SUPPLEMENTARY AGENDA- COUNCIL MEETING 16 AUGUST 2023 ATTACHMENTS

11.3. PROPOSED ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21 - CONSIDERATION FOR FINAL APPROVAL.....2

11.3.1. AERIAL PHOTOGRAPH.....2

11.3.2. ADVERTISED ABBEY SOUTH STRUCTURE PLAN.....3

11.3.3. ADVERTISED SCHEME AMENDMENT.....470

11.3.4. SCHEDULE OF AGENCY SUBMISSIONS (3).....488

11.3.5. SCHEDULE OF PUBLIC SUBMISSIONS (3).....527

11.3.7. SCHEDULE OF MODIFICATIONS.....653

11.3.8. LEEUWIN NATURALISTE SUB REGIONAL STRATEGY PLANS (1).....662

11.3.9. INTERSECTION CONCEPTS AND TECHNICAL NOTE.....663

11.3.10. PEER REVIEW OF TECHNICAL NOTE.....690

11.3.11. FURTHER INFORMATION TO TECHNICAL NOTE.....695

11.4. APPLICATION FOR DEVELOPMENT APPROVAL (DA21/0822) - PROPOSED EXTRACTIVE (SAND) - LOT 4205 GALE ROAD KALOORUP.....732

11.4.1. EXCAVATION/REHABILITATION PLAN.....732

11.4.2. WATER MANAGEMENT PLAN.....830

11.4.3. PLANNING HISTORY.....852

11.4.4. SCHEDULE OF SUBMISSIONS.....861


Geographe Bay
INDIAN OCEAN
Geographe Bay Rd
Caves Rd
Bussell Hwy
Jones Way
Julianne St
Jeffers Cr
Diedre St
Barkle Cl
Quokka St
Yale Cl
Lincoln St
Edith Cowan Ct
Kooljak Rd
Stanford Dr
Beachfields Dr
Latrobe Pl
Macquarie Pass
Swinburne Pass
Monash Way
Oxford Cl
Cambridge Bvd
Flinders Cr
Newtown Beach Rd
Monaghans Way
Skiff Way
Cookworthy Rd
Averil St
Dawson Av
Phillip Pl
Karinga Rd
Cabarita Rd
John St
Forth St
Locke St
Pearce Rd
Cuthbert St
Roberts Rd
McCann Cl
Lot 4
Lot 12
Lot 14
Lot 11
Lot 6
Lot 8
Lot 9
Lot 1121
Lot 2002
Lot 2006
Lot 2008
Lot 2005
Lot 2009
Lot 4563
Lot 5614
Lot 1576
Lot 45
Lot 46
Lot 44
Lot 9003
Lot 9001
Lot S19
Lot S20
Lot 55
Lot 500
Lot S14
Lot S16
Lot S17
Lot S12
Lot 5303
Lot 4532
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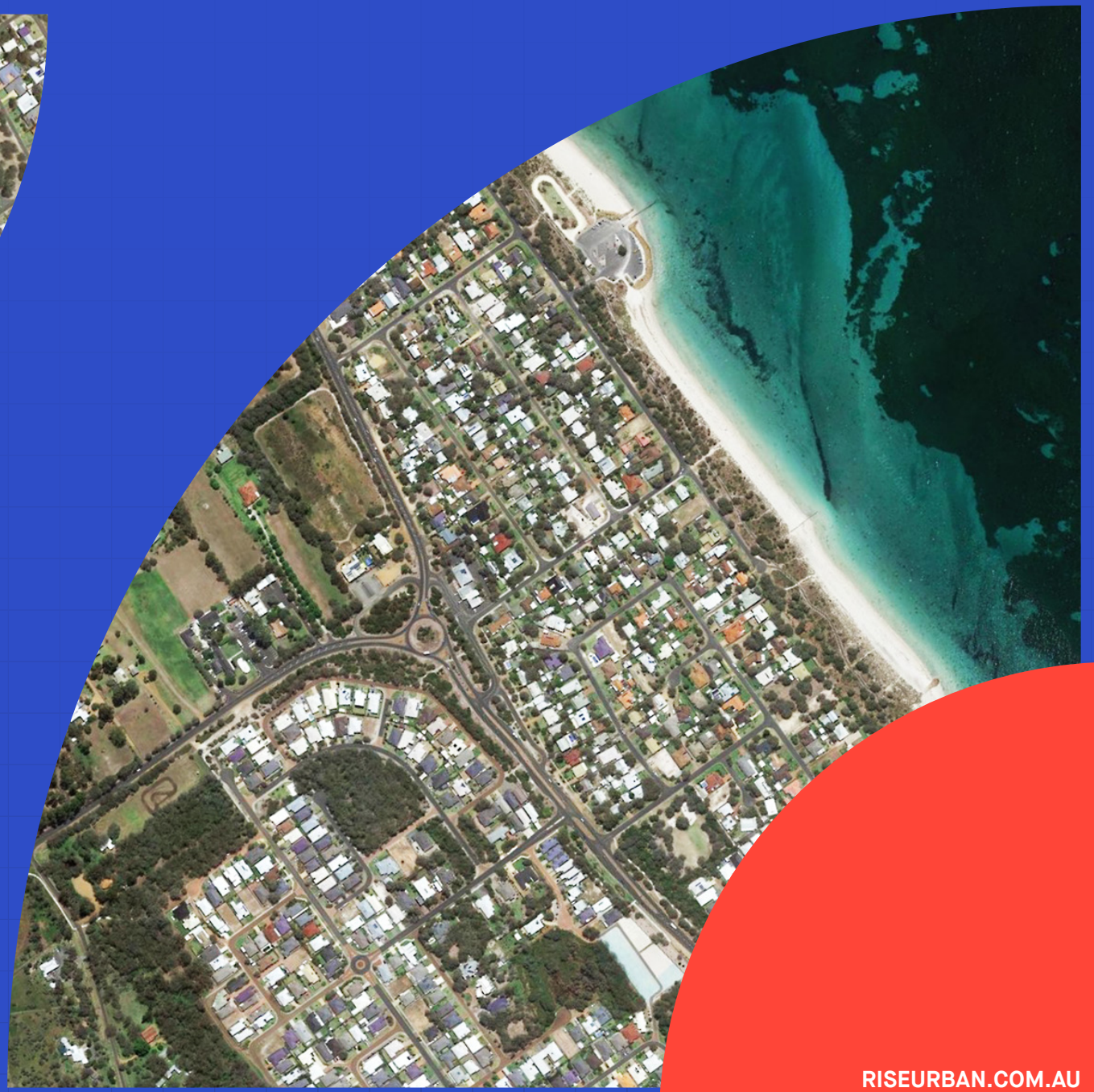

Rise Urban

Abbey South Structure Plan

Part I – Implementation Report

January 2023

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Table of Amendments

Amendment Number	Summary of the Amendment	Amendment Type	Date approved by the WAPC

Document Control

Version	Comment	Author	Approved By	Issue Date
3	Modified as per City of Busselton Resolution	NG	CL	Jan 2023

Disclaimer and Copyright

This document was commissioned by and prepared for the exclusive use of the landowners of Lots 4, 12 and 402 Caves Road, and Lots 14 and 15 Bussell Highway, Abbey ("the Abbey Landowner Group"). It is subject to and issued in accordance with the agreement between The Abbey Landowner Group and Rise Urban Pty Ltd.

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Rise Urban Pty Ltd, 2022.

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Executive Summary

Executive Summary

The Abbey South Structure Plan has been prepared to guide the subdivision and development of approximately 30.5 hectares of land on Lots 4, 12 and 402 Caves Road, and Lots 14 and 15 Bussell Highway, Abbey, within the City of Busselton.

The Structure Plan has been prepared on behalf of the landowners ("The Abbey Landowner Group") and in collaboration with the City of Busselton. The Structure Plan is informed by extensive technical reporting and analysis prepared by the following specialist consultant team:

- Rise Urban – Town planning and project coordination
- Studio CFM – Urban design
- Emerge Associates – Environment, hydrology, landscaping and bushfire
- Stantec – Civil engineering and transport planning

The Abbey South Structure Plan provides an overarching planning framework to guide and facilitate the development of the structure plan area for urban purposes, and has been prepared in accordance with the requirements of the *Planning and Development (Local Planning Schemes) Regulations 2015*.

The plan provides for an integrated and coordinated approach to an appropriate mix of land uses and infrastructure, necessary to create a strong and vibrant community, whilst delivering triple bottom line sustainability outcomes in accordance with the State and Local Government policy requirements.

Design Approach

The design approach has been a rigorous multidisciplinary process with continuous reflection upon the purpose of the Structure Plan. Design principles and considerations which have informed the design approach include:

- Understanding of the local vernacular and characteristics that make Abbey a unique place within the Geographe region and the broader South West region.
- Consideration of existing environmental and physical assets and infrastructure.
- Public Open Space allocation, function and community creation.
- Urban structure and place making that is environmentally responsive.
- Movement systems and connectivity that promote pedestrian activity and local street activation.

Project Overview

The Abbey South Structure Plan will create a framework for the future urban development of an anticipated 350+ dwellings, which will ultimately house a new community in the vicinity of 800-950 people, as well as a mix of commercial uses that recognise the existing commercial operations and provide an appropriate interface to Bussell Highway.

The Structure Plan recognises the unique location, and surrounding land use context whilst enabling a diverse range of housing typologies. The Structure Plan fulfils the strategic planning objectives identified in the Leeuwin Naturaliste Sub-regional Planning Strategy which was amended by the Western Australian Planning Commission in December 2021 to identify the Abbey South area as being suitable for urban development in the short to medium term.

It also assesses and resolves the 'Public Open Space Investigation Area' that was identified through the review of the Strategy, and provides an open space network that respects and responds to its physical context.



The Structure Plan supports residential densities of R10 – R60 and will ultimately deliver approximately 350 – 400 residential dwellings.

The Structure Plan area is serviced by essential infrastructure already located within the adjacent Caves Road reserve and can be easily extended to service future development in the Abbey South area with no expansion of capacity required.

This report comprehensively addresses all of the relevant planning considerations and demonstrates that the land is suitable for urban development in the form proposed.

