APPENDIX E

Stormwater Management Plan

ProjexPartners
PROJECT MANAGEMENT | ENGINEERING | PLANNING
Building community through our people

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL
Approval no: DEV2021/1187
Date: 24 June 2022

Queensland Government

Stormwater Management Plan

REDLAND BAY FERRY TERMINAL

Pensar Structures

Projex Partners Pty Ltd
Level 3
135 Horton Parade
Maroochydore Qld 4558

Our ref: 497-001

Pensar

Prepared by:

ProjexPartners
PROJECT MANAGEMENT | ENGINEERING | PLANNING
Building community through our people

Projex Partners Pty Ltd
ACN 153 518 971 ABN 62 153 518 971
Level 3
135 Horton Parade
MAROOCHYDORE QLD 4558

Telephone: 1300 789 214

DOCUMENT ISSUE RECORD

Revision Code	Date Revised	Revision Details	Author	Checked	Approved
A	24/03/2021	Original Issue	RK	DB	DB
B	29/11/2021	Updated plans and water quality treatment	RK	DB	DB

Approved

Daniel Berry (RPEQ 6343)

CONTENTS

Tables

Figures

Appendices

1 INTRODUCTION

Projex Partners have been engaged by Pensar Structures to undertake the detailed design of the Redland Bay Ferry Terminal upgrade for SeaLink. Currently, the facility consists of a single ramp used for vehicle services plus a service ramp and disused ramp on the northern side of the vehicular loading ramp. To improve services for their customers, SeaLink are proposing to upgrade the existing facility to provide two vehicle access locations to accommodate a new fleet of ferries with associated improvements to queuing, ticketing and access.

The site is located within Redland Bay vehicular ferry terminal is located at the eastern end of Weinam Street, Redland Bay. It is also within the Weinam Creek Priority Development Area (PDA) with development approvals coordinated by Economic Development Queensland (EDQ).

This Stormwater Management Plan (SMP) has been prepared to support the development approval application.

Figure 1-1: Redland Bay Vehicular Ferry Terminal Location

2 SITE DESCRIPTION

2.1 General Description

The site is located on Lots 1 & 2 SP261696 and 186 SL8029 at the end of Weinam Street, Redland Bay as shown in figure 2.1 below. The property is 7039m^2 with approximately 4540m^2 within tidal zones.

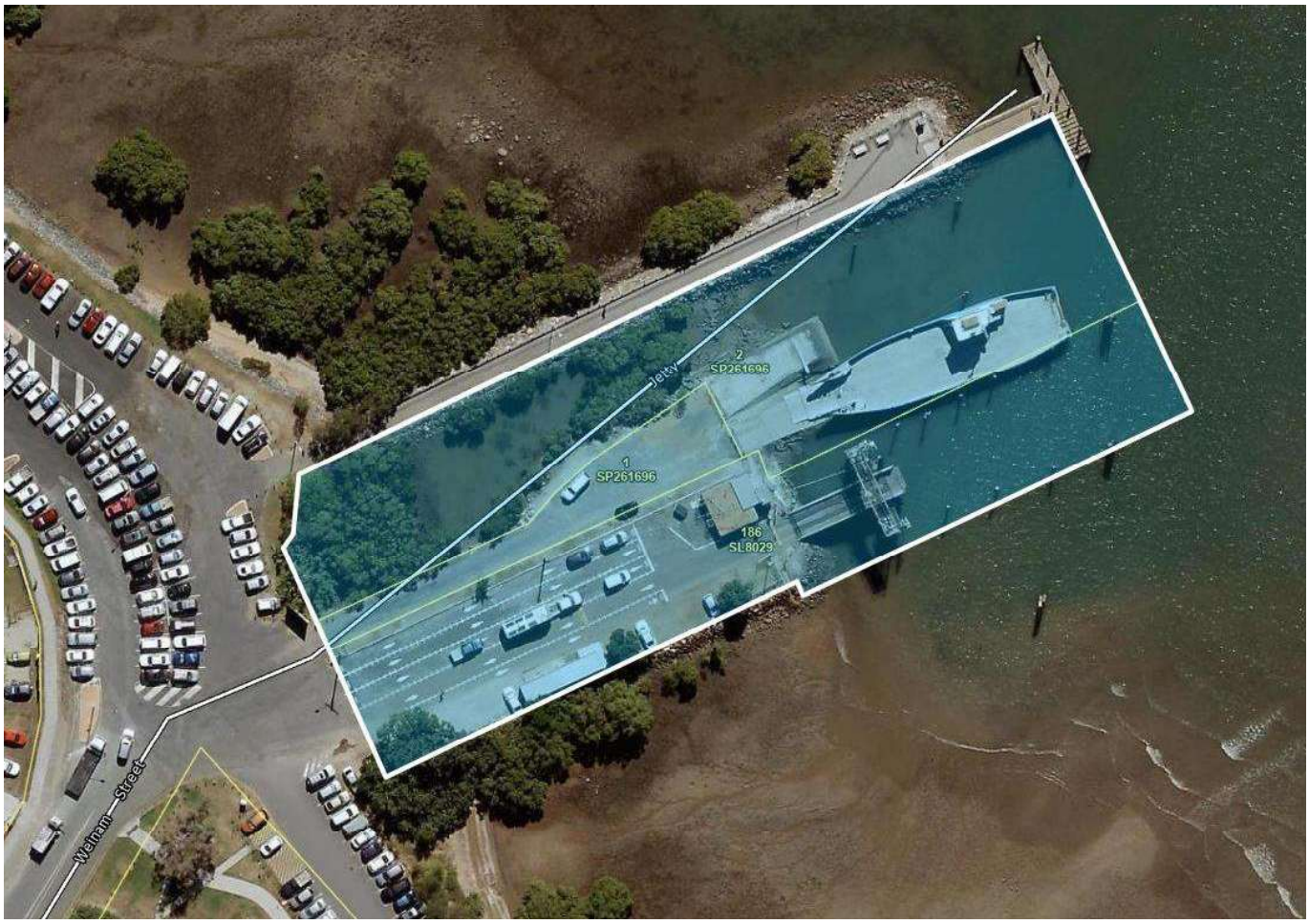


Figure 2-1: Current Site Layout

2.1.1 Topography, Vegetation and Site Drainage

The site is approximately 2m AHD and is relatively flat with no defined fall on the site. All stormwater is conveyed by overland flow paths and discharges directly into Redland Bay.

A small number of trees are present on the southern boundary of the site along with two small grassed areas. The rest of the site has no landscaping.

A council stormwater inlet pit is present at the entrance to the site. This travels under the south western corner of the site and discharges into Redland Bay.

As the site is located below 5m AHD, Acid Sulphate Soils (ASS) may be present. Potential ASS are addressed separately in the environmental reports for the project.

