adjoining residences.

# 3.5.4.3 Potential Operation Impacts

#### Dust

As the proposed access tracks adjoining residences are to be paved, it is not anticipated that dust is likely to be generated through mobilization of soil from the access road and carpark during summer periods.

# 3.5.5 Mitigation and Monitoring Measures

Mitigation and monitoring measures relating to the project construction and operation will be implemented to minimise potential dust and air quality impacts. These are shown in the table below.

Potential Impact	Timing	Safeguard
		Inductions for all employees will include information on:
		<ul> <li>Location of project receivers,</li> </ul>
General air quality	Pre-	<ul> <li>Potential sources of dust;</li> </ul>
impacts	construction	<ul> <li>Monitoring of dust during construction activities,</li> </ul>
		<ul> <li>Mitigation measures for managing dust, and</li> </ul>
		<ul> <li>Speed limits onsite and staying on designated roads</li> </ul>

#### Table 7 – Air quality mitigation and monitoring measures

Potential Impact	Timing	Safeguard
		Monitor wind and weather forecasts (Bureau of Meteorology)
		and cease non-essential construction operations (i.e. topsoil
		stripping) during excessively windy conditions. <sup>(1)</sup>
		Minimise open areas exposed to wind erosion as much as
		practical and carrying out stabilisation works.
		Operate at least one dedicated water cart during dry, windy
		conditions and during the summer months, across the site to
		apply water to unsealed operational areas (i.e. roads and
		loading areas) where required.
		All unsealed roads being used for heavy vehicle traffic within
		the Project area will be treated with dust suppressant
		additives where appropriate.
Dust emissions	Construction	Apply clay fines <sup>(2)</sup> or oversize material to all non-active
		stockpiles prone to wind erosion, within four weeks of
		disturbance (depositing or moving) during the summer
		months.
		Conduct topsoil stripping only during suitable wind and
		weather conditions, so as to minimise the generation dust.
		Topsoil stripping will be conducted in areas proposed for
		construction no more than two months before construction
		commences, wherever practical.
		After re-establishment of the soil profile (post construction),
		vegetative cover will be established within 8 months, as part
		of the progressive rehabilitation program.
		Adhere to site speed limits and designated roads.
		Construction plant and equipment must be maintained in
Exhaust emissions	Construction	good working, serviced order.
	Construction	All plant and equipment must be of adequate size to
		undertake work proposed.
luonant an adiainin-		Wind direction and speed to be monitored during dusty
Impact on adjoining sensitive receivers.	Construction	operations. All works to stop if adjoining houses are impacted
		by dust emissions.

(1) Shut down periods during excessively windy conditions will be determined following a risk assessment of impact to various sensitive receivers, including motorists on adjacent public roads and employees.

(2) Clay fines are effective dust suppressants, in place of chemically manufactured additives.

# 3.5.6 Conclusion

Odour emissions generated from the project are not expected to impact air quality because of the type of project. Other issues relating to air quality such as dust and minor vehicle emissions are also not expected to create significant air quality impacts to the local area, however contractors employed to undertake works will be aware of dust mitigation measures prior to works commencing. Further to justifying that dust will not be an issue is that to achieve correct compaction during construction the soils used for construction must be moist to ensure adequate compaction.

# 3.6 Noise and Vibration

#### 3.6.1 Introduction

While noise generated by construction and operational activities has the potential to impact upon surrounding residences, noise has been demonstrated not to be an issue for well-managed construction projects. This project is located adjoining the rural township of Darlington Point and care is required to manage noise during the construction phase of the project.

#### 3.6.2 Existing Environment

The project site is located on the east side of the rural township of Darlington Point, the south side of the Murrumbidgee River (opposite the caravan park) and on the west side on an area of remnant vegetation and farming land. It could be conservatively assumed that background levels may be LA90 45dB during all time periods, which is typical of a rural urban environment with vehicle traffic on the road network. It is reasonable to say that the existing noise levels in the area are directly related to the current land use activities and infrastructure.

#### 3.6.3 Methodology

No site-specific noise assessment has been undertaken relating to this project. The site is located between a rural farming area, an area of vegetation and adjoining the rural township of Darlington Point. The background sound levels in rural area are typically low and often variable. Similar areas that have undergone site specific noise testing have been used as a guide and generally have ambient levels ranging between 25-45dB. The background noise level established under the *NSW Industrial Noise Policy* is 45dB. The project specific noise level that will be used for this project assessment will be 45dB + 5dB equating to a total of 50dB. This level will be used to assess the impact of the project on the nearest receivers.

The noise assessment procedure for industrial noise must consider two separate components, the intrusiveness and the amenity criteria. The project intrusiveness noise level aims to protect against significant changes in noise levels, whilst the project amenity noise level seeks to protect against cumulative noise impacts from industry and maintain amenity for particular land uses. The lower of the two criteria is applied as the noise levels specific to the project.

The *NSW Industrial Noise Policy, 2000* provides acceptable ambient noise levels that can be received by rural receivers. These are:

Period	Intrusiveness Criteria	Amenity Criteria
Day (7am-6pm)	40 dB LAeq, 15 minute	50 dB LAeq, Daye
Evening (6pm-10pm)	35 dB LAeq, 15 minute	45 dB LAeq, Evening
Night (10pm-7am)	35 dB LAeg, 15 minute	40 dB LAeq, Night

Table 8 - Amenity Criteria - Recommended LAeq Noise Levels from Industrial Noise Sources

Typical construction equipment noise levels, presented in **Table 9** below and have been obtained from:

- AS2436-2010, Guide to noise and vibration control on construction, demolition and maintenance sites
- BS 5228-1, Code of practice for noise and vibration control on construction and open sites. Noise.

Item of Plant	A-weighted sound power	A-weighted sound	
	Typical Range	Typical (midpoint)	pressure levels L <sub>pa</sub> (mid-
			point) dB at 10m
Compactor	110-115	113	85
Mobile Crane	95-113	104	76
Excavator	97-117	107	79
Grader	105-115	110	82
Scraper	116	116	88
Truck (>20 T)	107	107	79
Truck – Water cart style	106-108	107	79
Vehicle – 4WD style	100-111	106	78

Table 9 - Typical noise levels of Construction Plant and Equipment

Construction noise impacts associated with the project were estimated using the distance attenuation Equation as follows:

dL =Lp2 – Lp1 = 10 log (R2 / R1)<sup>2</sup> = 20 log (r2 / R1)

Where:

dL = difference in sound pressure level (dB) Lp1 = sound pressure level at location 1 (dB) Lp2 = sound pressure level at location 2 (dB) R1 = distance from the source to location 1 (m) R2 - distance from the source to location 2 (m)

# 3.6.4 Assessment

# 3.6.4.1 Construction

During any given period, items of plant operating within the project site would operate at maximum power (loudest sound emitting) for only brief periods of time. It is highly unlikely that any plant utilized at the project site during construction activities would be operating at their maximum sound power levels at any one time. Several items of plant identified above would not be on location at the same time due to the type of activities that they perform. EG: the crane and likely excavator would not be operating at the same time as a scraper.

Utilizing the distance attenuation equation provided above, the closest receptor to the project site would see the noise reduction in the order of 78dBSPL – above to the Intrusiveness criteria for any period.

# 3.6.4.2 Operation

The ongoing use of the project will see vehicle to the car parking areas and the boat ramp. This will only occur during day and evening periods. Using the above formula for a 4WD style vehicle would have a level of 68dBSPL which is also above the intrusiveness criteria for any period. As the vehicles will be infrequent in nature and passing the residential areas on the other side of the levee bank, this is not envisaged to create an impact.

# 3.6.5 Mitigation Measures

Mitigation and monitoring measures relating to the Project construction and operation will be implemented to minimise potential noise impacts. These are shown in the table below.

Potential Impact	Timing	Safeguard
		Ensure construction activities are scheduled to ensure adjoining residences are lease effected.
	Construction	Ensure that all machinery is regularly serviced and has appropriate noise abatement devices. All equipment selected for use on site will be regularly monitored to minimise noise emissions with any excessively noisy equipment stood down until issue rectified.
General Noise	Construction	Machines where practical will not operate at full power and will be switched off when left for long periods of time.
	Construction	Construction will only be undertaken during the acceptable time frames.
	Operation	All traffic is to utilise the formed entrances to the site.
	Construction	All construction traffic is to utilise the existing well-formed
	Construction	is permitted as part of the Project works.

Table 10 – Noise mitigation and monitoring measures

#### 3.6.6 Conclusion

Noise generated from the project would occur during construction and operational activities. The construction activities are only proposed during the day period and would be temporary in nature and predicted noise levels from these activities will be managed through the use of mitigation measures.

Ongoing use of the project also involve noise generating activities of standard traffic access which would also be temporary in nature and noise generated from the proposed project use is not expected to create a significant impact on the surrounding environment.

# 3.7 Heritage

#### 3.7.1 Non-Indigenous Heritage

Searches undertaken on the Australian Heritage Database. NSW State Heritage Inventory and the *Murrumbidgee Local Environmental Plan 2013* show that there is one Archaeological Site that is identified in the Environmental Heritage register. This site is identified as the Warrangesda Aboriginal Mission and Station and is adjoining the Project site on the east side. No works are proposed in this area.

#### 3.7.2 Indigenous Heritage

Attached to this report in **Appendix 6** is a Cultural Heritage Due Diligence Assessment. This assessment and associated Aboriginal Heritage Management System (AHIMS) search has shown the following:

No Aboriginal objects or places have been identified through a desktop assessment of the project area. Within the broader area there are 16 valid registered sites all of which are modified trees. This project does involve the removal of some trees however none of these have been identified as modified through a desktop or site inspection.

A site inspection undertaken by Griffith Local Aboriginal Land Council representative Mr Robert Carroll within the project works area was undertaken and identified that "no cultural material was observed during the survey nor expected to be found within the area to be impacted by the development. The immediate area surrounding the proposed boat ramp and roadway have been impacted by clearing and previous flood protection works. This has left the proposed development area surrounded by disturbed landscapes".

#### Based on the above, the project works should proceed with caution.

The following mitigation measures should however be employed:

Whilst this report has not identified any Aboriginal object within the project area, the construction works must still **proceed with caution**. Should any Aboriginal object be discovered and/or harmed in, or under the project area whilst undertaken the proposed project activities, the applicant/contractor/delegate must:

- Not further harm the object,
- Immediately cease all work at that particular location,
- Secure the area so that as to avoid further harm to the Aboriginal object,
- Notify OEH as soon as practical on 131 555, providing any details on the Aboriginal object and its location;
- Contact Griffith Local Aboriginal Land Council immediately to discuss and negotiate a plan of action, and
- Not recommence any work at that particular location unless authorised in writing by OEH.

# In the event that skeletal remains are unexpectedly encountered during the activity, work must stop immediately, the area secured to prevent unauthorised access and NSW Police and OEH contacted.

# 3.8 Traffic and Access

#### 3.8.1 Existing Environment

As shown below in **Figure 12**, the existing road network of Pool and Cemetery Road are proposed to be utilised to access the proposed access road to the boat ramp and carpark providing legal and practical access to the site. There are no additional access points required or changes to any existing road networks.



Figure 12 - Overview plan showing roads

#### 3.8.1 Assessment

The proposed project works are currently advertised for tender. Due to the variability in construction methodology and timing of contractor availability and works, it is not known at this stage the timeframe and proposed machinery to be utilised for construction. As a result projected traffic volumes for the construction period are unable to be calculated.

#### **Operation**

The project plans attached in Appendix 2 show the proposed vehicle on-site parking, maneuvering and enty and access points. This design has been undertaken in conjunction and with approval from the Murrumbidgee Shire Council.

#### 3.8.2 Mitigation Measures

Mitigation and monitoring measures relating to the project construction will be implemented to minimise potential impacts traffic. These are shown in the table below.

Potential Impact	Timing	Safeguard
		Successful tenderer is to provide to council the expected
Impacts to road traffic		traffic volumes during the life of the project.
nipacis to road trainc	Construction	All construction traffic is to utilise the existing well-formed
Helwork		entrances to the properties. No additional unauthorised access
		is permitted as part of the project works.

#### Table 11 – Traffic mitigation measures

#### 3.8.3 Conclusion

At the time of completing this assessment, traffic construction activities have been unable to be predicted. It is recommended that the successful tenderer provide this detail to the council prior to commencing works. The design of the project includes Murrumbidgee Shire Council approved vehicle access, parking and maneuvering considerations. No additional access points are proposed as part of these project works. Facility users will use the existing access via Pool and Cemetery Roads.

# 3.9 Visual

#### 3.9.1 Existing Environment and Methodology

It is noted at the outset that the value placed upon visual amenity and the impacts upon surrounding visual amenity varies from person to person and from location to location. As a result, a visual amenity assessment is, by its nature, highly subjective. Emphasis has therefore been placed on providing a description of the existing visual amenity surrounding the project site and the measures that would be taken by the Applicant to minimise potential visual amenity-related impacts on surrounding residents and others.

#### 3.9.2 Assessment

The proposed project will be visible from the township of Darlington point however is not inconsistent with other surrounding recreational areas. There will be no issues relating to:

- Privacy between adjoining properties,
- Overshadowing of adjoining properties,
- Acoustic issues as a result of the placement of active use outdoor areas, vehicular movement, air conditioners, pumps or other habitation activities, or
- Views enjoyed from nearby properties.

The completed project works will be visible from the Murrumbidgee River – a public recreation area and the surrounding recreation areas, however these works are consistent with other infrastructure within townships along rivers. Colors utilized for the project works will be a natural colour selected to blend into the natural environment. The area is located on the outside of the existing levee bank which will assist with the prevention of acoustic issues created by users of the facility.

#### 3.9.3 Mitigation Measures

The visual impact will be minimized by the selection of neutral colors in utilised for the pontoon, walkway and stairs.

Potential Impact	Timing	Safeguard
Disturbance of visual amenity	Construction	All works are to be confined within the Project construction footprint. All waste, vehicles, plant and equipment is to be stored in identified laydown areas and will be removed from the site at Project completion.
	Operation	Ensure that surrounds are revegetated to blend into the natural environment

#### Table 12 – Visual impact mitigation measures

#### 3.9.4 Conclusion

The gain by the public and residents in the form of tourism and additional recreational areas are likely to outweigh any loss of aesthetic views that the completed project will create. The existing levee bank will assist with the management of any acoustic issues created by users of the facility and the surrounding areas of the completed project will be consistent with other recreational areas within the township.
#### 4 Erosion & Sediment Controls

This sections objective is to ensure that any sediments that may be created from site works and activities and its subsequent use do not affect the River and its environment. Works relating to the management of erosion and sediment control should be undertaken in conjunction with the vegetation rehabilitation works identified below. This section is provided as a guide to assist with the assessment and preparation of any final erosion and sediment control measures for the life of the project.

#### 4.1 Works Standards

The following actions should be considered:

- Works must be timed to minimise the potential for exposure for flood events and must not commence before approval to do so has been granted,
- A site log book should be maintained recording site activities and events relating to rainfall spilliges etc and must be available for inspection by control authorities,
- A floating silt/sediment curtain and spillage boom must be placed in the river at the work area. Additionally, fabric silt curtains, socks or coir logs should be sited so that any area where works related activity will occur will be isolated from the river.
- As far as possible, works should be limited to the areas being excavated and store or equipment areas should be sited away from the area on high flat ground. These and other trafficked areas should be contained within silt control barriers. Vegetation planting areas are to be barrier protected and are not to be accessed unless for essential site access which must be barrier protected from the other area.
- Stormwater leaving any part of the site must be close to the pH of the receiving waterway, contain no visible oil, heavy metals or other toxicants and should not exceed a sediment concentration of up to that in the receiving water body (river), other than during a major storm event. Restriction of the area exposed at any one time is the most important control measure to protect waterways during major events.
- A coffer wall of supported sheet piling will be installed at the mouth of the pondage just short of the original river bank as a contingency measure to contain sediment within the basin during excavation and bank stabilisation works.
- When all installation and revegetation works have been finalised, inspected and approved by the required authority, the coffer structure can be removed. The floating silt curtain or boom remaining in place. Once the turbidity of the water over the project construction area diminishes to the same as the river, the silt curtain can be removed.
- No invasive ripping or cultivation should occur adjacent to the river bank and any ripping to restore compacted areas should ensure that sediments are trapped and contained within sediment controls.
- Essential site access should be contained where excavation and construction is to occur.
- All reasonable and practical measures must be adopted to control erosion and sediment generation on land not served by a sediment basin.
- All excavation material is to be immediately removed from the project area adjoining the river.
- No vegetation is to be removed or soil disturbed except where expressly indicated in the approved plan.
- There must be no site disturbance, including vegetation removal until the following measures have been implemented:
  - o Areas to be disturbed are physically marked out,
  - o Barriers are in place around any areas that require protections,
  - Remnant vegetation on site is to be preserved except where removal is essential for approved construction or operation of the project.
- Exposed soil areas such as batters and embankments which are completed or are not being actively worked on must be protected from vehicular access.
- There must at all times be a nominated person responsible for day to day supervision of erosion and sediment control measures, and this persons contact details be visible and securely maintained on the site.
- All erosion and sediment control measures must be properly and effectively maintained and operated and must be in good working order and fully effective condition at the completion of each days work. These

**Rich River Irrigation Developments** Statement of Environmental Effects October 2018 measures must also be maintained until the site has been permanently stabilised and further disturbance of the soil by any erosion prevented.

- The floating silt curtain can only be removed after written consent is received from the responsible authority.
- A monitoring plan should be implemented as identified in **Section** Error! Reference source not found..
- Appropriate Erosion and Sediment Control measures that could be used are described below and shown in **Appendix 5**.

#### **Clean Water Diversion Drains and Banks**

Diversion drains are to be designed in accordance with Landcom (2004) to cater for a 1 in 10 year Average Recurrence Interval (ARI) storm event. The side batters are to have a maximum grade of 1V: 2H (vertical: horizontal) with typical dimensions as shown below. The drains are to be located and designed with base widths so as to minimise peak velocities. Where peak design velocities exceed 1 m/s in clean water catchments and along the roadsides of permanent roads rock bars will be placed along the invert of the drain every 100 metres to reduce the peak velocities. If required, additional planting of grass, small shrubs and riparian species to achieve the required bank stability.

#### **Catch Drains**

Catch drains are to be used to collect water for treatment in sedimentation dams. All catch drains are to be designed in accordance with Landcom (2004) criteria to cater for a 1 in 20 year ARI storm event and will provide a minimum of 0.5 metre freeboard. The typical specifications of the catch drains to be implemented are shown below. The side batters are to have a maximum grade of 1V: 2H (vertical: horizontal). The drains will be grassed where practical and will be located and designed with base widths so as to minimise peak velocities. Where peak design velocities exceed 1 m/s in clean water catchments and along the roadsides of permanent roads the drains are to be lined with geofabric and rock bars placed along the inverts of the drains every 100 metres to reduce the peak velocities and minimise erosion potential.

#### Silt Fences

Silt fences are to be designed in accordance with Landcom (2004) with typical dimensions shown in Appendix 3. Where necessary, silt fences are to be constructed immediately down slope of the areas to be disturbed to minimise the potential for sediment transport into receiving catchments and waterways. They are to be constructed along site contours if practicable and the catchment is to have a maximum grade of 1V: 2H (vertical: horizontal). Fences are to be constructed using geotextile filter fabric with structural post to be spaced no more than 1.5 metres apart. Where practicable, the catchment areas of silt fences are to be limited by constructing the fences with small returns at 20 metre intervals to create smaller contributing sub catchments. This is necessary as silt fences are prone to failure in larger storm events and should be designed to ensure a maximum of 50 L/s passes through the silt fence during a storm event.

#### **5 REHABILITATION**

There are 2 separate areas that works will be occurring on. The main area is within the Vegetated Riparian Zone being the access and car park which will be finished with pavement. The other areas where works are proposed is within the channel bed. Revegetation works will only occur in the areas where it is appropriate for stabilisation and will not be an ongoing access area. The area requiring rehabilitation works will be prepared as follows:

#### 5.1.1 Vegetated Riparian Zone

The project works are located within the floodplain zone. Existing eucalypts will be utilised to provide the high foliage canopy and no additional plantings of high canopy trees will occur. This is to minimise the opportunity for limb drop hazards over the area to be utilised for the public. Where revegetation works are proposed to occur the following species can be utilised:

#### 5.1.1.1 Trees to be planted as seedlings

Acacia salacina	Cooba or Native Willow
A. Dealbata	Silver Wattle

**Rich River Irrigation Developments** Statement of Environmental Effects October 2018

Mallee Wattle
Golden Wattle
Miljee
Butterbush
Ruby Saltbush
Mallee bush pea

#### 5.1.2 Channel Bed

This area is proposed to be a public use area and there is currently few native reeds or sedges there now due to previous disturbance. This area will be protected by means of geotextile fabric and rip rap. In areas where there will be limited future public access, Giant Rush (*Juncus ingens*) could be established directly into the soil at the edge of the bed where the erosion control rip rap is proposed. This combined with rip-rap will also prevent any chance of future erosion on the banks occurring.

#### **6 MONITORING**

#### 6.1 Erosion Controls

The strategies outlined for the control of erosion and sedimentation will be inspected regularly. Monitoring and inspections of the site will include where required:

- Monthly monitoring of water quality in sedimentation dams if the dams have the potential to discharge dirty water off site, including pH, EC and TSS in accordance with the Surface Water Monitoring Program,
- Regular inspections of water levels, silt build-up and scouring or erosion, and
- Revegetation progress of disturbed areas.

If the type and/or location of erosion and sediment control strategies are identified during inspections as being ineffective, the control structures will be modified or added to. Additional inspections will be carried out after high rainfall events to ensure the effectiveness of the controls.

De-silting of the structures will be carried out before the efficiency of the structure is impeded. This will be determined through visual assessment.

#### 6.2 Vegetation

The ongoing management of the revegetation works relating to this project is of the upmost importance. A survival rate of greater than 80% is the aim of this rehabilitation project. This will be achieved through regular monitoring of the health of the vegetation.

All vegetation will be established after good pest and weed control has been undertaken and adequate soil moisture has been achieved.

Regular monitoring of the site will be undertaken over the following 2 years from establishment to identify;

- Adequate soil moisture for survival of grasses,
- Pests and weeds are not interfering with the survival of the vegetation, and
- The weed mats are still intact.

If there is deemed to be a problem with any of the monitoring measures above the problem will be rectified as soon as practically possible. These measures include; watering, pest and weeds removed or prevented access to the vegetation through guarding or temporary fencing.

Should an event occur where the vegetation is damaged beyond the point of survival the control measures will be re-evaluated and rectified and the same species will be re-established to an 80% survival rate.

#### 7 REVIEW AND REVISION

This vegetation management will be reviewed and revised:

- On an annual yearly basis,
- If there are major changes to the project or its operations,
- In response to issues raised by any authorities, and
- In response to any incident which results in a failure to meet any of the commitments of this Plan.

#### 8 Conclusion

#### 8.1 Summary of Findings

The range of environmental factors that may be affected by the proposed works are summarised below.

#### **Biodiversity**

This appended report provides an assessment of the proposed project site to a 10km radius and the written inclusion of the EPBC Protected Matters Report. The report also considers threatened species likely to occur within the sub-region and has shown that there have been species to be considered within the broader area as part of this test.

A review of each of these species, populations and community's identified, has considered their requirements with relation to environment, habitat and food source and the results show that the impact of this project would be limited.

There are 8 juvenile River Red-gum trees that are proposed to be removed as part of the project construction activities however they are small in growth and do not contain hollows. The removal of these trees and general construction activities have not identified impacts to threatened species, populations of communities.

The above assessment has been conducted under the provisions of Section 5A of the EP&A Act.

#### Water

The assessment and associated mitigation measures have been provided to ensure that the development is unlikely to have an effect on the water quality and flows within the Murrumbidgee River, the stability of the bed and banks is maintained and will not increase water extraction from the watercourse.

This flood investigation examined the design events for the Murrumbidgee River is association with Darlington Point and the proposed boat ramp. The main purpose of this investigation was to understand the flood risk to the structure and any potential impacts on the flood behavior due to the proposed works. The investigation showed that the area where the proposed boat ramp is to be located is significantly inundated in the design events as it is located outside the Darlington Point levee. Depth for these events are over 5 m in depth. However, as a result of the large depths during flood events there is little impact to the flood behavior through the area modified as part of the boat ramp design. The floating pontoons and walkway will be removed during times of high river levels and will not significantly affect the flood behavior.

Groundwater is also unlikely to be affected or contaminated as the local water table level is approximately 10m below the surface in the vicinity of the project site.

#### **Odour and Air Quality**

Odour emissions generated from the project are not expected to impact air quality because of the type of project. Other issues relating to air quality such as dust and minor vehicle emissions are also not expected to create significant air quality impacts to the local area, however contractors employed to undertake works will be aware of dust mitigation measures prior to works commencing. Further to justifying that dust will not be an issue is that to achieve correct compaction during construction the soils used for construction must be moist to ensure adequate compaction.

**Rich River Irrigation Developments** Statement of Environmental Effects October 2018

#### Noise and Vibration

Noise generated from the project would occur during construction and operational activities. The construction activities are only proposed during the day period and would be temporary in nature and predicted noise levels from these activities will be managed through the use of mitigation measures.

Ongoing use of the project also involve noise generating activities of standard traffic access which would also be temporary in nature and noise generated from the proposed project use is not expected to create a significant impact on the surrounding environment.

#### Heritage

No Aboriginal objects or places have been identified through a desktop assessment of the project area. Within the broader area there are 16 valid registered sites all of which are modified trees. This project does involve the removal of some trees however none of these have been identified as modified through a desktop or site inspection.

A site inspection undertaken by Griffith Local Aboriginal Land Council representative Mr Robert Carroll within the project works area was undertaken and identified that "no cultural material was observed during the survey nor expected to be found within the area to be impacted by the development. The immediate area surrounding the proposed boat ramp and roadway have been impacted by clearing and previous flood protection works. This has left the proposed development area surrounded by disturbed landscapes".

Based on the above, the project works should proceed with caution.

#### Traffic and Access

At the time of completing this assessment, traffic construction activities have been unable to be predicted. It is recommended that the successful tenderer provide this detail to the council prior to commencing works. The design of the project includes Murrumbidgee Shire Council approved vehicle access, parking and maneuvering considerations. No additional access points are proposed as part of these project works. Facility users will use the existing access via Pool and Cemetery Roads.

#### **Erosion and Sediment Control**

Erosion and sediment controls are proposed for the construction and initial operation phase of the project relating to the areas of disturbance. A monitoring and review program will be implemented as part of these works to ensure their effectiveness and that the project and its surrounds will be protected from erosion occurring.

#### Rehabilitation

Areas within the project footprint and adjoining the completed car parking and access roads should be considered where appropriate for vegetation rehabilitation works. A species list appropriate to this environment has been provided to ensure that the area disturbed as part of the project works remain consistent with the surrounding environment.

#### 8.2 Conclusion

This SEE has therefore found that:

- The proposed works are not likely to significantly affect, threatened species, populations, or ecological communities,
- The proposed works and ongoing operation of the project are not anticipated to effect surface water, flooding or groundwater networks within the site or the region,
- Appropriate mitigation measures can be implemented to manage any potential short term environmental effects, and
- The proposed works will not have any significant impacts on the natural or human environment.

This project also fulfills the recommendations of the *Darlington Point Structure Plan*, 2017. Issues raised in this report include:

- Opportunity to create a new boat ramp on the western side of the Murrumbidgee River to provide better connections with the town. This would also support a growing demand for water recreation activities such as boating and fishing, including the annual Darlington Point fishing competition;
- There is a need to better link the town to the river. At present, the town backs onto this waterway and the construction of the flood levee bank has further isolated this natural feature. This is a similar situation for the swimming pool which is also isolated;
- Opportunity to better link and extend a number of existing footpaths and recreational trails and areas throughout the urban area and along the Murrumbidgee River;
- Need to better promote water based recreation activities such as boating, fishing and swimming.

This proposal fulfils the following recommended actions.

- Action 4.3.3 Investigate the creation of a new boat ramp and associated car parking area on the western bank of the Murrumbidgee River following the completion of more detailed designs and approvals from relevant public authorities.
- Action 4.3.5 Investigate opportunities to extend and connect a number of existing footpaths and trails, particularly from the residential areas of town to the River. These could adjoin the swimming pool, the new boat ramp and Fig Tree Park.
- Action 4.3.6 Investigate opportunities to extend the 'Goanna Walking Track' in consultation with Aboriginal elders and adjoining landowners. Opportunities to align the path with the existing/future levee bank should be encouraged and supported by:
  - Environmental restoration/regeneration works;
  - o Construction of benches, tables and seating; and
  - o Installation of public art, information, interpretative and directional signage.

#### 9 Appendices

9.1 Appendix 1 – NSW Property Planning Report

See Over Page

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# Property Report for Punt Road, Darlington Point, 2706

## **Property Details**



## **Council Details**

## MURRUMBIDGEE COUNCIL

Website	http://www.murrumbidgee.nsw.gov.au/
Phone Number	03 5886 1200
Email Address	jerilderie@murrumbidgee.nsw.gov.au
Council Address	35 Jerilderie Street
	Jerilderie 2716

## Planning Controls associated with this property

#### Land Zoning

- E3 - Environmental Management : (pub. 2013-08-23)

#### Bushfire Prone Land

- Vegetation Category 2
- Vegetation Buffer

#### Contribution Plans (LGA-Based)

- Murrumbidgee CP 2006 - Darlington Point and Coleambally Peripheral Area

Development Control Plans (LGA-Based)

- Jerilderie DCP 2012
- Murrumbidgee DCP 1995 Village

#### Groundwater Vulnerability

- Groundwater Vulnerable (pub. 2013-08-23)

#### Land Application LEP

- Included : Murrumbidgee Local Environmental Plan 2013 (pub. 2013-08-23)

#### ${\rm Minimum} \ {\rm Lot} \ {\rm Size}$

- M - 600.00 m<sup>2</sup> : Range [ 600 - 624 sqm ] (pub. 2013-08-23)

Riparian Lands and Watercourses

- Watercourse (pub. 2013-08-23)

#### Terrestrial Biodiversity

- Biodiversity (pub. 2013-08-23)

#### Wetlands

- Wetland (pub. 2013-08-23)
  - . ... . . . .

#### MURRUMBIDGEE COUNCIL

Website	http://www.murrumbidgee.nsw.gov.au/
Phone Number	02 6960 5500
Email Address	mail@murrumbidgee.nsw.gov.au
Council Address	21 Carrington Street
	Darlington Point 2706

## Other spatial data associated with this property

Local Government Area

- Murrumbidgee

Suburbs

- Darlington Point



## State Environmental Planning Policies which apply at Punt Road, Darlington Point, 2706

State Environmental Planning Policy (Affordable Rental Housing) 2009 : (pub. 2009-07-31) State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004 : (pub. 2004-06-25) State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 : (pub. 2008-12-12) State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 : (pub. 2004-03-31) State Environmental Planning Policy (Infrastructure) 2007 : (pub. 2007-12-21) State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007: (pub. 2007-02-16) State Environmental Planning Policy (Miscellaneous Consent Provisions) 2007 : (pub. 2007-09-28) State Environmental Planning Policy No 1-Development Standards : (pub. 1980-10-17) State Environmental Planning Policy No 21-Caravan Parks : (pub. 1992-04-24) State Environmental Planning Policy No 30-Intensive Agriculture : (pub. 1989-12-08) State Environmental Planning Policy No 33-Hazardous and Offensive Development : (pub. 1992-03-13) State Environmental Planning Policy No 36-Manufactured Home Estates : (pub. 1993-07-16) State Environmental Planning Policy No 50-Canal Estate Development : (pub. 1997-11-10) State Environmental Planning Policy No 55-Remediation of Land : (pub. 1998-08-28) State Environmental Planning Policy No 62-Sustainable Aquaculture : (pub. 2000-08-25) State Environmental Planning Policy No 64-Advertising and Signage : (pub. 2001-03-16) State Environmental Planning Policy No 65-Design Quality of Residential Apartment Development : (pub. 2002-07-26) State Environmental Planning Policy (Rural Lands) 2008 : (pub. 2008-05-09) State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 : Subject Land (pub. 2017-08-25)



Land Zoning

Zone E3 Environmental Management

1 Objectives of zone

- To protect, manage and restore areas with special ecological, scientific, cultural or aesthetic values.
- To provide for a limited range of development that does not have an adverse effect on those values.
- To ensure development is compatible with the flood hazard and riparian corridor of the Murrumbidgee River.
- 2 Permitted without consent
- Extensive agriculture; Home occupations; Water reticulation systems
- 3 Permitted with consent

Aquaculture; Bed and breakfast accommodation; Boat launching ramps; Boat sheds; Building identification signs; Business identification signs; Camping grounds; Dwelling houses; Ecotourist facilities; Environmental facilities; Environmental protection works; Farm buildings; Farm stay accommodation; Flood mitigation works; Helipads; Home-based child care; Home businesses; Home industries; Jetties; Roads; Water recreation structures; Water recycling facilities; Water supply systems

4 Prohibited

Industries; Multi dwelling housing; Residential flat buildings; Retail premises; Seniors housing; Service stations; Warehouse or distribution centres; Any other development not specified in item 2 or 3



Land Zoning

Zone RU5 Village

1 Objectives of zone

- To provide for a range of land uses, services and facilities that are associated with a rural village.
- To ensure that development in village areas is compatible with the environmental capability of the land.
- To retain and facilitate the expansion and redevelopment of the existing central business districts of Darlington Point and Coleambally and to further strengthen the core
- retail functions of these areas.
- 2 Permitted without consent

Environmental protection works; Home occupations; Roads; Water reticulation systems

3 Permitted with consent

Centre-based child care facilities; Community facilities; Dwelling houses; Neighbourhood shops; Places of public worship; Recreation areas; Recreation facilities (indoor); Recreation

facilities (outdoor); Respite day care centres; Schools; Any other development not specified in item 2 or 4

4 Prohibited

Agriculture; Air transport facilities; Airstrips; Animal boarding or training establishments; Cellar door premises; Electricity generating works; Extractive industries; Farm buildings; Farm stay accommodation; Forestry; Heavy industrial storage establishments; Heavy industries; Mooring pens; Moorings; Open cut mining; Rural industries; Rural workers' dwellings; Waste disposal facilities; Wharf or boating facilities



Land Zoning

Zone W2 Recreational Waterways

1 Objectives of zone

- To protect the ecological, scenic and recreation values of recreational waterways.
- To allow for water-based recreation and related uses.
- To provide for sustainable fishing industries and recreational fishing.

2 Permitted without consent

Nil

3 Permitted with consent

Aquaculture; Boat building and repair facilities; Boat launching ramps; Boat sheds; Building identification signs; Business identification signs; Charter and tourism boating facilities; Emergency services facilities; Environmental facilities; Environmental protection works; Flood mitigation works; Heliports; Information and education facilities; Jetties; Kiosks; Marinas; Mooring pens; Moorings; Recreation areas; Recreation facilities (outdoor); Roads; Take away food and drink premises; Water recreation structures; Water recycling facilities; Water supply systems; Wharf or boating facilities

4 Prohibited

Industries; Multidwelling housing; Residential flat buildings; Seniors housing; Warehouse or distribution centres; Any other development not specified in item 2 or 3



#### Minimum Lot Size

- (1) The objectives of this clause are as follows:
  - (a) to ensure that land use and development is undertaken on appropriately sized parcels of land,
  - (b) to ensure that lot sizes have a practical and efficient layout to meet their intended use,
  - (c) to maintain viable farm sizes to promote continuing agricultural production,
  - (d)
  - to recognise the role that the Coleambally Irrigation Area plays in promoting intensive plant agriculture,
  - (e) to prevent the fragmentation of rural land.
- (2) This clause applies to a subdivision of any land shown on the Lot Size Map that requires development consent and that is carried out after the commencement of this Plan.
- (3) The size of any lot resulting from a subdivision of land to which this clause applies is not to be less than the minimum size shown on the Lot Size Map in relation to that land.
- (4) This clause does not apply in relation to the subdivision of any land:
  - (a)

by the registration of a strata plan or strata plan of subdivision under the Strata Schemes Development Act 2015,

or

- (b) by any kind of subdivision under the Community Land Development Act 1989.
- (4A) Despite subclause (3), land in Zone R5 Large Lot Residential may be subdivided to create lots of not less than 5,000 square metres if each lot will be serviced by a sewage reticulated system and water reticulation system.



This report is provided for general information purposes only and does not replace the need for a section 149 Certificate

#### 9.2 Appendix 2 – Proposal Plans

See Over Page

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#### GENERAL NOTES

- G1. THESE NOTES APPLY TO ALL DRAWINGS IN THE CONTRACT SET. WHERE SPECIFIC NOTES ON OTHER DRAWINGS APPLY THEY SHOULD BE READ IN CONJUNCTION WITH THE GENERAL NOTES. G2. ALL DIMENSIONS ARE IN METRES (m). (UNLESS OTHERWISE STATED)
- G3. ALL LEVELS SHOWN ARE TO AUSTRALIAN HEIGHT DATUM (AHD).
- G4. DO NOT SCALE DIMENSIONS FROM DRAWINGS.
- G5. WORKS TO BE COMPLETED IN ACCORDANCE WITH AS 4000 1997 GENERAL CONDITIONS OF CONTRACT TO THE APPROVED PLAN, TO THE SATISFACTION OF THE SUPERINTENDENT AND TO ALL RELEVANT STANDARD DRAWINGS WHERE APPLICABLE.
- G6. WORKS SUPERVISOR TO BE CONTACTED A MINIMUM OF 5 WORKING DAYS PRIOR TO COMMENCEMENT
- OF ANY WORKS THAT AFFECT ROAD ASSETS.
   G7. A PLANNING PERMIT IS REQUIRED FOR A NEW ACCESS OR ALTERATION TO AN EXISTING DRIVEWAY AND MAY BE REQUIRED FOR THE REMOVAL OF NATIVE VEGETATION.
- G8. A TRAFFIC MANAGEMENT PLAN MUST BE PREPARED AND IS TO COMPLY WITH THE RELEVANT CODE OF PRACTICE FOR WORK SITE SAFETY TRAFFIC MANAGEMENT IN RELATION TO ANY WORKS UNDERTAKEN WITHIN THE ROAD RESERVE.
- C9. THE TYPICAL PAVEMENT DIAGRAM SHOWN ON THIS SHEET IS A GUIDE FOR A TYPICAL LAYOUT OF A ROADWAY ACCESS FOR A RURAL ROAD. G10. PAVEMENT LINE MARKING REQUIREMENTS AS PER SHEET 10 OF 12.
- G11. UNDERGROUND SERVICES:

PRIOR TO ANY EXCAVATION WORKS, CHECK WITH ALL RELEVANT RESPONSIBLE AUTHORITIES (e.g. TELECOMMUNICATIONS, ELECTRICITY, GAS, WATER etc.)

- ABOVEGROUND SERVICES:
- PRIOR TO ANY WORKS AN INSPECTION OF THE CONSTRUCTION FOOTPRINT SHOULD BE UNDERTAKEN TO IDENTIFY ANY ABOVEGROUND SERVICES AND APPROPRIATE PRECAUTIONS TAKEN TO ELIMINATE THE POTENTIAL OH&S RISKS. G12. THE CONTRACTOR IS REQUIRED TO CONFINE ALL CONSTRUCTION VEHICLES TO THE EASEMENTS AND
- ROAD RESERVES. ANY DAMAGE CAUSED TO ADJACENT PROPERTIES MUST BE MADE GOOD.
- G13. ALL FILL AREAS TO BE COMPACTED AS SPECIFIED. ALL STRUCTURAL FILLING MATERIAL IS TO BE APPROVED BY THE SUPERINTENDENT AND THE RELEVANT ROAD AUTHORITY PRIOR TO PLACEMENT. G14. ALL FILL AREAS EXCEEDING 200mm ARE TO BE STRIPPED OF TOPSOIL, FILLED AND TOPSOIL
- REPLACED TO ACHIEVE THE FINAL FINISHED FILL LEVELS SHOWN ON THE DRAWINGS.
- G15. SUBGRADE TO BE SELECT CLAY MATERIAL PLACED IN 150mm LAYERS. (ASSUME CBR OF 10%) G16. RESERVES/EASEMENTS TO BE LEFT IN A CONDITION SATISFACTORY TO THE SUPERINTENDENT AND
- RELEVANT ROAD AUTHORITY G17. ALL PIPE AND SERVICE TRENCHES UNDER ROADS TO BE BACKFILLED WITH CLASS 2 CRUSHED ROCK.
- G18. NO TOPSOIL IS TO BE REMOVED FROM SITE.
- G19. UNLESS OTHERWISE SHOWN, ALL TREE'S AND SHRUB'S ARE TO BE RETAINED. WRITTEN PERMISSION MUST BE OBTAINED FROM THE SUPERINTENDENT WHERE PARTICULAR CONSTRUCTION NECESSITATES THEIR REMOVAL.
- G20, ALL DEWATERING TO BE CARRIED OUT IN ACCORDANCE WITH THE EPA'S GUIDELINE "CONSTRUCTION GUIDELINES FOR CONSTRUCTION SITES" – DECEMBER 1995. G21. ENVIRONMENTAL PROTECTION INCLUDING SILT CONTROL SHALL BE THE RESPONSIBILITY OF THE
- CONTRACTOR
- G22. THE CONTRACTOR WILL BE RESPONSIBLE FOR THE CARE AND MAINTENANCE OF ALL TBM'S. TBM'S FOUND TO BE DISTURBED OR MISSING AT THE COMMENCEMENT OF CONSTRUCTION ARE TO BE RE-ESTABLISHED BY A QUALIFIED SURVEYOR.
- G23. ALL WORKS SHALL BE SETOUT AND PEGGED ACCURATELY PRIOR TO THE COMMENCEMENT OF WORKS BY A SUITABLY QUALIFIED SURVEYOR.

#### CONSTRUCTION SETOUT TABLE

POIN	Т	EASTING		IORTHING	RL (AHD)	DESCRIPTION				
1	4	18343 0	28 61	74124 320	124.02	DESIGN EDGE OF SEAL				
		18346 4	86 61	74127.320	127.02					
	4	9340.4	47 61	74122.744	123.09	DESIGN FORD CENTRELINE				
		00349.9	40 01	74121.100	123.70	DESIGN EDGE OF SEAL				
4	40	0000.9	00 01	74123.203	-	DESIGN EDGE OF SEAL				
5	40	0707.0		74120.902	123.21	DESIGN EDGE OF SEAL				
	40	18383.2	10 00	74167.793	_	DESIGN EDGE OF SEAL				
	4(	18366.4	45 61	/41/5.692	-	DESIGN EDGE OF SEAL				
8	4	08371.1	81 61	74176.764	123.00	ROAD CENTRELINE/GRADE CHANGE				
9	4	08387.1	26 61	74218.564	123.13	DESIGN EDGE OF SEAL				
10	40	08390.4	88 61	74216.787	123.00	DESIGN ROAD CENTRELINE				
11	40	408392.823 6174212.883 12		122.87	DESIGN EDGE OF SEAL					
12	4	08403.5	61 61	74209.866	122.51	DESIGN EDGE OF SEAL				
13	4(	08407.5	53 61	74216.753	122.51	DESIGN EDGE OF SEAL				
14	14 408407.1		86 61	74218.119	-	DESIGN EDGE OF SEAL				
15	40	408397.726		408397.726		408397.726		74221.733	-	DESIGN EDGE OF SEAL
16	4	408408.511		74234.725	-	DESIGN EDGE OF SEAL				
17	17 408398.461		61 61	74238.218	-	DESIGN EDGE OF SEAL				
18	3 408414.066		66 61	74249.754	123.00	CENTRE POINT / RADIUS 10m				
19	40	408404.604 617425		74253.429	-	DESIGN EDGE OF SEAL				
20	4	08419.8	56 61	74241.416	-	DESIGN EDGE OF SEAL				
21	4(	08424.1	64 61	74250.785	122.67	EDGE OF CONCRETE BOAT RAMP				
22	4	08453.6	61 61	74279.274	117.81	EDGE OF CONCRETE BOAT RAMP				
23	4(	08448.1	37 61	74285.032	117.81	EDGE OF CONCRETE BOAT RAMP				
24	4(	08420.0	62 61	74257.944	122.67	EDGE OF CONCRETE BOAT RAMP				
				1		The c				
						the o				

## EARTHWORK NOTES

- E1. RECORDS SHALL BE KEPT OF ALL EARTHWORK CONSTRUCTION AS CONTAINED IN AS3798-2007 CLAUSE 3.4 AND A COPY MADE AVAILABLE TO THE SUPERINTENDENT UPON COMPLETION.
   E2. ALL TOPSOIL SHALL BE SPRAYED WITH A PRE-EMERGENT HERBICIDE PRIOR TO STRIPPING.
- PRIOR TO THE COMMENCEMENT OF WORKS THE SITE SHALL BE STRIPPED AND MATERIAL STOCKPILED
- AT DESIGNATED LOCATIONS CLEAR OF THE WORKS. E4. ANY EXCESS TOPSOIL SHALL REMAIN THE PROPERTY OF THE PRINCIPAL AND IS TO BE STORED AS
- DIRECTED FOR USE IN THE FUTURE. E5. ALL SUBGRADE FILL MATERIAL IS NOT TO CONTAIN ANY VEGETABLE MATTER AND SHOULD CONFORM TO ONE OF THE CLASSES LISTED BELOW.
- \* GW-SC WELL GRADED SAND AND GRAVEL WITH CLAY BINDER
- \* GC CLAYEY GRAVEL SOILS \* SW-SC SAND WITH CLAY BINDER
- \* SC SILTY CLAY
- E6. ALL LOOSE FILL MATERIAL SHALL BE SPREAD BEFORE COMPACTION TO FORM AN EVEN LAYER THICKNESS. WHERE PRACTICABLE THE LAYERS SHALL BE PARALLEL TO THE FINISHED SURFACE OR HORIZONITAL
- E7. FILL MATERIAL IS TO BE PLACED IN 150mm LAYERS COMPACTED TO 95% OF THE MAXIMUM DRY DENSITY AT OPTIMUM MOISTURE CONTENT IN ACCORDANCE WITH AS 1289-E1.1.
- E8. DUST SUPPRESSION IS TO BE ACHIEVED USING AN APPROVED METHOD OR COMBINATION OF METHODS.
   E9. THE MOISTURE CONTENT OF THE FILL MATERIAL IS TO BE MONITORED AT ALL TIMES. WHERE NECESSARY ADDITIONAL WATER WILL BE BROUGHT TO THE SITE AND ADDED TO THE FILL MATERIAL AT A CONTROLLED RATE. THE WATER IS TO BE CLEAN AND CARTED/DISTRIBUTED USING APPROVED
- EQUIPMENT ONLY. E10. ANY SOFT AREAS ENCOUNTERED ARE TO BE INSPECTED BY THE SUPERINTENDENT. THE SUPERINTENDENT MAY DETERMINE THAT THE SOFT MATERIAL IS TO BE EXCAVATED AND REMOVED FROM THE SITE. WHERE THE MATERIAL WITHIN THE SOFT SPOT IS DEEMED BY THE SUPERINTENDENT TO BE RECOVERABLE THE SUPERINTENDENT MAY ALSO DETERMINE A METHODOLOGY FOR TREATING THE UNSUITABLE MATERIAL.
- E11. ALL HAULAGE ROUTES AND ALIGNMENTS WILL BE SUBJECT TO THE APPROVAL OF THE
- SUPERINTENDENT. E12. ALL UNSUITABLE MATERIALS INCLUDING BUT NOT LIMITED TO LITTER, BUILDING WASTE, STONE, IBBLE, DEBRIS, ORGANIC MATERIAL AND VEGETABLE MATTER SHALL NOT BE INCORPORATED INTO THE WORK. ALL SUCH MATERIAL SHALL BE COLLECTED ON A REGULAR BASIS AND STOCKPILED CLEAR OF THE WORKS AND IS TO BE DISPOSED OF BY THE CONTRACTOR TO AN APPROVED LOCATION.
- E13. DE-WATERING WHERE APPLICABLE IS TO BE CARRIED OUT IN ACCORDANCE WITH THE EPA'S "CONSTRUCTION GUIDELINES FOR MAJOR CONSTRUCTION SITES" - DECEMBER 1995.
- E14. ALL SURPLUS SPOIL MATERIAL NOT REQUIRED IS TO BE STOCKPILED CLEAR OF THE WORKS. E15. ANY BORROW MATERIAL REQUIRED FOR SUBGRADE WILL BE SOURCED FROM AN APPROVED LOCATION
- AND TESTED IN ACCORDANCE WITH AS 1209.3.8.1. E16. THE CONTRACTOR SHALL KEEP AND MAINTAIN DETAILED RECORDS OF THE COMPACTION METHOD USED
- AND THE PLACEMENT OF ALL FILL MATERIALS. E17. THERE IS TO BE NO FILL MATERIAL PLACED AGAINST OR WITHIN CLOSE PROXIMITY TO FENCES OR OTHER NON STRUCTURAL OBJECTS WITHOUT THE SUPERINTENDENTS PRIOR APPROVAL.

#### BEACHING NOTES

B1. BEACHING STONE SHALL CONSIST OF CLEAN SOUND HARD QUARRIED ROCK OF UNIFORM QUALITY WITH AN UNCONFINED CRUSHING STRENGTH OF NOT LESS THAN 25MP $_{d}$  and free of defined cleavage PLANES.

B2. THE SIZE AND GRADING OF THE STONE SHALL CONFORM AS NEARLY AS PRACTICAL TO THE SIZES SET OUT IN TABLE 1.

