

APPLICATION ON NOTIFICATION – CATEGORY 3

Applicant:	Whyalla City Council
Development Number:	010/U054/18
Nature of Development:	Redevelopment of the Whyalla Jetty
Type of Development:	Merit
Zone / Policy Area:	Coastal Marina Zone and Mixed Use (Forseshore) Zone – Whyalla Council Development Plan Unzoned land - Land Not Within a Council Area (Coastal Waters) Development Plan
Subject Land:	Allotment 3, DP26088: CT 5931/820
Contact Officer:	Sharon Wyatt
Phone Number:	7109 7132
Start Date:	6 September 2018
Close Date:	20 September 2018
During the notification period, hard copies of the application documentation can be viewed at the Department of Planning, Transport and Infrastructure, Level 5, 50 Flinders St, Adelaide, during normal business hours. Application documentation may also be viewed during normal business hours at the local Council office (if identified on the public notice).	

Written representations must be received by 20 September 2018 and can either be posted, faxed, hand-delivered or emailed to the State Commission Assessment Panel.

Any representations received after the close date will not be considered.

Postal Address:

The Secretary
State Commission Assessment Panel
GPO Box 1815
ADELAIDE SA 5001

Street Address:

Development Division
Department of Planning, Transport and Infrastructure
Level 5, 50 Flinders St
ADELAIDE SA 5000

Email Address:

scapreps@sa.gov.au

Fax Number:

(08) 8303 0753



DEVELOPMENT ACT 1993

CATEGORY 3 PUBLIC NOTICE

NOTICE OF APPLICATION FOR CONSENT TO DEVELOPMENT

Notice is hereby given that an application has been made by the **Whyalla City Council** for consent to demolish the existing public jetty and construct a new jetty and access ramp.

Development Number: 010/U054/18

The new jetty will be situated in approximately the same location, but will extend further into local coastal waters, with a circular walkway in the centre of the structure. Associated works will include the modification of the existing marina enclosure to accommodate the new jetty and access ramp and the incorporation of a shelter and lighting system.

The subject land comprises land covered by water (within the state's coastal waters), existing marina enclosure and adjacent public carpark (Allotment 3, DP26088: CT 5931/820).

The development site is located within the Coastal Marina Zone and Mixed Use (Foreshore) Zone of the Whyalla Council Development Plan (Consolidated 14 June 2017) and unzoned land within the Land Not Within a Council Area (Coastal Waters) Development Plan (Consolidated 12 December 2017).

The application may be examined during normal office hours at the office of the State Commission Assessment Panel, Level 5, 50 Flinders Street, Adelaide and at the office of the Whyalla City Council, 15 Darling Terrace, Whyalla. Application documentation may also be viewed on the SCAP website:
https://www.saplanningcommission.sa.gov.au/scap/public_notices

Any person or body who desires to do so may make representations concerning the application by notice in writing delivered to the Secretary, State Commission Assessment Panel, GPO Box 1815, Adelaide 5001 **NOT LATER THAN 20 September 2018**. Submissions may also be emailed to: scapreps@sa.gov.au

Each person or body making a representation should state the reason for the representation and whether that person or body wishes to be given the opportunity to appear before the Commission to further explain the representation.

Submissions may be made available for public inspection.

Should you wish to discuss the application and the public notification procedure please contact Sharon Wyatt on (08) 7109 7132 or sharon.wyatt@sa.gov.au

Alison Gill

SECRETARY

STATE COMMISSION ASSESSMENT PANEL

PN3026

www.sa.gov.au

**South Australian
DEVELOPMENT ACT, 1993
REPRESENTATION ON APPLICATION – CATEGORY 3**

Applicant:	Whyalla City Council
Development Number:	010/U054/18
Nature of Development:	Demolish the existing public jetty and construct a new jetty and access ramp
Type of development:	Merit - Category 3
Zone / Policy Area:	Coastal Marina Zone and Mixed Use (Foreshore) Zone of the Whyalla Council Development Plan; and unzoned coastal waters (Out of Councils).
Subject Land:	Whyalla Marina, Buttlingarra Way, Whyalla
Contact Officer:	Sharon Wyatt
Phone Number:	7109 7132
Close Date:	20 September 2018

My name: _____

My phone number: _____

PRIMARY METHOD(S) OF CONTACT: Email address: _____

Postal address: _____

Postcode _____

You will be contacted via your nominated PRIMARY METHOD(s) OF CONTACT if you indicate below that you wish to be heard in support of your submission.

My interests are:

☐ owner of local property

☐ occupier of local property

☐ a representative of a company/other organisation affected by the proposal

☐ a private citizen

The address of the property affected is _____ Postcode _____

The specific aspects of the application to which I make comment on are:

I ☐ wish to be heard in support of my submission
☐ do not wish to be heard in support of my submission
(Please tick one)

By ☐ appearing personally
☐ being represented by the following person:
(Please tick one)

Date _____ Signature _____

Return Address: The Secretary, State Commission Assessment Panel, GPO Box 1815, Adelaide SA 5001 or scapreps@sa.gov.au

DEVELOPMENT APPLICATION FORM

PLEASE USE BLOCK LETTERS

COUNCIL: WHYALLA CITY COUNCIL

APPLICANT: WHYALLA CITY COUNCIL

Postal Address: PO BOX 126

WHYALLA SA 5600

Owner: WHYALLA / CROWN

Postal Address: _____

BUILDER: TBA

Postal Address: _____

Licence No: _____

CONTACT PERSON FOR FURTHER INFORMATION

Name: BART SERVAAS

Telephone: 0407 637 757 [work] _____ [Ah]

Fax: _____ [work] _____ [Ah]

EXISTING USE: JETTY (RECREATION)

FOR OFFICE USE

Development No: _____

Previous Development No: _____

Assessment No: _____

- ☐ Complying
- ☐ Non Complying
- ☐ Notification Cat 2
- ☐ Notification Cat 3
- ☐ Referrals/Concurrences
- ☐ DA Commission

Application forwarded to DA

Commission/Council on

/ /

Decision: _____

Type: _____

Date: / /

	Decision required	Fees	Receipt No	Date
Planning:	_____	_____	_____	_____
Building:	_____	_____	_____	_____
Land Division:	_____	_____	_____	_____
Additional:	_____	_____	_____	_____
Development Approval	_____	_____	_____	_____

DESCRIPTION OF PROPOSED DEVELOPMENT: DEMOLITION OF EXISTING JETTY & CONSTRUCTION OF NEW JETTY AND ACCESS RAMP

LOCATION OF PROPOSED DEVELOPMENT: _____

House No: _____ Lot No: 3 Street: _____ Town/Suburb: WHYALLA

Section No [full/part] _____ Hundred: OF RANDEL Volume: CT 5931 Folio: 820

Section No [full/part] _____ Hundred: _____ Volume: _____ Folio: _____

LAND DIVISION:

Site Area [m²] _____ Reserve Area [m²] _____ No of existing allotments _____

Number of additional allotments [excluding road and reserve]: _____ Lease: YES ☐ NO ☐

BUILDING RULES CLASSIFICATION SOUGHT: _____ Present classification: _____

If Class 5,6,78 or 9 classification is sought, state the proposed number of employees: Male: _____ Female: _____

If Class 9a classification is sought, state the number o persons for whom accommodation is provided: _____

If Class 9b classification is sought, state the proposed number of occupants of the various spaces at the premises: _____

DOES EITHER SCHEDULE 21 OR 22 OF THE DEVELOPMENT REGULATIONS 2008 APPLY? YES ☐ NO ☒

HAS THE CONSTRUCTION INDUSTRY TRAINING FUND ACT 2008 LEVY BEEN PAID? YES ☐ NO ☒

DEVELOPMENT COST [do not include any fit-out costs]: \$ 3.8 MILLION

I acknowledge that copies of this application and supporting documentation may be provided to interested persons in accordance with the Development Regulations 2008.

SIGNATURE: BART SERVAAS

Dated: 31 / 07 / 2018

REAL PROPERTY ACT, 1886



The Registrar-General certifies that this Title Register Search displays the records maintained in the Register Book and other notations at the time of searching.



Certificate of Title - Volume 5931 Folio 820

Parent Title(s) CR 5752/733
Creating Dealing(s) RLG 10058065
Title Issued 09/12/2004 Edition 1 Edition Issued 09/12/2004

Estate Type

FEE SIMPLE

Registered Proprietor

THE CORPORATION OF THE CITY OF WHYALLA
OF PO BOX 126 WHYALLA SA 5600

Description of Land

ALLOTMENT 3 DEPOSITED PLAN 26088
IN THE AREA NAMED WHYALLA
OUT OF HUNDREDS (WHYALLA) AND HUNDRED OF RANDELL

Easements

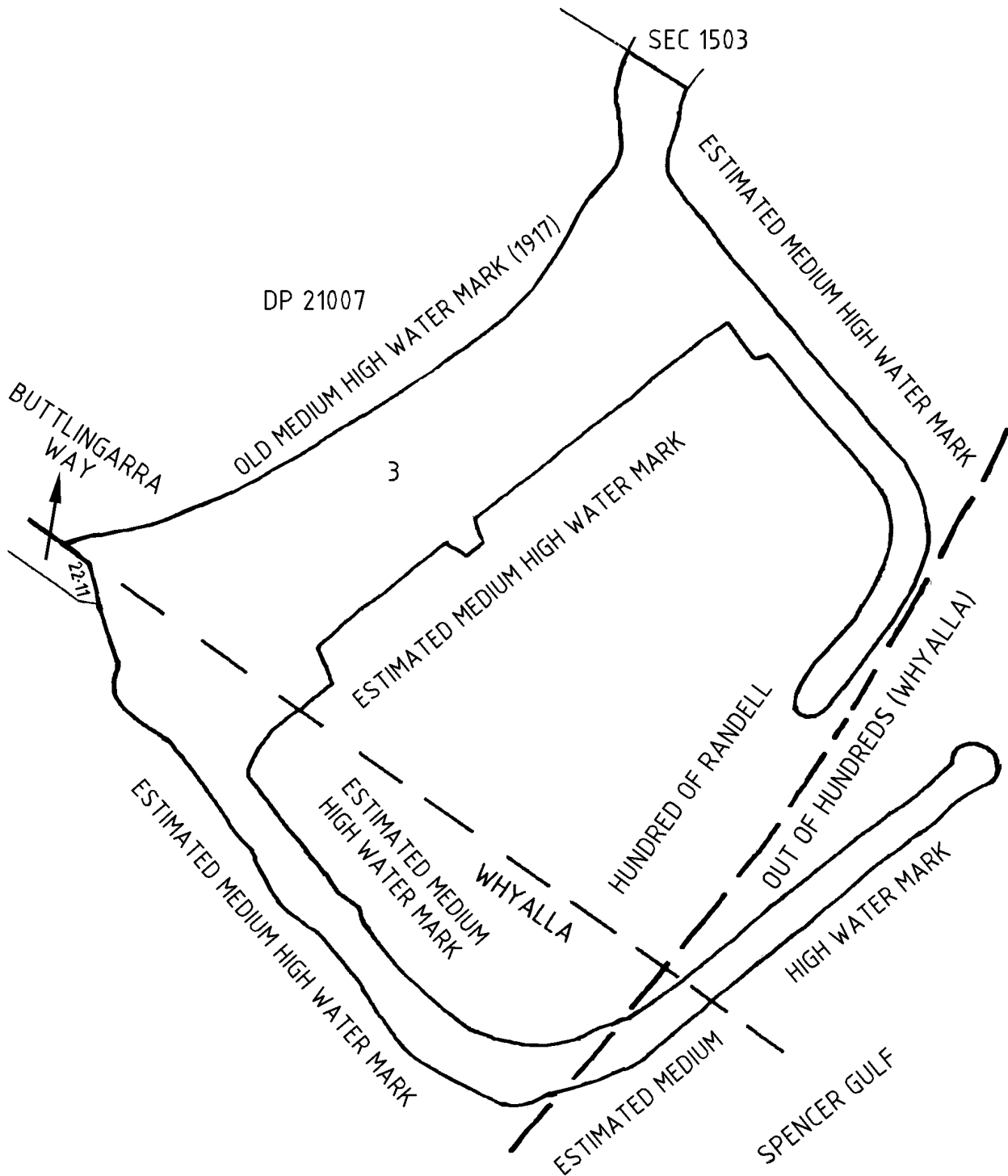
NIL

Schedule of Dealings

NIL

Notations

Dealings Affecting Title	NIL
Priority Notices	NIL
Notations on Plan	NIL
Registrar-General's Notes	NIL
Administrative Interests	NIL



DP 26088

THIS IS SHEET 1 OF 2 SHEETS

DEPOSITED 19/7/1989
ACCEPTED FOR FILING 19/7/1989
MAP REF. 6431 - IV. DEV. No. PRO REGISTRAR GENERAL

TITLE SYSTEM CROWN LANDS

TITLE REFERENCE

O.B. / LAST PLAN REF. DP 21007 TOTAL AREA

DOCKET No. SD 9076 DL 4622 / 88

FIELD BOOK No. 3656 PP 20-22.

CLOSURE CHECKED PLAN M.M.D. PLAN APPROVED P.M.S. APPROVED
A.W. 12-7-89 9/6/89
PRO SURVEYOR GENERAL

IRREGULAR AREA

HUNDRED OF RANDELL AND OUT OF HUNDREDS.

AREA NAME WHYALLA

COUNCIL CORPORATION OF THE CITY OF WHYALLA

PLAN

DIVISION OF UNALLOTTED CROWN LANDS
IN THE HUNDRED OF RANDELL AND OUT
OF HUNDREDS.

SCALE 0 50 100 150 200 250 METRES

STATEMENTS CONCERNING EASEMENTS ANNOTATIONS
AND AMENDMENTSOLD MEDIUM HIGH WATER MARK PLOTTED
FROM DIAGRAM BOOK PAGE 10.OLD LOW WATER MARK PLOTTED FROM
DIAGRAM BOOK PAGE 9.

NO OCCUPATION UNLESS OTHERWISE SHOWN.

ADDITION OF AREA NAME AND BOUNDARY ~
VIDE DKT. 69/2004
SV PRO R.G. 19/10/2004

ALL DISTANCES ARE GROUND DISTANCES

COMBINED SCALE FACTOR 1:00032 ZONE 53 AMG 84
BEARING DATUM 236° 49' 16" DISTANCE 12175.85
DERIVED FROM TRIG. 6431/1197 - TRIG. 6331/1047

I. ROBERT JOHN MCMURTRIE

Licensed Surveyor of South Australia do hereby certify:
1) That this plan has been made from surveys executed
by me or under my personal supervision,
2) that the field work was completed on
the 14th day of APRIL 1989
3) that both plan and field work are to the best of my
knowledge correct and have been made in accordance
with the Regulations under the Surveyors Act 1975

Date 22.5.1989

Licensed Surveyor R.J. McMurtrie

REFERENCE MARKS

CNR	BEARING	FROM	DIST.	PSM NUMBER
1	—	PMFD	—	6431 / 2785
2	—	RAMFD	—	—
3	—	PMFD	—	6431 / 2613
4	31° 30'	MPFD	0.07	—
5	102° 05'	PMFD	0.78	6431 / 2796
6	—	MPFD	—	—
7	—	PMFD	—	6431 / 2797
8	121° 31'	MPFD	0.55	—
9	121° 31'	MPFD	0.39	—
10	33° 15'	MPFD	1.33	—
11	—	PMFD	—	6431 / 2560
12	228° 35'	MP	10.19	—
13	—	MP	—	—
14	230° 25'	PM	1.05	6431 / 1597
15	—	MP	—	—
16	—	MP	—	—
17	—	MP	—	—
18	—	RAM	—	—
19	—	RAM	—	—
20	—	MP	—	—
21	—	MP	—	—
22	—	MP	—	—

SURVEY OPERATIONS BRANCH
S.A. DEPARTMENT OF LANDS

LEGEND	
NETWORK PSM	FD
NETWORK STATION	FD
PERMANENT SURVEY MARK	FD
REFERENCE MARKS	FD OR RM
DIRECTION CHANGE	SPK FD
PART DISTANCES	BT GONE
CALCULATED DATA	—
COPIED DATA	—





Whyalla City Council

Whyalla Jetty Redevelopment Environmental Assessment Report

August 2018

Executive summary

The Whyalla Jetty is located on the western shore of the Upper Spencer Gulf, South Australia. Originally built in the mid-1970s, the Whyalla Jetty is now in a state of disrepair, such that Whyalla City Council (Council) have identified that redevelopment of the jetty is appropriate.

After extensive deliberation inclusive of community consultation, Council have completed detailed design of the new jetty (Magryn Consulting Engineers). Once constructed the jetty will extend 165 m offshore, featuring a 145 m circular walkway, and will support various recreational activities.

As part of their commitment to sustainable coastal development, Council have undertaken an Environmental Assessment of the proposed works. The Environmental Assessment Report (this document) will be used to support project approvals including the development application seeking State Government endorsement, and includes the following elements:

- Description of the existing environment in the location of the proposed development
- Assessment of potential impacts to the existing environment
- Assessment of potential impacts to local traffic
- Preparation of a draft Construction and Environmental Management Plan (CEMP)

The outcome of the environmental assessment is that the majority of environmental impacts will occur during the construction phase of the proposed development and that:

- Traffic and transport related impacts will be negligible;
- Potential environmental impacts during construction include:
 - Disturbance of the seabed and existing pylon biofouling communities
 - Noise pollution from pile driving and rock placement activities
 - Artificial light emissions
 - Atmospheric emissions from activities
 - Interference with other users of the area affected by construction activities
- Other impacts from unplanned events may also arise from the project activities. The risks to the environment from these activities are:
 - Pest introduction and proliferation
 - Accidental release of solid waste
 - Marine fauna collisions
 - Hydrocarbon, chemicals and other liquid waste
 - Damaged fuel tank associated with vessel collision
- Management controls and mitigation measures are available to reduce or eliminate the impact of the above to acceptable levels. These are outlined within the draft CEMP.

With the implementation of the identified management controls and mitigation measures, risks to the receiving environment have been eliminated or reduced to as low as reasonably practical. Any impacts that do occur as a result of the proposed activities are expected to be localised to the immediate area, and be of a short duration.

This report is subject to, and must be read in conjunction with, the limitations, assumptions and qualifications contained throughout the Report.

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This report has been prepared by GHD for Whyalla City Council and may only be used and relied on by Whyalla City Council for the purpose agreed between GHD and the Whyalla City Council as set out in section 1.1 and 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than Whyalla City Council arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Whyalla City Council and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

1. Introduction

1.1 Background

The Whyalla Jetty is located on the western shore of the Upper Spencer Gulf, South Australia (Figure 1). Originally built in the mid-1970s, the Whyalla Jetty is now in a state of disrepair, such that Whyalla City Council (Council) have identified that redevelopment of the jetty is appropriate.

After extensive deliberation inclusive of community consultation, Council have completed detailed design of the new jetty. Once constructed the jetty will extend 165 m offshore, featuring a 145 m circular walkway (Plate 1, Appendix A), and will support various recreational activities.

As part of their commitment to sustainable coastal development, Council need to undertake an Environmental Assessment of the proposed works. The Environmental Assessment Report (this document) will be used to support project approvals including the development application seeking State Government endorsement.



Plate 1 Jetty conceptual illustration (Oxygen, 2018)

1.2 Project scope

GHD have been engaged by Council to develop an Environmental Assessment Report which includes the following elements:

1. Description of the existing environment in the location of the proposed development
2. Assessment of potential impacts to the existing environment
3. Assessment of potential impacts to local traffic
4. Preparation of a draft Construction and Environmental Management Plan (CEMP)

Although not part of GHD's scope, Council have requested that, for completeness, this report contains Development Plan considerations prepared by Development Answers, who has been independently engaged by Council. This information is included in Section 4. GHD has not been involved in the preparation of this material and has had no contribution to, or review of the content, and therefore, GHD shall not be liable to any person for any error in, omission from, or false or misleading statement contained within this section of the report.

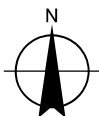


Paper Size ISO A4

0 100 200 300

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 53



Whyalla City Council
Whyalla Jetty Redevelopment
Environmental Assessment

Project No. **33-18899**
Revision No. **A**
Date **19/07/2018**

PROJECT LOCALITY

FIGURE 1

1.3 Project approach

A two-phased approach was implemented for the impact assessment. This comprised:

1. The identification of existing conditions and environmental values relevant to the proposed redevelopment, using a combined approach of desktop review of relevant primary and secondary information sources, a site visit and consultation with Council
2. An assessment of potential environmental and traffic impacts of the proposed activities.

The draft CEMP was developed based on the outcomes of the marine and traffic impact assessments.

2. Environmental assessment

2.1 Existing environment

This section notes the types of environmental conditions, and supported biodiversity that are of relevance to the existing jetty infrastructure and adjacent habitats. This information is used to inform what types of impacts could be realised from the proposed redevelopment, described by Section 2.2.

The existing jetty infrastructure is proposed to be replaced. Currently, the steel superstructure lands onto an artificial rocky revetment breakwater with land side infrastructure including car parking, roadway access and marina facilities. Intent for redevelopment is to utilise the existing landing site and upgrade infrastructure. As such, description of the environment addresses the marine and coastal areas as those are the potentially undisturbed values that could be affected by the redevelopment.

2.1.1 Physical Environment

The Spencer Gulf is a unique marine embayment, supporting several highly productive marine habitats (BHP 2009). The Spencer Gulf indents the south eastern coast of South Australia between the Eyre and Yorke peninsulas (BHP 2009). From the southern reaches of the gulf, the embayment gradually becomes narrow and shallow towards the northern reaches. The waters in the Upper Spencer Gulf are relatively warm and high salinity, as this region experiences high temperatures, low rainfall and runoff, and high rates of evaporation (BHP 2009).

The tidal regime in the Northern Spencer Gulf is unique. At spring tide, the tidal range reaches a maximum height of 4 m at Port Augusta and 3 m at Whyalla. During neap tides, all tidal movements stop for two to three days at 0 m tidal range (Harvey, Clouston and Carvalho 1995).

The majority of the subtidal zone between 10 to 25 m in the Upper Spencer Gulf consists of unvegetated soft sediment. In the shallow subtidal zone (0-10 m) seagrass meadows are prevalent (Gostin, Hails and Belperio 1984; PIRSA 2014). The intertidal zone supports mixed areas of bare sand flats, intertidal seagrasses, dense mangroves and samphire communities. Algal mats occur extensively amongst the samphires and extending into the mangroves (Gostin, Hails and Belperio 1984). More detail regarding these communities is provided following.

2.1.2 State Protected Areas

The Whyalla Jetty project area is not located within any state protected areas (Figure 2) however the waters immediately north are designated as being a part of the Upper Spencer Gulf Marine Park (USGMP). On the western side of Spencer Gulf, this marine park boundary commences north of a line from the southern end of the Whyalla-Cowleds Landing Aquatic Reserve. It extends to Jarrold Point on the eastern shore and includes the uppermost reaches of Spencer Gulf extending north of Port Augusta. Areas of Whyalla (including the project area), Port Bonython, and the port of Port Pirie are excluded from the marine park (DEWNR 2012).

A number of sanctuary zones, habitat protection zones, special purpose areas (identified under section the Marine Parks Act 2007) and Aquatic Reserves (identified under the Fisheries Act 2007), exist within the Upper Spencer Gulf (Figure 2). The nearest to the Whyalla Jetty project area is the Whyalla-Cowleds Landing Aquatic Reserve (approximately 5 km to the south) which was declared to protect the samphire, mangrove and seagrass communities, and associated fish nursey areas (PIRSA 2007) (Figure 2).

The USGMP also includes a number of other protected areas including Blanche Harbour-Douglas Bank (approximately 33 km north of Whyalla jetty development) and Yatala Harbour (approximately 42 km north of Whyalla jetty development) and overlays part of Winninowie Conservation Park (DEW 2009) (Figure 2).

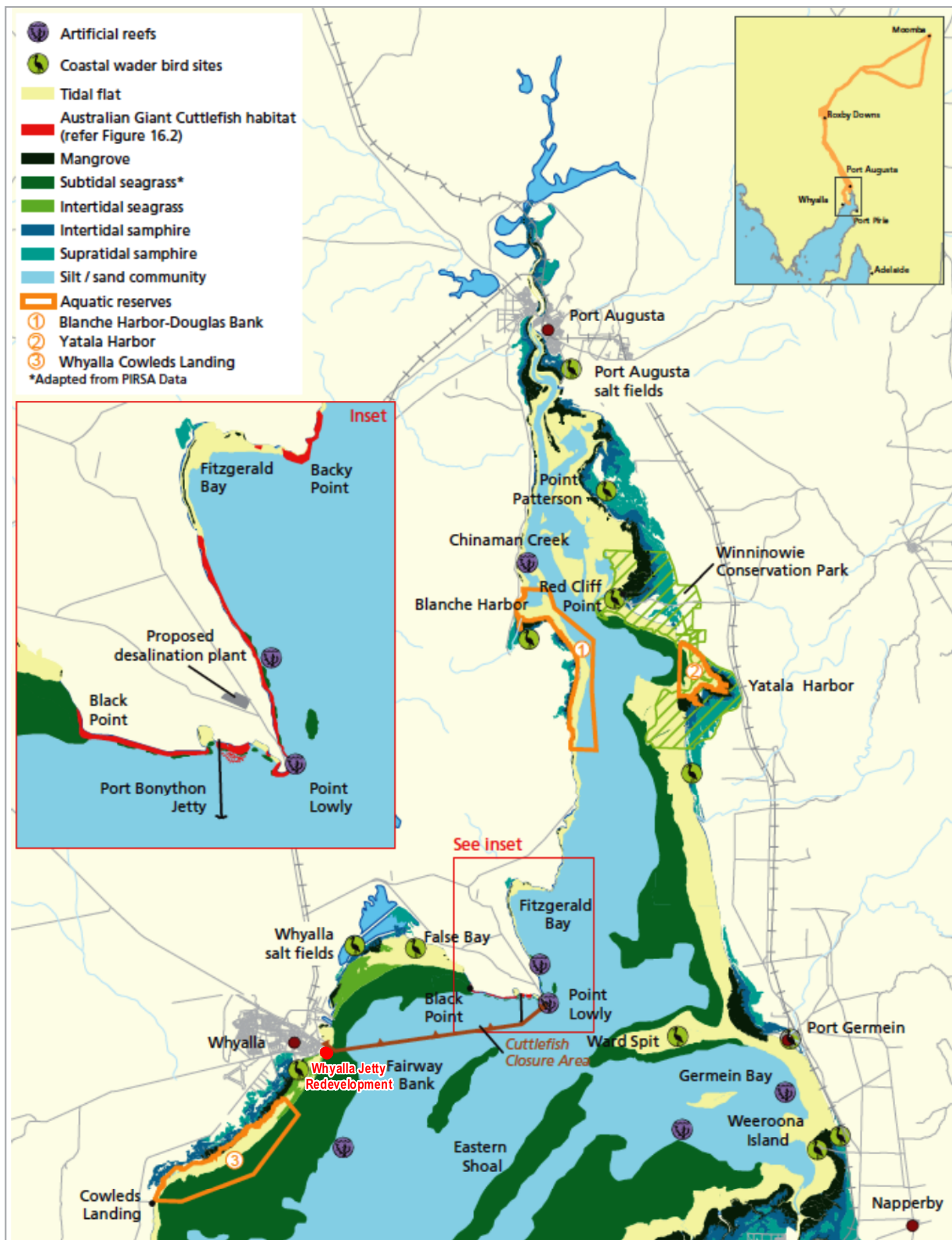


Figure 2 Marine Habitat and Protected Areas (reproduced from BHP, 2009)

2.1.3 Marine habitats

Seagrasses

Seagrass meadows are known to be abundant in shallow subtidal and lower intertidal regions of the Gulf (BHP 2009), and it is likely there are patches of seagrass within the vicinity of the Whyalla jetty development. Seagrass species in this region are dominated by eelgrass (*Heterozostera nigricalis*) and garweed (*Zostera mucronata*) in the intertidal zone, and tapeweeds (*Posidonia australis* and *Posidonia sinuosa*), wireweed (*Amphibolis antarctica*) and paddleweed (*Halophila ovalis*) in the subtidal zone (BHP 2009; DENR 2010). In False Bay, north of Whyalla, tapeweed meadows are known to occur extensively in shallow waters (BHP 2009).

Seagrass communities are recognised as important ecosystems as they provide breeding and nursery areas for fish and crustacean species. They are also recognised as important habitat for species of Syngnathids. Shallow seagrass meadows are highly productive and support many commercial fish species for all or part of their lifecycle, including juvenile King George Whiting (*Sillaginoides punctatus*) and Garfish (*Hyporhamphus melanochir*) (BHP 2009). The razorfish (*Pinna bicolor*) also occur commonly in or near these seagrass communities in high densities (BHP 2009).

Biofouling community

The existing jetty infrastructure support diverse biofouling communities. Biogenic habitat is formed by large bivalves, macroalgae, sponges, and ascidians attached directly to the pylons and surrounding tyres. This biogenic habitat provides either refugia or food sources for a number of fish species and invertebrates including crustaceans, echinoderms and molluscs. Species associated with the jetty infrastructure are comparable to those found on nearby shallow reefs (addressed in more detail following).