Table 1 below sets out an indicative land use summary based on the Structure Plan map provided at Plan A, and the Concept Plan contained within the explanatory report.

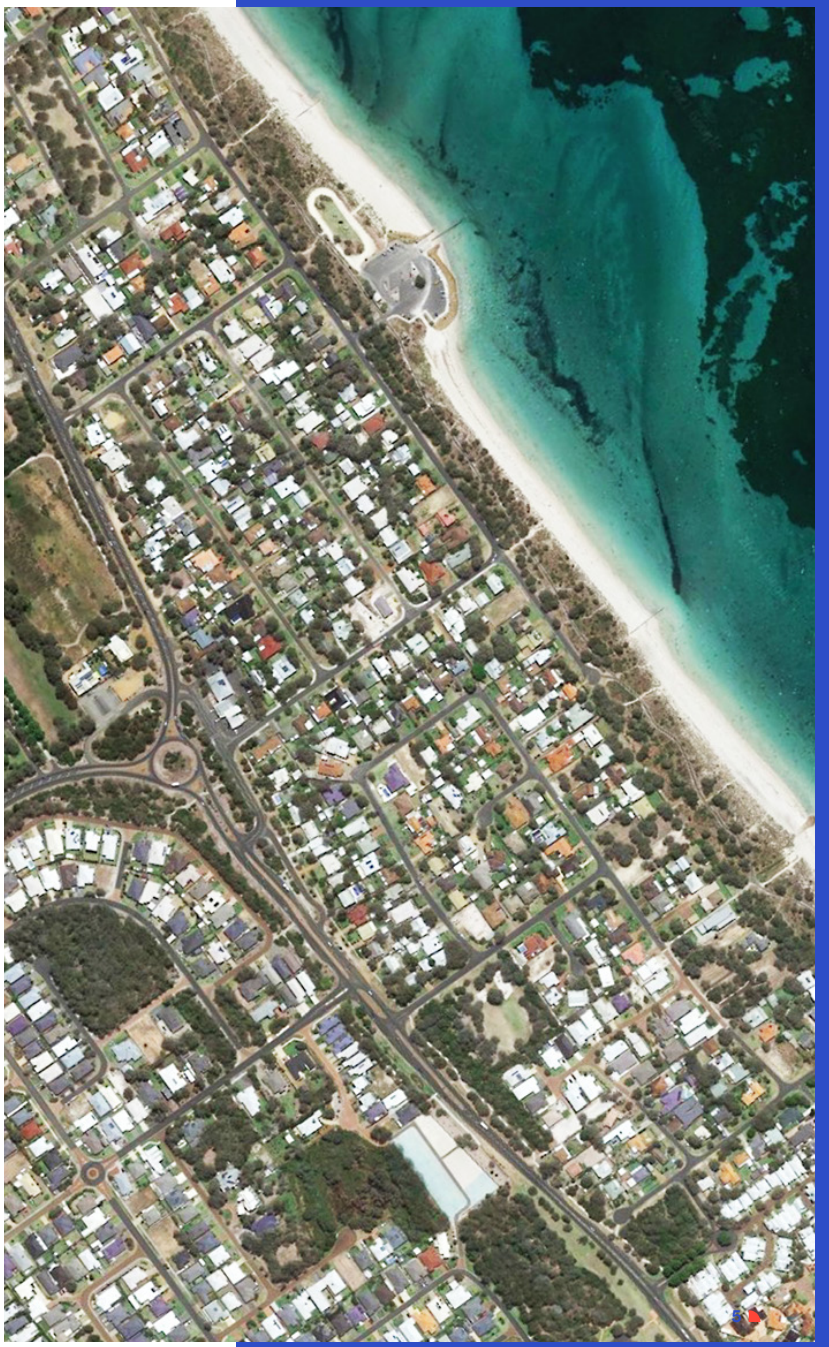
Table 1 – Land Use Summary

Item	Data
Structure Plan Area	30.5ha
Area of each land use proposed: Zones (as per LPS21): Residential Local Centre Reserves (as per LPS21): Recreation	 24.84ha 0.58ha 4.6ha (gross)
Estimated number of dwellings	350-400
Estimated residential site density - Dwellings per site hectare	Estimated 22 dwellings per site ha
Estimated population	875 – 1,000 people (@ 2.5 people per household)



Table of Contents

1.0	**Structure Plan Area**	**6**
2.0	**Structure Plan Content**	**6**
3.0	**Operation**	**6**
4.0	**Interpretation and Relationship with the Statutory Planning Framework**	**6**
5.0	**Staging**	**6**
6.0	**Land Use and Subdivision**	**7**
6.1	Subdivision and Development	7
6.2	Zones and Reserves	7
6.3	Residential Density	7
6.4	Public Open Space	7
6.5	Road Network and Access	7
6.6	Local Centre	7
7.0	**Notifications on Title**	**8**
8.0	**Local Development Plans**	**8**
9.0	**Further Subdivision Reporting**	**8**
10.0	**Development Contributions**	**8**



1.0 Structure Plan Area

The Abbey South Structure Plan Area applies to the land contained within the inner edge of the line denoting the Structure Plan boundary shown on the Structure Plan Map (Plan A: Structure Plan Map), and comprises all of Lots 4, 12 and 402 Caves Road and Lots 14 and 15 Bussell Highway, Abbey.

2.0 Structure Plan Content

This Structure Plan comprises:

- Part One – Implementation Section
- Part Two – Explanatory Report
- Appendices – Technical Reports

Part One of the Structure Plan comprises the structure plan map and planning provisions including zoning, subdivision and development controls. Part Two of the Structure Plan is the planning report component which can be used to interpret and implement the requirements of Part One.

3.0 Operation

This Structure Plan comes into effect on the date that it is endorsed by the Western Australian Planning Commission (WAPC) and expires ten years from the date that it is endorsed by the WAPC unless amended otherwise.

4.0 Interpretation and Relationship with the Statutory Planning Framework

The Structure Plan constitutes a structure plan pursuant to the City of Busselton Local Planning Scheme 21 and Schedule 2 - Deemed provisions for local planning schemes of the *Planning and Development (Local Planning Schemes) Regulations 2015*.

The Structure Plan Map (Plan A) outlines future land use, zones and reserves applicable within the Structure Plan area.

Pursuant to Schedule 2 of the *Planning and Development (Local Planning Schemes) Regulations 2015*, a decision maker of an application for development approval or subdivision approval is to have due regard to the provisions of this Structure Plan, including the Structure Plan Map, Implementation Report, Explanatory Report and any Technical Appendices.

5.0 Staging

Development staging will follow an orderly sequence and shall not exceed the extension of essential service infrastructure or constructed road access.



6.0 Land Use and Subdivision

6.1 Subdivision and Development

The subdivision and development of land is to generally be in accordance with the Structure Plan. Residential lots shall be designed such that future dwellings can achieve a minimum habitable floor level of 3.0m AHD consistent with the City's Coastal Hazard Risk Management Adaptation Plan.

6.2 Zones and Reserves

Plan A outlines land use, zones and reserves applicable within the structure plan area.

6.3 Residential Density

6.3.1 Density Codes

Where the Structure Plan Map depicts a specific residential density code, residential densities applicable to the Structure Plan shall be those residential densities shown on the Structure Plan Map.

6.3.2 Density Ranges

Where the Structure Plan Map depicts a density range (for example R20-R40), the following locational criteria shall be applied at subdivision stage:

The lower density code shall apply as the base code to all 'Residential' zoned lots.

The higher density code may be applied to 'Residential' zoned lots where one or more of the following applies:

(a) The lot has a laneway abutting the rear boundary.

(b) The lot is directly abutting or immediately opposite the central public open space 'spine'.

(c) The lot is within a 400m walkable catchment of the 'Monaghans' local centre.

(d) The lot or lots are located at the end of a street block.

6.3.3 Residential Density Code Plan

(a) Where a density range applies, lot specific residential densities, within the defined residential ranges, are to be subsequently assigned in accordance with a Residential Density Code Plan approved by the Western Australian Planning Commission at subdivision stage.

(b) A Residential Density Code Plan is to be submitted at the time of subdivision to the WAPC and shall be consistent with the Structure Plan and the Residential Density Ranges identified on the Structure Plan Map and the density range criteria in section 6.3.2.

(c) The Residential Density Code Plan is to include a summary of the proposed dwelling yield of the subdivision.

(d) Approval of the Residential Density Code Plan shall be undertaken at the time of determination of the subdivision application by the WAPC. The approved Plan shall then form part of the Structure Plan and shall be used for the determination of future development applications and R-Code Assessments.

(e) Variations to the Residential Density Code Plan will require further approval of the WAPC, with a revised Plan submitted generally consistent with the approved plan of subdivision issued by the WAPC.

(f) A revised Residential Density Code Plan, consistent with clause 6.3.3 (e) will replace, wholly or partially, the previously approved Plan, and shall then form part of the Structure Plan as outlined in Clause 6.2.2 (d).

(g) Residential Density Code Plans are not required if the WAPC considers that the subdivision is for one or more of the following:

i. The amalgamation of lots;

ii. Consolidation of land for superlot purposes to facilitate land assembly for future development; or

iii. The purposes of facilitating the provision of access, services or infrastructure.

6.4 Public Open Space

A minimum of 10% Public Open Space (POS) is to be provided at the time of subdivision in accordance with the WAPC's Liveable Neighbourhoods. POS is to be provided generally in accordance with Plan A and Table 4 – POS Schedule, with an updated POS schedule to be provided at the time of subdivision for determination by the WAPC, on the advice of the City of Busselton.

6.5 Road Network and Access

All roads within the Structure Plan area are classified as 'Access Street D' pursuant to Liveable Neighbourhoods with the exception of the western access to Caves Road, which is classified as 'Access Street B' as indicated on Plan A – Structure Plan Map.

A 20m wide perimeter road for bushfire separation purposes is to be provided generally in the locations depicted on Plan A – Structure Plan Map.

Access to Caves Road and Bussell Highway shall be generally in the locations and format depicted on Plan A. Direct lot access to Caves Road and Bussell Highway is not permitted.

