GOVERNMENT OF WESTERN AUSTRALIA

Department of Biodiversity, Conservation and Attractions

SWAN CANNING RIVERPARK

Development Application Guidelines for Form 1

Under the Swan and Canning Rivers Management Act 2006 – Part 5 – section 72(1)

Important information for applicants

1. The Department of Biodiversity, Conservation and Attractions (the department) is responsible for assessment of development applications in the Swan Canning Development Control Area under section 72(1) of the *Swan and Canning Rivers Management Act 2006* (SCRM Act).
2. The original application Form 1 must be accompanied by sufficient information detailing the proposed works and a full set of scaled plans and specifications for the proposed development. Under section 72(7) of the SCRM Act, the department may also request further information relating to the development before considering the application to be valid and to enable proper consideration of the application.
3. The landowner(s) must consent to the application being made and must sign the application. The applicant is responsible for obtaining landowner(s) consent, except where the landowner is the department.
4. Where the applicant appoints an authorised agent to act on their behalf, the authorised agent must attach a copy of the written authority to the application.
5. The application is to be lodged with the local government or redevelopment authority in whose jurisdiction the proposed development is situated. If the proposed development is not within a local government or redevelopment authority area, the application is to be made direct to the department's Swan Canning Waterways Branch.
6. There are penalties for providing false information in the application, which may include a fine of up to $10 000, under section 88 of the SCRM Act.
7. Please carefully read the information below when preparing your application. The application will not be considered valid and will be returned to the applicant if the application has not been signed by the owner(s) of the land, or is not accompanied by adequate detail, plans and specifications of the proposed development.

Planning Policies for development affecting the Swan Canning Development Control Area

Development proposals must be consistent with the purpose and objectives of the SCRM Act, which provides for the protection and enhancement of the ecological health, community benefits, amenity and heritage value of the Swan Canning river system. A range of planning policies have been created to guide land use and development and provide for consistent and integrated planning and decision making in relation to the Swan Canning Development Control Area.

The policies provide guidance regarding the issues that are considered when assessing an application. Where possible please address any relevant issues identified in the policies and include this supplementary information with the application.

Corporate Planning Policies for development affecting the Swan Canning Development Control Area

The department has a range of policies, guidelines and plans relevant to development affecting the Swan Canning Development Control Area, which are available on the department's website.

These documents provide direction and guidance regarding how the department assesses development applications in accordance with the SCRM Act and Swan and Canning Rivers Management Regulations 2007.

State Planning Policy 2.9 Water (SPP 2.9)

State planning policies (SPPs) provide the highest level of planning policy control and guidance in Western Australia. SPPs are prepared under Part 3 of the *Planning and Development Act 2005*.

SPP 2.9 identifies issues for planning and decision making for the Swan Canning river system and is available on the Department of Planning, Lands and Heritage website: https://www.planning.wa.gov.au/state-planning-policy-2.9-water

Other relevant planning policies, guidelines and Australian Standards that address issues such as (but not limited to) design, lighting, wetlands, bushfire planning, visual impacts, stormwater, contaminated sites, acid sulphate soils, bushland conservation and water quality may also be considered during the assessment.

Application submission

Via email at: Rivers.planning@dbca.wa.gov.au

In person to:

Department of Biodiversity, Conservation and Attractions

17 Dick Perry Avenue

Technology Park, Western Precinct

KENSINGTON WA 6151

In post to:

Statutory Assessments – Swan Canning Waterways Branch

Department of Biodiversity, Conservations and Attractions

Locked Bag 104

BENTLEY DC WA 6983

Telephone enquiries: 9219 9000

GOVERNMENT OF WESTERN AUSTRALIA

Department of Biodiversity, Conservation and Attractions

SWAN CANNING RIVERPARK

Checklist of information to include with a Form 1 application

To assist the efficient assessment of applications, please include the detail requested below and any other additional information relevant to the proposal.

Item	☑	N/A
Completed application form, including written consent of the landowner(s).	☐	
Additional information, including details of the proposed development (including the existing and proposed use of the site and proposed hours of operation) and addressing any relevant issues identified in the policies.	☐	
Plans and specifications of the proposed development showing: • current and proposed levels (contours at no greater than 1 metre intervals), including retaining structures and fill requirements • the location, metric dimensions, materials, finishes and type of all existing and proposed structures, including services • sections through the site • the nature and extent of any existing and proposed open space and landscaping • proposed external lighting and signage • any watercourse(s) flowing through the site • position and species of any large trees or on-site vegetation, clearly marking vegetation proposed to be retained and removed • the existing and proposed means of access and movement for pedestrians and vehicles.	☐	
Plans, elevations and sections of any building or structure proposed to be erected or altered and/or any building or structure to be retained.	☐	
Site plan of the lot showing the development location in relation to: • adjacent roads • rivers, creeks, springs and wetlands • nearby conservation areas and/or Bush Forever sites • floodway and flood fringe boundaries • land reserved for Regional Open Space under the Metropolitan Region Scheme.	☐	
Information on the availability of drainage and sewer.	☐	
Information on any impacts to Aboriginal heritage sites and historic heritage sites and subsequent approvals (if required).	☐	☐
Information regarding potential acid sulphate soils and/or contamination.	☐	
If the proposed development is likely to disturb potential and/or actual acid sulphate soils or a contaminated site, a preliminary investigation is required, and the results included with this application.	☐	☐
Detail of proposed construction methodologies.	☐	
Geotechnical information.	☐	
Operational details (where relevant) e.g. for a proposed café.	☐	
Larger developments should also include:		
Photo montages showing the development in relation to the river and foreshore landscape.	☐	☐
Information on the impacts of parking, noise and traffic generated by the proposal.	☐	☐
Details of stormwater management incorporating water sensitive urban design principles.	☐	☐
Details of any dewatering proposed during construction, including the expected volumes, water quality, method of disposal and sampling regimes in accordance with DBCA's Policy 50 – Planning for Dewatering Affecting the Swan Canning Development Control Area.	☐	☐
Any specialist studies and/or management plans required to support the application, such as traffic, heritage, environmental, engineering, landscaping or urban design studies.	☐	☐

Department of Biodiversity, Conservation and Attractions

SWAN CANNING RIVERPARK

Form 1 – Application for Approval of Development

Swan and Canning Rivers Management Act 2006 – Part 5 – section 72(1)

1. Applicant details

The applicant is the person with whom the department, on behalf of the Chief Executive Officer, will correspond, unless an authorised agent has been appointed to act on behalf of the applicant, in which case correspondence will be sent direct to the agent.

Name	Nathan Stronach
Position (if applicable)	Bosun
Organisation (if applicable)	Royal Freshwater Bay Yacht Club
Contact person	Nathan Stronach
Postal address	PO Box 373
Town/Suburb	[redacted] State WA Postcode 6911
Telephone	Work [redacted] Mobile [redacted]
Email	[redacted]

I give authority for an agent (as identified at item No. 3) to act on my behalf during the assessment of the application ☐ YES ☑ NO

If 'YES', please provide Agent's details at item No. 3

Applicant signature: NDStronach Date: 5/6/2026

2. Landowner details

All owner(s) of the land **must sign this application**. Where land is owned by the Crown or has a management order granted to a local government or other agency, this application must be signed by the relevant landowner or management body as required under section 72(5)(a) of the Act. If there are more than two landowners, please provide the additional information and signature(s) on a separate page.

Details of first landowner

Name	Glen McLeod-Thorpe
Position (if applicable)	Manager, Swan Canning Waterways Branch
Organisation (if applicable)	Department of Biodiversity, Conservation and Attractions, on behalf of the Swan River Trust
Contact person	
Postal address	17 Dick Perry Avenue
Town/Suburb	Kensington State WA Postcode 6151

I consent to this application being made.

First landowner signature: [signature] Date: 14 May 2026

Details of second landowner (if applicable)

Name	
Position (if applicable)	
Organisation (if applicable)	
Contact person	
Postal address	
Town/Suburb	State Postcode

I consent to this application being made.

Second landowner signature: Date:

3. Authorised agent details (if applicable)

The applicant must sign the form and tick the authorisation under item No. 1 to provide authority for an appointed authorised agent to act on their behalf.

Details of authorised agent

Name					
Position (if applicable)					
Company/agency (if applicable)					
ACN/ABN (if applicable)					
Postal address					
Town/Suburb		State		Postcode	
Telephone	Work		Mobile		
Email					
Authorised Agent signature		Date			

4. Location of proposed development

Certificate of title information	Volume	LR3151	Folio	3598
	Diagram/plan/deposit plan no.	222326 and 168202		
Lot No.(s)	2534 and 7634			
Location				
Reserve No.(s) (if applicable)	17060 and 171113			
Street No.(s) and name	1 Hobbs Place			
Town/Suburb	Peppermint Grove			
Nearest road intersection	Hobbs Place and Lilla Street			

5. Details of proposed development

Please provide a written description of the proposed development (refer to the Development Application Guidelines for further details on what information to include in this section).

Estimated cost of development	$3,000,000
Current use of land	Royal Freshwater Bay Yacht Club utilizes the the land and riverbed leases to conduct yacht club operations including the safe access to vessel berths and on water activities
Proposed development	The proposed works are essential to continue the safe berthing of vessels and the safe access to vessels within the RFBYC marina The scope of works would include 1. the removal of existing mooring piles and fixed concrete jetty structures. 2. The installation mooring piles and floating jetty structures

Development Application

Applicant: Royal Freshwater Bay Yacht Club

Project: D E and F Jetty Replacement

Date: 6 May 2026

Development Application

Royal Freshwater Bay Yacht Club

1. PROJECT DESCRIPTION

1.1 Project overview:

Due to the dilapidated condition of several jetties, Royal Freshwater Bay Yacht Club proposes to undertake the replacement of portions of the marina, commencing 2026/27.

The proposed works are located wholly within the existing RFBYC riverbed lease area.

1.2 Scope of works:

- Removal of existing fixed concrete jetty structures and mooring piles
- Installation of floating jetty structures and mooring piles

1.3 Timing of Works:

- Project commencement - on approval of this Development Application - 2026/27
- Project duration - approximately 18 months

2. LOCALITY OF PROJECT AREA

The works will occur on the premises of Royal Freshwater Bay Yacht Club
Lot 2534 on Plan 222326, Hobbs Place, Peppermint Grove (Reserve 17060)

Locality Plan

Development Application

Royal Freshwater Bay Yacht Club

Proposed Works Battery Limits

Additional Project Drawings and Details are provided within the following documents

- DEF Jetty Replacement Project Drawing Set, pg. 11-17
- Burbury Consulting - Principles Projects Requirements, pg. 18-71
- Jetty and Marine Tender Submission, pg. 72-98

3. ENVIRONMENTAL AND HERITAGE CONSIDERATIONS

The following points have been considered and addressed in this Development Application

Further advice will be provided by the Lead Contractor within their CEMP (TBA)

3.1 Water Quality Management

Water Quality Management			
Objective(s)	Ensure that water quality is not affected by turbidity, debris, spills, acid sulphate soils or pre-existing contaminates		
Management Strategy	Education, Awareness, Turbidity Control Devices, Monitoring, Water Testing, Reporting		
		Responsibility	**Timing**
Control(s)	If turbidity control is required a silt curtain shall be deployed	Lead Contractor	TBA
Performance Indicator(s)	Visual, reporting	Lead Contractor	
Monitoring	Continual during all activities,	Lead Contractor	
Reporting	Any event that affects water quality must be reported to RFBYC and DBCA immediately.	Lead Contractor	
Corrective Action(s)	All reasonable efforts shall be taken to prevent sediment plumes, but where they occur, work must stop whilst the plume is addressed, work shall only recommence once the integrity of the turbidity management device is restored. Spill kits must be maintained and readily available at all times. Staff and contractors must be trained in the use of spill equipment and the spill response procedures.	Lead Contractor	

3.2 Underwater Noise

Underwater Noise			
Objective(s)	Ensure that Marine Fauna is not affected by underwater noise		
Management Strategy	Education, Awareness, Monitoring, Reporting		
		Responsibility	**Timing**
Control(s)	Monitors shall keep watch for dolphins,	Lead Contractor	TBA
Performance Indicator(s)	Records noting dolphin interactions	Lead Contractor	
Monitoring	Continual during excavation activities	Lead Contractor	
Reporting	RFBYC Management and DBCA	Lead Contractor	
Corrective Action(s)	Works shall cease if a dolphin comes within 50m of the site shall not recommence until any dolphin has moved more than 200m away or has not been observed for 20 minutes	Lead Contractor	

3.3 Noise Management

NOISE MANAGEMENT			
Objective(s)	To minimise the impacts of noise on the amenity of the surrounding areas.		
Management Strategy	Noise to be managed primarily through administrative and equipment controls during the construction phase.		
		Responsibility	**Timing**
Control(s)	All equipment used during the excavation to be maintained to ensure efficient operation. Pre-start checks and maintenance schedules to ensure equipment performance is as required.	Lead Contractor	TBA
Performance Indicator(s)	No complaints from adjacent commercial premises and/or community.	Lead Contractor	
Monitoring	Daily inspection of works sites to occur Service logs for equipment/machinery used on site	Lead Contractor	
Reporting	Any complaints or incidents to be reported RFBYC	Lead Contractor	
Corrective Action(s)	Investigate cause of excessive noise Implement corrective measures prior to the recommencement of site works Reschedule of noise-generating activities to reduce noise annoyance	Lead Contractor	

3.4 Dust Management

DUST MANAGEMENT			
Objective(s)	To ensure the impacts of dust on adjacent areas and the community are minimised.		
Management Strategy	Dust issues managed controls at source, and administrative controls during works. Cutting and sanding on site to be a minimum.		
		Responsibility	**Timing**
Control(s)	Where dust is identified as an issue, dust control measures will be implemented. Dust awareness issues in environmental induction process Environmental enclosures	Lead Contractor	TBA
Performance Indicator(s)	No complaints from adjacent community.	Lead Contractor	
Monitoring	Daily inspection of works site including:	Lead Contractor	
Reporting	Any complaints or incidents to be reported to RFBYC.	Lead Contractor	
Corrective Action(s)	Implement corrective measures prior to the recommencement of site works Implement administrative controls if required, such as rescheduling of dust generating activities to more favourable weather conditions.	Lead Contractor	

3.5 Foreshore and Vegetation Protection

Foreshore and Vegetation Protection			
Objective(s)	Minimise soil and vegetation disturbance, degradation and erosion.		
Management Strategy	Ensure that direct impacts (land disturbance) are limited to the works area		
		Responsibility	**Timing**
Control(s)	Works will only be conducted within the works zone. Lay down area shall keep clear of Tree and Root Protection Zones Vehicle movements will be restricted to the defined roads.	Lead Contractor RFBYC	TBA
Performance Indicator(s)	No evidence of significant sediment deposition outside the works area. No evidence of run-off erosion. No damage to Vegetation	Lead Contractor	
Monitoring	Daily inspection of work site to occur.	Lead Contractor	
Reporting	Incidents logs to be provided to RFBYC and DBCA	Lead Contractor	
Corrective Action(s)	Restoration to the satisfaction of DBCA	Lead Contractor	

4. SITE ACCESS AND TRAFFIC MANAGEMENT PLAN

ROYAL FRESHWATER BAY YACHT CLUB
D, E AND F JETTY REPLACEMENT PROJECT

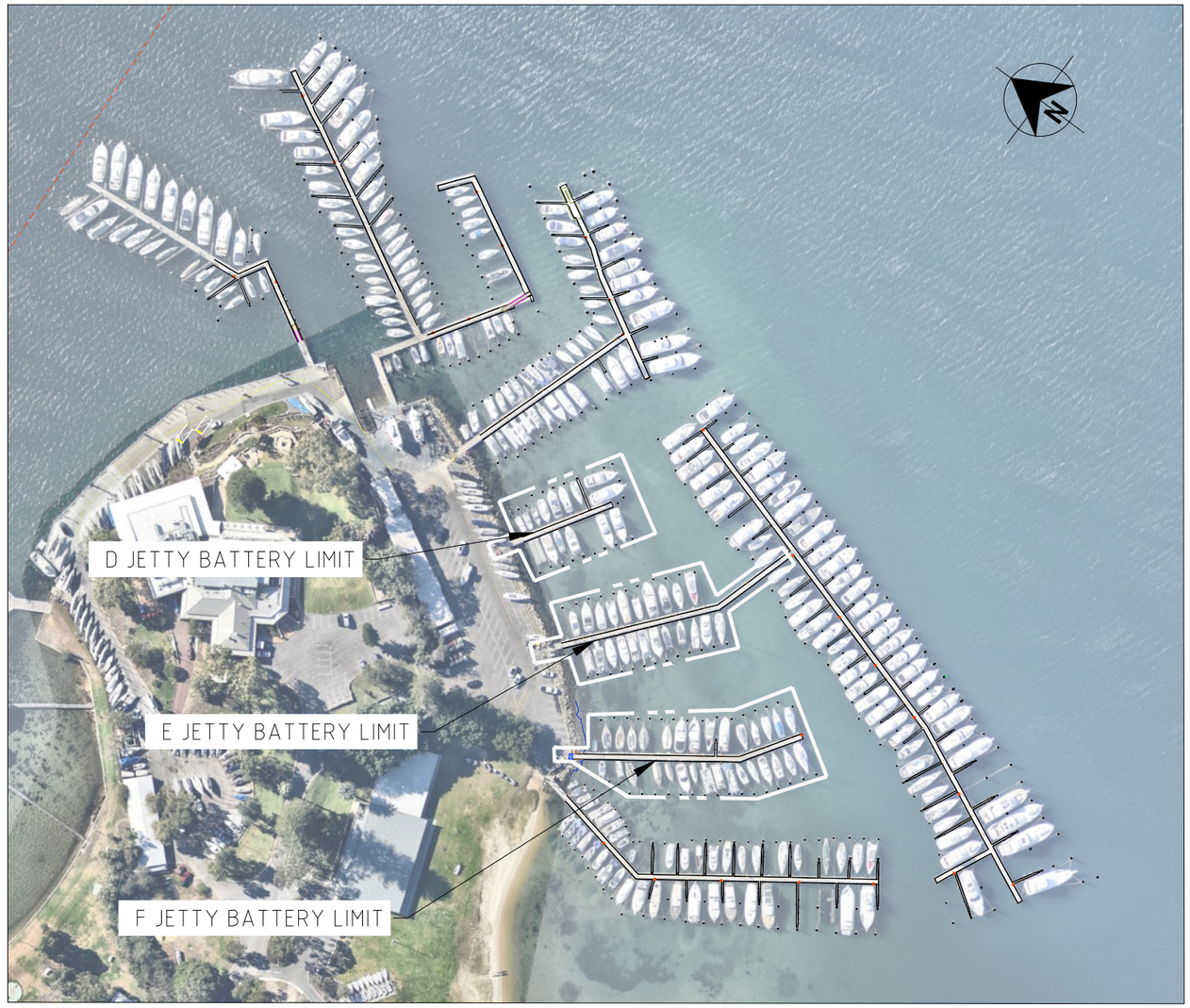
DRAWING LIST:

1932 - SK100	COVER PAGE, DRAWING LIST, LOCATION PLAN
1932 - SK101	EXISTING MARINA GENERAL ARRANGEMENT
1932 - SK102	DEMOLITION PLAN
1932 - SK103	MARINA MASTER PLAN GENERAL ARRANGEMENT
1932 - SK104	D JETTY DETAILED DIMENSIONS
1932 - SK105	E JETTY DETAILED DIMENSIONS
1932 - SK106	F JETTY DETAILED DIMENSIONS

GENERAL NOTES:

1. UNLESS NOTED OTHERWISE ON A PARTICULAR DRAWING THESE NOTES APPLY TO ALL DRAWINGS IN THIS SET.
2. THIS IS A PRELIMINARY DESIGN DRAWING PACKAGE FOR APPROVALS SUBMISSION ONLY.
3. THESE DRAWINGS ARE NOT TO BE USED FOR CONSTRUCTION PURPOSES.
4. LEVELS SHOWN ARE TO AHD DATUM.

LOCATION PLAN
NTS



D, E & F JETTY LOCATION PLAN
NTS

SUBJECT TO FINAL VERIFICATION AND APPROVAL

FOR INFORMATION

REVISIONS	Rev No	Revision note	Date	Checked	Approved
	A	FOR REVIEW	30/01/26	DB	JB

rfbyc

Burbury Consulting
Project Management & Engineering

ABN 75 146 719 959
P.O. BOX 156
WEST PERTH, WA, 6872
P: (08) 6323 5852
E: admin@burburyconsulting.com.au

Drawn By:	K MAHENDRAN	Date	JANUARY 2026
Designed By:	K MAHENDRAN	Date	JANUARY 2026
Checked By:		Date	
Approved By:	D BRENTNALL	Date	JANUARY 2026

Client	ROYAL FRESHWATER BAY YACHT CLUB				
Project	D, E & F JETTY REPLACEMENT				
Title	COVER PAGE, DRAWING LIST, LOCATION PLAN				
Scale	1:1000	A3	Drawing No.	1932-SK100	Rev A

D, E & F JETTY LAYOUT

1:1000

SUBJECT TO FINAL VERIFICATION AND APPROVAL

FOR INFORMATION

REVISIONS

Rev No	Revision note	Date	Checked	Approved
A	FOR REVIEW	30/01/26	DB	JB

20 10 0 20 40m

SCALE 1:1000

Burbury Consulting
Project Management & Engineering

ABN 75 146 719 959
P.O. BOX 156
WEST PERTH, WA, 6872
P: (08) 6323 5852
E: admin@burburyconsulting.com.au

Drawn By: K MAHENDRAN	Date JANUARY 2026	Client	ROYAL FRESHWATER BAY YACHT CLUB
Designed By: K MAHENDRAN	Date JANUARY 2026	Project	D, E & F JETTY REPLACEMENT
Checked By:	Date	Title	EXISTING MARINA GENERAL ARRANGEMENT
Approved By: D BRENTNALL	Date JANUARY 2026	Scale 1:1000 / A3	Drawing No. 1932-SK101 / Rev A

D JETTY EXISTING MOORING PILES TO BE REMOVED

E INNER JETTY EXISTING MOORING PILES TO BE REMOVED

6m FINGER TO BE REMOVED

F JETTY EXISTING MOORING PILES TO BE REMOVED

EXISTING LEASE BOUNDARY

11.6m
0.7m
2.2m
42.3m
2.0m
31.4m
62.0m
1.9m
23.4m
57.8m

-8.00
-9.00
-10.00
-11.00
-12.00
-13.00
0.00

DEMOLISHED JETTY

DEMOLISHED PILE

D, E & F JETTY LAYOUT - DEMOLITION EXTENTS

1:1000

SUBJECT TO FINAL VERIFICATION AND APPROVAL

FOR INFORMATION

REVISIONS	Rev No	Revision note	Date	Checked	Approved
	A	FOR REVIEW	30/01/26	DB	JB

20 10 0 20 40m

SCALE 1:1000

Burbury Consulting
Project Management & Engineering

ABN 75 146 719 959
P.O. BOX 156
WEST PERTH, WA, 6872
P: (08) 6323 5852
E: admin@burburyconsulting.com.au

Drawn By:	K MAHENDRAN	Date	JANUARY 2026
Designed By:	K MAHENDRAN	Date	JANUARY 2026
Checked By:		Date	
Approved By:	D BRENTNALL	Date	JANUARY 2026

Client	ROYAL FRESHWATER BAY YACHT CLUB
Project	D, E & F JETTY REPLACEMENT
Title	DEMOLITION PLAN
Scale	1:1000
	A3
Drawing No.	1932-SK102
Rev	A

NOTES:

1. NEW MARINA DESIGN IN ACCORDANCE WITH PPR AND AS3962 FOR D, E AND F JETTIES.

D, E & F JETTY - DESIGN LAYOUT FOR MARINA MASTER PLAN

1:1000

SUBJECT TO FINAL VERIFICATION AND APPROVAL

FOR INFORMATION

REVISIONS

Rev No	Revision note	Date	Checked	Approved
A	FOR REVIEW	30/01/26	DB	JB
B	UPDATE FOR REVIEW	03/03/26	DB	JB
C	UPDATED FOR JMC PONTOON DESIGN	28/04/26	DB	JB

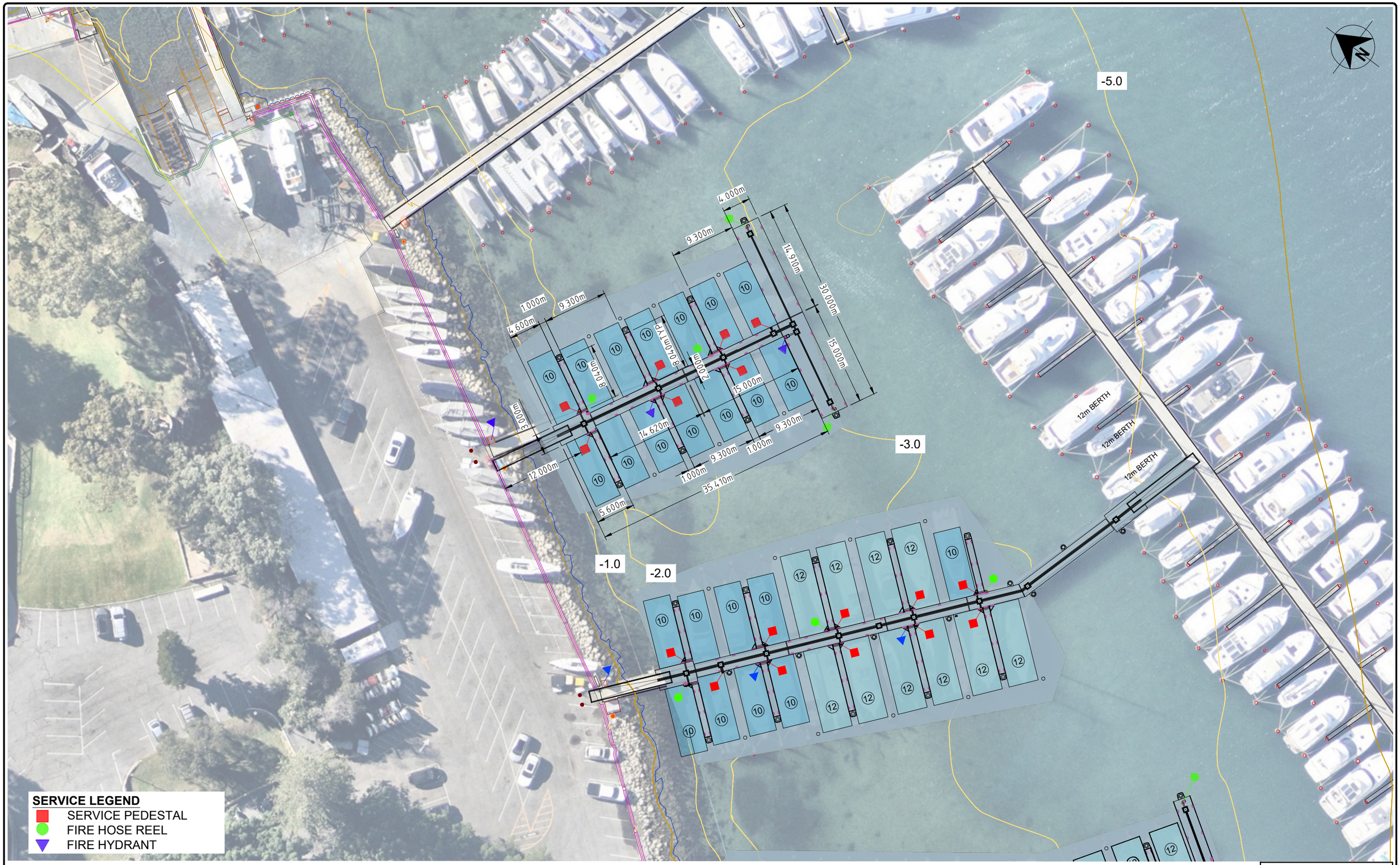
20 10 0 20 40m

SCALE 1:1000

ABN 75 146 719 959
P.O. BOX 156
WEST PERTH, WA, 6872
P: (08) 6323 5852
E: admin@burburyconsulting.com.au

Drawn By:	K MAHENDRAN	Date	JANUARY 2026
Designed By:	K MAHENDRAN	Date	JANUARY 2026
Checked By:		Date	
Approved By:	D BRENTNALL	Date	JANUARY 2026

Client	ROYAL FRESHWATER BAY YACHT CLUB
Project	D, E & F JETTY REPLACEMENT
Title	MARINA MASTERPLAN LAYOUT
Scale	1:1000
	A3
Drawing No.	1932-SK103
Rev	C



F JETTY - INTERIM DESIGN & CONSTRUCT LAYOUT

1:500

SUBJECT TO FINAL VERIFICATION AND APPROVAL

FOR INFORMATION

REVISIONS

Rev No	Revision note	Date	Checked	Approved
A	FOR REVIEW	30/01/26	DB	JB
B	ISSUED FOR TENDER	07/11/25	DB	JB
C	UPDATED FOR JMC PONTOON DESIGN	28/04/26	DB	JB

40 20 0 40 80m

SCALE 1:2000

ABN 75 146 719 959
P.O. BOX 156
WEST PERTH, WA, 6872
P: (08) 6323 5852
E: admin@burburyconsulting.com.au

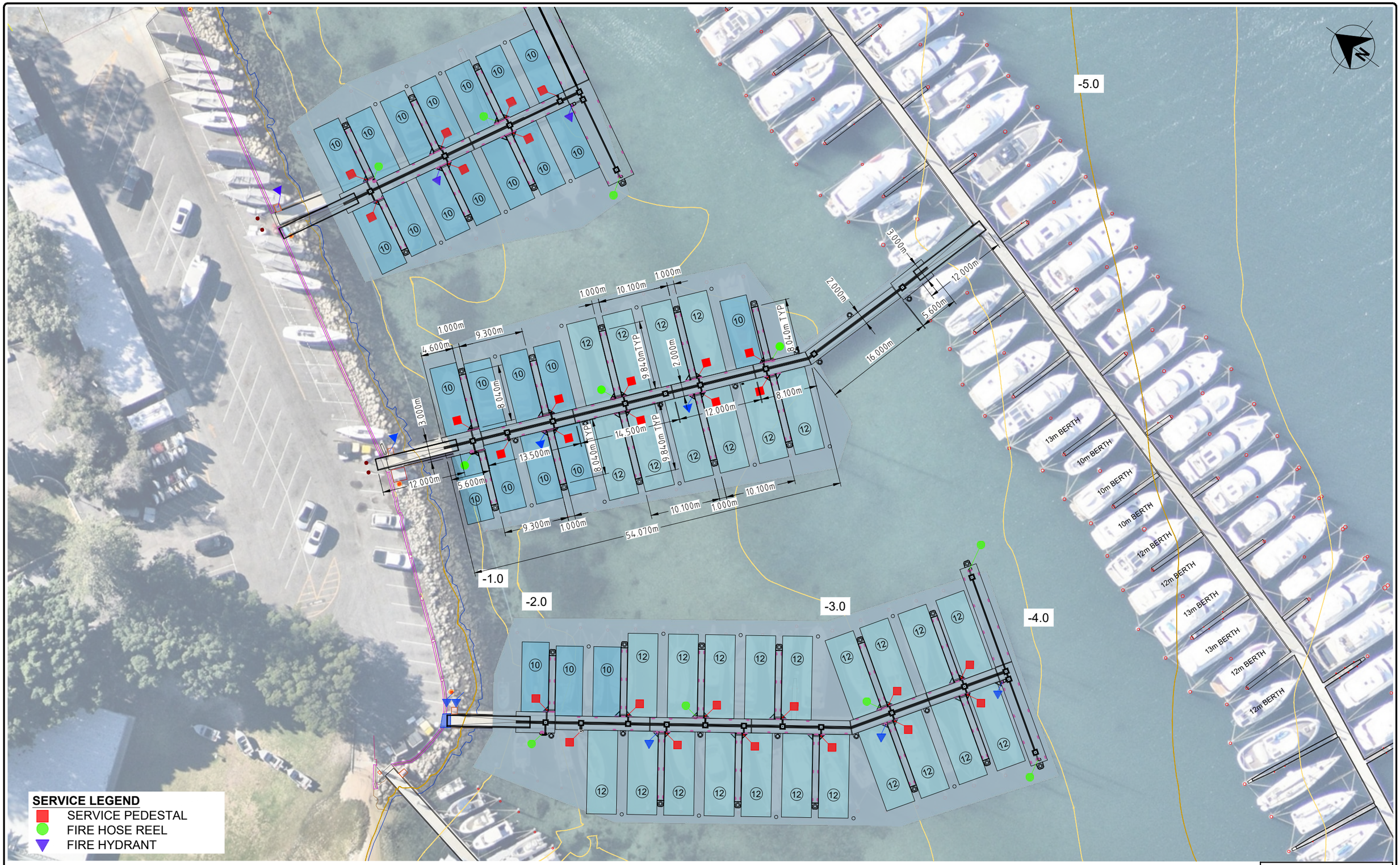
Drawn By:	K MAHENDRAN	Date	JANUARY 2026
Designed By:	K MAHENDRAN	Date	JANUARY 2026
Checked By:		Date	
Approved By:	D BRENTNALL	Date	JANUARY 2026