- B3. THE MINIMUM THICKNESS SHALL BE AS DEFINED IN TABLE 1.
- B4. UNLESS NOTED OTHERWISE THE STANDARD BEACHING SIZE SHALL BE TYPE 3. B5. ALL BEACHING TO BE UNDERLAIN BY BIDIM A44 OR APPROVED EQUIVALENT GEOTEXTILE MEMBRANE KEYED IN ALONG ALL EDGES

TABLE 1

	% PASSING SCREEN SIZE						
% PASSING	TYPE 2	TYPE 3	D50 = 225				
450mm	-	-	100				
300mm	-	100	70-95				
225mm	100	70-95	40-65				
150mm	60-65	50-70	20-35				
75mm	40-65	35-50	10-20				
37.5	20-35	15-30	-				
26.5	10-20	10-20	-				
MINIMUM LAYER THICKNESS	150	225	300				



Basecourse - 50% mix PSG & Class 2 FCR - Stabilise with 1.5% Triple Blend Subarade - Assume CBR of 10% - Stabilise with 3% Quicklime

\*Triple Blend - 60% Cement, 30% Slag, 10% Fly Ash.

EARTHWORKS AND CONCRETE SCHEDULE								
ITEM	SEAL (m2)	BASECOURSE (m3)	SUBBASE (m3)	CUT (m3)	FILL (m3)	CONCRETE (m3)	CONCRETE BASE CLASS 2 FCR (m3)	CONCRETE STRENGTH (MPa)
EALED ROADWAY	2519	382	663	330	1318	96		40
NSEALED ROADWAY		376						
OAT RAMP				350.75	4.5	81	45.5	40
CCESS RAMP						21	19	25
OTALS	2519	758	663	680.75	1322.50	198	64.50	

											NTOON DESIGN DETAILS		2
				COPYRIGHT The and information contained in this document are the copyright of Rich River Irrigation Developments.	LEVEL BOOK: AN	IS-BK101		NORTH	CA RIVER IRRIGAN	murrumbidgee shire council / a PROPOSED DARLINGTON POINT	pex club BOAT RAM	Ρ	
3	18-02/18		CONCRETE PAVEMENT DETAIL ADDED	-					E Z	DESIGN NOTES & LOCALITY P	LAN		
2	23/10/17		ISSUED FOR CONSTRUCTION	party in whole or part				SCALE					
-	20,00,47			without the written permission				N.T.S.		RICH RIVER IRRIGATION DEVELOPMENTS	SHEET NUMBER	DRAWING NUMBER	REVISION
	50-08-17		ISSUED FOR DISCUSSION	of Rich River Irrigation	SUBVEYED BY	DRAWN	DESIGNED	DATE	DEVEL ODMENTS	Unit 1, 164 Qailvie Avenue, Echuca, 3564,			7
REV	DATE F	ESIGN REV'D APP'D EVIEW P.MGR P.DIR	REVISIONS	infringement of copyright.	D.LEE	D.LEE	D.LEE	30-08-17	PTY LTD A.C.N. 106 901 777	Telephone (03) 5482 2564 Fax (03) 5482 1918 Email admin@rrid.com.au	01 OF 12	2016-107	3







#### TYPICAL SEALED PAVEMENT



7mm Primerseal + 14/7 Two coat final seal Basecourse - 50% mix PSG & Class 2 FCR -Stabilise with 1.5% Triple Blend Subbase - PSG - Stabilise with 1.5% Triple Blend Assume CBR of > 30%

Subgrade – Assume CBR of 10% – Stabilise with 3% Quicklime

\*Triple Blend - 60% Cement, 30% Slag, 10% Fly Ash.

#### TYPICAL CONCRETE PAVEMENT



Pavement - Reinforced Concrete (40Mpa) with SL81 mesh centrally placed

Subbase - PSG - Stabilise with 1.5% Triple Blend Assume CBR of > 30%

NORTH

Subarade – Assume CBR of 10% - Stabilise with 3% Quicklime

\*Triple Blend - 60% Cement, 30% Slag, 10% Fly Ash.

	DRAWING SET REGISTER	
DRAWING NO.	DRAWING DESCRIPTION	REVISION
2016-107/SHT1	DESIGN NOTES AND LOCALITY PLAN	3
2016-107/SHT2	DESIGN NOTES 2	3
2016-107/SHT3	SITE PLAN	4
2016-107/SHT4	BOAT RAMP SITE PLAN	3
2016-107/SHT5	RIVER CROSS-SECTIONS	4
2016-107/SHT6	RAMP CROSS-SECTIONS	3
2016-107/SHT7	ROADWAY CROSS-SECTIONS	3
2016-107/SHT8	ROADWAY LONGITUDINAL SECTION	3
2016-107/SHT9	DESIGN DETAILS	3
2016-107/SHT10	PAVEMENT LINEMARKING DETAILS	2
2016-107/SHT11	PONTOON DESIGN PLAN	2
2016-107/SHT12	PONTOON DESIGN DETAILS	2

#### CONCRETE GENERAL

- CONCRETE SHALL BE IN ACCORDANCE WITH AS3600 CONCRETE STRUCTURES.
- C2. EXPOSURE CLASSIFICATION FOR DURABILITY IS B1.
- C3. CONCRETE TO BE AS FOLLOWS:

STRUCTURAL ELEMENT	WALKWAY	BOAT RAMP SLAB	PAVEMENT
STRENGTH GRADE (MPa)	N25	N40	N40
CEMENT TYPE	GP	GP	GP

- C4. MINIMUM 15mm CHAMFERS ARE REQUIRED ON ALL EXPOSED CONCRETE EDGES AND CORNERS.
- C5. THE USE OF CONCRETE ADMIXTURES WHERE REQUIRED SHALL BE SUBJECT TO THE APPROVAL OF THE SUPERINTENDENT AND SHALL CONFORM TO AS1478.1. WHERE FORMS TO BE STRIPPED BEFORE 24 HRS SIKA RAPID 1 OR EQUIVALENT SHOULD BE USED.
- C6. SURFACE FINISHES SHALL BE IN ACCORDANCE WITH AS3610 UNLESS SHOWN OTHERWISE ON DRAWINGS
- C7. THE FINISHED CONCRETE SHALL BE A DENSE HOMOGENOUS MASS, COMPLETELY FILLING THE FORMWORK THOROUGHLY EMBEDDING THE REINFORCEMENT AND FREE OF STONE POCKETS. ALL CONCRETE INCLUDING SLABS ON GROUND AND FOOTINGS SHALL BE COMPACTED WITH MECHANICAL VIBRATORS.
- C8. ELAPSED TIME BETWEEN WETTING OF MIX AND DISCHARGE OF CONCRETE AT SITE MUST BE AS SHORT AS POSSIBLE AND COMPLY WITH THE FOLLOWING.

CONCRETE TEMPERATURE AT TIME OF DISCHARGE (*C)	MAXIMUM ELAPSED TIME (HOURS)
10-24	2.00
24-27	1.50
27-30	1.00
30-32	0.75

- C9. NO UNCONTROLLED WATER TO BE ADDED ON SITE WITHOUT PRIOR CONSENT OF MIX DESIGNER.
- C10. THE COVER (OR "CLEAR COVER") AS STATED ON THE DRAWINGS, SHALL BE THE CLEAR DISTANCE FROM THE FACE OF ANY REINFORCEMENT. WIRE TIES FOR FIXING REINFORCEMENT, FORMWORK FIXINGS OR SIMILAR METAL WORK TO THE NEAREST CONCRETE SURFACE.

C11. COVER TO BE AS FOLLOWS, UNLESS NOTED OTHERWISE:

SUBSTRATE	MINIMUM COVER (mm)
DAMP PROOF MEMBRANE	40
BLINDING LAYER	50
ON GROUND	75

- C12. CONCRETING SHALL BE COMMENCED AT THE LOWEST LEVEL OF EACH PART OF THE WORK AND SHALL BE BROUGHT UP IN A MANNER APPROVED BY THE PROJECT MANAGER, THE PLACING ROUTINE BEING SUCH THAT EACH LAYER MUST STILL BE SOFT WHEN A NEW LAYER IS PLACED UPON IT. THE CONCRETE SHALL BE THOROUGHLY CONSOLIDATED BY APPROVED VIBRATORS.
- CONCRETE SHALL NOT BE PLACED IN WATER, EXCEPT WITH THE APPROVAL OF THE C13. PROJECT ENGINEER, AND THEN UNDER SUCH CONDITIONS AS THE PROJECT ENGINEER MAY IMPOSE
- IMMEDIATELY BEFORE PLACING CONCRETE, ALL SURFACES OR FOUNDATION UPON OR C14. AGAINST WHICH THE CONCRETE IS TO BE PLACED, SHALL BE FREE FROM STANDING WATER (EXCEPT AS PROVIDED ABOVE) MUD OR DEBRIS. ALL SURFACES OF ROCK UPON OR AGAINST WHICH CONCRETE IS TO BE PLACED, SHALL IN ADDITION, BE FREE AND CLEAN FROM OIL, OBJECTIONABLE COATINGS AND FROM ALL LOOSE, SEMIDETACHED OR UNSOUND FRAGMENTS. THE SURFACE OF ABSORPTIVE FOUNDATIONS AGAINST WHICH CONCRETE IS TO BE PLACED SHALL BE MOISTENED THOROUGHLY.
- C15. DO NOT USE VIBRATORS TO MOVE CONCRETE ALONG FORMS, USE PLACEMENT METHODS THAT WILL MINIMISE PLASTIC SETTLEMENT AND SHRINKAGE CRACKING. LIMIT VERTICAL FREE FALL BY USE OF CHUTES FTC KEEP CHUTES VERTICAL FULL AND IMMERSED IN PLACED CONCRETE. PLACE CONCRETE IN LAYERS AND BLEND SUCCEEDING LAYERS BY COMPACTION. MAINTAIN A PLASTIC CONCRETE EDGE BETWEEN CONSTRUCTION JOINTS. PROPERLY COMPACT CONCRETE USING MECHANICAL VIBRATORS (AND HAND METHODS IF REQUIRED) TO REMOVE AIR BUBBLES AND GIVE MAXIMUM COMPACTION WITHOUT SEGREGATION OF CONCRETE. TAKE CARE TO AVOID CONTACT BETWEEN VIBRATORS AND PARTIALLY HARDENED CONCRETE, FORMWORK OR REINFORCEMENT.

C16. IN COLD WEATHER MAINTAIN TEMPERATURE OF FRESHLY MIXED CONCRETE WITHIN LIMITS SHOWN BELOW. 'OUTDOOR' AIR TEMPERATURE IS AIR AT TIME OF MIXING, OR PREDICTED OR LIKELY AIR TEMPERATURE DURING NEXT 48 HOURS. BEFORE AND WHILE PLACING CONCRETE. MAINTAIN TEMPERATURE OF FORMWORK AND REINFORCEMENT AT >5°C. DO NOT USE CALCIUM CHLORIDE, SALTS, CHEMICALS OR OTHER MATERIAL IN MIX TO LOWER THE FREEZING POINT OF CONCRETE, DO NOT ALLOW FROZEN MATERIALS TO ENTER MIXER, KEEP FORMS, MATERIALS, EQUIPMENT IN CONTACT WITH CONCRETE FREE OF FROST AND ICE. HEAT CONCRETE MATERIALS (OTHER THAN CEMENT) TO MINIMUM TEMPERATURE NECESSARY TO ENSURE TEMPERATURE OF PLACED CONCRETE IS WITHIN LIMITS SPECIFIED. MAXIMUM WATER TEMPERATURE: 60°C WHEN PLACED IN MIXER.

OUTDOOR AIR	TEMPERATURE OF CONCRETE						
	MINIMUM	MAXIMUM					
>5°C	10°C	32°C					
<5°C	18°C	32°C					

C17. IN HOT WEATHER PREVENT PREMATURE STIFFENING OF FRESH CONCRETE; REDUCE WATER ABSORPTION AND EVAPORATION LOSSES. MIX, TRANSPORT, PLACE AND COMPACT CONCRETE AS QUICKLY AS POSSIBLE, DURING PLACEMENT TEMPERATURE OF CONCRETE MUST NOT EXCEED TEMPERATURES BELOW

CONCRETE ELEMENT	TEMPERATURE
NORMAL CONCRETE IN FOOTINGS, BEAMS, COLUMNS, WALLS AND SLABS f'c $\preceq$ 32MPa	35°C
MASS CONCRETE SECTIONS ≥ 1.0m EACH DIMENSION, OR CONCRETE f'c ≥ 40 MPa IN SECTIONS ≥ 600mm THICKNESS	27°C

- DO NOT MIX CONCRETE WHEN SURROUNDING OUTDOOR SHADE TEMPERATURE ≥ 38°C C18. MAINTAIN TEMPERATURE OF FORMWORK AND REINFORCEMENT AT ≤32°C BEFORE AND DURING PLACING MAINTAIN SPECIFIED TEMPERATURE OF PLACED CONCRETE BY:
  - COOL CONCRETE USING LIQUID NITROGEN INJECTION BEFORE PLACING, OR
  - COVER CONTAINER IN WHICH CONCRETE IS TRANSPORTED TO FORMS, OR
  - SPRAY COARSE AGGREGATE USING COLD WATER OR USE CHILLED MIXING WATER.
- PROTECT FRESH CONCRETE FROM PREMATURE DRYING PARTICULARLY IN HOT, WINDY OF DRY (LOW HUMIDITY) CONDITIONS, EXCESSIVELY HOT OR COLD TEMPERATURES, RAIN, ETC. PROVIDE WIND BREAKS, MAINTAIN CONCRETE AT A REASONABLY CONSTANT TEMPERATURE WITH MINIMUM MOISTURE LOSS FOR CURING PERIOD.
- C20. KEEP ON SITE A LOG BOOK RECORDING EACH PLACEMENT OF CONCRETE INCLUDING DATE, CLIMATIC CONDITIONS, PORTION OF WORK, SPECIFIED GRADE AND SOURCE OF CONCRETE, DELIVERY DOCKET DATA, METHODS OF PLACEMENT AND COMPACTION, PROJECT ASSESSMENT CARRIED OUT, SLUMP MEASUREMENT AND VOLUME.
- C21. CONSTRUCTION JOINTS OR POUR BREAKS WHERE NOT SHOWN ON THE DRAWINGS SHALL BE OCATED AND FORMED TO THE APPROVAL OF THE PROJECT ENGINEER.
- CURING OF ALL CONCRETE SHALL COMMENCE NO LATER THAN 2 HOURS AFTER FINISHING OPERATIONS HAVE BEEN COMPLETED. THE CONCRETE SHALL BE CURED FOR A PERIOD OF 7 DAYS (UNLESS APPROVED OTHERWISE BY THE ENGINEER) BY ONE OF THE FOLLOWING METHODS:
  - PONDING OR CONTINUOUS SPRINKLING WITH WATER.
  - USE OF AN ABSORPTIVE COVER KEPT CONTINUOUSLY WET.
  - COATING WITH AN APPROVED SPRAYED MEMBRANE CURING COMPOUND WHERE COMPATIBLE WITH FINISHES.
  - USE OF AN APPROVED MOISTURE RETAINING COVERING SUCH AS HEAVY GAUGE BUILDERS PLASTIC OR PAPER FIRMLY HELD AGAINST CONCRETE SURFACES TO PREVENT AIR CIRCULATION
- CONSTRUCTION SUPPORT PROPPING SHALL BE LEFT IN PLACE WHERE NEEDED TO AVOID C23. OVERSTRESSING THE STRUCTURE DUE TO CONSTRUCTION LOADING WHEN AIR TEMPERATURE IS BELOW 5°C OR ABOVE 35°C SPECIAL CONCRETE PLACEMENT PRECAUTIONS SHALL BE TAKEN IN ACCORDANCE WITH GOOD CONSTRUCTION PRACTICE.
- STRIP FORMWORK TO AS3600 CLAUSE 17.6. REMOVE FROM TIE BOLTS WITHOUT DAMAGING CONCRETE, PARTS OF BOLTS LEFT IN CONCRETE MUST NOT INTRUDE INTO COVER CONCRETE. FLUSH FILL HOLES USING MATERIAL MATCHING CONCRETE SURFACE COLOUR, STRENGTH AND
- C25. THE CONCRETE FINISH SHALL BE TO THE SATISFACTION OF THE PROJECT ENGINEER

C26. SURFACE IRREGULARITIES SHALL BE TESTED BY USE OF A TEMPLATE 1.5m LONG AND SHALL CONSISIT OF A STRAIGHT EDGE. THE MAXIMUM SURFACE IRREGULARITY FOR EACH CLASS OF FORMWORK MEASURED USING THE TEMPLATE SHALL BE AS FOLLOWS:

- CLASS 2 - 5mm

- CLASS 3 - 7mm

- CLASS 4 NO MEASUREMENT REQUIRED.
- CLASS 5 NO MEASUREMENT REQUIRED.
- C27. THOSE CONCRETE SURFACES REQUIRED TO BE RENDERED AND ANY OTHER CONCRETE SURFACE WHICH THE PROJECT ENGINEER MAY ORDER TO BE RENDERED SHALL BE TREATED AS FOLLOWS:
- THE CONCRETE SURFACE SHALL BE SCABBLED AND DAMPENED.
- CEMENT MORTAR, MIXED IN THE PROPORTION OF 80kg OF PORTLAND CEMENT TO 0.1m<sup>3</sup> OF SAND (DRY RODDED MEASUREMENT), SHALL BE APPLIED IN ONE OR TWO COATS, AS MAY BE ORDERED BY THE PROJECT MANAGER, TO FORM A TOTAL THICKNESS OF ABOUT 13mm.
- FOR TWO-COAT WORK. THE FIRST COAT SHALL BE WELL WORKED ON TO THE SURFACE AND SHALL BE SCORED BEFORE IT HAS SET HARD AND SHALL BE KEPT DAMP UNTIL THE SECOND COAT IS APPLIED.
- C28. ALL CONCRETE PILES SHALL BE INSTALLED IN ACCORDANCE WITH AS2159.

#### FORMWORK

- EW1. ALL FORMWORK TO BE CLASS 3 IN ACCORDANCE WITH AS 3610.
- FW2. ALL HOLES LEFT BY FORM TIES TO BE PLUGGED TO FULL COVER DEPTH WITH CEMENTITIOUS GROUT
- FW3. FORMS TO BE CLEANED OF ANY TIE WIRE, REINFORCEMENT OFFCUTS, SCREWS, FIXINGS, DIRT ETC. BEFORE POUR.
- FW4. FORM SURFACES SHALL BE SMOOTH AND FREE FROM HOLES OR IRREGULARITIES. AND TO THE SATISFACTION OF THE PROJECT MANAGER. BEFORE CONCRETE IS PLACED, THE SURFACES OF THE FORMS SHALL BE COATED WITH AN APPROVED FORM COATING THAT WILL EFFECTIVELY PREVENT STICKING AND WILL NOT STAIN THE CONCRETE SURFACES.
- FW5. MINIMUM FORMWORK STRIPPING TIMES FOR VERTICAL FACES SHALL BE AS GIVEN IN AS 3610, TABLE 5.4.1.

#### SEALANT

- PS1 SEALANT TO BE EMERSEAL PUAG OR APPROVED FOURVALENT INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS FOR IMMERSED WATER APPLICATIONS OR APPROVED ALTERNATIVE.
- PS2. SURFACE TO BE PREPARED USING PARCHEM PRIMER 13 OR APPROVED ALTERNATIVE.

#### REINFORCEMENT

- R1. REINFORCEMENT SHALL BE DEEMED TO INCLUDE ALL REINFORCING BARS, REINFORCING MESH, AND DOWEL BARS. REINFORCEMENT SHALL COMPLY WITH AS4671-2001.
- REINFORCEMENT IS REPRESENTED DIAGRAMMATICALLY; IT IS NOT NECESSARILY SHOWN IN R2 TRUE PROJECTION.
- R3. REINFORCING MESH TO BE GRADE D500L COLD ROLLED HIGH STRENGTH DEFORMED FABRIC IN ACCORDANCE WITH AS 4671
- REINFORCING BARS TO BE GRADE D500N HOT ROLLED HIGH STRENGTH DEFORMED BARS IN R4 ACCORDANCE WITH AS 4671
- N12 TRIM BARS ARE REQUIRED ON ALL SLOPING, VERTICAL AND HORIZONTAL FACES OF R5. CONCRETE WHERE THERE IS NO OTHER BAR WITHIN 100mm OF THAT FACE.
- R6 LAPPING OF REINFORCING BARS AND FABRIC TO BE IN ACCORDANCE WITH AS 3600
- REINFORCEMENT WHICH REQUIRES FABRICATION OR BENDING TO SHAPE SHALL BE SUPPLIED IN THE FULL LENGTH SHOWN ON THE DRAWINGS. REINFORCEMENT SHALL BE COLD BENT TO THE SPECIFIED SHAPE. BARS SHALL NOT BE BENT AFTER FABRICATION UNLESS SHOWN ON THE DRAWINGS.
- R8 STRAIGHT BARS SHALL BE SUPPLIED TO THE FULL LENGTHS SHOWN ON THE DRAWINGS. WHERE LAPPING OF STRAIGHT BARS IS UNAVOIDABLE, SUCH LAPS SHALL BE STAGGERED AND A MINIMUM OF TWO WIRE TIES PLACED AT EACH LAP.

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3	18-02-18			CONCRETE GENERAL NOTE AMENDMENT	-					H	DESIGN NOTES 2			
2	23/10/17			ISSUED FOR CONSTRUCTION	party in whole or part without the written permission				SCALE N.T.S.		RICH RIVER IRRIGATION DEVELOPMENTS	Sheet Number	DRAWING NUMBER	REVISION
1	30/08/17	FSIGN REV'D	APP'D	ISSUED FOR DISCUSSION	of Rich River Irrigation Developments constitutes an	SURVEYED BY	DRAWN	DESIGNED	DATE	DEVELOPMENTS	Unit 1, 164 Ogilvie Avenue, Echuca. 3564.	02 OF 12	2016-107	
REV	DATE	EVIEW P.MGR	P.DIR	REVISIONS	infringement of copyright.	D.LEE	D.LEE	D.LEE	30-08-17	PTY LTD A.C.N.106 901 777	Telephone (03) 5482 2564 Fax (03) 5482 1918 Email admin@rrid.com.au	02 01 12	2010 107	Ľ

COFFER DAM CD1. STEEL SHEET PILE COFFER TO BE INSTALLED IN ACCORDANCE WITH AS2159.

R9. REINFORCING MESH IS TO BE LAPPED A MINIMUM OF TWO BARS AT ANY SPLICE. R10. WHERE NOT SHOWN ON THE DRAWINGS, ADOPT THE FOLLOWING LAP SPLICE LENGTHS.

AR SIZE & TYPE	HORIZONTAL BARS WITH MORE THAN 300mm CONCRETE CAST BELOW	OTHER BARS
N12	375	300
N16	560	450
N20	830	660
N24	1150	920
N28	1530	1220
N32	1900	1520
N36	2340	1870

R11. REINFORCEMENT SYMBOLS:

GRADE D500N DEFORMED BAR. GRADE D5001 DEEORMED EABRIG

PI 2. SI THE NUMBER FOLLOWING THESE SYMBOLS IS THE BAR DIAMETER IN MILLIMETRES.

R12 REINFORCEMENT NOTATIONS:

EACH FACE

EACH WAY

FF

EW

CP

R14.

TOP BOTTOM

CENTRALLY PLACED

R13. WELDING OF REINFORCEMENT WILL ONLY BE PERMITTED WITH THE PRIOR APPROVAL OF THE ENGINEER.

A BOND BREAKING MATERIAL SHALL BE USED BETWEEN CONTACTING SURFACES AT CONTROL JOINTS. REFER DRAWINGS. REINFORCEMENT SHALL NOT BE CONTINUOUS THROUGH CONTROL JOINTS UNLESS NOTED OTHERWISE.

R15. ALL REINFORCEMENT SHALL BE FIRMLY SUPPORTED ON EITHER PLASTIC CHAIRS OR CONCRETE CHAIRS AT NOT GREATER THAN 1000 CRS BOTH WAYS, BARS SHALL BE TIED AT ALTERNATIVE INTERSECTIONS

R16. SUPPLY AND LAY FABRIC IN FLAT SHEETS. AT SPLICES, FABRIC SHALL BE LAPPED AS FOLLOWS:

. . . MAXIMUM THREE SHEETS OF FABRIC TO BE LAPPED AT ANY SPLICE

R17. ALL STARTER BARS TO EXISTING CONCRETE TO BE GROUTED USING EITHER HILTI HIT-HY 150 MAX. OR HILTI HIT-RE 500.

BEFORE THE REINFORCEMENT IS PLACED. THE SURFACE OF THE REINFORCEMENT AND THE SURFACES OF ANY METAL BAR SUPPORTS SHALL BE CLEANED OF ANY HEAVY RUST. LOOSE MILL SCALE, DIRT, GREASE AND OTHER FOREIGN SUBSTANCES. AFTER BEING PLACED, THE REINFORCEMENT SHALL BE MAINTAINED IN A CLEAN CONDITION UNTIL IT IS COMPLETELY EMBEDDED IN THE CONCRETE.

R19. REINFORCEMENT SHALL BE ACCURATELY PLACED AND SUPPORTED TO PREVENT DISPLACEMENT DURING ALL STAGES OF CONCRETING. TACK WELDING OR WIRE TIES ARE ACCEPTABLE METHODS FOR PREVENTING SUCH DISPLACEMENT.

R20. WHERE APPROVED BY THE PROJECT ENGINEER THE CONTRACTOR SHALL BE PERMITTED TO LOCATE JOINTS OR SPLICES AT LOCATIONS OTHER THAN THOSE SHOWN ON THE DRAWINGS.

R21. WHERE WELDED SPLICES IN REINFORCING BARS ARE USED, THE EQUIPMENT, MATERIALS AND ALL WELDING AND TESTING PROCEDURES SHALL BE IN ACCORDANCE WITH AS 1554.3 - 2002. REINFORCING BAR LAP LENGTHS SHALL BE MAINTAINED ACROSS ALL WELDED LOCATIONS.

PONTOON POLES

PP1. STEEL PONTOON PILES TO BE INSTALLED IN ACCORDANCE WITH AS2159.



LOCALITY PLAN NOT TO SCALE

**A** PM 24182 124.35

- 12 / 3<sup>M</sup>/ 2<sup>E</sup>



#### Services

The shou cons	The location of services shown on the plan should be proven to be correct prior to construction.										
The relevant authorities should be contacted prior to commencement of works to ascertain the correct location of all services.											
4	18/02/18	CUL DE SAC AMENDEDED									
3	23/10/17	ISSUED FOR CONSTRUCTION									
2	30/08/17	PRELIMINARY DESIGN FOR DISCUSSION									
1	21/12/16	DRAFT FOR DISCUSSION									
REV	DATE	REVISIONS									

## Disclaimer

Notwithstanding any description contained in the plans or design specifications, the contractor shall be responsible for satisfying themselves as to the nature and extent of the specified works and the physical and legal conditions under which the works will be carried out, including site conditions, access, nature of material to be excavated, size and type of mechanical plant required and any like matters effecting the construction of the works.

CEMETERY ROAD

	LEGEND												
Asphalt Driveway		Concrete Driveway		Gravel Driveway		S.E.C. U/G Cable	—— E ——	Fire Hydrant	O F.H.	Proposed Culvert	)(	A RIVER IRAIGRA	
Proposed K & C		Permanent Mark	М РМ	Tree to be removed	×	Gas Main	G	Fire Plug	O F.P.	Proposed Picnic Table		Se Contraction	
Conduits	c	Telstra U/G Cable	т	Telstra Pole	•	Sewer Main	s	Valve		Proposed Shelter	X		
Existing Drains	D	Water Main		Telstra Pit	<b>—</b>	Property Outlet	— sw —	S.E.C. Pole	O	Survey Station	<b>▲</b> PEG		
Existing Drain Pits		Proposed Drain Pits		Proposed Drains	PD	Existing K & Ch	====	Existing Culvert	)(	Rock Spalling		DEVELOPMENTS PTY LTD A.C.N. 106 901 777 Teleph	





RIVER IRRIGATION DEVELOPMENTS TITLE: DARLINGTON POINT BOAT RAMP DRAWING NUMBER REVISION SIZE SHEET NUMBER 1, 164 OGILVIE AVENUE, ECHUCA 3564 none (03) 5482 2564 Fax (03) 5482 1918 DESCRIPTION: SITE PLAN (1:1000) 03 of 12 2016-107 A1 4





# SURVEY NOTES

Topographical & Feature Survey Datum A.H.D. Contour Interval 100 mm.

## MURRUMBIDGEE SHIRE COUNCIL / APEX CLUB PROPOSED DARLINGTON POINT BOAT RAMP SITE PLAN



NOT TO SCALE



Asphalt Driveway		Concrete Driveway		(
Proposed K & C		Permanent Mark	▲ РМ	
Conduits	c	Telstra U/G Cable	T	
Existing Drains	D	Water Main	— w —	
Existing Drain Pits		Proposed Drain Pits		
				_



Services

The location of services shown on the plan should be proven to be correct prior to construction.

The relevant authorities should be contacted prior to commencement of works to ascertain the correct location of all services.

3	23/10/17	ISSUED FOR CONSTRUCTION
2	30/08/17	PRELIMINARY DESIGN FOR DISCUS
1	21/12/16	DRAFT FOR DISCUSSION
REV	DATE	REVISIONS

			,		•			
X	Gas Main	G	Fire Plug	O F.P.	Proposed Picnic Table		No.	
\$	Sewer Main	s	Valve		Proposed Shelter	X		
	Property Outlet	— sw —	S.E.C. Pole	Ō	Survey Station	<b>▲</b> PEG		RIC
PD	Existing K & Ch	===	Existing Culvert	)(	Rock Spalling		PTY LTD A.C.N. 106 901 777	Tele

	1974 Flood lev	rel (Approximate) — 125. — — — — — — — — — — — — —	.55											
122.00-	HWM stain on	day of survey — 124.95	5											
120.00-					EXISTING NA	TURAL SURFACE		SUMMI	LEVEL ON DAY OF SURVEY - " ER WATER LEVEL - 119.20	20.71				
118.00-	-										EXISTING NATURAL SURFACE			
116.00-	-													
DATUM (m AHD) 114.00	0													
DESIGN SURFACE														
	120.71 119.80 119.50					117.20	116.60	116.00	116.50	117.10	117.00	117.80	118.30 118.00	
CHAINAGE (m)	00.00 1.94 2.30					24.19	26.28	31.44	39.39	44.85	53.58	63.38	70.29	
11.26 122.15 122.65 12.15 122.15 122.65 NOILION 122.24 MOLTON 122.24 MOLTON 122.25 MOLTON 1		REFER DETAIL	EXISTING N CONCRETE RAMP ON NTRALLY PLACED NFORCED CONCRE	MATURAL SURF	ACE MP PROOF MEMBE L CONCRETE AND	1974 Flood HWM stain of BASE COURSE MA REFER DETAIL	level (Approximate on day of survey ED BETWEEN STERIAL CODE T IN SITU CONCRI 1 MESH CENTRALL CENTRALL CENTRALL CENTRALL	e) - 125.55 - 124.95 - 124.95 WATER LEVEL ON DAY OF SUMMER WATER LEVEL - ETE RAMP WITH LY PLACED SUMMER WATER LEVEL - SUMMER WATER - SUMMER WATER LEVEL - SUMMER WATER -	SURVEY - 120.71 - 119.20 REFER DETAIL	E	-EXISTING NATURAL SURFACE	77.59 116.20	85.70 117.00	96.52 118.00







			Disclaimer
			Notwithstanding any descrip
4	18/02/18	RIVER CROSS-SECTION 2 AMENDED	or design specifications, th for satisfying themselves a
3	23/10/17	ISSUED FOR CONSTRUCTION	specified works and the ph
2	30/08/17	PRELIMINARY DESIGN FOR DISCUSSION	access, nature of material
1	21/12/16	DRAFT FOR DISCUSSION	mechanical plant required a construction of the works.
REV	DATE	REVISIONS	

scription contained in the plans , the contractor shall be responsible is as to the nature and extent of the e physical and legal conditions under e carried out, including site conditions, orial to be excavated, size and type of ed and any like matters effecting the tes.

LEGEND													
Asphalt Driveway		Concrete Driveway		Gravel Driveway		S.E.C. U/G Cable	—— E ——	Fire Hydrant	O F.H.	Proposed Culvert	)(	A RIVEN INAIGAL	
Proposed K & C		Permanent Mark	<b>A</b> PM	Tree to be removed	X	Gas Main	G	Fire Plug	O F.P.	Proposed Picnic Table		No.	
Conduits	c	Telstra U/G Cable	T	Telstra Pole	\$	Sewer Main	s	Valve		Proposed Shelter	X		
Existing Drains	D	Water Main	— w —	Telstra Pit	<b>——</b>	Property Outlet	— sw —	S.E.C. Pole	O	Survey Station	<b>▲</b> PEG		RICH R
Existing Drain Pits		Proposed Drain Pits		Proposed Drains	PD	Existing K & Ch	====	Existing Culvert	)(	Rock Spalling		PTY LTD A.C.N.106 901 777	Telepho

RIVER CROSS-SECTION 2 SCALE 1:200 HORIZONTAL 1:200 VERTICAL (Chainage 0.00 to Chainage 114.22)

1974 Flood level (Approximate) — 125.55

HWM stain on day of survey — 124.95

				WATER LEVEL	ON DAY OF SURVEY - 120.71					
				SUMMER WAT	ER LEVEL – 119.20	- EXISTING	NATURAL SURFACE			
119.20	117.50	115.50	115.70	116.00	116.30	116.90	118.00	118.30	118.90	
11.45	16.55 16.55	21.35	26.96	33.27	40.07	46.87	5 7 AF	59.48	90 80 80	



#### 1974 Flood level (Approximate) — 125.55

HWM stain on day of survey — 124.95

\_\_\_\_EXISTING NATURAL SURFACE

			WATER LEVE	L ON DAY OF SURVEY - 120.7	71					-
			SUMMER W	ATER LEVEL – 119.20		EXISTING NATURAL SURFAC	ЭЕ			
117.40	116.50	116 BO	117.30	117.10	117 60	117.70	117.80	117.90	118.80	120.71
14.00	17.35	23.04	29.09	36.09	41 93	47.75	52.33	55.69	58.06	67.53

# RIVER CROSS—SECTION 4 SCALE 1:200 HORIZONTAL 1:200 VERTICAL (Chainage 0.00 to Chainage 67.53)

RIVER IRRIGATION DEVELOPMENTS I, 164 OGILVIE AVENUE, ECHUCA 3564 none (03) 5482 2564 Fax (03) 548







## MURRUMBIDGEE SHIRE COUNCIL / APEX CLUB PROPOSED DARLINGTON POINT BOAT RAMP **RIVER CROSS - SECTIONS**

•	TITLE: DARLINGTON POINT BOAT RAMP	SIZE	SHEET NUMBER	DRAWING NUMBER	REVISION
4 182 1918	DESCRIPTION: RIVER CROSS-SECTIONS (1:200)	A1	05 <sub>OF</sub> 12	2016-107	4



								ICR IPD.	
Gravel Driveway		S.E.C. U/G Cable	—— Е ——	Fire Hydrant	O F.H.	Proposed Culvert	)(	ARIVENINAIGRA	
Free to be removed	X	Gas Main	G	Fire Plug	O F.P.	Proposed Picnic Table		No.	
Telstra Pole	\$	Sewer Main	s	Valve	<b>_</b>	Proposed Shelter	$\boxtimes$		
Telstra Pit	<b>—</b>	Property Outlet	— sw —	S.E.C. Pole	$\odot$	Survey Station	<b>▲</b> PEG		RICH RIVER IRRIGATIO
Proposed Drains	PD PD	Existing K & Ch		Existing Culvert	)(	Rock Spalling		PTY LTD A.C.N.106 901 777	Telephone (03) 5482





SEALED ROADWAY CROSS-SECTION D-D SCALE 1:200 HORIZONTAL 1:200 VERTICAL

		– Disclaimer						LEC	GEND						
		Notwithstanding any description contained in the plans	Asphalt Driveway		Concrete Driveway		Gravel Driveway		S.E.C. U/G Cable	€ Fire Hydrant	O F.H.	Proposed Culvert	)(	A RIVER IRRIGA	
3 18/02/		for satisfying themselves as to the nature and extent of the specified works and the physical and legal conditions under	Proposed K & C	====	Permanent Mark	<b>^</b> PM	Tree to be removed	8	Gas Main	General Fire Plug	O F.P.	Proposed Picnic Table		Se Contraction	
2 23/10/	/17 ISSUED FOR CONSTRUCTION	<ul> <li>which the works will be carried out, including site conditions, access, nature of material to be excavated, size and type of</li> </ul>	Conduits	c	Telstra U/G Cable	T	Telstra Pole	<b></b>	Sewer Main	s Valve		Proposed Shelter	$\square$		
1 30/08,	/17 DRAFT FOR DISCUSSION	mechanical plant required and any like matters effecting the construction of the works.	Existing Drains	D	Water Main		Telstra Pit		Property Outlet	— sw — S.E.C. Pole	$\odot$	Survey Station	<b>▲</b> PEG		UNIT 1. 164 OGILVIE AVENUE, ECHUCA 3564
REV DATE	E REVISIONS		Existing Drain Pits		Proposed Drain Pits		Proposed Drains	PD	Existing K & Ch	$\equiv \equiv \equiv \equiv$ Existing Culvert	)(	Rock Spalling		PTY LTD A.C.N.106 901 777	Telephone (03) 5482 2564 Fax (03) 5482



SEALED ROADWAY CROSS-SECTION E-E scale 1:200 horizontal 1:200 vertical



## LEGEND

BASECOURSE

SUBBASE

AREA OF CUT

AREA OF FILL

CONCRETE PAVEMENT

## MURRUMBIDGEE SHIRE COUNCIL / APEX CLUB PROPOSED DARLINGTON POINT BOAT RAMP **ROADWAY CROSS - SECTIONS**

	TITLE DARI INGTON POINT BOAT RAMP	SIZE	SHEET NUMBER	DRAWING NUMBER	REVISION
4 82 1918	DESCRIPTION: ROADWAY CROSS-SECTIONS (1:200)	A1	07 of 12	2016-107	3





		·····						
			-existing natural surface				EXISTING NATURAL SURFACE	
	ON EXIS	STING NATURAL SURFACE GRADES						
125.23	124.45	124.26	123.83	123.25	123.17	123.85		123.89
125.08	124.30	124.11	123.68	123.10	123.02	123.270		123.73
100.00	112.04	125.00	150.00	175.00	<u>180.75</u> 181.37	225.00		250.00



## LEGEND



SUBBASE

AREA OF FILL

3 18/02/18 CONCRETE PAVEMENT ADDED 2 23/10/17 ISSUED FOR CONSTRUCTION

1 30/08/17 DRAFT FOR DISCUSSION

REV DATE

CONCRETE PAVEMENT

REVISIONS

#### Disclaimer

Notwithstanding any description contained in the plans or design specifications, the contractor shall be responsible for satisfying themselves as to the nature and extent of the specified works and the physical and legal conditions under which the works will be carried out, including site conditions, access, nature of material to be excavated, size and type of mechanical plant required and any like matters effecting the construction of the works.

	LEGEND													
Asphalt Driveway		Concrete Driveway		Gravel Driveway		S.E.C. U/G Cable	—— E ——	Fire Hydrant	O F.H.	Proposed Culvert	)(	A RIVEN INAIGAA		
Proposed K & C		Permanent Mark	<b>▲</b> PM	Tree to be removed	X	Gas Main	G	Fire Plug	O F.P.	Proposed Picnic Table		No.		
Conduits	— c —	Telstra U/G Cable	—T	Telstra Pole	\$	Sewer Main	s	Valve	<b>—X</b> —	Proposed Shelter	$\boxtimes$			
Existing Drains	D	Water Main	— w ——	Telstra Pit	<b>—</b>	Property Outlet	— sw —	S.E.C. Pole	$\odot$	Survey Station	<b>▲</b> PEG		RICH RIVER	
Existing Drain Pits		Proposed Drain Pits		Proposed Drains	PD	Existing K & Ch	====	Existing Culvert	)(	Rock Spalling		DEVELOPIVIEN IS PTY LTD A.C.N.106 901 777	Telephone	

-EXISTING NATURAL SURFACE			
23 23	126.90	126.85	
106 R7	126.75	126.70	
	25.00 75.00	80.67	

# DESIGN ROAD LONGITUDINAL SECTION — (0—100) scale 1:200 horizontal 1:200 vertical (looking north west)



EXISTING LEVEE BANK - 126.84

<u>DESIGN ROAD LONGITUDINAL SECTION — (100—255.99)</u> scale 1:200 horizontal 1:200 vertical (looking north west)

SUM LEA			SCIPA DEAL		÷	sublich .	BER BUT
				CONCRETE PA	EXISTING LEVEE BANK - 126.84		
		AREA OF FILL		-EXISTING NATURAL SURFA	DE AREA OF FILL		<u></u>
					P -	3.33%	
23.00 123.00	22.84	22.53 123.00	FLAT	122.41	22.42 123.00	3.33%	22.23 122.67

DESIGN ROAD LONGITUDINAL SECTION — (255.99—411.12) scale 1:200 horizontal 1:200 vertical (looking north west)

R IRRIGATION DEVELOPMENTS 164 OGILVIE AVENUE, ECHUCA 3564 e (03) 5482 2564 Fax (03) 5482

# EXISTING LEVEE BANK - 126.84 EXISTING ENTRY RAMP

## MURRUMBIDGEE SHIRE COUNCIL / APEX CLUB PROPOSED DARLINGTON POINT BOAT RAMP **ROADWAY LONGITUDINAL - SECTION**

	TITLE: DARLINGTON POINT BOAT RAMP	SIZE	SHEET NUMBER	DRAWING NUMBER	REVISION
64 482 1918	DESCRIPTION: ROADWAY LONGITUDINAL-SECTION (1:200)	A1	08 of 12	2016-107	3



<u>ES</u>					
	MURRUMBIDGEE SHIRE COUNCIL	. / APE	X CLUB		
F	PROPOSED DARLINGTON PO	INT E	BOAT RAMP	)	
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PONTOON POLE LOCATION TABLE							
POLE NO.	EASTING	NORTHING					
P1	408430.160	6174270.015					
P2	408435.016	6174274.700					
P3	408439.884	6174279.397					
P4	408444.784	6174284.124					
P5	408446.028	6174288.386					
P6	408444.270	6174300.587					
P7	408442.776	6174312.494					
P8	408443.263	6174319.148					
P9	408445.415	6174330.953					
P10	408447.568	6174342.759					







#### 9.3 Appendix 3 – Threatened Species Assessment

See Over Page

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Murrumbidgee Council
NSW Threatened Species Assessment
<b>Darlington Point Boat Ramp</b>
Lot7312 DP1159328

October 2018

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RICH RIVER IRRIGATION DEVELOPMENTS



#### **Table of Contents**

1.	INTRODUCTION	3
1.1.	Scope of Assessment	3
1.2.	Purpose	3
2.	PROJECT DESCRIPTION	3
2.1.	Project objectives	3
2.2.	Project background	3
2.3.	Site Location	4
2.4.	Description of Works	5
Α	ccess Road from Cemetery Road to Boat Ramp	5
В	oat Ramp	5
F	loating Pontoon	6
D	isability Access Ramp	6
G	eneral 6	
2.5.	Existing Environment	9
3.	METHODOLOGY	12
3.1.	Area clearing threshold	
3.2.	Biodiversity Values Map threshold	
3.3.	Biodiversity Offsets Scheme Entry Tool	
3.4.	Test of significance	
4.	RESULTS	14
4.1.	National Environmental Significance	14
4.	.1.1. Wetlands of International Importance	14
4.	.1.2. Listed Threatened Ecological Communities	14
4.	.1.3. Listed Threatened Species	14
4.	.1.4. Listed Migratory Species	15
4.2.	Other Matters Protected by the EPBC Act	15
4.	.2.1. Listed Marine Species	16
4.3.	Extra Information	17
4.	3.1. State and Territory Reserves	
4.	3.2. Invasive Species	
4.4.	Species and Community Detail	
5.	ASSESSMENT	64
6.	CONCLUSION	67
7.	APPENDICES	68
7.1.	Appendix 1 - Project plans	68
72	Appendix 2 EDBC Act Protected Matters Penert	60
1.2.	Appendix 2 – EPBC Act Protected Matters Report	

#### **1. INTRODUCTION**

#### 1.1.Scope of Assessment

This report for threatened species impact assessment is written in accordance with *the Biodiversity Conservation* Act 2016, Local Land Services Amendment Act 2016 and the State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 and meets the requirements of the assessment guidelines.

#### **1.2.Purpose**

The purpose of this report is to identify the required assessment method and assess any impacts that may occur to vegetation or threatened species as part of completing project works described below. The Threatened Species Assessment report has been carried out in accordance with the following standards, guidelines, and policies:

- Environmental Planning and Assessment Act 1979,
- Environment Protection and Biodiversity Conservation Act, 1999,
- Biodiversity Conservation Act, 2016,
- Fisheries Management Act 1994,
- Local Land Services Amendment Act, 2016,
- Biodiversity Conservation Regulation, 2017,
- State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017,
- Murrumbidgee Shire Local Environmental Plan, 2013
- Murrumbidgee Development Control Plan, 1995,
- Biodiversity Offsets Scheme threshold, and
- Threatened species 'test of significance'.

This document also aims to provide further clarity surrounding Biodiversity Values within the project site.

#### 2. PROJECT DESCRIPTION

#### **2.1.Project objectives**

The objectives of the project are as follows:

- Provide improved and safer access to the Murrumbidgee River,
- Provide disabled access to boats launched on the Murrumbidgee River,
- Incorporates the town, river and the existing levee bank with the potential to better link and extend a number of walking paths connecting the towns infrastructure, and
- Promote water-based recreation activities.
- Minimize adverse environmental impact on the surrounding area, and
- Comply with relevant environmental legislation.

#### 2.2.Project background

The proposal is part of the future of Darlington Point and provides many opportunities to better integrate one of the towns greatest assets – the Murrumbidgee River with the existing infrastructure within the town. The project will lay the foundations for other potential opportunities within the town and will provide a safer and improved access for boats and the public to the river. This proposal importantly also allows disabled access to boating facilities and as such the recreational waterway.

The existing boat ramp is located on the north side of the Murrumbidgee River, opposite the township and has several disadvantages. This site is becoming unsafe for people to access and use being problematic launching boats in the river. The boat ramp infrastructure at this location is also nearing the end of its life and is likely to require an upgrade. Over recent years that has also been an influx of tourists particularly with the popularity of the "Darlington Point Riverina Classic Catch and Release Fishing Competition".

This proposal includes the installation of a new boat ramp, removable floating pontoon and walkway to allow access to maritime vessels, car and trailer parking area and a more appealing and user-friendly area for locals and tourists to access the river and its environment. This project is is in line with the current Darlington Point Structure Plan and is located close to the town and other open space recreational areas and will provide the foundation for other associated open space areas and uses.

The proposal has the ability to provide the following benefits:

- The Project provide an opportunity to provide better connections with the town,
- It supports a growing demand for water recreation activities such as boating and fishing, including the annual Darlington Point fishing competition;
- Incorporates the town and river and the existing levee bank with the potential to better link and extend a number of walking paths connecting the towns infrastructure, and
- It will better promote water based recreation activities.
- The proposal is expected to provide economic benefits through tourism and improved township appeal,
- The potential environmental impacts of the proposed development are considered as minimal.

#### 2.3.Site Location

This project is located in New South Wales on the east side of Darlington Point, the south side of the Murrumbidgee River (opposite the existing caravan park), and the west side of a stand of remnant native vegetation and agricultural farming area. The project adjoins the existing Darlington Point flood levee protection bank works and is ancillary to other recreational areas within the rural township.

Details	Specific related to project site
Lot number	7312
Deposited Plan	1159328
Local Shire	Murrumbidgee Council
LEP Zone - Land	E3 – Environmental Management
LEP Zone – Water	W2 – Recreational Waterway
Catchment Area	Murrumbidgee
IBRA Region	Riverina
IBRA Sub Region	Murrumbidgee
Traditional Owners/Land Council	Griffith Local Aboriginal Land Council
Land Stature	Crown land managed by council for public recreation
Area of project	0.5ha
GPS Reference	MGA Zone 55 E: 408436 N: 6174271

#### Table 1 - Land details of the project



Figure 1 - Locality plan showing project location

#### **2.4.Description of Works**

This proposal is in the process of being tendered. The successful tenderer will be responsible for the construction and completion of the Works under contract as per the Drawings and the Specifications (See appendix 1).

The proposed works shall as shown on the Drawings and set out in the specification and generally comprise the following:

#### Access Road from Cemetery Road to Boat Ramp

- Construction of unsealed road pavement as specified approximately 256m long x 7.6m wide from Cemetery Road including unsealed trailer turn-around area,
- Construction of a sealed road and angled carparking pavement approximately 105m long x 18.7m wide with AG drains on one side,
- Construction of approximately 55m long concrete paved roadway including approximately 19m wide trailer turn-around area with AG drains on one side,
- Open drain relocation and construction of associated underground drainage pipes, pits and headwalls,
- Construction of steel and concrete sleeper retaining walls,
- Associated tree removal, earthworks, subgrade treatments & pavements, Type 2 rock beaching, post & rail fencing, signage and line-marking,

**Boat Ramp** 

• Construction of approximately 40m long x 8m wide concrete boat ramp and adjoining 2.3m wide concrete access pathway,
- Associated tree removal, concrete piling, earthworks, subgrade treatments, rock armouring and Type 2 beaching,
- Construction of steel and concrete sleeper retaining walls,

#### **Floating Pontoon**

- Supply and installation of 17 custom fabricated and hinged aluminium walkway sections ranging from 3.4m to 6.3m in length (approximately 85m overall length) and supported by Polyurethane filled Polyethylene floatation pontoons as detailed,
- Supply and installation of aluminium access ramp to pontoon walkway,
- Supply and installation of 10 galvanised steel piles as detailed

#### **Disability Access Ramp**

- Construction of approximately 45m x 3m wide all abilities access reinforced concrete ramp between existing pathway and top of boat ramp;
- Associated earthworks and rock beaching.