6.6 Local Centre

6.6.1 Retail Floor Space

Shop / retail uses (PLUC 5) within the Local Centre zone are restricted to not more than 300m2 of gross floor area in aggregate unless supported by a Retail Sustainability Assessment prepared in accordance with SPP 4.2.

6.6.2 Land Use

Land use permissibility is in accordance with Table 1 - Zoning Table of the City's Local Planning Scheme 21, with the exception of the following uses, which are 'X' (prohibited) uses in the Local Centre zone as depicted on the Structure Plan Map:

- Service Station

7.0 Notifications on Title

In respect of applications for the subdivision of land, the City of Busselton may recommend to the WAPC that condition(s) be imposed on the grant of subdivision approval for a notification to be placed on the Certificate(s) of Title(s) pursuant to s.165 of the *Planning and Development Act 2005* to advise of the following:

a) Land or lots deemed to be affected by a Bush Fire Hazard as identified in the Bushfire Management Plan (Emerge Associates) contained within Appendix 3.

b) Land or lots deemed to be affected by coastal inundation in accordance with the City of Busselton Coastal Hazard and Risk Management Adaptation Plan and State Planning Policy 2.6 – State Coastal Planning Policy.

c) Land or lots deemed to be in close proximity to known mosquito breeding areas.

8.0 Local Development Plans

Local Development Plans (LDPs) are required to be prepared and implemented pursuant to Part 6 of Schedule 2 of the *Planning and Development (Local Planning Schemes) Regulations 2015* for lots comprising one or more of the following site attributes:

- Lots zoned Local Centre;
- Lots with rear-loaded (laneway) vehicle access;
- Lots that propose grouped or multiple dwelling development;
- Lots with direct boundary frontage (primary or secondary) to an area of POS;
- Lots located within an area with a density coding of R10;
- Lots that are deemed to be affected by road noise as determined in accordance with SPP 5.4.

9.0 Further Subdivision Reporting

As a condition of subdivision approval, the City of Busselton may recommend, and the WAPC may impose conditions requiring the following additional technical reports:

- Urban Water Management Plan.
- Bushfire Attack Level (BAL) Assessment.
- Traffic Noise Assessment.
- Mosquito Management Plan.

10.0 Development Contributions

The Structure Plan is located within DCA1 – Community Infrastructure under the City of Busselton Local Planning Scheme 21 and as such is subject to development contributions for community and service infrastructure located throughout the City of Busselton.

All shared infrastructure within the Structure Plan area, including the distribution of public open space, is to be funded via private agreement between landowners.

PLAN A: STRUCTURE PLAN MAP



0 25 50 75 100 125m

DRAFT

LOCAL STRUCTURE PLAN

LOTS 4 & 12 CAVES ROAD & LOTS 14, 15 & 402 BUSSELL HIGHWAY, ABBEY.

NOTE:
Base Data supplied by Landgate / Denada Surveys
Aerial Photo - Feb 2019
Projection - BCG94
Areas and dimensions shown are subject to final survey calculations.

Revision	Date	Item
A	29/6/22	Initial issue

LEGEND

- STRUCTURE PLAN BOUNDARY
- RESIDENTIAL R10
- RESIDENTIAL R20 - R40
- RESIDENTIAL R60
- RECREATION RESERVE
- LOCAL CENTRE (R60)
- FLOODWAY
- PERIMETER ROAD
- ACCESS STREET B
- HIGHER ORDER CYCLE PATH
- ACCESS STREET D (INDICATIVE ONLY)
- FUTURE PEDESTRIAN / CYCLE CONNECTION TO BUAYANYUP DRAIN CYCLE PATH
- EMERGENCY SECONDARY EGRESS
- (2) POS NUMBER
- ROUNDABOUT
- FULL MOVEMENT INTERSECTION
- LEFT IN / LEFT OUT INTERSECTION

-	:	CLIENT
A3@1:2,500	:	SCALE
15 December 2022	:	DATE
IA Abbey-2-001	:	PLAN No
B	:	REVISION
C.L.	:	PLANNER
B.L	:	DRAWN

Rise Urban
AGILE PLANNING FOR THE NEW NORMAL

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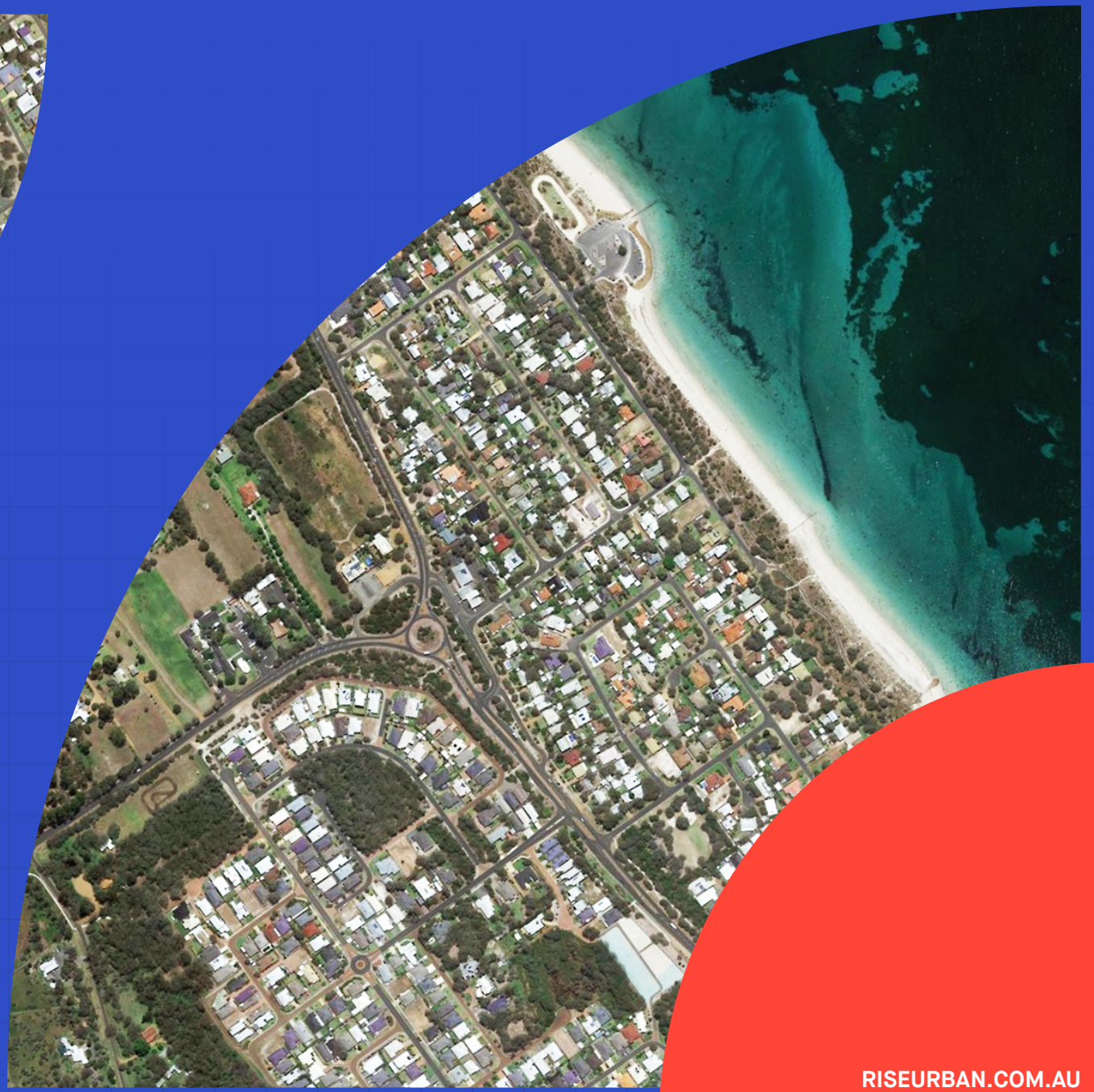

Rise Urban

Abbey South Structure Plan

Part II – Explanatory Report

January 2023

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Contents

Introduction and Purpose		**4**
Part 1 - Site Context		**5**
1.1	Legal Description and Ownership	5
1.2	Location	6
1.3	Site Description and Existing Land Uses	7
1.4	Surrounding Land Uses	9
Part 2 - Planning Context		**11**
2.1	City of Busselton Local Planning Scheme 21	11
2.1.1	Landscape Value Area	11
2.1.2	Floodway and Wetland Areas	11
2.2	Leeuwin-Naturaliste Sub-regional Strategy	13
2.3	Statement of Planning Policy 6.1 Leeuwin Naturaliste Ridge Policy	15
2.4	City of Busselton Local Planning Strategy (City of Busselton, 2019)	19
2.5	State Planning Policy 2.6 – State Coastal Planning Policy (WAPC, 2013)	19
2.6	State Planning Policy 3.7 – Planning in Bushfire Prone Areas (WAPC, 2015)	20
2.7	State Planning Policy 5.4 – Road and Rail Noise (WAPC, 2019)	20
2.8	Liveable Neighbourhoods Operational Policy (WAPC, 2009)	20
Part 3 : Site Conditions, Opportunities and Constraints		**21**
3.1	Vegetation and Flora	21
3.2	Fauna	21
3.3	Landform and Landscape	21
3.4	Floodways and Wetlands	22
3.5	Surface and Groundwater	23
3.6	Bushfire	23
3.7	Aboriginal and European Heritage	23
3.8	Regional Road Network – Access and Capacity	23
3.8.1	Future Regional Road Network	25
3.8.2	Access to the Regional Road Network	25
3.9	Traffic Noise	25
3.10	Servicing	27
3.10.1	Earthworks	27
3.10.2	Wastewater	27
3.10.3	Reticulated Water	27
3.10.4	Underground Power	27
3.10.5	Gas	27
3.10.6	Telecommunications	27
Part 4 – Abbey South Structure Plan		**29**
4.1	Structure Plan Guiding Principles	29
4.2	Urban Form	29
4.3	Land Use	32
4.4	Housing Density and Yield	32
4.5	Open Space	32
4.5.1	Open Space Principles	33
4.5.2	Open Space Investigation Area	33
4.5.3	Public Open Space Schedule	35
4.5.4	Public Open Space Description	36
4.6	Drainage and Water Management	38
4.6.1	Water Supply and Conservation	39
4.6.2	Stormwater Management	39
4.6.3	Groundwater Management	39
4.7	Bushfire Mitigation	39
4.8	Road Network	40
4.8.1	Access to the Regional Network	40
4.8.2	Internal Road Network	40
4.8.3	Pedestrian and Cyclist Network	40
4.9	Delivery Staging and Development Contributions	42