Client: ROYAL FRESHWATER BAY YACHT CLUB

Project: D, E & F JETTY REPLACEMENT

Title: D JETTY DETAILED DIMENSIONS

Scale: 1:1000 | A3 | Drawing No. 1932-SK104 | Rev C



F JETTY - INTERIM DESIGN & CONSTRUCT LAYOUT

1:500

SUBJECT TO FINAL VERIFICATION AND APPROVAL

FOR INFORMATION

REVISIONS

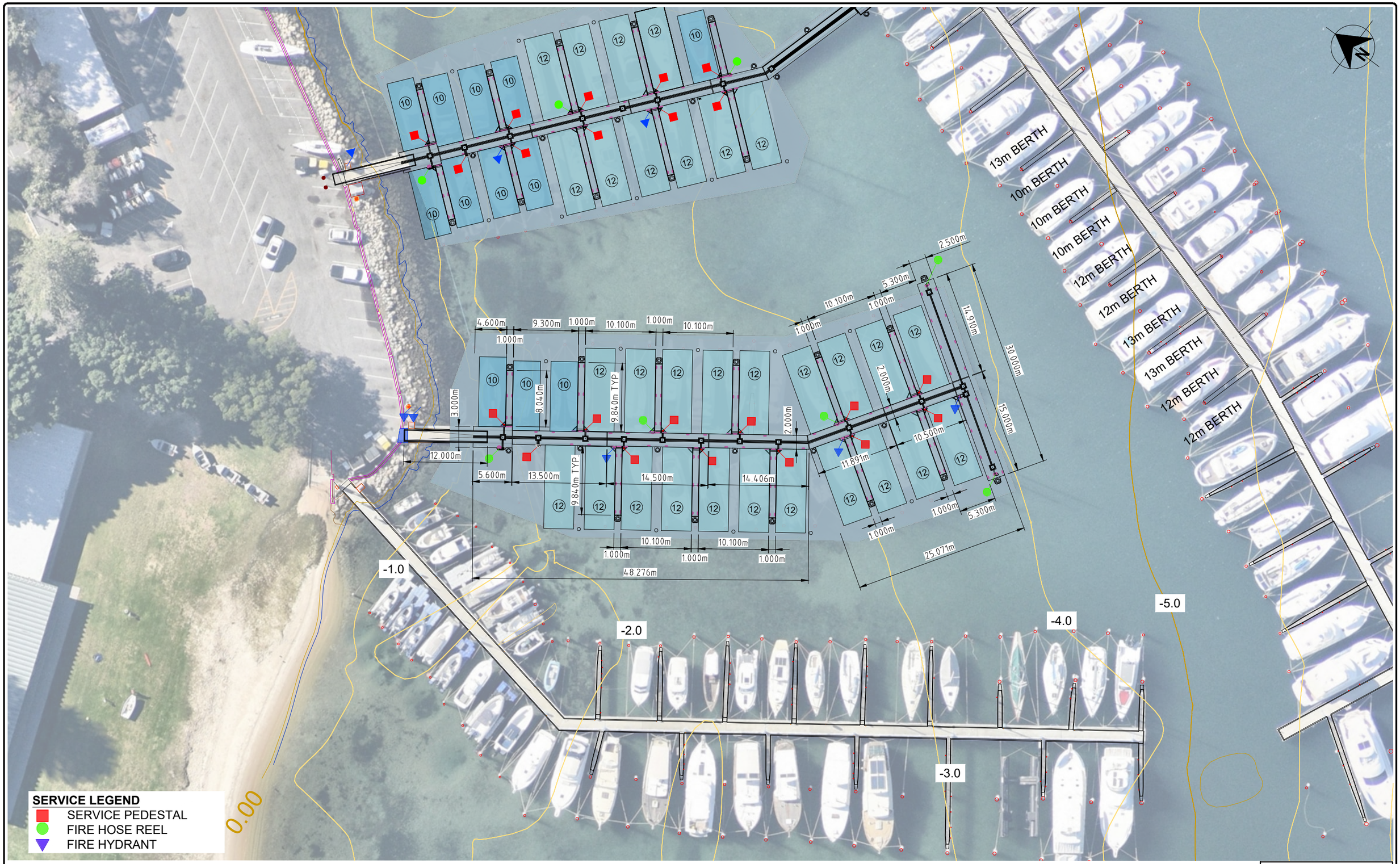
Rev No	Revision note	Date	Checked	Approved
A	FOR REVIEW	30/01/26	DB	JB
B	ISSUED FOR TENDER	7/11/25	DB	JB
C	UPDATED FOR JMC PONTOON DESIGN	28/04/26	DB	JB

40 20 0 40 80m

SCALE 1:2000

ABN 75 146 719 959
P.O. BOX 156
WEST PERTH, WA, 6872
P: (08) 6323 5852
E: admin@burburyconsulting.com.au

Drawn By: K MAHENDRAN	Date JANUARY 2026	Client	ROYAL FRESHWATER BAY YACHT CLUB
Designed By: K MAHENDRAN	Date JANUARY 2026	Project	D, E & F JETTY REPLACEMENT
Checked By:	Date	Title	E JETTY DETAILED DIMENSIONS
Approved By: D BRENTNALL	Date JANUARY 2026	Scale 1:1000	A3 Drawing No. 1932-SK105 Rev C



F JETTY - INTERIM DESIGN & CONSTRUCT LAYOUT

1:500

SUBJECT TO FINAL VERIFICATION AND APPROVAL

FOR INFORMATION

REVISIONS

Rev No	Revision note	Date	Checked	Approved
A	FOR REVIEW	30/01/26	DB	JB
B	ISSUED FOR TENDER	7/11/25	DB	JB
C	UPDATED FOR JMC PONTOON DESIGN	28/04/26	DB	JB

40 20 0 40 80m

SCALE 1:2000

Burbury Consulting
Project Management & Engineering

ABN 75 146 719 959
P.O. BOX 156
WEST PERTH, WA, 6872
P: (08) 6323 5852
E: admin@burburyconsulting.com.au

Drawn By: K MAHENDRAN	Date: JANUARY 2026	Client: ROYAL FRESHWATER BAY YACHT CLUB	
Designed By: K MAHENDRAN	Date: JANUARY 2026	Project: D, E & F JETTY REPLACEMENT	
Checked By:	Date	Title: F JETTY DETAILED DIMENSIONS	
Approved By: D BRENTNALL	Date: JANUARY 2026	Scale: 1:1000	A3
		Drawing No.: 1932-SK106	Rev: C

ENGINEERING AND PROJECT MANAGEMENT

Burbury
CONSULTING

PROJECT

Royal Freshwater Bay Yacht Club
D,E,F Jetty Replacement
Principals Project Requirements

CLIENT

Royal Freshwater Bay Yacht Club

DATE

1 May 2026

CIVIL STRUCTURAL MARITIME PROJECT MANAGEMENT

287 Macquarie Street, Hobart 7000
PO Box 354, South Hobart, 7004
admin@burburyconsulting.com.au
www.burburyconsulting.com.au
Tel 03 6223 8007
Fax 03 6212 0642
Burbury Consulting Pty Ltd
ABN 75 146 719 959

Contents

Burbury Consulting Pty Ltd
ABN 75 146 719 959

Burbury Consulting Pty Ltd ACN 146 719 959
136 Stirling Highway, Nedlands, WA 6009

P. 08 6323 5852 F. 03 6212 0642
admin@burburyconsulting.com.au
www.burburyconsulting.com.au

Document Status

Author		K. Mahendran	**Email**	kmahendran@burburyconsulting.com.au		
Document Number		1932-PPR-012	**Revision**	1		
Client Document Number		N/A				
1	1/05/26	Issued for Contract	DB	JB	JB	JB
0	12/11/25	Issued for Tender	JB	JB	DB	JB
B	5/11/2025	Issued for Review	KM	JB	DB	JB
A	3/10/2025	Issued for Internal Review	KM	DB	DB	JB
Rev	**Date**	**Revision Description**	**Author**	**Checked**	**Approved**	**Principal**

1. Introduction and Interpretation

These Principal's Project Requirements (PPR) cover the requirements for the design, supply, manufacture and construction of the Royal Freshwater Bay Yacht Club (RFBYC) D,E,F Jetty replacement.

The Contractor must carry out and complete the Works to the highest quality commercial standard. These Principal's Project Requirements and accompanying documentation outline the minimum requirements and standards for the Works.

Capitalised terms used in these Principal's Project Requirements have the same meaning given to those terms in the General Conditions of Contract, unless expressly stated to the contrary.

This Principal's Project Requirements and accompanying Preliminary Design drawings outline the minimum requirements for the operational and structural capacity and durability of materials and layout of the D,E,F Jetty.

The PPR are contained in the following documents:

- This document;
- Appendix A - Preliminary Design
- Appendix B – Site Information
- Appendix C – Landowner's Conditions

Burbury Consulting Pty Ltd
ABN 75 146 719 959

2. Scope of Work

2.1 Purpose of the Works

RFBYC is planning to replace the existing fixed D,E,F jetty structures with floating pontoon jetties to align with its marina master plan and replacement of dilapidating fixed jetty infrastructure.

The scope of Work includes, but is not limited to the following and the requirements described in this PPR and shown on the drawings and the following specific items:

- Detailed design, certification and documentation of floating marina pontoon system and pile connection details, fenders, cleats and services for both temporary and future master plan design proposal as outlined in the Preliminary Design Drawings.
- Demolition of existing fixed concrete jetty including disconnection of services and removal and disposal of all materials.
- Supply and installation of marina piles.
- Fabrication and installation of gangway with raised abutment including landside transition ramp.
- Fabrication and installation of pontoon walkways and temporary fingers and associated fittings and fixtures to form walkways and berths for mooring and fendering.
- Supply and installation of services (fire, water and power) to berths including the supply and installation of a new electrical mains connection from E Jetty abutment distribution board to a new main distribution board at the abutment of D and F jetty.
- Site clean up.

The proposed pontoon layout is provided in the Preliminary Design Drawings in Appendix A. The Contractor may choose to undertake a site visit during the tender period and be provided survey and Drawings in digital form (on request). Any dimensions for design shall be confirmed on site by the Contractor.

This contract must be executed under AS 4902 Amended General Conditions of Contract for Design and Construct.

2.2 Other Works (Exclusions)

Other Works that will be undertaken on the site by the Principal and their subcontractors:

- Planning permits & works approval.
- Relocation of vessels from D,E,F Jetties prior to site mobilisation, demolition and construction works.
- Upgrade of services supply requirements (power and water) to meet design.
- Mains supply for fire to the jetty abutment.

2.3 Special Requirements

2.3.1 Maintaining Jetty Access

Access to E Jetty out shall not be restricted for any more than 4 weeks in one consecutive block of time.

Burbury Consulting Pty Ltd
ABN 75 146 719 959

At least one of the D,E, or F Jetties must remain open in operation at any one time. Restriction in access to, and servicing of the outer E Jetty (Jetty section that is to remain) must be limited to one occurrence and to a duration of no greater than 4 weeks. During this time, the club will arrange for access to these berths.

2.3.2 Operational Requirements

The work under the Contract (WUC) is to be carried out at an existing operational facility. The Contractor's acknowledgements, warranties and obligations with respect to existing marina operations and access by the Principal and others are set out at clause 24.2 of the General Conditions of Contract.

Without limiting clause 24.2 of the General Conditions of Contract, the Contractor acknowledges that the activities and operations set out in Section 2.2 may or will be occurring during the performance of Works. The Contractor must ensure the continuity of these operations and activities, coordinate the Works with those activities and operations and cooperate with other contractors and operators at or adjacent to the Site. The Contractor is deemed to have made adequate allowance in the Contract Sum and in its Construction Program for compliance with these requirements.

Any vessel relocation shall be managed by RFBYC through notice of request by the Contractor. A minimum 14 days' notice is required for relocation of vessels for site works. Only vessels in D, E and F Jetties are intended to be relocated for the proposed WUC.

2.3.3 Legislative Planning Conditions

The Contractor must at all times comply with the requirements of the Legislative planning permit conditions which relate to compliance to an approved Construction Environmental Management Plan prepared by the Contractor for the Works. A framework or specific requirements should be referred to from any planning or works permit.

The Contractor must comply with the Building Code of Australia (BCA). Unless otherwise directed by the Superintendent. The Contractor must, to the extent that they are not inconsistent with the requirement of the BCA, comply with all the requirements of all Acts of Parliament of the Commonwealth and with the requirements of the provisions of all Acts of the Parliament of the State in which the work under the Contract or any part thereof is carried out and with the requirements of all ordinances, regulations, by-laws, order and proclamations made or issued under any such act or Ordinance and with the lawful requirements of public and other authorities in any way affecting or applicable to the Works or the execution of the work under the Contract.

2.3.4 Development Application / Works Approval Requirements

A Development Application / Works Approval will be submitted for these works. The Contractor will be responsible for ensuring all works are undertaken in accordance with the permit conditions. Generally, a condition of the permit is the approval of a Construction Environmental Management Plan (CEMP) prior to commencement of works. The Contractor must prepare and submit a CEMP for approval and ensure all works comply with requirements of this document. Further requirements of the CEMP are provided in Section 10.2 of this PPR. The approval of the CEMP must be given by the Superintendent prior to commencement of works on site. This is a **HOLD Point.**

2.4 Hold Points

Item	Type	Required	Clause
Approved CEMP	Hold Point	Prior to commencement of works on site	Section 2.3.4 of this PPR

3. Site

RFBYC is located in Peppermint Grove on the western side of Freshwater Bay on the Swan River. The site is exposed to wind waves from the north to south (clockwise). Vessel wakes from vessels navigating the river (including ferries and recreational boats) also impact the site through vessel wakes. The marina is approximately 20 minutes from Perth City. Contractor access to the site for the Project is either from Hobbs Place or the Swan River.

A lay down area will be made available to the Contractor to use as a storage area landside of F Jetty and between F and E Jetty. Four (4) car parks immediately adjacent to the F Jetty abutment will be made available to the Contractor for the duration of construction activities. Additional laydown areas can be confirmed as outlined in Section 3.7.

The remaining of the marina and car park will continue to be open to its members throughout the Works. The Contractor's traffic management shall ensure disruption to the adjacent marina berths and landside areas are minimised and local traffic is managed. Any floating plant shall be moored offsite or only remain within the marina after hours subject to agreement with RFBYC.

RFBYC are intending to replace D, E and F Jetty in a staged manner with replacement of the dilapidated fixed concrete walkway decking and piles with a floating pontoon walkway with the berth arrangement layout as outlined in Figure 3.1 below.

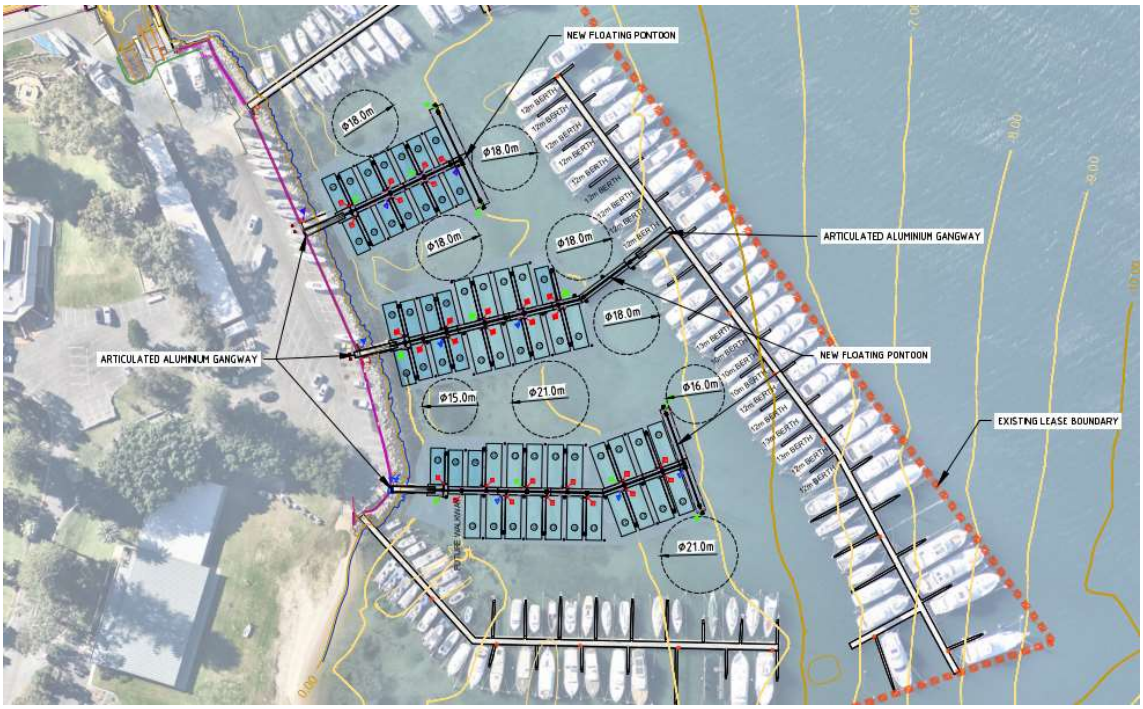


Figure 3.1 Site overview with D, E and F Jetty berthing arrangement

3.1 Existing Services around D,E,F jetty

The Contractor shall make themselves aware of existing services (electrical and water) around the abutment of D,E,F jetties as shown Figure 3.2. The Contractor shall protect services that run within

the extents of D,E,F Jetties (i.e. light post adjacent to F jetty, electrical, fire and water) for the duration of the Works. Any redundant services from the demolition shall be removed entirely and made safe.

Figure 3.2 Existing Services around D,E,F Jetty abutments

Water shall be designed for connection into the existing water supply available at the abutments.

Fire shall be design and constructed for the pontoon walkway to AS3962 and per the preliminary design. Mains supply to the abutment shall be undertaken by the Principal.

A new electrical main supply from E Jetty shall be designed and installed to a new distribution board at the abutment of E and F Jetty (or otherwise proposed by the Contractor) including modifications to the existing distribution board as required (noting the existing jetties are supplied from E Jetty – Refer Appendix B5).

Figure 3.3 Distribution board at E Jetty (existing mains supply for D, E and F Jetty)

3.2 Existing Fire Unit

The Contractor shall provide new abutments or footings to support the existing fire extinguishers and their housings as shown in Figure 3.4. The location of the fire extinguisher housings shall be selected to ensure unobstructed access to the fire extinguisher at all times from the abutment/walkway. The Contractor must ensure that the installation complies with relevant fire safety regulations and does not impede pedestrian movement or emergency access.

Figure 3.4 Existing Fire Extinguisher (F Jetty example)

3.3 New Abutment Level

A raised abutment level of nominally 1m AHD has been nominated on the Preliminary Design Drawings. The Contractor shall design for a new abutment including landside transitions as well as adjustable gangway and services. The clearance between the gangway and rock rip-rap shall be assessed by the Contractor to ensure clearance of the gangway at lowest design water level whilst achieving adequate gangway grade and length for the pontoon layout.

3.4 Existing Jetty Structures

The existing D,E and F Jetty structures comprises three typical fixed deck arrangements. These arrangements comprise a pre-stressed concrete deck supported on precast concrete piles. Limited historical drawings of this structure are provided in Appendix B.

3.5 Site Geotechnical Information

Limited historical as-built pile data is provided in Appendix B, outlining existing pile size and embedment depths of selected installed piles.

A geophysical investigation comprising sub-bottom profiling has been undertaken at the site and is provided in Appendix B.

3.6 Wave Climate

The new pontoons shall be designed to accommodate the wave climate as outlined in Appendix B 'Wave Climate Assessment.' The wave assessment outlines incident waves immediately adjacent to the marina site and does not consider any wave attenuation from the vessels or adjacent jetty structures.

The design of the pontoon shall be able to withstand the loads, actions and function for the design life to the site wave and water level conditions. It is noted that the pontoon is required to attenuate waves on the lee side of the "T" head and walkway to achieve improved wave climate on the lee side of the new structures. The Contractor shall provide design attenuation factors with the proposed pontoon walkway design.

3.7 Site Equipment & Laydown Areas

Subject to clause 28 of the General Conditions of Contract, the Principal may make the following site equipment and laydown available to the Contractor:

- Laydown area for delivery and loading of pontoons and construction materials (restricted for load outs only and secured only at those times to the approval of the Superintendent).
- Car parks (4) in front of the jetty abutment for the duration of the site work activities.
- Any other permanent areas only as agreed with the Superintendent.

Refer to Figure 3.5 below for the extents of the nominated laydown area made available to the Contractor for delivery and loading of pontoons and construction materials. The extent and location of the laydown area nominated in Figure 3.5 below may change at the discretion of the Superintendent, subject to requirements of the Principal.

Figure 3.5 Nominated laydown area for contractor

4. General Requirements

4.1 Interpretations

Words and Expressions

In the Contract, except where the context otherwise requires:

'approved', 'directed', 'required', 'rejected', and similar expressions must mean approved, directed, required, rejected, and the like, by the *Superintendent*.

'give notice', 'submit', 'furnish', and similar expressions, must mean give notice, submit, furnish, and the like, to the *Superintendent*.

4.2 Contractor to Inform Itself

The Contractor warrants that it has examined carefully and has acquired actual knowledge of the:

- Contents of the Principal's Project Requirements, the Amended General Conditions of Contract, Annexures, Appendices and Addenda's;
- Nature of the work and necessary materials, including the nature of the existing jetty structure that requires demolition;
- Availability and cost of labour;
- The Site and its surroundings including access and restrictions;
- The physical conditions (obstructions) and local conditions (climatic, hydrologic, winds and waves);
- Risks, contingencies and other circumstances;
- Requirements of Authorities and relevant building industry unions; and
- Any other available information provided or publicly available.

Failure by the Contractor to do all or any of the things it is deemed to have done under this clause will not relieve the Contractor of its liability to perform or complete the Contract in accordance with its terms and conditions.

4.3 Standards

Unless otherwise specified in the Contract, and where applicable, materials and workmanship are to comply, as a minimum, with the relevant standard of Standards Australia. The Australian Standard applicable to the Works will be the edition last published prior to the Date of Contract unless otherwise specified. Overseas standards and other standard documents named in the Principal's Project Requirements are applicable in the same manner as Australian Standards to relevant materials and workmanship.

4.4 Manufacturers Recommendation

Unless otherwise specified, manufactured items to be used in WUC must, as a minimum, be in accordance with current published recommendations of the manufacturer relevant to such use.

4.5 Proprietary Items

Definition

A proprietary item is any item identified by graphic representation on the Drawings, or by naming one or more of the following: manufacturer, supplier, installer, trade name, brand name, catalogue or reference number, and the like.

Implication

The identification of a proprietary item will not necessarily imply exclusive preference for the item so identified but will be deemed to indicate the required properties of the item, such as type, quality, appearance, finish, method of construction, performance and the like.

Alternatives

The Contractor may offer a similar alternative item containing the required properties. The Superintendent may in his absolute discretion adopt or reject the alternative.

Claims

No claim is to arise from any rejection, nor, unless otherwise agreed, will adoption of an alternative be ground for any claim for variation to cost or time.

Information

When offering an alternative for approval, provide all available technical information, and any other relevant information requested by the Superintendent. If so requested, obtain and submit reports on relevant tests by an independent testing authority.

Alterations

State whether the use of the alternative will require alteration to any other part of the Works. If the alternative is adopted, carry out any such alteration without extra charge.

4.6 Interpretation of Drawings

The Contractor must not depart from the Preliminary Design Drawings and Principal's Project Requirements in any respect without the prior written consent of the Superintendent.

If the Contractor from time to time considers it necessary or desirable to vary the Preliminary Design Drawings and Principal's Project Requirements in any way, the Contractor may by notice in writing to the Superintendent seek the Superintendent's consent to vary the Drawings and Principal's Project Requirements. Any such notice must give full particulars of the proposed variations and must specify the proposed changes in the Drawings and Principal's Project Requirements and effect on the construction program.

4.7 Contractor's Site Areas

The Contractor's access will be limited to the area agreed with the Superintendent prior to the WUC commencing on Site. This includes areas on and around the location in which the permanent Works are to be constructed and use of the Site for Temporary Works and Construction Plant, including working and storage areas, location of offices, workshops, sheds, roads, temporary access tracks, parking and the like. Any subsequent amendments to the Contractor's work areas requires written approval of the Superintendent, subject to such conditions as stated in the Contract.

Operations must be arranged so that access to and from the area does not impede on activities relating to marina or activities at the site.

Through the duration of the works, pedestrian access to G jetty must be maintained at all times. Any variation or impact to the pedestrian access must be approved by the Superintendent.

Site personnel under no circumstance are to use the designated RFBYC members parking spaces adjacent to the works site.

4.8 Working Hours

The Works on Site may only be executed within the following working hours, unless additional hours are approved in writing by the Superintendent:

- Monday to Friday 7:00 am to 6:00 pm.
- Saturday work by negotiation with the Principal.

Work outside these times requires written approval from the Superintendent.

4.9 Contractor's Site Compound

The Contractor may choose to erect, maintain, secure and subsequently remove such buildings, compounds, sanitary accommodation, and associated services as required by the Contractor for the supervision and construction of the Works. Workplace amenities, facilities and environment must be in accordance with WHS Laws, including the Work Health and Safety Regulations 2022 (WA) (WHS Regulations). The Contractor must obtain all Approvals associated with the Site establishment and access arrangements associated with its Site compound.

The location and form of such buildings and compounds must:

(a) minimise noise, disturbance and inconvenience to all abutting properties;

(b) be consistent with, and complement the Construction Environmental Management Plan (required by Section 10.2 of these Principal's Project Requirements) and the WHS Management Plan (required by clause 11 of the General Conditions of Contract);

(c) provide suitable hard-stand areas for storage of materials and equipment and parking vehicles; and

(d) allow for all pedestrian traffic.

Prior to the Contractor achieving Practical Completion, these facilities will remain the property of the Contractor and, as a condition of Practical Completion, must be removed from the Site by the Contractor and the area reinstated to the satisfaction of the Superintendent.

4.10 Site Amenities

Amenities at RFBYC are available for contractors working on site. Contractors shall obtain approval for use of the amenities.

If amenities are not available or unsuitable the Contractor must provide all statutory and necessary amenities and sanitary facilities for workers and other persons lawfully on the Site for the purposes of the Works and remove them on Practical Completion.

4.11 Light, Power and Water

The Contractor must familiarise themselves with location of power supply and water for construction activities and make plan when necessary for the execution of the Works.

4.12 Site Meetings

Throughout the duration of the Contract, the Contractor must attend regular fortnightly (or as agreed) meetings with the Superintendent and any other personnel whose attendance the Superintendent may require. The meetings will be held on Site (immediately prior and during site construction works) in suitable premises provided by the Contractor or made available through negotiation with the Principal. The agenda for such meetings will include, without limitation, reporting on WHS, Notices and correspondence, progress and program, scope, Variations, quality, cash flow, operational interfaces and any coordination or interface problems that may have arisen.

The Site meetings must, at a minimum, be attended by the Contractor's Representative.

At the first meeting the Contractor must submit to the Superintendent the names and telephone numbers of all responsible persons who may be contacted after hours during the course of the Contract. A list of all persons on the Site during normal working hours (including subcontractors), must also be submitted.

Prior to construction and during the design phase meetings may be held on Teams coinciding with hold points and allow at least four (4) meetings prior to commencement on site.

4.13 Delivery of Materials

The Contractor must ensure that all component of the proposed Works are designed for any loading incurred during transportation and handling. Transport vehicles must be appropriate for the purpose of adequately secure all goods. Obtain approvals and provide necessary support and protection for over dimensional loads. Provide adequate equipment for safe unloading, placement or storage of materials. Any units damaged during transportation or handling will not be accepted and will be replaced at the Contractors expense. All major plant and materials must be delivered through the main entrance to the Marina, off Hobbs Place, or from the Swan River.

4.14 Sealed Containers

Materials and products supplied by a manufacturer in closed or sealed containers or packages must be brought to the point of use in WUC in the original unbroken container or package, otherwise they may be liable to rejection.

4.15 Storage on Site

The Contractor must store materials and equipment on Site so as to prevent damage to the Site and minimise hazards to persons, materials and equipment.

4.16 Setting Out of Work

The Contractor is responsible for setting out the works in accordance with Clause 26 of the General Condition of Contract Design and Construct. The Contractor is responsible for the establishment, protection and preservation of all reference points. Reduced levels (RLs) shown on the Drawings refer to AHD unless otherwise indicated.

Existing site survey and bathymetry have been provided for the use in the preparation of drawings by the Contractor. The information is provided as Site Information. The Contractor must confirm the set out against the information prior to commencing construction utilising the marina jetty as the key reference lines.

The Superintendent may inspect the setting out of any or all parts of the Works and for this purpose the Superintendent must be given at least 48 hours' notice that the Contractor intends to set out part

of the Works. The Contractor must, without charge, provide all necessary assistance, labour and materials which the Superintendent may require for checking the setting out. The Works may be suspended if necessary to enable the Superintendent to inspect the lines and levels on any part of the Works. Notwithstanding any inspection by the Superintendent, the ultimate responsibility for the accuracy of the setting out remains with the Contractor.

4.17 Demolition of existing sections of marina

The Superintendent must be given notification of the demolition of any existing section of the marina 14 days prior to the indented demolition. This must be approved by explicit written consent by the Superintendent prior to any demolition works occurring. The Superintendent reserves the right to hold the demolition program to allow the Principal adequate time to inform users and members. This acts as a **HOLD Point.**

4.18 Accessibility

The Contractor must maintain access for members to car parks, jetties and marina vessels wherever possible throughout all stages of construction works. In the event access to the marina or sections of the RFBYC is to be restricted or removed, notification must be given to the Superintendent for approval including days and hours for restricted access.

4.19 Supervision of Construction

The Contractor must ensure that suitably qualified supervisory staff are present on Site at all times. The Contractors Site Supervisor (or their nominated Subcontractors Supervisor) shall be provided on Site for 100% of the work hours. Site Supervisor's activities on Site must primarily relate to the management of the Site.

4.20 Photographic Records

Further to the requirements set out in clause 29 of the General Conditions of Contract, the Contractor will provide the Superintendent with a photographic record of times and sections of work as requested by the Superintendent in the form of digital photographs (including pre-construction photos of proposed Site compounds and work areas).

Prior to commencement of the Works on site, the Contractor shall undertake a preconstruction inspection audit of the areas of and immediately adjacent to the areas that will be impacted by the Works and any proposed elements to be retained or reused as part of the Works. The purpose of the inspection is to identify defects or areas of dilapidation prior to commencement of the construction.

The inspection shall include at least the following areas:

- Marina entry, exist and proposed compound areas and hardstands to be utilised by the Contractor during works including delivery and loadouts.
- Existing marina elements retained in the works and adjacent to any demolition works.
- Existing mooring piles to be reused in the new works.

The inspection should incorporate detailed listing of inspection elements, defects and description and photo records of defects.

Any element inspected for re-use within the proposed new works that the Contractor identified of being significant dilapidated or unsuitable for re-use shall be supplied with an engineer's certificate identifying the issues and defects of the elements.

A post construction audit of the works shall be undertaken and submitted at the completion of the works.

Any elements damaged during the works or defects identified post completion shall be investigated to the extent of defect / damage and suitable repaired method statement submitted to the Superintendent for approval prior to repairs. This requirement acts as a **HOLD Point (pre-construction and post-construction)**.

These photographic records must be provided prior to Practical Completion or at a frequency requested by the Superintendent.

4.21 Notices for Inspection of Works

The Contractor must give the Superintendent reasonable written notice (but in any event not less than two (2) working days) of the Contractor's intention to:

- Commence use of cranes on site;
- Commence diving works;
- Undertake any required testing (pile, electrical or water);
- Completion of any hold points,

So that an inspection of Works or witnessing of tests can be undertaken. Such notice must not be given on weekends and public holidays.

4.22 Samples

Where these Principal's Project Requirements require samples to be submitted by the Contractor, the Contractor is solely responsible for the consequences of delay resulting from failure to allow adequate time for the assessment and approval of samples, or from the rejection of samples which do not comply with the Principal's Project Requirements.

The Superintendent may at any time up until the issue of Practical Completion require the Contractor to provide additional samples. The amounts and timeframes for provision of such samples will be determined by the Superintendent.

The Contractor must keep approved samples in good condition on the Site until Practical Completion.

4.23 Temporary Works and Loading of the Structure

The Contractor is responsible for the design, supply and fabrication of any Temporary Works required to complete the Work in a safe manner.

The structural integrity of existing structures and properties not part of the Works must be maintained at every stage of the project.

4.24 Design of Temporary Work

The Contractor must:

- Have the structural design, and design/proof checks, of any required Temporary Works (including temporary structural support to elements under repair, and containment structures) undertaken by an experienced chartered structural engineer who is an existing member of (or is eligible for membership, of) the Institution of Engineers Australia, with appropriate experience in structural design, safety, scaffolding, industrial ventilation and containment systems;

- Design Temporary Works to comply, at a minimum, with Australian Standards and Design Codes for the materials being utilised;
- Prior to construction of Temporary Works, produce design drawings for use during the work;
- Include in the design drawings all details and instructions necessary for the fabrication, erection and operation of the Temporary Works;
- Detail the design loads on the design drawings;
- Have the design drawings approved and signed by the structural engineer referred to above;
- Arrange for the Temporary Works design and drawings to be proof checked by an experienced third-party structural engineer;
- Ensure the designer of a structure or any part of a structure that is to be constructed gives the Principal a written report that specifies the hazards relating to the design of the structure that, so far as the designer is reasonably aware:
    - create a risk to the health or safety of persons who are to carry out any construction work on the structure or part; and
    - are associated only with the particular design and not with other designs of the same type of structure.

4.25 Maintenance

The Contractor must alter, adapt and maintain Temporary Works as necessary, and remove them progressively as WUC proceeds, unless otherwise specified or instructed by the Superintendent.

4.26 Inclusion of Works

If the Contractor wishes to include any part of the Temporary Works in the completed Works, it must provide a request in writing to the Superintendent seeking the Superintendent's written consent to its request. The request must detail the specific part of the Temporary Works which the Contractor proposes to incorporate into the Works. If the Superintendent consents to the Contractor's request (such consent to be in the absolute discretion of the Superintendent), the inclusion of such Temporary Works will be an exception to the clean-up requirements in clause 27 of the General Conditions of Contract.