## General

- Levelling topsoiling and seeding of proposed picnic area ready for installation of shelter and picnic settings by others,
- Construction of safety railings adjacent parking area as specified,
- Full site management, including setting out, construction management, clean-up and disposal off-site of all surplus materials and debris resulting from the construction activities and reinstatement of disturbed areas including re-sowing of disturbed areas with approved native species,
- Supply of marked up 'as-constructed' drawings.

A copy of the overview plan and the Bill of Quantities is shown below.



Figure 2 - Overview plan of project

Specific details of the size and dimensions of the project are shown in the table below.

Item	<b>Description of Works</b>	Quantity	Unit
No.			
1.0	GENERAL:		
1.1	Site Establishment		
1.1.1	Site Establishment and Management. (Including Site hut, Portable toilet and Rubbish skip)		Item
1.2	Project Set Out		
1.2.1	Survey setout and re-establishment of pegs as required.		Item
1.3	Vegetation Removal		
1.3.1	Tree removal.	8	No.
1.4	Site Cleanup		
1.4.1	Post construction site clean-up including removal and disposal of all surplus materials and site debris, reinstatement of all disturbed areas including supply and spreading of topsoil and reseeding excepting areas adjacent roadway and boat ramp as included below.		Item
1.5	Post Construction Survey and As-Constructed Plans		
	Post construction survey and report including supply of 'marked up' Works as Constructed Plans for:		
1.5.1	Roadworks & Drainage		Item
1.5.2	Boat ramp and Pontoon Structure		Item
2.0	ROAD & DRAINAGE WORKS: (Including Carpark Area)		
2.1	Earthworks		
2.1.1	Earthworks – including removal of topsoil and stockpiling/spreading, trimming of subgrade.	2,550	m2
2.1.2	Cut (solid)	330	m3
2.1.3	Fill to design levels and grades. (solid)	1318	m3
2.2	Road Pavements		
	Road Pavement – to supply, place and compact:-		
2.2.1	(a) Sub-base - 200mm depth - PSG - Stabilised with 1.5% Triple Blend.	2519	m2
2.2.2	(b) Basecourse (Sealed Road) - 150mm depth of 50% mix PSG & Class 2 FCR - Stabilised with 1.5% Triple Blend.	1879	m2
2.2.3	(c) Basecourse (Unsealed Road) - 150mm depth of 50% mix PSG & Class 2 FCR - Stabilised with 1.5% Triple Blend.	2136	m2
	Bituminous Sealing - including supply, place, cover and compacting of aggregate:-		
2.2.3	(a) 7mm Primerseal	1879	m2
2.2.4	(b) 14/7mm Two coat final seal.	1879	m2
2.2.5	Concrete Pavement - including supply and place:-		
	Supply and place 150mm thick 40MPa concrete reinforced with single layer of SL81 reinforcing including edge beams as specified.	636	640

Table 2 - Project earthworks detail

Item	Description of Works	Quantity	Unit
2.3	Drainage		
	Drainage Pipelines, Drainage Pits and Headwalls – including supply, excavation, bedding, placing and backfilling of pipes.		
2.3.1	100mm slotted & socked AG Drain laid in 20mm screenings	126	lin. m
2.3.2	DN225mm SN8-SCJ PVC Pipe FCR Backfill	32	lin. m
2.3.3	DN900mm SN8-SCJ PVC Pipe Earth Backfill	6	lin. m
2.3.4	Double Sided Side Entry Pit to suit open earth drain. Pits - 600x600x800 deep with trafficable lid.	3	No.
2.3.5	Standard concrete end wall to suit DN 225mm pipe	2	No.
2.3.6	Standard concrete end wall to suit DN 900mm pipe	2	No.
2.3.7	Fill existing open drain.	144	m3
2.3.8	Excavate new earthen drain.	120	m3
2.4	Reinstatement of Road & Drainage Works		•
2.4.1	Reinstate, topsoil and seed disturbed areas adjacent to road		Item
2.5	Hardwood Post and Rail Barrier Fence		·
2.5.1	Supply and install treated hardwood post & rail barrier	63	lin. m
	fence adjacent to road and angle park at future picnic		
	area		
3.0	BOAT RAMP CONSTRUCTION:		
3.1	Cofferdam and Dewatering	Γ	1
3.1.1	Steel sheet pile coffer dam installation and removal.		Item
3.1.2	Dewatering:- (Initial and continued throughout ramp construction)		Item
3.2	Boat Ramp		
	Base Preparation	1	
3.2.1	Excavation. (Cut)	350.75	m3
3.2.2	Concrete pile supply and installation - 300x300x6000 long.	6	No.
3.2.3	Crushed rock supply, spread & compact - Class 2 FCR.	45.5	m3
	Concreting	Γ	1
3.2.4	Formation of base for slab including formwork.		Item
3.2.5	Concrete 40MPa.	81	m3
3.2.6	Reinforcement - SL81 mesh and N12 Deformed bar.		Item
3.2.7	Concrete laying and finishing.		Item
	Rock Work	. –	-
3.2.8	Rock armouring (Scour protection)	45	m2
3.2.9	Beaching (Type 2) Supply and install including Geofabric.	210	m2
3.3	Retaining Walls (Max 1m high)	Γ	T
	Retaining wall supply and installation:-	42	
3.3.1	(a) 150UB18 Galvanised UB x 3m long.	16	No.
3.3.2	(b) Concrete sleepers - 200x75x2000 long.	/5	No.
3.3.3	(c) Install AG Drain, backfill screenings and compacted pervious fill	30	m length

Item	<b>Description of Works</b>	Quantity	Unit
4.0	ACCESS WALKWAY AND PONTOON		
4.1	Concrete Access Walkway		
4.1.1	Excavate and supply, place and compact - Class 2 FCR	19	m3
	bedding		
4.1.2	Reinforcement - Supply and place- SL81 mesh.	185	m2
4.1.3	Concrete 25MPa Supply, place and finish including formwork	19	m3
4.2	Floating Pontoon	•	
	Pontoon modules - Supply and install including marine grade aluminium frames, decking and handrails as per Drawings:		
4.2.1	6 Float units x 6.0 to 6.3m long	9	No.
4.2.2	4 Float Units x 3.4 5.8m long	8	No.
	Piling - Supply and installation. (Length's as per drawings)		
4.2.3	DN300x10mm thick galvanised steel piles	5	No.
4.2.4	DN200x6mm thick galvanised steel piles	5	No.
4.2.5	Marine grade aluminium access walkway - Supply and install as per Drawings.	1	No.

The construction methodology, erosion and sediment control works will be determined by the successful tendered as part of the project works.

## **2.5.Existing Environment**

The site consists of a generally modified riverine floodplain. There is an existing levee bank and a vehicle access track located within the Vegetated Riparian Zone (VRZ) of the project area. The existing embankment upstream of the site contains vegetation typically found in this area. The area where works are proposed and downstream of the site have been completely modified with no vegetation remaining.



Figure 3 - Photo showing proposed site looking south across the Murrumbidgee River



Figure 4 - Photo showing project site looking upstream



Figure 5 - Photo looking south from edge of River at existing access and road and project site



Figure 6 - Photo looking downstream of project site

The VRZ at this project site covers a distance of 40 meters from the high bank of the water course of which only one side is taken into consideration due to the project works. This 40m area has been nominated in accordance

with the Riparian corridor matrix in the Guidelines for vegetation management plans on waterfront land (NSW Office of Water 2012).

The proposed project site is a small area and the activity associated with the development will be confined to the site. The footprint of the proposed development, including the parking area and boat ramp will be approximately 0.5 hectares.

## **3. METHODOLOGY**

The Biodiversity Offsets Scheme Entry Tool has been utilised to establish if the project lies within an area mapped as high biodiversity values and if the project proposal exceeds the area threshold. It has also been identified through the NSW Planning portal that the *Vegetation in Non-Rural areas SEPP* does apply to this project.

#### 3.1.Area clearing threshold

The site is one that is been historically modified. It has been developed for other town infrastructure in the form of a levee bank with significant works in the area disturbing the site. There are 8 standing remnant trees within the project site and the groundcover consists of a heavy burden of introduced weeds and grasses. The entire project site encompasses an area of 0.5Ha.

## **3.2.Biodiversity Values Map threshold**

The project areas are adjoining but the vegetation for removal is not covered by land identified on the biodiversity values map.

## 3.3.Biodiversity Offsets Scheme Entry Tool

Mapping of the project area was undertaken using this (BOSET) tool. This report provided (and attached in the Threatened Species Assessment) displays the following results:

Date of Calculation	04/05/2018 12:17PM	BAM Required
Total Digitised Area	0.08 ha	
Minimum Lot Size Method	Lot Size	
Minimum Lot Size	1.71 ha	
Area Threshold	0.5 ha	
Area of native vegetation cleared	Unknown #	Unknown #
Impact on biodiversity values land map	No	Νο

# whilst the area of Native Vegetation to be cleared cannot be identified by the BOSET, it can be clearly seen within this report that there are 8 trees to be removed. These trees have cover an area of less than 0.5ha – being under the area threshold. Based on this, this report has progressed based on the project not exceeding the threshold.

## **3.4.Test of significance**

As the project does not exceed the Biodiversity Offset Scheme Threshold, a 'test of significance' is required to determine whether impacts other than those associated with clearing native vegetation will have a significant impact on biodiversity – specifically threatened species.

The existing '7-part test' guidelines have been utilised for this report. To undertake the 7 part test the following method has been utilised.

A desktop assessment was undertaken to identify threatened flora and fauna species, populations and ecological communities listed under the *Biodiversity Conservation Act 2016* Schedules 1-4, and MNES listed under the *EPBC Act* that may be affected by the proposal. Records provided in the *TSC Act* and *FM Act* have also been considered

as part of this assessment. Database records pertaining to the study area and locality (i.e. within a 10km radius of the proposal footprint) and the Riverina – Murrumbidgee IBRA Sub-region were reviewed and included:

- NSW Office of Environment and Heritage (OEH) Wildlife Atlas database (NSW BioNET) (licensed) for records of threatened species and endangered ecological communities listed under the *TSC Act* that have been recorded in the locality (OEH 2017; data supplied by OEH on 4<sup>th</sup> May 2018.
- Australian Government Department of Environment and Energy- Protected Matters Online Search Tool for MNES listed under the *EPBC Act* and predicted to occur within 10km radius of the project (DEE 2018; database queried on 4<sup>th</sup> May 2018).
- OEH threatened species profiles online database (OEH 2018).
- DEE online species profiles and threats database (DEE 2018).
- Broad-scale vegetation mapping of south-east NSW to identify threatened ecological communities mapped as occurring within the locality of the site.
- NSW OEH NSW (Mitchell) Land scape V3.1.

Following collation of database records and species and community profiles, a 'likelihood of occurrence' assessment was prepared with reference to the broad habitats contained within the study area. This was further refined following a site visit and assessment of any possible habitat present.

A likelihood of occurrence ranking was attributed to threatened biota and migratory species based on the framework outlined in Table 3 below.

Table 3 - Ranking for Assessment		
Presence of habitat	Definition	
Present	Present Potential or known habitat is within the study area.	
Marginal	Habitat present is not typical but may be suitable.	
Absent	No potential or known habitat is present within the study area.	
Unlikely	Species not previously recorded within a 10km radius and suitable habitat not recorded within the proposal footprint.	
Likelihood of occurrence	Definition	
Known	Species recorded within the footprint either from previous records or field survey results	
Likely	Species previously recorded within a 10km radius and suitable habitat occurs within the project footprint	
Possible	Species recorded within 10km radius but no suitable habitat recorded, or species not previously recorded within a 10km radius, but the project footprint is located within species known distribution and suitable habitat occurs within the project footprint.	
Unlikely	Species not previously recorded within a 10km radius and suitable habitat not recorded within the project footprint.	
Possible to be impacted	Definition	
Νο	The project would not result in an impact to this species. No Assessment of Significance (AoS) is necessary for this species.	
Low	The project is unlikely to result in an impact to the species. No Assessment of Significance (AoS) is necessary for this species.	
Moderate	The project could impact on this species of its habitats. This species is considered further in the Assessment. The risk to this species is considered manageable and an AoS is not considered necessary.	
High	The project is likely to impact on this species or its habitats. An AoS has been applied to these entities.	

## 4. RESULTS

## 4.1.National Environmental Significance

The search of the EPBC Act Protected Matters within a 10km radius of the project site has shown the following results:

Matter	Result
World Heritage Properties	None
National Heritage Properties	None
Wetlands of International Importance	4
Great Barrier Reef Marine Park	None
Commonwealth Marine Park	None
Listed Threatened Ecological Communities	4
Listed Threatened Species	18
Listed Migratory Species	9

Further information is provided below on the items identified above.

#### 4.1.1. Wetlands of International Importance

There are 4 RAMSAR Wetlands that have been identified within 300-300kms of the project sites. These include the following:

- Banrock station wetland complex
- Hattah-Kulkyne lakes
- Riverland
- The Coorong, and Lakes Alexandrina and Albert wetland

### 4.1.2. Listed Threatened Ecological Communities

There are 4 Listed Threatened Ecological Communities (TEC) determined by the EPBC search and 2 additional TECs shown through the NSW BioNet search and NSW Fisheries. These are:

- Allocasuarina luehmannii (Buloke) Woodlands of the Riverina and Murray-Darling Depression Bioregions
- *Eucalyptus macrocarpa* (Inland Grey Box) Grassy Woodlands and Derived Native Grasslands of Southeastern Australia
- Weeping Myall Woodlands
- Sandhill Pine Woodland in the Riverina, Murray-Darling Depression, and NSW South Western Slopes bioregions

Further information is provided below regarding Listed Threatened Ecological Communities.

#### 4.1.3. Listed Threatened Species

There are 18 listed species identified with the Protected Matters search. These are as follows:

Scientific Name	Common Name	NSW Status	Commonwealth Status
Birds			
Botaurus piociloptilus	Australasian Bittern	Endangered	Endangered
Calidris ferruginea	Curlew Sandpiper		Critically
			Endangered
Grantiella picta	Painted Honeyeater		Vulnerable
Leipoa ocellate	Malleefowl		Vulnerable

Scientific Name	Common Name	NSW Status	Commonwealth
			Status
Numenius	Eastern Curlew		Critically
madagascariensis			Endangered
Pedionomus torquatus	Plains-wonderer		Critically
			Endangered
Pezoporus occidentalis	Night Parrot		Endangered
Polytellis swainsonii	Superb Parrot	Vulnerable	Vulnerable
Rostratula australis	Australian Painted Snipe		Endangered
Fish			
Galaxis rostratus	Flathead Galaxias		Critically
			Endangered
Maccullochella peelii	Murray Cod		Vulnerable
Macquaria australasica	Macquarie Perch		Endangered
Frogs			
Litoria raniformis	Southern Bell Frog		Vulnerable
Mammals			
Nyctophilus corbeni	Corben's Long=eared bat		Vulnerable
Phascolarctos cinereus	Koala		Vulnerable
Plants			
Austrostipa wakoolica			Endangered
Brachyscome papillosa	Mossgiel Daisy		Vulnerable
Swainsona murrayana	Slender Darling-pea		Vulnerable

A search for species, populations and communities known and predicted to occur within the Bioregion has also been undertaken with results shown below.

#### 4.1.4. Listed Migratory Species

Within the a 5km radius of the project site there are 9 Listed Migratory Species. They are as follows:

Species Scientific Name	Common Name	
Apus pacificus	Fork-tailed Swift	Marine Bird
Actitis hypoleucos	Common Sandpiper	Wetland Species
Calidris acuminata	Sharp-tailed Sandpiper	Wetland Species
Calidris ferruginea	Curlew Sandpiper	Wetland Species
Calidris melanotos	Pectoral Sandpiper	Wetland Species
Gallinago hardwickii	Latham's Snipe, Japanese Snipe	Wetland Species
Motacilla flava	Yellow Wagtail	Terrestrial Species
Myiagra cyanoleuca	Satin Flycatcher	Terrestrial Species
Numenius madagascariensis	Eastern Curlew, Far Eastern Curlew	Wetland Species

Critically Endangered Species

## 4.2. Other Matters Protected by the EPBC Act

This section identifies other matters protected under the Act relating to the area nominated in the search.

Matter	Result
Commonwealth Land	None
Commonwealth Heritage Places	None
Listed Marine Species	14
Whales and Other Cetaceans	None
Critical Habitats	None
Commonwealth Reserves Terrestrial	None
Commonwealth Reserves Marine	None

### 4.2.1. Listed Marine Species

Within the 10kms of the project site and within the project sites there are the following 14 Listed Marine Species.

Species Scientific Name	Common Name	
Actitis hypoleucos	Common Sandpiper	Species or species habitat may occur within the area
Apus pacificus	Fork-tailed Swift	Species or species habitat may occur within the area
Ardea alba	Great Egret, White Egret	Species or species habitat may occur within the area
Ardea ibis	Cattle Egret	Species or species habitat may occur within the area
Calidris acuminata	Sharp-tailed Sandpiper	Species or species habitat may occur within the area
Calidris ferruginea	Curlew Sandpiper	Species or species habitat may occur within the area
Calidris melanotos	Pectoral Sandpiper	Species or species habitat may occur within the area
Gallinago hardwickii	Latham's Snipe, Japanese Snipe	Species or species habitat may occur within the area
Haliaeetus leucogaster	White-bellied Sea-Eagle	Species or species habitat may occur within the area
Merops ornatus	Rainbow Bee-eater	Species or species habitat may occur within the area
Motacilla flava	Yellow Wagtail	Species or species habitat may occur within the area
Myiagra cyanoleuca	Satin Flycatcher	Species or species habitat may occur within the area
Numenius madagascariensis	Eastern Curlew, Far Eastern Curlew	Species or species habitat may occur within the area
Rostratula benghalensis	Painted Snipe	Species or species habitat may occur within the area



Critically Endangered Species Endangered Species

## 4.3.Extra Information

Matter	Result
State and Territory Reserves	2
Regional Forest Agreements	None
Invasive Species	29
Nationally Important Wetlands	None
Key Ecological Feathers (Marine)	None

#### 4.3.1. State and Territory Reserves

There are 2 state and territory reserves identified as:

• Murrumbidgee Valley X 2

## 4.3.2. Invasive Species

The invasive species identified in the Report are as follows:

Scientific Name	Common Name	Status	Type of Presence
Birds			
Acridotheres tristis	Common Myna		Species or species habitat
			likely to occur within area
Alauda arvensis	Skylark		Species or species habitat
			likely to occur within area
Anas platyrhynchos	Mallard		Species or species habitat
			likely to occur within area
Carduelis carduelis	European Goldfinch		Species or species habitat
			likely to occur within area
Columba livia	Rock Pigeon, Rock Dove,		Species or species habitat
	Domestic Pidgeon		likely to occur within area
Passer domesticus	House Sparrow		Species or species habitat
			likely to occur within area
Passer montanus	Eurasian Tree Sparrow		Species or species habitat
			likely to occur within area
Streptopelia chinensis	Spotted Turtle-dove		Species or species habitat
			likely to occur within area
Sturnus vulgaris	Common Starling		Species or species habitat
			likely to occur within area
Turdus merula	Common Blackbird,		Species or species habitat
	Eurasian Blackbird		likely to occur within area
Mammals			
Bos Taurus	Domestic Cattle		Species or species habitat
			likely to occur within area
Canis lupus	Domestic Dog		Species or species habitat
			likely to occur within area
Capra hircus	Goat		Species or species habitat
			likely to occur within area
Felis catus	Cat, House Cat, Domestic		Species or species habitat
	Cat		likely to occur within area

Scientific Name	Common Name	Status	Type of Presence
Lepus capensis	Brown Hare		Species or species habitat likely to occur within area
Mus muculus	House Mouse		Species or species habitat
			likely to occur within area
Oryctolagus cuniculus	Rabbit, European Rabbit		Species or species habitat
			likely to occur within area
Rattus rattus	Black Rat		Species of species habitat
			likely to occur within area
Vulpes Vulpes	Red Fox, Fox		Species or species habitat
			likely to occur within area
Plants	1	1	1
Alternanthera	Alligator Weed		Species or species habitat
philoxeroides			likely to occur within area
Asparagus asparagoides	Bridal Creeper, Bridal Veil		Species or species habitat
	Creeper, Smilax, Florist's Smilax, Smilax Asparagus		likely to occur within area
Chrysanthemoides	Boneseed		Species or species habitat
monifera			likely to occur within area
Lycium ferocissimum	African Boxthorn		Species or species habitat
			likely to occur within area
Opuntia spp.	Prickly Pears		Species or species habitat
			likely to occur within area
Prosopis spp.	Mesquite		Species or species habitat
			likely to occur within area
Rubus fruticosus	Blackberry, European		Species or species habitat
aggregate	Blackberry		likely to occur within area
Sagittaria playyphylia	Delta Arrowhead,		Species or species habitat
	Arrowhead, Slender Arrowhead		likely to occur within area
Salix spp	Willows except Weeping		Species or species habitat
	willow, Pussy Willow &		likely to occur within area
	Sterile Pussy Willow		
Solanum elaeagnifolium	Silver Nightsahde		Species or species habitat
			likely to occur within area

# 4.4.Species and Community Detail

A search of the NSW BioNet Atlas provided the following results with relation to Threatened Species within a 10km radius of the site.

Scientific Name	Common Name	NSW Status	Commonwealth Status
Amphibia			
Litoria raniformis	Southern Bell Frog	Endangered	Vulnerable
Birds			
Chthonicola sagittata	Speckled Warbler	Vulnerable	
Oxyura australis	Blue-billed Duck	Vulnerable	
Anseranas semipalmata	Magpie Goose	Vulnerable	
Circus assimilis	Spotted Harrier	Vulnerable	

Haliaeetus leucogaster	White-bellied Sea-Eagle	Vulnerable	Listed Marine Species
Hieraaetus morphnoides	Little Eagle	Vulnerable	
Grus rubicunda	Brolga	Vulnerable	
Pedionomus torquatus	Plains-Wanderer	Endangered	
Calyptorhynchus lathami	Glossy Black-Cockatoo	Vulnerable	
Polytelis swainsonii	Superb Parrot	Vulnerable	Vulnerable
Climacteris picumnus	Brown Treecreeper	Vulnerable	
victoriae	(eastern subspecies)		
Pomatostomus temporalis	Grey-crowned Babbler	Vulnerable	
temporalis	(eastern subspecies)		
Daphoenositta chrysoptera	Varied Sittella	Vulnerable	
Artamus cyanopterus	Dusky Woodswallow	Vulnerable	
cyanopterus			
Burhinus grallarius	Bush Stone-curlew	Endangered	
Mammals			
Saccolaimus flaviventris	Yellow-bellied Sheathtail-	Vulnerable	
	bat		
Vespadelus baverstocki	Inland Forest Bat	Vulnerable	
Flora			
Diuris tricolor	Pine Donkey Orchid	Vulnerable	

A search for species, populations and communities known and predicted to occur within the Murrumbidgee Bioregion has also been undertaken with results shown below.

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			h	habitat	of	for
						e	impact
Amphibians							
Crinia sloanei	Sloane's Froglet	<ul> <li>Region: Murray-Darling Basin with majority or records in the Darling Riverine Plains, NSW South Western Slopes and Riverina Bioregions.</li> <li>Habitat: Ground-dwelling frog associated with periodically inundated areas in grassland, woodland and disturbed areas.</li> <li>Preferred Food: No information available.</li> <li>Breeding: Breeds in ephemeral wetlands or periodically inundated areas of permanent wetlands, in grasslands, woodlands and disturbed environments</li> </ul>	Vulnerable	Not Listed	Present	Possible	Moderat e
Litoria raniformis	Southern Bell Frog	<ul> <li>Region: In NSW the species was once distributed along the Murray and Murrumbidgee Rivers and their tributaries, the southern slopes of the Monaro district and the central southern tablelands as far north as Tarana, near Bathurst. Currently, the species is known to exist only in isolated populations in the Coleambally Irrigation Area, the Lowbidgee floodplain and around Lake Victoria.</li> <li>Habitat: Usually found in or around permanent or ephemeral Black Box/Lignum/Nitre Goosefoot swamps, Lignum/Typha swamps and River Red Gum swamps or billabongs along floodplains and river valleys. They are also found in irrigated rice crops, particularly where there is no available natural habitat. Outside the breeding season animals disperse away from the water and take shelter beneath ground debris such as fallen timber and bark, rocks, grass clumps and in deep soil cracks.</li> <li>Food sources: Invertebrates as well as other small frogs.</li> <li>Breeding: Breeding occurs during the warmer months and is triggered by flooding or a significant rise in water levels. The species has been known to breed anytime from early spring through to late</li> </ul>	Endangered	Vulnerable	Present	Likely	Moderat e

Darlington Point Boat Ramp - NSW Threatened Species AssessmentP a g e | 20 October 2018

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			h	habitat	0t occurrenc	tor Impact
						e	inipact
		summer/early autumn (Sept to April) following a rise in					
		water levels.					
Reptiles							
Fish							
Galaxias	Flathead	Region: endemic to the southern tributaries of the	Critically		Marginal	Possible	Low
rostratus	Galaxias	Murray Darling River system; the Murray,	Endangered				
		Murrumbidgee and Lachlan Rivers and their tributaries					
		and the upper Macquarie River catchment. Flathead					
		Galaxias has experienced significant declines in					
		distribution and abundance in all river systems in NSW.					
		Extensive scientific sampling over the last two decades					
		has recorded extremely few specimens. The last record					
		in the Murrumbidgee River was in 1971, and it is					
		thought that the species may be locally extinct from					
		the lower Murray, Murrumbidgee, Macquarie and					
		Lachlan Rivers.					
		Habitat: freshwater fish generally found mid-water in					
		still and gently moving waters of small streams, lakes,					
		lagoons, billabongs and backwaters. Its habitat consists					
		of coarse sand or mud substrate and aquatic					
		vegetation.					
		Preferred Food Flathead Galaxias feeds predominately					
		on aquatic insects and crustaceans.					
		Breeding Spawning occurs in spring, when water					
		temperatures are above 10.5°C. The species produces					
		2000-7000 transparent, slightly adhesive demersal					
		eggs, with fecundity increasing with length of fish.					
		The eggs hatch after 9 days at temperatures between					
		9-14°C. Fry are 6-8 mm long after natching. Individuals					
		probably mature in their first year (approximately 80					
Custo sus	D.4. united a	mm long).	) (ulu avalala		Manajaal	Dessible	1
Eustacus	Crowfich	<b>Region:</b> originally occurring in the Nurrumbidgee	vulnerable		iviarginai	Possible	LOW
armatus	Craytish	River system in NSW and the ACT, and parts of the					
		Wurray river system in NSW, victoria and South					
		Australia.					

Darlington Point Boat Ramp - NSW Threatened Species AssessmentP a g e | 21 October 2018

Scientific Common Description NSW Status Commonweal Presence of Likelihoo	Potential
<i>Name</i> Name h habitat of	for
occurren	Impact
e The species has also been recorded from the Lachlan	
and Macquarie catchments in NSW although the origin	
of these populations is currently unknown, and may be	
translocated. Murray Crayfish have an upper altitudinal	
range of approximately $750 - 800$ m ASL.	
Habitat: occurs in a range of habitats. from small	
upland streams to large lowland rivers, although it	
prefers fast-flowing, well-oxygenated waters at low	
altitudes. During the day can be found in burrows	
along the river bank and also underneath boulders and	
logs. Clay banks, woody debris and deep holes are	
important features of the Murray crayfish's habitats.	
Preferred Food: Murray Crayfish are opportunistic	
feeders, feeding mainly on decaying aquatic plant	
matter, dead fish and other animals. Cannibalism has	
also been reported within high-density populations.	
Breeding: Mating may be cued by a rapid decline in	
water temperature in May. Fecundity is size-	
dependent, with large mature females producing a	
maximum of 2 400 eggs. Females incubate eggs under	
their abdomen for 20 weeks. Hatchlings remain in the	
mother's care for a further month before dispersing.	<u> </u>
BidanusSilver PerchRegion: endemic to the Murray Darling river system.VulnerableUnlikely	No
bidyanus The species was once widespread and abundant	
throughout most of this area, significant enough to be	
a commercially harvested species in the 1900s.	
Commercial catch records show a relatively consistent	
decline of Sliver Perch catch from the 1960s, followed	
by a collapse of the fishery in the 1980s. The species is	
suit absent from most of its former range and in NSW,	
the central Murray River, downstream of Varrawonga	
Moir	
Habitat: found in a wide range of babitats and climates	
across the Murray-Darling Basin. They are generally	

Darlington Point Boat Ramp - NSW Threatened Species AssessmentP a g e | 22 October 2018

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			n	nabitat	OCCURRENC	TOr
						e	inipact
		found in faster-flowing water including rapids and					
		races and more open sections of river. Individuals					
		sometimes form large shoals in open water.					
		Preferred Food: They are omnivorous, feeding on a					
		variety of small prey including aquatic insects,					
		molluscs, worms, crustaceans, zooplankton and algae.					
		Breeding: Males reach sexual maturity at three years					
		of age, when around 25 cm in length, and females at					
		four to five years, when around 29 cm. Adult Silver					
		Perch can move large distances, often associated with					
		spawning activity in spring and summer. Juveniles					
		disperse over large distances and are often seen at					
		fishways travelling upstream in large schools. Females					
		can lay 300,000 or more non-adhesive, floating eggs					
		that are about 2.7 mm in diameter. They are mostly					
		released in one spawning, and hatch after					
		approximately 30 hours. Eggs and larvae passively drift					
		with the river current for a number of days.					
Maccullochella	Murray Cod	<b>Region:</b> Once abundant throughout the Murray-Darling		Vulnerable	Marginal	Possible	Low
peelii		river system, but overfishing and environmental					
		changes have drastically reduced its numbers. The					
		species has been selectively stocked in other river					
		systems in NSW, Victoria and Western Australia, but					
		has generally failed to establish itself in those areas.					
		Habitat: Generally, prefer slow flowing, turbid water in					
		streams and rivers, favouring deeper water around					
		boulders, undercut banks, overhanging vegetation and					
		logs.					
		referred tood: voracious feeders and predators. Their					
		turtles and terrestrial animals such as miss and analysis					
		Recording: Percently discovered that Murray and makes.					
		an unstream migration to snawn. This movement can					
		he up to 120 km and generally occurs in late					
		winter (oarly spring when river levels are high After					
		winter/early spring when river levels are high. After					

Darlington Point Boat Ramp - NSW Threatened Species AssessmentP a g e | 23 October 2018

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			n	nabitat	ot occurrenc	for Impact
					·	е	
		spawning the fish move downstream again, returning					
		to the same area they occupied before the migration,					
		usually to exactly the same snag.					
Macquarie	Maquarie	<b>Region:</b> found in the Murray-Darling Basin (particularly	Endangered	Endangered	Marginal	Possible	Low
australasica	Perch	upstream reaches) of the Lachlan, Murrumbidgee and					
		Murray rivers, and parts of south-eastern coastal NSW,					
		including the Hawkesbury/Nepean and Shoalhaven					
		catchments.					
		Habitat: Found in both river and lake habitats;					
		especially the upper reaches of rivers and their					
		tributaries. Preferred micronabitat consists of complex					
		structural features in streams such as large rocks,					
		stumps, logs, branches and other woody structures					
		Such structures reduce or influence stream flows and					
		provide shelter from fast-flowing water					
		<b>Preferred food:</b> Adult fish feed on aquatic insects					
		crustaceans and molluses					
		<b>Breeding</b> : Sexual maturity occurs at 15-20 cm or two					
		vears of age for males and 25 cm or three years for					
		females however this varies between locations due to					
		local conditions. Spawn in spring or summer in flowing					
		shallow upland streams and rivers. • Females produce					
		around 50,000-100,000 eggs which settle among					
		stones and gravel of the stream or river bed. Hatching					
		occurs after approximately 10 days and larvae are					
		about 7 mm long.					
Maccullochella	Trout-Cod	Region: endemic to the southern Murray-Darling river	Endangered		Marginal	Possible	Low
macquariiensis		system, including the Murrumbidgee and Murray					
		Rivers, and the Macquarie River in central NSW. The					
		species was once widespread and abundant in these					
		areas but has undergone dramatic declines in its					
		distribution and abundance over the past century. The					
		last known reproducing population of Trout Cod is					

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			h	habitat	Of occurrenc	for Impact
						e	impact
		confined to the Murray River below Yarrawonga					
		downstream to Tocumwal.					
		Habitat: Trout Cod tend to occupy areas which have					
		lots of large in-stream woody debris or 'snags', which					
		provide complex habitats for each stage of the species'					
		life cycle. They tend to remain at the one site with					
		limited home ranges.					
		Preferred Food: Trout Cod are carnivores, preying					
		mainly on crustaceans and aquatic insects but also on					
		other fishes.					
		Breeding: Maximum life span is thought to be 20 - 25					
		years, with sexual maturity reached at 3 - 5 years,					
		when approximately 35 cm (males) or 43 cm (females)					
		in length, and 0.75 - 1.5 kg in weight. They form pairs					
		and spawn during spring and early summer when the					
		water temperature is around 15°C. Females produce					
		1,200 – 11,000 adhesive eggs (2.5 – 3.6 mm in					
		diameter) that attach to hard substrates and are					
		guarded by the male. Larvae hatch after 5 - 10 days					
		when they are approximately 6 - 9 mm in length, and					
		then disperse by drifting in the water column.					
Birds	N	Destant Chill as labits have seen to Assess line as which are	Mada analala	NI-+ I SetI	D da uzi u a l	Dessible	1
Anseranas	Magpie	Region: Still relatively common in Australian northern	Vulnerable	Not Listed	Marginal	Possible	LOW
semipaimata	Goose	tropics but had disappeared from south-east Australia					
		by 1920 due to drainage and overgrazing of reed					
		been an increasing number of records in control and					
		northern NSW					
		Habitat: Activities are centred on wetlands mainly					
		those on floodplains of rivers and large shallow (<1m					
		deen) wetlands formed by run-off. Seen both in					
		wetlands with dense growth of rushes and sedges or					
		walking and grazing on land					
		Food Sources: Grasses, bulbs, rhizomes.					

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			h	habitat	of	for
						occurrenc e	Impact
		Breeding: Most breeding occurs in monsoonal areas.					
		Breeding unlikely in southeastern NSW.					
		Nest: Nests formed in trees over deep water.					
Anthochaera	Regent	Region: Mainly inhabits temperate woodlands and	Critically	Critically	Marginal	Possible	Low
phrygia	Honeyeater	open forests of the inland slopes of south-east	Endangered	Endangered			
		Australia. The species' range has severely contracted in					
		the last 30 years; only three known breeding regions					
		remain (Chiltern-Albury region in Victoria, Capertree					
		Valley in NSW and Bundarra-Barraba region in NSW).					
		In NSW, distribution is patchy and mainly confined to					
		breeding regions and surrounding remnant vegetation.					
		Habitat: Dry open forest and woodland, particularly					
		Box-Ironbark woodland, and riparian forests of River					
		Sheoak. Woodlands have significantly high species					
		richness, large numbers of mature trees, high canopy					
		cover and an abundance of mistletoes.					
		Food source: Generalist forager, which feeds mainly on					
		eucalypt nectar.					
		Breeding: Species breed between July and January.					
		Usually nest in horizontal branches or forks in tall					
		mature eucalypts and Sheoaks. Also nest in mistletoe					
		haustoria. Two or three eggs laid per clutch.					
Ardeotis australis	Australian	Region: Mainly occurs in inland Australia and is now	Endangered	Not Listed	Unlikely	Unlikely	No
	Bustard	absent or scarce from southern and south-eastern					
		Australia. In NSW, mainly found in the north-western					
		corner and less often recorded in lower western and					
		central plains. Occasionally vagrants seen on western					
		slopes and Riverine plain.					
		Habitat: Prefers tussock and hummock grasslands; also					
		occurs in low shrublands and open grassy woodlands.					
		Occasionally seen in pastoral and cropping country,					
		golf courses and near dams. Roosts on ground among					
		shrubs and long grasses or under trees.					
		Food source: Insects, young birds, lizards, mice, leaves,					
		seeds, fruit.					

Scientific Name	Common Name	Description	NSW Status	Commonwealt h	Presence of habitat	Likelihood of	Potential for
						occurrenc e	Impact
		<b>Breeding</b> : Breeds on bare ground on low sandy ridges or stony rises in ecotones between grassland and protective shrubland cover. Now only breeds in north- west region of NSW.					
Artamus cyanopterus cyanopterus	Dusky Woodswallow	<ul> <li>Region: Widespread in eastern, southern and southwestern Australia. In New South Wales it is widespread from coast to inland, including the western slopes of the Great Dividing Range.</li> <li>Habitat: Predominantly woodlands and dry open sclerophyll forests, usually dominated by eucalypts, including mallee associations. The Dusky Wood swallow is considered a woodland dependent bird.</li> <li>Preferred Food: Primarily eats invertebrates, mainly insects. Occasionally feeds on nectar, fruit and seeds.</li> <li>Breeding: Late September to late February, with eggs present between September and January, although most eggs are present between October and early December. Clutch size is 1–4 and pairs may nest twice in a season.</li> <li>Nest: The nest is an open shallow untidy cup, frequently in an open hollow, crevice or stump.</li> </ul>	Vulnerable	Not Listed	Marginal	Possible	Low
Botaurus poiciloptilus	Australasian Bittern	<ul> <li>Region: Widespread but uncommon over southeastern Australia. Found throughout most of NSW except for the north-west.</li> <li>Habitat: Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes and spikerushes.</li> <li>Food source: Frogs, rush, yabbies, spiders, insects, snails.</li> <li>Breeding: Occurs in summer from October to January. Usually six eggs to a clutch.</li> <li>Nests: Built in secluded places in densely-vegetated wetlands on a platform of reeds.</li> </ul>	Endangered	Endangered	Absent	Unlikely	Low
Burhinus grallarius	Bush Stone- curlew	<b>Region</b> : Found throughout mainland Australia except for central and southern coast, inland, and the far	Endangered	Not Listed	Marginal	Possible	Low

Darlington Point Boat Ramp - NSW Threatened Species AssessmentP a g e | 27

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			h	habitat	of	for
						occurrenc	Impact
		south-eastern corner. Still common in northern				е	
		Australia: aither rare or extinct alcowhere throughout					
		its former range					
		Habitat: Inhabits onen forests and woodlands with					
		sparse grassy ground layer and fallen timber					
		Food source: Insects, small vertebrates such as frogs					
		lizards and snakes					
		<b>Breeding</b> : Nest on the ground in a scrape or small have					
		natch Two eggs laid in spring and early summer					
Numenius	Fastern	<b>Region:</b> Has a primarily coastal distribution but is	Not Listed	Critically	Absent	Unlikely	No
madaaascariensi	Curlew	found in all states, particularly the north, east, and	Hot Listed	Endangered	, losent	onnicely	
s		south-east regions including Tasmania. Eastern					
-		Curlews are rarely recorded inland. Mainly found in					
		estuaries such as the Hunter River, Port Stephens,					
		Clarence River, Richmond River and ICOLLs of the					
		south coast.					
		Habitat: Generally, occupies coastal lakes, inlets, bays					
		and estuarine habitats, and in NSW is mainly found in					
		intertidal mudflats and sometimes saltmarsh of					
		sheltered coasts. Occasionally, the species occurs on					
		ocean beaches (often near estuaries), and coral reefs,					
		rock platforms, or rocky islets. It roosts on sandy spits					
		and islets, especially on dry beach sand near the high-					
		water mark, and among coastal vegetation including					
		low saltmarsh or mangroves. May also roost on					
		wooden oyster leases or other similar structures					
		Food Source: Forages in or at the edge of shallow					
		water, occasionally on exposed algal mats or					
		waterweed, or on banks of beach-cast seagrass or					
		seaweed. It is carnivorous, mainly eating crustaceans					
		(including crabs, shrimps and prawns), small molluscs,					
		as well as some insects.					
		Breeding: Species may delay breeding until three to					
		tour years of age. Within Australia, immature birds,					
		which do not migrate, move northward in winter.					

Darlington Point Boat Ramp - NSW Threatened Species AssessmentP a g e | 28 October 2018

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
пате	Name			n	nabitat	occurrenc	for Impact
						е	
Calidris	Curlew	Region: The Curlew Sandpiper is distributed around	Endangered	Critically	Marginal	Possible	Low
ferruginea	Sandpiper	most of the Australian coastline (including Tasmania). It occurs along the entire coast of NSW, particularly in		Endangered			
		the Hunter Estuary, and sometimes in freshwater					
		wetlands in the Murray-Darling Basin. Inland records are probably mainly of birds pausing for a few days					
		during migration. The Curlew Sandpiper breeds in					
		Siberia and migrates to Australia (as well as Africa and					
		Asia) for the non-breeding period, arriving in Australia					
		between August and November, and departing					
		Habitat: It generally occupies littoral and estuarine					
		habitats, and in New South Wales is mainly found in					
		intertidal mudflats of sheltered coasts. It also occurs in					
		non-tidal swamps, lakes and lagoons on the coast and					
		sometimes inland. Roosts on shingle, shell or sand					
		beaches; spits or islets on the coast or in wetlands; or					
		sometimes in salt marsh, among beach-cast seaweed,					
		Food source: Worms, molluses, crustaceans, insects					
		and some seeds.					
Calyptorhynchus	Glossy Black-	<b>Region</b> : Uncommon although widespread through	Vulnerable	Not Listed	Absent	Possible	Low
lathami	Cockatoo	suitable forest and woodland habitats, from central					
		Queensland coast south to East Gippsland in Victoria,					
		inland to the southern tablelands and central western					
		plains of NSW.					
		the Great Dividing Range where stands of Sheoak					
		occur. In the Riverina, birds are associated with hills					
		and rocky rises supporting Sheoak, but also recorded in					
		open woodlands dominated by Belah.					
		Food source: Feeds almost exclusively on several					
		species of Sheoak (Casuarina and Allocasuarina					
		species). Belah is also used as a critical food source for					
		some populations.					

Darlington Point Boat Ramp - NSW Threatened Species AssessmentP a g e | 29 October 2018

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Nume	Name			"	Παμιται	occurrenc e	Impact
		<b>Breeding</b> : A single egg is laid between March and May. <b>Nest</b> : Dependent on large hollow-bearing eucalypts for nest sites.					
Calyptorhynchus lathami - endangered population	Glossy Black- Cockatoo, Riverina population	See above for description.			Absent	Possible	Low
Certhionyx variegatus	Pied Honeyeater	<ul> <li>Region: Widespread throughout acacia, mallee and spinifex scrubs of arid and semiarid Australia.</li> <li>Occasionally occurs further east, on the slopes and plains and the Hunter Valley, typically during periods of drought.</li> <li>Habitat: Highly nomadic and follows the flowering patterns of shrubs. Inhabits wattle shrub, primarily Mulga (Acacia aneura), mallee, spinifex and eucalypt woodlands.</li> <li>Food source: Nectar, predominantly from various species of emu bushes.</li> <li>Breeding: Constructs a relatively large cup-shaped nest, usually robust, although occasionally loose, constructed of grasses and fine twigs, bound with spider webs, in the fork of a shrub or tree up to 5 m above the ground.</li> </ul>	Vulnerable	Not Listed	Unlikely	Unlikely	No
Chthonicola sagittata	Speckled Warbler	<ul> <li>Region: Ranges throughout south-eastern Queensland, the eastern half of NSW and into Victoria. Most frequently reported from the hills and tablelands of the Great Dividing Range. Severe species decline observed where no vegetation remnants larger than 100ha survive.</li> <li>Habitat: Eucalyptus dominated communities that have a grassy understorey, often on rocky ridges or gullies. Large, relatively undisturbed remnants are required for species to persist in an area.</li> <li>Food source: Seeds and insects.</li> </ul>	Vulnerable	Not Listed	Marginal	Possible	Low

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			n	nabitat	0T occurrenc	for Impact
						e	inpuct
		Breeding: Nests are rounded, domed and built of dry					
		grass and strips of bark, located in a slight hollow in					
		the ground or at the base of a low dense plant, often					
		amongst fallen branches or litter. 3-4 eggs per clutch,					
		laid between August to January. Eggs are a glossy red-					
Circus assimilis	Spotted	Brown.	Vulnerable	Not Listed	Present	Likoly	Moderat
circus ussiminis	Harrier	Individuals disperse widely in NSW and comprise a	vullierable	NOT LISTED	FIESEIIC	LIKEIY	
	Tidiffer	single population.					
		Habitat: Occurs in grassy open woodland including					
		Acacia and mallee remnants, inland riparian woodland,					
		grassland and shrub steppe. Found most commonly in					
		native grassland, but also occurs in agricultural land,					
		foraging over open habitats including edges of inland					
		wetlands.					
		Food Source: Preys on terrestrial mammals (e.g.					
		bandicoots and rodents), birds and reptiles,					
		occasionally insects and rarely carrion.					
		Breeding: Breeding season from spring to autumn.					
Climacteris	Brown	Region: Eastern Australia from SA to Cane York, Old	Vulnerable	Not Listed	Marginal	Likely	Low
nicumnus	Treecreener	Western houndary of the species' range runs	Vallerable	Not Listed	Wargina	LIKCIY	2000
victoriae	(eastern	approximately through Corowa, Wagga Wagga.					
	subspecies)	Temora, Forbes, Dubbo, Inverell.					
	, ,	Habitat: Mainly inhabits woodlands dominated by					
		rough-barked eucalypts, usually with open grassy					
		understorey, sometimes with one or more shrub					
		species. Fallen timber is an important habitat feature.					
		Food source: Feeding predominantly on ants and other					
		invertebrates and sometimes on nectar, sap, lizards					
		and food scraps.					
		Breeding: Usually produce 2-3 speckled and streaked					
		pinkish eggs.					
		Nest: Grass-lined hollow.					

Scientific Name	Common Name	Description	NSW Status	Commonwealt h	Presence of habitat	Likelihood of	Potential for
						occurrenc e	Impact
Daphoenositta chrysoptera	Varied Sittella	<ul> <li>Region: Distribution in NSW nearly continuous from the coast to the far west.</li> <li>Habitat: Eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.</li> <li>Food source: Arthropods.</li> <li>Breeding: Limited information available.</li> <li>Nest: Cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, often re-using the same fork or tree in successive years.</li> </ul>	Vulnerable	Not Listed	Marginal	Likely	Moderat e
Epthianura albifrons	White- fronted Chat	<ul> <li>Region: Found across southern half of Australia.</li> <li>Potential to occur throughout NSW; most commonly found in southern half of the state.</li> <li>Habitat: Salt marsh and other damp, open areas with low vegetation such as swampy farmland and roadside verges.</li> <li>Food source: Insects.</li> <li>Breeding: Breed from late July through to early March.</li> <li>Open cup nests usually built in low vegetation approximately 23cm above ground. Two to three eggs laid per clutch.</li> </ul>	Vulnerable	Not Listed	Unlikely	Unlikely	No
Falco hypoleucos	Grey Falcon	<ul> <li>Region: Sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin. The breeding range has contracted since the 1950's, with most breeding now confined to the arid parts of the range.</li> <li>Population trends are unclear, but it is believed to be extinct in areas with more than 500mm annual rainfall in NSW.</li> <li>Habitat: Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions.</li> <li>Occasionally found in open woodlands near the coast.</li> <li>Also occurs near wetlands where surface water attracts prey.</li> </ul>	Endangered	Not Listed	Marginal	Possible	Low

Darlington Point Boat Ramp - NSW Threatened Species AssessmentP a g e | 32 October 2018

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			h	habitat	of	for Impact
						e	mpass
		<ul> <li>Food source: Preys primarily on birds, especially parrots and pigeons.</li> <li>Breeding: Two to three eggs are laid in late winter and early spring.</li> <li>Nest: Uses old nests of other birds of prey and ravens, usually high in a living eucalypt near water or a watercourse.</li> </ul>					
Falco subniger	Black Falcon	<ul> <li>Region: Widely but sparsely distributed in NSW, mostly in inland regions. Assumed to be a single population in NSW that is continuous with a broader continental population, giving the falcons are highly mobile.</li> <li>Habitat: Found along tree-lined watercourses and in isolated woodlands, mainly in arid and semi-arid areas. Roosts in trees at night and often on power poles by day.</li> <li>Food source: Birds, small mammals, insects, reptiles, sometimes carrion. Sometimes steals prey from other falcons.</li> <li>Breeding: Limited information available, but likely to have poor breeding success.</li> <li>Nest: Nest along tree-lined creeks and rivers of inland drainage basins.</li> </ul>	Endangered	Not Listed	Present	Possible	Low
Grantiella picta	Painted Honeyeater	<ul> <li>Region: Nomadic species occurring at low densities throughout its range. Occurs throughout NSW, except in coastal areas and the south-western corner of the state. Greatest concentration and almost all breeding occurs on inland slopes of Great Dividing Range.</li> <li>Habitat: Boree/Weeping Myall, Brigalow and Box-Gum Woodlands and Box-Ironbark forests.</li> <li>Food source: Specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias.</li> <li>Breeding: Nest from spring to autumn in a small, delicate nest hanging within the outer canopy of</li> </ul>	Vulnerable	Vulnerable	Unlikely	Unlikely	No

Scientific Name	Common Name	Description	NSW Status	Commonwealt h	Presence of habitat	Likelihood of	Potential for
						occurrenc e	Impact
		drooping eucalypts, Sheoak, paperbark or mistletoe branches.					
Grus rubicunda	Brolga	<ul> <li>Region: Formerly found across most of Australia, particularly towards the north. Still abundant in the north, but very sparse across the southern part of its range.</li> <li>Habitat: Dependent on wetlands, yet will also feed in dry grassland and ploughed paddocks.</li> <li>Food source: Sedge roots, tubers, insects, crustaceans, molluscs, frogs.</li> <li>Breeding: Two eggs laid from winter to autumn.</li> <li>Nest: A platform of grasses and sticks augmented with mud, on an island or in the water.</li> </ul>	Vulnerable	Not Listed	Marginal	Possible	Low
<i>Haliaeetus</i> <i>leucogaster</i>	White-bellied Sea-Eagle	Region: distributed along the coastline (including offshore islands) of mainland Australia and Tasmania. It also extends inland along some of the larger waterways, especially in eastern Australia. The inland limits of the speciesare most restricted in south-central and south-western Australia, where it is confined to a narrow band along the coast. Habitat: found in coastal habitats (especially those close to the sea-shore) and around terrestrial wetlands in tropical and temperate regions of mainland Australia and its offshore islands. Habitats occupied are characterised by the presence of large areas of open water (larger rivers, swamps, lakes, the sea). Birds have been recorded in (or flying over) a variety of terrestrial habitats. Birds have been recorded at or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs, saltmarsh and sewage ponds. Food source: Fish, birds, reptiles, mammals, crustaceans, carrion and offal. Breeding: Breeding season from June to January. Nesting: The nest is a large structure composed of sticks and lined with leaves, grass or seaweed. Nests	Vulnerable	Not Listed	Absent	Possible	Low

Darlington Point Boat Ramp - NSW Threatened Species Assessment P a g e | 34 October 2018

Scientific Name	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Nume	Name				Παμιται	occurrenc	Impact
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		may be built in a variety of sites including tall trees					
		(especially Eucalyptus species), busnes, mangroves,					
		clins, rocky outcrops, caves, crevices, on the ground or					
Hieragetus	Little Eagle	Begion: Occurs throughout the Australian mainland	Vulnerable	Not Listed	Marginal	Likely	Moderat
mornhnoides	Little Lagie	Habitat: Occupies open eucalynt forest, woodland or	vullerable	Not Listed	Wargina	LIKETY	ρ
morphilolaes		open woodland. Sheoak or Acacia woodlands and					
		riparian woodlands of interior NSW also used.					
		<b>Food source</b> : Birds, reptiles and mammals, large					
		insects and carrion.					
		Breeding: Lays two or three eggs in spring, young					
		fledge in summer.					
		Nest: Pairs build large stick nest in tall living trees					
		within remnant patches in winter.					
Lathamus	Swift Parrot	Region: Breeds in Tasmania during spring and summer,	Endangered	Critically	Unlikely	Unlikely	No
discolor		migrating in the autumn and winter months to south-		Endangered			
		eastern Australia from Victoria and the eastern parts					
		of South Australia to south-east Queensland. In NSW					
		mostly occurs on the coast and south west slopes.					
		Habitat: Swift Parrots are found in dry scierophyll					
		and flowering fruit trees. They reast communally					
		often in the same tree each night. They are almost					
		always in trees only coming to ground to drink					
		Migrates to the Australian south-east mainland					
		between March and October. Following winter they					
		return to Tasmania where they breed from September					
		to January, nesting in old trees with hollows and					
		feeding in forests dominated by Tasmanian Blue Gum					
		Eucalyptus globulus.					
		Food Source: Commonly used lerp infested trees					
		include Inland Grey Box, Grey Box and Blackbutt.					
		Favoured feed trees include winter flowering species					
		such as Swamp Mahogany, Spotted Gum, Red					
		Bloodwood, Mugga Ironbark, and White Box.					