List of Tables, Figures and Appendices

Tables

1. Abbey South Structure Plan Property Description
2. Wetland Amenity Area Policies
3. SPP 5.4 Noise Targets
4. Public Open Space Schedule

Figures

1. Location Plan
2. Site Plan
3. Context Plan
4. LPS21 Zoning Plan
5. Leeuwin – Naturaliste Sub-regional Strategy Map
6. SPP 6.1 – Land Use Strategy Plan
7. Floodway and Waterway Features Mapping
8. BAL Contours
9. Sewer Pump Station
10. Abbey South Structure Plan
11. Abbey South Concept Plan
12. Abbey South Landscape Concept
13. Public Open Space 1 Landscape Concept
14. Drainage Strategy
15. Road Hierarchy Map
16. Perimeter Road Cross Section
17. Preliminary Staging Plan

Appendices:

1. Environmental Assessment – Emerge Associates
2. Local Water Management Strategy – Emerge Associates
3. Bushfire Management Plan – Emerge Associates
4. Traffic and Transport Assessment – Stantec
5. Servicing Strategy – Stantec
6. POS and Landscape Strategy – Emerge Associates
7. Abbey South Structure Plan and Concept Plan – Rise Urban and Studio CFM
8. Open Space Investigation Report – Rise Urban



Introduction and Purpose

This Structure Plan has been prepared in accordance with the obligations set out under Part 4 – Structure Plans of Schedule 2 – Deemed Provisions of the *Planning and Development (Local Planning Schemes) Regulations 2015*.

The purpose of this Structure Plan is to establish a contemporary planning framework that provides for future subdivision and development of the Abbey South precinct. Significantly, the Structure Plan not only establishes the spatial context for future subdivision, but also investigates the physical and environmental attributes of the 'Public Open Space Investigation' area that is identified in the Leeuwin – Naturaliste Sub-regional Strategy, and determines the extent of this area that should be set aside as public open space to provide for drainage, conservation and recreation.

Overall, the Structure Plan aims to enable development of the precinct into a residential community with a mix of housing densities and typologies that respond to the local conditions, while addressing and responding to all site features.

This Structure Plan also informs and will be processed in parallel with an amendment to the City of Busselton Local Planning Scheme 21 (LPS21) to rezone the Abbey South area from the Rural and Conservation zones to the Urban Development zone. The Urban Development Zone provides the head of power to enable this Structure Plan to be determined pursuant to clause 15 of Schedule 2 – Deemed Provisions of the *Planning and Development (Local Planning Schemes) Regulations 2015*.

This report is the explanatory report for the Structure Plan, and is to be read in conjunction with the Part 1 Implementation Report, as well as the Structure Plan Map which is contained in the Implementation Report.

Consistent with clause 27 of the Deemed Provisions, this Structure Plan is a 'due regard' document for the purposes of assessing and determining subsequent subdivision and development applications.



Part 1 – Site Context

The following sections provide an overview of the physical and legal context of the Structure Plan area.

1.1 Legal Description and Ownership

The Structure Plan area comprises the entirety of five freehold lots within the former Abbey Planning Investigation Area as defined in the Leeuwin Naturaliste Sub-regional Strategy, totaling 30.5ha. Table 1 below summarises the legal description and ownership of each of the five lots.

Table 1 – Abbey South Structure Plan Property Description

Lot Number	Street Address	Street	Diagram	Land Area (ha)	Owner
12	N/A	Caves Road	43998	2.68	Lowe Pty Ltd and Lukin Pty Ltd
4	63	Caves Road	46285	23.91	Michael Stewart and Venetia Bennett
402	12	Caves Road	252489	0.58	Donna Michelle Carlyle, Christopher Ronald Carlyle
14	5840	Bussell Highway	96590	2.77	Thomas Benford Norris, Judith Doris Driver
15	5842	Bussell Highway	96590	0.56	Erica Pauline Maisey

All of the landowners within the Structure Plan area have provided their consent and support for the progression of planning over their land.



1.2 Location

The Abbey South Structure Plan area is located within the City of Busselton municipality in the south-west of Western Australia. It can be generally described as the land immediately to the west of Bussell Highway and south of Caves Road in the Busselton suburb of Abbey.

The Structure Plan area is located approximately 8.5km west of the Busselton town centre, 15.5km east of the Dunsborough town centre, and approximately 2km north of the Vasse town centre. It comprises a significant portion of the last remaining undeveloped land with significant development potential north of Busselton Bypass and within the Busselton township.

A location plan is provided at Figure 1.

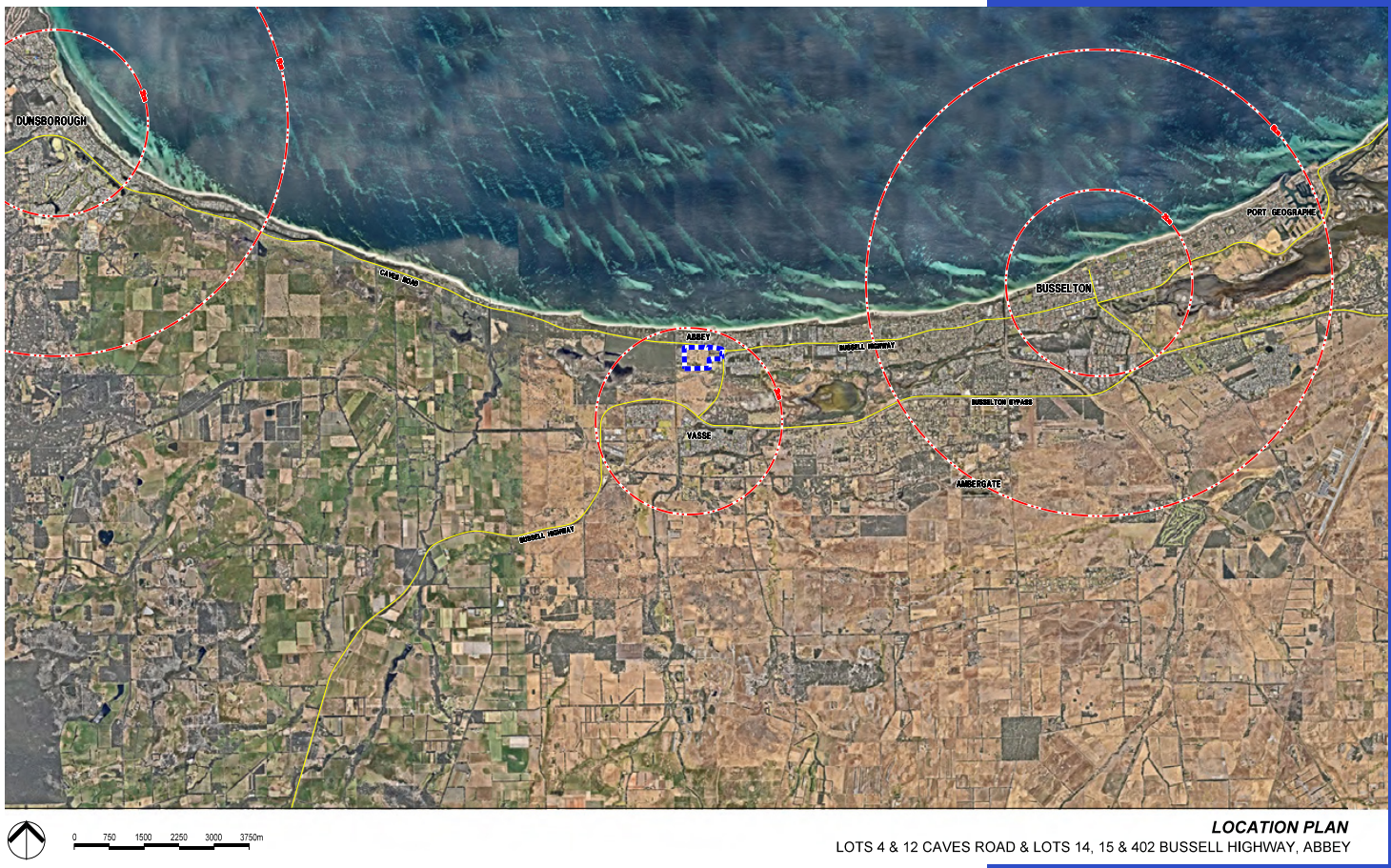


Figure 1 Location Plan

1.3 Site Description and Existing Land Uses

The Structure Plan area comprises approximately 30.5ha of land. The following sets out a brief description of the current land use and physical context of the site, while a site plan is provided at Figure 2.

The Structure Plan area is characterised by rural land uses to the north and west and an eclectic mix of rural-residential, tourism and commercial uses along the eastern edge fronting Bussell Highway.

Lots 4 and 12 Caves Road – together forming the northern interface to Caves Road, are both parkland cleared with scattered peppermint trees across Lot 4, and a strip of mature trees forming the boundary between the two properties. Both properties have previously been used for cattle grazing. Lot 12 is currently unused and vacant. Lot 4 has two separate dwellings at the northern and southern ends of the property, with the remainder of the property being used for cattle grazing.