4.27 Materials

The Contractor must ensure that materials used for construction of Temporary Works are suitable for the intended purpose and in accordance with the approved Temporary Works design.

4.28 Diving Operations

The Contractor is responsible to ensure that any diving Subcontractor completes works in accordance with relevant standards and legislative requirement. All diving work shall:

- Be risk assessed prior to commencement of works in accordance with AS2299;
- Be completed by divers who holds a current certificate of medical fitness;
- Be completed by divers who are competent through qualifications and/or experience for the work, specifically use of any subsea cutting or excavation tooling;
- Be undertaken with divers with rigging licence when working with cranes;

- Be under the supervision of a dive supervisor with the required level of competence is appointed to supervise workers carrying out general diving work;
- Have a dive plan prepared by the dive supervisor;
- Have dive safety log prepared;
- Meet the requirement of AS2299:1 *Occupational diving operations—Standard operational practice.*

4.29 Certification of equipment & personnel

Prior to commencement of works on site the contractor shall submit all certification as requested by the superintendent including but not limited to:

- Relevant white card, crane, coxswain and any other licenses prior to works on site;
- Valid, in date CraneSafe assessment for any cranes prior to use on site;
- Barge Certification including stability booklet;
- Diver qualifications (if required).
- Design certification of any pile temporary works including pile leaders to the satisfaction of the Superintendent; and
- Design certification of any non-proprietary piling equipment or modifications to any piling equipment to the satisfaction of the Superintendent.

4.30 Cleaning Up

The below requirements are in addition to those set out at clause 27 of the General Conditions of Contract.

The Contractor is required to clean up the Site prior to Practical Completion and reinstate any damage which has arisen as a result of the performance of WUC. The Contractor is required to carry out such Site assessment as necessary to satisfy themselves that the Site is free from contaminants that may have been introduced as a result of the performance of the Works.

Prior to issue of a Certificate of Practical Completion, all working, and establishment areas must be cleared of construction debris, residue of stockpiles and material waste and must be left in a neat and tidy state to the satisfaction of the Superintendent.

4.31 Post Construction

At the Practical Completion of the works, the Contractors must supply a set of “As-built” data including but not limited to construction records such as construction program and QA documents. This acts as a **HOLD Point**

4.32 Hold Points

Item	Type	Required	Clause
Demolition of existing sections	Hold Point	Written approval by Superintendent	Section 4.17 of this PPR
Defect repair method statement	Hold Point	Written approval by superintendent prior to undertaking works	Section 4.20 of this PPR
As built data and documentation	Hold Point	Prior to provision of Certificate of Practical Completion	Section 4.31 of this PPR

5. Specific Project Requirements

The following specific requirements apply to the RFBYC D,D,F Jetty redevelopment.

5.1 Marina Layout

A marina general arrangement is provided in the Preliminary Design Drawings (Drawing 1932-SK103 to 1932-SK106).

Where the pontoon and fixtures are exposed to incident waves it shall be designed and constructed to withstand loading from those wave conditions recognising that the existing internal marina conditions are likely to exceed the moderate wave climate conditions of Table 4.2 AS3962.

5.2 Future Marina Layout

The design shall take into account potential for the future re-alignment of G Jetty which is proposed to connect to F Jetty as shown on the Preliminary Design Drawing 1932-SK103 (Future Walkway).

The future marina layout shall be designed to meet AS3962 for the proposed berth arrangement.

5.3 Pontoon Walkway

The Contractor shall design a suitable pontoon material and design that meets the design life and performance requirements of the PPR and preliminary design.

The pontoon units must be of proven durable, robust construction such that maintenance requirements are minimised. The pontoons shall be suitably resistant to:

- Ultraviolet light.
- Saltwater.
- Petrochemicals.
- Marine organisms; and
- Structural damage to marine fire events.

The deck shall be finished with anti-slip surface suitable to meet AS4586.

The pontoons and gangways must be designed to ensure stability, structural capacity and serviceability under all combinations of design dead, live, environmental, berthing, mooring and anchor loads in accordance with AS3962 for restricted access. The design loads must also include the loads imposed on the pontoon by the gangway or any other fixtures or services.

The deck must be finished with an anti-slip surface. Design to be carried out by the Contractor, with details of fixings and specifications supplied on or with the drawings.

Pontoons must be completely filled with closed cell foam to provide buoyancy in case of cracking or penetration of the pontoon. The foam fill must be completely isolated from the marine environment.

The main walkway shall be minimum 2m wide or minimum design width, strength and stability to suit the incident wave conditions as well as providing clear walkway for access and services to suit the interim and permanent marina layout design requirements.

The outer T end walkway shall be minimum 2.5m in width and length as nominated on the drawings or as assessed by the Contractor adequate to provide wave attenuation from incident waves to protect berths and marina walkway from incident wave climate.

Where the T end or fingers are not nominated for the interim marina layout the Contractor shall specify conditions that would

5.4 Walers

Where pontoons are interconnected using an aluminium framed system the grade and treatment of the aluminium must be nominated to suit the design life and exposed conditions. In particular isolation between dissimilar metals, fixings and composite products must be included to ensure the design life and warranty conditions are met.

Where the pontoon units are inter-connected by FRP walers to form a walkway, the walers must be fabricated from adequate structural grade to meet the design loads with allowance for degradation to meet the specified design life.

Where the pontoon units are inter-connected by some other means, the details of the fixing materials and connections must be provided. These details must clearly indicate materials, protection systems, and similar.

Calculations of loads on walers (where applicable) and details of connections must be provided by the Contractor in the submission.

5.5 Fenders

Heavy-duty rubber buckling type fendering must be provided to the edges of the pontoons to assist in absorbing the impact from manoeuvring vessels. The energy absorption capacity required must be determined in accordance with BS6349 Part 1, based on the vessel parameters and the approach velocity recommended in AS 3962:2020 and AS4997.

Fenders must be continuous around the end of the pontoon walkways and fingers, including pile guide assemblies.

Consideration must be given to the use of non-marking white coatings on fenders to protect the paint on boat hulls.

5.6 Freeboard

The Contractor must supply pontoon modules that have a minimum freeboard of 500mm throughout its design life for the permanent marina design layout.

5.7 Mooring Pile Connection

Where the walkway or finger requires mooring piles for restraint, the guides must be designed to resist forces associated with wave action, currents, berthing and mooring.

Assemblies located in the guide brackets must be of heavy-duty construction, with suitable approved fittings (stainless steel or aluminium) and non-binding. Calculations of the loads to be transferred through the systems must be provided and the connections detailed on the drawings with the manufacturer's certified load capacity clearly noted.

The pontoon restraint system must be configured to the pile vertically to permit unrestricted movement of the pontoon through the full-predicted range of water levels.

Where required, adequate spacing for walkways around the gangway and additional floatation must be provided.

5.8 Pile Design and Load testing

Piles used to restrain floating pontoons shall be supplied with protective coatings to suit marine exposure conditions and design life nominated. The piles shall be installed to an adequate depth for full moment fixity of the pile in the ground.

The Contractor shall provide calculations and state on the drawings the position and verticality tolerances for the piles, cut off levels and required design load capacities.

The tolerance defined by the Contractor shall ensure that for normal and extreme conditions allowing for the pile guide assembly and resist jamming of the pontoon pile guides on the pile.

Piles shall be filled with a white PVC or other approved pile caps (white).

The Contractors must allow for any pile testing required by their designer to satisfy the design. Any piles that do not achieve nominated design depths shall be certified by the Contractor through either the certified designer or pile load testing in accordance with AS2159 with a lateral load test. A maximum design load limit shall be nominated and piles tested with load cell and surveyor to the increments and method nominated in AS2159. The results of the testing shall be provided to the Superintendent for review along with designers pile test certification.

If required, the Superintendent/Principal may request piles to be tested.

5.9 Cleats

The pontoon units must be fitted with cleats of a size commensurate with the design vessels. Cleats must be secured to the pontoons with adequate bolted connections, including suitable durability to meet the design life of the pontoon.

Sufficient cleats must be provided along the pontoon perimeter so as to provide ample mooring points including bow, stern and springer lines. Reference is made to the preliminary design layout.

5.10 Berth Signage

All berths must be provided with signage indicating the berth number and arm. Signs must be made of suitable approved material (such as routered polyethylene) provided with reflective writing of a minimum 80mm font height. Berth and arm naming & numbering convention must approved by the Superintendent prior to fabrication.

5.11 Existing Services

Verify the position of underground and other services before commencing the works. The Contractor must notify the Superintendent immediately upon discovery of services or obstruction not shown on the Drawings.

The Contractor must protect all mains, poles and overhead or underground cables, underground drains and all other underground services or structure during the construction of the works. The Contractor will be held responsible to make good any damage to these caused by, or as a result of his operations (i.e. arrange and pay the cost of repair by the responsible servicing authority).

Where existing services must be interrupted to enable carrying out of the works, such interruption must be at a time agreed by the Superintendent. Organise with the responsible servicing authority so that the interruption must be for the minimal practical time. Give notices of the interruption to all affected parties

5.12 New Services

Any existing mains required to be raised, lowered, removed or altered in position for the marina works (excluding existing marina service mains and new electrical main from E Jetty), such work will be done at the expense of the Principal, and the Contractor is to cooperate with persons or authorities carrying out such work, and to vary his works program as may be directed by the Superintendent to facilitate the laying, removal or alteration of such services.

The Principal must bear the cost charged by the Public Bodies for this work, but the Contractor is to supply, at his own expense, any necessary labour to give assistance to this work. This clause must not relieve the Contractor of his liability to bear the full cost of any of these structures if such alteration is caused by his operations or failure to properly protect them.

5.13 Berth Service Pedestals

Service pedestals or pillars are to be designed and supplied to service the marina berths as indicated on the Preliminary Drawings (Appendix A). Pedestals must include electrical GPO's (2 x 15amp metered single phase), a tap outlet for water and led lighting.

Service pedestals design and construction shall meet the requirements of AS 3962, AS3004 and AS 3000.

The pedestal housing must be constructed of suitably approved durable material (stainless steel, fibreglass or HDPE). Units must be lockable, provide resistance to vandalism and watertight. Lighting shall be photocell controlled for illumination.

The service pedestals shall be designed to suit the temporary layout and be relocatable for future master plan walkway and finger layout provided on the Drawings.

The service pedestal shall be designed and constructed with an appropriate NMI approved (accuracy class 1) kwh meter reading hardware for each service outlet as well as RCDs and MCBs to AS3004 and AS3000.

5.14 Electrical

All berths must be provided with single phase electrical power from the existing facilities to outlets in service pedestals. All materials and workmanship must satisfy the requirements of AS 3962:2020, AS3004 and AS 3000 and be completed by a licenced electrician holding an Electrical Workers Licence issued by the Elec.

The layout of service pedestals must be in accordance with relevant standards and industry practice but not less than one pedestal per two berths (or as indicated on the Drawings).

The maximum demand for the jetty must be provided to the Superintendent for review prior to commencing ordering or fabrication to confirm adequate supply capacity exists. This acts as a **HOLD Point**. The Principal must be responsible for providing the upgrade of the mains supply on site and mains supply to the head of the new gangway abutment to a distribution board adjacent to the abutment. The Contractor is responsible for the design, supply and installation of the new distribution board and must advise the minimum supply capacity to support the design for the new marina layout.

5.15 Water

Each berth shall be provided with town water reticulated through taps located externally on service pedestals with taps and integrated external backflow preventer. Each pedestal shall service two berths or as indicated on the Drawings. Back flow prevention devices are to be fitted to each water outlet in accordance with the relevant standards.

The existing water supply (copper) on shore shall be used for new water supply connection.

All plumbing works shall be carried out by licensed tradespersons holding local licence for local and state plumbing permits. A design and as-built drawing for the works shall be supplied by the plumbing contractor suitable for plumbing permits.

5.16 Fire fighting

A fire-fighting station pedestal must be provided with 9kg DCP ABE fire extinguishers in a secure weatherproof pedestal with light mounting on the T end of the pontoons. The pedestal must be different colour to the service pedestals and be adequate signed.

The Contractor must provide design for fire hose reels and fire mains in accordance with the requirements of AS 3962:2020 for the new marina walkway (including provision for gangway and floating pontoons to install fire services).

The Principal shall be responsible for providing adequate water supply and a hydrant to the abutment and installation of fire hose reels and fire mains and commissioning in accordance with the Contractor's design (at a future stage).

5.17 Lighting

The walkway and berths to the marina must be provided with energy efficient lighting at the appropriate intensity for navigation, security and pedestrian purposes.

The Contractor must ensure that these light sources are located to provide light to the required standard at all locations throughout the marina. Lighting incorporated in service pedestals and in accordance with the above requirements will be considered along with any other approved arrangements.

5.18 Gangway

Gangways shall be designed to AS3962 accessible requirements for width and grade, handrails, kick plates as well as requirements for AS1428.1. Transition plates shall be provided at both landside and marina to meet the variable grade requirements for extreme tide levels with a suitable non-slip pedestrian surface to AS4586.

Adequate spacing of pontoon walkway shall be provided around the gangway and transition plates to maintain safe pedestrian access for any vessel, berth access or maintenance as well as compensating buoyancy for design loading actions (dead and live) from the gangway.

5.19 Pontoon Safety Access Ladder

Ladders for the proposed jetty arms shall be design and installed in accordance with AS3962 for one ladder for each side of the walkway. Ladders shall be either removeable (with a stand located at the gangway or T end) or permanently located to minimise risk of damage to vessels on berthing or mooring and located whilst providing ease of access from the water.

5.20 Life Ring

At least one (1) Solas and/or industry approved life ring(s) shall be installed on the marina at the end of the each walkway or bottom of the gangway with a suitable aluminium support frame and secured strap to hold in place and ease of access in the event of use.

5.21 Pontoon Defects

The pontoons must be free of defects including external damage, shrinkage cracks, surface cracks, colour distortion, crazing, pitting and similar. Any such defects will not be accepted and the pontoon units must be replaced at the expense of the Contractor.

The Contractor must ensure that all components of the floating berths are adequately packed and protected against damage during transportation and handling. Any units damaged during transportation or handling will not be accepted and must be replaced at the Contractors expense.

The Contractor must ensure that all components of the berths are adequately packed and protected against damage during transportation and handling. Any units damaged during transportation or handling will not be accepted and must be replaced at the Contractors expense.

5.22 Staging of the Works

Staging of the Works shall be mutually agreed by both the Principal and the Contractor, and under the parameters prescribed under Clause 2.3.2 of this Principals Project Requirements.

6. Design Requirements

6.1 General

The design of the floating pontoon, fenders, connections, piles brackets, materials and components that for the WUC shall be undertaken in accordance with the nominated codes and standards as well as requirements outlined in the PPR and Drawings.

The design of structures must take into account, as appropriate, stability, strength, serviceability and durability. The design must be in accordance with relevant standards, together with any additional requirements included in this PPR, the Contract or shown on the drawings included as part of this PPR.

The Contractor shall nominate the designer for works including qualifications to certify the works meet the requirements by an appropriately qualified engineer eligible or holding Chartered Professional Engineer status as recognised by Engineers Australia.

6.2 Principal's Preliminary Design

The Principal's Preliminary Design is provided in the drawings included at Appendix A. These drawings provide a concept design developed for D,E and F Jetty that includes:

- Replacement of the existing dilapidated fixed jetty structure with floating walkway and T head.
- Demolition of existing fixed jetty structures.
- Adaptable for future permanent marina layouts for fingers and services.

The design shown on the drawings in Appendix A is a Preliminary Design only and illustrates only 1 potential design solution, and it does not affect the Contractor's Design Obligations.

Set out for the Works, based on the Preliminary Design, is nominated on the drawings included as part of this PPR. The Contractor shall comply with the set out, design arrangements, nominated dimensions and vertical levels unless otherwise noted within the PPR or on the drawings.

6.3 Design Life

The design life means the period over which the structure or structural element must perform its intended purpose without replacement, refurbishment or significant maintenance.

The Works must be designed in accordance with the following Design Life requirements:

Table 6-1 Design Life

Elements	Minimum Design Life
Pontoons and associated elements	30 years
Piles and pile connections	50 years
Services	30 years

The design and construction of the pontoon walkway shall meet the design life as nominated above in either interim or permanent marina layout arrangement.

6.4 Environmental Conditions

The Contractor shall assess the site to determine adequate environmental design criteria for the marina as per AS3962 Section 2 including tides, currents, waves, winds, sea level rise, sedimentation and extreme events.

6.5 Design Vessel

The design vessel shall be in accordance with the Preliminary Design Drawings and parameters from AS3962.

6.6 Codes & Standards

The current editions of the standards and codes of practice are to be adhered to for the design, supply and construction of the F Jetty Pontoon.

Where there appears to be conflicting requirements between these documents, the higher standard must be adopted unless otherwise approved in writing by the Superintendent.

AS3962: 2020 Marina Design

AS3004.1 Electrical Installation for Marinas

AS3000 Electrical installations

AS4997 Design of Maritime Structures

AS1170.1 Dead and live loads

AS1170.2 Wind loads

AS1428.1 Design for Access & Mobility – General Requirements for Access

AS1554 Structural steel welding code

AS1657 Fixed platforms, walkways, stairways and ladders – Design, Construction & Installation

AS1664 Aluminium structures code

AS1665 Aluminium welding code

AS2159 Piling Design and Installation

AS2312 Guide to protection of structural steel

AS2441 Installation of fire hose reels

AS2601 Demolition of structures

AS3600 Concrete structures

AS4100 Steel structures code

Code compliance is not limited to those listed above and the Contractor must comply with all relevant codes and statutory authority requirements applicable to the works. Any departure from standards shall issued to the Superintendent for approval.

6.7 Durability

The elements shall be designed to meet durability requirements of AS4997 and AS3962.

7. Design Deliverables

The design of the D,E,F Jetty Pontoon must be in accordance with the recommended standards and codes of practice listed in the Principals Project Requirements, in particular the pontoon design and performance.

All aspects of the design of the Works must be carried out by persons eligible for membership of the Institute of Engineers Australia and certified naval architect (or equivalent), experienced and currently practicing in the field of marine and naval architecture maritime engineering design.

7.1 Design & Construct Program

The Contractor must provide within two weeks of award a detailed Construction Program and must indicate but not be limited to the following:

- Design of pontoons, piling and services.
- Certification and delivery of design documents.
- Fabrication of pontoons.
- Transport to site.
- Installation.
- Commissioning and handover.

Following review of the Design & Construction program, the above items must be deemed to be Hold Points for the WUC and The Contractor must not proceed without written approval from the Superintendent. This acts as a **HOLD Point.**

7.2 Technical specifications and construction drawings

The technical specifications and drawings must include:

a) a fully dimensioned General Arrangement drawing (plan view and elevation of the proposed works);

b) structural and fabrication details of the structure and components;

c) the design criteria, loads and water levels;

d) references to Australian Standards;

e) the tidal planes relative to Australian Height Datum (AHD); and

f) the set-out point and bearing

7.3 Design Report

The Contractor must submit design certification to demonstrate the Works meets the requirements of the PPR.

a) Document control page (for signoff by the Superintendent)

b) Project details and scope

c) Design details:

   i. site investigation, which may include but not limited to geotechnical, bathymetric, wave climate etc.;

ii. design tidal plans and flood levels (if applicable); and

iii. assumptions and design methodology.

d) Referenced Standards;

e) Stability and buoyancy calculation summary;

f) Certified fabrication and construction drawings

g) Special design and/or construction requirements for approval conditions;

h) Safety in Design report for the construction, operation and maintenance phases of the works; and

i) Maintenance schedule and requirements.

The specifications must include standards of workmanship, materials, and protective treatments, and quality assurance procedures for the fabrication and installation of the floating pontoon.

A copy of the design report must be provided to the Superintendent for review and comment prior to construction.

All design documents must be certified (in its compliance to the WUC) by the Contractor to the satisfaction of the Superintendent.

The design calculations must be made available for review on request and legibly written on A4 sheets with clear references to all standards, codes of practice, manuals, papers and the like, used in the design of the floating pontoon system.

Specifications and drawings must be forwarded to the Superintendent for review by the Superintendent at the 50% and 100% design stages, unless otherwise noted. This acts as a **HOLD Point**.

7.4 Certification of design

The designer must certify the construction drawings and must also certify (by declaration notes on the drawings or by a separate Engineer's Certificate) that the design of the works:

a) is suitable for the intended usage;

b) is structurally adequate for the intended location and anticipated usage;

c) is structurally adequate to allow for the scour resulting from flood and tidal conditions (if applicable);

d) is designed in accordance with all appropriate Australian standards and guidelines;

e) has a non-slip surface.

Design Certification must be submitted no later than 2 weeks prior to commencement of installation. This acts as a **HOLD Point.**

7.5 Drawings

The Contractor shall provide the following:

- General arrangement drawings and typical sections in .pdf format
- Detailed drawings of connection detail between existing abutment and new pontoon for review and acceptance 2 weeks prior to commencement of fabrication.

The connection detail drawings must include details of all fixing and clearance dimensions including section thicknesses and dimensions, bolt sizes, welding details, and a listing of all individual components and their material of manufacture cross referenced to the general arrangement drawing.

Where applicable, the drawings must include full details of proprietary components identified by their make, model, type, figure number, etc., fully defining the item and its materials of construction. Specification data sheets must be submitted for all such items.

Drawings must include all engineering details sufficient for construction and include layouts, elevations, cross sections and details, structural, electrical, and hydraulic design details.

Submission of Drawings acts as a **HOLD Point.**

7.6 Hold Points

Item	Type	Required	Clause
Design & Construction Program	Hold Point	Within 2 weeks of award and 2 weeks Prior to procurement	Section 7.1 of this PPR
50% Design	Hold Point	2 weeks prior to prefabrication	Section 7.3 of this PPR
100% Design	Hold Point	2 weeks prior to prefabrication	Section 7.3 of this PPR
Design Certification	Hold Point	Prior to Practical completion	Section 7.4 of this PPR
Drawings	Hold Point	2 weeks Prior to procurement	Section 7.5 of this PPR

7.7 Operations and Maintenance Manual

At completion of the commissioning and works and prior to practical completion the Contractor shall provide a maintenance and operations manual. The manual shall include all as-built records, testing, commissioning, warranties, quality assurance certificates and any amendments or instructions included through the construction necessary to support operations and maintenance of the Works.

The operation and maintenance manual shall include:

- As-built drawings for design and installation including pile as-built records.
- Equipment, Material and Fitting Schedules.
- Maintenance instructions.
- Spare parts register.

7.8 Warranty

The contractor must provide a minimum 5-year warranty period for the pontoons, connections, mooring fittings and piles against breakage, structural distress, cracking, or the like. Any and all such repairs necessitated during this time must be undertaken at the Contractor's expense to as new condition.

Should such rectification be required, the period of the warranty for that item must re-commence from the time of the rectification works.

8. Project and Quality Management

8.1 Quality Terms and Definitions

Quality terms and definitions are defined by the Australian Standard AS/NZS ISO 9000 Quality management systems – Fundamentals and vocabulary.

Other definition and terms are as follows:

'accredited laboratory' or **'accredited method'** means -

(i) for all inspections (other than for material which is supplied from outside Australia) a laboratory or method (as the case requires) accredited by the National Association of Testing Authorities (NATA) for those inspections or inspection methods;

(ii) for all material which is supplied from outside Australia, a laboratory or method accredited by NATA for those inspections or inspection methods or by another laboratory or method accredited by a recognised certifying body approved in the Contract or, if the Contract does not provide such approval, then by a recognised certifying body approved by the Superintendent.

'inspection' means and incorporates measuring, testing or otherwise examining goods and services or works or materials (including, where appropriate, raw materials, components, and intermediate assemblies) for determining conformity with the specified requirements.

'measuring' includes checking for line, level, dimensional accuracy, and quantity.

'test' includes taking of samples and specimens and preparation of materials and work for testing.

'Hold Point' means those points beyond which the stated activity must not proceed without the Superintendent's approval to proceed. The Superintendent's approval to proceed beyond the Hold Point does not relieve the Contractor of responsibility for satisfactory execution or performance of WUC.

8.2 Construction Management Plan

Within 14 days of the Date of Contract, the Contractor must submit to the Superintendent a copy of its project-specific Construction Management Plan (CMP), which will include a number of associated plans referenced herein and will address the conditions of the Development Application (Appendix C).

The Superintendent will review the submitted CMP, and provide any review comments to the Contractor, after which the Contractor must promptly update and reissue the CMP to the satisfaction of the Superintendent. Approval of the CMP acts as a **Hold Point**.

The CMP must include, as a minimum, the following components:

- WHS Management Plan as specified in Section 9 of this document, clause 11 of the General Conditions of Contract and under the requirements of Part 6.4 of WHS Regulations;
- Construction Environmental Management Plan as per Section 10.2 of these Principal's Project Requirements;
- Quality management plan, per Section 8.4 of these Principal's Project Requirements, outlining how the Contractor's quality management system will be applied to the WUC, how the Contractor will manage product and production quality and how the Contractor will comply with the quality requirements of the Principal's Project Requirements (including appendices);
- Method Statements per Section 8.7 of these Principal's Project Requirements;

- Projected project cash flow (monthly); and
- Construction Program.

8.3 Quality Management Systems Standards

The WUC must be undertaken in accordance with a contract management system that meets the requirements of relevant AS/NZS ISO Standards, as updated from time to time. The standards specified in this section form part of the Principal's Project Requirements. Copies are not included in this document.

These standards include:

Standard	Title
AS/NZS ISO 9001	Quality Management Systems - Requirements
AS/NZS ISO 14001	Environmental Management Systems - Principal's Project Requirements with guidance for use
AS/NZS 4801	OHS – Management Systems

The Contractor's quality systems must demonstrate compliance with all relevant Legislative Requirements and the Principal's Project Requirements.

8.4 Quality Management Plan

The Contractor must prepare a Quality Management Plan (QMP) that details all checks, inspections, technical submissions, Witness Points and Hold Points as required in this Specification. The Contractor must prepare and submit the plan 2 weeks prior to commencement of construction works.

The plan must contain at least the following elements:

- Testing schedules including inspection and test plans (ITP's) – The contractor must set up appropriate ITP's for all work as outlined in section 8.9 of these Principals Project Requirements.
- Audits – The Contractor must undertake quality audits in accordance with the Contractor's QMP as outlined in Section 8.13 of these Principals Project Requirements. The Superintendent may at any time conduct independent quality audits of the Contractor's Works and Quality system including the Works and Quality systems of sub-contractors and suppliers as outlined in Section 8.12 of these Principals Project Requirements.
- Hold Points and Witness Points – The Contractor's QMP must detail Hold Points and Witness Points.
- Non-conformance reporting – Nonconforming Works must be reported to the Superintendent by the Contractor's quality representative in writing using a non-conformance report. The Contractor must advise the Superintendent how the non-conformance will be dealt with and suitable corrective action. The Superintendent may permit or reject the proposed actions. Any time delays arising from non-conformance are barred from being a basis of any claims by the Contractor including but not limited to for extension of time;
- Documentation and record procedures;
- Lot numbering – Work lots must be numbered in a fashion as to identify the lot in any specific location. A homogenous lot is defined as continuous work in any single segment and is completed in any continuous work shift and is not disjointed;
- Process control;

- Suppliers and subcontractor plans; and
- Procedures to capture as built records.

No responsibility is assumed or accepted by the Principal for any delay in Superintendent's release of the Hold Point for the Quality Management Plan where this arises because the Quality Management Plan failed to meet the required parameters or if these areas are not sufficiently detailed prior to the commencement of the construction works.

Compliance with the Quality Management Plan will not relieve the Contractor of any of its duties, obligations or responsibilities under the Contract.

Quality records must be submitted to the Superintendent in accordance with the timing requirements of the Contract.

8.5 Monthly Reports

The below requirements are in addition to the reporting requirements in the General Conditions of Contract, including in clause 32 of the General Conditions of Contract.

The Contractor must, from the Date of Contract until issue of the Certificate of Practical Completion, prepare and submit to the Superintendent at no greater than monthly intervals, a report in writing to the satisfaction of the Superintendent (Monthly Report).

The Monthly Report must, at a minimum, specify the progress of WUC to date, including:

- Description of physical progress including photographic record;
- Contractual issues;
- Actual time performance against Construction Program (this requirement may be satisfied by including the monthly Construction Program status report (as required by Clause 32 of the General Conditions of Contract) in the Monthly Report);
- Progress Payments summary and Variations summary;
- Actual cash flow against predicted cash flow;
- Quality assurance and test results;
- Claims for variations and extensions of time; and
- Other details reasonably required by the Superintendent.

The Monthly Reports must be submitted to the Superintendent no later than the Contractor's Payment Claim.

Submission of the Monthly Report is a contractual prerequisite to the processing of the Progress Payment Claim.

8.6 Stakeholder Updates

From two weeks prior to commencement of WUC, the Principal must provide weekly updates to project stakeholders on current and future construction activities. The Contractor must provide the Superintendent with a weekly written briefing, detailing current WUC underway, WUC planned over the next two weeks and potential disruptions or hazards that stakeholders need to be aware of. The briefing may be given by email and must be in a format of the satisfaction of the Superintendent.

8.7 Method Statement

The Contractor must provide to the Superintendent a detailed description of the proposed methods to execute WUC before commencing any WUC on the Site (Method Statement). The Method Statements must include:

- The sequence of operations;
- Plant and equipment proposed;
- Details of any Temporary Works associated with the project, including general arrangements, dimensions, and relevant design details;
- All matters affecting the safety of the Site including proposed exclusion zones, control of access to the Site and management and escorting of trucks and other plant through the facility;
- Manufacturer's recommendations for proprietary materials (e.g. coatings, patch repair materials etc.

8.8 Construction Program

The Contractor must provide a Construction Program in accordance with clause 32 of the General Conditions of Contract; against which the progress of Works and subsequent program revisions must be reported. The construction program must be in the form of a critical path network and associated bar diagrams (i.e. Gantt Chart). The Contractor must show all activities required to complete a logical and comprehensible network. It must identify all activities on the critical path including an allowance for submission and review of documentation by Superintendent prior to issue of a Certificate of Practical Completion. The construction program must include all Hold Points and Witness Points to be released by Superintendent, however the construction program itself does not constitute a formal notice of a Hold Point or Witness Point requiring release. The Contractor is still required to submit Hold Point and Witness Point notifications.

Reporting of progress must be submitted monthly with progress payment claims, with any changes clearly identified and revised dates for Hold Point and Witness Point forecasted.

8.9 Inspection and Test Plans

The Contractor must submit to the Superintendent, as part of the Quality Management Plan, proposed inspection and test plans (ITPs) covering all material supply, construction/demolition and testing/commissioning work elements of the WUC.

ITPs must include:

- A description of the work process;
- Identification and verification of tests/inspections against Contract requirements (see particularly clause 30 of the General Conditions of Contract), Specifications, Drawings, Standards and other relevant details;
- Identification of records to be maintained of tests, inspections and trials;
- Details of test equipment to be used for specified tests; and
- Use of representative samples to demonstrate acceptable standards of workmanship for activities where subjective assessment of quality may be required, e.g. finishes.

The ITPs will be reviewed and returned to the Contractor within 14 days of receipt of the ITPs. The Contractor must include any comments or requirements of the Superintendent in the ITP. Construction of any particular element must not commence until the Superintendent has reviewed the ITP and the

Superintendent's review comments or requirements have been included in the ITP or until 14 days after the Contractor has submitted the ITP.

8.10 Non-Conformance

If the Contractor discovers material or Work that is not in accordance with the Contract, the Contractor's quality representative must promptly notify the Superintendent.

The Contractor must submit all details of any nonconforming material and works and a rectification or remediation proposal. Such a proposal must be obtained in writing before the nonconforming WUC is covered up or incorporated into the Works.

The Contractor must initiate and submit to the Superintendent all non-conformance reports that:

- Result in the finished Work having one or more characteristics different from those specified in the Contract (including the Technical Specification); and
- Result in project time delays;

The Contractor should not proceed unless the Superintendent reviews and approves the proposed rectification or remediation.

The Superintendent may permit or reject the proposed actions. Any time delays arising from non-conformance are barred from being a basis of any claims by the Contractor including but not limited to for extension of time.

8.11 Control of Non-Conforming Product

Where an unreported non-conformity breaches the contractual requirements, the Superintendent may direct a Hold Point in relation to that area of WUC. A report of the non-conformity must be submitted to the Superintendent that must include:

(a) the details of the non-conformity;

(b) the proposed rectification or remediation to resolve the non-conformity; and

(c) the proposed corrective action.

8.12 Audits

The Superintendent may carry out audits of the Contractor's quality system by way of:

- Review and verification of Contractor's records;
- External inspection and testing.

The Contractor must aid the Superintendent in the conduct of such audits. The audits will check that the Contractor is complying with the requirements of the QMP and quality system, a check on the Contractor's individual procedures, records and\or calculations and also a continuous check on the Contractor's processes. If the Superintendent detects any deficiency or deviation in the quality, the Contractor must immediately rectify the Works and Quality systems.

8.13 Audits by the Contractor

The Contractor must carry out audits in accordance with the requirements of AS/NZS ISO 19011:2002 'Guidelines for quality and/or environmental management systems auditing'.

The Contractor must prepare an audit and surveillance schedule for each subcontractor, which must be submitted to the Superintendent for review prior to the commencement of WUC by the

subcontractor. The Contractor must conduct regular surveillance and audits of all on Site and off-Site subcontractors, sufficient to ensure that all WUC complies with the Contract.

The Contractor must notify the Superintendent of the times when formal audits of a subcontractor are to occur.