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			n	napitat	occurrenc	Impact
						е	
		Breeding: Swift Parrots breed only in Tasmania and					
		many pairs breed close together. Timing may vary with					
		the flowering of the Tasmanian Blue Gum.					
		<b>Nest</b> : The nest is in a hollow in the trunk, a branch or					
		spout of a living or dead gum. Pairs may return to the					
		same nest site each year.					
Leipoa ocellata	Malleefowl	<b>Region</b> : Known and predicted to occur in central and	Endangered	Vulnerable	Unlikely	Unlikely	No
		western NSW. Significant populations occur in Mallee					
		Cliffs NP, extending east to Bairanaid and north to					
		Mungo. The population in central NSW has been					
		significantly reduced due to land clearance and lox					
		Coopeo forest near Dubbo					
		Habitat: Predominantly inhabit mallee communities					
		less frequently found in other eucalynt woodlands					
		such as Inland Grey Box, Ironhark or Bimble Box					
		woodlands with thick understorey, or in other					
		woodlands dominated by Mulga or native Cypress Pine					
		species. Prefers areas of light sandy to sandy loam soils					
		and habitats with a dense but discontinuous canopy.					
		with dense and diverse shrub and herb layers.					
		<b>Food source</b> : Forage in open areas on seeds, buds,					
		flowers, fruits, herbs, insects and cereals if available.					
		Breeding: Usually 15-24 (up to 34) eggs laid in a single					
		season.					
		Nest: Incubate eggs in large mounds with considerable					
		volume of sandy soil.					
Limosa limosa	Black-tailed	Region: Migratory wading bird that breeds in Mongolia	Vulnerable	Not Listed	Marginal	Possible	Low
	Godwit	and eastern Siberia and flies to Australia for the					
		southern Summer, arriving in August and leaving in					
		March. Primarily a coastal species. In NSW, recorded in					
		the Hunter River estuary, with occasional records					
		along the coast. It has also been recorded in western					
		NSW, in the Murray Darling Basin, on the western					

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			h	habitat	of	for
						occurrenc	Impact
		slopes of the Northern Tablelands, implying it has a				e	
		regular inland migratory passage through the State.					
		Habitat: Usually found in sheltered bays, estuaries and					
		lagoons with large intertidal mudflats and/or sandflats.					
		Further inland, usually found on mudflats, and around					
		muddy lakes and swamps.					
		Food source: Insects, crustaceans, molluscs, worms,					
		larvae, spiders, fish eggs, frog eggs and tadpoles.					
Lophochroa	Major	Region: Found across arid to semi-arid inland, from	Vulnerable	Not Listed	Marginal	Possible	Low
leadbeateri	Mitchell's	south-western Queensland to north-west Victoria,					
	Cockatoo	through most of south Australia, north into the south-					
		west Northern Territory and across to the west coast					
		between Shark Bay and Jurien. In NSW, it is regularly					
		found as far east as Bourke and Griffith, and					
		sporadically found further east than that.					
		Habitat: Can inhabit a wide variety of environments					
		from forest to mallee scrub. Their main requirements					
		are fresh surface water and trees that have large					
		hollows for nesting.					
		Food source: Seeds (particularly acacia seeds), fruit,					
		nuts and tubers.					
		Breeding: 3-4 eggs laid each season. Breeding pairs					
		need a large feeding area, so nests are well spaced.					
		<b>Nest:</b> Loss of habitat is particularly affecting nest sites.					
		Birds nest in the hollows of eucalyptus of Califris					
		ctrip from the trees using their backs					
Lonhoictinia isura	Square tailed	Begion: Panges along coastal and subcoastal areas	Vulnorablo	Notlistad	Marginal	Possiblo	Low
Lopholetinia isura	Kito	from south-western to northern Australia	vuillerable	NUL LISLEU	Iviaigiliai	POSSIBLE	LOW
	Rite	Oueensland NSW and Victoria In NSW scattered					
		records indicate species is a regular resident in the					
		north_north-east and along major west-flowing river					
		systems. It migrates to south-east Australia to breed.					

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			h	habitat	of	for Impact
						e	mpace
		Habitat: Found in a variety of timbered habitats					
		including dry woodlands and open forests. Shows					
		preference for timbered watercourses.					
		Food Sources: Is a specialist nunter of passerines,					
		Recoding: Prooding from July to Echrypry, Prooding					
		productivity is 0.7 young per pair per year in NSW					
		<b>Nest</b> : Nest sites located along or near watercourses in					
		a fork or on large horizontal limbs.					
Melanodryas	Hooded Robin	Region: Widespread throughout Australia except for	Vulnerable	Not Listed	Unlikely	Unlikely	No
cucullata	(south-	the driest deserts and wettest coastal areas. Rare			_	-	
cucullata	eastern form)	throughout most of its range.					
		Habitat: Lightly wooded country such as open eucalypt					
		woodland, acacia scrub and mallee, often in or near					
		clearings/open areas. Requires structurally diverse					
		habitats including mature and young trees, shrubs and					
		native grasses.					
		<b>Breeding:</b> Breed between July and November, often					
		raising several broods. Two to three eggs per clutch					
		<b>Nest</b> : Small cup of bark, grasses and webs in a tree fork					
		or crevice, from less than 1m to over 5m above					
		ground.					
Melithreptus	Black-chinned	Region: has two subspecies, with only the nominate	Vulnerable	Not Listed	Marginal	Possible	Low
gularis gularis	Honeyeater	(gularis) occurring in NSW. The eastern subspecies					
	(eastern	extends south from central Queensland, through NSW,					
	subspecies)	Victoria into south eastern South Australia, though it is					
		very rare in the last state. In NSW it is widespread,					
		the Great Dividing Range to the north-west and					
		central-west plains and the Riverina. It is rarely					
		recorded east of the Great Dividing Range although					
		regularly observed from the Richmond and Clarence					
		River areas.					

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			n	nabitat	ot occurrenc	for Impact
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		Habitat: Found in the upper levels of open eucalypt forests and woodlands dominated by box and ironback eucalypts and often found along waterways, especially in arid and semi-arid areas and in northern Australia. It is occasionally seen in gardens and street trees. Food sources: Mainly nectar and insects, but will sometimes eat seeds. It usually forages in the upper canopy on the outermost flowers and foliage. Breeding: Often breed co-operatively, with up to four adults helping the females to feed the young. At the start of the breeding season the males become agitated and aggressive, attacking even larger birds of other species, and defend a breeding territory. Nest: Female builds the nest, with helpers sometimes bringing materials or accompanying the female bird while she builds. Nest is placed high in the crown of a tree, hidden by foliage and slung by the rim from the outer leaves of a branch and is a compact, cup-shaped formed from bark fibres, woven with hair, wool or fur and matted into a thick, hairy 'felt', and is lined with wool, hair or fur.					
Neophema pulchella	Turquoise Parrot	<ul> <li>Region: Southern Queensland through to northern</li> <li>Victoria, from coastal plains to western slopes of Great</li> <li>Diving Range.</li> <li>Habitat: Lives on edges of eucalypt woodland</li> <li>adjoining clearings, timbered ridges and creeks in farmland.</li> <li>Preferred Food: Seeds, grasses, herbaceous plants, vegetable matter.</li> <li>Breeding: Nests in tree hollows, logs or posts, from</li> <li>August to December. Lays four to five white, rounded</li> <li>eggs on a nest of decaved wood dust.</li> </ul>	Vulnerable	Not Listed	Present	Possible	Low
Ninox connivens	Barking Owl	<b>Region</b> : Found throughout continental Australia except for in the central arid regions. Species has declined in southern Australia, occurs in a wide but sparse	Vulnerable	Not Listed	Present	Possible	Low

Darlington Point Boat Ramp - NSW Threatened Species Assessment October 2018

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			n	napitat	occurrenc	Impact
						е	
		distribution in NSW. Core populations exist on the					
		western slopes and plains (especially in the Pilliga) and					
		in some northeast coastal and escarpment forests.					
		Habitat: Inhabits woodland and open forest, including					
		fragmented remnants and partly cleared farmland. Is					
		flexible in its habitat use. Can hunt in closed forest and					
		more open areas. Sometimes able to successfully					
		breed along timbered watercourses in heavily cleared					
		habitats due to higher prey density on fertile soil.					
		Food source: Small arboreal mammals such as squirrel					
		gliders and ringtail possums, birds, invertebrates,					
		terrestrial mammals such as rodents and rabbits.					
		Breeding: Two or three eggs laid in hollows of large,					
		old trees. Nesting occurs during mid-winter and spring					
		but is variable between pairs and among years.					
Oxyura australis	Blue-billed	Region: Endemic to south-eastern and south-western	Vulnerable	Not Listed	Marginal	Possible	Low
	Duck	Australia. Widespread in NSW, most common in the					
		southern Murray-Darling Basin area. Birds disperse					
		during the breeding season to deep swamps 300km					
		away. They are generally only seen in coastal areas					
		during summer or in drier years.					
		Habitat: Prefers deep water in large permanent					
		wetlands and swamps with dense aquatic vegetation.					
		The species is completely aquatic.					
		Food Sources: Feed on the bottom of swamps eating					
		seeds, buds, stems, leaves, fruit and small aquatic					
		Insects.					
		Breeding: Species is partly migratory, with short-					
		distance movements between breeding swamps and					
		to broad during arrive and early surgers and					
		Nort: Next over deep water in bull ruch or in trampled					
		vogetation in Lignum, codges or spike rush					
Dachucorhala		vegetation in Lighum, seuges of spike-rush.					
Puchvcephala	Cilbort's	<b>Bagion</b> : Distributed throughout most of control and	Vulnorable	Notlictod	Unlikoly	Uplikoly	No

Darlington Point Boat Ramp - NSW Threatened Species Assessment October 2018

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			h	habitat	0t occurrenc	tor Impact
						e	inipact
		<ul> <li>declined chiefly due to habitat clearance, such that the extent of communities is uncertain.</li> <li>Habitat: Occurs in a range of habitats, with a dense shrub layer seeming to be a key habitat feature.</li> <li>Forages on or near the ground in shrub thickets and in tops of small trees.</li> <li>Food source: Spiders, insects, and occasionally seeds and fruits.</li> <li>Breeding: Breeding occurs between August and November. Between two and four eggs per clutch.</li> <li>Nest either lined cup or sometimes birds use old nests of other species, particularly disused babblers' nests.</li> </ul>					
Pedionomus torquatus	Plains- wanderer	<ul> <li>Region: Western Riverina area bounded by Hay, Narrandera on the Murrumbidgee River in the north, the Cobb highway in the west, the Billabong creek in the south and Urana in the east. Also in North-central Victoria and central-western QLD.</li> <li>Habitat: Plains-wanderers live in semi-arid, lowland native grasslands that typically occur on hard red- brown soils. Habitat structure appears to play a more important role than plant species composition.</li> <li>Preferred habitat of the Plains-wanderer typically comprises 50% bare ground, 10% fallen litter, and 40% herbs, forbs and grasses.</li> <li>Food source: Insects.</li> <li>Breeding: Plains-wanderers are capable of breeding in their first year and they breed in solitary pairs. Clutch- size is usually four eggs, but can range from two to five.</li> <li>Nest: The nest is a hollow or 'scrape' that is scratched into the ground and lined with grass. The nests are placed amongst native grasses and herbs, or sometimes amongst crops.</li> </ul>	Endangered	Critically Endangered	Unlikely	Unlikely	Νο
Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
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Name	Name			h	habitat	of	for
						occurrenc	Impact
Petroica boodang	Scarlet Robin	Region: South east Queensland to south east South Australia, also in Tasmania and WA. In NSW, occurs from coast to inland slopes. Habitat: Dry eucalypt forests and woodlands. Understorey open and grassy with few scattered shrubs. Species lives in both mature and regrowth vegetation. Also occasionally occurs in mallee or wet forest communities, in wetlands and tea-tree swamps. Breeds on ridges, hills and foothills of western slopes, Great Dividing Range and eastern coastal regions. Food Source: Insects and other invertebrates. Breeding: Breeding season between July and January, between two to three broods in each season. Eggs pale	Vulnerable	Not Listed	Unlikely	e Unlikely	No
		greenish-, bluish- or brownish-white, spotted with brown. Clutch size 1-4. <b>Nest</b> : Open cup made of plant fibres and cobwebs, usually more than 2m above ground. Nests usually on a dead branch in a live tree, or in a dead tree/shrub.					
Petroica phoenicea	Flame Robin	Region: Near Queensland border to south east South Australia, also in Tasmania. In NSW, breeds in upland areas, and moves to inland slopes and plains in winter. Likely there are two separate NSW populations, one in Northern Tablelands, another ranging from Central to Southern Tablelands. Habitat: Breeds in upland tall moist eucalypt forests and woodlands, open on ridges and slopes. Prefers clearings and/or open understoreys, with ground layer of native grasses. In winter, birds migrate to drier, more open habitats in the lowlands, including dry forests, open woodlands, and in pastures and native grasslands with or without scattered trees. Food source: Insects and other invertebrates. Breeding: Reproduce in spring to late summer. Clutch size three to four eggs.	Vulnerable	Not Listed	Marginal	Possible	Low

Scientific Name	Common Name	Description	NSW Status	Commonwealt h	Presence of habitat	Likelihood of	Potential for
						occurrenc e	Impact
		<b>Nest</b> : Open cup nest, often near ground in sheltered sites such as shallow tree cavities, stumps, banks. Eggs oval in shape, pale bluish- or greenish-white and marked with brownish blotches.					
Polytelis anthopeplus monarchoides	Regent Parrot (eastern subspecies)	<ul> <li>Region: The eastern subspecies is restricted to areas around the Murray River in South Australia, Victoria and NSW. In NSW it occurs along the Murray River downstream of Tooleybuc (though there are few records between Mildura and the South Australian border), the Wakool River downstream of Kyalite, and the Murrumbidgee River immediately upstream from the junction with the Murray River and adjoining areas of mallee.</li> <li>Habitat: The species nests within River Red Gum forests along the Murray, Wakool and lower Murrumbidgee Rivers, and possibly the Darling River downstream of Pooncarie. Principal foraging habitat is mallee woodlands, though foraging also occurs in riverine forests and woodlands. Mallee woodland within 20 kilometres of nesting sites is critical foraging habitat for breeding birds.</li> <li>Food source: Seeds, grasses, plant material, flower buds, insect larvae. They may utilise cereal crops and will feed on spilt grain. Is claimed to be a pest in almond orchards.</li> <li>Breeding: Breeding season August to January, clutch size 3 to 5. Typical nest trees are large, mature healthy trees with many spouts (though dead trees are used) and are usually located close to a watercourse.</li> </ul>	Endangered	Vulnerable	Present	Possible	Low
Polytelis swainsonii	Superb Parrot	<ul> <li>Region: Eastern inland NSW Breeding on the Southwestern slopes, migrating to the Namoi &amp; Gwydir regions during winter.</li> <li>Habitat: Red river gums, black box, yellow box, river oak, mostly near rivers; mallee, stubbles, pastures, gardens.</li> </ul>	Vulnerable	Vulnerable	Present	Likely	Moderat e

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			h	habitat	of	for
						occurrenc e	Impact
		Food source: Mostly on grass seed and herbaceous					
		plants but also fruits, berries, nectar, bud's, insects and					
		flowers.					
		<b>Breeding</b> : Sept-Jan to produce 4-6 round white eggs.					
		Nest: Hollow of red river gum or yellow box near					
Pomatostomus	Grev-crowned	Region: Eastern and northern Australia. Becoming	Vulnerable	Not Listed	Marginal	Possible	Low
temporalis	Babbler	rarer in settled areas.					
temporalis	(eastern	Habitat: A bird species common in Box-Gum, Box-					
	subspecies)	Cypress & Open Box woodlands and scrubland. Birds					
		are generally unable to cross large open areas.					
		Food source: Feed on invertebrates by foraging on the					
		trees or on the ground digging and probing amongst					
		litter and tussock grasses.					
		Breeding: Usually 2-3 eggs laid between July and					
		February.					
		Nest: Nest is a large, untidy dome of sticks lined with					
		grass, bark, wool etc. 3-6m above ground.					
Pyrrholaemus	Redthroat	<b>Region</b> : In NSW, the species is confined to the far west	Vulnerable		Unlikely	Unlikely	No
brunneus		of the state, with populations known from four main					
		due to its shy habits and low observer numbers within					
		its distribution.					
		Habitat: In NSW the species has been recorded mainly					
		in chenopod shrublands including Old Man Saltbush,					
		Black Bluebush and Dillon Bush shrublands. Around					
		Broken Hill it appears to be associated with the denser					
		vegetation, particularly Acacias, found in drainage lines					
		<b>Food sources</b> : Terrestrial invertebrates and grass					
		seeds.					
		Breeding: Breeds in late winter to spring and builds a					
		bulky dome-shaped nest with a side entrance from					
		coarse strips of bark, grass and feathers. The nest is					

Darlington Point Boat Ramp - NSW Threatened Species Assessment P a g e | 44 October 2018

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			h	habitat	of	for
						occurrenc	Impact
	1				1	е	1
		located in shrubs or small trees up to one metre above					
	A 1 1	the ground and usually contains two to four eggs.				<b>D</b> 11	
Rostratula	Australian	<b>Region:</b> Most records from the south east, particularly	Endangered	Endangered	Marginal	Possible	LOW
australis	Painted Shipe	the Murray Daning Basin. In NSW, most records					
		Associated with marshes, lakes and swamps in the					
		Habitat: Profers fringes of swamps, dams and nearby					
		marshy areas where there is a cover of grasses lignum					
		low scrub or open timber. Forages on mud flats and in					
		shallow water.					
		<b>Food source</b> : Worms, molluscs, insects, some plant					
		matter.					
		Breeding: Often in response to local conditions,					
		generally occurs from September to December.					
		Nest: A scrape in the ground lined with grasses and					
		leaves.					
Pandion cristatus	Eastern	Region: has a global distribution with four subspecies	Vulnerable	Not Listed	Unlikely	Unlikely	No
	Osprey	previously recognised throughout its range. However,					
		recent studies have identified that there are two					
		species of Osprey - the Western Osprey (P. halietus)					
		with three susbpecies occurring in Europe, Asia and					
		the Americas and the Eastern Osprey ( <i>P. cristatus</i> )					
		occurring between Sulawesi (in Indonesia), Australia					
		and New Caledonia. Eastern Ospreys are found right					
		and Tacmania. They are common around the porthern					
		coact especially on rocky shorelines, islands and roofs					
		The species is uncommon to rare or absent from					
		closely settled parts of south-eastern Australia. There					
		are a handful of records from inland areas.					
		Habitat: Favour coastal areas. especially the mouths of					
		large rivers, lagoons and lakes.					
		<b>Food Source:</b> Feed on fish over clear, open water.					
		Breed from July to September in NSW.					

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			h	habitat	of	for
						occurrenc	Impact
		<b>Broading:</b> Nosts are made high up in dead trees or in			[	e	
		doad crowns of live trees, usually within one kilometre					
		of the sea Incubation of 2-3 eggs usually by the					
		female is about 40 days. Female remains with young					
		almost until they fly usually after about nine weeks in					
		the nest.					
Stagonopleura	Diamond	Region: Endemic to south-eastern Australia, from central	Vulnerabl	Not Listed	Marginal	Possible	Low
guttata	Firetail	Queensland to South Australia. Widely distributed in	е				
-		NSW. Uncommon along the coast and west of the Darling					
		River.					
		Habitat: Grassy eucalypt woodlands. Often found in					
		riparian areas, sometimes in lightly wooded farmland.					
		Food source: Grass and herb seeds, green leaves, insects.					
		Breeding: Between August and January. Nests are					
		globular structures either in shrubby understorey or					
		higher up (especially under hawk's or raven's nests).					
Stictonetta	Freckled Duck	Region: Found primarily in south-eastern and south-	Vulnerable		Marginal	Possible	Low
naevosa		western Australia. Widespread throughout NSW.					
		Habitat: Prefers permanent freshwater swamps and					
		creeks with heavy growth of Cumbungi, Lignum or Tea-					
		tree. During drier times, they move from ephemeral					
		breeding swamps to more permanent waters such as					
		lakes, reservoirs, farm dams and sewage ponds.					
		Generally, rest in dense cover over deep water during					
		the day.					
		Food source: Algae, seeds and vegetative parts of					
		aquatic grasses, small invertebrates.					
		Breeding: Nesting usually occurs between October and					
		favourable conditions					
		Nests: Usually located in dense vegetation at or near					
		water level.					
Tvto	Masked Owl	<b>Region</b> : Records for this species fall within 90% of	Vulnerable	Not Listed	Present	Possible	Low
novaehollandiae		NSW, excluding the most arid north-western corner.					
		Most common on the western plains.					

Scientific Name	Common Name	Description	NSW Status	Commonwealt h	Presence of habitat	Likelihood of	Potential for
						occurrenc e	Impact
		<ul> <li>Habitat: Lives in dry eucalypt forests and woodland from sea level to 1100m ASL.</li> <li>Food source: Tree and ground-dwelling mammals, especially rats.</li> <li>Breeding: Breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting. Breeds any time of the year, with clutch sizes of 2-3 eggs.</li> </ul>					
Mammals		·		'			
Phascolarctos cinereus	Koala	<ul> <li>Region: Fragment distribution throughout eastern Australia from north-east Queensland to South Australia. In NSW, mainly occurs on the central and north coasts, and some populations in the west of the Great Dividing Range.</li> <li>Habitat: Eucalypt woodlands and forests.</li> <li>Food source: Foliage of more than 70 eucalypt and 30 non-eucalypt species.</li> <li>Breeding: Females breed at two years of age and produce one young per year.</li> </ul>	Vulnerable	Vulnerable	Unlikely	Unlikely	No
Dasyurus maculatus	Spotted-tailed Quoll	Region: range has contracted considerably since European settlement and is now found in eastern NSW, eastern Victoria, south-east and north-eastern Queensland, and Tasmania. Only in Tasmania is it still considered relatively common. Habitat: Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow- bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites. Mostly nocturnal, although will hunt during the day; spends most of the time on the ground, although also an excellent climber and will hunt possums and gliders in tree hollows and	Vulnerable	Endangered	Present	Possible	Low

Darlington Point Boat Ramp - NSW Threatened Species Assessment P a g e | 47 October 2018

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			h	habitat	of	for
						occurrenc	Impact
		prev on roosting birds. Use communal 'latrine sites'				e	
		often on flat rocks among boulder fields, rocky cliff-					
		faces or along rocky stream beds or banks. Such sites					
		may be visited by multiple individuals and can be					
		recognised by the accumulation of the sometimes					
		characteristic 'twisty-shaped' faeces deposited by					
		animals.					
		Food Source: generalist predator with a preference for					
		medium-sized (500g-5kg) mammals. Consumes a					
		variety of prey, including gliders, possums, small					
		wallabies, rats, birds, bandicoots, rabbits, reptiles and					
		insects. Also eats carrion and takes domestic fowl.					
		Breeding: Females occupy home ranges up to about					
		750 hectares and males up to 3500 hectares. Are					
		known to traverse their home ranges along densely					
		vegetated creeklines. Average litter size is five; both					
		sexes mature at about one year of age. Life expectancy					
		in the wild is about 3-4 years.					
Bats							
Chalinolobus	Little Pied Bat	Region: Found inland in Queensland and NSW	Vulnerable	Not Listed	Unlikely	Unlikely	No
picatus		(including Western Plains and slopes), extending					
		slightly into South Australia and Victoria.					
		Habitat: Occurs in dry open forest, open woodland,					
		mulga woodlands, chenopod shrublands, cypress pine					
		forest and mallee and Bimbil box woodlands. Roosts in					
		caves, rock outcrops, mine shafts, tunnels, tree					
		hollows and buildings. Can tolerate high temperatures					
		and dryness but requires access to nearby water.					
		Food source: Moths and possibly other flying					
		Invertebrates.					
		Breeding: Limited information available.	N/ 1 11				•
Nyctophilus	Corben's	Region: Coincides approximately with the Murray	Vulnerable	Vulnerable	Possible	Unlikely	NO
corbeni	Long-eared	Darling Basin with the Pilliga Scrub region being the					
	Bat	distinct stronghold for this species.					

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			h	habitat	of	for
						occurrenc	Impact
		Habitat: Inhabits a variety of vegetation types,					
		including mallee, bulloke Allocasuarina leuhmanni and					
		box eucalypt dominated communities, but it is					
		distinctly more common in box/ironbark/cypress-pine					
		vegetation that occurs in a north-south belt along the					
		western slopes and plains of NSW and southern					
		Queensland. Roosts in tree hollows, crevices, and					
		under loose bark.					
		Food Source: Low flying agile bat, utilising the					
		understorey to hunt non-flying prey - especially					
		caterpillars and beetles - and will even hunt on the					
		ground.					
		Breeding: Mating takes place in autumn with one or					
	-	two young born in late spring to early summer.		-			
Myotis macropus	Southern	<b>Region</b> : The Southern Myotis is found in the coastal	Vulnerable	Not Listed	Marginal	Possible	Low
	Myotis	band from the north-west of Australia, across the top-					
		end and south to western Victoria. It is rarely found					
		more than 100 km inland, except along major rivers.					
		<b>Habitat:</b> Generally, roost in groups of 10 - 15 close to					
		water in caves, mine snafts, hollow-bearing trees,					
		storm water channels, buildings, under bridges and in					
		Each source: Earage over streams and pools catching					
		insects and small fish by raking their feet across the					
		water surface					
		<b>Breeding</b> : In NSW females have one young each year					
		usually in November or December.					
Saccolaimus	Yellow-bellied	Region: The Yellow-bellied Sheathtail-bat is a wide-	Vulnerable	Not Listed	Marginal	Possible	Low
flaviventris	Sheathtail-bat	ranging species found across northern and eastern					
		Australia. There are scattered records of this species					
		across the New England Tablelands and North West					
		Slopes.					
		Habitat: Forages in most habitats across its very wide					
		Region, with and without trees; appears to defend an					
		aerial territory. Roosts singly or in groups of up to six,					

Darlington Point Boat Ramp - NSW Threatened Species AssessmentP a g e | 49 October 2018

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			n	habitat	of occurrenc	for Impact
						е	
		in tree hollows and buildings; in treeless areas, they					
		are known to utilise mammal burrows.					
		Food source: Insects					
		to mid-March, when a single pup is born					
<b>Vespadelus</b> Ir	nland Forest	<b>Region</b> : Because of the difficulty of identification the	Vulnerable	Not Listed	Present	Likely	Moderat
baverstocki B	Bat	distribution of this species, particularly in NSW, is very	vullerable	Not Listed	Tresent	LIKCIY	e
		poorly known. Believed to occur widely in all the					
		mainland states, generally in areas with annual rainfall					
		less than 400 millimetres.					
		Habitat: The habitat requirements of this species are					
		poorly known but it has been recorded from a variety					
		of woodland formations, including Mallee, Mulga and					
		River Red Gum. Most records are from drier woodland					
		Forest Bat. However, other habitats may be used for					
		foraging and/or drinking. These bats cover an					
		extensive foraging area.					
		Food source: Presumed to feed on flying insects.					
		Breeding: Females congregate to raise young in					
		November and December, with young carried for the					
		first week following birth. Young are independent by					
Elora		January.					
Austrosting	spear-grass	<b>Region</b> : Confined to the floodplains of the Murray	Endangered	Endangered	Present	Possible	Low
wakoolica	Copeur Bruss	River tributaries of central-western and south-western	Enddingered	Enddingered	Tresent	1 0351510	2011
		NSW, with localities including Manna State Forest,					
		Matong, Lake Tooim, Merran Creek, Tulla, Cunninyeuk					
		and Mairjimmy State Forest (now part of South West					
		Woodland Nature Reserve).					
		Habitat: Grows on floodplains of the Murray River					
		tributaries, in open woodland on grey, silty clay or					
		sandy loam solls; habitats include the edges of a					
		The second					

Darlington Point Boat Ramp - NSW Threatened Species AssessmentP a g e | 50

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			n	nabitat	occurrenc	tor Impact
						e	impact
		open Cypress Pine forest on low sandy range; and a					
		low, rocky rise. Associated species include Callitris					
		glaucophylla, Eucalyptus microcarpa, E. populnea,					
		Austrostipa eremophila, A. drummondii,					
		Austrodanthonia eriantha and Einadia nutans.					
		Flowering/Description: Flowers from October to					
		December, mainly in response to rain.					
Brachyscome	Claypan Daisy	<b>Region</b> : The Claypan Daisy occurs in the Wagga Wagga,	Vulnerable	Vulnerable	Present	Possible	Low
muelleroides		Narranderra, rocumwal and Walbundrie areas. Also					
		from Tocumwal to the Ovens River)					
		Habitat: Grows in damp areas on the margins of					
		claypans in moist grassland with Pycnosorus globosus.					
		Agrostis avenacea and Austrodanthonia duttoniana.					
		Also recorded from the margins of lagoons in mud or					
		water, and in association with Calotis anthemoides.					
		Victorian collections have generally come from open					
		positions on the Murray River floodplain, swampy					
		River Red Gum (Eucalyptus camaldulensis) Forest and					
		damp depressions.					
		Flowering/Description: September to November					
Brachyscome	Mossgiel	Region: The Mossgiel Daisy is endemic to NSW and	Vulnerable	Vulnerable	Unlikely	Unlikely	No
papillosa	Daisy	chiefly occurs within the Riverina Bioregion, from					
		Mossgiel in the north, Murrumbidgee Valley (Yanga)					
		National Park in the south west to Urana in the south					
		edst. Habitat: Decorded primarily in clay soils on Bladder					
		Salthush (Atripley vesicaria) and Leafless Bluebush					
		(Maireana anhylla) plains but also in grassland and in					
		Inland Grey Box (Fucalvatus microcarpa) - Cypress Pine					
		( <i>Callitris spp.</i> ) woodland.					
		Flowering/Description: June to December.					
Caladenia	Sand-hill	<b>Region</b> : Caladenia arenaria is found mostly on the	Endangered	Endangered	Unlikely	Unlikely	No
arenaria	Spider Orchid	south west plains and western south west slopes. The	U	J			
		original description is of a plant from Nangus, west of					

Darlington Point Boat Ramp - NSW Threatened Species Assessment October 2018

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			n	nabitat	OT	TOR Impact
						e	impact
		Gundagai (1865) and there is a report of the species					
		from Adelong near Tumut. The Sand-hill Spider Orchid					
		is currently only known to occur in the Riverina					
		between Urana and Narranderra.					
		Habitat: Occurs in woodland with sandy soil, especially					
		that dominated by White Cypress Pine (Callitris					
		glaucophylla).					
		Flowering/Description: The flower stalk is up to 40 cm					
		tall and has 1 or 2 pale yellow flowers. The petals and					
		lateral sepals are stiffly spread into a cross shape; the					
		tips of all are red and hairy. The labellum is only 8 mm					
		across when flattened out and without lobes; this					
		combination of flower characters is unique. The					
Companya	Diadaya ad	nowers appear between September and November.	<b>F</b> undamental	N1-4-1 *-41	Descent	Dessible	1 million
Convoivulus	Bindweed	Region: This species has been recorded from northern	Endangered	Not Listed	Present	Possible	LOW
teamoorei		Miand areas of South Australia, South-Western					
		queensiand and western NSW. There are rew known					
		and Darling Piver floodplains in contral western NSW					
		Ifrom Toganmain Station, Darlington Point, and from a					
		locality 8km north-west of Louth); and two other					
		records from east of Broken Hill on the road to					
		Wilcannia, and from the Menindee Road. Scarsdale.					
		<b>Habitat</b> : Grows in self-mulching grev clay soils on the					
		floodplains of the Darling and Murrumbidgee Rivers.					
		Flowering/Description: Flowering specimens of					
		Convolvulus tedmoorei were collected in late winter					
		(August) and early spring (September).					
Cullen parvum	Small Scurf-	Region: known in NSW from only two herbarium	Endangered	Not Listed	Marginal	Possible	Low
	реа	collections; one from Wagga Wagga in 1884 and the					
		other from Jindera (near Albury) in 1967. A small					
		population was recently reported from near Jerilderie					
		(although it has not been relocated). In recent years,					
		two populations have been recorded in travelling stock					
		reserves south-west of Wagga Wagga, and a					

Darlington Point Boat Ramp - NSW Threatened Species AssessmentP a g e | 52 October 2018

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			h	habitat	of	for
						e	Impact
		population reputedly exists on a roadside near Galong. Another population has recently been discovered on private land near Young. Large populations have been recorded in grassy gaps in the Red Gum Woodlands of Barmah State Park, just across the border in Victoria. Extensive suitable habitat probably occurs across the border in NSW. <b>Habitat</b> : In known populations in Victoria and NSW, plants are found in grassland, River Red Gum ( <i>Eucalyptus camaldulensis</i> ) Woodland or Box-Gum Woodland, sometimes on grazed land and usually on table drains or adjacent to drainage lines or watercourses, in areas with rainfall of between 450 and 700 mm. Flooding has been suggested as a mechanism for seed dispersal. <b>Flowering/Description:</b> Plants tend to die back in dry seasons and resprout with rain in winter or spring; in dry years, plants apparently do not always produce shoots but survive below the ground. Its flowers are usually also in threes, purple-pink (or sometimes white) apparenting in cummor					
Diuris sp. (Oaklands, D.L. Jones 5380)	Oaklands Diuris	Region: Currently known only from the Oaklands- Urana region of southern NSW. Habitat: Grows in White Cypress Pine ( <i>Callitris</i> glaucophylla) Woodland, either among dense grasses in flat areas with associated eucalypts, or amongst sparse grasses and forbs on low sandhills. Grows mostly on sandy loam soils. Flowering/Description: the flowers are slightly fragrant compared to being intensely fragrant with a strong spicy scent. It also has longer lateral sepals and a larger column. Unlike many species in the genus, which are yellow (often in combination with purple) in colour, the flowers of Oaklands Diuris are white and purple.	Endangered	Not Listed	Unlikely	Unlikely	Νο

Darlington Point Boat Ramp - NSW Threatened Species AssessmentP a g e | 53 October 2018

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			h	habitat	of	for
						occurrenc e	Impact
Diuris tricolor	Pine Donkey Orchid	<ul> <li>Region: Sporadically distributed on western slopes of NSW, extending from south of Narrandera to the north of NSW.</li> <li>Habitat: Sclerophyll forest amongst grass, often with native Cypress Pine. Found in sandy soils, either on flats or small rises. Also recorded from red earth soil in a Bimble Box community in western NSW. Disturbance regimes are not known, although the species is usually recorded from disturbed habitats.</li> <li>Flowering: Farly September to late October.</li> </ul>	Vulnerable	Not Listed	Absent	Possible	No
Eucalyptus leucoxylon subsp. pruinosa	Yellow Gum	<ul> <li>Region: Restricted to several small areas between Barham and Euston. This species is not known from any protected area within NSW, though some remnants occur within State Forests along the Murray River, particularly within Campbells Island and Euston SFs.</li> <li>Habitat: Eucalyptus leucoxylon subsp. pruinosa is a tree species which, in New South Wales, occurs at the bases of sandy rises and on loamy clay flats on the floodplains of the Murray River and its tributaries in the Riverina Bioregion.</li> </ul>	Vulnerable	Not Listed	Unlikely	Unlikely	No
Lepidium monoplocoides	Winged Peppercress	<ul> <li>Region: Widespread in the semi-arid western plains regions of NSW.</li> <li>Habitat: Occurs on seasonally moist to waterlogged sites, on heavy fertile soils, with a mean annual rainfall of around 300-500 mm. Predominant vegetation is usually an open woodland dominated by Bulloak and/or eucalypts. The field layer of the surrounding woodland is dominated by tussock grasses. Species highly dependent on seasonal conditions and does not tolerate grazing disturbance.</li> <li>Flowering: From August to October.</li> </ul>	Endangered	Endangered	Unlikely	Unlikely	No
Leptorhynchos orientalis	Lanky Buttons	<b>Region</b> : Recorded from several Hay Plain and southern Riverina localities, including Willanthry east of Hillston, Zara-Wanganella via Hay, McKinley Road SW of	Endangered	Not Listed	Marginal	Possible	Low

Darlington Point Boat Ramp - NSW Threatened Species AssessmentP a g e | 54 October 2018

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			h	habitat	of	for
						occurrenc	Impact
		Hillston and "Morundah" nawy land wort of				e	
		Ruckinghong SE A large population has most recently					
		been recorded from Cowl Cowl Station SSW of Hillston					
		along a TSP					
		Habitat: Grows in woodland or grassland sometimes					
		on the margins of swamps. Communities include a					
		Bimble Box plain in red-brown soil dense Acacia					
		pendula woodland with herbaceous understorey on					
		red clay to clay-loam open grassland areas on red					
		soils, and red clay plains at the edge of a Canegrass					
		swamp. Associated species include Eucalyptus					
		populnea subsp. bimbil. Acacia pendula. Eraarostis					
		australasica, Lepidium monoplocoides, Enchylaena					
		tomentosa, Minuria leptophylla, Rhodanthe floribunda,					
		R. pygmaea and Ptilotus spathulatus.					
		Flowering/Description: Flowers in late winter (August)					
		and spring (October).					
Maireana cheelii	Chariot	Region: Restricted to the southern Riverina region of	Vulnerable	Vulnerable	Marginal	Possible	Low
	Wheels	NSW, mainly in the area between Deniliquin and Hay.					
		Also has a limited distribution in Victoria where very					
		rare. NSW collections have mainly been from the					
		Moulamein, Deniliquin and Hay districts, including					
		Tchelery and Zara Stations. There is an outlying record					
		from "Wangareena east of Wanaaring".					
		Habitat: Usually found on heavier, grey clay soils with					
		Atriplex vesicaria (Bladder Saltbush). Recorded on the					
		Hay Plain in Atriplex vesicaria, Maireana aphylla and					
		Acacia homalophylla shrublands. Soils include heavy					
		brown to red-brown clay-loams, hard cracking red clay,					
		other heavy texture-contrast soils. Tends to grow in					
		snallow depressions, often on eroded or scalded					
		surfaces, and does not extend to the higher soils in the					
		nabitat. It has been found on the edges of bare,					
		windswept claypans, in shallow depressions of eroded					

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			h	habitat	of	for
						occurrenc	Impact
		surfaces where rainwater collects and on a "shelf" in					
		the crabhole complex of heavy grey soils.					
		Flowering/Description: Flowering time is mostly spring					
		to summer. Bears fruits mostly from September to					
		November.					
Pilularia novae-	Austral	Region: In NSW, Austral Pillwort has been recorded	Endangered	Not Listed	Marginal	Possible	Low
hollandiae	Pillwort	from suburban Sydney, Khancoban, the Riverina					
		between Albury and Urana (including Henty,					
		Walbundrie, Balldale and Howlong), Oolambeyan					
		National Park near Carathool and at Lake Cowal near					
		West Wyalong. The populations at Lake Cowal and					
		Oolambeyan NP are the only known extant					
		populations in NSW, although the species is obscure					
		and has possibly been overlooked elsewhere.					
		Habitat: Austral Pillwort grows in shallow swamps and					
		waterways, often among grasses and sedges. It is most					
		often recorded in drying mud as this is when it is most					
		Conspicuous.					
		enhamoral (acrocially in the drive parts of its range)					
		appearing when soils are moistened by rain					
Sclerolaena	Turnin	<b>Region:</b> Known from only a few small populations in	Endangered	Endangered	Unlikely	Unlikely	No
napiformis	Copperburr	remnant grassland in the southern Riverina of NSW	Enddingered	Linddingered	onnicery	Officery	
		and north-central Victoria. NSW populations are					
		confined to the area between Jerilderie and Moama on					
		travelling stock routes and road reserves.					
		Habitat: Confined to remnant grassland habitats on					
		clay-loam soils. Grows on level plains in tussock					
		grassland of Austrostipa nodosa and Chloris truncata,					
		in grey cracking clay to red-brown loamy clay. Sites are					
		roadside travelling stock routes and reserves subject to					
		sheep grazing. Associated species include					
		Austrodanthonia duttoniana, Enteropogon acicularis,					
		Austrostipa nodosa, Chloris truncata, Lolium rigidum,					
		Swainsona murrayana, S. plagiotropis, S. procumbens,					

Darlington Point Boat Ramp - NSW Threatened Species AssessmentP a g e | 56 October 2018

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			h	habitat	of	for
						occurrenc	Impact
		Rhodanthe corymbiflora, Calotis scabiosifolia,					
		Microseris lanceolata, Acacia pendula and various					
		chenopods.					
		Flowering/Description: Fruiting period is from					
		November to May. Plants grow as low shrubs within an					
		open to mid-dense tussock grassland with herbaceous					
		ground layer.					
Solanum	Menindee	Region: the only species of Solanum endemic to NSW	Vulnerable	Vulnerable	Marginal	Possible	Low
karsense	Nightshade	and is restricted to the far south-western plains,					
		extending up the Darling River to the Menindee and					
		Wilcannia districts. Mainly restricted to the area					
		between the Darling and Lachlan Rivers. Localities					
		include Kars Station, Lake Tandou, Lake Cawndilla,					
		Oxley area, between Broken Hill and Menindee, and					
		the Darling River. It has been recorded from Kinchega					
		National Park and Nearle Lake Nature Reserve.					
		Habitat: Grows in occasionally flooded depressions					
		with neavy soil, including level river floodplains of grey					
		tracless plains with selepized brown soils. Habitats are					
		generally lake hods or floodplains of hoavy groy clays					
		with a highly self-mulching surface. Also found on					
		sandy floodnlains and ridges and in calcareous soils					
		red sands red-brown earths and loamy soils					
		Flowering/Description: Flowers chiefly in spring.					
Swainsona	Slender	<b>Region</b> : Found throughout NSW, it has been recorded	Vulnerable	Vulnerable	Marginal	Possible	Low
murrayana	Darling Pea	in the Jerilderie and Deniliquin areas of the southern			_		
		riverine plain, the Hay plain as far north as Willandra					
		National Park, near Broken Hill and in various localities					
		between Dubbo and Moree.					
		Habitat: Collected from clay-based soils. Grows in a					
		variety of vegetation types. Species may require some					
		disturbance and has been known to occur in paddocks					
		that are moderately grazed or occasionally cultivated.					