Rocky reef

Rocky reefs in the northern reaches of the gulf are generally sparse. However, shallow reef communities (to 6 m depth) are relatively common along the west coast, supporting a wide diversity of marine flora and fauna. These are largely dominated by macroalgal beds but also support a variety of sponges, corals, echinoderms, crustaceans and molluscs (BHP, 2009; DENR 2010). Macroalgal canopy-forming species in this region are dominated by *Cystophora polycystidea*, *Sargassum spinuligerum*, *Caulocystis* spp. and *Scaberia agardhii* (corkweed), and understorey macroalgal species comprising of brown algae (*Zonaria* sp.) and red algae (*Gigartina brachiata*, *Asparagopsis taxiformis* and *Laurencia* spp.) (BHP 2009).

Much of this rocky reef habitat has potential to also support conservation significant species such as the Australian giant cuttlefish (*Sepia apama*) (BHP 2009); this is addressed in more detail following.

Mangroves and samphire

Mangrove communities, principally comprised of the grey or white mangrove (*Avicennia marina*), fringe tidal creeks and intertidal mudflats in the northern and western reaches of the Upper Spencer Gulf (BHP 2009). Adjoining the mangrove woodlands, samphire communities of *Tecticornis* spp. typically dominate the supratidal zone in sheltered regions (BHP 2009).

Collectively, these mangrove and samphire communities provide important ecological services as they protect coastlines and intertidal systems from erosion and coastal process impacts (SWP 2011). They also provide breeding grounds and nurseries during early life stages for some commercially and recreationally important fish and crustacean species. Commercial

species of relevance include the western king prawn (*Melicertus latisulcatus*), King George whiting (*Sillaginodes punctatus*) and yellowfin whiting (*Sillago schomburgkii*).

Locally important and internationally recognised avifauna utilise mangroves and the interspersed sand and mud flat areas adjacent as important feeding and roosting areas (Baker 2015). Shorebirds are addressed in more detail in 2.1.4.

2.1.4 Marine fauna

Australian giant cuttlefish

The Australian giant cuttlefish (*Sepia apama*) is the largest of all the cuttlefish in the world, with males reaching 1 m in length (Gales *et al.* 1993). The species is endemic to southern coastal waters of Australia, and occurs across temperate waters from southern Queensland to the west coast of Western Australia (BHP 2009).

In the Upper Spencer Gulf, thousands of Australian giant cuttlefish congregate to a narrow strip of rocky reef between Whyalla and Point Lowly in water depths of 2 to 5 metres (BHP 2009). This rocky reef consists of broken slabs of old seafloor sandstone providing a suitable hard surface for females to attach their eggs on the undersides of the flat rocks (BHP 2009).

During breeding season, cuttlefish arrive at Whyalla and Point Lowly in early May, with peak spawning period occurring in June. The species has been known to continue mating and spawning activities through to September (BHP 2009; Steer 2015). The migratory route to the breeding grounds, between Whyalla and Point Lowly, is not completely understood (BHP 2009). However, they are likely to migrate through areas with lower light and across seagrass meadows adjacent to deep waters (Steer and Hall 2005).

Sharks

A variety of sharks can be found in the waters of the Upper Spencer Gulf, including the white shark (*Carcharodon carcharias*), dusky whaler (*Carcharhinus obscurus*), bronze whaler (*Carcharhinus brachyurus*), thresher shark (*Alopias vulpinus*) and hammerheads (BHP 2009; DENR 2010).

The white shark, listed as Vulnerable and migratory under the *Commonwealth Environment Protection and Biodiversity Conservation (EPBC) Act 1999*, is distributed predominantly throughout temperate Australia, with individuals known to undertake migrations into sub-tropical and tropical waters (Bruce *et al.* 2008; DEW 2013). Known aggregations occur in nearshore waters of South Australia, the most well-known of these occurs around sea lion and fur seal colonies such as Neptune Island and the Goolwa region (DoEE 2018). The white shark is also known to seasonally visit regions in the Upper Spencer Gulf including channels off Whyalla and Point Lowly, and deep waters to predate on snapper (DENR 2010).

The bronze whaler and hammerhead typically occur seasonally in the Upper Spencer Gulf where they are known to feed on schools of fish in deep channels (DENR 2010).

Marine reptiles

Nationally threatened marine reptile species, including the loggerhead turtle (*Caretta caretta*) and green turtle (*Chelonia mydas*) have been observed seasonally in the Upper Spencer Gulf (BHP 2009). The loggerhead turtle is widely distributed throughout Australian coastal and offshore zones (DoEE 2018). Nesting sites for the species occur throughout northern Australia from southern Queensland through to Shark Bay in WA (Limpus 2008). Loggerhead turtles primarily feed on benthic invertebrates in habitats, including rocky reef outcrops, macroalgal beds, seagrass beds and inshore embayments (DoEE 2018).

Green turtles are distributed throughout the Australian coastal warm temperate to tropical seas (DoEE 2018). Nesting grounds are not known to occur in South Australia, they typically nest throughout northern Australia.

The leatherback turtle (*Dermochelys coriacea*), listed as Endangered under the *EPBC Act 1999* has been observed in southern Spencer Gulf (BHP 2009). Leatherback turtles are circum-globally distributed in warm temperate to tropical seas, primarily feeding on jellyfish and other soft-bodied invertebrates (DoEE 2018).

Sea turtles that occur within the Upper Spencer Gulf are not known to breed or nest within the region (MLSSA 2017).

Marine mammals

The Australian sea lion (*Neophoca cinerea*), listed as Vulnerable under the *EPBC Act 1999* and *State National Parks and Wildlife (NPW) Act 1972* is endemic to Australia with breeding ranges extending from Houtman Abrolhos in Western Australia to The Pages Island, east of Kangaroo Island, in South Australia (Ling 1992). They use a wide variety of onshore habitats for breeding sites and haul-out sites (rest stops), including exposed islands and reefs, rocky terrain, sandy beaches, vegetated fore dunes and swales (Gales *et al.* 1994; Dennis and Shaughnessy 1996, 1999). The nearest known sea lion site (a haul out site) is Point Gibbon, approximately 113 km south of the proposed development. Australian sea lions are also known to seasonally visit the upper Spencer Gulf, where they feed on fish and cephalopods (DENR 2010).

Some whale species are known to occasionally visit the upper Spencer Gulf, including the humpback whale (*Megaptera novaeangliae*), Bryde's whale (*Balaenoptera edeni*), strap-toothed whale (*Mesoplodon layardii*), pygmy sperm whale (*Kogia breviceps*) and southern right whale (*Eubalaena australis*) (Bryars *et al.* 2016; DENR 2010).

The southern right whale, listed as Endangered under the *EPBC Act 1999* and Vulnerable under the *NPW Act 1972*, is commonly found around the southern coastline off southern Western Australia and far western South Australia but also Tasmania (Bannister 1990; Burnell and McKenna 1996; Warneke 1989). The closest known major calving area is in South Australia at Head of Bight. Smaller numbers of calving females are regularly seen at Encounter Bay, Sleaford Bay and Fowlers Bay (Bannister 2001; Burnell and McKenna 1996). From the foraging grounds in the southern ocean, southern right whales are often sighted in southern Spencer Gulf between May and November (Gillanders *et al.* 2013). During the winter, individuals and small groups of southern right whales are known to occur in the northern regions of the Gulf (DENR 2010). They are not likely to occur in the very shallow waters adjacent the existing jetty.

Upper Spencer Gulf is known to provide suitable habitat for a couple of dolphin species, including the common dolphin (*Delphinus delphis*) and bottlenose dolphin (*Tursiops truncatus*) (Bryars *et al.* 2016; DENR 2010). The bottlenose dolphin has been recorded in several regions in the upper Spencer Gulf, and is known to visit the mouth of Chinaman Creek (DENR 2010), approximately 46 km north of Whyalla.

Migratory and local shorebirds

Upper Spencer Gulf is one of the most important sites in South Australia for migratory and local shorebirds, and is nationally and internationally important for several species (Watkins 1993). The most important shorebird sites in the Upper Spencer Gulf occur along the east coast between Point Jarrold and Red Cliff Point, and at the saltfields at Port Augusta and Whyalla (BHP 2009). The nearest significant site to the Whyalla jetty development is the Whyalla Saltfield, which is approximately 9 km to the north.

Large numbers of shorebirds migrate from the Northern Hemisphere after breeding season and arrive at sites in the summer period between January and February. During the winter, a proportion of young birds remain (BHP 2009). At high tide, most shorebird species roost on islands, spits and saltfields, and on intertidal mudflats. At low tide, they feed on invertebrates within the substrate along sandflats (BHP 2009).

Significant shorebird breeding colonies occur in the Upper Spencer Gulf and extend 60 km south to Cowell and Wallaroo. These include several large colonies of the pied cormorant (*Phalacrocorax varius*) with the little pied cormorant (*Phalacrocorax melanoleucos*) and great egret (*Ardea alba*). These breeding colonies occur in mangrove woodlands at several sites in Port Pirie and along Chinaman Creek at Red Cliff Point (BHP 2009). Ward Spit, located 30 km east of Whyalla, also supports nesting colonies of terns (great tern *Sterna bergii*, caspian tern *Sterna caspia* and fairy tern *Sterna nereis*) and silver gulls (*Larus novaehollandiae*) (BHP 2009).

The cormorants and terns feed on small fish as well as crustaceans in open water and tidal channels, and great egrets feed in the shallow water on a range of aquatic vertebrates and invertebrates within the substrate (Birdlife Australia 2018).

Syngnathids

Seagrass meadows, algal stands among rocky reefs and seaweed beds in the Upper Spencer Gulf provide important habitat for several species of syngnathids. These include the spotted pipefish located in False Bay, 11 km north of Whyalla and the pugnose pipefish located near Port Pirie (DEW 2009), 40 km east of Whyalla. These areas also provide a habitat for seahorses and seadragons, including the leafy seadragon (DoF 2011). In conjunction with occurring within rocky reef and meadow areas, syngnathids are also known to reside around man-made structures, such as jetties close to shore (AFMA 2010). There is high potential the existing jetty supports habitat for, and individuals of, these faunal groups.

Fisheries resource

A number of commercially and recreationally important fisheries occur in the Upper Spencer Gulf (BHP, 2009). Commercial fishing is predominantly productive in the area between Whyalla and Port Pirie, with over 6,000 tonnes of catch caught annually (Wolanski 2013).

The following key fish species are caught in or near shallow seagrass meadows and mangroves as they depend on these habitats during various life history stages (BHP 2009):

- Australian herring (*Arripis georgianus*);
- Australian salmon (*Arripis truttacea*);
- Blue swimmer crab (*Portunus pelagicus*);
- Garfish (*Hyporhamphus melanochir*);
- King George whiting (*Sillaginodes punctatus*);
- Western king prawn (*Melicertus latisulcatus*);
- Snapper (*Pagrus auratus*);
- Snook (*Sphyraena novaehollandiae*);
- Southern calamary (*Sepioteuthis australis*);
- Yellow-eye mullet (*Aldrichetta forsteri*); and
- Yellowfin whiting (*Sillago schomburgkii*).

Seagrass meadows are located at False Bay (11 km north of Whyalla) and have been highlighted as important nursery areas for juvenile species including the Western king prawn

and blue swimmer crab before they migrate into deeper waters as adults (BHP 2009; DEW 2009).

2.1.5 Introduced marine species

Introduced marine species are known to occur in the Upper Spencer Gulf. These include the European fan worm (*Sabella spallanzanii*), pearl oyster (*Pinctada albina sugillata*) and slime featherduster worm (*Myxicola infundibulum*) (BHP 2009; PIRSA 2018). A survey completed in 2016 confirmed three invasive species were found immediately adjacent the jetty: the European fan worm, vase tunicate (*Ciona intestinalis*) and European clam (*Corbula gigga*) (Wiltshire *et al.* 2017). The findings of that assessment indicated that the Spencer Gulf and Gulf of St Vincent were regarded as 'same-risk' for domestic ballast water controls given they support equivalent levels/species of pests of concern.

2.2 Impact assessment

2.2.1 Assessment approach

This section provides information regarding potential environmental risks that may occur in relation to the construction of the proposed Whyalla Jetty redevelopment, in conjunction with relevant management controls for those risks. Information presented in Section 2.1 informs which environmental features may be at risk from project activities. To complete this risk assessment the following process has been adopted:

- Describe which project activities have potential to harm which environmental features and why (hazard identification)
- Describe the consequences of the potential impact being realised
- Identify relevant management controls to reduce or eliminate the potential environmental risk
- Discuss overall environmental outcomes.

Environmental hazard identification

The redevelopment of the Whyalla Jetty has an estimated duration of 25 weeks and will include the removal of the existing structure and installation of 102 pylons and jetty walkway infrastructure. Construction will be undertaken during daylight hours only (7 am – 6 pm), six days a week. The total design footprint for the Jetty and associated walkway infrastructure is 1,860 m². The redeveloped jetty has been designed with a deck level of 5.9 m above AHD, which is approximately 2 m greater than the minimum levels prescribed in the Development Plan to manage sea level rise.

The detailed construction methodology will be determined by the contractor engaged for the project, however the construction of the jetty is likely to be vessel based, with the fleet comprising two work barges, one with spuds and one without, and two supporting tenders. These vessels will all be locally sourced and will be restricted to a 4 knot speed limit in the vicinity of the project area. Construction of the ramp will be shore based, with works taking place on the existing breakwater. Works will include the placement of additional rocks on the breakwater. Equipment required to support construction works will include a pile driver and 16 tonne crane (barge based) and a front end loader, 8 tonne crane and 50 tonne backacter (land based).

The existing structure will be removed entirely from the project area; pylons will be cut at seabed level and the retrieved material will be transported to the contractor's home port, prior to disposal at an appropriate licenced facility.

The 102 pylons (450 mm diameter) required to support the new jetty infrastructure will be driven into the seabed from the spud barge using a two tonne hydraulic hammer with a 2 m drop. This component of the project is expected to take 25 days to complete.

As identified in Section 2.1, the project area is located in proximity to a range of marine habitats; accordingly the jetty redevelopment has the potential to harm these environments. The methods used during construction that have the potential to harm the environment will be:

- Disturbance of the seabed and existing pylon biofouling communities
- Noise pollution from pile driving and rock placement activities
- Artificial light emissions
- Atmospheric emissions from activities
- Interference with other users of the area affected by construction activities

Other impacts from unplanned events may also arise from the project activities. The risks to the environment from these activities are:

- Pest introduction and proliferation
- Accidental release of solid waste
- Marine fauna collisions
- Hydrocarbon, chemicals and other liquid waste
- Damaged fuel tank associated with vessel collision

Impact analysis

Impact analysis for each identified hazard is conducted in a systematic manner following the general process of:

- Identifying the key concerns
- Consideration of sensitive environmental features potentially affected either directly or indirectly by the activities
- Where practicable, quantification of the magnitude of the stressor, the concentration of contaminant and/or level of disturbance
- Consideration of timing, duration and other factors affecting the impact and risk (water depth, temperature, tides etc.)
- Consideration of cumulative impacts.

The impact analysis is undertaken for environmental values and protected matters identified, as detailed in Section 2.1.

It is considered that within the natural environment, some aspects have a higher value than others, and these aspects, or sensitive receptors, have been specifically considered when determining the overall environmental consequence of an impact. In determining consequence, the potential presence of the following environmental receptors has been considered:

- Benthic primary producer habitats
- Habitats that are rare or unique
- Conservation significant species and ecological communities
- State Protected Areas
- Marine Conservation Reserves.

The following section addresses potential impacts from planned activities. Following that, potential impacts from unplanned activities are considered.

2.2.2 Planned activities

Seabed and pylon biofouling community disturbance

Environmental hazard description

Disturbance to the seabed and benthic habitats may occur during the following planned activities:

- Removal of the existing jetty infrastructure
- Pile driving
- Placement/anchoring of construction vessels.

Impact analysis

Removal of the jetty infrastructure will include the cutting of existing pylons at seabed level and subsequent removal by crane. New pylons with a diameter of 450 mm will be driven, and works will require anchoring and deployment of barge spuds.

Each of these activities is expected to directly disturb a small area of seabed where the activity is occurring. Mobile fauna within the area of disturbance have potential to be temporarily displaced from the area; however, any benthic species in the direct path of activity will be directly affected by activities. This may include small, slow moving fishes like Syngnathids. Impacts may occur from direct removal from the environment (as biofouling on piles), collision with equipment, burial, or from sediment suspension affecting filter feeding (UNEP, 2007; Söker *et al.*, 2000).

Infauna, seagrasses, algae or other species associated with the seabed that are directly removed/lost from the area during construction are expected to recolonise the area relatively rapidly. Migration and recolonization into the disturbed footprint from adjacent soft sediment environments will begin immediately following construction and occur over subsequent weeks and months.

The removal of the existing infrastructure will also include the removal of the biofouling communities associated with the jetty infrastructure (refer Section 0). This will also lead to temporary loss of biodiversity from the project footprint, and the likely avoidance of/displacement from the area by associated mobile fauna. Slow moving or semi-sedentary mobile fauna may suffer mortality if located on piles at the time of removal. Recolonisation of the new pylons is expected to commence following installation, with an established mobile community expected to be associated with the pylons within months (Hamer and Mills, 2015). The biofouling community will undergo a recruitment succession process that is likely to take months to years to achieve the same level of mature state supported by the current jetty infrastructure. The assemblages that occur on that infrastructure are, however, represented on rocky reefs and other subtidal hard substrates in the local area.

Extending of the jetty offshore also has the potential to alter the local hydrodynamics around the jetty, potentially influencing areas of sediment erosion and deposition. Initial desktop assessment of the hydrodynamics based on published information and air photos indicates that, for the type of jetty proposed, any changes to waves, currents and sediment transport are likely to be insignificant.

Piling activities has potential to generate turbid plumes, however these effects are expected to be localised to the immediate jetty area and impacts downstream are unlikely. Due to the sandy

nature of the bed material, local currents, and small disturbance areas of individual pylons, any sediment generated during works is predicted to settle out rapidly with little impact.

Management controls

To reduce or eliminate the impact of seabed and pylon biofouling community disturbance, a number of management controls can be implemented:

- Works to remove the pylons will commence after a visual inspection for protected mobile fauna (e.g. syngnathids). If present these will be relocated to adjacent habitats, outside the zone of influence by the proposed works, where feasible.
- Placement of new pylons will be clearly mapped to avoid disturbance of areas outside the immediate project footprint.
- Extensive planning of vessel placement will be implemented to minimise the number of spud deployments required.

Environmental outcome

The activities associated with the jetty redevelopment will disturb the seabed and pylon biofouling communities within an area of up to 1860 m² with the actual disturbance footprint expected to be a significantly smaller portion of this area.

The jetty redevelopment activities will occur in/over benthic habitats that are widely represented at both a local and a regional scale. Once the jetty has been constructed, further disturbance or damage to soft sediment habitats and benthic communities is not anticipated. Changes to local hydrodynamics as a result of the jetty redevelopment are likely to be insignificant.

The environmental risks associated with planned seabed disturbance will be limited to the immediate surrounds of the jetty, and are expected to be short term in nature, with low risk on existing species with the implementation of the nominated management controls. As such risks associated with planned seabed disturbance are considered to be acceptable and as low as reasonably practical.

Artificial noise emissions

Environmental hazard description

Artificial noise emissions may occur during the following planned activities:

- Vessel and plant movements
- Placement of additional rocks on the breakwater
- Pile removal and driving.

Disturbance to marine and avifauna from above ground and underwater noise may occur in response to noise generated by these activities.

Impact analysis

The activities associated with the jetty refurbishment will generate standard shipping noise associated with vessel movements between port environments. Additional rocks will be placed on the breakwater above the water line, which is expected to generate both above ground and underwater noise. Existing piles will be cut at the seabed and extracted from the environment, placed onto the Contractor's vessel and disposed of on land, generating both underwater and above ground noise. Steel pylons will be driven up to 10 m into the seabed using a two tonne hydraulic hammer with a 2 m drop. Pile driving is expected to take 25 days to complete.

These construction activities have potential to generate noise that could displace fauna from the area realising a temporary reduction in diversity. They also have potential to cause a temporary or permanent threshold shift in the hearing ability, which would influence sensitive fauna that use acoustic means of navigation or communication.

Cetaceans

Dolphin species can be classified as 'medium frequency' cetaceans. This is due to the species producing and using sounds ranging from tens of kHz to 100 kHz for echolocation, communication and navigation. In contrast, low frequency sounds are used by baleen whales (e.g. humpback, southern right, and Bryde's whales), thereby making them the most sensitive of cetaceans to artificially generated low frequency noise (frequencies between 12 Hz to below 1 kHz (McCauley, 1994)).

The hearing mechanism of toothed whales (e.g. strap-toothed whales, pygmy sperm whales) have been estimated to detect sounds with frequencies between 150 and 160 kHz (Southall *et al.*, 2007), though the hearing range is principally within the 50 to 130 kHz frequency range. According to NRC (2003), research has revealed that toothed whales are predominantly sensitive to aural stimuli above the approximate frequency of 10 kHz. This research has indicated that for acoustics below frequencies of about 10 kHz, hearing sensitivity declines with decreasing sounds frequency, with sensitivity to noises below 1 kHz appearing to be poor.

Observed responses from cetaceans to artificially generated sound include changes in swimming direction, increases in swimming speed and marked 'shocked' reactions. Other noted reactions in response to anthropogenic sound include changes to the diving, surfacing and breathing behaviours and avoidance of the sound source and the immediate area, among other behavioural changes (NRC, 2003). However, the extent and intensity of these reactions are not consistent and fluctuate widely depending on a variety of factors in relation to the individual animal and scenario (NRC, 2003).

Animals are expected to avoid areas where construction generated noise is being generated. This has been observed in other coastal locations where construction work has been undertaken (e.g. Darwin, Townsville). Following cessation of construction works animals are known to return to the area, as such any displacement is expected to be temporary and will support mitigation of risk of impact upon the animals.

Subsurface noise generated by construction activities also has the potential to disrupt the ability of marine fauna to perceive natural sounds, in a phenomenon called 'auditory masking'. It is possible for auditory masking to interfere with communication and the social functions of marine animals, the identification of predators and prey, and the navigation and coordination capabilities of these animals.

Richardson *et al.* (1995) suggests that insufficient evidence has been obtained with regards to call masking among whales though there are indications that observed lengthening of calls by humpback whales and orcas to low-frequency noise may be in response to auditory masking (Fristrup *et al.*, 2003; Foote *et al.*, 2004). However, auditory masking is not likely to affect toothed whales, as they detect frequencies above the frequencies generated by the proposed activities.

While animals are expected to move out of the zone of impact/influence of any noise generated during construction, pile driving works and rock placement are expected to generate noise thresholds that give potential to cause a temporary or permanent hearing shift in animals. According to McCauley (1994) and Richardson *et al.* (1995), the sound pressure threshold for direct physical trauma to occur in cetaceans is typically viewed to be >200 dB re 1Pa. Kongsberg Maritime Ltd (2010) report non-injury limits for cetaceans (both permanent or temporary) at 183 dB. The Government of South Australia's Underwater Noise Piling Guidelines

(DPTI, 2012) indicate temporary and permanent threshold shifts in cetaceans to occur at 183 dB (re 1 $\mu\text{Pa}^2\cdot\text{s}$) and 198 dB (re 1 $\mu\text{Pa}^2\cdot\text{s}$), respectively. Planned construction activities are expected to generate noise that would surpass these guideline values and, therefore, has potential to cause direct physical damage to cetacean physiology which will require risk management.

Other Marine Mammals

Other marine mammals such as the Australian Sea lion may be present within the project area. Pinniped response to noise is not well documented, but has been known to cause short-term disturbance, with increased activity following loud noises and displacement from haul-outs, but within minutes activity levels are likely to drop and displaced pinnipeds return (Demarchi *et al.*, 1998). The impact assessment completed by Kongsberg Maritime Ltd (2010) gave consideration to potential acoustic impacts to pinnipeds from a range of construction activities. Impact thresholds were reported to range from 171-218 dB (re 1 μPa rms at 1 m) across both permanent and temporary threshold shifts. They noted a non-injury threshold was set at 180 dB by the US government. Local guidelines (DPTI, 2012) indicate temporary and permanent threshold shifts in pinnipeds to occur at 171 dB (re 1 $\mu\text{Pa}^2\cdot\text{s}$) and 186 dB (re 1 $\mu\text{Pa}^2\cdot\text{s}$), respectively

Similar to findings for cetaceans, proposed pile driving and rock placement activities have the potential to impact pinnipeds if they are present in close proximity to the activity.

Birds

A variety of migratory and local shorebirds are likely to occur in the region; with bird numbers and species being highly dependant upon the time of year.

Pile driving and other construction activities have the potential to disturb birds in residence via the generation of artificial noise, which may cause a local reduction in shorebird use of the project area during construction.

Marine Turtles

There is a lack of research investigating the impacts of noise on turtles. Bartol and Musick (2003) found that turtles have high hearing sensitivity to low frequency sound, detecting sounds frequency in the range of 100 to 700 Hz. Turtles have also been reported to develop erratic swimming behaviour and increase swimming activity in response to increased levels of artificial sounds (McCauley *et al.*, 2002).

Species of marine turtle have been identified as potentially occurring in within the project area. However, the project area is not considered as core habitat for those turtle species; they may transit the area in search for food. If any nesting was occurring vibration from construction works could affect nests. However, as the site is not a nesting area, and is remote from known rookeries, potential to impact on turtles from noise generation is considered unlikely.

Sharks and Fish

Elasmobranchs (rays, skates and sharks) utilise low frequency sound to detect prey (Myrberg *et al.*, 1978). Due to their lack of swim bladders, they are not classified as hearing specialists (Baldridge, 1970). Sharks have demonstrated highest hearing sensitivity to low frequency noise ranging from 40 Hz to 800 Hz (Myrberg, 2001). These low frequency sounds generally mimic noise from prey and are irregularly pulsed, broadband and transmitted with no sudden increase in intensity (Myrberg *et al.*, 1978). Beyond those frequencies, sharks may exhibit avoidance of the source of acoustic disturbance.

The ability of fish to withstand underwater noise and their sensitivity to it varies widely across species. According to Amoser and Ladich (2005), most fish are classified as hearing

generalists, with relatively poor hearing, reduced sensitivity to noise and vibrations in comparison with hearing specialists, which have developed hearing specialisations. Gordon *et al.* (2003) suggest that hearing specialists are especially susceptible to intense acoustic vibrations as many hearing specialist species possess an air-filled swim bladder. A number of species of fish are considered to have no known noise sensitivities to underwater noise impacts. These include the goat fish, sweetlip, red emperor, trigger fish, snapper, rock cod, tuna and mackerel (Willis *et al.*, 2010, Nedwell *et al.*, 2016, Yelverton *et al.* 1975, and references within). The hearing capability, habits, distance to the noise source and timing of noise occurrence in the fish lifecycle are also factors that contribute to fish sensitivity and resilience to underwater noise (McCauley and Salgado-Kent, 2008).

Impacts on sharks and fish from noise sources generated during planned construction activities are expected to be constrained to a short-term period and may result in behavioural responses such as avoidance of the area. Such actions would be temporary in nature and localised. At a population level, the behavioural responses are not expected to be significant.

Australian Giant Cuttlefish

Research suggests that cuttlefish are sensitive to low frequency (50-400 Hz) sounds (Andre *et al.*, 2011), which have the potential to cause physical, physiological and behavioural changes in individuals (Woodcock *et al.*, 2014). Pile driving and other construction activities will generate low frequency sounds, therefore if construction is undertaken during the cuttlefish breeding season (May-September), there is potential for a large portion of the population to be impacted by project activities.

Management controls

The following controls can be implemented for the purposes of managing or mitigating the impact of noise generation on fauna:

- Activities that generate underwater noise (e.g. pile cutting, driving and rock placement) could be timed to reduce overlap with the cuttlefish breeding season and therefore reduce the potential threat to this sensitive species.
- During piling activities the following standard operational procedures are to be implemented (per the Government of South Australia's Underwater Noise Piling Guidelines (DPTI, 2012)):
 - *Pre-start procedure* – The presence of marine mammals should be visually monitored by a suitably trained crew member for at least 30 minutes before the commencement of the soft start procedure. Particular focus should be put on the shut-down zone but the observation zone should be inspected as well, for the full extent where visibility allows. Observations should be made from the piling rig or a better vantage point if possible.
 - *Soft start procedure* – If marine mammals have not been sighted within or are likely to enter the shut down zone during the pre-start procedure, the soft start procedure may commence in which the piling impact energy is gradually increased over a 10 minute time period. The soft start procedure should also be used after long breaks of more than 30 minutes in piling activity. Visual observations of marine mammals within the safety zones should be maintained by trained crew throughout soft starts. The soft start procedure may alert marine mammals to the presence of the piling rig and enable animals to move away to distances where injury is unlikely.
 - *Normal operation procedure* – If marine mammals have not been sighted within or are not likely to enter the shut down or observation zone during the soft start procedure, piling may start at full impact energy. Trained crew should continuously undertake visual observations during piling activities and shut-down periods. After long breaks in piling activity or when visual observations ceased or were hampered by poor visibility, the

pre-start procedure should be used. Night-time or low visibility operations may proceed provided that no more than 3 shut-downs occurred during the preceding 24 hour period.