8.14 Construction Records (As Built)

During the execution of the WUC, the Contractor must maintain records pertaining to the Contract in accordance with the Contract and the Contractor's quality system.

The Contractor must make all records pertaining to the Contract available to the Superintendent at all times. Where requested by the Superintendent, the Contractor must provide the Superintendent with a copy of records within 5 Business Days.

Further to definition of 'Practical Completion' in the General Conditions of Contract, the supply of the following documents is deemed to be essential for the use, operation and maintenance of the Works:

- Completed works report;
- Contract records;
- All quality records and test results;
- Service Installations and Relocations.

The Contractor must provide the above-listed documents to the Superintendent for review and acceptance prior to issue of a Certificate of Practical Completion. Within 7 days of the submission of each document, the Superintendent will advise whether the document is accepted.

Electronic copies of the above documents must also be provided in .pdf and where applicable Microsoft Excel format.

The completed works report must also contain the following information:

- Information on the condition of the completed works; and
- Information relevant to assessing the structural capacity of the works, including, where applicable, sub-surface conditions, foundations and sub-structures.

Submission of As built records acts as a **HOLD Point.**

8.15 Surveillance and Audits by the Superintendent

The Superintendent may arrange surveillance and audits to ensure that the Contractor is complying with the Project Management Plan.

The Contractor must, upon being given reasonable notice by the Superintendent, make available or arrange to be available all facilities, documentation, records and personnel, including those of any sub-contractors, that are reasonably required for audits to be undertaken.

Notwithstanding that the Principal may have previously undertaken audits of a subcontractor's quality management system in connection with other Work, the Contractor must include the operations of all such sub-contractors in the Project Management Plan and must fulfil all the quality obligations of the Contract.

The Principal may carry out audit and surveillance of the Work of all sub-contractors as it sees fit, in the same way that it may carry out audit and surveillance of all Work done, and materials supplied by the Contractor. Copies of any such audit and surveillance reports used by the Superintendent will be provided to the Contractor.

8.16 Examination and Testing of Materials and Works

8.16.1 General

Unless otherwise specified or agreed with the Superintendent, any testing required by the Contract is to be carried out by an independent authority that is an approved member of the National Association of Testing Authorities Australia (NATA).

The Superintendent reserves the right to order additional samples and testing to satisfy himself that the requirements of the Contract are being adhered to.

8.16.2 Notification

Notwithstanding the notice requirements in clause 30.4 of the General Conditions of Contract, where inspection of WUC by the Superintendent is specified as a Hold Point, or where a Hold Point is created by a non-conformance, at least 24 hours' notice of testing and/or inspection must be given to the Superintendent.

8.17 Hold Points

Item	Type	Required	Clause
Construction Management Plan	Hold Point	2 weeks prior to commencement of any WUC.	Section 8.2 of this PPR
Construction Program	Hold Point	Within 14 days after the Date of Contract.	Section 8.8 of this PPR
Construction Records (As Built)	Hold Point	Prior to receipt of Certificate of Practical Completion	Section 8.14 of these Principal's Project Requirements.

9. Work Health and Safety Requirements

The requirements set out in this Section must be read in conjunction with clause 11 of the General Conditions of Contract and the Construction Work Code of Practice, which can be accessed at the following internet address:

https://www.safeworkaustralia.gov.au/doc/model-codes-practice/model-code-practice-construction-work

Where the requirements set out in this Section are inconsistent with the General Conditions of Contract, the General Conditions of Contract will take precedence.

9.1 Compliance

As specified in clause 11 of the General Conditions of Contract, the Contractor must comply with, and ensure that its workers, subcontractors and agents comply with any Acts, Regulations, local laws and by-laws, codes of practice (published by Safe Work Australia or WorkSafe WA), and Australian Standards relating to WHS that are applicable to the WUC.

The Contractor must comply with the Principal's WHS policies, procedures and Site rules which are in any way applicable to this Contract or the performance of the WUC.

9.2 Key Site-specific safety issues

The project specific key WHS issues identified by the Principal in preliminary assessment include, but are not necessarily limited to:

- Piling works – Risk of dropped objects;
- Works in vicinity of commercial and recreational vessels including influence of vessel wake – Injury to personnel;
- Failure of temporary works due to inadequate design – Injury to personnel
- Crane works – Risk of dropped objects / injury to rigging crew;
- Contractor personnel & equipment working adjacent to live edge over water – Risk of man overboard;

Notwithstanding the above, the Contractor is wholly responsible for undertaking its own investigation of risks which pertain to the Site.

9.3 Project WHS Management Plan

The WHS Management Plan must be developed and documented as per WHS Regulation clause 309 and with reference to WorkSafe WA guidance.

The WHS Management Plan may be either incorporated as a discrete and readily identifiable part of the Contractor's Project Management Plan described in section 5.3 above, or as separate specific WHS Management Plan for the project.

As the principal contractor, the Contractor must ensure, as far as reasonably practicable, that each Worker who is to carry out construction Work in connection with the project is, before commencing Work, made aware of the content of the WHS Management Plan for the workplace.

The WHS Management Plan must comply with all relevant legislative requirements.

The site-specific SMP must include, but is not to be limited to:

- Identification of work that is high risk construction work;
- Specify hazards relating to the high-risk construction work and risks to health and safety associated with those hazards;
- Measures to be implemented to control the risks;
- Control measures to be implemented, monitored and reviewed;
- Evacuation and emergency procedures;
- An up-to-date register of all Site hazards and how they are being managed;
- Contractor's safety policy, training procedures and recent safety records;
- Requirements for safety equipment;
- Safety Data Sheet (SDS) Site register;
- Identification of specialised equipment for specific tasks;
- The names, positions and health and safety responsibilities of all persons at the workplace whose positions or roles involve specific health and safety responsibilities in connection with the project;
- The arrangements in place, between any persons conducting a business or undertaking at the workplace where the construction project is being undertaken, for consultation, cooperation and the co-ordination of activities in relation to compliance with their duties under the Act and these regulations;
- The arrangements in place for managing and reporting any work health and safety incidents that occur;
- Any site-specific health and safety rules, and the arrangements for ensuring that all persons at the workplace are informed of these rules;
- The arrangements for the collection and any assessment, monitoring and review of safe work method statements at the workplace.
- Requirements for safety meetings; as frequently as necessary, and in any event at least weekly; and
- Procedures of Work Instructions for all tasks to be undertaken during the Works (note: A Job Hazard Analysis (JHA) or equivalent must be prepared prior to undertaking any work element or task).

The Contractor must provide first aid facilities and personnel with relevant first aid training at all times whilst on Site.

The Contractor must conduct site-wide safety audits as frequently as required to ensure the safety of all persons on the Site and, in any event, within 24 hours of the commencement of Works and thereafter in accordance with legislative requirements.

Without limiting the foregoing, the Contractor must establish and maintain a register of hazards for the Site in which the Contractor must record identified hazard(s), the date it was identified, and any steps taken to eliminate, mitigate, mark or isolate the hazard. A copy of each revision of the register must be forwarded to the Superintendent.

Submission of a WHS Management Plan acts as a **HOLD Point.**

9.4 Changes to Project WHS Management Plan

The WHS Management Plan is a controlled document. The Contractor must review the operation of its WHS Management Plan as frequently as required (or at least weekly) to ensure the safety of all

persons and stakeholders on the Site. The WHS Management Plan will require revision if any one of the following circumstances arises (but the need for revision is not limited to these circumstances):

a) there is evidence to suggest that the risk assessment (required by clause 11 of the General Conditions of Contract) is no longer valid; or

b) subsequent injury indicates the risk assessment may not have been adequate; or

c) prior to commencement of a new scope of work not previously defined in the WHS Management Plan.

Records of reviews must be kept within the document.

As the principal contractor, the Contractor is to ensure, so far as reasonably practicable, that each person carrying out WUC is made aware of any revision to the WHS Management Plan.

9.5 Risk Assessments, Risk Control Plans and SWMS

In managing risks to WHS, the Contractor must take reasonable steps to:

a) eliminate risks to health and safety so far as is reasonably practicable; and

b) if it is not reasonably practicable to eliminate risks to WHS, minimise those risks as far as reasonably practicable.

The Contractor is to prepare and submit a WHS risk assessment (as required by clause 11 of the General Conditions of Contract) in conformity with the requirements of the Contractor's WHS Management System prior to commencing the WUC. This WHS risk assessment must outline the respective controls and mitigations (including responsibilities) that will be used to address risks identified in the risk assessment. The Contractor must submit the risk assessment using forms from the Contractor's WHS Management System.

Where the WUC is 'high risk construction work' as defined in Chapter 6 of the WHS Regulations, a safe work method statement (SWMS) is to be prepared by the Contractor and submitted to Principal.

The risk assessment, control plans and SWMS must be reviewed frequently to reflect changes at the Site which includes but not limited to changes in personnel, plant and equipment, process or Work hours.

The risk assessment, control plans and SWMS shall be available on Site for the duration of the Works to enable audit and surveillance to be conducted.

Submission of task risk assessments / SWMS minimum 3 days prior to commencement of Works acts as a **HOLD Point.**

9.6 Subcontractors

Where a subcontractor is engaged by the Contractor to perform any activities on the Contractor's behalf, the Contractor must provide the subcontractor with copies of those sections of the WHS risk assessment and control plans that are relevant to the Work to be performed by the subcontractor.

The Contractor is to ensure that the subcontractors prepare compatible Site-specific SWMS prior to commencing WUC at the Site. The documents must be reviewed by the Contractor for completeness prior to commencement of the relevant activity to be carried out by the subcontractor. A copy of the subcontractor's SWMS is to be retained onsite.

Any subcontractors must comply with the requirements of this Principals Project Requirements and provide. It is the responsibility of the Contractor to coordinate and collate relevant documentation from Subcontractors and submit to the Superintendent. This acts as a **HOLD Point.**

9.6.1 Control of Subcontractors

The Contractor must undertake appropriate monitoring of each subcontractor's work to ensure that the Contractor's WHS Management System is being effectively implemented and all work is carried out without an unacceptable level of risk.

9.7 Work Health and Safety Induction

Prior to the commencement of the WUC, all workers must complete a site induction developed by the Contractor.

The Principals induction may include general induction, Work activity WHS induction and location specific WHS induction.

The Contractor's induction training program must include training related to hazards likely to be encountered on Site, and the control measures that have been developed in response to these hazards.

For all WUC, the Contractor is to ensure that all Workers (including subcontractors) have received training in accordance with the requirements of part 6.5 (General Construction Induction Training) of the WHS Regulations.

The Contractor must not allow a person to carry out WUC on the Site until the Contractor is satisfied that the person has completed all the required WHS induction training identified in this section.

9.8 Licensing Competence

The Contractor must ensure and confirm that all Workers (including subcontractors) have the required high-risk Work licences as required by the Work Health and Safety Regulations 2012 for the classes of high risk WUC being undertaken and any other licences/competence for the WUC undertaken.

9.9 Supervision

The Contractor must all time times provide supervision of the work Site and has a responsibility to:

a) ensure acceptable risk controls are implemented throughout the duration of the WUC to eliminate or minimise injury;
b) seek expertise as required through engaging other stakeholders;
c) ensure that the Principal's Project Requirements and Legislative Requirements are met prior to the WUC commencing and during the execution of WUC;
d) ensure a process of consultation is established with other duty holders who have a WHS duty in relation to the same matter; and
e) ensure records of implementation of all WHS requirements are maintained.

The nominated Site Supervisor shall act in an oversight role and not operate plant and machinery as their primary role.

9.10 Communication and Consultation

The Contractor must put in place a procedure for consultation between any relevant stakeholders, which includes consultation between the representatives of any subcontractors and any other stakeholders. The consultation procedure or process must include an issue resolution process.

9.11 Obligations with Respect to Plant and Equipment

The Contractor must ensure that risk assessment processes are in place and implemented for plant and equipment as per the requirements of the WHS Regulations. The Contractor is to certify that plant is safe and will not pose a risk to health and safety when properly used.

The Contractor must allow the Principal to carry out inspection at any time of any plant or equipment that the Contractor brings on to the Site for compliance with the relevant code of practice and manufacturer's guidelines.

Submission of plant risk assessments and any relevant certification and licences prior to any works on site acts as a **HOLD Point.**

The Contractor must:

a) complete a pre-commencement plant inspection verifying that the item of plant is suitably maintained and safe to operate;

b) have any relevant certificates, licences and permits that are required by WorkSafe WA, or any other relevant standard, and make them available to the Principal on request;

c) maintain the plant and equipment in accordance with manufacturer's standards or certified modification;

d) maintain records of inspections (those conducted daily and for other purposes), service, cleaning and/or maintenance and make these available to the Principal on request;

e) provide adequate information about the plant to ensure its safe use; and

f) ensure that all workers and subcontractors who are required to use or operate plant or equipment are appropriately licensed or certified and have received the necessary training to operate the particular item and/or perform particular tasks.

9.12 Emergency Planning and Response

The Contractor must establish a Site-specific emergency management plan by carrying out a Site-specific risk assessment. Among other things, the emergency management plan must identify the process for Site communication, external communication and communication with subcontractors in relation to the notification of safety issues and emergencies.

The Contractor must develop a Site-specific emergency and rescue / recovery systems / procedures and devote resources to them; it is not appropriate to only rely on the emergency services. Unless otherwise stated, the Contractor must supply emergency equipment and it must be tested and maintained as per the relevant standards.

The Contractor is to maintain a current list of relevant contact names and telephone numbers for the project and display contact details on Site in accordance with the requirements of the WHS Regulations.

9.13 Reporting of Incidents, Injuries and Disease

In addition to the requirements of clause 11 of the General Conditions of Contract, the Contractor is to report all incidents, which includes hazards, interventions or near misses, to the Principal and the Superintendent as soon as possible or within 24 hours of the incident.

The Principal may participate in, or undertake an investigation into, the incident/injury or illness as and if it is deemed necessary. The Contractor is to cooperate with and aid the Principal in any investigation organised or undertaken by or on behalf of the Principal.

The Contractor will permit the Superintendent, staff of the Principal's insurer, its auditors or any other auditors approved by the Superintendent to access and audit the incident reporting system contained in the Contractor's WHS Management Plan or System and any documentation associated with claims or relating to incidents or near incidents and to take copies of any documents associated with claims or relating to the incidents.

If a notifiable incident, as defined *Work Health and Safety Act 2020* (WA), occurs during the performance by the Contractor of the WUC, then in addition to the requirements set out in these Principal's Project Requirements and in the General Conditions of Contract, the Contractor must also give notice to WorkSafe WA. The Contractor must also immediately give a copy of that notice to the Principal and the Superintendent.

If the Contractor is served with a notice or fine by WorkSafe WA, the Contractor must immediately give a copy of that notice or fine to the Principal and the Superintendent.

The Contractor must keep a record of each notifiable incident for at least 5 years from the day that notice of the incident is given to the regulator under this section.

Notification of incidents and near misses are required as soon as practical and within 24 hours. This acts as a **HOLD Point.**

9.14 Corrective Actions

The Contractor is to ensure that WHS issues and corrective actions are recorded and appropriately addressed as soon as reasonably possible. Evidence of the close out of corrective actions is to be provided to the Principal upon request. A corrective action register may form part of the Contractor's CMP required by section 8.2 of these Principal's Project Requirements.

9.15 Noncompliance

If, during the course of the Contract, the Principal informs the Contractor that, in the opinion, of the Principal, the Contractor:

a) is not conducting the WUC in compliance with its WHS Management Plan or System, relevant Legislative Requirements or WHS procedures provided by the Principal from time to time; or

b) has allowed a risk to the health and safety of its workers, members of the public, the Principal's workers, or any subcontractors workers; or

c) has allowed a risk in relation to any plant, equipment or materials to arise,

then the Contractor must identify, isolate and correct that breach or risk and notify Principal that the issue has been resolved. The Principal reserves right to ask for relevant documents and records before closing the issue.

Submission of Non-Compliance report acts as a **HOLD Point.**

9.16 Surveillance and Audits by the Superintendent

The Superintendent may arrange surveillance and audits to ensure that the Contractor is complying with its WHS Management System and WHS Management Plan.

The Contractor must, upon being given reasonable notice by the Superintendent, make or arrange to be available all facilities, documentation, records and personnel, including those of any sub-contractors, that are reasonably required for surveillance and audits to be undertaken.

The Contractor must include the operations of all such sub-contractors in the WHS Management Plan.

9.17 Contractor Signage at Worksites

In accordance with Section 308 of the WHS Regulations, the Contractor, as principal contractor, must ensure that signs are installed which:

- Show the principal contractor's name and telephone contact numbers (including an after-hours telephone number);
- Show the location of the Site office for the project, if any, and;
- Are clearly visible from outside the workplace, or the work area of the workplace, where the construction project is being undertaken.

The cost of the provision, erection, maintenance and removal of the principal contractor signs will be deemed to be allowed for in the Contract Sum.

9.18 Hold Points

Item	Type	Required	Clause
Submission of WHS Plan	Hold Point	2 weeks prior to commencement of any WUC.	Section 9.3 of this PPR
Task risk assessments / SWMS	Hold Point	Minimum 7 days prior to nominated task	Section 9.5 of this PPR
Subcontractors WHS Documentation	Hold Point	Minimum 7 days prior to planned works on site	Section 9.6 of this PPR
Submission of Plant Risk Assessments	Hold Point	1 weeks prior to commencement of any WUC.	Section 9.11 of this PPR
Reporting of incidents	Hold Point	As soon as practical and within 24 hours	Section 9.13 of this PPR
NCR Submission	Hold Point	Within 24 hours of NCR	Section 9.15 of this PPR

10. Environmental Control

10.1 General

This Section is to be read in conjunction with clause 11 of the General Conditions of Contract.

The Contractor must comply, and make sure that the Contractor's Personnel and Subcontractors comply, with the provisions of this section in addition to the requirements of clause 11 of the General Conditions of Contract.

The standard of environmental control is to be consistent with the sensitivity associated with works being undertaken in a coastal area. Work practices are to be organised to prevent pollution of the environment.

As part of the obligation under clause 11 of the General Conditions of Contract to comply with all applicable Environmental Laws and other requirements relating to the environment, the Contractor and the Contractor's Personnel must comply with:

- Department of Biodiversity, Conservation and Attraction (Swan River Trust) requirements, legislation and management plans;
- Department of Water and Environmental (DWER) requirements, legislation and management plans; and
- Environment Protection and Biodiversity Conservation Act 1999 (Cth).

Compliance with the above will not be deemed to constitute compliance with all applicable Environmental Laws and other requirements relating to the environment.

If the Contractor fails to meet its obligations under this section or the requirements of clause 11 of the General Conditions of Contract, the Superintendent may direct the Contractor to modify or cease WUC until the Contractor can satisfy the Superintendent that the failure has been corrected. All costs are to be borne by the Contractor.

10.2 Construction Environmental Management Plan (CEMP)

The Contractor must provide a CEMP which it will then implement. The CEMP will be a site-specific management plan that must identify the measures and the sequences of operations to be adopted by the Contractor.

The CEMP will describe requirements pertaining to:

1) all relevant regulatory requirements;
2) key environmental values and risks;
3) environmental awareness training and inductions;
4) environment incident management; and,
5) management of specific environmental values, including
    a. flora and fauna
    b. water quality
    c. heritage
    d. weed and soil pathogen management

e. waste management
f. disposal of contaminated materials
g. noise emission control
h. dust control (The control of concrete dust escape into marine environment during demolition must be specifically addressed)
i. auditing
j. corrective actions/incident management
k. record keeping
l. reporting

Submission of a CEMP acts as a **HOLD Point.**

10.3 Hold Points

Item	Type	Required	Clause
Submission of CEMP	Hold Point	2 weeks prior to commencement of any WUC.	Section 10.2 of this PPR

Appendix A Preliminary Design

ID	Title	Drawing Number	Revision	Revision Date
A1	RFBYC D,E and F Jetty Replacement Project Cover Page, Drawing List, Location Plan	1932-SK100	A	30/01/26
A2	RFBYC D, E and F Jetty Replacement Project Existing Marina General Arrangement	1932-SK101	A	30/01/26
A3	RFBYC D,E and F Jetty Replacement Project Demolition Plan	1932-SK102	A	30/01/26
A4	RFBYC D, E and F Jetty Replacement Project Marina Masterplan General Arrangement	1932-SK103	C	28/04/26
A5	RFBYC D,E and F Jetty Replacement Project D Jetty Detailed Dimensions	1932-SK104	C	28/04/26
A6	RFBYC D,E and F Jetty Replacement Project E Jetty Detailed Dimensions	1932-SK105	C	28/04/26
A7	RFBYC D,E and F Jetty Replacement Project F Jetty Detailed Dimensions	1932-SK106	C	28/04/26

Appendix B Site Information

ID	Title	No of Pages
B1	Wave Climate Assessment – Burbury Consulting	22 pdf
B2	Feature and Contour Survey – RM Surveys	1 pdf, 1 .dwg
B3	Historical as built pile data - Various	29 pdf
B4	Geophysical Investigation Report – GBG	[HOLD] - TBC
B5	Existing F Jetty historical drawings – Various	19 pdf

Appendix C Landowner's Conditions

ID	Title	No of Pages
C1	[HOLD] – In progress	[HOLD] - TBC

TENDER SUBMISSION

LEVEL OF SERVICE

PROJECT

Jetty F Replacement RFT

CLIENT

Royal Freshwater Bay Yacht Club

Jetty and Marine Constructions Pty Ltd
ABN 51 161 955 013
Phone: 0431 625 897
www.jmcaustralia.com.au

Part of the Pelagic Group
www.pelagic.com.au
PO Box 190, South Fremantle WA 6162
16 Mews Road, Fremantle WA 6160

CONTENTS

1. INTRODUCTION

Jetty and Marine Constructions (JMC) are pleased to submit a proposal for the replacement of Jetty F for the Royal Freshwater Bay Yacht Club (RFBYC).

JMC have experience in managing and delivering a variety of marine infrastructure projects, specialising in marine construction, piling, demolition, asset remediation, fabrication, pontoon fabrication, boat ramp installation and marine logistics. With our **own vessels, construction equipment and fabrication facility**, we can oversee all aspects of a project from planning through to delivery, with minimal need for subcontractors.

We pride ourselves on being able to develop the most robust methodology that ensures safety, efficiency and the timely delivery of each project. This is possible due to our **dedicated experience in marine construction**, the utilisation of our own assets and having the ability to perform a majority of the scope in-house.

Through our extensive experience delivering pontoon systems across WA, we identified a **clear gap in the market** – the need for a **higher quality, low maintenance floating pontoon system** that delivers long-term stability, durability, and reliable performance.

To address this, at the beginning of this year, **JMC partnered with Marine Structures** in Queensland, to bring their cutting-edge pontoon designs and products to Western Australia.

Our collaboration combines Marine Structures' **industry-leading pontoon design** and manufacturing capabilities with JMC's extensive marine construction expertise and **deep local knowledge**. Together, we deliver a **superior product** backed by a delivery model that remains fully controlled and self-performed by JMC.

We believe we are the best positioned to deliver the replacement of Jetty F for the following reasons:

- We are the **only local marine construction contractor capable of self-performing** the majority of key project components including marine based class 1 demolition, piling (and pile extraction), fabrication, and pontoon installation without relying on external subcontractors. This integrated delivery approach significantly **reduces the risk of delays, cost variation submissions**, and coordination issues, ensuring greater control, accountability, and value for the client.

- Our barges are well suited for the scope of work, offering a **non-intrusive operational footprint** while providing sufficient deck space and load capacity to accommodate our own cranes, excavator, piling equipment and material storage for efficient and safe project delivery.

- Mounted on our **35-tonne excavator**, we use two advanced piling attachments: the **Movax SG-60V side grip pile driver** and the **Movax DH-25 piling hammer**. These tools significantly reduce the time needed for pile driving and extraction, offering high precision and minimal disruption, while also minimising noise and environmental impact.

- Our joint venture with **Marine Structures (MSXJMC)** brings trusted, experienced pontoon supply capability directly into our delivery model. This allows in-house oversight of pontoon supply and fabrication, supporting a fully integrated quality approach across all aspects of the works.

2. NUELITE PONTOONS

JMC propose to install NuElite concrete pontoons to replace Jetty F.

Why NuElite pontoons?

125mm thick 50MPa concrete deck with GRP Reinforcing

The deck of any floating pontoon experiences the greatest torsional loading, which is why our product has 125mm of structural concrete on the deck to handle this load.

The Elite Pontoon system does not have any ferrous componentry eliminating any risk of corrosion or concrete cancer.

The deck will have a coarse broom finish, which is non-slip in accordance with AS4586

No timber walers; pontoons connected with proprietary joining hinges.

Our aluminium framed system eliminates the need for the ongoing maintenance required with timber waler systems, substantially reducing maintenance.

Each pontoon is an individual unit, connected to each other through HDPE hinges, which spread all loads through the whole system.

The pile brackets are bolted on the aluminium extrusion and can be relocated to accommodate the new design under the master plan.

6000 series Australian aluminium (6351-T5 or similar)

The 6000 series aluminium alloys, including 6351-T5, are widely used in Australia for structural and architectural applications due to their excellent strength, corrosion resistance and weldability.

There are no aluminium companies in WA make custom extrusion out of this high-grade aluminium, so we import this product from Queensland.

Soft, clip-in, PVC fender to all berthing faces, corners and pile brackets

Our proprietary PVC fender system does not mark, or scuff vessels berthed on the pontoons as it does not contain any rubber.

SL grade polystyrene floatation blocks

The buoyancy for our Elite System comes from SL grade polystyrene floatation blocks which are made from expanded polystyrene (EPS). These blocks are:

- Highly buoyant
- Resistant to moisture (absorbing only about 2% of their weight in water overtime)
- Environmentally stable

The blocks are fully sealed within an HDPE wrap and have no exposure to the environment around them.

The NuElite pontoons are suitably resistant to all reasonably expected chemicals, organisms, fire and UV lights.

Figure 1 - NuElite Pontoons, Sanctuary Cove Marina

2.1 NUELITE PONTOONS SPECIFICATIONS - RFBYC

Marina Pontoons

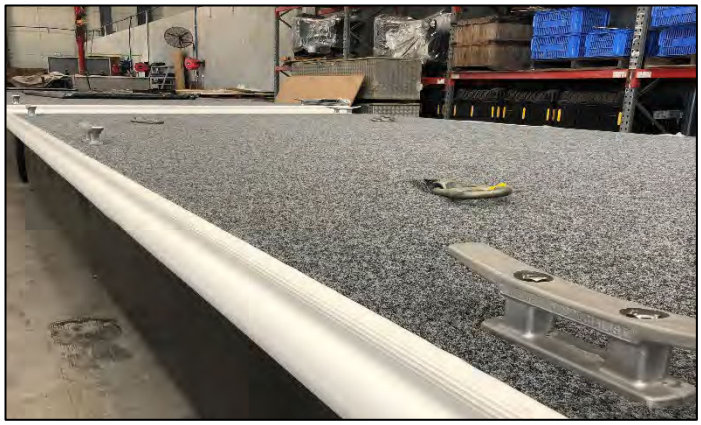
- Main pontoons will be 2.0m wide
- Finger pontoons will be 1.0m wide
- All pontoons will have 0.5m freeboard
- Coarse broom concrete finish

Marina Cleat

- Fabricated from marine grade aluminium
- Standard size – 370mm
- Ample space for multiple ropes
- Provision of 5 cleats per berth in the future Master Plan design

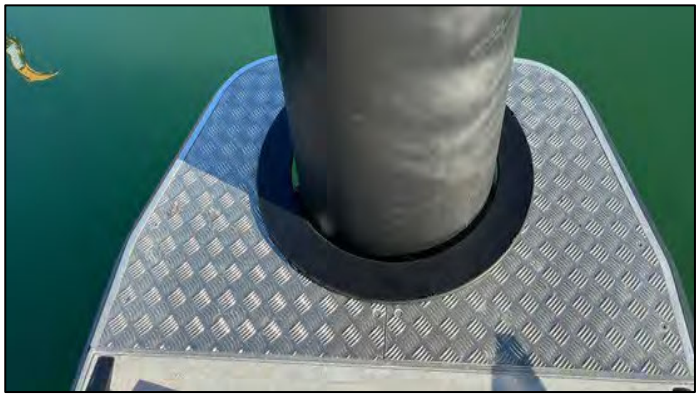
Fender – White

- Non-marking proprietary PVC fender provides market leading protection
- Durable construction
- Weather & UV resistant



Pile Brackets – Silver

- Fabricated from marine grade aluminium
- No moving parts
- Finger protective
- Checker plate finish



Pedestals – Patron Power

- M-Pod Series II, 2 Door, with LED PE Cell Light
- 4 x 15A, IP66 Switched Socket Outlets
- 4 x Electronic, "A" Type, 16A RCBO's
- 2 x ½" Chrome ¼ turn taps
- RFBYC Logo on each pedestal can be done at no additional cost.

3. RELEVANT EXPERIENCE & PROJECT EXAMPLES

3.1 JETTY AND MARINE CONSTRUCTIONS

3.1.1 REFURBISHMENT OF ROTTNEST BERTHS 1, 2 AND 3

Year: 2024

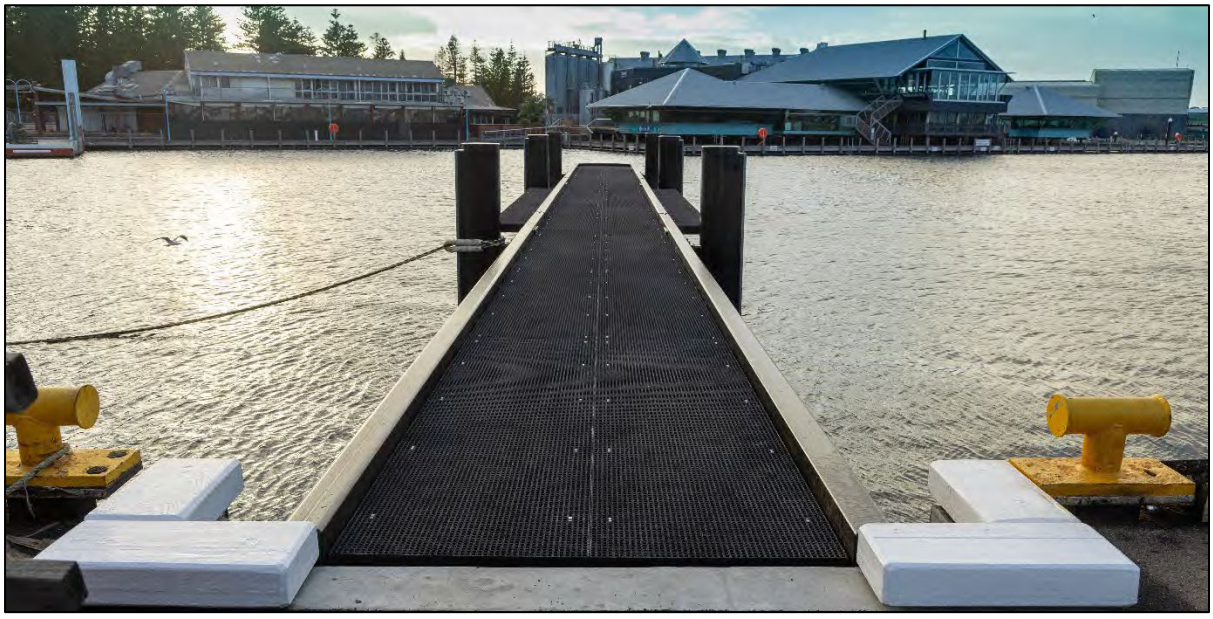
JMC conducted major remediation work to berths 1-3 on the Rottnest Island Ferry Jetty. This work included the demolition and replacement of concrete coping beam, the fabrication and installation of 22 fender piles with rubber fender stripping, cylindrical fenders and chain tensioning system, as well as the removal and disposal of the old piles and concrete.

Other areas of the ferry jetty remained open to island visitors while this project was underway, meaning all of the work had to be done from the water. Our large range of marine assets was crucial in ensuring we met deadlines, didn't disturb the ferry timetable and completed the job safely.

Relevance to Jetty F Replacement:

- Demolition
- Piling
- Marine logistics
- Traffic and pedestrian management

3.1.2 DESIGN, DEMOLITION & CONSTRUCTION OF KAILIS FINGER JETTIES



Year: 2024

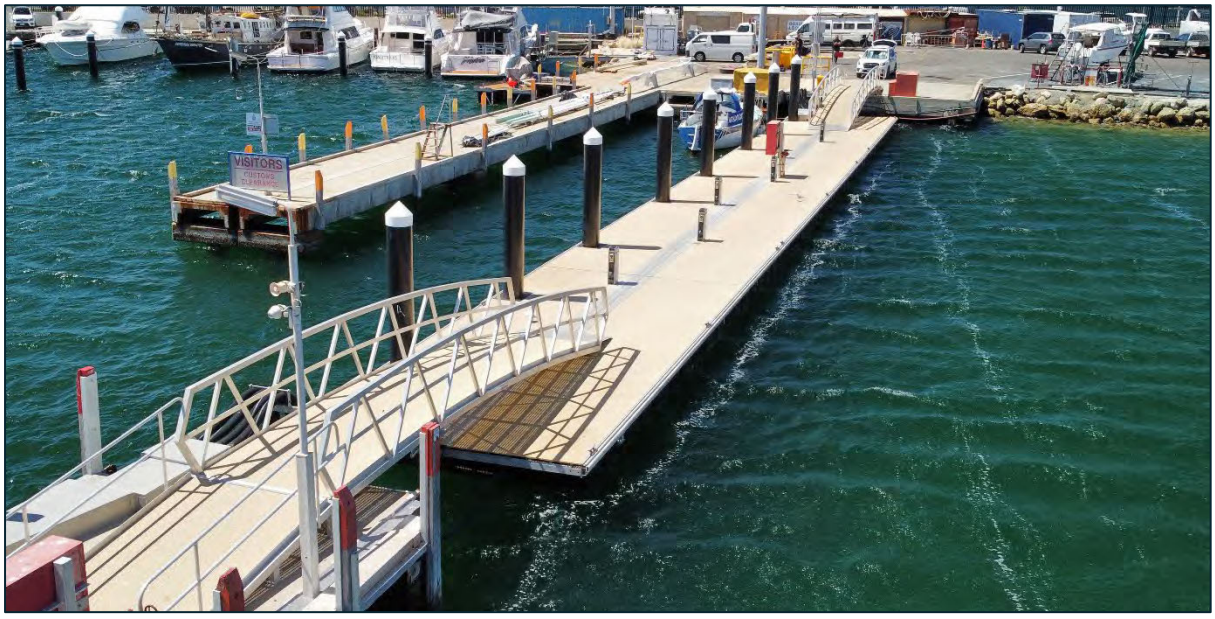
Jetty & Marine Constructions (JMC) were engaged by Kailis Marine - Sea Harvest to replace three existing timber jetties with new, 30-metre steel and FRP structures, total 95 metres.

