GOVERNMENT OF WESTERN AUSTRALIA

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 – the applicant is required to sign the form at item No. 8

The applicant is the person with whom 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 of Applicant	City of Canning					
Name of Company (if applicable)	City of Canning					
Contact person	Asile Wong					
Postal address	Locked Bag 80, Welshpool, Western Australia					
Town/Suburb	Cannington				Postcode	6986
Telephone	Work	1300 422 664	Home		Mobile	0403067492
Facsimile						
Email	Asile.Wong@canning.wa.gov.au					

2. Landowner(s) – landowners are required to sign the form at item No. 8

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 as required under section 72(5)(a) of the Act. If there are more than 2 landowners, please provide the additional information on a separate page.

Details of 1st landowner

Full name	City of Canning					
Company/agency (if applicable)	City of Canning					
Position & ACN/ABN (if applicable)	Position	-		ACN/ABN No.	-	
Postal address	Locked Bag 80, Welshpool, Western Australia, 6986					
Town/Suburb	Cannington		State	WA	Postcode	6107

Details of 2nd landowner (if applicable)

Full name						
Company/agency (if applicable)						
Position & ACN/ABN (if applicable)	Position			ACN/ABN No.		
Postal address						
Town/Suburb			State		Postcode	

Department of **Biodiversity, Conservation and Attractions**

GOVERNMENT OF WESTERN AUSTRALIA

SWAN CANNING RIVERPARK

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3. Appointment of an authorised agent – authorised agent is required to sign the form at item No. 8

Where the applicant has appointed an authorised agent to act on their behalf, the authorised agent must attach **the written authority** to this application.

Have you appointed an authorised agent to act on your behalf? **YES** [ ] **NO** [X]

Details of authorised agent

Full name					
Company/agency (if applicable)					
Position in company/agency (if applicable)					
ACN/ABN (if applicable) /Telephone	ACN/ABN:	Work		Mobile	
Postal address					
Town/Suburb		State		Postcode	

4. Certificate(s) of title information

Certificate of title	Volume	LR3056/227	Folio	
	Diagram/plan/deposit plan no.		P208931	
Lot No. and location of subject lot	Lot No. (whole/part)		Lot 1859	
	Location			
Reserve No. (if applicable)	26292			
Street No. and name	Lot 1859 Riverton Drive North. Shelley 6148			
Town/Suburb	Shelley			
Nearest road intersection	Riverton Drive North, Beatrice Ave			

5. River reserve lease (*Swan and Canning Rivers Management Act 2006* - section 29)

If you intend to apply for a lease in relation to this proposed development, you will need to complete a separate Form – Application for a River reserve lease – and lodge it concurrently with this application. Note: River reserve leases will not be granted for developments requiring approval under section 70 of the Act – to which the proposed lease relates – unless that approval has been granted.

Does the development require a River reserve lease? **YES** [ ] **NO** [X]

If the development requires a River reserve lease, please tick the appropriate box below.

New lease	
Renewal of a lease	
Modification of an existing lease (ie. change in area or purpose etc.)	

Form 1 – Application for Approval of Development

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

6. River reserve licence (*Swan and Canning Rivers Management Act 2006* - section 32)

If you intend to apply for a licence in relation to this proposed development, you will need to complete a separate Form – Application for a River reserve licence – and lodge it concurrently with this application, e.g. charter vessel operation, kayak, canoe tours, etc. Refer to the Licence Application Guidelines on how to apply for a River reserve licence.

Does the proposed development involve an activity in the River reserve that will require a River reserve licence?

YES ☐ **NO** X ☐

If the development requires a River reserve licence, please tick the appropriate box below.

New licence	
Renewal of a licence	

Modification of an existing licence (ie. change in area, purpose, etc.)

7. Details of proposed development

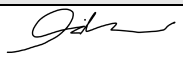
Please provide a written description of the proposed development (refer to the Development Application Guidelines for further details on what information to include in this section).

Estimated cost of development	$ 1,200,000.00
Current use of land	Currently, the land is classified as Crown land and is managed by the City of Canning. It falls under the Parks & Recreation space (Regional Reserve) category within the LPS42 Zone. This area serves as a versatile location for both active and passive recreation, and the City of Canning occasionally hosts significant events here, such as the New Year's Day Celebrations & Fireworks. The development area comprises several features, including a 375m2 Children's playground, 18 parallel parking car bays, a shared pedestrian and cycle pathway, bbq and picnic benches, mature trees (which will be preserved and safeguarded), and a sizable 1,830m2 lawn area.
Proposed development	The City of Canning has scheduled redevelopment construction works at the Shelley Rossmoyne Foreshore, with a specific focus on the 'Shelley Beach Park playground' area situated at Lot 1859 on Watersby Crescent and Lot 3244 on Riverton Drive in Shelley. These planned improvements are collectively referred to as the Shelley Beach Park – Playground construction and are in accordance with the Shelley Beach Park Masterplan, which received Council approval in 2021. As per the City of Canning's Public Open Space Strategy, the designated area is classified as a neighborhood park. The park predominantly features open grasslands with scattered trees, along with fringing riverine vegetation, a small beach area, retaining walls, jetties, shared pathways, play facilities, and passive park furniture. This park is a popular destination for both locals and visitors, hosting annual events organised by the City and hosting various community activities throughout the year. The proposed development works undertaken will require the following; - Alignment with the Shelley Beach Foreshore Management Plan - Engagement with the Swan River Trust Management - Engagement with DBCA for any Development Control Area works The main focus of the project will be on constructing the playground which will include both hardscape and softscape elements within the proposed development area. This includes carrying out earthworks, protecting and retaining existing trees, removing some turf areas to enhance water efficiency, planting more trees and garden beds, modifying parking spaces to accommodate extra parking and ACROD bays, installing footpaths, aligning services accordingly, adding park furniture and fixtures, shelters, and playground equipment. Moreover, the project will incorporate WSUD (Water Sensitive Urban Design) elements like permeable paving and rain gardens to promote sustainable water management. The City has submitted an activity notice to SWALSC and is currently working with the Whadjuk Aboriginal Corporation and DPLH to address the project requirements under the 2021 Aboriginal Cultural Heritage Act. Please refer to the attached documents for further details of the proposed construction works.

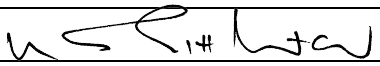
Form 1 – Application for Approval of Development
Swan and Canning Rivers Management Act 2006 – Part 5 – section 72(1)

8. Signatures

Signed by Applicant

Applicant signature		
Date	24.07.2023	
Print name and position (if signing on behalf of a company or agency)	Name	Asile Wong
	Position	Landscape Architect

Signed by Landowner/s (if the landowner is not the applicant)

I consent to this application being made.		
Landowner signature		
Landowner signature		
Date	07.08.2023	
Print name and position (if signing on behalf of a company or agency)	Name	Michael Littleton
	Position	Chief Executive Officer

Signed by Authorised Agent (if you are acting for the applicant)

I have attached a copy of the written authorisation for me to act on behalf of the applicant to this application.		
Authorised Agent signature		
Date		
Print name and position (if signing on behalf of a company or agency)	Name:	
	Position:	

Shelley Beach Park - Playground

Landscape Concept Plan

CITY OF CANNING

Legend

- Extent of works
- Existing Playground Footprint
- Existing Trees
- Proposed Trees
- Lawn
- Garden bed

1. 90° Parking bays (Permeable paving)
2. ACROD Parking bays
3. **0-5 Playspace** (Feature Pelican's Nest playground)
4. Discovery sand pit
5. Basket nest swing
6. Informal nature play area
7. Passive picnic lawn
8. Shelter with picnic benches
9. Large Shelter with BBQ and drink fountain
10. Bicycle parking
11. Passive lawn area
12. **Waterplay Area** (Feature art middens sculptures and shells)
13. Accessible trampoline
14. **6-12 Playspace** (Feature play tower with tall slide)
15. Informal nature play area
16. Bench seat
17. Lost and Found box
18. Swingset with Joey swing
19. Double Flying Fox
20. **12+ Playspace** (Thematic play elements focusing on agility and problem solving)
21. Spacenet climber
22. Turf
23. Shared pedestrian pathway

Note: This drawing represents a design intent and is for the convenience of general reference. The City of Canning reserves the right to make modifications where necessary and applicable.

SHELLEY BEACH PARK - STAGE ONE

CITY OF CANNING

AUGUST 2023

DRAWING LIST: LANDCAPE WORKS

REVIEW ISSUE

DATE	DESCRIPTION	REV
11.08.23	90% DETAIL DESIGN - ISSUED TO DBCA	C
08.08.23	85% ISSUED FOR REVIEW - DESIGN UPDATES	B
18.07.23	85% DETAIL DESIGN - ISSUED FOR REVIEW	A

CITY OF CANNING

PROJECT TITLE

CITY OF CANNING

SHELLEY BEACH PARK MASTERPLAN

STAGE ONE

DRAWING TITLE

LA-CO-01

CONTENTS AND SHEET LAYOUT PLAN

PROJECT NO.	SCALE @ A1	PLOT DATE	REVISION
PR.H1.58	AS SHOWN @ A1	11/08/2023	C

FILE PATH
R:\A LANDSCAPE PLANNING & DESIGN\PROJECTS\SHELLEY BEACH PARK MASTER PLAN\STAGE ONE WORKS\DETAIL DESIGN\LA_LANDSCAPE

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AW	GP	GP	1 OF 30

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SHELLEY BEACH PARK - STAGE ONE

CITY OF CANNING

AUGUST 2023

HARD WORKS LEGEND

EXTENT OF WORKS

CADASTRAL BOUNDARY

P01 - 100MM THICK EXPOSED AGGREGATE CONCRE - REFER TO TYPICAL DETAILS & SPECIFICATION

P01A (TRAFFICABLE) - 175MM THICK EXPOSED AGGREGATE CONCRETE - REFER TO TYPICAL DETAILS & SPECIFICATION

P02 - 100MM THICK EXPOSED AGGREGATE CONCRE - REFER TO TYPICAL DETAILS & SPECIFICATION

P03 - 100MM THICK COLOURED CONCRETE - REFER TO TYPICAL DETAILS & SPECIFICATION

P04 - 100MM THICK GREY CONCRETE - REFER TO TYPICAL DETAILS & SPECIFICATION

P05A - UNIT PAVING PREMEABLE MIX - REFER TO TYPICAL DETAILS & SPECIFICATION

P05B - UNIT PAVING PREMEABLE MIX - REFER TO TYPICAL DETAILS & SPECIFICATION

P05C - UNIT PAVING - BAY LINE MARKING - REFER TO TYPICAL DETAILS & SPECIFICATION

P06 - 100MM THICK GLOW STONE CONCRETE MIX - REFER TO TYPICAL DETAILS & SPECIFICATION

P08 - RUBBER SOFTFALL - REFER TO TYPICAL DETAILS & SPECIFICATION

P09 - SOFTFALL MULCH - REFER TO TYPICAL DETAILS & SPECIFICATION

P10 - SAND SOFTFALL - REFER TO TYPICAL DETAILS & SPECIFICATION

P11 - RED ASPHALT SHARED PATH - REFER TO TYPICAL DETAILS & SPECIFICATION

E01 - 150MM CONCRETE EDGE BEAM - REFER TO TYPICAL DETAILS & SPECIFICATION

E02 - 300MM CONCRETE EDGE BEAM - REFER TO TYPICAL DETAILS & SPECIFICATION

MK - ROADWAY MOUNTABLE KERBING - REFER TO TYPICAL DETAILS & SPECIFICATION

FK - FLUSH KERBING - REFER TO TYPICAL DETAILS & SPECIFICATION

BK - BARRIER KERBING - - REFER TO TYPICAL DETAILS & SPECIFICATION

S01 - SHELTER 1 - REFER TO TYPICAL DETAILS & SPECIFICATION

S02 - SHELTER 2 - REFER TO TYPICAL DETAILS & SPECIFICATION

FIXTURE 1: LIMESTONE BOULDERS - REFER TO DETAILS & SPECIFICATION

FIXTURE 2: DONNYBROOK SANDSTONE BOULDERS - REFER TO DETAILS & SPECIFICATION

FIXTURE 3: SHADE SAILS - REFER TO SPECIFICATION

FIXTURE 4: EXTERNAL DOUBLE GPO - REFER TO SPECIFICATION

FIXTURE 5: CHAINLINK FENCING - REFER TO SPECIFICATION

FIXTURE 6: REMOVABLE BOLLARD - REFER TO SPECIFICATION

FIXTURE 7: GARDEN BED BOLLARD - REFER TO SPECIFICATION

FIXTURE 8: WHEEL STOPPER - REFER TO SPECIFICATION

FIXTURE 9: SINGLE SWING GATE - REFER TO SPECIFICATION

FIXTURE 10: DOUBLE SWING GATE - REFER TO SPECIFICATION

LS: RECYCLED TIMBER STEPPERS - REFER TO SPECIFICATION

TL: RECYCLED TIMBER LOG - REFER TO SPECIFICATION

FURNITURE 1: TIMBER SEAT (WITH BACKREST) - REFER TO SPECIFICATION

FURNITURE 2: TIMBER BENCH (WITHOUT BACKREST) - REFER TO SPECIFICATION

FURNITURE 3: PICNIC SETTING - REFER TO SPECIFICATION

FURNITURE 4: DRINK FOUNTAIN WITH BOTTLE TAP - REFER TO SPECIFICATION

FURNITURE 5: DOUBLE BBQ (ACCESSIBLE) - REFER TO SPECIFICATION

FURNITURE 6: DOUBLE BIN ENCLOSURE (GENERAL WASTE ONLY) - REFER TO SPECIFICATION

FURNITURE 7: 3-PHASE ENCLOSURE - S/S BOLLARD - REFER TO SPECIFICATION

FURNITURE 8: LOST & FOUND BOX - REFER TO SPECIFICATION

SW: 175L SOAKWELL - REFER TO SPECIFICATION

PLAY EQUIPMENT 1: 6-12+ AGE GROUP, FEATURE PLAY ELEMENT - REFER TO SPECIFICATION

PLAY EQUIPMENT 2: 0-5 AGE GROUP, FEATURE PELICAN'S NEST - REFER TO SPECIFICATION

PLAY EQUIPMENT 3: 12+ AGE GROUP, FEATURE PLAY ELEMENT - REFER TO SPECIFICATION

PLAY EQUIPMENT 4: 2.5M TRIPLE SWING SET WITH NEST SWING - REFER TO SPECIFICATION

PLAY EQUIPMENT 5: RECTANGULAR TRAMPOLINE (ACCESSIBLE) - REFER TO SPECIFICATION

PLAY EQUIPMENT 6: SPACENET CLIMBER (EXISTING RELOCATED) - REFER TO SPECIFICATION

PLAY EQUIPMENT 7: DOUBLE CABLE-WAY WITH STARTING PLATFORM (ACCESSIBLE) - REFER TO SPECIFICATION

PLAY EQUIPMENT 8: LOW BASKET SWING - REFER TO SPECIFICATION

PLAY EQUIPMENT 9 : TIMBER MUD KITCHEN - REFER TO SPECIFICATION

PLAY EQUIPMENT 10 : SCULPTURES - REFER TO DETAILS AND SPECIFICATION

PLAY EQUIPMENT 11 : WATER PLAY FIXTURES - REFER TO DETAILS AND SPECIFICATION

SOFT WORKS LEGEND

ROLL ON TURF PLANTING - REFER TO SPECIFICATION

GARDEN BED PLANTING WITH 75MM THICK MULCH - REFER TO TYPICAL DETAILS & SPECIFICATION

MULCH ONLY - REFER TO DETAILS & SPECIFICATION

EXISTING TREE TO BE RETAINED AND PROTECTED - REFER TO SPECIFICATION

PROPOSED TREE

REVIEW ISSUE

DATE	DESCRIPTION	REV
10.08.23	90% DETAIL DESIGN - ISSUED TO DBCA	B
08.08.23	85% DETAIL DESIGN - ISSUED FOR REVIEW	A

CITY OF CANNING

PROJECT TITLE

CITY OF CANNING

SHELLEY BEACH PARK MASTERPLAN

STAGE ONE

DRAWING TITLE

LA-LE-01

LANDSCAPE LEGEND

PROJECT NO.	SCALE @ A1	PLOT DATE	REVISION
PR.H1.58	AS SHOWN @ A1	11/08/2023	B

FILE PATH: P:\3.LANDSCAPE PLANNING & DESIGN\PROJECTS\SHELLEY BEACH PARK MASTER PLAN\STAGE ONE WORKS\DETAIL DESIGN\LA_LANDSCAPE

DRAWN	CHECKED	APPROVED	DRAWING NO.
AW	GP	GP	2 OF 30

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MATCHLINE - REFER LA-DEMO-02

MATCHLINE - REFER LA-DEMO-01

REMOVE CONCRETE PAD. COMMEMORATIVE BENCH TO BE PROTECTED AND RELOCATED ONSITE.

REMOVE LIGHTPOLE

HAND EXCAVATE ONLY AROUND TPZ REMOVE TURF

REMOVE TURF

RETAIN AND PROTECT EXISTING TREES

REMOVE DRINK FOUNTAIN

REMOVE CONCRETE PATH

REMOVE ASPHALT BAYS. RETAIN AND PROTECT FLUSH KERB ABUTTING ROADWAY

REMOVE TURF

REMOVE CONCRETE PAD. COMMEMORATIVE BENCH TO BE PROTECTED AND RELOCATED ONSITE.

DEMOLISH PLAYGROUND, RUBBLE SOFTFALL AND LIMESTONE WALLS. NOTE RETENTION AND RELOCATION OF 1NOS. EQUIPMENT (SPACE NET CLIMBER)

DISMANTLE EXISITNG EQUIPMENT SPACE NET CLIMBER, CLEAN, PROTECT, AND RELOCATE TO NEW LAYOUT AS DOCUMENTED.

DECOMISSION GPO BOX

DISMANTLE EQUIPMENT (LIBERTY SWING) AND TRANSPORT TO CITY OF CANNING DEPO

REMOVE FENCING

REMOVE BIN AND BIN STAND

RETAIN AND PROTECT EXISTING TREES

REMOVE TURF

REMOVE TURF

REMOVE EXISTING BOLLARDS

REMOVE ASPHALT PATH AND KERBING

REMOVE BIN AND BIN STAND

RETAIN AND PROTECT EXISTING TREES

RETAIN AND PROTECT EXISTING TREES

REMOVE ASPHALT BAYS. RETAIN AND PROTECT FLUSH KERB ABUTTING ROADWAY

REMOVE EXISTING BOLLARDS

RETAIN AND PROTECT EXISTING ROADWAY KERB

REMOVE CONCRETE PATH

RETAIN AND PROTECT EXISTING SHARED PATH AND KERBING. TO TIE INTO WORKS NEATLY.

RETAIN AND PROTECT EXISTING TREES

HAND EXCAVATE ONLY AROUND TPZ

RETAIN AND PROTECT EXISTING PATH AND KERBING. TO TIE INTO WORKS NEATLY.

EXISTING GATE TO BE PROTECTED AND RETAINED

871

46

47

NOTES:

- HAND EXCAVATE AROUND EXSITING TREES SRZ ZONE ONLY UNLESS INSTRUCTED BY APPOINTED PROJECT ARBORIST.
- ALL FURNITURE WITH COMMEMORATIVE PLAQUES TO BE CAREFULLY REMOVED AND PROTECTED. THESE WILL BE RELOCATED ON SITE. REFER TO DRAWINGS FOR LOCATIONS.
- EXISTING ROADWAY KERBING TO BE RETAINED AND PROTECTED.
- REFER TO IRRIGATION DRAWINGS FOR COORDINATION AND RETENTION OF EXISTING RETICULATION SYSTEM.
- ALL EXCAVATION TO BE KEPT TO A MAXIMUM OF 1400MM DEEP.
- EXISTING SPACE NET CLIMBER TO BE DISMANTLED, CLEANED, AND RELOCATED ON SITE AS DOCUMENTED.

REVIEW ISSUE

10.08.23	90% DETAIL DESIGN - ISSUED TO DBCA	B
18.07.23	85% DETAIL DESIGN - ISSUED FOR REVIEW	A
DATE	DESCRIPTION	REV

CITY OF CANNING

PROJECT TITLE

CITY OF CANNING

SHELLEY BEACH PARK MASTERPLAN

STAGE ONE

DRAWING TITLE

LA-DEMO-01

LANDSCAPE DEMOLITION PLAN - 1

N

PROJECT NO.	SCALE @ A1	PLOT DATE	REVISION
PR.H1.58	1:200	11/08/2023	B

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1:200

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RETAIN AND PROTECT EXISTING SHARED PATH AND KERBING. TO TIE INTO WORKS NEATLY.

REMOVE ASPHALT PATH AND KERBING

REMOVE TURF

REMOVE BIN AND BIN STAND

REMOVE TURF

HAND EXCAVATE ONLY AROUND SRZ REMOVE TURF

REMOVE CONCRETE PAD. COMMEMORATIVE BENCH TO BE PROTECTED AND RELOCATED ONSITE.

RETAIN AND PROTECT ALL EXISTING TREES

REMOVE BBQ

REMOVE CONCRETE PAD. COMMEMORATIVE FRUNITURE TO BE PROTECTED AND RELOCATED ONSITE.

RETAIN AND PROTECT ASPHALT BAYS AND KERBING. TO TIE INTO WORKS NEATLY.

REMOVE ASPHALT BAYS. RETAIN AND PROTECT FLUSH KERB ABUTTING ROADWAY

MATCHLINE - LA-DEMO-02

MATCHLINE - LA-DEMO-01

NOTES:
- HAND EXCAVATE AROUND EXSITING TREES SRZ ZONE ONLY UNLESS INSTRUCTED BY APPOINTED PROJECT ARBORIST.
- ALL FURNITURE WITH COMMEMORATIVE PLAQUES TO BE CAREFULLY REMOVED AND PROTECTED. THESE WILL BE RELOCATED ON SITE. REFER TO DRAWINGS FOR LOCATIONS.
- EXISTING ROADWAY KERBING TO BE RETAINED AND PROTECTED.
- REFER TO IRRIGATION DRAWINGS FOR COORDINATION AND RETENTION OF EXISTING RETICULATION SYSTEM.
- ALL EXCAVATION TO BE KEPT TO A MAXIMUM OF 1400MM DEEP.
- EXISTING SPACE NET CLIMBER TO BE DISMANTLED, CLEANED, AND RELOCATED ON SITE AS DOCUMENTED.

0 2 4 6 8 10m

1:200

REVIEW ISSUE

DATE	DESCRIPTION	REV
10.08.23	90% DETAIL DESIGN - ISSUED TO DBCA	B
18.07.23	85% DETAIL DESIGN - ISSUED FOR REVIEW	A

CITY OF CANNING

PROJECT TITLE

CITY OF CANNING

SHELLEY BEACH PARK MASTERPLAN

STAGE ONE

DRAWING TITLE

LA-DEMO-02

LANDSCAPE DEMOLITION PLAN - 2

PROJECT NO.	SCALE @ A1	PLOT DATE	REVISION
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MATCHLINE - REFER LA-GR-02

MATCHLINE - REFER LA-GR-01

TREE 9M S 2M H 100MM T

TREE 13M S 6AM H 1200MM T

TREE 15M S 17M H 1000MM T

TREE 12M S 16M H 600MM T

TREE 9M S 2M H 100MM T

6AM-EUCALYPTUS 22M S 17M H 1200MM T

+1.200

+1.300

+1.400

+1.500

RIVERTON DRIVE NORTH

BEATRICE AVE

REVIEW ISSUE

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CITY OF CANNING

PROJECT TITLE

CITY OF CANNING

SHELLEY BEACH PARK MASTERPLAN

STAGE ONE

DRAWING TITLE

LA-GR-01

GRADING PLAN - 01

N

PROJECT NO.	SCALE @ A1	PLOT DATE	REVISION
PR.H1.58	1:100	11/08/2023	B

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MATCHLINE - REFER LA-GR-03

MATCHLINE - REFER LA-GR-02

PE03 - WORK IN PROGRESS

6HM-EUCALYPTUS 20M S 16M H 1100MM T

TPZ - REFER TO ARBORIST REPORT

PE01 - WORK IN PROGRESS

+ TREE 3M S 4M H 200MM T

TPZ - REFER TO ARBORIST REPORT

PE01 - WORK IN PROGRESS

+ TREE 5M S 6M H 300MM T

+ TREE 5M S 2M H 150MM T

MATCHLINE - REFER LA-GR-02

MATCHLINE - REFER LA-GR-01

MATCHLINE - REFER LA-GR-02

MATCHLINE - REFER LA-GR-05

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18.07.23	85% DETAIL DESIGN - ISSUED FOR REVIEW	A

CITY OF CANNING

PROJECT TITLE

CITY OF CANNING

SHELLEY BEACH PARK MASTERPLAN

STAGE ONE

DRAWING TITLE

LA-GR-02

GRADING PLAN - 02

N

PROJECT NO.	SCALE @ A1	PLOT DATE	REVISION
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0 1 2 3 4 5m

1:100

BEFORE YOU DIG www.dyda.com.au

MATCHLINE - REFER LA-GR-03

MATCHLINE - REFER LA-GR-04

MATCHLINE - REFER LA-GR-03

MATCHLINE - REFER LA-GR-02

TREE SM S 4M H 500MM T

GUM-EUCALYPTUS 20M S 16M H 1100MM T

TREE TM S 11M

TPZ - REFER TO ARBORIST REPORT

PE03 - WORK IN PROGRESS

+1.000

+1.100

+1.200

+1.300

+1.400

+1.500

REVIEW ISSUE

DATE	DESCRIPTION	REV
10.08.23	90% DETAIL DESIGN - ISSUED TO DBCA	B
18.07.23	85% DETAIL DESIGN - ISSUED FOR REVIEW	A

CITY OF CANNING

PROJECT TITLE

CITY OF CANNING

SHELLEY BEACH PARK MASTERPLAN

STAGE ONE

DRAWING TITLE

LA-GR-03

GRADING PLAN - 03

PROJECT NO.	SCALE @ A1	PLOT DATE	REVISION
PR.H1.58	1:100	11/08/2023	B

FILE PATH
R:\A LANDSCAPE PLANNING & DESIGN\PROJECTS\SHELLEY BEACH PARK MASTER PLAN\STAGE ONE WORKS\DETAIL DESIGN\A_LANDSCAPE

DRAWN	CHECKED	APPROVED	DRAWING NO.
AW	GP	GP	7 OF 30

NOTE: CHECK ALL DIMENSIONS ON SITE PRIOR TO COMMENCING WORK. WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE. ALL DRAWINGS TO BE READ IN CONJUNCTION WITH MANUFACTURERS AND CONSULTANTS DOCUMENTATION AND SPECIFICATION. REPORT ANY DISCREPANCIES TO LANDSCAPE ARCHITECT BEFORE PROCEEDING WITH WORK.

0 1 2 3 4 5m

1:100

BEFORE YOU DIG www.byda.com.au

MATCHLINE - REFER LA-GR-03

MATCHLINE - REFER LA-GR-04

+1.100

+1.200

+1.300

+1.400

+1.500

GUM-EUCALYPTUS 7M S 7M H 400MM T

TREE 12M S 17M H 900MM T

TREE 12M S 15M H 800MM T

PALM TREE 2M S 9M H 300MM T

TPZ - REFER TO ARBORIST REPORT

TPZ - REFER TO ARBORIST REPORT

TPZ - REFER TO ARBORIST REPORT

MATCHLINE - REFER LA-GR-04

MATCHLINE - REFER LA-GR-05

REVIEW ISSUE

DATE	DESCRIPTION	REV
10.08.23	90% DETAIL DESIGN - ISSUED TO DBCA	B
18.07.23	85% DETAIL DESIGN - ISSUED FOR REVIEW	A

CITY OF CANNING

PROJECT TITLE

CITY OF CANNING

SHELLEY BEACH PARK MASTERPLAN

STAGE ONE

DRAWING TITLE

LA-GR-04

GRADING PLAN - 04

PROJECT NO.	SCALE @ A1	PLOT DATE	REVISION
PR.H1.58	1:100	11/08/2023	B

FILE PATH
R:\LA LANDSCAPE PLANNING & DESIGN\PROJECTS\SHELLEY BEACH PARK MASTER PLAN\STAGE ONE WORKS\DETAIL DESIGN\LA_LANDSCAPE

DRAWN	CHECKED	APPROVED	DRAWING NO.
AW	GP	GP	8 OF 30

NOTE: CHECK ALL DIMENSIONS ON SITE PRIOR TO COMMENCING WORK. WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE. ALL DRAWINGS TO BE READ IN CONJUNCTION WITH MANUFACTURERS AND CONSULTANTS DOCUMENTATION AND SPECIFICATION. REPORT ANY DISCREPANCIES TO LANDSCAPE ARCHITECT BEFORE PROCEEDING WITH WORK.

0 1 2 3 4 5m

1:100

BEFORE YOU DIG www.byda.com.au

MATCHLINE - REFER LA-GR-04

MATCHLINE - REFER LA-GR-05

MATCHLINE - REFER LA-GR-02

MATCHLINE - REFER LA-GR-05

RIVERTON DRIVE NORTH

43

44

TPZ - REFER TO ARBORIST REPORT

PE01 - WORK IN PROGRESS

PE01 - WORK IN PROGRESS

+1.600

+1.700

+1.600

+1.600

150

140

160

150

160

150

160

160

REVIEW ISSUE

DATE	DESCRIPTION	REV
10.08.23	90% DETAIL DESIGN - ISSUED TO DBCA	B
18.07.23	85% DETAIL DESIGN - ISSUED FOR REVIEW	A

CITY OF CANNING

PROJECT TITLE

CITY OF CANNING

SHELLEY BEACH PARK MASTERPLAN

STAGE ONE

DRAWING TITLE

LA-GR-05

GRADING PLAN - 05

N

PROJECT NO.	SCALE @ A1	PLOT DATE	REVISION
PR.H1.58	1:100	11/08/2023	B

FILE PATH

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DRAWN	CHECKED	APPROVED	DRAWING NO.
AW	GP	GP	9 OF 30

NOTE: CHECK ALL DIMENSIONS ON SITE PRIOR TO COMMENCING WORK. WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE. ALL DRAWINGS TO BE READ IN CONJUNCTION WITH MANUFACTURERS AND CONSULTANTS DOCUMENTATION AND SPECIFICATION. REPORT ANY DISCREPANCIES TO LANDSCAPE ARCHITECT BEFORE PROCEEDING WITH WORK.

0 1 2 3 4 5m

1:100

BEFORE YOU DIG www.byda.com.au

MATCHLINE - REFER LA-HW-02

MATCHLINE - REFER LA-HW-01

RIVERTON DRIVE NORTH

BEATRICE AVE

TREE 9M S 2M H 100MM T

TREE 13M S 6M H 1200MM T

TREE 15M S 17M H 1000MM T

TREE 12M S 16M H 600MM T

TREE 9M S 2M H 1000MM T

GUM-EUCALYPTUS 22M S 17M H 1200MM T

TURF

P11 P10 P04 P05A P05B P05C P03

F05 F07 F08 F01

E01 GDB BK MK

+1.200 +1.300 +1.400 +1.500 +1.100

REVIEW ISSUE

DATE	DESCRIPTION	REV
10.08.23	90% DETAIL DESIGN - ISSUED TO DBCA	C
08.08.23	85% ISSUED FOR REVIEW - DESIGN UPDATES	B
18.07.23	85% DETAIL DESIGN - ISSUED FOR REVIEW	A

CITY OF CANNING

PROJECT TITLE

CITY OF CANNING

SHELLEY BEACH PARK MASTERPLAN

STAGE ONE

DRAWING TITLE

LA-HW-01

HARD LANDSCAPE PLAN - 01

PROJECT NO.	SCALE @ A1	PLOT DATE	REVISION
PR.H1.58	1:100	11/08/2023	C

FILE PATH
R:\A LANDSCAPE PLANNING & DESIGN\PROJECTS\SHELLEY BEACH PARK MASTER PLAN\STAGE ONE WORKS\DETAIL DESIGN\LA_LANDSCAPE

DRAWN	CHECKED	APPROVED	DRAWING NO.
AW	GP	GP	10 OF 30

NOTE: CHECK ALL DIMENSIONS ON SITE PRIOR TO COMMENCING WORK. WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE. ALL DRAWINGS TO BE READ IN CONJUNCTION WITH MANUFACTURERS AND CONSULTANTS DOCUMENTATION AND SPECIFICATION. REPORT ANY DISCREPANCIES TO LANDSCAPE ARCHITECT BEFORE PROCEEDING WITH WORK.

0 1 2 3 4 5m

1:100

BEFORE YOU DIG www.byda.com.au

MATCHLINE - REFER LA-HW-03

MATCHLINE - REFER LA-HW-02

PE03 - WORK IN PROGRESS

TPZ - REFER TO ARBORIST REPORT

PE01 - WORK IN PROGRESS

TPZ - REFER TO ARBORIST REPORT

TURF

MATCHLINE - REFER LA-HW-02

MATCHLINE - REFER LA-HW-01

MATCHLINE - REFER LA-HW-02

MATCHLINE - REFER LA-HW-05

REVIEW ISSUE

DATE	DESCRIPTION	REV
10.08.23	90% DETAIL DESIGN - ISSUED TO DBCA	C
08.08.23	85% ISSUED FOR REVIEW - DESIGN UPDATES	B
18.07.23	85% DETAIL DESIGN - ISSUED FOR REVIEW	A

CITY OF CANNING

PROJECT TITLE

CITY OF CANNING

SHELLEY BEACH PARK MASTERPLAN

STAGE ONE

DRAWING TITLE

LA-HW-02

HARD LANDSCAPE PLAN - 02

PROJECT NO.	SCALE @ A1	PLOT DATE	REVISION
PR.H1.58	1:100	11/08/2023	C

FILE PATH
R:\A LANDSCAPE PLANNING & DESIGN\PROJECTS\SHELLEY BEACH PARK MASTER PLAN\STAGE ONE WORKS\DETAIL DESIGN\LA_LANDSCAPE

DRAWN	CHECKED	APPROVED	DRAWING NO.
AW	GP	GP	11 OF 30

NOTE: CHECK ALL DIMENSIONS ON SITE PRIOR TO COMMENCING WORK. WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE. ALL DRAWINGS TO BE READ IN CONJUNCTION WITH MANUFACTURERS AND CONSULTANTS DOCUMENTATION AND SPECIFICATION. REPORT ANY DISCREPANCIES TO LANDSCAPE ARCHITECT BEFORE PROCEEDING WITH WORK.

0 1 2 3 4 5m

1:100

BEFORE YOU DIG www.byda.com.au

MATCHLINE - REFER LA-HW-03

MATCHLINE - REFER LA-HW-04

MATCHLINE - REFER LA-HW-03

MATCHLINE - REFER LA-HW-02

TREE SM S 6M H 500MM T

GUM-EUCALYPTUS 20M S 16M H 1100MM T

PE03 - WORK IN PROGRESS

TPZ - REFER TO ARBORIST REPORT

TREE TPY S 11M

P11 F05 GDB P03 P09 P01 E01 F09 TURF P02 S01 FN03 FN04 FN05 E02 PE11 P06 SW TL F01 PE03 F02

+1.000 +1.100 +1.200 +1.300 +1.400 +1.500

06.0

REVIEW ISSUE

DATE	DESCRIPTION	REV
10.08.23	90% DETAIL DESIGN - ISSUED TO DBCA	C
08.08.23	85% ISSUED FOR REVIEW - DESIGN UPDATES	B
18.07.23	85% DETAIL DESIGN - ISSUED FOR REVIEW	A

CITY OF CANNING

PROJECT TITLE

CITY OF CANNING

SHELLEY BEACH PARK MASTERPLAN

STAGE ONE

DRAWING TITLE

LA-HW-03

HARD LANDSCAPE PLAN - 03

PROJECT NO.	SCALE @ A1	PLOT DATE	REVISION
PR.H1.58	1:100	11/08/2023	C

FILE PATH: R:\A LANDSCAPE PLANNING & DESIGN\PROJECTS\SHELLEY BEACH PARK MASTER PLAN\STAGE ONE WORKS\DETAIL DESIGN\LA_LANDSCAPE

DRAWN	CHECKED	APPROVED	DRAWING NO.
AW	GP	GP	12 OF 30

NOTE: CHECK ALL DIMENSIONS ON SITE PRIOR TO COMMENCING WORK. WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE. ALL DRAWINGS TO BE READ IN CONJUNCTION WITH MANUFACTURERS AND CONSULTANTS DOCUMENTATION AND SPECIFICATION. REPORT ANY DISCREPANCIES TO LANDSCAPE ARCHITECT BEFORE PROCEEDING WITH WORK.

0 1 2 3 4 5m

1:100

BEFORE YOU DIG www.byda.com.au

MATCHLINE - REFER LA-HW-03

MATCHLINE - REFER LA-HW-04

TPZ - REFER TO ARBORIST REPORT

TPZ - REFER TO ARBORIST REPORT

TPZ - REFER TO ARBORIST REPORT

MATCHLINE - REFER LA-HW-04

MATCHLINE - REFER LA-HW-05

REVIEW ISSUE

10.08.23	90% DETAIL DESIGN - ISSUED TO DBCA	C
08.08.23	85% ISSUED FOR REVIEW - DESIGN UPDATES	B
18.07.23	85% DETAIL DESIGN - ISSUED FOR REVIEW	A
DATE	DESCRIPTION	REV

CITY OF CANNING

PROJECT TITLE

CITY OF CANNING

SHELLEY BEACH PARK MASTERPLAN

STAGE ONE

DRAWING TITLE

LA-HW-04

HARD LANDSCAPE PLAN - 04

PROJECT NO.	SCALE @ A1	PLOT DATE	REVISION
PR.H1.58	1:100	11/08/2023	C

FILE PATH
R:\A LANDSCAPE PLANNING & DESIGN\PROJECTS\SHELLEY BEACH PARK MASTER PLAN\STAGE ONE WORKS\DETAIL DESIGN\X_LANDSCAPE

DRAWN	CHECKED	APPROVED	DRAWING NO.
AW	GP	GP	13 OF 30

NOTE: CHECK ALL DIMENSIONS ON SITE PRIOR TO COMMENCING WORK. WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE. ALL DRAWINGS TO BE READ IN CONJUNCTION WITH MANUFACTURERS AND CONSULTANTS DOCUMENTATION AND SPECIFICATION. REPORT ANY DISCREPANCIES TO LANDSCAPE ARCHITECT BEFORE PROCEEDING WITH WORK.

0 1 2 3 4 5m

1:100

BEFORE YOU DIG www.byda.com.au

MATCHLINE - REFER LA-HW-04

MATCHLINE - REFER LA-HW-05

MATCHLINE - REFER LA-HW-02

MATCHLINE - REFER LA-HW-05

RIVERTON DRIVE NORTH

43

44

PE01 - WORK IN PROGRESS

PE02

PE01 - WORK IN PROGRESS

PE02

TPZ - REFER TO ARBORIST REPORT

TURF

ACRD

GDB

+1.600

+1.700

REVIEW ISSUE

DATE	DESCRIPTION	REV
10.08.23	90% DETAIL DESIGN - ISSUED TO DBCA	C
08.08.23	85% ISSUED FOR REVIEW - DESIGN UPDATES	B
18.07.23	85% DETAIL DESIGN - ISSUED FOR REVIEW	A

CITY OF CANNING

PROJECT TITLE

CITY OF CANNING

SHELLEY BEACH PARK MASTERPLAN

STAGE ONE

DRAWING TITLE

LA-HW-05

HARD LANDSCAPE PLAN - 05

N

PROJECT NO.	SCALE @ A1	PLOT DATE	REVISION
PR.H1.58	1:100	11/08/2023	C

FILE PATH
R:\A LANDSCAPE PLANNING & DESIGN\PROJECTS\SHELLEY BEACH PARK MASTER PLAN\STAGE ONE WORKS\DETAIL DESIGN\LA_LANDSCAPE

DRAWN	CHECKED	APPROVED	DRAWING NO.
AW	GP	GP	14 OF 30

NOTE: CHECK ALL DIMENSIONS ON SITE PRIOR TO COMMENCING WORK. WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE. ALL DRAWINGS TO BE READ IN CONJUNCTION WITH MANUFACTURERS AND CONSULTANTS DOCUMENTATION AND SPECIFICATION. REPORT ANY DISCREPANCIES TO LANDSCAPE ARCHITECT BEFORE PROCEEDING WITH WORK.

0 1 2 3 4 5m

1:100

BEFORE YOU DIG www.dyda.com.au

MATCHLINE - REFER LA-SW-02

MATCHLINE - REFER LA-SW-01

TREE 9M S 2M H 100MM T

TREE 13M S 6M H 1200MM T

TREE 15M S 17M H 1600MM T

TREE 12M S 16M H 600MM T

TREE 9M S 2M H 100MM T

GUM-EUCALYPTUS 22M S 17M H 1200MM T

REVIEW ISSUE

DATE	DESCRIPTION	REV
10.08.23	90% DETAIL DESIGN - ISSUED TO DBCA	A

CITY OF CANNING

PROJECT TITLE

CITY OF CANNING

SHELLEY BEACH PARK MASTERPLAN

STAGE ONE

DRAWING TITLE

LA-SW-01

SOFT LANDSCAPE PLAN - 01

N

PROJECT NO.	SCALE @ A1	PLOT DATE	REVISION
PR.H1.58	1:100	11/08/2023	A

FILE PATH
R:\LA LANDSCAPE PLANNING & DESIGN\PROJECTS\SHELLEY BEACH PARK MASTER PLAN\STAGE ONE WORKS\DETAIL DESIGN\X_LANDSCAPE

DRAWN	CHECKED	APPROVED	DRAWING NO.
AW	GP	GP	15 OF 30

NOTE: CHECK ALL DIMENSIONS ON SITE PRIOR TO COMMENCING WORK. WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE. ALL DRAWINGS TO BE READ IN CONJUNCTION WITH MANUFACTURERS AND CONSULTANTS DOCUMENTATION AND SPECIFICATION. REPORT ANY DISCREPANCIES TO LANDSCAPE ARCHITECT BEFORE PROCEEDING WITH WORK.

0 1 2 3 4 5m

1:100

BEFORE YOU DIG www.byda.com.au

MATCHLINE - REFER LA-SW-03

MATCHLINE - REFER LA-SW-02

PE03 - WORK IN PROGRESS

TP2 - REFER TO ARBORIST REPORT

PE01 - WORK IN PROGRESS

PE01 - WORK IN PROGRESS

TP2 - REFER TO ARBORIST REPORT

MATCHLINE - REFER LA-SW-02

MATCHLINE - REFER LA-SW-01

MATCHLINE - REFER LA-SW-02

MATCHLINE - REFER LA-SW-05

REVIEW ISSUE

DATE	DESCRIPTION	REV
10.08.23	90% DETAIL DESIGN - ISSUED TO DBCA	A

CITY OF CANNING

PROJECT TITLE

CITY OF CANNING

SHELLEY BEACH PARK MASTERPLAN

STAGE ONE

DRAWING TITLE

LA-SW-02

SOFT LANDSCAPE PLAN - 02

N

PROJECT NO.	SCALE @ A1	PLOT DATE	REVISION
PR.H1.58	#####	11/08/2023	A

FILE PATH
R:\A LANDSCAPE PLANNING & DESIGN\PROJECTS\SHELLEY BEACH PARK MASTER PLAN\STAGE ONE WORKS\DETAIL DESIGN\X_LANDSCAPE

DRAWN	CHECKED	APPROVED	DRAWING NO.
AW	GP	GP	16 OF 30

NOTE: CHECK ALL DIMENSIONS ON SITE PRIOR TO COMMENCING WORK. WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE. ALL DRAWINGS TO BE READ IN CONJUNCTION WITH MANUFACTURERS AND CONSULTANTS DOCUMENTATION AND SPECIFICATION. REPORT ANY DISCREPANCIES TO LANDSCAPE ARCHITECT BEFORE PROCEEDING WITH WORK.

0 1 2 3 4 5m

1:100

BEFORE YOU DIG www.dyda.com.au

MATCHLINE - REFER LA-SW-03

MATCHLINE - REFER LA-SW-04

TREE SM S 4M H 500MM T

+1.000

+1.100

+1.200

+1.300

+1.400

+1.500

TREE SM S 10M H 1000MM T

TPZ : REFER TO ARBORIST REPORT

PE03 - WORK IN PROGRESS

GUM-EUCALYPTUS 20M S 16M H 1500MM T

MATCHLINE - REFER LA-SW-03

MATCHLINE - REFER LA-SW-02

REVIEW ISSUE

DATE	DESCRIPTION	REV
10.08.23	90% DETAIL DESIGN - ISSUED TO DBCA	A

CITY OF CANNING

PROJECT TITLE

CITY OF CANNING

SHELLEY BEACH PARK MASTERPLAN

STAGE ONE

DRAWING TITLE

LA-SW-03

SOFT LANDSCAPE PLAN - 03

PROJECT NO.	SCALE @ A1	PLOT DATE	REVISION
PR.H1.58	1:100	11/08/2023	A

FILE PATH
R:\A LANDSCAPE PLANNING & DESIGN\PROJECTS\SHELLEY BEACH PARK MASTER PLAN\STAGE ONE WORKS\DETAIL DESIGN\A_LANDSCAPE

DRAWN	CHECKED	APPROVED	DRAWING NO.
AW	GP	GP	17 OF 30

NOTE: CHECK ALL DIMENSIONS ON SITE PRIOR TO COMMENCING WORK. WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE. ALL DRAWINGS TO BE READ IN CONJUNCTION WITH MANUFACTURERS AND CONSULTANTS DOCUMENTATION AND SPECIFICATION. REPORT ANY DISCREPANCIES TO LANDSCAPE ARCHITECT BEFORE PROCEEDING WITH WORK.

0 1 2 3 4 5m

1:100

BEFORE YOU DIG www.byda.com.au

MATCHLINE - REFER LA-SW-03

MATCHLINE - REFER LA-SW-04

MATCHLINE - REFER LA-SW-04

MATCHLINE - REFER LA-SW-05

REVIEW ISSUE

DATE	DESCRIPTION	REV
10.08.23	90% DETAIL DESIGN - ISSUED TO DBCA	A

CITY OF CANNING

PROJECT TITLE

CITY OF CANNING

SHELLEY BEACH PARK MASTERPLAN

STAGE ONE

DRAWING TITLE

LA-SW-04

SOFT LANDSCAPE PLAN - 04

PROJECT NO.	SCALE @ A1	PLOT DATE	REVISION
PR.H1.58	1:100	11/08/2023	B

FILE PATH
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DRAWN	CHECKED	APPROVED	DRAWING NO.
AW	GP	GP	18 OF 30

NOTE: CHECK ALL DIMENSIONS ON SITE PRIOR TO COMMENCING WORK. WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE. ALL DRAWINGS TO BE READ IN CONJUNCTION WITH MANUFACTURERS AND CONSULTANTS DOCUMENTATION AND SPECIFICATION. REPORT ANY DISCREPANCIES TO LANDSCAPE ARCHITECT BEFORE PROCEEDING WITH WORK.

0 1 2 3 4 5m

1:100

BEFORE YOU DIG www.byda.com.au

MATCHLINE - REFER LA-HW-04

MATCHLINE - REFER LA-HW-05

MATCHLINE - REFER LA-HW-02

MATCHLINE - REFER LA-HW-05

43

44

REVIEW ISSUE

DATE	DESCRIPTION	REV
10.08.23	90% DETAIL DESIGN - ISSUED TO DBCA	A

CITY OF CANNING

PROJECT TITLE

CITY OF CANNING

SHELLEY BEACH PARK MASTERPLAN

STAGE ONE

DRAWING TITLE

LA-SW-05

SOFT LANDSCAPE PLAN - 05

PROJECT NO.	SCALE @ A1	PLOT DATE	REVISION
PR.H1.58	1:100	11/08/2023	B

FILE PATH
R:\A LANDSCAPE PLANNING & DESIGN\PROJECTS\SHELLEY BEACH PARK MASTER PLAN\STAGE ONE WORKS\DETAIL DESIGN\LA_LANDSCAPE

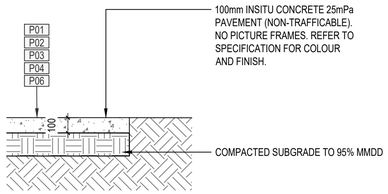
DRAWN	CHECKED	APPROVED	DRAWING NO.
AW	GP	GP	19 OF 30

NOTE: CHECK ALL DIMENSIONS ON SITE PRIOR TO COMMENCING WORK. WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE. ALL DRAWINGS TO BE READ IN CONJUNCTION WITH MANUFACTURERS AND CONSULTANTS DOCUMENTATION AND SPECIFICATION. REPORT ANY DISCREPANCIES TO LANDSCAPE ARCHITECT BEFORE PROCEEDING WITH WORK.

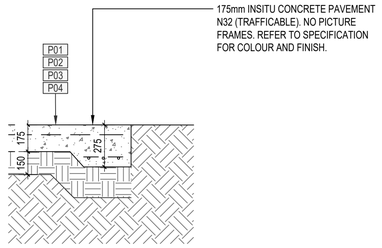
0 1 2 3 4 5m

1:100

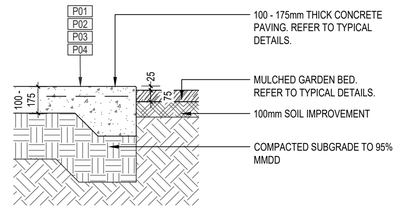
BEFORE YOU DIG www.dyda.com.au



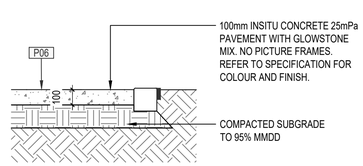
1.01 L-HW-01 TYPICAL DETAIL - P01/P02/P03/P04 NON-TRAFFICABLE - CONCRETE PAVEMENT
SCALE 1:20



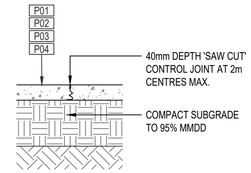
1.02 L-HW-01 TYPICAL DETAIL - P01/P02/P03/P04 TRAFFICABLE - CONCRETE PAVEMENT
SCALE 1:20



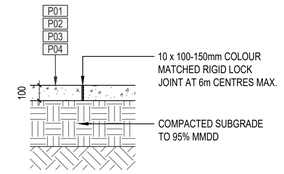
1.03 L-HW-01 TYPICAL DETAIL - P01/P02/P03/P04 - CONCRETE PAVING TO PLANTING
SCALE 1:20



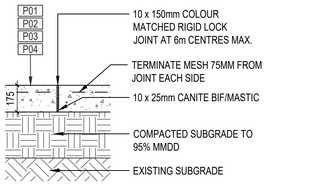
1.01 L-HW-01 TYPICAL DETAIL - P06 NON-TRAFFICABLE - CONCRETE PAVEMENT TO E01
SCALE 1:20



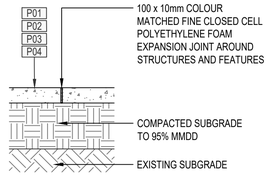
1.04 L-HW-01 TYPICAL DETAIL - CONTROL JOINT
SCALE 1:20



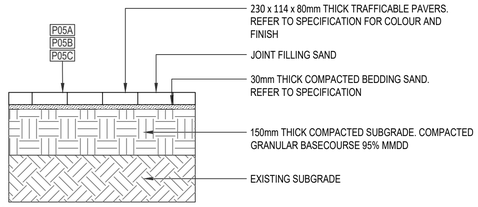
1.05 L-HW-01 TYPICAL DETAIL - EXPANSION JOINT
SCALE 1:20



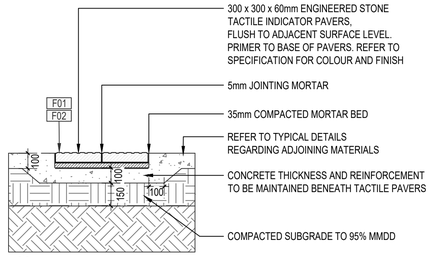
1.06 L-HW-01 TYPICAL DETAIL - P01/P02 TRAFFICABLE EXPANSION JOINT
SCALE 1:20



1.07 L-HW-01 TYPICAL DETAIL - P01/P02 ISOLATION JOINT
SCALE 1:20



1.08 L-HW-01 TYPICAL DETAIL - P05A/P05B/P05C TRAFFICABLE PAVERS
SCALE 1:20



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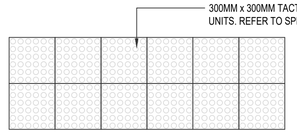

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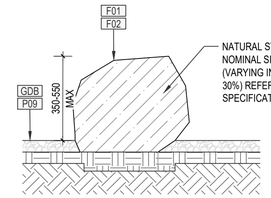

1.11 L-HW-01 TYPICAL DETAIL - F01/F02 STONE BOULDERS
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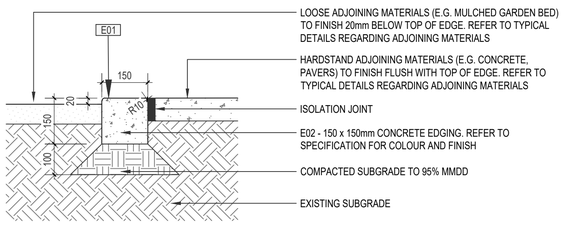

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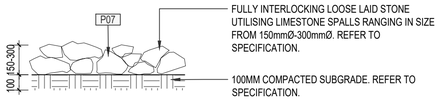
SCALE 1:10



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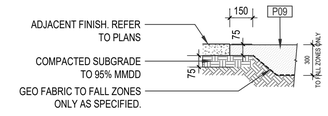

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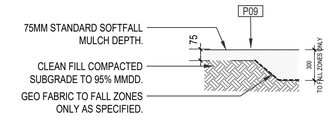

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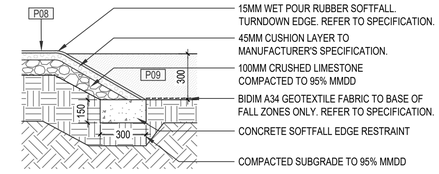

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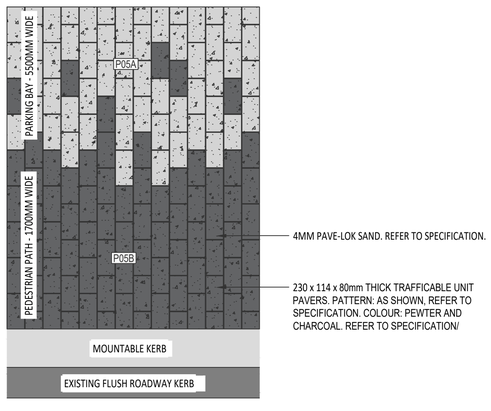

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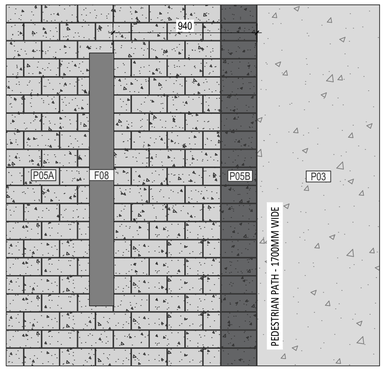

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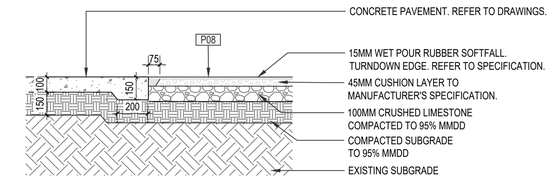

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REVIEW ISSUE

DATE	DESCRIPTION	REV
10.08.23	90% DETAIL DESIGN - ISSUED TO DBCA	A

CITY OF CANNING

PROJECT TITLE
CITY OF CANNING
SHELLEY BEACH PARK MASTERPLAN
STAGE ONE

DRAWING TITLE
LA-DE-01
TYPICAL LANDSCAPE DETAILS - 1

PROJECT NO.	SCALE @ A1	PLOT DATE	REVISION
PR.H1.58	AS SHOWN	11/08/2023	A

FILE PATH
R:\LANDSCAPE PLANNING & DESIGN\PROJECTS\SHELLEY BEACH PARK MASTER PLAN\STAGE ONE WORKS\DETAIL DESIGN\SBP-LA-DD-DETAILS-

DRAWN	CHECKED	APPROVED	DRAWING NO.
AW	GP	GP	24 OF 30

NOTE: CHECK ALL DIMENSIONS ON SITE PRIOR TO COMMENCING WORK. WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE. ALL DRAWINGS TO BE READ IN CONJUNCTION WITH MANUFACTURERS AND CONSULTANTS DOCUMENTATION AND SPECIFICATION. REPORT ANY DISCREPANCIES TO LANDSCAPE ARCHITECT BEFORE PROCEEDING WITH WORK.

BEFORE YOU DIG www.byda.com.au

City of Canning

Construction Environmental Management Plan

Project:
Shelley Beach Park – Stage One Works

Contents

1. Introduction

1.1. General

The City of Canning is delivering of Stage One of the Shelley Beach Park Masterplan, the beginning of an exciting upgrade for one of Canning's most treasured reserves.

Stage One of the delivery plan will include upgrades to the existing playground and see an improved multi-generational play space, new picnic shelter, improved pedestrian and cyclist connections, and more parking bays with accessible facilities. As part of these works, the City will also be planting a range of local endemic plants to increase biodiversity and create more shade pockets around the park for visitors to relax

The City of Canning have developed this Environmental Management Plan to control risks to the environment and site during 'the works' (refer to Section 2 of this report).

This Environment Management Plan has been prepared to provide the framework for Environmental Management and will be in accordance to DBCA Permit (Permit no: ######) requirements for the works. The CEMP will also address detailed information relevant to the proposed works as well as the City of Canning's site requirements.

2. Project Description

2.1. Location

Shelley Beach Park, Shelley WA 6148. (Lot 1859, Watersby Crescent and Lot 3244 Riverton Drive, Shelley.)

Figure 1: Indicative extent of works at Shelley beach Park. Shown in Pink. (Detailed site layout provided below.)

2.2. Construction & Operation Activities

The project construction comprises of the following stages:

- Mobilisation of construction site, temporary fencing

- Installation of sediment control measures within works area
- Survey and site establishment
- Grass clearing and scalping, existing tree protection measures and watering
- Demolition and disposal of existing playground and carparking bays
- Drainage and Water Sensitive Design features excavation and installation
- Modification of existing services
- Screened and approved import fill, placement, and compaction
- Feature profiling, shaping, and site grading works
- Hot mix asphalt laying and profiling
- Install of new playground, hard surface finishes and fixtures
- Irrigation works
- Planting and mulching works
- Trial testing
- Periodic inspections

2.3. Timing & Schedule

The Shelley Beach Park and its surrounding areas are frequently utilised by the public and visitors alike for active and passive recreational activities. As such, the implementation of the proposed works will need to be undertaken in a timely, safe, and efficient manner, with minimal disruption to the broader park and its users.

The City of Canning is proposing to implement the construction works over a (16 week) period; an indicative project schedule is outlined below. Note that the proposed start date is subject to the approval of this CEMP by DBCA and the Part 5 approval process to be undertaken by the City. Note that the City's appointed contract will provide a detailed project schedule which will then be shared with DBCA upon approval.

Table 1: Indicative Project Schedule

Task	Duration	Start	Finish	Responsibilities
Award of Contract				
Preparation and submission of requested documentation and management plans to the City of Canning and DBCA				
Approval of Management Plans				
Site Mobilisation: includes temporary fencing installation, sediment control measures, TPZ measures, measures to ensure watering regime to existing trees within works area				
Demolition works				
Construction work: Hard landscape works (including but not limited to)				
Construction work: Soft landscape works (including but not limited to)				
Site Clean up and demobilisation				

2.4. Environmental Management Plan Objectives

This Construction Environmental Management Plan seeks to provide a concise and comprehensive plan for use by the City of Canning's nominated contractor for the project. This includes but is not limited to the following:

- Complete site management
- Reduce the risk of environmental incidents or emergencies
- Protect the existing vegetation and environment while construction works are being undertaken
- Reduce the risk to site staff and persons affected by actions and works on site
- Continually improve on the construction environmental management best practice

3. Environmental Management

3.1. Project Specific Environmental Concerns

Shelley Beach Park is a valuable, and protected area that hosts several important environmental, cultural, and recreation features. A key feature of this CEMP is the protection of the Canning River / Djarlgarro Beeliar and its associated environmental attributes.

This project looks to upgrade the existing play space and the extents of the works should have minimal to no disturbance and impact to the protected vegetation and waterbodies. However, the City of Canning understand and any potential disturbance or impact to areas outside of the work area should also be considered and properly managed in the event of such occurrences. The following points outlines the City of Canning's proposed management of key issues that may occur:

3.1.1. Permanent Drainage

An appropriate and sustainable drainage solution is key to the success of the public open space and the City is committed to ensuring that any drainage or run-off resulting from the infrastructure is directed towards an infiltration system, whether naturalised or constructed, within the project area, while keeping in mind the principles of WSUD. This will be designed to minimise negative impacts on the water cycle, prevent run-off from directly entering the nearby river before its treated, and introduce sustainable solutions that protect the environment and maximise use of natural resources. The final details of these will be included in the final design drawings and will be provided to DBCA prior to construction works commencing.

3.1.2. Temporary Drainage

Control of any run-off from the construction site during construction works will be implemented to eliminate any risk of contamination of the adjoining river system from either the drainage system or overland flow. The City of Canning's appointed contractor will implement silt fencing as required to redirect and potential run-off to a suitable location where it can be effectively dealt with, without causing contamination of the river.

3.1.3. Protection of the River from inputs of debris, run-off, soil, fill, or other deleterious materials

With construction works occurring near the banks of the River, there is a risk for deleterious materials to enter the water way. The City of Canning will ensure that the appointed Contractor will have controls in place so that this does not occur, including the storage of all equipment and materials a safe distance away from the waterbody and vegetation.

All areas containing fines, fill material, or rock stockpiles will be bunded. Bunding will be in the form of silt trap fencing to the river side of materials, trenched or secured into the ground and held in place using timber stakes, as per manufacturer's instructions. If rain is forecast during the works, material stockpiles will be covered using geotextile or black plastic secured to the ground using steel pins, to prevent runoff or wind-borne materials entering the water way. Any bunded areas will be within the works site and away from existing trees.

3.1.4. Protection of Existing Trees

It is of great importance that all existing trees within the area of works are retained and protected throughout the works. Prior to work commencing on site, the Contractor is to ensure that the Tree Protection Zones as marked on the landscape drawings are to be established and maintained for the duration of the project. The tree protection zones are to be fenced and signs are to be positioned on the fence at 5 metre centres reading Tree Protection Zone – Authorised Entry Only. The entire tree protection zone is to be mulched to a depth of 100mm using well decomposed processed tree pruning. Recommend a clean native mulch and inclusion of pest and pathogen hygiene measures:

- Movement of soil to be minimised
- Only essential vehicles, machinery and equipment to access the site

- Boots, vehicle, machinery and equipment to be cleaned on entry and exit between sites/reserves (sanitising agent such as 5% bleach, 70% Methylated Spirits or Phytoclean)
- Vehicles, machinery and footwear to be inspected for soil, plant and animal material before entering and exiting the reserve

Mulch is to extend to the perimeter of each fence.

The contractor is to engage a qualified arborist to inspect the tree protection zones and ensure that they are installed in accordance with this specification. The arborist is to inspect all trees marked for retention on a fortnightly basis throughout the duration of the project and provide a written report on their condition and any recommendations to ensure their health is maintained. Strictly no building materials are to be stored or disposed of within the tree protection zone. Excavated soil shall not be stored or built up around the trunk of trees to be retained. Soil levels shall not be changed around the base of trees either raised or lowered.

Supplementary watering to retained trees will be required over summer months where works are in proximity of the trees. Watering the trees is required to minimise stress on the trees while works are occurring. The appointed contractor is required to water deeply a minimum of once per week for a total of 1000 litres per tree for mature trees and 600 litres for trees less than 8m in height. A wetting agent is to be applied within the water application.

All work within the TPZ is to be undertaken under the supervision of the engaged qualified arborist utilising means that will result in the least disturbance to the tree. Trenching and digging of any manner is to be completed by hand.