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			h	habitat	of	for
						occurrenc	Impact
		Flowering (Description, Dreduce, winter, apping growth				e	
		flowering/Description: Produce winter-spring growth,					
		flowering. They re sheet readily and often carnet the					
		lowering. They re-shoot reading and often carpet the					
Curringang	Red Darling	Perior: Occurs in the upper Murray Diver valley in the	Vulnarahla	Vulnarahla	Linikoly	Linlikoly	No
Swainsona	Red Darling	Region: Occurs in the upper wurray River valley in the	vumerable	vumerable	Uninkely	Uninkely	NO
piagiotropis	Pea	NSW records are from the Jerilderia area, with passible					
		applications from the Louth Dougle area and a disjunct					
		conections from the bouth-Bourke area and a disjunct					
		Stud Park 2E km NW of Warran Also raro in Victoria					
		restricted to a few sites in the central parth, mostly					
		between Bondige and the Murray Piver south of					
		Habitat: Grows on flat grassland and in beauw red soil					
		often en readsides and especially in table drains. Soils					
		are derived from quaternary sediments and are usually					
		red-brown clay-loams. The species is absent from black					
		low-lying soils. Recorded from roadsides, rail reserves					
		stock routes and areas of lightly grazed unimproved					
		pasture comprising Austrodanthonia Enteronogon					
		acicularis and Austrosting grassland communities					
		Associated species include Austrosting gristialumis					
		nodosa A setacea Homonholis proluta Chloris					
		truncata Austrodanthonia caesnitosa A duttoniana					
		Enteropogon acicularis, Hordeum spp., Lolium rigidum,					
		Rhodanthe corymbiflora. Calotis scabiosifolia.					
		Microseris lanceolata and Chrysocephalum apiculatum.					
		Flowering/Description: Flowering is from August to					
		November, with fruit maturing in November. The					
		species is a perennial, but the lifespan is unknown.					
Swainsona	Silky	<b>Region</b> : Northern Tablelands to Southern Tablelands	Vulnerable	Not Listed	Unlikely	Unlikely	No
sericea	, Swainson-pea	and further inland to the slopes and plains. Its				,	
		stronghold is on the Monaro.					
		Habitat: Natural Temperate Grassland and Snow Gum					
		Woodland on the Monaro, Box Gum Woodland in the					

Darlington Point Boat Ramp - NSW Threatened Species Assessment October 2018

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			h	habitat	of	for
						e	impact
		Southern Tablelands and South West Slopes.					
		Sometimes found in association with cypress pines.					
		Habitat on plains unknown.					
		Flowering/Description: Vegetative reproduction					
		appears to be most common method of reproduction.					
		Flowers from September to November. Generates					
		from seed after fire.					
Endangered Ecolog	gical Community	1					1
Acacia melvillei S	hrubland in the	Acacia melvillei Shrubland in the Riverina and Murray-	Endangered	Not Listed	Absent	Possible	No
Riverina and M	urray-Darling	Darling Depression bioregions is the name given to the					
Depression b	pioregions	ecological community that is dominated by Acacia					
		melvillei (Yarran). Acacia melvillei Shrubland typically					
		has an open canopy of shrubs or small trees,					
		sometimes with scattered mid-stratum shrubs, and					
		with a sometimes sparse, but highly variable ground					
		layer dominated by grasses, chenopods and herbs. The					
		structure and species composition of the community					
		varies depending on disturbance history and temporal					
		variability in rainfall. The open stratum of large shrubs					
		or small trees may be reduced to isolated individuals					
		of may be absent as a result of past clearing. The					
		sill ub/liee layer is dominated by Acucia merviner,					
		abundant trees or tall shrubs. These may include Nelia					
		(Acacia loderi) Western Rosewood (Alectryon					
		oleifolius subsp. canescens) Belah (Casuaring nauner)					
		and Sugarwood (Myoporum platycarpum). Acacia					
		<i>melvillei</i> Shrubland shares a number of species with					
		Acacia loderi Shrublands, another endangered					
		ecological community. These two ecological					
		communities inhabit similar soils and landforms and					
		have some overlap in their distributions, but Acacia					
		loderi Shrublands are more common in the northern					
		part of the Riverina and Murray-Darling Depression					
		bioregions and extend further north into several other					

Darlington Point Boat Ramp - NSW Threatened Species Assessment P a g e | 59 October 2018

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			n	habitat	0 Occurrenc	for Impact
						e	impact
		bioregions. They may be distinguished on the basis of					
		the relative abundance of their tree species (with A.					
		melvillei generally uncommon within A. loderi					
		shrublands) and differences in composition of their					
		understories. Acacia melvillei occurs widely in NSW,					
		including the Cobar Peneplain and NSW South Western					
		Slopes Bioregions. It also intergrades extensively with					
		the very similar Acacia homalophylla (also called					
		Yarran) across its distribution in NSW. Currently, these					
		populations outside the Riverina and Murray-Darling					
		Depression Bioregions do not comprise part of the					
		listed Endangered Ecological Community. In south					
		western NSW Acacia melvillei typically occurs on					
		sandhills and undulating sand plains. The community					
		occurs on red-brown, sandy loam soils as scattered					
		patches grading into surrounding woodlands					
		dominated by Belah and Western Rosewood,					
		WhiteCypress Pine (Callitris glaucophylla) or sandplain					
		mallee.					
Allocasuarino	ı luehmannii	Allocasuarina luehmannii Woodland in the Riverina	Endangered	Endangered	Absent	Possible	No
Woodland in th	e Riverina and	and Murray-Darling Depression bioregions is the name					
Murray-Darlin	g Depression	given to the ecological community dominated by					
Biore	gions	Buloke (Allocasuarina luehmannii), sometimes with co-					
		occurring tree species. The community typically					
		comprises an open tree canopy with a sparse and					
		highly variable ground layer dominated by grasses and					
		herbs, sometimes with scattered shrubs and/or small					
		trees. The structure and species composition of the					
		community varies depending on disturbance history					
		and temporal variability in rainfall. The species					
		composition of a site will be influenced by the size of					
		the site, recent rainfall or drought conditions and by its					
		aisturbance (including grazing, land clearing and fire)					
		nistory. The number and relative abundance of species					
		will change with time since fire, and may also change					

Darlington Point Boat Ramp - NSW Threatened Species AssessmentP a g e | 60 October 2018

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			h	habitat	of	for
						occurrenc	Impact
		in response to changes in fire frequency or grazing					
		regime. The groundcover is highly variable in structure					
		and composition. It is typically sparse, but may be					
		more continuous within patches or following					
		substantial rainfall events. Allocasuarina luehmannii					
		Woodland shares a number of species with another					
		endangered ecological community listed under the					
		Threatened Species Conservation Act 1995: Sandhill					
		Pine Woodland in the Riverina, Murray-Darling					
		Depression and NSW South Western Slopes bioregions.					
		These two ecological communities inhabit similar soils					
		and landforms and have similar geographic					
		distributions. They may be distinguished on the basis					
		of the relative abundance of their tree species and					
		subtle differences in composition of their understorey.					
		When tree abundance is assessed at hectare scales, A.					
		luehmannii is the most abundant tree species in					
		Allocasuarina luehmannii Woodland, whereas Callitris					
		glaucophylla is the most abundant tree species in					
		Sandhill Pine Woodland.					
Inland Grey Box	Woodland in the	Inland Grey Box Woodland includes those woodlands	Endangered	Endangered	Absent	Unlikely	No
Riverina, NSW	South Western	in which the most characteristic tree species,					
Slopes, Coba	r Peneplain,	Eucalyptus macrocarpa (Inland Grey Box), is often					
Nandewar and	Brigalow Belt	found in association with E. Populnea subsp. Bimbil					
South Bio	oregions	(Bimble or Poplar Box), Callitris glaucophylla (White					
		Cypress Pine), Brachychiton populneus (Kurrajong),					
		Allocasuarina luehmannii (Bulloak) or E. melliodora					
		(Yellow Box), and sometimes with <i>E. albens</i> (White					
		Box). Shrubs are typically sparse or absent, although					
		this component can be diverse and may be locally					
		common, especially in drier western portions of the					
		community. A variable ground layer of grass and					
		herbaceous species is present at most sites. At					
		severely disturbed sites the ground layer may be					
		absent. The community generally occurs as an open					

Darlington Point Boat Ramp - NSW Threatened Species AssessmentP a g e | 61 October 2018

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			h	habitat	of	for
						occurrenc	Impact
		woodland 15–25 m tall but in some locations the					
		overstorev may be absent as a result of past clearing or					
		thinning, leaving only an understorey. Inland Grey Box					
		Woodland occurs predominately within the Riverina					
		and South West Slopes regions of NSW down to the					
		Victorian border. It includes Albury to the east and					
		may extend out west towards Hay. This community					
		also extends across the slopes and plains in Central					
		and Northern NSW up to the Queensland Border. This					
		includes Yetman and Inverell in the North, Molong to					
		the east of the Central Slopes and plains and out					
		towards Nymagee to the west.Inland Grey Box					
		Woodland occurs on fertile soils of the western slopes					
		and plains of NSW. The community generally occurs					
		where average rainfall is 375- 800 mm pa and the					
		mean maximum annual temperature is 22- 26°C. There					
		is a correlation between the distribution of Eucalyptus					
		microcarpa communities and soils of Tertiary and					
		Quaternary alluvial origin, largely corresponding with					
		the Red Brown Earths. The majority of remnant					
		patches of Inland Grey Box Woodland survive with					
		trees largely intact but with the shrub or ground layers					
		degraded to varying degrees through grazing or					
		pasture modification. Some species that are part of the					
		community appear intolerant to heavy grazing by					
		domestic stock and are confined to the least disturbed					
		remnants.					
Myall Woodland	in the Darling	This ecological community is scattered across the	Endangered	Endangered	Absent.	Unlikely	No
Riverine Plains,	Brigalow Belt	eastern parts of the alluvial plains of the Murray-					
South, Cobar Per	eplain, Murray-	Darling river system. The community is also known as					
Darling Depression	on, Riverina and	Boree particularly in the southern part of its					
NSW South W	estern Slopes	distribution. Typically, it occurs on red-brown earths					
biore	gions	and heavy textured grey and brown alluvial soils within					
		a climatic belt receiving between 375 and 500 mm					
		mean annual rainfall. The structure of the community					

Darlington Point Boat Ramp - NSW Threatened Species Assessment October 2018

Scientific	Common	Description	NSW Status	Commonwealt	Presence of	Likelihood	Potential
Name	Name			h	habitat	of	for
						occurrenc	Impact
		varies from low woodland and low open woodland to low sparse woodland or open shrubland, depending on site quality and disturbance history. The tree layer grows up to a height of about 10 metres and invariably includes <i>Acacia pendula</i> (Weeping Myall or Boree) as one of the dominant species or the only tree species present. The understorey includes an open layer of chenopod shrubs and other woody plant species and an open to continuous groundcover of grasses and herbs. The structure and composition of the community varies, particularly with latitude, as chenopod shrubs are more prominent south of the Lachlan River district, while other woody species and summer grasses are more common further north. In some areas the shrub and canopy stratum may have been reduced or eliminated by clearing or heavy grazing, leaving derived grassland that may still					
Sandhill Pine W Riverina, Mu Depression an Western Slope	oodland in the rray-Darling d NSW South es bioregions	Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions is the name given to the ecological community dominated by White Cypress Pine ( <i>Callitris</i> <i>glaucophylla</i> ). Sandhill Pine Woodland is characterised by an open tree stratum, which may be reduced to isolated individuals or may be absent as a result of past clearing. The tree layer is dominated by <i>C</i> . <i>glaucophylla</i> , either in pure stands or with a range of other less abundant trees or tall shrubs. The structure and species composition of the community varies depending on disturbance history and temporal variability in rainfall.	Endangered	Not Listed	Absent	Unlikely	No

## **5. ASSESSMENT**

The seven (7) part test that was previously required under section 5A of the EP&A Act has been utilised to determine the effects of the project on threatened species and communities that have either been recorded or are likely to occur at the site. This assessment has been undertaken in accordance with the NSW *"Threatened species assessment guidelines"* (DECC 2007).

The potential impacts on threatened species with relation to the project are expected to be very localised. There are no works related to the Murrumbidgee River and the site is a very small highly modified site with no vegetation remaining on it. The habitat value of the site is negligible and there would be little to no foraging or breeding value. The assessment assesses the impacts to the local environment.

As shown above there is no known species that are considered as part this test or require an Assessment of Significance.

A) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species that a viable local population or the species is likely to be placed at risk of extinction.

The project site is mostly disturbed through previous construction activities relating to the levee bank. There are 8 juvenile River Red-gum tree that do require removal as part of the project activities however there are no identified hollows or habitat formations within these trees. The project works have also not identified any snags located within the River channel that could require removal and there are erosion and sediment control measures proposed to prevent Based on this, it is unlikely that the project construction or operation activities would result in any adverse effect on any threatened species or would cause the extinction of any threatened species.

B) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

There is only one identified endangered population that has been identified in the study area – *Calyptorhynchus lathami* (Glossy Black Cockatoo). The habitat utilised by this species is not located in the project area and as such no adverse effect will occur to this species population or place it at risk of extinction.

- C) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:
  - i. Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction,
  - ii. Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

There are five endangered ecological communities that have been identified in the EPBC Act Protected Matters Report and the BioNET search.

The site can be described as a Riverine Red Gum Community which is not one of the defined threatened ecological communities listed above. The works involved with the construction and operation of the proposed boat ramp covers a small area and will not place any entire community at risk of extinction or substantially modify the composition of this community.

- D) In relation to the habitat of a threatened species, population or ecological community:
  - i. The extent to which habitat is likely to be removed or modified as a result of the action proposed, and
  - ii. Whether the area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and
  - iii. The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community,

The existing site is one that has been previously modified and has no threatened ecological community identified with it. The vegetation that requires removal as part of the construction activities are unlikely to provide habitat, a food source or breeding value for any threatened species and they are located on the edge of existing remnant vegetation. The removal of this vegetation is will not fragment or isolate any species, population or community.

E) Whether the proposed action is likely to have an adverse effect on critical habitat (either directly or indirectly),

There has been no critical habitat declared within or surrounding the project area.

F) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

Recovery Plans, Biodiversity Conservation Programs and associated Saving our Species projects have been applied to safeguard the future survival of threatened species. The plans and programs broadly encourage the protection of species through habitat and food source protection and addressing Key Threatening Processes relating for each species. This project does not involve the removal of any vegetation or habitat from the project area, therefor the action does not pose a risk to the habitat quality.

Threat abatement plans explain how threats to species and ecological communities can be reduced or eliminated. There are no threat abatement plans relative to this assessment.

Priorities Action Statements (PAS) is a statutory, non-regulatory document addressing each threatened species, population, ecological community and key threatening process (KTP) listed on the schedules of the *Fisheries Management Act 1994*. The PAS provides an agreed list of strategies and actions that will assist to down-grade or de-list species, populations and ecological communities from the threatened species schedules of the *Fisheries Management Act 1994*, as well as actions that will assist to abate or eliminate the impacts of KTPs.

As there are no species that have been identified as affected by the project there are no Recovery Plans, threat abatement plans of priorities action statements that are related to the action.

## G) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process,

A threat may be listed as a key threatening process under the NSW Biodiversity Conservation Act 2016 if it adversely affects threatened species, populations of a species or ecological communities or could cause species, populations of a species or ecological communities to become threatened.

The action proposed is listed as a KTP under the *Fisheries Management Act* - "Installation and operation of instream structures and other mechanisms that alter natural flow regimes of rivers and streams". This describes instream structures as structures that modify natural flow including dams, weirs, canals, navigation locks, floodgates, culverts, flow regulators, levee banks, erosion control structures and causeways. Mechanisms that

alter natural flow regimes include the operation of the above structures as well as water extraction, pumping and diversion and sand and gravel extraction.

There are currently 38 listed Key Threatening Processes (KTP) listed under the *Biodiversity Conservation Act 2016* (BCA) and a further 19 in the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC).

No KTPs from the EPBC Act are considered to be relevant to this proposal however, the following KTPs from the BCA are considered relevant:

- Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands,
- Clearing of native vegetation,
- Invasion of native plant communities by exotic perennial grasses,
- Removal of dead wood and dead trees.

The project works have had a flood assessment undertaken and this report has identified that the project construction and operation will not alter the natural flows of the river or floodplain.

The works are occurring on an already modified site being the Darlington Point Levee bank. There are 8 juvenile River Red-gum trees that require removal however as can be seen from the above satellite image these are located on the edge of large stand of remnant vegetation and are unlikely to be a major contributor to the quality of the vegetation within the area.

The site is in its current state is unmaintained as it is located close to an area of remnant vegetation. The incorporation of the site into a public area will increase the management and maintenance of the site ensuing that the existing weed load is better managed and there will be less chance of an invasion to native plant communities by exotic perennial grasses.

No dead wood, snags or dead trees are proposed to be removed as part of the project construction or operation works. Based on these factors, it is unlikely that any key threatening processes would be exacerbated by this project.

## 6. CONCLUSION

This report provides an assessment of the proposed project site and an additional 10km radius with the written inclusion of the EPBC Protected Matters Report. The report also considers threatened species likely to occur within the sub-region and has shown that there have been species to be considered within the broader area as part of this test.

A review of each of these species, populations and community's listed above, has considered their requirements with relation to environment, habitat and food source and the results show that the impact of this project would be limited.

There are 8 juvenile River Red-gum trees that are proposed to be removed as part of the project construction activities however they are small in growth and do not contain hollows. The removal of these trees and general construction activities have not identified impacts to threatened species, populations of communities.

The above assessment has been conducted under the provisions of Section 5A of the EP&A Act.

Prepared by,

blone fitzratrick

Clare Fitzpatrick

Consultant

## 7. APPENDICES

## 7.1.Appendix 1 - Project plans

## GENERAL NOTES

- G1. THESE NOTES APPLY TO ALL DRAWINGS IN THE CONTRACT SET. WHERE SPECIFIC NOTES ON OTHER DRAWINGS APPLY THEY SHOULD BE READ IN CONJUNCTION WITH THE GENERAL NOTES. G2. ALL DIMENSIONS ARE IN METRES (m). (UNLESS OTHERWISE STATED)
- G3. ALL LEVELS SHOWN ARE TO AUSTRALIAN HEIGHT DATUM (AHD).
- G4. DO NOT SCALE DIMENSIONS FROM DRAWINGS.
- G5. WORKS TO BE COMPLETED IN ACCORDANCE WITH AS 4000 1997 GENERAL CONDITIONS OF CONTRACT TO THE APPROVED PLAN, TO THE SATISFACTION OF THE SUPERINTENDENT AND TO ALL RELEVANT STANDARD DRAWINGS WHERE APPLICABLE.
- G6. WORKS SUPERVISOR TO BE CONTACTED A MINIMUM OF 5 WORKING DAYS PRIOR TO COMMENCEMENT
- OF ANY WORKS THAT AFFECT ROAD ASSETS.
   G7. A PLANNING PERMIT IS REQUIRED FOR A NEW ACCESS OR ALTERATION TO AN EXISTING DRIVEWAY AND MAY BE REQUIRED FOR THE REMOVAL OF NATIVE VEGETATION.
- G8. A TRAFFIC MANAGEMENT PLAN MUST BE PREPARED AND IS TO COMPLY WITH THE RELEVANT CODE OF PRACTICE FOR WORK SITE SAFETY TRAFFIC MANAGEMENT IN RELATION TO ANY WORKS UNDERTAKEN WITHIN THE ROAD RESERVE.
- C9. THE TYPICAL PAVEMENT DIAGRAM SHOWN ON THIS SHEET IS A GUIDE FOR A TYPICAL LAYOUT OF A ROADWAY ACCESS FOR A RURAL ROAD. G10. PAVEMENT LINE MARKING REQUIREMENTS AS PER SHEET 10 OF 12.
- G11. UNDERGROUND SERVICES:

PRIOR TO ANY EXCAVATION WORKS, CHECK WITH ALL RELEVANT RESPONSIBLE AUTHORITIES (e.g. TELECOMMUNICATIONS, ELECTRICITY, GAS, WATER etc.)

- ABOVEGROUND SERVICES:
- PRIOR TO ANY WORKS AN INSPECTION OF THE CONSTRUCTION FOOTPRINT SHOULD BE UNDERTAKEN TO IDENTIFY ANY ABOVEGROUND SERVICES AND APPROPRIATE PRECAUTIONS TAKEN TO ELIMINATE THE POTENTIAL OH&S RISKS. G12. THE CONTRACTOR IS REQUIRED TO CONFINE ALL CONSTRUCTION VEHICLES TO THE EASEMENTS AND
- ROAD RESERVES. ANY DAMAGE CAUSED TO ADJACENT PROPERTIES MUST BE MADE GOOD.
- G13. ALL FILL AREAS TO BE COMPACTED AS SPECIFIED. ALL STRUCTURAL FILLING MATERIAL IS TO BE APPROVED BY THE SUPERINTENDENT AND THE RELEVANT ROAD AUTHORITY PRIOR TO PLACEMENT. G14. ALL FILL AREAS EXCEEDING 200mm ARE TO BE STRIPPED OF TOPSOIL, FILLED AND TOPSOIL
- REPLACED TO ACHIEVE THE FINAL FINISHED FILL LEVELS SHOWN ON THE DRAWINGS.
- G15. SUBGRADE TO BE SELECT CLAY MATERIAL PLACED IN 150mm LAYERS. (ASSUME CBR OF 10%) G16. RESERVES/EASEMENTS TO BE LEFT IN A CONDITION SATISFACTORY TO THE SUPERINTENDENT AND
- RELEVANT ROAD AUTHORITY G17. ALL PIPE AND SERVICE TRENCHES UNDER ROADS TO BE BACKFILLED WITH CLASS 2 CRUSHED ROCK.
- G18. NO TOPSOIL IS TO BE REMOVED FROM SITE.
- G19. UNLESS OTHERWISE SHOWN, ALL TREE'S AND SHRUB'S ARE TO BE RETAINED. WRITTEN PERMISSION MUST BE OBTAINED FROM THE SUPERINTENDENT WHERE PARTICULAR CONSTRUCTION NECESSITATES THEIR REMOVAL.
- G20, ALL DEWATERING TO BE CARRIED OUT IN ACCORDANCE WITH THE EPA'S GUIDELINE "CONSTRUCTION GUIDELINES FOR CONSTRUCTION SITES" – DECEMBER 1995. G21. ENVIRONMENTAL PROTECTION INCLUDING SILT CONTROL SHALL BE THE RESPONSIBILITY OF THE
- CONTRACTOR
- G22. THE CONTRACTOR WILL BE RESPONSIBLE FOR THE CARE AND MAINTENANCE OF ALL TBM'S. TBM'S FOUND TO BE DISTURBED OR MISSING AT THE COMMENCEMENT OF CONSTRUCTION ARE TO BE RE-ESTABLISHED BY A QUALIFIED SURVEYOR.
- G23. ALL WORKS SHALL BE SETOUT AND PEGGED ACCURATELY PRIOR TO THE COMMENCEMENT OF WORKS BY A SUITABLY QUALIFIED SURVEYOR.

### CONSTRUCTION SETOUT TABLE

POIN	Т	EASTIN	3 N	IORTHING	RL (AHD)	DESCRIPTION
1	4	18343 0	28 61	74124 320	124.02	DESIGN EDGE OF SEAL
		18346 4	86 61	74127.320	127.02	
	4	9340.4	47 61	74122.744	123.09	DESIGN FORD CENTRELINE
		00349.9	40 01	74121.100	123.70	DESIGN EDGE OF SEAL
4	40	0000.9	00 01	74123.203	-	DESIGN EDGE OF SEAL
5	40	0707.0		74120.902	123.21	DESIGN EDGE OF SEAL
	40	18383.2	10 00	74167.793	_	DESIGN EDGE OF SEAL
	4(	18366.4	45 61	/41/5.692	-	DESIGN EDGE OF SEAL
8	4	08371.1	81 61	74176.764	123.00	ROAD CENTRELINE/GRADE CHANGE
9	4	08387.1	26 61	74218.564	123.13	DESIGN EDGE OF SEAL
10	40	08390.4	88 61	74216.787	123.00	DESIGN ROAD CENTRELINE
11	40	)8392.8	23 61	74212.883	122.87	DESIGN EDGE OF SEAL
12	4	08403.5	61 61	74209.866	122.51	DESIGN EDGE OF SEAL
13	4(	08407.5	53 61	74216.753	122.51	DESIGN EDGE OF SEAL
14	4(	08407.1	86 61	74218.119	-	DESIGN EDGE OF SEAL
15	40	)8397.7	26 61	74221.733	-	DESIGN EDGE OF SEAL
16	4	08408.5	511 61	74234.725	-	DESIGN EDGE OF SEAL
17	4	08398.4	61 61	74238.218	-	DESIGN EDGE OF SEAL
18	4	08414.0	66 61	74249.754	123.00	CENTRE POINT / RADIUS 10m
19	40	)8404.6	04 61	74253.429	-	DESIGN EDGE OF SEAL
20	4	08419.8	56 61	74241.416	-	DESIGN EDGE OF SEAL
21	4(	08424.1	64 61	74250.785	122.67	EDGE OF CONCRETE BOAT RAMP
22	4	08453.6	61 61	74279.274	117.81	EDGE OF CONCRETE BOAT RAMP
23	4(	08448.1	37 61	74285.032	117.81	EDGE OF CONCRETE BOAT RAMP
24	4(	08420.0	62 61	74257.944	122.67	EDGE OF CONCRETE BOAT RAMP
				1		The c
						the o

## EARTHWORK NOTES

- E1. RECORDS SHALL BE KEPT OF ALL EARTHWORK CONSTRUCTION AS CONTAINED IN AS3798-2007 CLAUSE 3.4 AND A COPY MADE AVAILABLE TO THE SUPERINTENDENT UPON COMPLETION.
   E2. ALL TOPSOIL SHALL BE SPRAYED WITH A PRE-EMERGENT HERBICIDE PRIOR TO STRIPPING.
- PRIOR TO THE COMMENCEMENT OF WORKS THE SITE SHALL BE STRIPPED AND MATERIAL STOCKPILED
- AT DESIGNATED LOCATIONS CLEAR OF THE WORKS. E4. ANY EXCESS TOPSOIL SHALL REMAIN THE PROPERTY OF THE PRINCIPAL AND IS TO BE STORED AS
- DIRECTED FOR USE IN THE FUTURE. E5. ALL SUBGRADE FILL MATERIAL IS NOT TO CONTAIN ANY VEGETABLE MATTER AND SHOULD CONFORM TO ONE OF THE CLASSES LISTED BELOW.
- \* GW-SC WELL GRADED SAND AND GRAVEL WITH CLAY BINDER
- \* GC CLAYEY GRAVEL SOILS \* SW-SC SAND WITH CLAY BINDER
- \* SC SILTY CLAY
- E6. ALL LOOSE FILL MATERIAL SHALL BE SPREAD BEFORE COMPACTION TO FORM AN EVEN LAYER THICKNESS. WHERE PRACTICABLE THE LAYERS SHALL BE PARALLEL TO THE FINISHED SURFACE OR HORIZONITAL
- E7. FILL MATERIAL IS TO BE PLACED IN 150mm LAYERS COMPACTED TO 95% OF THE MAXIMUM DRY DENSITY AT OPTIMUM MOISTURE CONTENT IN ACCORDANCE WITH AS 1289-E1.1.
- E8. DUST SUPPRESSION IS TO BE ACHIEVED USING AN APPROVED METHOD OR COMBINATION OF METHODS.
   E9. THE MOISTURE CONTENT OF THE FILL MATERIAL IS TO BE MONITORED AT ALL TIMES. WHERE NECESSARY ADDITIONAL WATER WILL BE BROUGHT TO THE SITE AND ADDED TO THE FILL MATERIAL AT A CONTROLLED RATE. THE WATER IS TO BE CLEAN AND CARTED/DISTRIBUTED USING APPROVED
- EQUIPMENT ONLY. E10. ANY SOFT AREAS ENCOUNTERED ARE TO BE INSPECTED BY THE SUPERINTENDENT. THE SUPERINTENDENT MAY DETERMINE THAT THE SOFT MATERIAL IS TO BE EXCAVATED AND REMOVED FROM THE SITE. WHERE THE MATERIAL WITHIN THE SOFT SPOT IS DEEMED BY THE SUPERINTENDENT TO BE RECOVERABLE THE SUPERINTENDENT MAY ALSO DETERMINE A METHODOLOGY FOR TREATING THE UNSUITABLE MATERIAL.
- E11. ALL HAULAGE ROUTES AND ALIGNMENTS WILL BE SUBJECT TO THE APPROVAL OF THE
- SUPERINTENDENT. E12. ALL UNSUITABLE MATERIALS INCLUDING BUT NOT LIMITED TO LITTER, BUILDING WASTE, STONE, IBBLE, DEBRIS, ORGANIC MATERIAL AND VEGETABLE MATTER SHALL NOT BE INCORPORATED INTO THE WORK. ALL SUCH MATERIAL SHALL BE COLLECTED ON A REGULAR BASIS AND STOCKPILED CLEAR OF THE WORKS AND IS TO BE DISPOSED OF BY THE CONTRACTOR TO AN APPROVED LOCATION.
- E13. DE-WATERING WHERE APPLICABLE IS TO BE CARRIED OUT IN ACCORDANCE WITH THE EPA'S "CONSTRUCTION GUIDELINES FOR MAJOR CONSTRUCTION SITES" - DECEMBER 1995.
- E14. ALL SURPLUS SPOIL MATERIAL NOT REQUIRED IS TO BE STOCKPILED CLEAR OF THE WORKS. E15. ANY BORROW MATERIAL REQUIRED FOR SUBGRADE WILL BE SOURCED FROM AN APPROVED LOCATION
- AND TESTED IN ACCORDANCE WITH AS 1209.3.8.1. E16. THE CONTRACTOR SHALL KEEP AND MAINTAIN DETAILED RECORDS OF THE COMPACTION METHOD USED
- AND THE PLACEMENT OF ALL FILL MATERIALS. E17. THERE IS TO BE NO FILL MATERIAL PLACED AGAINST OR WITHIN CLOSE PROXIMITY TO FENCES OR OTHER NON STRUCTURAL OBJECTS WITHOUT THE SUPERINTENDENTS PRIOR APPROVAL.

## BEACHING NOTES

B1. BEACHING STONE SHALL CONSIST OF CLEAN SOUND HARD QUARRIED ROCK OF UNIFORM QUALITY WITH AN UNCONFINED CRUSHING STRENGTH OF NOT LESS THAN 25MP $_{d}$  and free of defined cleavage PLANES.

B2. THE SIZE AND GRADING OF THE STONE SHALL CONFORM AS NEARLY AS PRACTICAL TO THE SIZES SET OUT IN TABLE 1.

- B3. THE MINIMUM THICKNESS SHALL BE AS DEFINED IN TABLE 1.
- B4. UNLESS NOTED OTHERWISE THE STANDARD BEACHING SIZE SHALL BE TYPE 3. B5. ALL BEACHING TO BE UNDERLAIN BY BIDIM A44 OR APPROVED EQUIVALENT GEOTEXTILE MEMBRANE KEYED IN ALONG ALL EDGES

TABLE 1

	% PASSING SCREEN SIZE									
% PASSING	TYPE 2	TYPE 3	D50 = 225							
450mm	-	-	100							
300mm	-	100	70-95							
225mm	100	70-95	40-65							
150mm	60-65	50-70	20-35							
75mm	40-65	35-50	10-20							
37.5	20-35	15-30	-							
26.5	10-20	10-20	-							
MINIMUM LAYER THICKNESS	150	225	300							



Basecourse - 50% mix PSG & Class 2 FCR - Stabilise with 1.5% Triple Blend Subarade - Assume CBR of 10% - Stabilise with 3% Quicklime

\*Triple Blend - 60% Cement, 30% Slag, 10% Fly Ash.

EARTHWORKS AND CONCRETE SCHEDULE									
ITEM	SEAL (m2)	BASECOURSE (m3)	SUBBASE (m3)	CUT (m3)	FILL (m3)	CONCRETE (m3)	CONCRETE BASE CLASS 2 FCR (m3)	CONCRETE STRENGTH (MPa)	
EALED ROADWAY	2519	382	663	330	1318	96		40	
NSEALED ROADWAY		376							
OAT RAMP				350.75	4.5	81	45.5	40	
CCESS RAMP						21	19	25	
OTALS	2519	758	663	680.75	1322.50	198	64.50		

											NTOON DESIGN DETAILS		2
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3	18-02/18		CONCRETE PAVEMENT DETAIL ADDED	-					E Z	DESIGN NOTES & LOCALITY P	LAN		
2	23/10/17		ISSUED FOR CONSTRUCTION	party in whole or part				SCALE					
-	20,00,47			without the written permission				N.T.S.		RICH RIVER IRRIGATION DEVELOPMENTS	SHEET NUMBER	DRAWING NUMBER	REVISION
	50-08-17		ISSUED FOR DISCUSSION	of Rich River Irrigation	SUBVEYED BY	DRAWN	DESIGNED	DATE	DEVEL ODMENTS	Unit 1, 164 Qailvie Avenue, Echuca, 3564,			7
REV	DATE F	ESIGN REV'D APP'D EVIEW P.MGR P.DIR	REVISIONS	infringement of copyright.	D.LEE	D.LEE	D.LEE	30-08-17	PTY LTD A.C.N. 106 901 777	Telephone (03) 5482 2564 Fax (03) 5482 1918 Email admin@rrid.com.au	01 OF 12	2016-107	3







## TYPICAL SEALED PAVEMENT



7mm Primerseal + 14/7 Two coat final seal Basecourse - 50% mix PSG & Class 2 FCR -Stabilise with 1.5% Triple Blend Subbase - PSG - Stabilise with 1.5% Triple Blend Assume CBR of > 30%

Subgrade – Assume CBR of 10% – Stabilise with 3% Quicklime

\*Triple Blend - 60% Cement, 30% Slag, 10% Fly Ash.

## TYPICAL CONCRETE PAVEMENT



Pavement - Reinforced Concrete (40Mpa) with SL81 mesh centrally placed

Subbase - PSG - Stabilise with 1.5% Triple Blend Assume CBR of > 30%

NORTH

Subarade – Assume CBR of 10% - Stabilise with 3% Quicklime

\*Triple Blend - 60% Cement, 30% Slag, 10% Fly Ash.

	DRAWING SET REGISTER	
DRAWING NO.	DRAWING DESCRIPTION	REVISION
2016-107/SHT1	DESIGN NOTES AND LOCALITY PLAN	3
2016-107/SHT2	DESIGN NOTES 2	3
2016-107/SHT3	SITE PLAN	4
2016-107/SHT4	BOAT RAMP SITE PLAN	3
2016-107/SHT5	RIVER CROSS-SECTIONS	4
2016-107/SHT6	RAMP CROSS-SECTIONS	3
2016-107/SHT7	ROADWAY CROSS-SECTIONS	3
2016-107/SHT8	ROADWAY LONGITUDINAL SECTION	3
2016-107/SHT9	DESIGN DETAILS	3
2016-107/SHT10	PAVEMENT LINEMARKING DETAILS	2
2016-107/SHT11	PONTOON DESIGN PLAN	2
2016-107/SHT12	PONTOON DESIGN DETAILS	2

#### CONCRETE GENERAL

- CONCRETE SHALL BE IN ACCORDANCE WITH AS3600 CONCRETE STRUCTURES.
- C2. EXPOSURE CLASSIFICATION FOR DURABILITY IS B1.
- C3. CONCRETE TO BE AS FOLLOWS:

STRUCTURAL ELEMENT	WALKWAY	BOAT RAMP SLAB	PAVEMENT
STRENGTH GRADE (MPa)	N25	N40	N40
CEMENT TYPE	GP	GP	GP

- C4. MINIMUM 15mm CHAMFERS ARE REQUIRED ON ALL EXPOSED CONCRETE EDGES AND CORNERS.
- C5. THE USE OF CONCRETE ADMIXTURES WHERE REQUIRED SHALL BE SUBJECT TO THE APPROVAL OF THE SUPERINTENDENT AND SHALL CONFORM TO AS1478.1. WHERE FORMS TO BE STRIPPED BEFORE 24 HRS SIKA RAPID 1 OR EQUIVALENT SHOULD BE USED.
- C6. SURFACE FINISHES SHALL BE IN ACCORDANCE WITH AS3610 UNLESS SHOWN OTHERWISE ON DRAWINGS
- C7. THE FINISHED CONCRETE SHALL BE A DENSE HOMOGENOUS MASS, COMPLETELY FILLING THE FORMWORK THOROUGHLY EMBEDDING THE REINFORCEMENT AND FREE OF STONE POCKETS. ALL CONCRETE INCLUDING SLABS ON GROUND AND FOOTINGS SHALL BE COMPACTED WITH MECHANICAL VIBRATORS.
- C8. ELAPSED TIME BETWEEN WETTING OF MIX AND DISCHARGE OF CONCRETE AT SITE MUST BE AS SHORT AS POSSIBLE AND COMPLY WITH THE FOLLOWING.

CONCRETE TEMPERATURE AT TIME OF DISCHARGE (°C)	MAXIMUM ELAPSED TIME (HOURS)
10-24	2.00
24-27	1.50
27-30	1.00
30-32	0.75

- C9. NO UNCONTROLLED WATER TO BE ADDED ON SITE WITHOUT PRIOR CONSENT OF MIX DESIGNER.
- C10. THE COVER (OR "CLEAR COVER") AS STATED ON THE DRAWINGS, SHALL BE THE CLEAR DISTANCE FROM THE FACE OF ANY REINFORCEMENT. WIRE TIES FOR FIXING REINFORCEMENT, FORMWORK FIXINGS OR SIMILAR METAL WORK TO THE NEAREST CONCRETE SURFACE.

C11. COVER TO BE AS FOLLOWS, UNLESS NOTED OTHERWISE:

SUBSTRATE	MINIMUM COVER (mm)
DAMP PROOF MEMBRANE	40
BLINDING LAYER	50
ON GROUND	75

- C12. CONCRETING SHALL BE COMMENCED AT THE LOWEST LEVEL OF EACH PART OF THE WORK AND SHALL BE BROUGHT UP IN A MANNER APPROVED BY THE PROJECT MANAGER, THE PLACING ROUTINE BEING SUCH THAT EACH LAYER MUST STILL BE SOFT WHEN A NEW LAYER IS PLACED UPON IT. THE CONCRETE SHALL BE THOROUGHLY CONSOLIDATED BY APPROVED VIBRATORS.
- CONCRETE SHALL NOT BE PLACED IN WATER, EXCEPT WITH THE APPROVAL OF THE C13. PROJECT ENGINEER, AND THEN UNDER SUCH CONDITIONS AS THE PROJECT ENGINEER MAY IMPOSE
- IMMEDIATELY BEFORE PLACING CONCRETE, ALL SURFACES OR FOUNDATION UPON OR C14. AGAINST WHICH THE CONCRETE IS TO BE PLACED, SHALL BE FREE FROM STANDING WATER (EXCEPT AS PROVIDED ABOVE) MUD OR DEBRIS. ALL SURFACES OF ROCK UPON OR AGAINST WHICH CONCRETE IS TO BE PLACED, SHALL IN ADDITION, BE FREE AND CLEAN FROM OIL, OBJECTIONABLE COATINGS AND FROM ALL LOOSE, SEMIDETACHED OR UNSOUND FRAGMENTS. THE SURFACE OF ABSORPTIVE FOUNDATIONS AGAINST WHICH CONCRETE IS TO BE PLACED SHALL BE MOISTENED THOROUGHLY.
- C15. DO NOT USE VIBRATORS TO MOVE CONCRETE ALONG FORMS, USE PLACEMENT METHODS THAT WILL MINIMISE PLASTIC SETTLEMENT AND SHRINKAGE CRACKING. LIMIT VERTICAL FREE FALL BY USE OF CHUTES FTC KEEP CHUTES VERTICAL FULL AND IMMERSED IN PLACED CONCRETE. PLACE CONCRETE IN LAYERS AND BLEND SUCCEEDING LAYERS BY COMPACTION. MAINTAIN A PLASTIC CONCRETE EDGE BETWEEN CONSTRUCTION JOINTS. PROPERLY COMPACT CONCRETE USING MECHANICAL VIBRATORS (AND HAND METHODS IF REQUIRED) TO REMOVE AIR BUBBLES AND GIVE MAXIMUM COMPACTION WITHOUT SEGREGATION OF CONCRETE. TAKE CARE TO AVOID CONTACT BETWEEN VIBRATORS AND PARTIALLY HARDENED CONCRETE, FORMWORK OR REINFORCEMENT.

C16. IN COLD WEATHER MAINTAIN TEMPERATURE OF FRESHLY MIXED CONCRETE WITHIN LIMITS SHOWN BELOW. 'OUTDOOR' AIR TEMPERATURE IS AIR AT TIME OF MIXING, OR PREDICTED OR LIKELY AIR TEMPERATURE DURING NEXT 48 HOURS. BEFORE AND WHILE PLACING CONCRETE. MAINTAIN TEMPERATURE OF FORMWORK AND REINFORCEMENT AT >5°C. DO NOT USE CALCIUM CHLORIDE, SALTS, CHEMICALS OR OTHER MATERIAL IN MIX TO LOWER THE FREEZING POINT OF CONCRETE, DO NOT ALLOW FROZEN MATERIALS TO ENTER MIXER, KEEP FORMS, MATERIALS, EQUIPMENT IN CONTACT WITH CONCRETE FREE OF FROST AND ICE. HEAT CONCRETE MATERIALS (OTHER THAN CEMENT) TO MINIMUM TEMPERATURE NECESSARY TO ENSURE TEMPERATURE OF PLACED CONCRETE IS WITHIN LIMITS SPECIFIED. MAXIMUM WATER TEMPERATURE: 60°C WHEN PLACED IN MIXER.

OUTDOOR AIR	TEMPERATURE OF CONCRETE						
TEMPERATORE	MINIMUM	MAXIMUM					
>5°C	10°C	32°C					
<5°C	18°C	32°C					

C17. IN HOT WEATHER PREVENT PREMATURE STIFFENING OF FRESH CONCRETE; REDUCE WATER ABSORPTION AND EVAPORATION LOSSES. MIX, TRANSPORT, PLACE AND COMPACT CONCRETE AS QUICKLY AS POSSIBLE, DURING PLACEMENT TEMPERATURE OF CONCRETE MUST NOT EXCEED TEMPERATURES BELOW

CONCRETE ELEMENT	TEMPERATURE
NORMAL CONCRETE IN FOOTINGS, BEAMS, COLUMNS, WALLS AND SLABS f'c $\preceq$ 32MPa	35°C
MASS CONCRETE SECTIONS ≥ 1.0m EACH DIMENSION, OR CONCRETE f'c ≥ 40 MPa IN SECTIONS ≥ 600mm THICKNESS	27°C

- DO NOT MIX CONCRETE WHEN SURROUNDING OUTDOOR SHADE TEMPERATURE ≥ 38°C C18. MAINTAIN TEMPERATURE OF FORMWORK AND REINFORCEMENT AT ≤32°C BEFORE AND DURING PLACING MAINTAIN SPECIFIED TEMPERATURE OF PLACED CONCRETE BY:
  - COOL CONCRETE USING LIQUID NITROGEN INJECTION BEFORE PLACING, OR
  - COVER CONTAINER IN WHICH CONCRETE IS TRANSPORTED TO FORMS, OR
  - SPRAY COARSE AGGREGATE USING COLD WATER OR USE CHILLED MIXING WATER.
- PROTECT FRESH CONCRETE FROM PREMATURE DRYING PARTICULARLY IN HOT, WINDY OF DRY (LOW HUMIDITY) CONDITIONS, EXCESSIVELY HOT OR COLD TEMPERATURES, RAIN, ETC. PROVIDE WIND BREAKS, MAINTAIN CONCRETE AT A REASONABLY CONSTANT TEMPERATURE WITH MINIMUM MOISTURE LOSS FOR CURING PERIOD.
- C20. KEEP ON SITE A LOG BOOK RECORDING EACH PLACEMENT OF CONCRETE INCLUDING DATE, CLIMATIC CONDITIONS, PORTION OF WORK, SPECIFIED GRADE AND SOURCE OF CONCRETE, DELIVERY DOCKET DATA, METHODS OF PLACEMENT AND COMPACTION, PROJECT ASSESSMENT CARRIED OUT, SLUMP MEASUREMENT AND VOLUME.
- C21. CONSTRUCTION JOINTS OR POUR BREAKS WHERE NOT SHOWN ON THE DRAWINGS SHALL BE OCATED AND FORMED TO THE APPROVAL OF THE PROJECT ENGINEER.
- CURING OF ALL CONCRETE SHALL COMMENCE NO LATER THAN 2 HOURS AFTER FINISHING OPERATIONS HAVE BEEN COMPLETED. THE CONCRETE SHALL BE CURED FOR A PERIOD OF 7 DAYS (UNLESS APPROVED OTHERWISE BY THE ENGINEER) BY ONE OF THE FOLLOWING METHODS:
  - PONDING OR CONTINUOUS SPRINKLING WITH WATER.
  - USE OF AN ABSORPTIVE COVER KEPT CONTINUOUSLY WET.
  - COATING WITH AN APPROVED SPRAYED MEMBRANE CURING COMPOUND WHERE COMPATIBLE WITH FINISHES.
  - USE OF AN APPROVED MOISTURE RETAINING COVERING SUCH AS HEAVY GAUGE BUILDERS PLASTIC OR PAPER FIRMLY HELD AGAINST CONCRETE SURFACES TO PREVENT AIR CIRCULATION
- CONSTRUCTION SUPPORT PROPPING SHALL BE LEFT IN PLACE WHERE NEEDED TO AVOID C23. OVERSTRESSING THE STRUCTURE DUE TO CONSTRUCTION LOADING WHEN AIR TEMPERATURE IS BELOW 5°C OR ABOVE 35°C SPECIAL CONCRETE PLACEMENT PRECAUTIONS SHALL BE TAKEN IN ACCORDANCE WITH GOOD CONSTRUCTION PRACTICE.
- STRIP FORMWORK TO AS3600 CLAUSE 17.6. REMOVE FROM TIE BOLTS WITHOUT DAMAGING CONCRETE, PARTS OF BOLTS LEFT IN CONCRETE MUST NOT INTRUDE INTO COVER CONCRETE. FLUSH FILL HOLES USING MATERIAL MATCHING CONCRETE SURFACE COLOUR, STRENGTH AND
- C25. THE CONCRETE FINISH SHALL BE TO THE SATISFACTION OF THE PROJECT ENGINEER

C26. SURFACE IRREGULARITIES SHALL BE TESTED BY USE OF A TEMPLATE 1.5m LONG AND SHALL CONSISIT OF A STRAIGHT EDGE. THE MAXIMUM SURFACE IRREGULARITY FOR EACH CLASS OF FORMWORK MEASURED USING THE TEMPLATE SHALL BE AS FOLLOWS:

- CLASS 2 - 5mm

- CLASS 3 - 7mm

- CLASS 4 NO MEASUREMENT REQUIRED.
- CLASS 5 NO MEASUREMENT REQUIRED.
- C27. THOSE CONCRETE SURFACES REQUIRED TO BE RENDERED AND ANY OTHER CONCRETE SURFACE WHICH THE PROJECT ENGINEER MAY ORDER TO BE RENDERED SHALL BE TREATED AS FOLLOWS:
- THE CONCRETE SURFACE SHALL BE SCABBLED AND DAMPENED.
- CEMENT MORTAR, MIXED IN THE PROPORTION OF 80kg OF PORTLAND CEMENT TO 0.1m<sup>3</sup> OF SAND (DRY RODDED MEASUREMENT), SHALL BE APPLIED IN ONE OR TWO COATS, AS MAY BE ORDERED BY THE PROJECT MANAGER, TO FORM A TOTAL THICKNESS OF ABOUT 13mm.
- FOR TWO-COAT WORK. THE FIRST COAT SHALL BE WELL WORKED ON TO THE SURFACE AND SHALL BE SCORED BEFORE IT HAS SET HARD AND SHALL BE KEPT DAMP UNTIL THE SECOND COAT IS APPLIED.
- C28. ALL CONCRETE PILES SHALL BE INSTALLED IN ACCORDANCE WITH AS2159.

#### FORMWORK

- EW1. ALL FORMWORK TO BE CLASS 3 IN ACCORDANCE WITH AS 3610.
- FW2. ALL HOLES LEFT BY FORM TIES TO BE PLUGGED TO FULL COVER DEPTH WITH CEMENTITIOUS GROUT
- FW3. FORMS TO BE CLEANED OF ANY TIE WIRE, REINFORCEMENT OFFCUTS, SCREWS, FIXINGS, DIRT ETC. BEFORE POUR.
- FW4. FORM SURFACES SHALL BE SMOOTH AND FREE FROM HOLES OR IRREGULARITIES, AND TO THE SATISFACTION OF THE PROJECT MANAGER. BEFORE CONCRETE IS PLACED, THE SURFACES OF THE FORMS SHALL BE COATED WITH AN APPROVED FORM COATING THAT WILL EFFECTIVELY PREVENT STICKING AND WILL NOT STAIN THE CONCRETE SURFACES.
- FW5. MINIMUM FORMWORK STRIPPING TIMES FOR VERTICAL FACES SHALL BE AS GIVEN IN AS 3610, TABLE 5.4.1.

#### SEALANT

- PS1 SEALANT TO BE EMERSEAL PUAG OR APPROVED FOURVALENT INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS FOR IMMERSED WATER APPLICATIONS OR APPROVED ALTERNATIVE.
- PS2. SURFACE TO BE PREPARED USING PARCHEM PRIMER 13 OR APPROVED ALTERNATIVE.

#### REINFORCEMENT

- R1. REINFORCEMENT SHALL BE DEEMED TO INCLUDE ALL REINFORCING BARS, REINFORCING MESH, AND DOWEL BARS. REINFORCEMENT SHALL COMPLY WITH AS4671-2001.
- REINFORCEMENT IS REPRESENTED DIAGRAMMATICALLY; IT IS NOT NECESSARILY SHOWN IN R2 TRUE PROJECTION.
- R3. REINFORCING MESH TO BE GRADE D500L COLD ROLLED HIGH STRENGTH DEFORMED FABRIC IN ACCORDANCE WITH AS 4671
- REINFORCING BARS TO BE GRADE D500N HOT ROLLED HIGH STRENGTH DEFORMED BARS IN R4 ACCORDANCE WITH AS 4671
- N12 TRIM BARS ARE REQUIRED ON ALL SLOPING, VERTICAL AND HORIZONTAL FACES OF R5. CONCRETE WHERE THERE IS NO OTHER BAR WITHIN 100mm OF THAT FACE.
- R6 LAPPING OF REINFORCING BARS AND FABRIC TO BE IN ACCORDANCE WITH AS 3600
- REINFORCEMENT WHICH REQUIRES FABRICATION OR BENDING TO SHAPE SHALL BE SUPPLIED IN THE FULL LENGTH SHOWN ON THE DRAWINGS. REINFORCEMENT SHALL BE COLD BENT TO THE SPECIFIED SHAPE. BARS SHALL NOT BE BENT AFTER FABRICATION UNLESS SHOWN ON THE DRAWINGS.
- R8 STRAIGHT BARS SHALL BE SUPPLIED TO THE FULL LENGTHS SHOWN ON THE DRAWINGS. WHERE LAPPING OF STRAIGHT BARS IS UNAVOIDABLE, SUCH LAPS SHALL BE STAGGERED AND A MINIMUM OF TWO WIRE TIES PLACED AT EACH LAP.

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3	18-02-18			CONCRETE GENERAL NOTE AMENDMENT	-					H	DESIGN NOTES 2			
2	23/10/17			ISSUED FOR CONSTRUCTION	party in whole or part without the written permission				SCALE N.T.S.		RICH RIVER IRRIGATION DEVELOPMENTS	Sheet Number	DRAWING NUMBER	REVISION
1	30/08/17	FSIGN REV'D	APP'D	ISSUED FOR DISCUSSION	of Rich River Irrigation Developments constitutes an	SURVEYED BY	DRAWN	DESIGNED	DATE	DEVELOPMENTS	Unit 1, 164 Ogilvie Avenue, Echuca. 3564.	02 OF 12	2016-107	
REV	DATE	EVIEW P.MGR	P.DIR	REVISIONS	infringement of copyright.	D.LEE	D.LEE	D.LEE	30-08-17	PTY LTD A.C.N.106 901 777	Telephone (03) 5482 2564 Fax (03) 5482 1918 Email admin@rrid.com.au	02 01 12	2010 107	Ľ

COFFER DAM CD1. STEEL SHEET PILE COFFER TO BE INSTALLED IN ACCORDANCE WITH AS2159.

R9. REINFORCING MESH IS TO BE LAPPED A MINIMUM OF TWO BARS AT ANY SPLICE. R10. WHERE NOT SHOWN ON THE DRAWINGS, ADOPT THE FOLLOWING LAP SPLICE LENGTHS.

AR SIZE & TYPE	HORIZONTAL BARS WITH MORE THAN 300mm CONCRETE CAST BELOW	OTHER BARS
N12	375	300
N16	560	450
N20	830	660
N24	1150	920
N28	1530	1220
N32	1900	1520
N36	2340	1870

R11. REINFORCEMENT SYMBOLS:

GRADE D500N DEFORMED BAR. GRADE D5001 DEEORMED EABRIG

PI 2. SI THE NUMBER FOLLOWING THESE SYMBOLS IS THE BAR DIAMETER IN MILLIMETRES.

R12 REINFORCEMENT NOTATIONS:

EACH FACE

EACH WAY

FF

EW

CP

R14.

TOP BOTTOM

CENTRALLY PLACED

R13. WELDING OF REINFORCEMENT WILL ONLY BE PERMITTED WITH THE PRIOR APPROVAL OF THE ENGINEER.

A BOND BREAKING MATERIAL SHALL BE USED BETWEEN CONTACTING SURFACES AT CONTROL JOINTS. REFER DRAWINGS. REINFORCEMENT SHALL NOT BE CONTINUOUS THROUGH CONTROL JOINTS UNLESS NOTED OTHERWISE.

R15. ALL REINFORCEMENT SHALL BE FIRMLY SUPPORTED ON EITHER PLASTIC CHAIRS OR CONCRETE CHAIRS AT NOT GREATER THAN 1000 CRS BOTH WAYS, BARS SHALL BE TIED AT ALTERNATIVE INTERSECTIONS

R16. SUPPLY AND LAY FABRIC IN FLAT SHEETS. AT SPLICES, FABRIC SHALL BE LAPPED AS FOLLOWS:

. . . MAXIMUM THREE SHEETS OF FABRIC TO BE LAPPED AT ANY SPLICE

R17. ALL STARTER BARS TO EXISTING CONCRETE TO BE GROUTED USING EITHER HILTI HIT-HY 150 MAX. OR HILTI HIT-RE 500.