- *Stand-by operations procedure* – If a marine mammal is sighted within the observation zone during the soft start or normal operation procedures, the operator of the piling rig should be placed on stand-by to shut-down the piling rig. An additional trained crew member should continuously monitor the marine mammal in sight.
- *Shut-down procedure* – If a marine mammal is sighted within or about to enter the shut-down zone, the piling activity should be stopped immediately. If a shut-down procedure occurred and marine mammals have been observed to move outside the shut-down zone, or 30 minutes have lapsed since the last marine mammal sighting, then piling activities should recommence using the soft start procedure. If marine mammals are detected the shut-down zone during poor visibility, operations should stop until visibility improves.
- Consideration be given to the implementation of additional management and mitigation measures detailed in the Government of South Australia’s Underwater Noise Piling Guidelines (DPTI, 2012), such as the engagement of suitably qualified Marine Mammal Observers, or the use of bubble curtains during pile driving activities.
- Consideration be given to adopting the Piling Guidelines detailed above for rock placement and pile cutting activities as well.
- Works to remove the pylons will commence after a visual inspection for protected mobile fauna (e.g. syngnathids). If present these will be relocated to adjacent habitats, outside the zone of influence by the proposed works, where feasible, to mitigate risk of acoustic impacts.
- Vessel and heavy machinery should be maintained in accordance with the manufactures specifications to reduce noise emissions.
- The interaction of all vessels with cetaceans and pinnipeds will be compliant with Part 8 of the Environment Protection and Biodiversity Conservation (EPBC) Regulations (2000). The Australian Guidelines for Whale and Dolphin Watching (Commonwealth of Australia, 2017) for sea-faring activities will be implemented across the entire project. This includes the implementation of the following guidelines:
 - Caution zone (300 m either side of whales and 150 m either side of dolphins) –vessels must operate at no wake speed in this zone.
 - Caution zone must not be entered when calf (whale or dolphin) is present
 - No approach zone (100 m either side of whales and 50 m either side of dolphins) – vessels should not enter this zone and should not wait in front of the direction of travel or an animal or pod, or follow directly behind
 - If there is a need to stop, reduce speed gradually.
 - Do not encourage bow riding.
 - If animals are bow riding, do not change course or speed suddenly.

Environmental outcome

Above ground and underwater noise generated by vessel movements, rock placement and pile driving activities within the project area may result in localised influences on fauna.

The vessels are required in the field for the construction activities, therefore, vessel elimination is not considered to be a practicable alternative on this basis. Similarly, pile cutting, driving and rock placement activities are a key component in the jetty reconstruction and thus elimination of these components is not considered practicable.

Due to the transitory and mobile nature of the marine fauna found in the wider area, marine fauna sensitive to artificial noise, such as cetaceans, pinnipeds and turtles will not remain in the region during construction. With the identified management controls implemented, behavioural impacts (e.g. avoidance patterns and swimming movements away from the area) are the most probable form of impact to marine fauna as a result of anthropogenic noise generated by this activity, particularly for sensitive species such as cetaceans. Generated noise is anticipated to only induce temporary and localised behavioural impact, with afflicted marine species expected to adopt normal behavioural patterns within a short time frame in the open waters surrounding the project area.

Artificial light emissions

Environmental hazard description

Artificial light emissions may occur through the use of vessel and site construction safety lighting, and once constructed, from lights installed as part of the jetty infrastructure.

Impact analysis

Artificial lighting has the potential to affect fauna by altering use of visual cues for orientation, navigation or other purposes, resulting in behavioural responses which can alter foraging and breeding activity in marine turtles, cephalopods, birds, fish, dolphins, and other pelagic species.

Continuous lighting in the same location for an extended period of time may result in disturbance to terrestrial and marine fauna including:

- Birds may either be attracted by the light source itself or indirectly via the aggregation of prey species.
- Turtles can be attracted to lights (note turtle nesting does not occur in the region).
- Fish and other pelagic species (e.g. zooplankton, squid, larval fish) may be directly or indirectly attracted to lights. This can, in turn, alter predatory fish behaviour.

Construction is planned for daylight hours only. Therefore, artificial light emissions during construction are expected only in association with vessel and construction safety lighting on moored construction vessels and surrounding the construction site. The existing jetty is currently lit at night; lighting will also be installed on the redeveloped jetty. This lighting is expected to be minimal in comparison to the nearby Port of Whyalla. The proposed works are likely to contribute to but not elevate or increase the existing landscape lighting profile. As such, construction based lighting is not predicted to result in any change in migratory behaviours of birds that use the area and are already habituated to current light conditions.

Management controls

To reduce or eliminate the impact of artificial lighting, the following management controls can be implemented during construction:

- Light spill from the nearshore vessel operations will be minimised where possible using directional lighting. Light shields could be considered to avoid spill if sensitive receptors are determined during activities to be negatively affected
- Lighting on vessel decks or the jetty construction platform will be managed to reduce direct light spill onto marine waters or surrounding landscape, unless such actions do not comply with site safety or navigation and vessel safety standards (AMSA Marine Orders Part 30: Prevention of Collisions; AMSA Marine Orders Part 21: Safety of Navigation and Emergency Procedures).

Environmental outcome

Minimum lighting is required for safety purposes across the construction site, on board the vessels, and for navigational purposes. Vessel presence is required to undertake the activities and therefore environmental consequences due to lighting spill into the marine environment are possible.

It is necessary for all vessels in Australian waters to comply with the navigation safety requirements prescribed within the Navigation Act 2012 and the subordinate Marine Orders with regards to workplace safety equipment (e.g. lighting) and navigation. While light spill will be reduced wherever possible, the elimination of deck lighting on vessels or the elimination of lighting on the jetty during construction would result in:

- Increased probability for vessel collisions and accidents
- Presenting new safety risks to crew members or the public
- Non-compliance with safety and maritime codes and regulations.

The use of directional lighting to reduce the risk and impact of artificial lighting to faunal species has been identified. This would need to also adhere to any required site safety codes. Even with this control in place negligible spill of artificial lighting cannot be avoided.

Given the coastal nature of the development, and the nearby 24/7 operations at the Port of Whyalla, potential influences on fauna from construction based lighting associated with the proposed redevelopment is expected to be minimal.

Atmospheric emissions

Environmental hazard description

Greenhouse gases (GHG) (including carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O)) and non-GHG (such as sulphur oxides (SO_x) and nitrous oxides (NO_x)) are emitted as a result of the burning of fuel to power vessel engines, generators, and mobile and fixed plant and equipment. The fuel predominantly used for these activities would be diesel.

Impact analysis

Short-term reduction in air quality in immediate region around the discharge point will be due to the burning of hydrocarbons. This would occur throughout the jetty reconstruction activity.

Humans and seabirds in the immediate vicinity of the works would be affected by the localised decline in air quality accompanying the emission of non-GHG and GHG. The gaseous emissions are of relatively low quantities and it is expected that under normal conditions these emissions would undergo rapid dissipation into the surrounding environment. It would also be noted that the emissions would contribute to the national GHG count.

Management controls

A variety of possible management controls can be implemented in order to mitigate or eliminate the occurrence of gaseous discharge:

- All equipment will be properly maintained in good working order.
- Catalytic converters and exhaust filters will be correctly fitted where appropriate and available to minimise diesel exhaust emissions.
- Idling time of diesel engines should be limited and engines should not be overloaded.
- Fuel oil will meet regulated sulphur content levels in order to control SO_x and particulate matter emissions.

- Engines will be operated in a manner so that regulated NO_x emission levels are achieved.
- Compliance with MARPOL Annex VI (as implemented in Commonwealth waters by the Commonwealth Protection of the Sea (Prevention of Pollution from Ships) Act 1983 (PSPPS Act); and Marine Orders - Part 97: Marine pollution prevention - air pollution).

Environmental outcome

As the proposed jetty reconstruction activities require the presence of vessels and construction plant, there is no potential for the elimination of gaseous emissions from these. Vessel gaseous emissions resulting from the combustion of hydrocarbons is permitted on Australian waters under the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983*. This Act meets the requirements and obligations outlined in the MARPOL Annex VI.

Other feasible and reliable fuel types for vessels/construction plant have not been found. However, in order to reduce emissions, low sulphur-oxide marine-grade diesel would be used to fuel the vessels, as opposed to heavy fuel oil. For the purposes of controlling sulphur oxide and particulate matter emissions into the atmosphere, the applicable fuel will satisfy standardised sulphur content quantities. Given the international acceptance and industry-wide adoption of the MARPOL standards, it is accepted that compliance with the corresponding MARPOL requirements would translate into diminished environmental impacts from planned discharges to as low as reasonably possible.

Interference with other users

Environmental hazard description

A number of different environmental hazards may arise from unrelated vessel traffic crossing into the construction zone. These may include vessel damage, which is addressed under Section 2.2.3.

Impact analysis

A construction exclusion zone will be established prior to the commencement of the project. This will restrict pedestrian access to the jetty and laydown area (on the existing breakwater), and boat access in the vicinity of the jetty. Pedestrian access to the existing jetty is currently restricted due to safety reasons. As such, the establishment of a construction exclusion zone is not expected to greatly impact on the general public's use of the area.

Management controls

The following management controls have been considered and may be implemented if feasible in order to mitigate or remove interference issues between activity-related vessels and other users of the area:

- Stakeholder consultation prior to commencement of the project to notify current users of the changes that will be in place during construction.
- The South Australian Department of Planning, Transport and Infrastructure will be contacted to issue a notice to mariners prior to the commencement of the project. This will highlight the works being undertaken and the construction exclusion zones/navigation restrictions associated with the project.
- Land-side pedestrian access will be managed via the placement of construction fencing, signage and site induction processes.

Environmental outcome

Stakeholder consultation and marine user notifications, which are industry standard processes, will be implemented for the activity in order to inform and mitigate the impacts on current users of the area. Notifications will also be undertaken to inform all maritime users of action (including location and duration) to support management of collision risk.

Apart from engagement and notification, no other management controls have been identified to mitigate the possibility of disruption to current users of the area. Because of this, the impacts to other users have been deemed reasonable and controlled to keep the effects of jetty redevelopment as low as reasonably possible.

2.2.3 Unplanned activities

Pest introduction and proliferation

Environmental hazard description

Proposed activities may support spread, dispersal or expansion of existing marine pest populations within the area. Vessels carrying invasive marine pests (IMP) may unintentionally but successfully introduce new species to the region where the activity is occurring or carry pests from the region to other areas.

IMPs may be carried within the external biological fouling on the vessel hull, within seawater pipes (e.g. cooling water) and associated infrastructure or on submersible marine instruments and equipment. Ballast water exchange may also allow for the transportation and proliferation of IMPs within the area of activity.

Before vessels can proceed to the site location, quarantine obligations will have to be fulfilled by all vessels. For vessels sourced from high risk or international destinations, ballast water exchange record requirements will need to be complied with, including possession of Australian Quarantine and Inspection Service (AQIS) clearance documentation in order to verify compliance with ballast water and biofouling management measures.

Impact analysis

According to DAFF (2009), IMPs are identified as marine plants, animals and algae which have been introduced into a location that is not within their natural dispersal range but which provides conditions that support their survivorship.

Ecosystem health, biodiversity, fisheries, aquaculture, human health and waterway industries including tourism are at potential risk from the impacts of IMPs (DAFF, 2009; Wells, 2009). The extent of the detrimental effects introduced marine pests may have includes depletion of viable fishing areas and aquaculture stock, out-competing native flora and fauna, over-predation of native flora and fauna, reduction of coastal aesthetics and increased maintenance costs, human illness through released toxins, reduction in vessel performance, damage to vessel engines and propellers and damage to industrial infrastructure.

The introduction of new species is not a rare occurrence. However, the physical, chemical and biological circumstances of the environment into which the species has been introduced are important determining factors as to whether the species will successfully establish and become an invasive pest.

Flora and fauna species atypical to the region can be attracted to newly created hard substrate habitats; such as those that would be provided by the presence of the newly installed pylons.

Management controls

The following controls and processes may be employed when possible in order to mitigate or eliminate the risk of introducing pests:

- Locally sourced vessels (within South Australian waters) to complete the works.
- If an IMP is identified or suspected, then the contractor is obliged to immediately (within 24 hours) notify the South Australian Department of Primary Industries and Regions (PIRSA) on the Fishwatch 24 hour hotline on 1800 065 522
- Changes to Australia's biosecurity system came into effect on 16 June 2016 with commencement of the *Biosecurity Act 2015*. New biosecurity requirements may come into force during the life of the project. If this occurs, these management controls should be reviewed to confirm adequacy.

Environmental outcome

Organisms from the natural environment naturally collect on vessels and submersible equipment as biofouling. Vessels also require ballast water for safe operational purposes. Marine pests are known to occur in the area currently. As such, these risks of spread are difficult to eliminate.

To mitigate the possibility of introducing IMPs, the planned activities will be conducted with equipment and vessels, which would ideally have been operational and active within the Gulf waters that have the same pest profile risk since their last dry-dock inspection or cleaning session.

Because of these factors, the risk of the successful introduction of an IMP is considered as low as reasonably practicable.

Marine fauna collision/entanglement

Environmental hazard description

There is potential for collision to occur between marine fauna and vessels associated with the proposed activities. The consequences of such collisions between marine fauna and vessels/equipment for the marine organisms range from changes to fauna behavioural patterns to injury or death of the organism as a result of a direct collision.

Impact analysis

Due to their inquisitive nature, cetaceans e.g. dolphins are frequently attracted to vessels and offshore facilities.

Deep to shallow water transition zones, and deep water channels, are where high shipping traffic coincides with natural cetacean habitats. At these locations, collisions between vessels and cetaceans are considered more likely (WDCS, 2006). A number of instances of vessel collisions resulting in the death of the involved cetacean have occurred in Australian waters though data suggests that these instances are commonly associated with fast ferries and container ships (WDCS, 2006). Some cetaceans are known to be capable of detecting and manoeuvring to avoid collision with vessels (WDCS, 2006). There is a variety of whale responses to the advance of vessels, with some whale species known to be inquisitive and approach vessels that are slow moving or stationary, while other whale species dive or stay motionless in the presence of vessels. However, whales typically do not approach vessels and are more likely to adopt evasive behaviours to avoid nearby ships, including the employment of longer dives.

The risk of potential vessel strike is considered to be low for all marine species, including cetaceans, sharks, marine turtles, fish and seabirds. This risk accounts for the avoidance behaviour marine fauna species adopt to evade vessels until the vessel disruption has elapsed. Further, works will be concentrated within a small area which will limit the potential for encounters to a small spatial footprint.

Works will occur where fishing and commercial shipping currently traverse. The risk that the additional vessel presence in the activity location will have considerable effect on marine fauna within the area is relatively small due to the relatively low vessel speeds during the activity operations, with all construction vessels restricted to a 4 knot speed limit. This will support animals avoiding vessels through behavioural response.

Management controls

The following controls may be adopted and executed when possible to mitigate or eliminate the risk of collision between vessels and marine fauna:

- Operations of vessels will be commensurate with Part 8 of the EPBC Regulations (Interacting with Cetaceans and Whale Watching).
- The Australian Guidelines for Whale and Dolphin Watching (Commonwealth of Australia, 2017) for sea-faring activities will be implemented across the entire project. This includes the implementation of the following guidelines:
 - Caution zone (300 m either side of whales and 150 m either side of dolphins) – vessels must operate at no wake speed in this zone.
 - Caution zone must not be entered when calf (whale or dolphin) is present
 - No approach zone (100 m either side of whales and 50 m either side of dolphins) – vessels should not enter this zone and should not wait in front of the direction of travel or an animal or pod, or follow directly behind
 - If there is a need to stop, reduce speed gradually.
 - Do not encourage bow riding.
 - If animals are bow riding, do not change course or speed suddenly.

Environmental outcome

As these activities require the presence of vessels, there is no potential for the elimination of vessels from the locality. All construction vessels will be restricted to a 4 knot speed limit. In order to reduce the chance of vessel interaction with marine fauna, the management and legislative control measures would be implemented. Vessels will be operating within a small spatial footprint, and collision risk will, therefore be limited. On this basis the potential risks associated with collision and interference with marine animals from vessel activities is considered to be as low as reasonably practical.

Accidental release of solid wastes

Environmental hazard description

A variety of hazardous and non-hazardous solid waste may be released unintentionally into the environment from overfull and/or uncovered bins or if blown off the deck of a vessel. Accidental spillage during transfers of waste from vessel to shore, and incorrectly disposed items may also cause the unintentional release of solid waste into the surrounding environment.

Non-hazardous solid waste includes plastics, packaging and paper materials and products while examples of hazardous solid wastes include oily and contaminated wastes, aerosol products, fluorescent tubes, batteries and medical waste.

Impact analysis

There is capacity for non-hazardous solid waste such as plastic bags to detrimentally affect the environment and cause entanglement or be ingested by fauna. The entanglement and ingestion of non-hazardous solid waste is a risk particularly prevalent for seabirds and marine turtles. The ingestion of solid wastes like plastic bags can consequently result in internal tissue damage, prevention of normal feeding behaviours and potentially death of the affected fauna.

The pollution of the immediate environment with the release of hazardous solid waste has the likely consequence of negatively affecting the health of flora and fauna within the area. Particular fish, cetaceans, seabirds and reptiles are susceptible to chemical impacts, including disease or physical injury after ingesting or absorbing the waste.

Management controls

The following management controls have been considered and may be implemented if feasible in order to mitigate or remove the risk of accidental solid waste release:

- Appropriate waste containment facilities will be included on site and managed to avoid overflow or accidental release to the environment.
- No waste materials will be disposed of overboard, all non-biodegradable and hazardous wastes will be collected, stored, processed and disposed of in accordance with the vessel's Garbage Management Plan as required under Regulation 9 of MARPOL Annex V.
- All marine vessels will be operated and maintained in accordance with the South Australian Government's Code of practice for vessel and facility management (marine and inland waters) 2008.
- Hazardous wastes will be separated, labelled and retained in storage onboard within secondary containment (e.g. bin located in a bund).
- All recyclable and general wastes to be collected in labelled, covered bins (and compacted where possible) for appropriate disposal at regulated waste facility.
- Solid non-biodegradable and hazardous wastes will be collected and disposed of onshore at a suitable waste facility.

Environmental outcome

Small amounts of solid non-biodegradable and hazardous wastes will be generated during the proposed activities. Storage of these wastes across the construction footprint and plant/vessels in fully enclosed containers is considered good (and common) practice within the construction industry. Stored wastes will be regularly removed to an appropriate onshore facility.

During the activities, given the adoption of the industry standard management controls listed above, it is considered that all practicable measures have been implemented and the likelihood of solid wastes being discharged to the environment has been reduced to as low as reasonably practicable.

The unplanned release of non-hazardous and hazardous solid wastes through inadequate containment and practices is unlikely to have any significant environmental effects, as impacts would be temporary and localised. The management controls are considered effective in reducing the potential environmental impact to the marine environment. As such, the risk associated with unplanned releases of non-hazardous and hazardous solid wastes is considered as low as reasonably practicable.

Accidental release of hydrocarbons, chemicals and other liquid waste

Environmental hazard description

Vessels require a wide variety of liquids, chemicals and hydrocarbon compounds to operate and to be maintained. Vessel engines and equipment such as cranes, pile drivers and heavy machinery operate on diesel fuel while hydraulic and lubricating oils are required for the operation and continual maintenance of mechanical components. Fuel drums may also be retained in dedicated storage areas while some vessel engines adopt independent storage tanks. Examples of hazardous liquids include corrosion inhibitors, biocide and miscellaneous chemicals like cleaning agents and lubricating oils.

In addition, other liquid wastes such as sewage and food waste will be generated during construction. There are various scenarios that may result in the accidental release of liquid wastes, including tank pipework failure or inadequate bunding.

If refuelling is required during the proposed activity, then refuelling events have the potential to cause environmental impacts through reduction in water quality and/or contamination of marine flora and fauna. Spills during refuelling can occur through several pathways, including fuel hose breaks, coupling failure or tank overfilling.

Impact analysis

Under certain scenarios, State legislation allows for the release of some liquid waste to the environment. Despite this, there are no releases planned during the project. Rather, all liquid waste will be stored for discharge to an appropriate onshore facility.

There is a low likelihood that a leak or spill of hydrocarbons or other liquids (including environmentally hazardous wastes and non-hazardous substances) may occur at the site. Such an occurrence would result in the localised reductions in water quality and contamination of nearby marine fauna and habitats.

Management controls

The following controls can be adopted when feasible in order to mitigate or eliminate the potential for the spillage of hydrocarbons, environmentally hazardous chemicals and liquid-waste to the marine environment:

- All liquid waste to be stored for discharge to an appropriate onshore facility.
- Chemicals and hydrocarbons will be packaged, marked, labelled and stowed in accordance with MARPOL Annex I, II and III regulations. These include provisions for all chemicals (environmentally hazardous) and hydrocarbons to be stored in closed, secure and appropriately bunded areas.
- A Material Safety Data Sheet (MSDS) will be available for all chemicals and hydrocarbons in locations nearby to where the chemicals/wastes are stored.
- Vessel operators will have an up to date Shipboard Oil Pollution Emergency Plan (SOPEP) and Shipboard Marine Pollution Emergency Plan (SMPEP). All shipboard chemical and hydrocarbon spills will be managed in accordance with these plans by trained and competent crew. Related mitigation measures in place:
 - Spill exercises will be conducted at minimum of every three months and recorded in the vessel log.
 - Spill kit will be located near high risk spill areas.
 - Spills will be cleaned up immediately, spill kits re-stocked and clean up material contained, and not washed overboard.

- Vessel decks will be bunded. Scupper plugs should be available to prevent liquid discharges from decks.
- Any contaminated material collected will be contained for appropriate onshore disposal.
- Spill clean-up equipment will be located where chemicals and hydrocarbons are stored and frequently handled (i.e. 'high risk' areas). The quantity of spill recovery materials will be appropriate to the quantity of stored chemicals.
- Transfer deck run off discharges to the sea via the scuppers. Scupper plugs or equivalent will be available on vessel decks where chemicals and hydrocarbons are stored and frequently handled (i.e. 'high risk' areas). Plugs will be utilised during handling of large quantities of hydrocarbons or hazardous chemicals.
- Any equipment or machinery with the potential to leak oil will be enclosed in continuous bunding or will have drip trays in place where appropriate.
- Following rainfall events, bunded areas on open decks of the vessels or within any construction laydown areas will be cleared of rainwater.
- All hoses for pumping and transfers will be maintained and checked as per the PMS.
- The following controls can be implemented when possible for the purposes of mitigating or eliminating the risk of the spillage of hydrocarbon from refuelling:
 - Refuelling of vessels will occur only in a controlled environment.
 - Refuelling operations will be a manned operation. In the event the refuelling pipe is ruptured, fuel bunkering will cease.
 - Spill clean-up equipment will be located where hydrocarbons are stored and frequently handled (i.e. 'high risk' areas).

Environmental outcome

Removal of the use of chemicals or hydrocarbons on-board vessels and heavy machinery is not an option for the proposed construction activities. Similarly, since open deck drainage is an essential safety feature of any marine vessel, the risk of discharge from deck drainage cannot be eliminated. However, it is anticipated that any impacts to water quality resulting from a hydrocarbon or chemical spillage would be temporary and constrained to the immediate vicinity, if such an incident did occur. In such cases, spillage of hydrocarbons or environmentally hazardous chemicals may be attributed to machinery, engines and tanks leaking these liquids into the marine environment. Due to these limited impacts and the management controls implemented to reduce the risk of contaminants reaching the surrounding environment to levels as low as reasonably possible, the risks of a small hydrocarbon spill are considered to be environmentally acceptable.

Vessels and heavy machinery will only operate with, process and/or retain in storage low quantities of chemicals and hydrocarbons. The vessels will also adopt safety measures consistent with the requirements of the Protection of the Sea (Prevention of Pollution from Ships) Act 1983 and MARPOL Annex I, II and III. These safety precautions and safeguards may entail, among other measures, the assignment of correct stowage and designation of appropriate storage and handling areas. The risks of discharge to the environment are mitigated by the adoption of these safety control measures, resulting in the reduction of these risks to levels as low as reasonably possible. A variety of measures have been implemented to prepare for spill response should any incident occur.

The risks and measures adopted to address any potential spill resulting from hydrocarbon refuelling are similar to those outlined for spills as a result of discharge. Refuelling of vessels or plant may only be carried out in controlled environment, which would reduce the effects of an

accidental spill. Keeping equipment well serviced and maintaining spill cleanup and containment equipment are some of the safeguards that can be adopted.

As such, the risk associated with unplanned releases of hydrocarbons, chemicals and other liquid wastes is considered as low as reasonably practicable.

Damaged fuel tank associated with vessel or plant collision

Environmental hazard description

During the activities, there is a possibility that vessels or plant could collide. The rupture of a vessel's fuel tank is the predominant risk resulting from a potential vessel or plant collision. The significance of the risk is attributed to the release of marine or other diesel into the environment from the damaged fuel tank.

As a consequence of a tank rupture from vessel collision, a standard tank is expected to empty into the environment within hours.

Impact analysis

Fauna Receptors

Marine Mammals

Geraci (1990) cited studies that suggested that marine mammals have the capacity to identify and avoid oil slicks. In contrast, other sources indicate that this is not evident (Etkin, 1997) with examples of marine mammals observed surfacing and feeding in oil affected areas (Matkin *et al.*, 2008).

Understanding of the effects of surface oil on marine mammals has not been fully developed. The impact of oil on marine wildlife is influenced by the characteristics of the oil and the extent to which it has been weathered. Through direct contact and ingestion, organisms oiled in the early stages of a spill experience higher levels of toxicity than those exposed to weathered oil. Within the activity zone the surface oil released from a vessel collision is likely to have severe effects on marine mammals in the afflicted areas. No known key breeding, feeding or rest areas are located in the project area, where any potential surface spill may occur. Therefore, it is unlikely that numerous species would be exposed in the event of a spill.

Marine mammals may be affected by oil slicks via the following mechanisms, as outlined by Geraci (1990):

- Ingestion and accumulation: Feeding behaviours that rely on surface skimming are especially susceptible to the ingestion of surface oil condensate. The following effects may occur as a consequence of oil condensate ingestion:
 - Acute effects include neurological damage and liver disorders (Geraci 1990), gastrointestinal ulceration, haemorrhaging and secondary organ dysfunction due to ingestion of oil (Etkin 1997).
 - Chronic poisoning via ingestion of components that have entered the food web (Neff *et al.*, 1976).

There is no observed evidence from studies or records to indicate that a whale may consume enough hydrocarbons by feeding in/near a hydrocarbon spill to suffer the above acute impacts. Additionally, Mysticetes (baleen whales) are less exposed to chronic poisoning risk as they typically feed on biota that can accumulate and dispose of hydrocarbons from their systems in a relatively short period of time.

- Skin contact: Hydrocarbon's material characteristics mean they readily adhere to rough surfaces on fauna, e.g. fur, calluses and hair. Due to their hairless and smooth-skinned

features, hydrocarbons typically do not stick to whales and dolphins, with testing conducted by Geraci *et al.* (1985) confirming that cetacean skin is a suitable barrier to oil. However, Etkin (1997) reported the development of eye and skin lesions on cetaceans as a result of prolonged exposure to oil.

- Interference with feeding: The loss of food species and loss of access to feeding areas due to the surface condensate coupled with the species selective diet can result in substantial decrease in body mass in marine mammals exposed to oil spills. The stress associated with oil spill exposure also has an effect on the body mass of marine mammals (UNEP, 2013).

Baleen feeders rely on a sieve-like mechanism called a baleen to filter nutrient-rich water for food such as plankton and small fish. The whale's tongue then shifts the food to the oesophagus. This feeding mechanism is vulnerable to a heavy oil spill inclusive of exposure to weathered oil, as indicated by the combined evidence of studies conducted by Geraci *et al.* (1985). Oil can potentially disrupt the efficiency of the feeding mechanism for days by blocking the baleen plates. As such whales, which skim food inclusive of from surface waters, are therefore more susceptible to impacts from surface oil than other species.

- Vapour inhalation: Congested lungs, damaged airways or emphysema are possible consequences of vapour inhalation of surface oil, depending on the inhalation concentration. The inhalation of oil vapours is also known to cause irritation and harm to soft tissue e.g. the mucous eye membranes. The damage to an individual is greatest when it is trapped, panicked and exposed continuously or for prolonged periods to the oil (Geraci, 1990).

Fish

According to Kennish (1997) and Scholz *et al.*, (1992), open sea fish typically have the ability to identify and avoid surface slicks. Compared to other marine organisms, fish are unlikely to experience as much exposure to surface oil since diesel would remain on the sea surface.

However, since eggs, larvae and fish in their early juvenile stages are likely to inhabit the planktonic sea surface waters, recruitment success could be affected. The surface oil would predominantly have lethal or near-lethal impacts on the future growth and development of exposed larvae/eggs/juvenile fish (Kennish, 1997).

Australian Giant Cuttlefish

A key breeding area for the Australian Giant Cuttlefish is located in close proximity to the project area. Should a spill occur during breeding season (May-September) and extend to the breeding area between Whyalla and Point Lowly, the recruitment success of that breeding event, and thus the persistence of the population could be jeopardised.

Marine Reptiles

Similar to baleen whales, surface diesel may impact marine turtles via a variety of direct and indirect means, including:

- Ingestion and accumulation
- Consumption of contaminated food
- Skin contact
- Vapour inhalation

Hydrocarbon spills are particularly detrimental to marine turtles since they are vulnerable to the impacts of such spills in all stages of its life cycle from eggs to adults, onshore or offshore (NOAA, 2010). This is compounded by indications that turtles show no avoidance behaviours to

zones affected by oil spills. Ingestion and inhalation of surface hydrocarbons is also likely as marine turtles rise to the surface to breathe. Skin infections, impacts on internal organs and the occurrence of respiratory issues are likely effects of marine turtles exposure to surface hydrocarbons.