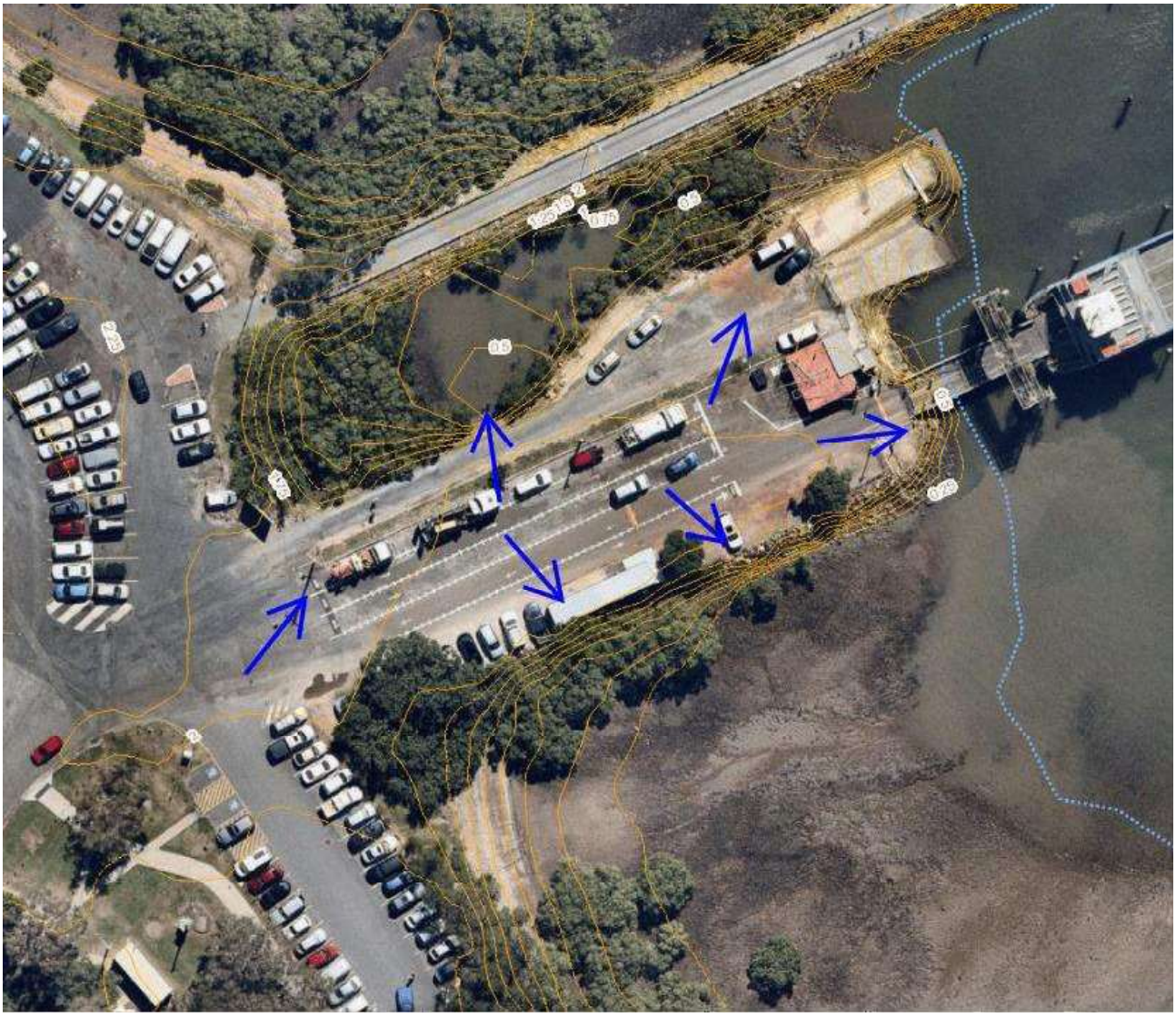


Figure 2-2: Site Topography and Drainage Features

2.1.2 Existing Imperviousness Area

The site located on land is approximately 2500m^2. Approximately 105m^2 is pervious. The remainder of the land is sealed or heavily compacted gravel which results in approximately 96% impervious area.

2.2 Previous Studies

Redland City Councils City Plan indicates that the site is within an erosion prone area and storm tide inundation area.

3 DEVELOPMENT DESCRIPTION

3.1 General Description

The proposed development is to consist of two ferry loading ramps along with 6 entry lanes, 1 holding lane and 1 exit lane. Localised footpaths and seating areas are also included in the new development. A grassed area runs along the southern boundary of the site and includes a bioretention swale drain to improve water quality from the site. The northern boundary has a similar bioretention swale drain that will also capture and treat stormwater runoff.

The site also reclaims approximately 150m^2 due to the extension of the boarding ramps with a resultant area of 2650m^2. Reclamation fill has been specified as rockfill to minimise the potential for sediment transfer and will be sourced from a registered quarry. Certification will be obtained from the quarry that the materials used are free of contamination.

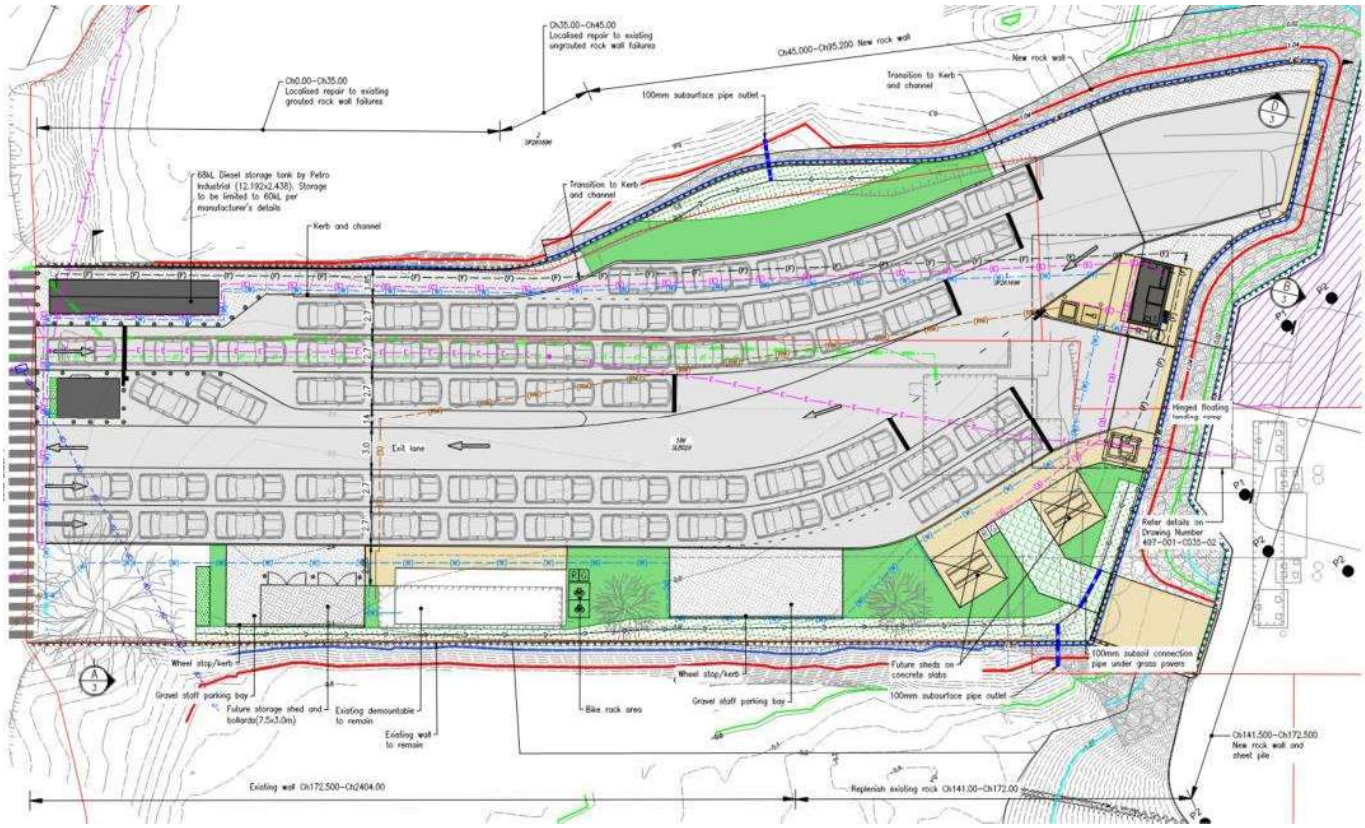


Figure 3-1: Site Plan

Stormwater from the site will be conveyed as per the current drainage regime via overland sheet flow paths. The proposed drainage scheme introduces a series of swale drains to intercept flows prior before discharging to the bay.

No underground stormwater network will be installed due to the low-lying nature of the site and tidal conditions restricting outflow from an underground network.

3.2 Lawful Point of Discharge

Currently stormwater flows into the bay via overland flow paths.

No changes to stormwater discharge are proposed.

Water will discharge to Moreton Bay as per the current conditions and will have no impact on surrounding properties or other drainage infrastructure prior to discharge.

4 STORMWATER QUALITY

The only current water quality treatment on the site is localised bunding at the fuel storage and loading areas. All other runoff from the site discharges directly to Moreton Bay.