BEFORE THE REINFORCEMENT IS PLACED. THE SURFACE OF THE REINFORCEMENT AND THE SURFACES OF ANY METAL BAR SUPPORTS SHALL BE CLEANED OF ANY HEAVY RUST. LOOSE MILL SCALE, DIRT, GREASE AND OTHER FOREIGN SUBSTANCES. AFTER BEING PLACED, THE REINFORCEMENT SHALL BE MAINTAINED IN A CLEAN CONDITION UNTIL IT IS COMPLETELY EMBEDDED IN THE CONCRETE.

R19. REINFORCEMENT SHALL BE ACCURATELY PLACED AND SUPPORTED TO PREVENT DISPLACEMENT DURING ALL STAGES OF CONCRETING. TACK WELDING OR WIRE TIES ARE ACCEPTABLE METHODS FOR PREVENTING SUCH DISPLACEMENT.

R20. WHERE APPROVED BY THE PROJECT ENGINEER THE CONTRACTOR SHALL BE PERMITTED TO LOCATE JOINTS OR SPLICES AT LOCATIONS OTHER THAN THOSE SHOWN ON THE DRAWINGS.

R21. WHERE WELDED SPLICES IN REINFORCING BARS ARE USED, THE EQUIPMENT, MATERIALS AND ALL WELDING AND TESTING PROCEDURES SHALL BE IN ACCORDANCE WITH AS 1554.3 - 2002. REINFORCING BAR LAP LENGTHS SHALL BE MAINTAINED ACROSS ALL WELDED LOCATIONS.

PONTOON POLES

PP1. STEEL PONTOON PILES TO BE INSTALLED IN ACCORDANCE WITH AS2159.



LOCALITY PLAN NOT TO SCALE

**A** PM 24182 124.35

06

8



Services

The I shoul cons	The location of services shown on the plan should be proven to be correct prior to construction.									
The relevant authorities should be contacted prior to commencement of works to ascertain the correct location of all services.										
4	18/02/18	CUL DE SAC AMENDEDED								
3	23/10/17	ISSUED FOR CONSTRUCTION								
2	30/08/17	PRELIMINARY DESIGN FOR DISCUSSION								
1	21/12/16	DRAFT FOR DISCUSSION								
REV	DATE	REVISIONS								

## Disclaimer

Notwithstanding any description contained in the plans or design specifications, the contractor shall be responsible for satisfying themselves as to the nature and extent of the specified works and the physical and legal conditions under which the works will be carried out, including site conditions, access, nature of material to be excavated, size and type of mechanical plant required and any like matters effecting the construction of the works.

CEMETERY ROAD 🎐

	LEGEND												
Asphalt Driveway		Concrete Driveway		Gravel Driveway		S.E.C. U/G Cable	—— Е ——	Fire Hydrant	O F.H.	Proposed Culvert	)(	ARIVERIARIGAN	
Proposed K & C		Permanent Mark	<b>小</b> PM	Tree to be removed	8	Gas Main	G	Fire Plug	O F.P.	Proposed Picnic Table		No.	
Conduits	c	Telstra U/G Cable	T	Telstra Pole	\$	Sewer Main	s	Valve		Proposed Shelter	$\square$		
Existing Drains	D	Water Main		Telstra Pit	<b>——</b>	Property Outlet	— sw —	S.E.C. Pole	O	Survey Station	<b>▲</b> PEG		RICH     UNIT <sup>-</sup>
Existing Drain Pits		Proposed Drain Pits		Proposed Drains	PD	Existing K & Ch	====	Existing Culvert	)(	Rock Spalling		PTY LTD A.C.N.106 901 777	Teleph





RIVER IRRIGATION DEVELOPMENTS DRAWING NUMBER REVISION SIZE SHEET NUMBER TITLE: DARLINGTON POINT BOAT RAMP 1, 164 OGILVIE AVENUE, ECHUCA 3564 none (03) 5482 2564 Fax (03) 5482 1918 DESCRIPTION: SITE PLAN (1:1000) 03 of 12 2016-107 A1 4





## SURVEY NOTES

Topographical & Feature Survey Datum A.H.D. Contour Interval 100 mm.

## MURRUMBIDGEE SHIRE COUNCIL / APEX CLUB PROPOSED DARLINGTON POINT BOAT RAMP SITE PLAN



NOT TO SCALE





Asphalt Driveway		Concrete Driveway		
Proposed K & C		Permanent Mark	<b>A</b> PM	
Conduits	— c —	Telstra U/G Cable	T	
Existing Drains	D	Water Main	— w —	
Existing Drain Pits		Proposed Drain Pits		



Services

The	loc	atic	n	of	se	ervi	ces	shown		on	the	)	pla
shou	ld	be	pr	ove	n	to	be	correc	t	pri	ior	to	5
con	stri	JCTIC	on.										

The i prior the c	relevant o to comn correct lo	authorities should be contacted nencement of works to ascertain cation of all services.	
3	23/10/17	ISSUED FOR CONSTRUCTION	

2	30/08/17	PRELIMINARY DESIGN FOR DISCUSSION
1	21/12/16	DRAFT FOR DISCUSSION
REV	DATE	REVISIONS

			,		•			
X	Gas Main	G	Fire Plug	O F.P.	Proposed Picnic Table		No.	
Ф	Sewer Main	s	Valve	<b>_</b>	Proposed Shelter	$\mathbb{N}$		
	Property Outlet	— sw —	S.E.C. Pole	Ō	Survey Station	<b>▲</b> PEG		RIC
PD	Existing K & Ch		Existing Culvert	)(	Rock Spalling		DEVELOPIVIEN IS PTY LTD A.C.N.106 901 777	Tele

	1974 Flood lev	rel (Approximate) — 125. — — — — — — — — — — — — —	.55											
122.00-	HWM stain on	day of survey — 124.95	5											
120.00-					EXISTING NA	TURAL SURFACE		SUMMI	<u>Level on day of survey – '</u> Er water level – 119.20	20.71				
118.00-	-										EXISTING NATURAL SURFACE			
116.00-	-													
DATUM (m AHD) 114.00	0													
DESIGN SURFACE														
	120.71 119.80 119.50					117.20	116.60	116.00	116.50	117.10	117.00	117.80	118.30	
CHAINAGE (m)	00.00 1.94 2.30					24.19	26.28	31.44	39.39	44.85	53.58	63.38	70.29	
11.26 122.15 122.65 12.15 122.15 122.65 NOITION NITION REFER		REFER DETAIL	EXISTING N CONCRETE RAMP ON NTRALLY PLACED NFORCED CONCRE	MATURAL SURF	ACE MP PROOF MEMBE L CONCRETE AND	1974 Flood HWM stain of BASE COURSE MA REFER DETAIL	level (Approximate on day of survey ED BETWEEN STERIAL CODE T IN SITU CONCRI 1 MESH CENTRALL CENTRALL CENTRALL CENTRALL	e) - 125.55 - 124.95 - 124.95 WATER LEVEL ON DAY OF SUMMER WATER LEVEL - ETE RAMP WITH LY PLACED SUMMER WATER LEVEL - SUMMER WATER - SUMMER WATER LEVEL - SUMMER WATER -	SURVEY - 120.71 - 119.20 REFER DETAIL	E	-EXISTING NATURAL SURFACE	77.59 116.20	85.70 117.00	96.52 118.00







			Disclaimer
			Notwithstanding any descrip
4	18/02/18	RIVER CROSS-SECTION 2 AMENDED	or design specifications, th for satisfying themselves a:
3	23/10/17	ISSUED FOR CONSTRUCTION	specified works and the ph
2	30/08/17	PRELIMINARY DESIGN FOR DISCUSSION	access, nature of material
1	21/12/16	DRAFT FOR DISCUSSION	mechanical plant required (   construction of the works.
REV	DATE	REVISIONS	

scription contained in the plans , the contractor shall be responsible is as to the nature and extent of the e physical and legal conditions under e carried out, including site conditions, orial to be excavated, size and type of ed and any like matters effecting the tes.

	LEGEND												
Asphalt Driveway		Concrete Driveway		Gravel Driveway		S.E.C. U/G Cable	—— E ——	Fire Hydrant	O F.H.	Proposed Culvert	)(	A RIVEN INAIGAL	
Proposed K & C		Permanent Mark	<b>A</b> PM	Tree to be removed	X	Gas Main	G	Fire Plug	O F.P.	Proposed Picnic Table		No.	
Conduits	c	Telstra U/G Cable	T	Telstra Pole	\$	Sewer Main	s	Valve		Proposed Shelter	X		
Existing Drains	D	Water Main	— w —	Telstra Pit	<b>——</b>	Property Outlet	— sw —	S.E.C. Pole	O	Survey Station	<b>▲</b> PEG		RICH R
Existing Drain Pits		Proposed Drain Pits		Proposed Drains	PD	Existing K & Ch	====	Existing Culvert	)(	Rock Spalling		PTY LTD A.C.N.106 901 777	Telepho

RIVER CROSS-SECTION 2 SCALE 1: 200 HORIZONTAL 1: 200 VERTICAL (Chainage 0.00 to Chainage 114.22)

1974 Flood level (Approximate) — 125.55

HWM stain on day of survey — 124.95

				WATER LEVEL	ON DAY OF SURVEY - 120.71					
				SUMMER WAT	ER LEVEL – 119.20	- EXISTING	NATURAL SURFACE			
119.20	117.50	115.50	115.70	116.00	116.30	116.90	118.00	118.30	118.90	
11.45	16.55 16.55	21.35	26.96	33.27	40.07	46.87	5 7 AF	59.48	90 80 80	



## 1974 Flood level (Approximate) — 125.55

HWM stain on day of survey — 124.95

\_\_\_\_EXISTING NATURAL SURFACE

			WATER LEVE	L ON DAY OF SURVEY - 120.7	71					-
			SUMMER W	ATER LEVEL – 119.20		EXISTING NATURAL SURFAC	ЭЕ			
117.40	116.50	116 BO	117.30	117.10	117 60	117.70	117.80	117.90	118.80	120.71
14.00	17.35	23.04	29.09	36.09	41 93	47.75	52.33	55.69	58.06	67.53

# RIVER CROSS—SECTION 4 SCALE 1:200 HORIZONTAL 1:200 VERTICAL (Chainage 0.00 to Chainage 67.53)

RIVER IRRIGATION DEVELOPMENTS I, 164 OGILVIE AVENUE, ECHUCA 3564 none (03) 5482 2564 Fax (03) 548







## MURRUMBIDGEE SHIRE COUNCIL / APEX CLUB PROPOSED DARLINGTON POINT BOAT RAMP **RIVER CROSS - SECTIONS**

•	TITLE: DARLINGTON POINT BOAT RAMP	SIZE	SHEET NUMBER	DRAWING NUMBER	REVISION
4 182 1918	DESCRIPTION: RIVER CROSS-SECTIONS (1:200)	A1	05 <sub>OF</sub> 12	2016-107	4



								ICR IPD.	
Gravel Driveway		S.E.C. U/G Cable	—— Е ——	Fire Hydrant	O F.H.	Proposed Culvert	)(	ARIVENINAIGRA	
Free to be removed	X	Gas Main	G	Fire Plug	O F.P.	Proposed Picnic Table		No.	
Telstra Pole	\$	Sewer Main	s	Valve	<b>_</b>	Proposed Shelter	$\boxtimes$		
Telstra Pit	<b>—</b>	Property Outlet	— sw —	S.E.C. Pole	$\odot$	Survey Station	<b>▲</b> PEG		RICH RIVER IRRIGATIO
Proposed Drains	PD PD	Existing K & Ch		Existing Culvert	)(	Rock Spalling		PTY LTD A.C.N.106 901 777	Telephone (03) 5482





SEALED ROADWAY CROSS-SECTION D-D SCALE 1:200 HORIZONTAL 1:200 VERTICAL

		Disclaimer						LEC	GEND						
		Notwithstanding any description contained in the plans	Asphalt Driveway		Concrete Driveway		Gravel Driveway		S.E.C. U/G Cable	ε Fire Hydrant	O F.H.	Proposed Culvert	)(	A RIVER IRRIGA	
3 18/02/18 F		for satisfying themselves as to the nature and extent of the specified works and the physical and legal conditions under	Proposed K & C		Permanent Mark	<b>1</b> PM	Tree to be removed	8	Gas Main	G Fire Plug	O F.P.	Proposed Picnic Table		Se Contraction	
2 23/10/17	ISSUED FOR CONSTRUCTION	which the works will be carried out, including site conditions, access, nature of material to be excavated, size and type of	Conduits	c	Telstra U/G Cable	T	Telstra Pole	•	Sewer Main	s — Valve		Proposed Shelter	$\square$		
1 30/08/17 [	DRAFT FOR DISCUSSION	mechanical plant required and any like matters effecting the construction of the works.	Existing Drains	D	Water Main		Telstra Pit		Property Outlet	— sw — S.E.C. Pole	O	Survey Station	<b>▲</b> PEG		UNIT 1. 164 OGILVIE AVENUE, ECHUCA 3564
REV DATE	REVISIONS		Existing Drain Pits		Proposed Drain Pits		Proposed Drains	PD	Existing K & Ch	$\equiv \equiv \equiv \equiv$ Existing Culvert	)(	Rock Spalling		PTY LTD A.C.N.106 901 777	Telephone (03) 5482 2564 Fax (03) 5482



SEALED ROADWAY CROSS-SECTION E-E scale 1:200 horizontal 1:200 vertical



## LEGEND

BASECOURSE

SUBBASE

AREA OF CUT

AREA OF FILL

CONCRETE PAVEMENT

## MURRUMBIDGEE SHIRE COUNCIL / APEX CLUB PROPOSED DARLINGTON POINT BOAT RAMP **ROADWAY CROSS - SECTIONS**

	TITLE DARI INGTON POINT BOAT RAMP	SIZE	SHEET NUMBER	DRAWING NUMBER	REVISION
4 82 1918	DESCRIPTION: ROADWAY CROSS-SECTIONS (1:200)	A1	07 <sub>OF</sub> 12	2016-107	3





			-Existing natural surface				-existing natural surface	
	ON EXIS	STING NATURAL SURFACE GRADES						
125.23	124.45	124.26	123.83	123.25	123.17	123.42 123.85		123.88
125.08	124.30	124.11	123.68	123.10	123.02	123.27 123.70		123.73
100.00	112.04	125.00	150.00	175.00	<u>180.75</u> 181.37	225.00		250.00



## LEGEND



SUBBASE

AREA OF FILL

3 18/02/18 CONCRETE PAVEMENT ADDED 2 23/10/17 ISSUED FOR CONSTRUCTION

1 30/08/17 DRAFT FOR DISCUSSION

REV DATE

CONCRETE PAVEMENT

REVISIONS

## Disclaimer

Notwithstanding any description contained in the plans or design specifications, the contractor shall be responsible for satisfying themselves as to the nature and extent of the specified works and the physical and legal conditions under which the works will be carried out, including site conditions, access, nature of material to be excavated, size and type of mechanical plant required and any like matters effecting the construction of the works.

					LEC	GEND							
Asphalt Driveway		Concrete Driveway		Gravel Driveway		S.E.C. U/G Cable	—— E ——	Fire Hydrant	O F.H.	Proposed Culvert	)(	A RIVEN IMAIGAL	
Proposed K & C		Permanent Mark	▲ РМ	Tree to be removed	X	Gas Main	G	Fire Plug	O F.P.	Proposed Picnic Table		No.	
Conduits	— c —	Telstra U/G Cable	T	Telstra Pole	Ф	Sewer Main	s	Valve		Proposed Shelter	$\boxtimes$		
Existing Drains	<b>D</b>	Water Main	— w —	Telstra Pit		Property Outlet	— sw —	S.E.C. Pole	O	Survey Station	<b>▲</b> PEG		CH RIVER
Existing Drain Pits		Proposed Drain Pits		Proposed Drains	PD	Existing K & Ch	===	Existing Culvert	)(	Rock Spalling		PTY LTD A.C.N.106 901 777	lephone

-existing natural surface			
127.02	126.90	126.85	
126.87	126,75	126.70	
50.00	75.00 75.00	80.67	

# DESIGN ROAD LONGITUDINAL SECTION — (0—100) scale 1:200 horizontal 1:200 vertical (looking north west)



EXISTING LEVEE BANK - 126.84

<u>DESIGN ROAD LONGITUDINAL SECTION — (100—255.99)</u> scale 1:200 horizontal 1:200 vertical (looking north west)

Seitenteen			Still Dial-			BAR BAR
				CONCRETE PAVE	EXISTING LEVEE BANK - 126.84	
		AREA OF FILL		EXISTING NATURAL SURFACE	AREA OF FILL	
			FLAT			3.33%
23.00 123.00	22.84 123.00	22.53 123.00	FLAT	22.41	22.42	<u>3.33%</u>

DESIGN ROAD LONGITUDINAL SECTION — (255.99—411.12) scale 1:200 horizontal 1:200 vertical (looking north west)

R IRRIGATION DEVELOPMENTS 164 OGILVIE AVENUE, ECHUCA 3564 ne (03) 5482 2564 Fax (03) 5482

# EXISTING LEVEE BANK - 126.84 EXISTING ENTRY RAMP

## MURRUMBIDGEE SHIRE COUNCIL / APEX CLUB PROPOSED DARLINGTON POINT BOAT RAMP **ROADWAY LONGITUDINAL - SECTION**

	TITLE: DARLINGTON POINT BOAT RAMP	SIZE	SHEET NUMBER	DRAWING NUMBER	REVISION
64 482 1918	DESCRIPTION: ROADWAY LONGITUDINAL-SECTION (1:200)	A1	08 of 12	2016-107	3



<u>ES</u>					
	MURRUMBIDGEE SHIRE COUNCIL	_ / APE	X CLUB		
F	PROPOSED DARLINGTON PO	INT E	BOAT RAMP	)	
	DESIGN DETAILS				
	TITLE: DARLINGTON POINT BOAT RAMP	SIZE	SHEET NUMBER	DRAWING NUMBER	REVISION
64 482 1918	DESCRIPTION: DESIGN DETAILS	A1	09 of 12	2016-107	3
	•				

- 1000	1000	1000	<del>-   -</del> 515
			2. 
A A	75 (MIN)	CONCRETE PILE TO E BACK TO EXPOSE RE	


SCALE

DATE

DESIGNED

D.LEE

N.T.S.

30-08-17

DEVELOPMENTS PTY LTD A.C.N. 106 901 777

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SURVEYED BY

D.LEE

DRAWN

D.LEE

-

REV DATE DESIGN REV'D APP'D REVIEW P.MGR P.DIR

ISSUED FOR CONSTRUCTION

REVISIONS

ISSUED FOR DISCUSSION

2 23/10/17

1 30-08-17

\_

EDGE LINE CENTRE LINE (Solid)	Om	OF SEAL		
MURRUMBIDGEE SHIRE COUNCIL / A	PEX CLUB			
PROPOSED DARLINGTON POINT BOAT RAMP				
PAVEMENT LINEMARKING DETA	LS			
RICH RIVER IRRIGATION DEVELOPMENTS	Sheet Number	DRAWING NUMBER	REVISION	
Unit 1, 164 Ogilvie Avenue, Echuca. 3564. Telephone (03) 5482 2564 Fax (03) 5482 1918 Email admin@rrid.com.au	10 of 12	2016-107	2	
			A3	

NALK	WAYS	AND	HAH	NDRA	ils t	0 (	COMPLY	WITH	OH&S	ACT	2004	, OH&S	RE(	GULATIONS	2007
AND	AS165	57–FĽ	XED	PLAT	FORM	٨S,	WALKW	AYS,	STAIRW	AYS	AND L	ADDERS	; –	DESIGN,	
CONS	STRUCI	TION	AND	INST	ALLA	<b>TIO</b>	N.								

PONTOON POLE LOCATION TABLE				
POLE NO.	EASTING	NORTHING		
P1	408430.160	6174270.015		
P2	408435.016	6174274.700		
P3	408439.884	6174279.397		
P4	408444.784	6174284.124		
P5	408446.028	6174288.386		
P6	408444.270	6174300.587		
P7	408442.776	6174312.494		
P8	408443.263	6174319.148		
P9	408445.415	6174330.953		
P10	408447.568	6174342.759		







7.2.Appendix 2 – EPBC Act Protected Matters Report

Australian Government



Department of the Environment and Energy

# **EPBC** Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about <u>Environment Assessments</u> and the EPBC Act including significance guidelines, forms and application process details.

Report created: 04/05/18 10:45:49

Summary Details Matters of NES Other Matters Protected by the EPBC Act Extra Information

**Acknowledgements** 



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates Buffer: 10.0Km



# Summary

## Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the <u>Administrative Guidelines on Significance</u>.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	18
Listed Migratory Species:	9

## Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A <u>permit</u> may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	14
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

## **Extra Information**

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	2
Regional Forest Agreements:	None
Invasive Species:	29
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

# Details

# Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)	[Resource Information]
Name	Proximity
Banrock station wetland complex	500 - 600km upstream
Hattah-kulkyne lakes	300 - 400km upstream
Riverland	400 - 500km upstream
The coorong, and lakes alexandrina and albert wetland	500 - 600km upstream

## Listed Threatened Ecological Communities

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

[Resource Information]

Name	Status	Type of Presence
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Endangered	Community may occur within area
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern	Endangered	Community likely to occur within area
Australia Weeping Myall Woodlands	Endangered	Community likely to occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area
Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Botaurus poiciloptilus		
Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Grantiella picta		
Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area

Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat known to occur within area
Pezoporus occidentalis Night Parrot [59350] Polytelis swainsonii	Endangered	Extinct within area
Superb Parrot [738]	Vulnerable	Breeding known to occur within area

Name	Status	Type of Presence
Rostratula australis		
Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Fish		
Galaxias rostratus		
Flathead Galaxias, Beaked Minnow, Flat-headed Galaxias, Flat-headed Jollytail, Flat-headed Minnow [84745]	Critically Endangered	Species or species habitat may occur within area
Maccullochella peelii		
Murray Cod [66633]	Vulnerable	Species or species habitat may occur within area
Macquaria australasica		
Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
Frogs		
Litoria raniformis Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog [1828]	Vulnerable	Species or species habitat likely to occur within area
Mammals		
Nyctophilus corbeni		
Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, N	<u>ISW and the ACT)</u>	
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104] Plants	Vulnerable	Species or species habitat likely to occur within area
Austrostipa wakoolica		
[66623]	Endangered	Species or species habitat may occur within area
Brachyscome papillosa		
Mossgiel Daisy [6625]	Vulnerable	Species or species habitat may occur within area
Swainsona murrayana		
Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat likely to occur within area
Listed Migratory Species		[Resource Information ]
* Species is listed under a different scientific name on th	EPRC Act - Threatened	Spaciae list
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata		
Sharp tailed Sandpiner [97/]		Spacing or opening hebitat

Sharp-tailed Sandpiper [874]

Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

## Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on th	e EPBC Act - Threatened	Species list.
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba		
Great Egret, White Egret [59541]		Breeding known to occur within area
<u>Ardea ibis</u>		
Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area

Calidris ferruginea Curlew Sandpiper [856]

Calidris melanotos Pectoral Sandpiper [858]

Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]

Haliaeetus leucogaster White-bellied Sea-Eagle [943]

Merops ornatus Rainbow Bee-eater [670]

Motacilla flava Yellow Wagtail [644] Critically Endangered

Species or species habitat may occur within area

Species or species habitat may occur within area

Species or species habitat may occur within area

Species or species habitat known to occur within area

Species or species habitat may occur within area

Species or species

Threatened	Type of Presence
	habitat may occur within
	area
	Species or species habitat
	may occur within area
Critically Endangered	Species or species habitat
	may occur within area
	<b>a</b>
Endangered*	Species or species habitat likely to occur within area
	Threatened Critically Endangered Endangered*

## **Extra Information**

State and Territory Reserves	[Resource Information]
Name	State
Murrumbidgee Valley	NSW
Murrumbidgee Valley	NSW

# **Invasive Species**

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis		
Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area

Alauda arvensis Skylark [656]

Species or species habitat

[Resource Information]

Anas platyrhynchos Mallard [974]

Carduelis carduelis European Goldfinch [403]

Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]

Passer domesticus House Sparrow [405]

Passer montanus Eurasian Tree Sparrow [406]

Streptopelia chinensis Spotted Turtle-Dove [780] likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Sturnus vulgaris		
Common Starling [389]		Species or species habitat
		likely to occur within area
		-
Turdus merula		
Common Blackbird, Eurasian Blackbird [596]		Species or species habitat
		likely to occur within area
Mammals		
Bos taurus		
Domestic Cattle [16]		Species or species habitat
		likely to occur within area
Canis lupus familiaris		
Domestic Dog [82654]		Species or species habitat
		likely to occur within area
Capra hircus		
Goat [2]		Species or species habitat
		likely to occur within area
Felis catus		
Cat, House Cat, Domestic Cat [19]		Species or species habitat
		likely to occur within area
Brown Hare [127]		Species or species nabitat
		likely to occur within area
Mus musculus		
House Mouse [120]		Spacios or spacios babitat
House Mouse [120]		likely to occur within area
Orvctolagus cuniculus		
Rabbit European Rabbit [128]		Species or species habitat
		likely to occur within area
Rattus rattus		
Black Rat, Ship Rat [84]		Species or species habitat
		likely to occur within area
Vulpes vulpes		

Species or species habitat likely to occur within area

## Plants

Red Fox, Fox [18]

Alternanthera philoxeroides Alligator Weed [11620]

Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]

Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]

Lycium ferocissimum African Boxthorn, Boxthorn [19235]

Opuntia spp. Prickly Pears [82753]

Prosopis spp. Mesquite, Algaroba [68407]

Rubus fruticosus aggregate Blackberry, European Blackberry [68406] Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species habitat likely to occur within area

Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Sagittaria platyphylla		
Delta Arrowhead, Arrowhead, Slender Arrowheae [68483]	d	Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron	& S.x reichardtii	
Willows except Weeping Willow, Pussy Willow an Sterile Pussy Willow [68497]	nd	Species or species habitat likely to occur within area
Solanum elaeagnifolium		
Silver Nightshade, Silver-leaved Nightshade, Wh	lite	Species or species habitat
Horse Nettle, Silver-leaf Nightshade, Tomato We	ed,	likely to occur within area
White Nightshade, Bull-nettle, Prairie-berry, Satanshas, Silver loof Bitter apple, Silverloof net	tlo	
Trompillo [12323]		

# Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

# Coordinates

-34.56925 146.0018

# Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales -Department of Environment and Primary Industries, Victoria -Department of Primary Industries, Parks, Water and Environment, Tasmania -Department of Environment, Water and Natural Resources, South Australia -Department of Land and Resource Management, Northern Territory -Department of Environmental and Heritage Protection, Queensland -Department of Parks and Wildlife, Western Australia -Environment and Planning Directorate, ACT -Birdlife Australia -Australian Bird and Bat Banding Scheme -Australian National Wildlife Collection -Natural history museums of Australia -Museum Victoria -Australian Museum -South Australian Museum -Queensland Museum -Online Zoological Collections of Australian Museums -Queensland Herbarium -National Herbarium of NSW -Royal Botanic Gardens and National Herbarium of Victoria -Tasmanian Herbarium -State Herbarium of South Australia -Northern Territory Herbarium -Western Australian Herbarium -Australian National Herbarium, Canberra -University of New England -Ocean Biogeographic Information System -Australian Government, Department of Defence Forestry Corporation, NSW -Geoscience Australia -CSIRO -Australian Tropical Herbarium, Cairns -eBird Australia -Australian Government – Australian Antarctic Data Centre -Museum and Art Gallery of the Northern Territory

-Australian Government National Environmental Science Program

-Australian Institute of Marine Science

-Reef Life Survey Australia

-American Museum of Natural History

-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania

-Tasmanian Museum and Art Gallery, Hobart, Tasmania

-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Lot - Cadastre

**Biodiversity Values** 

Land Excluded from LLS Act

Notes

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## Biodiversity Offset Scheme (BOS) Entry Threshold Report

### **Results Summary**

Date of Calculation	04/05/2018 12:17 PM	BAM Required*
Total Digitised Area	0.08 ha	
Minimum Lot Size Method	Lot size	
Minimum Lot Size	1.71 ha	
Area Threshold	0.5 ha	
Area of native vegetation cleared	Unknown <sup>#</sup>	Unknown <sup>#</sup>
Impact on biodiversity values land map	no	no

\*If BAM required has:

• at least one 'Yes': you have exceeded the BOS threshold. You are now required to submit a Biodiversity Development Assessment Report with your development application. Go to <u>https://customer.lmbc.nsw.gov.au/assessment/AccreditedAssessor</u> to access a list of assessors who are accredited to apply the Biodiversity Assessment Method and write a Biodiversity Development Assessment Report

- 'No': you have not exceeded the BOS threshold. You may still require a permit from local council. Review the development control plan and consult with council. You may still be required to assess whether the development is "likely to significantly affect threatened species' as determined under the test in s. 7.3 of the Biodiversity Conservation Act 2016. You may still be required to review the area where no vegetation mapping is available.
- # Where the area of impact occurs on land with no vegetation mapping available, the tool cannot determine the area of native vegetation cleared and if this exceeds the Area Threshold. You will need to work out the area of native vegetation cleared – refer to the BOSET user guide for how to do this.

## Disclaimer

This results summary and map can be used as guidance material only. This results summary and map is not guaranteed to be free from error or omission. The State of NSW and Office of Environment and Heritage and its employees disclaim liability for any act done on the information in the results summary or map and any consequences of such acts or omissions. It remains the responsibility of the proponent to ensure that their development application complies will all aspects of the *Biodiversity Conservation Act 2016*.

The mapping provided in this tool has been done with the best available mapping and knowledge of species habitat requirements. This map is valid for a period of 30 days from the date of calculation (above).

## Acknowledgement

I as the applicant for this development, submit that I have correctly depicted the area that will be impacted or likely to be impacted as a result of the proposed development.

Signature	Date:	04/05/2018	12:17 PM
-----------	-------	------------	----------



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#### STATEMENT OF LIMITATIONS

This report has been prepared for the Murrumbidgee Council the purpose set out herein. The services performed by Rich River Irrigation developments (RRID) have been conducted with the level of quality and expertise generally associated with activities of this nature by an environmental consulting practice. Responsibility is disclaimed for any loss or damage to the Murrumbidgee Council. RRID does not accept any responsibility suffered by any other party whatsoever including, but not limited to, negligence on the part of RRID. This report is for the use of Murrumbidgee Council and its agents. RRID does not intend that any other person accept or rely upon it. This report shall only be presented in full, except where written approvals with comments are provided by RRID. RRID cannot provide warranties or assurances that the contents of this report will be applicable in the future due to potential changes in the condition of the site, other knowledge acquired, applicable legislation or other factors making void any aspect of the report. The information contained in this report is considered to be accurate on the date of issue in accordance with the current conditions of the site. Whilst the report is accurate to the best of our knowledge and belief, RRID cannot guarantee completeness or accuracy of any descriptions or conclusions based on supplied information, including but not limited to, information provided by previous site assessors and data arising from investigations by any other third party.

## 9.4 Appendix 4 – Flood Assessment

See Over Page

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# Darlington Point Hydraulic Investigation

Proposed Boat Ramp Assessment

V171890

Prepared for Rich River Irrigation Developments

22 December 2017





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### **Document Information**

Prepared for	Rich River Irrigation Developments
Project Name	Proposed Boat Ramp Assessment
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Date	22 December 2017
Version Number	1

### **Document History**

Version	Effective Date	Description of Revision	Prepared by	Reviewed by
V1	22/12/2017	Draft	Heath Sommerville	Rob Swan

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## **Table of Contents**

1 In		Introduction		
		1.1	Study Area	1
	2	Design E	Events	3
	3	Model S	etup and Validation	6
		3.1	Topography Adjustments	7
		3.2	Model Roughness	7
	4	Results		8
		4.1	Flood Impact of the boat ramp and approach road	18
	5	Conclus	ions	19
	6	Referen	ces	20

## **Tables**

4
5
9
19

## **Figures**

Figure 1-1	Study area and hydraulic model topography	2
Figure 2-1	Fitted FFA from FLIKE for gauge 410021 (annual data)	3
Figure 2-2	Fitted FFA curve to the annual peak data at gauge 410021	5
Figure 3-1	Darlington Point hydraulic model extent and setup	6
Figure 4-1	Peak flood depth for the 1% AEP design event – full model area	10
Figure 4-2	Peak flood depth for the 1% AEP design event – Zoomed to boat ramp	11
Figure 4-3	Peak flood depth for the 5% AEP design event – full model area	12
Figure 4-4	Peak flood depth for the 1% AEP design event – zoomed to boat ramp	13
Figure 4-5	Peak flood depth for the 20% AEP design event – full model area	14
Figure 4-6	Peak flood depth for the 1% AEP design event – zoomed to boat ramp	15
Figure 4-7	Peak flood depth for the bank full design event – full model area	16
Figure 4-8	Peak flood depth for the bank full design event – zoomed to boat ramp	17
Figure 4-9	Example cross section for the boat ramp	18

## 1 Introduction

Cardno have been engaged to undertake a hydraulic assessment of a proposed boat ramp in Darlington Point, NSW. This assessment aims at identifying and assessing a range of flood events in relation to the boat ramp to determine:

- Any potential impacts that the boat ramp would have on flood behaviour
- The impacts of floods on the boat ramp structure.

This assessment has focussed on the bank full, 20%, 5% and 1% Annual Exceedance Probability (AEP) flood events.

### 1.1 Study Area

Darlington Point is located on the Murrumbidgee River. The Murrumbidgee River is characterised by a broad flat floodplain with multiple distributaries. As a result, the peak flood through the area are long events (multiple days to weeks) in duration and are relatively slow moving. The peak flows are also limited due to the distributaries.

Within the study area (Figure 1-1) there is a long term streamflow gauge at Murrumbidgee River at Darlington Point (410021) located within the township. The hydraulic model area extends approximately 4km upstream and downstream. The location of the boat ramp is immediately upstream of the township outside the existing levee protection system.

The township of Darlington Point is leveed at this location and an additional retaining wall has recently been installed near the proposed boat ramp location to upgrade the levee system. It is believed the levee is designed to withstand the 1% AEP flood event but this is unknown.

The Murrumbidgee River at this location is complex with many overland flow paths activated during high flows which can bypass certain areas and link between river systems. The closest gauge to the proposed house site is the Murrumbidgee River at Darlington Point (410021). This gauge has a good record spanning 47 years from 1970 to 2017. The most recent large flood was the 2012 flood event with a peak flow rate of 1,311 m<sup>3</sup>/s at Darlington Point, however a reported 1% AEP event was the 1974 flood through the region. In 1974 the peak flow rate reached at Darlington Point was 1,368 m<sup>3</sup>/s and a level of 125.55 mAHD.



Figure 1-1 Study area and hydraulic model topography

## 2 Design Events

In order to assess the hydraulic characteristics of the area deign events are required to simulate the expected flood for a given return period. To do this an assessment has been undertaken on the Murrumbidgee River at Darlington Point gauge and reviewing various regional studies.

A desktop review of the Narrandera Flood Study Review (Lyall & Associates, 2015) shows that the estimated 1% AEP event at Narrandera is 3,200 m<sup>3</sup>/s which is the equivalent of the 1974 flood at this location. Given the peak flow rate at Darlington Point is 1,368 m<sup>3</sup>/s in 1974, this shows there are considerable bypass flows between Narrandera and Darlington Point. Although this is the case, it suggests that the historic 1974 event was approximately a 1% AEP event and is a suitable estimate of the expected 1% AEP flood for this area.

A separate method for determining the estimated 1% AEP peak flow rate is a flood frequency assessment (FFA) at the Darlington Point gauge. This has been undertaken using the annual peak flow rates at the gauge and TUFLOW FLIKE. The FFA was fitted using a Log Pearson Type III curve using all annual points with no censoring. 0 shows the estimated peak flow rates and associated confidence limits. Figure 2-1 shows the fitted FFA relationship.

The fitted FFA relationship is shown with the 10% confidence limits associated with the fitted relationship. The peak flow rate for the 1974 event is plotted at 1,368 m<sup>3</sup>/s as an equivalent 1% AEP event. This sits just inside the lower 90% confidence interval and is notably lower than the estimated peak flow rate based on the fitted FFA distribution.



Figure 2-1 Fitted FFA from FLIKE for gauge 410021 (annual data)

Annual Exceedance Probability	FFA Peak Flow (m³/s)	Lower 90% Confidence interval (m³/s)	Upper 90% Confidence interval (m³/s)	Selected Peak Flow Rate for Design (m³/s)
Bank Full (~1 EY)	25	10	50	50
20%	538	415	701	475
10%	807	607	1141	-
5%	1,125	804	1809	950
2%	1,628	1052	3183	-
1%	2,078	1228	4785	1,368
0.5%	2,595	1382	7109	-
1974 Event (est. as a 1% AEP)	1,368			
2012 Event	1,311			

Table 2-1	Peak flow rates	from the FFA	at Darlington Point
			0

Notably on the FFA there is a deviation from the fitted data for the larger flood events. It appears that peak flow rates tend to be restricted though the township due to the cross catchment flows. This is evident in the 1974 and 2012 events having a significantly lower flow rate than the predicted fitted distribution. For systems where there are large overland flows the peak flow rate can be limited due to excess flows feeding into other systems rather than remaining within the Main river system during high flow events.

Between Narrandera and Darlington Point it is understood that a large amount of flow enters Yanko Creek, Coleambally Canal and Main Canal. This is shown in the Narrandera Flood Study Review and Levee Options Assessment (Lyall & Associates, 2015).

A similar location where this is known to occur on the Murray River is at Swan Hill. Peak flow rates at Swan Hill are limited due to the system feeding distributaries to the north (Wakool and Edwards Rivers). These flows re-enter the Murray River downstream. Similar flood behaviour is observed for the Murrumbidgee River with numerous anabranches and systems leaving the main channel for long periods before rejoining further downstream.

As a result of the catchment observations and the previous studies indicating that 1974 was commensurate with a 1% AEP flood event it was decided that a peak flow rate of 1,368 m<sup>3</sup>/s would be adopted as the upstream boundary of the hydraulic model. A revised FFA has been adopted for this assessment as shown in Figure 2-2. Due to the adoption of the 1974 event as the 1% AEP flood event the other design events have been adjusted accordingly based on the revised FFA. The final selected peak flow rates for each event are summarised in Table 2-2.



Figure 2-2 Fitted FFA curve to the annual peak data at gauge 410021

٦t
٦

Annual Exceedance Probability	Selected Peak Flow Rate for Design (m³/s)		
Bank Full (~1 EY)	50		
20%	475		
5%	950		
1%	1,368		

## 3 Model Setup and Validation

The hydraulic model topography and location is shown in Figure 1-1. The hydraulic model setup is shown in Figure 3-1. The model extents sufficiently upstream and downstream so that the levels at the boundaries do not influence the flood results at the proposed boat ramp.



Figure 3-1 Darlington Point hydraulic model extent and setup

The hydraulic model consists of a 2D topography grid at 10m x 10m grid cell resolution. This size is limited by the available LiDAR information. The LiDAR information was taken from the Murrumbidgee River LiDAR capture in 2009.

### 3.1 Topography Adjustments

The LiDAR was captured when there was water within the main Murrumbidgee River and as a result the LiDAR did not capture the bathymetry for the river bed. To account for this loss of carrying capacity and storage cross sections as supplied as part of this assessment were used to get an understanding of the shape and depth of the Murrumbidgee River. This was then used to adjust the LiDAR so that the channel was embedded in the 2D surface.

Similarly, the levees within the model have not been accurately picked up by the 2009 LiDAR and there have been additional works associated with the levee since the LiDAR was captured. To account for these within the model the levees have been manually updated to reflect the levels supplied within the plans for the boat ramp.

### 3.2 Model Roughness

The hydraulic model roughness has been set at a Manning's 'n' of 0.05 based on the understanding of the floodplain and aerial imagery. This was checked using the simulation of the 1974 flood event which resulted in a modelled peak flood level of 125.5 mAHD which was approximately 5 cm lower than the gauged level. This was considered an acceptable validation of the model roughness.

**EQUATION 1** 

## 4 Results

### 4.1 Flood Maps and Information

The design runs for the bank full, 20%, 5% and 1% AEP events have been run to determine critical information at the proposed boat ramp. Figure 4-1 to Figure 4-8 show the peak flood depths for the design events for the full study area and for the local area around the proposed boat ramp. The images show that the peak flood levels do not overtop the levee adjacent to the boat ramp.

During large flood events the access road and boat ramp structure is significantly overtopped by floodwaters. These floodwaters are not fast moving however they are of significant depth. Table 4-1 outlines the peak depths, water surface elevations and velocities for the boat ramp structure itself for each design event.

Also shown is the Froude number. The Froude number is a measure which describes the flow state of open channel flow. Flow values less than 1 indicate subcritical flows (i.e. slow / tranquil) whereas values above 1 indicate supercritical flows (fast / turbulent). The values at the boat ramp are all well below 1 and as such indicate the slow moving nature of the floodwaters. The Froude number has been calculated using Equation 1. The velocities for each design event at this location are all below 1 m/s indicating the slow moving nature of the flows.

$$Fr = \frac{V}{\sqrt{gD}}$$

Where:

G = Gravity

Also shown is an estimate of the shear stress on the boat ramp location. This has been approximated using Equation 2. In this equation the hydraulic radius has been approximated by the depth of water at the boat ramp for this calculation.

$$\tau = \omega RS$$
 EQUATION 2

Where:

 $\omega$  = Unit weight of water = 9,789 N/m<sup>3</sup> at 20 Degrees Celsius

R = hydraulic radius (m) = In a wide open channel approximated by the depth of flow (m)

S = water surface slope (m/m)

Annual Exceedance Probability	Max Depth (m)	Max Water Surface Elevation (mAHD)	Peak Velocity (m/s)	Froude No.	Approximate Shear Stress (N/m <sup>2</sup> )
Bank Full (~1 EY)	0.35	120.03	0.042	0.023	0.45
20%	4.65	124.34	0.41	0.061	7.46
5%	5.62	125.30	0.81	0.109	11.08
1%	5.98	125.66	0.94	0.123	14.44

 Table 4-1
 Selected Peak design flow rates for the Darlington Point assessment



Figure 4-1 Peak flood depth for the 1% AEP design event – full model area



Figure 4-2 Peak flood depth for the 1% AEP design event – Zoomed to boat ramp



Figure 4-3 Peak flood depth for the 5% AEP design event – full model area






Figure 4-5 Peak flood depth for the 20% AEP design event – full model area







Figure 4-7 Peak flood depth for the bank full design event – full model area



Figure 4-8 Peak flood depth for the bank full design event – zoomed to boat ramp

### 4.1 Flood Impact of the boat ramp and approach road

The design plans for the amended approach road and boat ramp were assessed and there are only minor changes to the natural surface proposed for the development location.

A cross section of the changes at the boat ramp are shown in Figure 4-9. There is a small portion of cut where the boat ramp is located but for the majority of the area there is minimal change to the existing surface. This area of cut is the equivalent to 1 to 2 grid cells within the model space and these have been lowered in the design surface.



Figure 4-9 Example cross section for the boat ramp

On the access road there are areas of cut and fill which involve changing the surface by approximately +/-200 mm.

To assess the design, the ground surface of the model was adjusted to reflect the changes proposed. As discussed these changes were not large ground level changes but more smoothing of the natural surface to accommodate roads, carparks and the boat ramp itself.

The hydraulic model was run for the bank full, 20%, 5% and 1% AEP events and the peak flood levels compared. Overall the maximum changes observed with less than 1 cm due to the high depths of water associated with the area.

For the bank full scenario there is a slight change in the flood extent due to the boat ramp but this is extremely localised.

## 5 Conclusions

This investigation examined the design events for the Murrumbidgee River is association with Darlington Point and the proposed boat ramp. The main purpose of this investigation was to understand the flood risk to the structure and any potential impacts on the flood behaviour due to the proposed works.

The investigation showed that the area where the proposed boat ramp is to be located is significantly inundated in the design events as it is located outside the Darlington Point levee. Depth for these events are over 5 m in depth.

However, as a result of the large depths during flood events there is little impact to the flood behaviour through the area modified as part of the boat ramp design.

For the design of the boat ramp some key information was extracted from the model. This is repeated here in Table 5-1. Notably the peak velocities in and around this area are not high and are all expected to be under 1 m/s. The primary reason for the low velocities is that the area is adjacent to the levee system and downstream of the boat ramp location is a constriction in the Murrumbidgee River floodplain that controls the flow rates and levels in this area. This results in high depths but low moving flood waters.

The Froude number for the area is well below one indicating the slow moving nature of the flood waters as well. Similarly, the approximate shear stresses are relatively low and standard rock protection and armour should be sufficient for protection of the structure. This has been designed separately to this report and this report does not aim to provide a detailed scour assessment.

Annual Exceedance Probability	Max Depth (m)	Max Water Surface Elevation (mAHD)	Peak Velocity (m/s)	Froude No.	Approximate Shear Stress (N/m <sup>2</sup> )
Bank Full (~1 EY)	0.35	120.03	0.042	0.023	0.45
20%	4.65	124.34	0.41	0.061	7.46
5%	5.62	125.30	0.81	0.109	11.08
1%	5.98	125.66	0.94	0.123	14.44

 Table 5-1
 Selected Peak design flow rates for the Darlington Point assessment

## 6 References

Lyall & Associates, (2015), Narrandera Flood Study Review and Levee Options Assessment, Australia.



### Diversion Drain and Bank (for 2Ha or less)

**Rich River Irrigation Developments** Statement of Environmental Effects October 2018

#### **Silt Fence Drawing**



**Rich River Irrigation Developments** Statement of Environmental Effects October 2018

### **Sediment Dam**



**Rich River Irrigation Developments** Statement of Environmental Effects October 2018 53 Murrumbidgee Council Darlington Point Boat Ramp

### **Rock Check Dam**



**Rich River Irrigation Developments** Statement of Environmental Effects October 2018 54 Murrumbidgee Council Darlington Point Boat Ramp

### Level Spreader



**Rich River Irrigation Developments** Statement of Environmental Effects October 2018 This page has been intentionally left blank

9.6 Appendix 6 – Cultural Heritage Due Diligence Assessment

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# **Cultural Heritage Due Diligence Assessment**

## **Murrumbidgee Council**

## **Darlington Point Boat Ramp**

"Lot:7312 DP:1159328

# October 2018

Document Control*					
Version	Revision	Comment	Author	Date	Authorised by
1		Initial Document	C Fitzpatrick	27/04/18	Russell Healey
1	1	Draft	C Fitzpatrick	28/08/18	Russell Healey
	2	FINAL	C Fitzpatrick	01/10/2018	Russell Healey/Murrumbidgee
					Shire



RICH RIVER IRRIGATION DEVELOPMENTS

**BAUER PRODUCTS** 

### **Table of Contents**

1. INTRODUCTION	3
1.1. Scope of Assessment	3
1.2. Purpose	3
2. BACKGROUND	3
2.1. Site Location	3
2.2. Description of Works	4
2.2.1. Project Description Access Road from Cemetery Road to Boat Ramp Boat Ramp	4 4 5
Floating Pontoon Disability Access Ramp General 5 2.2.2. Ground Disturbance Works	5 5 9
2.3. Existing Environment	9
2.4. Landscape Features	12
2.5. Other Available Information	12
2.6. Archaeology of the local area	13
3. METHODOLOGY	15
4. ASSESSMENT	17
4.1. Does the Due Diligence Code apply?	17
4.2. Generic Due Diligence Code of Practice	18
5. MITIGATION MEASURES	21
6. CONCLUSION	21
7. APPENDICES	22
7.1. Appendix 1 – Project Plans	22
7.2. Appendix 2 – AHIMS Reports	23
7.3. Appendix 3 – Letter from Griffith Local Aboriginal Land Council	24

### **1. INTRODUCTION**

### **1.1. Scope of Assessment**

This report follows the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* which sets out a step by step process to assist with determining whether a further archaeological investigation is required or if the proposed work that will involve ground disturbance can proceed with caution and without requiring an Aboriginal Heritage Impact Permit (AHIP). Should it be determined that an AHIP is not required, then this documentation of the process can be utilised to support a defence against prosecution in the event of unanticipated harm.

This report is to be added as an appendix to the Darlington Point Boat Ramp Statement of Environmental Effects dated October 2018 for a proposed boat ramp, floating pontoon with walkway and car park. This assessment provides additional supporting documentation to the heritage and archaeological significance section.

### 1.2. Purpose

The purpose of this report is to assess any impacts that may occur to Aboriginal Objects as part of completing project works described below. The Aboriginal Cultural Heritage Assessment report has been carried out with reference to the following standards, guidelines, and policies:

• Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (NSW Department of Environment, Climate Change and Water [DECCW] 2010a – Now OEH) (the Code).

This document also aims to provide further clarity surrounding Cultural heritage values within the project site.

### 2. BACKGROUND

### 2.1. Site Location

This project is located in New South Wales on the east side of Darlington Point, the south side of the Murrumbidgee River (opposite the existing caravan park), and the west side of a stand of remnant native vegetation and agricultural farming area. The project adjoins the existing Darlington Point flood levee protection bank works and is ancillary to other recreational areas within the rural township.

Details	Specific related to project site
Lot number	7312
Deposited Plan	1159328
Local Shire	Murrumbidgee Council
LEP Zone - Land	E3 – Environmental Management
LEP Zone – Water	W2 – Recreational Waterway
Catchment Area	Murrumbidgee
IBRA Region	Riverina
IBRA Sub Region	Murrumbidgee
Traditional Owners/Land Council	Griffith Local Aboriginal Land Council
Land Stature	Crown land managed by council for public recreation
Area of project	0.5ha
GPS Reference	MGA Zone 55 E: 408436 N: 6174271

#### Table 1 - Land details of the project



Figure 1 - Locality plan showing project location

### 2.2. Description of Works

### 2.2.1. Project Description

This proposal is in the process of being tendered. The successful tenderer will be responsible for the construction and completion of the Works under contract as per the Drawings and the Specifications (See appendix 1).