Birds

The feeding and resting behaviours of birds on surface waters and within intertidal areas renders them exposed to surface oil condensate. The primary impact mechanisms faced by seabirds include:

- Ingestion of oil
- Impact on feeding areas
- Fouling of plumage.

Seabird fouling can occur when contact is made between the seabirds and floating hydrocarbons. According to Michel and Hayes (1992), seabirds may experience fouling during feeding and diving for prey, wading in shallower waters/intertidal areas or during roosting on the surface of waters affected by surface condensate.

The structural integrity, performance and function of a seabird's plumage are affected by oil fouling. Fouling can consequently cause the loss of buoyancy, inability to fly and loss of waterproofing properties of plumage resulting in hyperthermia in affected seabirds.

Preening and feeding / diving actions on the surface of affected waters can lead to the ingestion of surface oils by seabirds. Changes in blood characteristics and intestinal irritation are some of the consequences of oil ingestion by bird species (Michel and Hayes, 1992). The quantity of hydrocarbons required to instigate effects in seabirds is not known. However, the extent of impacts on seabirds is dependent on the type of hydrocarbon they are exposed to, duration of exposure and the type of seabird affected.

As noted above, hydrocarbon condensate on the water surface or beach environs can affect a wide number of prey species occupying the surface water environments, e.g. krill and baitfish. These disruptions to the food chain through the reduced availability of suitable prey caused by surface condensate may be detrimental to the behaviour and survival of certain bird species, which feed on surface water biota.

The predominant feeding behaviours of seabird species within the activity zone are either by skimming surface water or by dive bombing. These birds are therefore exposed to surface oil condensate while feeding and resting on the water surface.

The quantity of marine wildlife affected and the extent of surface oil's impact is reliant on a variety of factors including the weather, season and biological productivity of the afflicted region (Dunlop, 1988).

Habitat Receptors

Rocky Reefs

An oil spill in near-shore environments as a consequence of vessel/plant collision and rupturing of a fuel tank close to shore and or in shallow waters may result in impacts upon a wide variety of organisms inhabiting shallow water rocky reefs. Shallow rocky reefs are relatively common on the west coast of the Gulf, supporting a wide diversity of marine flora and fauna including conservation significant species, the Australian giant cuttlefish. Such an oil spill could subsequently hinder the photosynthesis processes for some of these reef-inhabiting organisms and impart toxic effects to affected species.

Sandy Beaches

An oil spill close to shore resultant from a vessel collision in shallow waters or from plant operating adjacent the jetty land infrastructure can result in oil being trapped on sandy beaches, such as Whyalla Beach. It is likely that some of the oil will result in the contamination of sand deeper in the beach profile. This may be facilitated by the melting of oil into the beach profile, the suspension of sediments within the surf zone or the infiltration of oil condensate to sediments located deeper in the beach profile. It is noted that sandy beaches are vital environments to various protected shorebirds for feeding and roosting; no turtle nesting occurs at the beaches in proximity to the project area.

Seagrass and macroalgal beds

The occurrence of oil captured within the water column could affect light qualities and the ability for seagrasses and macroalgae to photosynthesise. Studies conducted by Burns *et al.* (1993) and Dean *et al.* (1998) reveal that fast recovery rates are possible despite heavy oiling. Periods ranging from weeks to months may, however, be needed for benthic habitats exposed to oil within the water column to recover to original water quality conditions.

Phytotoxic effects caused by absorption from the water column may be experienced by seagrasses and macroalgae. Reduced photosynthetic efficiency has been indicated by aquatic plants where hydrocarbon compounds have concentrated within the membranes of the plant (Runcie and Durako, 2004). A recovery duration ranging from weeks to months is required for habitats to return to original water quality conditions after experiencing long-term effects.

Management controls

The following management controls may be adopted and executed for the purposes of mitigating or eliminating the risk of hydrocarbon spillage as a result of vessel collision:

- Visual observations will be maintained by watch keepers on all vessels and plant/moving machinery.
- Regular notification to the following Australian Government agencies before and during operations:
 - The Australian Hydrographic Office of proposed activity, location and commencement date to enable a 'Notice to Mariners' to be issued.
 - In the event of a spill resulting in notification to AMSA, other sea users (e.g. fishing industry) will be informed of the incident via Marine Notices to prevent vessels entering an area where hydrocarbons have been released.
- Vessels will operate in compliance with all marine navigation and vessel safety requirements in the International Convention of the SOLAS 1974 and the Navigation Act 2012. This includes the requirement for all equipment and procedures to comply with the following AMSA Marine Orders:
 - Marine Orders - Part 30: Prevention of Collisions
 - Marine Orders - Part 21: Safety of Navigation and Emergency Procedures
 - Marine Orders - Part 27: Radio Equipment: sets out ship requirements regarding radio installations, equipment, watch keeping arrangements, sources of energy, performance standards, maintenance requirements, personnel and recordkeeping
 - Marine Orders Parts 3 and 6 – Seagoing Qualifications and Marine Radio Qualifications: ensures seafarer competency standards meet the needs of the Australian Shipping Industry

- Vessels will be equipped with appropriate navigational systems which may include an automatic identification system (AIS) and an automatic radar plotting aid (ARPA) system capable of identifying, tracking and projecting the closest approach for any vessel (time and location) within the operational area and radar range (up to approximately 70 km)
- Marine diesel oil compliant with MARPOL Annex VI Regulation 14.2 (i.e. sulphur content of less than 3.50% m/m) is the only engine fuel to be used by the vessels.
- Oil spill responses will be executed in accordance with the vessel's SOPEP, as required under MARPOL.

Environmental outcome

In order to undertake the activities, vessel and other mobile plant presence is required and no alternative is available. Navigation and safety instruments and equipment can be found on vessels and within mobile plant, as prescribed by the International Convention of the SOLAS 1974 and actioned through the *Navigation Act 2012*. These are necessary for the safe navigation of the vessel and plant to avoid potential collisions.

In order to combat the possible eventuality of a spill from collision risk, measures have been implemented to respond to spills and minimise their effects. Marine user notifications and stakeholder consultation for affected parties within the activity zone are some of the other industry standard and activity-specific controls in place to reduce the risk of vessel collision, which could result in ruptured fuel tanks and oil slicks.

These standards and controls are considered to reduce the likelihood of a vessel/plant collision. With all controls in place risk of vessel/plant collision is considered managed to as low as reasonably possible.

3. Traffic impact assessment

3.1 Introduction

A Traffic Impact Assessment (TIA) details the principal impacts of the traffic, and transport related activities, associated with the Whyalla Jetty Redevelopment during the construction phase of the project.

Some of the key issues with regard to Whyalla Jetty Redevelopment are associated with traffic and transport matters for the Whyalla City Council, particularly during the demolition and construction phases in managing the additional vehicle movements, as well as maintaining access/egress for the Whyalla Marina, Whyalla Yacht Club and Whyalla Boat Ramp for users of these facilities.

3.2 Site Location

The Whyalla Jetty is located off Buttlingsarra Way, which provides direct access to the Whyalla Yacht Club, Marina and Boat Ramp, as well as the existing Whyalla Jetty. Buttlingsarra Way connects with Cudmore Terrace, one of the main connector roads within the Whyalla City Council area.

The existing Jetty is accessible by a large surface car and trailer (boat) parking area which is part of the Whyalla Marina as shown below in Figure 3.



Figure 3 Existing Whyalla Jetty site, Source: Google Maps 2017

3.3 Existing Conditions

3.3.1 Site accessibility

The site is accessible via Cudmore Terrace, one of Whyalla City Council's local connector roads, which is a sealed, undivided, two-way road with one lane of traffic in either direction. The current speed limit along Cudmore Terrace is set at 50 km/h.

Cudmore Terrace joins Essington Lewis Avenue, which connects onto the Lincoln Highway (B100) via Broadbent Terrace, Elliot Street or McBryde Terrace.

Access to the Whyalla Jetty is directly from Buttlingarra Way, which runs off Cudmore Terrace and services the Whyalla Yacht Club, Whyalla Marina and Whyalla Boat Ramp.

The following photographs in Figure 4 - Figure 6, show the existing conditions, as they currently are associated with the car park area and breakwater leading out to the jetty.



Figure 4 Existing large surface vehicle and boat trailer parking area



Figure 5 Car parking area leading to breakwater

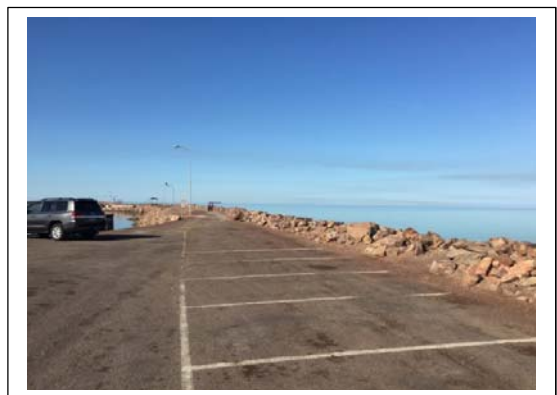


Figure 6 Breakwater area for pedestrians and cyclists leading to jetty

Vehicular connections and parking adjacent to and within the site include:

- Large surface vehicle and boat trailer parking characterises the marina;
- A single entry and exit road to the marina serviced by Buttlingarra Way;
- Extensive parking along the foreshore; and

Pedestrian connections adjacent to and within site include:

- The foreshore promenade extending from the Discovery Holiday Park to the marina;
- A path network between the foreshore and Ada Ryan Gardens;

3.3.2 Road Network

All road routes from Adelaide to Whyalla are primarily either National Highways or State Roads. Whyalla is located approximately 384 km or 4 hours and 24 minutes by road from Adelaide via Port Wakefield Road, Augusta Highway (National Highway, A1).

Once past the township of Port Augusta travelling along the Eyre Highway (Lincoln Gap) then via the Lincoln Highway (B100) which links Port Augusta and Port Lincoln located on the east coast of Eyre Peninsula, as shown in Figure 7 below:

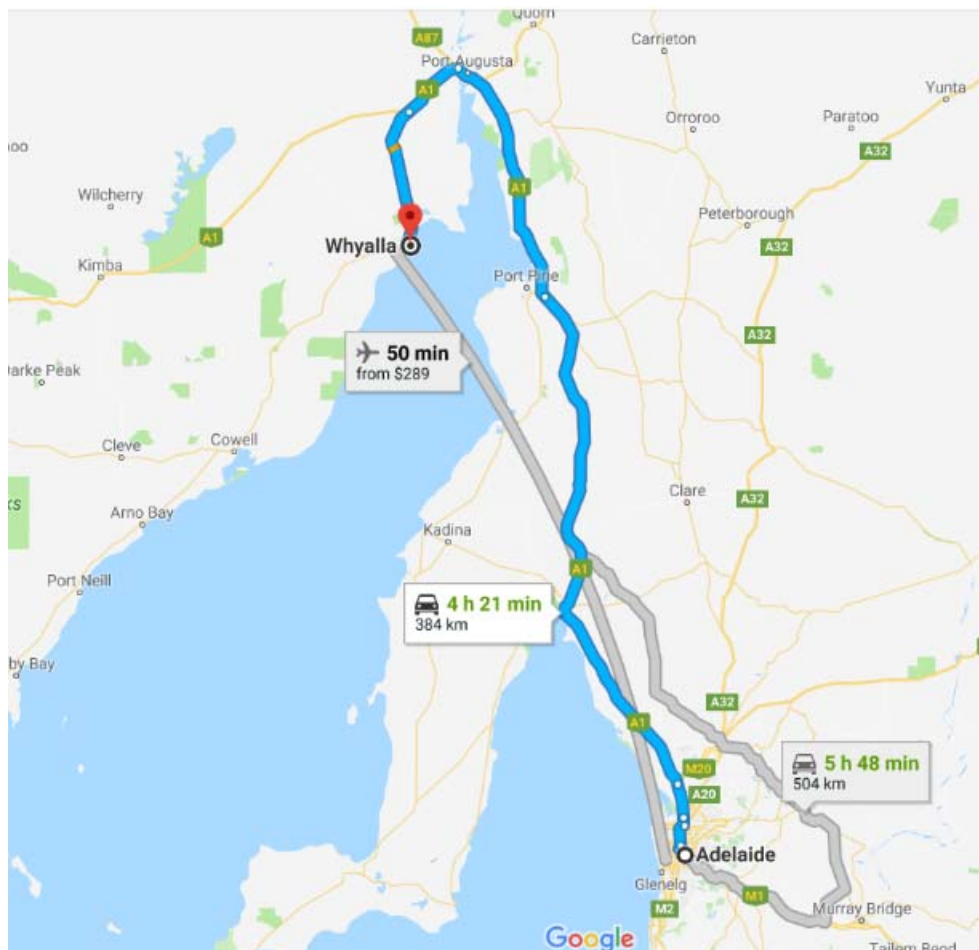


Figure 7 Adelaide to Whyalla, Source: Google Maps 2017

The Lincoln Highway (B100) consists of a two-way undivided road which comes under the care, control and management of the Department of Planning, Transport and Infrastructure (DPTI) in South Australia, as seen below in Figure 8.

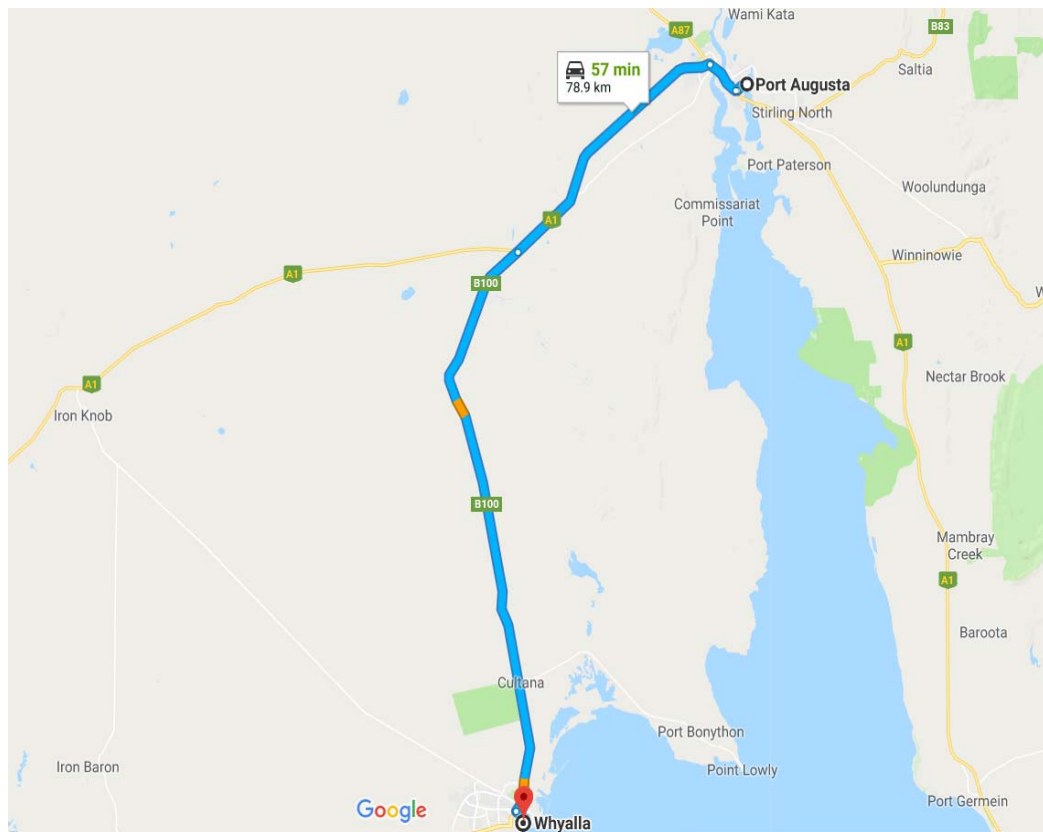


Figure 8 Port Augusta to Whyalla via Lincoln Highway, Source: Google Maps 2017

The Lincoln Highway from the Eyre Highway (A1) to Whyalla has been gazetted for Level 3A access under the Performance Based Standards (PBS) Scheme, through the NHVR classification system and carries approximately 2,000 vehicles per day (VPD).

The following approved Restricted Access Vehicles (RAV's) are:

- Up to 36.5 m Road Train (General Mass Limit) GML
- Up to 36.5 m Road Train (Higher Mass Limit) HML
- 4.5 m Wide and up to 93.5 t Low Loader (Over size/Over mass) OSM

3.3.3 DPTI Approved Freight Routes

Performance Based Standards (PBS) set minimum heavy vehicle '*performance*' standards to ensure trucks are stable on the road and can turn and stop safely. PBS vehicles are generally referred to as SMART trucks - because they work smarter.

The Standards are a national program that focuses on how the vehicle behaves on the road, rather than how big and heavy it is. With this, the Standards have been approved through the *Council of Australian Governments* and the *Australian Transport Commission*.

PBS vehicle routes are classified into four (4) national networks levels, i.e. Levels 1 to 4 as shown in Table 1. These network levels include a Class A and Class B category for the vehicle lengths which cover General Mass Limits (GML), Concessional Mass Limits (CML) and Higher Mass Limits (HML). Lincoln Highway PBS Classification is for Level 3A, which is approximately equivalent to a GML 36.5 m Road Train Route, as shown below in Figure 9.

Table 1 PBS Route network classifications

Vehicle Performance Level	Network Access by Vehicle Length (m)	
	Access Class "A" Existing Networks	Access Class "B" Classified PBS Networks
Level 1	L≤20 m	Not Applicable
Level 2	L≤26 m	L≤30 m
Level 3	L≤36.5 m	L≤42 m
Level 4	L≤53.5 m	L≤60 m

DPTI RAVnet provides up to date information on PBS route network classification of DPTI owned roads in SA. A RAVnet route assessment is only required for B-Double and Road Train access when a route is to be gazetted as part of the approved route network.

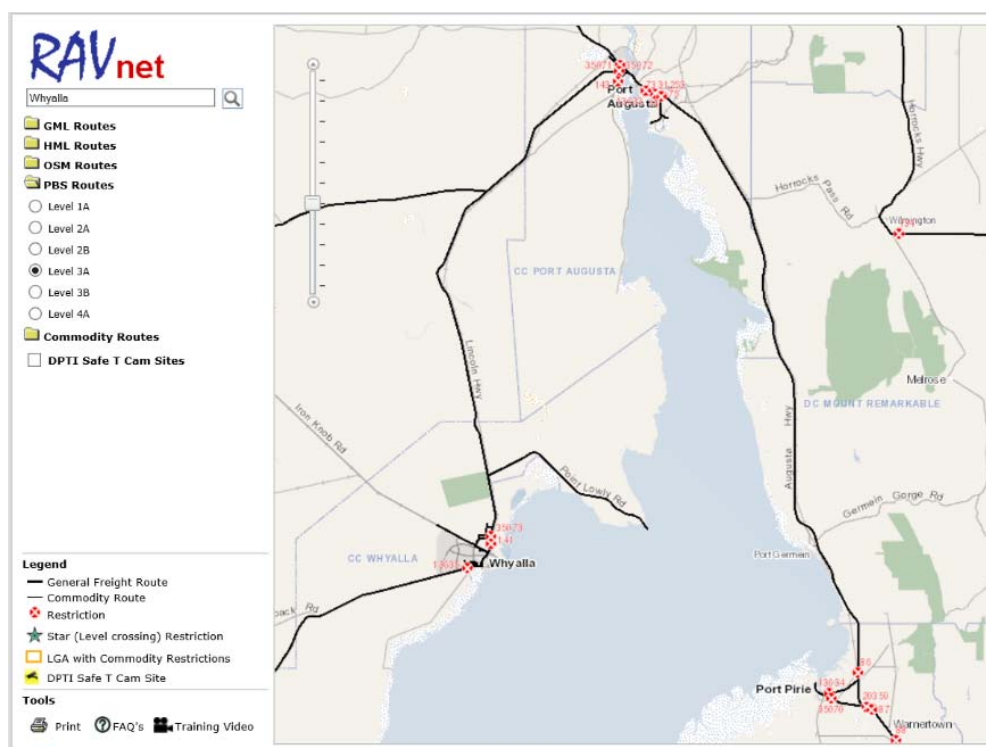


Figure 9 PBS Route Network Level 3A – Whyalla City Council Area

3.3.4 Existing Traffic Volumes

Annual Average Daily Traffic Volumes

The Annual Average Daily Traffic (AADT) estimate represents the total bi-directional traffic volume passing a roadside observation point over a period of one (1) year and divided by the number of days in a year.

Details obtained of traffic volumes from the Rural Traffic Estimate Maps produced by the Road Asset Management System, DPTI. These traffic counts identify the two-way AADT volumes and percentage of Heavy Vehicles (%HV).

The Lincoln Highway whilst gazetted as Level 3A classification has an AADT of 2,000 vehicles between the Eyre Highway and McBryde Highway, with 19% or 380 of these being heavy vehicles, regulated by a posted speed limit of 110 km/h.

As for traffic volume data for McBryde Terrace, Essington Lewis Avenue, Cudmore Terrace and Buttlingsgarra Way, unfortunately, current data is unknown as there is no recorded traffic data available.

Car Parking

The existing Jetty is accessible by a large surface car and trailer (boat) parking area which is part of the Whyalla Marina. This large surface car park has an estimated forty-two (42) car and trailer (boat) formal parks in the car parking area adjacent the marina and boat ramp.

There are other parking areas just off Buttlingsgarra Way. The first right leads into the car park for the Whyalla Surf Lifesaving Club, which can accommodate an estimated one hundred (100) formal parking spaces.

Further along Buttlingsgarra Way, the second right is a car park for the breakwater and existing Whyalla Jetty, which accommodates an estimated sixty (60) formal parking spaces.

Towards the Whyalla Marina, there is further estimated thirty five (35) formal parking spaces available, with another estimated fifty five (55) formal parking spaces at the end of Buttlingsgarra Way behind the Whyalla Yacht Club.

3.3.5 Crash History

Cudmore Terrace

A review of the crash data from Location SA Map Viewer (2015) indicates that in the immediate area of the Whyalla Jetty Redevelopment (Buttlingsgarra Way) shows there are no recorded crashes.

However, the road connecting Buttlingsgarra Way, Cudmore Terrace have recorded 7 crashes, with two (2) injury casualty crashes, and the remaining five (5) Property Damage Only (PDO), as seen in Table 2.

Table 2 Recorded Crash Data for Cudmore Terrace

Number of Crashes	Reason	Additional Information (day/night, fatality/serious)
2 crashes	All Right Angle	1 x casualty injury, and 1 x PDO, 1 x night time hours, 1 day time hours
4 crashes	All Right Angle	1 x casualty injury, 3 x PDO, 1 x night time hours, 3 x day time hours
1 crash	Hit Parked Vehicle	PDO (Property Damage Only), night time hours

The main cause of the crashes along this section of Cudmore Terrace includes six (6) right angle crashes, and one (1) hit parked vehicle crash, which is symbolised in Figure 10 below.



Figure 10 Road Crash Locations for Cudmore Terrace

Surrounding Road Network

Crash data was also reviewed for connecting roads further north which could be used to gain access to Cudmore Terrace and Buttlingsgarra Way through to the Whyalla Jetty.

Looking at the crash data from Location SA Map Viewer (2015) the stretch of road along the Lincoln Highway from the intersection of Point Lowly Road through to McBryde Terrace, and then continuing onto Essington Lewis Avenue, which connects with Cudmore Terrace, a further sixteen (16) crashes have been recorded including three (3) casualty injury crashes, eleven (11) Property Damage Only (PDO), and four (4) hit animal as seen in Table 3 below.

Table 3 Recorded Crash Data for surrounding road network

Number of Crashes	Reason	Additional Information (day/night, fatality/serious)
Lincoln Highway		
4 crashes	All Hit Animal All at Night	4 x hit animal, 4 x PDO, and 4 x night time hours
3 crashes	Rear End Hit Fixed Object Roll-over	1 x casualty injury, 2 x PDO, and all 3 crashes during day time hours
2 crashes	Right Turn Hit Fixed Object	1 x PDO, 1 x right turn, 1 x hit fixed object, 1 x day time hours, 1 x night time hours
1 crash	Right Angle	1 x casualty injury, 1 x right angle, 1 x night time hours
1 crash	Side Swipe	1 x PDO, 1 x side swipe, 1 x day time hours
McBryde Terrace		

Number of Crashes	Reason	Additional Information (day/night, fatality/serious)
4 crashes	Rear End Right Angle Right Turn	1 x casualty injury, 2 x PDO, 1 x rear end, 1 x right angle, 2 x right turn, 3 x day time hours and 1 x night time hours
Essington Lewis Avenue		
1 crash	Right Angle	1 x PDO, 1 x right angle, 1 x day time hours

The main cause of the crashes along this section includes four (4) hit animal (all at night) three (3) right turn crashes, three (3) right angle crashes and one (1) hit fixed object, one (1) rear end and one (1) side swipe crash, which is symbolised below in Figure 11.



Figure 11 Road Crash Locations for Cudmore Terrace

3.4 Traffic Impact Assessment

The principal issues associated with traffic and transport will be during the construction phase of the Whyalla Jetty Redevelopment, and the movement of construction vehicles and the associated material deliveries.

Following completion of the jetty construction the potential traffic generated during operation is expected to be similar to existing levels, and therefore not considered further.

3.4.1 Construction Timeframe

The Whyalla City Council has provided an overview in regards to the proposed construction timing for the project, as shown in Table 4 below. The overall proposed construction timing consists of the following:

Table 4 Proposed Construction Timeframe

Item	Quantity No.	Time – Approx. Days/Weeks	Comments
Site establishment and induction	1	5 Days	
Pile 457 mm x 9.5 mm Diameter	102 No.	25 Days	Driven by block off barge
Concrete beams between	51	15 Days	Placed by crane off barge
Stringers between concrete beams	107	20 Days	
Concrete deck panels	224	30 Days	Placed by crane off barge
Hand rails including lights	632 m	30 Days	Placed on jetty from the jetty
Total Construction Time		25 Weeks	

3.4.2 Proposed Construction Process

The proposed construction methodology is outlined in previous section 2.2.

The area available for storage or construction equipment and materials, is shown below in Figure 12.



Figure 12 Proposed storage area for jetty redevelopment works

3.4.3 Impacts

The estimated maximum trips for construction staff movements to and from the site are typically based on an estimated maximum workforce at any one time, however no information in regards to staff numbers, resources or vehicle movements are available at this time. However, the construction workforce is not expected to be large, and staff movements will have negligible impact on the surrounding road network.

Deliveries of material and equipment required for construction will be spread over the construction period, and although the estimated number of vehicle movements are not available at this time, they are not anticipated to be of any significance.

The impacts from traffic and transport related activities are not considered to be significant due to the limited number of vehicle movements, current low traffic volumes and good access to the Lincoln Highway.

The proposed laydown area for construction has no impact on traffic, and minimal impact to available parking. If additional laydown area is required, there is ample additional room

available within the existing footprint of the areas below without impeding on day-to-day trading, operations, visitors, and boating enthusiasts accessing the area:

- Whyalla Surf Lifesaving Club;
- Whyalla Jetty;
- Whyalla Marina; and
- Whyalla Yacht Club.

Due to the proposed minor increase in heavy vehicle / construction traffic in the area surrounding the proposed construction area, there is a risk some motorist, pedestrians and cyclists may unexpectedly encounter slow moving vehicles. Signs warning motorists, pedestrians and cyclists to expect slow moving traffic would be erected to manage this risk.

Also resulting from the increased heavy vehicle / construction traffic, there is the potential for road pavement and footpath damage to occur during the construction phase. The contractor should undertake consultation with Whyalla City Council to identify areas most at risk of damage and implement an inspection program to monitor pavement and footpath condition.

3.5 Management / Mitigation Measures

The selected transport contractor will develop the specific traffic management measures as part of the process of obtaining approvals from the relevant state and local road authorities including Whyalla City Council and DPTI located along the defined transport route(s) for the transportation of the necessary equipment, construction vehicles and materials.

The proposed management measures would likely include the following:

- **Engaging licensed and experienced transport contractor(s)** who have the required equipment and experience in transport of over dimensional and over mass loads, and have established knowledge and contacts with the relevant road authorities. The transport contractors will generally be responsible for:
 - Obtaining all the required permits for undertaking the transport task, from the responsible authorities;
 - Selecting final route, mode of operation and timetable and identifying any modifications required to existing road infrastructure (such as, temporary removal of street furniture, temporary modifications to roundabouts, intersections and access points) as part of obtaining the required permits;
 - Complying with over dimensional and over mass permit conditions stated by authorities, including measures such as pilot cars and police escorts and staging of deliveries to meet restrictions on travel times along different routes;
 - Phasing of delivery schedules to meet construction requirements, and to ensure deliveries will not overwhelm transport infrastructure, based on the permits obtained from authorities;
 - Conducting any surveys and arranging for any pavement and infrastructure inspections prior to carrying out the transport tasks to ensure all roads along the proposed route are suitable; and
 - Installing of suitable warning signs and signage at appropriate locations along the route, to alert other transport users of the transportation activities.
- **Developing of a specific Traffic Management Plan (TMP)** would be developed in further consultation with the relevant authorities, Whyalla City Council and DPTI, to ensure all road safety, traffic issues are addressed, and the impacts to the local communities and road users are minimised. The TMP will include:

- Designated delivery periods, delivery routes and access points to the site for all materials and equipment supplied for the proposed storage area;
 - Designated speed limits and load limits specified for heavy vehicle routes;
 - Directional and warning signage on the designated access routes to the storage area;
 - Designated reserved areas on the construction site for parking, turning, loading and unloading;
 - Appropriate traffic controls and management on site to ensure that vehicles use the designated site access tracks and do not travel off these tracks;
 - Appropriate traffic controls and management on site to ensure that vehicles use the designated wash down areas if applicable;
 - An inspection and maintenance program for the selected access routes to ensure these are kept in an adequate and safe condition; and
 - Controls and management measures to ensure shared access/egress, to/from the storage area are maintained for the Whyalla Surf Lifesaving Club, Whyalla Marina and Boat Ramp, and Whyalla Yacht Club during construction operations.
- **Developing and implementing a suitable community information and awareness program** to ensure that residents along the preferred routes are fully aware of the proposed transportation plans, timings and activities.