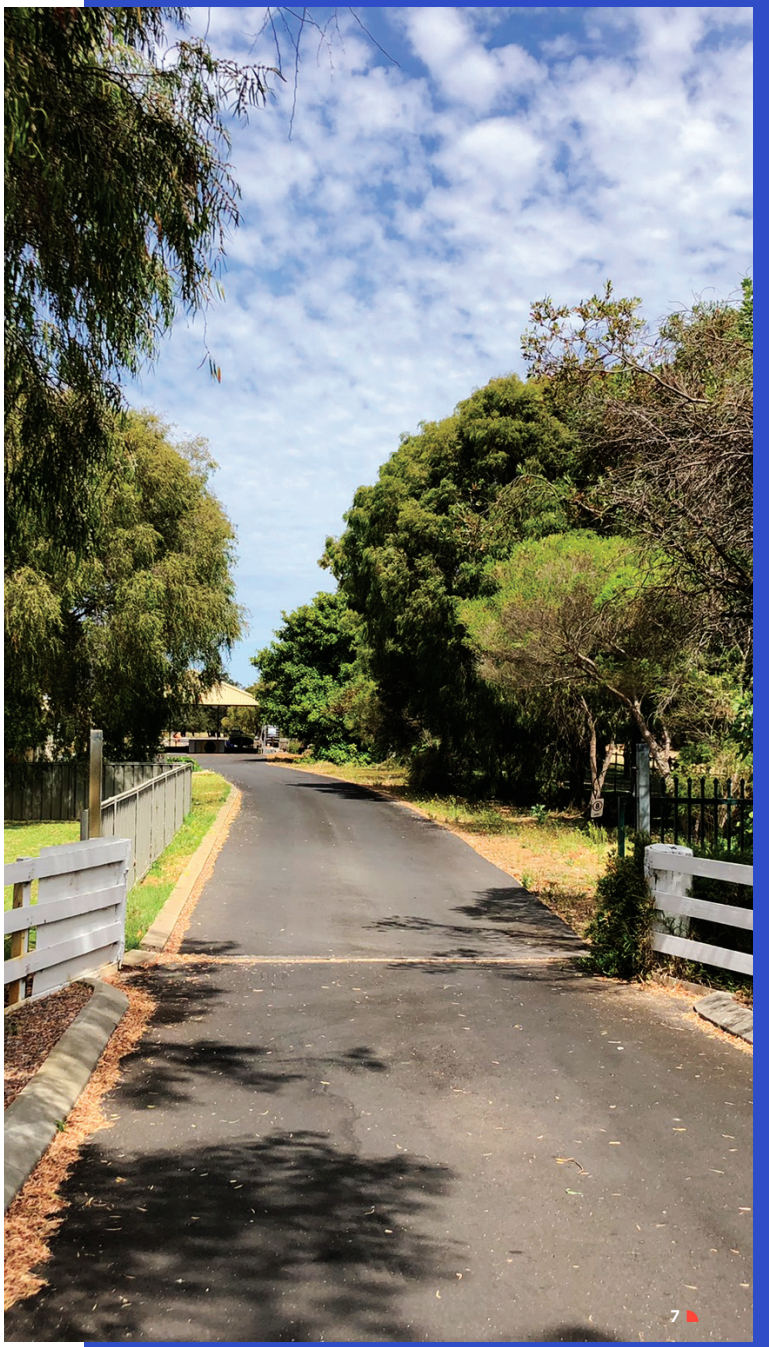
The predominantly cleared and undeveloped nature of both lots lends itself to more intensive land uses, with opportunities to retain mature vegetation within open space and road reserves. The southern portion of Lot 4 is lower lying and some of it is prone to seasonal inundation.

Lots 4 and 12 are screened from Caves Road by a continuous strip of dense, mature vegetation located within the Caves Road reserve. The retention of this vegetation within the Caves Road reserve ensures that the landscape and viewscape when viewed from Caves Road will be largely unaltered by development within the Structure Plan area.

Lot 402 is located on the corner of Bussell Highway and Caves Road and is currently occupied by 'The Shed Markets' – a popular local market selling fresh local produce, prepared food and coffee. The Shed Markets provides a unique opportunity for early amenity and a sense of place as the surrounding land uses evolve. There is an existing older style single dwelling on the north side of the Shed Markets with two separate crossovers to Caves Road.

Lot 14 is a rural residential property to the south of Lots 402 and 12. Lot 14 is improved by a large single dwelling and associated outbuildings. Lot 14 is separated from the lots to the north and west by a strip of mature peppermint trees, providing interim opportunities for screening and amenity if Lots 4 and 14 develop at different times. Lot 14 has an existing paved driveway and crossover access to Bussell Highway.

Immediately adjacent to the east and south of Lot 14 is the Busselton Ice Supply (Lot 15), which is an existing commercial / light industrial use supplying ice and cold storage facilities. Lot 15 is occupied by a number of large sheds and warehouses, as well as an older style single dwelling located towards the front (east) of the property. Both the Busselton Ice Supply business and the single dwelling have separate crossovers and access to Bussell Highway. Intensification and future subdivision of the Structure Plan area creates an opportunity to consolidate these access points to Bussell Highway, improving efficiency and safety on this stretch of the highway.





SITE PLAN

LOTS 4 & 12 CAVES ROAD & LOTS 14, 15 & 402 BUSSELL HIGHWAY, ABBEY

Figure 2 Site Plan

1.4 Surrounding Land Uses

The Structure Plan area is framed on all sides by boundary-defining natural and man-made land uses which combine to make the site a self-contained enclave that is well suited to urbanisation without encouraging further sprawl into less suitable areas. A context plan is provided at Figure 3 and demonstrates the self-contained nature of the site.

The Structure Plan area is bordered by Bussell Highway and Caves Road on its eastern and northern boundaries respectively. Having regional roads on two sides is a significant advantage as it provides for a range of access options, ensures the early delivery of key service infrastructure (which is typically located within the regional road reserves) and avoids congestion on existing local roads. Intensification of land uses adjacent to regional roads is a sound planning principle as it makes efficient use of the existing infrastructure, and prevents undue pressure from being applied to less suitable roads and infrastructure elsewhere. The opposite sides of both Caves Road and Bussell Highway are developed with low to medium density urban residential uses, while a small local commercial centre is located on the north side of the Bussell Highway / Caves Road roundabout, providing local retail convenience for surrounding residents.

To the south east of the Structure Plan area are Lots 6, 8 and 11 Bussell Highway. Lots 6 and 8 are used for rural residential purposes. Lot 11 accommodates the Amelia Park Lodge – a popular hospitality complex incorporating a restaurant, tavern and guest accommodation, as well as the heritage listed Newtown House – an 1850s limestone homestead. Like The Shed, the Amelia Park Lodge is a fantastic opportunity to leverage early amenity and a sense of place for residential and 'urban' style development within the adjoining Structure Plan area.

Adjacent to the western edge of the site is the existing RAC Busselton Holiday Park, a large scale holiday park including chalets / cabins, camping and caravan sites, as well as an extensive range of recreation infrastructure and amenities in a landscaped setting. Direct interface between holiday parks and more traditional residential development is common in the western part of Busselton, and has been managed through the Structure Plan design process such that the amenity of both the holiday park users and the permanent residents will be adequately protected.

At present there is no safe pedestrian or cycle connection between the RAC Busselton Holiday Park and The Shed Markets, Amelia Park Lodge, and other non-residential, high amenity uses further to the east. The Structure Plan is an opportunity to connect these two uses via a series of pedestrian and cycle friendly links located away from the busy Caves Road and Bussell Highway.

Buayanyup Drain is located west of the Holiday Park. The Buayanyup Drain forms the lower portion of the Buayanyup River system and has been artificially straightened into a drain for several kilometres before the river meets Geographe Bay at Abbey beach. The Structure Plan area is not within the Buayanyup catchment, however flooding of the drain during peak storm events and the potential for inundation over portions of the site is an important consideration, and has been addressed in the Local Water Management Strategy that accompanies this Structure Plan.

Locke Nature Reserve is located immediately to the west of Buayanyup Drain (220m west of the Structure Plan area). The Locke Nature Reserve is a 220ha, publicly accessible nature reserve that provides a conservation and passive recreation function for the Busselton and Dunsborough communities. In contrast to the Structure Plan area it is heavily vegetated, and largely undisturbed by rural or urban land uses. The proximity of the Structure Plan area to the Locke Nature Reserve is an ideal opportunity to create a unique sense of place and to encourage future residents to take on a high level of local custodianship of this reserve. It also provides a clear demarcation and permanent 'green belt' between the settlements of Abbey to the east and greater Dunsborough to the west.

The southern boundary of the Structure Plan area is framed by Lot 37 (Reserve 44754) which is Crown land under the care and control of the City of Busselton, and is a 10m wide unmade road reserve often referred to as Fox Road. Fox Road contains a strip of planted peppermint trees and eucalypts, and forms a natural bund between the southern extent of the Structure Plan area (which sits at around 2.5m-3m AHD on the southern boundary) and the lower lying floodway further to the south which sits at around 1m AHD. Lot 37 and the floodway provide both a natural and cadastral boundary between the Structure Plan area and the surrounding rural areas. There is an opportunity to utilise Fox Road to connect through to the existing cycle way along the edge of the Buayanyup Drain, and provide direct cycle and pedestrian access to the existing schools, retail facilities and amenities at Vasse to the south.

The area to the south of Fox Road, commonly referred to as Vasse North, is also identified for future urban purposes in the Leeuwin - Naturaliste Sub-regional Strategy. It is understood that there are no current proposals to rezone this land, and that further investigations into the suitability of the northern portions of the Vasse North site for urban development are required prior to any formal planning being progressed over the site.



CONTEXT PLAN

LOTS 4 & 12 CAVES ROAD & LOTS 14, 15 & 402 BUSSELL HIGHWAY, ABBEY

Figure 3 Context Plan

Part 2 – Planning Context

The following provides a brief synopsis of those planning instruments and decisions that are directly relevant to the Structure Plan.

2.1 City of Busselton Local Planning Scheme 21

The City of Busselton Local Planning Scheme 21 (LPS21) forms the primary statutory land use control over the Structure Plan area. There is no higher-order region scheme or similar applicable to the Structure Plan area.

At present LPS21 zones the majority of the Structure Plan area, including the entirety of lots 12, 402, 14 and 15 and the northern half of lot 4 as 'Rural'. The Rural zoned portion of the Structure Plan area is not affected by any special control areas or similar.

The southern portion of lot 4, along with the lower lying land to the south is zoned 'Conservation'. It is unclear as to how the zoning boundary between the Conservation and Rural zones on lot 4 was derived as it does not correspond to any specific natural feature on the site (i.e. contours, vegetation, wetlands etc). As discussed further in the following section, the detailed environmental investigations have confirmed that there are no specific conservation-worthy features within this portion of the Conservation zone.