Bioretention swales have been introduced to treat stormwater runoff prior to discharge from the site. These swales are shallow vegetated swales which capture, treat and infiltrate stormwater runoff. The bioretention media is proposed to be 500mm deep and will capture all runoff from a storm event.

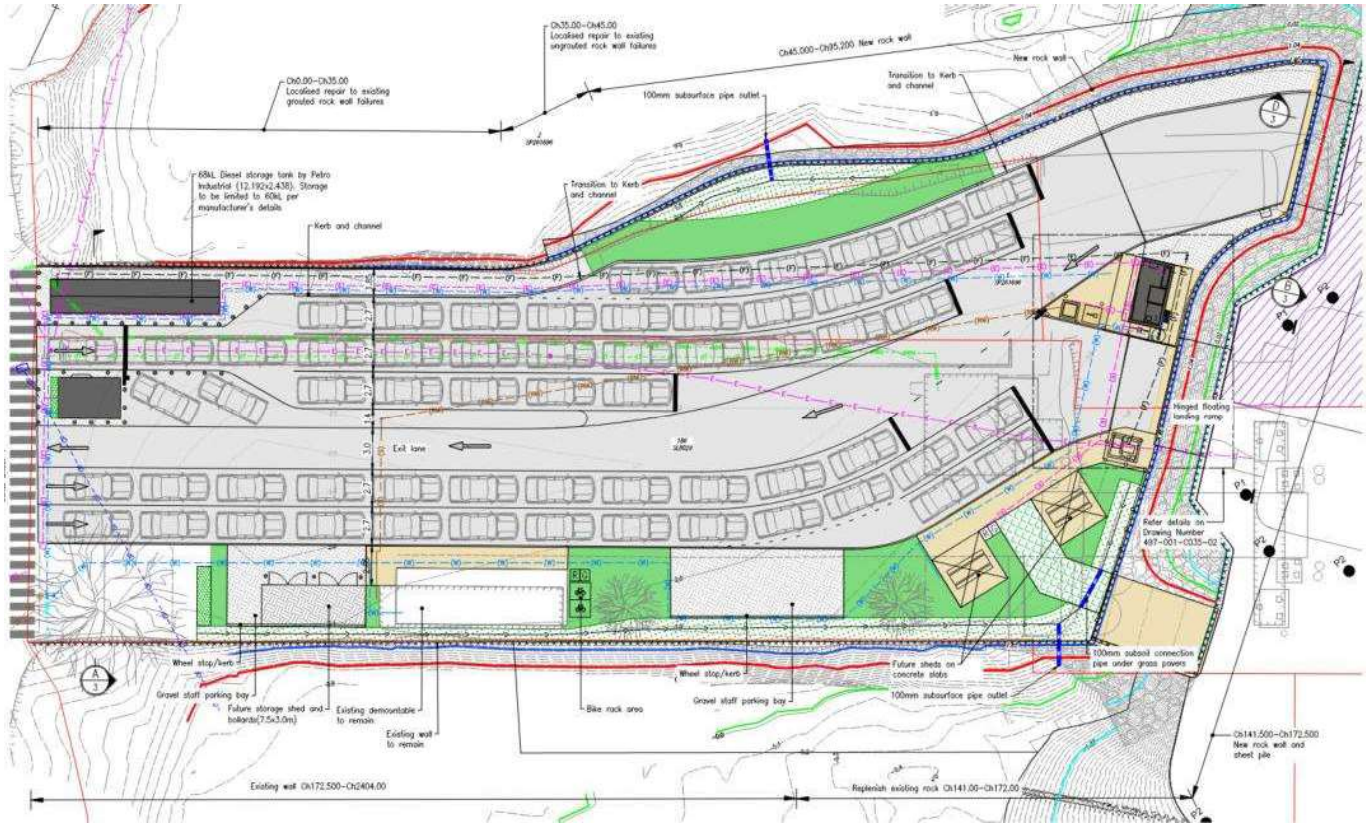


Figure 4-1: Swale Drain Locations

Stormwater is directed to the edge of the site into the bioretention swales. Pollutants from rainfall will be picked up in the initial rainfall during a storm event and will flow into the bioretention swale. This water will then soak into the swale and filtration media to be treated.

All stormwater from the queuing bays is directed towards the bioretention swales. Pollutants (TN and TSS) will then soak into the bioretention media for treatment.

Hydrocarbon capture will be assisted by the utilisation of the depth within the swale to capture spills prior to discharge to the Bay. It is noted that the parking areas (likely sources of discharges from parked vehicles) have been directed into the swales and there is no direct outlet (i.e. no direct pipes) from the swales into the bay under normal runoff events. This facilitates the capture of spills utilising the spill kits discussed below.

In addition to the bioretention swales, fuels and oils stored on site will be located within bunds. These bunds are designed to capture any leaks or spills. Spill kits will also be located on site near storage and refuelling stations. The kits are to contain equipment suitable for capturing and cleaning spills on land and within waterways. Examples of the proposed spill kits are included in ***Appendix C***.

Gross pollutants are also captured within the vegetated swale, allowing removal by SeaLink staff during normal site cleaning operations. Additional waste bins are being provided on site to manage gross pollutant load.

A MUSIC model treatment train has been completed for the site. The treatment train effectiveness is shown below in Figure 4.2.

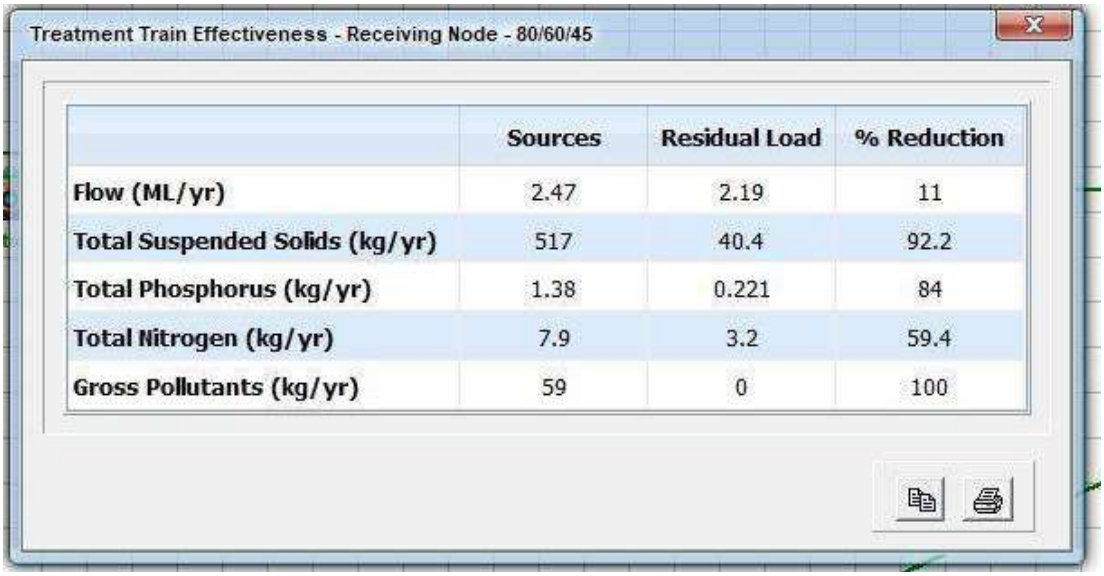


Figure 4-2: MUSIC Model Treatment Train Effectiveness

As shown in the treatment train, all targets within the State Planning Policy have been met. These are summarised below in Table 6-1.

Table 4-1: Achieved Pollutant Reduction

Pollutant Type	Reduction Target	Achieved
Gross Pollutants (>5mm)	90% in mean annual load	100%
Total Suspended Solids (TSS)	80% in mean annual load	92.2
Total Phosphorous (TP)	60% in mean annual load	84%
Total Nitrogen (TN)	45% in mean annual load	59.4%

5 STORMWATER QUANTITY

The current site is approximately 2500m2 with 96% of the site impervious. The proposed development is 2650m2 with 88% of the site impervious. Due to the slightly larger site area, stormwater runoff increases slightly across all storm events. As the site is located at the end of the stormwater catchment and discharges directly into Moreton Bay, a slight increase has no effect on the total stormwater network and does not impact any properties or infrastructure.