Additionally, a Tree protection plan for the large *Eucalyptus gomphocephala* has been prepared by a qualified arborist for the City, to provide further certainty regarding the tree remains in optimal health during construction works. Refer attachment - Appendix D - Arboriculture Design Report.

3.1.5. Removal of Existing Trees

No removal of existing trees (except for dead trees) should occur under this contract. In the event of a need to remove a dead tree or tree identified to be a hazard, the Contractor together with a supporting Arborist report obtain approval from the DBCA alongside City of Canning to remove the identified tree after a site inspection and clear identification of the tree and cause of the failure or death.

3.1.6. New Planting

Future planting within the works area by the City of Canning will consist of vegetation that is local to the area and plants that enhance the existing biodiversity of the area. Water-wise and WSUD planting will be utilised in areas that provide an opportunity to both filter low-peak run-offs from hard surfaces. Final soft landscape plans and planting schedule will be provided by the City in a separate document once made available. The plant selection will be guided by Shelley Rossmoyne Foreshore Management Plan 2019 to ensure ecological connectivity with suitable species up and down stream of the Shelley Beach area.

3.1.7. Storage of Materials, Plant, and Refuelling

Plant and materials must be stored in such a way to ensure that any contamination of the environment is minimised. To that end, the following controls will be implemented:

- Chemicals and fuels to be stored in bunded areas, utes, shipping containers, with the preference for off-site storage
- Machinery must be well-maintained, periodically checked for any leaks or damages in the duration of works.
- Plant stock must be screened from diseases and pests off-site prior to transport to site and procured from an accredited nursery
- Large scale machinery and equipment re-fuelling preference is to be off-site. However small machinery/equipment re-fuelling may be considered on-site and shall take place within a designated

area over non-vegetated areas such as hardstands or asphalt with spill containment measures in place.

3.1.8. Site Contamination

The City of Canning understands the risks associated with site works and excavation on projects as such. These may be in the form of contamination, asbestos, hydrocarbon, acid sulphate, and other chemical contamination. The City has engaged a Geotechnical Investigator to provide a report to identify the existing ground and water conditions in the works area. This report will provide an appropriate understanding of the site conditions, the impact of the redevelopment, excavation conditions, and detailing methods and recommendations to support the redevelopment. This report is currently being developed and will be provided to DBCA as part of the supporting documents.

In the event of a fuel/oil spill or any other environmental incident, steps will be taken to clean up the contaminated area immediately (Table 4), and DBCA will be notified within 1 hour on (08) 9278 0981. Due to the location of the proposed material laydown area, it is not envisaged that any temporary drainage blocks will be required for these works, however the City will ensure these are readily available in the case of an emergency. Small machinery and equipment refuelling will be kept to an absolute minimum on site and will only take place within designated areas, as per the site controls map.

Table 2: Spill Management Plan

Step	Action/Activity
1.	Remain up-wind of the spill site at all times
2.	Before attempting to respond to a spill, ensure the appropriate PPE is worn
3.	Identify chemical(s) involved, including: ▪ chemical name ▪ location and approximate area (extent) affected by the spill ▪ proximity to the Swan River ▪ presence of any drains that could potentially lead into waterways
4.	Determine if anyone has been affected by the incident, and ***if safe to do so***, provide assistance or call for emergency assistance (dial 000, indicating the nature of the emergency and the chemical(s) involved)
5.	If the spill can be dealt with safely on site then follow the four 'C' of spill handling:
5.1	**CONTROL the spill:** stop the leak as quickly as possible without risking your own safety. ▪ If a container has fallen over then quickly set it up right to prevent more from spilling out. ▪ If any plant or equipment is leaking then shut down the motor and close all valves. ▪ If possible use any spare containers to catch leaking material.
5.2	**CONTAIN the spill:** keep spilled material from spreading. ▪ Use the spill kit material to dam the chemical to prevent it from spreading. ▪ Carefully sweep or collect the absorbent material. Put clean up materials in a plastic bag for proper disposal at an approved site. ▪ Ensure any drains around spill site are dammed or blocked to prevent chemicals from entering the system.
5.3	**CLEAN up the spill:** read relevant SDS and handle appropriately. ▪ Consult relevant SDS for additional clean up information. ▪ Remove contaminated clothing if suggested by SDS and rinse affected areas. ▪ Do not wash down spills as this will enlarge the contaminated area. ▪ use the absorbent material from spill kit to prevent further spread of the chemical

	▪ After allowing sufficient time for chemical to be absorbed, material is to be swept up and stored in an appropriate container until the material can be disposed of at a class III landfill
5.4	**CALL the appropriate authority:** ▪ Call the relevant NAH personnel (Project manager or Director) to notify of any spill. ▪ The Project Manager will contact the Superintendent, the City and DBCA ▪ Make sure to have the relevant SDS on hand and ready for emergency response crews.
6.	If the spill cannot be safely controlled, then immediately call and request assistance. In the event where it cannot be contained, the following steps should be adhered to: ▪ Remain upwind at all times and wear available PPE. ▪ Ensure that members of the public are kept away from the spill area. ▪ Determine if anyone has been affected by the incident and if safe to do so provide assistance

3.1.9. Traffic, Access, and Parking Management for Contractors and the Public

A site-specific pedestrian traffic management plan will be prepared upon appointment of a Contractor and is to be read in conjunction with this CEMP. The City of Canning will provide this information to DBCA once made available.

Temporary site fencing will be utilised to secure the project and site laydown area and aims to restrict public access. The installation of the temporary fence will occur once the appointed Contract is granted site possession. The temporary fence will remain in place until all works are completed.

Site access will be specified by the City in an area that minimises environmental impact, including away from vegetation and existing trees. If site access is required in any areas adjacent to existing trees single access points and/or rumble mats will be provided to minimise compaction of the ground conditions within these areas.

3.1.10. Public Safety and Amenity

Signage will be placed around the works area to alert the general public of the works taking place. Signage will be placed at suitable locations either side of the works area to alert pedestrians and cyclists using the dual use path of the works ahead. A contact number for the City will be provided on this signage, in the case or any unforeseen events related to the works.

3.2. Approvals & Licensing Requirements

Approvals and licensing requirements for this project:

Item	Detail	Responsibilities
Licenses &Training/Induction	- Site induction - City required induction - White Card	Project Manager (Contractor)
Approvals	- Planning related - Design changes - External agencies approvals (i.e. DBCA)	City of Canning (Project Manager / Principal Rep)
Permits	- Works permit	City of Canning (Project Manager / Principal Rep)

3.3. Reporting

The appointed Contractor is to ensure that all staff are to report any known non-compliance should this arise. The Contractor must provide the City of Canning a detailed reporting structure that outlines the process map.

3.4. Environmental Training

The appointed Contractor must ensure that all employees working on site understands their obligation to exercise due diligence for environmental matters. It is the Contractor's responsibility to ensure that their personnel undergo general environmental awareness training and training about their responsibilities under the CEMP during the Company Induction and Site-Specific Induction. This includes contractors and sub-contractors.

Environmental training includes (not limited to):

- A site induction
- Familiarisation with the requirements of the CEMP
- Environmental emergency response training
- Familiarisation with the site environmental controls, and
- Targeted environmental training for specific personnel, for example, plant operators in dust suppression.

The requirement for additional training will be highlighted and brought to the attention of the City's Principal representative during reviews of the CEMP, following any non-compliance or environmental emergency.

The Contractor is to ensure that a training register is kept identifying individuals that have been inducted to the CEMP capturing the following:

- Name of Employee
- Date
- Name of Trainer
- Description of Training content

3.5. Emergency Contacts

The Project Manager (Contractor) is the nominated contract person for emergencies and will be available 24 hours a day, seven days a week, and has the authority to stop or direct works. This contact will be provided upon nomination of personnel from the appointed Contractor.

Other contacts:

Emergency Contact Numbers	
Fire, Ambulance, Police	000
City of Canning Principal Representative: Jason Tindale	0481 465 286
City of Canning Project Landscape Architect: Asile Wong	0403 067 492

3.6. Emergency Response

An environmental emergency is any event that causes or has the potential to cause material harm to the environment. It is an unplanned event that can cause significant harm to the environment; or that can shut down operations, disrupt operations, cause physical damage, or threaten the Company's financial standing or public image.

The emergency response is the action mitigating the environmental impact arising from an environmental emergency. On-site information on hazardous materials, including Material Safety Data Sheets and spill containment materials are housed in the site container. These are easily identifiable and are highlighted during the onsite induction.

The appointed Contractor is to provide the City of Canning an approved ER plan upon appointment. This information can be shared with DBCA upon request.

4. Implementation

4.1. Environmental Controls Map

This will be provided at a later stage upon confirmation.

4.2. Environmental Schedules

This will be provided at a later stage upon confirmation.

5. Monitoring & Review

5.1. Environmental Monitoring

Environmental monitoring will be carried out in the form of the Site Checklist. The checklist will be carried out on mobilisation by the Site Supervisor and at regular intervals throughout the project life cycle, including following any non-compliance issues and/. Or environmental emergencies.

Copies of the site checklist and any follow up actions will be stored in the Project Managers digital project file for records keeping purposes.

5.2. Environmental Auditing

Environmental auditing is undertaken periodically by the appointed Contractor (Project Manager). The Project Manager will undertake audits of work sites and audits of staff training and environmental management knowledge retention.

The City of Canning Principal representative (Superintendent) will conduct audits of worksites in order to cross reference organisational standards, knowledge share and ultimately provide best practice environmental management techniques on site.

The Environmental Management is reviewed annually, and CEMP documentation subsequently updated to reflect changes.

5.3. Corrective Actions

The Project Director, Client, Project Manager and Site Supervisor have the authority for initiating corrective action. Casual employees, volunteer workers and sub-contractors have a duty of care to raise issues of non-compliance and report to senior staff, verbally or written, to action.

5.3.1. Non-compliance with environmental controls

It is the site supervisor's role to ensure that all staff, including volunteer workers and subcontractors are complying with environmental controls. Disciplinary action will be taken if staff are found to be deliberately non-compliant. Should any non-compliance issues arise a review of site inductions and the CEMP will be initiated.

5.3.2. Non-compliance with environmental incidents & emergencies

It is the site supervisor's role to ensure that all staff, including volunteer workers and subcontractors comply with the environmental emergency procedure. It is the Project Managers role to ensure the procedure is fully understood by all staff working on site. Disciplinary action will be taken if staff are found to be deliberately non-compliant. Should any non-compliance issues arise a review of site inductions and the CEMP will be initiated.

5.4. Environmental Management Plan Review

The CEMP is not static and should be reviewed within the lifespan of the project. This CEMP may be reviewed following outcomes on other City of Canning projects. A review will also take place following any non-compliance issues and/ or environmental incidents or emergencies.

The Project Manager is responsible for reviewing the document and recording any decisions of change, the reason for them and making and communicating the subsequent change. The site project team will be updated by the site supervisor at the Daily Toolbox Meeting or equivalent, and the change will also be discussed during

the Weekly Construction Meeting. If changes to the CEMP affect the scope of works, budget, resourcing or quality, then the changes to the CEMP must be approved by the City of Canning.

STATS Australia
Specialist Testing and Technical Services

PROPOSED SHELLEY PARK UPGRADE

Preliminary Acid Sulphate Soils and Geotech Investigation work

Prepared for:

City of Canning

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Issued to:	City of Canning
Author:	Francesco M
Reviewer:	Aidan S
Approval:	Aidan S

Distribution List for this Report	Hard Copy	Soft Copy
City of Canning	Nil	1 pdf, Email
STATS	Nil	1 pdf, Server

IMPORTANT NOTE

Please refer to STATS "Notes about Your Report"

STATS Australia
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Table of Contents

Figures

Appendices

Photographic Survey

Perth
Unit 1/16 Production Road, Canning Vale, WA 6155
Karratha
1938 Pyramid Road, Karratha, WA 6714
Singapore
71 Toh Guan Rd East, #02-01/02/06 Techcentre, SG 602598
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EXECUTIVE SUMMARY

Specialist Testing and Technical Services (STATS) was engaged by Mr. Asile Wong on behalf of City of Canning (the Client), to conduct a Preliminary Acid Sulphate Soils and Geotech Investigation work for the proposed Shelley Park Development. STATS is also given to understand the proposed Shelley Park Upgrade – Stage 1 development comprises of the following:

- New Play space area,
- Waterplay area,
- Shelter with BBQ pits,
- Exercise station,
- Realignment of carpark bays.

The Geotechnical Investigation was conducted in accordance with AS 1726 to provide a Preliminary Geotech Investigation work for the proposed development and comprises of Mechanical Hand Augers, DCP Tests and Field Permeability Tests.

The field investigation activities were carried out on 2nd May 2023 comprises of the following:

- Five (x5) test pits (TP) up to the depth of 2.3m or refusal;
- Five (x5) Dynamic Cone Penetration tests (DCP) up to the depth of 2.05m were carried out adjacent to each test location;
- Four (x4) Field Infiltration tests (IFT).

An overall layout of test locations is presented in Figure 1.

Findings

The soil profile at all five (x5) TP is consistent and comprises of Sand Mixtures (SAND): fine to medium grained, brown/white, dry/moist, dense, with occasional shell fragments and gravels up to 1.3m-1.5m in depth; overlaying Sand-Silt Mixtures (silty SAND) fine to medium grained, grey/black, wet, dense/medium dense, with occasional shell fragments and gravels up to 2.3m in depth. All the five (x5) TP reached the target depth between 2.1m and 2.3m.

Water table was encountered at all five(x5) TP locations between 1.1m and 1.3m in depth.

Based on the Soils Testing Handbook of Australian Standard, Table 6.4.6.1(B) (Correlation of DCP Blow Count with Relative Density), the density of the soils for the granular materials (Sand mixtures) was generally "**Dense**", with an average of 3.9 blows per 100mm of penetration up to a depth of 2.05m.

The Field Permeability measurements conducted over the site revealed an overall average permeability of 3.79 m/day, with the lowest value of 1.46 m/d recorded for IFT2In accordance with Table 5.1 of AS/NZS 1547:2012 the site has been classified as "Sands" with a respective soil category of 1 out of 6.

The site is currently assigned a Site Classification of "**A**" in accordance with the definitions provided in the Australian Standard AS2870 -2011. For the soil profile encountered, the characteristic surface movement (Ys Value) for the site was assessed as nil movement from moisture changes.

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Based on the type of soils encountered, an allowable soils bearing capacity of up to 120kPa may be adopted for all pad and strip footing structures, on the condition the ground is prepared and compacted to achieve 95% MDR compaction.

From the ASS screen and following SPOCAS results, TP2 location presents a relevant NET acidity value (excluding ANC) at a depth of 2.0m. For this reason, all earthwork excavations are recommended to be limited to a maximum depth of 1.5m for the development. An Acid Sulphate Management Plan and Acid Sulphate soils treatment program may need to be incorporated.

Based on the laboratory test results, a CBR design value of 15% is recommended for the subgrade layer for the carparking areas.

Any further earthworks for site preparation shall be carried out in accordance with AS 3798-2007.

1.0 INTRODUCTION

1.1 The following is a Geotechnical Investigation and Preliminary Acid Sulphate Soil Assessment Report for the proposed Shelley Park Upgrade – Stage1, Shelley.

1.2 The objective was to obtain information on the subsurface conditions to classify the site in accordance with the definitions provided in Australian Standard AS2870 - 2011, and AS 1726 for the Geotechnical Parameter and earthwork information required for the construction work.

1.3 The site investigation was carried out on 2 May 2023.

2.0 SCOPE OF INVESTIGATION

2.1 The scope of investigation is as follows:

- Discussions with Client on final scope of work, changes (if any), inductions, etc.
- Review all Dial Before U Dig information at the proposed test locations.
- Mobilize and demobilize a crew and equipment to site.
- Carrying out six(x6) hand auger boreholes up to 2m or refusal as shown in Figure 1.
- Carry out USC logging of boreholes, including ASS sampling at depth intervals of 0.25m up to 2m depth. SPOCAS Tests at nominated test locations during Phase 2 work.
- Reinstate areas of investigation using excavated spoils and make good.
- Carry out DCP tests up to a depth of 1m or refusal adjacent to all hand auger borehole locations to determine soil density versus depth.
- Cary out Field Permeability tests at four (x4) locations to determine soil hydraulic conductivity.
- Test pits in accordance with AS2870 section 2.4.3 & 2.4.4.
- Test pit logging of soil strata and observations for ground water.
- Investigation Report to include:
  - Details of investigation.
  - Site plan showing location of subsurface probing/test pits.
  - Presence of ground water table level.
- Carry out these laboratory tests, by STATS Laboratory:
  - Particle Size Distribution (AS 1289 3.6.1).
  - Plasticity Index (AS1289) AS 1289 3.1.2-3.4.1 (1pt Casagrande, incl Linear Shrinkage).
  - Modified Maximum Dry Density (AS1289.5.2.1).
  - 4 days soaked CBR Tests (AS1289.6.1.1).
  - Field pHF and pHFox screen tests,
  - SPOCAS tests on most significant field screen results.
  - Submit Preliminary Geotech Report on findings, including earthwork and compaction tests recommendations, permeability flow rate across site, pavement subgrade design values.
  - Submit preliminary report on Field Acid Sulphate Soils Screening and SPOCAS results and recommended earthwork requirements to mitigate the outcome.
  - Determine geotechnical suitability for the proposed development, requirements for removal of any unsuitable soils and import of select fill materials.

- Advice appropriate foundation system(s) for the proposed structures, including foundation design parameters such as allowable bearing pressures estimations for footings.
- Advice on existing ground water levels across development, annual ground water levels.

3.0 SITE CHARACTERISTICS

3.1 Geology

3.1.1 A review of 1:250,000 Environmental Geological Map of Perth indicates that the site is situated on Predominantly Quartz SAND, embedded in the Bassendean Sands System.

3.2 Groundwater

3.2.1 Groundwater was encountered during test pitting at all the five(x5) location, at a similar depth between 1.1m and 1.3m.

4.0 SITE DESCRIPTION

4.1 The site is located at Shelley Beach Park, City of Canning.

4.2 The park is equipped with facilities, playground, toilet facilities and other structures. On the north-west side of the park is at boundary with the Swan River.

4.3 There are existing structures, trees, facilities, pedestrian way, and plants on site at the time of visit.

5.0 FIELD PROGRAMME

5.1 Test Pit Logs

5.1.1 The soil profile at all five (x5) TP is consistent and comprises of Sand Mixtures (SAND): fine to medium grained, brown/white, dry/moist, dense, with occasional shell fragments and gravels up to 1.3m-1.5m in depth; overlaying Sand-Silt Mixtures (silty SAND) fine to medium grained, grey/black, wet, dense/medium dense, with occasional shell fragments and gravels up to 2.3m in depth.

5.1.2 For TP1 location the soil profile from 2.0m to 2.3m in depth is slightly different, comprises of Sand - Silt Mixtures (well graded silty SAND), fine to medium grained, grey/brown/black, wet, loose, with occasional shell fragments and gravels.

5.1.3 TP1, TP2 and TP3 terminated at a target depth of 2.3m, whereas TP4 terminated at 2.2m and TP5 at 2.1m.

5.1.4 TP1, TP2 intercepted water table at a depth of 1.3m, whereas the water table level at TP3 and TP4 was intercepted at 1.1m and at 1.2m depth for TP5.

5.1.5 The Test Pit logs are presented in Appendix 2, and the test locations are presented in Figure 1.

5.2 Dynamic Cone Penetrometer

5.2.1 Dynamic Cone Penetrometer (DCP) testing was carried out alongside each test pit location to determine the soil density versus depth.

5.2.2 Based on the Soils Testing Handbook of Australian Standard, Table 6.4.6.1(B) (Correlation of DCP Blow Count with Relative Density), the density of the soils for the granular materials (Sand mixtures) was generally "Dense", with an average of 3.9 blows per 100mm of penetration up to a depth of 2.05m.

5.2.3 The DCP results are presented in Appendix 3 of this report.

5.3 Field Infiltration Test (Permeability)

5.3.1 The Field Permeability measurements conducted over the site revealed for IFT1, IFT3 and IFT4 similar value with an average permeability of 4.56 m/day, whereas a lower value of 1.46 m/d has been recorded for IFT2. In accordance with Table 5.1 of AS/NZS 1547:2012 the site has been classified as "Sands" with a respective soil category of 1 out of 6.

5.3.2 The Field Infiltration Test (IFT) results are presented in Appendix 4 of this report.

5.4 ASS Field Test

5.4.1 The Field Permeability measurements conducted over the site revealed an average pH_F of 8.25 and a pH_{Fox} of 6.13. Reaction rate is generally "Slight" to "Moderate" apart from two (x2) samples with a "Strong" reaction rate at depths of 1.75m and 2.0m at TP 2 location.

5.4.2 SPOCAS Lab Test have been carried to further investigate on selected samples, resulting in an overall likely acid-generating potential at a depth of 2.0m at TP2 location. All other locations revealed a negative response to ASS criteria.

5.4.3 On this basis, STATS recommend excavation work for the site shall not exceed 1.5m unless an Acid Sulphate Management Plan is in place for the development and further lime treatment required to deal with Acid Sulphate Soils at this depth and beyond.

5.4.4 The Summary of ASS screen and SPOCAS test results are presented in Appendix 5 of this report.

6.0 LABORATORY TESTS

6.1 Laboratory Tests

6.1.1 Representative soil samples were taken from the test pit investigation program to determine the soil properties.

6.1.2 Laboratory tests based on Australian Standards 1289 were conducted on the samples, at STATSWA Laboratory, Perth.

6.1.3 The laboratory test program consists of the following:

- Particle Size Distribution (AS 1289 3.6.1).
- Plasticity Index (AS1289) AS 1289 3.1.2-3.4.1 (1pt Casagrande, incl Linear Shrinkage).
- Modified Maximum Dry Density (AS1289.5.2.1).
- 4 days soaked CBR Tests (AS1289.6.1.1).
- Field pH_F and pH_{Fox} screen tests,
- SPOCAS tests on most significant field screen results.

6.1.4 The laboratory test results are presented in Appendix 5. A summary of the laboratory test findings is presented in Table 1 below.

Table 1: Summary of Laboratory Tests

Test Pit ID	TP1	TP3	TP4	TP5
Depth (m)	2.0m – 2.3m	1.3m – 1.8m	1.5m – 2.0m	0.8 – 1.2m
USC	SP-SM	SP	SP	SP
Passing 2.36mm (%)	95	93	97	91
Passing 75µm (%)	10	3	3	2
Liquid limit (%)	0	0	–	–
Plastic limit (%)	0	0	–	–
Plastic Index (%)	0	0	–	–
Linear Shrinkage (%)	N/A	N/A	–	–
Opt. Moisture Content (%)	13.9	14.0		
Maximum Dry Density (t/m3)	1.801	1.801		
CBR (%)	15 @ 2.5mm	20 @ 25mm		

A total of forty (x40) samples using environmental hand auger equipment were carried out for Preliminary Acid Sulfate tests every 0.25m in each Test Pit. A summary of the laboratory test results is presented in Table 2 below.

Table 2 Summary of Laboratory ASS Test Results

Compound	Units	TP1 (0.25m)	TP1 (0.50m)	TP1 (0.75m)	TP1 (1.0m)	TP1 (1.25m)	TP1 (1.50m)	TP1 (1.75m)	TP1 (2.0m)
pH(F)	pH Unit	7.1	7.6	8.3	8.3	8.4	8.1	8.0	7.8
pH(Fox)	pH Unit	5.4	6.2	6.1	6.2	6.5	6.4	6.4	6.2
ΔpH	pH Unit	1.7	1.4	2.2	2.1	1.9	1.7	1.6	1.6
Reaction Rate	-	Moderate	Moderate	Moderate	Moderate	Slight	Slight	Slight	Strong
Compound	**Units**	**TP2 (0.25m)**	**TP2 (0.50m)**	**TP2 (0.75m)**	**TP2 (1.0m)**	**TP2 (1.25m)**	**TP2 (1.50m)**	**TP2 (1.75m)**	**TP2 (2.0m)**
pH(F)	pH Unit	7.3	7.5	7.9	8.0	7.9	7.8	8.0	7.9
pH(Fox)	pH Unit	5.4	5.5	5.8	6.1	6.7	6.6	6.5	5.9
ΔpH	pH Unit	1.9	2	2.1	1.9	1.2	1.2	1.5	2
Reaction Rate	-	Moderate	Moderate	Moderate	Moderate	Slight	Slight	Strong	Strong

Compound	Units	TP3 (0.25m)	TP3 (0.50m)	TP3 (0.75m)	TP3 (1.0m)	TP3 (1.25m)	TP3 (1.50m)	TP3 (1.75m)	TP3 (2.0m)
pH(F)	pH Unit	7.7	7.7	8.0	8.3	8.4	7.9	7.9	7.7
pH(Fox)	pH Unit	5.2	5.6	5.9	6.1	6.3	6.5	6.4	6.5
ΔpH	pH Unit	2.5	2.1	2.1	2.2	2.1	1.4	1.5	1.2
Reaction Rate	-	Moderate	Moderate	Moderate	Moderate	Moderate	Slight	Slight	Slight
Compound	**Units**	**TP4 (0.25m)**	**TP4 (0.50m)**	**TP4 (0.75m)**	**TP4 (1.0m)**	**TP4 (1.25m)**	**TP4 (1.50m)**	**TP4 (1.75m)**	**TP4 (2.0m)**
pH(F)	pH Unit	8.2	8.2	8.3	8.3	7.6	8.0	7.9	8.1
pH(Fox)	pH Unit	5.9	5.7	6.1	5.8	6.1	6.2	6.4	6.4
ΔpH	pH Unit	2.3	2.5	2.2	2.5	1.5	1.8	1.5	1.7
Reaction Rate	-	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Slight	Moderate
Compound	**Units**	**TP5 (0.25m)**	**TP5 (0.50m)**	**TP5 (0.75m)**	**TP5 (1.0m)**	**TP5 (1.25m)**	**TP5 (1.50m)**	**TP5 (1.75m)**	**TP5 (2.0m)**
pH(F)	pH Unit	8.2	8.6	8.7	8.6	8.2	8.2	7.8	8.1
pH(Fox)	pH Unit	6.0	6.2	6.3	6.2	6.6	6.4	6.5	6.2
ΔpH	pH Unit	2.2	2.4	2.4	2.4	1.6	1.8	1.3	1.9
Reaction Rate	-	Moderate	Moderate	Moderate	Moderate	Moderate	Slight	Slight	Moderate

Following from the pH_F and pH_{Fox} screening tests above, a follow up SPOCAS test regime was carried out for the samples which are potentially reactive, to determine the soil potential acidity. The criteria for selecting SPOCAS is based on the following:

- Where the $pH_{Fox} < 6$,
- Difference between pH_F and pH_{Fox} is significantly larger compare to the rest of the results,
- Reaction rate is Moderate or Strong.

In Table 3 presents a summary of SPOCAS results completed.

Table 3 Summary of Laboratory SPOCAS results

Acid Base Accounting	Units	Limit of report	TP1 (0.25m)	TP2 (0.25m)	TP2 (0.50m)	TP2 (0.75m)	TP2 (2.0m)	TP3 (0.25m)	TP3 (0.50m)	TP4 (0.25m)	TP4 (0.50m)	TP4 (1.0m)
ANC Fineness Factor		0.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Net Acidity (sulfur units)	% S	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Net Acidity (acidity units)	mole H+ / t	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Net Acidity excluding ANC (sulfur units)	% S	0.02	<0.02	<0.02	<0.02	<0.02	**0.20**	<0.02	<0.02	<0.02	<0.02	<0.02
Net Acidity excluding ANC (acidity units)	mole H+ / t	10	<10	<10	<10	<10	**123**	<10	<10	<10	<10	<10

7.0 SITE CLASSIFICATION

7.1 The site is currently assigned a **Site Classification of *"A"*** in accordance with the definitions provided in the Australian Standard AS2870 -2011. For the soil profile encountered, the characteristic surface movement (Y_s Value) for the site was assessed as nil movement from moisture changes.

7.2 The explanation of the site classification is outlined in Table 4 below (source: tables 2.1 & 2.3 AS2870 2011).

Table 4: Classification by Characteristic Surface Movement Ys

Site Class	Soil Description Based on Reactivity	Characteristic Surface movement *Ys (mm)*
A	Most Sand & Rock Sites with little or no ground movement from moisture changes	0
S	Slightly reactive clay sites which may experience slight ground movements from moisture changes	$0 < Ys \leq 20$
M	Moderately reactive clay or silt sites which may experience moderate ground movements from moisture changes	$20 < Ys \leq 40$
H1	Highly reactive clay sites which may experience high ground movements from moisture changes	$40 < Ys \leq 60$
H2	Highly reactive clay sites which may experience very high ground movements from moisture changes	$60 < Ys \leq 75$
E	Extremely reactive sites which may experience extreme ground movements from moisture changes	$Ys > 75$
P	Sites with inadequate bearing capacity or is affected by factors other than Reactivity of the soil eg. soft soils, landslip, mine subsidence, uncontrolled fill, coastal erosion and the site cannot be classified based on soil reactivity	-

8.0 CONSTRUCTION STAGE SUPERVISION AND CERTIFICATION

8.1 The site investigation and subsequent classification has been carried out using a limited amount of test pits, visual inspection, sampling, and testing programme.

8.2 To achieve a full coverage of the site to ensure all variations are investigated and coverage is not practical and is seldom done due to cost and time constraints.

8.3 Due to the inherent nature of “natural ground” it is very possible that subsurface conditions may vary over short distances within the site.

8.4 It is essential that during the earthworks, a qualified Engineer/Technician be further engaged to inspect the foundation material and excavation work, including providing certification that the compaction works are completed satisfactory. This enables verification of the information contained in this report, and to advise on any changes to the design that may be needed, based on any variations encountered. Thus, the foundation material can then be certified as complying with the requirements of this report and the proposed design.

9.0 GENERAL EARTHWORKS

9.1 Any loose or areas of weakness should be removed and backfilled with approved granular fill. If boulders, rocks, or building rubble (>300mm) is encountered, they should be removed from the works.

9.2 Where there is the presence of minor organics and tree roots the material should be raked and removed using a rake with a 50mm grid spacing.

9.3 The base of the building pads shall be compacted using a 700kg vibrating plate compactor prior to importing of fill.

9.4 For this development, excavate to 0.5m below existing level, stockpile the excavated materials, compact at this base level until satisfactory, then backfill in two layers (max. 250mm lift each) and compact. Import of Filling Sands until the required design sands pad level, shall follow similar lift thickness operation and compaction requirements.

9.5 As groundwater was intercepted at relatively shallow depth of 1.2m in average, earthwork compaction may encounter some compaction difficulties for excavation work to this depth. Alternately will be to delay the earthwork until the summer drier period before carrying out any compaction.

9.6 Backfill Materials

9.6.1 Any imported structural fill material to support footings should be clean sand with maximum 10% passing 0.075mm sieve.

9.6.2 All structural fill is to be compacted in maximum layers of 250mm (loose) and compacted to achieve the specified minimum density ratio by an approved method.

9.6.3 The plasticity index shall be < 5%.

9.7 Site Compaction

9.7.1 Compaction required to achieve the density requirements is set out in the following tables and shall be conducted in accordance with AS 1289.5.1.1.

Table 5: Compaction Requirements for Fill

Item	Application	Compaction Criteria	
		Min Density Ratio (Cohesive Soils)	Min Density Index (Cohesion less Soils)
1	Residential: Lots and House Sites	95%	70%
2	Commercial: To support minor loadings, including floor loadings up to 120kPa and isolated pad or strip footings to 100kPa	98%	75%

9.7.2 Alternatively, the compaction certification may be verified with the use of a Perth Sands Penetrometer (PSP) or Dynamic Cone Penetrometer (DCP) based on AS 1289.6.3.3 or AS 1289.6.3.2 respectively.

9.7.3 Typical target values to achieve, pending which test approach are as follows. If required, further correlations could be made by carrying out test pads and the number of passes and determining the corresponding Compaction Density Ratios and the DCP or PSP values.

Table 6: Compaction Requirements for Fill based on DCP or PSP

Depth intervals	DCP Blows (cumulative)	PSP Blows (cumulative)
0 - 150	Seat	Seat
150 – 450	9	8
450 – 750	14	11
750 – 1050	19	15

9.8 Drainage and Soils Permeability

9.8.1 If construction works were to take place during the rainy seasons, the perimeter around the site and areas of proposed earthworks should be constructed with a shallow gradient to allow drainage to a sump and to allow water to be discharged from the site. It is important that the conditions under the footings remain relatively dry. Where required, drains should be constructed to divert water from the site and to ensure no erosion or premature saturation occurs around the footings.

9.8.2 Storm water should be collected and stored as roof runoff and the surface runoff controlled to prevent scour and loss of soil during periods of high intensity rainfall.

9.8.3 Based on the type of Soils encountered on site, stormwater may be discharged on site using soakwell systems. The design of soakwell for the proposed development shall be carried out by a Qualified Engineer, taking note also potential shallow ground water table level at depth of 1.1m to 1.2m.

10.0 CONCLUSIONS AND RECOMMENDATIONS

10.1 The site is currently assigned a Site Classification of "**A**" in accordance with the definitions provided in the Australian Standard AS2870 -2011. For the soil profile encountered the characteristic surface movement (Ys Value) for the site was assessed as nil to negligible movement from moisture changes.

10.2 It is recommended that the site is prepared in accordance with the recommendations given in Australian Standard AS 3798-2011, "Guidelines on Earthworks for Commercial and Residential Developments". This will require:

a) Removal of any deleterious material, organics etc., by raking to a depth of 0.3m - 0.5m in general.
b) Any construction rubbles, brickbats, subsoil septics, old drainage systems are to be removed off site.
c) Compact the base of the excavation to achieve a classification of dense over a depth of 0.9m.
d) Replace the stockpiled SANDS in layers not exceeding 250mm lifts, to achieve a DENSE classification.
e) Import filling SANDS to the current levels or sands pad level and compact to achieve "Dense" classification, for the uppermost 1.0 metre from the surface.

10.3 Based on the type of soils encountered, an allowable soils bearing capacity of up to 120kPa may be adopted for all pad and strip footing structures, on the condition the ground is prepared and compacted to achieve 95% MDR compaction.

10.4 Based on the type of Soils encountered on site, stormwater may be discharged on site using conventional soakwell systems.

10.5 From the ASS screen and following SPOCAS results, TP2 location presents a relevant NET acidity value (excluding ANC) at a depth of 2.0m. For this reason, all earthwork excavations are recommended to be limited to a maximum depth of 1.5m for the development. An Acid Sulphate Management Plan and Acid Sulphate soils treatment program may need to be incorporated.

10.6 From the laboratory test results, a CBR design value of 15% is recommended for the subgrade layer for the carparking areas.

10.7 It is highly recommended that ongoing geotechnical supervision, sampling, and testing be carried out throughout the different stages during the course of construction to verify the level of compaction prior to pouring concrete.

11.0 REFERENCES

- AS 1289 -2000, “Methods of Testing Soils for Engineering Purposes”.
- AS 1726 - 2017, “Geotechnical Site Investigations”.
- AS 2870 - 2011, “Residential Slabs and Footings”.
- AS 3798 - 2007, “Guidelines on earthworks for commercial and residential developments”.

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Figures

Figure 1: Proposed test locations

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Test Number	Coordinates
TP1	32° 1' 46"S, 115° 52' 56"E
TP2	32° 1' 45"S, 115° 52' 57"E
TP3	32° 1' 44"S, 115° 52' 57"E
TP4	32° 1' 44"S, 115° 52' 57"E
TP5	32° 1' 45"S, 115° 52' 55"E
IFT1	32° 1' 46"S, 115° 52' 55"E
IFT2	32° 1' 44"S, 115° 52' 57"E
IFT3	32° 1' 43"S, 115° 52' 57"E
IFT4	32° 1' 44"S, 115° 52' 56"E

Legend

- **Hand Auger boreholes (x5) up to 2m or refusal**
- **Field Permeability Tests (X4)**

Project Title:

Proposed Shelley Park Upgrade

- ***Preliminary Acid Sulphate Soils and Geotech Investigation work***

Title: Proposed test locations	
Figure: 1	**Scale: NTS**
Date: 10 May 2023	**Drawn: FM**
Checked: AS	**Approved: AS**
Drawing No: 102714	**Rev: 0**

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Appendices

Appendix 1: Notes Relating to this Report, Soils and Rocks Descriptions

(No of pages including this page: 07)

NOTES ABOUT YOUR REPORT

STATS prepared this report based on our understanding of you (the Client) and your project requirements. This report is developed based on a unique set of project conditions and requirements, such as the objectives of the project, the locality and size, as well as the feasibility of the development. These notes are meant to allow you to understand where our responsibilities as the engineers begin and end, and to assist you to manage and plan your construction, and mitigate any perceived risk. If there are areas in our report that you do not understand and would like to seek clarification, please contact STATS and we will assist you.

Our findings are based on limited subsurface investigation, sampling and testing works due to site constraints, underground service information and location, as well as project costs. Some variations to our findings may occur. It is therefore recommended, that we are engaged for the construction supervision and ongoing support based on either a site visit to confirm the accuracy/expectation of the conditions originally encountered, or that of full-time supervision.

Below are examples of conditions which will influence how this report is interpreted and therefore will affect the limitations of the report.

a) Subsurface conditions can be affected by events such as the removal of soil or placement of fill and by events such as seasonal fluctuations in ground water table, flood, earthquake and unstable landforms, all of which can change with time. It is therefore necessary when the above situations occur to undertake additional sampling, testing and/or analysis.
b) Any changes in the proposed development, layout, orientation, elevation, loading and configuration will affect the findings and recommendations in our report.
c) If information provided in the report is to be used by others, the report shall be produced in full and not in part.
d) This report is prepared for a specific purpose and is for the client or specific party involved in the initial project request. This report must be regarded as confidential to the Client and the Client's professional team. To prevent misunderstanding or misuse of information, it is recommended that you inform and discuss with STATS first before passing your report to a third party. STATS does not accept any responsibility for any damage caused by the decisions or actions made by third party.
e) This report has been prepared with no inclusions for environmental considerations, unless specified in our scope. If there are any known concerns or documents which relate to environmental risks at site, it is your responsibility to inform STATS and we shall advise where further information and/or contacts are required.
f) Our report has been prepared with no inclusions for environmental considerations, unless specified in our scope. If there are specific concerns or document in relation to environmental risks at site, it is your responsibility to inform STATS and we shall advise on further information and contacts.

STATS has prepared this report based on information provided by the Client and others. STATS disclaim responsibility relating to any unverified information provided, including errors in, or omissions from such information. The opinions, conclusions and recommendations in this report are based on, but not limited to, assumptions made in the project proposal and accepted scope of work.

Further attention is drawn to the information "Guidelines for the Provision of Geotechnical Information in Tender Documents", published by the Institution of Engineers, Australia. Whereby information or data obtained from the report is provided for tendering purposes, it is important that all information, including the written report, email correspondence and any discussions be made available. In the event that sections of the report are not relevant to the contractual document, it may be appropriate to prepare an edited executive summary document. Please contact STATS if you need assistance in this regard.

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SOILS AND ROCKS EXPLANATION SHEET

Soils Definitions:

The term "soil" refers to every type of uncemented or partially cemented inorganic or organic material found in the ground. In practice, if the material can be remoulded or broken up by hand in the field or in water it is described as a soil. Other materials are described using rock description terms.

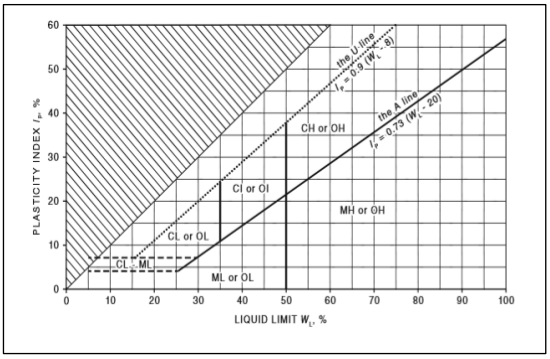
Soil Name and Classification:

The terms for Soil and Rock is described and classified in the reports (Test Pits/Boreholes) are based on the system given in AS1726-2017, Appendix A. The material properties are described using visual/tactile methods, combining field test data (if applicable).

Particle Size Description:

Name	Subdivision	Size (mm)
Boulders		> 200 mm
Cobbles		63 mm to 200 mm
Gravel	Coarse	19 mm to 63 mm
	Medium	6.7 mm to 19 mm
	Fine	2.36 mm to 6.7 mm
Sand	Coarse	0.6 mm to 2.36 mm
	Medium	0.21 mm to 0.6 mm
	Fine	0.075 mm to 0.21 mm
Fines	Silt	0.002 to 0.075
	Clay	< 0.002

Plasticity Properties:



Moisture Condition:

Symbol	Term	Description
D	**Dry**	Looks and feels dry. Non-cohesive and free running.
M	**Moist**	Soil feels cool and darker in colour. Soils tend to stick together.
W	**Wet**	Soil feels cool and darker in colour. Soils tend to stick together and with free water forming on hands when handled.

Soil Structure:

Zoning		Cementing	
Layers	Continuous across exposure or sample	Weakly cemented	Easily broken up by hand in air or water
Lenses	Discontinuous layers of lenticular shape	Moderately cemented	Effort is required to break up the soil by hand in air or water
Pockets	Irregular inclusions of different material		

Consistency and Density of Cohesive Soils (AS 1726 – 2017 and HB160-2006):

Symbol	Term	Undrained Shear Strength, s_u (kPa)	Field Guide	SPT "N"	DCP Blows per 100mm
VS	Very Soft	≤ 12	A finger can be pushed well into the soil with little effort	0 to 2	< 1
S	Soft	> 12 and ≤ 25	A finger can be pushed into the soil to about 25 mm depth.	2 to 4	< 1
F	Firm	> 25 and ≤ 50	The soil can be indented about 5 mm with the thumb, but not penetrated.	4 to 8	1 to 2
St	Stiff	> 50 and ≤ 100	The surface of the soil can be indented with the thumb, but not penetrated.	8 to 15	3 to 4
VS_t	Very Stiff	> 100 and ≤ 200	The surface of the soil can be marked, but not indented with thumb pressure.	15 to 30	5 to 10
H	Hard	> 200	The surface of the soil can be marked only with the thumbnail.	> 30	> 10

Observed ease of excavation with the use of excavator / hand auger:

Symbol	Term	Remarks
E	Easy	Can be done with little effort
M	Medium	Can be carried out, but with harder effort to get through
H	Hard	Takes a lot of effort to get through the digging/excavation/auger works

Consistency and Density of Granular Soils (AS 1726 – 2017 and HB160-2006):

Symbol	Term	Density Index (%)	SPT "N"	DCP Blows per 100mm
VL	Very Loose	≤ 15	0 to 4	< 1
L	Loose	> 15 and ≤ 35	4 to 10	1 to 2
MD	Medium Dense	> 35 and ≤ 65	10 to 30	2 to 3
D	Dense	> 65 and ≤ 85	30 to 50	4 to 8
VD	Very Dense	> 85	> 50	> 8

Secondary and Minor Soil Components:

Term	Assessment Guide	Proportion Of Minor Component In:
Minor	Presence just detectable by feel or eye, but soil properties little or no different to general properties of primary component.	Coarse grained soils: < 5% Fine grained soils: < 15%
Secondary	Presence easily detected by feel or eye, soil properties little different to general properties of primary component.	Coarse grained soils: 5% - 12% Fine grained soils: 15% - 30%

Geological Origin:

Weathered in Place Soils	
Extremely weathered material	Structure and fabric of parent rock visible. Formed directly from in situ weathering.
Residual soil	Structure and fabric of parent rock not visible. Formed directly from in situ weathering.
Transported Soils	
Aeolian soil	Carried and deposited by wind.
Alluvial soils	Deposited by streams and rivers.
Colluvial soils	Deposited on slopes (transported down slope by gravity).
Fill	Man-made deposit. Fill may be significantly more variable between tested locations than naturally occurring soils.
Lacustrine soil	Deposited in freshwater lakes.
Marine soil	Deposited in ocean basins, bays, beaches and estuaries.

Symbols in relation to Sampling and Testing:

B	Bulk Disturbed Sample	**P**	Piston Sample
BS	Block Sample	**PBT**	Plate Bearing Test
C	Core Sample	**U**	Undisturbed Sample, U50: 50mm diameter
CBR	CBR Mould Sample	**D**	Small Disturbed Sample
ES	Environmental Soil Sample	**EW**	Environmental Water Sample
DCP	Dynamic Cone Penetrometer	**PSP**	Perth Sand Penetrometer
SPT	Standard Penetration Test E.g. 3, 4, 5 refers to blows per 150mm N = 4+5 = 9: Blows per 300mm after first 150mm seating interval	**CPT**	Cone Penetration Truck
VS	Vane Shear ; P = Peak R = Remoulded (kPa)	**HA**	Hand Auger
EX	Excavator Machinery	**BH**	Backhoe Machinery
DR	Drilling Rig with Auger Rod	**AT**	Air Track
HQ	HQ Core Barrel of core size 63.5mm	**PQ**	PQ Core Barrel of core size 85mm

Rock Core Recovery:

TCR	Total Core Recovery (%) = $\frac{CRL}{TCL} \times 100\%$
SCR	Solid Core Recovery (%) = $\frac{CCR}{TCL} \times 100\%$
RQD	Rock Quality Designation (%) = $\frac{ALC >}{TCL} 100$
TCL	Length of Core Run
CRL	Recovered Length of Core
CCR	Total Length of Cylindrical Pieces of Core Recovered
ALC>100	Total Length of Axial Lengths of Core Greater than 100mm length

Soil Classification Description and Identification:

FIELD IDENTIFICATION PROCEDURES (Excluding particles larger than 60mm and basing fractions on estimated mass)					Fines %	USC	Primary Name
COARSE Grained Soils (More than 65% of material excluding oversized fraction is larger than 0.075mm)	0.075mm particle is about the smallest particle visible to the naked eye	GRAVELS More than half of coarse fraction is larger than 2.36mm	CLEAN GRAVELS (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle size. No dry strength.	≤ 5	**GW**	GRAVEL
				Predominantly one size or a range of sizes with some intermediate sizes missing. No dry strength.	≤ 5	**GP**	GRAVEL
			GRAVELS WITH FINES ((Appreciable Amount of fines)	'Dirty' materials with excess of non-plastic fines (for identification procedures see ML below). Zero to medium dry strength.	≥ 12	**GM**	SILTY GRAVEL
				'Dirty' materials with excess of plastic fines (for identification procedures see ML below). Medium to high dry strength.	≥ 12	**GC**	CLAYEY GRAVEL
		SANDS More than half of coarse fraction is smaller than 2.36mm	CEAN SANDS (Little or no fines)	Wide range in grain sizes and substantial amounts of all intermediate sizes missing. No dry strength.	≤ 5	**SW**	SAND
				Predominantly one size or a range of sizes with some intermediate sizes missing. No dry strength.	≤ 5	**SP**	SAND
			SANDS WITH FINES ((Appreciable Amount of fines)	'Dirty' materials with excess of non-plastic fines (for identification procedures see ML below). Zero to medium dry strength.	≥ 12	**SM**	SILTY SAND
				'Dirty' materials with excess of plastic fines (for identification procedures see CL below). Medium to high dry strength.	≥ 12	**SC**	CLAYEY SAND

*Note: For fines content >5% and <12% the soil shall be given a dual classification comprising the two groups symbols. For example: gravel with between 5% and 12% fines will be classified as GP-GM.

FIELD IDENTIFICATION PROCEDURES (Excluding particles larger than 60mm and basing fractions on estimated mass)					USC	Primary Name
FINE Grained Soils (More than 35% of soil excluding oversize fraction is less than 0.075mm)			**Identification procedures for fractions < 0.2mm**			
			Dry Strength	**Dilatancy**	**Toughness**	
		SILTS & CLAYS Liquid Limit < 50 Low – medium plasticity	None to Low	Slow to rapid	Low	**ML**	SILT
			Medium to High	None to slow	Medium	**CL**	CLAY
			Low to Medium	Slow to very slow	Low	**OL**	Organic SILT
		SILTS & CLAYS Liquid Limit > 50 High plasticity	Low to Medium	None to slow	Low to medium	**MH**	SILT
			High	None	High	**CH**	CLAY
			Medium to High	None to very slow	Low to medium	**OH**	Organic Clay
Highly Organic Soils			Readily identified by colour, odour, spongy feel and frequently by fibrous texture.			**PT**	PEAT

Low plasticity – Liquid Limit W_L less than 35%. • Medium plasticity – W_L between 35% and 50%.

Rock Definitions:

In engineering terms, rock substance is any naturally occurring aggregate of minerals and organic material which cannot be disintegrated or remoulded by hand in air or water. Defect in rock is described as any discontinuity or break in the continuity of a substance or substances. Mass in rock is described as any material which is not effectively homogeneous. It can consist of two or more substances without defects or one or more substances with one or more defects. The descriptive terms given hereby are broadly consistent with Australian Standard AS1726-2017.

SUBSTANCE DESCRIPTIVE TERMS:		ROCK SUBSTANCE STRENGTH TERMS:			
Rock Name	**Simple rock names are used rather than precise geological classification.**	**Term**	**Abbrev-aition**	**Point Load Index, I_s50 (MPa)**	**Field Guide**
PARTICLE SIZE **Coarse grained** **Medium grained** **Fine grained**	Grain size terms for sandstone are: Mainly > 2 mm Mainly 0.06 mm to 2 mm Mainly < 0.06 mm	Very Low	VL	0.03 to 0.1	Material crumbles under firm blows with sharp end of pick, can be peeled with knife, pieces up to 30 mm thick can be broken by finger pressure.
FABRIC	Terms for layering or penetrative fabric (eg. Bedding, cleavage, etc.) are:	Low	L	0.1 to 0.3	Easily scored with a knife, indentations 1 mm to 3 mm show with firm blows of a pick point, has a dull sound under hammer. Pieces of core 150 mm long by 50 mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
		Medium	M	0.3 to 1.0	
		High Strength	H	1.0 to 3.0	
Massive	No layering or penetrative fabric.	Very High Strength	VH	3.0 to 10.0	
Indistinct	Layering or fabric just visible. Little effect on properties.	Extremely High Strength	EH	> 10.0	
Distinct	Layering or fabric is easily visible. Rock breaks more easily parallel to layering or fabric.				

Classification of Material Weathering

Term	Symbol	Definition	Term	Symbol	Point Load Index, I_s50 (MPa)	Field Guide
Residual Soil	**RS**	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.	**Medium**	**M**	0.3 to 1.0	Readily scored with a knife, a piece of core 150 mm long by 50 mm diameter can be broken by hand with difficulty.
Extremely Weathered Material	**XW**	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible.	**High**	**H**	1 to 3	A piece of core 150 mm long by 50 mm cannot be broken by hand but can be broken by a pick with a single firm blow, rock rings under hammer.
Highly Weathered Rock	**HW**	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognizable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.	**Very High**	**VH**	3 to 10	**Hand specimen breaks after more than one blow of a pick, rock rings under hammer.**

Classification of Material Weathering (Continued)

Term	Symbol	Definition	Term	Symbol	Point Load Index, I_s50 (MPa)	Field Guide
Moderately Weathered Rock	**MW**	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognizable, but shows little or no change of strength from fresh rock.	**Extremely High**	**EH**	More than 10	**Specimen requires many blows with geological pick to break, rock, rings under hammer.**
Slightly Weathered Rock	**SW**	Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.				
Fresh Rock	**FR**	Rock shows no sign of decomposition of individual minerals or colour changes.				

Rock Types:

Sedimentary	Carbonates	Igneous
• Shale • Claystone /Mudstone • Siltstone • Sandstone • Conglomerate • Breccia	• Limestone • Carbonate Claystone/Calcisiltite • Carbonate Sandstone/Calcarenite • Chalk	• Coarse Grained • Medium Grained • Fine Grained • Dolerite
Metamorphic	**Evaporites**	
• Coarse Grained • Medium Grained • Fine Grained	• Gypsum or Halite	

Notes on Weathering:

1. AS1726 suggests the term "Distinctly Weathered" (DW) to cover the range of substance weathering conditions between XW and SW. For projects where it is not practical to delineate between HW and MW or it is judged that there is no advantage in making such a distinction, DW may be used with the definition given in AS1726.
2. Where physical and chemical changes were caused by hot gasses and liquids associated with igneous rocks, the term "altered" may be substituted for "weathering" to give the abbreviations XA, HA, MA, SA and DA.

Notes on Rock Substance Strength:

1. In anisotropic rocks the field guide to strength applies to the strength perpendicular to the anisotropy. High strength anisotropic rocks may break readily parallel to the planar anisotropy.
2. The term "extremely low" is not used as a rock substance strength term. While the term is used as AS1726-2017, the field guide therein makes it clear that materials in that strength range are soils in engineering terms.
3. The unconfined compressive strength of isotropic rocks (and anisotropic rocks which fail across the planar anisotropy) is typically 10 to 25 times the point load index (Is50). The ratio may vary for different rock types. Lower strength rocks often have lower rations than higher strength rocks.

Appendices

Appendix 2: Test Pit Logs.

(No of pages including this page: 06)

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TEST PIT LOG

Test Pit: **TP1**

Sheet 1 of 5

Project Info		Excavation/Drilling Info		Coordinates:	
Job:	102714	Contractor:	STATS	Latitude (S):	32°1'45.836"S
Client:	City of Canning	Equipment:	Hand Auger	Longitude (E):	115°52'55.793"E
Project:	Proposed Shelley Park Development	Bucket/Auger:	Auger	Surface RL (m):	N/A
Location:	Shelley Park	Logged by:	FM	Datum:	N/A
Date:	2/05/2023	Time:	AM	Weather:	Fine

Depth (m)	Ease of Excavation	Classification	Sample Type	Material Description Soil Type, Particle Characteristic or plasticity, colour, secondary/minor components	Moisture Condition	Consistency/Density	GWT Level	Field Records/Comments
0.2	M	SP		**[FILL - GRASS] Sand Mixtures (SAND):** fine to medium grained, brown/black/white, moist/wet, loose to medium dense, with organics(rootlets) up to 0.2m in depth.	M	L-MD		
0.5	M	SP		**Sand Mixtures (SAND):** fine to medium grained, brown/white, dry/moist, dense, with occasional shell fragments and gravels.	D - M	D		
1.0								
1.3							▼	GWT encountered at a depth of 1.3m
1.5								
1.6								
2.0	M	SM		**Sand - Silt Mixtures (silty SAND):** fine to medium grained, grey/white, wet, loose, with occasional shell fragments and gravels.	W	L		
2.3	M	SW-SM	B	**Sand - Silt Mixtures (well graded silty SAND):** fine to medium grained, grey/brown/black, wet, loose, with occasional shell fragments and gravels.	W	L		**%age passing 2.36mm: 95** **%age passing 0.075mm: 10** **Plasticity Index: Non Plastic**
2.5								**Test pit terminated at the target depth of 2.3m.**
3.0								

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TEST PIT LOG

Test Pit: **TP2**

Sheet 2 of 5

Project Info		Excavation/Drilling Info		Coordinates:	
Job:	102714	Contractor:	STATS	Latitude (S):	32°1'44.555"S
Client:	City of Canning	Equipment:	Hand Auger	Longitude (E):	115°52'56.822"E
Project:	Proposed Shelley Park Development	Bucket/Auger:	Auger	Surface RL (m):	N/A
Location:	Shelley Park	Logged by:	FM	Datum:	N/A
Date:	2/05/2023	Time:	AM	Weather:	Fine

Depth (m)	Ease of Excavation	Classification	Sample Type	Material Description Soil Type, Particle Characteristic or plasticity, colour, secondary/minor components	Moisture Condition	Consistency/Density	GWT Level	Field Records/Comments
0.2	M	SP		**[FILL - GRASS] Sand Mixtures (SAND):** fine to medium grained, brown/black/white, moist/wet, loose to medium dense, with organics(rootlets) up to 0.2m in depth.	M	L-MD		
0.5	M	SP		**Sand Mixtures (SAND):** fine to medium grained, brown/white, dry/moist, dense, with occasional shell fragments and gravels.	D - M	D		
1.0								
1.3							▼	GWT encountered at a depth of 1.3m
1.5	M	SM		**Sand - Silt Mixtures (silty SAND):** fine to medium grained, grey/white/black, wet, loose, with occasional shell fragments and gravels.	W	L		
2.0								
2.3								**Test pit terminated at the target depth of 2.3m.**
2.5								
3.0								

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TEST PIT LOG

Test Pit: **TP3**

Sheet 3 of 5

Project Info		Excavation/Drilling Info		Coordinates:	
Job:	102714	Contractor:	STATS	Latitude (S):	32°1'43.465"S
Client:	City of Canning	Equipment:	Hand Auger	Longitude (E):	115°52'57.716"E
Project:	Proposed Shelley Park Development	Bucket/Auger:	Auger	Surface RL (m):	N/A
Location:	Shelley Park	Logged by:	FM	Datum:	N/A
Date:	2/05/2023	Time:	PM	Weather:	Fine

Depth (m)	Ease of Excavation	Classification	Sample Type	Material Description Soil Type, Particle Characteristic or plasticity, colour, secondary/minor components	Moisture Condition	Consistency/Density	GWT Level	Field Records/Comments
0.2	M	SP		**[FILL - GRASS] Sand Mixtures (SAND):** fine to medium grained, brown/black/white, moist/wet, loose to medium dense, with organics(rootlets) up to 0.2m in depth.	M	L-MD		
0.5 1.0	M	SP		**Sand Mixtures (SAND):** fine to medium grained, brown/white, dry/moist, dense, with occasional shell fragments and gravels.	D-M	D		
1.1							▼	GWT encountered at a depth of 1.1m
1.3								
1.5	M	SM	B	**Sand - Silt Mixtures (silty SAND):** fine to medium grained, grey/black, wet, loose, with occasional shell fragments and gravels.	W	L		**%age passing 2.36mm: 93** **%age passing 0.075mm: 3** **Plasticity Index: Non Plastic**
1.8 2.0								
2.3								**Test pit terminated at the target depth of 2.3m.**
2.5 3.0								

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TEST PIT LOG

Test Pit: **TP4**

Sheet 4 of 5

Project Info		Excavation/Drilling Info		Coordinates:	
Job:	102714	Contractor:	STATS	Latitude (S):	32°1'43.974"S
Client:	City of Canning	Equipment:	Hand Auger	Longitude (E):	115°52'56.017"E
Project:	Proposed Shelley Park Development	Bucket/Auger:	Auger	Surface RL (m):	N/A
Location:	Shelley Park	Logged by:	FM	Datum:	N/A
Date:	2/05/2023	Time:	PM	Weather:	Fine

Depth (m)	Ease of Excavation	Classification	Sample Type	Material Description Soil Type, Particle Characteristic or plasticity, colour, secondary/minor components	Moisture Condition	Consistency/Density	GWT Level	Field Records/Comments
0.2	M	SP		**[FILL - GRASS] Sand Mixtures (SAND):** fine to medium grained, brown/black/white, moist/wet, loose to medium dense, with organics(rootlets) up to 0.2m in depth.	M	L-MD		
0.5 1.0	M	SP		**Sand Mixtures (SAND):** fine to medium grained, brown/white, dry/moist, dense, with occasional shell fragments and gravels.	D - M	D		
1.1							▼	GWT encountered at a depth of 1.1m
1.5	M	SM	B	**Sand - Silt Mixtures (silty SAND):** fine to medium grained, grey/black, wet, loose/dense, with occasional shell fragments and gravels.	W	L-D		**%age passing 2.36mm: 97** **%age passing 0.075mm: 3**
2.0 2.2								**Test pit terminated at the target depth of 2.2m.**
2.5 3.0								

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TEST PIT LOG

Test Pit: **TP5**

Sheet 5 of 5

Project Info		Excavation/Drilling Info		Coordinates:	
Job:	102714	Contractor:	STATS	Latitude (S):	32°1'45.418"S
Client:	City of Canning	Equipment:	Hand Auger	Longitude (E):	115°52'55.107"E
Project:	Proposed Shelley Park Development	Bucket/Auger:	Auger	Surface RL (m):	N/A
Location:	Shelley Park	Logged by:	FM	Datum:	N/A
Date:	2/05/2023	Time:	PM	Weather:	Fine

Depth (m)	Ease of Excavation	Classification	Sample Type	Material Description Soil Type, Particle Characteristic or plasticity, colour, secondary/minor components	Moisture Condition	Consistency/Density	GWT Level	Field Records/Comments
0.2	M	SP		**[FILL - GRASS] Sand Mixtures (SAND):** fine to medium grained, brown/black/white, moist/wet, loose to medium dense, with organics(rootlets) up to 0.2m in depth.	M	L-MD		
0.5	M	SP		**Sand Mixtures (SAND):** fine to medium grained, brown/white, dry/moist, dense, with occasional shell fragments and gravels.	D - M	D		
0.8								
1.0			B					**%age passing 2.36mm: 91** **%age passing 0.075mm: 2**
1.2							▼	GWT encountered at a depth of 1.2m
1.5	M	SM		**Sand - Silt Mixtures (silty SAND):** fine to medium grained, grey/black, wet, dense/medium dense, with occasional shell fragments and gravels.	W	D - MD		
2.0								
2.1								**Test pit terminated at the target depth of 2.1m.**
2.5								
3.0								

Appendices

Appendix 3: Dynamic Cone Penetrometer (DCP) Results.