4. Development Plan Considerations

Consideration of the proposed jetty redevelopment in relation to the Development Plan has been completed by Development Answers, who have been independently engaged by Council.

4.1 Existing context

As outlined throughout this report, the proposal seeks to replace the existing Whyalla jetty – a jetty that has outlived its useful life.

The replacement jetty is located in the same position as the existing jetty (in an extended and varied form with a length of 165 metres and a circular walkway) and abuts/joins the existing causeway at the same location.



Figure 13 Existing jetty

The jetty is located within, and forms an integral part of, the Whyalla marina and waterfront area that has associated infrastructure in place relating to car parking, public conveniences, services and the like – the marina/waterfront area also has excellent linkages in place to adjoining seafront reserve areas and the central business district.



Figure 14 Whyalla marina and waterfront area

4.2 Development Plan zones

The proposed new jetty replacement is predominantly located in the Coastal Marina Zone of the Whyalla Council Development Plan.

A small portion of the jetty protrudes into an area defined as Land Not Within A Council Area (Coastal Waters) – this area is in effect zoned as Coastal Waters within the Land Not Within A Council Area (Coastal Waters) Development Plan.

The approximate location of the replacement jetty, relevant to the zoning of the land, is illustrated below.

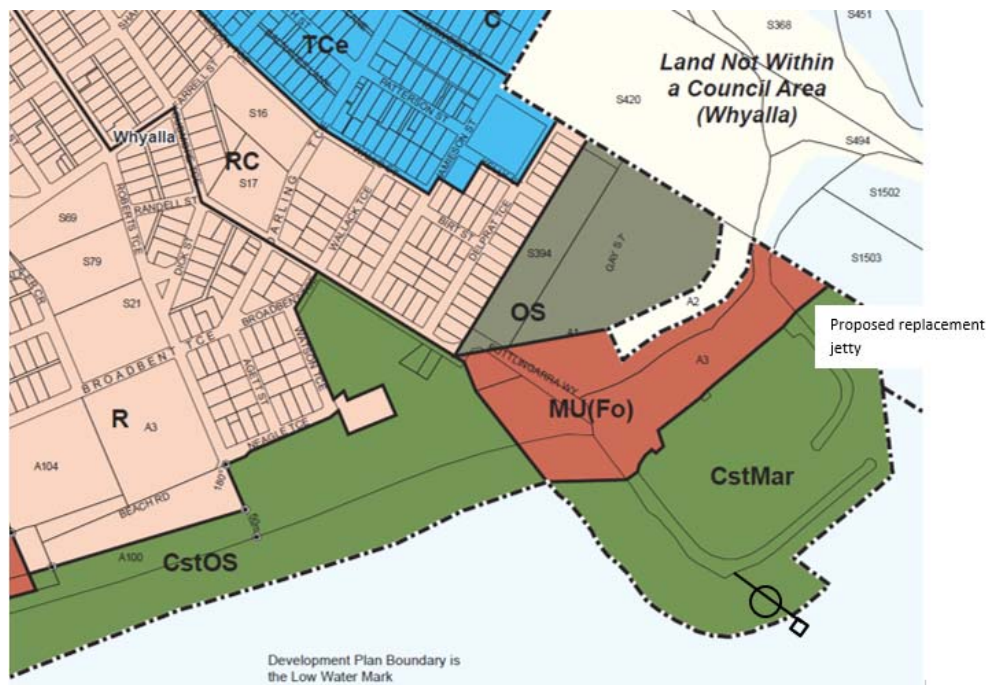


Figure 15 Development Plan zones

Notwithstanding there is no change in use of the land, by virtue of the proposed new jetty being a replacement Jetty, both zones envisage a jetty or maritime infrastructure.

4.3 Coastal Marina Zone

No change in use of the land is proposed – the replacement jetty is located in the same position as the existing jetty (in an extended and varied form with a length of 165 metres and a circular walkway) and abuts/joins the existing causeway at the same location.

Notwithstanding no change in use is proposed, importantly, the Coastal Marina Zone specifically identifies a jetty/pier as an envisaged form of development in Objective 1:-

Objective 1:- A zone that provides for a marina and maritime structures including:

- (a) pontoons
- (b) jetties**
- (c) piers**
- (d) boat berths
- (e) slipways
- (f) repair facilities
- (g) wastewater collection, storage and transfer facilities.

Furthermore the Desired Character Statement for the Coastal Marina Zone states that the zone is to primarily accommodate coast protection works, marine waterways, berths, pontoons, jetties, piers, slipways and boat ramps.

Desired Character Statement

This zone primarily accommodates coast protection works, marine waterways, berths, pontoons, jetties, piers, slipways and boat ramps.....

.....The zone will be characterised by a high degree of pedestrian activity, with a particular focus on the waterfront and associated public reserves that provide for passive recreation....

..... Development will have a contemporary flavour, both in terms of built form and overall urban design.

Principle of Development Control 1 of the zone also envisages a wide range of land uses associated with those structures identified in Objective 1 including a marina facilities for which the jetty is associated with.

PDC 1:- The following forms of development are envisaged in the zone:

- boat berth
- boat construction, maintenance, repair or sale
- boat servicing facility (including fuel supply, power, water, effluent pump, toilets and showers)
- coastal protection works
- clubroom in association with a marina
- loading and unloading facilities
- **marina**
- parking for vehicles and boats
- small scale tourist development

- storage
- wastewater collection, storage and transfer facilities.

Consistent with the objectives, desired character and principles of the zone, importantly, a jetty is a 'merit' form of development in the zone.

In terms of the urban design elements of the jetty, it is understood that the Council has widely publicised the project through community engagement and has received strong support for the design – it is also noted the Desired Character for the zone reinforces use of contemporary structures.

The proposal maintains its current arrangements with regard to strong linkages to the Whyalla Marina, waterfront reserves, existing car parking and facilities, and to the central business district.

As outlined in this Environmental Report, the jetty has been designed with regard to key environmental principles outlined in the Development Plan at a zone and council-wide level relating to the coastal/marine environment, traffic and construction management.

4.4 Land Not Within A Council Area (Coastal Waters) Development Plan

As illustrated below, a small portion of the jetty protrudes into an area defined as Land Not Within A Council Area (Coastal Waters) – this area is in effect zoned as Coastal Waters within the Land Not Within A Council Area (Coastal Waters) Development Plan.



Figure 16 Coastal Waters boundary (shown in blue) – Source – Whyalla Council/DPTI

This Development Plan applies to the land bounded by the State borders with Western Australia and Victoria, the high water mark along the whole of the South Australian coast and the line

three nautical miles seaward of the low water mark, and includes both the Spencer Gulf and the Gulf St Vincent, the off-shore islands and the land three nautical miles seaward of the low water mark around the off-shore islands. It does not include any land in that area which is covered by a council area Development Plan or the Land Not Within a Council Area (Metropolitan) Development Plan.

Similar to the Coastal Marina Zone the proposed development is neither listed as 'complying' or 'non-complying' in the Land Not Within a Council Area Development Plan, and is therefore a 'merit' based application.

The proposed jetty is not affected by the Aquaculture Zone prescribed in the Land Not Within a Council Area (Coastal Waters) Development Plan.

Many of the Whyalla Council Development Plan provisions address the same policy directions that are contained in the Land Not Within a Council Area (Coastal Waters) Development Plan, principally under the heading of Coastal Development.

The Land Not Within a Council Area provisions do not provide any zone or site specific policy that directly relates to this proposal. However, various general policies in the Coastal Waters provisions seek to promote the segregation of land use to suitable areas, and development in areas zoned for that purpose.

Objective 2: A proper distribution and segregation of living, working and recreational activities by the allocation of suitable areas for those purposes.

Objective 3: The proper location of public and community facilities.

Objective 20: Location of activities, uses and development in areas zoned for that purpose.

The proposed development accords with these provisions – where the Coastal Marina Zone (for which the land is predominately located within) gives clear policy that promotes jetties, piers and the like.

4.5 Planning Authority

Through discussions with both officers of Council and the Department for Planning, Transport and Infrastructure, it has been determined that the State Commission Assessment Panel (SCAP) is the relevant authority as part of the development lies within Land Not Within a Council Area – Section 34(1)(b)(iv) of the Development Act.

4.6 Agency referrals

The Council has held pre-application discussions with the relevant planning authority and government agencies on the project.

Subject to the outcome of an environmental assessment, no significant issues were raised in the context of a replacement jetty – it is also noted that relevant agencies will be formally consulted with via the SCAP Development Plan assessment process.

4.7 Summary

The proposed development seeks to provide for renewed recreational infrastructure that will enable ongoing benefit for community users and visitors to the area. The improvements do not impact on the public's ability to access other adjacent coastal areas.

The Council has widely publicised the project through community engagement and has received strong support for the design and community need.

In addition to the Development Plan being an enabler for the proposed development, the proposed development enacts targeted tourism and community development aims and objectives of the State Strategic Plan, the State Planning Strategy, the Region Plan and Council's Strategic Management Plan.

The jetty has been designed by Magryn Consulting Engineers in liaison with Council's Engineering Services department and will be subject to final engineering documentation and Building Rules certification, post a Development Plan Consent.

5. Draft construction and environmental management plan

5.1 Purpose of this CEMP

This draft CEMP seeks to provide high level guidance to avoid and/or minimise potential environmental impacts associated with the construction phase of the Whyalla Jetty Redevelopment. This draft CEMP identifies the minimum mitigation measures and strategies that should be adopted during the construction phase of the project, including site closure and/or rehabilitation works.

A final CEMP(s) will be prepared by the respective construction contractor(s) for review and acceptance prior to works commencing on site. Detailed site-specific mitigation measures will be developed by the construction contractors and included in any final CEMP. A CEMP is a dynamic document and is to be updated by the contractor as required to reflect detailed methodology, changes to site conditions or scheduled works. The construction contractor will take responsibility for reviewing and managing the outcomes identified in the CEMP.

The purpose of the CEMP is to:

- Provide for works to be carried out in accordance with the environmental conditions outlined in the Development Approval and any other permits/licences;
- Provide for works to be carried out in accordance with the applicable environmental legislation and standards;
- Outline how the environmental features of the site are to be protected during construction;
- Ensure all potential environmental risks associated with construction are identified and assessed;
- Protect environmental features and sensitive receptors;
- Outline measures to monitor and control potential environmental impacts associated with the works that are implemented effectively;
- Provide government, community and other stakeholders with assurance that environmental issues associated with the works are managed appropriately;
- Allocate clear responsibilities for the environmental management at all levels; and
- Optimise construction methods.

5.2 Environmental Management System

Managing environmental issues and promoting environmental awareness during the site works is an essential component of responsible project management. It requires the active consideration of environmental issues and health and safety as a prerequisite to all construction operations. This section identifies the key management measures which will be required to avoid or minimise project impacts. The Contractor's EMS is expected to comprise an environmental policy and the basic elements indicated in Section 5.3 of this document.

5.2.1 Implementation Responsibility

The roles and responsibilities of the following key participants in the construction works for the project are outlined below:

- Whyalla City Council Principal

- Contractor Superintendent
- Contractor Environmental Manager
- Contractor and Staff.

Council will engage a construction company ("the Contractor") who will be responsible for ensuring the final CEMP is developed and implemented by all staff and their subcontractors involved with the construction works.

The Principal should ensure that all contractual documents specifically quote a CEMP in terms of responsibility for addressing and implementing relevant environmental requirements. The contractual documents should also indicate that the Contractor is responsible for ensuring legislative and CEMP compliance controls are maintained on site.

The Contractor is responsible for obtaining all relevant approvals/permits/licences prior to works commencing. The Contractor will appoint an Environmental Manager who is responsible for developing environmental impact mitigation measures compliant with all approvals, permits, licences and management measures and incorporating this into the CEMP for construction works. The Contractor will assign a superintendent who will have overall responsibility for ensuring that all employees, subcontractors, and persons involved with the planning and carrying out of the proposed works are familiar with their obligations to comply with environmental requirements.

Successful implementation relies upon support for, and compliance with, the CEMP's requirements from all involved parties. Responsibilities are detailed below:

Whyalla City Council Principal (the "Principal")

- Key contact and representative of Whyalla City Council.
- Ensure contractual documents include environmental responsibilities, adequate training and preparation of a final CEMP prior to construction commencing.
- Overall responsibility for ensuring the project meets its compliance obligations and environmental requirements are implemented.
- Agree procedures for emergency response.
- Agree frequency and method of auditing, monitoring and other matters which are to be reported to Whyalla City Council.
- Environmental Manager (assigned by the Contractor)
- Responsible for managing environmental aspects during the construction and site closure phases and that the Superintendent has the information required to implement site controls successfully.
- Checks all environmental requirements, licences and procedures are implemented.
- Advises staff of special requirements.
- Conducts or commissions a consultant to undertake environmental audits/monitoring during all stages to ensure implementation of requirements.
- Determines and/or ensures environmental controls and procedures are in place and maintained during all phases of the project.
- Determines the training/instructions required for staff to be able to meet their environmental obligations.
- Reports environmental incidents during construction.

- Responsible for the emergency response procedure for environmental incidents.

Superintendent (assigned by the Contractor)

- Supervises and implements environmental controls on site during the construction works.
- Ensures training/instructions required by staff to be able to meet their environmental obligations, are undertaken and recorded.
- Reporting of environmental incidents to the Environmental Manager.
- During an emergency situation, responsible for informing the Environmental Manager and activating the response procedure.

Contractor(s) and Staff

- Implement environmental controls as directed
- Report environmental incidents to the superintendent.

Table 5-1 summarises the responsibilities relevant to implementation of a CEMP.

Table 5-1 Project Role Description and Responsibility

Planning	Principal	Oversees planning and Tender phase. Responsible for ensuring environmental compliance during the design phase and CEMP preparation.
	Design Consultant	Responsible for design of the project. Responsible for preparation of a draft CEMP to guide development of a project-specific CEMP and outline legislative requirements.
	Environmental Manager	Responsible for review of the draft CEMP and preparation of final CEMP prior to construction commencing.
Construction Works	Principal	Responsible for environmental compliance.
	Superintendent	Oversees construction phase and enforces environmental controls on site.
	Environmental Manager	Ensures Contractor complies with environmental requirements.

5.3 CEMP Review, Reporting and Monitoring

The CEMP will only be effective if it is appropriately managed and utilised. Although the final CEMP will be developed prior to the commencement of construction works by the Contractor with the intention of covering the detailed methodology, circumstances may differ from those anticipated. Consequently it is very important that the CEMP be regularly reviewed and updated. This will ensure that the measures, responsibilities, criteria and corrective actions remain achievable, effective and suitable to the project, whilst maintaining compliance with relevant legislation and policy.

An important principle that is embodied in this draft CEMP is that of “continuous improvement”. To facilitate this process it is critical that an appropriate monitoring, reporting and review process be developed and adopted.

5.3.1 Review of CEMP

The CEMP is to be reviewed throughout the construction phase fortnightly (or at a frequency determined by the Contractor). The review is to examine the following as a minimum:

- The implemented environmental management activities
- The incident reporting and preventative action procedures
- The complaints handling procedures
- The emergency response procedures for environmental incidents.

5.3.2 Monitoring Records

The results of any monitoring required by any approvals, licences or Conditions of Consent granted for the construction phase of the development must be:

- In a legible form
- Kept for at least 4 years after the monitoring or event to which they relate/took place
- Be available upon request to any authorised person.
- The following minimum records will be kept in regards to any monitoring / sampling activity:
- The date(s) on which the monitoring was taken
- The time(s) at which the monitoring was collected
- The point at which the monitoring was taken
- The name of the person who conducted the sample.

5.3.3 Sampling Quality Control Plan

Where practicable, NATA-accredited laboratories will be used for any testing of samples. Laboratory detection limits must be below the adopted assessment criteria.

Quality Assurance / Control measures such as collection and testing of duplicates and blind duplicates will be used to ensure the accuracy and quality of the required monitoring.

5.3.4 Follow Up Action

Where adherence to the requirements in this document are found to be unsatisfactory in achieving broader environmental and site management goals, action will be taken to investigate the cause and make amendments to the CEMP as required.

5.3.5 Reporting

The Contractor shall provide a fortnightly report to the Principal to cover the following circumstances:

- Include a report on any monitoring undertaken in accordance with licences, approvals or conditions of consent
- Provide a summary of complaints received during the construction phase of this project
- Report of compliance with the CEMP.

5.4 Training and Site Induction

The Contractor will oversee that all employees, sub- contractors and visitors receive environmental instruction in relation to the CEMP and legislative requirements. Each person will be made aware of and have an understanding of their obligations and duties detailed in this CEMP. Everyone involved with the project should be familiar with the CEMP components that are relevant to their role.

The Principal is responsible for overseeing that the contractual agreement with the Contractor specifies the necessity of providing adequate training to the construction teams. This responsibility is to be assigned to the Superintendent who can liaise with the Principal and other agencies, if required. During construction works, the Contractor must ensure that each operative is trained to use the machinery and materials on site efficiently to avoid environmental nuisance, including, but not necessarily limited to, noise, air pollution, impacts on water quality, spread of waste material and land contamination.

5.5 Emergency Response and Incident Management

The final CEMP should detail emergency response procedures, with clear lines of responsibility to enable effective response with minimal environmental harm or disruption. The following sections provide an outline of procedures and protocols that should be included in the final CEMP.

5.5.1 Environmental Incidents (Notification of Environmental Harm)

For a particular incident, the requirement for notification in accordance with legislation depends on the extent of harm or the potential damage to the environment. To ensure that Whyalla City Council has a consistent approach to incident reporting, the Principal must be contacted immediately after the site has been made safe. However, the steps necessary to render the site safe and notify appropriate authorities may require an immediate response from the Principal. In addition valuable time may be lost in attempts to contact the Principal who may be unavailable to respond, however attempts to contact the Principle should be made immediately following an event. Therefore the Contractor's Environmental Manager and Superintendent will be responsible for ensuring:

- An immediate assessment of the potential onsite and offsite impacts of the incident
- Consulting (if necessary) with emergency services
- Instigating appropriate steps to mitigate the impacts
- Advising regulatory authorities, where these authorities can provide assistance with mitigation of impacts.
- Failure to report an incident may result in enforcement action on all involved.
- The Principal will provide written details of the notification to the appropriate authorities within 7 days of the dates on which the incident occurred.
- The Principal will liaise with the appropriate authorities to provide suitable details within the time specified.

5.5.2 Emergency Response Plan

Emergencies that may occur during the construction phase of the project include:

- Storm conditions i.e. wave action, high tides.
- Fire
- Chemical spill
- Flooding
- Explosion
- Wildlife Injury
- Damage to power or services cables
- Personnel injury

Prior to the commencement of the construction phase, the Principal and the Contractor are to agree on procedures for emergency response. It is the responsibility of the Contractor to develop, implement and train staff in the emergency response procedures.

To ensure emergencies are managed in an appropriate manner, the Contractor is to follow the general procedures outlined in Table 5-2.

Table 5-2 General Emergency Response Plan

Standard	Management Criteria
Policy	To minimise the risk of an environmental accident or emergency during construction phase of the Project.
Performance Objective	Ensure that an Emergency Response Plan is kept in place to respond to any accidents or incidents that may impact on the environment and that all personnel are inducted in its application.
Implementation Strategy/ Mitigation Measures	Material Safety Data Sheets for all relevant materials used or stored on site, regardless of quantity, for the construction works shall be kept on site by the Contractor.
	Spill Response Kits, fire extinguishers and other emergency response equipment should be fully maintained and readily available.
	In the event of an emergency the Contractor's Superintendent is to immediately notify the Principal. The Superintendent will also notify the relevant emergency services.
Monitoring	Following an emergency, the affected areas shall be monitored as required. In the event of a spill, it should be ensured that all contaminated material, including soil, has been removed and properly disposed of by a suitably qualified contractor.
	Follow up action is to be undertaken to ensure adequate provisions are implemented to minimise or eliminate the risk of reoccurrence of the emergency.
Reporting	Once immediate mitigation steps have been undertaken and the incident contained. All incidents/emergencies will be reported to the Principal. The Contractor is to record emergency information on an Incident/Complaints Form and will include the following: • Location of the emergency or incident • Name and telephone number of the designated contact person • Time of the emergency/incident • The environmental harm or nuisance caused, threatened, or to be caused by the emergency/incident • Any remediation work undertaken • Actions to be taken to prevent further incidents/emergencies and mitigate any environmental harm and/or nuisance caused by the incident/emergency.
Corrective Action	Non-conformance with this plan shall be documented by the Principal and corrective action undertaken to ensure future conformance. All non-conformances shall be documented and passed onto the Contractor.

5.5.1 Incident and Corrective Action Records

All environmental incidents need to be documented, recorded and followed up with identified corrective action(s). Incident Reporting documentation needs to be completed by those personnel involved along with the Contractor's Environment Manager; approval should be sought from the Principal. Corrective actions should be identified and documented in Corrective Action documentation and approved by the Principal's Representative. While identifying

corrective actions to be taken, personnel responsible for implementing the corrective action need to be identified and informed of their responsibilities. Corrective Action documentation should be updated throughout the course of the construction works and/or until the identified actions have been fully completed.

Incident/Emergency Response Plan Contact Register

In the event of an incident or emergency occurring at the site, contact will be made with the key emergency services as identified in Table 5-3.

Table 5-3 Incident/Emergency Contact Register

Organisation	Title	Telephone Number
Principal (Whyalla City Council)	TBC	TBC
Whyalla City Council Representative	TBC	TBC
Contractor Environmental Manager	TBC	TBC
Contractor nominated Superintendent	TBC	TBC
EPA	Pollution and Environmental Incident reporting (24 hour)	(08) 8204 2004
Fire Brigade Police Ambulance	Emergency	000

5.1 Community information and grievance procedure

A programme will be established of public information provision to residents or other nearby sensitive receptors which may be impacted by the construction works, including haul traffic. A grievance procedure will be included in the final CEMP and implemented during the construction phase. A complaints register including details of the complaint, how the complaint was actioned / resolved should be maintained and retained throughout the construction period.

5.2 Stakeholder Consultation

Stakeholder consultation and marine user notifications, which are industry standard processes, will be implemented for the activity in order to inform and mitigate the impacts on current users of the area. Notifications will also be undertaken to inform all maritime users of action (including location and duration) to support management of collision risk. The following controls will be implemented to mitigate interference issues between activity-related vessels and other users of the area.

- Consultations with stakeholders held prior to commencement of the project to notify current users of the changes that will be in place during construction.
- The South Australian Department of Planning, Transport and Infrastructure will be contacted to issue a notice to mariners prior to the commencement of the project. This will highlight the works being undertaken and the construction exclusion zones/navigation restrictions associated with the project.
- Land-side pedestrian access will be managed via the placement of construction fencing, signage and site induction processes.

5.3 Environmental Sub-management Plans

The following section outlines potential mitigation strategies to avoid and/or minimise potential impacts to various environmental aspects associated with the construction works. Key legislative considerations and potential approvals/permits are highlighted. This will need reviewing against the construction methodology, once finalised. The Contractor's Environmental Manager will need to determine the Inspection / Criteria/ Target / Evidence required to meet compliance with each element of the CEMP. Mitigation measures provided represent the minimum requirements that should be adopted in any final CEMP to be prepared prior to commencement of construction. Where indicated, Management Plans should be prepared and provided as part of the final CEMP.

The following outline sub-management plans provided here are:

- Flora and Fauna Protection (section 5.4)
- Air Quality Control (section 5.5)
- Construction Noise and Vibration Control (section 5.6)
- Water Quality Protection (section 5.7)
- Materials, Fuels and Waste Management (section 5.8)
- Weed, Pest and Disease Control (section 5.9)

5.4 Flora and Fauna Protection

Table 5-4 Flora and Fauna Protection

Objective	Minimise impacts to protected flora and fauna including seabed communities.
Legislation / Policy	<i>Native Vegetation Act 1991</i> <i>Native Vegetation Regulations 2003</i> <i>Environment Protection and Biodiversity Conservation Act 1999</i> <i>Natural Resources Management Act 2004</i> <i>National Parks and Wildlife Act 1972</i> <i>Coast Protection Act, 1972</i> <i>Development Act, 1993</i> <i>Fisheries Management Act, 2007</i>
Permits/Approvals	Council responsibility

Table 5-5 Flora and Fauna Protection Mitigation and Controls

Construction Activity	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
Pre-construction planning.	Environmental values not known by project personnel and impacts not managed appropriately.	A Flora and Fauna Management Plan will be provided as part of the final CEMP. Site inductions will educate all staff on key environmental values, obligations, and management measures. Timing of activities should be coordinated to avoid peak frequency of marine fauna if it is known that activities cross known cetacean migratory routes.	TBC	Environmental Manager Superintendent
Site establishment (including temporary facilities and stockpiles).	Disturbance to shore vegetation	A suitably qualified person will assess the site prior to disturbance to identify any protected wildlife within the project footprint. The construction footprint will be minimised to avoid where possible disturbance to protected flora/fauna values.	TBC	Environmental Manager Superintendent

Table 5-5 Flora and Fauna Protection Mitigation and Controls

Construction Activity	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
		Site structures and laydown/stockpile areas will be located on previously cleared areas away from shore vegetation including native grasses, where possible.		
Removal of existing jetty infrastructure. Pile driving of new pylons. Placement/anchoring of construction vessels.	Disturbance to the seabed and benthic habitats.	A suitably qualified person in fauna management will inspect the pylons prior to removal. Where possible, protected mobile fauna (e.g. syngnathids) will be relocated from the work area to adjacent habitats prior to pylon removal. Pylons will be installed as per design. A map that spatially indicates pylon placement will be developed as part of the design and provided to the Contractor. Vessel placement will be planned in such a way that minimal spud deployments are required. Mobilising the barge/crane will consider tidal movements and weather conditions to ensure minimal disturbance of the sea bed. Works will be postponed in the event weather conditions are forecast to be such that they may interfere with the correct installation of piles. Anchoring should be planned for sandy seabed environs and should not occur in sensitive habitats except in the event of emergency. Anchors will be raised as slowly and steadily as possible from the seabed. All equipment and gear on the vessels should be securely fastened during mobilisation/demobilisation.	TBC	Environmental Manager Superintendent

Table 5-5 Flora and Fauna Protection Mitigation and Controls

Construction Activity	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
		Lifting is to be carried out by competent personnel using equipment that is suitable, certified and maintained. Detailed records of any equipment lost overboard or dropped will be maintained and reviews will be undertaken to reflect on methods to mitigate repetition of the incident.		
Removal of existing jetty infrastructure. Pile driving of new pylons.	Behavioural or physiological impacts to noise-sensitive marine fauna.	Noise mitigation controls for managing risk to sensitive marine fauna will be implemented as per Section 5.6 of this CEMP – Construction Noise and Vibration. Potential noise impacts are to be managed in accordance with Government of South Australia’s Underwater Noise Piling Guidelines (DPTI, 2012) or later version. Noise management will be based on the understanding that the relevant species in the vicinity of the project area include low-frequency Cetaceans, mid-frequency Cetaceans, Pinnipeds and fish.	TBC	Environmental Manager Superintendent
Removal of existing jetty infrastructure. Pile driving of new pylons. Placement/anchoring of construction vessels.	Collision/entanglement/physical impacts to marine fauna.	Operations of vessels will be commensurate with Part 8 of the EPBC Regulations (Interacting with Cetaceans and Whale Watching). The Australian Guidelines for Whale and Dolphin Watching (Commonwealth of Australia, 2017) for sea-faring activities will be implemented across the entire project. This includes the implementation of the following guidelines: - Caution zone (300 m either side of whales and 150 m either side of dolphins) – vessels must operate at no wake speed in this zone. - Caution zone must not be entered when calf (whale or dolphin) is present - No approach zone (100 m either side of whales and 50 m either side of dolphins) – vessels should not enter this zone and should not wait in front of the direction of travel or an animal or pod, or follow directly behind	TBC	Environmental Manager Superintendent

Table 5-5 Flora and Fauna Protection Mitigation and Controls

Construction Activity	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
		- If there is a need to stop, reduce speed gradually. - Do not encourage bow riding. - If animals are bow riding, do not change course or speed suddenly. Waste management will be implemented appropriately to avoid/minimise risk of marine fauna entanglement with wastes (such as plastic bags, etc).		
Construction of new ramp at the breakwater.	Disturbance to habitat within existing rock armouring.	A qualified fauna specialist will inspect the work area prior to placement of any new rock or other material to identify if any protected mobile fauna or habitat is are present. Protected fauna identified will be relocated to adjacent habitat where possible. Placement of new rock armouring will be carried out so as to disturb the smallest area possible and without disturbing potential habitat outside the work footprint.	TBC	Environmental Manager Superintendent
Construction site decommissioning.	Minimise permanent impacts to flora and fauna.	Reinstatement of any areas of vegetation disturbed during construction. Endemic species only to be used.	TBC	Environmental Manager Superintendent