The discharges from site are summarised in Table 5-1 below.

Table 5-1: Stormwater Discharge

Storm Event (AEP)	Pre-Development Flow (Q, m^3/s)	Post Development (Q, m^3/s)	Difference (Q, m^3/s)
1%	0.242	0.250	-0.009
2%	0.208	0.215	-0.008
5%	0.161	0.167	-0.006
10%	0.133	0.138	-0.005
63%	0.058	0.060	-0.002

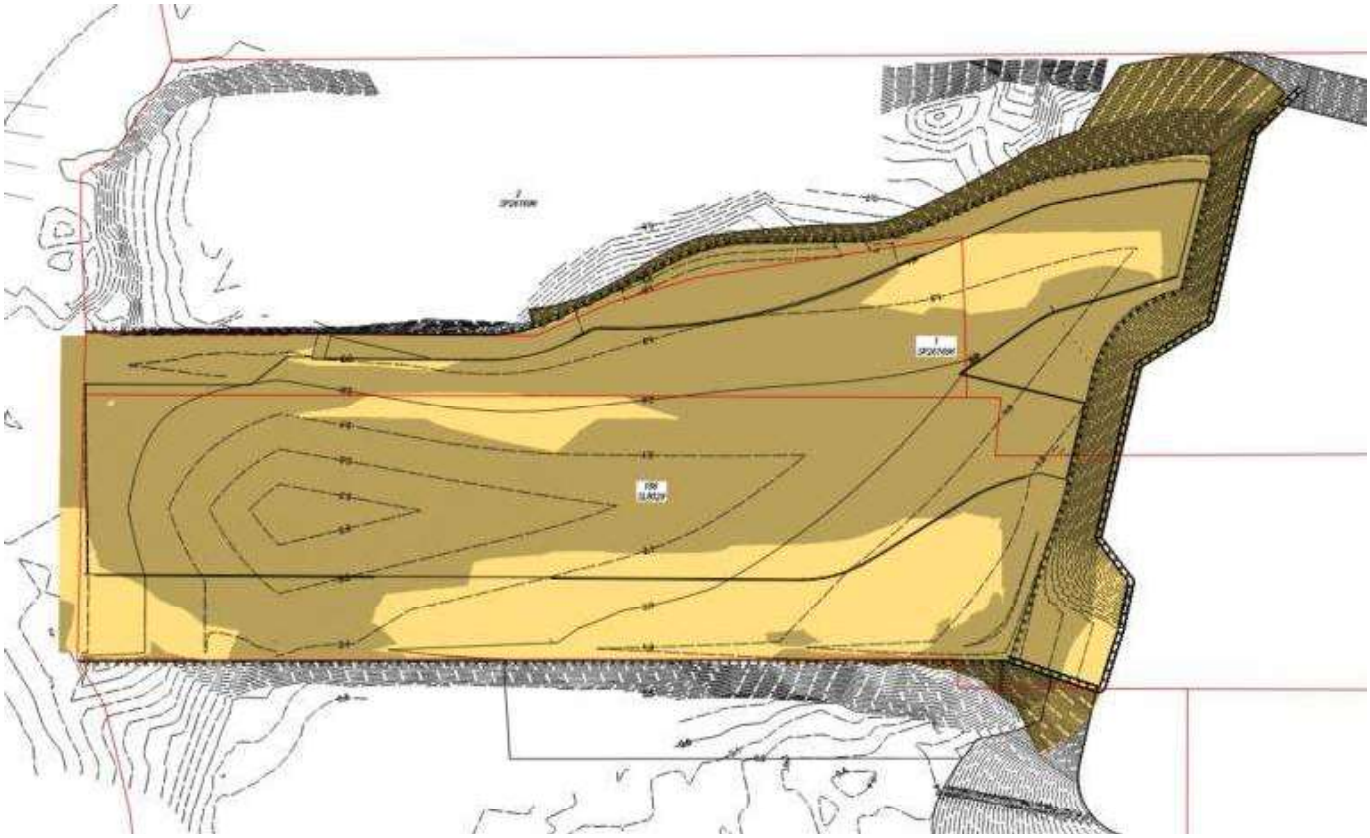


Figure 5-1: Drainage Contours Plan

6 CONCLUSION

Projex Partners were engaged by Pensar Structures on behalf of SeaLink to undertake the design for the upgrade of Redland Bay Ferry Terminal. The development consists of increasing capacity for passenger storage and improving access for a new fleet of ferries. A second loading ramp will also be formalised for use by passengers.

The post development site will improve water quality discharging from the site through the use of bioretention swale drains. Pollutants will be reduced to meet the requirements within the State Planning Policy.

Stormwater runoff will increase slightly but will have no impact on the overall stormwater catchment and will not impact surrounding properties or infrastructure.

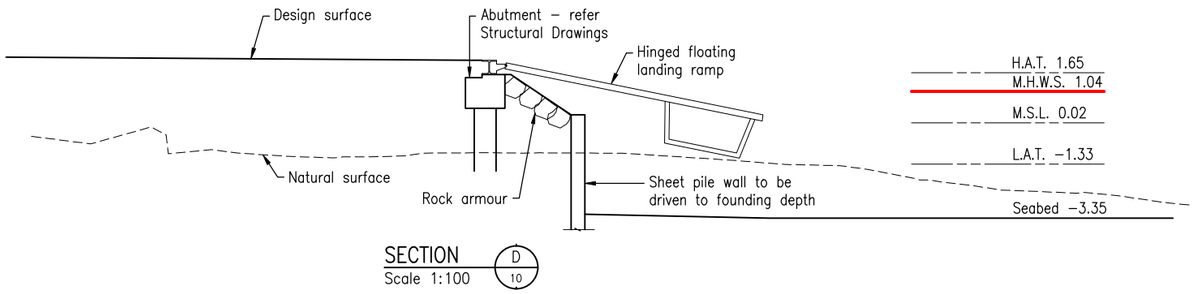
7 REFERENCES

This SMP has been prepared with consideration of the following documentation:

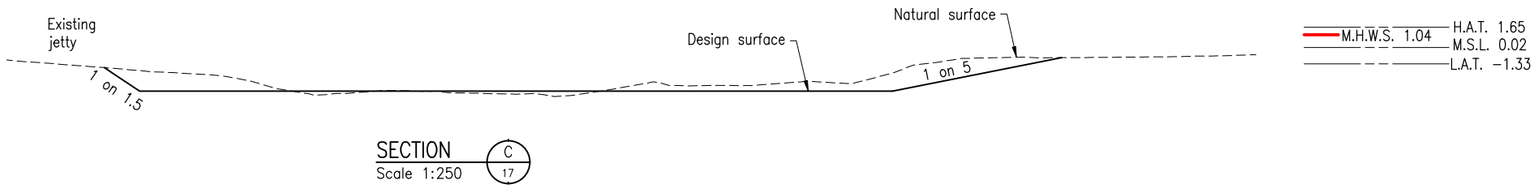
- State Planning Policy (2017)
- Queensland Urban Drainage Manual (2017)
- MUSIC Modelling Guidelines
- Redland City Plan – Planning Scheme Policy 2: Infrastructure Works.