The proposed works shall as shown on the Drawings and set out in the specification and generally comprise the following:

### Access Road from Cemetery Road to Boat Ramp

- Construction of unsealed road pavement as specified approximately 256m long x 7.6m wide from Cemetery Road including unsealed trailer turn-around area,
- Construction of a sealed road and angled carparking pavement approximately 105m long x 18.7m wide with AG drains on one side,
- Construction of approximately 55m long concrete paved roadway including approximately 19m wide trailer turn-around area with AG drains on one side,
- Open drain relocation and construction of associated underground drainage pipes, pits and headwalls,
- Construction of steel and concrete sleeper retaining walls,
- Associated tree removal, earthworks, subgrade treatments & pavements, Type 2 rock beaching, post & rail fencing, signage and line-marking.

### **Boat Ramp**

- Construction of approximately 40m long x 8m wide concrete boat ramp and adjoining 2.3m wide concrete access pathway,
- Associated tree removal, concrete piling, earthworks, subgrade treatments, rock armouring and Type 2 beaching,
- Construction of steel and concrete sleeper retaining walls.

### **Floating Pontoon**

- Supply and installation of 17 custom fabricated and hinged aluminium walkway sections ranging from 3.4m to 6.3m in length (approximately 85m overall length) and supported by Polyurethane filled Polyethylene floatation pontoons as detailed,
- Supply and installation of aluminium access ramp to pontoon walkway,
- Supply and installation of 10 galvanised steel piles as detailed.

### **Disability Access Ramp**

- Construction of approximately 45m x 3m wide all abilities access reinforced concrete ramp between existing pathway and top of boat ramp,
- Associated earthworks and rock beaching.

### General

- Levelling topsoiling and seeding of proposed picnic area ready for installation of shelter and picnic settings by others,
- Construction of safety railings adjacent parking area as specified,
- Full site management, including setting out, construction management, clean-up and disposal off-site of all surplus materials and debris resulting from the construction activities and reinstatement of disturbed areas including re-sowing of disturbed areas with approved native species,
- Supply of marked up 'as-constructed' drawings.

A copy of the overview plan and the Bill of Quantities is shown below.



Figure 2 - Overview plan of project

Specific details of the size and dimensions of the project are shown in the table below.

Item	Description of Works	Quantity	Unit
No.			
1.0	GENERAL:		
1.1	Site Establishment		
1.1.1	Site Establishment and Management. (Including Site hut, Portable toilet and Rubbish skip)		ltem
1.2	Project Set Out		
1.2.1	Survey setout and re-establishment of pegs as required.		ltem
1.3	Vegetation Removal		
1.3.1	Tree removal.	8	No.

#### Table 2 - Project earthworks detail

Item	Description of Works	Quantity	Unit
1.4	Site Cleanup		
1.4.1	Post construction site clean-up including removal and disposal of all surplus materials and site debris		Item
	reinstatement of all disturbed areas including supply and		
	spreading of topsoil and reseeding excepting areas		
	adjacent roadway and boat ramp as included below.		
1.5	Post Construction Survey and As-Constructed Plans	1	
	Post construction survey and report including supply of 'marked up' Works as Constructed Plans for:		
1.5.1	Roadworks & Drainage		Item
1.5.2	Boat ramp and Pontoon Structure		ltem
2.0	ROAD & DRAINAGE WORKS: (Including Carpark Area)		
2.1	Earthworks		
2.1.1	Earthworks – including removal of topsoil and stockpiling/spreading, trimming of subgrade.	2,550	m2
2.1.2	Cut (solid)	330	m3
2.1.3	Fill to design levels and grades. (solid)	1318	m3
2.2	Road Pavements		
	Road Pavement – to supply, place and compact:-		
2.2.1	(a) Sub-base - 200mm depth - PSG - Stabilised with 1.5% Triple Blend.	2519	m2
2.2.2	(b) Basecourse (Sealed Road) - 150mm depth of 50% mix PSG & Class 2 FCR - Stabilised with 1.5% Triple Blend.	1879	m2
2.2.3	(c) Basecourse (Unsealed Road) - 150mm depth of 50% mix PSG & Class 2 FCR - Stabilised with 1.5% Triple Blend.	2136	m2
	Bituminous Sealing - including supply, place, cover and compacting of aggregate:-		
2.2.3	(a) 7mm Primerseal	1879	m2
2.2.4	(b) 14/7mm Two coat final seal.	1879	m2
2.2.5	Concrete Pavement - including supply and place:-		
	Supply and place 150mm thick 40MPa concrete reinforced with single layer of SL81 reinforcing including edge beams as specified.	636	640
2.3	Drainage		
	Drainage Pipelines, Drainage Pits and Headwalls – including supply, excavation, bedding, placing and backfilling of pipes		
2.3.1	100mm slotted & socked AG Drain laid in 20mm	126	lin. m
2.3.2	DN225mm SN8-SCJ PVC Pipe FCR Backfill	32	lin. m
2.3.3	DN900mm SN8-SCJ PVC Pipe Earth Backfill	6	lin. m
2.3.4	Double Sided Side Entry Pit to suit open earth drain. Pits - 600x600x800 deep with trafficable lid.	3	No.
2.3.5	Standard concrete end wall to suit DN 225mm pipe	2	No.
2.3.6	Standard concrete end wall to suit DN 900mm pipe	2	No.
2.3.7	Fill existing open drain.	144	m3
2.3.8	Excavate new earthen drain.	120	m3

Item	Description of Works	Quantity	Unit
2.4	Reinstatement of Road & Drainage Works		
2.4.1	Reinstate, topsoil and seed disturbed areas adjacent to		Item
2.5	1030 Hardwood Post and Rail Barrier Fence		
2.5	Supply and install treated bardwood past & rail barrier	63	lin m
2.3.1	fence adjacent to road and angle park at future nicnic	00	
	area		
3.0	BOAT RAMP CONSTRUCTION:		
3.1	Cofferdam and Dewatering		
3.1.1	Steel sheet pile coffer dam installation and removal.		Item
3.1.2	Dewatering:- (Initial and continued throughout ramp construction)		Item
3.2	Boat Ramp		
	Base Preparation		
3.2.1	Excavation. (Cut)	350.75	m3
3.2.2	Concrete pile supply and installation - 300x300x6000 long.	6	No.
3.2.3	Crushed rock supply, spread & compact - Class 2 FCR.	45.5	m3
	Concreting		
3.2.4	Formation of base for slab including formwork.		Item
3.2.5	Concrete 40MPa.	81	m3
3.2.6	Reinforcement - SL81 mesh and N12 Deformed bar.		Item
3.2.7	Concrete laying and finishing.		Item
	Rock Work		
3.2.8	Rock armouring (Scour protection)	45	m2
3.2.9	Beaching (Type 2) Supply and install including Geofabric.	210	m2
3.3	Retaining Walls (Max 1m high)		
	Retaining wall supply and installation:-		
3.3.1	(a) 150UB18 Galvanised UB x 3m long.	16	No.
3.3.2	(b) Concrete sleepers - 200x75x2000 long.	75	No.
3.3.3	(c) Install AG Drain, backfill screenings and compacted pervious fill	30	m length
4.0	ACCESS WALKWAY AND PONTOON		
4.1	Concrete Access Walkway		
4.1.1	Excavate and supply, place and compact - Class 2 FCR bedding	19	m3
4.1.2	Reinforcement - Supply and place- SL81 mesh.	185	m2
4.1.3	Concrete 25MPa Supply, place and finish including formwork	19	m3
4.2	Floating Pontoon		
	Pontoon modules - Supply and install including marine grade aluminium frames, decking and handrails as per Drawings:		
4.2.1	6 Float units x 6.0 to 6.3m long	9	No.
4.2.2	4 Float Units x 3.4 5.8m long	8	No.
	Piling - Supply and installation. (Length's as per drawings)		

Item	Description of Works	Quantity	Unit
4.2.3	DN300x10mm thick galvanised steel piles	5	No.
4.2.4	DN200x6mm thick galvanised steel piles	5	No.
4.2.5	Marine grade aluminium access walkway - Supply and install as per Drawings.	1	No.

The construction methodology, erosion and sediment control works will be determined by the successful tendered as part of the project works.

### 2.2.2. Ground Disturbance Works

There are 2 areas of proposed ground disturbance work. These are the works to construct the boat ramp within the River and the work undertaken for the construction of the carpark and access roadway.

The area of the proposed boat ramp will require works within a 39m long x 10.2m wide area (398m<sup>2</sup> area) and requires a maximum excavation of 20cm within the River bed and 2m within the existing levee bank edge.



Figure 3 - Image showing Cross section of River

The road access works encompass an area of 2,550m<sup>2</sup> and requires an excavation of 330m<sup>3</sup> and a fill of 1,318m<sup>3</sup>. The excavation within this area relates to the removal of existing topsoil placed in the area upon completion of the Darlington Point Levee bank works.



Figure 4 - Image showing long section of access road

### 2.3. Existing Environment

The site consists of a generally modified riverine floodplain. There is an existing levee bank and a vehicle access track located within the Vegetated Riparian Zone (VRZ) of the project area. The existing embankment upstream of the site contains vegetation typically found in this area. The area where works are proposed and downstream of the site have been completely modified with no vegetation remaining.



Figure 5 - Photo showing proposed site looking south across the Murrumbidgee River



Figure 6 - Photo showing project site looking upstream



Figure 7 - Photo looking south from River edge at existing access and road



Figure 8 - Photo looking downstream of project site

The VRZ at this project site covers a distance of 40 meters from the high bank of the water course of which only one side is taken into consideration due to the project works. This 40m area has been nominated in accordance

with the Riparian corridor matrix in the Guidelines for vegetation management plans on waterfront land (NSW Office of Water 2012).

The proposed project site is a small area and the activity associated with the development will be confined to the site. The footprint of the proposed development, including the parking area and boat ramp will be approximately 0.5 hectares.

### 2.4. Landscape Features

The Code defines a number of landscape features where Aboriginal objects are often associated with. Examples of these features are rock shelters, sand dunes, waterways, waterholes and wetlands. It is important to determine if the works proposed incorporate any of the following features:

- Within 200m of waters (described as the whole or any part of: any river, stream, lake, lagoon, swamp, wetlands, natural watercourse, tidal waters (including the sea), or
- Located within a sand dune system (refers to sand ridges and sand hills formed by the wind, usually found in desert regions, near a lake or in coastal areas), or
- Located on a ridge top, ridge line or headland, or
- Located within 200m below of above a cliff face, or
- Within 200m of or in a cave, rock shelter of a cave mouth

And is on land that is not disturbed land (described as being the subject of human activity that has changed the land's surface, being changes that remain clear and observable. Examples of these activities include:

a) soil ploughing,

(b) construction of rural infrastructure (such as dams and fences),

(c) construction of roads, trails and tracks (including fire trails and tracks and walking tracks),

(d) clearing of vegetation,

(e) construction of buildings and the erection of other structures,

(f) construction or installation of utilities and other similar services (such as above or below ground electrical infrastructure, water or sewerage pipelines, stormwater drainage and other similar infrastructure),

(g) substantial grazing involving the construction of rural infrastructure, (h) construction of earthworks associated with anything referred to in paragraphs (a)-(g).

This project does relate to a landscape feature being within 200m of a River.

### 2.5. Other Available Information

A search of AHIMs Archaeological Reports has been undertaken to identify if any reports have been completed in either the project area or the Darlington Point area.

This search and searches for other available information showed the following results:

- Archaeological survey of the route of a proposed electricity transmission line from Hay to Darlington *Point.* Report to the Electricity Commission of NSW, Gollan, K. 2/01/1982.
- Archaeological survey of the route of a proposed electricity transmission line from Hay to Darlington *Point.* Report to the Electricity Commission of NSW, Gollan, K. 4/01/1982.
- Darlington Point Levee Preliminary Indigenous and Non-Indigenous Heritage Assessment, Prepared by Australian Museum Business Services for SMEC Australia Pty Ltd September 2010 (Final Report)
- Aboriginal and Historic Heritage Assessment: Darlington Point Levee Upgrade. Report to NSW Public Works for Murrumbidgee Shire Council. OzArk, 2013.
- *Murrumbidgee Province Aboriginal Cultural Heritage Study.* AACAI Monograph No. 4. Pardoe, C and Martin, S. 2011
- An Archaeological Survey on the Hay to Darlington Point Transmission Line. Report to the Aboriginal and Historic Resources Section, NSW NPWS. Witter, D. 1982.

• Conservation Management Plan, Warangesda Aboriginal Mission & Station. High Ground Consulting, 2014

### 2.6. Archaeology of the local area

The settlement of the Murray-Darling Basin region by Aboriginal people is represented by a series of sites located to the north (Willandra Lakes region) and west (Kow Swamp) of the Riverine Plain dating back to the Late Pleistocene and Holocene. These sites indicate that during periods of wetter climatic conditions than today, the increased rainfall fed both river systems and now extinct lakes (eg. Lake Mungo), providing optimum conditions for Aboriginal people to settle in the region. Based on current evidence and models, Aboriginal sites were concentrated on rivers, lakes and creek lines – i.e. the necessity for water as both a resource and as an environment attractive to game, water fowl and fish. The active Murray floodplain is also an excellent environmental for exposing Aboriginal sites and objects.

Based on similar assessments within the broader region of the Creek and River systems the following landscape features could be expected to be located within or adjoining this project site. These include:

### Scarred trees

Aboriginal culturally modified (scarred and carved) trees are trees that show the scars caused by the removal of bark or wood for the making of, for example, canoes, vessels, boomerangs, shelters and medicines. The shape and size of the scar may indicate the purpose for which the bark or wood was removed from the tree. In some regions of NSW, trees were carved with intricate patterns and designs for ceremonial purposes, or to mark country boundaries or burials. Carved trees associated with burial sites are usually in groups of two or more trees. Carved trees associated with ceremonial grounds may have also been used for educational purposes. Scarred and carved trees occur in various locations across NSW. Scarred and carved trees are significant to the descendants of the Aboriginal people living today. They are becoming rarer in NSW as the trees decay, are burnt or are destroyed. It is important to note that the defence to a prosecution contained in Clause 80B of the NPW Regulation relating to certain low impact activities does not apply in relation to any harm to an Aboriginal culturally modified tree. Ensuring that Aboriginal culturally modified trees are not harmed will likely include ensuring that effective buffer zones are used, as their significance is often part of the broader landscape.

### Hearths, Ovens and Mounds

Ovens or hearth sites are the remains of a domestic open fireplace. Domestic open fireplaces have been used in populated places throughout Australia to provide warmth and lighting. They are also used for cooking food and sometimes to signal from one group to another. These hearths are roughly circular piles of burnt clay or heat fractured rock with associated charcoal fragments, burnt bone, shell and stone artefacts. (Due Diligence Code of Practice, 2010)

### **Middens**

Shell middens are commonly made up of the remains of edible shellfish, and could be the result of a single meal or many meals at the same location over many years. A midden may also contain fish and animal bones, stone tools, or charcoal. They can vary in size and depth. Middens are sometimes associated with burials. Middens can be found on headlands, sandy beaches and dunes, around estuaries, swamps and tidal stretches of creeks and rivers, and along the banks of inland rivers, creeks and lands. Middens may also be found in the open or in rock shelters. Middens can indicate that a place was, and may continue to be, a key meeting place of significance. Middens can also provide information about the environment that existed when Aboriginal people collected the shellfish, such as changes in species, and tools or raw materials that were used. Middens which contain burials are particularly significant. Middens are amongst the most fragile cultural sites. They can be exposed by wind or degraded by human and animal activity.

### **Burials**

Burials include one of a variety of customs that Aboriginal people had for honouring the dead and laying them to rest; they were among the first people in the world to use cremation. However, Aboriginal burials may be found in a variety of landscapes throughout NSW, although most frequently they are found in middens, sand dunes, lunettes, bordering dunes and other sandy or soft sedimentary soils. Activities such as sand mining, stock grazing, ripping rabbit warrens, ploughing, trail bike riding and four-wheel car driving can devastate burial sites. Aboriginal ancestral remains are very sensitive and significant to Aboriginal people.

### Artefact scatters and Isolated artefacts

Surface artefact scatters are the material remains of Aboriginal people's activities. Scatter sites usually contains stone artefacts, but other material such as charcoal, animal bone, shell and ochre may also be present. The size of scatters may vary from one square metre to larger areas, and may contain from a few to thousands of artefacts. Stone artefacts can be found almost anywhere Aboriginal people camped or lived, particularly around occupation sites, in sand dunes, rock shelters, caves, on ridges and near watercourses. Ground-axe edges may also be found near axe-grinding grooves or quarries.

Stone artefacts are a common type of Aboriginal object, and include stone tools, spear points, surface scatters, grinding stones, ground-edge axes and other implements that were used for a variety of purposes, such as in the preparation of food or to make nets, baskets and other tools. Stone artefacts often have sharp edges, or are of a stone type that is different from the natural rock in the area. Another type of stone artefact is a ground-edge axe, which can come in different shapes, but are usually round or oval. They are sometimes rounded and narrow at one end, and slightly broader and straighter at the cutting edge. Because stone artefacts do not rot or rust they are often the primary physical evidence of Aboriginal occupation in a particular area. They can also provide important information about past Aboriginal people's settlement patterns, lifestyle and other connections, such as trade. The presence of stone artefacts in an area may indicate that either a place was previously used by Aboriginal people, or that the area continues to be a place of significance, which may include sensitive sites, such as men's or women's areas which may require a buffer zone to maintain. In some cases it will be appropriate to consider removing stone artefacts from where they are found (salvage), following advice from DECCW and Aboriginal groups. Stone artefacts are often small, so they can be difficult to protect. Erosion and weathering caused by activities such as ditch digging and ploughing can disturb stone artefacts. They can also be broken when trampled by animals, or when run over by vehicles.

### **3. METHODOLOGY**

The *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (the Code) describes the process that must be followed to assess potential harm to Aboriginal objects and demonstrate due diligence in assessing potential harm to Aboriginal objects by a development or action.

The Code provides a step by step guide to check if the Due Diligence Code is applicable and identify if the proposed activities may impact Aboriginal places or objects. These Steps shown in the Code are replicated below:



The generic due diligence process is as follows:



The above process has been followed as part of this assessment.

Addressing these Due Diligence process questions shown above will determine whether or not Due Diligence obligations for the protection of Aboriginal objects are satisfied. If they are not, further approval (an AHIP) under the NPW Act is required, and this may be a recommendation of the Due Diligence study.

### 4. ASSESSMENT

### 4.1. Does the Due Diligence Code apply?

### Is the activity a Part 3A project declared under s75B of the EP&A Act?

Section s75B of the EP&A Act was been repealed in May 2011 and has been replaced with the State Environmental Planning Policy (State and Regional Development 2011).

#### Comment

No - This project is not described as a State significant development 🗪 Next Step

#### Is the activity exempt from NPW Act or NPW Regulation?

Exemptions under the NPW Act and Regulation occur in the following circumstances:

- Aboriginal people and their dependants when carrying out non-commercial traditional cultural activities,
- Any emergency firefighting or bush fire hazard reduction work within the meaning of the Rural Fires Act 1997 that is authorised or required to be carried out under that Act,
- Emergency activities carried out under the State Emergency and Rescue Management Act 1989 that are reasonably necessary in order to avoid an actual or imminent threat to life or property,
- Works by, or directed by, authorised DECCW officers to protect or conserve Aboriginal objects, and
- Anything specifically required or permitted under the express terms of a conservation agreement entered into under Division 12 of Part 4 of the NPW Act.

#### **Comment**

#### No - This project is not any of the above actions - Next Step

#### Will the activity involve harm that is trivial or negligible?

'Harm' as described in Section 86 of the NPW Act meaning any act or omission that:

- Destroys, defaces, or damages the object,
- Moves the object from the land on which it had been situated, or
- Causes or permits the object to be harmed.

*Examples of what might be trivial, or a negligible act are picking up and replacing a small stone artefact, breaking a small Aboriginal object below the surface when you are gardening.* 

#### **Comment**

No - Works occurring in the project area could cause damage to any Aboriginal object located in the area. The area of influence for the works are located on a significantly disturbed area where works have previously occurred relating to the Darlington Point Levee bank upgrade. Next Step

*Is the activity in an Aboriginal Place or Have previous investigations that meet the requirements of this code identified Aboriginal objects?* 

#### Aboriginal Places

Aboriginal Places are declared by the Minister under s.84 of the NPW Act. The location of Aboriginal Places is made available to the public via the government gazette (available through the NSW Department of Services, Technology and Administration). The places are also listed on the OEH website. The due diligence defence is not available for activities which harm Aboriginal places. If you wish to undertake an activity which may harm an Aboriginal place, you must apply for an AHIP.

#### Known Aboriginal Objects

If as a result of previous investigations that meet the requirements of this code you already know that Aboriginal objects are in the area and that harm to these objects cannot be avoided, then you need to apply for an AHIP. If the previous investigation includes a search on the Aboriginal Heritage and Information Management System

(AHIMS) database (maintained by DECCW's Country, Culture and Heritage Division) which is over 12 months old you must search AHIMS again to ensure that the information is still current.

### Comment

No - The project areas are not within or on an Aboriginal Place although it is adjoining a listed area. There are 16 valid registered sites within approx. 1.3kms of the area of the project all of which are modified trees. The closest recorded site to the construction area is 130m on the other side of the levee bank downstream of the project. This site will not be at risk of harm during the construction or operation activities. There are no known Aboriginal objects within the project site. Further detail relating to this is shown below.  $\longrightarrow$  Next Step

### Is the activity a low impact one for which there is a defence in the NPW Regulation?

### Comment

No the area of proposed works cannot be described as any of the low impact activities as described in section 86 (2) of the Act. . — Next Step

**Do you want to use an industry specific code of practice or the Generic Due Diligence Code of Practice?** The NPW Act also provides that due diligence may be exercised by complying with a code of practice which is adopted under the NPW Regulation. These codes provide due diligence guidance tailored for specific types of activities or industries. Codes which have been adopted are the:

- Plantation and Reafforestation Code (being the Appendix to the Plantations and Reafforestation (Code) Regulation 2001) as in force on 15 June 2010
- Private Native Forestry Code of Practice approved by the Minister for Climate Change and the Environment and published in the Gazette on 8 February 20085
- NSW Minerals Industry Due Diligence Code of Practice for the Protection of Aboriginal Objects published by the NSW Minerals Council Ltd and dated 13 September 2010
- Aboriginal Objects Due Diligence Code for Plantation Officers Administering the Plantations and Reafforestation (Code) Regulation 2001 published by the Department of Industry and Investment and dated 13 September 2010
- Operational Guidelines for Aboriginal Cultural Heritage Management published by Forests NSW and dated 13 September 2010.

### Comment

No - There is no industry specific Code of Practice relevant to this project. The Generic Due Diligence Code of Practice will be followed Next Step – The Generic Due Diligence Process.

### 4.2. Generic Due Diligence Code of Practice

### Step 1 – Will the activity disturb the ground surface or any culturally modified trees?

Disturbance of the ground surface is often significant when machinery is used to dig, grade, bulldoze, scrap, plough, or drill the ground surface for the purpose of building a structure or removing vegetation. If an activity will disturb the ground surface, there is a higher likelihood that Aboriginal objects will be harmed.

### Comment

The project works are located on an area that has undergone disturbance in the past through the construction of the levee bank. There is a minimal amount of excavation required within the area however the ground surface will be disturbed as part of the project activities. There are no culturally modified trees located within the project site  $\longrightarrow$  Check the AHIMS database

**Step 2a – Search the AHIMS database and use any other sources of information which may be available.** A search the AHIMS database must be undertaken to check whether any Aboriginal sites have been recorded in the area of the Project. If the results of the initial AHIMS search indicates that AHIMS contains information about recorded Aboriginal objects in the area of the proposed activity, a copy of these records must be obtained. After obtaining the records from AHIMS of any recorded Aboriginal objects, these objects should be confirmed that they are located in the area where the activity is proposed.

If there are any other sources of information, these need to be used to identify whether or not Aboriginal objects are likely to be present in the area. Other sources of information can include previous studies, reports or surveys which have been commissioned or are otherwise aware of.

### Comment

An AHIMS search has been undertaken which returned the following results. This search encompassed the project site and a broad area surrounding the site utilising the following:

- Latitudes: -34.5777 to -34.5634
- Longitudes: 145.9886 to 146.0112
- Buffer: 50m
- Date: 30<sup>th</sup> August 2018

This search attached in Appendix 2 – AHIMS Reports shows the results of 17 (16 valid) Aboriginal sites and Zero (0) Aboriginal places. The locations of the recorded sites are shown below in relation to the project site.



Figure 9 - Project site shown in green and surrounding recorded sites (radius shown as 1km)

**Step 2b – Activities in the areas where landscape features indicate the presence of Aboriginal objects** Regardless of whether the AHIMS search indicates known Aboriginal objects, consideration of whether Aboriginal objects are likely to be in the area of the proposed activity need to be made having regard to the above identified landscape features. If after completing steps 2a and 2b it is reasonable to conclude that there are no known Aboriginal objects or a low probability of objects occurring in the area of the proposed activity, you can proceed with caution without applying for an AHIP.

### Comment

As shown and identified above, the site is located within a landscape feature being within 200m of a River and there are identified recorded sites within the broader area... Proceed to Step 3.

### Step 3 - Can the Project avoid harm to the object or disturbance of the landscape feature?

This step only applies if your activity is on land that is not disturbed land or contains known Aboriginal objects. Where as a result of step 2a you think it is likely that there are Aboriginal objects present in the area of the proposed activity, you need to decide whether you can avoid the harm to those objects. Where as a result of step 2b you have concluded that the landscape features listed are present, you need to decide whether you can move your activity away from the area with the landscape feature(s) so as to avoid disturbing any Aboriginal objects which may be present. If you can't avoid harm to the object or disturbance of the landscape feature(s) you must go to step 4. If you can avoid harm to the object and disturbance of the landscape feature(s) you can proceed with caution without applying for an AHIP.

### Comment

The project site is located within a landscape feature area and contains evidence of a utilisation by Aboriginal people in the broader area.  $\implies$  Go to Step 4.

# *Step 4 – Does a desktop assessment and visual inspection confirm that there are Aboriginal objects or that they are likely?*

This step only applies if your activity is on land that is not disturbed land or contains known Aboriginal objects. The assessment process is primarily a desktop exercise that involves examination and collation of the readily available information. The assessment must consider the area of the proposed activity as a whole, not just particular areas where any Aboriginal objects have been recorded on AHIMS or areas where landscape features are located.

At a minimum the information reviewed as part of the desktop assessment should include existing knowledge of Aboriginal cultural heritage gleaned from previous heritage studies or reports for the area, including any archaeological studies on AHIMS.

A visual inspection of the area must be undertaken to see if Aboriginal objects can be identified or are likely to be present below the surface. This visual inspection must be done by a person with expertise in locating and identifying Aboriginal objects. This person with expertise could be an Aboriginal person or landholder with experience in locating and identifying Aboriginal objects or a consultant with appropriate qualifications or training in locating and identifying Aboriginal objects.

Where either the desktop assessment or visual inspection indicates that there are (or are likely to be) Aboriginal objects in the area of the proposed activity, more detailed investigation and impact assessment will be required. This will need to be done by a person with expertise in Aboriginal cultural heritage management. Go to step 5. Where the desktop assessment or visual inspection does not indicate that there are (or are likely to be) Aboriginal objects, you can proceed with caution without an AHIP application.

### Comment

This step is triggered through the identification of a landscape feature within the project area. Based on this the following steps have been undertaken:

#### **AHIMs search**

Results returned for the project site as discussed above and shown in Appendix 2 - AHIMS Reports

### Previous Surveys

As shown above in **section 2.5** a search of AHIMs Archaeological Reports has been undertaken to identify if any reports have been completed in either the project area or the Darlington Point area.

### **Visual Inspection**

A visual inspection has been undertaken by Griffith Local Aboriginal Land Council representatives Mr Robert Carroll on the 29<sup>th</sup> June 2017. Following this inspection, a letter confirming that there was no cultural material observed during the inspection or expected to be found within the area to be impacted. See Appendix 3.

### Step 5 – Further investigations and impact assessment

The desktop assessment and visual inspection has not indicated that there are Aboriginal objects within the immediate area of the project, therefore a more detailed investigation will not be required. Based on this assessment and report the applicant has exercised Due Diligence and can **proceed with caution** without an AHIP application.

### **5. MITIGATION MEASURES**

Whilst this report has not identified any Aboriginal object within the project area, the construction works must still **proceed with caution**. Should any Aboriginal object be discovered and/or harmed in, or under the project area whilst undertaken the proposed project activities, the applicant/contractor/delegate must:

- Not further harm the object,
- Immediately cease all work at that particular location,
- Secure the area so that as to avoid further harm to the Aboriginal object,
- Notify OEH as soon as practical on 131 555, providing any details on the Aboriginal object and its location;
- Contact Griffith Local Aboriginal Land Council immediately to discuss and negotiate a plan of action, and
- Not recommence any work at that particular location unless authorised in writing by OEH.

In the event that skeletal remains are unexpectedly encountered during the activity, work must stop immediately, the area secured to prevent unauthorised access and NSW Police and OEH contacted.

### 6. CONCLUSION

No Aboriginal objects or places have been identified through a desktop assessment of the project area. Within the broader area there are 16 valid registered sites all of which are modified trees. This project does involve the removal of some trees however none of these have been identified as modified through a desktop or site inspection.

A site inspection undertaken by Griffith Local Aboriginal Land Council representative Mr Robert Carroll within the project works area was undertaken and identified that "no cultural material was observed during the survey nor expected to be found within the area to be impacted by the development. The immediate area surrounding the proposed boat ramp and roadway have been impacted by clearing and previous flood protection works. This has left the proposed development area surrounded by disturbed landscapes".

Based on the above, the project works should proceed with caution.

blane fitzratuck

Clare Fitzpatrick Rich River Irrigation Developments
### 7. APPENDICES

7.1. Appendix 1 – Project Plans

Please see over page.

### GENERAL NOTES

- G1. THESE NOTES APPLY TO ALL DRAWINGS IN THE CONTRACT SET. WHERE SPECIFIC NOTES ON OTHER DRAWINGS APPLY THEY SHOULD BE READ IN CONJUNCTION WITH THE GENERAL NOTES. G2. ALL DIMENSIONS ARE IN METRES (m). (UNLESS OTHERWISE STATED)
- G3. ALL LEVELS SHOWN ARE TO AUSTRALIAN HEIGHT DATUM (AHD).
- G4. DO NOT SCALE DIMENSIONS FROM DRAWINGS.
- G5. WORKS TO BE COMPLETED IN ACCORDANCE WITH AS 4000 1997 GENERAL CONDITIONS OF CONTRACT TO THE APPROVED PLAN, TO THE SATISFACTION OF THE SUPERINTENDENT AND TO ALL RELEVANT STANDARD DRAWINGS WHERE APPLICABLE.
- G6. WORKS SUPERVISOR TO BE CONTACTED A MINIMUM OF 5 WORKING DAYS PRIOR TO COMMENCEMENT
- OF ANY WORKS THAT AFFECT ROAD ASSETS.
   G7. A PLANNING PERMIT IS REQUIRED FOR A NEW ACCESS OR ALTERATION TO AN EXISTING DRIVEWAY AND MAY BE REQUIRED FOR THE REMOVAL OF NATIVE VEGETATION.
- G8. A TRAFFIC MANAGEMENT PLAN MUST BE PREPARED AND IS TO COMPLY WITH THE RELEVANT CODE OF PRACTICE FOR WORK SITE SAFETY TRAFFIC MANAGEMENT IN RELATION TO ANY WORKS UNDERTAKEN WITHIN THE ROAD RESERVE.
- C9. THE TYPICAL PAVEMENT DIAGRAM SHOWN ON THIS SHEET IS A GUIDE FOR A TYPICAL LAYOUT OF A ROADWAY ACCESS FOR A RURAL ROAD. G10. PAVEMENT LINE MARKING REQUIREMENTS AS PER SHEET 10 OF 12.
- G11. UNDERGROUND SERVICES:

PRIOR TO ANY EXCAVATION WORKS, CHECK WITH ALL RELEVANT RESPONSIBLE AUTHORITIES (e.g. TELECOMMUNICATIONS, ELECTRICITY, GAS, WATER etc.)

- ABOVEGROUND SERVICES:
- PRIOR TO ANY WORKS AN INSPECTION OF THE CONSTRUCTION FOOTPRINT SHOULD BE UNDERTAKEN TO IDENTIFY ANY ABOVEGROUND SERVICES AND APPROPRIATE PRECAUTIONS TAKEN TO ELIMINATE THE POTENTIAL OH&S RISKS. G12. THE CONTRACTOR IS REQUIRED TO CONFINE ALL CONSTRUCTION VEHICLES TO THE EASEMENTS AND
- ROAD RESERVES. ANY DAMAGE CAUSED TO ADJACENT PROPERTIES MUST BE MADE GOOD.
- G13. ALL FILL AREAS TO BE COMPACTED AS SPECIFIED. ALL STRUCTURAL FILLING MATERIAL IS TO BE APPROVED BY THE SUPERINTENDENT AND THE RELEVANT ROAD AUTHORITY PRIOR TO PLACEMENT. G14. ALL FILL AREAS EXCEEDING 200mm ARE TO BE STRIPPED OF TOPSOIL, FILLED AND TOPSOIL
- REPLACED TO ACHIEVE THE FINAL FINISHED FILL LEVELS SHOWN ON THE DRAWINGS.
- G15. SUBGRADE TO BE SELECT CLAY MATERIAL PLACED IN 150mm LAYERS. (ASSUME CBR OF 10%) G16. RESERVES/EASEMENTS TO BE LEFT IN A CONDITION SATISFACTORY TO THE SUPERINTENDENT AND
- RELEVANT ROAD AUTHORITY G17. ALL PIPE AND SERVICE TRENCHES UNDER ROADS TO BE BACKFILLED WITH CLASS 2 CRUSHED ROCK.
- G18. NO TOPSOIL IS TO BE REMOVED FROM SITE.
- G19. UNLESS OTHERWISE SHOWN, ALL TREE'S AND SHRUB'S ARE TO BE RETAINED. WRITTEN PERMISSION MUST BE OBTAINED FROM THE SUPERINTENDENT WHERE PARTICULAR CONSTRUCTION NECESSITATES THEIR REMOVAL.
- G20, ALL DEWATERING TO BE CARRIED OUT IN ACCORDANCE WITH THE EPA'S GUIDELINE "CONSTRUCTION GUIDELINES FOR CONSTRUCTION SITES" – DECEMBER 1995. G21. ENVIRONMENTAL PROTECTION INCLUDING SILT CONTROL SHALL BE THE RESPONSIBILITY OF THE
- CONTRACTOR
- G22. THE CONTRACTOR WILL BE RESPONSIBLE FOR THE CARE AND MAINTENANCE OF ALL TBM'S. TBM'S FOUND TO BE DISTURBED OR MISSING AT THE COMMENCEMENT OF CONSTRUCTION ARE TO BE RE-ESTABLISHED BY A QUALIFIED SURVEYOR.
- G23. ALL WORKS SHALL BE SETOUT AND PEGGED ACCURATELY PRIOR TO THE COMMENCEMENT OF WORKS BY A SUITABLY QUALIFIED SURVEYOR.

### CONSTRUCTION SETOUT TABLE

POIN	Т	EASTIN	3 N	IORTHING	RL (AHD)	DESCRIPTION
1	4	18343 0	28 61	74124 320	124.02	DESIGN EDGE OF SEAL
		18346 4	86 61	74127.320	127.02	
	4	9340.4	47 61	74122.744	123.09	DESIGN FORD CENTRELINE
		00349.9	40 01	74121.100	123.70	DESIGN EDGE OF SEAL
4	40	0000.9	00 01	74123.203	-	DESIGN EDGE OF SEAL
5	40	0707.0		74120.902	123.21	DESIGN EDGE OF SEAL
	40	18383.2	10 00	74167.793	_	DESIGN EDGE OF SEAL
	4(	18366.4	45 61	/41/5.692	-	DESIGN EDGE OF SEAL
8	4	08371.1	81 61	74176.764	123.00	ROAD CENTRELINE/GRADE CHANGE
9	4	08387.1	26 61	74218.564	123.13	DESIGN EDGE OF SEAL
10	40	08390.4	88 61	74216.787	123.00	DESIGN ROAD CENTRELINE
11	40	)8392.8	23 61	74212.883	122.87	DESIGN EDGE OF SEAL
12	4	08403.5	61 61	74209.866	122.51	DESIGN EDGE OF SEAL
13	4(	08407.5	53 61	74216.753	122.51	DESIGN EDGE OF SEAL
14	4(	08407.1	86 61	74218.119	-	DESIGN EDGE OF SEAL
15	40	)8397.7	26 61	74221.733	-	DESIGN EDGE OF SEAL
16	4	08408.5	511 61	74234.725	-	DESIGN EDGE OF SEAL
17	4	08398.4	61 61	74238.218	-	DESIGN EDGE OF SEAL
18	4	08414.0	66 61	74249.754	123.00	CENTRE POINT / RADIUS 10m
19	40	408404.604 6		74253.429	-	DESIGN EDGE OF SEAL
20	4	08419.8	56 61	74241.416	-	DESIGN EDGE OF SEAL
21	4(	08424.1	64 61	74250.785	122.67	EDGE OF CONCRETE BOAT RAMP
22	4	08453.6	61 61	74279.274	117.81	EDGE OF CONCRETE BOAT RAMP
23	4(	08448.1	37 61	74285.032	117.81	EDGE OF CONCRETE BOAT RAMP
24	4(	08420.0	62 61	74257.944	122.67	EDGE OF CONCRETE BOAT RAMP
				1		The c
						the o

# EARTHWORK NOTES

- E1. RECORDS SHALL BE KEPT OF ALL EARTHWORK CONSTRUCTION AS CONTAINED IN AS3798-2007 CLAUSE 3.4 AND A COPY MADE AVAILABLE TO THE SUPERINTENDENT UPON COMPLETION.
   E2. ALL TOPSOIL SHALL BE SPRAYED WITH A PRE-EMERGENT HERBICIDE PRIOR TO STRIPPING.
- PRIOR TO THE COMMENCEMENT OF WORKS THE SITE SHALL BE STRIPPED AND MATERIAL STOCKPILED
- AT DESIGNATED LOCATIONS CLEAR OF THE WORKS. E4. ANY EXCESS TOPSOIL SHALL REMAIN THE PROPERTY OF THE PRINCIPAL AND IS TO BE STORED AS
- DIRECTED FOR USE IN THE FUTURE. E5. ALL SUBGRADE FILL MATERIAL IS NOT TO CONTAIN ANY VEGETABLE MATTER AND SHOULD CONFORM TO ONE OF THE CLASSES LISTED BELOW.
- \* GW-SC WELL GRADED SAND AND GRAVEL WITH CLAY BINDER
- \* GC CLAYEY GRAVEL SOILS \* SW-SC SAND WITH CLAY BINDER
- \* SC SILTY CLAY
- E6. ALL LOOSE FILL MATERIAL SHALL BE SPREAD BEFORE COMPACTION TO FORM AN EVEN LAYER THICKNESS. WHERE PRACTICABLE THE LAYERS SHALL BE PARALLEL TO THE FINISHED SURFACE OR HORIZONITAL
- E7. FILL MATERIAL IS TO BE PLACED IN 150mm LAYERS COMPACTED TO 95% OF THE MAXIMUM DRY DENSITY AT OPTIMUM MOISTURE CONTENT IN ACCORDANCE WITH AS 1289-E1.1.
- E8. DUST SUPPRESSION IS TO BE ACHIEVED USING AN APPROVED METHOD OR COMBINATION OF METHODS.
   E9. THE MOISTURE CONTENT OF THE FILL MATERIAL IS TO BE MONITORED AT ALL TIMES. WHERE NECESSARY ADDITIONAL WATER WILL BE BROUGHT TO THE SITE AND ADDED TO THE FILL MATERIAL AT A CONTROLLED RATE. THE WATER IS TO BE CLEAN AND CARTED/DISTRIBUTED USING APPROVED
- EQUIPMENT ONLY. E10. ANY SOFT AREAS ENCOUNTERED ARE TO BE INSPECTED BY THE SUPERINTENDENT. THE SUPERINTENDENT MAY DETERMINE THAT THE SOFT MATERIAL IS TO BE EXCAVATED AND REMOVED FROM THE SITE. WHERE THE MATERIAL WITHIN THE SOFT SPOT IS DEEMED BY THE SUPERINTENDENT TO BE RECOVERABLE THE SUPERINTENDENT MAY ALSO DETERMINE A METHODOLOGY FOR TREATING THE UNSUITABLE MATERIAL.
- E11. ALL HAULAGE ROUTES AND ALIGNMENTS WILL BE SUBJECT TO THE APPROVAL OF THE
- SUPERINTENDENT. E12. ALL UNSUITABLE MATERIALS INCLUDING BUT NOT LIMITED TO LITTER, BUILDING WASTE, STONE, IBBLE, DEBRIS, ORGANIC MATERIAL AND VEGETABLE MATTER SHALL NOT BE INCORPORATED INTO THE WORK. ALL SUCH MATERIAL SHALL BE COLLECTED ON A REGULAR BASIS AND STOCKPILED CLEAR OF THE WORKS AND IS TO BE DISPOSED OF BY THE CONTRACTOR TO AN APPROVED LOCATION.
- E13. DE-WATERING WHERE APPLICABLE IS TO BE CARRIED OUT IN ACCORDANCE WITH THE EPA'S "CONSTRUCTION GUIDELINES FOR MAJOR CONSTRUCTION SITES" - DECEMBER 1995.
- E14. ALL SURPLUS SPOIL MATERIAL NOT REQUIRED IS TO BE STOCKPILED CLEAR OF THE WORKS. E15. ANY BORROW MATERIAL REQUIRED FOR SUBGRADE WILL BE SOURCED FROM AN APPROVED LOCATION
- AND TESTED IN ACCORDANCE WITH AS 1209.3.8.1. E16. THE CONTRACTOR SHALL KEEP AND MAINTAIN DETAILED RECORDS OF THE COMPACTION METHOD USED
- AND THE PLACEMENT OF ALL FILL MATERIALS. E17. THERE IS TO BE NO FILL MATERIAL PLACED AGAINST OR WITHIN CLOSE PROXIMITY TO FENCES OR OTHER NON STRUCTURAL OBJECTS WITHOUT THE SUPERINTENDENTS PRIOR APPROVAL.

### BEACHING NOTES

B1. BEACHING STONE SHALL CONSIST OF CLEAN SOUND HARD QUARRIED ROCK OF UNIFORM QUALITY WITH AN UNCONFINED CRUSHING STRENGTH OF NOT LESS THAN 25MP $_{d}$  and free of defined cleavage PLANES.

B2. THE SIZE AND GRADING OF THE STONE SHALL CONFORM AS NEARLY AS PRACTICAL TO THE SIZES SET OUT IN TABLE 1.

- B3. THE MINIMUM THICKNESS SHALL BE AS DEFINED IN TABLE 1.
- B4. UNLESS NOTED OTHERWISE THE STANDARD BEACHING SIZE SHALL BE TYPE 3. B5. ALL BEACHING TO BE UNDERLAIN BY BIDIM A44 OR APPROVED EQUIVALENT GEOTEXTILE MEMBRANE KEYED IN ALONG ALL EDGES

TABLE 1

	% PASSING SCREEN SIZE								
% PASSING	TYPE 2	TYPE 3	D50 = 225						
450mm	-	-	100						
300mm	-	100	70-95						
225mm	100	70-95	40-65						
150mm	60-65	50-70	20-35						
75mm	40-65	35-50	10-20						
37.5	20-35	15-30	-						
26.5	10-20	10-20	-						
MINIMUM LAYER THICKNESS	150	225	300						



Basecourse - 50% mix PSG & Class 2 FCR - Stabilise with 1.5% Triple Blend Subarade - Assume CBR of 10% - Stabilise with 3% Quicklime

\*Triple Blend - 60% Cement, 30% Slag, 10% Fly Ash.

EARTHWORKS AND CONCRETE SCHEDULE									
ITEM	SEAL (m2)	BASECOURSE (m3)	SUBBASE (m3)	CUT (m3)	FILL (m3)	CONCRETE (m3)	CONCRETE BASE CLASS 2 FCR (m3)	CONCRETE STRENGTH (MPa)	
EALED ROADWAY	2519	382	663	330	1318	96		40	
NSEALED ROADWAY		376							
OAT RAMP				350.75	4.5	81	45.5	40	
CCESS RAMP						21	19	25	
OTALS	2519	758	663	680.75	1322.50	198	64.50		

											NTOON DESIGN DETAILS		2
				COPYRIGHT The and information contained in this document are the copyright of Rich River Irrigation Developments.	LEVEL BOOK: AN	IS-BK101		NORTH	CA RIVER IRRIGAN	murrumbidgee shire council / a PROPOSED DARLINGTON POINT	pex club BOAT RAM	Ρ	
3	18-02/18		CONCRETE PAVEMENT DETAIL ADDED	-					E Z	DESIGN NOTES & LOCALITY P	LAN		
2	23/10/17		ISSUED FOR CONSTRUCTION	party in whole or part				SCALE					
-	20,00,47			without the written permission				N.T.S.		RICH RIVER IRRIGATION DEVELOPMENTS	SHEET NUMBER	DRAWING NUMBER	REVISION
	50-08-17		ISSUED FOR DISCUSSION	of Rich River Irrigation	SUBVEYED BY	DRAWN	DESIGNED	DATE	DEVEL ODMENTS	Unit 1, 164 Qailvie Avenue, Echuca, 3564,			7
REV	DATE F	ESIGN REV'D APP'D EVIEW P.MGR P.DIR	REVISIONS	infringement of copyright.	D.LEE	D.LEE	D.LEE	30-08-17	PTY LTD A.C.N. 106 901 777	Telephone (03) 5482 2564 Fax (03) 5482 1918 Email admin@rrid.com.au	01 OF 12	2016-107	3







### TYPICAL SEALED PAVEMENT



7mm Primerseal + 14/7 Two coat final seal Basecourse - 50% mix PSG & Class 2 FCR -Stabilise with 1.5% Triple Blend Subbase - PSG - Stabilise with 1.5% Triple Blend Assume CBR of > 30%

Subgrade – Assume CBR of 10% – Stabilise with 3% Quicklime

\*Triple Blend - 60% Cement, 30% Slag, 10% Fly Ash.

### TYPICAL CONCRETE PAVEMENT



Pavement - Reinforced Concrete (40Mpa) with SL81 mesh centrally placed

Subbase - PSG - Stabilise with 1.5% Triple Blend Assume CBR of > 30%

NORTH

Subarade – Assume CBR of 10% - Stabilise with 3% Quicklime

\*Triple Blend - 60% Cement, 30% Slag, 10% Fly Ash.

	DRAWING SET REGISTER	
DRAWING NO.	DRAWING DESCRIPTION	REVISION
2016-107/SHT1	DESIGN NOTES AND LOCALITY PLAN	3
2016-107/SHT2	DESIGN NOTES 2	3
2016-107/SHT3	SITE PLAN	4
2016-107/SHT4	BOAT RAMP SITE PLAN	3
2016-107/SHT5	RIVER CROSS-SECTIONS	4
2016-107/SHT6	RAMP CROSS-SECTIONS	3
2016-107/SHT7	ROADWAY CROSS-SECTIONS	3
2016-107/SHT8	ROADWAY LONGITUDINAL SECTION	3
2016-107/SHT9	DESIGN DETAILS	3
2016-107/SHT10	PAVEMENT LINEMARKING DETAILS	2
2016-107/SHT11	PONTOON DESIGN PLAN	2
2016-107/SHT12	PONTOON DESIGN DETAILS	2

### CONCRETE GENERAL

- CONCRETE SHALL BE IN ACCORDANCE WITH AS3600 CONCRETE STRUCTURES.
- C2. EXPOSURE CLASSIFICATION FOR DURABILITY IS B1.
- C3. CONCRETE TO BE AS FOLLOWS:

STRUCTURAL ELEMENT	WALKWAY	BOAT RAMP SLAB	PAVEMENT
STRENGTH GRADE (MPa)	N25	N40	N40
CEMENT TYPE	GP	GP	GP

- C4. MINIMUM 15mm CHAMFERS ARE REQUIRED ON ALL EXPOSED CONCRETE EDGES AND CORNERS.
- C5. THE USE OF CONCRETE ADMIXTURES WHERE REQUIRED SHALL BE SUBJECT TO THE APPROVAL OF THE SUPERINTENDENT AND SHALL CONFORM TO AS1478.1. WHERE FORMS TO BE STRIPPED BEFORE 24 HRS SIKA RAPID 1 OR EQUIVALENT SHOULD BE USED.
- C6. SURFACE FINISHES SHALL BE IN ACCORDANCE WITH AS3610 UNLESS SHOWN OTHERWISE ON DRAWINGS
- C7. THE FINISHED CONCRETE SHALL BE A DENSE HOMOGENOUS MASS, COMPLETELY FILLING THE FORMWORK THOROUGHLY EMBEDDING THE REINFORCEMENT AND FREE OF STONE POCKETS. ALL CONCRETE INCLUDING SLABS ON GROUND AND FOOTINGS SHALL BE COMPACTED WITH MECHANICAL VIBRATORS.
- C8. ELAPSED TIME BETWEEN WETTING OF MIX AND DISCHARGE OF CONCRETE AT SITE MUST BE AS SHORT AS POSSIBLE AND COMPLY WITH THE FOLLOWING.