The scope of work included the complete demolition and disposal of the outdated timber jetties, the fabrication of custom steel frames and fender systems, and the installation of steel piles, frames, fenders and FRP decking. With the support of our in-house fabrication division, we successfully managed the entire scope internally, ensuring complete quality control and efficiency throughout the project.

Relevance to Jetty F Replacement:

- Design
- Demolition
- Piling
- Traffic and pedestrian management

3.1.3 FREMANTLE SAILING CLUB SERVICE JETTY REPLACEMENT



Year: 2021

JMC was contracted by Fremantle Sailing Club (FSC) to demolish their existing service jetty and construct a new floating pontoon system. The project involved the two staged removal of prestressed concrete deck panels and a reinforced concrete ring beam, followed by the installation of new steel piles and a floating jetty.

The new floating design supported critical services including diesel, petrol, electricity, water, vacuum waste, and fire systems. JMC was responsible for the disconnection and reconnection of all services, ensuring full operational reinstatement in accordance with updated standards. Piling was undertaken using a barge mounted 30t crane and air hammer. The new pontoon system was then installed and fitted out, enhancing FSC's user facilities with improved service functionality.

JMC performed the majority of the scope, including demolition, piling, fabrication, and service reinstatement, ensuring high levels of quality control and project efficiency.

Relevance to Jetty F Replacement:

- Disconnection of services
- Demolition
- Piling
- Installation of floating pontoon
- Installation of services
- Traffic and pedestrian management

3.2 MARINE STRUCTURES

3.2.1 COFFS HARBOUR INTERNATIONAL MARINA

The completed redevelopment at Coffs Harbour showcases a fully engineered and executed marina upgrade.

The scope included detailed design and engineering, alongside piling and demolition works to support the installation of 143 new berths. These berths feature concrete pontoons reinforced with GFPR, ensuring long-term durability and performance. Gangways with secure access gates provide safe and controlled entry, while the addition of service pedestals and a dedicated fire service enhance operational capability and safety across the facility.

Relevance to Jetty F Replacement:

- Design
- Demolition
- Piling
- Pontoon fabrication
- Installation of floating pontoon
- Installation of services
- Traffic and pedestrian management

3.2.2 SANCTUARY COVE MARINA

Sanctuary Cove is an iconic boating, golfing and residential paradise nestled in the northern corridor of the Gold Coast in Queensland, Australia. Superior Jetties contracted with Mulpha Australia, the site owners, upgraded the marina facilities with 67 new berths installed.

The new berths, constructed from a floating concrete system are from 12m to 50m, with a dedicated super yacht arm catering for vessels over 50 metres. The addition of commercial grade shade covers to the berths is a first for the Australian recreational marina industry.

Relevance to Jetty F Replacement:

- Design
- Piling
- Pontoon fabrication
- Installation of floating pontoon
- Installation of services

3.3 JMC AND MARINE STRUCTURES CAPABILITIES MATRIX

Project	Client	Contract Type	Value	Location	Year Complete	Design	Demo	Piling	Traffic & Pedestrian Management	Install of Floating Pontoons	Fabrication of Floating Pontoons	Installation of Services
Refurbishment of Berths 1 – 3 Rottnest Island	DBCA	Construct Only	<$2m	Rottnest, WA	2024		✓	✓	✓	✓		✓
Finger Jetty Replacement	Kailis	Design & Construct	<$1m	Fremantle, WA	2024	✓	✓	✓	✓			
Nornalup Boat Ramp & Monastery Landing	DBCA	Design & Construct	>$1m	Nornalup, WA	2024	✓	✓	✓	✓	✓		
Fremantle Sailing Club Service Jetty Replacement	FSC	Construct Only	>$1m	Fremantle, WA	2021		✓	✓	✓	✓		✓
Bandy Creek Boat Harbour	Ventia	Construct Only	>$1m	Esperance, WA	2025		✓	✓	✓	✓		
Coffs Harbour International Marina	CHIM	Design & Construct	>$8m	Coffs Harbour, NSW	2024	✓	✓	✓	✓	✓	✓	✓
Sanctuary Cove International Marina	Mulpha	Design & Construct	>$5m	Sanctuary Cove, QLD	2020	✓	✓	✓	✓	✓	✓	✓
Inner Harbour Jetty Replacement	Freo Ports	Construct Only	<$3m	Fremantle, WA	Current		✓	✓	✓			✓

4. KEY PERSONNEL

JMC is driven by young, motivated and experienced marine and construction personnel.

Civil marine construction is a highly specialised industry, where knowledge is gained through experience. To ensure this knowledge and experience is retained, JMC has implemented an employee ownership model.

Duncan, Gavin, Seb and Leigh all have been given ownership interest within JMC in recognition of their motivation, dedication and experience. All of the aforementioned employees will be directly involved in the design, construction, WHSEQ and contract management.

The below table outlines the project management team that will be responsible for the delivery of the Jetty F replacement should JMC be successful in this ECI process. CVs for Michael, Duncan, Jonathan and Gavin are provided at **Appendix 1-4**. All other CVs available upon request.

Company Position	Name	Project Role	Project Responsibilities
Managing Director	Michael Sier		• Governance • Project oversight
Executive Director	Duncan Parsons	Project Supervisor	• Provide strategic oversight and leadership for project delivery • Oversee site operations at a strategic level and ensure efficient allocation of resources • Coordinate communication between stakeholders and project teams • Ensure compliance with contractual requirements, standards, and specifications • Monitor overall site safety, environmental, and quality management performance • Review and approve project reports and documentation
Project Director	Jonathan Roberts	Project Manager/Engineer	• Manage project engineering activities and technical delivery • Liaise with clients, subcontractors, and suppliers to ensure alignment • Develop and maintain project schedules and budgets • Direct and coordinate daily resources, subcontractors, and technical personnel • Implement and maintain adherence to quality, safety, and environmental standards on site • Overall project leadership

Marine and HSEQ Manager	Gavin Byrne	Project HSEQ Manager	• HSEQ system implementation • Site inductions and audit • Safety and environmental compliance • Incident reporting & investigation • Regulatory and ISO alignment • Promote safety culture
Financial Controller	Anton Ramli	Contract Management	• Legal • Finance • Contract management
Commercial Manager	Luke Sier	Contract Management	• Legal • Contract management
Construction Manager	Seb Cook	Site Supervisor	• Day-to-day site supervision • Coordination of crews and plant • Compliance with plans/specs • Site safety monitoring • Quality and environmental checks • Daily reporting • Permits to work
Supervisor	Leigh Hammond	Site Supervisor	• Day-to-day site supervision • Coordination of crews and plant • Compliance with plans/specs • Site safety monitoring • Quality and environmental checks • Daily reporting • Permits to work
Supervisor	Wes Cross	Site Supervisor	• Day-to-day site supervision • Coordination of crews and plant • Compliance with plans/specs • Site safety monitoring • Quality and environmental checks • Daily reporting • Permits to work
Leading Hand	Jourdin Harwood	Leading Hand	• Safety checks and site organisation
Leading Hand	Jeremy Elliott	Leading Hand	• Safety checks and site organisation

Table 1

5. PLANT AND EQUIPMENT

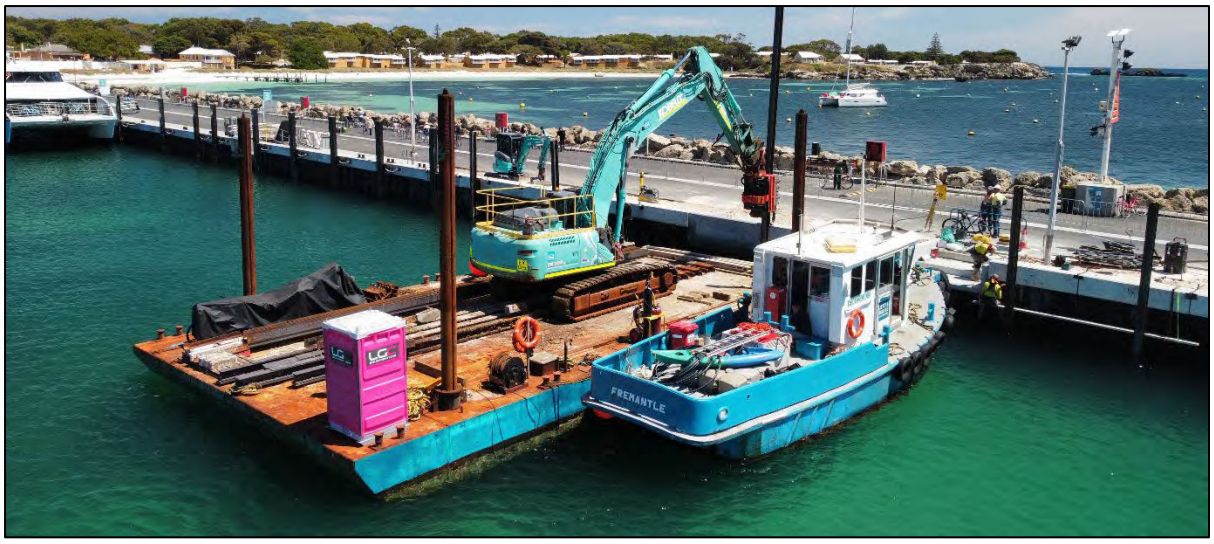
JMC own all of the marine and construction assets required to deliver the replacement of F Jetty. Our employees have years of experience in operating all of our assets within the Swan River.

The primary assets JMC will utilise for this project are listed on the following pages.

JMC's full list of assets can be found in the Asset Overview attached at **Appendix 5**

5.1 MARINE ASSETS

5.1.1 B24 – CONSTRUCTION BARGE



The B24 provides a stable platform for marine piling and demolition operations.

With the ability to carry JMC's excavator and crane, the B24 will be used for the demolition of the existing structure as well as piling.

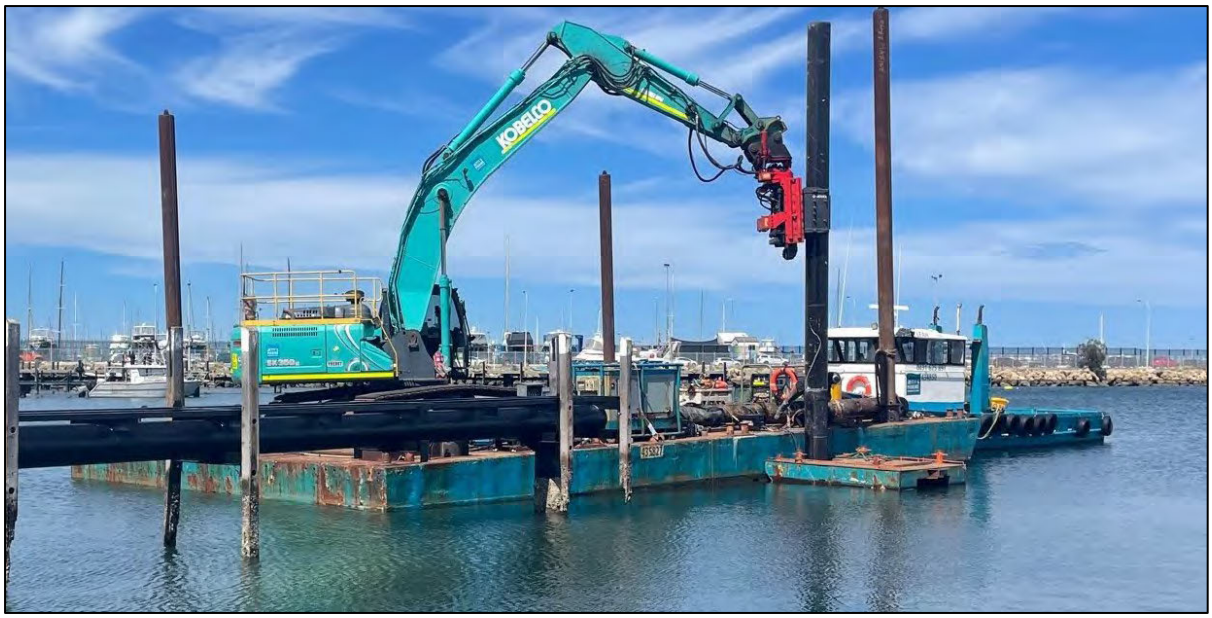
5.1.2 SHAW II – CONSTRUCTION BARGE

The Shaw II shares similar capabilities to the B24 and will be utilised if the B24 is unavailable.

The Shaw II and B24 will be supported by the Leah and Fortescue, JMC's dedicated tug vessels.

5.2 CONSTRUCTION ASSETS

5.2.1 35T EXCAVATOR



JMC own a 35t excavator which will be utilised for the installation of piles.

It is fitted with a Movax hydraulic, vibratory grip allowing it to seamlessly pick up piles and drive them.

We will also utilise the Movax for the removal of piles, to eliminate the need for divers.

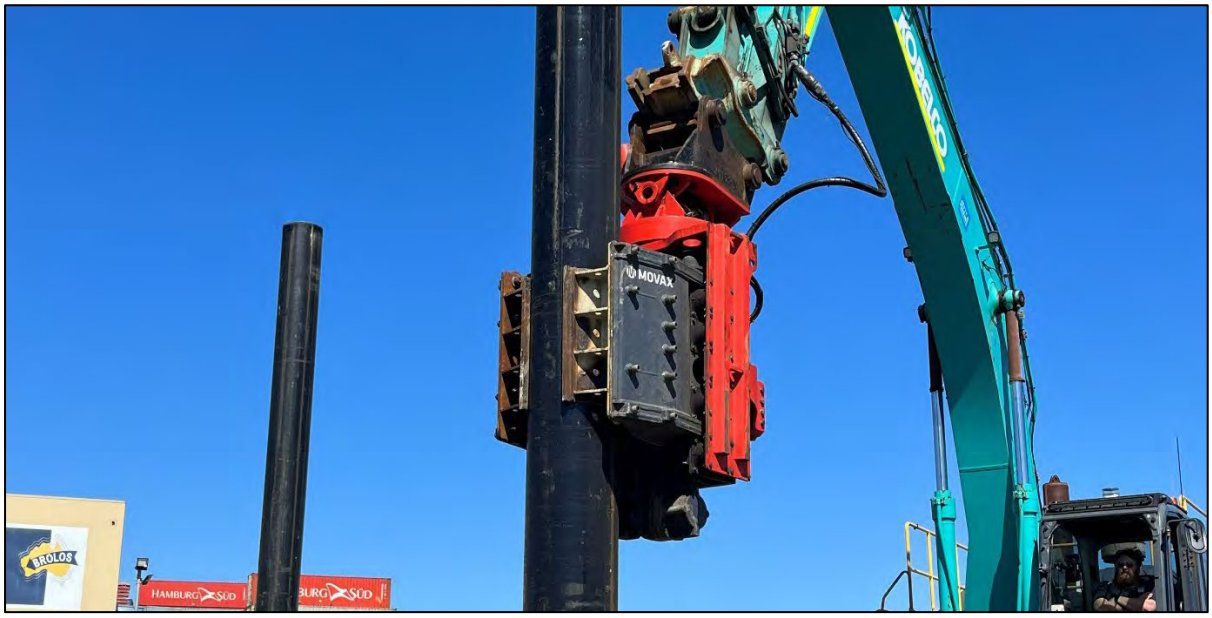
5.2.2 30T TADANO CRAWLER CRANE

JMC have a 30t crawler crane, which will be used for piling off the barges.

This crane will be barge mounted and used for the demolition of the existing jetty

5.2.3 MOVAX SG60

5.2.4 VIBRATORY PILING ATTACHMENT



JMC's 35t excavator is fitted with a state-of-the-art piling attachment which has the ability to pile both standard and raker piles up to four times as fast as conventional methods, with a far superior tolerance.

6. METHODOLOGY

6.1.1 PRELIMINARIES AND DESIGN

Design

The pontoon system will be **designed by Marine Structures**, leveraging their specialist expertise in marine infrastructure design and proven experience delivering durable floating systems across WA.

Marine Structures will finalise the overall pontoon layout, confirm how the pontoon connects to the piles and abutment, and ensure all features and components are coordinated so the system performs reliably in the local marine environment. All design work will be completed under established engineering and quality processes to ensure compliance with relevant standards and seamless transition into fabrication.

Procurement of materials and components:

Procurement of materials, including steel piles and materials required for the pontoon manufacturing.

Access Coordination with Yacht Club:

Early engagement with the yacht club and the Principal's Representative will confirm site access arrangements, working area boundaries, and the sequence of site delineation. This coordination will minimise disruption to public facilities and reduce impacts on use of adjacent areas, as much as reasonably practicable.

Site Boundary and Public Access Management:

To maintain access to the surrounding pens while the demolition of the concrete jetty is occurring demolition activities will be carefully managed to avoid disruption to recreational vessel users.

Implementation of HSEQ Controls:

All works will be undertaken in accordance with JMC's Health, Safety, Environmental and Quality (HSEQ) systems, including the approved Health and Safety Management Plan (HSMP) and Construction Environmental Management Plan (CEMP). Task-specific Safe Work Method Statements (SWMS) and risk assessments will be prepared for high-risk activities including barge operations, piling, lifting, and working over water.

Mobilisation of JMC Equipment, Materials, and Vessels:

JMC will mobilise all required plant and equipment to site, including the spudded barge *B24*, towed by JMC's tug *Leah*. Additional equipment, including our *35-tonne excavator, or Crane* and *piling attachments*, will also be mobilised to site. Mobilisation will be deemed complete once all major plant and equipment are on site, commissioned, and approved by the Principal's Representative.

6.1.2 DEMOLITION

Demolition works:

Demolition works will be carried out from JMC's spudded barge **B24**, which provides a safe and stable platform for marine based demolition.

Removal of Existing Services:

All services on the existing finger jetty will be removed by the client prior to possession of the site, allowing JMC to commence demolition on arrival.

Demolition Sequence and Site Access:

Demolition of the concrete jetty will commence from the Eastern end and progress inward toward the shore. The spudded barge ***B24***, will be positioned on the Southern side of the finger jetty during the demolition phase, maintaining access to the adjacent jetties surrounding throughout the works. This approach is designed to minimise disruption to public use and ensure ongoing access.

Removal of Concrete Decking:

The demolition will primarily be carried out from the water using ***JMC's 30-tonne Crane*** mounted on the ***B24***. Concrete panels will be removed and loaded onto the deck of the barge and then offloaded ashore for disposal.

Each deck panel will be inspected for defects before rigging is installed and a safe removal and rigging sequence set up. The panel will be lifted from the headstocks onto the barge ready for removal.

On shore a crane and truck to be deployed to remove the panel from the deck and remove from site to minimise material within the laydown and on the shore.

Headstocks

The concrete headstocks will be cut from the existing piles and rigged up to be lifted out via JMC's barge and crane.

These will be accumulated and removed form site for disposal.

Extraction of Existing Piles

Existing piles will be extracted using a vibratory hammer attachment, a proven method successfully applied on previous projects. This technique significantly reduces reliance on diver cutting, enhancing safety and cost efficiency. Additionally, by fully extracting the piles, the method ensures all below-ground material is completely removed, preventing any future impacts on subsequent works in the area.

Transport and Disposal of Materials:

All demolition waste to be transported to the local landfill facility.

JMC's preferred location for removal of waste is per the tender documents adjacent to jetty F on the shore.

On these days traffic management would be implemented with sufficient signage and cones to isolate the area. Only on the few days of loading out material would this be required and a majority of the work period would just be laydown for materials.

Waste management and environmental compliance:

Demolition activities will be executed under the provisions of the project's Construction and Environmental Management Plan (CEMP). This includes continuous monitoring and mitigation of environmental impacts, as well as adherence to waste handling and marine protection requirements.

6.1.3 PILE AND HDPE INSTALLATION

Piles will be delivered and installed immediately following demolition. All pile orders will be ordered in line with JMC quality procedures ensuring full quality control and adherence to design specifications prior to delivery to site.

All works will be carried out from the water using JMC's spudded barge, providing a stable and safe platform for lifting, positioning, and securing piles for install. Materials will be staged efficiently on the barge or at JMC's Rous Head facility, allowing piles fabricated components to be transferred to the work area with minimal public interface.

- **Initial Placement**
  - Full 12m piles will be transported via barge from JMC's Rous Head facility.
  - Piles will be lifted and pitched into position using the Movax SG60 attachment on 35T excavator mounted on the B24 spudded barge.
- **Pile Driving Procedure**
  - Vibratory hammer is activated to gradually drive the pile vertically into the seabed.
  - Driving continues in controlled stages, monitoring vibration and verticality to minimise soil disturbance.
  - Deck crew ensures pile remains aligned and level during the driving process.
  - Driving stops periodically for survey checks to confirm verticality and position before continuing to final embedment depth.
- **Stabilisation and Alignment**
  - Spudded B24 stabilises the barge sufficiently to ensure accurate installation.
  - Movax SG-60 and excavator have superior ability to align piles to meet tolerances required.
- **Coating Protection**
  - JMC design proposal is to use fully sealed HDPE sleeves in tandem with the pontoon system
- **Survey and Verification**
  - Pre-driving survey to mark exact pile location.
  - Continuous monitoring during pitching and driving.
  - Post-driving survey to verify verticality, elevation, and location.
- **Pile Performance Testing**
  - PDA testing conducted to confirm pile embedment.
- **Safety and Access**
  - Safe access for deck crew during lifting, rigging, and driving.
  - Clear communication between crane operator, deck crew, and surveyor.
- **Documentation / Records**
  - Survey logs, PDA results, driving records, and coating inspection notes.

6.1.4 PONTOON AND ABUTMENT

All components of the floating pontoon system will be installed by JMC's experienced marine crew using **JMC owned barge mounted plant and equipment**. employing industry standard piling and marine construction methods to ensure precise, efficient, and safe installation.

All floating pontoon system components will be installed by JMC's marine crew using barge mounted plant and equipment, including vibratory and/or impact piling methods.

Abutment Installation

- Formwork and reinforcing to be installed in the abutment location ready for pour.
- Inspection for quality line and level to be carried out.
- Concrete to be poured form the shore using a concrete pump.
- After curing formwork to be stripped and concrete inspected for defects.

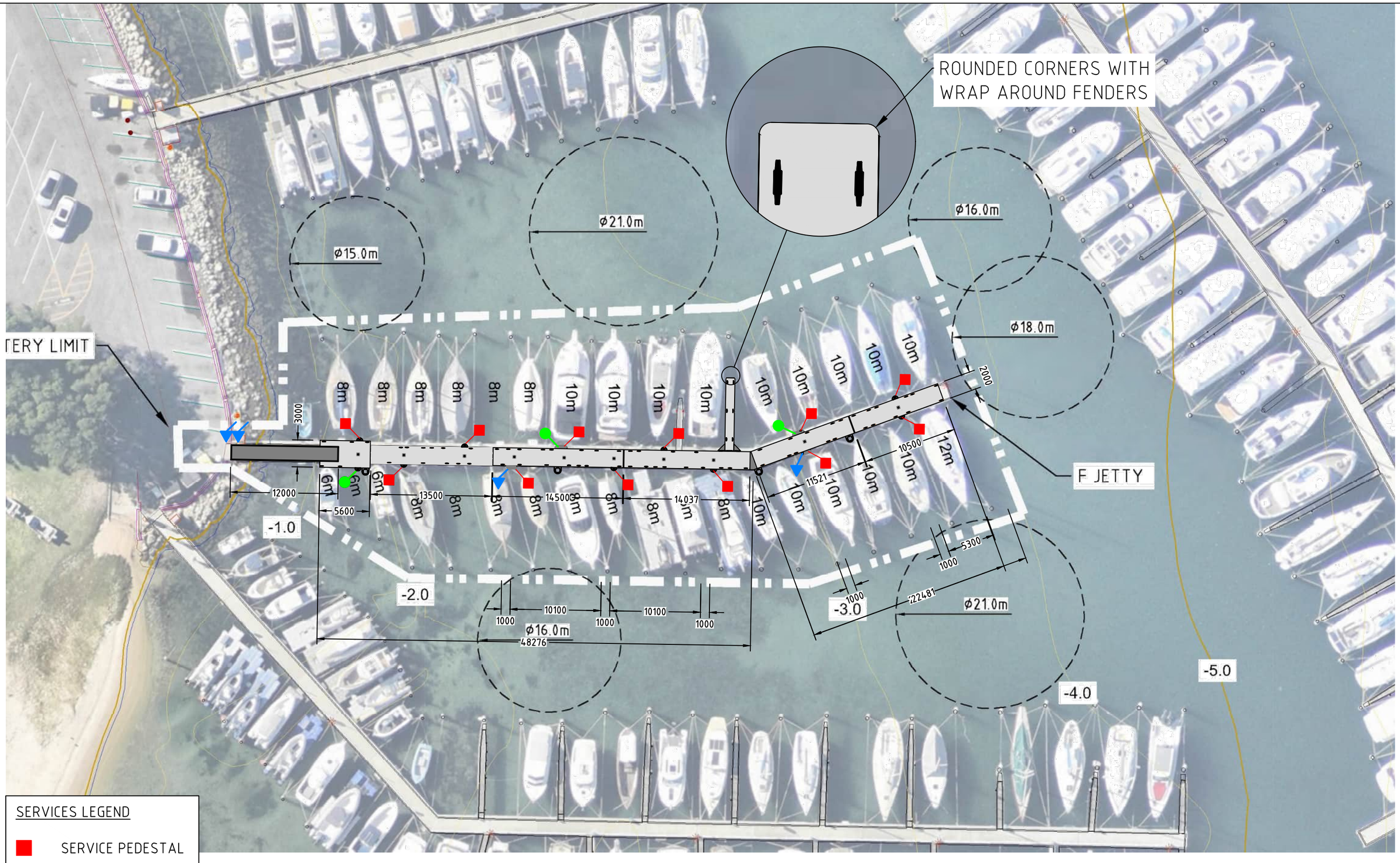
Delivery of new Pontoons

- Pontoons will be delivered via truck and loaded into the site.
- Pontoons will be lowered into the water not to disrupt the onshore public activities.
- Each pontoon will be towed into position and the associated connections to the piles installed and secured.
- Gangway and connections to the abutment will be installed and checked.
- Final ladders and cleats installed ready for final checks.
- Service pedestals will have 4 x 15A GPOs each to ensure all vessels in the current arrangement have power – there will be ample GPO connections in the final layout supplied by client.
- 10m finger to stabilise walkway will be reused at the base of the jetty in the future design

Quality Verification

Completion of all site inspections of steel and concrete elements for compliance with specifications

7. DRAWINGS



SERVICES LEGEND

- SERVICE PEDESTAL
- FIRE HOSE REEL
- FIRE HYDRANT

NOTE:
WHEN NO FINGER PONTOONS ARE INSTALLED, ALL SERVICES ARE TO BE FITTED ONTO EXTERNAL ALUMINIUM BRACKETS.

TENDER DRAFT

REV	DESCRIPTION	DRN BY	DATE	APPD
A	TENDER DRAFT	DG	8/12/25	

ProjexPartners
PROJECT MANAGEMENT | ENGINEERING | PLANNING
CHKD R.P.E.Q. DATE:

MARINE STRUCTURES
1300 128 164 www.marinestructures.com.au info@marinetructures.com.au

CLIENT: ROYAL FRESHWATER BAY YACHT CLUB
PEPPERMINT GROVE
WESTERN AUSTRALIA

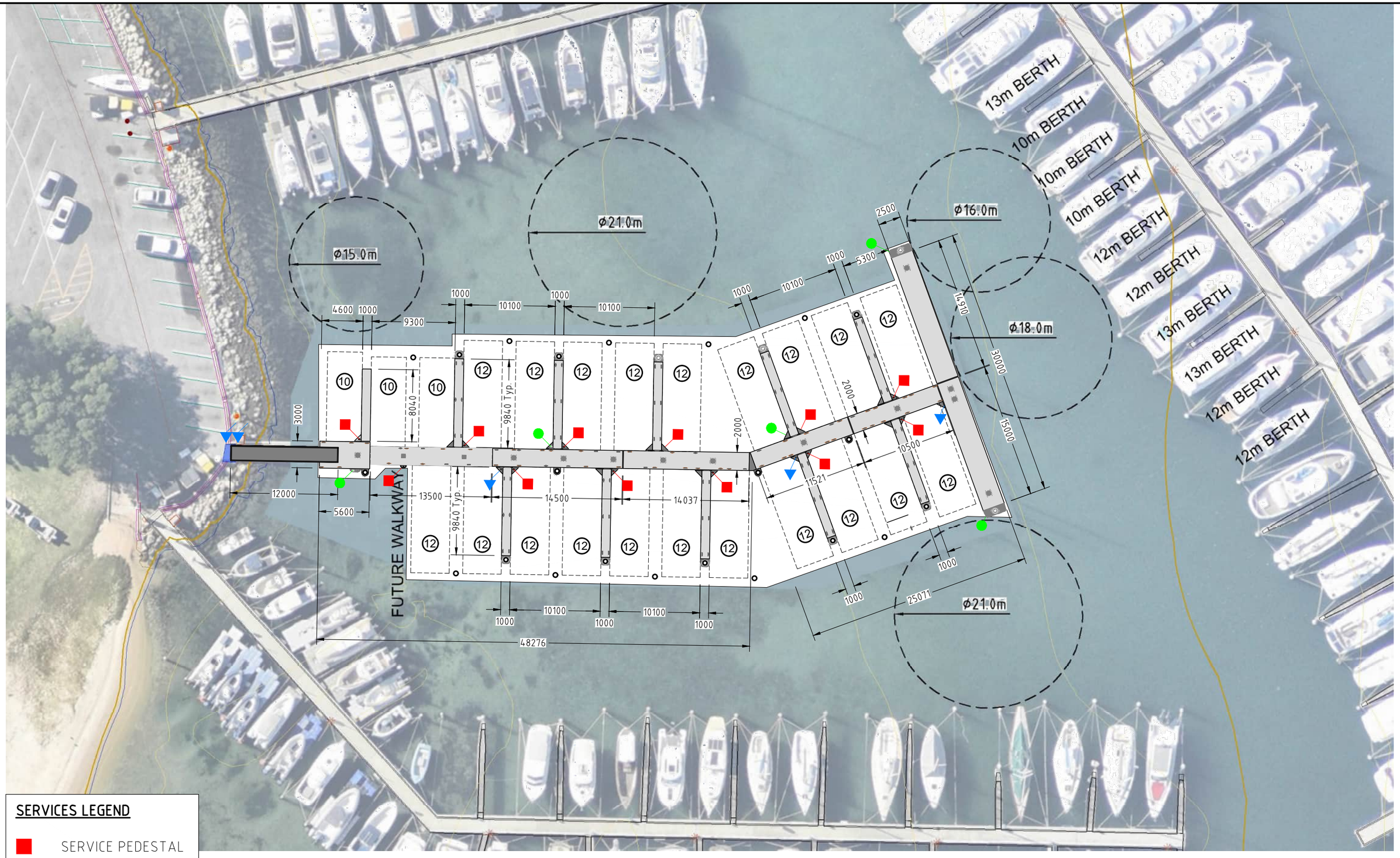
PROJECT: F-ARM REPLACEMENT

TITLE: GENERAL ARRANGEMENT
FINGER PONTOONS OMITTED

SHEET SIZE: A3
SHEET:

DRAWING No: QX1642-D01

REV: A



SERVICES LEGEND

- SERVICE PEDESTAL
- FIRE HOSE REEL
- FIRE HYDRANT

TENDER DRAFT

REV	DESCRIPTION	DRN BY	DATE	APPD
E	TENDER DRAFT	DG	8/12/25	

ProjexPartners
PROJECT MANAGEMENT | ENGINEERING | PLANNING
CHKD R.P.E.Q. DATE:

MARINE STRUCTURES
1300 128 164 www.marinestructures.com.au info@marinestructures.com.au

CLIENT: ROYAL FRESHWATER BAY YACHT CLUB
PEPPERMINT GROVE
WESTERN AUSTRALIA

PROJECT: F-ARM REPLACEMENT

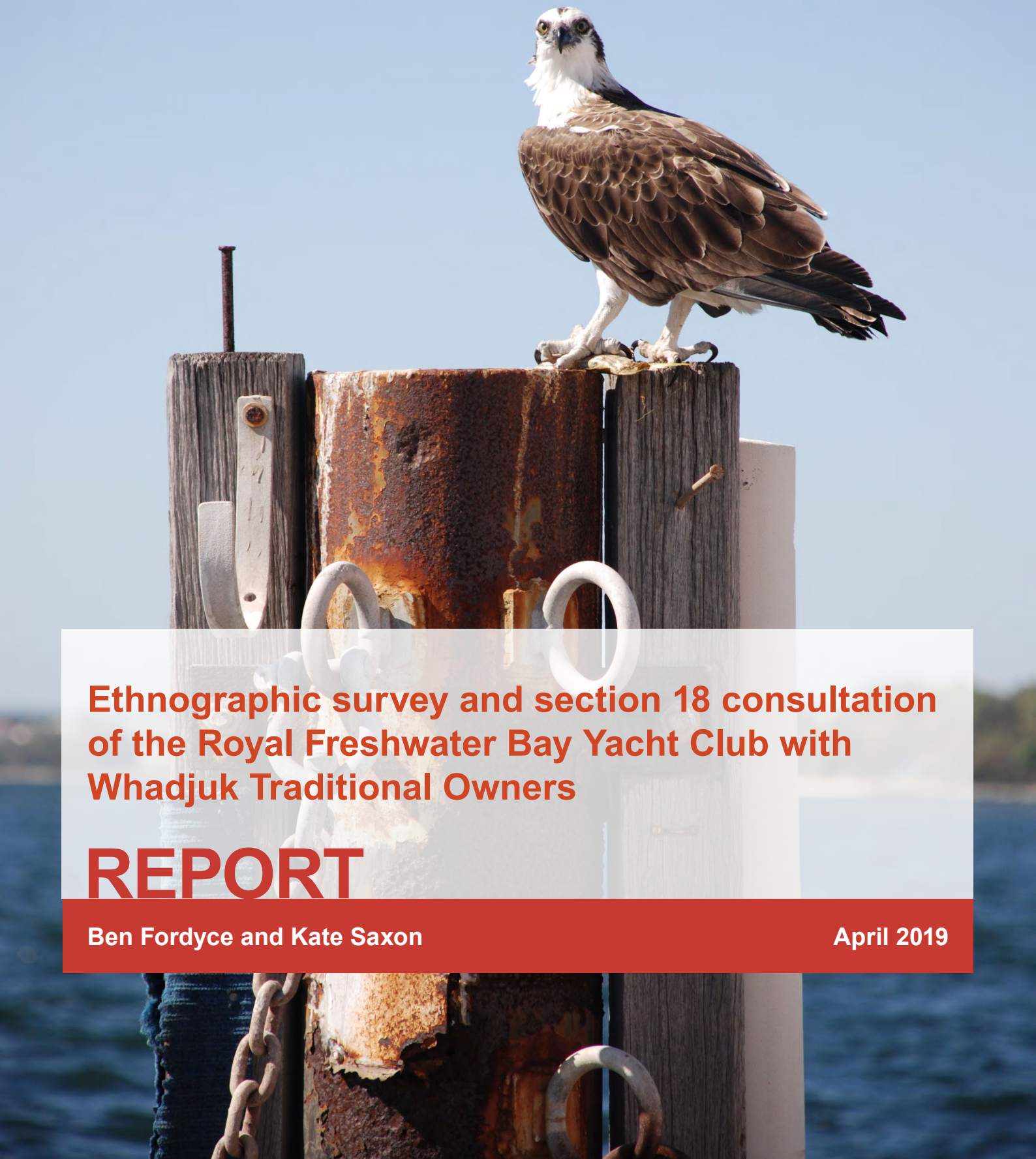
TITLE: GENERAL ARRANGEMENT
FINGER PONTOONS INCLUDED

SHEET SIZE: A3
SHEET:

DRAWING No: QX1642-D02

REV: E

TERRA ROSA
CONSULTING



Ethnographic survey and section 18 consultation of the Royal Freshwater Bay Yacht Club with Whadjuk Traditional Owners

REPORT

Ben Fordyce and Kate Saxon

April 2019

Acknowledgement of Country

Terra Rosa acknowledge the Whadjuk Noongar people, who are the Traditional Custodians of the Country described in this document.