APPENDIX A

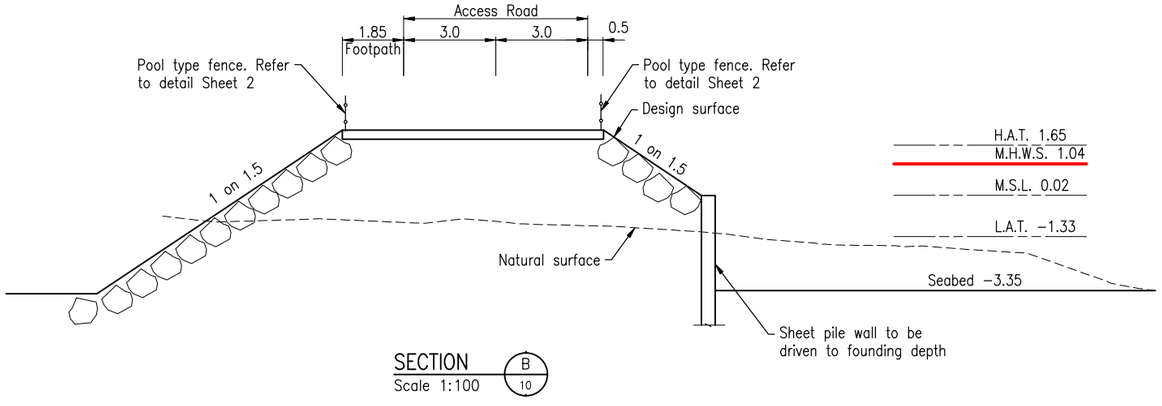
Drawings / Plans



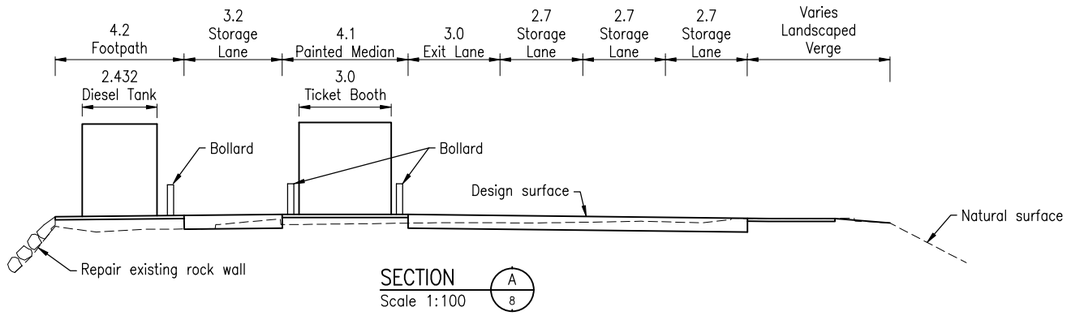
SECTION D
Scale 1:100



SECTION C
Scale 1:250



SECTION B
Scale 1:100



SECTION A
Scale 1:100

ROCK ARMOUR NOTES

1. These drawings are to be read in conjunction with the Technical Specification.
2. Dimensioned layer thicknesses are an indication of minimum thickness only; and generally reflect that required to schieve the number of specified armour layers.
3. Seawall Design Parameters:
   - Design Event = 1% Annual Exceedance Probability
   - Ocean storm tide level (including wave setup) = RL4.0m AHD
   - Design wave parameters (at toe of seawall)
     Hs = 1.59 metres
     Tp = 4.47 seconds
   - Duration of joint storm tide and waves = 6 hours
4. Rock armour to be carefully placed to match smoothly into existing rock shelf and boulders.
5. Loose rock < armour size to be removed prior to placement of armour

TYPE A ROCK – PRIMARY ARMOUR

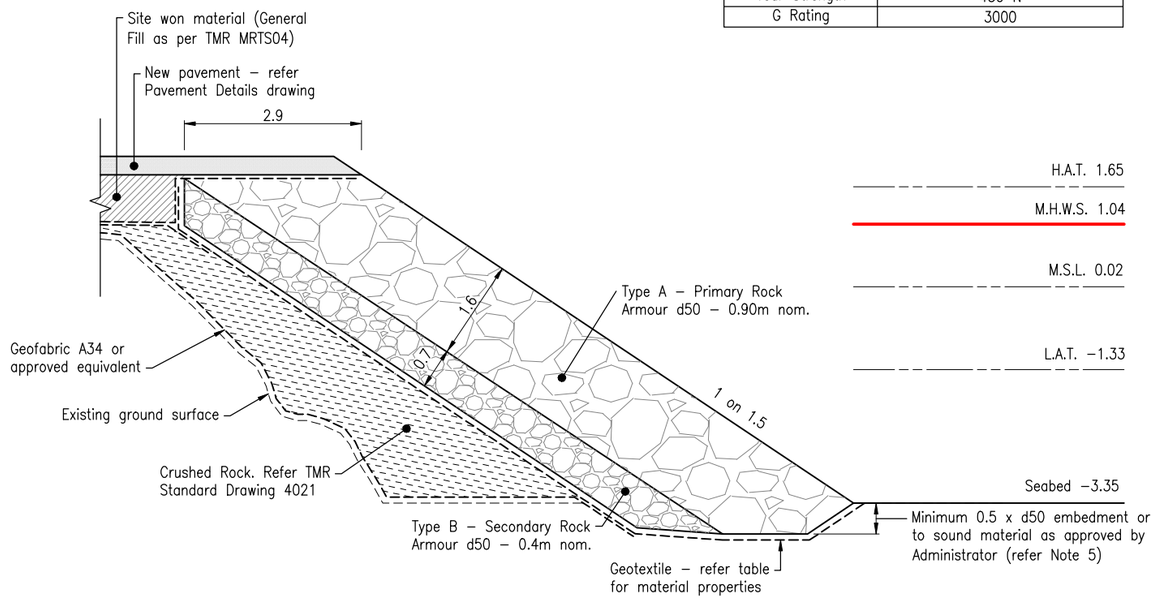
- D50 = 0.90m
- M50 = 1841kg
- Armour is to be placed to ensure interlocking is achieved

TYPE B ROCK – SECONDARY ARMOUR

- D50 = 0.40m
- M50 = 173kg
- Armour is to be placed to ensure interlocking is achieved

GEOTEXTILE PROPERTIES

Parameter	Requirement
Material	Non–woven needle punched staple fibre polyester or polypropylene meeting minimum strength Class D and Filtration Class 1
Elongation	> = 30%
Grab Strength	1200 N
Tear Strength	450 N
G Rating	3000



ROCK ARMOUR DETAIL
Scale 1:50

ProjexPartners
PROJECT MANAGEMENT | ENGINEERING | PLANNING
Ph: 1300 789 214 www.projexpartners.com.au

CLIENT
PENSAR STRUCTURES

Rev.	Description	Date	Drawn	Design	Check	RPEQ No. & Initial
B	REVISED LAYOUT	10/12/2021	JC	JM	DB	6343 DB
A	FOR DEVELOPMENT APPLICATION APPROVAL	29/3/2021	JC	JM	DB	6434 DB

ENGINEERING CERTIFICATION (RPEQ)