5.5 Air Quality Control

Table 5-6 Air Quality Control

Objective	Avoid and/or minimise air quality impacts during construction works.
Legislation / Policy	Environmental <i>Protection Act</i> 1993 Environment <i>Protection Regulations</i> 2009 Environment <i>Protection (Air Quality)</i> Policy 1994
Permits/Approvals	Council responsibility

Table 5-7 Air Quality Mitigation and Controls

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
Site establishment and pre-construction planning.	Environmental values not known by project personnel and impacts not managed appropriately.	An Air Quality Management Plan will be provided as part of the final CEMP, including any Air Quality monitoring to be undertaken upon receipt of a complaint. Site inductions will educate all staff on key environmental values, obligations, and management measures.	TBC	Environmental Manager Superintendent

Table 5-7 Air Quality Mitigation and Controls

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
Construction traffic entering/existing site. Plant and equipment operation. Sea vessel movements. Transportation of materials and equipment.	Exhaust fumes from construction and haulage to and from site, impacting surrounding environment including residential areas and marine wildlife.	All equipment will be properly maintained in good working order. Catalytic converters and exhaust filters will be correctly fitted where appropriate and available to minimise diesel exhaust emissions. Idling time of diesel engines should be limited and engines should not be overloaded. Fuel oil will meet regulated sulphur content levels in order to control SOX and particulate matter emissions. Engines will be operated in a manner so that regulated NOX emission levels are achieved. The Air Quality Management Plan will include measures to manage potential fugitive material during transportation and operation of equipment to control exhaust emissions. All vehicles and equipment will be operated and maintained to comply with regulatory standards for exhaust emissions. Any loads of dust generating or odorous materials will be sprayed with water and/or covered before transporting (to/from site). A procedure for complaints will be included in the Air Quality Management Plan.	TBC	Environmental Manager Superintendent

Table 5-7 Air Quality Mitigation and Controls

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
Sea vessel operation and installation of jetty lighting	Artificial lighting impacting wildlife.	Light spill from nearshore vessel or plant or safety operations will be minimised where possible using directional lighting. Light shields will be considered to avoid spill if sensitive receptors are determined during activities to be negatively affected. Light spill management measures will need to comply with navigation, vessel and site safety standards (e.g. AMSA Marine Orders Part 30: Prevention of Collisions; AMSA Marine Orders Part 21: Safety of Navigation and Emergency Procedures).	TBC	Environmental Manager Superintendent
Excavation of local material or placement of rock on breakwater	Odour from construction works or excavation/placement of odorous marine material impacting amenity of surrounding area.	Any material taken from the sea bed and placed on any beach must be substantially free of weed and vegetative matter including sea grass and kelp, and animal or fish matter. Any works involving potentially odorous materials to be undertaken with consideration to the amenity of public areas.	TBC	Environmental Manager Superintendent

5.6 Construction Noise and Vibration

Table 5-8 Construction Noise and Vibration

Objective	Avoid and/or minimise noise and vibration emissions during construction works.
Legislation / Policy	<i>Environmental Protection Act 1993</i> <i>Environment Protection Regulations 2009</i> <i>Environment Protection (Noise) Policy 2007</i> <i>AS2436 – 2010 “Guide to Noise Control on Construction, Maintenance and Demolition Sites</i> <i>Australian Standard AS 1055–1997 Acoustics – Description and measurement of environmental noise</i> <i>National Parks and Wildlife Act 1972</i> <i>Department of Planning, Transport and Infrastructure ‘Underwater Piling Noise Guidelines’ 2012.</i>
Permits/Approvals	Council responsibility

Table 5-9 Construction Noise and Vibration Mitigation and Controls

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
Site establishment and pre-construction planning	Environmental values not known by project personnel and impacts not managed appropriately.	The final CEMP will include a Construction Noise and Vibration Management Plan. Site inductions will provide information on marine mammal identification, and the environmental legal obligations for companies operating in SA state waters, should be provided to all staff involved in the piling activities. Likely marine mammal concentration areas, peak migration paths and times, key feeding sites, and other aggregation areas should be identified during the planning stage and this information should be provided to trained crew members and the marine mammal observer to improve the identification and observation of marine mammals.	TBC	Environmental Manager Superintendent
Vessel movements, operation of construction plant and equipment.	Noise and vibration from construction activities may impact on nearby sensitive	Throughout construction activities the Contractor will be required to observe all obligations under the Environment Protection Act 1993 and Section 6 of	TBC	Environmental Manager Superintendent

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
Pile driving of new pylons. Placement of rock on the breakwater. Construction site decommissioning and make good.	receptors including residential dwellings and/or marine fauna.	AS2436 – 2010 “Guide to Noise Control on Construction, Maintenance and Demolition Sites”. Activities to be undertaken must be compliant with requirements of Environment Protection (Noise) Policy 2007. Construction plant and equipment is to be properly maintained and have noise limitation equipment installed as per manufacturer’s specification. Plant and equipment used on site to be stood down when not required. Construction activities to occur only during the hours specified. (7:00 am to 6:00 pm Monday to Saturday) unless otherwise agreed with the EPA. Nearby residents/stakeholders will be notified of construction activities. Separation distances maintained to the greatest extent possible from construction works or fixed plant, to any sensitive receptors. Noise monitoring/inspections to be undertaken as part of site audits. Noise monitoring undertaken if required upon receipt of a complaint. Noise/vibration control barriers may need to be setup between noise/vibration sources and sensitive receptors.		
Vessel movements; Pile driving of new pylons; Placement of rock on the breakwater.	Noise and vibration impacts to sensitive marine fauna (eg. whales, dolphins, dugongs, pinnipeds, sea turtles).	Piling activities will be conducted in accordance with the <i>Department of Planning, Transport and Infrastructure ‘Underwater Piling Noise Guidelines’ 2012</i>. The Contractor will develop and implement a Noise and Vibration Management Procedure that ensures construction activities, especially pile driving and	TBC	Environmental Manager Superintendent

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
		operating sea vessels, adheres to the limit conditions provided by the <i>Underwater Piling Noise Guidelines 2012</i>. The procedure will also include, but not limited to, the following controls: <i>Timing and duration</i> – Avoid conducting piling activities during times when marine mammals are likely to be breeding, calving, feeding, or resting in biologically important habitats located within the potential noise impact footprint. <i>Contract documentation</i> – The Construction Noise and Vibration Management Plan will include any relevant underwater noise exposure criteria to be met during construction and standard management and mitigation procedures to be put in place. <i>Trained crew</i> – Ensure that a suitably qualified person is available during piling activities to conduct the standard operational procedures outlined below. A suitably qualified person must have qualifications in ecology, zoology or environmental sciences and demonstrated experience with the identification and management of dolphins or whales. In <i>Pre-start procedure</i> – The presence of marine mammals should be visually monitored by a suitably trained crew member for at least 30 minutes before the commencement of the soft start procedure. Particular focus should be put on the shut-down zone but the observation zone should be inspected as well, for the full extent where visibility allows. Observations should be made from the piling rig or a better vantage point if possible. <i>Soft start procedure</i> – If marine mammals have not been sighted within or are likely to enter the shut down zone during the pre-start procedure, the soft start		

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
		procedure may commence in which the piling impact energy is gradually increased over a 10 minute time period. The soft start procedure should also be used after long breaks of more than 30 minutes in piling activity. Visual observations of marine mammals within the safety zones should be maintained by trained crew throughout soft starts. The soft start procedure may alert marine mammals to the presence of the piling rig and enable animals to move away to distances where injury is unlikely. <i>Normal operation procedure</i> – If marine mammals have not been sighted within or are not likely to enter the shut down or observation zone during the soft start procedure, piling may start at full impact energy. Trained crew should continuously undertake visual observations during piling activities and shut-down periods. After long breaks in piling activity or when visual observations ceased or were hampered by poor visibility, the pre-start procedure should be used. Night-time or low visibility operations may proceed provided that no more than 3 shut-downs occurred during the preceding 24 hour period. <i>Stand-by operations procedure</i> – If a marine mammal is sighted within the observation zone during the soft start or normal operation procedures, the operator of the piling rig should be placed on stand-by to shut-down the piling rig. An additional trained crew member should continuously monitor the marine mammal in sight. <i>Shut-down procedure</i> – If a marine mammal is sighted within or about to enter the shut-down zone, the piling activity should be stopped immediately. If a shut-down procedure occurred and marine mammals have been observed to move outside the shut-down zone, or 30		

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
		minutes have lapsed since the last marine mammal sighting, then piling activities should recommence using the soft start procedure. If marine mammals are detected in the shut-down zone during poor visibility, operations should stop until visibility improves. Works will be planned to minimise vessel movements where possible. Rock placement and pile cutting works should consider adopting the same controls as pile driving activities.		
Construction traffic movement – onshore.	Haul traffic may cause noise and vibration nuisance or damage to residential and sensitive receptors traveling to and from the site	A Construction Traffic Management Plan will be established prior to construction commencing. Appropriate routes for light and heavy construction vehicles selected to minimise disturbance prior to commencement of construction works. Approved areas for parking will be identified. All vehicles and equipment will be operated and maintained to comply with regulatory standards in order to control noise emissions. Best practice in regard to construction traffic in residential areas.	TBC	Environmental Manager Superintendent

5.7 Water Quality Protection

Table 5-10 Water Quality Protection

Objective	Minimise impact to water quality within project footprint.
Legislation / Policy	<i>Environment Protection Act 1993</i> <i>Environment Protection Regulations 2009</i> <i>Environment Protection (Water Quality) Policy 2003</i> <i>Natural Resources Management Act, 2004</i> <i>Stormwater Pollution Prevention, Code of Practice for the Building and Construction Industry</i> <i>EPA Guidelines (EPA 396/10) - Water Quality, Dredging and Earthworks Drainage.</i> <i>Protection of Marine Waters (Prevention of Pollution by Ships) Act, 1987</i> <i>Environment Protection (Sea Dumping) Act, 1984</i> <i>Coast Protection Act, 1972</i> <i>Environment Protection (Marine) Policy, 1994</i>
Permits/Approvals	Council responsibility

Table 5-11 Water Quality Mitigation and Controls

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
Pre-construction planning	Environmental values not known by project personnel and impacts not managed appropriately.	A Water Management Plan will be prepared prior to construction, including any Water Quality monitoring to be undertaken in response to an incident. Site inductions will educate all staff on key environmental values, obligations, and management measures.	TBC	Environmental Manager Superintendent
Site establishment (including temporary facilities and stockpiles); Removal of existing pylons; Operation and movement of	Impacts to water quality affecting aquatic fauna and/or the aesthetic value of the project area.	Consideration to stormwater drainage control and tidally influenced areas will be given when establishing the construction site. Existing natural drainage paths and stormwater structures will not be blocked or restricted. Runoff from unsealed areas onshore will not directly enter stormwater drains or natural drainage lines.	TBC	Environmental Manager Superintendent

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
construction plant, vessels, and equipment.		Stormwater will be diverted around stockpiles and laydown areas. Surface run-off entering and leaving the work area will be controlled. Erosion and sedimentation control devices installed prior to commencement of construction/works. Any stormwater drainage infrastructure installed will be inspected and its suitability to the permanent configuration of the access tracks, hardstands and buildings compounds will be assessed. Maintain the sediment control and stormwater drainage devices at all times. Any dewatering on site to be undertaken in a manner which prevents sediment entering stormwater drains and water course. A procedure for vessel deck wash down will include the requirement that all scuppers and other deck openings are securely plugged or sealed to prevent uncontrolled releases to the environment, and that adequate spill absorption materials are located nearby prior to cleaning.		
Pile driving of new pylons.	Generation of a plume of suspended solids from the works area. Generalised turbidity with associated environmental impacts.	Plumes and suspended solids are not expected. However this should be visually monitored and if unexpected plumes arise, works should cease until equipment is inspected and the process reviewed to identify if there are any problems which need rectifying. Monitoring of turbid plumes generated by piling, drilling and material placement activities will be undertaken. Observations will be recorded daily during those activities and will be from an elevated location ensuring line of sight is maximised. These	TBC	Environmental Manager Superintendent

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
		observations will include (but are not limited to) recorded information (pro forma) and site photographs demonstrating: (a) Plume extent (e.g. estimated distance in metres from the drill rig or construction work face), (b) Plume direction (c) Prevailing metocean conditions (e.g. wind, tide, swell) (d) Start-up and shut down times for drilling / piling operations (e) Any other notable visual characteristics of the plume or piling / drilling activity. All material from drilling / mucking out operations will be recovered on land and not discharged directly into the marine environment. All marine based mucking out and drilling shall take place during daylight hours only unless otherwise approved by the EPA.		
Construction site decommissioning.	Minimise ongoing / permanent impacts to marine waters.	Any remnant stockpiles will be removed from site. Cleared areas to be stabilised / rehabilitated promptly and where possible enhance the natural value of these areas.	TBC	Environmental Manager Superintendent

5.8 Materials, Fuels and Waste Management

Table 5-12 Materials, Fuels and Waste Management

Objective	Avoid and/or minimise impacts associated with the release of hazardous substances or materials. Avoid and/or minimise waste generation during the construction works.
Legislation / Policy	<i>Environment Protection Act 1993</i> <i>Environment Protection Regulations 2009</i> <i>Dangerous Substances Act 1979</i> <i>Dangerous Substances Regulations 2002.</i> <i>Controlled Substances Act, 1984</i> <i>Natural Resources Management Act, 2004</i> <i>Environment Protection (Waste to Resources) Policy 2010</i> <i>Harbours and Navigation Act, 1993</i> <i>Environment Protection (Sea Dumping) Act, 1984</i> <i>EPA Guidelines for Stockpile Management – Waste and Waste Derived Fill</i> <i>EPA Guidelines for Bunding and Spill Management</i> <i>EPA Current criteria for the classification of waste - including Industrial and Commercial Waste (Listed) and Waste Soil</i> <i>EPA Guidelines (EPA 396/10) - Water Quality, Dredging and Earthworks Drainage.</i>
Permits/Approvals	Council responsibility

Table 5-13 Materials, Fuels and Waste Management Mitigation and Control

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
Pre-construction planning	Environmental values not known by project personnel and impacts not managed appropriately.	Prior to construction commencing, a Materials, Fuels and Site Waste Management Plan will be established which will identify the materials and storage requirements for all chemicals used on site or transported to site. Site inductions will educate all staff on key environmental values, obligations, and management measures.	TBC	Environmental Manager Superintendent
Site establishment - temporary facilities	Contamination of the environment with hazardous	All hazardous chemicals and dangerous goods used or stored at the site (including on vessels) will be stored in	TBC	Environmental Manager

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
and stockpile areas. Removal of existing pylons; Pile driving of new pylons; Operation and movement of construction plant, vessels, and equipment. Construction site decommissioning and make good.	substances and/or material's.	accordance with the Dangerous Substances Act and the EPA Guidelines (or MARPOL standards where relevant). All recyclable and general wastes to be collected in labelled, covered bins (and compacted where possible) for appropriate disposal at regulated waste facility. Hazardous wastes will be separated, labelled and retained in storage on-board within secondary containment (e.g. bin located in a bund). Solid non-biodegradable and hazardous wastes will be collected and disposed of at a suitable waste facility or to a carrier licensed to receive the waste if required by legislation. The Materials, Fuels and Site Waste Management Plan will identify the disposal location of any waste created on land or at sea. Material Safety Data Sheets for all relevant materials used or stored on site, regardless of quantity, for the construction works shall be kept on site by the Contractor. Spill kits will be located on site to be used in the event that there is an incident and appropriate personnel will be trained in the use of this equipment. Emergency procedures in the event of a spill should be documented. Storage of materials should not be in areas at risk of inundation. All hazardous chemicals and dangerous goods should be stored away from any drainage channels and stormwater drains. Offshore waste management: Vessel operators will have an up to date Shipboard Oil Pollution Emergency Plan (SOPEP) and Shipboard Marine Pollution Emergency Plan (SMPEP). All shipboard chemical and hydrocarbon spills will be managed in accordance with these plans by trained and competent crew. Related		Superintendent

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
		mitigation measures in place: - Spill exercises will be conducted at minimum of every three months and recorded in the vessel log. - Spill kit will be located near high risk spill areas. - Spills will be cleaned up immediately, spill kits re-stocked and clean up material contained, and not washed overboard. - Vessel decks will be bunded. Scupper plugs should be available to prevent liquid discharges from decks. No waste materials will be disposed of at sea, all non-biodegradable and hazardous wastes will be collected, stored, processed and disposed of in accordance with the vessel's Garbage Management Plan as required under Regulation 9 of MARPOL Annex V. A Material Safety Data Sheet (MSDS) will be available for all chemicals and hydrocarbons stored on vessels. These will be located nearby to where the chemicals/wastes are stored. Any contaminated material collected will be contained on board for appropriate onshore disposal. Any equipment or machinery with the potential to leak oil will be enclosed in continuous bunding or will have drip trays in place where appropriate. Following rainfall events, bunded areas on construction laydown areas or on open decks of the vessels will be cleared of rainwater. All hoses for pumping and transfers will be maintained and checked as per the PMS. On board oily water disposal will be managed in accordance with the Marine Pollution Regulation 2006. The vessel operator will record the quantity, time and onshore location of the oily water disposal in the vessel Oil Record Book. Refuelling operations will be a manned operation. In the event the refuelling pipe is ruptured, fuel bunkering will		

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
		cease. Detergents or emulsifiers will not be used in bilge water.		
Site establishment - temporary facilities and stockpile areas. Removal of existing pylons; Pile driving of new pylons; Removal/disposal of project waste Operation and movement of construction plant, vessels, and equipment. Construction site decommissioning and make good.	Waste generated during construction impacting upon the environment. Waste generated during construction inappropriately disposed of offsite and impacting the environment.	Management of waste in accordance with all statutory and licensing requirements. Any food waste should be contained and removed from site regularly to prevent attracting pest species. Implement to reduce waste: • Re-use of materials wherever possible in accordance with legislative requirements. • Adequate waste separation repositories. • All waste generated during construction separated at source and taken to an appropriately licensed waste disposal facility if not able to be re-used on site. • No burning or waste burial on site. • Management of litter and site debris. Appropriate portable toilets will be located onshore to accommodate the workforce size Greywater and black water generated offshore on vessels will be disposed of on land at an approved facility.	TBC	Environmental Manager Superintendent
Operation and movement of construction plant, vessels, and equipment.	Vessel collision causing hydrocarbon spill impacting the environment	Visual observations will be maintained by watch keepers on all vessels. Regular notification to the following Australian Government agencies before and during operations: - The AMSA RCC of proposed activity, location and commencement date to enable a AusCoast warning to be issued. - The Australian Hydrographic Office of proposed activity, location and commencement date to enable a 'Notice to Mariners' to be issued. - In the event of a spill resulting in notification to AMSA, other sea users (e.g. fishing industry) will be informed of the incident via Marine Notices to prevent vessels	TBC	Environmental Manager Superintendent

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
		entering an area where hydrocarbons have been released. Vessels and plant will operate in compliance with all marine and land navigation and vessel safety requirements in the International Convention of the SOLAS 1974 and the Navigation Act 2012. This includes the requirement for all equipment and procedures to comply with the following AMSA Marine Orders: - Marine Orders - Part 30: Prevention of Collisions - Marine Orders - Part 21: Safety of Navigation and Emergency Procedures - Marine Orders - Part 27: Radio Equipment: sets out ship requirements regarding radio installations, equipment, watch keeping arrangements, sources of energy, performance standards, maintenance requirements, personnel and recordkeeping - Marine Orders Parts 3 and 6 – Seagoing Qualifications and Marine Radio Qualifications: ensures seafarer competency standards meet the needs of the Australian Shipping Industry - approach for any vessel (time and location) within the operational area and radar range (up to approximately 70 km) Marine diesel oil compliant with MARPOL Annex VI Regulation 14.2 (i.e. sulphur content of less than 3.50% m/m) is the only engine fuel to be used by the vessels. Oil spill responses will be executed in accordance with the vessel's SOPEP, as required under MARPOL.		
Construction traffic movement – onshore.	Waste generated during construction impacting upon the environment.	Any material spread onto public roads from construction vehicle tyres or spilled from vehicles leaving the site will be cleaned up by the end of the day's work.	TBC	Environmental Manager Superintendent

5.9 Weed, Pest and Disease Control

Table 5-14 Weed, Pest and Disease Control

Objective	Prevent the movement or increase in weeds, pests or diseases.
Legislation / Policy	<i>Native Vegetation Act 1991</i> <i>Native Vegetation Regulations 2003</i> <i>Environment Protection and Biodiversity Conservation Act 1999</i> <i>Natural Resources Management Act 2004</i> <i>National Parks and Wildlife Act 1972</i> <i>Fisheries Management Act, 2007</i>
Permits/Approvals	Council responsibility

Table 5-15 Weed, Pest and Disease Mitigation and Controls

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
Pre-construction planning	Environmental values not known by project personnel and impacts not managed appropriately.	Prior to construction commencing, a Flora and Fauna Management Plan will be provided as part of the final CEMP, and this will need to cover the issue of Weed, Pest and Disease Management. Site inductions will educate all staff on key environmental values, obligations, and management measures.	TBC	Environmental Manager Superintendent
Site establishment - temporary facilities and stockpile areas. Removal of existing pylons; Pile driving of new pylons; Operation and movement of construction plant,	Potential spreading of weeds, pests and diseases. Potential increase in prevalence of pest animals.	Vessels will be operated and maintained in accordance with the Code of Practice for vessel and facility management (marine and inland waters). Weeds identified on site during construction will be controlled and the site will be monitored for any outbreaks. Raw materials, such as rubble, gravel, sand, soil and water will be brought into the construction site free of weeds, pests and diseases. Check rock	TBC	Environmental Manager Superintendent

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
vessels, and equipment. Removal/disposal of project waste Construction site decommissioning and make good.		prior to transportation and clean/spray as appropriate. Vegetation from weed species will be disposed of separately at a licensed waste depot. Any material removed from the sea bed and placed on any beach must be substantially free of weed and vegetative matter including sea grass and kelp, and animal or fish matter. Only locally sourced vessels (within South Australian waters of same marine pest risk profile) are to complete the works. Vessels will not perform in-water hull cleaning, that results in the removal of applied surface coating material (eg antifoulant), unless under extraordinary circumstances, when written approval by the EPA has been provided. Vessels will be removed from the water for hull and deck cleaning and make use of purpose-built slipways or wash bays with waste containment and wastewater controls, or if the vessel is afloat during deck cleaning, undertake measures to avoid the discharge of wash-down water that reflect the risk of environmental harm from the activity being performed. If an newly introduced invasive marine pest (IMP) is identified or suspected, then the contractor is obliged to immediately (within 24 hours) notify the South Australian Department of Primary Industries and Regions (PIRSA) on the Fishwatch 24 hour hotline on 1800 065 522 Changes to Australia's biosecurity system came into effect on 16 June 2016 with commencement of the Biosecurity Act 2015. New biosecurity requirements may come into force during the life		

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
		of the project. If this occurs, these management controls should be reviewed to confirm adequacy.		

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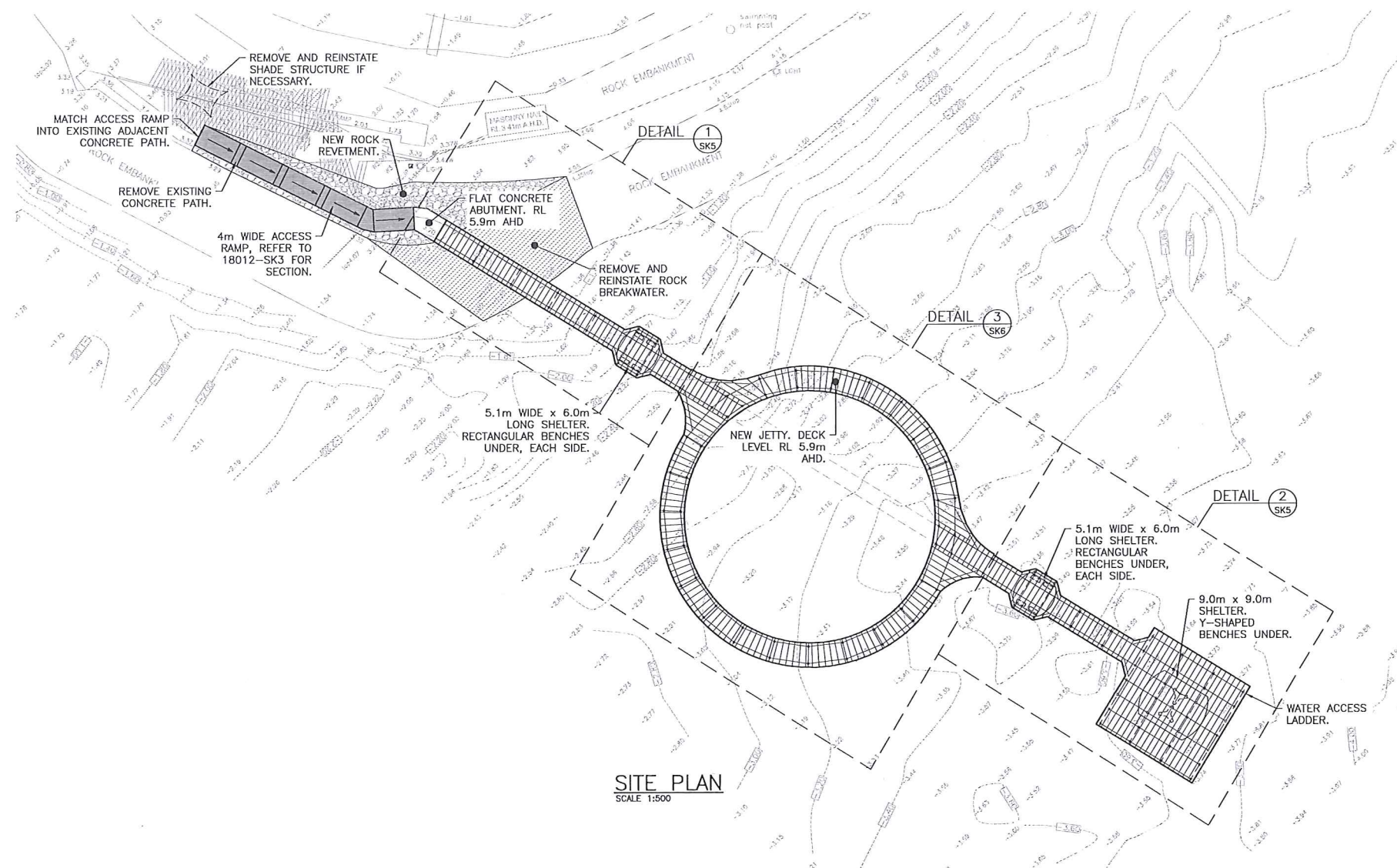
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Appendices

Appendix A – Engineering Documentation - Magryn (August 2018)



PRELIMINARY

THE ARRANGEMENT SHOWN IS FOR DISCUSSION PURPOSES ONLY.
IT MUST NOT BE USED FOR CONSTRUCTION.