We pay our respects to their Elders past, present, and emerging, and to their continuing cultural and spiritual connections to their lands.

https://www.reconciliation.org.au/

TRCo ref
WK1901

Ethnographic site identification and section 18 consultation

Royal Freshwater Bay Yacht Club Section 18 Area

Survey date

09 April 2019

EXECUTIVE SUMMARY

Heritage Link on behalf of the Royal Freshwater Bay Yacht Club (RFBYC) commissioned Terra Rosa Consulting (Terra Rosa) to undertake an ethnographic site identification heritage survey and section 18 consultation over areas planned for development within the Whadjuk People native title claim (WC2011/009).

The survey was undertaken on 9 April 2019 by eight Whadjuk representatives and a heritage consultant from Terra Rosa. One representative from Heritage Link, four RFBYC representatives and two Terra Rosa interns were also present during this time to support the survey team and provide logistical support.

The summarised survey results of the scope of works (SOW) are as follows:

Royal Freshwater Bay Yacht Club Section 18 Area – complete

- One Department of Planning, Lands and Heritage (DPLH) registered site (DPLH ID 3536: Swan River) was located within the survey area;
- No DPLH other heritage places (OHPs) exist within the survey area;
- No new heritage places were identified; and
- No isolated artefacts were documented.

Based on the results of the survey and consultation with the Traditional Owners, the following recommendations are made:

1 Whadjuk Traditional Owners request that SWALSC approved monitors are present during all work undertaken at the site.

2 The Whadjuk Traditional Owners advise that they are satisfied with the RFBYC's proposed method for the replacement of timber pylons.

3 Whadjuk Traditional Owners request that a silt curtain is installed around all work areas to prevent water disturbance during pylon replacement.

4 Whadjuk Traditional Owners request that cultural awareness training is provided to all yacht club executives, members, and contracted workers.

5 The Whadjuk Traditional Owners request that recognition of the local Aboriginal history be integrated into a foyer display and included in the RFBYC's history book.

6 The Whadjuk Traditional Owners request that a cultural welcome to Country and sand throwing ceremony is integrated into key RFBYC events, such as the annual launching of the fleet.

CONTENTS

PROJECT INTRODUCTION

The Royal Freshwater Bay Yacht Club (RFBYC) intend to use land within the Whadjuk native title claim area (WC2011/009) to undertake two projects; the Jetty C Replacement Plan and the Future Timber Pylon Replacement Plan.

In order to meet their requirements under the *Aboriginal Heritage Act 1972 (WA)* (the Act), RFBYC commissioned an ethnographic site identification heritage consultation over the areas planned for development. These are detailed in scope of works (SOW) attached in Appendix C.

Concurrently, RFBYC are lodging an application under Regulation 10 of the Act to replace five pylons that are at an advanced state of disrepair in the interest of public safety.

RFBYC's project area is located within the Swan River (DPLH ID 3536) adjacent to Keanes Point Reserve in the suburb of Peppermint Grove (see map 1 below).

Survey participants

The heritage survey was conducted on

9 April 2019

by 8 Whadjuk representatives, 3 Terra Rosa consultants, and 4 RFBYC representatives.

As the representative for the Whadjuk Traditional Owners, South West Aboriginal Land and Sea Council (SWALSC) were consulted by the proponent representative (Heritage Link) to provide preliminary feedback on the project and nominate appropriate survey participants. Terra Rosa Consulting (Terra Rosa) were engaged by Heritage Link on behalf of RFBYC to conduct an ethnographic survey and section 18 consultation of the area requested in the SOW.

The heritage survey was carried out by the following people on 9 April 2019:

Whadjuk Traditional Owners

- Garry Bennell
- Gloria Bennell
- Jennifer Garlett
- Doris Getta
- Cheryl Martin
- Greg Ugle
- Theresa Walley
- Marlene Warrell

Terra Rosa Consulting

- Ben Fordyce (Heritage consultant)
- Ava Mandal (Heritage consultant intern)
- Genevieve Kan (Heritage consultant intern)

Royal Freshwater Bay Yacht Club

- Nathan Stronach (Bosun)
- Paul Bayliss (CEO)
- Gary McNally (Commodore)
- Tony Packer (General Committee Member)
- Patricia Edwards (Heritage Link)

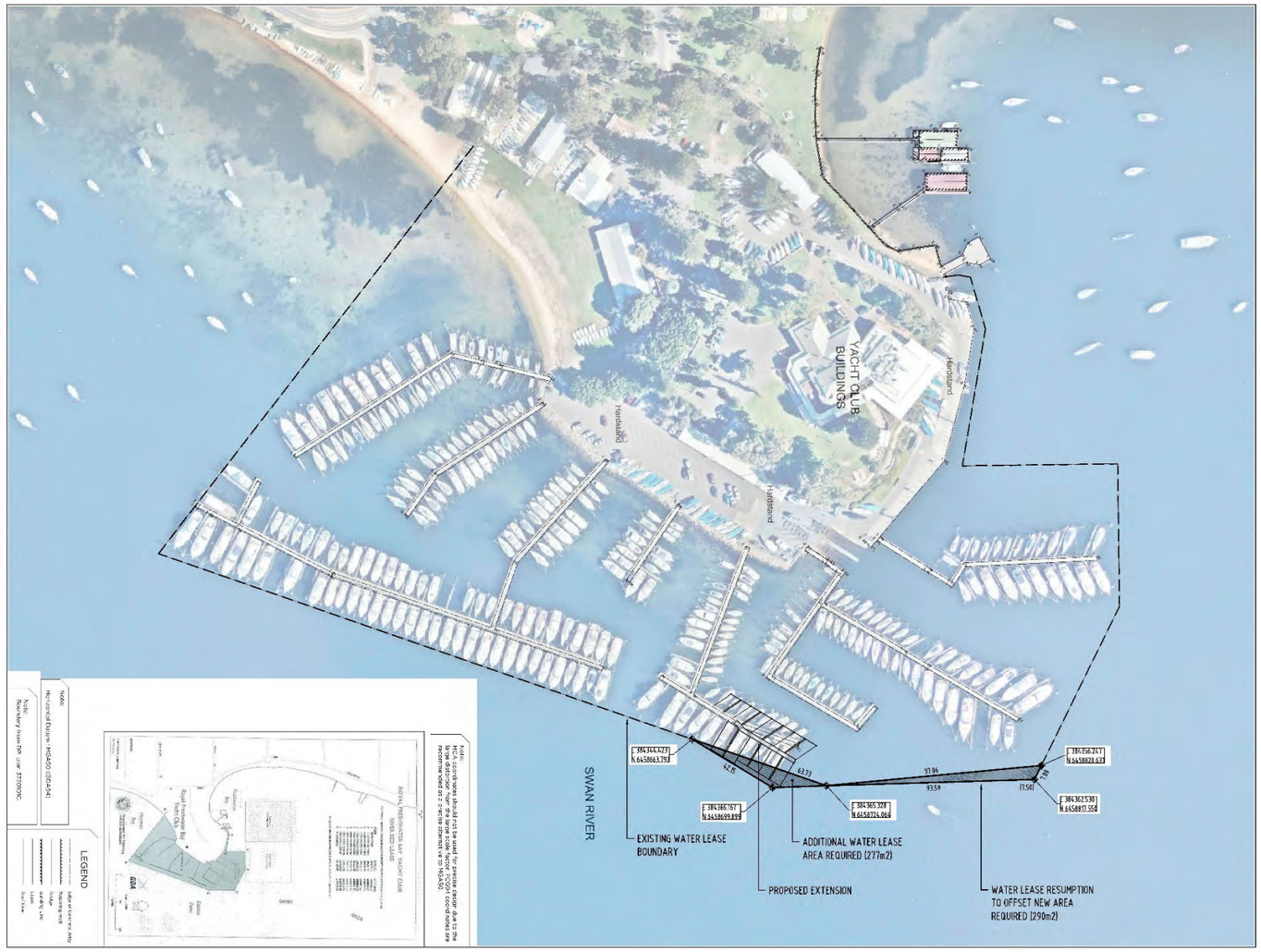
The Whadjuk participants were selected by SWALSC as the appropriate knowledge holders for the survey area and consented to participate in the heritage survey.

Contact details for the survey participants are provided in Appendix A of this report.

Right: *The survey team inspecting the area.*

Below: *Swans at RFBYC*

Map 1: Heritage survey overview map provided by RFBYC



NOTES:

1. ALL COORDINATES ARE TO MGA 94 GRID 50
2. ALL DIMENSIONS IN METRES UNLESS NOTED OTHERWISE.
3. WATER LEASE BOUNDARY FROM DPI PLAN 372010IC

PLAN
SCALE 1:1000

When sheet printed full size, the scale bar is 100mm.
0 50 100mm

ISSUED FOR APPROVAL
NOT FOR CONSTRUCTION

REV.	DATE	DESCRIPTION	DRAFT	ENG.	CHKD
A	19.06.18	ISSUED FOR REVIEW	RP	ND	ND
B	21.08.18	ISSUED FOR REVIEW	RP	ND	ND
C	01.11.18	ISSUED FOR TENDER	LV	ND	ND
D	23.11.18	ISSUED FOR APPROVAL	LV	ND	ND
E	02.04.19	ISSUED FOR APPROVAL	LV	ND	ND

WGA
WALLBRIDGE GILBERT AZTEC
Lvl 1 66 Kings park Rd, West Perth
Western Australia 6005
Telephone 08 6336 6626
Email perth@wga.com.au

ROYAL FRESHWATER BAY YACHT CLUB
PEPPERMINT GROVE
SWAN RIVER
WATER LEASE LAND SWAP

A1 | DRAWING NUMBER | Job Number | Sheet No. | Rev.
Design ND | Drawn RP | PER170761 | ST-02 | E

Whadjuk people

WC2011/009

Major towns

Perth

Key waterways

Swan River

Canning River

WHADJUK COUNTRY

The Whadjuk People native title application (WC2011/009) is in the Southwest region and includes the Perth metropolitan area and Fremantle. The claim is bordered to the north by the Yued, to the east by the Ballardong People and to the south by the Gnaala Karla Booja. It sits within the Swan Coastal Plain bioregion that runs from the city of Perth to Cape Naturaliste in the south. The primary geographic feature of this bioregion is the Swan River and prior to European settlement, the coastal plain comprised a series of freshwater wetlands.

The Swan and Canning Rivers hold great significance to the Noongar people, as they are believed to have been created by the rainbow serpent or Waugal, a dreamtime being in the form of a giant snake. In the dreamtime story the Waugal created creeks, waterholes, lakes and valleys on its journey to the ocean from Mt Eliza, including the Swan River (Hughes-Hallett 2010: 4, 11). Waugal are inherently linked to the Dreamtime responsible for creating the landscape and water sources (Shaw & Martin 2011: 53). Permanent water sources continue to be of high cultural importance, indicating the health of country, which in turn reflects the health of culture (Barber & Jackson 2011).

The significance of the Swan River is reflected in the ongoing visitation and association with the river system by Noongar people, whose physical and spiritual wellbeing is viewed as being directly linked to such water sources. Hughes-Hallett (2010: 13) notes that, “the condition of the rivers is directly related to the well-being of the Waugal, and both are interconnected with the health and well-being of Noongar cultural identity. It is thought that if the Waugal leaves or is killed, then the rivers and other water features with which it is connected will dry up, subsequently the processes of rejuvenation, with which it is linked, will cease to occur”.

The knowledge and use of various plants and animals by the Noongar people that occupy the region is indicative of the inherent ongoing connection they have to country. Reflecting the importance to the health, safety and survival of the Noongar people and their

environment, people, water, plants and animals form part of the order of all forms of cultural and spiritual life (Nannup 2011).

There are many important places in Whadjuk country where the Traditional Owners practice their traditional knowledge and ceremonies as well as to identify and navigate boundaries with neighbouring language groups. The term ‘Aboriginal site’ is used to identify places of importance and significance to Aboriginal people. This is based on the tangible and / or intangible cultural and heritage values contained within. Identified sites on country, based on the register of sites held by the DPLH (2019), include:

- Mythological sites associated with stories and songs;
- Ceremonial sites, including Law Grounds;
- Burial and birthing places;
- Domestic camping and hunting sites (characterised by artefact scatters, rockshelters containing cultural materials, grinding patches, modified trees, hunting hides, and storage places / walled niches);
- Historical sites associated with the post-European Colonisation period.

Whadjuk country has been inhabited for a considerable period of time; the Upper Swan Bridge camping ground has been dated to 38,000 years BP (Pearce & Barbetti 1981). Prior to European settlement, the coastal plain comprised a series of freshwater wetlands the majority of which have been drained, filled or cleared since 1832. Two freshwater wetlands remain: Lake Monger and Herdsman Lake, which are of special significance to the Whadjuk Traditional Owners. Resources were often accessed via known tracks, concentrated on connecting permanent water sources. One such track went from Perth and followed the northern side of the river (through the modern suburb of Peppermint Grove) to North Fremantle, where it crossed the river and continued on to Bibra Lake. These crossings were used primarily in summer when the fish were in abundance and could be easily caught (Hughes-Hallett 2010: 11).

PROJECT METHOD

The ethnographic heritage survey of the Royal Freshwater Bay Yacht Club Section 18 Area was conducted to a site identification standard in accordance with section 18 (s18) requirements, and to satisfy obligations outlined in the heritage agreement relevant to the project. The aims of a site identification survey are to:

Site identification surveys aim to record any identified sites to a standard that enables the ACMC to make a fair assessment of them under sections 5 and 39 the Act.

1. identify Aboriginal sites (as defined under s5 of the Act) within the requested survey area
2. document the heritage values of the site comprehensively enough to provide the Department of Planning, Lands and Heritage (DPLH) and the Aboriginal Cultural Materials Committee (ACMC) with a fair understanding of the site's importance and significance under s5 and s39 of the Act; and
3. provide RFBYC with relevant and informed heritage management recommendations for heritage values identified within the requested survey area.

Legislation

Aboriginal Heritage Act 1972

Under section 17 (s17) of the Act, it is an offence to disturb an Aboriginal site without prior written Ministerial consent to do so under s16 or s18 of the Act. This applies regardless of whether an Aboriginal site is registered. Heritage assessments of proposed development areas are conducted to identify the location and extent of sites so that they can be appropriately managed in accordance with the legislative requirements of the Act.

A full copy of the Act can be accessed online.

Desktop method

Registered Aboriginal sites are heritage places that have been assessed by the ACMC as constituting **sites** under sections 5 and 39 of the Act.

Other heritage places include places for which data has been **lodged** with the DPLH but are pending assessment by the ACMC, and places that have already been assessed by the ACMC as not constituting an Aboriginal site under the meaning of the Act (listed as **stored data / not a site**).

A desktop assessment was completed before the start of the field survey to understand the extent of heritage research undertaken to date within the survey area. This research relies largely on the Register of Sites maintained by the DPLH, which is a catalogue of heritage places previously recorded within the area and submitted to the DPLH.

Before the start of the field work the scoped survey area was entered into the DPLH's Aboriginal Heritage Inquiry System (AHIS) to learn whether any heritage surveys have previously been conducted and whether any registered Aboriginal sites or other heritage places (OHPs) exist in the area.

After the AHIS search has been completed, relevant site files and survey reports were requested from the DPLH for review. The site files were reviewed and summarised to provide the survey team with an understanding of the cultural landscape context of the survey area.

Survey method

Prior to the heritage survey, RFBYC and Heritage Link presented a brief regarding their regulation 10 application and proposed section 18 application consultation to the SWALSC working group. The outcomes of this initial consultation informed the project discussion with the Whadjuk Traditional Owners present during the heritage survey, with information about the purpose, scope, and proposed method of the heritage survey presented again on the day.

The proposed survey method was approved by the Whadjuk Traditional Owners present and the initial concerns raised by the working group were re-iterated and discussed.

After the project briefing, an inspection of the proposed work area was undertaken by the heritage survey team.

RFBYC representative and Whadjuk Traditional Owners in consultation on Jetty C

At the end of the site inspection, a debrief was conducted to discuss the results of the heritage survey, and to offer the Traditional Owners an opportunity to provide additional comments on proposed impact to the Swan River, the effectiveness of the survey methods used, and provide their recommendations for the management of cultural heritage values in the area.

Report review

A draft version of this report was reviewed by SWALSC concurrently with it being provided to Heritage Link. This review ensures that culturally sensitive information is appropriately indicated, and that the recommendations provided are made in accordance with any existing agreements between SWALSC and the proponent. This

process also provides Terra Rosa with feedback from both the proponent and SWALSC, which is considered during the final edit of the report.

SURVEY OUTCOMES

The site identification of RFBYC section 18 Application Area is complete.

The complete results of the desktop and field survey for the survey area is presented in the following table and illustrated in the following map. These results are further discussed below.

Summary of the desktop and heritage survey results

Survey area	Survey standard	Survey status	DPLH Registered Aboriginal sites	DPLH OHPs	Potential sites / Heritage sites	Isolated artefacts	Notes
RFBYC – Jetty C	Site Identification	Complete	DPLH 3536 (Swan River)	None	None	None	Key Heritage Recommendations in results section below
RFBYC – Pylon Replacement	Site Identification	Complete	DPLH 3536 (Swan River)	None	None	None	Key Heritage Recommendations in results section below

Survey standard

Site Identification

Registered sites: 1

DPLH OHPs: 0

Potential Sites: 0

HRZs: 0

Isolated artefacts: 0

Consultation results

The RFBYC section 18 Area survey area was ethnographically assessed to site identification standard on 9 April 2019.

The survey area comprises the extent of the existing on-water portion of the RFBYC. This encompasses a total of seven jetties and 325 pens of varying sizes.

Within this project area, RFBYC intends to lodge two separate section 18 applications;

1. to undertake re-alignment works on Jetty C to meet Australian Design Standards for fairway width, which will involve the removal and replacement of up to 21 pylons; and

2. to undertake the ongoing replacement of deteriorating wooden pylons with longer-lasting metal pylons when they reach their effective end of life.

The two proposed section 18 applications (and concurrent regulation 10 application) were discussed with the survey team in the context of

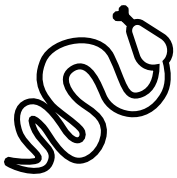
understanding any proposed physical impacts to the fabric of the Swan River (DPLH ID 3536) as well as impacts to the spiritual importance and significance of the registered site.

Jetty C consists of an ageing concrete jetty and associated boat pens, mounted on wooden support pylons. These wooden pylons will be replaced with metal pylons and the jetty alignment straightened to meet specified fairway requirements.

The wooden pylons earmarked for immediate (regulation 10) and future (section 18) replacement will be cut at the riverbed and then sleeved with a metal pylon. This new pylon is then driven into the riverbed to a depth where it is stable, dependant on the underlying geomorphology.

Several of these ageing pylons were inspected during the heritage survey as well as examples of the newer metal pylons.

During the survey, no new heritage places were identified and recorded, though the cultural significance of the broader Mosman Park and Peppermint Grove riverside was discussed.



The Wagyl (Waugal)

"A long time ago in the Dreaming, the animals and other being were huge. Two rainbow serpents called wagyls (maned, seal-faced creatures), left York and followed the Avon River down to Walyunga National Park, to where the river bends east.…

The wagyls continued on to Melville Waters and swam around, creating the huge bay. The female wagyl laid some eggs at the foot of Kings Park where Kennedy Fountain is today…

After separating and going underground to create the lakes to the north and south of the river, they got lonely and came back together again at Melville Waters…

They swam around together, so creating Crawley Bay, then followed the river down to Fremantle. There they lay in the sun creating a rock bar across the river…

Then the two serpents followed the river out from Fremantle, beyond Rottnest Island and back to the Dreaming".

From 'The Wagyl', courtesy of SW Regional TAFE – Aboriginal Tourism Centre.

DPLH ID 3536 - Swan River

As discussed in the background section above, the importance of the Swan River to the Whadjuk People is well documented and forms an integral part of their spiritual and cultural identity.

The entire Swan River (*Derbal Yerrigan)* is a mythological site of central heritage significance to the Whadjuk People. This mythological site is permanently registered on the DPLH register and its site file contains a substantial amount of ethnographic information as well as associated historical references.

This site includes the entire course of the Swan River with particular named locations being of greater importance and significance, arising from actions of the Waugal. The river is believed to be the track and the resting place of the Waugal, who not only created it but remains ever present within it as evidenced by the water flow.

The Waugal created the Swan River by making its way down the river, creating the bends at Belmont and Maylands before emerging through the Narrows into the Perth waterfront to create the large expanse of downstream water. The Waugal is also believed to have created permanent freshwater sources at places where it rested, and a number of these locations subsequently became important to Aboriginal people as centres for both secular and ritual trade and exchange (Vinnicombe 1989: 19; Bates 1985). The Swan River and its surrounding freshwater swamps and wetlands were important sources of both plant and animal food. Campsites are known to have been located near these seasonal food sources and along trade routes, law and corrobboree grounds.

Any proposed impact to the Swan River is viewed by the Whadjuk People as being of great concern, hence the importance ascribed by the current consultation.

Jetty C Replacement

The following concerns and requests were raised by the Whadjuk survey participants present during the heritage survey in relation to the realignment of Jetty C:

- The waters in and around Freshwater Bay are an important place to the Whadjuk People, both in the context of the Waugal cultural narrative but also as a traditional source of seasonal food resources and fresh water.

- The foreshore on both sides of the river were important meeting places and corrobboree grounds. Paperbark trees that used to grow near the yacht club were used to make bark canoes and people would float across the river.

- Silt curtains are to be used to minimise the impact of sediment raised during construction on the waters surrounding the yacht club.

- Existing timber pylons are to be retained where possible or cut at the base where replacement is necessary.

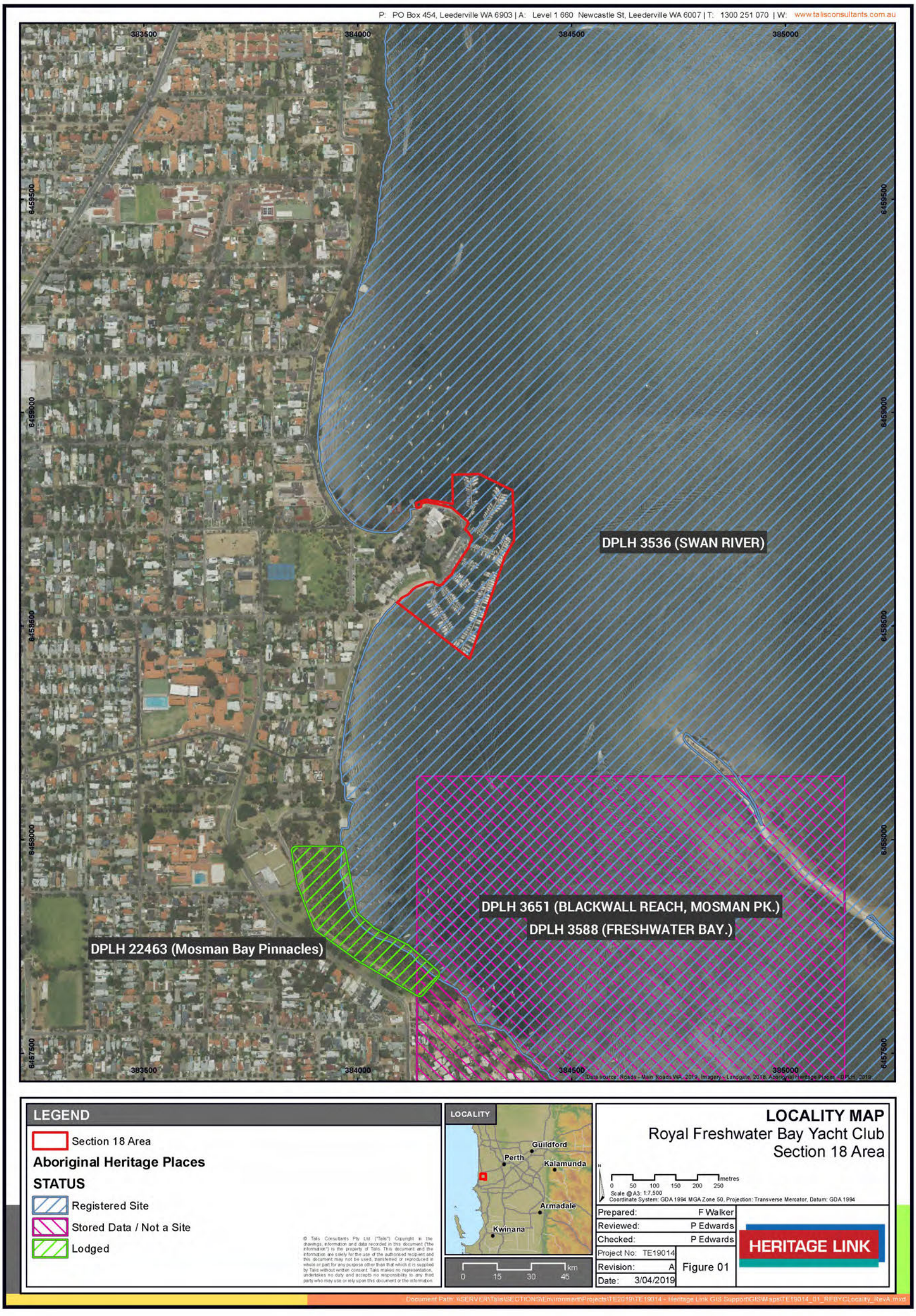
Future Timber Pylon Replacement

The following concerns and requests were raised by the Whadjuk survey participants present during the heritage survey in relation to the future replacement of timber pylons:

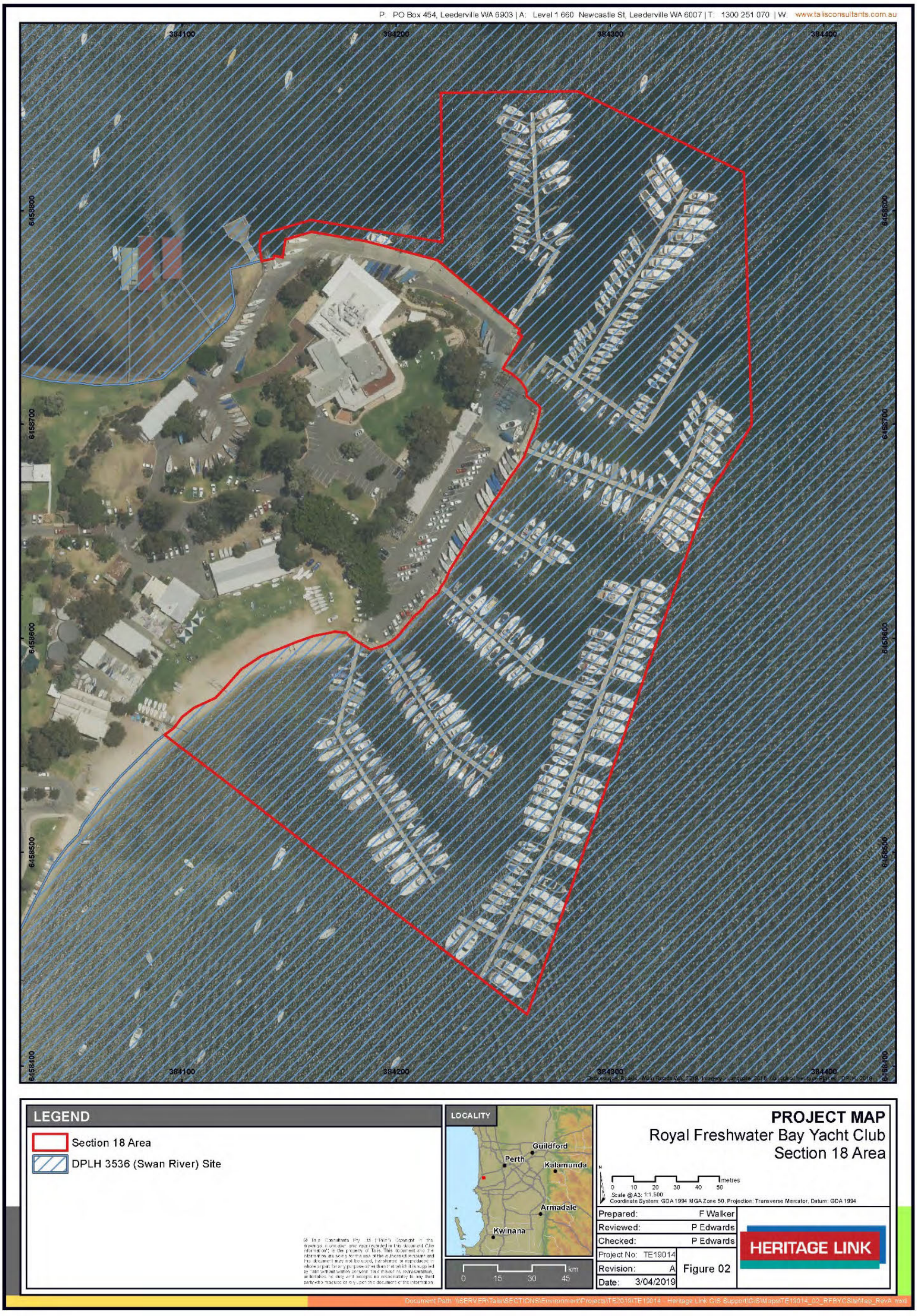
- Silt curtains are to be used to minimise the impact of sediment raised during pylon replacement work on the waters surrounding the yacht club.

- Existing timber pylons are to be cut at the base where replacement is necessary.

Map 2: RFBYC section 18 project area, showing DPLH sites and OHPs in its surrounds



Map 3: RFBYC section 18 consultation area showing the extent of DPLH ID 3536: Swan River



HERITAGE MANAGEMENT RECOMMENDATIONS

Based on the survey outcomes, Terra Rosa and the Whadjuk Traditional Owners have developed the following recommendations to assist RFBYC with the management of the identified cultural heritage values in the area.

1 **Whadjuk Traditional Owners request that SWALSC approved monitors are present during all work undertaken at the site.**

To ensure that impacts to the Swan River is minimised during the proposed works, the Whadjuk Traditional Owners advise that SWALSC approved monitors should be present during the realignment of Jetty C and the replacement of the timber pylons.