(No of pages including this page: 03)

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DYNAMIC CONE PENETROMETER (DCP) TEST RESULTS

Project Info		Spatial Info		
Job No:	102714	Coordinates:	See Test Pit Log	Southing (m)
Client:	City of Canning		See Test Pit Log	Easting (m)
Project:	Geotech Investigation – Proposed Shelley Park Upgrade	Surface RL (m):	N/A	
Site:	Shelley Park	Datum:	N/A	
Operator Info				
Date Test:	2.5.2023	Tested by:	FM	
Standard:	AS 1289.6.3.2	Table 6.4.6(B) of HB 160-2006		

Reference:	DCP1	DCP2	DCP3	DCP4	DCP5
Penetration Resistance - Blows/(100mm):					
Depth below ground level test commenced 0 – 50	**SEAT**	**SEAT**	**SEAT**	**SEAT**	**SEAT**
50 – 150	2	3	4	3	1
150 – 250	3	2	5	2	4
250 – 350	3	5	3	5	6
350 – 450	4	4	6	3	3
450 – 550	5	4	7	2	2
550 – 650	5	6	8	4	5
650 – 750	6	8	7	6	3
750 – 850	5	7	6	5	3
850 – 950	5	5	5	8	6
950 – 1050	5	6	3	9	5
1050 – 1150	4	4	4	7	4
1150 -- 1250	2	2	5	6	7
1250 -- 1350	1	2	7	4	6
1350 -- 1450	2	1	8	2	3
1450 -- 1550	2	2	2	3	1
1550 – 1650	2	3	1	2	2
1650 – 1750	1	2	2	4	4
1750 – 1850	1	1	3	3	6
1850 – 1950	1	2	5	2	5
1950 – 2050	1	2	4	1	4
Density Classification:					
Depth below ground level test commenced 0 – 50	**SEAT**	**SEAT**	**SEAT**	**SEAT**	**SEAT**
50 – 150	L	MD	D	MD	L
150 – 250	MD	L	D	L	D
250 – 350	MD	D	MD	D	D
350 – 450	D	D	D	MD	MD
450 – 550	D	D	D	D	L
550 – 650	D	D	D	D	D
650 – 750	D	D	D	D	MD
750 – 850	D	D	D	D	MD
850 – 950	D	D	D	D	D

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950 – 1050	D	D	MD	VD	D
1050 – 1150	D	D	D	D	D
1150 -- 1250	L	L	L	D	D
1250 -- 1350	L	L	L	D	D
1350 -- 1450	L	L	L	L	MD
1450 – 1550	L	L	L	MD	L
1550 – 1650	L	MD	L	L	L
1650 – 1750	L	L	L	D	D
1750 – 1850	L	L	MD	MD	D
1850 – 1950	L	L	D	L	D
1950 – 2050	L	L	D	L	D

**Remarks: REF-Refusal*

As per HB 160-2006, Table 6.4.6.1 (B), Correlation of Sand Density to DCP results

Description:	VD=Very Dense	D=Dense	MD=Medium Dense	L=Loose	VL=Very Loose
Blows:	> 8	4-8	2-3	1 - 2	< 1

Appendices

Appendix 4: IFT Results

(No of pages including this page: 05)

STATS
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FIELD PERMEABILITY TEST

In-situ Permeability (Guelph Permeameter - One Head Method)

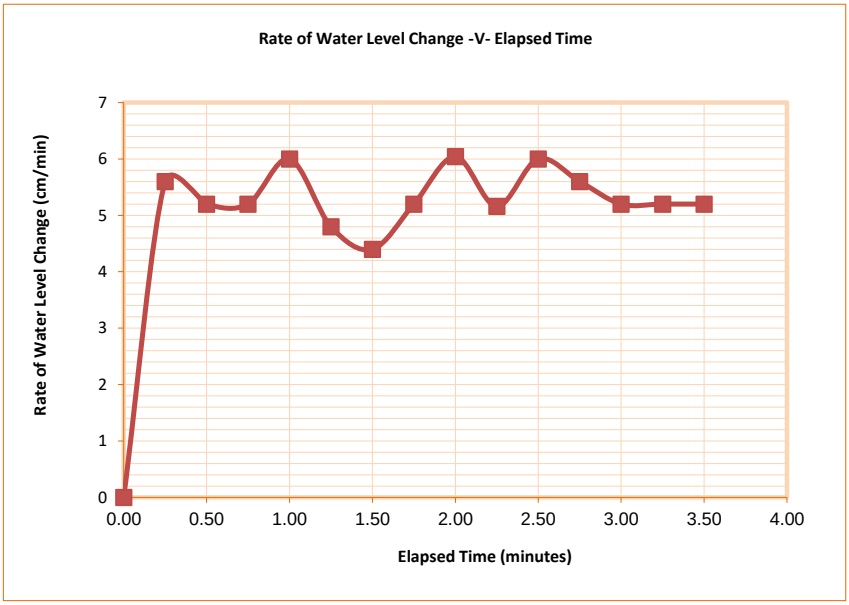
Client:	City of Canning	**Test ID:**	IFT1
Project No:	102714	**Test Location:**	IFT1
Project:	Shelley Park upgrade		
Location:	Shelley Park		

Test Procedure:	ASTM D 5126-90		
Test Depth:	0.3m	**Soil Description:**	SAND
Time:	am	**Well Diameter (mm)**	50
Date:	2/05/2023	**Tested By:**	FM/CT
Latitude: South	32° 1' 45.90"	**Datum:**	NA
Longitude : East	115° 52' 55.07"	**Ground Surface RL (m AHD):**	NA
Weather:	Fine		

Input Parameters

Head H (cm)	Well radius "a" (cm)	α^*	Shape Factor Constants, C (based on a* value)			Reservoir Constant (cm^2)	
5.0	5.00	0.36	0.754	2.074	0.093	X	35.22

* X = Combined reservoir cross sectional area
* Y= inner reservior only
* α= constant based on soil type
(adapted from Elrick et al., 1989)



Field-saturated hydraulic conductivity K_{fs}: 6.07E-03 cm/s
Matrix flux potential $Ø_m$: 1.69E-02 cm^2/s
Field-saturated hydraulic conductivity K_{fs}: 5.25 m/d

Notes

Prepared by: Francesco Malavolta Date: 15/05/2023

Approved by: Aidan Seck Date: 15/05/2023

STATS
Specialist Testing and Technical Services

FIELD PERMEABILITY TEST

In-situ Permeability (Guelph Permeameter - One Head Method)

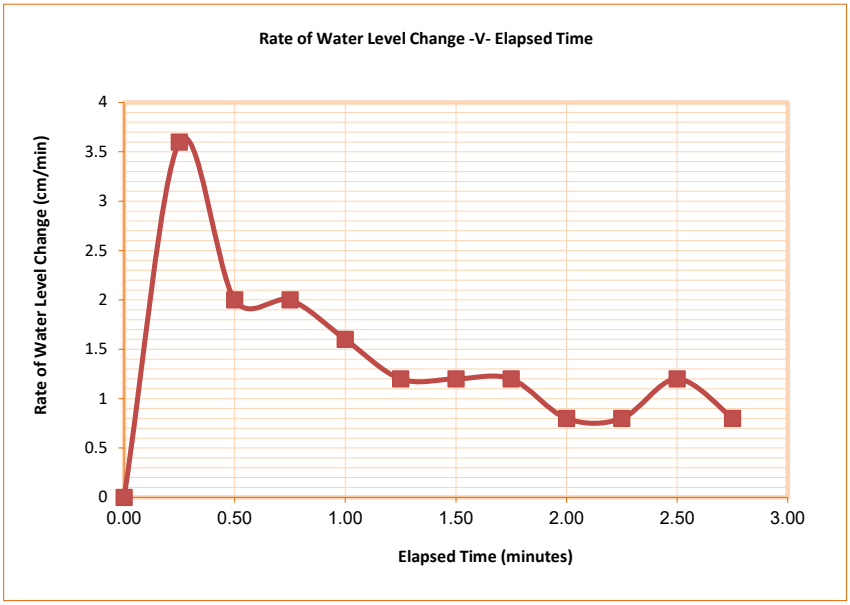
Client:	City of Canning	**Test ID:**	IFT2
Project No:	102714	**Test Location:**	IFT2
Project:	Shelley Park upgrade		
Location:	Shelley Park		

Test Procedure:	ASTM D 5126-90		
Test Depth:	0.3m	**Soil Description:**	SAND
Time:	pm	**Well Diameter (mm)**	50
Date:	2/05/2023	**Tested By:**	FM/CT
Latitude: South	32° 1' 43.99"	**Datum:**	NA
Longitude : East	115° 52' 56.49"	**Ground Surface RL (m AHD):**	NA
Weather:	Fine		

Input Parameters

Head H (cm)	Well radius "a" (cm)	α^*	Shape Factor Constants, C (based on a* value)			Reservoir Constant (cm^2)	
5.0	5.00	0.36	0.754	2.074	0.093	X	35.22

* X = Combined reservoir cross sectional area
* Y= inner reservior only
* α= constant based on soil type
(adapted from Elrick et al., 1989)



Field-saturated hydraulic conductivity K_{fs}: 1.70E-03 cm/s
Matrix flux potential $Ø_m$: 4.71E-03 cm^2/s
Field-saturated hydraulic conductivity K_{fs}: 1.46 m/d

Notes

Prepared by: Francesco Malavolta Date: 15/05/2023

Approved by: Aidan Seck Date: 15/05/2023

STATS
Specialist Testing and Technical Services

FIELD PERMEABILITY TEST

In-situ Permeability (Guelph Permeameter - One Head Method)

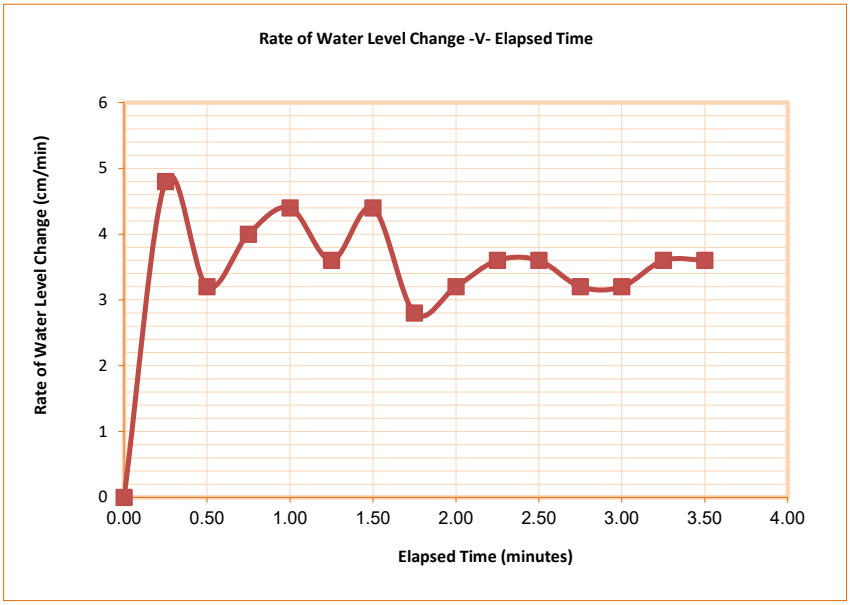
Client:	City of Canning	**Test ID:**	IFT3
Project No:	102714	**Test Location:**	IFT3
Project:	Shelley Park upgrade		
Location:	Shelley Park		

Test Procedure:	ASTM D 5126-90		
Test Depth:	0.3m	**Soil Description:**	SAND
Time:	pm	**Well Diameter (mm)**	50
Date:	2/05/2023	**Tested By:**	FM/CT
Latitude: South	32° 1' 43.15"	**Datum:**	NA
Longitude : East	115° 52' 57.10"	**Ground Surface RL (m AHD):**	NA
Weather:	Fine		

Input Parameters

Head H (cm)	Well radius "a" (cm)	α^*	Shape Factor Constants, C (based on a* value)			Reservoir Constant (cm^2)	
5.0	5.00	0.36	0.754	2.074	0.093	X	35.22

* X = Combined reservoir cross sectional area
* Y= inner reservior only
* α= constant based on soil type
(adapted from Elrick et al., 1989)



Field-saturated hydraulic conductivity K_{fs}: 4.16E-03 cm/s
Matrix flux potential $Ø_m$: 1.15E-02 cm^2/s
Field-saturated hydraulic conductivity K_{fs}: 3.59 m/d

Notes

Prepared by: Francesco Malavolta Date: 15/05/2023

Approved by: Aidan Seck Date: 15/05/2023

STATS
Specialist Testing and Technical Services

FIELD PERMEABILITY TEST

In-situ Permeability (Guelph Permeameter - One Head Method)

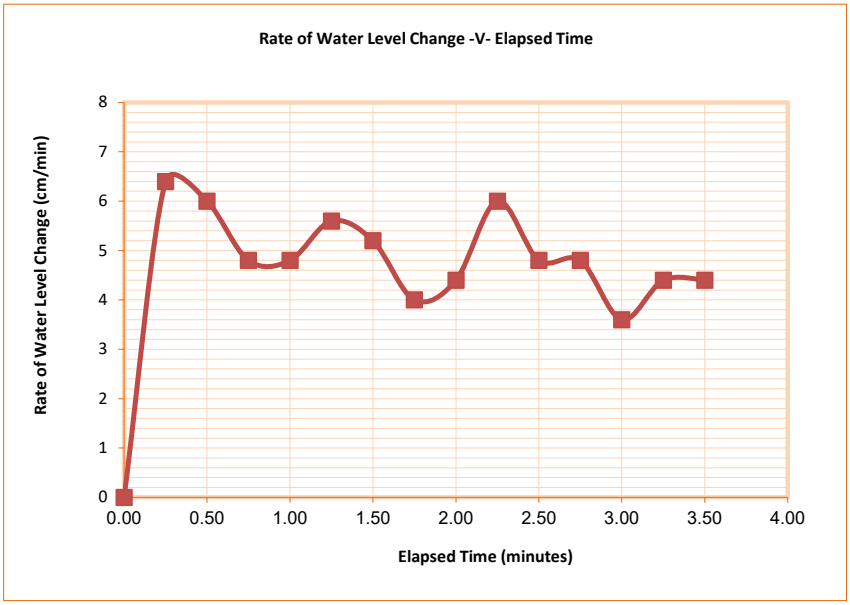
Client:	City of Canning	**Test ID:**	IFT4
Project No:	102714	**Test Location:**	IFT4
Project:	Shelley Park upgrade		
Location:	Shelley Park		

Test Procedure:	ASTM D 5126-90		
Test Depth:	0.5m	**Soil Description:**	SAND
Time:	pm	**Well Diameter (mm)**	50
Date:	2/05/2023	**Tested By:**	FM/CT
Latitude: South	32° 1' 43.66"	**Datum:**	NA
Longitude : East	115° 52' 56.01"	**Ground Surface RL (m AHD):**	NA
Weather:	Fine		

Input Parameters

Head H (cm)	Well radius "a" (cm)	α^*	Shape Factor Constants, C (based on a* value)			Reservoir Constant (cm^2)	
5.0	5.00	0.36	0.754	2.074	0.093	X	35.22

* X = Combined reservoir cross sectional area
* Y= inner reservior only
* α= constant based on soil type
(adapted from Elrick et al., 1989)



Field-saturated hydraulic conductivity K_{fs}: 5.62E-03 cm/s
Matrix flux potential $Ø_m$: 1.56E-02 cm^2/s
Field-saturated hydraulic conductivity K_{fs}: 4.86 m/d

Notes

Prepared by: Francesco Malavolta Date: 15/05/2023

Approved by: Aidan Seck Date: 15/05/2023

Appendices

Appendix 5: Laboratory Test Results.

(No of pages including this page: 26)

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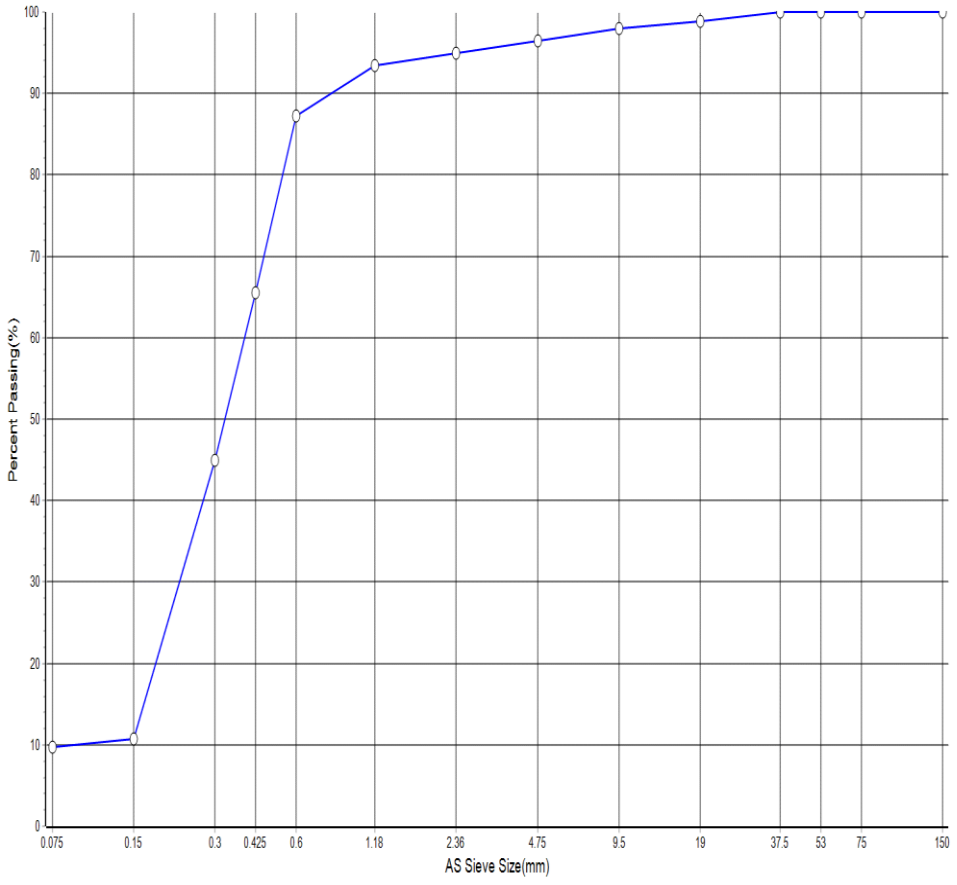
www.statsaustralia.com.au ABN 50 161 049 476

Particle Size Distribution Report

Client :	**City of Canning**	Report Number:	**PE-102215 - 1/1**
Address :	**1317 Albany Highway, Cannington, WA, 6107**	Report Date :	**15/05/2023**
Project Name :	**Proposed Shelley Park Upgrade - Stage 1**	Order Number :	
Project Number :	**PE-102215**	Test Method :	**AS1289.3.6.1**
Location:	**Shelley Park**	**Page 1 of 4**	

Sample Number :	S23-638	SAMPLE LOCATION	
Sampling Method :	AS1289.1.2.1 Clause 6.5.2 (Hand Auger)	**TP1**	
Sampled By :	Francesco Malavolta	**2.0-2.3m**	
Date Sampled :	2/05/2023		
Date Tested :	12/05/2023		
Material Type :	Soil Sample	Test Number :	**1**
Material Source :	Test Pit	Lot Number :	
Remarks :	STATS Australia Pty Ltd Project Number 102714	Specification Number :	

AS Sieve Size(mm)	Percent Passing	Specification Limits
53	**100**	
37.5	**100**	
19.0	**99**	
9.5	**98**	
4.75	**96**	
2.36	**95**	
1.18	**93**	
0.600	**87**	
0.425	**66**	
0.300	**45**	
0.150	**11**	
0.075	**10**	



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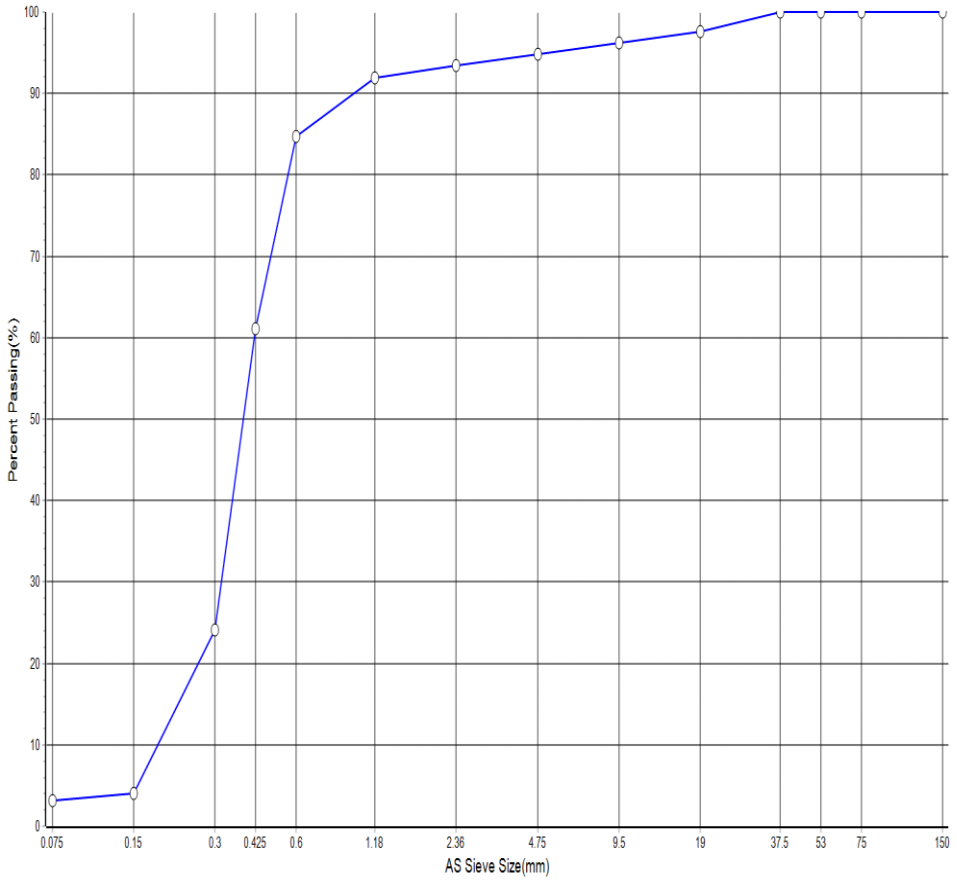
Particle Size Distribution Report

Client :	**City of Canning**	Report Number:	**PE-102215 - 1/1**
Address :	**1317 Albany Highway, Cannington, WA, 6107**	Report Date :	**15/05/2023**
Project Name :	**Proposed Shelley Park Upgrade - Stage 1**	Order Number :	
Project Number :	**PE-102215**	Test Method :	**AS1289.3.6.1**
Location:	**Shelley Park**	**Page 2 of 4**	

Sample Number :	S23-639	SAMPLE LOCATION	
Sampling Method :	AS1289.1.2.1 Clause 6.5.2 (Hand Auger)	**TP3**	
Sampled By :	Francesco Malavolta	**1.3-1.8m**	
Date Sampled :	2/05/2023		
Date Tested :	12/05/2023		
Material Type :	Soil Sample	Test Number :	**2**
Material Source :	Test Pit	Lot Number :	
Remarks :	STATS Australia Pty Ltd Project Number 102714	Specification Number :	

AS Sieve Size(mm)	Percent Passing	Specification Limits
53	**100**	
37.5	**100**	
19.0	**98**	
9.5	**96**	
4.75	**95**	
2.36	**93**	
1.18	**92**	
0.600	**85**	
0.425	**61**	
0.300	**24**	
0.150	**4**	
0.075	**3**	



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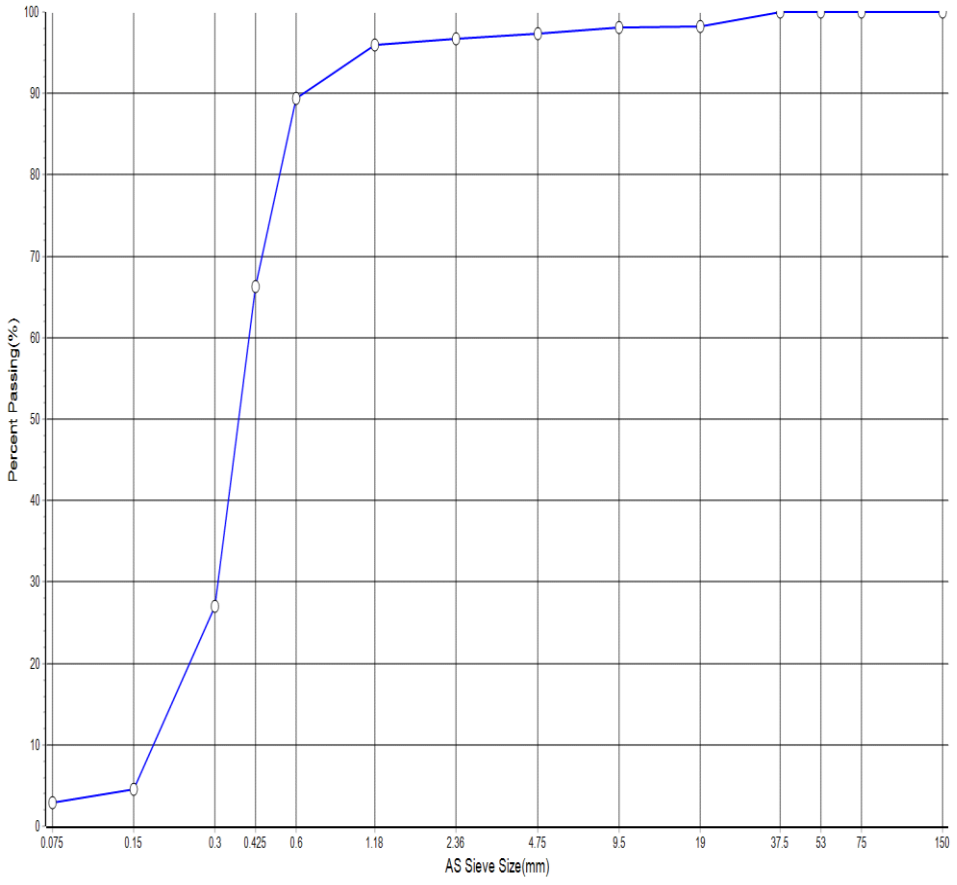
Particle Size Distribution Report

Client :	**City of Canning**	Report Number:	**PE-102215 - 1/1**
Address :	**1317 Albany Highway, Cannington, WA, 6107**	Report Date :	**15/05/2023**
Project Name :	**Proposed Shelley Park Upgrade - Stage 1**	Order Number :	
Project Number :	**PE-102215**	Test Method :	**AS1289.3.6.1**
Location:	**Shelley Park**	**Page 3 of 4**	

Sample Number :	S23-640	SAMPLE LOCATION	
Sampling Method :	AS1289.1.2.1 Clause 6.5.2 (Hand Auger)	**TP4**	
Sampled By :	Francesco Malavolta	**1.5-2.0m**	
Date Sampled :	2/05/2023		
Date Tested :	12/05/2023		
Material Type :	Soil Sample	Test Number :	**3**
Material Source :	Test Pit	Lot Number :	
Remarks :	STATS Australia Pty Ltd Project Number 102714	Specification Number :	

AS Sieve Size(mm)	Percent Passing	Specification Limits
53	**100**	
37.5	**100**	
19.0	**98**	
9.5	**98**	
4.75	**97**	
2.36	**97**	
1.18	**96**	
0.600	**89**	
0.425	**66**	
0.300	**27**	
0.150	**5**	
0.075	**3**	



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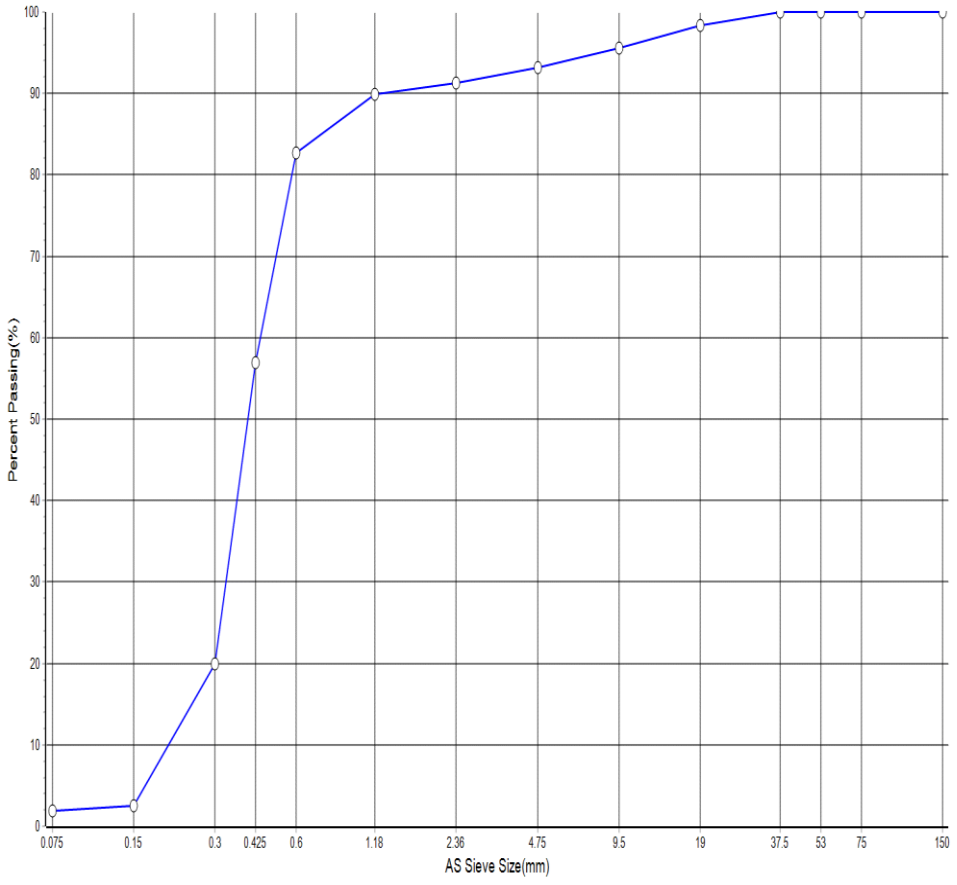
Particle Size Distribution Report

Client :	**City of Canning**	Report Number:	**PE-102215 - 1/1**
Address :	**1317 Albany Highway, Cannington, WA, 6107**	Report Date :	**15/05/2023**
Project Name :	**Proposed Shelley Park Upgrade - Stage 1**	Order Number :	
Project Number :	**PE-102215**	Test Method :	**AS1289.3.6.1**
Location:	**Shelley Park**	**Page 4 of 4**	

Sample Number :	S23-641	SAMPLE LOCATION	
Sampling Method :	AS1289.1.2.1 Clause 6.5.2 (Hand Auger)	**TP5**	
Sampled By :	Francesco Malavolta	**0.8-1.2m**	
Date Sampled :	2/05/2023		
Date Tested :	12/05/2023		
Material Type :	Soil Sample	Test Number :	**4**
Material Source :	Test Pit	Lot Number :	
Remarks :	STATS Australia Pty Ltd Project Number 102714	Specification Number :	

AS Sieve Size(mm)	Percent Passing	Specification Limits
53	**100**	
37.5	**100**	
19.0	**98**	
9.5	**96**	
4.75	**93**	
2.36	**91**	
1.18	**90**	
0.600	**83**	
0.425	**57**	
0.300	**20**	
0.150	**3**	
0.075	**2**	



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Atterberg Limits Report

Client :	**City of Canning**	Report Number:	**PE-102215 - 2/1**
Address :	**1317 Albany Highway, Cannington, WA, 6107**	Report Date :	**15/05/2023**
Project Name :	**Proposed Shelley Park Upgrade - Stage 1**	Test Method :	**AS1289.3.1.2; 3.2.1; 3.3.1; 3.4.1**
Project Number :	**PE-102215**		
Location:	**Shelley Park**		**Page 1 of 1**

Sample Number :	S23-638	S23-639		
Test Number :	1	2		
Date Sampled :	2/05/2023	2/05/2023		
Date Tested :	11/05/2023	11/05/2023		
Sampled By :	Francesco Malavolta	Francesco Malavolta		
Sampling Method :	AS1289.1.2.1 Clause 6.5.2 (Hand Auger)	AS1289.1.2.1 Clause 6.5.2 (Hand Auger)		
Material Source :	Test Pit	Test Pit		
Material Type :	Soil Sample	Soil Sample		
Sample Location :	TP1 2.0-2.3m	TP3 1.3-1.8m		
Lot Number :				
Moisture Method :	AS1289.2.1.1	AS1289.2.1.1		
Sample History :	Drying Cabinet	Drying Cabinet		
Sample Preparation :	Dry	Dry		
Notes :	No Cracking or Crumbling	No Cracking or Crumbling		
Mould Length (mm) :				
Liquid Limit (%) :	Not Obtainable	Not Obtainable		
Plastic Limit (%) :	Not Obtainable	Not Obtainable		
Plasticity Index (%) :	NP (Non Plastic)	NP (Non Plastic)		
Linear Shrinkage (%) :	N/A	N/A		
SPECIFICATION DETAILS				
Specification Number :				
Liquid Limit - Max :				
Plasticity Index - Max :				
Linear Shrinkage - Max :				
Remarks :	STATS Australia Pty Ltd Project Number 102714			

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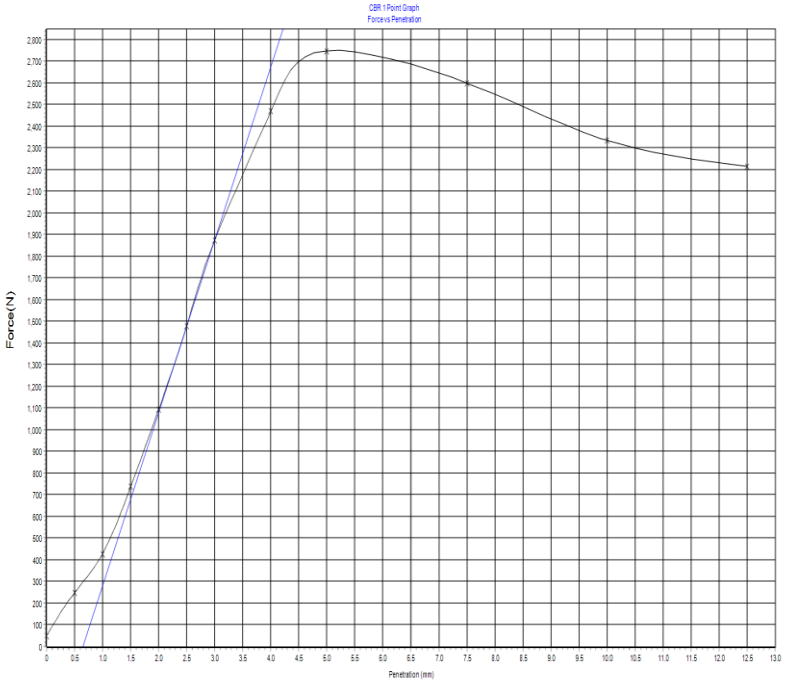
California Bearing Ratio Report (1 Point)

Client :	**City of Canning**	Report Number:	**PE-102215 - 4/1**
Address :	**1317 Albany Highway, Cannington, WA, 6107**	Report Date :	**19/05/2023**
Project Number :	**PE-102215**	Order Number :	
Project Name :	**Proposed Shelley Park Upgrade - Stage 1**	Test Method :	**AS1289.6.1.1**
Location:	**Shelley Park**	**Page 1 of 2**	

Sample Number :	S23-638	SAMPLE LOCATION
Date Sampled :	2/05/2023	TP1
Date Tested :	19/05/2023	2.0-2.3m
Sampled By :	Francesco Malavolta	
Sampling Method :	AS1289.1.2.1 Clause 6.5.2 (Hand Auger)	
Material Source :	Test Pit	Lot Number :
Material Type :	Soil Sample	Test Number : 1
Remarks :	STATS Australia Pty Ltd Project Number 102714	

Moisture Method :	AS1289.2.1.1
Maximum Dry Density (t/m³) :	1.801
Optimum Moisture Content (%) :	13.9
Compactive Effort :	Modified
Nominated Percentage of MDD :	95
Nominated Percentage of OMC :	100
Achieved Percentage of MDD :	95
Achieved Percentage of OMC :	96
Dry Density Before Soak (t/m³) :	1.712
Dry Density After Soak (t/m³) :	1.714
Moisture Content Before Soak (%) :	13.4
Moisture Content After Soak (%) :	15.6
Density Ratio After Soak (%) :	95
Field Moisture Content (%) :	7.4
Top Moisture Content - After Penetration (%) :	16.9
Total Moisture Content - After Penetration (%) :	15.9
Soak Condition :	Soaked
Soak Period (days) :	4
Swell (%) :	0.0



CBR Surcharge (kg) :	4.5		
Oversize (%) :	1		
Oversize Material Replaced (%) :	Excluded	**CBR Value (%) :**	**15 @ 2.5mm**

Site Selection :	
Soil Description :	

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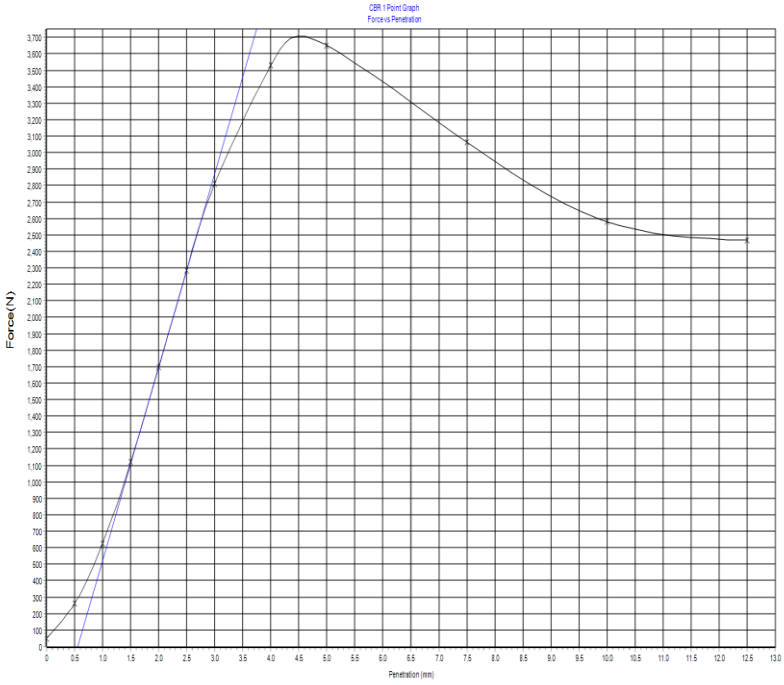
California Bearing Ratio Report (1 Point)

Client :	**City of Canning**	Report Number:	**PE-102215 - 4/1**
Address :	**1317 Albany Highway, Cannington, WA, 6107**	Report Date :	**19/05/2023**
Project Number :	**PE-102215**	Order Number :	
Project Name :	**Proposed Shelley Park Upgrade - Stage 1**	Test Method :	**AS1289.6.1.1**
Location:	**Shelley Park**	**Page 2 of 2**	

Sample Number :	S23-639	SAMPLE LOCATION
Date Sampled :	2/05/2023	TP3
Date Tested :	19/05/2023	1.3-1.8m
Sampled By :	Francesco Malavolta	
Sampling Method :	AS1289.1.2.1 Clause 6.5.2 (Hand Auger)	
Material Source :	Test Pit	Lot Number :
Material Type :	Soil Sample	Test Number : 2
Remarks :	STATS Australia Pty Ltd Project Number 102714	

Moisture Method :	AS1289.2.1.1
Maximum Dry Density (t/m³) :	1.801
Optimum Moisture Content (%) :	14.0
Compactive Effort :	Modified
Nominated Percentage of MDD :	95
Nominated Percentage of OMC :	100
Achieved Percentage of MDD :	95
Achieved Percentage of OMC :	99
Dry Density Before Soak (t/m³) :	1.715
Dry Density After Soak (t/m³) :	1.720
Moisture Content Before Soak (%) :	13.8
Moisture Content After Soak (%) :	16.3
Density Ratio After Soak (%) :	96
Field Moisture Content (%) :	33.3
Top Moisture Content - After Penetration (%) :	15.8
Total Moisture Content - After Penetration (%) :	15.7
Soak Condition :	Soaked
Soak Period (days) :	4
Swell (%) :	0.0



CBR Surcharge (kg) :	4.5		
Oversize (%) :	2		
Oversize Material Replaced (%) :	Excluded	**CBR Value (%) :**	**20 @ 2.5mm**

Site Selection :	
Soil Description :	

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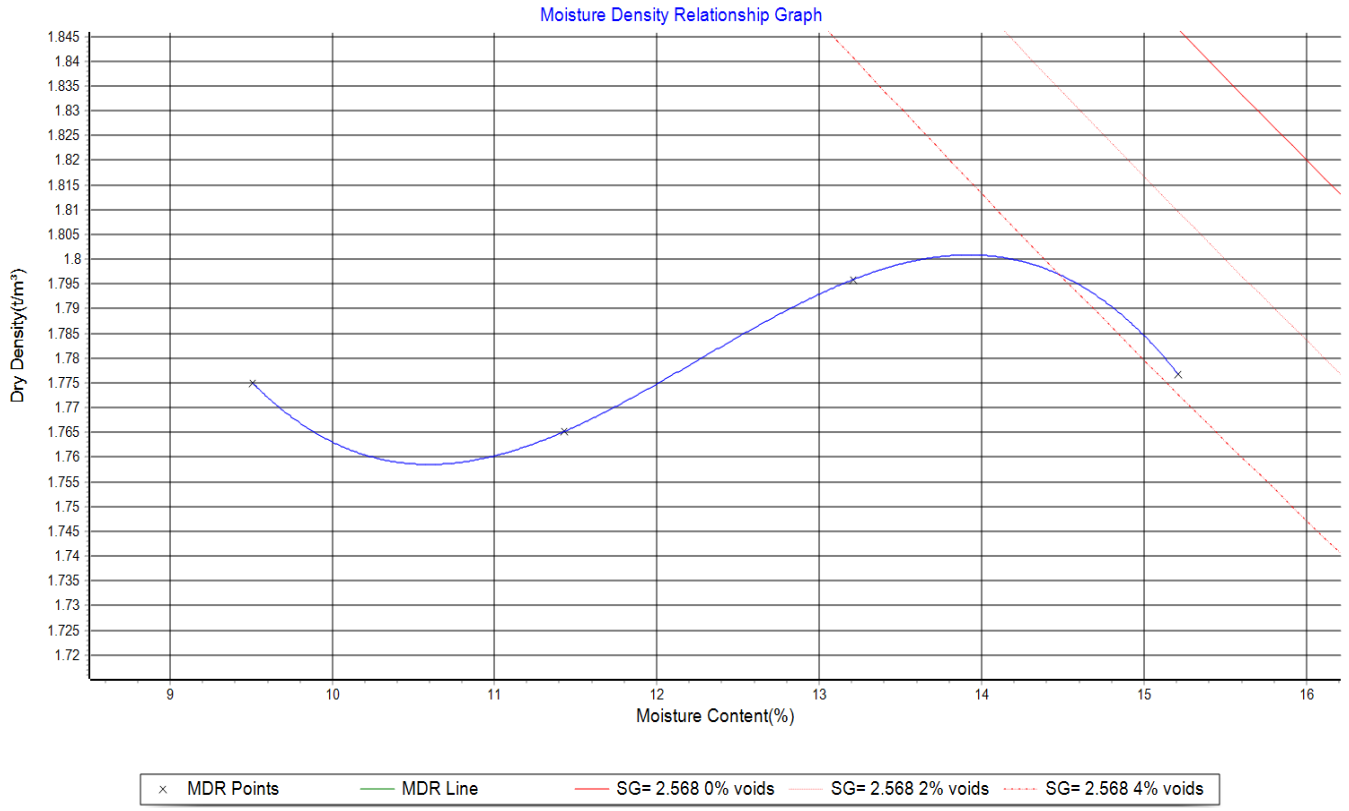
Moisture Density Relationship Report

Client :	**City of Canning**	Report Number:	**PE-102215 - 3/1**
Address :	**1317 Albany Highway, Cannington, WA, 6107**	Report Date :	**15/05/2023**
Project Name :	**Proposed Shelley Park Upgrade - Stage 1**	Order Number :	
Project Number :	**PE-102215**	Test Method :	**AS1289.5.2.1**
Location:	**Shelley Park**	**Page 1 of 2**	

Sample Number :	S23-638	SAMPLE LOCATION	
Sampling Method :	AS1289.1.2.1 Clause 6.5.2 (Hand Auger)	TP1	
Sampled By :	Francesco Malavolta	2.0-2.3m	
Date Sampled :	2/05/2023		
Date Tested :	11/05/2023		
Material Type :	Soil Sample	Test Number :	1
Material Source :	Test Pit	Lot Number :	
Remarks :	STATS Australia Pty Ltd Project Number 102714	Moisture Method :	AS1289.2.1.1

Maximum Size (mm) :	19.0	Curing Time (hrs) :	2
Oversize Dry (%) :	1	Plasticity Method :	Visual/Tactile
Oversize Density (t/m³) :		**Maximum Dry Density (t/m³) :**	1.80
Field Moisture Content (%) :		**Optimum Moisture Content (%) :**	14.0



NATA
WORLD RECOGNISED ACCREDITATION

Accredited for compliance with ISO/IEC 17025 - Testing.

APPROVED SIGNATORY

Ryan Donaldson - Lab Manager
NATA Accreditation Number
19186 Site Number 21714

STATS WA Pty Ltd

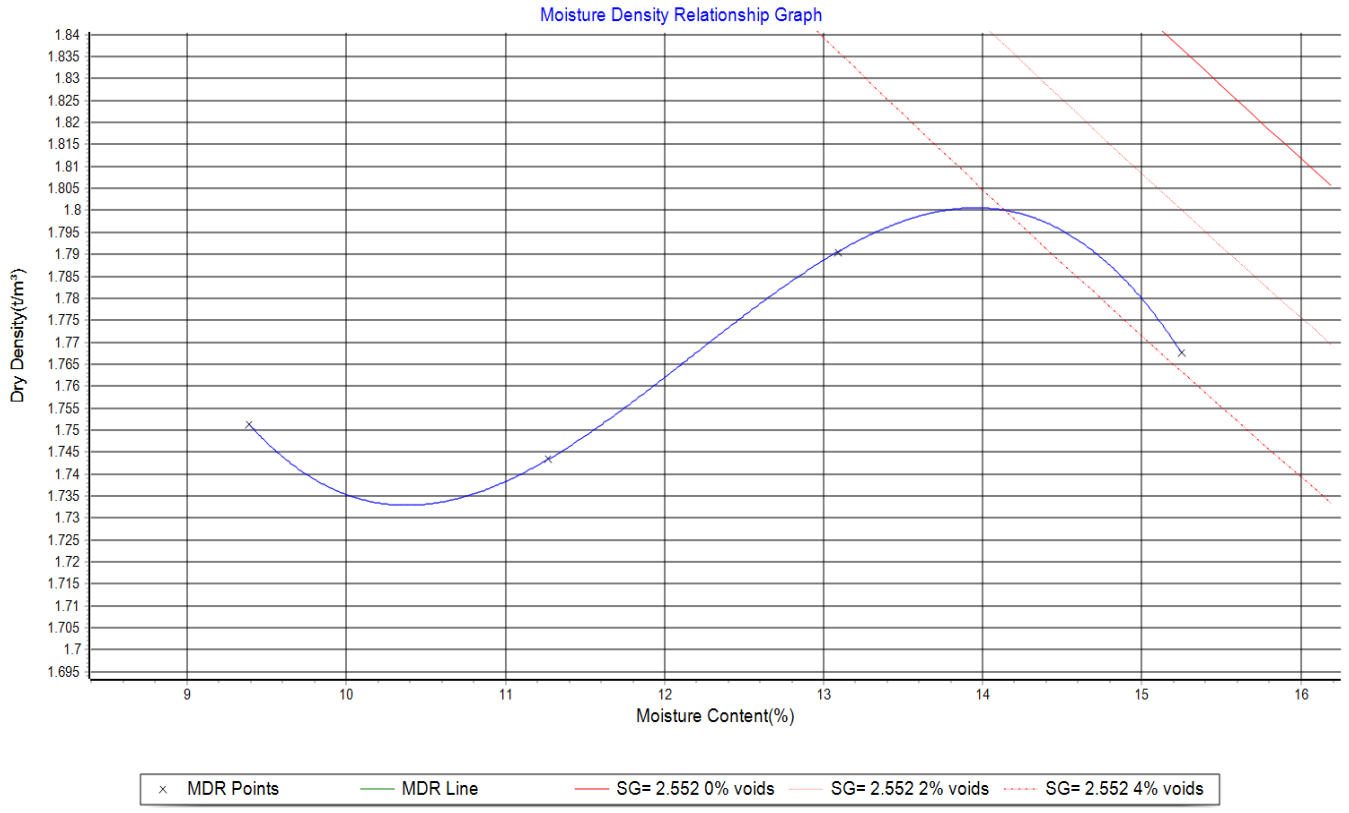
Perth
Unit 1/16 Production Road, Canning Vale, WA 6155
Karratha
1938 Pyramid Road, Karratha, WA 6714
Singapore
71 Toh Guan Rd East, #02-01/02/06 Techcentre, SG 602598
www.statsaustralia.com.au ABN 50 161 049 476

Moisture Density Relationship Report

Client :	**City of Canning**	Report Number:	**PE-102215 - 3/1**
Address :	**1317 Albany Highway, Cannington, WA, 6107**	Report Date :	**15/05/2023**
Project Name :	**Proposed Shelley Park Upgrade - Stage 1**	Order Number :	
Project Number :	**PE-102215**	Test Method :	**AS1289.5.2.1**
Location:	**Shelley Park**	**Page 2 of 2**	

Sample Number :	S23-639	SAMPLE LOCATION	
Sampling Method :	AS1289.1.2.1 Clause 6.5.2 (Hand Auger)	TP3	
Sampled By :	Francesco Malavolta	1.3-1.8m	
Date Sampled :	2/05/2023		
Date Tested :	11/05/2023		
Material Type :	Soil Sample	Test Number :	2
Material Source :	Test Pit	Lot Number :	
Remarks :	STATS Australia Pty Ltd Project Number 102714	Moisture Method :	AS1289.2.1.1

Maximum Size (mm) :	19.0	Curing Time (hrs) :	2
Oversize Dry (%) :	2	Plasticity Method :	Visual/Tactile
Oversize Density (t/m³) :		**Maximum Dry Density (t/m³) :**	1.80
Field Moisture Content (%) :		**Optimum Moisture Content (%) :**	14.0



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APPROVED SIGNATORY

Ryan Donaldson - Lab Manager
NATA Accreditation Number
19186 Site Number 21714

CERTIFICATE OF ANALYSIS

Work Order	: **EP2305824**	Page	: 1 of 10
Client	: **SPECIALIST TESTING AND TECHNICAL SERVICES PTY LTD**	Laboratory	: Environmental Division Perth
Contact	: FRANCESCO MALAVOLTA	Contact	: Customer Services EP
Address	: Unit 1/16 Production Road Canningvale 6155	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: 102714 Proposed Shelly Park Upgrade - Stage 1	Date Samples Received	: 03-May-2023 15:00
Order number	: 10223	Date Analysis Commenced	: 09-May-2023
C-O-C number	: ----	Issue Date	: 10-May-2023 16:45
Sampler	: FRANCESCO MALAVOLTA		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 40		
No. of samples analysed	: 40		

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
~ = Indicates an estimated value.

- ASS: EA037 (Rapid Field and F(ox) screening): pH F(ox) Reaction Rate: 1 - Slight; 2 - Moderate; 3 - Strong; 4 - Extreme
- EA037 ASS Field Screening: NATA accreditation does not cover performance of this service.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	TP1 (0.25m)	TP1 (0.50m)	TP1 (0.75m)	TP1 (1.0m)	TP1 (1.25m)
			Sampling date / time	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00
Compound	CAS Number	LOR	Unit	EP2305824-001	EP2305824-002	EP2305824-003	EP2305824-004	EP2305824-005
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	**7.1**	**7.6**	**8.3**	**8.3**	**8.4**
pH (Fox)	----	0.1	pH Unit	**5.4**	**6.2**	**6.1**	**6.2**	**6.5**
Reaction Rate	----	1	-	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Slight**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	TP1 (1.5m)	TP1 (1.75m)	TP1 (2.0m)	TP2 (0.25m)	TP2 (0.50m)
			Sampling date / time	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00
Compound	CAS Number	LOR	Unit	EP2305824-006	EP2305824-007	EP2305824-008	EP2305824-009	EP2305824-010
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	**8.1**	**8.0**	**7.8**	**7.3**	**7.5**
pH (Fox)	----	0.1	pH Unit	**6.4**	**6.4**	**6.2**	**5.4**	**5.5**
Reaction Rate	----	1	-	**Slight**	**Slight**	**Strong**	**Moderate**	**Moderate**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	TP2 (0.75m)	TP2 (1.0m)	TP2 (1.25m)	TP2 (1.5m)	TP2 (1.75m)
			Sampling date / time	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00
Compound	CAS Number	LOR	Unit	EP2305824-011	EP2305824-012	EP2305824-013	EP2305824-014	EP2305824-015
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	**7.9**	**8.0**	**7.9**	**7.8**	**8.0**
pH (Fox)	----	0.1	pH Unit	**5.8**	**6.1**	**6.7**	**6.6**	**6.5**
Reaction Rate	----	1	-	**Moderate**	**Moderate**	**Slight**	**Slight**	**Strong**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	TP2 (2.0m)	TP3 (0.25m)	TP3 (0.50m)	TP3 (0.75m)	TP3 (1.0m)
			Sampling date / time	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00
Compound	CAS Number	LOR	Unit	EP2305824-016	EP2305824-017	EP2305824-018	EP2305824-019	EP2305824-020
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	**7.9**	**7.7**	**7.7**	**8.0**	**8.3**
pH (Fox)	----	0.1	pH Unit	**5.9**	**5.2**	**5.6**	**5.9**	**6.1**
Reaction Rate	----	1	-	**Strong**	**Moderate**	**Moderate**	**Moderate**	**Moderate**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	TP3 (1.25m)	TP3 (1.5m)	TP3(1.75m)	TP3 (2.0m)	TP4 (0.25m)
			Sampling date / time	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00
Compound	CAS Number	LOR	Unit	EP2305824-021	EP2305824-022	EP2305824-023	EP2305824-024	EP2305824-025
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	**8.4**	**7.9**	**7.9**	**7.7**	**8.2**
pH (Fox)	----	0.1	pH Unit	**6.3**	**6.5**	**6.4**	**6.5**	**5.9**
Reaction Rate	----	1	-	**Moderate**	**Slight**	**Slight**	**Slight**	**Moderate**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	TP4 (0.50m)	TP4 (0.75m)	TP4 (1.0m)	TP4 (1.25m)	TP4 (1.5m)
			Sampling date / time	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00
Compound	CAS Number	LOR	Unit	EP2305824-026	EP2305824-027	EP2305824-028	EP2305824-029	EP2305824-030
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	**8.2**	**8.3**	**8.3**	**7.6**	**8.0**
pH (Fox)	----	0.1	pH Unit	**5.7**	**6.1**	**5.8**	**6.1**	**6.2**
Reaction Rate	----	1	-	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**Moderate**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	TP4(1.75m)	TP4 (2.0m)	TP5 (0.25m)	TP5 (0.50m)	TP5 (0.75m)
			Sampling date / time	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00
Compound	CAS Number	LOR	Unit	EP2305824-031	EP2305824-032	EP2305824-033	EP2305824-034	EP2305824-035
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	**7.9**	**8.1**	**8.2**	**8.6**	**8.7**
pH (Fox)	----	0.1	pH Unit	**6.4**	**6.4**	**6.0**	**6.2**	**6.3**
Reaction Rate	----	1	-	**Slight**	**Moderate**	**Moderate**	**Moderate**	**Moderate**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	TP5 (1.0m)	TP5 (1.25m)	TP5 (1.5m)	TP5 (1.75m)	TP5 (2.0m)
			Sampling date / time	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00
Compound	CAS Number	LOR	Unit	EP2305824-036	EP2305824-037	EP2305824-038	EP2305824-039	EP2305824-040
				Result	Result	Result	Result	Result
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	**8.6**	**8.2**	**8.2**	**7.8**	**8.1**
pH (Fox)	----	0.1	pH Unit	**6.2**	**6.6**	**6.4**	**6.5**	**6.2**
Reaction Rate	----	1	-	**Moderate**	**Moderate**	**Slight**	**Slight**	**Moderate**

CERTIFICATE OF ANALYSIS

Work Order	: **EP2306319**	Page	: 1 of 6
Client	: **SPECIALIST TESTING AND TECHNICAL SERVICES PTY LTD**	Laboratory	: Environmental Division Perth
Contact	: FRANCESCO MALAVOLTA	Contact	: Customer Services EP
Address	: Unit 1/16 Production Road Canningvale 6155	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: 102714 Proposed Shelly Park Upgrade - Stage 1	Date Samples Received	: 03-May-2023 15:00
Order number	: 10223	Date Analysis Commenced	: 16-May-2023
C-O-C number	: ----	Issue Date	: 23-May-2023 11:34
Sampler	: FRANCESCO MALAVOLTA		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 10		
No. of samples analysed	: 10		

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

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- Analytical Results

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Signatories

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

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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): Retained Acidity not required because pH KCl greater than or equal to 4.5
- ASS: EA029 (SPOCAS): Excess ANC not required for sample #1, #2, #3 and #6 because pH OX less than 6.5.
- This workorder is a rebatch of EP2305824.
- 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.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	TP1 (0.25m)	TP2 (0.25m)	TP2 (0.50m)	TP2 (0.75m)	TP2 (2.0m)
			Sampling date / time	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00
Compound	CAS Number	LOR	Unit	EP2306319-001	EP2306319-002	EP2306319-003	EP2306319-004	EP2306319-005
				Result	Result	Result	Result	Result
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	**6.8**	**7.1**	**7.2**	**8.9**	**9.2**
pH OX (23B)	----	0.1	pH Unit	**4.5**	**4.7**	**5.8**	**6.7**	**7.6**
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	<0.005	<0.005	<0.005	<0.005	**0.042**
Peroxide Sulfur (23De)	----	0.005	% S	<0.005	<0.005	<0.005	<0.005	**0.240**
Peroxide Oxidisable Sulfur (23E)	----	0.005	% S	<0.005	<0.005	<0.005	<0.005	**0.198**
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	5	mole H+ / t	<5	<5	<5	<5	**123**
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.005	% Ca	**0.010**	**0.028**	**0.037**	**0.053**	**0.142**
Peroxide Calcium (23Wh)	----	0.005	% Ca	**0.012**	**0.025**	**0.027**	**0.054**	**0.592**
Acid Reacted Calcium (23X)	----	0.005	% Ca	<0.005	<0.005	<0.005	<0.005	**0.450**
acidity - Acid Reacted Calcium (a-23X)	----	5	mole H+ / t	<5	<5	<5	<5	**225**
sulfidic - Acid Reacted Calcium (s-23X)	----	0.005	% S	<0.005	<0.005	<0.005	<0.005	**0.360**
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.005	% Mg	<0.005	<0.005	<0.005	<0.005	**0.006**
Peroxide Magnesium (23Tm)	----	0.005	% Mg	<0.005	<0.005	<0.005	<0.005	**0.011**
Acid Reacted Magnesium (23U)	----	0.005	% Mg	<0.005	<0.005	<0.005	<0.005	**0.005**
Acidity - Acid Reacted Magnesium (a-23U)	----	5	mole H+ / t	<5	<5	<5	<5	<5
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.005	% S	<0.005	<0.005	<0.005	<0.005	**0.006**
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.020	% CaCO3	**----**	**----**	**----**	**0.251**	**1.15**
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	**----**	**----**	**----**	**50**	**230**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	TP1 (0.25m)	TP2 (0.25m)	TP2 (0.50m)	TP2 (0.75m)	TP2 (2.0m)
			Sampling date / time	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00
Compound	CAS Number	LOR	Unit	EP2306319-001	EP2306319-002	EP2306319-003	EP2306319-004	EP2306319-005
				Result	Result	Result	Result	Result
EA029-F: Excess Acid Neutralising Capacity - Continued								
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.020	% S	**----**	**----**	**----**	**0.080**	**0.369**
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	<0.02	**0.20**
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	**123**
Liming Rate excluding ANC	----	1	kg CaCO3/t	<1	<1	<1	<1	**9**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	TP3 (0.25m)	TP3 (0.50m)	TP4 (0.25m)	TP4 (0.50m)	TP4 (1.0m)
			Sampling date / time	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00
Compound	CAS Number	LOR	Unit	EP2306319-006	EP2306319-007	EP2306319-008	EP2306319-009	EP2306319-010
				Result	Result	Result	Result	Result
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	**7.7**	**9.4**	**9.5**	**9.3**	**9.1**
pH OX (23B)	----	0.1	pH Unit	**4.9**	**7.3**	**7.5**	**7.3**	**6.9**
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	<0.005	<0.005	<0.005	<0.005	<0.005
Peroxide Sulfur (23De)	----	0.005	% S	**0.005**	**0.005**	**0.009**	**0.009**	**0.007**
Peroxide Oxidisable Sulfur (23E)	----	0.005	% S	<0.005	<0.005	**0.005**	**0.006**	<0.005
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	5	mole H+ / t	<5	<5	<5	<5	<5
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.005	% Ca	**0.039**	**0.085**	**0.134**	**0.093**	**0.074**
Peroxide Calcium (23Wh)	----	0.005	% Ca	**0.032**	**0.113**	**0.938**	**0.180**	**0.085**
Acid Reacted Calcium (23X)	----	0.005	% Ca	<0.005	**0.028**	**0.804**	**0.087**	**0.012**
acidity - Acid Reacted Calcium (a-23X)	----	5	mole H+ / t	<5	**14**	**401**	**44**	**6**
sulfidic - Acid Reacted Calcium (s-23X)	----	0.005	% S	<0.005	**0.022**	**0.643**	**0.070**	**0.009**
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.005	% Mg	<0.005	<0.005	**0.007**	<0.005	<0.005
Peroxide Magnesium (23Tm)	----	0.005	% Mg	<0.005	<0.005	**0.009**	<0.005	<0.005
Acid Reacted Magnesium (23U)	----	0.005	% Mg	<0.005	<0.005	<0.005	<0.005	<0.005
Acidity - Acid Reacted Magnesium (a-23U)	----	5	mole H+ / t	<5	<5	<5	<5	<5
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.005	% S	<0.005	<0.005	<0.005	<0.005	<0.005
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.020	% CaCO3	**----**	**0.309**	**2.58**	**0.446**	**0.231**
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	**----**	**62**	**516**	**89**	**46**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	TP3 (0.25m)	TP3 (0.50m)	TP4 (0.25m)	TP4 (0.50m)	TP4 (1.0m)
			Sampling date / time	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00	02-May-2023 00:00
Compound	CAS Number	LOR	Unit	EP2306319-006	EP2306319-007	EP2306319-008	EP2306319-009	EP2306319-010
				Result	Result	Result	Result	Result
EA029-F: Excess Acid Neutralising Capacity - Continued								
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.020	% S	**----**	**0.099**	**0.826**	**0.143**	**0.074**
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	<0.02	<0.02
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10
Liming Rate excluding ANC	----	1	kg CaCO3/t	<1	<1	<1	<1	<1

Photographs

Photos 1 to 8: Site Photographs.

(No of pages including this page: 05)

Photo 1: Soils encountered at TP 1 location – SANDS predominantly.

Photo 2: DCP1 test carried out adjacent to TP1 location.

Photo 3: Soils encountered at TP 5 location – SANDS predominantly.

Photo 4: Soils encountered at TP 4 location – SANDS predominantly.

Photo 5: Soils encountered at TP 3 location – SANDS predominantly.

Photo 6: Environmental hand auger and sampling work at TP 2 location.

Photo 7: Infiltration test at IFT4 location.

Photo 8: Infiltration test at IFT3 location.

2nd June 2023

Asile Wong
Landscape Architect
City of Canning
1317 Albany Highway
CANNINGTON WA 6107

Dear Asile,

ARBORICULTURAL ASSESSMENT AT SHELLEY FORESHORE PLAYGROUND

Please find enclosed the results of the arboricultural assessment undertaken recently for the trees at the Shelley Foreshore Playground, Shelley.

Where recommendations for remedial arboricultural work have been made, it is imperative that it is undertaken as outlined in the Australian Standard 4373-2007: Pruning of Amenity Trees and/ or Australian Standard 4970-2009: Protection of Trees on Development Sites. It is also strongly advised that any remedial pruning works be undertaken by, or supervised by, a qualified arborist (AQF Level 3 in Arboriculture).

If you have any questions regarding the assessment or if I can be of service to you again in the future, please feel free to contact me.

Yours sincerely,

Brad Bowden
Principal
Bowden Tree Consultancy®

B.Sc. Sustainable Forestry
Dip. Arboriculture & Parks Management
ISA Certified Arborist – Municipal Specialist AU-0020AM & Tree Risk Assessment Qualified (TRAQ)

1.0 Introduction

1.1 Scope of Report

1.2 The purpose of this report is to summarise the results of the walkby arboricultural assessment and provide recommendations for the 10 semi-mature and mature trees (mixed species) located at the Shelley Foreshore, at Riverton Drive North, Shelley. The site visit and visual tree assessments were undertaken from ground level on the 16th May 2023 and were accurate at the time of inspection. No detailed tree/ risk assessment, soil excavation or below ground inspection was undertaken unless specified. Viewing conditions were fine. Concern has been raised regarding tree condition and remedial works required, as well as techniques to mitigate the impact of the proposed construction activities.

1.3 Executive Summary

1.4 The assessed trees identified within this report provide a range of benefits to the ecosystem, to human beings for environmental and health reasons, and to the climate. The assessment has deduced a satisfactory structural condition for the majority of the assessed trees and tree vitality (health condition) was predominantly high, indicating a long useful life expectancy and provision of tree-related benefits.

1.5 To minimise rootplate disturbance, which if significant can result in tree decline, the proposed design should seek to use existing footings, below-ground services, and hard surfaces wherever possible. Where tree retention for the long term is desired, any proposed excavation/ construction works that occur within the tree protection zone (TPZ) of trees to be retained must be assessed and supervised by an AQF Level 5 Project Arborist. It is also imperative that tree protection measures are utilised as outlined in the Australian Standard 4970 (2009): Protection of Trees on Development Sites.

2.0 Site Investigations

2.1 Tree Locations

Figure 1 & 2. Aerial photos of site and location of the assessed trees.

Figure 3 & 4. Tree protection zones and Shelley Beach Park Stage 1 Design.