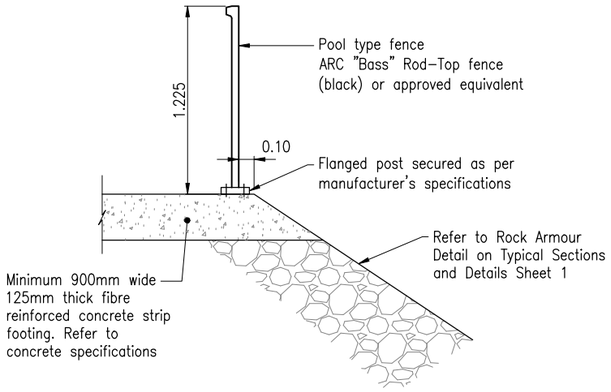
ENG. AREA	NAME	SIGNATURE	No.	DATE
CIVIL	D BERRY		6343	10/12/2021

SCALE
1:50 0 0.5 1 2 A1
1:100 A3
1:100 0 1 2 3 4 A1
1:200 A3
1:250 0 5 10 A1
1:500 A3

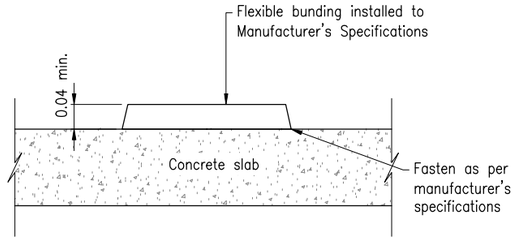
REDLAND BAY FERRY TERMINAL

TYPICAL SECTIONS AND DETAILS SHEET 1

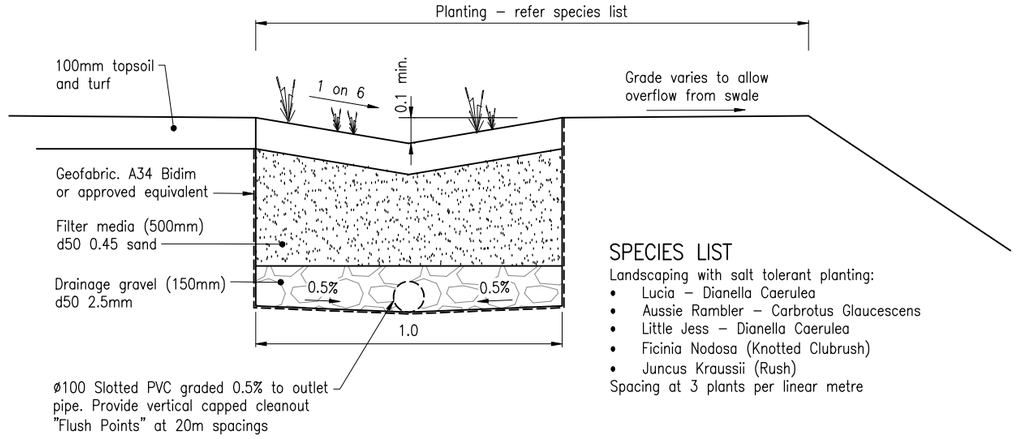
DRAWING NUMBER 497-001-C005-01
No IN SET 3 OF 25
REVISION B



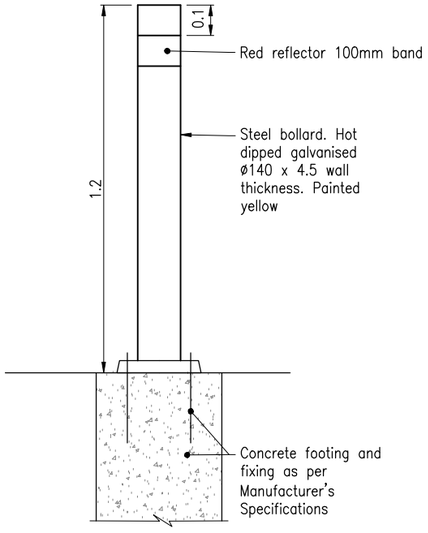
TYPICAL FENCE DETAIL ON ROCK WALL
Scale 1:20



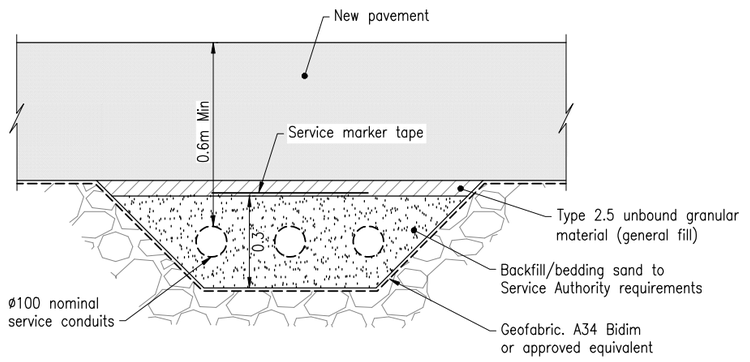
TYPICAL BUND DETAIL
Not to Scale



BIORETENTION SWALE DETAIL
Scale 1:10



BOLLARD DETAIL
Scale 1:10



TYPICAL SERVICES TRENCH DETAIL
Scale 1:10

ProjexPartners
PROJECT MANAGEMENT | ENGINEERING | PLANNING
Ph: 1300 789 214 www.projexpartners.com.au

CLIENT
PENSAR STRUCTURES

Rev.	Description	Date	Drawn	Design	Check	RPEQ No. & Initial
B	REVISED LAYOUT	10/12/2021	JC	JM	DB	6343 DB
A	FOR DEVELOPMENT APPLICATION APPROVAL	29/3/2021	JC	JM	DB	6434 DB

ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	NAME	SIGNATURE	No.	DATE
CIVIL	D BERRY		6343	10/12/2021

SCALE
1:10 0 0.1 0.2 0.3 0.4 A1
1:20 A3
1:20 0 0.2 0.4 0.6 0.8 A1
1:40 A3

REDLAND BAY FERRY TERMINAL

TYPICAL SECTIONS AND DETAILS
SHEET 2

DRAWING NUMBER 497-001-C005-02
No IN SET 4 OF 25
REVISION B

Ch0.00–Ch35.00
Localised repair to existing grouted rock wall failures

Refer details on Drawing Number 497–001–C035–01

68kL Diesel storage tank by Petro Industrial (12.192x2.438). Storage to be limited to 58.8kL per manufacturer's details

Kerb and channel

Existing drainage pit and pipe. Remove grate and frame. Reinstate with heavy duty grate and set to new surface levels

Ticket booth (3x3)

Staff parking

Exit lane

Wheel stop/kerb

Gravel staff parking bay

Future storage shed and bollards(7.5x3.0m)

Existing demountable to remain

Existing wall to remain

Existing wall Ch172.500–Ch2404.00

Joins Sheet 2

NOTE
For notes and legend, refer to Drawing Number 497–001–C001–01.

ProjexPartners
PROJECT MANAGEMENT | ENGINEERING | PLANNING
Ph: 1300 789 214 www.projexpartners.com.au

CLIENT
PENSAR STRUCTURES

Rev.	Description	Date	Drawn	Design	Check	RPEQ No. & Initial
B	REVISED LAYOUT	10/12/2021	JC	JM	DB	6343 DB
A	FOR DEVELOPMENT APPLICATION APPROVAL	27/8/2021	JC	JM	DB	6434 DB

ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	NAME	SIGNATURE	No.	DATE
CIVIL	D BERRY		6343	10/12/2021

SCALE
1:125 0 2.5 5 A1
1:250 A3

REDLAND BAY FERRY TERMINAL
GENERAL ARRANGEMENT SHEET 1

DRAWING NUMBER 497-001-C030-01
No IN SET 8 OF 25
REVISION B

Last Modified - Dec 15, 2021 - 4:36pm C:_Synergy\Workspace\data\S-AP-011497-001 RBay Ferry_22540\Design\AutoCAD_DRAWINGS\497-001-C030-GA-01.dwg By - JasonM

Ch0.00–Ch35.00
Localised repair to existing
grouted rock wall failures

Ch35.00–Ch45.00
Localised repair to existing
ungrouted rock wall failures

Ch45.000–Ch95.200 New rock wall

New rock wall

Transition to Kerb
and channel

100mm subsurface pipe outlet

68kL Diesel storage tank by Petro
Industrial (12.192x2.438). Storage
to be limited to 58.8kL per
manufacturer's details

Kerb and channel

Transition to Kerb
and channel

Hinged floating
landing ramp

Refer details on
Drawing Number
497–001–C035–02

Exit lane

Wheel stop/kerb

Gravel staff parking bay

Future storage shed and
bollards(7.5x3.0m)

Existing demountable
to remain

Existing wall
to remain

Bike rack area

Wheel stop/kerb

Gravel staff parking bay

Future sheds on
concrete slabs

100mm subsurface pipe outlet

100mm subsoil connection
pipe under grass pavers

Ch141.500–Ch172.500
New rock wall and
sheet pile

Existing wall Ch172.500–Ch2404.00

Replenish existing rock Ch141.00–Ch172.00

Joins Sheet 1

Joins Sheet 3

NOTE
For notes and legend, refer to Drawing Number 497–001–C001–01.