2 **The Whadjuk Traditional Owners advise that they are satisfied with the RFBYC's proposed method for the replacement of timber pylons.**

Whadjuk Traditional Owners agree with RFBYC's proposed method of wooden pylon replacement and request that this method is used when replacement commences.

3 **Whadjuk Traditional Owners request that a silt curtain is installed around all work areas to prevent water disturbance during pylon replacement.**

The Whadjuk Traditional Owners asserted the importance of the Swan River and have cultural obligations the to ensure that impacts to its flow is minimised. As such the Traditional Owners advise that a silt curtain must be used to limit the impact of raised sediment during the construction works of Jetty C and the replacement of the timber pylons.

4 **Whadjuk Traditional Owners request that cultural awareness training is provided to all yacht club executives, members, and contracted workers.**

To ensure that the cultural importance of the Swan River to Whadjuk People is communicated and understood, it is advised that cultural awareness training must be provided to all yacht club executives, members, and people contracted to

undertake the proposed development works. RFBYC is advised to liaise with SWALSC about facilitating the cultural awareness training.

The Traditional Owners also suggested that cultural inductions should be included in the club's onboarding process for new members.

5 **The Whadjuk Traditional Owners request that recognition of the local Aboriginal history is integrated into a foyer display and included in the RFBYC's history book.**

RFBYC is advised that the Whadjuk Traditional Owners request that recognition of local Aboriginal culture is integrated into the entry foyer of the yacht club, either in the form of a plaque or signage. They also said that information about Whadjuk history and association with the area should be included in the revised printing of the club history book to communicate the significance of the site to members of the RFBYC community.

6 **The Whadjuk Traditional Owners request that a cultural welcome to Country and sand throwing ceremony is integrated into key RFBYC events.**

it is recommended that RFBYC liaise with SWALSC to organise Welcome to Country and sand throwing ceremonies during all key future events organised, such as the annual launching of the fleet. These ceremonies are important in the ongoing recognition of the Whadjuk people as the caretakers of the Country on which the Yacht Club has been built.

BIBLIOGRAPHY

Australia ICOMOS 2013, *The Burra Charter: The Australia ICOMOS charter for places of cultural significance 2013*, viewed 12 April 2019, <http://australia.icomos.org/wp-content/uploads/The-Burra-Charter-2013-Adopted-31.10.2013.pdf>

Barber, M & Jackson, S 2011, *Indigenous water values and water planning in the upper Roper River, Northern Territory*, CSIRO: Water for a Healthy Country National Research Flagship

Commonwealth of Australia 2002, A*ustralian Natural Heritage Charter 2002*, 2nd edn, viewed 12 April 2019, <http://www.environment.gov.au/heritage/ahc/publications/commission/books/pubs/australian-natural-heritage-charter.pdf>

Commonwealth of Australia 2019, *Claimant summary – Whadjuk People*, viewed 12 April 2019, <http://www.nntt.gov.au/searchRegApps/NativeTitleClaims/Pages/details.aspx?NTDA_Fileno=WC2011/009>

Department of Planning, Lands and Heritage 2019, *Aboriginal Heritage Inquiry System*, viewed 12 April 2019, <http://maps.dia.wa.gov.au/AHIS2/>

Hughes-Hallett, D 2010, *Indigenous history of the Swan and Canning rivers,* paper prepared for Curtain University

Nannup, N 2011, 'Noel Nannup – A Nyoongar perspective on spirituality', *Youtube*, viewed 14 November 2016, <https://www.youtube.com/watch?v=2-k3WGOar_4>

Pearce, RH & Barbetti, M 1981. 'A 38,000-year-old archaeological site at Upper Swan, Western Australia', *Archaeology in Oceania*, *16*(3), pp.173-178.

Shaw, BC & Martin, J 2011, *Joan Martin (Yarrna): a Widi woman*, Aboriginal Studies Press, Acton, ACT

South West Land and Sea Council 2015b, viewed 14 November 2016, <http://www.noongar.org.au/noongar-people-history.php>

Legislation

Aboriginal and Torres Strait Islander Heritage Protection Act 1984 (Commonwealth of Australia), viewed 12 April 2019, <http://www.comlaw.gov.au/Details/C2010C00807>

Aboriginal Heritage Act 1972 (Western Australia), viewed 12 April 2019, <http://www.austlii.edu.au/au/legis/wa/consol_act/aha1972164/>

DPLH Registered Aboriginal Site and OHP files

DPLH ID 3536 – Swan River

APPENDICES

Appendix A – Project contacts

Appendix B - Acronyms and definitions

Appendix C – RFBYC SOW presentation to SWALSC

Appendix A – Project contacts

The contact details of the heritage project stakeholders are provided below. Terra Rosa thanks everyone involved with the heritage survey and its organisation.

Terra Rosa Consulting

Address	12/20 Sustainable Avenue, Bibra Lake, Western Australia 6163
Email	info@trco.com.au
Report authors	Kate Saxon and Ben Fordyce
Editor	Megan Tehnas
Executive sign-off	Scott Chisholm

Whadjuk Traditional Owners

Contact	South West Land and Sea Council
Address	Home Town Centre, 1490 Albany Highway Cannington, 6107 Western Australia

Proponent – Royal Freshwater Bay Yacht Club

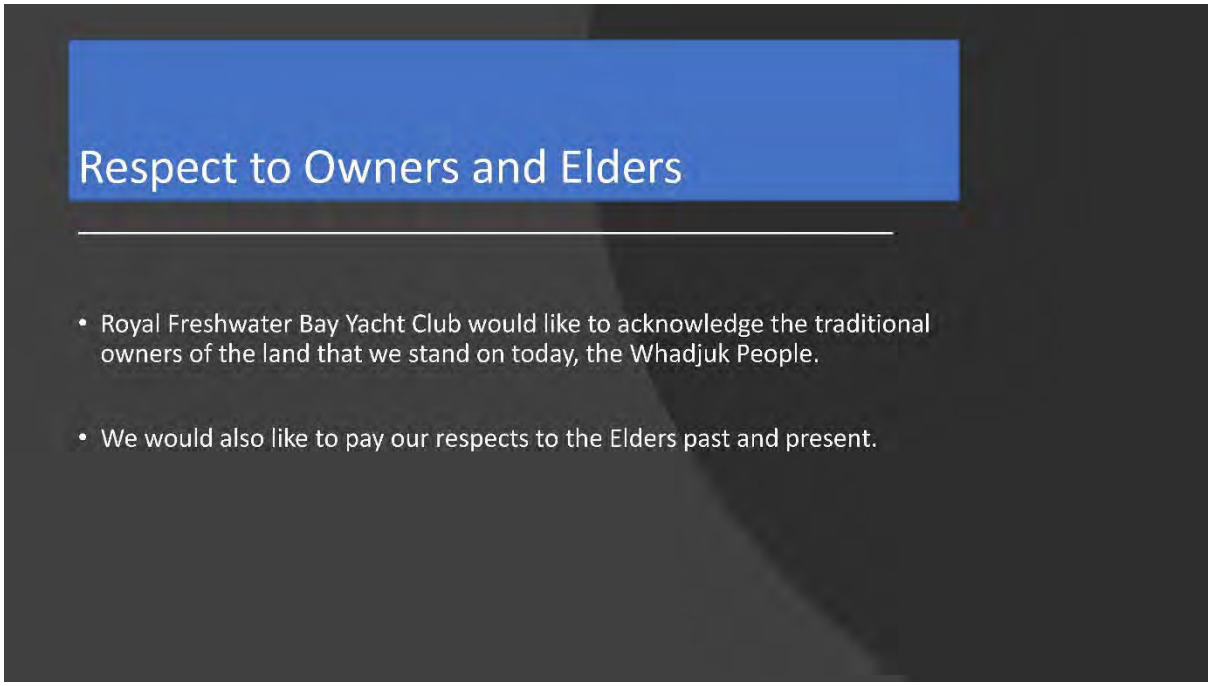
Contact	Nathan Stronach
Address	Keane's Point, 1 Hobbs Place, Peppermint Grove, 6011 Western Australia

Appendix B - Acronyms and definitions

The following terms and acronyms are used in this report. Definitions are provided below for reference.

Term / abbreviation	Definition
ACMC	Aboriginal Cultural Materials Committee
AHIS	Aboriginal Heritage Inquiry System
DPLH	Department of Planning, Lands and Heritage
GIS	Geographic information system
GPS	Global positioning system
Heritage object	An object to which the Act applies under section 6
Heritage site / Heritage place	Any place which may meet the criteria of an Aboriginal site under s5 of the *Aboriginal Heritage Act 1972 (WA).*
HISF	Heritage Information Submission Form
Isolated artefacts	Cultural material with insufficient density or context to constitute a site.
MGA	Map grid of Australia
NNTT	National Native Title Tribunal
Other Heritage Place	Other heritage places (OHPs) are heritage places classified by the DPLH as either: 1. A heritage place that has been reported to the DPLH but is pending assessment by the ACMC (status L – lodged; also see definition for 'potential site', below); or 2. A heritage place that has been submitted to the DPLH and evaluated by the ACMC to not meet the criteria for inclusion on the Register of Sites (i.e. not a registered Aboriginal site) (status S – stored / not a site).
Registered Aboriginal site	A heritage place which has been determined as meeting criteria under section 5 of the *Aboriginal Heritage Act 1972 (WA),* and has been registered by the Registrar of Aboriginal Sites (DPLH status R - registered).
RFBYC	Royal Freshwater Bay Yacht Club
SWALSC	South West Aboriginal Land and Sea Council
Terra Rosa	Terra Rosa Consulting
Traditional Owners	Whadjuk native title claimants (NNTT no WC2011/009 and invited participants
The Act	*Aboriginal Heritage Act 1972 (WA)*

Appendix C - RFBYC presentation to SWALSC



The Purpose

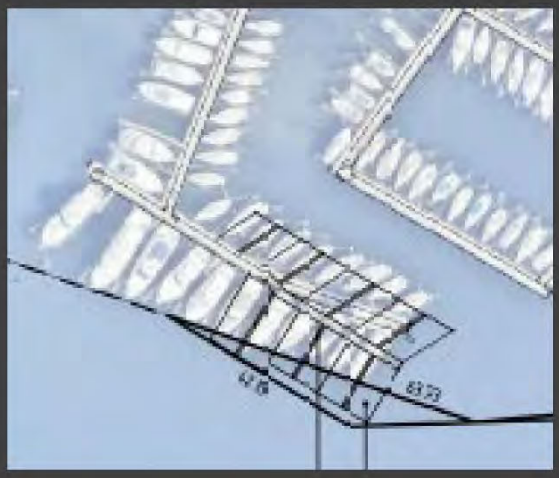
- Royal Freshwater Bay Yacht Club are here today to discuss the following:
  - The proposed Jetty Replacement Plans.
  - Future Timber Pylon Replacement Plans.

The Jetty Replacement Proposal

A section of jetty has reached the end of its designed life and now requires replacement.

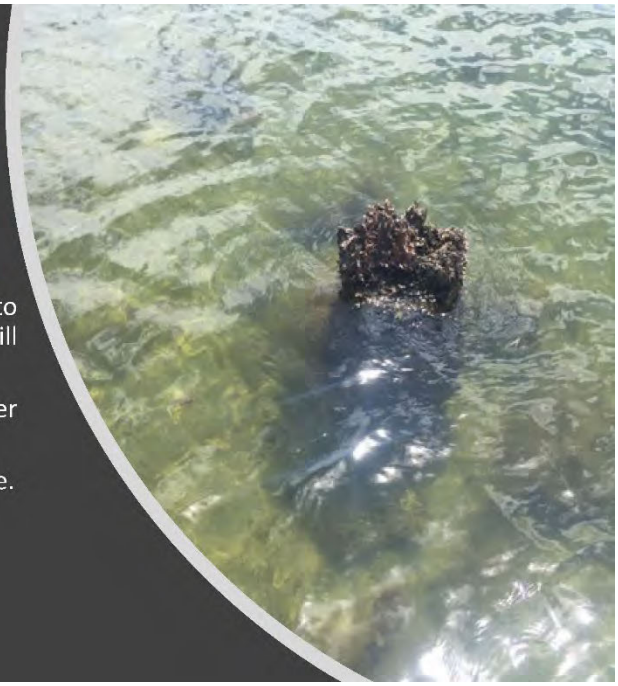
The Proposed Layout

- The existing jetty structure fails to meet current Australian Design Standards for fairway widths.
- Replacing the jetty on the existing footprint would continue an existing issue with regards to the interior fairway, which is narrower than that recommended by AS3962. This is a safety issue.
- Our proposal is to realign the jetty to fix this non-conformance.



Future Timber Pylon Replacements

- Timber pylons are being subjected to Marine Borer Activity and subsequently will need replacing at times.
- We propose to install new steel pylons over the existing timber pylon stumps.
- This method reduces river bed disturbance.

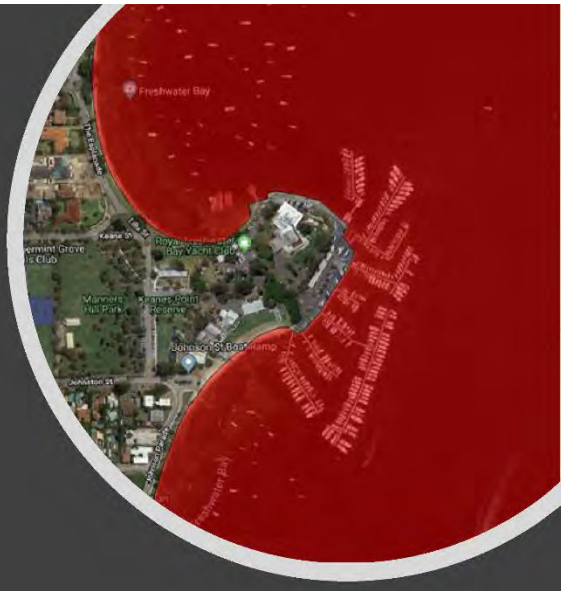


Pylons Requiring Urgent Replacement

These Pylon replacements have been approved by the DBCA with advice to ensure that the proposed works do not breach the *Aboriginal Heritage Act 1972*.

Registered Aboriginal Site DPLH 3536 (Swan River)

The Royal Freshwater Bay Yacht Club's jetties fall within the boundary of the registered Aboriginal site DPLH 3536 (Swan River), consent to undertake the proposed works will be required under Section 18 of the *Aboriginal Heritage Act 1972*.



Whadjuk Working Group

Royal Freshwater Bay Yacht Club conducted an Ethnographic Section 18 Consultation in 2005 and received Section 18 Consent for one of the Jetties. We would like to submit a Section 18 Notice to included the proposed Jetty Replacement Plan, Future Timber Pylon Replacement Plans.

- Can you confirm if the Whadjuk Working Party will support us submitting a Section 18 Notice into the Department of Planning, Lands and Heritage?
- Can the Whadjuk Working Party let us know if you have any concerns in regards to these works?

Copyright

Disclaimer

The information, opinion, ideas and recommendations presented in this document is partly based on the experience of the authors, research, and recognised procedures, which are believed to be accurate, but not infallible. The advice contained herein is given in good faith and follows acceptable professional standards and procedures, but is not meant to encourage any activity, practice or exercise, which may have ceased, changed or have been superseded for any reason without the knowledge of the authors. The authors assume no responsibility or liability for any loss or damage caused directly or indirectly by the information presented in this document.

Version Control

Version	Date	Change Log	Author(s)
0.1	12/04/2019	Document created	K. Saxon
0.2	16/04/2019	Results and recommendations drafted	B. Fordyce
0.3	18/04/2019	Draft review and edit	M. Tehnas
0.4	23/04/2019	Draft delivered to SWALSC and Heritage Link for review	M. Tehnas
1.0	23/04/2019	Final report delivered to Heritage Link	M. Tehnas

TERRA ROSA
CONSULTING

Acid Sulfate Soils Investigation

Royal Freshwater Bay Yacht Club

Revision No 1
March 2024

pendragon environmental solutions

ABN: 92 147 485 416

Leaders in Environmental Practice

Pendragon Environmental Solutions

ABN: 92 147 485 416

Address and Contact Details

Po Box 553

Floreat WA 6014

email: info@pendragonenvironmental.com

Website: www.pendragonenvironmental.com

Limitations, Uses and Reliance

This document, once read in its entirety, may be relied upon for the purposes stated within the limits of:

Environmental investigations and assessments are undertaken in accordance with an agreed term of reference and timeframe and may involve intrusive investigations of subsurface conditions, generally at a few selected locations. Although due care, skill and professional judgement are applied in the interpretation and extrapolation of environmental conditions and factors to elsewhere, the potential for variances cannot be discounted. Therefore, the results, analyses and interpretations presented herein cannot be considered absolute or conclusive. Pendragon Environmental Solutions does not accept any responsibility for variances between the interpreted and extrapolated and those that are revealed by any means. Specific warning is given that many factors, natural or artificial, may render conditions different from those that prevailed at the time of investigation and should they be revealed at any time subsequently, they should be brought to our attention so that their significance may be assessed and appropriate advice may be offered. Users are also cautioned that fundamental assumptions made in this document may change with time and it is the responsibility of any user to ensure that assumptions made, remain valid.

The comments, findings, conclusions and recommendations contained in this document represent professional estimates and opinions and are not to be read as facts unless expressly stated to the contrary. In general, statements of fact are confined to statements as to what was done and/or what was observed; others have been based on professional judgement. The conclusions are based upon information and data, visual observations and the results of field and laboratory investigations and are therefore merely indicative of the environmental conditions at the time, including the presence or otherwise of contaminants or emissions. In addition, presentations in this document are based upon the extent of the terms of reference and/or on information supplied by the client, agents and third parties outside our control. To the extent that the statements, opinions, facts, conclusions and/or recommendations in this document are based in whole or part on this information, those are contingent upon the accuracy and completeness of the information which has not been verified unless stated otherwise. Pendragon Environmental Solutions does not accept responsibility for omissions and errors due to incorrect information or information not available at the time of preparation of this document and will not be liable in relation to incorrect conclusions should any information be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed. Neither will we be liable to update or revise the document to take into account any events, emergent circumstances or facts occurring or becoming apparent after the date of this document.

Within the limitations imposed by the terms of reference, the assessment of the study area and preparation of this document have been undertaken and performed in a professional manner, by suitably qualified and experienced personnel, in accordance with generally accepted practices and using a degree of skill and care ordinarily exercised by environmental consultants under similar circumstances. No other warranty, expressed or implied, is made.

This document has been prepared for the purposes stated herein. Every care was taken in the interpretation of environmental conditions and the nature and extent of impacts, presentation of findings and recommendations which are provided in good faith in the general belief that none of these are misleading. No responsibility or liability for the consequences of use and/or inference by others is accepted.

Report

Title:	Acid Sulfate Soils Investigation Royal Freshwater Bay Yacht Club
File:	PES20004
Author(s):	Ryan Lawrence
Client:	Royal Freshwater Bay Yacht Club
Contact:	Nathan Stronach
Synopsis:	This document details the acid sulfate soils investigation of in-situ sand at Royal Freshwater Bay Yacht Club.

Document Control

Revision No	Date	Author(s)	Reviewer(s)
1	March 2024	Ryan Lawrence	Carel van der Westhuizen

Distribution

Revision No	Date	Approved	Recipient(s)	No of Copies
1	March 2024	Ryan Lawrence	Department of Biodiversity, Conservation and Attractions Royal Freshwater Bay Yacht Club	Electronic

Revision

Revision No	Date	Description	Approved
1	March 2024	Issued for information	Ryan Lawrence
Recipients are responsible for eliminating all superseded documents in their possession			

Table of Contents

Drawings and Figures

Tables

Appendices

1. Executive Summary

Background

Pendragon Environmental Solutions was engaged by Royal Freshwater Bay Yacht Club to investigate the presence of acid sulfate soils.

Objectives

This Acid Sulfate Soils Investigation was developed to ensure the best outcome is achieved for the environment should excess sand deposited in front of the Junior Club Facilities be excavated and removed from site.

Scope of Work

To undertake acid sulfate soils investigations of in-situ sand and develop a limited assessment report.

Summary of Investigations

Samples of soils have pHFOX levels lower than pHF by at least 2 pH units in each sample indicating potential acid sulphate soils.

Titratable Peroxide Acidity (s-23G) and Titratable Sulfidic Acidity (s-23H) were not detected in the samples; with Net Acidity below 0.02%S. However with the ANC excluded samples ASS4-6 have a net acidity requiring lime treatment.

2. Scope of Work

Pendragon Environmental Solutions was engaged by Royal Freshwater Bay Yacht Club to investigate the presence of acid sulfate soils (ASS) and to draft a brief assessment report.

This Acid Sulfate Soils Investigation and Management Plan was developed to ensure the best outcome is achieved for the environment should excess sand deposited in front of the Junior Club Facilities be excavated and removed from site (Figure 1).

2.1 Acid Sulfate Soils Self-Assessment

Royal Freshwater Bay Yacht Club Lot 2534 on Plan 222326 (Reserve 17060), 1 Hobbs Place, Peppermint Grove is located in an area classified as:

- Class 1: (red/pink) high to moderate risk of acid sulfate soils occurring within 3m of the natural soil surface.

A key issue is the disturbance of groundwater in ASS landscapes by dewatering activities as this may result in oxidation of sulfidic materials and acidification of both surface and groundwater. The intention of the project is to excavate some 90m^3 of sand that has built up on the foreshore of the Junior Yacht Club and adjacent pens. The sand is to be placed on an area of hardstand overnight to drain excess water prior to disposal (Figure 2).

It is understood that following discussions with regulators (by RFBYC) that sands to be excavated are to be tested for ASS parameters ahead of excavation as part of this investigation.

3. Site Identification

Royal Freshwater Bay Yacht Club, (Lot 2534 on Plan 222326 (Reserve 17060)) is located at, 1 Hobbs Place, Peppermint Grove approximately 8km south west of the Perth CBD (Figure 1). Brief descriptions and the coordinates of site boundaries in Tables 3.1 and 3.2 respectively.

Table 3.1: Brief Descriptions of Lots.

Street Address	Lot	Lot on Plan	Land ID Number	Area (ha)
1 Hobbs Pl,	2534	P222326 2534	2008770	3.2047

Table 3.2: Coordinates of Site Boundaries.

Site Corners	Zone	Longitude	Latitude
North	0	115.773551	32.001086
East		115.774758	32.001783
South		115.772746	32.003285
West		115.772328	32.002481
Datum: GDA94.			

4. Sampling and Analysis Plan and QA/QC

The sampling and analysis plan, methodologies and field and laboratory QA/QC are detailed in Table 4.1.

The locations of the acid sulfate soil investigative bores are indicated on Figure 2 at the back of this document. The characteristics of the proposed disturbance and in-situ sands coupled with the risk identification, adequately justifies the density of the sampling program, the locations of sampling points and the selection of samples for laboratory analysis (Appendix A).

Table 4.1: Sampling and Analysis Plan and Field QA/QC.

Component	Description
Standard:	Soil sampling were undertaken in accordance with Schedule B2 of the ASC NEPM; AS/NS 4482.1-2005 Guide to the Investigation and Sampling of Sites with Potentially Contaminated Soil – Non-Volatile and Semi-Volatile Compounds and CRC Care Technical Report 11 (Clements et al., 2009) and a Sampling and Analysis Quality Plan for site contamination.
Procedure (not included in this document):	Pendragon Environmental Solutions Standard Environmental Sampling Protocol. Pendragon Environmental Solutions Health, Safety and Environmental Plan (HSEP).
Accreditation:	Laboratory (ALS) is accredited by the National Association of Testing Authorities (NATA) and laboratory certificates are NATA endorsed reports. Competent professionals possessing the relevant knowledge, skills, experience and judgement supervised intrusive investigations. All site workers were made familiar with the Pendragon Environmental Solutions HSEP. All work was undertaken and executed in accordance with the applicable Australian Standards, Guidelines and Codes of Practice.
Pre-sampling activity:	Analytical laboratories were consulted to ensure that samples are taken, handled, packaged, stored, transported and delivered with an appropriately completed chain of custody, using the correct labels, container type with sufficient volume, preserved (if required), and to facilitate scheduling of laboratory analysis within stipulated holding times.
Analyte Selection	Analytes selected: Soils: ▪ pH_F and pH_{FOX}. ▪ SPOCAS Suite (Suspension Peroxide Oxidation Combined Acidity and Sulphur).
Record keeping and sampling and decontamination to prevent cross contamination:	At each soil sampling location, the following procedure was followed: ▪ Sample locations were recorded using a GPS device and appropriately marked on a site plan. ▪ Soil profiling based on Australian Standard (AS) 1726-2017 and the Unified Soil Classification System (USCS), comprising the material description (colour, particle size, roundness and sorting) with a note of the moisture content. ▪ Samples of soils were obtained at least 50cm below the surface level of the sand towards the lower edge of sand to be disturbed. ▪ Samples were obtained by directly collecting samples into NATA-accredited laboratory soil containers and placed immediately into pre-chilled insulated coolers. ▪ Disposable nitrile gloves were used at each sample location and between samples to prevent cross-contamination and to comply with health and safety requirements. ▪ Chain of Custody (CoC) documentation accompanied all sample containers to the laboratory. ▪ Each soil bore was backfilled using the excavated spoil, backfilled in the corresponding order from which the material was removed.
QA/QC Samples:	In addition to the primary samples no additional field QA/QC samples were obtained to assess aspects of field protocols.
Sample labelling:	Samples were clearly marked with unique identification details, sampling date, sampler initials, project name and number and analyses required.

Component	Description
Sample storage and delivery:	Soil samples were placed into new sampling bags provided by the analytical laboratories. All samples were placed on ice (1kg of ice per 10L of cooler to achieve 4°C) in an insulated cooler with a security seal. The samples were delivered to the analytical laboratories the same day.
Chain of Custody	Chain of Custody (CoC) procedures were adhered to for all sample transfers. CoC's detailed all relevant contact details, sample numbers, sampling date and time, condition of sample, description of sample containers and sizes (including details of filtration and preservation), analyses required, detection or reporting limits and specific instructions (e.g. special safety precautions, analysis of both solid and liquid phases, notification of possible contaminants to minimize laboratory staff contact and to ensure analysing equipment is appropriately calibrated), and were signed by each person transferring and accepting custody.
Laboratory QA/QC	The analytical results and laboratory certificates in Appendix A show that the samples were not contaminated during transport. **Soils (EP2402544: pH and SPOCAS):** No Method Blank value outliers occur. No Duplicate outliers occur. No Laboratory Control outliers occur. No Matrix Spike outliers occur. For all regular sample matrices, no surrogate recovery outliers occur. Outliers : Analysis Holding Time Compliance: no Analysis Holding Time Outliers exist. Outliers : Frequency of Quality Control Samples: no Quality Control Sample Frequency Outliers exist. **Relative Percentage Difference (RPD)** calculations for Intra-Laboratory: Variation/Repeatability and Inter-Laboratory: Method Precision and Heterogeneity may be found in Appendix D. Generally, a RPD of ≤20% indicates an acceptable result provided the result is five to ten times the limit of reporting or detection limit (LoR). In those circumstances where the result is close to the LoR, RPD may exceed 20% taking due cognisance that the acceptable RPD may be influenced significantly by the analyte and matrix. For this investigation the RPD has been set at 50% and whilst there are exceedances, they generally fall within the range 30% to 50% which is considered acceptable since no analyte exceeded the five to ten times LoR criterium and many analytes were reported below the LoR. It should be noted that the highest concentration for any analyte determined in either the primary or QA/QC samples, is the concentration at which the sample/result will be assessed. **The Analytical Data Validation** for this investigation concluded that: ▪ Documentation and data were complete with appropriate and sufficient QA/QC measures. ▪ Data comparability, representativeness, precision and accuracy were sufficient to demonstrate the reliability of data. The analytical results may therefore be deemed accurate and representative of site conditions.

5. Assessment Criteria

5.1 Soil

The assessment criteria and rationale adopted are the texture-based ASS Action Criteria (developed by QASSIT and outlined in the Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils in Queensland, 1998) based on Net Acidity (NA) excluding the consideration of Acid Neutralising Capacity (ANC: DER, 2015):

where *Net Acidity* = *Potential Acidity* + *Existing Acidity* (calculated as equivalent sulfur in %S or equivalent acidity in mol H^+/tonne)

combined with soil texture and the scale of disturbance (in this instance <1,000 tonnes).

The highest laboratory analytical value will be used to assess against the action criteria. Since soils encountered at the site may be described as *fine to medium sand*, the NA action criterion of 0.03%S was adopted.

Field pH tests:

- pH_F <4 (indicative of AASS).
- pH_F >4 but <5 (indicative of acid soils but the cause of the acidity needs further investigation by laboratory analysis).
- pH_{FOX} <3 (indicative of PASS).
- pH_{FOX} lower than pH_F by more than 1 pH unit (indicative of PASS).

6. Results

6.1 ASS Investigations

The investigation entailed the augering/excavating of six holes (Figure 2) to a depth of between 0.6m and 0.8m below surface. Samples were obtained between 0.6m and 0.8m within the sand proposed to be excavated all below the water table/river.

The detailed soil profiles with summaries of pH measurements and the analytical data of the SPOCAS Suite (Suspension Peroxide Oxidation Combined Acidity and Sulphur) may be found in Appendix A.

6.2 Results of Investigation

Samples of soils have pH_{FOX} levels lower than pH_F by at least 2 pH units in each sample indicating potential acid sulphate soils.

Titratable Peroxide Acidity (s-23G) and Titratable Sulfidic Acidity (s-23H) were not detected in the samples; with Net Acidity below 0.02%S. However with the ANC excluded samples ASS4-6 have a net acidity requiring lime treatment. This is attributable to the removed impacts of shells within samples.

7. Risk Assessment

7.1 Receptors

Sensitive receptors of potential impacts resulting from disturbance of ASS include:

On and Off-Site:

- Future underground infrastructure.
- Maintenance and construction workers.
- Natural Environment.

7.2 Sensitivity of Receiving Environment

The sensitivity of the receptors, the likely duration and type of exposure of potential adverse soil impacts were considered in the selection of the assessment criteria in Section 6.

7.3 Exposure and Risk

Factors that influence the level of risk include the nature, magnitude and duration of the proposed disturbance, the soil characteristics and the sensitivity of the surrounding environment:

- Excavating and draining 90m^3 of sediment from the riverbed and foreshore.

The potential risk to the environment and/or human health, either directly through acidity or indirectly through being a source of acidity which could mobilise chemicals and particularly heavy metals in the environment, is considered insignificant should the soils be treated to neutralise potential acidity.

Abbreviations	
AASS	Actual Acid Sulfate Soils
ANC	Acid Neutralising Capacity
ANZECC	Australian and New Zealand Environment and Conservation Council
ASSDMP	Acid Sulfate Soil and Dewatering Management Plan
ASS	Acid Sulfate Soils
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
CoK	City of Kwinana
CSA	Contaminated Sites Act 2003
CSR	Contaminated Sites Regulations 2006
DWER	Department Water and Environmental Regulation Western Australia
DER	The defunct Department Environment Regulation Western Australia
DoH	Department of Health Western Australia
DoW	The defunct Department of Water Western Australia
DGS	Dangerous Goods Site
DIA	Department of Indigenous Affairs
DMP	Department of Mines and Petroleum
FOI	Freedom of Information
LoR	Limit of Reporting
LPS	Local Planning Scheme
MAR	Mandatory Auditors Report
MRS	Metropolitan Region Scheme
NA	Net Acidity
NATA	National Association of Testing Authorities, Australia
NEPM	National Environment Protection Measure
PASS	Potential Acid Sulfate Soils
PSI	Preliminary Site Investigation
RPD	Relative Percentage Difference
S	Sulfur
SAP	Sampling and Analysis Plan
SPOCAS	Suspension Peroxide Oxidation Combined Acidity and Sulfur
TPA	Total Potential Acidity
TTA	Total Titratable Acidity
Units	
d	day
ha	hectare
hr	hour
kg	kilogram
km	kilometre
m	metre
min	minute
yr	year
s	second
t	ton

References

Ahern *et. al.*, 1998: *Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils (ASS) in Queensland.*

Australian and New Zealand Environment Conservation Council (ANZECC) (2000): *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.* Volume 1, Chapters 1 – 7, National Water Quality Management Strategy. Canberra, ACT.

Australian/New Zealand Standard (1998): *Water Quality – Sampling Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples.* AS/NZS 5667.1:1998. NSW, Australia and Wellington, New Zealand.

Davidson, W.A. (1995): *Hydrogeology and Groundwater Resources of the Perth Region Western Australia*, Bulletin 142, Geological Survey of Western Australia, Department of Minerals and Energy.

Department of Environmental Regulation (DER), 2015: *Identification and Investigation of Acid Sulfate Soils and Acidic Landscapes*.

Department of Environmental Regulation (DER), 2015: *Treatment and Management of Soils and Water in Acid Sulfate Soil Landscapes.*

Department of Water and Environmental Regulation (DWER), 2019: *Landfill Waste Classification and Waste Definitions 1996 (as amended 2019), Environmental Protection Act 1986.*

Land and Water Biodiversity Committee (LWBC) (2003): *Minimum Construction Requirements for Water Bores in Australia.* Edition 2, Revised September, 2003. QNRM04027. Australia.

National Health and Medical Research Council (NHMRC) and Natural Resource Management Ministerial Council (NRMMC) (ADWG) (2015): *Australian Drinking Water Guidelines 6 – 2015.*

Western Australian Planning Commission (WAPC), 2008: Acid Sulfate Soils Planning Guidelines.

Western Australian Planning Commission (WAPC), 2009: Planning Bulletin No. 64/2009: Acid Sulfate Soils.