CONCRETE TEMPERATURE AT TIME OF DISCHARGE (*C)	MAXIMUM ELAPSED TIME (HOURS)
10-24	2.00
24-27	1.50
27-30	1.00
30-32	0.75

- C9. NO UNCONTROLLED WATER TO BE ADDED ON SITE WITHOUT PRIOR CONSENT OF MIX DESIGNER.
- C10. THE COVER (OR "CLEAR COVER") AS STATED ON THE DRAWINGS, SHALL BE THE CLEAR DISTANCE FROM THE FACE OF ANY REINFORCEMENT. WIRE TIES FOR FIXING REINFORCEMENT, FORMWORK FIXINGS OR SIMILAR METAL WORK TO THE NEAREST CONCRETE SURFACE.

C11. COVER TO BE AS FOLLOWS, UNLESS NOTED OTHERWISE:

SUBSTRATE	MINIMUM COVER (mm)
DAMP PROOF MEMBRANE	40
BLINDING LAYER	50
ON GROUND	75

- C12. CONCRETING SHALL BE COMMENCED AT THE LOWEST LEVEL OF EACH PART OF THE WORK AND SHALL BE BROUGHT UP IN A MANNER APPROVED BY THE PROJECT MANAGER, THE PLACING ROUTINE BEING SUCH THAT EACH LAYER MUST STILL BE SOFT WHEN A NEW LAYER IS PLACED UPON IT. THE CONCRETE SHALL BE THOROUGHLY CONSOLIDATED BY APPROVED VIBRATORS.
- CONCRETE SHALL NOT BE PLACED IN WATER, EXCEPT WITH THE APPROVAL OF THE C13. PROJECT ENGINEER, AND THEN UNDER SUCH CONDITIONS AS THE PROJECT ENGINEER MAY IMPOSE
- IMMEDIATELY BEFORE PLACING CONCRETE, ALL SURFACES OR FOUNDATION UPON OR C14. AGAINST WHICH THE CONCRETE IS TO BE PLACED, SHALL BE FREE FROM STANDING WATER (EXCEPT AS PROVIDED ABOVE) MUD OR DEBRIS. ALL SURFACES OF ROCK UPON OR AGAINST WHICH CONCRETE IS TO BE PLACED, SHALL IN ADDITION, BE FREE AND CLEAN FROM OIL, OBJECTIONABLE COATINGS AND FROM ALL LOOSE, SEMIDETACHED OR UNSOUND FRAGMENTS. THE SURFACE OF ABSORPTIVE FOUNDATIONS AGAINST WHICH CONCRETE IS TO BE PLACED SHALL BE MOISTENED THOROUGHLY.
- C15. DO NOT USE VIBRATORS TO MOVE CONCRETE ALONG FORMS, USE PLACEMENT METHODS THAT WILL MINIMISE PLASTIC SETTLEMENT AND SHRINKAGE CRACKING. LIMIT VERTICAL FREE FALL BY USE OF CHUTES FTC KEEP CHUTES VERTICAL FULL AND IMMERSED IN PLACED CONCRETE. PLACE CONCRETE IN LAYERS AND BLEND SUCCEEDING LAYERS BY COMPACTION. MAINTAIN A PLASTIC CONCRETE EDGE BETWEEN CONSTRUCTION JOINTS. PROPERLY COMPACT CONCRETE USING MECHANICAL VIBRATORS (AND HAND METHODS IF REQUIRED) TO REMOVE AIR BUBBLES AND GIVE MAXIMUM COMPACTION WITHOUT SEGREGATION OF CONCRETE. TAKE CARE TO AVOID CONTACT BETWEEN VIBRATORS AND PARTIALLY HARDENED CONCRETE, FORMWORK OR REINFORCEMENT.

C16. IN COLD WEATHER MAINTAIN TEMPERATURE OF FRESHLY MIXED CONCRETE WITHIN LIMITS SHOWN BELOW. 'OUTDOOR' AIR TEMPERATURE IS AIR AT TIME OF MIXING, OR PREDICTED OR LIKELY AIR TEMPERATURE DURING NEXT 48 HOURS. BEFORE AND WHILE PLACING CONCRETE. MAINTAIN TEMPERATURE OF FORMWORK AND REINFORCEMENT AT >5°C. DO NOT USE CALCIUM CHLORIDE, SALTS, CHEMICALS OR OTHER MATERIAL IN MIX TO LOWER THE FREEZING POINT OF CONCRETE, DO NOT ALLOW FROZEN MATERIALS TO ENTER MIXER, KEEP FORMS, MATERIALS, EQUIPMENT IN CONTACT WITH CONCRETE FREE OF FROST AND ICE. HEAT CONCRETE MATERIALS (OTHER THAN CEMENT) TO MINIMUM TEMPERATURE NECESSARY TO ENSURE TEMPERATURE OF PLACED CONCRETE IS WITHIN LIMITS SPECIFIED. MAXIMUM WATER TEMPERATURE: 60°C WHEN PLACED IN MIXER.

OUTDOOR AIR	TEMPERATURE OF CONCRETE				
	MINIMUM	MAXIMUM			
>5°C	10°C	32°C			
<5°C	18°C	32°C			

C17. IN HOT WEATHER PREVENT PREMATURE STIFFENING OF FRESH CONCRETE; REDUCE WATER ABSORPTION AND EVAPORATION LOSSES. MIX, TRANSPORT, PLACE AND COMPACT CONCRETE AS QUICKLY AS POSSIBLE, DURING PLACEMENT TEMPERATURE OF CONCRETE MUST NOT EXCEED TEMPERATURES BELOW

CONCRETE ELEMENT	TEMPERATURE
NORMAL CONCRETE IN FOOTINGS, BEAMS, COLUMNS, WALLS AND SLABS f'c $\preceq$ 32MPa	35°C
MASS CONCRETE SECTIONS ≥ 1.0m EACH DIMENSION, OR CONCRETE f'c ≥ 40 MPa IN SECTIONS ≥ 600mm THICKNESS	27°C

- DO NOT MIX CONCRETE WHEN SURROUNDING OUTDOOR SHADE TEMPERATURE ≥ 38°C C18. MAINTAIN TEMPERATURE OF FORMWORK AND REINFORCEMENT AT ≤32°C BEFORE AND DURING PLACING MAINTAIN SPECIFIED TEMPERATURE OF PLACED CONCRETE BY:
  - COOL CONCRETE USING LIQUID NITROGEN INJECTION BEFORE PLACING, OR
  - COVER CONTAINER IN WHICH CONCRETE IS TRANSPORTED TO FORMS, OR
  - SPRAY COARSE AGGREGATE USING COLD WATER OR USE CHILLED MIXING WATER.
- PROTECT FRESH CONCRETE FROM PREMATURE DRYING PARTICULARLY IN HOT, WINDY OF DRY (LOW HUMIDITY) CONDITIONS, EXCESSIVELY HOT OR COLD TEMPERATURES, RAIN, ETC. PROVIDE WIND BREAKS, MAINTAIN CONCRETE AT A REASONABLY CONSTANT TEMPERATURE WITH MINIMUM MOISTURE LOSS FOR CURING PERIOD.
- C20. KEEP ON SITE A LOG BOOK RECORDING EACH PLACEMENT OF CONCRETE INCLUDING DATE, CLIMATIC CONDITIONS, PORTION OF WORK, SPECIFIED GRADE AND SOURCE OF CONCRETE, DELIVERY DOCKET DATA, METHODS OF PLACEMENT AND COMPACTION, PROJECT ASSESSMENT CARRIED OUT, SLUMP MEASUREMENT AND VOLUME.
- C21. CONSTRUCTION JOINTS OR POUR BREAKS WHERE NOT SHOWN ON THE DRAWINGS SHALL BE OCATED AND FORMED TO THE APPROVAL OF THE PROJECT ENGINEER.
- CURING OF ALL CONCRETE SHALL COMMENCE NO LATER THAN 2 HOURS AFTER FINISHING OPERATIONS HAVE BEEN COMPLETED. THE CONCRETE SHALL BE CURED FOR A PERIOD OF 7 DAYS (UNLESS APPROVED OTHERWISE BY THE ENGINEER) BY ONE OF THE FOLLOWING METHODS:
  - PONDING OR CONTINUOUS SPRINKLING WITH WATER.
  - USE OF AN ABSORPTIVE COVER KEPT CONTINUOUSLY WET.
  - COATING WITH AN APPROVED SPRAYED MEMBRANE CURING COMPOUND WHERE COMPATIBLE WITH FINISHES.
  - USE OF AN APPROVED MOISTURE RETAINING COVERING SUCH AS HEAVY GAUGE BUILDERS PLASTIC OR PAPER FIRMLY HELD AGAINST CONCRETE SURFACES TO PREVENT AIR CIRCULATION
- CONSTRUCTION SUPPORT PROPPING SHALL BE LEFT IN PLACE WHERE NEEDED TO AVOID C23. OVERSTRESSING THE STRUCTURE DUE TO CONSTRUCTION LOADING WHEN AIR TEMPERATURE IS BELOW 5°C OR ABOVE 35°C SPECIAL CONCRETE PLACEMENT PRECAUTIONS SHALL BE TAKEN IN ACCORDANCE WITH GOOD CONSTRUCTION PRACTICE.
- STRIP FORMWORK TO AS3600 CLAUSE 17.6. REMOVE FROM TIE BOLTS WITHOUT DAMAGING CONCRETE, PARTS OF BOLTS LEFT IN CONCRETE MUST NOT INTRUDE INTO COVER CONCRETE. FLUSH FILL HOLES USING MATERIAL MATCHING CONCRETE SURFACE COLOUR, STRENGTH AND
- C25. THE CONCRETE FINISH SHALL BE TO THE SATISFACTION OF THE PROJECT ENGINEER

C26. SURFACE IRREGULARITIES SHALL BE TESTED BY USE OF A TEMPLATE 1.5m LONG AND SHALL CONSISIT OF A STRAIGHT EDGE. THE MAXIMUM SURFACE IRREGULARITY FOR EACH CLASS OF FORMWORK MEASURED USING THE TEMPLATE SHALL BE AS FOLLOWS:

- CLASS 2 - 5mm

- CLASS 3 - 7mm

- CLASS 4 NO MEASUREMENT REQUIRED.
- CLASS 5 NO MEASUREMENT REQUIRED.
- C27. THOSE CONCRETE SURFACES REQUIRED TO BE RENDERED AND ANY OTHER CONCRETE SURFACE WHICH THE PROJECT ENGINEER MAY ORDER TO BE RENDERED SHALL BE TREATED AS FOLLOWS:
- THE CONCRETE SURFACE SHALL BE SCABBLED AND DAMPENED.
- CEMENT MORTAR, MIXED IN THE PROPORTION OF 80kg OF PORTLAND CEMENT TO 0.1m<sup>3</sup> OF SAND (DRY RODDED MEASUREMENT), SHALL BE APPLIED IN ONE OR TWO COATS, AS MAY BE ORDERED BY THE PROJECT MANAGER, TO FORM A TOTAL THICKNESS OF ABOUT 13mm.
- FOR TWO-COAT WORK. THE FIRST COAT SHALL BE WELL WORKED ON TO THE SURFACE AND SHALL BE SCORED BEFORE IT HAS SET HARD AND SHALL BE KEPT DAMP UNTIL THE SECOND COAT IS APPLIED.
- C28. ALL CONCRETE PILES SHALL BE INSTALLED IN ACCORDANCE WITH AS2159.

### FORMWORK

- EW1. ALL FORMWORK TO BE CLASS 3 IN ACCORDANCE WITH AS 3610.
- FW2. ALL HOLES LEFT BY FORM TIES TO BE PLUGGED TO FULL COVER DEPTH WITH CEMENTITIOUS GROUT
- FW3. FORMS TO BE CLEANED OF ANY TIE WIRE, REINFORCEMENT OFFCUTS, SCREWS, FIXINGS, DIRT ETC. BEFORE POUR.
- FW4. FORM SURFACES SHALL BE SMOOTH AND FREE FROM HOLES OR IRREGULARITIES. AND TO THE SATISFACTION OF THE PROJECT MANAGER. BEFORE CONCRETE IS PLACED, THE SURFACES OF THE FORMS SHALL BE COATED WITH AN APPROVED FORM COATING THAT WILL EFFECTIVELY PREVENT STICKING AND WILL NOT STAIN THE CONCRETE SURFACES.
- FW5. MINIMUM FORMWORK STRIPPING TIMES FOR VERTICAL FACES SHALL BE AS GIVEN IN AS 3610, TABLE 5.4.1.

### SEALANT

- PS1 SEALANT TO BE EMERSEAL PUAG OR APPROVED FOURVALENT INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS FOR IMMERSED WATER APPLICATIONS OR APPROVED ALTERNATIVE.
- PS2. SURFACE TO BE PREPARED USING PARCHEM PRIMER 13 OR APPROVED ALTERNATIVE.

### REINFORCEMENT

- R1. REINFORCEMENT SHALL BE DEEMED TO INCLUDE ALL REINFORCING BARS, REINFORCING MESH, AND DOWEL BARS. REINFORCEMENT SHALL COMPLY WITH AS4671-2001.
- REINFORCEMENT IS REPRESENTED DIAGRAMMATICALLY; IT IS NOT NECESSARILY SHOWN IN R2 TRUE PROJECTION.
- R3. REINFORCING MESH TO BE GRADE D500L COLD ROLLED HIGH STRENGTH DEFORMED FABRIC IN ACCORDANCE WITH AS 4671
- REINFORCING BARS TO BE GRADE D500N HOT ROLLED HIGH STRENGTH DEFORMED BARS IN R4 ACCORDANCE WITH AS 4671
- N12 TRIM BARS ARE REQUIRED ON ALL SLOPING, VERTICAL AND HORIZONTAL FACES OF R5. CONCRETE WHERE THERE IS NO OTHER BAR WITHIN 100mm OF THAT FACE.
- R6 LAPPING OF REINFORCING BARS AND FABRIC TO BE IN ACCORDANCE WITH AS 3600
- REINFORCEMENT WHICH REQUIRES FABRICATION OR BENDING TO SHAPE SHALL BE SUPPLIED IN THE FULL LENGTH SHOWN ON THE DRAWINGS. REINFORCEMENT SHALL BE COLD BENT TO THE SPECIFIED SHAPE. BARS SHALL NOT BE BENT AFTER FABRICATION UNLESS SHOWN ON THE DRAWINGS.
- R8 STRAIGHT BARS SHALL BE SUPPLIED TO THE FULL LENGTHS SHOWN ON THE DRAWINGS. WHERE LAPPING OF STRAIGHT BARS IS UNAVOIDABLE, SUCH LAPS SHALL BE STAGGERED AND A MINIMUM OF TWO WIRE TIES PLACED AT EACH LAP.

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3	18-02-18			CONCRETE GENERAL NOTE AMENDMENT	-					H	DESIGN NOTES 2			
2	23/10/17			ISSUED FOR CONSTRUCTION	party in whole or part without the written permission				SCALE N.T.S.		RICH RIVER IRRIGATION DEVELOPMENTS	Sheet Number	DRAWING NUMBER	REVISION
1	30/08/17	FSIGN REV'D	APP'D	ISSUED FOR DISCUSSION	of Rich River Irrigation Developments constitutes an	SURVEYED BY	DRAWN	DESIGNED	DATE	DEVELOPMENTS	Unit 1, 164 Ogilvie Avenue, Echuca. 3564.	02 OF 12	2016-107	
REV	DATE	EVIEW P.MGR	P.DIR	REVISIONS	infringement of copyright.	D.LEE	D.LEE	D.LEE	30-08-17	PTY LTD A.C.N.106 901 777	Telephone (03) 5482 2564 Fax (03) 5482 1918 Email admin@rrid.com.au	02 01 12	2010 107	Ľ

COFFER DAM CD1. STEEL SHEET PILE COFFER TO BE INSTALLED IN ACCORDANCE WITH AS2159.

R9. REINFORCING MESH IS TO BE LAPPED A MINIMUM OF TWO BARS AT ANY SPLICE. R10. WHERE NOT SHOWN ON THE DRAWINGS, ADOPT THE FOLLOWING LAP SPLICE LENGTHS.

AR SIZE & TYPE	HORIZONTAL BARS WITH MORE THAN 300mm CONCRETE CAST BELOW	OTHER BARS
N12	375	300
N16	560	450
N20	830	660
N24	1150	920
N28	1530	1220
N32	1900	1520
N36	2340	1870

R11. REINFORCEMENT SYMBOLS:

GRADE D500N DEFORMED BAR. GRADE D5001 DEEORMED EABRIG

PI 2. SI THE NUMBER FOLLOWING THESE SYMBOLS IS THE BAR DIAMETER IN MILLIMETRES.

R12 REINFORCEMENT NOTATIONS:

EACH FACE

EACH WAY

FF

EW

CP

R14.

TOP BOTTOM

CENTRALLY PLACED

R13. WELDING OF REINFORCEMENT WILL ONLY BE PERMITTED WITH THE PRIOR APPROVAL OF THE ENGINEER.

A BOND BREAKING MATERIAL SHALL BE USED BETWEEN CONTACTING SURFACES AT CONTROL JOINTS. REFER DRAWINGS. REINFORCEMENT SHALL NOT BE CONTINUOUS THROUGH CONTROL JOINTS UNLESS NOTED OTHERWISE.

R15. ALL REINFORCEMENT SHALL BE FIRMLY SUPPORTED ON EITHER PLASTIC CHAIRS OR CONCRETE CHAIRS AT NOT GREATER THAN 1000 CRS BOTH WAYS, BARS SHALL BE TIED AT ALTERNATIVE INTERSECTIONS

R16. SUPPLY AND LAY FABRIC IN FLAT SHEETS. AT SPLICES, FABRIC SHALL BE LAPPED AS FOLLOWS:

. . . MAXIMUM THREE SHEETS OF FABRIC TO BE LAPPED AT ANY SPLICE

R17. ALL STARTER BARS TO EXISTING CONCRETE TO BE GROUTED USING EITHER HILTI HIT-HY 150 MAX. OR HILTI HIT-RE 500.

BEFORE THE REINFORCEMENT IS PLACED. THE SURFACE OF THE REINFORCEMENT AND THE SURFACES OF ANY METAL BAR SUPPORTS SHALL BE CLEANED OF ANY HEAVY RUST. LOOSE MILL SCALE, DIRT, GREASE AND OTHER FOREIGN SUBSTANCES. AFTER BEING PLACED, THE REINFORCEMENT SHALL BE MAINTAINED IN A CLEAN CONDITION UNTIL IT IS COMPLETELY EMBEDDED IN THE CONCRETE.

R19. REINFORCEMENT SHALL BE ACCURATELY PLACED AND SUPPORTED TO PREVENT DISPLACEMENT DURING ALL STAGES OF CONCRETING. TACK WELDING OR WIRE TIES ARE ACCEPTABLE METHODS FOR PREVENTING SUCH DISPLACEMENT.

R20. WHERE APPROVED BY THE PROJECT ENGINEER THE CONTRACTOR SHALL BE PERMITTED TO LOCATE JOINTS OR SPLICES AT LOCATIONS OTHER THAN THOSE SHOWN ON THE DRAWINGS.

R21. WHERE WELDED SPLICES IN REINFORCING BARS ARE USED, THE EQUIPMENT, MATERIALS AND ALL WELDING AND TESTING PROCEDURES SHALL BE IN ACCORDANCE WITH AS 1554.3 - 2002. REINFORCING BAR LAP LENGTHS SHALL BE MAINTAINED ACROSS ALL WELDED LOCATIONS.

PONTOON POLES

PP1. STEEL PONTOON PILES TO BE INSTALLED IN ACCORDANCE WITH AS2159.



LOCALITY PLAN NOT TO SCALE

**A** PM 24182 124.35

06

8



Services

The I shoul cons	ocation c d be pro truction.	of services shown on the plan ven to be correct prior to								
The relevant authorities should be contacted prior to commencement of works to ascertain the correct location of all services.										
4	18/02/18	CUL DE SAC AMENDEDED								
3	23/10/17	ISSUED FOR CONSTRUCTION								
2	30/08/17	PRELIMINARY DESIGN FOR DISCUSSION								
1	21/12/16	DRAFT FOR DISCUSSION								
REV	DATE	REVISIONS								

# Disclaimer

Notwithstanding any description contained in the plans or design specifications, the contractor shall be responsible for satisfying themselves as to the nature and extent of the specified works and the physical and legal conditions under which the works will be carried out, including site conditions, access, nature of material to be excavated, size and type of mechanical plant required and any like matters effecting the construction of the works.

CEMETERY ROAD 🎐

	LEGEND												
Asphalt Driveway		Concrete Driveway		Gravel Driveway		S.E.C. U/G Cable	—— Е ——	Fire Hydrant	O F.H.	Proposed Culvert	)(	ARIVERIARIGAN	
Proposed K & C		Permanent Mark	<b>小</b> PM	Tree to be removed	8	Gas Main	G	Fire Plug	O F.P.	Proposed Picnic Table		No.	
Conduits	c	Telstra U/G Cable	T	Telstra Pole	\$	Sewer Main	s	Valve		Proposed Shelter	$\square$		
Existing Drains	D	Water Main		Telstra Pit	<b>——</b>	Property Outlet	— sw —	S.E.C. Pole	O	Survey Station	<b>▲</b> PEG		RICH     UNIT <sup>-</sup>
Existing Drain Pits		Proposed Drain Pits		Proposed Drains	PD	Existing K & Ch	====	Existing Culvert	)(	Rock Spalling		PTY LTD A.C.N.106 901 777	Teleph





RIVER IRRIGATION DEVELOPMENTS DRAWING NUMBER REVISION SIZE SHEET NUMBER TITLE: DARLINGTON POINT BOAT RAMP 1, 164 OGILVIE AVENUE, ECHUCA 3564 none (03) 5482 2564 Fax (03) 5482 1918 DESCRIPTION: SITE PLAN (1:1000) 03 of 12 2016-107 A1 4





# SURVEY NOTES

Topographical & Feature Survey Datum A.H.D. Contour Interval 100 mm.

# MURRUMBIDGEE SHIRE COUNCIL / APEX CLUB PROPOSED DARLINGTON POINT BOAT RAMP SITE PLAN



NOT TO SCALE





Asphalt Driveway		Concrete Driveway		
Proposed K & C		Permanent Mark	▲ РМ	
Conduits	— c —	Telstra U/G Cable	T	
Existing Drains	<b>D</b>	Water Main	— w —	
Existing Drain Pits		Proposed Drain Pits		



Services

The location of services shown on the plan should be proven to be correct prior to construction.

The relevant authorities should be contacted prior to commencement of works to ascertain the correct location of all services. 3 23/10/17 ISSUED FOR CONSTRUCTION 2 30/08/17 PRELIMINARY DESIGN FOR DIS

2	30/08/17	PRELIMINARY DESIGN FOR
1	21/12/16	DRAFT FOR DISCUSSION
REV	DATE	REVISIONS

			,		•			i i
X	Gas Main	G	Fire Plug	O F.P.	Proposed Picnic Table		No.	I
\$	Sewer Main	s	Valve	<b>—X</b> —	Proposed Shelter	X		
	Property Outlet	— sw —	S.E.C. Pole	$\odot$	Survey Station	<b>▲</b> PEG		RIC UN
PD	Existing K & Ch	====	Existing Culvert	)(	Rock Spalling		DEVELOPIVIEN IS PTY LTD A.C.N.106 901 777	Tele

	1974 Flood lev	rel (Approximate) — 125. — — — — — — — — — — — — —	.55											
122.00-	HWM stain on	day of survey — 124.95	5											
120.00-					EXISTING NA	TURAL SURFACE		SUMMI	<u>Level on day of survey – '</u> Er water level – 119.20	20.71				
118.00-	-										EXISTING NATURAL SURFACE			
116.00-	-													
DATUM (m AHD) 114.00	0													
DESIGN SURFACE														
	120.71 119.80 119.50					117.20	116.60	116.00	116.50	117.10	117.00	117.80	118.30 118.00	
CHAINAGE (m)	00.00 1.94 2.30					24.19	26.28	31.44	39.39	44.85	53.58	63.38	70.29	
11.26 122.15 122.65 12.15 122.15 122.65 NOILION 122.24 MOLTON 122.24 MOLTON 122.25 MOLTON 1		REFER DETAIL	EXISTING N CONCRETE RAMP ON NTRALLY PLACED NFORCED CONCRE	MATURAL SURF	ACE MP PROOF MEMBE L CONCRETE AND	1974 Flood HWM stain of BASE COURSE MA REFER DETAIL	level (Approximate on day of survey ED BETWEEN STERIAL CODE T IN SITU CONCRI 1 MESH CENTRALL CENTRALL CENTRALL CENTRALL	e) - 125.55 - 124.95 - 124.95 WATER LEVEL ON DAY OF SUMMER WATER LEVEL - ETE RAMP WITH LY PLACED SUMMER WATER LEVEL - SUMMER WATER - SUMMER WATER LEVEL - SUMMER WATER -	SURVEY - 120.71 - 119.20 REFER DETAIL	E	-EXISTING NATURAL SURFACE	77.59 116.20	85.70 117.00	96.52 118.00







			Disclaimer
			Notwithstanding any descrip
4	18/02/18	RIVER CROSS-SECTION 2 AMENDED	or design specifications, th for satisfying themselves a:
3	23/10/17	ISSUED FOR CONSTRUCTION	specified works and the ph
2	30/08/17	PRELIMINARY DESIGN FOR DISCUSSION	access, nature of material
1	21/12/16	DRAFT FOR DISCUSSION	mechanical plant required (   construction of the works.
REV	DATE	REVISIONS	

scription contained in the plans , the contractor shall be responsible is as to the nature and extent of the e physical and legal conditions under e carried out, including site conditions, orial to be excavated, size and type of ed and any like matters effecting the tes.

	LEGEND												
Asphalt Driveway		Concrete Driveway		Gravel Driveway		S.E.C. U/G Cable	—— E ——	Fire Hydrant	O F.H.	Proposed Culvert	)(	A RIVEN INAIGAL	
Proposed K & C		Permanent Mark	<b>A</b> PM	Tree to be removed	X	Gas Main	G	Fire Plug	O F.P.	Proposed Picnic Table		No.	
Conduits	c	Telstra U/G Cable	T	Telstra Pole	\$	Sewer Main	s	Valve		Proposed Shelter	X		
Existing Drains	D	Water Main	— w —	Telstra Pit	<b>——</b>	Property Outlet	— sw —	S.E.C. Pole	O	Survey Station	<b>▲</b> PEG		RICH R
Existing Drain Pits		Proposed Drain Pits		Proposed Drains	PD	Existing K & Ch	====	Existing Culvert	)(	Rock Spalling		PTY LTD A.C.N.106 901 777	Telepho

RIVER CROSS-SECTION 2 SCALE 1: 200 HORIZONTAL 1: 200 VERTICAL (Chainage 0.00 to Chainage 114.22)

1974 Flood level (Approximate) — 125.55

HWM stain on day of survey — 124.95

				WATER LEVEL	ON DAY OF SURVEY - 120.71					
				SUMMER WAT	ER LEVEL – 119.20	- EXISTING	NATURAL SURFACE			
119.20	117.50	115.50	115.70	116.00	116.30	116.90	118.00	118.30	118.90	
11.45	16.55 16.55	21.35	26.96	33.27	40.07	46.87	5 7 AF	59.48	90 80 80	



# 1974 Flood level (Approximate) — 125.55

HWM stain on day of survey — 124.95

\_\_\_\_EXISTING NATURAL SURFACE

			WATER LEVE	L ON DAY OF SURVEY - 120.7	71					-
			SUMMER W	ATER LEVEL – 119.20		EXISTING NATURAL SURFAC	ЭЕ			
117.40	116.50	116 BO	117.30	117.10	117 60	117.70	117.80	117.90	118.80	120.71
14.00	17.35	23.04	29.09	36.09	41 93	47.75	52.33	55.69	58.06	67.53

# RIVER CROSS—SECTION 4 SCALE 1:200 HORIZONTAL 1:200 VERTICAL (Chainage 0.00 to Chainage 67.53)

RIVER IRRIGATION DEVELOPMENTS I, 164 OGILVIE AVENUE, ECHUCA 3564 none (03) 5482 2564 Fax (03) 548







# MURRUMBIDGEE SHIRE COUNCIL / APEX CLUB PROPOSED DARLINGTON POINT BOAT RAMP **RIVER CROSS - SECTIONS**

•	TITLE: DARLINGTON POINT BOAT RAMP	SIZE	SHEET NUMBER	DRAWING NUMBER	REVISION
4 182 1918	DESCRIPTION: RIVER CROSS-SECTIONS (1:200)	A1	05 <sub>OF</sub> 12	2016-107	4



								ICR IPD.	
Gravel Driveway		S.E.C. U/G Cable	—— Е ——	Fire Hydrant	O F.H.	Proposed Culvert	)(	ARIVENINAIGRA	
Free to be removed	X	Gas Main	G	Fire Plug	O F.P.	Proposed Picnic Table		No.	
Telstra Pole	\$	Sewer Main	s	Valve	<b>_</b>	Proposed Shelter	$\boxtimes$		
Telstra Pit	<b>—</b>	Property Outlet	— sw —	S.E.C. Pole	$\odot$	Survey Station	<b>▲</b> PEG		RICH RIVER IRRIGATIO
Proposed Drains	PD PD	Existing K & Ch		Existing Culvert	)(	Rock Spalling		PTY LTD A.C.N.106 901 777	Telephone (03) 5482





SEALED ROADWAY CROSS-SECTION D-D SCALE 1:200 HORIZONTAL 1:200 VERTICAL

		Disclaimer						LEC	BEND						
		Notwithstanding any description contained in the plans	Asphalt Driveway		Concrete Driveway		Gravel Driveway		S.E.C. U/G Cable	٤ Fire Hydrant	O F.H.	Proposed Culvert	)(	A RIVER IRRIGA	
3 18/02/18 PA		for satisfying themselves as to the nature and extent of the specified works and the physical and legal conditions under	Proposed K & C		Permanent Mark	<b>^</b> PM	Tree to be removed	**	Gas Main	General Fire Plug	O F.P.	Proposed Picnic Table		Se Conton	
2 23/10/17 ISS	SUED FOR CONSTRUCTION	which the works will be carried out, including site conditions, access, nature of material to be excavated, size and type of	Conduits	c	Telstra U/G Cable	T	Telstra Pole	•	Sewer Main	s — Valve		Proposed Shelter	$\square$		
1 30/08/17 DR	RAFT FOR DISCUSSION	mechanical plant required and any like matters effecting the construction of the works.	Existing Drains	D	Water Main		Telstra Pit		Property Outlet	— sw — S.E.C. Pole	O	Survey Station	<b>▲</b> PEG		UNIT 1. 164 OGILVIE AVENUE, ECHUCA 3564
REV DATE	REVISIONS		Existing Drain Pits		Proposed Drain Pits		Proposed Drains	PD	Existing K & Ch	$\equiv \equiv \equiv \equiv$ Existing Culvert	)(	Rock Spalling		PTY LTD A.C.N.106 901 777	Telephone (03) 5482 2564 Fax (03) 5482



SEALED ROADWAY CROSS-SECTION E-E scale 1:200 horizontal 1:200 vertical



# LEGEND

BASECOURSE

SUBBASE

AREA OF CUT

AREA OF FILL

CONCRETE PAVEMENT

# MURRUMBIDGEE SHIRE COUNCIL / APEX CLUB PROPOSED DARLINGTON POINT BOAT RAMP **ROADWAY CROSS - SECTIONS**

	TITLE DARI INGTON POINT BOAT RAMP	SIZE	SHEET NUMBER	DRAWING NUMBER	REVISION
4 82 1918	DESCRIPTION: ROADWAY CROSS-SECTIONS (1:200)	A1	07 of 12	2016-107	3





		·····						
			-existing natural surface				EXISTING NATURAL SURFACE	
	ON EXIS	STING NATURAL SURFACE GRADES						
125.23	124.45	124.26	123.83	123.25	123.17	123.85		123.89
125.08	124.30	124.11	123.68	123.10	123.02	123.270		123.73
100.00	112.04	125.00	150.00	175.00	<u>180.75</u> 181.37	225.00		250.00



# LEGEND



SUBBASE

AREA OF FILL

3 18/02/18 CONCRETE PAVEMENT ADDED 2 23/10/17 ISSUED FOR CONSTRUCTION

1 30/08/17 DRAFT FOR DISCUSSION

REV DATE

CONCRETE PAVEMENT

REVISIONS

# Disclaimer

Notwithstanding any description contained in the plans or design specifications, the contractor shall be responsible for satisfying themselves as to the nature and extent of the specified works and the physical and legal conditions under which the works will be carried out, including site conditions, access, nature of material to be excavated, size and type of mechanical plant required and any like matters effecting the construction of the works.

	LEGEND												
Asphalt Driveway		Concrete Driveway		Gravel Driveway		S.E.C. U/G Cable	—— E ——	Fire Hydrant	O F.H.	Proposed Culvert	)(	A RIVEN INAIGAA	
Proposed K & C		Permanent Mark	<b>▲</b> PM	Tree to be removed	X	Gas Main	G	Fire Plug	O F.P.	Proposed Picnic Table		No.	
Conduits	— c —	Telstra U/G Cable	—T	Telstra Pole	\$	Sewer Main	s	Valve	<b>—X</b> —	Proposed Shelter	$\bowtie$		
Existing Drains	D	Water Main	— w ——	Telstra Pit	<b>—</b>	Property Outlet	— sw —	S.E.C. Pole	$\odot$	Survey Station	<b>▲</b> PEG		RICH RIVER
Existing Drain Pits		Proposed Drain Pits		Proposed Drains	PD	Existing K & Ch	====	Existing Culvert	)(	Rock Spalling		DEVELOPIVIEN IS PTY LTD A.C.N.106 901 777	Telephone

-EXISTING NATURAL SURFACE			
5 2 2	126.90	126.85	
106 R7	126.75	126.70	
	25.00 75.00	80.67	

# DESIGN ROAD LONGITUDINAL SECTION — (0—100) scale 1:200 horizontal 1:200 vertical (looking north west)



EXISTING LEVEE BANK - 126.84

<u>DESIGN ROAD LONGITUDINAL SECTION — (100—255.99)</u> scale 1:200 horizontal 1:200 vertical (looking north west)

SUM LEA			SCIPA DERIV		÷	sublich .	BER BUT
				CONCRETE PA	EXISTING LEVEE BANK - 126.84		
		AREA OF FILL		-EXISTING NATURAL SURFA	DE AREA OF FILL		<u></u>
					P -	3.33%	
23.00 123.00	22.84	22.53 123.00	FLAT	122.41	22.42 123.00	3.33%	22.23 122.67

DESIGN ROAD LONGITUDINAL SECTION — (255.99—411.12) scale 1:200 horizontal 1:200 vertical (looking north west)

R IRRIGATION DEVELOPMENTS 164 OGILVIE AVENUE, ECHUCA 3564 e (03) 5482 2564 Fax (03) 5482

# EXISTING LEVEE BANK - 126.84 EXISTING ENTRY RAMP

# MURRUMBIDGEE SHIRE COUNCIL / APEX CLUB PROPOSED DARLINGTON POINT BOAT RAMP **ROADWAY LONGITUDINAL - SECTION**

	TITLE: DARLINGTON POINT BOAT RAMP	SIZE	SHEET NUMBER	DRAWING NUMBER	REVISION
64 482 1918	DESCRIPTION: ROADWAY LONGITUDINAL-SECTION (1:200)	A1	08 of 12	2016-107	3



<u>ES</u>									
MURRUMBIDGEE SHIRE COUNCIL / APEX CLUB									
F	PROPOSED DARLINGTON PO	INT E	BOAT RAMP	)					
	DESIGN DETAILS								
	TITLE: DARLINGTON POINT BOAT RAMP	SIZE	SHEET NUMBER	DRAWING NUMBER	REVISION				
64 482 1918	DESCRIPTION: DESIGN DETAILS	A1	09 of 12	2016-107	3				
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2	23/10/17	7			ISSUED FOR CONSTRUCTION	party in whole or part				SCALE		
1	30-08-17				ISSUED FOR DISCUSSION	of Rich River Irrigation		DDAWA	DECIONED	N.I.S.		RICH RIVER IRRIGATION DEVEL
REV	DATE	DESIGN REVIEW	REV'D P.MGR	APP'D P.DIR	REVISIONS	infringements constitutes an infringement of copyright.	D.LEE	D.LEE	D.LEE	30-08-17	PTY LTD A.C.N. 106 901 777	Telephone (03) 5482 2564 Fax (03) 5482 19

CENTRE LINE (Solid)			
	EDGE	OF SEAL	
R	Om		
IMBIDGEE SHIRE COUNCIL / AF	PEX CLUB		
D DARLINGTON POINT	BOAT RAM	IP	
PAVEMENT LINEMARKING DETAI	LS		
on developments Educa 3564	SHEET NUMBER	DRAWING NUMBER	REVISION
5482 1918 Email admin@rrid.com.au	10 of 12	2016–107	2
			A3

NAL	WAYS	AND	HAH	NDRAIL	S TO	COMPLY	' WITH	OH&S	ACT	2004.	OH&S	REGU	JLATIONS	2007
AND	AS165	7-FL	XED	PLATE	ORMS	. WALKW	AYS.	STAIRW	AYS	AND L	ADDERS	5 – D	ESIGN.	
CONS	STRUCT	ION	AND	INST/	ALLATI	ON.						_	,	

PONTOON POLE LOCATION TABLE								
POLE NO.	EASTING	NORTHING						
P1	408430.160	6174270.015						
P2	408435.016	6174274.700						
P3	408439.884	6174279.397						
P4	408444.784	6174284.124						
P5	408446.028	6174288.386						
P6	408444.270	6174300.587						
P7	408442.776	6174312.494						
P8	408443.263	6174319.148						
P9	408445.415	6174330.953						
P10	408447.568	6174342.759						







### 7.2. Appendix 2 – AHIMS Reports



AHIMS Web Services (AWS) Search Result

Date: 30 August 2018

Rich River Irrigation Developments

26 McCulloch Drive PO Box 241 Moama New South Wales 2731 Attention: Clare Fitzpatrick

Email: clare@rrid.com.au

Dear Sir or Madam:

<u>AHIMS Web Service search for the following area at Lat, Long From : -34.5777, 145.9886 - Lat, Long To :</u> -34.5634, 146.0112 with a Buffer of 50 meters, conducted by Clare Fitzpatrick on 30 August 2018.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

17 Aboriginal sites are recorded in or near the above location.
0 Aboriginal places have been declared in or near the above location. \*

### If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (http://www.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Office of Environment and Heritage's Aboriginal Heritage Information Unit upon request

### Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Office of Environment and Heritage and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date .Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.



## AHIMS Web Services (AWS)

Extensive search - Site list report

Client Service ID : 367371

<u>SiteID</u>	SiteName	<u>Datum</u>	Zone	Easting	<u>Northing</u>	<u>Context</u>	<u>Site Status</u>	SiteFeatures	<u>SiteTypes</u>	<u>Reports</u>
49-4-0017	Possum Tree;Warangesda;	AGD	55	407818	6173846	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	1326,102867
	<u>Contact</u>	<b>Recorders</b>	Mr.M	1 Harris				Permits		
49-4-0005	Darlington Pt;Swimming Pool Site;	AGD	55	408095	6174120	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	737,102867
	Contact	<u>Recorders</u>	R Re	id				<u>Permits</u>		
49-4-0008	Narrand Street Site;Darlington Point;	AGD	55	408040	6174100	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	102867
	Contact	<u>Recorders</u>	R Re	id				<u>Permits</u>		
49-4-0064	darlington point school	GDA	55	407800	6173816	Open site	Valid	Modified Tree (Carved or Scarred) : -		102867
	Contact Mr.Stephen Johnston	<b>Recorders</b>	Mr.S	tephen Johns	ton			Permits		
49-4-0068	Darlington Point STP-2	GDA	55	407378	6173544	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	<u>Recorders</u>	OzAr	rk Environme	ental and Herit	age Management,Mi	ss.Erica Weston	<u>Permits</u>		
49-5-0104	Darlington Point STP-3	GDA	55	408452	6174414	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	<u>Recorders</u>	OzAr	rk Environme	ental and Herit	age Management,Mi	ss.Erica Weston	<u>Permits</u>		
49-4-0067	Darlington Point STP-1	GDA	55	407334	6173609	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	<u>Recorders</u>	OzAr	rk Environme	ental and Herit	age Management,Mi	ss.Erica Weston	<u>Permits</u>		
49-4-0066	DARLING POINT STP - 1 similar to 49-4-0067	GDA	55	407334	6173609	Open site	Deleted	Modified Tree (Carved or Scarred) : 1		
	Contact	<u>Recorders</u>	OzAr	rk Environme	ental and Herit	age Management		<u>Permits</u>		
49-4-0070	DPCOS-ST1	GDA	55	407222	6174681	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	<u>Contact</u>	<u>Recorders</u>	Miss	.Jennifer Ber	tolani			Permits [		
49-4-0080	Crown Land Darilington Point 1	GDA	55	407337	6173507	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	<u>Contact</u>	<b>Recorders</b>	Griff	ith Local Abo	riginal Land C	ouncil		<u>Permits</u>		

Report generated by AHIMS Web Service on 30/08/2018 for Clare Fitzpatrick for the following area at Lat, Long From : -34.5777, 145.9886 - Lat, Long To : -34.5634, 146.0112 with a Buffer of 50 meters. Additional Info : Assessment of recorded sites in a broader area for context. Number of Aboriginal sites and Aboriginal objects found is 17

This information is not guaranteed to be free from error omission. Office of Environment and Heritage (NSW) and its employees disclaim liability for any act done or omission made on the information and consequences of such acts or omission.



### AHIMS Web Services (AWS)

Extensive search - Site list report

Client Service ID : 367371

<u>SiteID</u>	SiteName	<u>Datum</u>	<u>Zone</u>	Easting	<u>Northing</u>	<u>Context</u>	<u>Site Status</u>	<b>SiteFeatures</b>	<u>SiteTypes</u>	<u>Reports</u>
49-4-0081	UriCrown Land Darlington Point 2	GDA	55	407320	6173313	Open site	Valid	Modified Tree		
								(Carved or Scarred) :		
								-		
	Contact	<u>Recorders</u>	Griffi	ith Local Abo	original Land C	ouncil		<u>Permits</u>		
49-4-0082	Darlington Point Golf Coures 1	GDA	55	407398	6173364	Open site	Valid	Modified Tree		
								(Carved or Scarred) :		
	Contact	Docondono	Criffi	th Local Aba	wiginal Land C	ouncil		- Dormita		
40.4.0092	<u>Contact</u>	<u>Recorders</u>	Griin			Onen site	Valid	<u>Perimits</u>		
49-4-0005	Darnington Point Gon Coures 2	GDA	55	407439	01/3392	Open site	Vallu	(Carved or Scarred) :		
								-		
	Contact	Recorders	Griffi	ith Local Abo	original Land C	ouncil		Permits		
49-4-0084	Darlington Point Golf Coures 3	GDA	55	407470	6173365	Open site	Valid	Modified Tree		
								(Carved or Scarred) :		
								-		
	<u>Contact</u>	<b>Recorders</b>	Griffi	ith Local Abo	original Land C	ouncil		Permits		
49-4-0085	Darlington Point Golf Coures 4	GDA	55	407539	6173351	Open site	Valid	Modified Tree		
								(Carved or Scarred) :		
			G . 100					-		
	Contact	Recorders	Griffi	ith Local Abo	original Land C	ouncil		Permits		
49-4-0113	DPCOS ST13	GDA	55	407323	6173446	Open site	Valid	Modified Tree		
								(Carved or Scarred) :		
	Contact	Recorders	Miss	Ionnifor Bor	tolani			- Permits		
49-4-0114	DPCOS ST12	GDA	55	407337	6173505	Onen site	Valid	Modified Tree		
17 1 0111		dDir	55	10/00/	0170000	opensite	Vulla	(Carved or Scarred) :		
								-		
	<u>Contact</u>	<u>Recorders</u>	Miss	Jennifer Ber	tolani			<u>Permits</u>		

Report generated by AHIMS Web Service on 30/08/2018 for Clare Fitzpatrick for the following area at Lat, Long From : -34.5777, 145.9886 - Lat, Long To : -34.5634, 146.0112 with a Buffer of 50 meters. Additional Info : Assessment of recorded sites in a broader area for context. Number of Aboriginal sites and Aboriginal objects found is 17 This information is not guaranteed to be free from error omission. Office of Environment and Heritage (NSW) and its employees disclaim liability for any act done or omission made on the information and consequences of such acts or omission.



# **Griffith Local Aboriginal Land Council**

ABN: 79 251 966 502 PO Box 8043 East Griffith, NSW 2680 5 Wiradjuri Place, Griffith, NSW 2680 Phone: (02) 6962 6711 • Fax: (02) 6964 1477 Email: grifflalc@bigpond.com

Your Ref: J000142

Date: 7th July 2017

Attention: Clare Fitzpatrick Client Name: Murrumbidgee Council Address 1 PO Box 241 MOAMA, NSW, 2731

Dear Mrs Fitzpatrick,

### **RE: Darlington Point Boat Ramp**

### Brief:

- Undertake a reconnaissance archaeological survey of with a representative(s) of the local Aboriginal community;
- Record any cultural heritage sites identified within the proposed works area and assess their significance;
- Determine the potential impacts of the proposed works on cultural heritage sites;

### Inspection:

The Cultural Heritage assessment was undertaken on the 29th June 2017 by Robert Carroll accompanied by representative Clare Fitzpatrick from Rich River Irrigation Developments. **Results:** 

No cultural material was observed during the survey nor expected to be found within the area to be impacted by this development. The immediate area surrounding the proposed boat ramp and roadway have been impacted by clearing and previous flood protection works This has left the proposed development area surrounded by disturbed landscapes. During the inspection it was noted that the soil was floodplain clay with no sand exposures or elevated areas.

### Assessment:

The location of the proposed development lies on the floodplain or the Murrumbidgee River. Previous studies have shown that this area was used for obtaining resources including food and medicine plants to support communities camped along the major water courses. **Recommendations:** 

- That the proposed development be allowed to proceed without constraint on archaeological and Aboriginal heritage grounds.
- That all contractors be aware of their responsibilities under the NSW National parks and Wildlife Act Section 86 that:



(1) A person must not harm or desecrate an object that the person knows is an Aboriginal object.

And Section 86 Defences that

(1) It is a defence to a prosecution for an offence under section 86 (1), (2) or (4) if (a) the harm or desecration concerned was authorised by an Aboriginal heritage impact permit, and (b) the conditions to which that Aboriginal heritage impact permit was subject were not contravened.

(2) It is a defence to a prosecution for an offence under section 86 (2) if the defendant shows that the defendant exercised due diligence to determine whether the act or omission constituting the alleged offence would harm an Aboriginal object and reasonably determined that no Aboriginal object would be harmed.

### **Opportunities:**

With the increase in use of the area proposed to contain the new boat ramp there could be future opportunities where walking paths and information boards could be placed – similar to that in Deniliquin and other towns. The area to the east of the proposed boat ramp would have been traditionally utilised for obtaining resources and as a camping and cooking area. In line with other educational opportunities such as native vegetation and wildlife.

This area presents a great future opportunity to increase tourism and local knowledge whilst utilising the current boat ramp proposal.

Yours faithfully

Robert Carroll Chief Executive Officer

### **GRIFFITH LOCAL ABORIGINAL LAND COUNCIL** ABN: 79 251 966 502

# **Tax INVOICE**

Attention: Clare Fitzpatrick Client Name: Murrumbidgee Council Address 1 Po Box 241 MOAMA, NSW 2731 INVOICE: 000165 DATE: 26<sup>th</sup> July 2017

DATE	SERVICES PROVIDED FOR	UNIT PRICE	TOTAL
29 <sup>th</sup> June 2017	Robert Carroll - Griffith LALC undertook an Aboriginal Cultural assessment of the immediate area of the proposed Darlington Point boat ramp on the Murrumbidgee River.	2 hours x \$150.00	\$300.00
	20% for Superannuation and Workers Comp		\$60.00
	10% for Griffith LALC Administration		\$30.00
	Mileage @ 65 cents per kilometer x 80 kilometers		\$52.00
	\$442.00		
	\$44.20		
	\$486.20		

### PLEASE SEND PAYMENT TO: 5 WIRADJURI PLACE, GRIFFITH NSW 2680 PO BOX 8043 EAST GRIFFITH NSW 2680

TERMS: 7 DAYS



26 McCulloch Drive PO Box 241 MOAMA NSW 2731 PH: 0354 822 564 FAX: 0354 821 918 Email: admin@rrid.com.au Web: <u>www.rrid.com.au</u>

### STATEMENT OF LIMITATIONS

This report has been prepared for the Murrumbidgee Council for the purpose set out herein. The services performed by Rich River Irrigation developments (RRID) have been conducted with the level of quality and expertise generally associated with activities of this nature by an environmental consulting practice. Responsibility is disclaimed for any loss or damage to Murrumbidgee Council. RRID does not accept any responsibility suffered by any other party whatsoever including, but not limited to, negligence on the part of RRID. This report is for the use of Murrumbidgee Council and its agents. RRID does not intend that any other person accept or rely upon it. This report shall only be presented in full, except where written approvals with comments are provided by RRID. RRID cannot provide warranties or assurances that the contents of this report will be applicable in the future due to potential changes in the condition of the site, other knowledge acquired, applicable legislation or other factors making void any aspect of the report. The information contained in this report is considered to be accurate on the date of issue in accordance with the current conditions of the site. Whilst the report is accurate to the best of our knowledge and belief, RRID cannot guarantee completeness or accuracy of any descriptions or conclusions based on supplied information, including but not limited to, information provided by previous site assessors and data arising from investigations by any other third party.



26 McCulloch Drive PO Box 241 MOAMA NSW 2731 PH: 0354 822 564 FAX: 0354 821 918 Email: admin@rrid.com.au Web: www.rrid.com.au

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**Rich River Irrigation Developments** Statement of Environmental Effects October 2018

59 Murrumbidgee Council Darlington Point Boat Ramp