2.2 Assessed Trees - Summary

Tree No.	Common Name:	Age-class:	TPZ Radius (m):	Structure:	Health:	Useful Life Expectancy (yrs):	Retention Value:
1	northern river red gum	Mature	4.3	Fair	High	5 to 15	Medium
2	river sheoak	Mature	10.7	Fair	High	15-40	High
3	river sheoak	Mature	12.2	Fair	High	15-40	High
4	modong	Semi-mature	1.8	Fair	Average	40 +	Medium
5	tuart	Mature	15	TBA	High	40 +	High
6	modong	Semi-mature	2.4	Fair	High	40 +	Medium
7	tuart	Mature	15	Fair	High	40 +	High
8	river sheoak	Mature	12.5	Fair	High	15-40	High
9	river sheoak	Mature	6.1	Fair	High	15-40	Medium
10	river sheoak	Mature	15	Fair	High	15-40	High

Table 1. Summary of tree condition, retention value and the tree protection zone radius (TPZ) for the assessed trees.

3.0 Discussion and Recommendations

3.1 Discussion

3.2 Tree root plate: Root plate composition for most tree species consists of a structural root zone and an absorbing root zone, responsible respectively for the support/ anchorage of the tree and the uptake of water/ mineral nutrients in solution. Severance of large diameter woody roots within the structural root zone (the root plate area immediately adjacent to the trunk) can compromise tree stability and result in the loss of a significant proportion of the absorbing roots – roots that are responsible for the uptake of water and nutrients, subsequently placing considerable stress upon the tree in the short term. The severance of large diameter woody structural roots also provides an entry opportunity for infection by wood decay fungi, increasing the potential for the degradation of wood tissue at the trunk basal area which can further compromise tree stability. The root development for most tree species generally occurs in the upper layers of the soil profile (0-1m depth) due to higher levels of organic matter and oxygen as required by the absorbing roots, and moisture sources such as reticulation systems and rainfall.

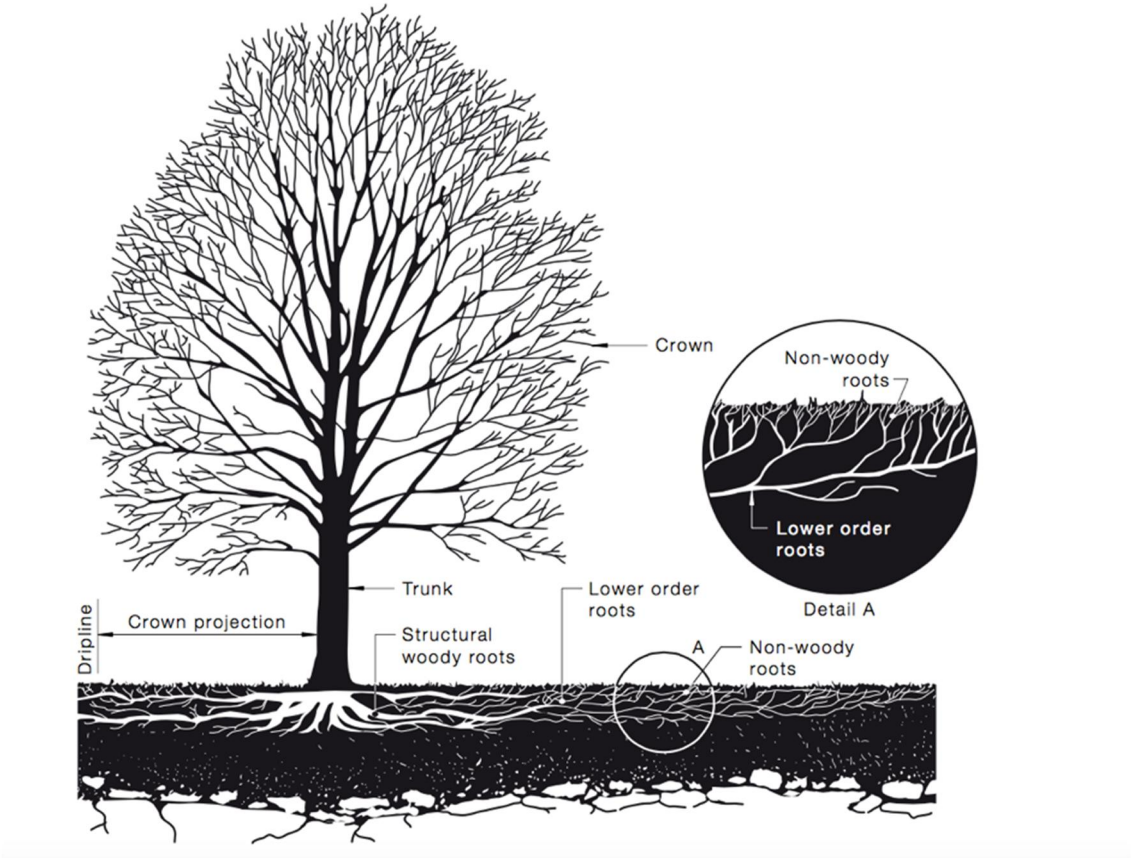

Figure 5. Typical tree structure above and below ground for cultivated urban trees, with naturally-seeded trees often having vertically-oriented sinker roots beneath the trunk section. Source: AS4970-2009: Protection of Trees on Development Sites.

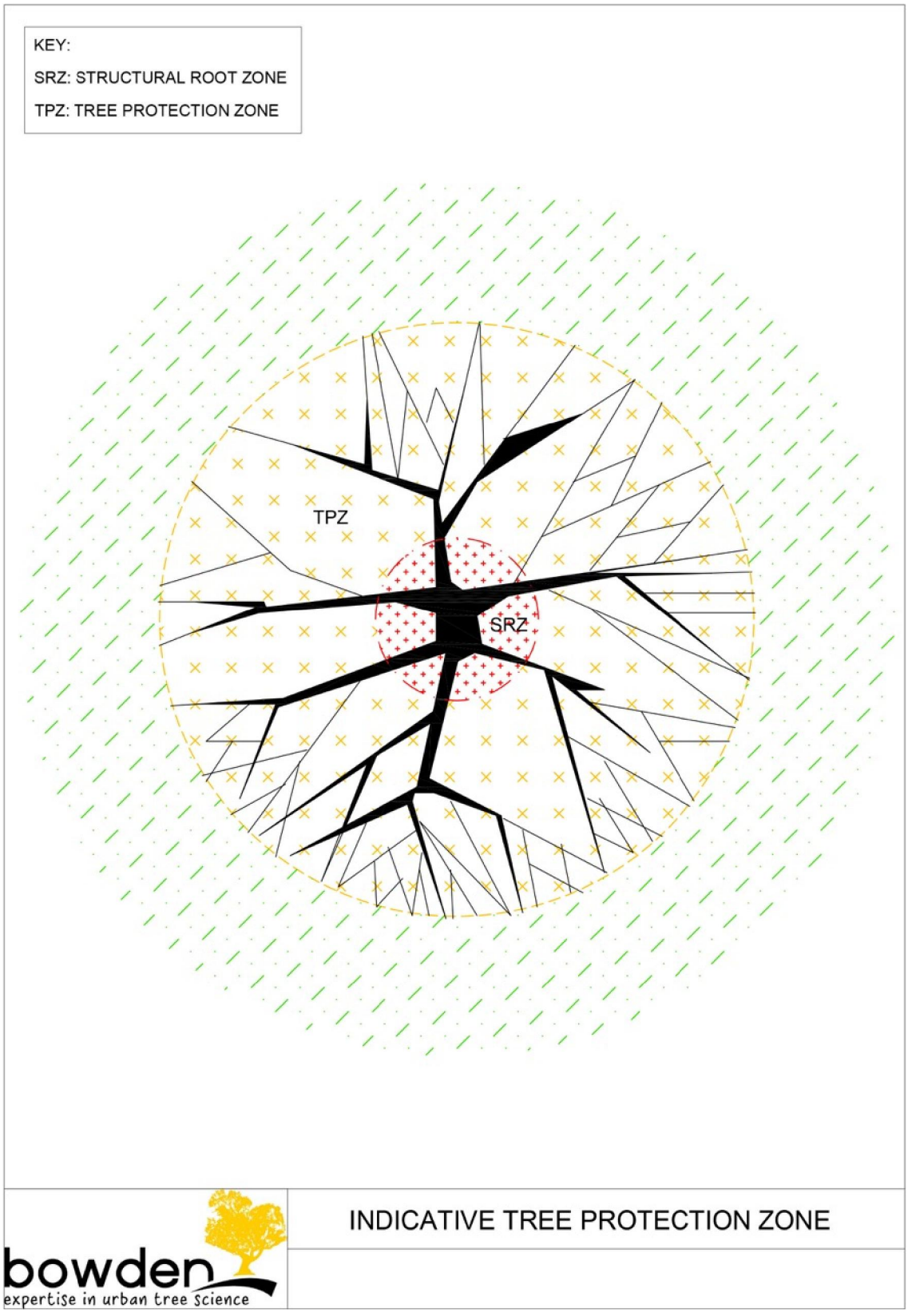

Figure 6. **Indicative rootplate zones outlining the structural root zone (SRZ) that has the large woody roots responsible for tree anchorage and stability, which subsequently taper into the smaller-diameter absorbing roots that take up water and mineral nutrients in solution.**

3.3 Root sensitive design and excavation: Where construction activities cannot occur outside the tree protection zone radius of a tree, preservation of the rootplate and subsequent tree health can be achieved by utilising discontinuous footings and/ or minor fill soil atop the existing grade. A structural design incorporating methods such as cantilever, pier and beam (lintel), and/ or screw pile footings that spans a structure across the root plate of the tree can be used to limit root damage and loss. The design should specify a root sensitive excavation technique such as air spading, hand digging or soil vacuum to alleviate the potential for damage to tree roots during excavation, and/ or the use of horizontal directional drilling for underground service/ conduit/ irrigation installation.

3.4 Should minor roots (<30mm in diameter) be encountered outside the structural root zone during excavation they can be pruned cleanly with a handsaw on an angle that is perpendicular to the root edge, to limit the size of the pruning wound and to enable the fastest rate of wound occlusion and subsequent new root growth. Large woody structural tree roots >30mm in diameter must be retained to avoid compromising tree stability and the design modified where possible. Any design should be approved by a structural engineer or other competent person.

Figure 7. Where hard surfacing is proposed adjacent to existing trees the use of permeable paving provides an option to improve water/ nutrient infiltration and adequate soil aeration (oxygen) to the small absorbing roots – required to maintain healthy trees.

Figure 8. **Example of root-sensitive options to span a low wall or fence structure across the root plate of a tree whilst limiting excavation to avoid severing large woody roots: (a) post and palisade fencing; (b) post and panel colorbond fence; (c) timber picket fence; (d) i-beam and sleeper low wall.**

3.5 **Root pruning:** To minimise tree stress where any significant construction activity or other work is proposed adjacent to mature trees, root-sensitive explorative works must be undertaken prior to any mechanical or noteworthy excavation within the tree protection zone (trunk diameter x 12), and such encroachment should be offset on another side of the tree. Firstly it is recommended to non-destructively remove soil within an inspection hole/ trench at the proposed limit of approach, using non-damaging methods such as hand-digging, air spading, or soil vacuum, and to a depth determined by the proposed construction activity/ repair works.

3.6 Dependant on the distance from the tree as well as the diameter of the roots (to be confirmed by an AQF Level 5 Arborist), the exposed root/s should be pruned cleanly with a handsaw at an angle that is perpendicular to the root edge, to leave a pruning wound with the smallest surface area possible - as this has a greater likelihood of wound occlusion and reducing subsequent new root growth (typical tree response). Pruned root sections should then be covered with soil and adequate soil moisture levels maintained. This procedure can also be applied to trees that have been negatively impacted by indiscriminate excavation and resulted in damage that tears or severs large woody roots.

Figure 9 & 10. Where mechanical excavation is used outside the tree protection zone the selection of a toothless bucket (a) and use of a spotter can reduce tree root damage, compared with the toothed bucket (b) type which can significantly tear and damage roots for several metres.

Figure 11, 12 & 13. Example of air-spading and soil vacuum to remove soil within the tree protection zone without damaging or severing tree roots, thereby allowing the installation of below-ground services beneath the rootplate.

Figure 14. **Example of a wounded root section (see arrow) in contact with the underside of displaced pavers, which is larger in diameter than the adjacent non-wounded section of the same root.**

3.7 **Roots and structures:** Structural damage to building foundations and walls can result following the removal of soil moisture. On expansive/ reactive clay soils, trees and vegetation transpire water which can result in soil desiccation and a subsequent reduction in the soil volume. This often causes subsidence of the soil surface and may result in structural failure. This type of damage is often referred to as indirect damage and occurs on expansive soil types i.e. a soil type that shrinks as it dries and is observed by large cracks on the surface of the soil.

3.8 Direct damage to structures involves lightly-loaded structures such as concrete footpaths and single course brick/ block walls. Tree root growth is opportunistic and may develop in areas with suitable levels of soil moisture, organic matter and soil nutrition. Roots of a very small diameter may pass beneath footpaths and brick walls to source water and nutrients with little initial disturbance to the structure. As root diameter increases through normal secondary thickening however, lightly-loaded structures can be displaced and damaged. The likelihood of direct damage to heavily-loaded structures i.e. a building foundation with the entire weight of the building upon it (on sandy soils), is low.

3.9 **Maintaining tree health:** On development sites and/ or where construction activities have exposed the upper soil profile of trees to be retained, maintaining adequate soil moisture is critical to ensuring the preservation of such trees. This can be achieved by providing supplemental irrigation throughout the summer months and/ or the application of woodchip mulch to

approximately 100mm depth within the tree protection zone radius of the retained trees. Retaining the original ground surface cover and the existing organic matter can also assist the symbiotic mycorrhizal associations (beneficial fungi) which aid trees with the uptake of water and mineral nutrients from the soil to maintain adequate tree health.

3.10 Tree benefits: Mature urban trees confer many benefits including shade and cooler air temperatures, screening (privacy) and noise reduction, built form aesthetic amelioration, energy conservation, mitigation of the urban heat island effect, air quality improvement and oxygen production, carbon uptake/ storage and greenhouse gas reduction, minimisation of storm water run-off and improvement of water quality, fauna habitat and food source. In general, they enhance our built and natural environments with larger trees providing more benefits.

3.11 Tree risk: Tree failure is an infrequent occurrence and serious damage, injury or death from tree failure is rare (Lilly *et al*, 2011). Research finds that for Britain, with a population of 60 million people, the risk of any tree causing a fatality is exceedingly small (Ball & Ball-King, 2011). It is impossible to maintain trees completely free of risk and some level of risk must be accepted to experience the benefits that trees provide. The use of 'safe' or 'unsafe' when assessing trees is both imprecise and ambiguous, as a tree cannot be free from defects or potential hazards - such a state is simply unattainable. It is essential to maintain a balance between the benefits and costs of risk reduction, not only financial cost but also the loss of amenity and other tree related benefits.

3.12 Recommendations (general guidelines for tree retention):

1. Where tree retention is desired - prior to the commencement of any excavation/ construction activities, the installation of 1.8m high temporary fence panels should be undertaken at the tree protection zone (TPZ) periphery where possible to mitigate the potential for machinery/ branch/ trunk impact and subsequent tree damage. Where site constraints restrict the erection of fencing at the TPZ periphery, the use of four panels must be considered the minimum tree protection requirement.

2. Where encroachment into the TPZ is proposed, and modification of the design/ alignment is not possible, this should be limited to a 10% encroachment and be offset on another section of the tree rootplate. Where encroachment occurs, it is recommended to undertake exploratory works with hand tools/ soil vacuum to identify root size and number of roots at the proposed excavation works limit. Any encroachment into the TPZ must be supervised and assessed by an AQF Level 5 Project Arborist.

3. Exploratory works should include the careful removal of the existing displaced surface treatments and/ or soil using a root sensitive excavation technique such as soil vacuum (slot trenching) or hand-digging to identify tree roots. N.B. Mechanical excavation/ continuous open trenching within the TPZ prior to any exploratory works must be avoided to alleviate the tearing/ severing of tree roots associated with such works - and the subsequent potential to compromise tree health and stability by the loss of the absorbing roots and large woody roots respectively.

4. Where root-sensitive excavation exploratory work fails to reveal or sever any large woody roots, excavation and subsequent construction is not likely to compromise tree structure or health. Additionally, noteworthy changes to the existing grade has the potential to disrupt soil aeration and exacerbate tree decline, and this should be considered during the design finalisation and any remedial works.

5. Tree roots revealed in root-sensitive excavation works within the TPZ must be assessed by an AQF Level 5 Project Arborist. Roots less than 30mm in diameter should be pruned cleanly using a hand saw and at an angle that is perpendicular to the root edge, to enable the fastest rate of wound occlusion. Where numerous large woody roots greater than 30mm in diameter are revealed within the TPZ, further discussion between the designer and the Project Arborist will be required to identify options to mitigate the potential for compromising tree health and stability i.e. modification of the proposed design.

6. The pouring of liquids such as paints, oils and concrete wash into the rootplate/ TPZ soil can be damaging to tree health and should be avoided, and this must be communicated to the site supervisor and all site

contractors. Additionally, all machinery refuelling must occur outside the TPZs.

7. Where any proposed works are scheduled to occur in the hot, dry months (November-April), the application of wood chip mulch of approximately 100mm depth atop the ground surface should occur within the TPZ of retained trees to alleviate tree moisture stress often associated with excavation works. Additionally, supplementary irrigation, wetting agents, and organic drenches may be recommended by the Project Arborist depending on climatic conditions at time of works.

8. Where groups of trees have been assessed, the TPZ radius measurement should extend from the edge of the tree group to delineate the root protection area.

3.13 Arboricultural Method Statement for the 10 trees

1. Unsupervised mechanical excavation as part of any infrastructure upgrades, below-ground services, or path surface works must cease at the TPZ periphery (see figure 15 & 16). Within the TPZ, any excavation, construction activity and/ or root pruning must be assessed and supervised by an AQF Level 5 Project Arborist.

2. To minimise rootplate disturbance - which if significant can result in tree decline, the design should seek to use existing footings, below-ground services, and hard surfaces wherever possible. Where this is not possible, see below:

3. Initial exploratory excavation within the TPZ should be undertaken using hand-digging and/ or soil vacuum to identify tree roots and direction of growth for any new design features. Depth of exploratory excavation should be 200-300mm. Any roots revealed during excavation that are conflicting with proposed/ existing infrastructure should be assessed by the Project Arborist and where <30mm diameter, can generally be pruned cleanly as required with minimal impact to tree health or stability.

4. Displaced/ cracked low block walls and asphalt or concrete pathways should be assessed to determine root size and condition at the root/ infrastructure conflict/s i.e. wounded roots in trafficked areas are generally larger in size than adjacent non-wounded roots (see figure 14). Any roots revealed during the inspection should be assessed by the Project Arborist and where <30mm diameter, can be pruned cleanly as required.

5. New adventitious root growth from the pruned root ends is probable (normal tree response) and it is likely that new root growth and extension is likely to contribute to future displacements. Consequently, it is recommended to install a PVC root barrier of 200-300mm depth immediately adjacent to any surface treatments following root pruning, to deflect new root growth away from the adjacent surfacing.

6. It is likely that root/ infrastructure conflicts will occur in the future as root plate extension for large trees cannot be effectively constrained within the narrow spaces. This applies to all lightly-loaded structures and pathways.

7. All contractors, sub-contractors and/ or project persons tendering for or undertaking for the above works shall ensure sufficient allowance within submissions for ongoing compliance with all items listed in the Recommendations and Arboricultural Method Statement.

Figure 15 & 16. Tree protection zones as calculated for tree numbers 1-6 (top image) and 7-10 (bottom image). Where tree retention is desired, any excavation or construction activity within the TPZ must be root-sensitive and supervised by an AQF Level 5 Project Arborist.

Tree Number:	1
Botanical Name:	*Eucalyptus camaldulensis* var. *obtusa*
Common Name:	northern river red gum
Location:	Northernmost tree, 3.6m northeast of concrete edge
GPS Coordinates:	-32.028767, 115.882437
Age-class:	Mature
Height (m):	8.8
DBH (cm):	36
TPZ Radius (m):	4.3
Crown Spread (NS/ EW)m:	11/7
Structure:	Fair
Health:	High
Estimated Risk:	Low
Useful Life Expectancy (yrs):	5 to 15
Retention Value:	Medium
Comments:	Suppressed, several previous branch failures evident, minor low foliage at 1.8m
Recommendations:	Crown lifting, consider new planting adjacent for replacement canopy cover in the medium term

Tree Number:	2
Botanical Name:	*Casuarina cunninghamiana*
Common Name:	river sheoak
Location:	1.8m southeast of concrete edge, 2.6m northeast of pathway, 2.1m northwest of concrete edge
GPS Coordinates:	-32.028833, 115.882425
Age-class:	Mature
Height (m):	19.9
DBH (cm):	89
TPZ Radius (m):	10.7
Crown Spread (NS/ EW)m:	13/11
Structure:	Fair
Health:	High
Estimated Risk:	Moderate
Useful Life Expectancy (yrs):	15-40
Retention Value:	High
Comments:	Suppressed on the west side, codominant stems evident that are typical for the species, low foliage in contact with the adjacent light
Recommendations:	Crown lifting

Tree Number:	3
Botanical Name:	*Casuarina cunninghamiana*
Common Name:	river sheoak
Location:	3.1m southeast of concrete edge, 1.9m northeast of pathway, 1.2m northwest of concrete edge
GPS Coordinates:	-32.028802, 115.882344
Age-class:	Mature
Height (m):	18.9
DBH (cm):	102
TPZ Radius (m):	12.2
Crown Spread (NS/ EW)m:	19/15
Structure:	Fair
Health:	High
Estimated Risk:	Moderate
Useful Life Expectancy (yrs):	15-40
Retention Value:	High
Comments:	Mower/ traffic damage to surface roots evident - typical for the species, acutely-angled stem attachments visible typical for the species and age-class of tree, minor low branches
Recommendations:	Crown lifting

Tree Number:	4
Botanical Name:	*Melaleuca preissiana*
Common Name:	modong
Location:	3m southeast of limestone low block wall
GPS Coordinates:	-32.028956, 115.882412
Age-class:	Semi-mature
Height (m):	4
DBH (cm):	15
TPZ Radius (m):	1.8
Crown Spread (NS/ EW)m:	2/2
Structure:	Fair
Health:	Average
Estimated Risk:	Low
Useful Life Expectancy (yrs):	40 +
Retention Value:	Medium
Comments:	Whipper snipper damage at base and intentionally-made drill holes throughout crown
Recommendations:	Apply a liquid compost soil drench as per label directions and a 1m radius mulch bed to mitigate turf maintenance machinery damage

Tree Number:	5
Botanical Name:	*Eucalyptus gomphocephala*
Common Name:	tuart
Location:	5.7m northwest of limestone low block wall, 8m northeast of fence, 9.4m southeast of pathway
GPS Coordinates:	-32.028868, 115.882156
Age-class:	Mature
Height (m):	34.3
DBH (cm):	148
TPZ Radius (m):	15
Crown Spread (NS/ EW)m:	28/21
Structure:	TBA
Health:	High
Estimated Risk:	TBA
Useful Life Expectancy (yrs):	40 +
Retention Value:	High
Comments:	Extensive cable brace support system observed, several cavities and wounds visible throughout the crown, recent pruning works evident
Recommendations:	Further investigation of support system prior to completion of site upgrade to determine risk-rating/ remedial options

Tree Number:	6
Botanical Name:	*Melaleuca preissiana*
Common Name:	modong
Location:	2.5m southwest of limestone low block wall, 3m southeast of limestone low block wall
GPS Coordinates:	-32.029104, 115.882245
Age-class:	Semi-mature
Height (m):	5
DBH (cm):	20
TPZ Radius (m):	2.4
Crown Spread (NS/ EW)m:	3/3
Structure:	Fair
Health:	High
Estimated Risk:	Low
Useful Life Expectancy (yrs):	40 +
Retention Value:	Medium
Comments:	Whipper snipper damage at basal area
Recommendations:	Apply a liquid compost soil drench as per label directions and a 1m radius mulch bed to mitigate turf maintenance machinery damage

Tree Number:	7
Botanical Name:	*Eucalyptus gomphocephala*
Common Name:	tuart
Location:	1.8m southeast of path edge, 3m southwest of path edge
GPS Coordinates:	-32.029553, 115.881856
Age-class:	Mature
Height (m):	24
DBH (cm):	140
TPZ Radius (m):	15
Crown Spread (NS/ EW)m:	28/26
Structure:	TBA
Health:	High
Estimated Risk:	Moderate
Useful Life Expectancy (yrs):	40 +
Retention Value:	High
Comments:	Minimally displaced concrete path evident, avian fauna browsing damage visible within the lower crown requires further investigation, minor low branches observed and suppressed crown development visible on the northwest side, long extended branches
Recommendations:	Crown lifting to improve clearance, consider reduction pruning to shorten stem/ branch length following confirmation of path alignment, maintain existing path position where possible to mitigate root damage

Tree Number:	8
Botanical Name:	*Casuarina cunninghamiana*
Common Name:	river sheoak
Location:	4.4m northwest of path edge
GPS Coordinates:	-32.029465, 115.881750
Age-class:	Mature
Height (m):	23.5
DBH (cm):	104
TPZ Radius (m):	12.5
Crown Spread (NS/ EW)m:	14/10
Structure:	Fair
Health:	High
Estimated Risk:	Low
Useful Life Expectancy (yrs):	15-40
Retention Value:	High
Comments:	Root/ mower/ path conflicts evident
Recommendations:	Maintain existing path position where possible to mitigate root damage

Tree Number:	9
Botanical Name:	*Casuarina cunninghamiana*
Common Name:	river sheoak
Location:	6.3m northwest of path edge
GPS Coordinates:	-32.029469, 115.881703
Age-class:	Mature
Height (m):	22
DBH (cm):	51
TPZ Radius (m):	6.1
Crown Spread (NS/ EW)m:	8/7
Structure:	Fair
Health:	High
Estimated Risk:	Low
Useful Life Expectancy (yrs):	15-40
Retention Value:	Medium
Comments:	Suppressed, root/ mower conflicts observed
Recommendations:	No work required at present

Tree Number:	10
Botanical Name:	*Casuarina cunninghamiana*
Common Name:	river sheoak
Location:	4.8m southwest of seat
GPS Coordinates:	-32.029401, 115.881699
Age-class:	Mature
Height (m):	21 .7
DBH (cm):	126
TPZ Radius (m):	15
Crown Spread (NS/ EW)m:	17/18
Structure:	Fair
Health:	High
Estimated Risk:	Moderate
Useful Life Expectancy (yrs):	15-40
Retention Value:	High
Comments:	Suppressed, root/ mower conflicts observed, minor low branches visible
Recommendations:	Crown lifting to improve clearance

4.0 Appendix I

4.1 Arboricultural Terminology

4.2 Crown – the leaves and branches of a tree measured from the lowest branch on the trunk to the top of the tree, whilst crown lifting involves pruning of the lower branches to improve clearance for buildings, pedestrians, vehicles etc.

4.3 DBH - diameter of the main trunk, measured at breast height approximately 1.4m above ground level for urban trees.

4.4 Deadwooding – the removal of dead, diseased or damaged branch wood from the crown of the tree, with short stubs often retained to assist local fauna.

4.5 Dripline – the width of the crown of the tree, measured by the lateral extent of the foliage side to side.

4.6 Fall zone – is the area in which the tree or tree part is likely to fall when it fails, often calculated as 1.5 times the tree height where brittle dead branches etc. may break up and scatter debris.

4.7 First order structural branch – the large branches or stems arising from the trunk that form the main structure of the crown.

4.8 Reduction prune – pruning to shorten the length of a branch, back to a lateral branch that extends in the same general direction where possible and is at least one-third the diameter of the branch being removed to maintain sapflow.

4.9 Root collar – area at the base of the tree were the roots and trunk merge.

4.10 Second order branch – a branch arising from a first order structural branch.

4.11 Targets – an object, person or structure that would be damaged or injured in the event of tree or branch failure is referred to as the target or target area. The evaluation of the target area is relative to the expected use and occupancy of that area.

4.12 Topping and Lopping – deleterious tree height and branch reduction work often at indiscriminate points and generally resulting in weakly-attached regrowth branches prone to failure as subsequent growth occurs.

4.13 Tree Protection Zone (TPZ) – the zone of the root plate most likely to contain large woody roots close to the trunk that are critical for anchorage and stability which taper into the smaller absorbing roots that take up water and nutrients in solution: a radius measurement calculated as trunk diameter (DBH) x 12.

4.14 V-shaped union – ingrown bark from adjacent parts of the tree that are in contact with each other; usually branch forks, acutely-angled branch attachments or basal stems – often a high failure potential.

4.15 Tree Structure and Health

4.16 The structural condition ('Structure') for each tree or group of trees has been assessed using the following qualitative criteria:

- Good – generally free of compromising structural features
- Fair – structural features evident that may be typical for the species and age class, and which could be corrected through remedial pruning works where necessary
- Poor – significant structural features that are not likely to be corrected through remedial pruning or arboricultural works
- To be assessed (TBA) – further investigation required to evaluate condition and provide recommendations

4.17 The vitality ('Health') for each tree or group of trees has been assessed using the following qualitative criteria:

- High – consistent crown density and foliage colour, good shoot extension and an insignificant number of naturally-occurring internal dead branches
- Average – crown condition that may representative for the species and/ or seasonal, possessing satisfactory shoot extension and/ or minimal decline and dead branches
- Low – poor shoot extension, sparse crown density and not likely to be corrected through improvement of site resources and plant nutrition
- Moribund – final stages of a decline spiral, recovery unlikely however could be reduced in size and retained for habitat purposes

5.0 Appendix II

5.1 Author Formal Qualifications

5.2 Bachelor of Science (Sustainable Forestry) – 2012
Edith Cowan University, Joondalup & Murdoch University, Murdoch, WA.

5.3 Diploma of Applied Science (Horticulture) – 2000
Major studies Arboriculture and Parks/ Gardens management
University of Melbourne, Burnley campus, VIC.

5.4 Certificate IV (TAE40110) in Training & Assessment – 2014
Plenty Training, Robina, QLD.

5.5 Certificate of Horticultural Practice – 1994
Challenger TAFE, Murdoch campus, WA.

5.6 Additional Certifications

5.7 ISA Certified Arborist Municipal Specialist (AU-0020AM) - 2012 (recertified 2022)
International Society of Arboriculture
www.isa-arbor.com/certification/benefits/credentialsExplained.aspx

5.8 ISA Tree Risk Assessment Qualification (TRAQ) - 2013 (recertified 2023)
International Society of Arboriculture
http://www.isa-arbor.com/certification/becomequalified/becomequalified.aspx

5.9 Limitation of Liability

5.10 Bowden Tree Consultancy are tree specialists who use their qualifications, education, knowledge, training, diagnostic tools and experience to examine trees, recommend measures to enhance the beauty and health of trees, and attempt to reduce the risk of living near trees. Clients may choose to accept or disregard the recommendations of this assessment and report.

5.11 Bowden Tree Consultancy cannot detect every condition that could possibly lead to the structural failure of a tree. Trees are living organisms that fail in ways that the arboriculture industry does not fully understand. Conditions are often hidden within trees and below ground. Unless otherwise stated, observations have been visually assessed from ground level. Bowden Tree Consultancy cannot guarantee that a tree will be healthy or a low risk of harm under all circumstances, or for a specified period of time. Likewise, remedial treatments cannot be guaranteed.

5.12 Treatment, pruning and removal of trees may involve considerations beyond the scope of Bowden Tree Consultancy's service, such as property boundaries and ownership, disputes between neighbours, sight lines, landlord-tenant matters and other related incidents. Bowden Tree

Consultancy cannot take such issues into account unless complete and accurate information is given prior or at the time of the site inspection. Likewise, Bowden Tree Consultancy cannot accept responsibility for the authorisation or non-authorisation of any recommended treatment or remedial measures undertaken.

5.13 In the event that Bowden Tree Consultancy recommends retesting or inspection of trees at stated intervals, or installs any cable/s, bracing systems and support systems, Bowden Tree Consultancy must inspect the system installed at intervals of not greater than 12 months, unless otherwise specified in written reports. It is the client's responsibility to make arrangements with Bowden Tree Consultancy to conduct the re-inspection.

5.14 Trees can be managed, but they cannot be controlled. To live or work near a tree involves a degree of risk. All written reports must be read in their entirety; at no time shall part of the written assessment be referred to unless taken in full context with the whole written report. If this written report is to be used in a court of law, or any other legal situation, Bowden Tree Consultancy must be advised in writing prior to the written assessment being presented in any form to any other party.

5.15 Business Details

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5.17 Literature Cited

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CITY OF CANNING

SHELLEY ROSSMOYNE FORESHORE MANAGEMENT PLAN

CITY OF CANNING

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Prepared for City of Canning by Urbaqua
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CONTENTS

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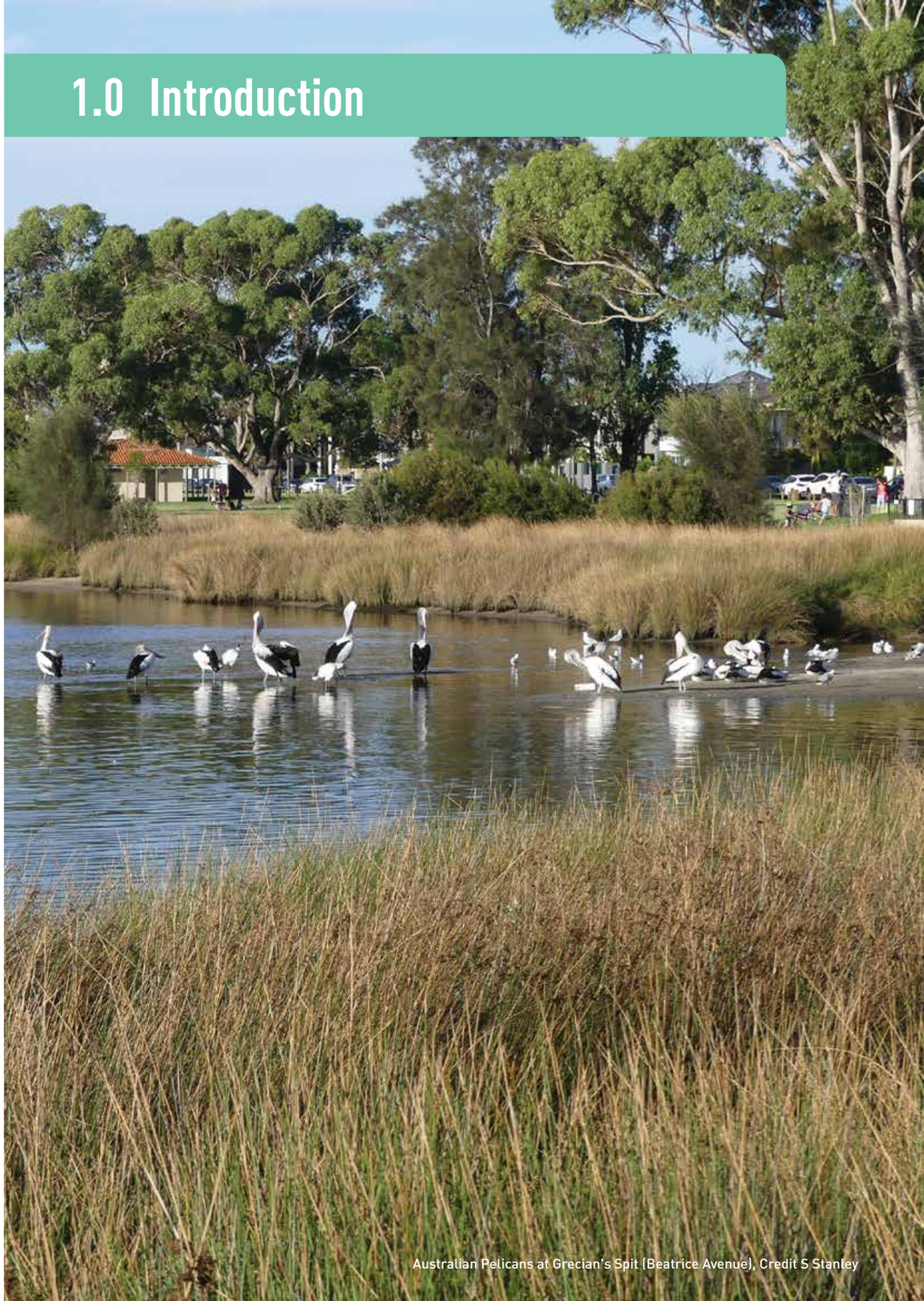
Acknowledgements

This Foreshore Management Plan was prepared in collaboration with the City of Canning with significant input from Jenni Andrews, Senior Environment Advisor and Mary Ross, Manager Natural Area Management and Conservation.

Urbaqua appreciates the input received from the community and stakeholder groups consulted in 2018 and would like to acknowledge all the people who contributed to the development of this Plan. In particular, Stephen Johnston, Grecian Sandwell, Colma Keating, and Sue Stanley of the Canning River Residents Environment Protection Association (CRREPA); Susan Harris of the Wadjup-Gabbilju Project; Peter Garlett, Brendan Moore and Gary Bennell of the Whadjuk Working Party; and the Shelley Rossmoyne community – this plan would not have come to fruition without their assistance, information and inspiration.

1.0 Introduction



Australian Pelicans at Grecian's Spit (Beatrice Avenue), Credit S Stanley

Riverbank Restoration, Credit: J Davies

1.0 Introduction

The Shelley Rossmoyne Foreshore Management Plan (FMP) has been prepared to guide the future use and development of the foreshore over the next ten years in a manner that ensures the long term preservation of ecological, cultural and social values.

The Shelley Rossmoyne Foreshore (the 'study area') extends 6.8 kilometres from Yagan Wetland Reserve along the eastern bank of Bull Creek and along the southern bank of the Canning River to Shelley Bridge (Figure 1). It includes the land between the river and the Riverton Drive road reserve and covers an area of approximately 16.2 hectares.

The Shelley Rossmoyne Foreshore is recognised for its significant environmental value and fragile ecosystems, as a sanctuary for birdlife and other fauna and riparian vegetation. It is also an area highly valued by the local community and is an important place for families and friends to meet, for recreation, and for people to find a sense of peace and connect to nature. The foreshore has important cultural and heritage value as a historical meeting place and camping ground for the local Whadjuk Nyoongar people, as a traditional source of food, medicine, and shelter, and as a place of sacred significance. In this context the anticipated increase in population in the local area and associated demands on infrastructure, and climate change, are expected to place increased pressure on the sensitive environment of the foreshore and therefore this plan has been prepared to guide management of this important area into the future.

The Shelley Rossmoyne FMP updates the previous five year plan (Shelley Rossmoyne Foreshore Management Plan 2001-2006 (City of Canning, 2001)) and recognises the Swan and Canning Rivers Management Act 2006 and Swan and Canning Rivers Regulations 2007 and Swan Canning River Protection Strategy (SRT, 2015).

1.1 Purpose of report

The purpose of the revised Shelley Rossmoyne FMP is to:

1. Guide the sustainable management and recreational use of the area through a plan that protects the environmental and cultural values of the area and identifies future access and infrastructure needs
2. Contribute to the implementation of State and Local strategic goals, policies and strategies including the Swan Canning River Protection Strategy (SRT, 2015)
3. Respond to recent and relevant issues such as recreational use, urban heat, water quality and climate change.

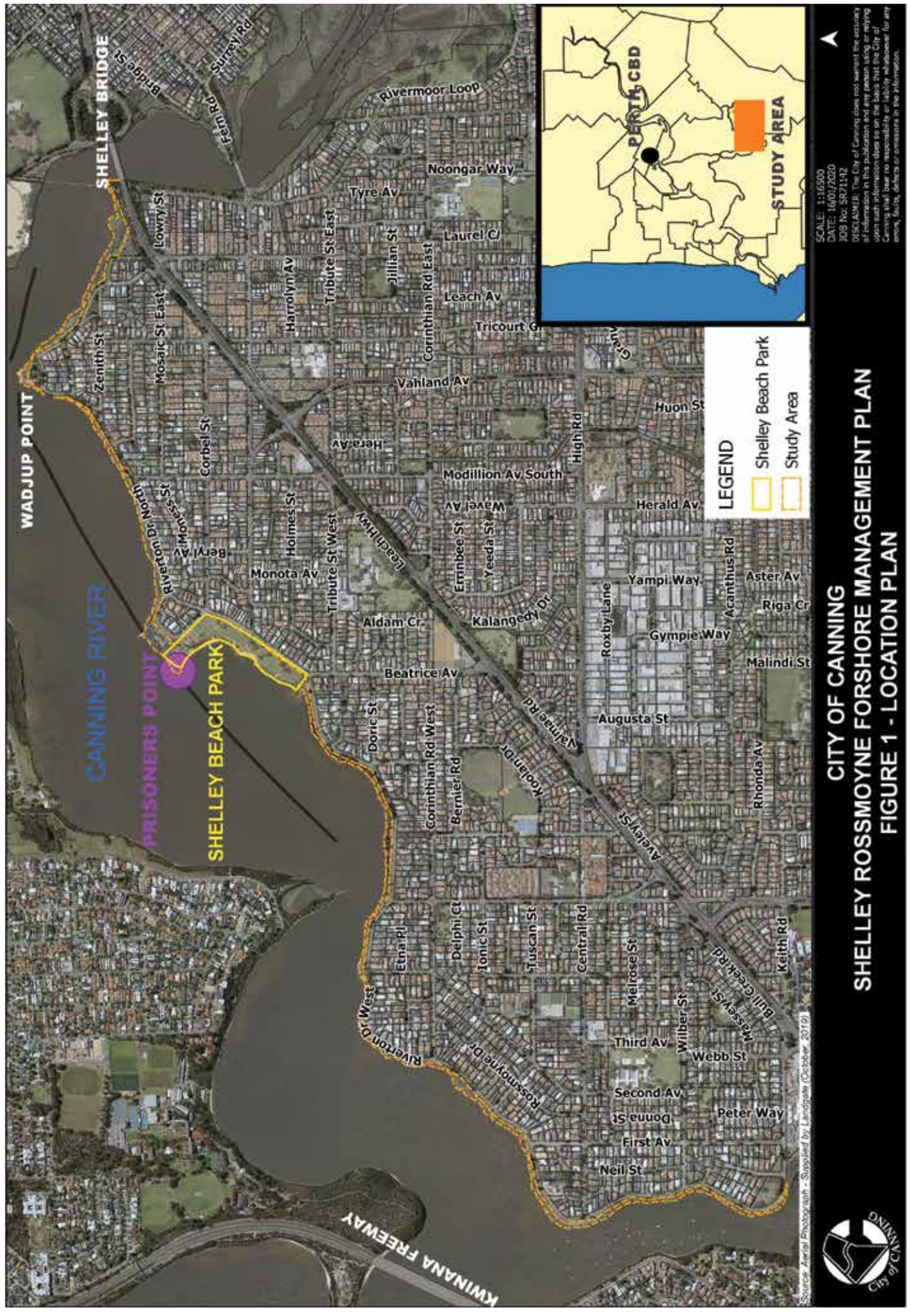


Figure 1: Location plan

1.2 Study area

The Shelley Rossmoyne Foreshore is located approximately 8km south of the Perth CBD, within the Swan Coastal Plain. The 6.8km length of foreshore forms part of the southern boundary of the Canning River, and links the Canning River Regional Park to the east with the Bull Creek reserve to the west. It is located opposite a number of other conservation reserves on the other side of the river including Mount Henry Reserve, Salter Point Reserve, and Andrew Thompson Conservation Reserve.

The foreshore is bounded to the west by the Yagan Wetland Reserve at the mouth of Bull Creek, and to the east by Shelley Bridge. The landward side of the foreshore is bounded by Riverton Drive East, Riverton Drive West, Riverton Drive North, and Watersby Crescent (Figure 1).

The foreshore is the northern boundary for the suburbs of Shelley and Rossmoyne within the Perth Metropolitan area, from which its name is derived.

The reserve is a long, narrow and winding ribbon of park located between the Canning River and road reserve adjacent to residential development, rarely more than 30m in width. The reserve strip typically comprises native, riparian vegetation and bushland combined with areas of open grass and a shared use path running along its length.

The Shelley Rossmoyne Foreshore is recognised for its significant environmental value and fragile ecosystems, as a sanctuary for birdlife and other fauna and riparian vegetation. It is also an area highly valued by the local community and is an important place for families, recreation, and for people to find a sense of peace and connect to nature. The foreshore has important cultural and heritage value as an historical meeting place and camping ground for the local Whadjuk Nyoongar people, as a traditional source of food, medicine, and shelter, and as a place of sacred significance. In this context the anticipated increase in population in the local area and associated demands on infrastructure, and climate change, are expected to place increased pressure on the sensitive environment of the foreshore and will be addressed as part of this Plan.

It is noted that the Shelley Rossmoyne FMP excludes the future development of Shelley Beach Park. Shelley Beach Park is located within the Shelley Rossmoyne Foreshore extending from the intersection of Beatrice Avenue and Riverton Drive to the Shelley Sailing Club on Watersby Crescent. While management objectives for the shoreline will be consistent with the Shelley Rossmoyne FMP, the development of the parkland area has been subject to a separate community engagement process (see section 1.4).

1.3 Preparation of the report

Preparation of this report was guided by the outcomes of a process of community consultation as well as the findings of an opportunities and constraints assessment.

The opportunities and constraints assessment was based on a desktop review of the previous Shelley Rossmoyne FMP 2001-2006; relevant State and Local Government legislation, policy and strategic documents; physical and biological attributes, values and threats including landform, vegetation and flora condition, natural features, hydrology, climate, prevailing weather conditions, past and current land use, use conflicts, existing facilities and management measures (see section 3). The assessment identified twenty two opportunities and issues which were considered during the preparation of this FMP.

A summary of the key findings from the consultation processes is presented in Section 2. It is anticipated that the FMP will be updated in response to further comments received as part of the public comment process.

1.4 Shelley Beach Park Landscape Master Plan

In October 2016, the City of Canning Council resolved to carry out a community survey and prepare a Landscape Master Plan for the Shelley Beach Park (Figure 1) which recognises its recreational amenity, environmental values and cultural significance. The results of the 2017 survey, together with additional information gathered during community engagement sessions and interactive place-making workshops undertaken in 2018, will guide preparation of the Landscape Master Pan.

Preliminary feedback has highlighted several key issues and ideas for the future of the Shelley Beach Park that are relevant to the wider Foreshore area. These issues and ideas can be broadly summarised as:

- greater playground areas with novel equipment use including nature play settings
- increased facilities for visitors (tables, BBQs, bins, fencing etc)
- retaining off-lead areas for dogs to be able to run and play fetch
- more shaded areas either through trees or shade structures
- transformation of drain outlets into living streams
- consideration of parking/traffic
- maintenance of shared use pathways
- protection and enhancements of vegetation along the foreshore, particularly the native river edge vegetation and grassed picnic areas.

While the Landscape Master Plan will identify the key elements and locations for amenities and infrastructure within the Shelley Beach Park, the revised FMP will define overarching objectives to be applied to the entire foreshore area, and inform patterns of use and ongoing management practices to maintain and enhance recognised values.

It is anticipated that the Shelley Beach Landscape Master Plan will be implemented in parallel with this revised FMP.

Red-tailed Black Cockatoos, Credit: B Lambe

2.0 Consultation outcomes

Osprey near Shelley Bridge, Credit: C Keating

2.0 Consultation outcomes

The consultation process undertaken to assist preparation of the Shelley Rossmoyne FMP involved a number of mechanisms:

- online survey (15th October – 2nd December 2018)
- two local community workshops (13th November 2018 and 4th December 2018)
- internal workshop with City of Canning officers (15th November 2018)
- on-country meeting with Whadjuk Traditional Owners (11th December 2018).

The consultation also included direct contact or correspondence with local community groups and agencies including:

- Canning River Canoe Club
- Canning River Residents Environment Protection Association (CRREPA)
- City of Canning Community Advisory Group
- City of Canning Sustainability and Environment Advisory Group
- City of Melville
- City of South Perth
- Department of Biodiversity Conservation and Attractions (DBCA)
- Department of Planning Lands and Heritage (inc Aboriginal Affairs) (DPLH)
- Department of Water and Environment Regulation (DWER)
- OzFish West
- Rec Fish West
- Riverton, Rossmoyne and Shelley Residents' Association (RRSRA)
- Shelley Sailing Club
- South East Regional Centre for Urban Landcare (SERCUL)
- South West Aboriginal Land and Sea Council (SWALSC)
- Sunset Paddleboards
- Wadjup Gabbilju Project.

Kayaking along the foreshore, Credit: S Stanley

2.1 Online survey

A community survey "Help us plan the future of the Shelley Rossmoyne Foreshore" was available to the public on the City of Canning's online community engagement space (Your Say: www.yoursaycanning.com.au) from 15 October – 2 December 2018.

Nine (9) questions were included in the survey to determine community opinions on key issues for the future use and management of the Shelley Rossmoyne Foreshore. These were:

1. Are you a resident of the City of Canning?
2. Have you visited the Shelley Rossmoyne Foreshore area in the last year?
3. How often do you visit the foreshore?
4. How do you travel to the foreshore?
5. What activity(s) did you do?
6. What do you like about the foreshore area?
7. Did you experience any of the following issues?
8. What would you like to see at the foreshore in the future?
9. Which issues do you feel should be addressed by the foreshore management plan as a priority?

A total of 102 responses were received. Approximately 59% of respondents were female and 33% were male. 1% of respondents were aged 14-17, 30% were aged 26-45, 44% were aged 46-65 and 20% were aged over 65 years old. The majority of respondents were from Shelley (36%), followed by Rossmoyne (13%) and Riverton (13%), and most survey respondents had visited the foreshore in the last year, but not all.

A summary of key findings are presented as follows:

- Driving and walking were equally the main methods of transport to the foreshore, followed by cycling.
- Most common activities at the foreshore were walking and observing nature, followed by cycling, then picnics/playground use, dog walking and bird watching. BBQs, water sports (kayaking, sailing and stand up paddle boarding) were the next most common, followed lastly by jogging and fishing.
- Respondents liked a range of aspects of the foreshore relating to its natural environment, accessibility and recreation facilities including its: peacefulness, nature, dog areas, cycling, meeting people, birds, space, and views.
- Majority of respondents did not experience significant issues when visiting the foreshore.

Respondent opinions were divided when asked about what they wanted to see at the foreshore in the future, and priority issues to be addressed by the FMP. Some respondents would like to see a café within the Shelley Beach Park area (not included within this FMP), while others are opposed to this sort of development. Changes to dog exercise areas also had a range of opinions. While support for and opposition to the presence of a café and increased dog exercise areas were expressed, respondents also stated a desire to see (in approximate order of priority):

- increased playground areas and exercise equipment, including equipment for older children and teenagers.
- more car parking and traffic management
- reduction in turfed areas
- increased access to the water
- improved path/cycle ways
- more facilities (BBQs, gazebos etc)
- more native revegetation, weed (including prickles) and erosion management, and tree planting.

Further details on the responses from the online survey are presented in Appendix A.

2.2 Community workshops

Two community workshops were held to enable a discussion of ideas with local community members and stakeholder representatives on the following topics:

- Workshop 1: Identification of important values and key opportunities associated with the current and future use of the Shelley Rossmoyne Foreshore (13th November 2018).
- Workshop 2: Discussion and prioritisation of objectives, key concepts and delivery for consideration in the draft FMP (4th December 2018).

2.2.1 Key values

The key values of the Shelley Rossmoyne Foreshore identified in the first workshop were:

- natural environment (vegetation, birds, habitat)
- community spirit – picnics, events and meeting place
- low impact uses including passive recreation (be aware that fishing can impact)
- connection with nature
- safety
- lack of commercialisation
- dog walking
- family time
- sailing
- heritage
- education
- activities and facilities in keeping with the carrying capacity of the foreshore.

Participants were then divided into groups, each focusing on one section of the foreshore area and asked to consider how it would like to be used, future pressures, and what changes they would like to see in terms of access, facilities, and management. In particular, groups were asked to consider:

1. beach access and fishing
2. passive recreation/picnic facilities
3. revegetation and nature
4. dog exercise areas.

2.2.2 Objectives

The second workshop focussed on defining objectives for the FMP, with participants stating that objectives should consider:

- green and local areas
- ecological corridor and nature
- preservation of green link
- access for community and family
- places for kids to play
- natural habitat and vegetation (eg. near Shelley Bridge)
- small area concepts (complying with overarching principles)
- applicable along whole length but particular locations for different, specific functions
- value all people that use it
- balance
- community ownership and stewardship
- carrying capacity
- quiet places
- harmonious society.

Based on this discussion, the agreed objectives for the FMP were:

1. preservation and enhancement of natural environment and linkages
2. supporting and encouraging local community connection and stewardship
3. balancing diversity of uses within carrying capacity of the foreshore.

2.2.3 Opportunities

Workshop participants explored key opportunities, including the priority actions to deliver defined outcomes for these opportunities as follows:

1. enhancement of foreshore for ecological protection and preservation
2. increased access to drinking water and water for irrigation
3. increased community education, engagement and participation
4. celebrating heritage – increased awareness and respect
5. balance competing interests and ensure sustainable use (supporting passive recreation)
6. dog exercise and off-lead areas
7. adapting for climate change – sea level rise and erosion, urban heat mitigation (including increased shade),
8. potential closure of road reserves at Wadjup Point and Zenith Park.

Priorities were generally agreed as:

- high/No. 1: enhancement of foreshore for ecological protection and preservation
- high: balance competing interests and ensure sustainable use
- high: identify location for revegetation and increased canopy cover
- high: improve access to online heritage information
- high: review/improve definition of dog exercise/off lead areas
- medium: community education.

Lower priority actions also supported included the closure of roads at Wadjup Point and Zenith Park. Notes providing further information from both workshops are presented in Appendix B.

Commercial opportunities within the foreshore were also considered during the workshops as part of the community consultation process. However, it was identified that the narrow characteristics of the foreshore outside of Shelley Beach Park were a limitation to supporting any further activity, in addition to conflicting with the identified values of the foreshore. Therefore, additional commercial activities outside the Shelley Beach Park area have not been recommended as part of this FMP.

Paperbarks, Credit: K Keating

3.0 Context

Australian Pelican, Credit: S Stanley

3.0 Context

As part of the development of the FMP, a review of the physical, biological, heritage, social and land use attributes of the study area was undertaken in order to determine the key issues which will be addressed by the plan. In addition, State and Local Government legislation, strategies, policies and planning documents applicable to the foreshore area were also reviewed to ensure that the plan was prepared in line with these existing documents

3.1 Strategy guidance

Management and works within the foreshore are governed by the Swan and Canning Rivers Management Act 2006 and Swan and Canning Rivers Regulations 2007. Key guidance for ongoing use and management is also provided by the Swan Canning River Protection Strategy (SRT, 2015).

Other policies of the Department of Biodiversity, Conservation and Attractions (DBCA) that are relevant to the foreshore are:

- Planning for Land Use, Development and Permitting Affecting the Swan Canning Development Control Area (Policy 42)
- Planning for Miscellaneous Structures and Facilities in the Swan Canning Development Control Area (Policy 45)
- Planning for Commercial Operations in the Swan Canning Development Control Area (Policy 46)
- Planning for Development Setback Requirements Affecting the Swan Canning Development Control Area (Policy 48);
- Planning for Stormwater Management Affecting the Swan Canning Development Control Area (Policy 49).

In addition, the City of Canning has a number of strategies and policies which have been and should be considered as part of the implementation of this FMP. These strategies and policies are summarised in Appendix C and include:

- Our City, Our Future: A strategic community plan for 2017-2027
- City of Canning Town Planning Scheme No. 40
- City of Canning Watercourse Reserves Management Strategies 2006
- City of Canning Policy ET527 - Urban Revegetation and Greening 2009
- City of Canning Water Management Strategy 2013
- City of Canning Economic Development Strategy 2015
- City of Canning Heritage Strategy 2015
- City of Canning Integrated Transport Strategy 2015
- City of Canning Local Environmental Management Strategy 2015
- City of Canning Public Open Space Strategy 2015
- City of Canning Climate Change Action Plan 2016
- City of Canning Policy ET525 - Trees in Streets, Thoroughfares and Parks 2016
- City of Canning Local Planning Strategy 2017
- City of Canning Reconciliation Action Plan 2018
- City of Canning Local Biodiversity Strategy 2018
- City of Canning Cycling and Walking Plan 2018
- City of Canning Draft Playground Provision Strategy 2018
- City of Canning Street Tree Strategy 2018
- City of Canning Policy CM188 - Naming of Parks, Park Features, Community Buildings, Recognition of Long and Exemplary Service, and Commemoration of Individuals or Events (currently under review)
- City of Canning Disability Access and Inclusion Plan 2017 – 2022
- Whadjuk People Indigenous Land Use Agreement (ILUA)
- Yagan Wetland Reserve Management Plan 2000.

3.2 Social and land use attributes

Current land uses and infrastructure within the Foreshore area are summarised in this Section.

3.2.1 Zoning and tenure

The foreshore is zoned Parks and Recreation under both the Metropolitan Region Scheme and Town Planning Scheme No 40. The land tenure and ownership information for the foreshore is presented in Table 1 below. An approximately 800m section of the foreshore remains as Unallocated Crown Land, located between the Water Corporation pump station at the end of Fifth Avenue and 239 Riverton Drive (before Beatrice Avenue) (as shown in Figure 2).

Table 1: Study area land tenure and ownership summary

Reserve no.	Lot no.	Area (ha)	Ownership	Vesting	Management orders
26292*	1859, 3243, 3244 & 3602	16.3	Crown	City of Canning	City of Canning Class C Park & Recreation
37753	3187	0.0329	Crown	Water Corporation	Water Corporation Class C Sewerage Pumping Stations
37754	3265	0.0375	Crown	Water Corporation	Water Corporation Class C Sewerage Pumping Stations
36766	3180	0.0246	Crown	City of Canning	City of Canning Class C Leased to Shelley Sailing Club (starting box & boat shed areas)
1599	1951	0.1997	Crown	City of Canning	City of Canning Class C Public Recreation
UCL	-	1.2381	Crown	None - (responsibility of Department of Planning, Lands, & Heritage)	

**The small section of Reserve 26292 between Shelley and Riverton Bridges is not part of the study area as it is included in the Canning River Regional Park*

The Local Biodiversity Strategy (CoC, 2018c) recommends that the Shelley Rossmoyne Foreshore reserve purpose, under the Land Administration Act 1977, is amended to include Environmental Conservation. However, given the multiple values of the foreshore, including different recreational and social values as well as high environmental values, a classification of 'Foreshore Purposes' would allow for the occurrence of multiple activities including Environmental Conservation. In addition, given the presence of existing and possible future businesses and recreational organisations within the foreshore (particularly Shelley Beach Park), it is important that the reserve purpose of the foreshore allows for commercial leases to be arranged if appropriate.

Figure 2: Landgate Map Viewer image snip showing section of UCL in foreshore study area (in orange)

3.2.2 Past land use

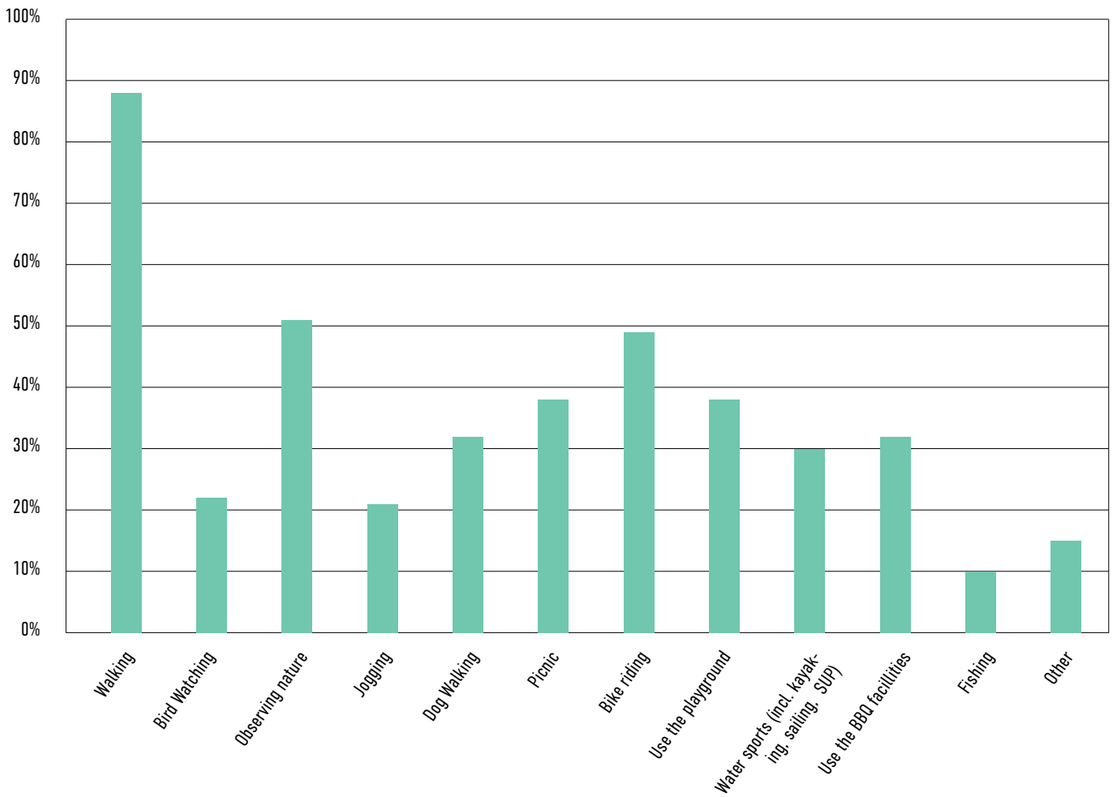
Prior to the construction of Riverton Drive in the 1960's the Shelley Rossmoyne Foreshore was dominated by extensive low lying river reed beds. Reeds were replaced with grassed areas beginning in the 1970's following the building of the first footpaths in the foreshore.

3.2.3 Current land use

The current land use along the Shelley Rossmoyne Foreshore largely comprises foreshore vegetation and grassed areas with a shared use footpath traversing the length of the foreshore. Key recreational activities include walking, jogging, cycling, fishing, kayaking, sailing, bird watching and dog walking and exercise (Figure 3). Wider parts of the foreshore which include the Shelley Beach Park area allow for more social recreation which includes picnics, events and social sporting games. Figure 4 presents existing assets, including recognised picnic spots within the foreshore. The values of the foreshore to the local community as a social meeting place and a place to connect with nature have been noted by many stakeholders through the consultation process.

The primary roles of the foreshore reserve are passive recreation and conservation. It is noted that these objectives sometimes conflict. In particular, this has been highlighted during community consultation as occurring between different forms of passive recreation, such as between cycling and walking on the dual use path, between dog-exercise and other recreational activity in existing dog exercise areas, or where recreational activity (including both dog and human) results in trampling of foreshore vegetation or disturbance of wildlife. Viewscapes and sightlines, although not highlighted as a significant issue in the community consultation, may also be perceived to conflict with revegetation activities through the blocking of views to the river.

Figure 3: Community survey results of activities undertaking by visitors to the foreshore (Q5)



Organised recreation within the study area includes the Shelley Sailing Club, established in the Shelley Beach Park area in 1974. The Club caters specifically for family sailing and associated infrastructure includes club rooms (leased to the Club by the City of Canning) and facilities for boat launching. The sailing club provides a focal point for the community, with many events being located on the grassed areas around the club. The Canning River Canoe Club uses the building for part of the year.

3.2.4 Existing assets

The City of Canning manages a variety of assets within the foreshore area. These assets (excluding assets within Shelley Beach Park) are mapped in Figure 4 and summarised in Table 2. A detailed list of assets and their locations is provided in Appendix D.

Table 2: Existing assets managed by the City of Canning, excluding Shelley Beach Park

Asset	No.	Asset	No.
Benches (inc. commemorative and non-commemorative)	51	Gazebos	1
Bins	52	Picnic tables	2
Dog waste bag stations	8	Playground	1
Fishing line disposal bins	2	Wadjup-Gabbilju signage	29
Fishing platforms	2	Drink fountains	4
Jetties	2	Drink fountains (no dog bowl)	3
Lookout platform	1	Shared use footpath	6km

The majority of the larger assets along the foreshore are within the Shelley Beach Park. At the western point of the beach is a playground with a spider frame. At the centre of the beach, where the sandy water access is situated is a washroom facility and gazebo with a fixed brick barbeque. The Shelley Sailing Club house is situated on the eastern point of the park.