The Conservation zoned portion of lot 4 is identified in the WAPC's Leeuwin - Naturaliste Sub-regional Strategy as 'Public Open Space Investigation' and requires further investigation into its suitability for public open space as part of the structure plan process. This Structure Plan is the mechanism through which these further investigations can occur.

A Scheme amendment request has been lodged with the City of Busselton concurrently with this Structure Plan to rezone the Structure Plan area to the 'Urban Development' zone; thereby providing a head of power for this Structure Plan to proceed and be determined.

LPS21 identifies three separate Special Control Areas (SCAs) over the southern portion of the Structure Plan area within Lot 4, being Landscape Value, Floodway and Wetland. Consideration of these SCAs and the values that they contain is discussed below

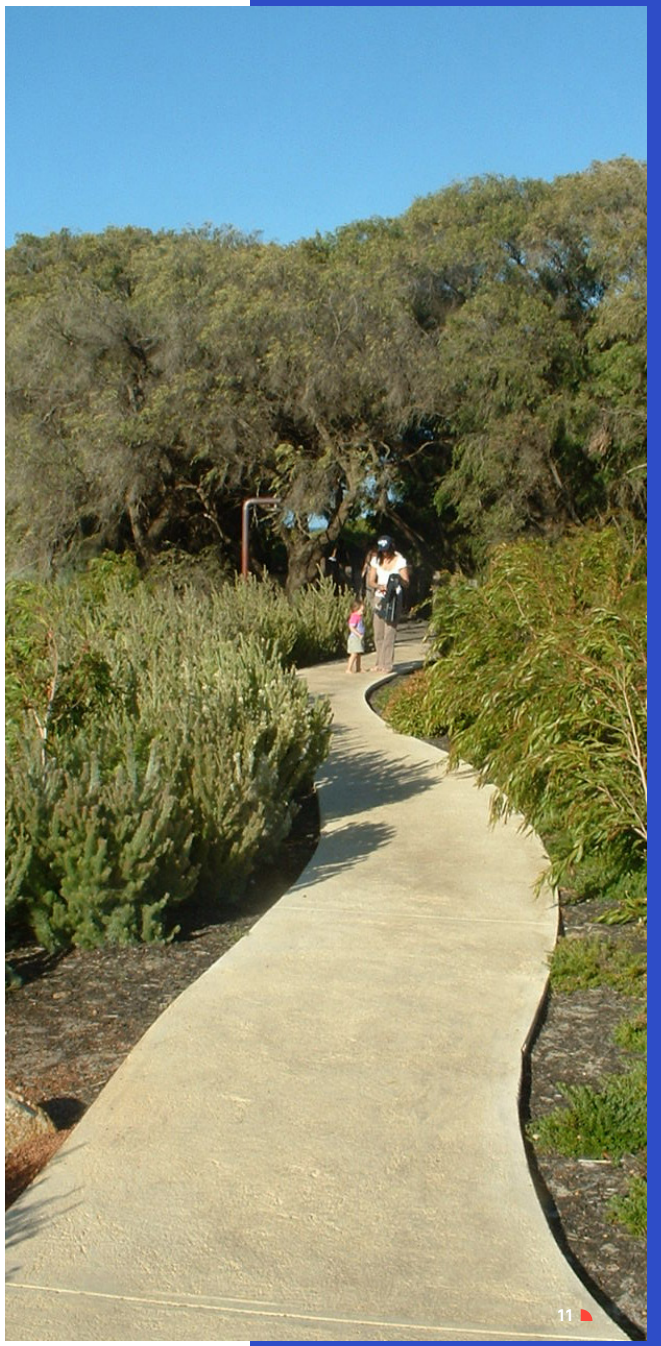
2.1.1 Landscape Value Area

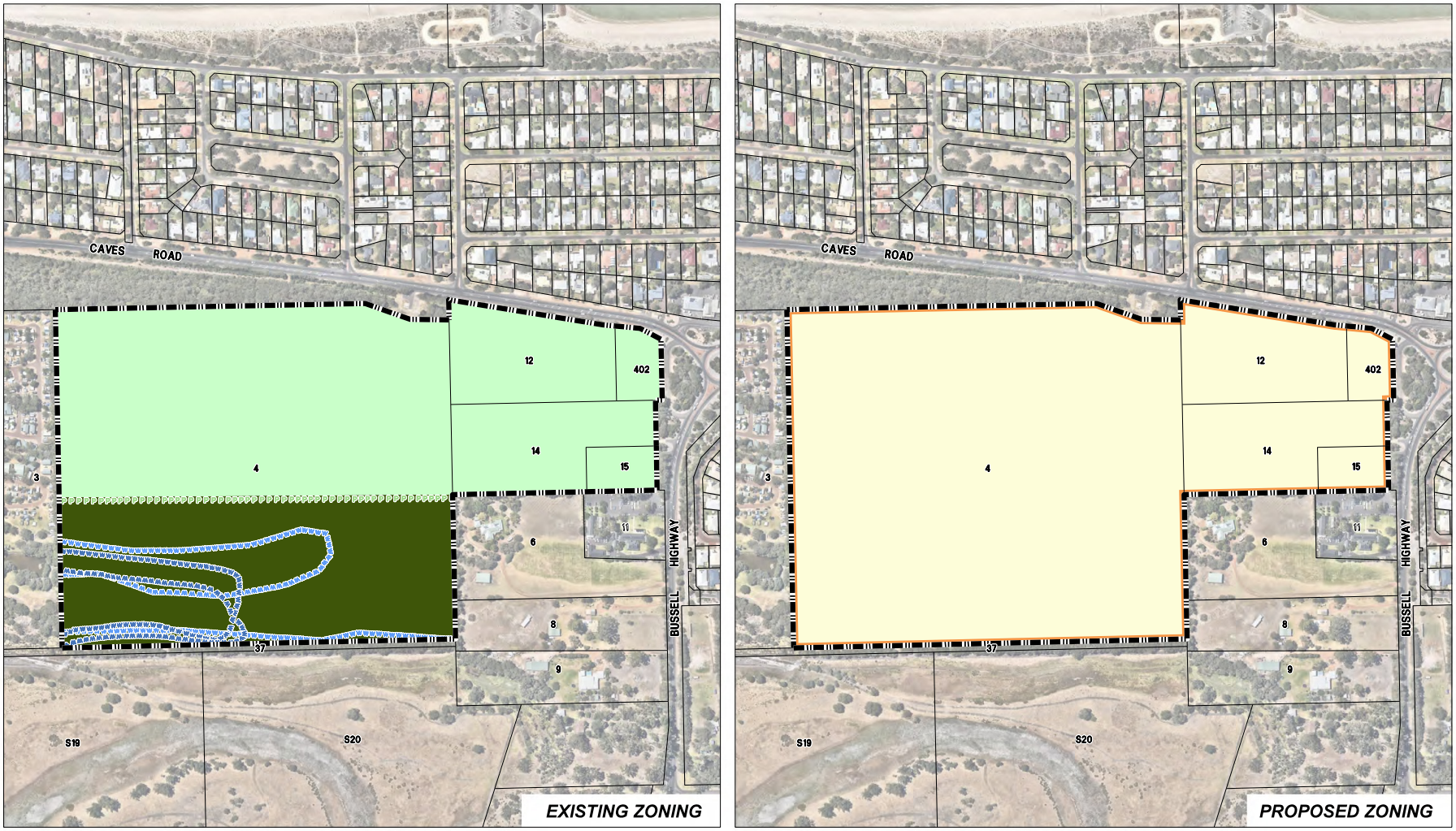
The portion of Lot 4 that is currently zoned 'Conservation' is also located within the Landscape Value Area SCA. All clearing and development in the Landscape Value area requires development approval from the City of Busselton, and these proposals are required to be compatible with the existing landscape, viewscape or environmental values associated with the area. The Scheme amendment removes the Landscape Value Special Control area from the Structure Plan area, as the SCA will no longer be necessary to protect the landscape values once the Structure Plan is in place.

2.1.2 Floodway and Wetland Areas

Irregular parts of the southern portion of Lot 4 (in the current 'Conservation' zone) are located within the Floodway Area and Wetland Area SCA. The mapped floodway within lot 4 is essentially a small 'offshoot' of the main floodway located further to the south and outside of the subject area.

A map depicting the current and proposed LPS21 zoning and Special Control Areas is shown at Figure 4.





0 50 100 150 200 250m

LPS21 ZONING PLAN

LOTS 4 & 12 CAVES ROAD & LOTS 14, 15 & 402 BUSSELL HIGHWAY, ABBEY

Figure 4 LPS21 Zoning Plan

2.2 Leeuwin-Naturaliste Sub-regional Strategy

The *Leeuwin-Naturaliste Sub-regional Strategy* ("the Strategy") was published by the WAPC in May 2019. The Strategy is an overarching strategic land use planning document outlining the WAPC's approach to future planning and development within the City of Busselton and the Shire of Augusta-Margaret River over the next 20 years.

The 2019 version of the strategy identified five Planning Investigation Areas, of which the Abbey South Structure Plan area was one. These five PIAs were assessed and considered by the WAPC in November 2021, where in relation to the Abbey PIA, the WAPC resolved to:

1. Designate the following lots as 'Urban':
   - Lot 12 on Diagram 43998
   - Lot 14 on Diagram 96590
   - Lot 15 on Diagram 96590
   - Lot 402 on Deposited Plan 252489
   - Northern portion of Lot 4 on Diagram 46285
2. Designate the following lots as 'Open Space Investigation':
   - Southern portion of Lot 4 on Diagram 46285.
3. Remove the Abbey Planning Investigation Area from the Strategy Plan.
4. Require the preparation of a single structure plan over the entirety of the land identified in (1) and (2) above. In addition to the information to be included in a structure plan outlined in Clause 16 of the Deemed Provisions, the structure plan is to set out the following:
   - a water management report that takes into consideration the land to the south and addresses all water-related matters relevant to the proposal.
   - measures to manage risk from coastal inundation.
   - open space requirements.

It is on the basis of this resolution of the WAPC that this Structure Plan has been prepared. The specific considerations relating to water management, coastal inundation and open space requirements are addressed in subsequent sections and appendices of this report.