Last Modified - Dec 15, 2021 - 4:38pm C:_SynergyWorkspace\data\S-AP-011497-001 RBay Ferry_22540\Design\AutoCAD_DRAWINGS\497-001-C030-GA-02.dwg By - JasonM

ProjexPartners
PROJECT MANAGEMENT | ENGINEERING | PLANNING
Ph: 1300 789 214 www.projexpartners.com.au

CLIENT
PENSAR STRUCTURES

Rev.	Description	Date	Drawn	Design	Check	RPEQ No. & Initial
B	REVISED LAYOUT	10/12/2021	JC	JM	DB	6343 DB
A	FOR DEVELOPMENT APPLICATION APPROVAL	27/8/2021	JC	JM	DB	6434 DB

ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	NAME	SIGNATURE	No.	DATE
CIVIL	D BERRY		6343	10/12/2021

SCALE
1:125 1:250 0 2.5 5 A1 A3

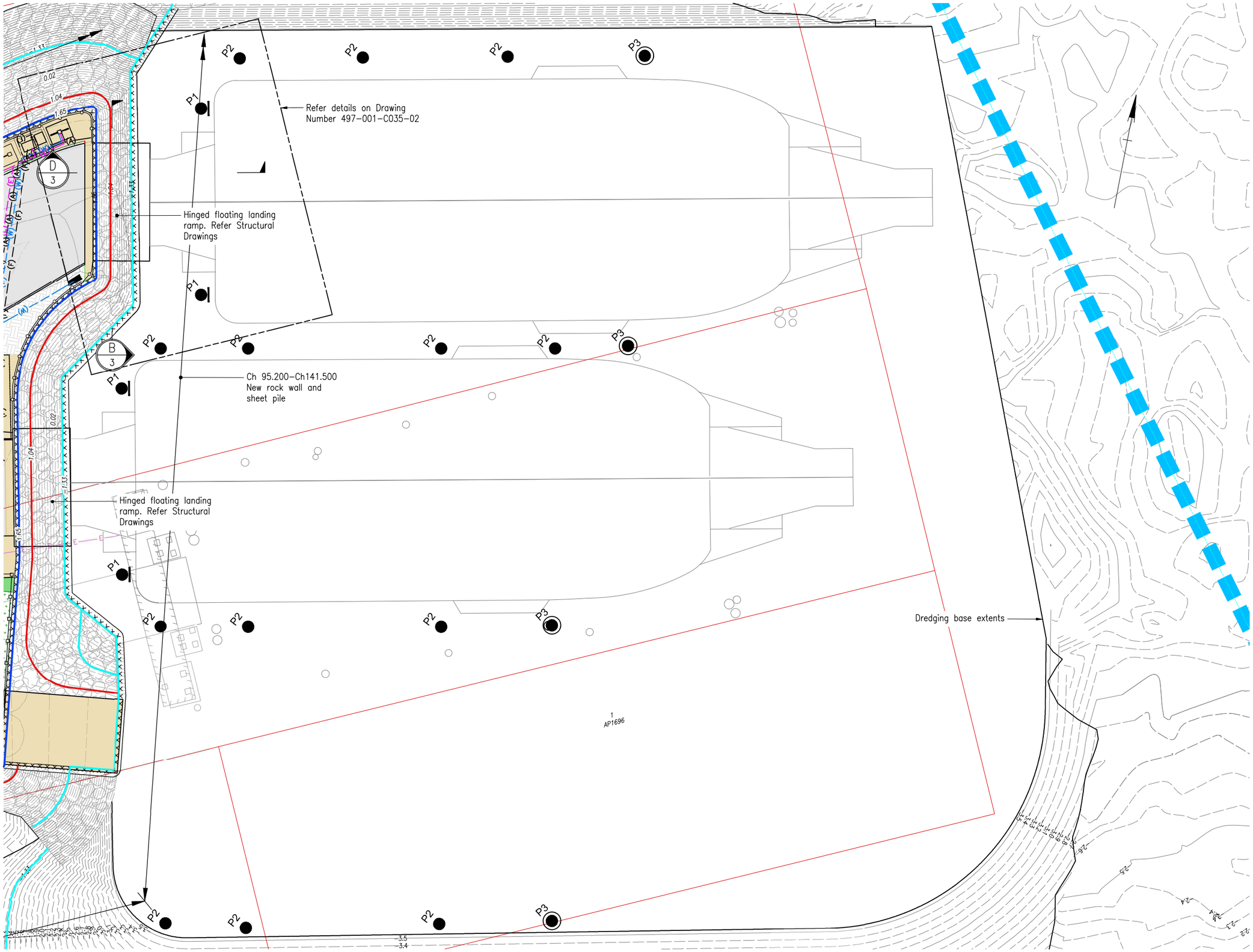
REDLAND BAY FERRY TERMINAL

GENERAL ARRANGEMENT
SHEET 2

DRAWING NUMBER 497-001-C030-02

No IN SET 9 OF 25

REVISION B



PILE LEGEND

P1 610CHS25 with Arch Fenders

P2 610CHS25

P3 762CHS25

Pile locations to be confirmed by marine architect to suit vessel mooring points

NOTE

For notes and legend, refer to Drawing Number 497-001-C001-01.

ProjexPartners
PROJECT MANAGEMENT | ENGINEERING | PLANNING
Ph: 1300 789 214 www.projexpartners.com.au

CLIENT: PENSAR STRUCTURES

Rev.	Description	Date	Drawn	Design	Check	RPEQ No. & Initial	
B	REVISED LAYOUT	10/12/2021	JC	JM	DB	6343	DB
A	FOR DEVELOPMENT APPLICATION APPROVAL	27/8/2021	JC	JM	DB	6434	DB

ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	NAME	SIGNATURE	No.	DATE
CIVIL	D BERRY		6343	10/12/2021

SCALE: 1:125 / 1:250 — 0 2.5 5 — A1 / A3

REDLAND BAY FERRY TERMINAL

GENERAL ARRANGEMENT SHEET 3

DRAWING NUMBER: 497-001-C030-03 | No IN SET: 10 OF 25 | REVISION: B

APPENDIX B

Stormwater Quantity Calculations

Redland Bay Ferry Terminal

Project: Redland Bay Ferry Terminal, 1% AEP

Catchment	Pre Development	Post Development	Post Development with Treatment
Area in Ha	0.25	0.265	0.265
Fraction Impervious	0.04	0.12	0.12
AEP	1%	1%	0.01
Frequency Factor	1.2	1.2	1.2
Rainfall intensity (Q10, 1hr)	68.3	68.3	68.3
C10 Runoff Coefficients	0.9	0.88	0.88
Time of concentration	5	5	5
Rainfall Intensity (ARI, TC)	322	322	
Q (m3/s)=	**0.242**	**0.250**	**-0.009**

Project: Redland Bay Ferry Terminal, 5% AEP

Catchment	Pre Development	Post Development	Post Development with Treatment
Area in Ha	0.25	0.265	0.265
Fraction Impervious	0.04	0.12	0.12
AEP	5%	5%	0.05
Frequency Factor	1.05	1.05	1.05
Rainfall intensity (Q10, 1hr)	68.3	68.3	68.3
C10 Runoff Coefficients	0.9	0.88	0.88
Time of concentration	5	5	5
Rainfall Intensity (ARI, TC)	245	245	
Q (m3/s)=	**0.161**	**0.167**	**-0.006**

Project: Redland Bay Ferry Terminal, 2% AEP

Catchment	Pre Development	Post Development	Post Development with Treatment
Area in Ha	0.25	0.265	0.265
Fraction Impervious	0.04	0.12	0.12
AEP	2%	2%	0.02
Frequency Factor	1.15	1.15	1.15
Rainfall intensity (Q10, 1hr)	68.3	68.3	68.3
C10 Runoff Coefficients	0.9	0.88	0.88
Time of concentration	5	5	5
Rainfall Intensity (ARI, TC)	289	289	
Q (m3/s)=	**0.208**	**0.215**	**-0.008**

Project: Redland Bay Ferry Terminal, 10% AEP

Catchment	Pre Development	Post Development	Post Development with Treatment
Area in Ha	0.25	0.265	0.265
Fraction Impervious	0.04	0.12	0.12
AEP	10%	10%	0.1
Frequency Factor	1	1	1
Rainfall intensity (Q10, 1hr)	68.3	68.3	68.3
C10 Runoff Coefficients	0.9	0.88	0.88
Time of concentration	5	5	5
Rainfall Intensity (ARI, TC)	213	213	
Q (m3/s)=	**0.133**	**0.138**	**-0.005**

Project: Redland Bay Ferry Terminal, 63% AEP

Catchment	Pre Development	Post Development	Post Development with Treatment
Area in Ha	0.25	0.265	0.265
Fraction Impervious	0.04	0.12	0.12
AEP	63%	63%	0.63
Frequency Factor	0.8	0.8	0.8
Rainfall intensity (Q10, 1hr)	68.3	68.3	68.3
C10 Runoff Coefficients	0.9	0.88	0.88
Time of concentration	5	5	5
Rainfall Intensity (ARI, TC)	116	116	
Q (m3/s)=	**0.058**	**0.060**	**-0.002**

APPENDIX C

Spill Kits

Redland Barge Terminal
Spill Kits

Spill kits on site: Marine Spill Kits

1x Pallet Bin – 855L Absorbent capacity

- Located between northern and centre berths.