A	PRELIMINARY ISSUE	AO 12.07.18
ISSUE	AMENDMENTS	INT./DATE



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> MINING
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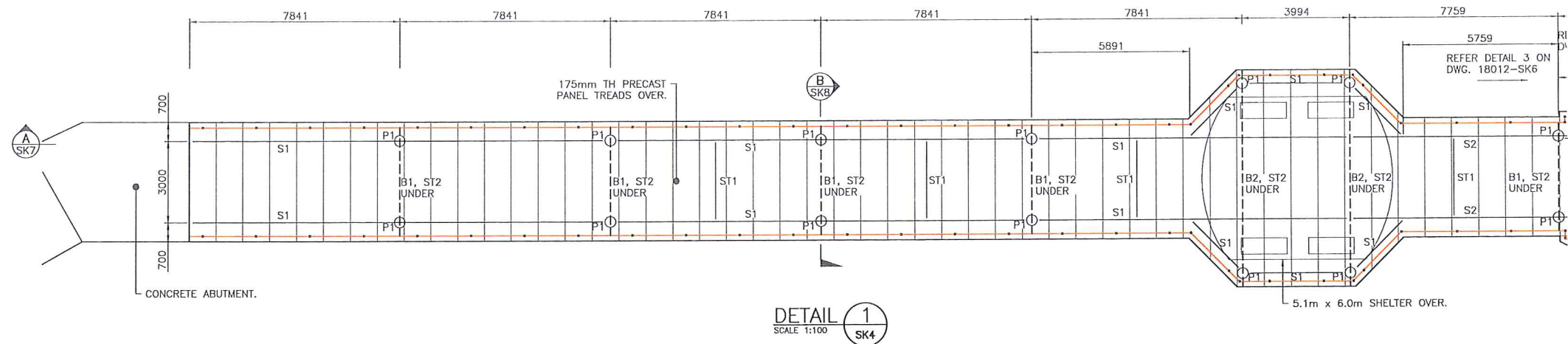
CLIENT:
WHYALLA CITY COUNCIL

PROJECT:
JETTY REPLACEMENT

PROJECT ADDRESS:
WHYALLA MARINA,
WHYALLA

TITLE:
LOWERED JETTY SITE PLAN

DESIGN: AO	SCALE: AS SHOWN	DATE: APR 2018
SHEET SIZE: A1	DRAWING NUMBER: 18012-SK4	REVISION: A

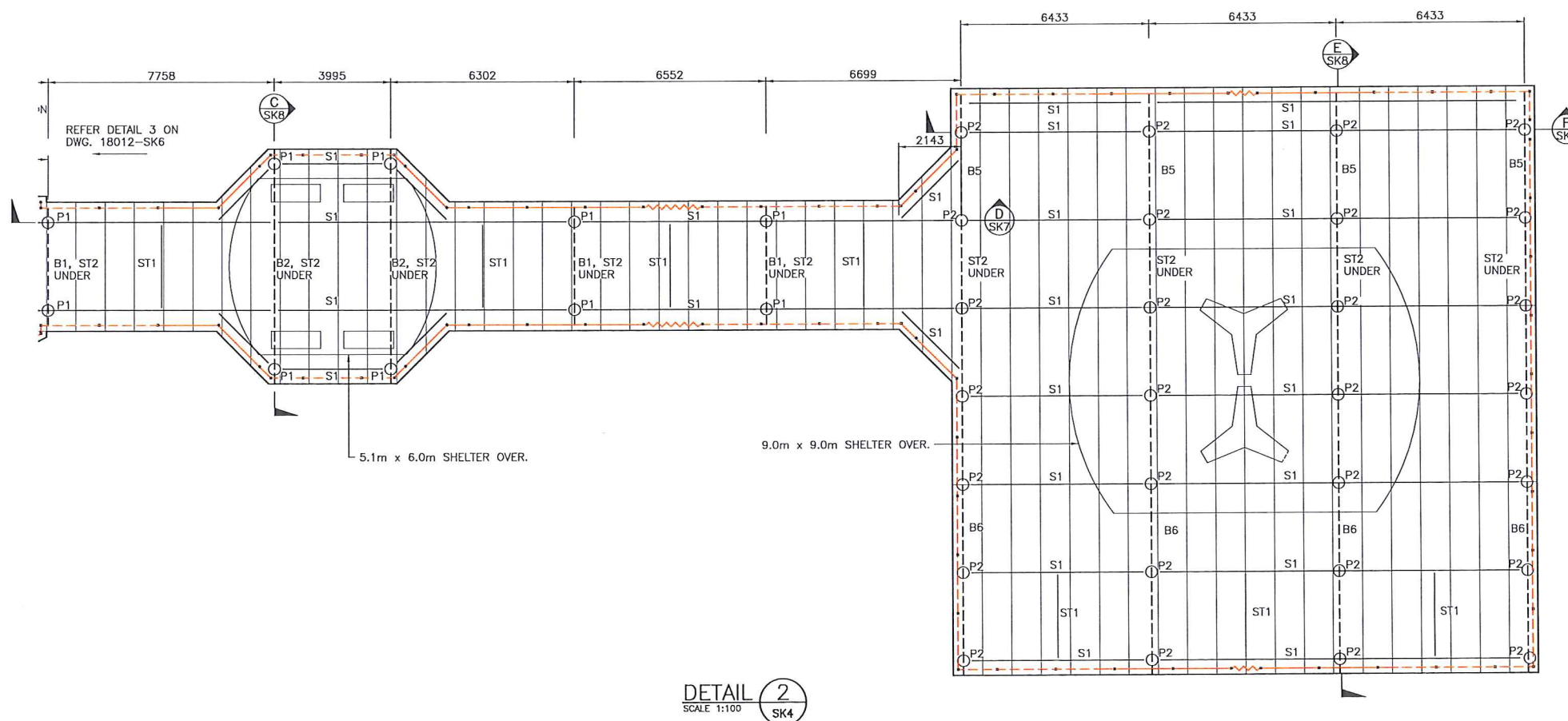


LEGEND

- INFILL BALUSTRADE, REFER TO 18012-SK8 FOR DETAILS.
- BALUSTRADE, REFER TO 18012-SK8 FOR DETAILS.
- DISABLED FISHING BALUSTRADE, REFER TO 18012-SK8 FOR DETAILS.

MEMBER SCHEDULE

MARK	SIZE	COMMENTS
B1	650 DEEP x 700 WIDE, S50 CONCRETE	PRECAST CONCRETE TRANSVERSE BEAM.
B2	900 DEEP x 700 WIDE, S50 CONCRETE	PRECAST CONCRETE TRANSVERSE BEAM.
B5	650 DEEP x 700 WIDE, S50 CONCRETE	PRECAST CONCRETE TRANSVERSE BEAM.
B6	650 DEEP x 700 WIDE, S50 CONCRETE	PRECAST CONCRETE TRANSVERSE BEAM.
P1	406x12.7 CHS, GRADE C350	ANGLED JETTY PILE. MINIMUM 8.2m EMBEDMENT BELOW SEABED LEVEL.
P2	406x12.7 CHS, GRADE C350	VERTICAL JETTY PILE. MINIMUM 8.2m EMBEDMENT BELOW SEABED LEVEL.
S1	530UB82.0, GRADE 300	JETTY STRINGER.
S2	530UB92.4, GRADE 300	JETTY STRINGER.
ST1	100x2.5 SHS, GRADE C350	STRINGER STRUT.
ST2	219.1x4.8 CHS, GRADE C350	PILE STRUT.



A	PRELIMINARY ISSUE	A0 12.07.18
ISSUE	AMENDMENTS	INT./DATE



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CLIENT:
WHYALLA CITY COUNCIL

PROJECT:
JETTY REPLACEMENT

PROJECT ADDRESS:
WHYALLA MARINA,
WHYALLA

TITLE:
LOWERED JETTY STRUCTURAL
DETAILS

DESIGN: AO	SCALE: AS SHOWN	DATE: APR 2018
SHEET SIZE: A1	DRAWING NUMBER: 18012-SK5	REVISION: A

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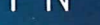


- ## MEMBER SCHEDULE

[illegible]

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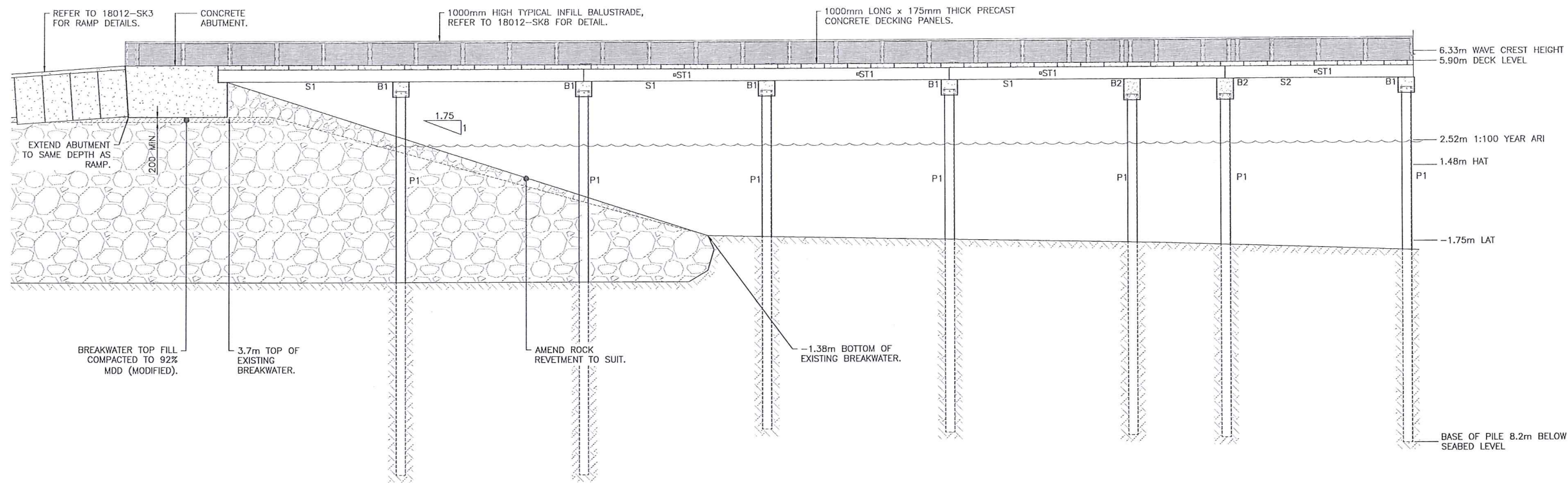
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WHYALLA CITY COUNCIL

PROJECT:
JETTY REPLACEMENT

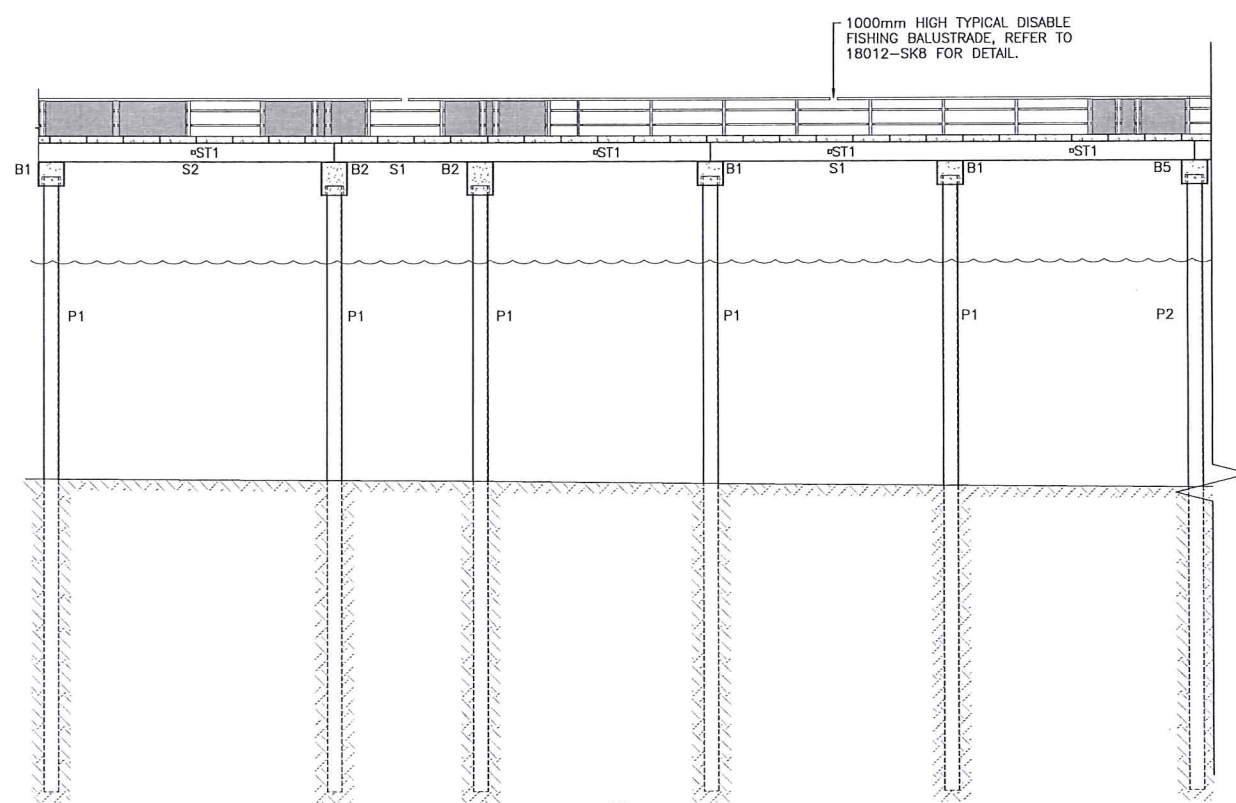
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WHYALLA MARINA,
WHYALLA

TITLE:
LOWERED JETTY STRUCTURAL
DETAIL 3

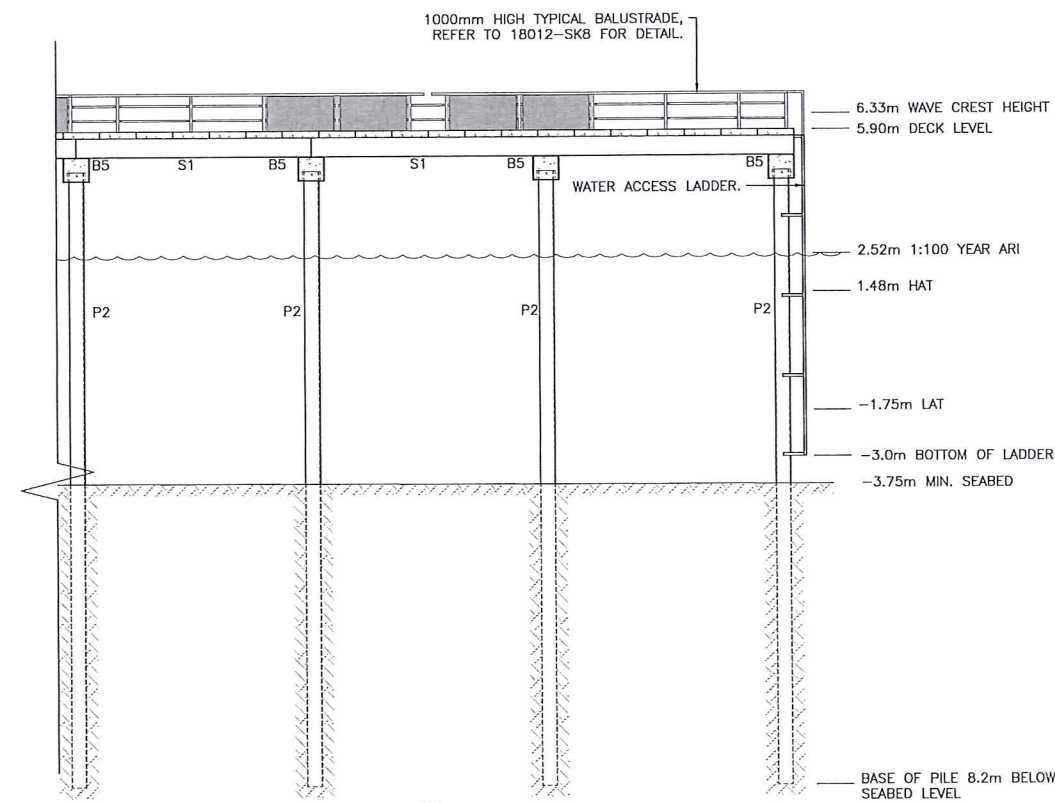
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DESIGN: AO	SCALE: AS SHOWN	DATE: APR 2018
SHEET SIZE: A1	DRAWING NUMBER: 18012-SK6	REVISION: A



SECTION A
SCALE 1:100
SK5



SECTION D
SCALE 1:100
SK5



SECTION F
SCALE 1:100
SK5

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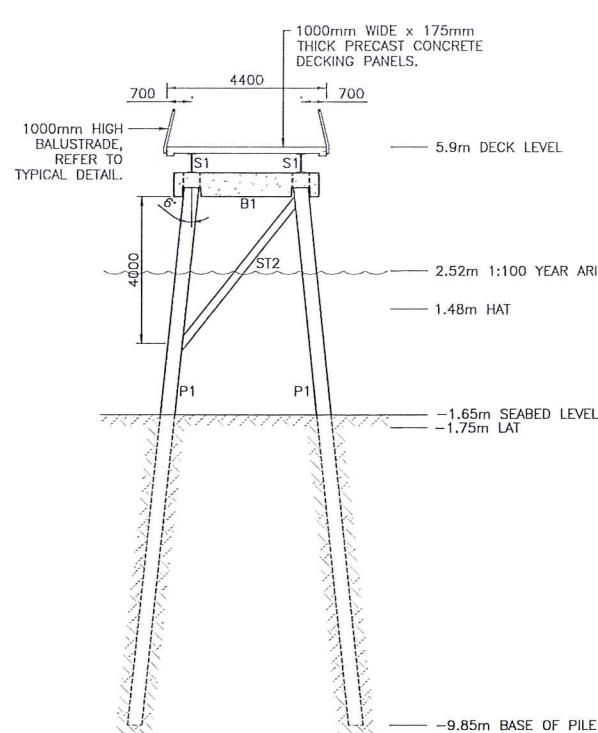
CLIENT:
WHYALLA CITY COUNCIL

PROJECT:
JETTY REPLACEMENT

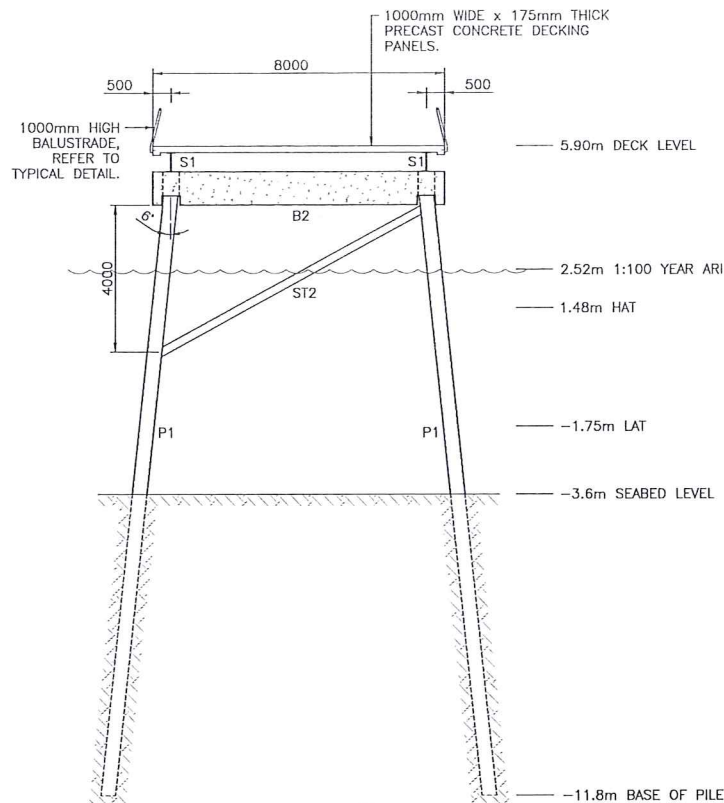
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WHYALLA MARINA,
WHYALLA

TITLE:
LOWERED JETTY LONGITUDINAL
SECTIONS

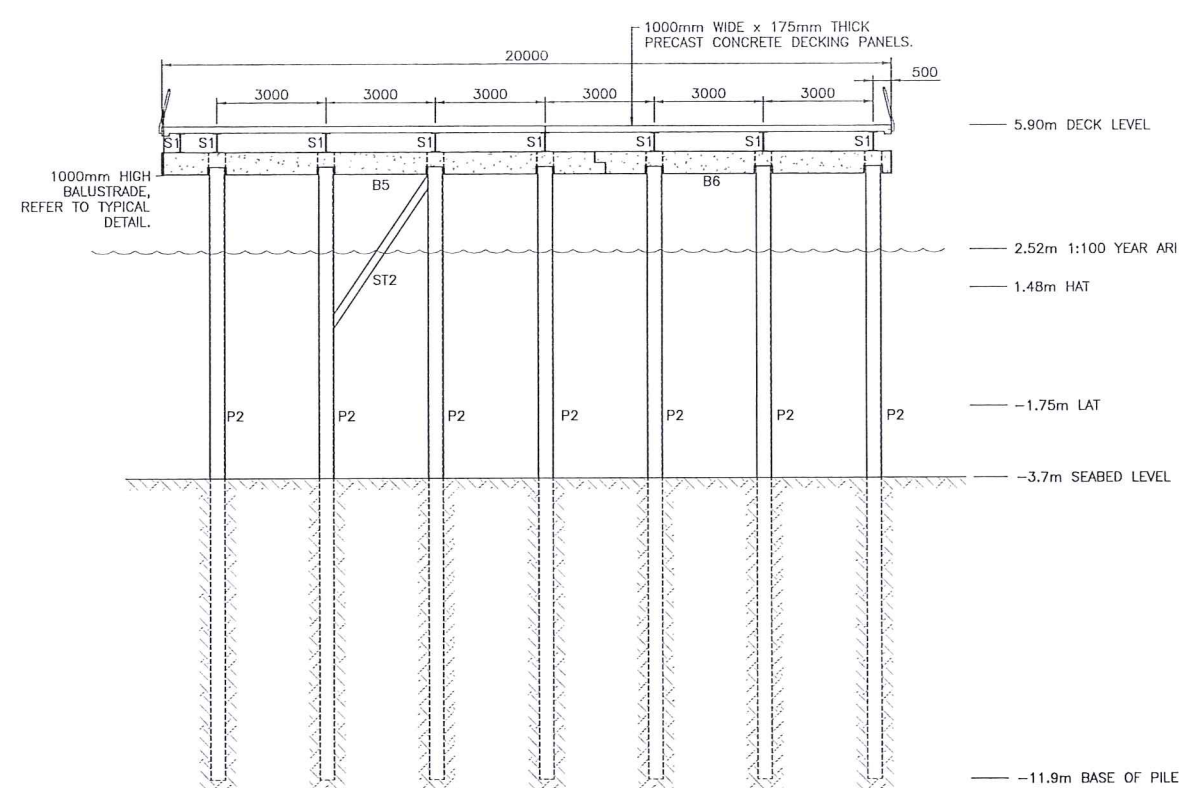
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SHEET SIZE: A1	DRAWING NUMBER: 18012-SK7	REVISION: A



SECTION B
SCALE 1:100
SK5



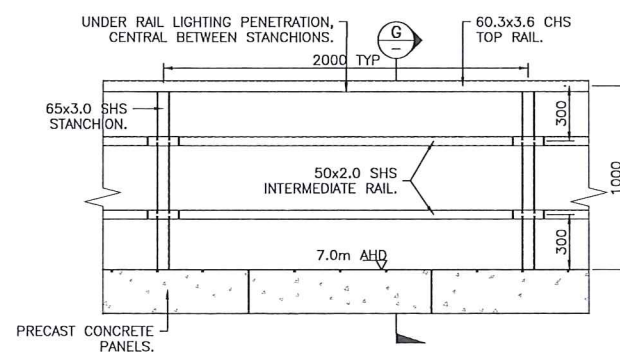
SECTION C
SCALE 1:100
SK5



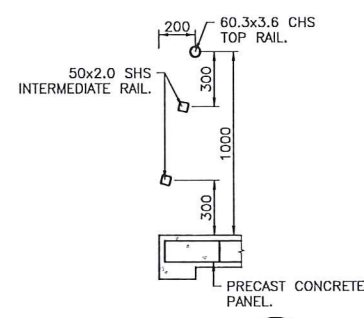
SECTION E
SCALE 1:100
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PRELIMINARY

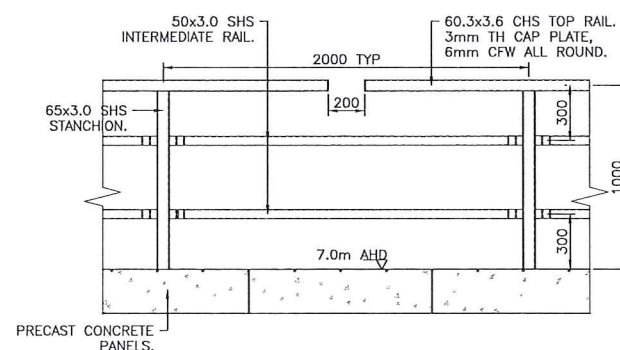
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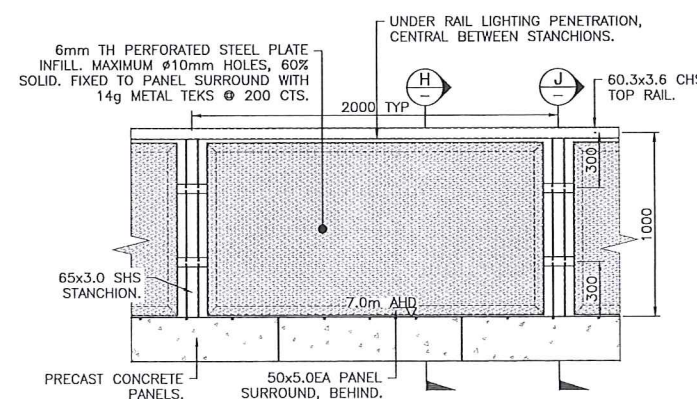
TYPICAL BALUSTRADE DETAIL
SCALE 1:20



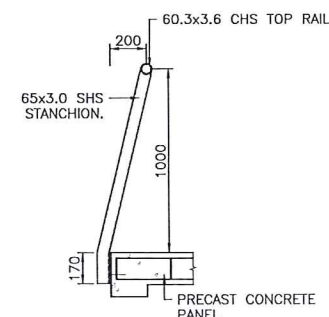
SECTION G
SCALE 1:20



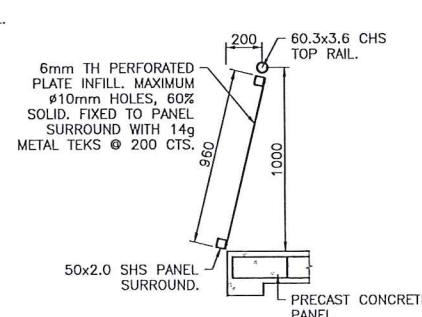
TYPICAL DISABLED FISHING
BALUSTRADE DETAIL
SCALE 1:20



TYPICAL INFILL BALUSTRADE DETAIL
SCALE 1:20



SECTION J
SCALE 1:20



SECTION H
SCALE 1:20

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PROJECT:
JETTY REPLACEMENT

PROJECT ADDRESS:
WHYALLA MARINA,
WHYALLA

TITLE:
LOWERED JETTY SECTIONS
AND BALUSTRADE DETAILS

DESIGN: AO	SCALE: AS SHOWN	DATE: APR 2018
SHEET SIZE: A1	DRAWING NUMBER: 18012-SK8	REVISION: A

GHD

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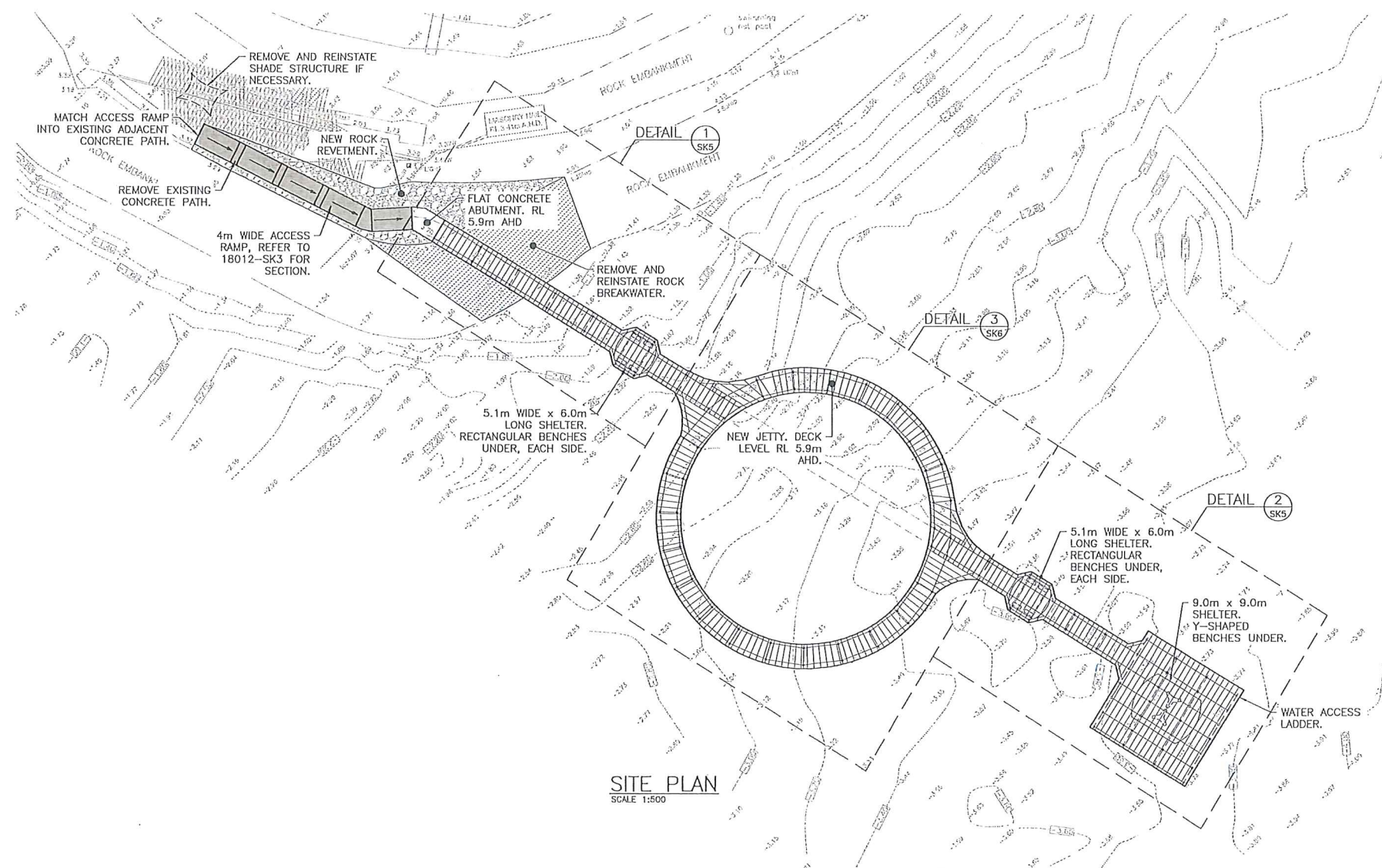
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Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
1	S. Blatchford (GHD) A. Boden (GHD) D. Altmann (Development Answers)	K. Neil (GHD)	**	D. Grzan (GHD)		09/08/2018