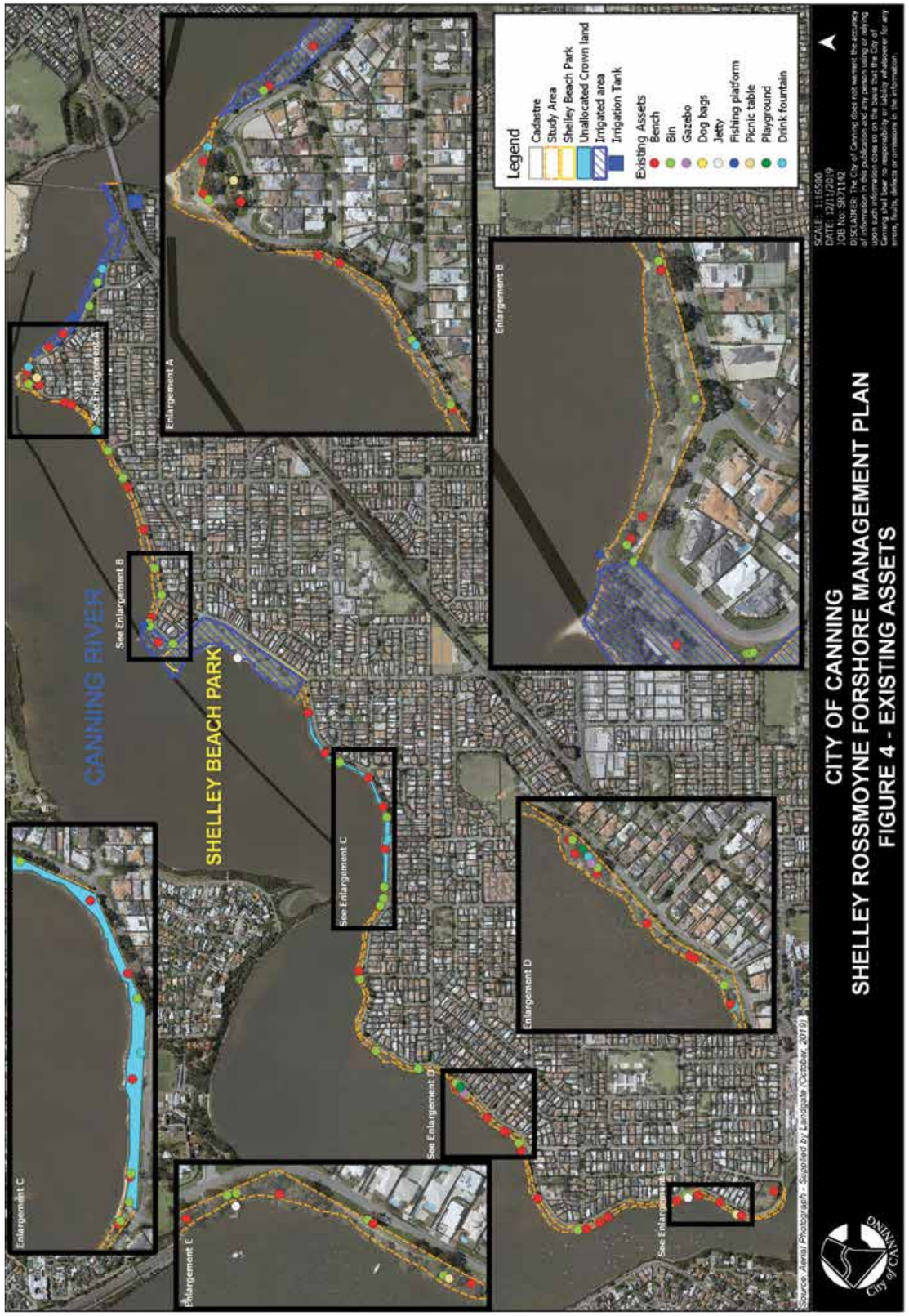


Figure 4: Existing assets

There are two (2) jetties and two (2) fishing platforms located along the foreshore - one jetty is within the Shelley Beach Park and the other is located opposite Wilber Street in Rossmoyne, one fishing platform is located on the eastern side of Watersby Crescent, and the second is adjacent to Zenith Park (Figure 4). The Wilber Street jetty was funded and built by the Swan River Trust with donations from CRREPA and the RRSRA, and the City built the other three structures between 2004 and 2005 with part of the funding for the jetty at Shelley Beach Park provided by a Recreational Boating Facilities Scheme grant and part funding for the fishing platforms through a Swan River Trust Riverbank grant. Regular inspections of the structures to identify maintenance requirements are undertaken by engineering consultants engaged by the City.

An irrigation system is located between Beatrice Avenue and Corbel Street and Prisoners Point. The system has two small bores abstracting from the superficial aquifer, located at 259b Riverton Drive and 269 Riverton Drive, with a reticulation cabinet located next to the first bore. The volume used during 2016-17 was 7165.2 kL. Irrigated areas within the foreshore are shown on Figure 4. There is also limited irrigation of the grassed area between the road and the path from Wadjup Point and Zenith Park. Water for this is taken from the Marjorie Avenue Drain and accumulated in a storage tank at the Shelley Bridge just upstream of the study area.

Over 50 benches are located along the stretch of foreshore, often alongside bins for convenience. Many of these benches include commemorative plaques to recognise individuals who are no longer living.

Fencing within the foreshore area varies between formal and temporary structures. Revegetation fencing is maintained by the City on advice of CRREPA. This fencing is intended to be temporary only and may be removed within approximately three years if the vegetation is sufficiently established and dense.

A shared use path runs the full length of Shelley Rossmoyne Foreshore. The original path was constructed from the early 1970s using concrete and, from the late 1990s sections were progressively replaced with red bitumen. Concrete is now being used again to replace new sections of the path because of its greater durability. Several degraded sections of the path have been realigned, consistent with recommendations in the previous FMP that recommended relocating the paths further from the river.

In 2016, 29 signs were installed on stands across 17 locations within the foreshore as part of the interpretive Wadjup-Gabbilju Foreshore Walk providing information on the natural and cultural heritage of the foreshore and river. The locations of these signs are shown on Figure 5. Additional signage was installed on the ablutions block at Shelley Beach Park and further upstream of the Shelley Rossmoyne Foreshore area. Signage maintenance and surrounding landscaping is currently undertaken by Wadjup-Gabbilju Project volunteers.

3.2.5 Access

Access to the foreshore and adjacent river are provided by a number of methods:

- Shared use pathway for walking and cycling along the entire length of the foreshore;
- Parallel parking bays (approximately 700 m) located at:
  - Linkwater St and Riverton Dve North
  - Beryl Ave and Riverton Dve North
  - Watersby Cres (north west side)
  - 249-275 Riverton Dve North (Shelley Beach Park)
  - 233-243 Riverton Dve North
  - 187-193 Riverton Dve North
  - 59-61 Riverton Dve West
  - 23-25 Riverton Dve West
  - 9-11 Riverton Dve West
  - Zenith Park.
- Two jetties (see section 3.2.4):
  - Shelley Beach Park (main)
  - Wilber St.
- Two fishing platforms (see section 3.2.4):
  - Watersby Cres (east side)
  - Zenith Park.
- River access at numerous locations along foreshore.

Residents access the river for a number of activities including canoeing, fishing, swimming and walking/playing on the beach. Moorings for smaller vessels to access the Canning River near the Shelley Rossmoyne Foreshore are located at Bull Creek.

While a number of defined access points including beaches and walkways are located along the foreshore, a number of unwanted access points have been created in recent years through or near revegetated areas and significant habitats. In addition, visitors use the foreshore to launch jet skis even though signs are currently present stating that no 'Personal Water Craft are allowed on the foreshore'.

City staff also access the foreshore as part of ongoing maintenance works of both natural areas and infrastructure within the foreshore reserve. There is limited access to larger parking areas along the foreshore for City maintenance trucks and trailers and this can create safety issues for both maintenance staff and the public when City vehicles are required to enter the reserve and drive along the shared use path running along the foreshore in order to undertake maintenance works.

Access points are presented on Figure 5.

Disability access

Outcome 2 of the City of Canning Disability Access and Inclusion Plan 2017 – 2022 aims to ensure all members of the community, including people with disability, have the same opportunities to live, work and recreate. It notes that, consistent with the previous plan, a Liberty Swing for children and adults in wheelchairs has been installed in Shelley Beach Park. It is understood that the management and use of this swing is being reviewed as part of the Shelley Beach Park Landscape Masterplan.

This outcome is associated with the following strategies:

- City managed buildings and facilities meet prescribed standards for access requirements for people with disability
- adequate ACROD parking is available to meet the demands of people with disability
- all new or redevelopment Council works provide access to people with disability
- improve access and inclusion at Council parks and reserves, playgrounds and to our river foreshores.

Any new infrastructure installed in the foreshore will need to consider appropriate access for disability.

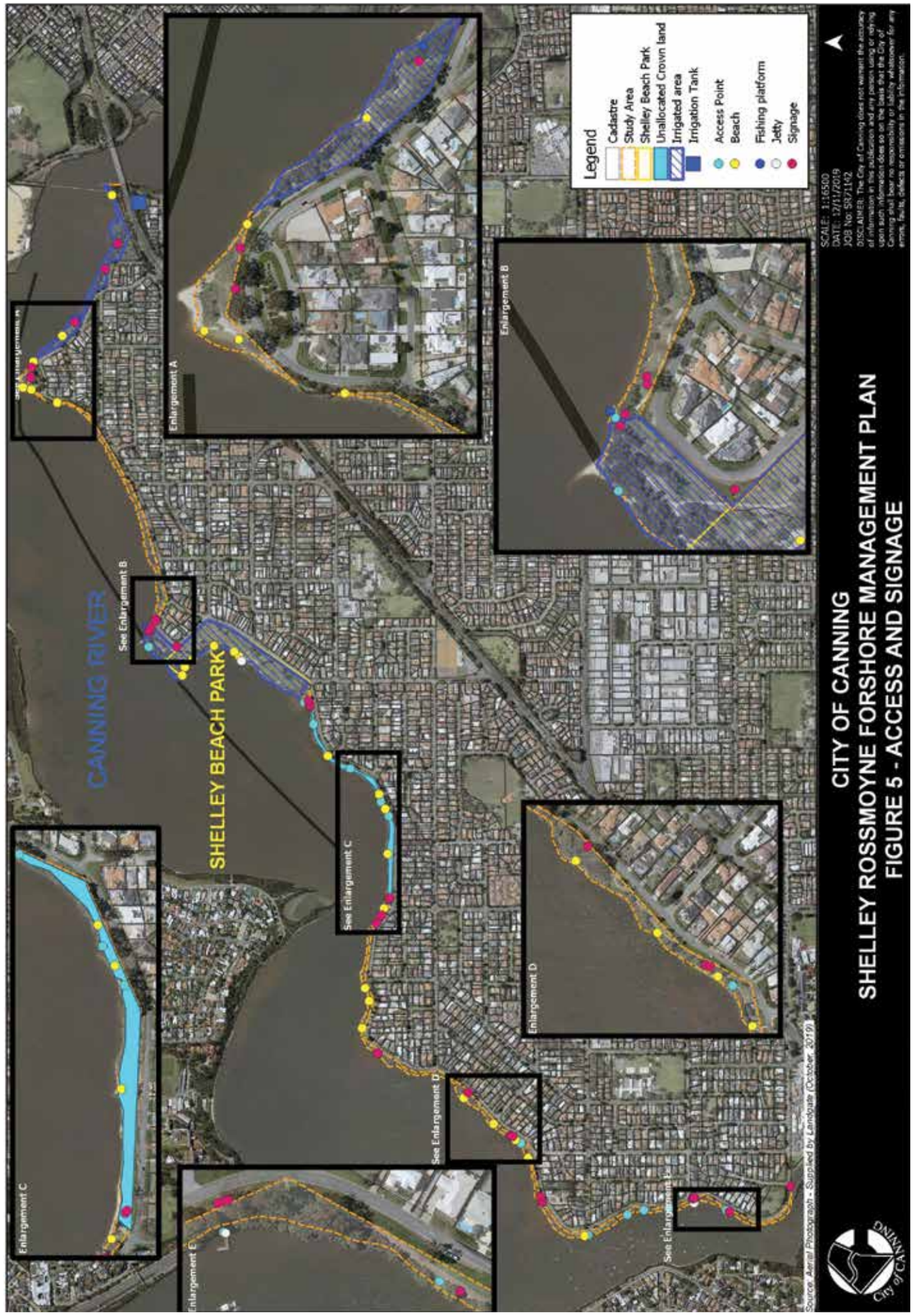


Figure 5: Access and signage

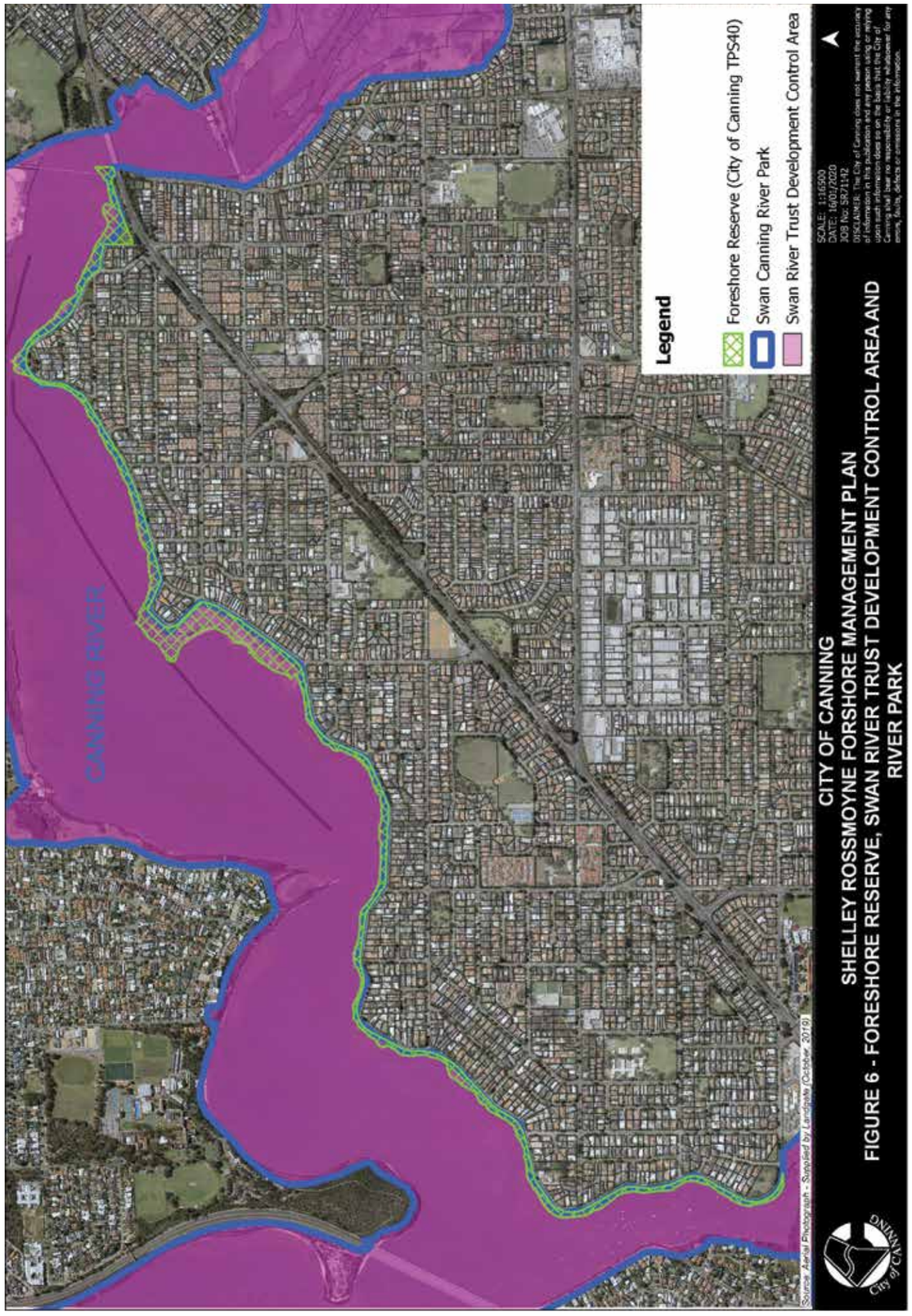


Figure 6: Foreshore reserve, Swan Canning Development Control Area and Riverpark

3.2.6 Reserve management responsibilities

The Foreshore is zoned Regional Parks and Recreation under City of Canning Town Planning Scheme No 40 (shaded green in Figure 6). All of this land is also contained within the Swan Canning Development Control Area (shaded pink). The development control area includes waterways as well as both freehold land in private ownership and public land. The waterways and public lands within the development control area are collectively described as the Swan Canning Riverpark (shaded blue in Figure 6). Within the development control area, the Swan River Trust, through the Department of Biodiversity, Conservation and Attractions (DBCA), is the primary assessing authority for any proposed development under Part 5 of the *Swan and Canning Rivers Management Act 2006* with the Minister for the Environment responsible for making final decisions.

Any development works undertaken within the Swan Canning Development Control Area requires the approval of a Part 5 application by the Swan River Trust. Any development works in land adjacent to the development control area will still be referred to the Swan River Trust. In this case their recommendations regarding the development application should be strongly considered by local government as part of their proposed works.

The DBCA manages the Swan Canning Riverpark in partnership with other river stakeholders. 'Management' activities undertaken by the Trust within the Riverpark range from active on-ground management of the river reserve itself to a higher level focus on policy and coordination of stakeholders and the various agencies with vested responsibility for management.

The City has vested responsibility for the on-ground management of the bulk of the foreshore, with the exclusion of Water Corporation reserves and the area of unallocated crown land. *City of Canning Consolidated local laws Part III—Parks, Reserves and Foreshores* provides clear guidance on the activities that are not permitted or are permitted within the foreshore with the consent of the City. Within the City of Canning, the management responsibilities are attributed across a number of departments.

3.2.7 Community participation and conservation activities

The level of community participation in conservation activities along the foreshore is significant. It has been led since 1994 by the Canning River Residents Environment Protection Association (CRREPA), which was formed by local residents concerned by the degradation of the Canning River and Yagan Wetland Reserve. Since inception CRREPA has obtained a number of grants to improve the biodiversity, stability and amenity of the foreshore reserve. CRREPA has also encouraged the community to:

- become informed on rivercare issue
- join in on community work days
- not trample or vandalise foreshore vegetation
- not disturb bird resting areas
- contact CRREPA with any bird sightings
- not put pollutants down the drains
- reduce use of garden fertilisers
- clean-up after their dogs.

CRREPA volunteers work collaboratively with the City's staff and coordinate works to optimise outcomes. For example, in 2008 CRREPA assisted the City to replace some sections of grass with sedges as part of the path relocation works the City was undertaking. The City also assists CRREPA by removing filled weed bags and watering the newly planted areas fortnightly over summer for two years.

In the past the City has given approval to commercial seed collectors to collect seed from the foreshore. The City advises collectors that there is no guarantee that the seed is endemic as CRREPA has been successfully revegetating the foreshore for many years and the City has no information on the original source of seed.

Leadership and dedication of the Canning River Residents

CRREPA has been actively managing the Shelley Rossmoyne Foreshore with the support of the City of Canning for over 25 years. The dedication of CRREPA members has resulted in a number of significant major achievements over the years including:

- conversion and rehabilitation of a pipe outlet at Beatrice Ave from turf into a vegetated wetland area, now a significant habitat area frequented by numerous species of migratory and local birds (2006)
- restoration and revegetation of area opposite 137 Riverton Drive to remediate severe erosion (2010)
- conversion of a an old concrete pipe outlet into a vegetated swale at 235 Riverton Drive (2013-2014)
- Ongoing weed management and revegetation along the entire 6.8 km length of foreshore.

Restoration and revegetation works to address severe foreshore erosion undertaken by CRREPA over 2010 has resulted in the preservation of the Canning River foreshore at Halophila Bay (Source: Grecian Sandwell, CRREPA, 2010)

Interpretative signage, Credit: S Stanley

In 2006 the City engaged EcoMedia to design and install an interpretive walking trail along the foreshore, providing information on the natural and cultural heritage of the foreshore and river. The consultant undertook a detailed research process which extended the project development over several years. The installation of the signs was completed in early 2016. In 2016 a group of volunteers formed the Wadjup-Gabbilju Project to help maintain the signage and landscaping in nearby surrounds. The Wadjup-Gabbilju group also holds an annual walking event sharing stories and information along the interpretive signage trail with the public.

3.2.8 Vandalism

Various tree vandalism incidents have occurred along the Shelley Rossmoyne Foreshore. The most common occurrence is snapping off the tops of saplings; however, there have also been some poisoning incidents reported. Most incidents were responded to collaboratively by the Department of Biodiversity, Conservation and Attractions and the City, and responses have included doorknocking and installation of vegetation vandalism / protection signs.

The most significant tree damage was in December 2006, when a concerned resident wrote to the City to report the suspected poisoning of ten mature trees including a Flame Tree and Red Gum (both estimated to be over 100 years old), as well as a heritage Fig tree and a number of Melaleucas. Although laboratory testing was undertaken, it was not possible to identify the type of poison used. The City has left the dead trees in place as a deterrent to further vandalism and they are checked for structural stability regularly by an arboriculturalist.

KEY ISSUES – SOCIAL AND LAND USE ATTRIBUTES

- City's management of Unallocated Crown Land
- SRT (DBCA) development control area
- dog exercise areas – requiring review, consideration of natural environment (significant habitat areas) and conflict with other uses (passive recreation)
- need for more facilities (drink fountains, shade, BBQs, and adequate parking)
- disability access
- vandalism of revegetated areas – need for community education & enforcement

3.3 Physical attributes

The physical attributes of the foreshore relate to the climate, topography and water under current and future conditions. A summary of these attributes is provided in this Section.

3.3.1 Climate and weather

The climate at the study area is typical of the Perth Metropolitan area. The foreshore experiences a Mediterranean (Csa) climate under the Köppen classification system, with hot, dry summers and cooler, wet winters. This typically results in larger volumes of stormwater runoff discharging into the Canning River at the foreshore study area over the late winter-early spring period. Typical mean rainfall and temperature patterns at the nearest Bureau of Meteorology (BoM) weather station, Gosnells City (no. 9106) reflecting these climatic conditions is presented in Figure 7.

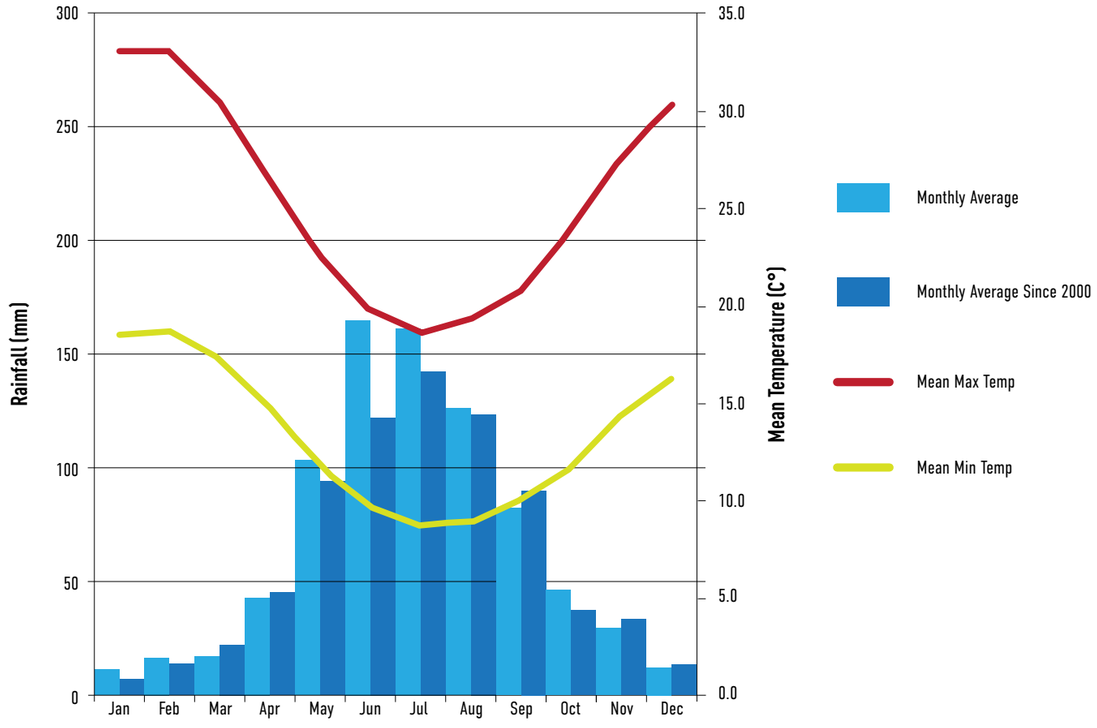


Figure 7: Monthly mean rainfall and temperature recorded at Gosnells City station based on data from 1961-2018 (BoM, 2019)

Annual average rainfall at this site, based on measurements recorded since 1961 when data is first available, is 811 mm. Analysis of annual average rainfall since 1975, 1990, and 2000, indicates that rainfall has steadily decreased since recording began with annual average rainfall dropping by over 12% since 2000, as shown in Table 4 below. The drying climate is expected to continue into the future and is likely to be one of a number of issues impacting the foreshore under climate change, such as availability of groundwater for irrigation of the foreshore.

Table 4: Annual average rainfall analysis at BoM station Gosnells City

Measurement period	Annual average rainfall (mm)	% Change
Since 1961	811.0	-
Since 1975	770.2	-5.0%
Since 1990	750.2	-7.5%
Since 2000	709.6	-12.5%

The Bureau of Meteorology annual wind rose describes Perth's wind direction as morning winds (9am) blowing predominantly from the east and north east at speeds of 10-40km/h, with westerly afternoon (3pm) winds blowing at speeds between 10-30km/h during summer months.

3.3.2 Topography and landform

The study area is a gently sloping thin band of sand, with surface geology defined as Bassendean sand underlain in some parts by sandy clay of the Guildford formation (S8 and S10) in the east in the suburb of Shelley, and Tamala sand (S7) in the west in the Rossmoyne area (Yagan Wetland to approximately Fifth Avenue) (Gozzard, 1986). Thin sections of alluvium are present along the foreshore between the Bassendean sands and the River. The foreshore extends between 10 and 100m inland from the edge of the Canning River. The foreshore is low lying, with elevation increasing from 0mAHD to a maximum of 2mAHD at the foreshore-road interface, although rarely exceeding 1mAHD.

Much of the suburb of Shelley was originally wetland, filled in the early 1960s by dredging the river in order to provide land on which residential development could be undertaken. As a result a large proportion of the top soil in this area is comprised of sand mixed with shell fragments.

3.3.3 Hydrology

Three main drainage catchments discharge into the Canning River via concrete pipes located underneath the Shelley Rossmoyne Foreshore. These Water Corporation main drain outlets are located at Sixth Avenue, Beatrice Avenue and Shelley Beach Park and direct the larger upstream runoff volumes from catchments that include portions of the suburbs of Riverton, Willetton, Bull Creek and Leeming. A further 45 outlets discharge local road runoff (see Figure 8).

Practically the entirety of the study area falls within the floodplain of the Canning River (Figure 8). When Cyclone Alby occurred in the late 1970s waves greater than 1 m high were observed to have washed over the foreshore reserve, flooding sections of Riverton Drive and the adjoining properties (Peter Hopkins pers. com. November 2000).

The study area is located within the Perth groundwater area and overlies the City of Canning superficial aquifer and deeper Perth South confined aquifer subareas. Groundwater flows directly towards the river and is thus a major source of freshwater for recharging the river system. Two small domestic bores located at Shelley Beach Park and three irrigation bores abstracting groundwater stored in a nearby 90,000L tank at Shelley bridge (outside the foreshore reserve, accessed from Riverton Drive East) tap into the superficial aquifer for irrigation of parts of the foreshore reserve.

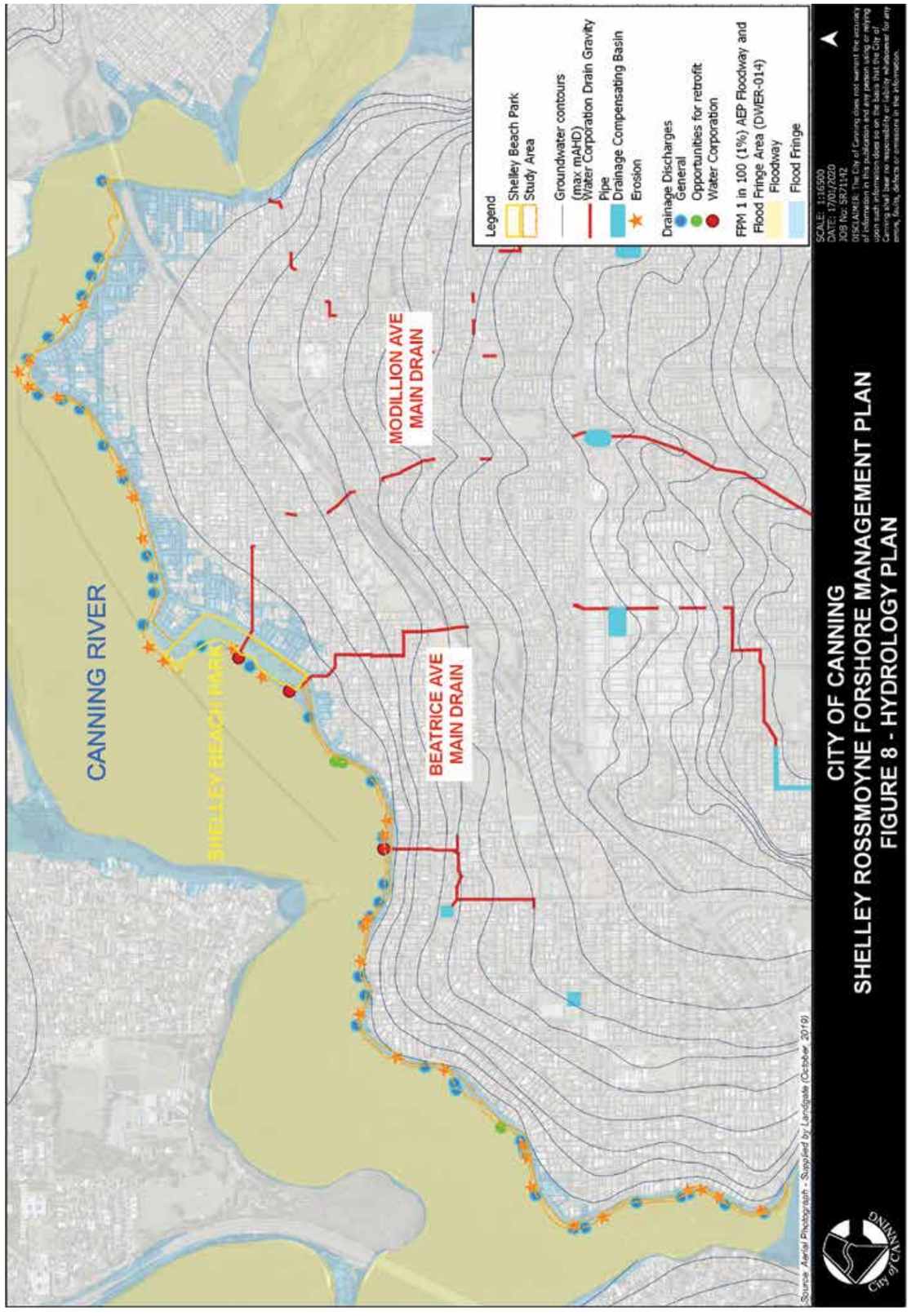


Figure 8: Hydrology plan

Australian Shelduck, Credit: B Lambe

3.3.4 Water quality

Water quality in the Canning River is measured by the Department of Biodiversity, Conservation and Attractions (DBCA). The 2016-2017 annual report (2017) shows that the Canning estuary did not meet its water quality targets for chlorophyll-*a* and dissolved oxygen concentrations. The Canning estuary reported four cases of harmful algal blooms during 2016-2017 with incident duration between one and four weeks.

The Department of Health – Environmental Health Directorate also grades water quality at a number of beaches along the Swan Canning River for microbial water quality and overall health. Five monitoring sites are situated along the foreshore and four of these are new sample sites with insufficient data to assign a risk classification. The fifth site, located at Shelley Beach jetty is given a fair but variable rating based upon incomplete information available to date (Department of Health, 2018).

Several drainage catchments in the City, including the Bull Creek catchment, have been identified in the Swan Canning Water Quality Improvement Plan (EPA 2009) as having "unacceptable water quality" and requiring load reductions greater than 45% for Nitrogen. The Bull Creek catchment discharges into the Canning River via the foreshore at three Water Corporation main drain outlets, in addition to Bull Creek itself. Water quality within the Bull Creek catchment, including nutrients, has been monitored by the City of Canning since 2014. It is not possible to determine water quality at the outlets of these systems; however, as the monitoring location is approximately 800m upstream of the outlets (Urbaqua, 2019). Elevated nitrogen and phosphorus levels have previously been identified in recent years upstream in both the Beatrice Avenue and Modillion Avenue drainage systems which discharge into the Canning River at the foreshore.

Runoff discharging from a number of large stormwater outlets along the foreshore has been identified by the community as providing a valuable freshwater source for birdlife at these points. In particular, the water from outlets located between Rob Bruce Park and Fifth Avenue, and at the sand spit at the end of Beatrice Avenue are recognised as being of particular importance to local wildlife.

Consistent with the City's Water Management Strategy and the River Protection Strategy, the City, together with Canning River Residents Environment Protection Association (CRREPA) has undertaken works to improve the water quality of stormwater entering the river from a number of drains around the reserve. Major works have included conversion of drains to swales or bubble-ups at Wadjup Point, opposite Nearwater Way, Zenith Street, Central Avenue and opposite 235 Riverton Drive.

Given that swimming occurs in the Canning River at the foreshore, opportunities for improving water quality from water discharging from stormwater outlets should be considered. However, there are limited opportunities for improving water quality of the stormwater drains within the narrow foreshore area itself (eg via the daylighting of stormwater drains, which converts buried piped drains into open, surface water treatment systems). Improvement of water quality in the Water Corporation regional drains is more viable through implementation of structural and non-structural controls in the upstream catchment.

3.3.5 Erosion

The previous FMP (City of Canning, 2002) noted that "the process of urban development has resulted in there being only a very thin, interrupted band of vegetation, protecting a narrow reserve area before the roadway, so the natural process of erosion and deposition becomes a potential threat to the park. Most of the erosion observed along the foreshore is associated with loss of the reed bed. Tree roots alone are not sufficient to prevent erosion. There are several points where tree roots have been undermined, and the trees are at risk of falling. Areas that are grassed up to the river are also subject to erosion, as the sand washes out from beneath the grass root mat, leaving an easily observable tier formed at the eroded edge within the grassed area. The steeper banks of the foreshore are more vulnerable to erosion; these areas often require engineered solutions, such as the use of rock gabions (large wire baskets filled with rock)."

In response to the observed erosion issues, the City has undertaken erosion control works with assistance provided by CRREPA and assistance from DBCA via several RiverBank grants. The City has addressed the priority sites identified in The Swan and Canning Rivers Foreshore Assessment and Management Strategy (2008) at Yagan Wetland, Tuscan Street, and west of Shelley Bridge. Ongoing management works are now guided by information provided by the community. Projects completed between 2007 and 2018 include:

- Prisoners Point geofabric bags and limestone armour revetment protecting the Sailing Club wall - 2008
- Swan River Trust Demonstration project including brush walling and limestone rip rap from the Sailing Club east to the Watersby Crescent jetty – 2009
- Wajup Point limestone armour revetment protecting the Tuart tree - 2010
- Halophila Bay (opposite 137 Riverton Drive) log and brush mattressing – 2011
- Shelley Beach Park limestone wall – 2014
- Modillion Avenue Restoration Project log and brush mattressing – 2015
- Beryl Avenue Restoration Project brush walling – 2015
- Wadjup Point gabions and brush mattressing – 2017.

A site visit undertaken by Urbaqua in October 2018, in addition to consultation with CRREPA, identified a number of places where various states of erosion are currently occurring (presented in Figure 8). Some locations are experiencing more significant erosion than others, with some sites threatening the structural stability of some trees. Sites that are recommended for further investigation include:

- beach area opposite Tuscan Street
- run-off from Corinthian Road
- access path opposite 131 Riverton Drive
- beach area opposite Second Avenue and exposed drain
- Sailing Club beach
- eroded beach opposite 357 Riverton Drive.

Night fishing along the foreshore, Credit: S Stanley

3.3.6 Sea level rise

The Shelley Rossmoyne Foreshore is located downstream of the Kent Street Weir which marks the boundary of the tidal Swan Canning estuary. Downstream of the weir, flooding is dominated by sea level rise and storm surge effects, whilst upstream of the weir, flooding is dominated by river processes.

Design storm surge levels downstream of Kent Street Weir are presented in Table 5. The flooding extent from the 100 year average recurrence interval (ARI) river flood and the 100 ARI storm surge (2110 scenario incl. sea level rise) are mapped in Figure 8. Increased flood levels along the Shelley Rossmoyne Foreshore, associated with predicted sea level rise, will potentially increase the number and value of assets and infrastructure at risk of damage from flooding.

Table 5: Storm surge event flood levels – Canning River (DoW, 2013)

Storm surge event	At 2010	At 2110 (incl. 0.9 m sea level rise)
100 year ARI	1.3 mAHD	2.2 mAHD
500 year ARI	1.4 mAHD	2.2 mAHD

The Department of Water and Environmental Regulation (DWER) and Eastern Metropolitan Regional Council (EMRC) reviewed the impact of sea level rise and storm surge on estuarine and riverine flooding levels in the Swan and Canning Rivers from 2013 to 2018 as part of the Swan and Helena Rivers Flood Study and Floodplain Management Plan (BMT, 2018). This study did not review flows originating in the Canning River catchment but includes revised riverine flooding from the Swan Helena system and coastal impacts on the Swan Canning estuary.

No assessment has currently been made of the effects of sea level rise on groundwater levels or the coastal or estuarine saline interface within groundwater aquifers.

The City of Canning Local Biodiversity Strategy (2018) outlines that infrastructure must be resilient to climate change, including river and sea level rise. Managing the effect of river rise on the foreshore to protect both vegetation and infrastructure is important to ensure the safety of the community and the foreshore. For example, the Shelley Sailing Club and Shelley Beach Park amenities (discussed further in Section 3.2.4) are both at risk of damage from river level rise.

KEY ISSUES – PHYSICAL ATTRIBUTES

- Improvement of stormwater quality discharging from drainage infrastructure within the foreshore.
- Controlling erosion along the foreshore to minimise impacts on river bank stability, infrastructure and vegetation, particularly mature trees.
- Adjusting to impacts of a drying climate, including reduced freshwater runoff and groundwater recharge.
- Mitigating potential risks associated with sea level rise including impacts on vegetation, habitat, infrastructure, and superficial groundwater (saline intrusion) in foreshore bores.

3.4 Biological attributes

The Shelley Rossmoyne Foreshore is an area of notable biodiversity and is an important habitat within the City of Canning. The key biological attributes are outlined in this Section.

3.4.1 Vegetation and habitat

The SRT 2016-2017 annual report (2017) gave the Canning Estuary a rating of good for shallow nearshore water biodiversity and a rating of fair for deeper offshore water biodiversity.

Vegetation along the foreshore is dominated by two complexes, the Bassendean Central and Southern vegetation complex and the Southern River complex (City of Canning 2017). The Bassendean complex ranges from woodland of *Eucalyptus marginata* (Jarrah), *Allocasuarina fraseriana* (Western Sheoak) – Banksia spp. to low woodland of Melaleuca spp. and sedgelands on the moister sites. The Southern River complex is comprised of open woodland of *Corymbia calophylla* (Marri) – *Eucalyptus marginata* (Jarrah)– Banksia spp. on elevated areas with fringing woodland of *Eucalyptus rudis* (Flooded Gum) – *Melaleuca rhaphiophylla* (Swamp Paperbark) along the streams. Species composition has been affected over time with changes in hydrology. Increased salinity in the estuary has resulted in the growth of the more salt tolerant species including *Casuarina obesa* (Swamp Sheoak) Despite being the two most common vegetation complexes in the City, the extent of the Bassendean and Southern River complexes as of 2014 is less than 10% of the pre-European extent.

Although the existing native vegetation along the foreshore is narrow in most places, its condition has improved markedly since 2001, when the previous management plan noted: "the trees on the very edge, the paperbarks and *Eucalyptus rudis* and sheoaks, are not regenerating naturally. Where the reed beds are worn down or undermined, they collapse. The vegetation is ageing but there is very little sign of a new generation to replace it."

CRREPA has been working since 1994 to help restore the Lower Canning and Bull Creek estuaries. Their submission notes that "The line of foreshore vegetation remains narrow, natural regeneration remains limited and weeds proliferate each year with the winter rain. But thanks to the many thousands of hours of voluntary work by principally volunteers from CRREPA but also the Lions Club of Booragoon and on occasions Conservation Volunteers Australia, well supported by the City of Canning, there is now an almost continuous band of sedges from Yagan Reserve to Shelley Bridge that provides protection and stability for the seven kilometres of foreshore."

This has been achieved through the combination of removal of grasses and revegetation with sedges, groundcovers and low shrubs. Natural regeneration assisted by the creation and ongoing management of a barrier strip between foreshore vegetation and grass has also enabled remnant vegetation to extend naturally up the slope. The planting of trees along the foreshore is managed separately from revegetation projects. The City consults with nearby residents to determine planting locations that consider the effect on the outlook from nearby properties where feasible. From 2010 to 2013 the City planted approximately 100 trees along the length of the foreshore to replace trees damaged and lost in the hail storm March 2010, as well as to ensure that continuing stands of trees remain on the foreshore. As per the City's policy ET 525 Trees in Streets, Thoroughfares and Parks when a tree is removed from the foreshore, two are planted in its place.

CRREPA members have recorded 82 different bird species along the foreshore of which 37 are seen on a regular weekly basis (Figure 9). The birds range from the magnificent raptors like the Osprey and Australian Hobby, land birds like the Rainbow Bee-eater and Striated Pardalote to water birds like the Musk Duck and Little Pied Cormorant. Importantly, the list continues to grow with the most recent new sighting being the Great Crested Grebe.

Four significant habitat areas in the Shelley Rossmoyne Foreshore have been identified by the community (Figure 10) including:

1. Pleasant Place dampland
2. Beatrice Avenue;
3. Wadjup Point; and
4. Shelley Bridge sedgelands.

These sites are noted primarily because of the regular presence of local and migratory water bird species, which use these beach spits as places for feeding and resting. Good quality sedges and other riparian vegetation are also characteristic of these habitat sites. The drainage outlet at Beatrice Avenue also provides an important source of freshwater for visiting birdlife. Yagan Wetlands has also been noted as a significant habitat but is outside of the study area for this plan.

CRREPA also notes that Sheoak *(Casuarina* sp.*)* in some locations along the Rossmoyne-Shelley Foreshore has formed dense stands and other vegetation is unable to grow underneath them. This inability for understorey to establish can reduce species diversity and can reduce the stability of the foreshore banks, as well as causing potential damage to City assets and infrastructure such as footpaths and fencing (see Box 2). The weed species **Casuarina glauca* is easily misidentified with *Casuarina obesa* and is a recognised woody weed that should be removed from the foreshore and the wider Swan and Canning Riverpark. The two species can also hybridise (pers. comms. Greg Keighery, May 2019). The City proposes to undertake mapping of the extent of *Casuarina* sp. on the foreshore. Some strategies to help reduce the lack of diversity may be to remove weed species, plant other tree species behind the Swamp Sheoak, undertake selective thinning to encourage the growth of larger trees rather than dense thickets, and the continued establishment of the reed bed. Thinning of the native Swamp Sheoak has been discouraged by DBCA because the trees naturally occur along foreshore environments in the Swan Canning Riverpark. However, Removal of *Casuarina glauca* and hybrid trees, their suckers and active management of *Casuarina obesa* in liaison with the DBCA will allow the preservation of multiple values within the foreshore reserve.

3.4.2 Protected flora and fauna species and communities

At the Commonwealth level, flora, fauna and ecological communities may be recognised as matters of national environmental significance and are protected under the *Environment Protection Biodiversity Conservation Act (EPBC) Act 1999*, administered by the Department of Environment. The categories of threatened flora and fauna protected under the *EPBC Act are (i) extinct in the wild (ii) critically endangered, (iii) endangered and (iv) vulnerable. An additional category of "conservation dependent" exists, which requires special consideration but is not protected under the EPBC Act.*

Pelicans on the foreshore, Credit: G Sandwell

Impact of *Casuarina obesa* (Swamp Sheoak) on understorey and bank stability

(Information provided by CRREPA)

Box 2

In some locations the Swamp Sheoak *(Casuarina obesa)* has formed dense stands along the Rossmoyne-Shelley Foreshore as well as in many rehabilitation and regeneration sites on the Swan Coastal Plain. It grows from suckers along the mature roots as well as seeds. In some areas the 'allelopathy' (the biological phenomenon by which an organism produces one or more biochemicals that influence the germination, growth, survival, and reproduction of other organisms) has resulted in the understorey either being 'knocked off' and or restrained from growing. This has resulted in areas of reduced species diversity and ecological values, as well as threats to bank stability and damage to City assets.

Beryl Avenue Site (CRREPA Site 09b) opposite 303 Riverton Drive, Shelley dramatically highlights this problem where the once dense and healthy sedge bank is being 'wiped out' with almost half of the plot's understorey now gone. Some strategies to help reduce the lack of diversity may be to plant other tree species behind the Swamp Sheoak *(*eg *Melaleuca preissiana, Melaleuca cuticularis, Melaleuca rhaphiophylla,* and/or *Eucalyptus rudis)* and continued establishment of the reed bed.

The photos show the site in 2002 when it was first rehabilitated with the Rossmoyne High School Bush Rangers. The image below shows the suckering of sheoaks from roots.

While it is acknowledged that sheoaks are a native species within this environment, active management of trees and their suckers in liaison with the DBCA will allow the preservation of multiple values within the foreshore.

Birds sighted along the Rossmoyne-Shelley WA foreshore (Yagan Wetland to Shelley Bridge)

WHICH ONES DO YOU SEE?

RAPTORS (5)

- ☐ Osprey
- ☐ Little Eagle
- ☐ Australian Hobby
- ☐ Black Shouldered Kite
- ☐ Brown Falcon

RAPTORS (5)

- ☐ Fan-tailed Cuckoo (Jul'18 KEATING)
- ☐ Pallid Cuckoo
- ☐ Black Faced Cuckoo Shrike
- ☐ Red Wattlebird
- ☐ Little Wattlebird
- ☐ Rainbow Bee-eater
- ☐ Mistletoe Bird
- ☐ Striated Pardalote
- ☐ New Holland Honeyeater
- ☐ Singing Honeyeater
- ☐ Brown Honeyeater
- ☐ White-cheeked Honeyeater (post Feb'04)
- ☐ Silver Eye
- ☐ Red Tailed Black Cockatoo
- ☐ Carnaby's Black Cockatoo
- ☐ Galah
- ☐ South Western Corella* (post Feb'04)
- ☐ Red Capped Parrot
- ☐ Ringneck (28) Parrot
- ☐ Welcome Swallow
- ☐ Tree Martin
- ☐ Willie Wagtail
- ☐ Australian Magpie (Mud) Lark
- ☐ Magpie
- ☐ Australian Raven
- ☐ Southern Boobook (post '04)
- ☐ Butcher Bird (post '04)
- ☐ Rufous Whistle (post '04)
- ☐ Western Gerygone (post '04)
- ☐ Grey Fantail (post '04)

FERALS/ESCAPEES (6)

- ☐ Rainbow Lorikeet
- ☐ Feral Pigeon
- ☐ Laughing Turtle-dove
- ☐ Spotted Turtle-dove
- ☐ Cockatiel
- ☐ Laughing Kookaburra

WATER BIRDS (43)

- ☐ Nankeen Night Heron
- ☐ Large Egret
- ☐ Little Egret (Dec'16 STANLEY)
- ☐ White Faced Heron
- ☐ Pacific Heron (Mar '15)
- ☐ Australian White (Sacred) Ibis
- ☐ Yellow-billed Spoonbill
- ☐ Black Swan
- ☐ Avocet
- ☐ Greenshank
- ☐ Hooded Plover
- ☐ Black-winged Stilt
- ☐ Common Sandpipe (post '04)
- ☐ Purple Swamphen (Aug'13)
- ☐ Black-tailed Native Hen (post '04)
- ☐ Pied Oystercatcher (post '04)
- ☐ Sooty Oystercatcher (post '04)
- ☐ Clamorous Reed Warbler
- ☐ Buff-banded Rail
- ☐ Spotless Crake (Jun '14)
- ☐ Little Grassbird (post '04)
- ☐ Australasian Grebe
- ☐ Hoary-Headed Grebe (post '04)
- ☐ Great Crested Grebe (Mar'17)
- ☐ Eurasian Coot
- ☐ Maned Goose / Wood Duck
- ☐ Musk Duck
- ☐ Pacific Black Duck
- ☐ Mountain Duck / Shelduck (post '04)
- ☐ Grey Teal
- ☐ Hardhead (Feb '19 KEATING/STANLEY)
- ☐ Pink-eared Duck (Jul '19 SANDWELL)
- ☐ Caspian Tern
- ☐ Crested Tern (post '04)
- ☐ Fairy Tern
- ☐ Darter
- ☐ Little Pied Cormorant
- ☐ Pied Cormorant
- ☐ Great Cormorant
- ☐ Little Black Cormorant
- ☐ Sacred Kingfisher
- ☐ Pelican
- ☐ Silver Gull

YOUR ADDITIONAL SIGHTINGS

*** Re Corella, origin unsure, could be crosses**

Birds recorded 1991-2020 by CRREPA members (updated 31st July 2020)

Figure 9: Birds sighted along the Shelley Rossmoyne Foreshore by CRREPA

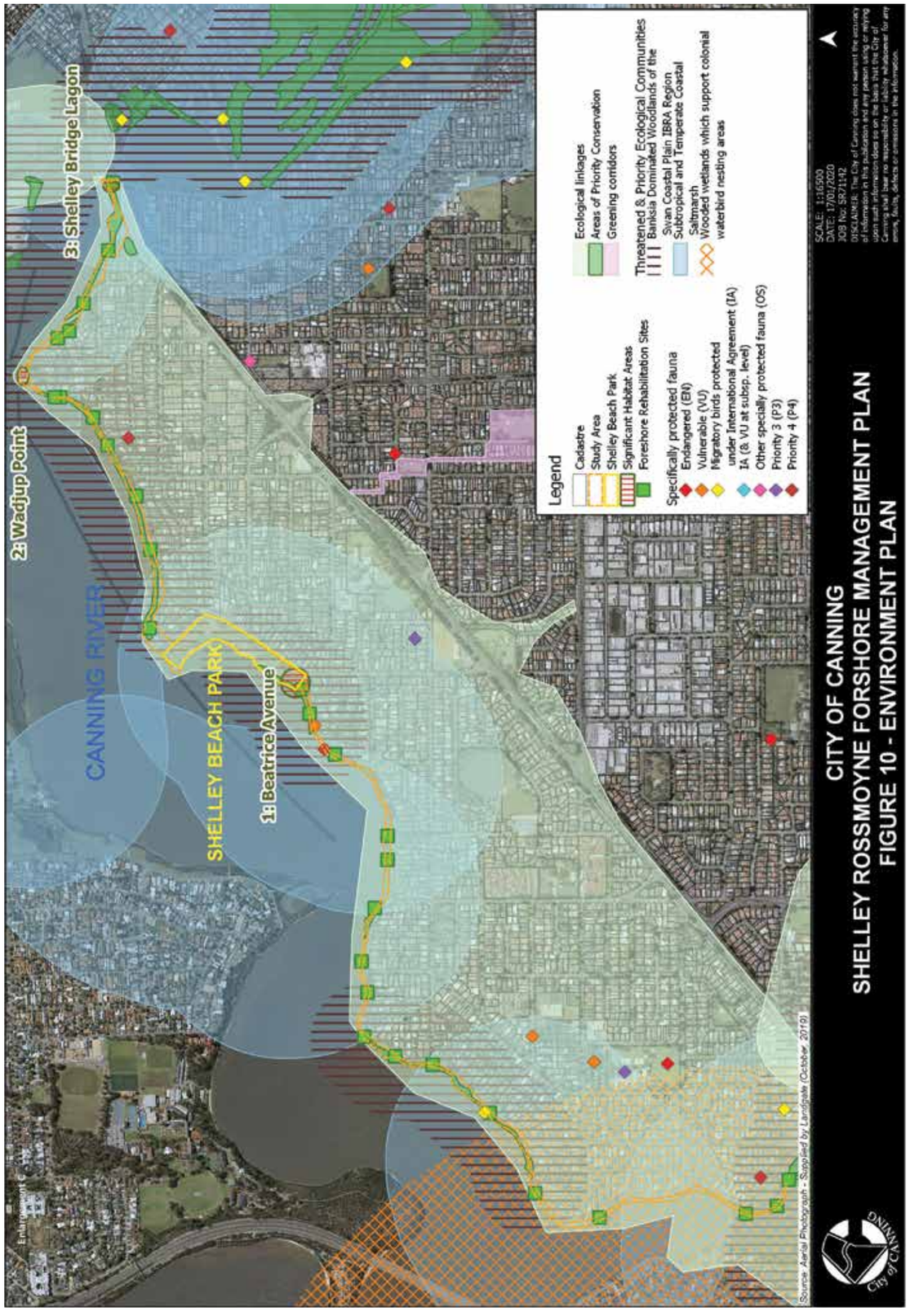


Figure 10: Environment plan

The Commonwealth lists a number of matters of national environmental significance in the region including 38 listed threatened species, 28 listed migratory species and two (2) threatened ecological communities: (i) Banksia Woodlands of the Swan Coastal Plain ecological community (endangered) and (ii) Subtropical and Temperate Coastal Saltmarsh (vulnerable), both of which are likely to occur within the area.

The threatened and migratory species listed under the *EPBC Act* include the Forest Red-tailed Black-Cockatoo *(Calyptorhynchus banksii naso)*, Greenshank *(Tringa nebularia)*, Common Sandpiper *(Actitis hypoleucos)*, Rainbow Bee-eater *(Merops ornatus)* and Osprey *(Pandion haliaetus)* all of which have been regularly sighted in the foreshore area.

Flora and fauna is also protected at the State level under the *Wildlife Conservation Act*, administered by the Department of Biodiversity, Conservation and Attractions (DBCA) . The Wildlife Conservation (Specially Protected Fauna) Notice, 2018 recognises four categories of rare and endangered fauna taxa, and the Wildlife Conservation (Rare Flora) Notice 2018 recognises two categories of rare flora. In addition, the DBCA also classifies flora and fauna under five different priority codes, with different management requirements. Priority 4 species, *Hydromys chrysogaster* (Water-rat, Rakali) was found dead and photographed by members of CRREPA in 2005 near Zenith Avenue (pers. comm. Colma Keating, 2018). The Rakali is thought to have been hit by a vehicle.

A search of the DBCA database of protected flora, fauna and threatened ecological communities (TECs) was undertaken for the foreshore area in November 2018 and is summarised in Table 6. One threatened species of flora (Grand spider orchid) and two endangered species of fauna (Baudin's Black-Cockatoo and Carnaby's Black-Cockatoo) have been observed within or near to the foreshore area, indicating its conservation value within the region. In addition, significant sections of the foreshore are located within identified threatened ecological communities, including the Subtropical and Temperate Coastal Saltmarsh (classified as vulnerable) and the Banksia Woodlands of the Swan Coastal Plain (classified as endangered), in which previously identified significant habitat areas are part of.

In order to protect fauna such as dolphins, water birds and other animals from the impact of discarded fishing line and tackle, the City joined the River Guardian's 'Reel It In' campaign which began in 2013. The campaign arranges for the installation of fishing line disposal bins at popular recreational fishing locations such as jetties, fishing platforms, traffic bridges and foreshores. Fishing line disposal bins are currently located at the jetties and fishing platforms located along the Shelley Rossmoyne Foreshore (see Figures 17-20).

The OzFish Fish Habitat project

The City of Canning has supported, in principle, the Perth chapter of OzFish to improve fish habitat in the Canning River near Fifth Avenue. The project focuses on resnagging and restoring shellfish reefs near the Shelley foreshore. Shellfish reefs provide feeding sites and nursery habitats for juvenile fish, and are particularly valuable habitats for species such as Black Bream. The ongoing project is undertaken in conjunction with Recfishwest, BCF, Main Roads WA and Fishers for Fish Habitat volunteers, with funding from the Community Rivercare Program.

Table 6: Flora and fauna species recorded in the DBCA protected species database likely to exist in and near to the foreshore area

Conservation Code	No. fauna species	No. flora species	Fauna and flora species
Threatened species (T)	-	1	*Caladenia huegelii* (Grand spider orchid)
Endangered species (EN)	2	-	*Calyptorhynchus baudinii* (Baudin's Black-Cockatoo) ***Calyptorhynchus latirostris*** **(Carnaby's Black-Cockatoo)**
Vulnerable species (VU)	3		***Calyptorhynchus banksii naso*** **(Forest Red-tailed Black-Cockatoo)** *Westralunio carteri* (Carter's freshwater mussel) *Limosa lapponica* (Bar-tailed Godwit)
Protected under an international agreement (IA)	8		*Calidris acuminata* (Sharp-tailed Sandpiper) ***Hydroprogne caspia*** **(Caspian Tern)** ***Pandion cristatus*** **(Osprey)** *Plegadis falcinellus* (Glossy Ibis) ***Thalasseus bergii*** **(Crested Tern)** *Tringa glareola* (Wood Sandpiper) ***Tringa nebularia*** **(Common Greenshank, Greenshank)** *Limosa lapponica* (Bar-tailed Godwit)
Other specially protected species (OS)	1		*Falco peregrinus* (Peregrine Falcon)
Priority 1 (P1)	-		*Hydrocotyle striata*
Priority 2 (P2)	-		
Priority 3 (P3)	2		*Lerista lineata* (Perth Slider, Lined Skink) *Neelaps calonotos* (Black-striped Snake, Black-striped burrowing Snake) *Amanita wadjukiorum* (type of mushroom) *Angianthus micropodioides* (native Daisy) *Stylidium paludicola* (Trigger plant)
Priority 4 (P4)	3		***Hydromys chrysogaster*** **(Water-rat, Rakali)** *Isoodon obesulus* (Southern Brown Banidcoot, Quenda) *Oxyura australis* (Blue-billed Duck)

Note: Species in bold have been sighted along the foreshore by CRREPA

3.4.3 Natural features

The Canning River has been extensively modified since European settlement and human activities have removed much of the Large Woody Habitats (LWH) along the river foreshore. LWH consist of submerged or partially submerged trees. These habitats provide shelter and breeding grounds for fish, oyster and mussel habitat and nesting sites for birds.

3.4.4 Ecological linkage and canopy coverage

The Shelley Rossmoyne Foreshore is an important ecological linkage area forming a part of the Regional Ecological Linkage (WALGA and Perth Biodiversity Project, 2004) connecting Bannister Creek and the Canning River Regional Park to The Esplanade in the City of Melville. Regional Ecological Linkages are defined as linear corridors of natural areas which include good condition native vegetation at least 10ha in size, located no more than 500-1,000m from each other. These were identified by the Perth Biodiversity Project in the Local Government Biodiversity Planning Guidelines for the Perth Metropolitan Region (WALGA and Perth Biodiversity Project, 2004).

The City's Local Biodiversity Strategy also identifies the foreshore and suburbs of Shelley and Rossmoyne as a Local Ecological Corridor area extending from Shelley Bridge along the foreshore to the Yagan Wetlands and bound by the Canning River and Leach Highway (Figure 10). Ecological linkages contribute to the long term survival of species by assisting in genetic variation, adaptation and ecosystem maintenance.

The ecological linkage is enhanced where both understorey and overstorey vegetation exist together. There is a notable lack of canopy coverage in the foreshore between Central Road and First Avenue.

A number of trees exist through the grassed areas of the foreshore; the trees generally follow the footpath offering canopy cover. Common local species located along the foreshore include *Melaleuca rhaphiophylla* (Swamp Paperbark), *Casuarina obesa* (Swamp Sheoak), *Eucalyptus gomphocephala* (Tuart), and *Eucalyptus rudis* (Flooded Gum), with *Melaleuca preissiana* (Modong) and *Melaleuca cuticularis* (Saltwater Paperbark) present to a lesser extent. Non-local species include *Eucalyptus camaldulensis* (River Redgum), *Eucalyptus cladocalyx* (Sugar Gum), *Casuarina cunninghamiana* (River Sheoak), and *Corymbia citriodora* (Lemon Scented Gum).

The City currently actively manages the health of trees located within the foreshore as part of its management of parks and natural areas. This includes activities such as pruning, and insect and disease management. In recent years the City has removed and replaced tree species that are considered weeds such as the weed of national significance, *Salix babylonica* (Weeping Willow). Management of trees adjacent to the shared use path (SUP) is an ongoing issue due to sightline requirements associated with line markings on the SUP, and branches growing within the safety zone for cyclists.

The City has audited its street trees periodically since 1996 and more recently individual trees have been recorded in the City's GIS asset layer. Park trees were first audited in 2010. The City is soon to commence a rolling program to audit all trees in parks and streetscapes every three to five years as well as selected trees in conservation areas that are adjacent to facilities such as paths and roads. Tree numbers, health, age, distribution across suburbs, and species diversity were assessed, and trees identified as being at the end of their useful lives were removed, and replacement trees have been planted.

In 2014 the University of Technology, Sydney quantified the urban green space of 139 local government authorities in metropolitan areas across Australia. The report Benchmarking Australia's Urban Tree Canopy (Jacobs, B. et al, 2014) noted that the City of Canning has the third lowest percentage canopy cover of 29 Local Governments assessed within the Perth metropolitan area. In 2015, more precise urban canopy monitoring (Astron 2015) was undertaken for the City of Canning and determined that canopy cover provided by trees 3m in height or taller was 7.57% across the City. Heat island mapping showed that the coolest mean and median values were in the suburbs of Rossmoyne and Shelley, largely due to their significant interface with the river.

The City of Canning's draft Urban Forest Strategy and adopted Street Tree, Local Biodiversity and Local Environment Management Strategies provide strategic support for the establishment of more trees along the foreshore. Important principles include the "right tree in the right place" and an understanding of the need to work to engage with residents who may have concerns about trees growing near their properties. The City's Local Biodiversity Strategy encourages the planting of local native trees and recommends that by 2031 at least 20% of park trees and 10% of street trees are local species and that trees planted in Local Ecological Linkages are endemic where possible.

3.4.5 Revegetation

As noted in section 3.2.7 CRREPA has been working since 1994 to help restore the Shelley Rossmoyne Foreshore. This has included the planned and coordinated revegetation and weeding of every site identified by the group (see Appendix E). In some instances, CRREPA was able to secure grant funding to assist with the on-ground works and in other instances, they were assisted by other community groups and volunteers, such as the Wildflower Society Murdoch, Rossmoyne Shelley Scouts, Shelley Primary School, and Rossmoyne Primary School, Rossmoyne Senior High School Bush Rangers, South East Regional Centre for Urban Landcare (SERCUL), Lions Club of Booragoon, Swan River Trust, the Landcare and Environment Action Project (LEAP) scheme employees, amongst others.

In some parts of the foreshore, targeted landscaping has also been undertaken outside conservation areas. For example, planting around the interpretive trail signs by Wadjup-Gabbilju Project volunteers. In these areas the City has required that plants are local to the City of Canning and surrounding local government areas. While a few exceptions have been made, planting non-local species is discouraged.

It is also noted that the City of Canning provides a substantial amount of assistance to the activities of CRREPA, including site preparation (particularly where heavy machinery is required) and fencing. The current partnership approach between these parties is highly effective and valued and it will be important to maintain this collaborative relationship into the future.

CRREPA and City officers meet regularly to discuss works programs and to identify future priorities. Areas identified by the City and CRREPA as priorities for future revegetation /rehabilitation with appropriate understorey and overstorey species (see Box 3) are listed in Table 7, noting that the two sites highlighted are considered to be the highest priority (after those sites scheduled for works in 2018/19). A detailed list of CRREPA's recommended management actions is presented in Appendix F. These recommended management actions are supported by the City.