Link for details: https://wssa.com.au/product/marine-pallet-bin-855l-absorbent-capacity/

Home / Spill Kits / Spill Kits Marine / Marine Spill Kit: Pallet Bin 855L Absorbent Capacity

Marine Spill Kit: Pallet Bin 855L Absorbent Capacity

$2,750.00 + GST

afterpay available between $1.00 - $2,000.00 Learn More

1 ADD TO CART ADD TO QUOTE

Part Number: SKM855 / Categories: Spill Kits, Spill Kits Marine

Specifications | Description

- Pallet-sized 855 litre capacity marine spill kit designed for spills of oils, fuels, diesel, petrol and other hydrocarbons around harbours, ponds and other inland waterways.
- **Weight:** 50.0 kg
- **Dimensions:** 117 x 117 x 85 cm

- 20 x Oil and fuel absorbent marine boom (3m x 12.5cm)
- 50 x Oil and fuel absorbent pads (45cm x 45cm)
- 4 x PVC gloves – pair (450mm)
- 10 x Disposal bag – labelled (100 micron polyethylene)
- 1 x Barrier Tape (50m x 7.5cm)
- 2 x Rope – polypropylene (15m x 6mm)
- 1 x Nally mega bin 780 litre (117cm x 117cm x 85cm)
- 1 x Spill kit labels and audit tag (Self-adhesive PVC)
- 1 x Spill kit instructions (A4 laminated)

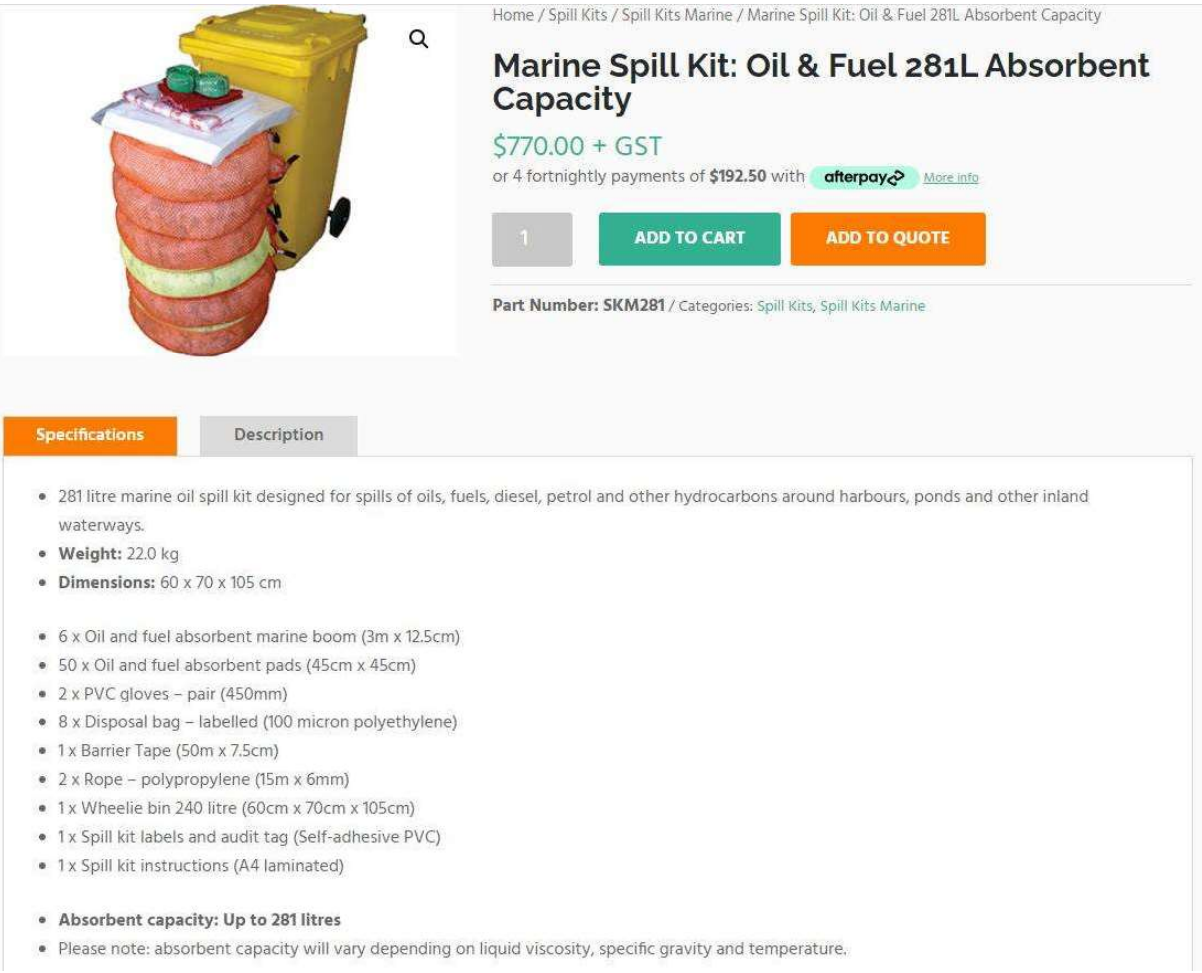
- **Absorbent capacity: Up to 855 litres**
- Please note: absorbent capacity will vary depending on liquid viscosity, specific gravity and temperature.

Redland Barge Terminal
Spill Kits

4x Oil and Fuel – 281L Absorbent capacity

- 2x Located between northern and centre berths.
- 2x Located at near storage shed/current demountable.

Link for details: https://wssa.com.au/product/marine-oil-and-fuel-281l-absorbent-capacity/



Home / Spill Kits / Spill Kits Marine / Marine Spill Kit: Oil & Fuel 281L Absorbent Capacity

Marine Spill Kit: Oil & Fuel 281L Absorbent Capacity

$770.00 + GST

or 4 fortnightly payments of **$192.50** with afterpay More info

1 ADD TO CART ADD TO QUOTE

Part Number: SKM281 / Categories: Spill Kits, Spill Kits Marine

Specifications | Description

- 281 litre marine oil spill kit designed for spills of oils, fuels, diesel, petrol and other hydrocarbons around harbours, ponds and other inland waterways.
- **Weight:** 22.0 kg
- **Dimensions:** 60 x 70 x 105 cm

- 6 x Oil and fuel absorbent marine boom (3m x 12.5cm)
- 50 x Oil and fuel absorbent pads (45cm x 45cm)
- 2 x PVC gloves – pair (450mm)
- 8 x Disposal bag – labelled (100 micron polyethylene)
- 1 x Barrier Tape (50m x 7.5cm)
- 2 x Rope – polypropylene (15m x 6mm)
- 1 x Wheelie bin 240 litre (60cm x 70cm x 105cm)
- 1 x Spill kit labels and audit tag (Self-adhesive PVC)
- 1 x Spill kit instructions (A4 laminated)

- **Absorbent capacity: Up to 281 litres**
- Please note: absorbent capacity will vary depending on liquid viscosity, specific gravity and temperature.