In relation to the Open Space Investigation designation, it was agreed with the WAPC in November 2021 that this Structure Plan is the appropriate vehicle to determine the full extent of the open space area in the south of Lot 4. Further, it was acknowledged that the Open Space Investigation area does not necessarily dictate that the land should be set aside for conservation or recreation purposes. Rather, it was intended that the Structure Plan should determine the extent of land needed for flooding, drainage, conservation and recreation purposes and ensure that this land is integrated into the broader urban area. The Structure Plan has been designed to achieve this.

A copy of the Strategy Map for Geographe Bay area (as amended by WAPC in 2021) is shown at Figure 5.



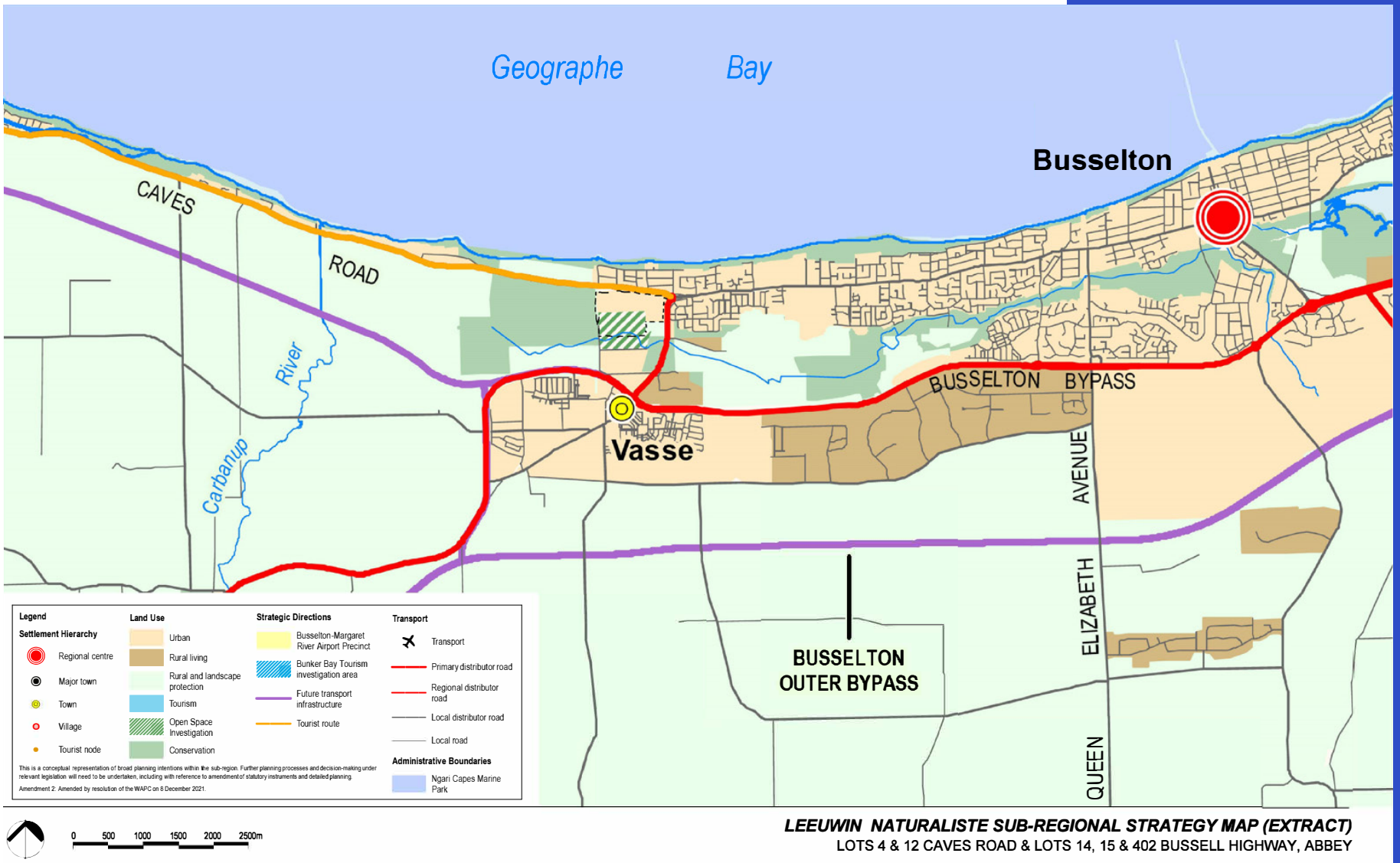


Figure 5 Leeuwin-Naturaliste SR Strategy

2.3 Statement of Planning Policy 6.1 Leeuwin Naturaliste Ridge Policy

Statement of Planning Policy 6.1 – *Leeuwin-Naturaliste Ridge Policy* (SPP 6.1) sets out the principles and considerations for land use and development decision-making in the Leeuwin-Naturaliste Ridge. The Structure Plan area is located in the north eastern periphery of the policy area.

SPP 6.1 was published in 1998 with an intended lifespan of 30 years and has not been substantially reviewed or amended since then. The *Leeuwin – Naturaliste Sub-regional Strategy* identifies the review of SPP 6.1 as a key priority. Although SPP6.1 is approaching the end of its lifespan, the vision and overall objectives for the Leeuwin-Naturaliste Ridge identified by SPP 6.1 remain relevant and important to the growth of the Policy area, and the Structure Plan area.

This Structure Plan meets the vision and objectives of SPP 6.1 by catering for population growth within an identified Structure Plan area, responding to adjacent commercial and tourism land uses and conserving and enhancing environmental values that have been confirmed are applicable to the Structure Plan area.

SPP 6.1 also includes a Land Use Strategy which identifies preferred land uses throughout the policy area and establishes specific land use policies. The Land Use Strategy identifies the Structure Plan area, along with land to the south as *Wetland Amenity Area*. An extract from the Land Use Strategy Plan of SPP 6.1 is shown at Figure 6.



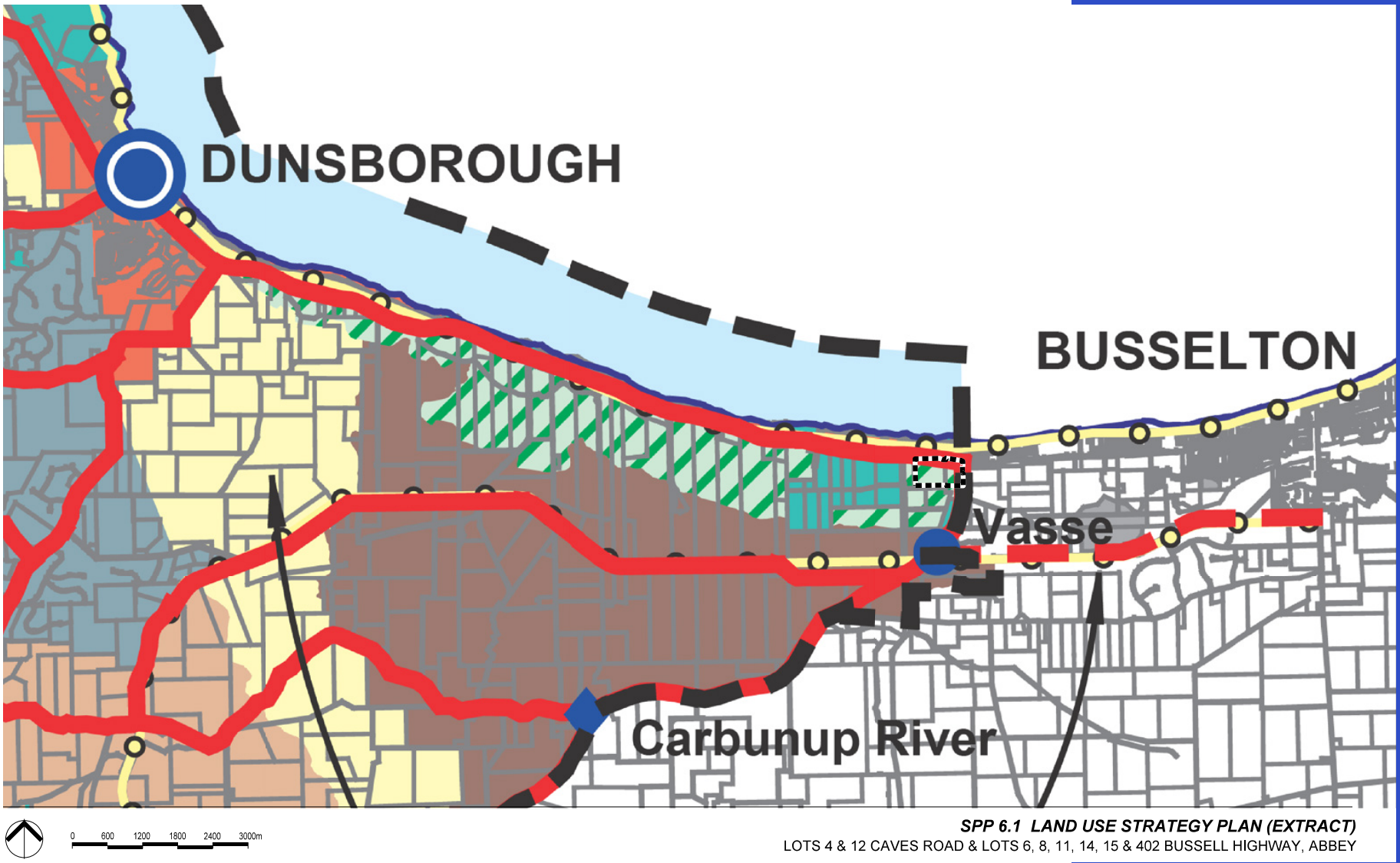


Figure 6 SPP6.1 Land Use Strategy Map

The land use policies applicable to the Wetland Amenity Area are set out in Table 2 below.