As identified in the original management plan the City will progressively revegetate the area of turf between the river and the shared use path where feasible, except in identified recreation nodes such as the playground area in Rossmoyne and Shelley Beach Park.

Table 7: Priority areas for future revegetation

Location (Riverton Dr)	Recommended management actions
9-13	Plant Saltwater Paperbark *(Melaleuca cuticularis)* among the Sea Rush *(Juncus kraussii)* to connect paperbarks downstream and upstream of this stretch.
35-39	Rehabilitate where the foreshore path used to be located with *Ficinia nodosa, Centella asiatica* and *Melaleuca preissiana*.
51-65	Revegetate with a mix of ground covers, shrubs and trees including Flooded Gum *(Eucalyptus rudis)* while still affording nearby residents views of the river and Mt Henry Bridge. Trial plantings of species including Club Rush *(Ficinia nodosa), Conostylis* sp and *Dianella revoluta* to identify those that have greatest prospects of long term, good growth. Undertake soil testing to identify deficiencies that may need to be rectified to enable long term survival of native plants. Ongoing communication/consultation with nearby residents to seek their understanding of and support for the revegetation initiatives.
109-111	Remove grass and revegetate with sedges *Juncus krausii* and *Baumea juncea*.
119	Community Rivercare Program Grant: Rehabilitation of grassed area between sedges and shared use path planned for 2020.
187-189 (pipe)	Expand the sedge bank (*Juncus kraussii* and *Baumea juncea*) and plant Saltwater Paperbarks (*Melaleuca cuticularis*) in sedges.
205-207	Control grass and weeds to encourage spread of *Juncus kraussii* up the bank.
223-227 Pleasant	Monitor and manage Swamp Sheoak (*Casuarina obesa*) suckers.
229-231	Revegetate steep slope with *Hakea prostrata* (similar to NAT project opposite 133). Replace dead and senescing Saltwater Paperback (*Melaleuca cuticularis*).
239-241	Community Rivercare Program Grant: Rehabilitation of grassed area between sedges and shared use path completed in 2018. Ongoing weed management and watering for 2018-2021.
345-347	Needs soil enrichment to encourage growth of ground cover. Ongoing weed management and watering for 2018-2021.
Wadjup (347-355)	North-west facing beach – future rehabilitation of grassed area. North-east facing foreshore – Community Rivercare Program Grant: Rehabilitation of grassed area behind sedges in 2018.
367-369	Remove grassed area and rehabilitate from sedge bank to shared use path.
371	Passive encroachment of Sheoaks will replace the grass between sedge bank and shared use path. Rehabilitation with other local native species is not recommended.
Zenith Park	Replace grass with local native trees, shrubs and understorey as important local ecological link.
Shelley Bridge sedgelands	Establish Saltwater Paperbarks (*Melaleuca cuticularis*) on bank. Erect exclusion fence/barrier to reduce disturbance.

*** Highlighted sites are considered highest priority.**

Two major constraints to successful revegetation of the foreshore have been identified in addition to vandalism to vegetation (described in section 3.2.8). These are:

1. availability of freshwater for irrigation of establishing plants
2. impact of recreational activity on vegetation and habitat for wildlife.

Providing water for irrigation during plant establishment as part of direct revegetation (as distinct from passive, barrier strip revegetation) is a significant cost with respect to infrastructure and labour associated with watering, in addition to the availability of suitable groundwater (potentially constrained by salinity due to proximity of local bores to the saline estuary) and voluntary labour.

In addition, the impact of people and their dogs recreating at the foreshore on areas of vegetation (both established in the long term and newly revegetated) and wildlife habitat is also significant. The unintentional damage that is associated with moving through sensitive areas of vegetation can be substantial and long-lasting, and can also have long term impacts upon the wildlife that inhabit the foreshore area. This issue is difficult to manage due to the limited scope for physical prevention (fencing), and the constant challenge of changing the behaviour of visitors and their understanding of their unintended impact on the natural environment of the foreshore.

Preferred species list

Box 3

Trees
Banksia littoralis
Banksia menziesii
Casuarina humilis
Casuarina obesa
(plant alternative tree where appropriate)
Eucalyptus gomphocephala
Eucalyptus rudis
Eucalyptus todtiana
Melaleuca preissiana
Melaleuca cuticularis
Melaleuca rhaphiophylla

Shrubs
Acacia pulchella
Astartea scoparia
Banksia nivea
Bossiaea eriocarpa
Gompholobium tomentosum
Hakea prostrata
Hakea varia
Hibbertia racemosa
Hypocalymma angustifolium
Hypocalymma robustum
Melaleuca lateritia

Shrubs
Baumea juncea
Ficinia nodosa
Gahnia trifida
Juncus krausii
Lepiodosperma longitudinale

Ground covers, herbs & grasses
Centella asiatica
Conostylis aculeata
Conostylis candicans
Conostylis juncea
Dianella revoluta
Kennedia prostrata
Lobelia alata
Patersonia occidentalis
Sporobolus virginicus

Australian Hobby, Credit: B Lambe

3.4.6 Weeds

The City has no regular roster for weed or vegetation mapping along the Shelley Rossmoyne Foreshore. A mapping assessment of native *Sporobolus virginicus* (Marine Couch) and introduced **Cynodon dactylon* (Couch) within the fringing remnant vegetation along the foreshore and in Yagan Reserve was undertaken in 2015/16 by Natural Area Consulting Management Services (NACMS, 2016). Areas with grass cover maintained for recreation were excluded from the survey.

Sporobolus virginicus (Marine Couch) was found throughout the foreshore and Yagan Reserve fringing remnant vegetation in increasing density towards the eastern end of the foreshore. Distribution in Yagan Reserve was characterised by small isolated patches in the north-west corner of the reserve. The majority of the native species was recorded at medium density (60-75%).

**Cynodon dactylon* was recorded throughout the Foreshore and Reserve fringing remnant vegetation, covering approximately three times the area of the native Marine Couch. The majority of the species was recorded at medium densities growing in native vegetation and in open areas.

The report made a number of recommendations to aid the protection of the Marine Couch, while removing the introduced species, these recommendations were:

- Species identification training and education for the staff members.
- Attaching shrouds to spray guns when undertaking herbicide spraying of Couch *(*Cynodon dactylon),* to minimise potential off target damage to *Sporobolus virginicus*.
- Using manual control instead of herbicides to control **Cynodon dactylon* where it is growing amongst *Sporobolus virginicus*.
- Undertaking weed control activities when grasses are flowering and easiest to identify.

The report also recommended public education about the effect dumping lawn clippings in the native vegetation can have on the introduction of **Cynodon dactylon*.

The City proposes to undertake mapping of the extent of *Casuarina* sp. to help identify the extent of the woody weed **Casuarina glauca*.

The City is responsible for weed management in the conservation zone of the foreshore which generally consists of a narrow strip of native vegetation between the shared use path and the river. The team visits the foreshore on a regular basis and targets areas of need.

A narrow spray line is applied using a glyphosate herbicide between the turf and native vegetation. This controls weeds spreading into the vegetated area and encourages the spreading of the rushes and sedges towards the footpath. It also delineates the conservation and recreation areas when the shared use path does not divide the two zones. This approach has been found to be more efficient and effective than the spreading of mulch bunds.

Herbicide is also applied to the summer grasses (Kikuyu and Couch). Sometimes grasses in problem areas are treated again with an alternative semi selective chemical which does not impact sedges. Other weed control in the conservation area is generally undertaken by hand weeding.

Other common weeds on the foreshore are Prickly Lettuce *(*Lactuca serriola);* Fleabane *(*Conyza* sp.);* Geraldton Carnation Weed *(*Euphorbia terracina);* Vetch *(*Vicia* sp.);* Wild Oats *(*Avena fatua);* Bush Starwart *(*Symphyotrichum subulatum);* Cretan Weed *(*Hedypnois rhagadioloides);* Fat Hen (**Chenopodium album)* and other species in the Brassicaceae family.

The City has a weed prioritisation framework and a regular program for mapping priority weeds. The Shelley Rossmoyne Foreshore is excluded from the weed mapping program, however, as it does not contain high priority weeds. Weed management on the foreshore is prioritised with consideration of the Swan Coastal Plain Weed Strategy, weeds listed under the Biosecurity and Agriculture Management Act 2007 and local priorities.

Weed management and restoration is also implemented by CRREPA. The City provides reusable weed bags that are left on the side of the road for collection and disposal by the City after a weeding event. CRREPA members focus their efforts on their project sites.

City representatives meet with the CRREPA committee annually to plan and coordinate works for the coming year. This is supplemented with ongoing communication regarding works being undertaken by both the City and CRREPA.

CRREPA Propagation (Max Risbey), Credit: D Matthews

3.4.7 Pests

A number of pests have been identified by the community as occurring at the foreshore and creating a nuisance for visitors, community volunteers rehabilitating the foreshore, and for the foreshore vegetation itself.

In particular, feral ants are known to be present along the foreshore and reduce the enjoyment of visitors through biting and crawling over those attempting to recreate in the area. Ants also often interrupt the rehabilitation efforts of community volunteers and City staff and can damage revegetated areas through the removal of seeds, or by moving soil away from the root systems of young, establishing plants.

Other pests known to create a nuisance at the foreshore include Rainbow Lorikeets, which compete for nesting and feeding sites with other native birds, and mosquitoes which can transmit a number of diseases to human and animal populations as well as creating a nuisance through their persistent biting, and disturbance of occupational, recreational and social activities.

3.4.8 Turf

Turf is present in key recreation areas including Shelley Beach Park and Zenith Park and surrounds, as well in many narrow areas parallel to the dual use path along the length of the foreshore. Only turf areas within Shelley Beach Park, Zenith Park and the area between the path and the road from Wadjup Point to Zenith Park are irrigated (see sections 3.2.4 and 3.3.3). The turf on the foreshore is maintained as part of a regular mowing schedule.

Fertiliser application is limited within the foreshore reserve, and only occurs at Shelley Beach Park. However, due to the expected increased use of Shelley Beach Park in the future, fertiliser application may be required to increase.

Liquid foliar fertiliser application is considered the most efficient application method and is thus preferred at the foreshore. This method also minimises infiltration of nutrients into the local soil and groundwater. However, foliar fertiliser application requires leaf tissue or soil analysis in addition to a fertiliser application plan for each site to ensure its proper use.

Bindii *(Soliva sessilis)* prickles have been identified by the community as a problem which they would like the City to manage. In particular, a Bindii problem exists near the Shelley Sailing Club car parking area. While the ideal solution to reduce this weed is to increase turf growth through additional irrigation, it is not considered feasible due to limited water supply and low pressure. Control options are therefore currently limited to herbicide application. The City will commence targeted applications of selective herbicide for Bindii in the future.

3.4.9 Bushfire risk

A very small part of the foreshore area is identified as a bush fire prone area, designated by the Fire and Emergency Services (FES) Commissioner (Figure 11). Should any land use change and/or development be proposed in this area, it would need to meet the requirements of State Planning Policy 3.7: Planning in Bushfire Prone Areas (SPP 3.7) (2015) the Guidelines for Planning in Bushfire Prone Areas (V1.3, WAPC, 2017) and Australian Standards (AS3959-2009): Construction of buildings in bushfire prone areas where these apply.

Figure 11: Map of Bushfire Prone Areas for the subject site (Source: DFES, 2018)

KEY ISSUES – BIOLOGICAL ATTRIBUTES

- Identification and protection of significant habitats, particularly for nesting birds.
- Establishment and maintenance of ecological linkages, natural areas and canopy cover.

Black Swans nesting, Bull Creek, Credit: C. Keating

3.5 Heritage

The Shelley Rossmoyne Foreshore is significant for both Aboriginal and European heritage. A summary is provided in the section below.

3.5.1 Aboriginal heritage

The original inhabitants of the Canning area are the Beeliar and Beeloo Whadjuk Nyoongar Aboriginal people and the Canning River formed the natural border between these two groups. Many Beeliar Nyoongar families considered the southern side of the Canning River foreshores as part of their 'run', which was the part of the seasonal route once travelled up and down the river, while the Beeloo considered the northern side of the Canning River to the hills as part of their ground. At the time of colonisation the Bull Creek area (Gabbilji) was of considerable importance as the wetlands were present in summer and provided many foods compared to other surrounding drier areas. At the time of European settlement, Midgegooroo (Beeliar) and Munday (Beeloo) were leaders of these people. The Cannington-Wilson area was called Beeloo for many years by the local residents (SRT, 1997).

The Canning River is of particular significance to the Nyoongar people as having been created by and sacred to the Rainbow Serpent 'Waugal', a dreamtime spirit taking the form of a giant snake. The traditional Nyoongar name for the Canning River is 'Djarlgarro Beeliar', signifying a 'place of abundance', and area occupied by both tribes. (SRT, 2010). The large accumulations of shells found at bends in the river are thought to be the remnants of the Waugal's skin or scales (pers. comm. Peter Garlett, 11/12/2018).

Traditional Owners from the Whadjuk Working Party (Gary Bennell, Peter Garlett and Brendan Moore) met with the authors and City officers at Wadjup Point on 11 December 2018 to share more about the cultural heritage and Aboriginal history of the foreshore. Stories were told regarding the foreshore as part of Munday's country and a site of meeting places and campgrounds for families. Whadjuk people would move up and down the river according to season and tradition, with the foreshore an important spiritual path of movement or songline. The foreshore and river provided everything that was needed for the local Whadjuk people including food (fishing and prawning), shelter, water, medicine. Fish traps were common in the river around Shelley Rossmoyne. The local pipis (clam-like shellfish) were regularly eaten and discarded shells were likely to form part of the many of the middens found along the foreshore (including one midden noticed at a mature tree at Wadjup Point) and further upstream of Shelley Rossmoyne. Before the sand bar at Fremantle was removed, the Canning River would dry out to form mudflats and provide a source of crabs and other food associated with this type of environment. It also allowed Midgegooroo's people to walk across at Wadjup Point (and likely other places at the foreshore) to meet and trade with families north of the river.

The Traditional Owners strongly emphasised the interconnectedness of the preservation of the natural values of the foreshore and river with their cultural heritage and Aboriginal spirituality. Personal totems often given to Whadjuk people such as the eagle, frog, and turtle indicated the strength of this connection. Respect for the birds, trees and other habitat and wildlife was strongly emphasised as a way of maintaining the Aboriginal cultural heritage of the foreshore and sacredness of the area.

While Traditional Owners no longer live at the river and foreshore due to the urbanisation of the area, suggestions for supporting Traditional Owner connection to the foreshore, and educating the local public of the Aboriginal history and cultural heritage of the foreshore and river included:

- direct employment of a Whadjuk Nyoongar person by the City of Canning to become involved with the management of the foreshore
- management of the foreshore by Whadjuk Nyoongar people through the SWALSC/DBCA's Aboriginal Ranger Program
- sharing of stories and heritage through design of infrastructure (such as patterns, position of benches, fountains and signage)
- production of animated local dreamtime stories for children online and use by school groups.

Such actions reflect the goals of the City's Reflect Reconciliation Action Plan (RAP) 2018-2019, particularly Strategy 11: 'Commence the development of an Aboriginal and Torres Strait Islander employment strategy'.

The history of Wadjup Point

Wadjup Point, Credit: D Graham

Box 4

Wadjup Point is an important site to the Whadjuk Noongar people of the Canning River area. Before the sand bar in Fremantle was removed by the State Government, under the guidance of C.Y. O'Connor at the start of the 20th century the river used to dry out over the summer to form mudflats in the Shelley Rossmoyne area and surrounds. The mudflats were an important source of food (such as crabs, prawns and pipis (local clams)). Evidence of camping grounds where people used to eat seafood such as pipis is still visible today in the form of shell middens located under some of the older trees at Wadjup Point. The mudflats also allowed the two Whadjuk peoples from north and south of the river (Beeloo and Beeliar) to meet, trade, arrange marriages and undertake other customs. The local and migratory birds, trees, and other wildlife at Wadjup Point were also totems for many local Aboriginal people and still evoke the rich natural values of the foreshore which are so strongly interconnected with the sacred Aboriginal values of the wider foreshore area.

The Department of Planning, Lands and Heritage maintains a register of known Aboriginal sites, which records the places and objects of significance that the *Aboriginal Heritage Act 1972 (WA) applies to. Preservation of Aboriginal sites and objects is afforded by Section 17 of the Aboriginal Heritage Act 1972 and Regulations 6 to 10 of the Aboriginal Heritage Regulations 1974*. Two registered Aboriginal Heritage sites are located over the study area, Aboriginal Site ID 3538 – Canning River and 24319 – Wadjup (DAA, 2018)(Figure 13). Approval was obtained under *Section 18 of the Aboriginal Heritage Act 1972* to conduct foreshore restoration, water quality improvement, infrastructure maintenance and upgrades, within the Swan Canning Riverpark in May 2013. However, this approval applies to land vested with the City of Canning and thus will not apply to Unallocated Crown Land identified in section 3.1.

The 7km Wadjup to Gabbilju heritage trail was established along the Shelley Rossmoyne Foreshore (including a small section outside the study area) in 2015-16 and included the installation of interpretive signage to provide information on the cultural and environmental heritage of the area.

The City of Canning's Heritage Strategy was prepared in 2015 in order to provide a framework for heritage management in the City (CoC, 2015). In addition, the Western Australian Government, in partnership with the South West Aboriginal Land and Sea Council (SWALSC) commenced a pilot program for cultural heritage surveys to be commissioned by Western Australian Government agencies, including local governments, in the metropolitan area. This is referred to as the Aboriginal Cultural Heritage Protocol. The heritage strategy and program should both be considered as part of any future management actions within the Shelley Rossmoyne Foreshore.

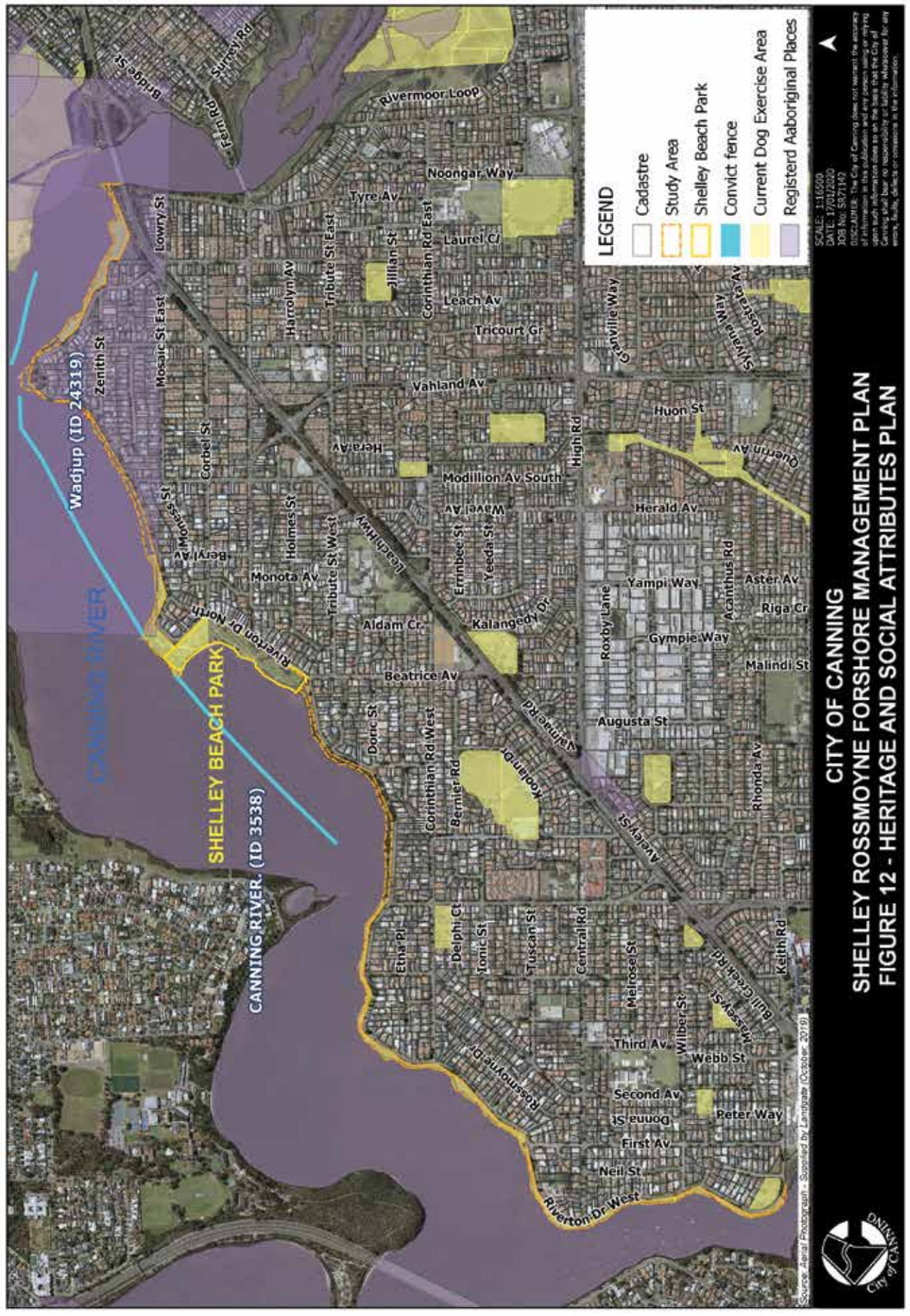


Figure 12: Heritage and social attributes plan

3.5.2 Other heritage

The Canning River is historically important because of its role as a major transport route to Perth and Fremantle from settlements along its banks. The significant heritage feature remaining in the area is the 'convict fence' (so-called because it was built by British convicts). The fence is visible in the river between Salter Point and Shelley Bridge. It has cultural heritage significance as a remnant of the convict era in Western Australia, and also a reminder of the early timber industry and river transportation system. While the convict fence no longer serves the purpose for which it was built, the spacing of the remaining posts provides a good indication of the way in which it was structured, as well as important resting posts for birds.

Wadjup Point, Credit: D Graham

The fence is believed to be part of a series of fences that were originally constructed by convict labour in 1866 to keep the navigation channel which had been excavated to enable timber to be transported down the river by barge in place. It was built from hewn jarrah piles backed by casuarina trees felled close by. The tops of the piles were originally connected by 100mm x 100mm timbers.

The convict fence is classified by the National Trust under nine categories:

- scientific / archaeological importance
- educational importance
- social importance
- historic importance
- recreational and tourist importance
- demonstration of a way of life / custom / process or function
- historical significance of development or cultural phases
- environmental importance, townscape or landscape value
- scarcity value.

Further information on the convict fence and European heritage of the foreshore and surrounding area may be found in:

- Carden FG (1991) Along the Canning - A short history of the City of Canning. 2nd Ed (City of Canning);
- Burningham, N (2003) Messing about in Earnest (Fremantle Press); and
- Hutchison, D & D Davidson (1979) The Convict-Built 'Fence' in the Canning River (Records of WA Museum 8(1) p147-159).

KEY ISSUES – HERITAGE

- Recognition of history and cultural heritage and sacred connection to the land.
- Preservation and enhancement of natural environment as connected to Aboriginal heritage.
- Traditional Owner involvement in managing foreshore.

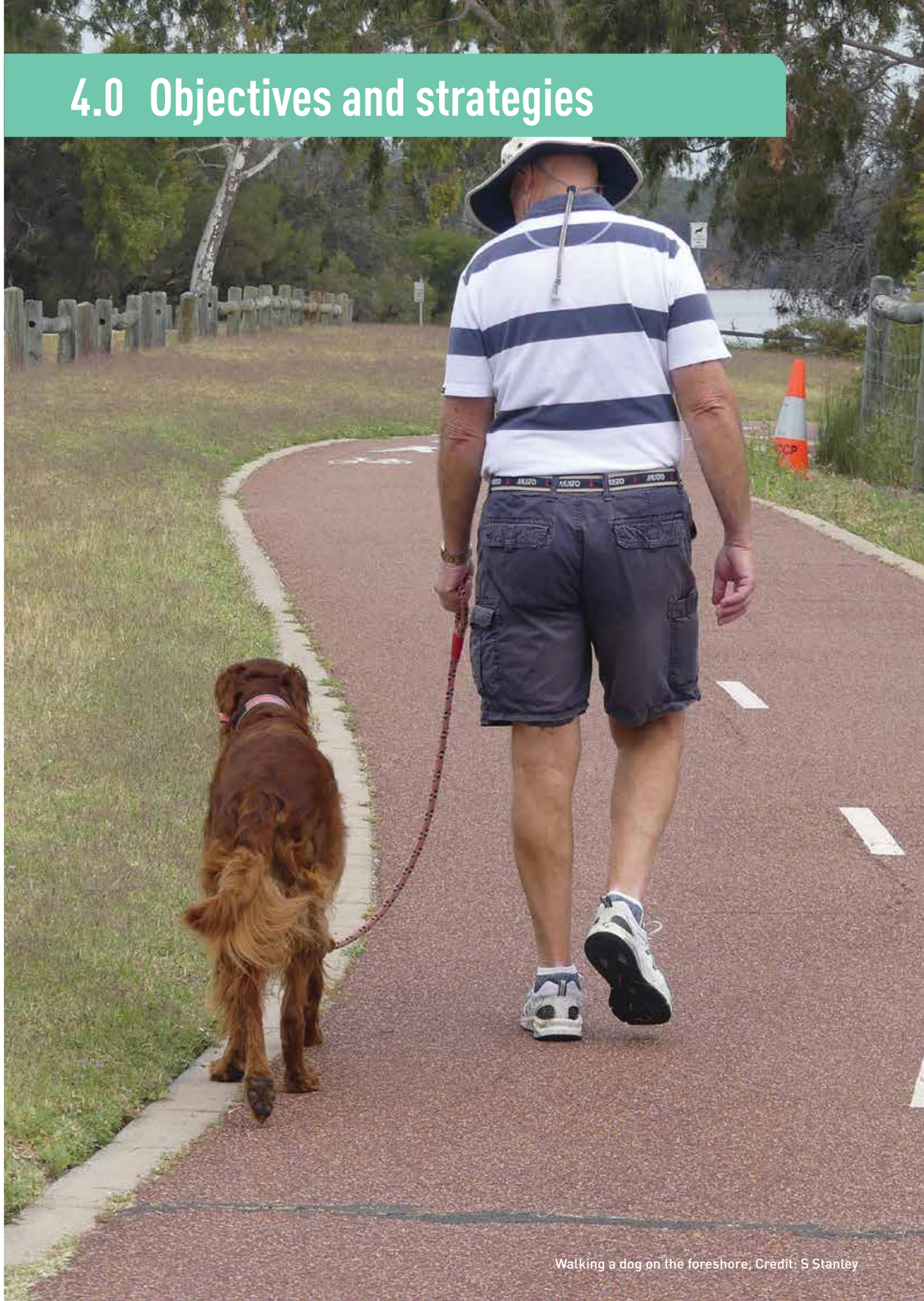
3.6 Summary of key issues

Key issues identified through the opportunities and constraints assessment and consultation process are summarised in Table 8. These issues underpin the objectives and strategies outlined in the next section.

Table 8: Key issues to be addressed by the Shelley Rossmoyne FMP

Site context	Key issues
Physical attributes	• Water quality – impact and management of stormwater discharge quality into the foreshore area • Erosion – impact on vegetation, particularly mature trees, river bank stability and infrastructure • Climate change: ▪ Drying climate – availability of fresh groundwater into the long term. ▪ Sea level rise – impact on vegetation, habitat and infrastructure, and on freshwater quality of superficial groundwater in adjacent foreshore bores.
Biological attributes	• Identification and protection of significant habitats, particularly for birds and aquatic fauna. • Maintenance of ecological linkages, natural areas and canopy cover.
Heritage	• Recognition of history and cultural heritage and sacred connection to the land. • Preservation and enhancement of natural environment as connected to Aboriginal heritage. • Traditional Owner involvement in managing the foreshore.
Social and land use attributes	• City's management of Unallocated Crown Land. • Dog exercise areas – consideration of natural environment (significant habitats) and conflict with other uses (passive recreation). • Need for additional facilities (drink fountains, shade, BBQs). • Disability access. • Vandalism of revegetated areas – need for community education & enforcement. • Long term maintenance and retrofit. • Integration with Shelley Beach Landscape Master Plan.

4.0 Objectives and strategies



Walking a dog on the foreshore, Credit: S Stanley

4.0 Objectives and Strategies

4.1 Objectives

The objectives of this Foreshore Management Plan (FMP) are to:

1. Preserve and enhance the natural environment and linkages;
2. Support and encourage local community connection and stewardship; and
3. Balance diversity of uses within carrying capacity of the foreshore

4.2 Community values

The key values of the foreshore as defined by the community are:

- natural environment (vegetation, birds, habitat) and linkages
- community spirit – picnics, events and meeting places
- recreation - low impact uses appropriate to the foreshore including:
  - peaceful places and connection with nature
  - lack of commercialisation
  - dog walking and cycling
  - family time
  - water-based activities including sailing, canoeing, sailboarding, and fishing
- personal safety
- heritage, and
- education.

Rainbow Bee-eater, Credit: B Lambe

4.3 Strategies, actions and outcomes

The following strategies and actions are proposed to meet the objectives and outcomes of the Shelley Rossmoyne FMP. The strategies that can be mapped are shown on Figures 13 to 20. Implementation of the strategies and actions is described in Section 5.

Objective 1: Preservation and enhancement of the natural environment and linkages

Outcome: Enhancement of the Shelley Rossmoyne Foreshore as a vital ecological corridor, linking the Canning Regional Park and the Bull Creek bush reserves, through the regeneration of vegetation with local (to Canning region) species to provide multi storey habitat. The FMP will establish significant habitat areas for priority protection from competing uses and address future risks of erosion, sea level rise and urban heat. Improvements will also be made to the quality of stormwater entering the foreshore where possible.

Strategy 1.1: Maintain and enhance ecological linkages

Continue to revegetate areas of the foreshore focusing on those lacking vegetation including areas highlighted by CRREPA (Table 7) and gradually replace grassed areas on the river side of the shared use path where feasible, except in identified recreation nodes. When planting trees, consider alternatives to *Casuarina obesa* and increase diversity of appropriate local, native species (consistent with preferred species list in Box 3).

a. Continue to revegetate areas of the foreshore lacking vegetation in line with the City's priorities and recommendations by CRREPA (Table 7).
b. Provide a temporary source of water (possibly via a water tank) to assist in establishment watering for revegetation sites for at least two summers.
c. Review age and health of canopy trees, particularly the *Melaleuca* sp, within the foreshore reserve and prepare and implement a succession plan for replacement to increase species diversity. Particular focus should be given to the foreshore areas lacking canopy coverage opposite 1, 51-65, 91-105, 203-205, 229-231, 311-317 and 359-363 Riverton Drive.
d. Link Rob Bruce Park to the foreshore with low to medium height native shrubs, groundcovers and herbs planted either side of the existing path that connects the park to the foreshore.
e. Continue weed control including barrier spraying and hand weeding particularly in areas of revegetation.
f. Through further community consultation and engagement of local residents, investigate the potential for closure of two portions of road reserve at Wadjup Point and Zenith Park to increase green space.

Strategy 1.2: Recognise significant habitat areas and reduce competing uses

a. Formally identify four significant habitat areas at Shelley Bridge, Wadjup Point, Beatrice Avenue and Pleasant Place through signage, fencing, and providing information on the migratory and local species that use the areas. See Box 5 for management recommendations.

Strategy 1.3: Manage erosion through ongoing observation and reactive maintenance

a. Prioritise sites and undertake necessary works as appropriate to the foreshore characteristics. This may include establishment of additional vegetation; addition of sand/organic material at the base of tree roots; use of woody debris; use of erosion control matting; fencing or installing gabion baskets, and appropriate bioengineering techniques . Sites to be investigated include:
   a. beach area opposite Tuscan Street
   b. run-off from Corinthian Road
   c. access path opposite 131 Riverton Drive
   d. beach area opposite Second Avenue and exposed drain
   e. Shelley Sailing Club beach
   f. eroded beach opposite 357 Riverton Drive
b. Continue to work with CRREPA to identify sites at risk of erosion.

Strategy 1.4: Improve water quality of stormwater flows into the River

a. Review stormwater drainage catchments and consider opportunities for retrofitting of drains to improve stormwater quality higher in the catchment.
b. Review opportunities to daylight the drains using the most appropriate method applicable to each site opposite 87 and 225 Riverton Drive, and opposite Pleasant Place (see Figure 3-16).
c. Liaise with the Water Corporation and Department of Water and Environmental Regulation's Drainage for Liveability program to scope opportunities for improvements within the Water Corporation's drainage system.
d. Continue beach grade and water quality sampling of the larger catchments to determine the need for further drainage intervention works to deliver water quality improvements.

Strategy 1.5: Consider future impacts on the foreshore resulting from climate change

a. Monitor changes in the foreshore as a result of sea level rise and plan for the ultimate retreat of significant infrastructure.
b. Extend the width of fringing vegetation along the foreshore to assist in maintaining the stability of the foreshore (refer to Table 7, section 3.4.5).
c. Identify additional locations for increased canopy cover in accordance with the City of Canning draft Urban Forest Strategy. Based upon the outcomes from community consultation, liaison with CRREPA and site visits by the authors, consideration should be given to planting trees in the foreshore opposite 75-79, 91-97, 133, 151-Second Ave, 155-161, 171-185 Riverton Drive, Rob Bruce Park, Shelley Beach Park and 1-7 Watersby Crescent (see Figure 13-16). Liaise with residents along the foreshore to elicit their support for the planting of canopy species and implement procedures for identifying and reporting vandalism including considering the use of CCTV as a deterrent.

Box 5

Managing the four identified significant habitat areas

Enhancing the connection between the community and the valuable natural areas and significant habitats along the foreshore will result in enhanced mental and physical wellbeing of visitors. The management of significant habitat areas will therefore require a careful balance between encouraging access to these areas whilst limiting the disturbance and impacts on wildlife. It is recommended that the following actions are considered for management of significant habitat areas:

- Installation of signage to provide information on migratory, threatened species and other birds which depend on these areas. Signage to emphasise the impacts people and dogs can have on the wildlife and encourage people to keep their distance.
- Dogs to be on leads within 100m of the habitat areas.

Figure 13: Strategies to deliver Objective 1: Preserving and enhancing the natural environment – Yagan to First Ave

Figure 14: Strategies to deliver Objective 1: Preserving and enhancing the natural environment – First Ave to Violet Ave

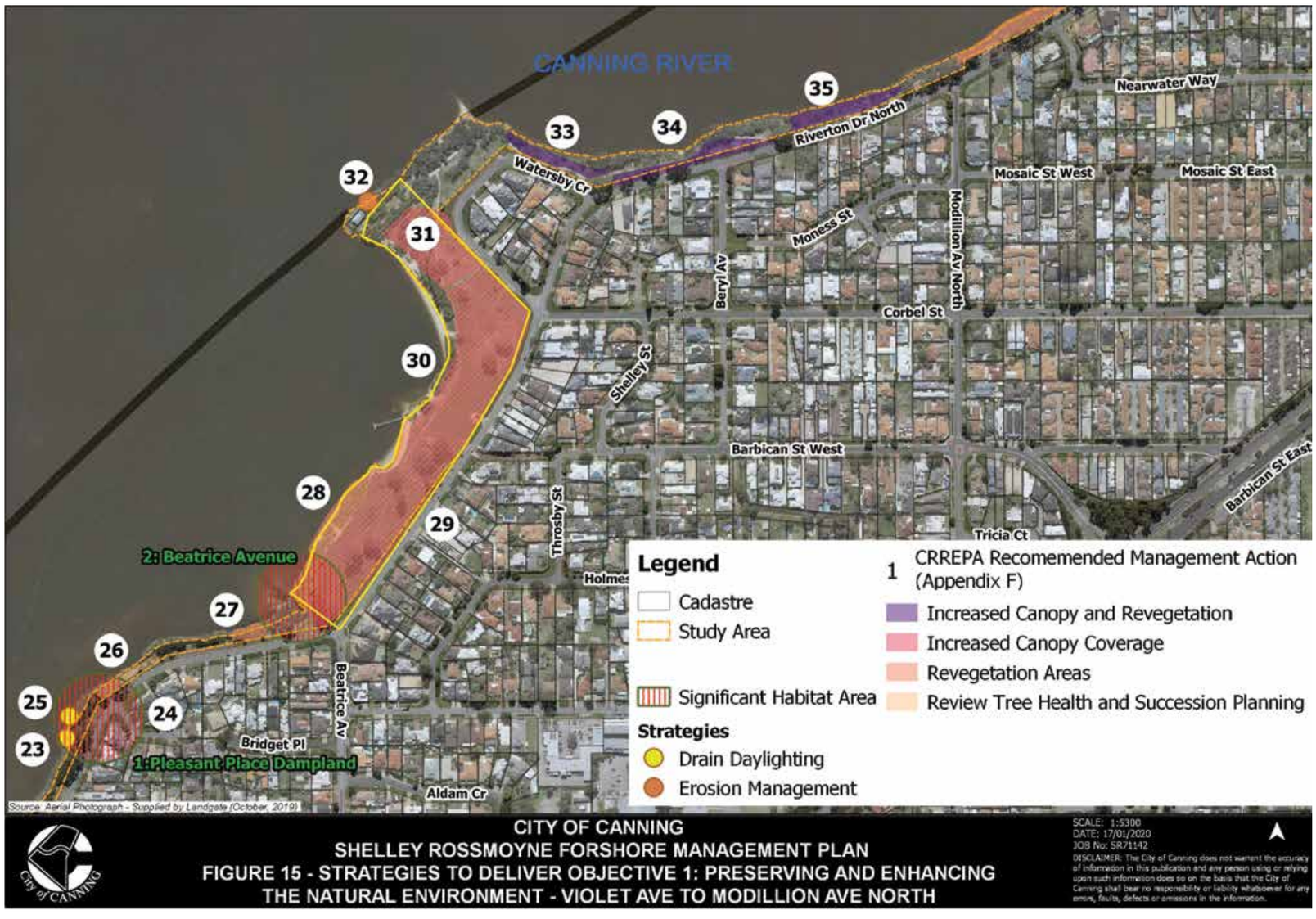


Figure 15: Strategies to deliver Objective 1: Preserving and enhancing the natural environment – Violet Ave to Modillion Ave North

Figure 16: Strategies to deliver Objective 1: Preserving and enhancing the natural environment – Modillion Ave North to Shelley Bridge

Objective 2: Supporting and encouraging local community connection and stewardship

Outcome: An engaged and informed community whose members feel a natural connection to the Shelley Rossmoyne Foreshore and who act in a manner that respects and supports the preservation of important natural, social and cultural values.

Strategy 2.1: Increase community education and facilitate improved visitor behaviour including participation in restoration and maintenance activities

a. Reduce signage on posts and replace unenforceable signage with symbols painted on the shared use path to enhance wayfinding, appropriate for the culturally diverse population (see Appendix D).

b. Prepare a guidance document for City of Canning Rangers which includes natural and cultural history, as well as preferred visitor behaviours (including dog control on and off lead, sustainable fishing and no littering), how to help maintain good water quality, and how to encourage personal, positive contact between Rangers and visitors.

c. Incorporate the Shelley Rossmoyne Foreshore into the City of Canning visitor app showing points of interest, facilities, history, event information, podcasts etc.

d. Encourage visits to the foreshore by school groups and provide information on the values of the foreshore, revegetation activities, and the water cycle (including water quality management) from the Water Sensitive Cities program.

e. Encourage walking tours which provide information on foreshore values, wildlife, revegetation, water quality management, European Heritage and Aboriginal Heritage. Preference would be for a Whadjuk tour guide.

Strategy 2.2: Improve knowledge of Aboriginal and heritage values of the foreshore

a. Maintain the signage for the Wadjup to Gabbilju interpretive trail.

b. Improve online information on the City's website and improve linkages to other sources of heritage information.

c. Incorporate Aboriginal heritage information into events and regular activities along the foreshore.

d. Liaise with the Department of Biodiversity, Conservation and Attractions regarding ranger training program and South West Aboriginal Land and Sea Council (SWALSC) regarding the potential employment of Whadjuk Nyoongar person by the City of Canning to assist in the management of the reserve and surrounding area.

Objective 2: Supporting and encouraging local community connection and stewardship

Outcome: Provide for an appropriate level of recreation along the foreshore, recognising the limitations resulting from the narrow reserve width in many places, supported by a range of facilities and amenity that encourages shared and sustainable use by the community.

Strategy 3.1: Provide appropriate facilities to support passive recreation activities

a. Install exercise equipment at various locations along the length of the foreshore reserve in appropriate locations.

b. Install recycling bins at Shelley Beach Park and additional locations for dog waste bins/bags (consider biodegradable bags) (Figures 17–20.)

c. Install barbeques at Wadjup Point (south of Riverton Drive), Creekview Park, and near Tuscan Street shelter.

d. Provide picnic spots (tables and shelters) at Prisoners Point.

e. Install additional drink fountains (Figures 17-20) with dog bowls and hose connections. This may require negotiation with the Water Corporation regarding the number of mains water connections allowed per lot.

f. Consider transforming Creekview Park and/or the park at Park Beach Close into a fenced dog exercise area with additional parking. Revise the adjacent foreshore areas in these locations to be "dog on lead" areas to protect significant habitat areas and provide safety due to narrow foreshore. Retain existing dog on leash and dog exercise areas until fenced dog parks are established.

g. Continue to support the 'Reel it In' campaign and install additional fishing line disposal bins where possible (Figures 17-20). Install rod holders on each jetty and fishing platform to improve useability of the jetties as fishing locations.

h. Assess the adequacy of watercraft launching areas.

Strategy 3.2: Increase the shade along the foreshore and in Shelley Beach Park

a. Increase shade along the foreshore and throughout Shelley Beach Park. Although it is recognised that shade sails may be appropriate over playground areas, the preference is for the planting of canopy trees that still provide visual access to the river (see Strategy 1.5c), as well as habitat for birds, insects, lizards and geckos.

b. Install additional shade structures (Figures 18-21).

Strategy 3.3: Appropriately control access to and through the foreshore

a. Retain current level of formal access to the water and discourage creation of new access pathways through vegetation by blocking with vegetation, woody debris or fencing.

b. Undertake an audit of the key facilities along the foreshore for disability access and respond to the recommendations. This should include the jetties and fishing platforms, the playground area in Rossmoyne between Tuscan Street and Corinthian Road, Wadjup Point and Shelley Beach Park as a minimum. Include consideration for the provision of recharge points for wheelchairs, scooters and gophers.

c. Provide a small number of additional car bays, ensuring they are not located adjacent to significant habitat areas. Priority locations should include close to the jetties and fishing platforms, beaches, picnic spots and playgrounds. Include provision for unloading kayaks near beaches (wider spaces) and for larger City maintenance vehicles.

d. City to consider appropriate processes, such as a Local Law, to better control inappropriate access and use from personal water craft such as jet skis.

Strategy 3.4: Schedule and undertake regular maintenance and asset renewal activities

a. Consider changing the vesting of the reserve to "Foreshore Purposes" and contact the Department of Planning, Lands and Heritage to resolve the management responsibilities and vesting of the strip of foreshore that is vacant crown land.

b. Undertake turf management based on weather and soils analysis, including reductions in fertiliser and herbicides where possible.

c. Ensure management of assets in accordance with the City of Canning asset management plan.

d. Continue to support community involvement in restoration activities.

White-faced Heron chicks, Credit: C Keating

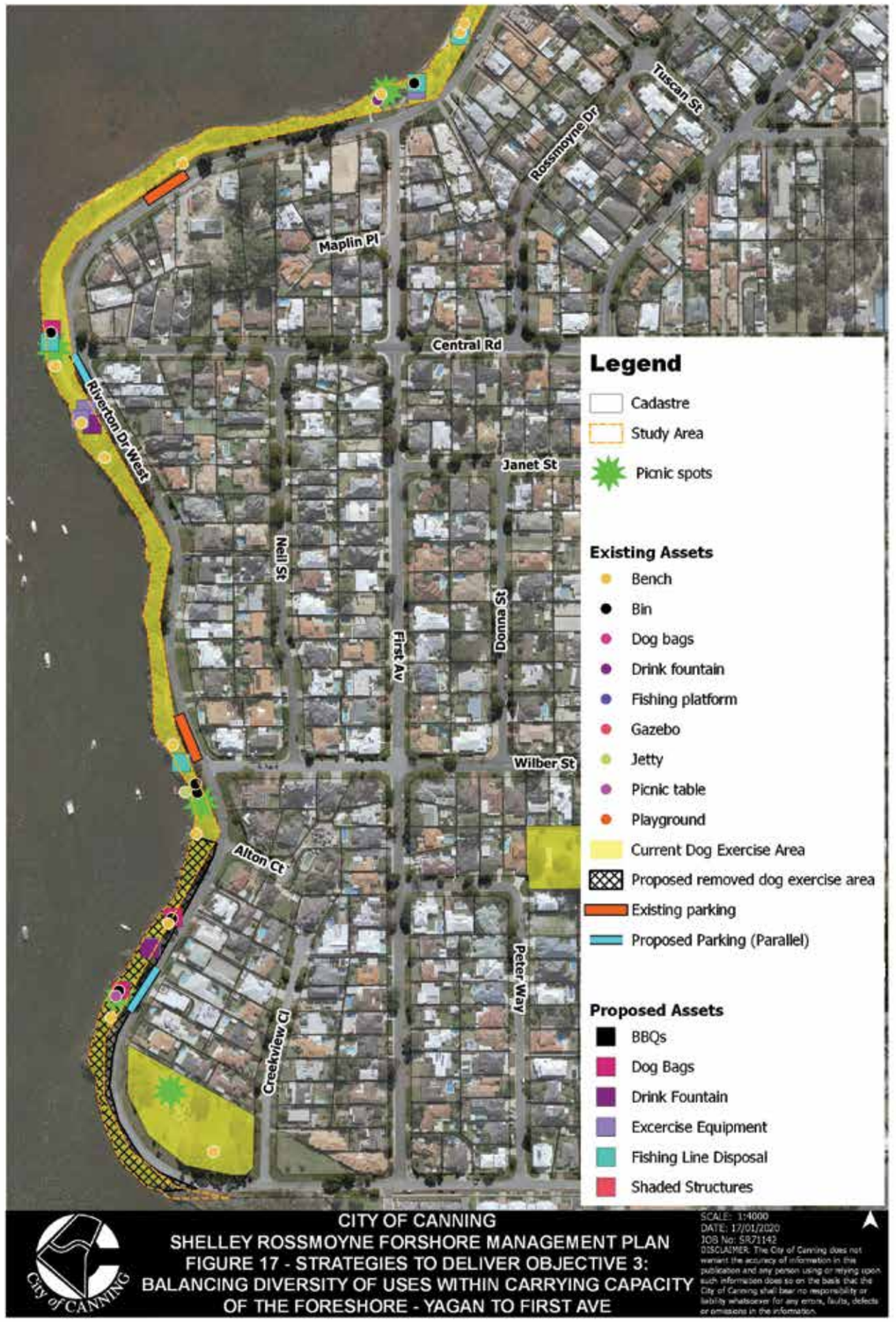


Figure 17: Strategies to deliver Objective 3: Balancing diversity of uses within carrying capacity of the foreshore – Yagan to First Ave

Figure 18: Strategies to deliver Objective 3: Balancing diversity of uses within carrying capacity of the foreshore – First Ave to Violet Ave

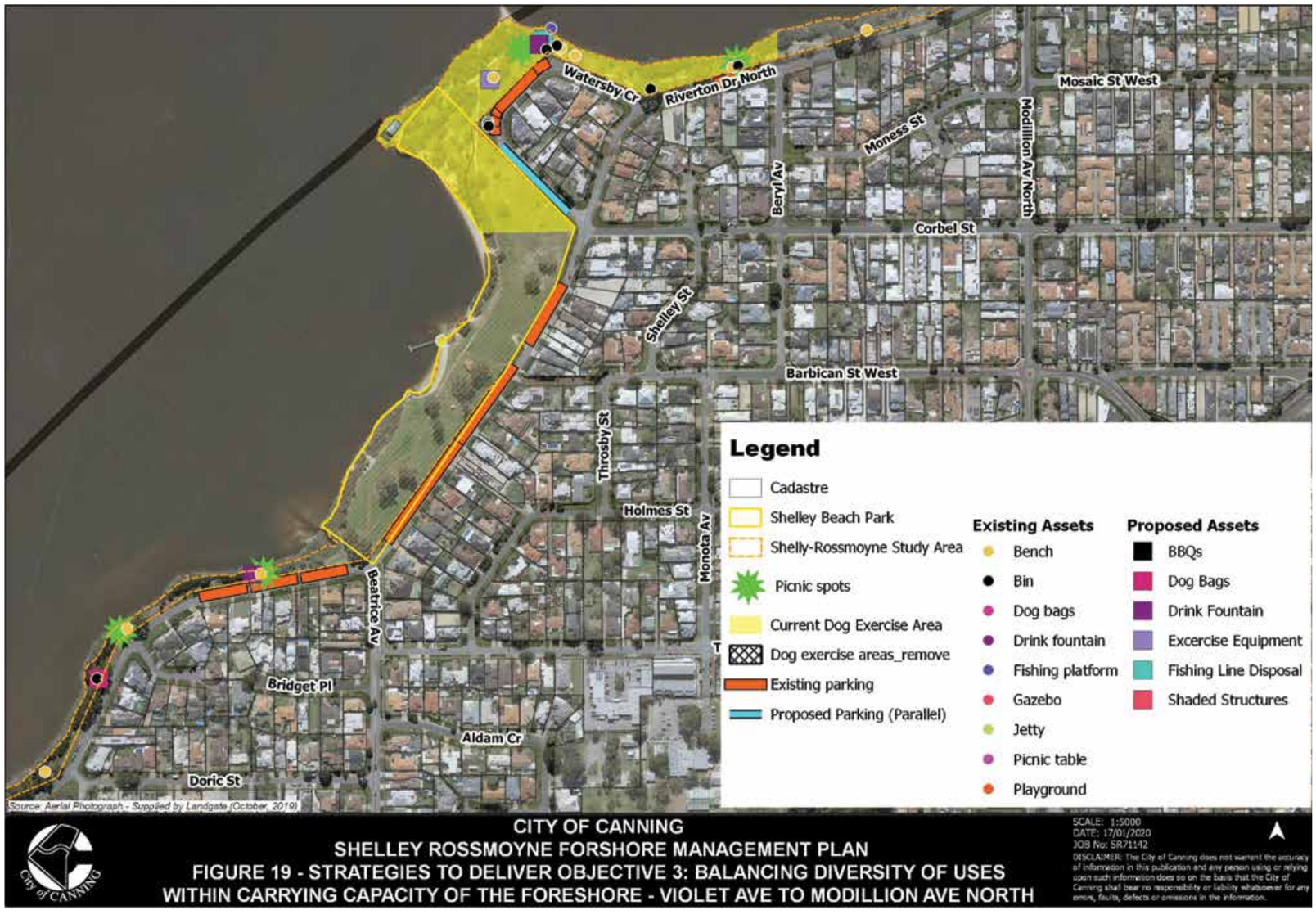


Figure 19: Strategies to deliver Objective 3: Balancing diversity of uses within carrying capacity of the foreshore – Violet Ave to Modillion Ave North

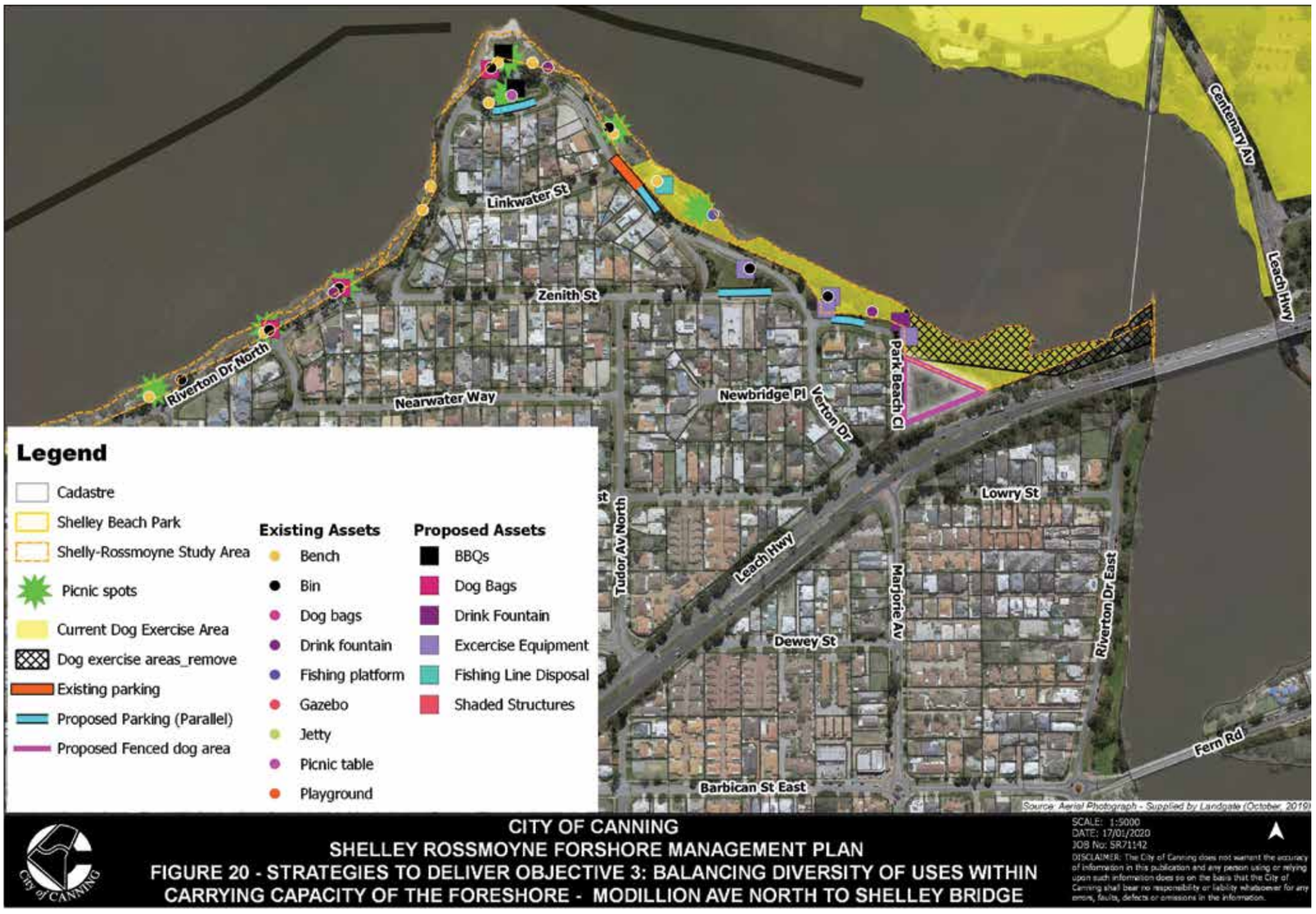


Figure 20: Strategies to deliver Objective 3: Balancing diversity of uses within carrying capacity of the foreshore – Modillion Ave North to Shelly Bridge

5.0 Implementation

Osprey. Credit: B Lambe

5.0 Implementation

The recommended actions defined in the implementation plan have been developed over a process of ongoing consultation with the community and the City of Canning. Actions are proposed to achieve the objectives of the FMP. A timeframe and level of priority is proposed for each action. Responsibility for implementation of each action is allocated to a specific business unit within the City, which will be required to consider the relevant action in setting its annual budget and providing input into the Integrated Planning Framework.

The timeframe reflects the suggested timeframe in which the action should be implemented while the priority reflects the importance of the action in contributing to the overall aim of the FMP. The priority and timeframe should be considered together; actions which are of low priority but have a short timeframe may represent some early achievements in the FMP's implementation. Actions that are of high priority may require a long timeframe due to the complexity of the action. These identified timeframes and priority levels should be considered indicative only and should not hinder an action of low priority or long term timeframe being undertaken if an opportunity should arise.

Tables 9 and 10 provide guidance on timeframes and priority of actions in Table 11.

Table 9: Key to timeframe

Timeframe	Actions to be completed
Short term	• 2019/20 – 2020/21 - within Annual Budget or Corporate Business Plan 2018-2021.
Medium term	• 2021/22 – 2023/24 - within Corporate Business Plan 2018-2021.
Long term	• 2024/25 – 2029/30 - within Long Term Financial Plan.
Ongoing	• To occur through operations and absorbed in normal operational budget.

Table 10: Key to priority designation

Timeframe	Actions to be completed
High	• Of high importance, needs a strong proactive approach, opportunities should be created.
Medium	• Of medium importance, opportunities should be sought out.
Low	• Of low importance, opportunities should be undertaken as they arise.

Australasian Darter female, Credit: B Lambe

Table 11: Implementation framework

Action[1]		Responsibility / Key stakeholder	Indicative budget	Timing	Priority
#	Objective 1: Preservation and enhancement of the natural environment and linkages				
a	Continue to revegetate areas of the foreshore lacking vegetation in line with the City's priorities and recommendations by CRREPA (Table 7).	City of Canning and external stakeholder	$50,000 /year over five years	Ongoing	High
1.1b	Provide a temporary source of water to assist in establishment watering for revegetation sites for at least 2 summers.	City of Canning	$2,000	Short term	High
1.1c	Review age and health of canopy trees, particularly the Melaleucas, within the foreshore reserve and prepare and implement a succession plan for replacement to increase species diversity. Particular focus should be given to the foreshore area opposite 1, 51-65, 91-105, 203-205, 229-231, 311-317 & 359-363 Riverton Drive.	City of Canning	$250,0002	Long term	Medium
1.1d	Link Rob Bruce Park to the foreshore with low height native shrubs, groundcovers and herbs planted either side of the existing path that connects the park to the foreshore.	City of Canning	$5,0001	Medium term	Medium
1.1e	Continue weed control including barrier spraying and hand weeding particularly in areas of revegetation.	City of Canning	Existing	Ongoing	High
1.1f	Through further community consultation and engagement of local residents, investigate the potential for closure of two portions of road reserves at Wadjup Point and Zenith Park to increase green space.	City of Canning	$25,000-$50,000	Medium term	Low
1.2a	Formally identify four significant habitat areas at Shelley Bridge, Wadjup Point, Beatrice Avenue and Pleasant Place through signage, fencing, and providing information on the migratory and local species that use the areas. See Box 5 for specific management recommendations.	City of Canning	$6,000	Short term	High
1.3a	Prioritise sites for management of erosion and undertake works appropriate to the foreshore characteristics. Sites to be investigated include: • beach area opposite Tuscan St • run-off from Corinthian Road • access path opposite 131 Riverton Dr • beach area opposite Second Avenue and exposed drain • Shelley Sailing Club beach • eroded beach opposite 357 Riverton Dr	City of Canning and external stakeholder	$55,0001	Short term	High
1.3b	Continue to work with CRREPA to identify sites at risk of erosion.	City of Canning	Operational	Ongoing	High

[1] Many allocations will have ongoing implications for maintenance and / or asset renewal
[2] From Rawlinsons

Action[1]		Responsibility / Key stakeholder	Indicative budget	Timing	Priority
1.4a	Review stormwater drainage catchments and consider opportunities for retrofitting of drains to improve stormwater quality higher in the catchment.	City of Canning	Operational	Medium term	Medium
1.4b	Review opportunities to daylight the drains (using the most appropriate method) opposite 87 and 225 Riverton Drive, and opposite Pleasant Place.	City of Canning	$32,0001	Medium term	Medium
1.4c	Liaise with the Water Corporation and Department of Water and Environmental Regulation's Drainage for Liveability program to scope opportunities for improvements within the Water Corporation's drainage system.	City of Canning	Operational	Medium term	Low
1.4d	Continue beach grade and water quality sampling of the larger catchments to determine the need for further drainage intervention works to deliver water quality improvements.	City of Canning	$25,000[3]	Long term	Low
1.5a	Monitor changes in foreshore as a result of sea level rise and plan for the ultimate retreat of significant infrastructure.	City of Canning	Operational	Ongoing	Medium
1.5b	Extend the width of fringing vegetation along the foreshore to assist in maintaining the stability of the foreshore (as per Table 7, section 3.4.5).	City of Canning and external stake-holder	Operational	Ongoing	Medium
1.5c	Identify additional locations for increased canopy cover in accordance with the City of Canning draft Urban Forest Strategy. Based upon the outcomes from community consultation, liaison with CRREPA and site visits by the authors, consideration should be given to planting trees in the foreshore opposite 75-79, 91-97, 133, 151-Second Ave, 155-161, 171-185 Riverton Drive, Rob Bruce Park, Shelley Beach Park and 1-7 Watersby Crescent (see Figure 14 - Figure 17). Liaise with residents along the foreshore to facilitate their support for the planting of canopy species and implement procedures for identifying and reporting vandalism including considering the use of CCTV as a deterrent.	City of Canning	$10,000[4]	Medium term	Low
#	Objective 2: Supporting and encouraging local community connection and stewardship				
2.1a	Reduce signage on posts and replace unenforceable signage with symbols painted on the shared use path to enhance wayfinding, appropriate for the culturally diverse population.	City of Canning	$1000 plus operational	Medium term	Low
2.1b	Prepare a guidance document for City of Canning Rangers which includes natural and cultural history, as well as preferred visitor behaviours (including no littering and sustainable fishing), how to help maintain good water quality, and encourage personal, positive contact between Rangers and visitors.	City of Canning	Operational	Medium term	Medium

[3] Estimated for 15 sites (drains), 6 samples for nutrients only
[4] Estimated from City of Vincent CCTV Strategy and City of Armadale tree costs

Action [1]		Responsibility / Key stakeholder	Indicative budget	Timing	Priority
2.1c	Incorporate the Shelley Rossmoyne Foreshore into the City of Canning visitor app showing points of interest, facilities, history, event information, podcasts etc.	City of Canning	Operational	Medium term	Low
2.1d	Encourage visits to the foreshore by school group programs and provide information on the values of the foreshore, revegetation activities, and water cycle (including water quality management) from the Water Sensitive Cities program.	City of Canning	Operational	Medium term	Medium
2.1e	Encourage walking tours which provide information on foreshore values, wildlife, revegetation, European Heritage and Aboriginal Heritage. Preference would be for a Whadjuk tour guide.	City of Canning	Operational	Medium term	Low
2.2a	Maintain the signage for the Wadjup to Gabbilju interpretive trail.	City of Canning and external stake-holder	Operational	Ongoing	Medium
2.2b	Improve online information on the City's website and improve linkages to other sources of heritage information.	City of Canning	Operational	Medium term	Medium
2.2c	Incorporate Aboriginal heritage information into events and regular activities along the foreshore.	City of Canning	Operational	Medium term	Medium
2.2d	Liaise with the Department of Biodiversity, Conservation and Attractions regarding ranger training program and South West Aboriginal Land and Sea Council (SWALSC) regarding potential employment of Whadjuk Nyoongar person by the City of Canning to assist in the management of the reserve and surrounding areas.	City of Canning	$100,000pa	Medium term	Medium
#	Objective 3: Balancing diversity of uses within carrying capacity of the foreshore				
3.1a	Install exercise equipment along the length of the foreshore reserve in appropriate locations.	City of Canning	$4,000/piece	Medium term	High
3.1b	Install recycling bins at Shelley Beach Park, and additional locations for dog waste bins/bags (consider biodegradable bags)	City of Canning	$1,400/bin	Medium term	High
3.1c	Install barbeques at Wadjup Point (south of Riverton Drive), Creekview Park, and near Tuscan Street shelter.	City of Canning	$5,000/BBQ	Medium term	Medium
3.1d	Provide picnic spots (tables and shelters) at Prisoners Point.	City of Canning	$2,500/table, $10,000/shelter	Long	Low
3.1e	Install additional drink fountains with dog bowls and hose connections..	City of Canning	$3,000/fountain	Medium term	High

[5] Average price for a Space fit for parks range
[6] Steel/aluminium frame with 80L bin

Action [1]		Responsibility / Key stakeholder	Indicative budget	Timing	Priority
3.1f	Review existing dog on leash and dog exercise areas and consider transforming Creekview Park and/or the park at Park Beach Close into a fenced dog exercise area with additional parking.	City of Canning	$70,000 (fencing only)	Medium term	Medium
3.1g	Continue to support the 'Reel it In' campaign and install additional fishing line disposal bins where possible. Install Rod holders on each jetty to improve useability of the jetties as fishing locations.	City of Canning	$3,000	Medium term	Low
3.1h	Assess the adequacy of watercraft launching facilities.	City of Canning	Operational	Long term	Low
3.2a	Consider options for increased shade along the foreshore and throughout Shelley Beach Park. Although it is recognised that shade sails may be appropriate over playground areas, the preference is for the planting of canopy trees that still provide visual access to the river (see Strategy 1.5).	City of Canning	Operational	Short term	High
3.2b	Install additional shade structures at Creekview Park and Shelley Beach Park	City of Canning	$10,000/shade structure	Medium term	Low
3.3a	Retain current level of formal access to the water and act to discourage creation of new access pathways through vegetation by blocking with vegetation, woody debris and/or fencing.	City of Canning	Operational	Ongoing	High
3.3b	Undertake an audit of the key facilities along the foreshore for disability access and respond to the recommendations. This should include the jetties and fishing platforms, Wadjup Point, the Rossmoyne playground area and Shelley Beach Park as a minimum. Include consideration for the provision of recharge points for wheelchairs, scooters and gofers.	City of Canning	Operational	Medium	High
3.3c	Provide a small number of additional car bays, ensuring they are not located adjacent to significant habitat areas. Priority locations should include close to the jetties, picnic spots and playgrounds. Include provision for unloading kayaks (wider spaces), and for larger City maintenance vehicles.	City of Canning	$75,000 (for ~54 m)	Medium	Medium
3.3d	City to consider appropriate processes, such as a Local Law, to better control inappropriate access and use from personal water craft such as jet skis.	City of Canning	Operational	Short term	High
3.4a	Consider changing the vesting of the reserve to "Foreshore Purposes" and contact the Department of Planning, Lands and Heritage to resolve the management responsibilities and vesting of the strip of foreshore that is vacant crown land.	City of Canning	Operational	Short term	High

Action[1]		Responsibility / Key stakeholder	Indicative budget	Timing	Priority
3.4b	Undertake turf management based on weather and soils analysis and including reductions in fertiliser and herbicides where possible.	City of Canning	Operational	Ongoing	High
3.4c	Ensure management of assets in accordance with the City of Canning asset management plan.	City of Canning	Operational	Ongoing	High
3.4d	Continue to support community involvement in restoration activities through provision of funding, coordination and delivery of management activities and actions. This includes scheduling regular meetings and providing support for the activities of CRREPA and the Wadjup-Gabbilju project.	City of Canning	Operational	Ongoing	High

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Australasian Darter, Credit: B Lambe.