Figures

Drawing Title: Site Location

Figure Number: 1

Revision: 1, March 2024

Legend:

Approximate Site Boundary

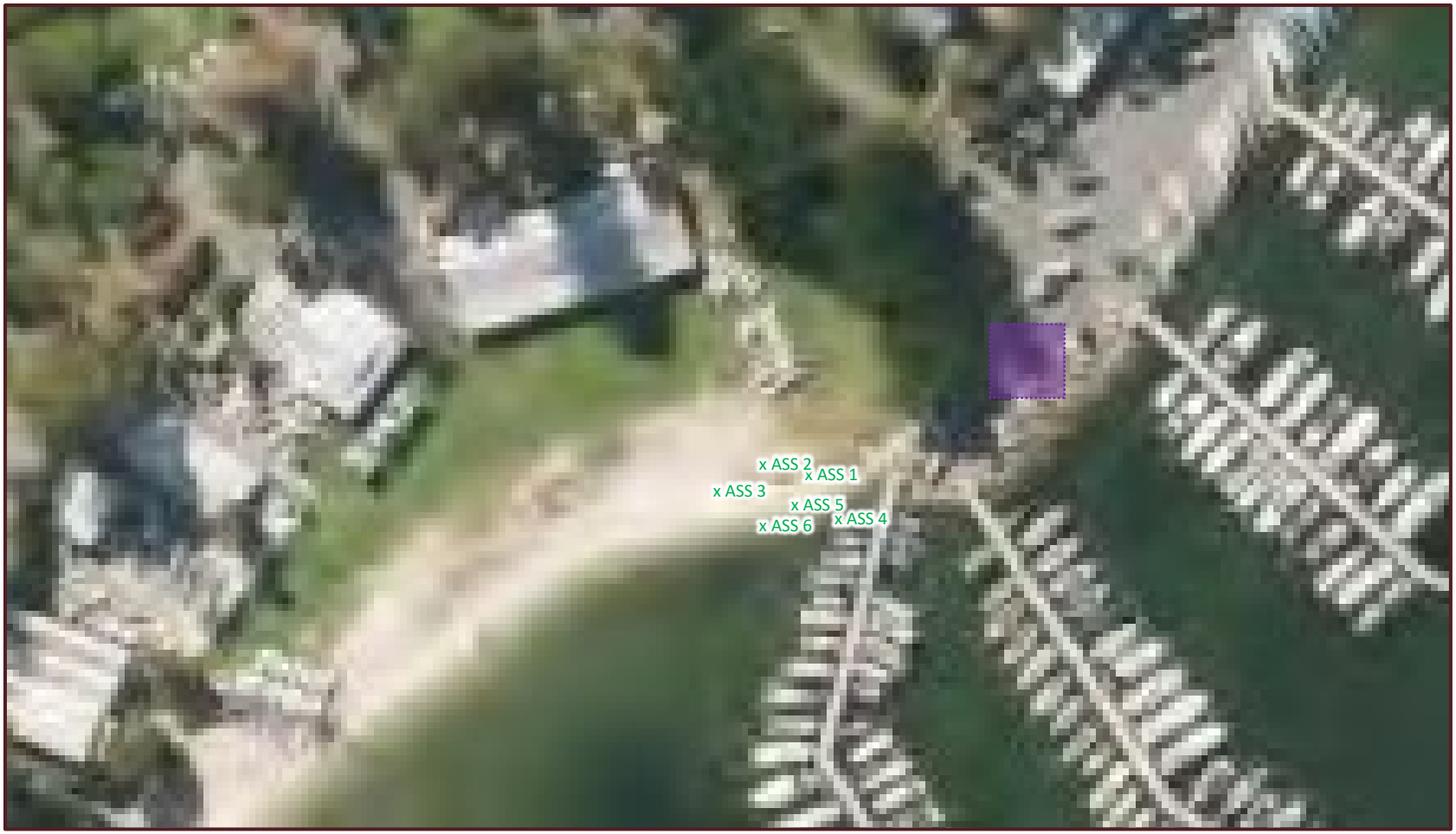
Notes:

Base image obtained from Landgate (2024).
Scale is approx.

N

0 80
meters

pendragon environmental solutions



Drawing Title: Site Details

Figure Number: 2

Revision: 1, March 2024

Legend:

x ASS 1 ASS Bore Location

Soil laydown area

Notes:

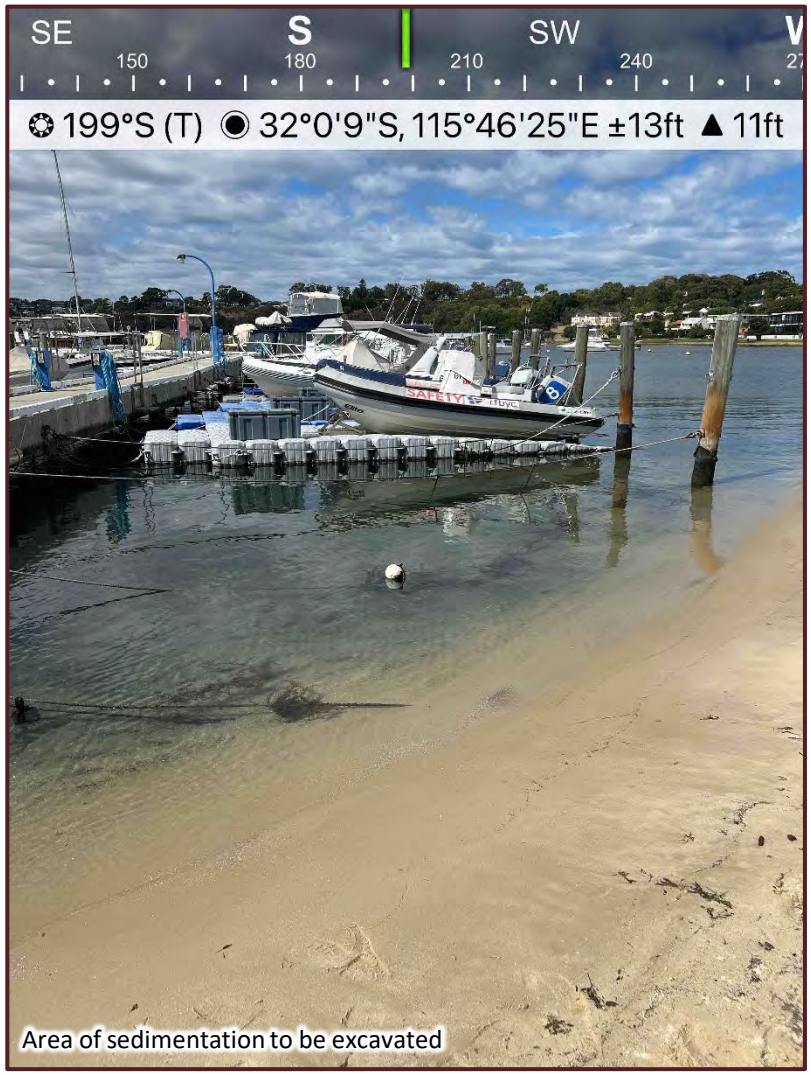
Base image obtained from Landgate (2024).
Scale is approx.

N

0 80

meters

pendragon environmental solutions



Drawing Title: Site Photographs	**Legend:**	**Notes:** Base image obtained from Landgate (2024). Scale is approx.	0 80 meters
Figure Number: 3		N	pendragon environmental solutions
Revision: 1, March 2024			

Appendices

Appendix A: Data Tabulations and Laboratory Certificates.

				pH		Acidity Trail			Sulfur Trail			Calcium Values				Magnesium Values				Net Acidity		
PES20004 RFBYC SPOCAS EP2402544		**pH (F)**	**pH (Fox)**	**pH KCl (23A)**	**pH OX (23B)**	**sulfidic - Titratable Actual Acidity (s-23F)**	**sulfidic - Titratable Peroxide Acidity (s-23G)**	**sulfidic - Titratable Sulfidic Acidity (s-23H)**	**KCl Extractable Sulfur (23Ce)**	**Peroxide Sulfur (23De)**	**Peroxide Oxidisable Sulfur (23E)**	**KCl Extractable Calcium (23Vh)**	**Peroxide Calcium (23Wh)**	**Acid Reacted Calcium (23X)**	**sulfidic - Acid Reacted Calcium (s-23X)**	**KCl Extractable Magnesium (23Sm)**	**Peroxide Magnesium (23Tm)**	**Acid Reacted Magnesium (23U)**	**sulfidic - Acid Reacted Magnesium (s-23U)**	**Net Acidity (sulfur units)**	**Net Acidity excluding ANC (sulfur units)**	**Liming Rate excluding ANC**
	Sample Description	pH Unit	pH Unit	pH Unit	pH Unit	% pyrite S	% pyrite S	% pyrite S	% S	% S	% S	% Ca	% Ca	% Ca	% S	% Mg	% Mg	% Mg	% S	% S	% S	kg CaCO3/t
Sample ID		0.1	0.1	0.1	0.1	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.02	0.02	1
ASS 1	Grey/Brown, fine to medium grained sand some shells	8.6	5.9	9.9	8.0	<0.005	<0.005	<0.005	0.006	0.009	<0.005	0.143	0.714	0.571	0.457	0.006	0.011	<0.005	0.006	<0.02	<0.02	<1
ASS 2		8.2	5.7	9.8	7.9	<0.005	<0.005	<0.005	0.006	0.006	<0.005	0.126	0.512	0.386	0.309	0.006	0.011	<0.005	0.006	<0.02	<0.02	<1
ASS 3		8.7	5.9	9.9	8.0	<0.005	<0.005	<0.005	<0.005	0.007	<0.005	0.132	0.756	0.624	0.499	0.005	0.010	0.005	0.007	<0.02	<0.02	<1
ASS 4		8.6	6.0	9.9	8.0	<0.005	<0.005	<0.005	0.020	0.056	0.036	0.181	1.92	1.74	1.39	0.021	0.039	0.019	0.024	<0.02	0.04	2
ASS 5		8.4	6.2	9.9	8.0	<0.005	<0.005	<0.005	0.018	0.054	0.035	0.169	1.55	1.38	1.10	0.018	0.039	0.021	0.028	<0.02	0.04	2
ASS 6		8.3	6.1	9.9	7.9	<0.005	<0.005	<0.005	0.014	0.027	0.013	0.143	0.776	0.632	0.506	0.013	0.024	0.011	0.015	<0.02	<0.02	1

CHAIN OF CUSTODY DOCUMENTATION
Pendragon environmental solutions

Water and Environmental Scientist and Engineers

Project Manager (PM):	Ryan Lawrence	Sampler:	RL
Job Number:	PES20004	Mobile:	430310085
Site:	RFBYC	Email analysis/report to:	ryan@pendragonenvironmental.com carel@pendragonenvironmental.com
Results required(Date):		Email invoice to: (if different to report)	

FOR LABORATORY USE ONLY
COOLER SEAL
INTACT: YES NO N/A
SAMPLE TEMPERATURE
CHILLED: YES NO

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPO
EN-222-23

SAMPLE INFORMATION (S = Soil, W=Water)					CONTAINER INFORMATION		ANALYSIS REQUIRED		
Lab ID	Sample ID	Matrix	Date	Time	Type / Code	Total bottles	EA003 pH F and pH Fox	EA029 SPOCAS Suite Complete	Notes: e.g. Highly contaminated samples,extra volume for QC or trace LORs etc.
1	ASS 1		26-Feb-24				x	x	
2	ASS 2		26-Feb-24				x	x	
3	ASS 3		26-Feb-24				x	x	
4	ASS 4		26-Feb-24				x	x	
5	ASS 5		26-Feb-24				x	x	
6	ASS 6		26-Feb-24				x	x	

RELINQUISHED BY:			RECEIVED BY:			METHOD OF SHIPMENT	
Name:	Ryan Lawrence	Date: 26/02/2024	Name: Brian ALS	26/2	:Date	Courier:	
Of:	Pendragon Environmental Solutions	Time:	Of:	16:45	:Time		
Name:		Date:	Name:		:Date	Other:	
Of:		Time:	Of:		:Time		

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved;
V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bad for Acid Sulphate Soils; B = Unpreserved Bag.

Note: Job number must be reflected on all invoices and statements. Attach copy of CoC to invoice.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EP2402544**

Client	: **PENDRAGON ENVIRONMENTAL SOLUTIONS**	Laboratory	: Environmental Division Perth
Contact	: MR RYAN LAWRENCE	Contact	: Customer Services EP
Address	: PO Box 553 Floreat 6014	Address	: 26 Rigali Way Wangara WA Australia 6065
E-mail	: ryan@pendragonenvironmental.com	E-mail	: ALSEnviro.Perth@alsglobal.com
Telephone	: +61 08 9382 8286	Telephone	: +61-8-9406 1301
Facsimile	: +61 08 9382 8693	Facsimile	: +61-8-9406 1399
Project	: PES20004	Page	: 1 of 2
Order number	: ----	Quote number	: EP2018PENENV0002 (EN/222)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: RFBYC		
Sampler	: R L		

Dates

Date Samples Received	: 26-Feb-2024 16:45	Issue Date	: 27-Feb-2024
Client Requested Due Date	: 06-Mar-2024	Scheduled Reporting Date	: **06-Mar-2024**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: 1	Temperature	: 10.0 - Ice present
Receipt Detail	: Ice Melted	No. of samples received / analysed	: 6 / 6

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- Please see scanned COC for sample discrepencies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **SOIL**

Laboratory sample ID	Sampling date / time	Sample ID	SOIL - EA003 pH field/fox	SOIL - EA029-WA WA - SPOCAS
EP2402544-001	26-Feb-2024 00:00	ASS 1	✓	✓
EP2402544-002	26-Feb-2024 00:00	ASS 2	✓	✓
EP2402544-003	26-Feb-2024 00:00	ASS 3	✓	✓
EP2402544-004	26-Feb-2024 00:00	ASS 4	✓	✓
EP2402544-005	26-Feb-2024 00:00	ASS 5	✓	✓
EP2402544-006	26-Feb-2024 00:00	ASS 6	✓	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

CAREL VAN DER WESTHUIZEN

- *AU Certificate of Analysis - NATA (COA)	Email	carel@pendragonenvironmental.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	carel@pendragonenvironmental.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	carel@pendragonenvironmental.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	carel@pendragonenvironmental.com
- A4 - AU Tax Invoice (INV)	Email	carel@pendragonenvironmental.com
- Chain of Custody (CoC) (COC)	Email	carel@pendragonenvironmental.com
- EDI Format - XTab (XTAB)	Email	carel@pendragonenvironmental.com

RYAN LAWRENCE

- *AU Certificate of Analysis - NATA (COA)	Email	ryan@pendragonenvironmental.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	ryan@pendragonenvironmental.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	ryan@pendragonenvironmental.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	ryan@pendragonenvironmental.com
- A4 - AU Tax Invoice (INV)	Email	ryan@pendragonenvironmental.com
- Chain of Custody (CoC) (COC)	Email	ryan@pendragonenvironmental.com
- EDI Format - XTab (XTAB)	Email	ryan@pendragonenvironmental.com

CERTIFICATE OF ANALYSIS

Work Order	: **EP2402544**	Page	: 1 of 6
Client	: **PENDRAGON ENVIRONMENTAL SOLUTIONS**	Laboratory	: Environmental Division Perth
Contact	: MR RYAN LAWRENCE	Contact	: Customer Services EP
Address	: PO Box 553 Floreat 6014	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: +61 08 9382 8286	Telephone	: +61-8-9406 1301
Project	: PES20004	Date Samples Received	: 26-Feb-2024 16:45
Order number	: ----	Date Analysis Commenced	: 28-Feb-2024
C-O-C number	: ----	Issue Date	: 07-Mar-2024 15:55
Sampler	: R L		
Site	: RFBYC		
Quote number	: EN/222		
No. of samples received	: 6		
No. of samples analysed	: 6		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Daniel Fisher	Inorganics Analyst	Perth ASS, Wangara, WA

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- ASS: EA029 (SPOCAS): Analysis is performed as per the Acid Sulfate Soils Laboratory Methods Guidelines (2004) and the updated National Acid Sulfate Soils Guidance: National acid sulfate soils identification and laboratory methods manual, Department of Agriculture and Water Resources, Canberra, ACT (2018)
- ASS: EA029 (SPOCAS): Retained Acidity not required because pH KCl greater than or equal to 4.5
- ASS: EA029 (SPOCAS): Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime ($CaCO_3$) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from kg/t dry weight to kg/m3 in-situ soil, multiply reported results x wet bulk density of soil in t/m3.
- ASS: EA003 (NATA Field and F(ox) screening): pH F(ox) Reaction Rate: 1 - Slight; 2 - Moderate; 3 - Strong; 4 - Extreme

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	ASS 1	ASS 2	ASS 3	ASS 4	ASS 5
			Sampling date / time	26-Feb-2024 00:00	26-Feb-2024 00:00	26-Feb-2024 00:00	26-Feb-2024 00:00	26-Feb-2024 00:00
Compound	CAS Number	LOR	Unit	EP2402544-001	EP2402544-002	EP2402544-003	EP2402544-004	EP2402544-005
				Result	Result	Result	Result	Result
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	**8.6**	**8.2**	**8.7**	**8.6**	**8.4**
pH (Fox)	----	0.1	pH Unit	**5.9**	**5.7**	**5.9**	**6.0**	**6.2**
Reaction Rate	----	1	Reaction Unit	**1**	**1**	**1**	**2**	**2**
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	**9.9**	**9.8**	**9.9**	**9.9**	**9.9**
pH OX (23B)	----	0.1	pH Unit	**8.0**	**7.9**	**8.0**	**8.0**	**8.0**
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	<2	<2	<2
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	<2	<2	<2
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	<2	<2	<2
sulfidic - Titratable Actual Acidity (s-23F)	----	0.005	% pyrite S	<0.005	<0.005	<0.005	<0.005	<0.005
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.005	% pyrite S	<0.005	<0.005	<0.005	<0.005	<0.005
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.005	% pyrite S	<0.005	<0.005	<0.005	<0.005	<0.005
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.005	% S	**0.006**	**0.006**	<0.005	**0.020**	**0.018**
Peroxide Sulfur (23De)	----	0.005	% S	**0.009**	**0.006**	**0.007**	**0.056**	**0.054**
Peroxide Oxidisable Sulfur (23E)	----	0.005	% S	<0.005	<0.005	<0.005	**0.036**	**0.035**
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	5	mole H+ / t	<5	<5	<5	**22**	**22**
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.005	% Ca	**0.143**	**0.126**	**0.132**	**0.181**	**0.169**
Peroxide Calcium (23Wh)	----	0.005	% Ca	**0.714**	**0.512**	**0.756**	**1.92**	**1.55**
Acid Reacted Calcium (23X)	----	0.005	% Ca	**0.571**	**0.386**	**0.624**	**1.74**	**1.38**
acidity - Acid Reacted Calcium (a-23X)	----	5	mole H+ / t	**285**	**193**	**312**	**866**	**689**
sulfidic - Acid Reacted Calcium (s-23X)	----	0.005	% S	**0.457**	**0.309**	**0.499**	**1.39**	**1.10**
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.005	% Mg	**0.006**	**0.006**	**0.005**	**0.021**	**0.018**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	ASS 1	ASS 2	ASS 3	ASS 4	ASS 5
			Sampling date / time	26-Feb-2024 00:00	26-Feb-2024 00:00	26-Feb-2024 00:00	26-Feb-2024 00:00	26-Feb-2024 00:00
Compound	CAS Number	LOR	Unit	EP2402544-001	EP2402544-002	EP2402544-003	EP2402544-004	EP2402544-005
				Result	Result	Result	Result	Result
EA029-E: Magnesium Values - Continued								
Peroxide Magnesium (23Tm)	----	0.005	% Mg	**0.011**	**0.011**	**0.010**	**0.039**	**0.039**
Acid Reacted Magnesium (23U)	----	0.005	% Mg	<0.005	<0.005	**0.005**	**0.019**	**0.021**
Acidity - Acid Reacted Magnesium (a-23U)	----	5	mole H+ / t	<5	<5	<5	**15**	**17**
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.005	% S	**0.006**	**0.006**	**0.007**	**0.024**	**0.028**
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.020	% CaCO3	**1.69**	**1.32**	**1.81**	**4.34**	**3.45**
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	**337**	**264**	**362**	**867**	**690**
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.020	% S	**0.540**	**0.422**	**0.580**	**1.39**	**1.10**
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	**0.04**	**0.04**
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	<10	<10	<10	**22**	**22**
Liming Rate excluding ANC	----	1	kg CaCO3/t	<1	<1	<1	**2**	**2**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	ASS 6	----	----	----	----
			Sampling date / time	26-Feb-2024 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EP2402544-006	--------	--------	--------	--------
				Result	----	----	----	----
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	**8.3**	----	----	----	----
pH (Fox)	----	0.1	pH Unit	**6.1**	----	----	----	----
Reaction Rate	----	1	Reaction Unit	**2**	----	----	----	----
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	**9.9**	----	----	----	----
pH OX (23B)	----	0.1	pH Unit	**7.9**	----	----	----	----
EA029-B: Acidity Trail								
Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	----	----	----	----
Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	----	----	----	----
Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	----	----	----	----
sulfidic - Titratable Actual Acidity (s-23F)	----	0.005	% pyrite S	<0.005	----	----	----	----
sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.005	% pyrite S	<0.005	----	----	----	----
sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.005	% pyrite S	<0.005	----	----	----	----
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.005	% S	**0.014**	----	----	----	----
Peroxide Sulfur (23De)	----	0.005	% S	**0.027**	----	----	----	----
Peroxide Oxidisable Sulfur (23E)	----	0.005	% S	**0.013**	----	----	----	----
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	5	mole H+ / t	**8**	----	----	----	----
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.005	% Ca	**0.143**	----	----	----	----
Peroxide Calcium (23Wh)	----	0.005	% Ca	**0.776**	----	----	----	----
Acid Reacted Calcium (23X)	----	0.005	% Ca	**0.632**	----	----	----	----
acidity - Acid Reacted Calcium (a-23X)	----	5	mole H+ / t	**316**	----	----	----	----
sulfidic - Acid Reacted Calcium (s-23X)	----	0.005	% S	**0.506**	----	----	----	----
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.005	% Mg	**0.013**	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	ASS 6	----	----	----	----
			Sampling date / time	26-Feb-2024 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EP2402544-006	--------	--------	--------	--------
				Result	----	----	----	----
EA029-E: Magnesium Values - Continued								
Peroxide Magnesium (23Tm)	----	0.005	% Mg	**0.024**	----	----	----	----
Acid Reacted Magnesium (23U)	----	0.005	% Mg	**0.011**	----	----	----	----
Acidity - Acid Reacted Magnesium (a-23U)	----	5	mole H+ / t	**9**	----	----	----	----
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.005	% S	**0.015**	----	----	----	----
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.020	% CaCO3	**1.81**	----	----	----	----
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	**362**	----	----	----	----
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.020	% S	**0.580**	----	----	----	----
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	**1.5**	----	----	----	----
Net Acidity (sulfur units)	----	0.02	% S	<0.02	----	----	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	<10	----	----	----	----
Liming Rate	----	1	kg CaCO3/t	<1	----	----	----	----
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	<0.02	----	----	----	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	<10	----	----	----	----
Liming Rate excluding ANC	----	1	kg CaCO3/t	**1**	----	----	----	----

QUALITY CONTROL REPORT

Work Order	: **EP2402544**	Page	: 1 of 4
Client	: **PENDRAGON ENVIRONMENTAL SOLUTIONS**	Laboratory	: Environmental Division Perth
Contact	: MR RYAN LAWRENCE	Contact	: Customer Services EP
Address	: PO Box 553 Floreat 6014	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: +61 08 9382 8286	Telephone	: +61-8-9406 1301
Project	: PES20004	Date Samples Received	: 26-Feb-2024
Order number	: ----	Date Analysis Commenced	: 28-Feb-2024
C-O-C number	: ----	Issue Date	: 07-Mar-2024
Sampler	: R L		
Site	: RFBYC		
Quote number	: EN/222		
No. of samples received	: 6		
No. of samples analysed	: 6		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Daniel Fisher	Inorganics Analyst	Perth ASS, Wangara, WA

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC
* = The final LOR has been raised due to dilution or other sample specific cause; adjusted LOR is shown in brackets. The duplicate ranges for Acceptable RPD% are applied to the final LOR where applicable.

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EA003 :pH (field/fox) (QC Lot: 5637080)									
EP2402544-001	ASS 1	EA003: pH (F)	----	0.1	pH Unit	8.6	8.6	0.0	0% - 20%
		EA003: pH (Fox)	----	0.1	pH Unit	5.9	5.9	0.0	0% - 20%
		EA003: Reaction Rate	----	1	Reaction Unit	1	1	0.0	No Limit
EA029-A: pH Measurements (QC Lot: 5645020)									
EP2402544-001	ASS 1	EA029: pH KCl (23A)	----	0.1	pH Unit	9.9	9.9	0.0	0% - 20%
		EA029: pH OX (23B)	----	0.1	pH Unit	8.0	8.0	0.0	0% - 20%
EA029-B: Acidity Trail (QC Lot: 5645020)									
EP2402544-001	ASS 1	EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02 (0.005)*	% pyrite S	<0.005	<0.005	0.0	No Limit
		EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02 (0.005)*	% pyrite S	<0.005	<0.005	0.0	No Limit
		EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02 (0.005)*	% pyrite S	<0.005	<0.005	0.0	No Limit
		EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	0.0	No Limit
		EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	0.0	No Limit
		EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	0.0	No Limit
EA029-C: Sulfur Trail (QC Lot: 5645020)									
EP2402544-001	ASS 1	EA029: KCl Extractable Sulfur (23Ce)	----	0.02 (0.005)*	% S	0.006	0.006	0.0	No Limit
		EA029: Peroxide Sulfur (23De)	----	0.02 (0.005)*	% S	0.009	0.008	0.0	No Limit
		EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02 (0.005)*	% S	<0.005	<0.005	0.0	No Limit
		EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10 (5)*	mole H+ / t	<5	<5	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EA029-D: Calcium Values (QC Lot: 5645020)									
EP2402544-001	ASS 1	EA029: KCl Extractable Calcium (23Vh)	----	0.02 (0.005)*	% Ca	0.143	0.152	6.2	0% - 20%
		EA029: Peroxide Calcium (23Wh)	----	0.02 (0.005)*	% Ca	0.714	0.737	3.2	0% - 20%
		EA029: Acid Reacted Calcium (23X)	----	0.02 (0.005)*	% Ca	0.571	0.585	2.4	0% - 20%
		EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02 (0.005)*	% S	0.457	0.468	2.4	0% - 20%
		EA029: acidity - Acid Reacted Calcium (a-23X)	----	10 (5)*	mole H+ / t	285	292	2.4	0% - 20%
EA029-E: Magnesium Values (QC Lot: 5645020)									
EP2402544-001	ASS 1	EA029: KCl Extractable Magnesium (23Sm)	----	0.02 (0.005)*	% Mg	0.006	0.006	0.0	No Limit
		EA029: Peroxide Magnesium (23Tm)	----	0.02 (0.005)*	% Mg	0.011	0.011	0.0	No Limit
		EA029: Acid Reacted Magnesium (23U)	----	0.02 (0.005)*	% Mg	<0.005	0.005	0.0	No Limit
		EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02 (0.005)*	% S	0.006	0.007	0.0	No Limit
		EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10 (5)*	mole H+ / t	<5	<5	0.0	No Limit
EA029-F: Excess Acid Neutralising Capacity (QC Lot: 5645020)									
EP2402544-001	ASS 1	EA029: Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	1.69	1.63	3.2	0% - 20%
		EA029: sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	0.540	0.522	3.2	0% - 20%
		EA029: acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	337	326	3.2	0% - 20%
EA029-H: Acid Base Accounting (QC Lot: 5645020)									
EP2402544-001	ASS 1	EA029: Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: Net Acidity excluding ANC (sulfur units)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: Liming Rate	----	1	kg CaCO3/t	<1	<1	0.0	No Limit
		EA029: Liming Rate excluding ANC	----	1	kg CaCO3/t	<1	<1	0.0	No Limit
		EA029: Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	0.0	No Limit
		EA029: Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	<10	<10	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA029-A: pH Measurements (QCLot: 5645020)								
EA029: pH KCl (23A)	----	----	pH Unit	----	5.4 pH Unit	99.4	94.6	100
EA029: pH OX (23B)	----	----	pH Unit	----	4.3 pH Unit	99.8	93.0	112
EA029-B: Acidity Trail (QCLot: 5645020)								
EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	18 mole H+ / t	100	83.4	112
EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	29.2 mole H+ / t	105	89.0	123
EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.020	----	----	----	----
EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.020	----	----	----	----
EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.020	----	----	----	----
EA029-C: Sulfur Trail (QCLot: 5645020)								
EA029: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.020	0.157 % S	94.6	70.0	120
EA029: Peroxide Sulfur (23De)	----	0.02	% S	<0.020	0.457 % S	96.0	72.2	110
EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.020	----	----	----	----
EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	----	----	----	----
EA029-D: Calcium Values (QCLot: 5645020)								
EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	<0.020	0.417 % Ca	89.9	70.0	117
EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	<0.020	0.512 % Ca	111	70.0	118
EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.020	----	----	----	----
EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.020	----	----	----	----
EA029-E: Magnesium Values (QCLot: 5645020)								
EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	<0.020	0.083 % Mg	90.6	71.6	120
EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	<0.020	0.086 % Mg	92.1	70.0	117
EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.020	----	----	----	----
EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.020	----	----	----	----

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EP2402544**	Page	: 1 of 5
Client	: **PENDRAGON ENVIRONMENTAL SOLUTIONS**	Laboratory	: Environmental Division Perth
Contact	: MR RYAN LAWRENCE	Telephone	: +61-8-9406 1301
Project	: PES20004	Date Samples Received	: 26-Feb-2024
Site	: RFBYC	Issue Date	: 07-Mar-2024
Sampler	: R L	No. of samples received	: 6
Order number	: ----	No. of samples analysed	: 6

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA003 :pH (field/fox)							
Snap Lock Bag - frozen on receipt at ALS (EA003)							
ASS 1, ASS 2, ASS 3, ASS 4, ASS 5, ASS 6	**26-Feb-2024**	**28-Feb-2024**	21-Nov-2026	✓	**01-Mar-2024**	28-May-2024	✓
EA029-A: pH Measurements							
Snap Lock Bag - frozen on receipt at ALS (EA029)							
ASS 1, ASS 2, ASS 3, ASS 4, ASS 5, ASS 6	**26-Feb-2024**	**06-Mar-2024**	21-Nov-2026	✓	**06-Mar-2024**	04-Jun-2024	✓
EA029-B: Acidity Trail							
Snap Lock Bag - frozen on receipt at ALS (EA029)							
ASS 1, ASS 2, ASS 3, ASS 4, ASS 5, ASS 6	**26-Feb-2024**	**06-Mar-2024**	21-Nov-2026	✓	**06-Mar-2024**	04-Jun-2024	✓
EA029-C: Sulfur Trail							
Snap Lock Bag - frozen on receipt at ALS (EA029)							
ASS 1, ASS 2, ASS 3, ASS 4, ASS 5, ASS 6	**26-Feb-2024**	**06-Mar-2024**	21-Nov-2026	✓	**06-Mar-2024**	04-Jun-2024	✓
EA029-D: Calcium Values							
Snap Lock Bag - frozen on receipt at ALS (EA029)							
ASS 1, ASS 2, ASS 3, ASS 4, ASS 5, ASS 6	**26-Feb-2024**	**06-Mar-2024**	21-Nov-2026	✓	**06-Mar-2024**	04-Jun-2024	✓
EA029-E: Magnesium Values							
Snap Lock Bag - frozen on receipt at ALS (EA029)							
ASS 1, ASS 2, ASS 3, ASS 4, ASS 5, ASS 6	**26-Feb-2024**	**06-Mar-2024**	21-Nov-2026	✓	**06-Mar-2024**	04-Jun-2024	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA029-F: Excess Acid Neutralising Capacity							
Snap Lock Bag - frozen on receipt at ALS (EA029)							
ASS 1, ASS 2, ASS 3, ASS 4, ASS 5, ASS 6	**26-Feb-2024**	**06-Mar-2024**	21-Nov-2026	✓	**06-Mar-2024**	04-Jun-2024	✓
EA029-G: Retained Acidity							
Snap Lock Bag - frozen on receipt at ALS (EA029)							
ASS 1, ASS 2, ASS 3, ASS 4, ASS 5, ASS 6	**26-Feb-2024**	**06-Mar-2024**	21-Nov-2026	✓	**06-Mar-2024**	04-Jun-2024	✓
EA029-H: Acid Base Accounting							
Snap Lock Bag - frozen on receipt at ALS (EA029)							
ASS 1, ASS 2, ASS 3, ASS 4, ASS 5, ASS 6	**26-Feb-2024**	**06-Mar-2024**	21-Nov-2026	✓	**06-Mar-2024**	04-Jun-2024	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
pH field/fox	EA003	1	6	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	1	6	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH field/fox	EA003	SOIL	In house: Referenced to Ahern et al 1998 - determined on a 1:5 soil/water extract designed to simulate field measured pH and pH after the extract has been oxidised with peroxide.
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	SOIL	In house: Referenced to Ahern et al 2004 - a suspension peroxide oxidation method following the 'sulfur trail' by determining the level of 1M KCL extractable sulfur and the sulfur level after oxidation of soil sulphides. The 'acidity trail' is followed by measurement of TAA, TPA and TSA. Liming Rate is based on results for samples as submitted and incorporates a minimum safety factor of 1.5.

Preparation Methods	Method	Matrix	Method Descriptions
Drying only	EN020D	SOIL	In house
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house