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SITE PLAN
SCALE 1:500

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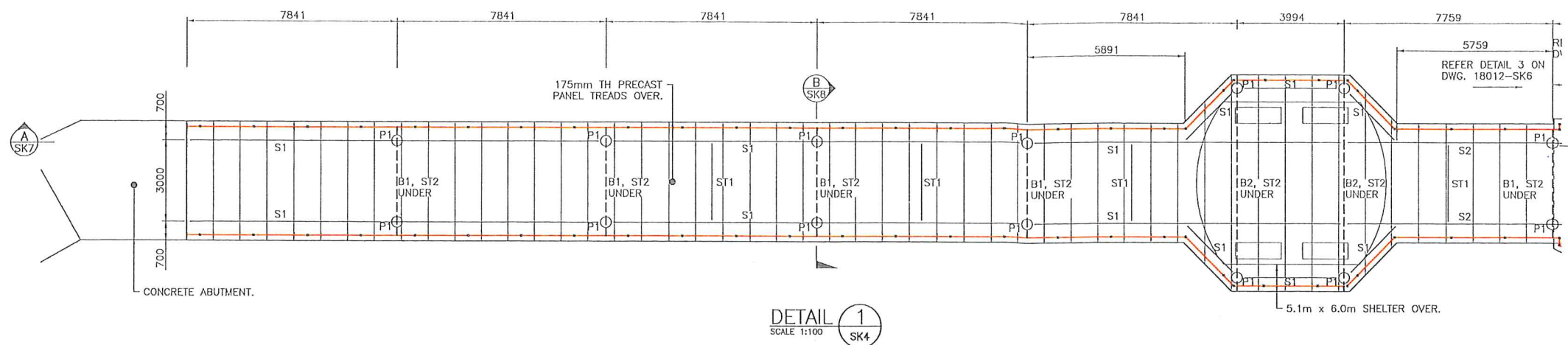
CLIENT:
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PROJECT:
JETTY REPLACEMENT

PROJECT ADDRESS:
WHYALLA MARINA,
WHYALLA

TITLE:
LOWERED JETTY SITE PLAN

DESIGN: AO	SCALE: AS SHOWN	DATE: APR 2018
SHEET SIZE: A1	DRAWING NUMBER: 18012-SK4	REVISION: A



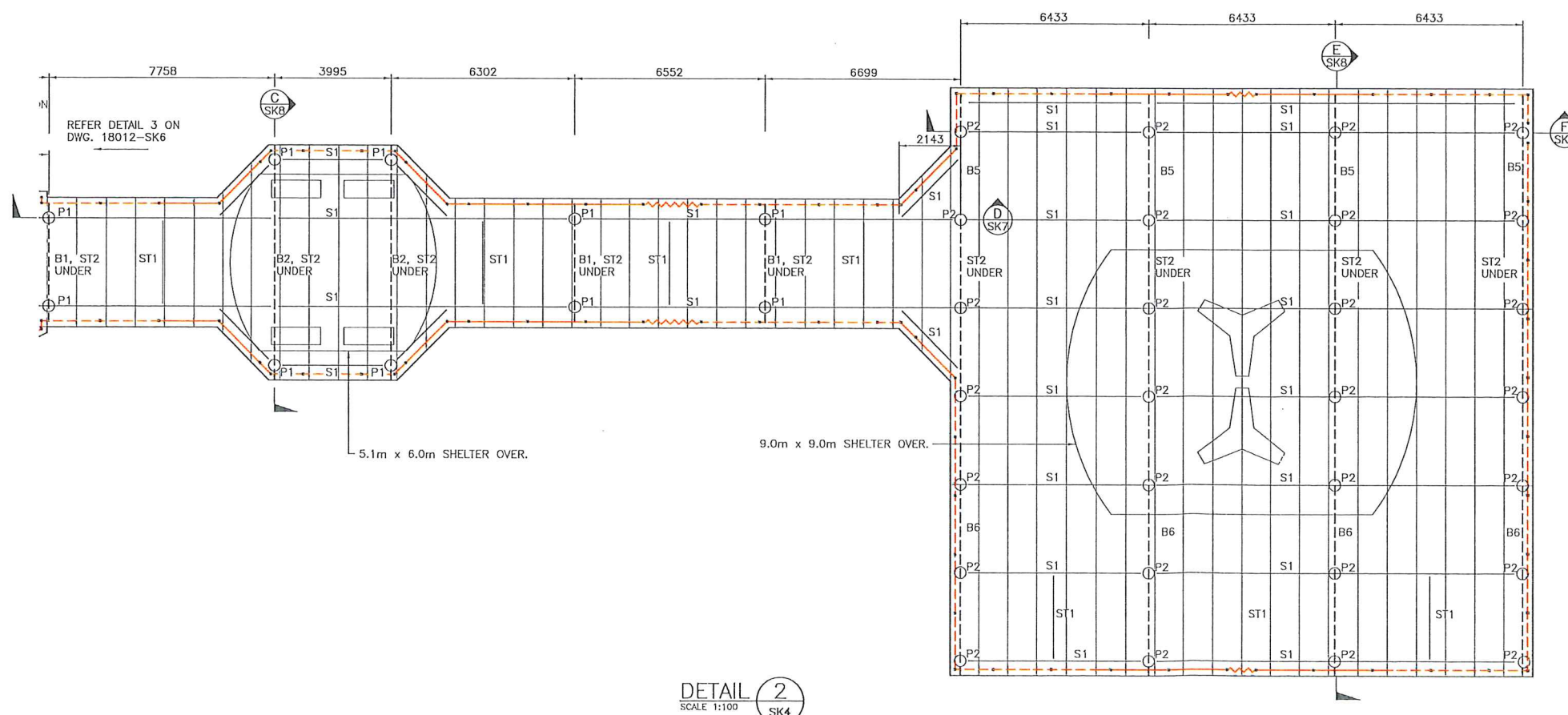
DETAIL 1
SCALE 1:100
SK4

LEGEND

- INFILL BALUSTRADE, REFER TO 18012-SK8 FOR DETAILS.
- BALUSTRADE, REFER TO 18012-SK8 FOR DETAILS.
- DISABLED FISHING BALUSTRADE., REFER TO 18012-SK8 FOR DETAILS.

MEMBER SCHEDULE

MARK	SIZE	COMMENTS
B1	650 DEEP x 700 WIDE, S50 CONCRETE	PRECAST CONCRETE TRANSVERSE BEAM.
B2	900 DEEP x 700 WIDE, S50 CONCRETE	PRECAST CONCRETE TRANSVERSE BEAM.
B5	650 DEEP x 700 WIDE, S50 CONCRETE	PRECAST CONCRETE TRANSVERSE BEAM.
B6	650 DEEP x 700 WIDE, S50 CONCRETE	PRECAST CONCRETE TRANSVERSE BEAM.
P1	406x12.7 CHS, GRADE C350	ANGLED JETTY PILE. MINIMUM 8.2m EMBEDMENT BELOW SEABED LEVEL.
P2	406x12.7 CHS, GRADE C350	VERTICAL JETTY PILE. MINIMUM 8.2m EMBEDMENT BELOW SEABED LEVEL.
S1	530UB82.0, GRADE 300	JETTY STRINGER.
S2	530UB92.4, GRADE 300	JETTY STRINGER.
ST1	100x2.5 SHS GRADE C350	STRINGER STRUT.
ST2	219.1x4.8 CHS, GRADE C350	PILE STRUT.



DETAIL 2
SCALE 1:100
SK4

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WHYALLA

TITLE:
LOWERED JETTY STRUCTURAL
DETAILS

DESIGN: AO	SCALE: AS SHOWN	DATE: APR 2018
SHEET SIZE: A1	DRAWING NUMBER: 18012-SK5	REVISION: A

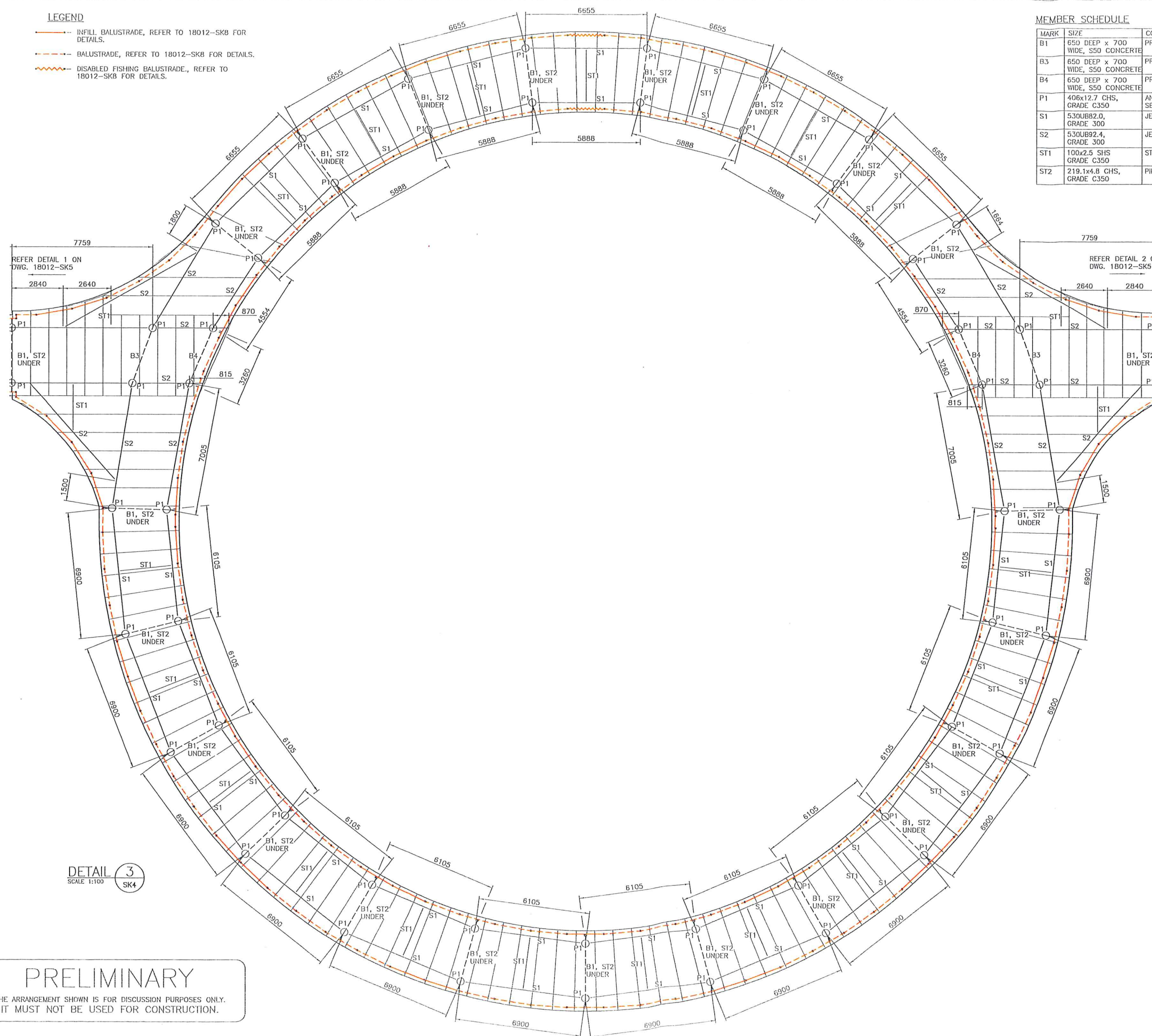


LEGEND

- INFILL BALUSTRADE, REFER TO 18012-SK8 FOR DETAILS.
- BALUSTRADE, REFER TO 18012-SK8 FOR DETAILS.
- DISABLED FISHING BALUSTRADE, REFER TO 18012-SK8 FOR DETAILS.

MEMBER SCHEDULE

MARK	SIZE	COMMENTS
B1	650 DEEP x 700 WIDE, S50 CONCRETE	PRECAST CONCRETE TRANSVERSE BEAM.
B3	650 DEEP x 700 WIDE, S50 CONCRETE	PRECAST CONCRETE ANGLED TRANSVERSE BEAM.
B4	650 DEEP x 700 WIDE, S50 CONCRETE	PRECAST CONCRETE ANGLED TRANSVERSE BEAM.
P1	406x12.7 CHS, GRADE C350	ANGLED JETTY PILE. MINIMUM 8.2m EMBEDMENT BELOW SEABED LEVEL.
S1	530UB82.0, GRADE 300	JETTY STRINGER.
S2	530UB92.4, GRADE 300	JETTY STRINGER.
ST1	100x2.5 SHS GRADE C350	STRINGER STRUT.
ST2	219.1x4.8 CHS, GRADE C350	PILE STRUT.



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PROJECT:
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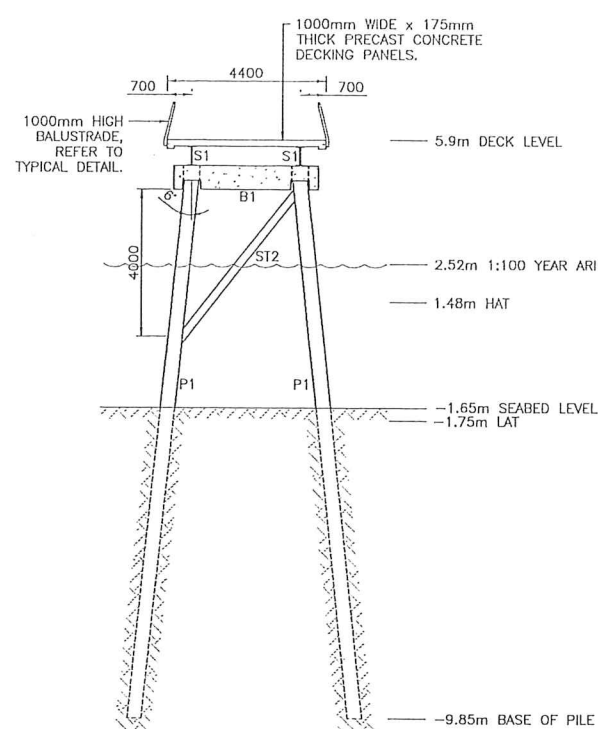
PROJECT ADDRESS:
WHYALLA MARINA,
WHYALLA

TITLE:
LOWERED JETTY STRUCTURAL
DETAIL 3

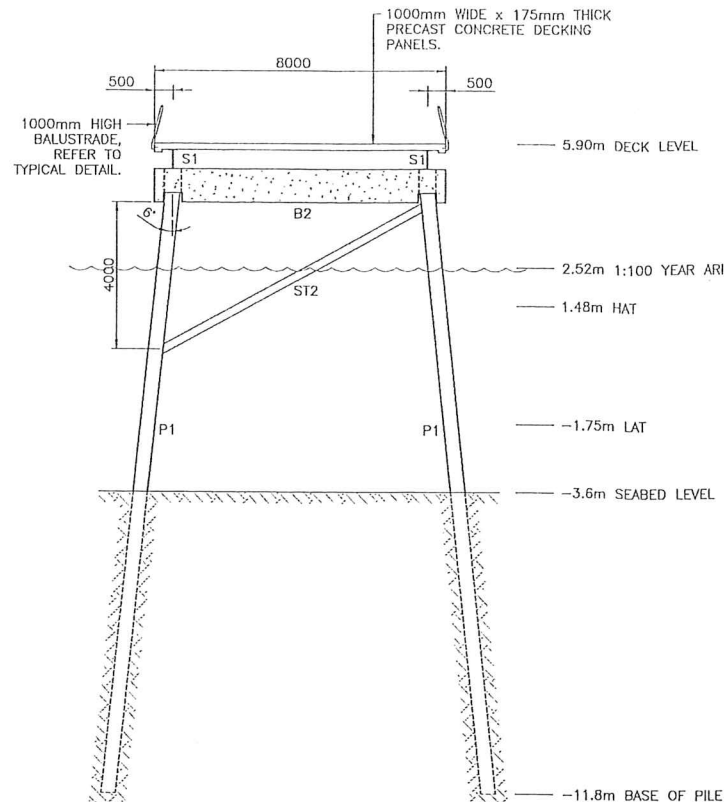
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SHEET SIZE: A1	DRAWING NUMBER: 18012-SK6	REVISION: A

PRELIMINARY

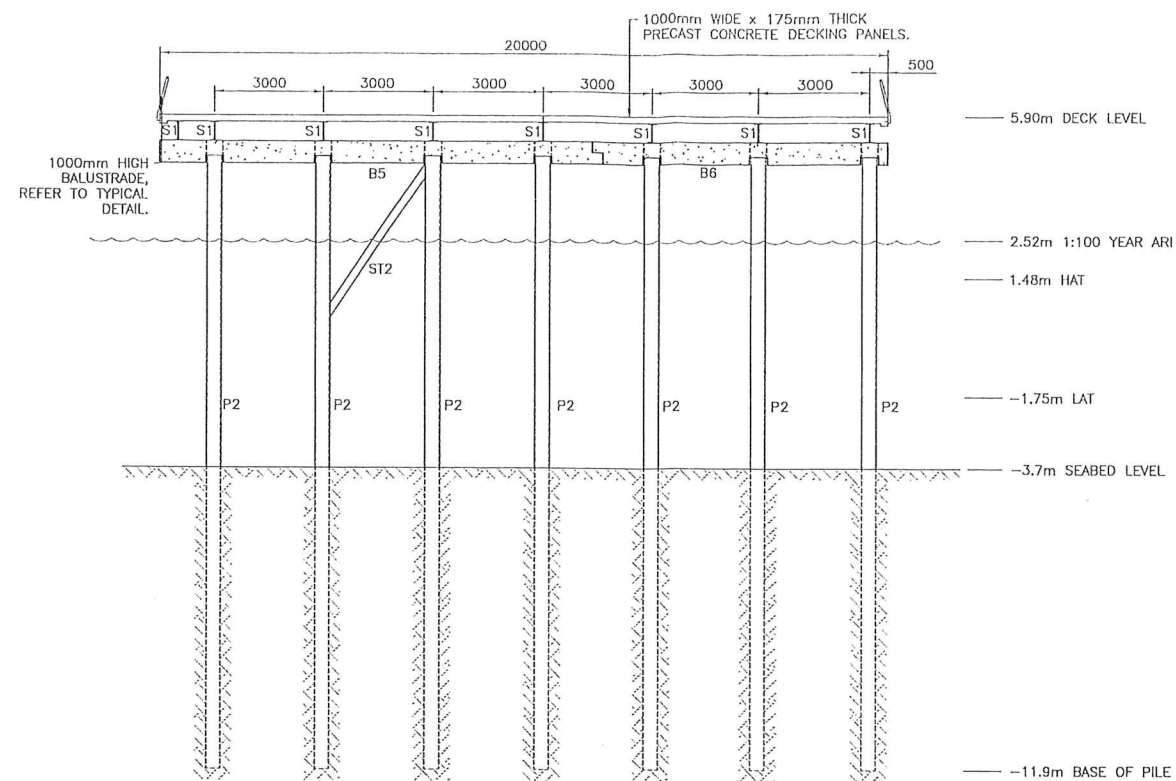
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SECTION B
SCALE 1:100
SK5



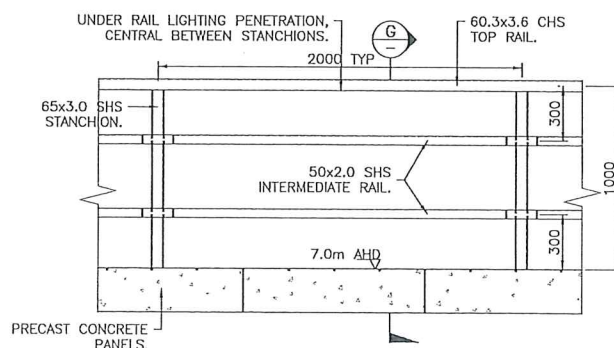
SECTION C
SCALE 1:100
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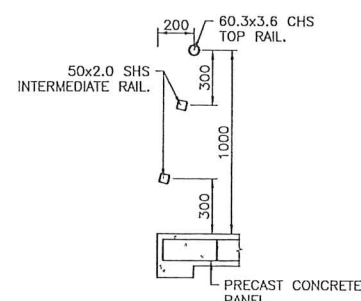
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PRELIMINARY

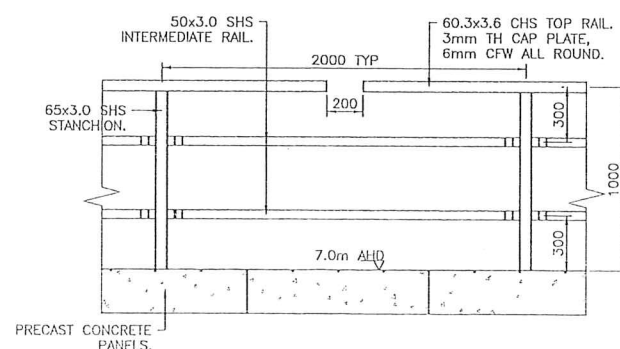
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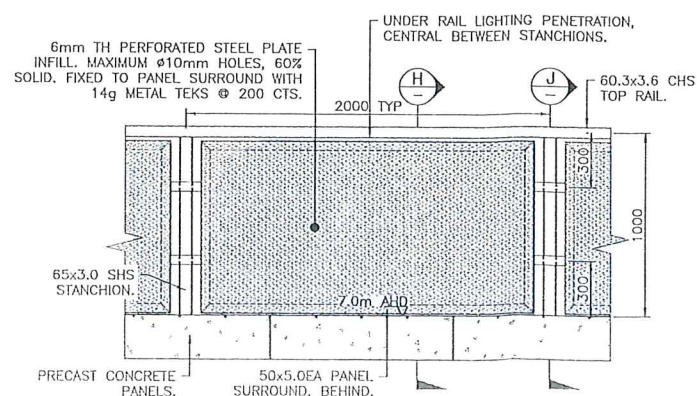
TYPICAL BALUSTRADE DETAIL
SCALE 1:20



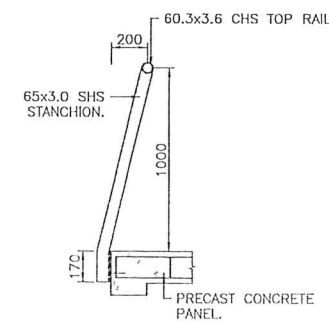
SECTION G
SCALE 1:20



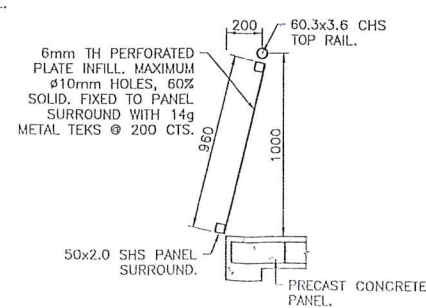
TYPICAL DISABLED FISHING
BALUSTRADE DETAIL
SCALE 1:20



TYPICAL INFILL BALUSTRADE DETAIL
SCALE 1:20



SECTION J
SCALE 1:20



SECTION H
SCALE 1:20

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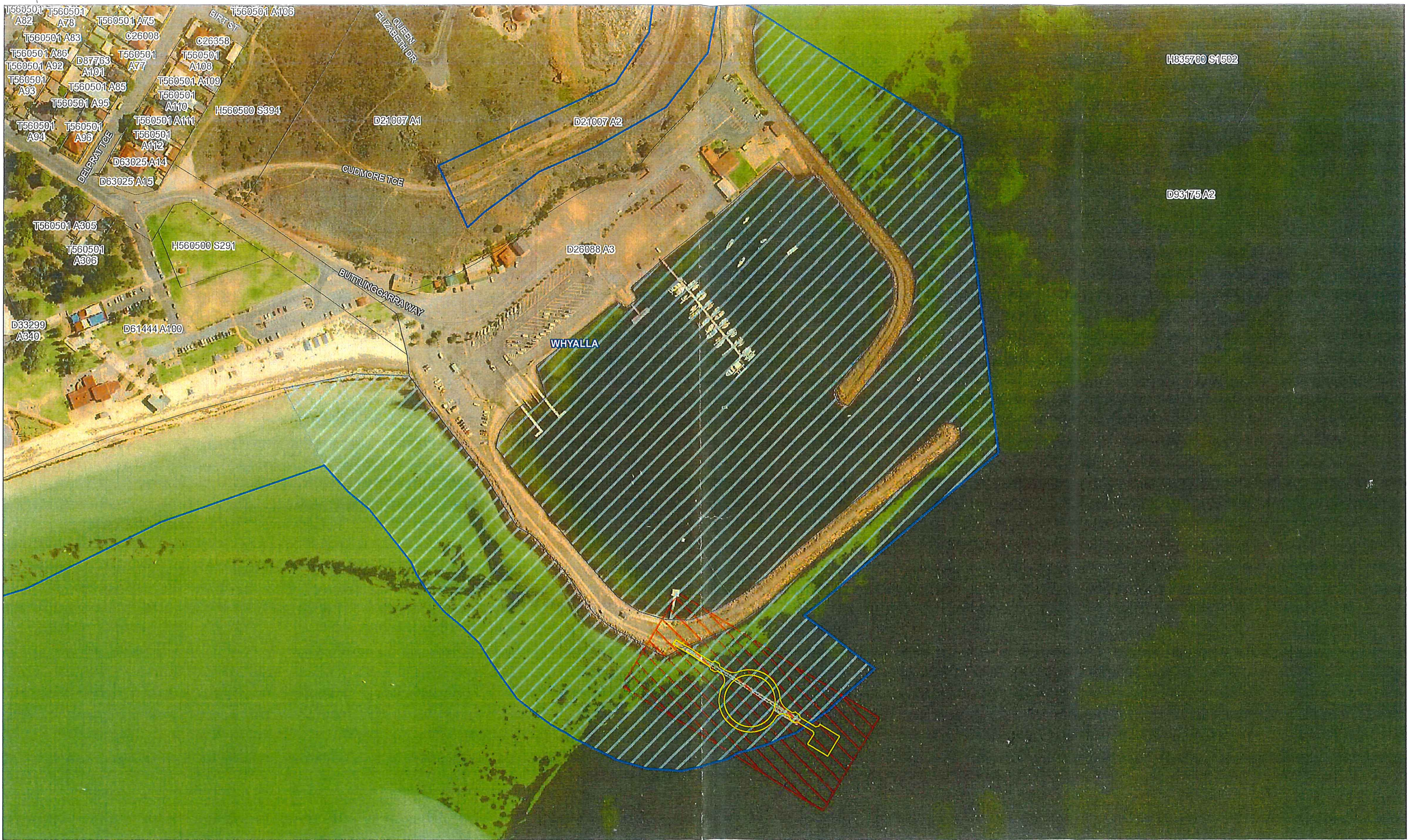
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PROJECT:
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PROJECT ADDRESS:
WHYALLA MARINA,
WHYALLA

TITLE:
LOWERED JETTY SECTIONS
AND BALUSTRADE DETAILS

DESIGN: AO	SCALE: AS SHOWN	DATE: APR 2018
SHEET SIZE: A1	DRAWING NUMBER: 18012-SK8	REVISION: A

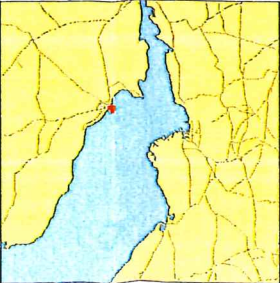


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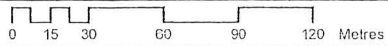
-  Local Govt Area
-  DCDB
-  Proposed New Jetty Area
-  Marina Water Area

Jetty Replacement Plan - Magryn Engineering Consultants

Overview 1:3000 - 18012 - G2 - S5 - revA.dwg



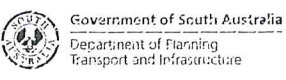
Coordinate System: GDA 94 MGAz53



1:3,000

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Patches No:	
Drawn By:	Geospatial Unit
Date:	5/07/2018
Revision:	



DPTI Plan

Whyalla



CONTROL POINT COORDINATES (m)		
CP	NORTH	SOUTH
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01	742092.495	6341003.549
02	742090.196	6341029.798
03	742170.938	6341003.633
04	742143.026	6340958.125
05	742218.101	6340961.005
06	742207.648	6340943.954
07	742235.152	6340950.552
08	742224.699	6340933.501
09	742093.995	6341074.262
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11	742268.767	6340967.119
12	742219.951	6340887.507

Legend

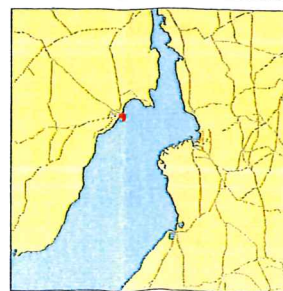
DCDB

Local Govt Area

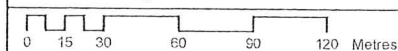
Jetty Replacement Plan - Magryn Engineering Consultants

Overview 1:2500 - 18012 - G2 - S5 - revA.dwg

Insert 1:1000 - 18010 - PL1 - S5 - revA.dwg



Coordinate System: GDA 94 MGAz53



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Whyalla

N

Government of South Australia
Department of Planning
Transport and Infrastructure

Issue —
For Review

Date —
29 May 2018

Project —
17.031

Whyalla Jetty

Concept Illustrations Package

PREPARED FOR



oxygen

Oxygen Pty Ltd
98-100 Halifax Street
Adelaide SA 5000

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design@oxygen.net.au
oxygen.net.au

Plan



View 01



View 02



View 03