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Appendices

Bull Creek, Rossmoyne, Credit: D Matthews

Appendix A – Community Survey Responses

A community survey "Help us plan the future of the Shelley Rossmoyne Foreshore" was undertaken as part of the community engagement process for helping the City of Canning preparing a revised plan for the future. The online survey is from 15th October to 3rd December in 2018.

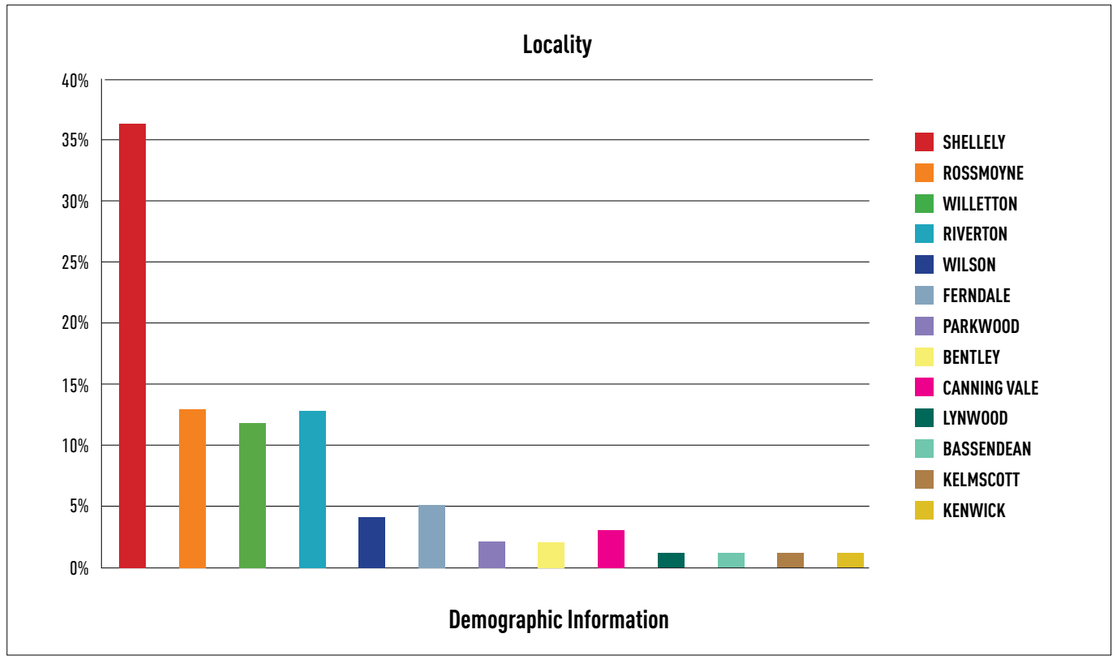
Nine (9) questions were included (in addition to demographic and workshop attendance queries) in order to determine community thoughts on key issues for the future use and management of the Shelley Rossmoyne foreshore. These were:

1. Are you a resident of the City of Canning?
2. Have you visited the Shelley Rossmoyne foreshore area in the last year?
3. How often do you visit the foreshore?
4. How do you travel to the foreshore?
5. What activity(s) did you do?
6. What do you like about the foreshore area?
7. Did you experience any of the following issues?
8. What would you like to see at the foreshore in the future?
9. Which issues do you feel should be addressed by the foreshore management plan as a priority?

A total of **102 responses** were received.

Approximately 59% of respondents were female and 33% were male. 1% of respondents were aged between 14-17, 30% were aged between 26-45, 44% were aged 46-65 and 20% were aged over 65 years old.

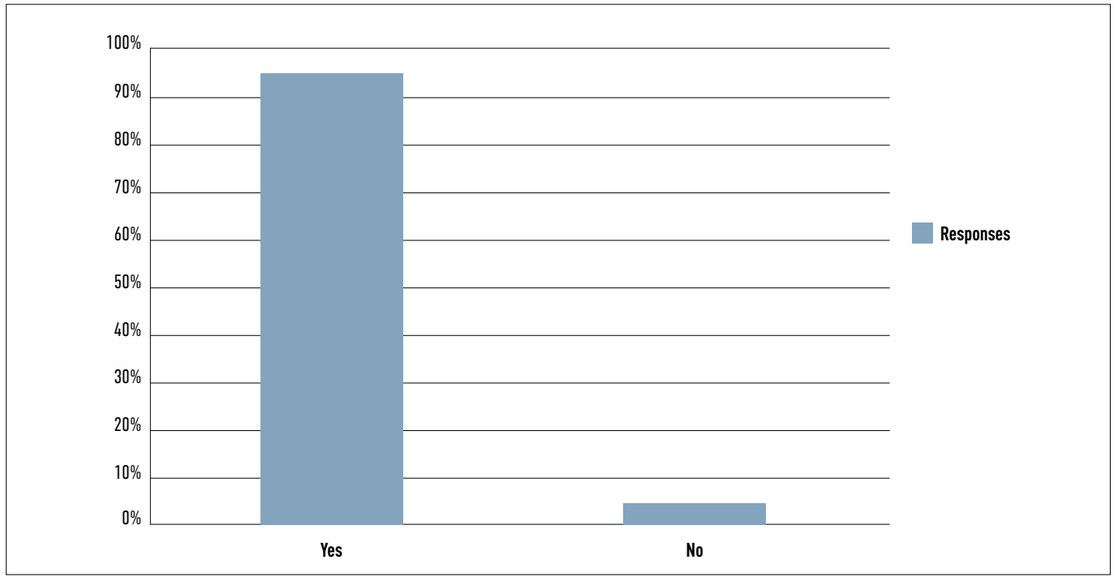
The majority of respondents were from SHELLEY (36%) followed by ROSSMOYNE (13%) and RIVERTON (13%).



A summary of community survey results are presented below.

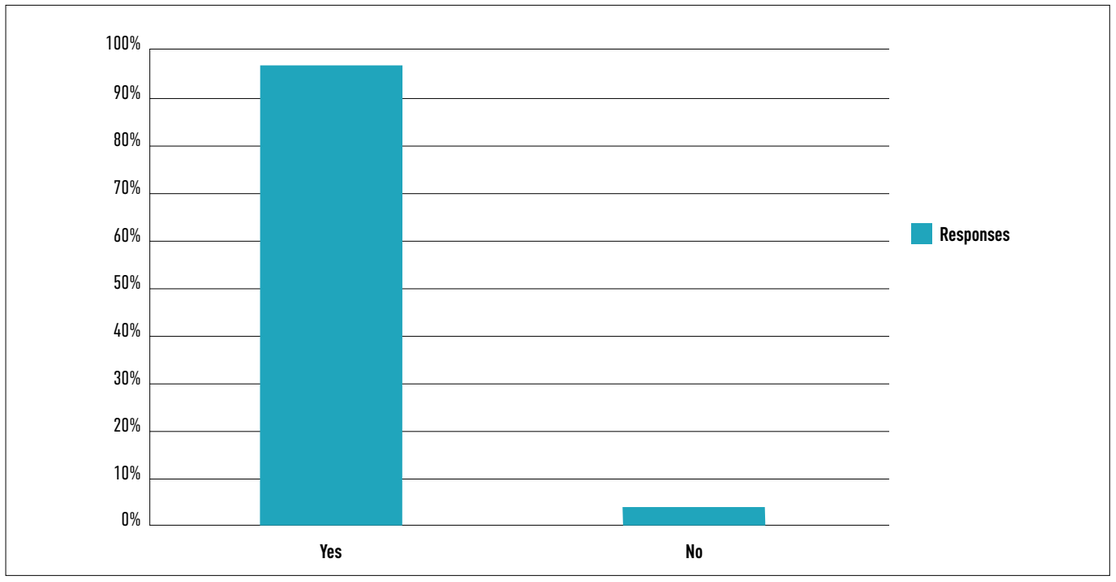
Question 1: Are you a resident of the City of Canning?

Answer Choices	Responses	
Yes	95%	97
No	5%	5
	Answered	**102**



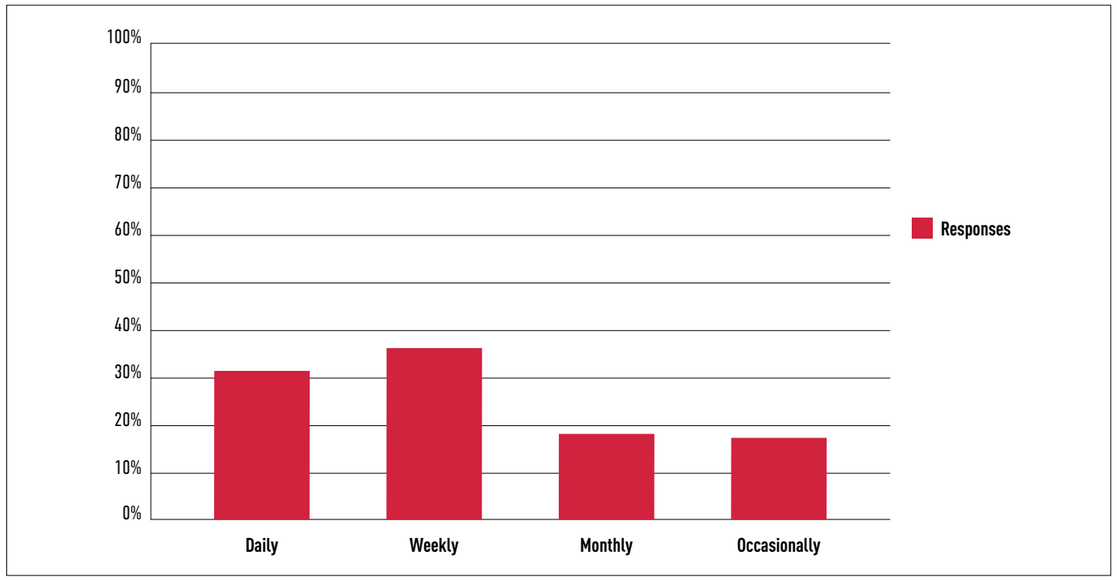
Question 2: Have you visited the Shelley Rossmoyne foreshore area in the last year?

Answer Choices	Responses	
Yes	97%	97
No	3%	5
	Answered	**102**



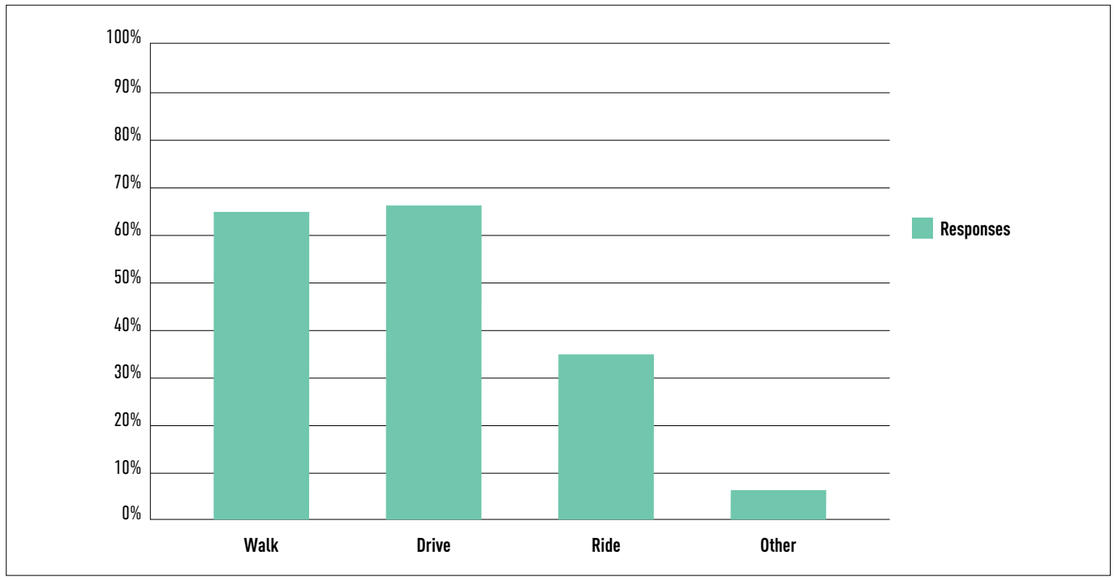
Question 3: How often do you visit the foreshore?

Answer Choices	Responses	
Yes	31%	32
No	36%	37
Monthly	18%	18
Occasionally	17%	17
	Answered	**102**



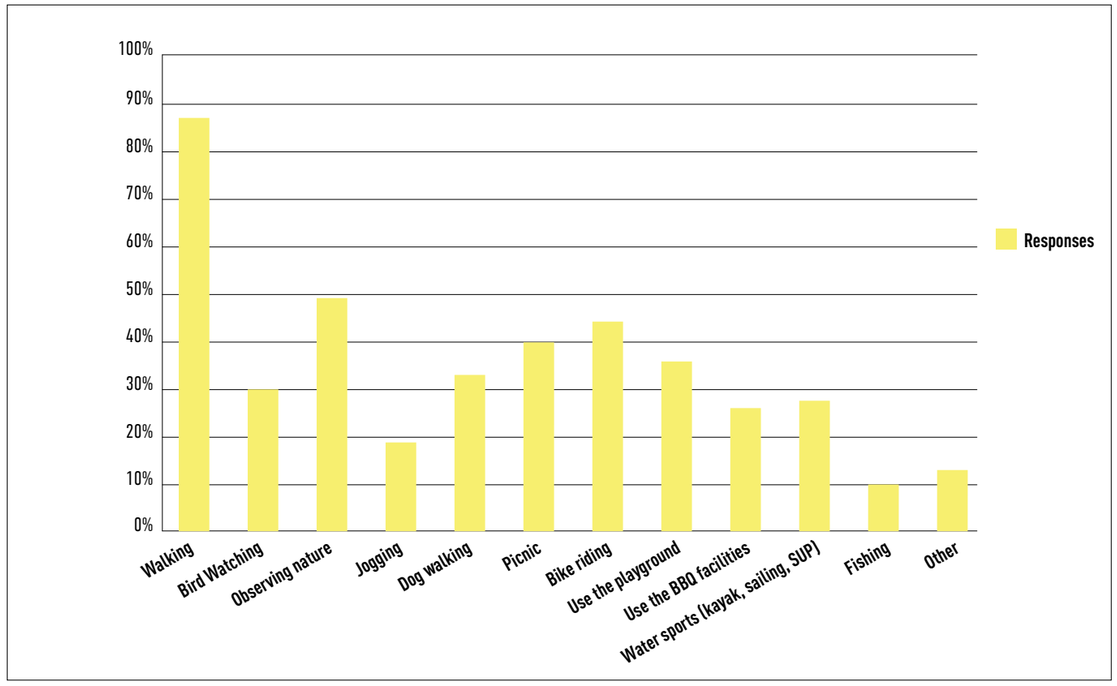
Question 4: How do you travel to the foreshore? (Please tick all that apply)

Answer Choices	Responses	
Walk	65%	66
Drive	66%	67
Ride	35%	36
Other	3%	3
	Answered	**102**



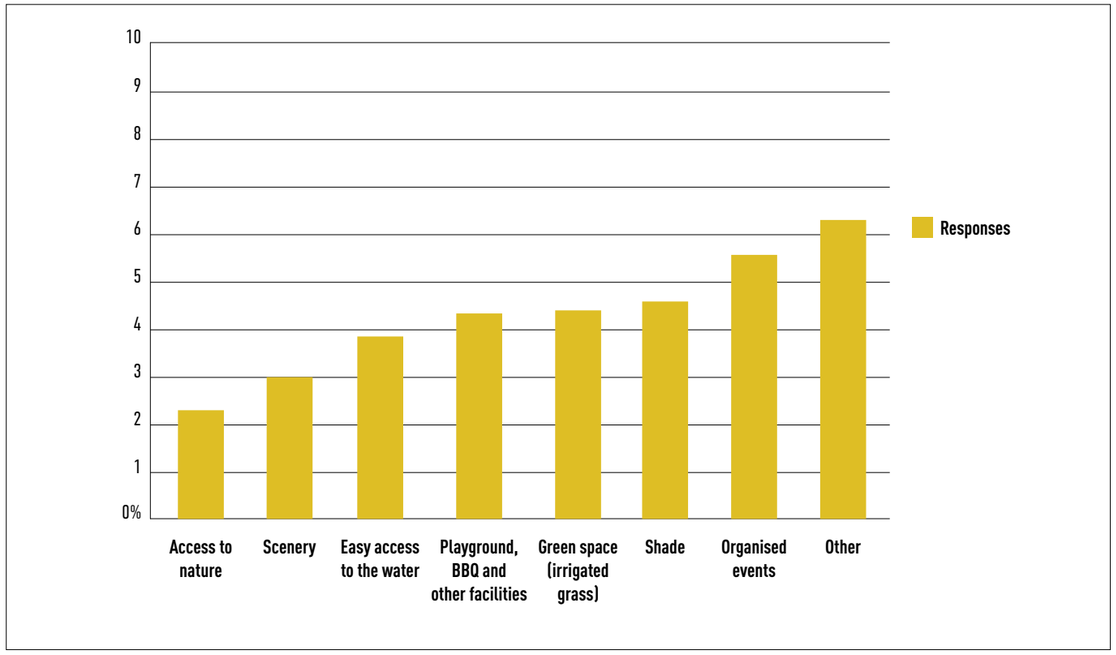
Question 5: What activity(s) did you do? (Please tick all that apply)

Answer Choices	Responses	
Walking	87%	89
Bird Watching	30%	31
Observing nature	49%	50
Jogging	19%	19
Dog walking	33%	34
Picnic	40%	40
Bike riding	44%	45
Use the playground	36%	37
Use the BBQ facilities	26%	27
Water sports (kayak, sailing, SUP)	27%	28
Fishing	10%	10
Other	13%	13
	Answered	**102**



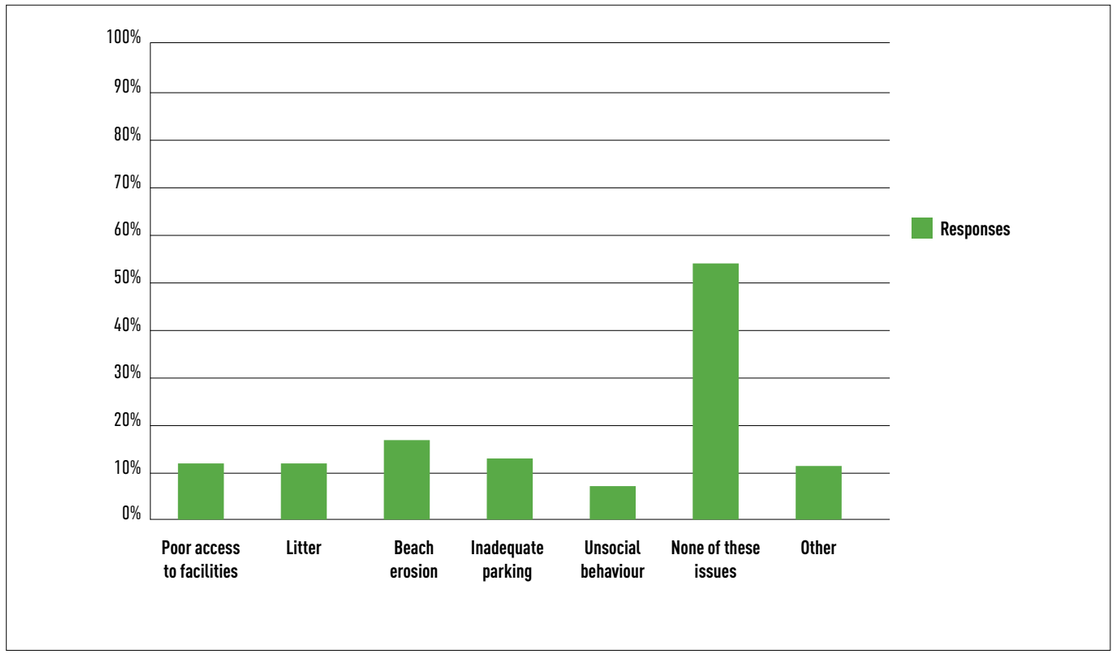
Question 6: What do you like about the foreshore area? (Please rank from highest (1) to lowest (9)

Answer Choices	Score
Access to nature	2.26
Scenery	3
Easy access to the water	3.95
Playground, BBQ and other facilities	4.42
Green space (irrigated grass)	4.47
Shade	4.6
Organised events	5.56
Other	6.27
Answered	**102**



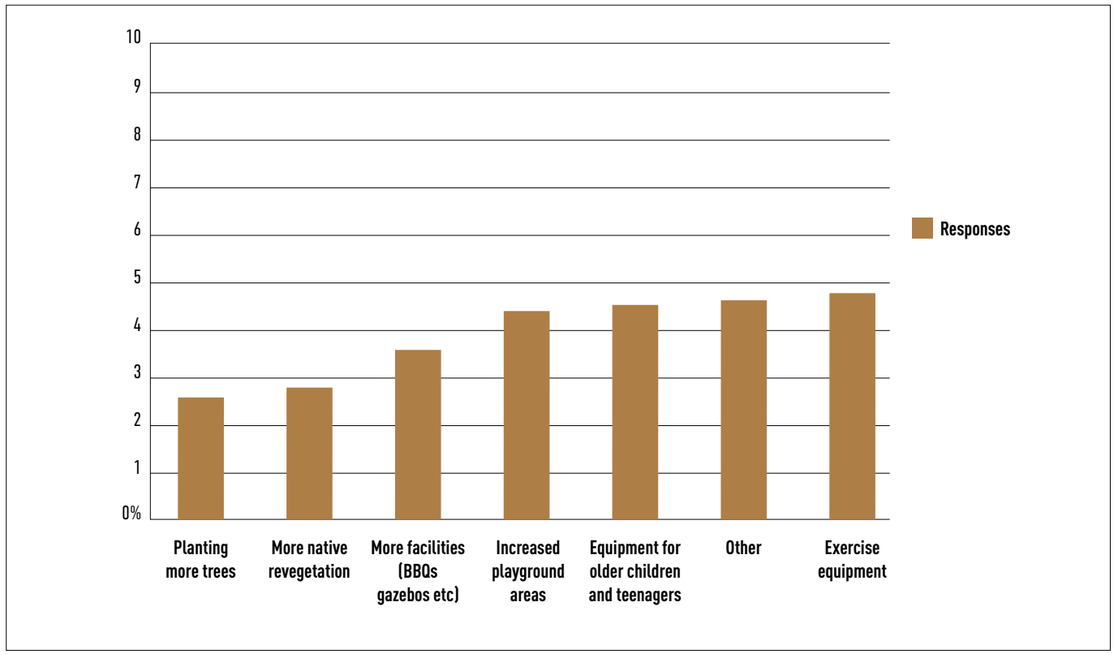
Question 7: Did you experience any of the following issues? (Please tick all that apply)

Answer Choices	Responses	
Poor access to facilities	12%	12
Litter	12%	12
Beach erosion	17%	17
Inadequate parking	13%	13
Unsocial behaviour	7%	7
None of these issues	54%	55
Other	11%	11
	Answered	**102**



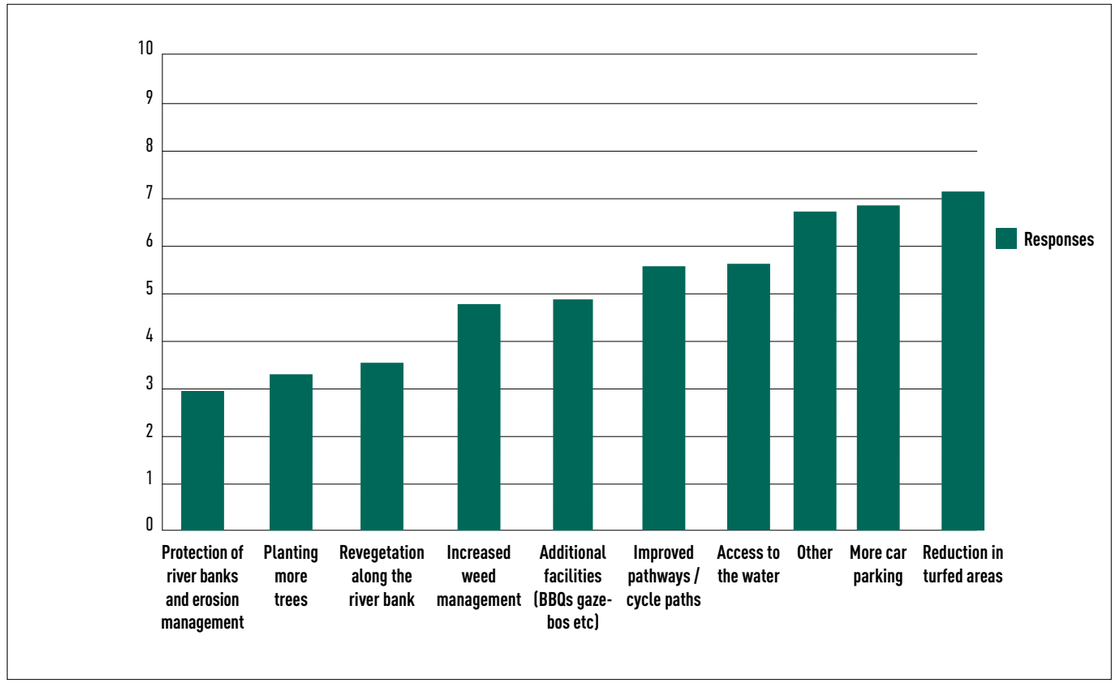
Question 8: What would you like to see at the foreshore in the future? (Please rank from highest (1) to lowest (10)

Answer Choices	Score
Planting more trees	2.63
More native revegetation	2.88
More facilities (BBQs gazebos etc)	3.52
Increased playground areas	4.28
Equipment for older children and teenagers	4.4
Other	4.48
Exercise equipment	4.54
Answered	**102**



Question 9: Which issues do you feel should be addressed by the foreshore management plan as a priority? (Please rank from highest (1) to lowest (11)

Answer Choices	Score
Protection of river banks and erosion management	2.94
Planting more trees	3.25
Revegetation along the river bank	3.65
Increased weed management	4.83
Additional facilities (BBQs gazebos etc)	4.89
Improved pathways / cycle paths	5.63
Access to the water	5.65
Other	6.79
More car parking	6.92
Reduction in turfed areas	7.11
Answered	**102**



See attachment for comments on what other issues are high priorities

Comments from Question 6: What do you like about the foreshore area?

- Dog friendly for swimming my fur baby.
- Peaceful. Well maintained. Great work by local community groups in preserving and protecting.
- The cycle path, and thinking about the history of the area. Plus the lack of high-rise and that it is quiet and residential. Apart from the horrendous multistorey building going up next to Bull Creek/Yagan Park, such an eyesore and not in keeping with any other building in Shelley or Rossmoyne. By water access I mean to sit next to, kayak or sail in and for kids to play in. I don't want increased power boats, jetskis or fishing, that are noisy and bad for the environment.
- Cafes to have coffee while enjoying, friendly vibe, dogs are allowed off the lead, access right on the water.
- The tranquillity of the area, yet so close to the city - watching life, people on the water, walking dogs, enjoying nature. It is such a lovely area - especially quiet mornings.
- Area has a sense of community about it.
- That it isn't commercialized with coffee shops or kiosks etc. It is a free activity the family can enjoy. Good dog zone.
- I like the dog area.
- That we don't have a huge cafe and car park on our foreshore. We are very happy that we have a large, beautiful open space for everyone to enjoy.
- It's proximity to my place.
- Lovely open areas to take the grandkids out for the day. Beautiful spot to have a picnic.
- It's beauty and that it doesn't have a busy cafe. It's more of a retreat.
- I would like a cafe or food facility put in place.
- Beautiful scenery. Easy parking. Close to home.
- The younger kids like to walk out to the edge of the little jetty. The big kids and grown ups like being able to play cricket. The playground, toilets and drink fountain are all essentials...
- There's not a lot of traffic and what there is is local and usually slow moving which enhances the peaceful nature of the foreshore and allows serious cyclists to ride on the road rather than the path.
- Seeing so many community members using it.
- It's closeness to residences and easy accessibility.
- My earliest childhood memories date back to the 1970's and are of the Shelley foreshore. Today I still enjoy spending recreational times with my children, at the swings, swimming, flying a kite or walking our dog, just as I did as a child. It remains an unspoilt nature park, and should remain that way for future generations to enjoy. With all of Perth's modern pace and progress it is a pleasure for family's to be able to enjoy the Canning River exactly as generations before have done. Please leave it alone. Many thanks.
- Triathlon, running, and cycling training.
- Meeting friends
- Big gathering space for parties and picnics. Great bike path.
- Cafeterias not a dome though. Something like Lo Quay café.
- I love the peacefulness of walking by the river, watching the birds and thinkiing my own thoughts. I also enjoy seeing other people enjoying the area, either walking, playing with their dogs or children, cycling or playing games. .As i walk every morning I also enjoy seeing the same people and having a chat so this adds to my social capital. Without the river and my daily walk I would be a much more stressed and unhealthy individual. I would also like other people to enjoy the area as much as I do so don't want to be selfish but don't make too many changes. Just a little more shade would suit me fine.
- It's Natural State, undeveloped. Easily Accessible by all except the connection to canning regional park down Sureey Road.
- It is in my local area so it is a great place for us as a family, and for our children on their own, to meet up with other people in our community and from outside the community.
- Helps people relax and take time out form their usual lives. Allows families to spend time away from home in big open spaces.
- Very few places in the world are as beautiful as the Shelley Foreshore. It is a place where community comes together, friends meet and dogs get to play together. If you are lucky you get to see the dolphins playing in the water.
- Peace and quiet away from heavy traffic a place to meditate and enjoy the natural surroundings without external noise except the laughter of children enjoying the open space to run around and be kids in a safe place.
- A pleasant open space.
- Because it is natural and unspoilt.
- Ability to walk and ride without dealing with cars.
- Safe to walk there in the day and early evening.
- Limited number of buildings. Walking./biking trails.

- Birds.
- I grew up in Shelley and moved back into the area as an adult because I love having access to the beautiful natural environment of the foreshore. We were members of the Shelley Sailing Club and my parents still are. We love sailing and kayaking in the river, watching the wildlife all around us. I love this part of the river so much I had my wedding ceremony on the lawn by the sailing club. We love to ride and walk around the river. My son loves the playground and to fish off the jetty. It's an awesome place to spend time relaxing with friends and family. There are so many things we love about the foreshore just the way it is! Finally, it is an awesome place for family events. We've been to the New Years Day fireworks every year for as long as I can remember. Thank you for putting on such a great event for the community.
- Open to everyone. The footpath is generally wide and flat. There are quite a few water fountains.
- Hang out with friends.
- Lots of space for family.
- The area always feels safe and civil. I've seen very little litter or evidence of anti-social behaviour.
- Peaceful.
- Space.
- I love the view as I walk, I love seeing people enjoy themselves.
- Views.
- Peaceful and quiet surroundings. No Bikes or organised bike riders who spoil the area for all.
- It is nice that there is no café or shops.
- I feel very fortunate to live in an area that has access to suck a beautiful natural, relaxing space in the middle of the suburbs. It is a great meeting place for family and friend catch ups. I love exercising along the river.
- I like that my dog can exercise off the lead. I like that there is plenty of room for everyone to pursue a range of activities.
- Calm, space for everyone, tap for dogs to drink, different views.
- Friendliness, connection with other people - both those you know in community as well as passers by. You meet them as you walk, ride, picnic, play and or volunteer.
- It's natural and no car parks or cafes.
- Natural areas and birds.
- The vibe.
- Sitting and reading. Visiting the play swings with my grandchildren.
- I love seeing a lot of people walking, cycling. families together enjoying picnics. People kayaking. The water birds such as swans, pelicans and ducks are a pleasure to have around. We are so lucky.
- Ability to photograph the migratory birds.
- Being able to meet other people who enjoy nature, chatting to people who also enjoy visiting the foreshore.
- Freedom from crowds.
- The open space and walk along the shore.
- Opportunity to walk around in a natural environment without having any commercial business, such as a cafe or any shop. It is a natural place and let us try to keep it that way. There are lots of commercial places available in nearby places (within less than 1km distance), hence, we should keep the foreshore as it is, NICE and NATURAL, WITH ANY BUSINESS ACTIVITY.
- Generally quiet, enjoy the surroundings, having a picnic.
- My dog loves to swim in the river. the thrill of seeing the dolphins swim by.
- River view.
- Love the open space that our family can use and the beach where the dogs can wander in the water on lead.
- Openness just to enjoy sit and listen to nothing. But birdsong.
- The openness of the spaces so that families can enjoy playing cricket, soccer, fly a kite etc; I like their are NO commercial businesses and therefore it is a peaceful and safe area.
- Open space. Minimal cars. Not built up or gentrified.
- This is our closest natural area that is visited by a great variety of bush and water birds that forage, nest, rest in the foreshore vegetation. While the remnant vegetation line is narrow you can still get in among the melaleucas and sedges and get a real sense of not being in a city. This is the critical vegetation which must be expanded to provide an ecological corridor between Canning Regional Park and the Bull Creek reserves.
- The new landscaping at Wadjup point is excellent.
- The meandering cycleways and links into Melville City and beyond.
- Taking my dog for a walk.
- It is just beautiful. so relaxing.
- Unspoiled beauty and open space.

Comments from Question 7: What other issues did you experience?

- Not enough shade over children's play area.
- Dogs off leash in on leash areas where owners, even when told, didn't care, dogs chasing water birds. Owners not picking up after dogs and/or disposing of feces by throwing the bags into vegetation. Fishing lines and hooks being left on the beaches. Trail bikes being ridden on foot path. Quad bike being ridden on grassed area. Dumping of garden refuse in the sedges. Poisoning and stealing of foreshore vegetation. People not using dedicated paths to get to the water, dragging boats over the vegetation. Damage to historical trail signs from leaning bikes, dog chains etc.
- Sometimes the toilets aren't very clean. It would be nice to have more bbqs and picnic tables and seats.
- Lack of toilets especially at bbq/ picnic/ playground area nearest to leach hwy.
- Trampling of riverine vegetation by thoughtless people.
- Inadequate activation. Doesn't all have to be landscaped could bring a lot back to natural state.
- Just enjoyed the beauty.
- Fishermen leaving hooks and blowfish on Jettys and river banks is my biggest complaint!!! Not good for dogs or little kids !!
- The playground is very boring. The toilet block needs upgrading. I have had problems with sharing between bikes, pedestrians and dogs at times, but generally it's paradise.
- A complete lack of a social meeting place. We desperately need a café. How wonderful is Lo Quay in Riverton as a meeting place. Where is the social centre in Rossmoyne-Shelley? We are loosing out as a community.
- Some people not adhering to signs of keeping their large dogs on leash in areas.
- Broken bbqs not enough shade not big enough playground.
- No facilities (except toilets and bbq) for adults such as a cafe. Lovely play area for kids but nothing for adults..
- Shelley Beach is the kind of area where you would like to spend more time as there is a lot for the kids to do and explore. Only, there is a lack of shade. Especially since we have a baby in tow. Suburban kids don't always see much of the outdoors. So some more shade would help us be more comfortable and to stay and enjoy all there is to experience longer...
- There is a slight litter problem but it's actually not too bad. I suspect that's because people who use the foreshore clean up other people's messes (eg dog poop and other rubbish).
- The rudenes of dog owners who don't think that their dogs should be on a leash in the dog leash areas. I often have dogs jumping at me and as a non-dog owner, this bothers me.
- Lack of availability of some sort of coffee or food.
- Excessive noise, and poor driving behaviours.
- No gazebos.
- Local motorists not adhering to the speed limit & stopping properly at STOP signs.
- There is not a lot of shade in summer. It is good to see that more trees are being planted.
- Unuseable public space. There is a large grassed section which is pretty much unused (other than as a carpark) and unuseable - between the ablution block and the dog exercise area near the dog beach. You are not allowed to exercise your dog there, there is almost no shade, the grass is prickly and not kept the same way as the other side of the ablution block, it is known as Shelley's biggest carpark because it is used for parking for the sailing club, Parkrun, fireworks and other public events. It is wasted and should be better utilised. Other than that I have not experienced anything negative in the area the council does a great job and the visitors are very respectful of the area.
- Dogs not under control when bike riding on the cycle path.
- Inadequate trees or shade cover in some areas.
- Meeting other people.
- Playground is very old and is in desperate need of a revamp and made bigger. Seagulls are a annoyance as scavenging food.
- Not enough BBQs or shaded tables to sit at. Cafe would be nice.
- Crowds.
- Large groups of bike riders who use the area for large groups runs and spoil the peace and quiet of the area as well as turn the area into some race meet which does not suit the area.
- Just some issues with cyclists not ringing bells when passing pedestrians or cycling too fast on path when there are a lot of people about. Otherwise no issues. It is clean and well maintained.
- Prickles in the grass especially the weird wasteland that doubles as a carpark.
- Dogs off leads in wrong areas.
- People and dogs disturbing (sometimes chasing) birds and dolphins. Fisher folk trampling sedges as well as digging them up for access to baby mussels as bait. Environmental vandalism via poisoning or cutting down of trees and shrubs on foreshore.

Comments about Question 8: What else would you like to see at the foreshore in the future?

- Café.
- Exclusion of dogs from foreshore except in limited designated locations.
- MOST DEFINITELY A CAFE without question.
- I love taking part in the activities along the foreshore. Fireworks, concerts. I would love to take part in Tai Chi on the Riverton foreshore if it was there.
- Dedicated bird watching platforms to stop people walking through the foreshore vegetation.
- More regular maintenance of existing facilities e.g. Toilets.
- An open air cafe with shaded seating which could serve light luncheons.
- More bench seats.
- More shade and better parking.
- Other= more toilets.
- A cafe or restaurant.
- Would like to see it like it used to be in the 70s with more reeds and swans and ducks.
- Would like the foreshore to remain as close to natural as possible.
- All remaining storm water pipes be replaced by "living streams" or bubbleup discharges with filtering plants.
- Attraction based activity like south PERTH with ferry access, cafes and kiosk like Riverton bridge.
- Café.
- A cafe.
- More drinking fountains on pathways.
- A cafe would be nice to catch up with friends.
- I would love to see a pedestrian/cyclist bridge across the river at Fifth Avenue, to better link to the other side of the river and city access, with minimal environmental impact.
- A kiosk cafe or bar.
- Cafe at Shelley beach.
- As mentioned above Rossmoyne-Shelley needs a social centre and a cafe would meet this need. The Yayht Club corner would be ideal. There is plenty of space for parking and it is away from housing. I am aware that there are coffee cafes in Rossmoyne and Shelley which are well patrinised and would not have their trade affected. Please allow the wider community be denied this amenty in an ideal environment. for the complaining few.
- No Commercialization of large car parks.
- Drinking fountain near Shelley sailing club corner. More shelters.
- Café.
- Not many changes- Keep the foreshore as it is. Perhaps greener grass for the kids to plan on- too many prickles at the moment.
- Cafe/restaurant.
- Keeping it natural and restoring the native flora. Increasing awareness of water quality and how to help keep the river healthy.
- As mentioned previously a café.
- A place to relax with family and friends such as a cafe/restaurant. At present there are no such facilities for visitors to sit and enjoy the beautiful surroundings. No refreshments are available at all. This would encourage more people to visit and stay longer.
- By more facilities I am thinking of gazebos. Specifically a few big gazebos with undercover tables so we can better plan and host birthday parties without fearing that all our food will get rained on. I don't know of any playgrounds in our area with a rainproof gazebo. Except the tiny one near the LoQuay Café.
- Restaurant with full dinner service. The water views should be capitalised on & able to be shared with those who want/ require the comfort of sitting indoors with proper facilities. Also jobs are created and a business brings security to the area / discourages loitering.
- My other option would be off-lead dog areas and my facilities would be water fountains for dogs as well as people.
- A coffee shop.
- Neither of the above. its being cared for and maintained nicely, my family love it just the way it is thank you, but please continue to maintain. Thank you.
- CAFE would be wonderful along there for all to enjoy and have somewhere peaceful amd beautiful to look out at.
- Cafeteria like Lo Quay.
- Nothing really.
- Additional Toilets around Rossmoyne towards bullcreek.

Comments about Question 8: What else would you like to see at the foreshore in the future?

- A cafe which is open 7 days a week which serves breakfast and lunch, and dinner if not every night then at least some nights. In keeping with the surrounding natural environment and dog friendly, like Canning River Cafe and Lo Quay, or with separate areas for dog and non-dog customers. Which allows patrons to visit and watch their children on or near a playground, and open space. I would also like to see improved use of the public space to the west of the ablution block.
- A cafe similar to Lo Quay or Canning River Cafe would be a strong attraction to couples, friends, families to spend time outdoors for a snack or meal. This would also attract people (Tourists) into the City of Canning.
- I would love to see a coffee shop/cafe built like the one near old Shelley Bridge. That one is always so full you cannot get a seat.
- Natural parkland where all people can enjoy with out the inclusion of commerical entities except for the special event times of the year.
- A coffee shop / restaurant at Shelley.
- left alone as it is and no commercialisation what so ever.
- Play/excercise equipment for disabled.
- Tall trees.
- An extra water fountain in Rossmoyne towards Bull Creek.
- A café.
- Café.
- Café.
- A sail over the childrens playground and increased playground area.
- Café.
- More seating and tranquil areas for people to stop and unwind.. I don't mean cafes or resturants. Just nice areas to stop and unwind and enjoy the views..
- More walking trails.
- A fence around a shaded playground.
- Cafe! Other than a cafe I think it is perfect, perhaps a shade sail for the playground. You don't want to clutter it up too much.
- It would be nice to have some sort of kiosk/cafe in that area.
- A cafe overlooking the water.
- Cafe & Restaurant.
- OTHER: (2) Living stream/lake from main drain at Shelley Beach Park such that a large lake with an island for birds to rest as well as seges etc to filter the water before it enters the Canning River.
- OTHER (2) Protection of Grecian's Spit, Wadjup Point and Shelley Bridge Wetland as high conservation value areas.
- OTHER (8) Fenced dog off lead exercise area in triangle at Park Beach Close.
- A cafe similar to the one at Riverton Bridge to allow people who don't live on the river to enjoy the surrounds while enjoying a snack or meal. Landscaping like that at Riverton Bridge would improve the area.

Comments about Question 9: Which issues do you feel should be addressed by the foreshore management plan as a priority?

- Prickles are at an all time high :(. More bitumen rather than concrete for a more comfortable running and walking surface.
- Mosquitos and flies are a big issue, at the forshore and at home.
- The cyclists need to learn to single file!!!!
- Cafe at the sailing club point as detailed above.
- Speed bumps on the road to reduce speeds of motorcycles / cars and bicyclists.
- Tranquillity of the place
- No Commercialisation of the foreshore. We do not want or need a cafe/car park near the river. There are not many open spaces where families can enjoy spending time together. Please don't turn our beautiful foreshore into development like Deep Water Point. Please consider our future generations. Thank you.
- Cafe or kiosk facility.
- Leave as open space! Please do not put in a coffee shop and carpark as it will destroy the lovely environment. We love the foreshore as it is!! Please do small improvements not big developments.
- Cafe/ restaurant.
- Refreshment facility. This may require additional parking facility if popular.
- I can see that there may be times where extra parking is needed but it would be a shame to lose any of that precious open grass space. I'm also just going to take this opportunity to mention that the LoQuay Cafe grassed area has a terrible problem with ants. The very viscious and painful variety. I now rarely go there for that very reason.

- Restaurants are required.
- Increased space for dogs.
- Coffee shop.
- Café.
- Cafeteria.
- I was not able to choose all the options from 1 to 11 for all issues. Is there a problem with your survey or is it designed in this way? If it is the former, my responses are not valid. Also there is a spelling error with "imporoved" pathways.
- Keeping it as it is. No Further Development.
- Co-existence of healthy natural environment with development of cafe and the addition of recreational equipment which is appealing to more age-groups particularly older children and teenagers and for the aged in our community all of whom are quite forgotten in the current foreshore footprint.
- Attracting visiting and local people into the area to spend time. Constructing a cafe/kiosk and not making buildings more than one storey high to keep the visual impact to a minimum.
- Keeping the integrity of the area with no high rise development
- Maintaining the open space and play area. Traffic management on the special events day/nights to ensure non congestion of traffic. This is usually dealt with fairly well but the parking on the verges and footpaths make it dangerous for pedestrians to manage the walk safely.
- A coffee shop /restaurant at Shelley.
- Maintaining the grassed areas could be improved.
- Keeping the area natural, beautiful, environmentally friendly and professional reducing building.
- More community concerts.
- A café.
- Lights for night time safety.
- More trees and native vegetation. Cafe in the bush.
- A cafe near the park would be welcome.
- Cafe needed.
- Reduce large group bike riders who use the area as a sporting and racing facility.
- Safe car parking and traffic management.
- Build a cafe and restaurant overlooking the river.
- NOTE: I tried to make this No 1 priority, but couldn't rearrange voting. Protection of Grecian's Spit, Wadjup Point and Shelley Bridge Wetland as high conservation value areas.
- Exclusion of dogs from foreshore to protect wildlife.
- CAFE, Sail shades over play equip,more BBQs,tables etc.
- Better signage (preferable on footpath for designated dog on/off leash areas).More patrols (initially educational) to show people how to be more responsible and community minded so everyone can enjoy the foreshore.
- An open air cafe with shaded seating which could serve light luncheons.
- Better control of pets.
- Toilets.
- A cafe.... please!
- To keep the natural landscape as much as possible and to prevent any commercialisation of the beautiful and natural Shelley / Rossmoyne foreshore.
- Waste management. Recycling.
- Protection of native vegetation including the sedge banks, ground covers, shrubs and trees from incidental or deliberate damage by people, dogs and boats. This will require certain areas to be fenced permanently, eg around the sedgebank near Beatrice Avenue or temporarily when new areas are being revegetated.
- The removal of the large storm water pipe under the jetty at Shelley Beach and the development of an attractive filtration swale with native plants.
- Tourism attraction.
- Make sure they do not spoil the natural beauty by building a coffee shop.
- Cafe/restaurant.

Appendix B – Community Workshop Summaries

SHELLEY-ROSSMOYNE FORESHORE MANAGEMENT PLAN

COMMUNITY WORKSHOP #1: VALUES AND OPPORTUNITIES

When: Tuesday 13th November 2018

Time: 6.30pm – 8.30pm

Where: Canning River Eco Education Centre (CREEC) - corner Kent Street and Queens Park Road, Wilson

Welcome, project background & workshop objectives

The welcome was provided by Mary Ross, Manager Natural Area Management and Conservation from the City of Canning. Mary acknowledged the traditional owners and provided some project background, noting that the review of the Shelley Rossmoyne Foreshore Management Plan 2001 - 2006 (City of Canning, 2001) aimed to:

- guide the future use & development of the foreshore to ensure the long-term preservation of ecological, cultural and social values;
- respond to recent & relevant issues such as recreational use, urban heat, water quality, population increase & climate change; and
- respond to latest State and Local government strategic goals, policy & legislation.

Mary noted that the Shelley Beach Park is one section in the Shelley Rossmoyne Foreshore but that it was not included as part of Shelley Rossmoyne Foreshore Management Plan review – a separate project & consultation process is occurring which will result in preparation of a masterplan for the park. This foreshore management plan will guide management practices at Shelley Beach Park but not identify the locations of any new facilities.

The objectives of the workshop were noted as:

- To identify important community values and opportunities associated with the Shelley Rossmoyne foreshore
- To inform preparation of the revised Shelley Rossmoyne Foreshore Management Plan

Characteristics of the Shelley Rossmoyne foreshore

The following characteristics of the Shelley Rossmoyne Foreshore were briefly described:

- 6.8 km of foreshore of the Dyarlgarro Beeliar (Canning River), spanning Yagan Reserve wetland – Shelley Bridge
- Bounded by Riverton Drive West, Riverton Drive North and Watersby Crescent
- Ribbon of land up to 30 m wide at most
- MRS Zoning: Class C Recreation, vested in the City of Canning
- Flat to gently sloping floodplain, originally wetland
- Filled in the early 1960's by dredging the river in order to create 'useable' land for residential development (sand mixed with shell)
- Erosion & deposition: natural process. No longer space to accommodate this process, and so foreshore is vulnerable.
- Located within Bull Creek catchment, almost entirely within Canning River floodway
- Small bushfire prone area in very south, next to Yagan Reserve
- High biodiversity values: vegetation & birdlife
- Heritage values; Registered Aboriginal Heritage site – Whadjuk Noongar people

These were to be considered by workshop participants during the workshop.

Workshop session #1 – Values

The first workshop session was undertaken as a room discussion. Participants were asked to share:

- What do we like about the foreshore?
- What don't we like about the foreshore?
- Are areas of the foreshore culturally, socially or environmentally important? Where?
- How do we access the foreshore?
- What facilities do we use there?
- What do we VALUE about the Shelley Rossmoyne foreshore area?

What we like

- Birdlife
- Scenic
- Natural vegetation
- Open space for family
- Dolphins
- Heritage
- History
- Dog friendly
- People and community
- Fishing and access
- Peaceful
- Sunset view
- Water

What we like

- Car parks
- Vandalism
- Lack of trees
- Brown grass and prickles
- Naughty people
- Dual use path (one each)
- Tree loss
- Speed on paths
- Disturbed birds
- Dog poo
- Not enough fountains
- Not enough flowering trees
- Easy playgrounds
- Rubbish

Favourite areas

- Shelley beach – Events, meetings, active recreation, Place for all
- Dog exercise (review) and dog on leash (link water access??)
- Wadjup point – birds
- Convict fence
- Grecians spit – birds
- Lagoon under Shelley bridge
- Jetties – fishing
- Bullcreek estuary, vegetation and habitat, access (jetty's)
- 2nd Ave – ski area/beach access good for little kids
- 5th Ave – fig trees, heritage
- Gazebo at Tuscan and play area
- Beaches – 1st Ave and 5th Ave for people
- Sand Spit at Watersby
- Water-skiers beach – 2nd Ave(5th)

Access

- Lots of good access
- Need better access for wheel chair
- Could be better defined
- Alignment of roadside car parks in foreshore activity

Facilities

- Jetties
- Fountains
- Paths
- Grass
- Playgrounds
- Dog poo bins/bags
- Toilets
- Gazebos
- BBQ
- Tables /benches
- Everything is used
- Could have playgrounds/ equipment for adults
- Looks tired

Key Values

The following responses were provided.

- Natural environment (vegetation, birds, habitat)
- Community spirit – picnics, events and meeting place
- Low impact uses including passive recreation (be aware that fishing can impact)
- Connection with nature
- Safety
- Lack of commercialisation
- Dog walking
- Family time
- Sailing
- Heritage
- Education
- Activities and facilities in keeping with the carrying capacity of the foreshore

Workshop session #2 – Opportunities

Participants were then divided into break out groups. Each group was to focus on one section of the foreshore area and consider the following:

- How would we like to use the foreshore?
- What are the future pressures? Environment? Demand?
- How should we use the foreshore?
- How do we protect the values we have identified?
- What facilities do we want or want to see improved?
- Should we change access to the foreshore? Parking?
- How should the foreshore be managed?

Each group was asked to indicate areas for different functions on their maps as follows:

- Red – beach access & fishing
- Blue – picnic/passive recreation
- Green – (re)vegetation and nature
- Yellow – dog exercise

The following is a summary from the report back to the room. Transcribed table notes are provided in attachment 1.

Map 1 - Shelley Bridge – Beryl Ave

- Remove roads to increase green space (Wadjup point and Zenith Park)
- Increase habitat to river
- More bbq's at Wadjup Point
- Change casuarinas to Tuarts
- Dog fountain at Beryl
- Wheelchair access at Wadjup
- More community involvement going forward including management by City of Canning
- Revegetate gabions
- Educate kids in values of foreshore eg. River Rangers

Map 2: Beryl Ave – Fifth Ave

- Increase shade and facilities at 5th Ave East
- Promote designated places – map
- Grecian's Spit (needs official title) Bird habitat – need protection (no boardwalk) with own management plan
- Ecological corridor – local SPP mixed – remove casuarinas which create mono culture
- More picnic spots at Prisoner's Point
- Need recycling bins and dog poo bag stands
- Succession planting of Melaleucas
- Erosion protection of Prisoner's Point

Map 3: Fifth Ave – First Ave

- Narrow foreshore so dog exercise area not really appropriate
- Dots on plan are existing access
- Most impacts from fishing – new paths. Big impact – need to educate
- Balance facilities with carrying capacity
- Give people skills about how to protect – recreational fishing patrols at dawn and dusk, education via contact (rangers), multicultural signs (symbols)
- Reduce boat speed in Bullcreek – speed cameras
- Some erosion issues – needs to be monitored
- Put signs on path showing 'use'

Map 4: First Ave – Leach Hwy

- Dots mostly existing, some need review
- Smaller areas of revegetation but all foreshores important
- Walking area for dogs (narrow foreshore)
- Heat island – need more vegetation
- Enforce no synthetic turf
- Link river with streets with parks and schools
- Use crushed limestone to upgrade paths
- Community education
- More trees in Creekview park

Next steps & close

The workshop participants noted the importance of integrating the foreshore management plan with the Shelley Beach Park master plan. Comments included:

- Need to recognise the values of rest of the Foreshore Management Plan area
- More people will impact on this part too
- Concerns that a café at SBP is a predetermined outcome despite the engagement process
- Emphasise physical and mental health benefits of this area
- Biodiversity strategy
- Retrofit the drain under the jetty – Water Corporation

The facilitator then thanked everyone for their input and enthusiasm. The next steps were noted:

- Send out notes from the workshop
- Online survey: https://www.yoursaycanning.com.au/ open until 2nd December 2018
- Community workshop #2: discussion of concepts & priorities for the draft management plan on 4th December 2018
- Draft Shelley Rossmoyne Foreshore Management Plan will be developed during January 2019
- City will seek public comment on the revised DRAFT Shelley Rossmoyne Foreshore Management Plan in April or May2019
- Respond to public submissions and Council endorsement of the Shelley Rossmoyne Foreshore Management Plan to guide decisions on management of the foreshore for the next 10 years in June or July 2019

ATTACHMENT 1: TABLE NOTES

Map 1: Shelley Bridge – Beryl Ave

- Area to be managed by City of Canning – no outsourcing
- Realign Riverton Drive at Zenith to increase the green space
- Remove dual roads (down to 1) at Wadjup Point
- Preserve/maintain/increase natural edges to the river – bird habitat etc.
- BBQ's are well used (often a queue) – place more spread along
- Increase vegetation – more Tuarts, less Casuarinas
- Increase drinking fountains, especially with dog bowl on Gymbal – end of Beryl Ave
- Wheelchair access near Wadjup Point
- How to Protect
  - Community involvement
  - Enshrine the area with strong management plans and City Policies
- Pressures
  - Increase population
  - Commercialisation
  - Lack of public open space
  - Heat islands
  - Insufficient tree canopy

Map 2: Beryl Ave – Fifth Ave

- Separation of waste (recycling bins) - Perhaps at playground/near BBQ's
- More shade/shelters
- Planting different tree species/plants
- More dog poo bag stands, water tap
- Cycle blind spot (Beryl Ave) – curved – straighten path
- Greater diversity of local native trees – dominance of Casuarina obesa must be checked. To be an ecological corridor need multi-story, mixed species local vegetation.
- Better definition/promotion of picnic/canoe launch area from Fifth Avenue, case eg. Picnic tables, more shades, bin
- Succession planting for ageing melaleucas
- Need separate sub management plan to protect Grecian's Spit bird roosting/resting areas to limit access by people.
- Need erosion protection plan for the end of Prisoner's Point.

Note: Shelley Beach Sailing Club is a very popular social gathering place

Map 3: Fifth Ave – First Ave

- More improvement – more people
  - Bigger impact on the foreshore/river
  - Needs to conserve
  - Need to educate
  - Teach how to protect/conserve
- This area is very narrow
- Lots of fishing – is a problem
- Do some patrols to educate people as to why they shouldn't damage the vegetation
- Education not limited to signage (look out for the fence area) 'access area in 200m'
- Signage that takes into consideration language barriers (symbols) / educate on signage
- Fines – let people know they will be fined
- Kayak and jet skies are illegal to launch there – so needs some policing
- Maintain and grow vegetation and grassy areas between bollards and roads (so no bitumen as carparks)
- Reduce erosion/managing erosion
- Space for conservation not development
- Re-engage/re-educate the community on the rules/management plan every year (fines/patrols)
- Succession planning for trees
- Boats speed on the Rossmoyne side (to limit waves)
- Community engagement/education at the foreshore/on site to target a bigger group
- Cycle path bridge on the water

Map 4: First Ave – Leach Hwy

Green Dots (area that needs revegetating)

- The entire foreshore strip has high natural vegetation – which supports native fauna

Yellow Dot

- Because this section is a thin strip – it should really be a dog walking area (on or off lead by choice)

A future pressure will be heat island effect:

1. There we need more vegetation
2. City of Canning has policy on hard surfaces on verges and front yards – but unfortunately not enforced especially synthetic turf over blue metal
3. Vegetation corridors linking rive to street verges to suburbs

Yellow dot

- Stencils on path for on or off leash

Red dot

- Reviewing unofficial access points to determine which to upgrade and make obvious with crushed limestone or fencing

Star

- The bylaws need to be enforced by City of Canning Rangers

Circle in circle

- Keeping community/residents informed Need erosion protection plan for the end of Prisoner's Point.

Note: Shelley Beach Sailing Club is a very popular social gathering place

Shelley Beach Park Masterplan Comments

Liberty swing (used? Location?)

Safety – depth of water (dredged areas) danger

Sailing club – to retain, important community activity

No over development/commercialisation

No replacing grass with car park

Safety – no licence premises

Ensure integration in Foreshore Management Plan

SHELLEY-ROSSMOYNE FORESHORE MANAGEMENT PLAN
COMMUNITY WORKSHOP #2: OBJECTIVES AND CONCEPTS

When: Tuesday 4th December 2018

Time: 6.30pm – 8.30pm

Where: Canning River Eco Education Centre (CREEC) - corner Kent Street and Queens Park Road, Wilson

Welcome, project background & workshop objectives

The welcome was provided by Mary Ross from the City of Canning.

The objectives of the workshop were noted as:

- To define the objectives of the Shelley Rossmoyne Foreshore Management Plan
- To scope and prioritise actions for delivery

A summary of the outcomes of the community survey was provided (shown in Attachment 1).

A recap of values and opportunities from the first workshop was presented as follows:

- Natural environment (vegetation, birds, habitat) and connection with nature
- Community spirit – picnics, events and meeting place, family time
- Low impact uses including passive recreation, dog walking, water-based activities including sailing
- Safety
- Lack of commercialisation
- Heritage
- Education

Defining objectives for the Foreshore Management Plan

Objectives for the Foreshore Management Plan should ideally consider:

- Green and local area
- Ecological corridor and nature
- Preservation of green link
- Access for community and family
- Places for kids to play
- Natural habitat and vegetation (eg. near Shelley Bridge)
- Small area concepts (complying with overarching principles)
- Applicable along whole length but particular locations for different, specific functions
- Value all people that use it
- Balance
- Community ownership and stewardship
- Carrying capacity
- Quiet places
- Harmonious society

Based on this discussion, the agreed objectives for the Foreshore Management Plan were:

1. Preservation and enhancement of natural environment and linkages;
2. Supporting and encouraging local community connection and stewardship; and
3. Balancing diversity of uses within carrying capacity of the foreshore.

Ensure to describe the fragility of the foreshore environment in the plan, and the need for sustainability

Exploring the opportunities

Key opportunities explored by workshop participants, including the top actions to deliver defined outcomes are summarised below. Transcribed notes are included in Attachment 2.

Closure of road reserves at Wadjup Point and Zenith Park

- More green space
- Consultation with residents and agencies
- Concept plans
- Gazettal of closure
- Double cul-de-sac?

Enhancement of foreshore for ecological protection and preservation

- Identify critical (fauna) habitat areas and vegetation areas for protection
- Plan protection strategy in fencing (temporary or permanent)
- Identify water resources to establish and sustain ecosystems
- Identify areas for revegetation – passive & active (direct)
- Strategy to educate about protection and revegetation activities, including signage
- Retain access to beach (control) and close inappropriate paths
- Timelines – as long as it take s to do well. Include review

Increased access to drinking water and water for irrigation

- Bottle filling station and distance to next one
- Smart turf and vegetation management
- Liaise with Water Corporation to relax requirements for hydrants
- Need in dog zone
- Consider drainage conversions

Community education, engagement and participation - more

- Diversity outreach (focus on kids) and events and groups/participants
- Online map/app – points of interest, podcasts
- Physical map/stand
- Walking tours and activities appropriate for width and lengths
- Topics support wildlife and plan outcomes
- Police presence for fireworks (road/traffic management)

Celebrating heritage – increased awareness and respect

- Aboriginal person in natural areas team
- Commitment to maintain signage for interpretive trail
- Improve online (high – include general education) heritage information/access and linkage (QR codes)

Balance competing interests and ensure sustainable use (supporting passive recreation)

- Review parking – signage, bollards, temporary locations – engineered plan, include provision for unloading kayaks (wider)
- Community education

Dog exercise and off-lead areas

- Protect 3 key bird areas – Shelley Bridge, Wadjup Point and Beatrice Avenue
- Signage on footpath
- Realign dog exercise area boundary to allow dogs access to the water at the north end of Shelley Beach
- Fenced dog areas with parking

Adapting for climate change – sea level rise & erosion, urban heat mitigation (including increased shade)

- Identify locations for revegetation and canopy
- Identify areas for erosion management
- Underground power
- Enforcement of current boat speed limits

City of Canning - Shelley Rossmoyne Foreshore Management Plan
Functions - Map 2

Agreeing priorities for delivery

Priorities were generally agreed as:

- High/No. 1: enhancement of foreshore for ecological protection & preservation;
- High: balance competing interests and ensure sustainable use
- High: identify location for revegetation and increased canopy cover
- High: improve access to online heritage information;
- High: review/improve definition of dog exercise/off lead areas
- Medium: community education

Priorities were generally agreed as:

- Closure of roads at Wadjup Point and Zenith Park

Next steps & close

No.	Task	Status
1	Community engagement: Online survey and two workshops	Completed
2	Draft Shelley Rossmoyne Foreshore Management Plan to City for review	Late December 2018
3	Public comment	April 2019
4	Respond to submissions, revise and finalise	June 2019

Additional comments

Note/support virtual gaming:

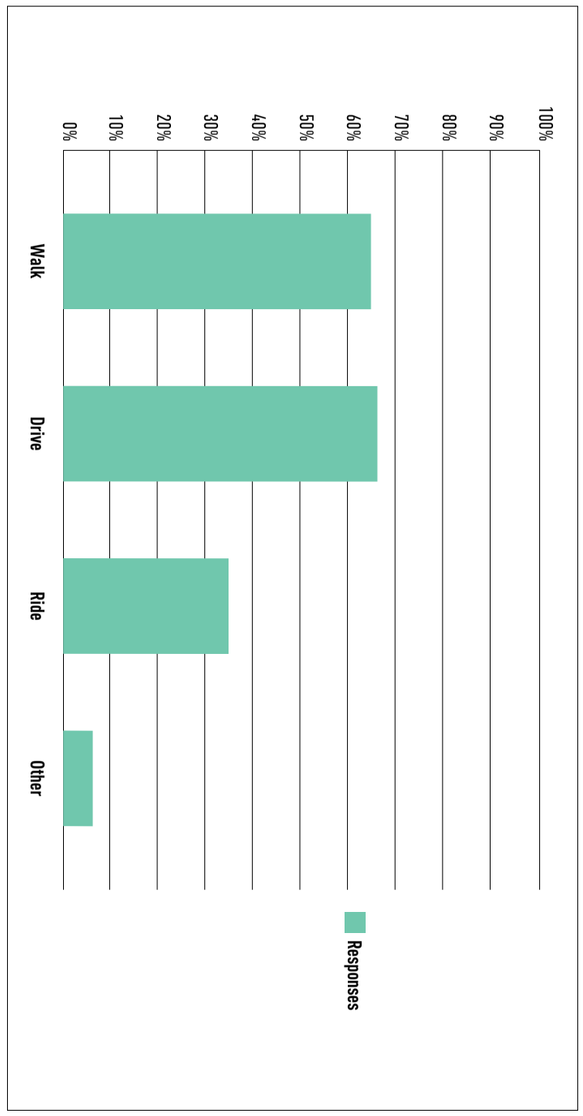
- Geocaching
- Pokemon Go
- Ingress – similar platform/portal

Principles for Shelley Beach– recognise the hierarchy of planning strategies and plans:
Biodiversity Strategy (Riverplan) –> Shelley Rossmoyne FMP –> Shelley Beach Master Plan (concept plan)

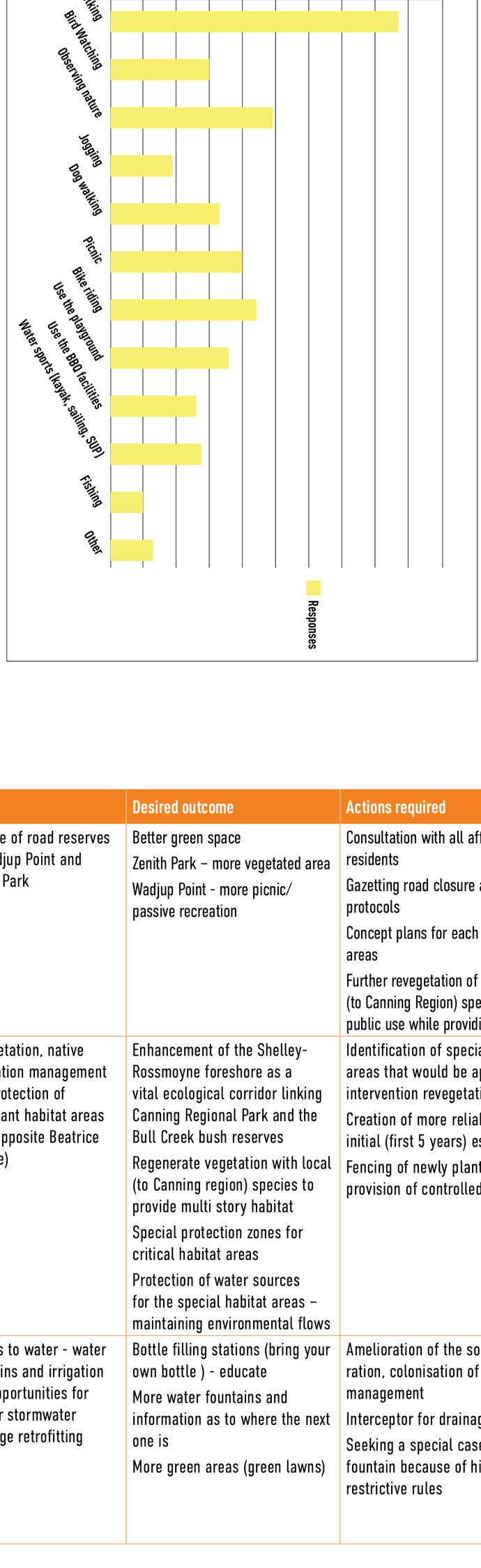
ATTACHMENT 1: COMMUNITY SURVEY RESULTS

102 responses - 59% female and 33% male. 1% aged between 14-17, 30% aged between 26-45, 44% aged 46-65 and 20% over 65 years old (5 people outside Canning & 3 people hadn't visited in the last year)

How do you travel to the foreshore? (Please tick all that apply)



What activity(s) did you do? (Please tick all that apply)



Idea	Desired outcome	Actions required	Responsibility	Resources	Timing
Closure of road reserves at Wadjup Point and Zenith Park	Better green space Zenith Park – more vegetated area Wadjup Point - more picnic/ passive recreation	Consultation with all affected organisations and residents Gazetting road closure all other required protocols Concept plans for each of the enlarged green areas Further revegetation of Zenith Park with local (to Canning Region) species that still allow public use while providing excellent habitat	Council Main Roads DBCA	Provision of $ in the Council's budget Obtaining grants for greening	Medium term priority
Revegetation, native vegetation management and protection of important habitat areas (e.g. Opposite Beatrice Avenue)	Enhancement of the Shelley-Rossmoyne foreshore as a vital ecological corridor linking Canning Regional Park and the Bull Creek bush reserves Regenerate vegetation with local (to Canning region) species to provide multi story habitat Special protection zones for critical habitat areas Protection of water sources for the special habitat areas – maintaining environmental flows	Identification of special habitat areas, areas that would be appropriate for direct intervention revegetation Creation of more reliable water sources for initial (first 5 years) establishment Fencing of newly planted areas, signage, provision of controlled access points	City of Canning CRREPA and other volunteer/landcare groups	Provision of $ in Council budget Funding also from State and Federal Government	Short, medium and long term Completion will be constrained by available resources and water
Access to water - water fountains and irrigation and opportunities for further stormwater drainage retrofitting	Bottle filling stations (bring your own bottle) - educate More water fountains and information as to where the next one is More green areas (green lawns)	Amelioration of the soil (carbon/nitrogen ration, colonisation of bacteria) - turf management Interceptor for drainage going into the river Seeking a special case for the water fountain because of high usage of the restrictive rules	Water Corporation City of Canning 'Water Board' or Swan River Trust Friends of the Canning River	Soil analysis Environment/ecological studies/to determine where the conservation areas should be located People surplus survey to ensure what the soil can take (how big an area you can load safely)	Progressively – after other priorities Study first Implementation plan to follow

Idea	Desired outcome	Actions required	Responsibility	Resources	Timing
Community education, engagement and participation	More community engagement, events Educate – signs for history, wildlife, revegetation information eg. CREEC could take people to the river/foreshore Safety of pathways – need separate pedestrians and cycle – review where it is	Look at options to diversify community reach/events outside Shelley Beach Park Online map with points of interest (bird watching, parking, historical points) link apps for birds/insects etc. access to fishing points/walking paths A stand in the gazebo with maps/flyers that people can take Who can do what, list of groups in online apps/maps/flyers Podcast/museum tour concept Be careful on spots to not enhance parking areas Study to determine the loading the area can take for cars/foot traffic	City of Canning Volunteer groups for revegetation Youth groups	Public events – need police (ref back to 2014 events) because it's getting dangerous for New Years event Traffic/parking management for events (asses/plan) Allocate in every annual budget	2019 – police presence Couple of years for the rest
Celebrating heritage	Increased awareness Increased respect	Permanent appointment to Natural Areas team of Aboriginal employee Acknowledging recent foreshore signage and commitment to on-going maintenance Improve online heritage information access/ links/QR codes – linked to education actions Research on appropriate media (QR etc.)	Council to ensure properly qualified people involved	Linking with State Government departments Linking to other groups and agencies Could draw on skills/ interest of local students – primary/high school/uni students	As long as it takes

Idea	Desired outcome	Actions required	Responsibility	Resources	Timing
Supporting passive recreation (walking, cycling, exercise equipment and meeting people) and water-based activities (fishing, kayaking, canoeing) including access, facilities and provision of additional parking	Balance all competing interests on foreshore whilst ensuring sustainable use Respect for other users	Improve signage for parking Increase community education, ownership of values and stewardship Shift bollards in relevant places	Council Community	Funding – Council/ Grants Expertise – Parks staff appointments, engineers/ consultants etc.	For duration of management plan
Dog exercise and off-lead areas	Dogs exercised both on and off lead in areas that are appropriate. Safety for dogs, cyclists, people and nature	Grass to exercise on Areas for dogs to swim – maintain 'dog beach' at Shelley Beach Park, but change configuration (alter boundary on the southern side, see Map 2) Protect the 3 key bird habitat areas - look at fencing to protect? • Lagoon at Shelley Bridge • Wadjup Point • Beatrice to 189 Riverton drive)) Consider fenced dog exercise area for toe of Leach Hwy (at Parkbeach Close)? some support, some against Keep the dog exercise areas as set? Improve Creek View park – fence etc Access paths to river from road or path have signage that makes clear whether it is on or off lead More dog (and people) drinking fountains, especially at each dog exercise area (Beryl Ave, dog beach, Second Ave, Central Road, Yagan – water already available at Yagan) Signs on paths themselves	City of Canning Dog owners and carers	Funding for fencing Clear signage	Soon – won't take long

Idea	Desired outcome	Actions required	Responsibility	Resources	Timing
Adapting for climate change – sea level rise & erosion, urban heat mitigation (including increased shade)	Minimise erosion with visually unobtrusive measures Increased tree and shrub/ groundcover coverage	Map opportunities for shrub/groundcover planting, especially near Central Avenue bare stretch (active surveillance and SBP?) Reconsider approach to development of the suburb (increase in urban heat) Changing road alignment at Wadjup and Zenith to provide more space for vegetation More tree shrub and groundcover planting Enforcement of boat speeds Plant further up the bank to cater for sea rise Underground power for Shelley for larger trees	Entire community City of Canning/State Government	Erosion management expertise Vegetation management experts Water tank for irrigation	Continued revegetation and erosion control Incremental

Appendix C – Relevant Legislation, State Policy and Strategy

Swan and Canning Rivers Management Act 2006 and Swan and Canning Rivers Regulations 2007

The Shelley Rossmoyne Foreshore is located within the Swan Canning Development Control Area (DCA). Shelley is located in section 21 of the DCA; Rossmoyne is located in section 20. The Machinery of Government changes in 2017 resulted in the creation of the Department of Biodiversity, Conservation and Attractions which has taken over the responsibilities of the office of the Swan River Trust and the Department of Parks and Wildlife. However, it is noted that the policies that are relevant to the foreshore area still refer to the Swan River Trust and the Department of Parks and Wildlife. The following policies are considered relevant to the foreshore area:

Planning for Land Use, Development and Permitting Affecting the Swan Canning Development Control Area (Policy 42)

The Swan River Trust's Swan Canning River Protection Strategy (2015) provides a collaborative management framework which outlines agreed actions for many partners in the community, industry, government and non-government organisations. The purpose of the document is to establish coordinated management arrangements to protect and enhance the ecological and community benefits of the Swan Canning Riverpark.

Through community consultation the strategy identified four key values:

- Ecosystem health
- Sense of place
- Community benefit
- Economic benefit

The strategic management program refers to river foreshore in a number of objectives and actions that are displayed in Table 12.

Table 12: The objectives, strategies and actions relating to foreshore management in the Swan Canning River Protection Strategy.

Site context	Key issues	
Manage, protect and enhance biodiversity	Protect and rehabilitate foreshore	Provide protection for riparian and/or aquatic vegetation Provide guidance on best management practices for foreshore stabilisation
	Reduce the adverse impacts of introduced plants and animals in the Riverpark	Manage riparian and/or aquatic weeds Coordinate the management of declared plant species
Provide access and a safe environment for Riverpark visitors	Maintain and improve safe access for Riverpark visitors	Maintain and improve the level of safe public access to and along foreshore areas in the Riverpark Implement a rational management system for dinghy storage on foreshore areas Develop a Shared Asset Management System to link funding/assets/damage to enable forecasting and prioritising of foreshore improvement works Implement works to stabilise the riverbank where valuable infrastructure or recreational amenity is threatened by erosion
	Promote appropriate tourism activities	Support community events (e.g. Skyworks, Autumn River Festival and Blessing of the Rivers) and tourism opportunities on the river
	Enhance the standard of Riverpark facilities	Improve quality of existing public facilities and infrastructure
Improve public knowledge and understanding of the Riverpark	Facilitate opportunities for engagement with the Riverpark	Promote opportunities for community groups and individuals to be involved in on-ground conservation activities Support local environmental groups to source additional funding Promote active and healthy lifestyles that encourage the use of the Riverpark
Improve the way we do business	Engage effectively in the statutory decision-making process	Provide clear guidance consistent with SPP 2.10 to developers of land adjacent to the foreshore Apply water sensitive urban design principles and other existing policies and guidelines Continue to collaborate on the development of precinct plans to support riverside development

Department of Biodiversity, Conservation and Attractions policies

The Shelley Rossmoyne Foreshore is located within the Swan Canning Development Control Area (DCA). Shelley is located in section 21 of the DCA; Rossmoyne is located in section 20. The Machinery of Government changes in 2017 resulted in the creation of the Department of Biodiversity, Conservation and Attractions which has taken over the responsibilities of the office of the Swan River Trust and the Department of Parks and Wildlife. However, it is noted that the policies that are relevant to the Foreshore area still refer to the Swan River Trust and the Department of Parks and Wildlife. The following policies are considered relevant to the foreshore area:

Planning for Land Use, Development and Permitting Affecting the Swan Canning Development Control Area (Policy 42)

The objective of policy no. 42 is to ensure land use, development and other permitted works, acts and activities in or affecting the Swan Canning Development Control Area;

- Maintain and enhance the ecological health, community benefits and amenity of the Swan Canning river system.
- Make suitable provisions for foreshore areas that can be reserved and protected under planning schemes and acquired as public land.
- Do not create obstructions to the flow of flood waters of the river system and that appropriate provisions are made to minimise property damage by major flood flows.

This policy provides direction and guidance regarding how the Department of Biodiversity, Conservation and Attractions assesses development and permit applications in the Swan and Canning Rivers. The policy outlines a number of policy statements that the department will adhere to; a number of these are relevant to the Shelley Rossmoyne Foreshore. Key relevant policy includes statements that the department will;

- Promote the maintenance and restoration of natural vegetation and encourage proponents to retain existing native vegetation as a means of protecting linkages and natural vegetation corridors. Proposals should avoid the removal or fragmentation of native vegetation, where possible. As a guide, any vegetation removed within the DCA will likely be required to be replanted at a minimum ratio of 3 to 1 with appropriate local native species.
- Encourage a range of tourism and recreation facilities to be provided for in a local and regional context thereby providing visitors to the Swan Canning river system with a choice of recreation activities and experiences.
- Seek to ensure that the river foreshores are linked through the provision of walking and cycle trails which connect places of natural and cultural interest as well as commercial and community facilities.
- Promote the protection of river foreshores by advising the WAPC to reserve them for Parks and Recreation in the MRS where appropriate. The Parks and Recreation reservation should cover areas with conservation, recreation and landscape amenity values.

Planning for Miscellaneous Structures and Facilities in the Swan Canning Development Control Area (Policy 45)

The objective of Policy no. 45 is to ensure that miscellaneous structures and facilities in the Swan Canning Development Control Area protect the ecological health, maintain and enhance long term community use and enjoyment, and preserve the amenity of the Swan Canning river system.

This policy applies to applications for bridges; groynes and headlands; river retaining walls; car parks and associated access roads; pedestrian and cycle access paths; boardwalks; landfills; fuel storage systems; sullage pump-out facilities; signage; lighting; telecommunications infrastructure; dinghy, tender and small vessel storage facilities; fireworks displays; and other miscellaneous structures.

The high importance placed on walking and cycling development within the City of Canning and in particular along the Shelley Rossmoyne Foreshore means the policy statements regarding boardwalks and pathways for pedestrian and/or cyclists need to be taken into account. These statements include;

- Require applications for boardwalks and pathways to demonstrate that they are consistent with an endorsed precinct or foreshore management plan for the area (or if there is no such plan, provide a public benefit and be consistent with the policy statements for parts of the river set out in SPP2.10 and the Land and Waterway Use Plan). Facilities are to be safe, provide convenient access and be developed as part of a structured hierarchy of connected access ways.
- Where appropriate, require pathway design and construction to comply with Australian Standard AS2156.2 Walking Tracks – Infrastructure Design and Australian Standard AS1428 Design for Access and Mobility. Pathway design should ensure that stormwater run-off does not result in erosion, and earthworks undertaken as part of construction should be minimised. Boardwalks are to be certified by a practising structural engineer and comply with relevant Australian Standards.
- Generally not support the development of a boardwalk over water where an alternative land-based access option is available or will soon be available.

Planning for Commercial Operations in the Swan Canning Development Control Area (Policy 46)

The objective of Policy no. 46 is to ensure commercial development or works, acts and activities in the Swan Canning Development Control Area are pertinent to the river, and demonstrate a community benefit and contribute to the long term community use and enjoyment of the Swan Canning river system without adversely affecting its ecological health and amenity. The policy in this document relevant to the Shelley Rossmoyne Foreshore relates to the maintenance of facilities, including the Shelley Sailing Club. The policy states;

- Require proprietors and facility managers undertaking maintenance activities such as paint scraping, spraying, washing or timber treatment on the exterior of a facility, to obtain a permit approval and ensure adequate measures are taken to prevent river contamination.

Planning for Development Setback Requirements Affecting the Swan Canning Development Control Area (Policy 48)

The objective of Policy no. 48 is to ensure development setback requirements and boundary interface treatments affecting the Swan Canning Development Control Area. This policy details setback requirements that apply to solid and hard-facing structures such as dwellings, sheds, garages, above-ground swimming pools, covered or enclosed balconies and solid walls with a total height exceeding 1 metre from the natural ground level. It provides setback requirements for the development of residential, rural, and other land, including survey-strata and strata-titled land, and details how setbacks should accommodate roads and floodplains. It also includes setback provisions for retaining walls and fencing, outdoor living areas, car parking areas, and landscaping.

Policy relevant in this document to the Shelley Rossmoyne Foreshore includes statements relating to landscaping of setback areas. Relevant statements include;

- Recommend use of local native vegetation species within the setback area, due to their low maintenance and fertiliser requirements and increased habitat values for native fauna.
- Not support the use of declared weed species or highly invasive environmental weed species within the setback area, due to the potential to spread and impact the ecological and landscape values of the river system.
- In determining whether an application is consistent with the objectives of this policy, take into consideration the preservation of existing vegetation and any landscaping and revegetation provisions that maintain or enhance the landscape values of the locality.

Planning for Stormwater Management Affecting the Swan Canning Development Control Area (Policy 49)

The objective of Policy no. 49 is to ensure land use, development, and other permitted works, acts and activities that comprise, include or use stormwater management systems in or affecting the Swan Canning Development Control Area. This includes proposals in and adjacent to the Development Control Area as well as those that may not immediately adjoin the Development Control Area but that may affect waters in the Swan Canning river system through surface and/or groundwater connections. Policy relevant to the Shelley Rossmoyne Foreshore in this document relates to land use change, with the policy stating the Department will;

- Recommend that land use planning proposals are managed to minimise sediment transportation and prevent the mobilisation of nutrients or contaminants from the subject site to the Swan Canning river system. Where practicable, land use changes should not result in further water quality degradation but should improve the situation.

Canning River Regional Park Management Plan 1997-2007

The Canning River Regional Park Management Plan 1997 – 2007 provides guidance for the management of the Canning River Regional Park. It provides for the establishment of a management structure, common goals and agreed priorities to safeguard the important conservation and recreational values of the park. The principal management directions include definition and delivery of a vision for the park; integration of agency policies; secure land tenure and boundaries; and defined management zones within the Park based on agreed values and uses. It recognises the importance of the park to its various land owners, the general public and interest groups, noting the need for community involvement and education to assist in achievement of the management goals.

Perth and Peel@3.5million: The Transport Network (2018)

The Perth and Peel @ 3.5 Million Transport Network (2018) provides a long term plan for a variety of transport infrastructure. Although the plan does not identify major roads, public transport, freight or aviation networks in the vicinity of the Shelley Rossmoyne Foreshore, it does recognise the foreshore as important for cycling.

The City has also noted that the State Government is considering widening the Leach Highway Bridge in the future.

Western Australian Bicycle Network Plan 2017 update

The vision of the Western Australian Bicycle Network Plan 2014-2031 is to make Western Australia a place where cycling is safe, connected, convenient and a widely-accepted form of transport. The proposed long term cycling network for Perth highlights the importance of the Shelley Rossmoyne Foreshore as being part of the Recreational Shared Path network.

Although the 2017 update highlights the potential for river crossings at Salter Point and the Pipeline at the eastern end of the study area, the update does not clarify the timing for these proposals.

Boating guide: Swan Canning Riverpark 2018

The Department of Transport's Boating guide for the Swan Canning Riverpark provides for the private moorings in the Bull Creek and identifies that the speed limit in the waters of the Shelley Rossmoyne Foreshore is 5 knots.

City of Canning: Our City, Our Future: A strategic community plan for 2017-2027

The City of Canning's Strategic Community Plan captures the community's aspirations for the region. It is the overarching and agreed vision representing the majority of views. The practical outcomes of the Strategic Community Plan result from a collaboration between Local Government and the community, along with other key stakeholders.

The community plan defines five principal goals that encapsulate the City's vision and define all that the City is going to achieve in the next decade. These five goals are:

- an inclusive safe and vibrant community (Connect).
- natural areas where people and wildlife flourish (Grow).
- accessible, pleasing urban spaces that are fit for purpose (Build).
- a thriving local economy (Prosper),
- accountable, responsible and forward thinking administration (Lead).

These five principle goals contain a number of aspirations set out by the City to define what the City wants to achieve within a goal. The aspirations are set against a number of objectives to help guide the fulfilment of the aspirations and goals. Aspirations and objectives relevant to the Shelley Rossmoyne Foreshore include;

Table 13: Aspirations and Objectives of the Strategic Community Plan

Goal	Aspiration	Objective
Connect	A safe and healthy community	Clean and safe public spaces
Grow	Natural areas are preserved and enjoyed	Well-managed natural areas supporting recreation and biodiversity An increase in Urban Forest (the trees growing within the City
	Resources are managed sustainably	Clean river, waterways and natural ecosystems
Build	Integrated, accessible, and safe transport alternatives	Better pedestrian and cycling infrastructure

City of Canning Town Planning Scheme No. 40

The City of Canning's Town Planning Scheme no. 40 sets out the local governments planning aims and intentions for the scheme area. The aims on this scheme are;

- to zone and classify the land within the local government for the purposes described in the scheme so as to promote the orderly and proper development of land, and make suitable provisions for the use of land within the local government
- to secure the amenity, health and convenience of the local government and the inhabitants thereof
- to set aside land used or to be secured for use as reserves for public purposes
- to make provision for the conservation and enhancement of places of cultural heritage significance
- to make provision for other matters incidental to town planning and land use.

Under the Scheme the Shelley Rossmoyne Foreshore is zoned as Parks and Recreation. Under this zoning a number of objectives are applied to the land use, which include;

- To set aside areas for public open space, particularly those established under the Planning and Development Act 2005 s. 152
- to provide for a range of active and passive recreation uses such as recreation buildings and courts and associated car parking and drainage.

There are no additional uses for land in local reserves that apply to this scheme.

City of Canning Local Planning Strategy 2017

The City of Canning Local Planning Strategy (2017) is the key strategic urban planning document for the City of Canning in conjunction with the Local Planning Scheme. The document defines a framework of land uses and activities and provides a guide to the integration of social, environmental and economic planning and development in the City.

The Strategy outlines a number of objectives, of these objectives a number are relevant to the Shelley Rossmoyne Foreshore;

- Enhance cycling and pedestrian movement networks;
- Protect and enhance the natural and built environment within the City landscape;
- Ensure public open space is easily accessible and provides protection for biodiversity, amenity and quality recreational opportunities;
- Protect buildings, objects and places of heritage and facilitate appropriate community facilities; and,
- Enhance the health and wellbeing of the community by creating an environment that encourages healthy active living.

The strategies and actions of these objectives have been taken from the local planning framework documents. These documents have been reviewed separately and the individual documents strategies and actions given in the individual document reviews. The local planning framework documents include;

- Water Management Strategy (Adopted February 2014);
- Environment Management Strategy (Adopted April 2014);
- Local Housing Strategy (Adopted October 2014);
- Community Development Strategy (Adopted March 2015);
- Public Open Space Strategy (Adopted June 2015);
- Integrated Transport Strategy (Adopted August 2015);
- Local Commercial and Activity Centres Strategy (Adopted October 2015);
- Heritage Strategy (Adopted May 2015);
- Cycling and Walking Plan 2017;
- Draft Biodiversity Strategy; and
- Draft Climate Change Action Plan.

City of Canning Economic Development Strategy 2015

The City of Canning Economic Development Strategy sits within Council decision making framework and supports one (Prosperity) of the five key pillars that make up the Strategic Community Plan. It addresses the aspirations for the economy and outlines the initiatives that the Council believes will add value to the City and those who use it. The document outlines key strategic outcomes and objects relating to the economic future of the City. While these objectives do not directly relate to the Shelley Rossmoyne Foreshore, the strategy does outline the need for infrastructure to enhance environmental quality and support the needs of the City, business and its citizens.

City of Canning Policy ET527 - Urban Revegetation and Greening 2009

The Urban Revegetation and Greening policy was adopted by the City in 2009. It aims to improve the urban revegetation and greening of the City. Although the policy is brief, it importantly recognises that "Local residents, schools and other interested groups shall be encouraged to assist with tree planting projects associated with the rehabilitation of natural areas." This provides a significant and continuing opportunity for the management of the Shelley Rossmoyne Foreshore.

City of Canning Policy ET525 - Trees in Streets, Thoroughfares and Parks 2016

The Trees in Streets, Thoroughfares and Parks policy was adopted in 2016. The policy recognises that trees are of value to the community because they provide habitat for fauna, improve air quality, offer shade and have a cooling influence on climate. The policy outlines how trees should be managed and consideration for species selection.

City of Canning Water Management Strategy 2014

The City of Canning Water Management Strategy (2014) provides a framework for the achievement of better water management outcomes, consistent with the overall vision and objectives of the City Local Planning Scheme. The purpose of this document is to:

Develop a water management framework that provides strategic guidance for all actions of the City that influence water resources. Which include, in addition to the planning and development, parks and reserves management and asset management (roads and drainage).

The document specifies actions to include in foreshore management programs to manage potential Mosquitos and Chironomid Midges swarms. Foreshore management should include removal of weeds (particularly exotic grasses), and grading, landscaping and revegetation of the foreshore reserve in accordance with the recommendations of River Science Issue 26: Constructed ephemeral wetlands on the swan coastal plain – the design process (DoW and SRT 2007).

City of Canning Local Environmental Management Strategy 2015

The City of Canning Local Environmental Management Strategy (2015) provides a framework for the achievement of better environmental management outcomes, consistent with the overall vision and objectives of the City. The purpose of the document is to provide an environmental management framework that:

Provides strategic guidance for all actions of the City that influence the natural environment, which include, in additional to planning and development, parks and reserves management, waste management and community education.

The document outlines a number of actions to achieve outcomes relating to climate change, natural areas, water, heritage and built environment. The outlined actions that relate to the Shelley Rossmoyne Foreshore are displayed in Table 14, along with timeframe and priority.

Table 14: The City of Canning's action relevant to the Shelley Rossmoyne Foreshore to achieve environmental objects outlined in the Local Environment Strategy.

Action	Priority	Timeframe
Ensure ecological corridors are provided between natural areas and the River to allow migration of flora and fauna	High	1-2 years
Develop a climate change mitigation and adaptation strategy	High	1-2 years
Ensure the preservation of protected flora and fauna including Threatened Ecological Communities as part of any future structure planning and/or development, including the incorporation of recreation infrastructure and interpretive signage	High	ongoing
Undertake mapping of weed infestations and monitor an ongoing basis to determine the effectiveness of weed management activities	High	ongoing
Consider partnerships with the Traditional Owners to achieve a joint management of natural areas	High	1-2 years

City of Canning Watercourse Reserves Management Strategies 2006

The City of Canning Watercourse Reserves Management Strategies (2006) acts as a subsidiary to large state and regional watercourse documents and fulfils a number of functions specific to the City of Canning. These functions include:

- Making the interaction between conservation and recreation more explicit;
- Providing a useful tool for general watercourse management within the City; and
- Providing a useful tool for writing and reviewing specific watercourse reserve management plans.

The document applies to all reserves within the City of Canning that include a watercourse; this includes the Shelley Rossmoyne Foreshore. The document outlines issues, objectives and strategies for a number of management and design aspects relating to watercourses. A number of these aspects are of particular importance for the Shelley Rossmoyne Foreshore. These include:

- Weed control in riparian vegetation;
- Erosion and deposition;
- Drainage lines and outfalls;
- Recreation;
- Watercraft access and storage; and
- Access for people with disabilities.

The document recommends a revision of the recreation node concept within the Shelley Rossmoyne Foreshore due to the thin linear shape of the Foreshore making it more suited to zoning conservation and recreation areas rather than designating nodes. The document provides issues, objectives and strategies for this particular recommendation.

The document outlines future management strategies for leased areas of reserves, of which the Shelley Sailing Club is categorized as. The document outlines strategies for lease renewals and future leasing in watercourse reserves.

City of Canning Public Open Space Strategy 2015

The City of Canning Public Open Spaces Strategy (2015) has been developed to create a Public Open Space Strategy that will be used in conjunction with a number of other strategic planning documents to inform a new Local Planning Strategy.

- Define the value of each area of open space within the City boundaries;
- Facilitate ranking of each space to assist in identifying future works that are required in those spaces;
- Facilitate budget planning for design, development, ongoing management and maintenance of POS areas; and

This document is relevant to the Shelley Rossmoyne FMP in that the document includes foreshore areas, defined as all land along the edge of a body of water, as public open space.

In conjunction with a number of City wide strategic recommendations the document recommends one suburb specific recommendation for both Shelley and Rossmoyne.

- Shelley: Focus will be on managing, maintaining and delivering a varied level of service and POS structure; and
- Rossmoyne: The emphasis is on retaining and enhancing current POS provision to meet the needs of a gradually aging population and managing, maintaining and delivering a varied level of service and POS infrastructure, retaining and enhancing current POS provision and ensuring that each park responds to the needs of a gradually ageing population.

The document recommends that parks which provide access to the Canning River Regional Park water recreational pursuits, including Shelley Beach Park require further consideration for planning and management of river sport and recreational access.

City of Canning Integrated Transport Strategy 2015

The City of Canning Integrated Transport Strategy (2015) is the result of a comprehensive integrated transport study commissioned in 2014. The report has been guided by economic, social, integration and safety objectives and developed around four key outcomes:

- Define regional movement framework as it relates to the City including defining what are the known constraints and what can and/or should be changed;
- Develop a local framework that responds to the regional framework and provides local needs and aspirations;
- Focus the City and the community towards key issues and strategies to be addressed over the next 20 years; and
- Provide a basis for the City and community to prioritise and guide the investment of City resources and lobby/partner with other agencies to delivery of other components identifies in the strategy

The report focuses on six themes which address the key elements of the transport networks. These include roads, public transport, cycling and walking, parking, travel demand management and monitoring and feedback.

The document does not outline any changes or issues with the roads acting as the Shelley Rossmoyne Foreshore boundary, namely Riverton Drive West, Riverton Drive North and Watersby Crescent.

The document does outline the need to construct a cyclist/pedestrian path on Shelley Bridge, promote cycling within the city and improve cycle links and paths within the City.

City of Canning Heritage Strategy 2015

The City of Canning Heritage Strategy (2015) is designed to focus on the historic cultural heritage of the City in a way that supports the objectives of the City's Environment Management Strategy (2014). The objectives of the document include knowing, supporting, protecting and promoting heritages places within the City.

The Shelley Rossmoyne Foreshore is not identified as a place of heritage in the document; however the Canning River is recognised as a place of aboriginal heritage for its mythological values

City of Canning Reconciliation Action Plan 2018

The City of Canning Reconciliation Action Plan (RAP) is being developed to turn The City's desire to be a culturally safe and inclusive City into action. Whilst there has always been a will to do more in the space of Reconciliation, the City is keen to build a policy foundation to do more, more effectively with community. Objectives outlined in the document that are relevant to the Shelley Rossmoyne Foreshore include developing a proposal for City of Canning buildings, land and places to have signage acknowledging traditional Noongar owners and custodians.

City of Canning Climate Change Action Plan 2016

The City of Canning Climate Change Action Plan (2016) has been developed to identify risks climate change presents to the City's services and develop adaptation options. The document is a climate change risk assessment that is based on the most recent and applicable climate change projections available for 2030 and 2070. These projections indicate the City of Canning is likely to experience:

- An increase in average temperature in all seasons;
- More hot days and warm spells;
- A decrease in average winter and spring rainfall;
- And increase in intensity of extreme rainfall events;
- A rise in min river level and an increase in height of extreme river-level events; and
- Harsher fire-weather climate in the future.

The assessment identified 89 risks across the City's five operational areas (Land Use Planning, Infrastructure, Biodiversity and Natural Resource Management). These risks were classified using the City's risk management framework. The majority of risks relate to:

- Impacts to the City's natural assets (biodiversity and the environment) (27 risks, including 16 high risks in 2030;
- Financial impacts, including increasing costs to the City and increased demand for City resources and expertise (24 risks, including one extreme and seven high risks in 2030);
- Health impacts to the City staff and the community (15 risks, including one extreme and nine high risks in 2030); and
- Disruptions to the City service delivery (e.g. open space maintenance, disruption to community events) (13 risks, six high risks in 2030).

The action plan identifies 59 adaptations action tailored to address the City's high and extreme rated risks. The actions proposed address the following areas:

- Water and energy efficiency and other sustainable design issues;
- The climate resilience of essential infrastructure;
- The long term protection and enhancement of public open space and urban forests;
- The protection of local properties and assets from river level rise;
- Community resilience to increased heat and flooding risks; and
- Protection and enhancement of biodiversity corridors.

The report identifies a number of risks that relate to the Shelley Rossmoyne Foreshore. The risks, their ratings and subsequent adaptation strategies are displayed in Table 15.

Table 15: Risks, ratings and associated adaptations relevant to the Shelley Rossmoyne Foreshore

Risk	Rating	Adaptation
Greater susceptibility of water storages and waterways to algal blooms, as a result of temperature increases and potential volume reduction.	Extreme	Create and enhance living streams in Public Open Spaces. Develop a Wetland Management Plan (including frequent water quality monitoring) and investigate the viability of constructing artificial wetlands to facilitate the treatment of stormwater.
Stress to, or a loss of vegetation and mature/ significant trees which act as wind breaks, provide shade, thermal moderation, visual amenity and cultural identity as a result of reduced rainfall and extreme heat. Requiring the City to replace trees and implement additional maintenance programs.	High	Prioritise drought tolerant species for planting and revegetation in all City-managed reserves (e.g. street trees, bush revegetation) and progressively replace water intense species with more drought resistant species. Review tree monitoring practices to ensure mature trees managed by the City are regularly checked for health and potential safety hazards by qualified specialists.
Increased river foreshore erosion as a result of extreme river level events leading to impacts to and loss of habitat, native vegetation, significant trees and fringing vegetation	High	Ensure all foreshore / river management plans include specific actions to enhance the long term resilience of biodiversity to projected climatic changes. Identify green corridors in our local planning scheme and management plans. Collaborate with appropriate partner agencies to enhance and extend biodiversity corridors throughout the region – prioritising those corridors that are currently at high risk from climate change.
Erosion of river banks as a result of extreme river level events resulting in the loss of river banks, open space and significant trees which provide shade.	Extreme	Undertake a detailed flood risk study and mapping (including inundation, changes to river bank stability) to identify locations most exposed to and vulnerable to river level rise and storm surge inundation and erosion. Provide guidance on the development of river vulnerability guidelines, with support from the State government.
Green spaces compromised, due to reduced ability to water those areas, resulting in loss of open spaces suitable for community use.	High	Implementation of a program to facilitate efficient use of Public Open Space (currently not all open space within the CoC is maximised). Look at ways to provide more green space as part of new developments; in higher density areas look at communal open space being provided in addition to open space requirements with landscaping. Public Open Space to be incorporated into the design for higher density development, not just car parking.

City of Canning Local Biodiversity Strategy 2018

The City of Canning Local Biodiversity Strategy (2018) is a strategic plan for biodiversity conservation in the City of Canning over the next 20 years. The purpose of the document is to ensure that

Over the next 20 years, the diversity of indigenous species and ecosystems is conserved, resilient to threats, restored and valued by the local community.

The document outlines five key objectives that will ensure the purpose of the document is achieved. The objectives include:

- To increase the protection status of significant biodiversity in the City, including on local government managed or owned lands, and on private land;
- To appropriately manage local natural areas to reduce threats to biodiversity;
- To increase the viability and resilience of natural areas by establishing buffers and ecological linkages; considering the impacts of climate change;
- To increase the distribution and abundance of fauna, including threatened fauna; and
- To increase local community awareness and support for biodiversity conservation.

The document identifies the Shelley Rossmoyne Foreshore as an ecological linkage area. This classification is based on the high ecological criteria (12-21) for most of the Foreshore area. The document makes five broad actions for ecological linkage areas include:

- Formalise the protection status of natural areas via reservation under the Land Administration Act 1997 and local planning scheme;
- Restore degraded areas within all conservation reserves;
- Increase native vegetation in POS areas where the primary objective is public recreation by introducing hydrozoning. Implement the recommendations of the City's Water Management Strategy (Essential Environmental 2014b) which identifies drain basins where improvement of landscaping is recommended. For example Mill Street basin in Linkage 6, Station Street and Wellington Street Basin in Linkage 5, Woodford Park basin in Linkage 4, Merrifield Court basin in Linkage 2 or Bannister Road basin in the Greening Corridor C;
- Adopt a landscaping policy that will require use of local native species in landscaping residential, business and industrial lands within regional and local linkages. Adopt a community incentive program to encourage use of local species in private gardens, street verges and within school grounds; and
- Adopt a City wide landscaping strategy that will aim to increase native tree cover across the whole City, with highest priority being public lands within ecological areas and in suburbs identified as having poor tree canopy cover (less than 5% in WAPC 2014).

City of Canning Cycling and Walking Plan 2018

The City of Canning Draft cycling and Walking Plan (2019) is a result of the City's desire to increase walking and cycling within its boundaries. A number of the City's strategic documents recognised the need for increased walking and cycling to be given a high profile. The purpose of the document is to lay out a vision and a long term strategic plan, providing a framework for the development, over time, of a cycling and walking friendly city.

The plan outlines a number of strategies and objectives to increase walking and cycling within the City's boundaries. A number of these strategies and objectives are relevant to the Shelley Rossmoyne Foreshore as the long linear landscape represents ideal opportunities to increase walking and cycling along the foreshore. These objectives include;

- Plan and implement a safe connected bicycle network that provides viable and direct linkage to the key activity centres, rail stations, schools, shops and other attractions;
- Develop policies that support best practice to improve accessibility and safety for cyclists and pedestrians; and
- Provide for greater shading and tree cover for pedestrian and cycling paths.

City of Canning Draft Playground Provision Strategy 2018

The city of Canning Playground Provision Strategy has been prepared to guide the future provision of public playgrounds. The strategy highlights that 29.5 % of the playgrounds in the City were built prior to 1995 and over 50% built prior to 2000. A key focus when upgrading playgrounds within the City is to incorporate "Nature Play" design elements, utilising natural materials and design.

There are two playgrounds currently situated along the Shelley Rossmoyne Foreshore. The first is located at Shelley Beach Park, the second at Shelley Rossmoyne Reserve. Both playgrounds are classified as district playgrounds. District playgrounds should be of intermediate size and have a wider range of play equipment.

The Shelley suburb area of the Shelley Rossmoyne Foreshore is mentioned in the strategy as a location for additional play equipment, the Rossmoyne suburb area is highlighted as possibly being too narrow for playground expansion.

City of Canning Street Tree Strategy 2018

The City of Canning's Street Tree Strategy has been prepared to identify planting opportunities within the City's streetscape. The aim of this Strategy is to provide clear information for residents, developers and Elected Members in regard to the characteristics of the street trees within the City, along with the City's vision for maintaining and increasing the number of suitable street trees. The strategy makes a number of recommendations to achieve tree planting targets, to be confirmed by the Urban Forest Strategy. Recommendations relevant to the Shelley Rossmoyne Foreshore include;

- To identify streets, with reference to the (Draft) Local Biodiversity Strategy's Regional Ecological Linkages map, and the City's own local priorities, which when planted, will assist with the establishment of wildlife corridors between bushland areas. There will be a preference for endemic tree species to be planted along these corridors where appropriate; and
- Continue the existing program of annual maintenance, infill-planting and replacement tree planting.

City of Canning Policy CM188 - Naming of Parks, Park Features, Community Buildings, Recognition of Long and Exemplary Service, and Commemoration of Individuals or Events 2009 (currently under review)

Policy CM 188 was prepared in 2009 in order to identify the principles, guidelines and administrative practices for naming parks, park features and community buildings, recognising long and exemplary service and commemoration individuals and events.

Key principles outlined in this policy include:

- Naming of parks under 1 ha in size, features in parks, and community buildings to be reported to the Council for determination, and generally follow the WA Landgate Geographic Names Committee's principles, guidelines and procedures; and
- Historic plaques may commemorate events of local, regional, state, national or international significance.

Whadjuk People Indigenous Land Use Agreement (ILUA)

The Whadjuk People Indigenous Land Use Agreement (ILUA) is the full and final settlement of all current and future applications made or to be made by Noongar People, under the Native Title Act. The Agreements states that in exchange for the payment and provision of benefits under the agreement, Noongar people will agree;

- To a surrender of Native Title Rights and Interests in respect of the Settlement Area; and
- To the validation of all acts that, historically, may have been done invalidly in relation to the Settlement Area.

Yagan Wetland Reserve Management Plan

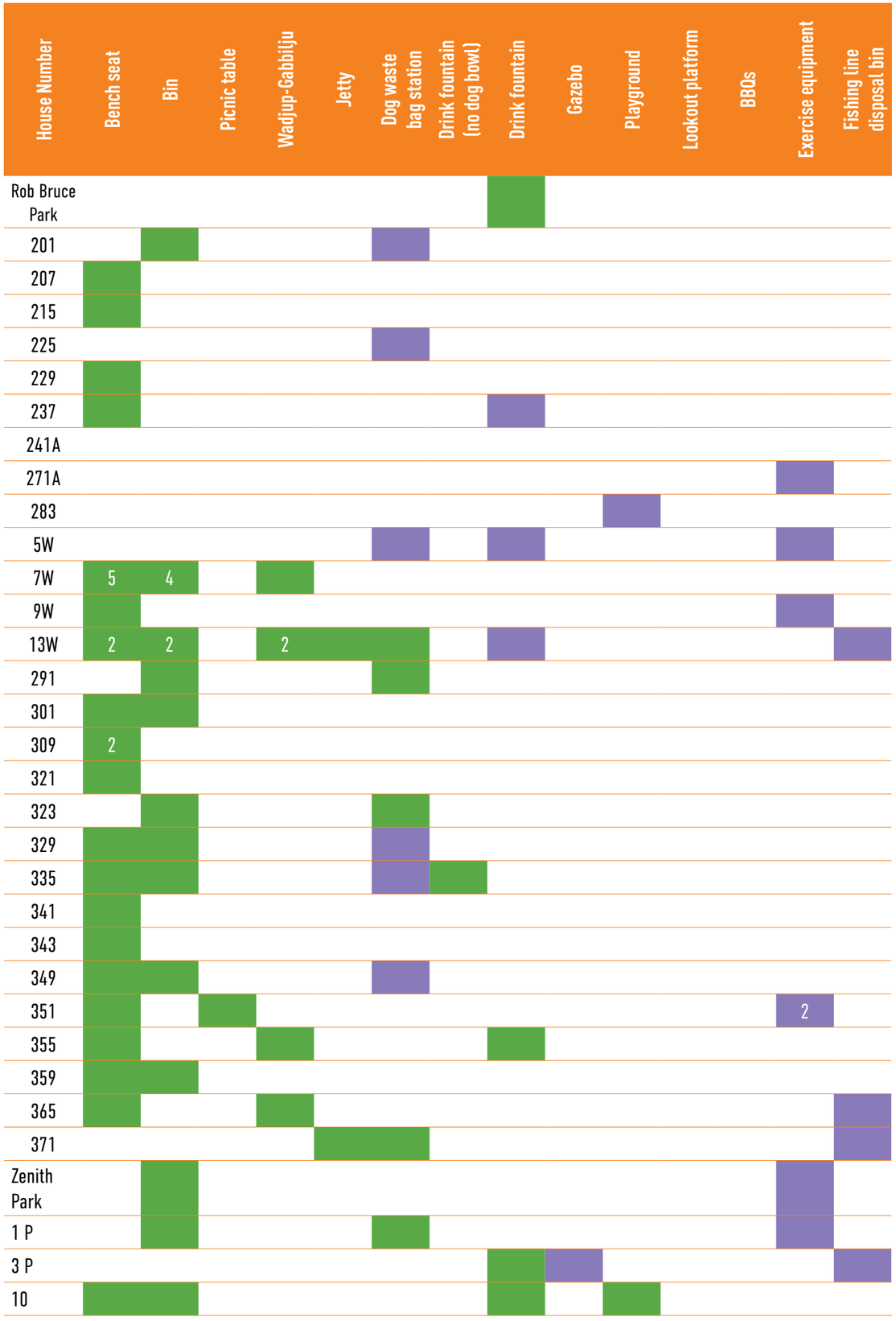
The Yagan Wetland Reserve Management Plan was prepared by the Yagan Wetland Reserve Advisory Working Group in 1996 and revised in 2000.

Appendix D – Assets

Existing and proposed assets excluding Shelley Beach Park.
(Numbers refer to Riverton Drive, C indicates Central Rd, W indicates Watersby Crescent, P indicates Park Beach Close)

Existing asset Proposed asset

House Number	Bench seat	Bin	Picnic table	Wadjup-Gabbiju	Jetty	Dog waste bag station	Drink fountain (no dog bowl)	Drink fountain	Gazebo	Playground	Lookout platform	BBQs	Exercise equipment	Fishing line disposal bin
1A	E	P				P				P	E			
1B						P		P	P		P	P		
1	E													
3		E	E			P								
9				E				P					P	
11	E	E				P								
19	E													E
21		2			E	E								P
23	E													
43	E													
45	E					P							2	
49	E													
2C		E				P								P
63	E			E										
77	E	E				E							P	
79						E								
85	2			E										P
93A	E													
97													P	
101	E	E				P			E					
103	E							E		E				
105	E	E				P						P		
119		E				P								
131	E	E		E		P		P						
151	E	E				P		P						
153	E													
171	E	E		E										
173		E				E			P					
179	E	E		E										
191	E													P



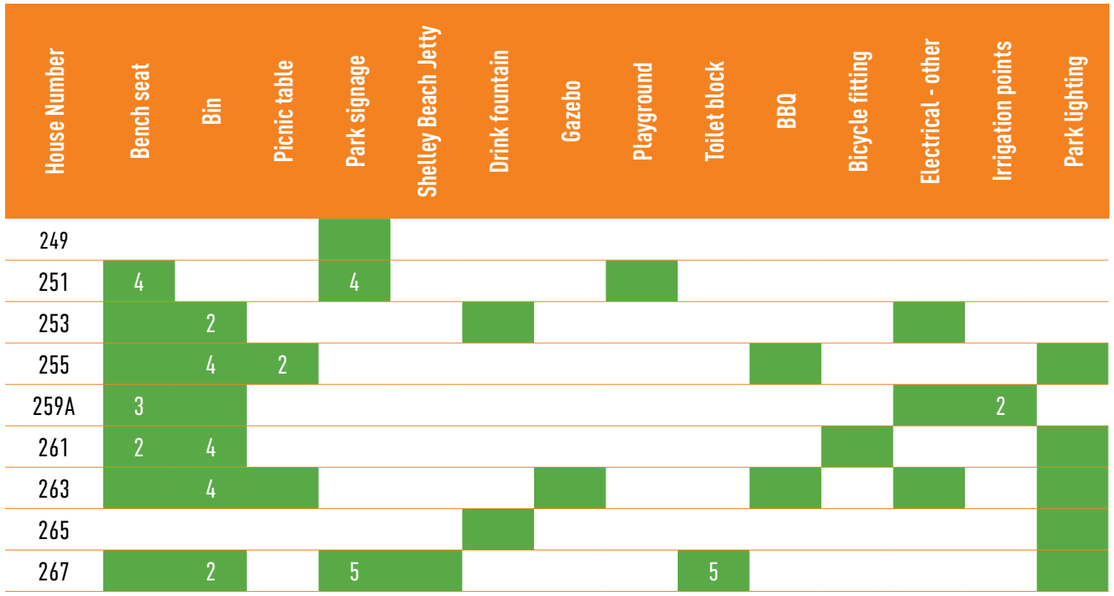


Table 15: Risks, ratings and associated adaptations relevant to the Shelley Rossmoyne Foreshore

Asset	No.	Asset	No.
Bench seat	11	Playground	1
Bin	17	Toilet block	1
Picnic table	3	BBQs	2
Park signage	10	Bicycle fitting	3
Jetty	1	Electrical - other	3
Drink fountains	2	Irrigation points	2
Gazebo	1	Park lighting	5

Appendix E – CRREPA Revegetation Sites

House Numbers	Year/s	$$/Resources	Volunteer Assitance
opp Creekview Cl.	1999		
opp Creekview Cl.	1999		
	2006		
opp. 111-117	1995		CSIRO Double Helix & Canning Sea Scouts
Yagan A	1995		1995 LEAP
	1996		1996 LEAP & Sherwin Lodge residents
Yagan B	1998	1998 CoC	1998 ATCV (now CVA)
	2018	2018 SERCUL	2018 (SERCUL
opp Creekview Cl.	1998	1998 CoC	
	1999		
opp. 1	2018		
opp. 3-47	2000	2000 Ecoplan	2000 ATCV
		2000 CoC	2000 Venturers & Scouts
			2000 CoC (site prep, fence)
	2006	2006 CoC	
opp. 183-189	1995	1995 LEAP	1995 CoC (site prep, fence)
	2018	2018 CoC	1995 Wildflower Soc Murdoch
			1995 Rossmoyne Shelley Scouts
			1995 Nedlands LEAP
			2018 CoC
opp. 191	1994?		
opp. 193-197	2006		2006 Shelley PS & Rossmoyne PS
	2009		
	2010	2010 SGIO	
	2012		2012 SERCUL
	2103		
	2014		
	2015		
	2017		

House Numbers	Year/s	$$/Resources	Volunteer Assitance
opp. 51-63	1997	1997 CoC	1997 Rossmoyne PS
	2003		2003 Rossmoyne SHS Bush Rangers
	2006		2007 CVA
	2007		2015 Work for the Dole
	2014		2016 SERCUL
	2015	2015 CoC	2015 CoC (site prep, engineer, auger, plant)
	2016		
	2018	2018 CoC	2018 CoC
opp. 47-49	1997		2007 CVA
	2006		2013 Rossmoyne PS River Rangers
	2007		
	2013		
	2014		2016 SERCUL
	2016		2016 Lions Club of Booragoon
	2017	2017 CoC	2017 Lions Club of Booragoon
	2017		2017 Lions Club of Booragoon
	2018	2018 CoC	2018 Lions Club of Booragoon
opp. 139-147	1998	1998 SRT	1998 Swan River Trust
opp. 301-303	1995		1997 LEAP
	1997	1997 CoC	1997 Canning River Regional Park Guides
	1998		1997 Zoo
	1999	1999 CoC	
opp. 303	2001		2001Shelley PS & Rossmoyne PS
	2002		2002 Rossmoyne SHS Bushrang-ers
	2006		
	2014	2017 CoC	
	2017		
	2018		
opp. 299	2014	2014 CoC/SRT	2014 Syringia consultancy
opp. 373-375	2001	2001 CoC	Mulching
		2001 SCULP	
opp. 153-161	2001	2001 SCULP	2001 CoC (Site prep, fence)
	2010		2010 Lions Club of Booragoon
	2013		

House Numbers	Year/s	$$/Resources	Volunteer Assitance
opp. 345-347	1997	1997 CoC, Gordon Reid Foundation & SRT	1997 Shelley PS
opp. 349-351	1997 2014	CoC	
opp. 355-363	1997		
	2017		2017 CoC (site prep, auger)
opp. 355-363	2013	2013 CoC	2013 CoC (site prep, engineering)
opp. 357-375	1995	1995 CoC	1995 Naval Reserve Cadets
	1997		
	2001	2001 SCULP	2001 CoC
			2001 Ecoplan – Bushland Care Day (incl
			Alinta Gas and CVA)
	2004	2004 CoC	2004 CoC
opp. 163-171	1997		
	2001		2001 Bullcreek/Leeming Cubs
	2007		2007 Lions Club of Booragoon
	2014		
Shelley Bridge	2004		2004 CoC
	2006		
	2017		
Park Beach Close to Shelley Bridge site	2004		
opp. 239-243	2006	2006 SALP	2006 Queen of Apostles School
	2018	2018 CRP	
opp. 239-243	2006	2006 SALP	2006 Queen of Apostles School
	2018	2018 CRP	2006 CoC (fence)
			2018 CoC (site prep, auger, fence)
opp. 65-109	1999 2006		
opp 123,127,129	2016 2017	2016 SCRRP + CoC	2016 CoC (site prep, auger, fence)
opp. 127-129	1999		
opp. 125	2000?	2000? CoC	2000? CoC (site prep, matting, planting)

House Numbers	Year/s	$$/Resources	Volunteer Assitance
opp. 225-225	2003		
opp. 13 Watersby	2005		2005 RSHS Bushrangers
opp. 317-319	2008	2008 SRT	2008 SRT
	2014	2014 Riverbank	2014 SRT
opp. 133-137 (steep slope)	2009 2010 2017	2009 SRT Riverbank 2010 CoC 2017 CoC	2009 Lions Club of Booragoon 2010 CoC (contour, rocks, logs, planting) 2017 CoC (site prep, auger, planting)
opp. 1 Zenith	2009	2009 CoC	2009 CoC (site prep, engineering, planting)
opp. Nearwater	2009	2009 CoC	2009 CoC (site prep, engineering, planting)
opp. 233-237	2013	2013 CoC	2013 SRT & CoC (site prep, engineering)
	2014	2014 CoC	2014 CoC & SRT (site prep, engineering)
opp. 233-237	2013	2013 CoC	2013 SRT & CoC (site prep, engineering)
	2014	2014 CoC	2014 CoC & SRT (site prep, engineering)

Appendix F – CRREPA Revegetation Sites

No.	Location (Riverton Dr)	
1	Recommended management actions	Plant Saltwater Paperbark *(Melaleuca cuticularis)* among the Sea Rush (Juncus kraussii) to connect melaleucas downstream and upstream of this stretch Priority: high - mainly because the management action requires minimal effort - planting - with little or no follow-up maintenance action so that trees should become well established in the life of the management plan.
2	35-39	Rehabilitate understorey where the foreshore path used to be located with Ficinia nodosa, Centella asiatica and Melaleuca preissiana. Remove Sheoak opposite No. 37
3	51-65	To ensure continuity of the Canning River ecological link, it is essential that this long section be successfully revegetated with a mix of ground covers, shrubs and trees including Flooded Gum *(Eucalyptus rudis)* while still affording nearby residents views of the river and Mt Henry bridge. Soil testing to identify deficiencies that may need to be rectified to enable long term survival of native plants Further trial plantings of species including Club Rush (Ficinia nodosa), *Conostylis sp* and *Dianella revoluta* to identify those that have greatest prospects of long term, good growth Ongoing communication/consultation with nearby residents to seek their understanding of and support for the revegetation initiatives Compliance action in response to acts of vandalism and theft including installation of signs similar to those used by the former Swan River Trust and installation of CCTV cameras with signs advising of their use in the area. Priority: high - given the lack of trees along the path to road section and the time required for them to establish and mature.
4	75-79	To ensure continuity of tree cover, plant Flooded Gum *(Eucalyptus rudis)* in the parkland area and *Melaleuca cuticularis* (Saltwater Paperbark) in the sedges.
5	87	Cut back drain to end in a swale that will act as a bio-filter for the stormwater.
6	91-97	Undertake appropriate works to prevent further erosion of the beach area opposite Tuscan Street. Plant Eucalypts between the shared-use-path and road to address the severe deficiency, to complement the vegetation in the river corridor and provide shade for the path. Replace dead and senescent paperbarks *(Melaleuca rhaphiophylla)* In the current tree cover gaps above the sedges, plant Saltwater Paperbark *(Melaleuca cuticularis)*. Priority: high - given the lack of trees along the DUP to road section and the time required for them to establish and mature.
7	99-105	Tuscan Street reserve with playground - monitor trees for succession planting
8	109-111	Bank erosion – remove grass and revegetate with sedges *Juncus krausii* and *Baumea juncea*.

No.	Location (Riverton Dr)	
9	113-115	One of the original CRREPA sites. The sword sedge *(Lepidosperma gladiatum)* holds the banks really well. Sheoaks need to be actively managed with thinning and pruning up.
10	Corinthian Rd - 117	Erosion management required on steep slope (Note: road run-off from Corinthian Road could be dispersed to reduce impact.
11	119	Community Rivercare Program Grant: Rehabilitation of grassed area between sedges and shared use path planned for 2020
12	131	Very narrow foreshore section that is eroded. Access path needs logs or something to prevent further erosion
13	133	Newly planted slope needs tree cover at base of the slope and dead paperbark *(Melaleuca cuticularis)* needs replacing.
14	151 - Second Ave	Major beach area opposite Second Avenue – mainly used by water-skiers. Needs trees *(Eucalyptus rudis)* for shade as well as ecological linkage. Check on status of exposed pipe. It is subject to erosion. Rail fences to be maintained.
15	155-161	Natural area has good understorey and mid-storey but requires overstorey of Flooded Gum *(Eucalyptus rudis)* in the parkland area. Exclusion fence not to be removed.
16	171-185	Establish more Flooded Gums *(Eucalyptus rudis)* in the parkland area for both shade and movement of birds across this expansive recreation area.
17	187-189 (pipe)	Expand the sedge bank *(Juncus kraussii and Baumea juncea)* and plant Saltwater Paperbarks *(Melaleuca cuticularis)* in sedges. Retain stormwater drain as freshwater supply for water birds.
18	Rob Bruce	Need trees to link Rob Bruce Park better with foreshore. Flooded Gums *(Eucalyptus rudis)* in parkland and Saltwater Paperbarks *(Melaleuca cuticularis)* in sedges.
19	197-203	Encourage natural regeneration.
20	203-205	Manage the grassed area of the beach access to be ensure it does not invade the adjoining natural areas. Succession planting of Saltwater Paperbarks *(Melaleuca cuticularis)* in sedges.
21	205-207	Spray grass and weeds to encourage spread of *Juncus kraussii* up the bank.
22	207-211	Encourage natural regeneration to extend toward the shared-use-path.

No.	Location (Riverton Dr)	
23	225	Living Drain - cut pipe back to create living drain. Open pipe, NOT bubble-up pit. Replace dead Saltwater Paperback *(Melaleuca cuticularis)*.
24	227-Pleasant	Very important remnant Dampland of high conservation value. Note: Swamp Sheoak *(Casuarina obesa)* suckers are a significant problem, need to be actively managed.
25	Pleasant Place	Living Drain - cut pipe back to create living drain. Open pipe, NOT bubble-up pit. Replace dead Saltwater Paperback *(Melaleuca cuticularis)*.
26	229-231	Revegetate steep slope with Hakea prostrata (similar to NAT project opposite 133). Replace dead and senescing Saltwater Paperback *(Melaleuca cuticularis)*.
27	239-241	Community Rivercare Program Grant: Rehabilitation of grassed area between sedges and shared use path planned for 2019.
28	243-Beatrice	Grecian's Spit – continue to protect this important resting and foraging area for waterbirds. This is also important freshwater access site for waterbirds and bushbirds. Exclusion fence not to be removed. Investigate small, low-impact bird viewing platform.
29	Shelley Beach Park	Establish more Flooded Gums *(Eucalyptus rudis)* and Tuarts *(Eucalyptus gomphocephala)* in the parkland area for both shade and movement of birds across this expansive recreation area. Also establish more Saltwater Paperback *(Melaleuca cuticularis)* in sedge bank.
30	The Paddock	Establish more Flooded Gums *(Eucalyptus rudis)* and Tuarts *(Eucalyptus gomphocephala)* in the parkland area for both shade and movement of birds across this expansive recreation area
31	Dog Beach & associated parkland	Expand the sedge bank *(Juncus kraussii* and *Baumea juncea)* and plant Saltwater Paperbarks *(Melaleuca cuticularis)* in sedges. Exclusion fence not to be removed.
32	Sailing Club to Fishing Jetty & associated parkland	High level erosion area. Monitor and infill plant the existing rehabilitation projects of the former Swan River Trust (Sailing Club to Spit) and City of Canning, CRREPA and Rossmoyne Primary School Bushrangers' rehabilitation (around the fishing Jetty). Exclusion fences not to be removed.
33	Fishing Jetty-293	Encourage natural regeneration. More trees needed on foreshore to continue canopy up to the corner of Riverton Drive where the Casuarinas start again.
34	293-307	Encourage natural regeneration and establish trees (Flooded Gum or Tuart) in parkland area.

No.	Location (Riverton Dr)	
35	293-307	Encourage natural regeneration and establish trees (Flooded Gum or Tuart) in parkland area.
36	311-317	Encourage natural regeneration and replace dead and senescing trees.
37	323-343	Encourage natural regeneration and plant Melaleuca cuticularis in the sedge bank.
38	Wadjup (347-355)	Needs soil enrichment to encourage growth of ground cover.
39	357	North-west facing beach – future rehabilitation of grassed area.
40	359-363	North-east facing foreshore – Community Rivercare Program Grant: Rehabilitation of grassed area behind sedges in 2018.
41	367-369	Eroded beach – retain grassed area, but requires erosion control work on bank.
42	371	Passive encroachment of Sheoaks will replace the grass between sedge bank and shared use path. Rehabilitation with local native species is not recommended due to growth inhibiting influence of Sheoaks.
43	Zenith Park	Replace lawn with local native trees, shrubs and understorey as important local ecological link.
44	Park Beach Close	Park Beach Close parkland - increase trees and shrubs to include eucalypts *(Corymbia calophylla, Eucalyptus todtiana, E. gomphocephala and E. rudis)* and *Banksias (Banksia littoralis, B. menziesii and B. attenuata)*.
45	Parallel to Leach Highway	Protect the high conservation value of the wide sedge banks
46	Shelley Bridge sedgelands	Protect this important local sedgelands Establish Saltwater Paperbarks (Melaleuca cuticularis) on bank.

Yellow-billed Spoonbill, Credit: B Lambe