Table 2 – Wetland Amenity Area Policies

Policy Number	Policy	Abbey South Structure Plan response
LUS 3.28	*Proposals for subdivision, development and land use within the designated Wetland Amenity Areas will be assessed for their compatibility with wetland conservation.*	The Structure Plan does not contain any mapped or recognised wetlands of significance (conservation or resource enhancement category wetlands). The site does contain two Multiple Use wetlands, however these lower-order wetlands are generally considered to be compatible with urban development and do not require retention or rehabilitation. This Structure Plan is supported by a detailed Environmental Assessment (refer Appendix 1) which assesses both the presence of wetlands within the Structure Plan area, as well as the compatibility of development over the Structure Plan area with wetlands in adjoining areas. The Environmental Assessment confirms that the majority of the Structure Plan area is capable of urban development, subject to floodway areas being provided as public open space.
LUS 3.29	*Development near the coast will conform with Department of Transport and Ministry for Planning guidelines as reflected in the proposed Shire of Busselton District Planning Scheme.*	It is understood that this provision relates to coastal planning, in which case State Planning Policy 2.6 – State Coastal Planning is now the primary planning instrument. The suitability of the Structure Plan area for urbanisation has been considered against the policy framework of SPP 6.1 and the City of Busselton's Coastal Hazard Risk Management Adaptation Plan. This is discussed further in section 2.5 of this report.
LUS 3.30	*Rural landscape and coastal reserve buffers between Abbey and Vasse, and Dunsborough and Abbey will be maintained to avoid urban sprawl and to create distinct communities.*	As noted in section 1.4 of this report, the Structure Plan area is framed by rural landscape buffers to the south and west. Given the low-lying nature of the designated floodway over the adjoining land to the south and the heavily vegetated nature and protected status of the Locke Nature Reserve to the west of the Structure Plan area, these buffers between the Structure Plan area and the settlements of Vasse and Dunsborough will be retained in perpetuity, and will not be compromised by the intensification of land use and development over the Structure Plan area.



LUS 3.31	*Subdivision and development will be consistent with and complement the existing landscape character of the Quindalup Strip and "Old Dunsborough".*	The Structure Plan area has been designed to provide for residential development that complements the Quindalup Strip and Old Dunsborough character through landscape design, generous road reserves and retention of existing Peppermint trees where viable to do so. This is balanced with higher levels of housing density and a mix of land uses in portions of the Structure Plan area, as well as the requirements of Liveable Neighbourhoods and contemporary urban design practice. The precise form of any future subdivision will be confirmed at subsequent stages in the planning process.
LUS 3.32	*The environmental and recreation values of the Wetland Amenity Area will be protected while facilitating tourism development that responds to the natural and social values of the locality.*	As demonstrated in Part 3 of this report, the environmental values of the Structure Plan area have been assessed and will be protected as part of public open space areas. Recreational tourism uses are limited to some of the properties fronting Bussell Highway, such as The Shed Market. These uses can be retained, while better connections through to the RAC holiday park, Locke Nature Reserve and southern floodway have been provided to integrate these environmental values with the tourism potential of the area.
LUS 3.33	*The landscape separation of Abbey, Vasse and Dunsborough will be maintained.*	Refer response to LUS 3.30 (above)



In addition to the land use classifications and policy statements discussed above, Figure 3 of SPP 6.1 also classifies the policy area into differing levels of significance with respect to its landscape values and significance.

The landscape character of the southern half of the Structure Plan area is classified in Figure 3 of the Policy as 'General Character' while the north and eastern areas adjacent to Bussell Highway and Caves Road are classified as 'Travel Route Corridor'. When compared to the other landscape classifications set out in SPP 6.1 and noting the location of the Structure Plan on the eastern border of the Leeuwin-Naturaliste Ridge, the landscape values of the Structure Plan area are less significant than those elsewhere on the ridge or within the areas that are mapped specifically for their landscape significance.

SPP 6.1 sets the following policy positions in relation to the landscape values within the Structure Plan area:

- PS 3.2 Development must be responsive to local values, and be compatible with the natural characteristics and traditional settlement patterns of the area.
- PS 3.3 Development will have due regard for the landscape integrity and value of Ridge backdrops when viewed from the coastline, bays or Travel Route Corridors.
- PS 3.7 In areas of General Character, as identified in Figure 3, development or change of use should protect the rural character and conform with policies and guidelines for Travel Route Corridors.

The Structure Plan has been designed to recognise the rural character immediately to the south and generally west through the retention of key areas of vegetation and screening from travel route corridors.

2.4 City of Busselton Local Planning Strategy (City of Busselton, 2019)

The City of Busselton Local Planning Strategy was endorsed by the Western Australian Planning Commission on 13 March 2020 and provides the Council and the community with the vision and strategic planning direction for the City of Busselton for the next 10 to 15 years.

The Local Planning Strategy recognises the Structure Plan area (described as "Abbey South") as an area with significant development potential, and states:

The appropriateness of the area for urban development will be determined via the WAPC's Planning Investigation Area assessment as required by the Leeuwin Naturaliste Sub-Regional Strategy. Other than Port Geographe, this is the last undeveloped coastal or near-coastal land with significant development potential in the Busselton-Vasse Urban Area. Inclusion of housing choice and non-residential land uses are to be considered.

A Planning Investigation Area (PIA) assessment has since been undertaken for Abbey South and concluded that:

The Abbey PIA is well suited to more intensive forms of urban development ... an opportunity exists for the Abbey PIA to respond to the looming land supply issues, and to ensure an adequate supply of affordable land, promoting a variety of housing choice remains available to the Busselton community as it continues to grow.

The Structure Plan provides potential for a range of R-Codes and street block typologies to support the development of different types of housing that is responsive to the housing market, and retain the potential for non-residential development, particularly adjacent to Bussell Highway on the eastern periphery of the Structure Plan area.

The Strategy also identifies the desire to retain a form of 'green belt' between greater Busselton and Dunsborough, and emphasises the need to maintain physical separateness of the settlements. Buayanyup Drain forms a logical hard edge between Busselton and this green belt, and therefore this Structure Plan will not compromise the key objective of maintaining separation between urban settlements.

2.5 State Planning Policy 2.6 – State Coastal Planning Policy (WAPC, 2013)

State Planning Policy 2.6 – State Coastal Planning Policy ("SPP 2.6") is the State Government's response to land use planning in coastal areas throughout Western Australia, and includes specific policy considerations and requirements for both infill and greenfield scenarios across a 100 year planning horizon.

SPP 2.6 requires coastal processes and climate change to be considered in the assessment of planning proposals in coastal areas. These coastal processes include erosion, storm surge and coastal inundation as a result of extreme storm events.

The City of Busselton adopted its *Coastal Hazard and Risk Management Adaptation Plan* ('CHRMAP') in July 2022. The CHRMAP maps the hazards from coastal processes in accordance with the requirements of Schedule 1 of SPP 2.6, and identifies management and mitigation strategies for affected areas.

At its nearest point, the Structure Plan area is approximately 380m south of the current high water mark (referred to as the Horizontal Shoreline Datum or HSD in SPP 2.6). Located between the northern boundary of the Structure Plan area and the HSD is a 250m wide strip of developed residential area comprising approximately 220 existing dwellings, and a regional road reserve with a width ranging from 25m to 110m accommodating Caves Road.

The City's hazard mapping indicates that, when applying SPP 2.6, the northern extent of Lots 4 and 12 would be impacted by coastal erosion within the 100 year timeframe if no mitigation measures were undertaken to protect the infrastructure already in place.

The CHRMAP sets in place a clear management framework for protecting the Abbey area, and proposes to "protect" Abbey beach and the surrounding infrastructure via a series of coastal protection works, which would essentially halt the coastal erosion process.

Inundation from both the coast and inland waterways such as Buayanyup Drain in an extreme weather event is also an important consideration. SPP 2.6 requires risk assessments to consider the effects of a storm event with a 0.2 percent or one-in-five hundred probability of being equaled or exceeded in any given year over the 100 year planning time frame, including a 0.9m allowance for sea level rise.

The CHRMAP recognises the risk posed by coastal inundation and sea level rise, and recommends a minimum habitable floor level of 3.0m AHD to reduce the risk of flooding during the 100 year planning timeframe.

Given a significant portion of the site is at, or very close to 3.0m AHD already, it can be developed for urban purposes while minimising the risk of impacts of flooding from coastal inundation. Further consideration of inundation is outlined in the Local Water Management Strategy at Appendix 2.

2.6 State Planning Policy 3.7 – Planning in Bushfire Prone Areas (WAPC, 2015)

State Planning Policy 3.7 – Planning in Bushfire Prone Areas ("SPP 3.7") sets out the framework for land use planning to address bushfire risk management in Western Australia.

The Structure Plan area and surrounding lots are designated as bushfire prone areas in accordance with SPP 3.7, and as such, further assessment against the requirements of SPP 3.7 is required.

A Bushfire Hazard Level Assessment and Bushfire Management Plan has been prepared and is discussed further in sections 3.6 and 4.7 of this report. The BHL Assessment confirms that bushfire risk is not a constraint to development, and can be safely mitigated through adequate separation from the hazards, along with increased construction standards for future dwellings (BAL-12.5 or BAL-19). The Concept Plan in Part 4 of this report demonstrates one possible way in which the hazard separation can be achieved.

2.7 State Planning Policy 5.4 – Road and Rail Noise (WAPC, 2019)

State Planning Policy 5.4 – Road and Rail Noise ("SPP 5.4") sets out the planning considerations for development adjacent to major road and rail transport corridors in order to minimise the impact of traffic noise on residential uses.

Bussell Highway and Caves Road are both identified as 'significant traffic routes' under SPP 5.4, and a portion of the Structure Plan area is within the mapped trigger distance (200m from the corridor). As such, traffic noise must be assessed as part of the rezoning and structure planning processes to accurately identify those areas that will be affected by noise, and to ensure adequate mitigation measures are in place for noise-sensitive uses.

2.8 Liveable Neighbourhoods Operational Policy (WAPC, 2009)

Liveable Neighbourhoods is the WAPC's operational policy for the design and assessment of new (greenfield) urban areas, and provides guidance as to key considerations such as urban form, housing density, road networks, schools and public open space.

The Structure Plan has been designed to meet the principles of Liveable Neighbourhoods including the urban form, road hierarchy, public open space distribution and urban water management.



Part 3 – Site Conditions, Opportunities and Constraints

The following section sets out the physical features of the site that inform the design of the Structure Plan. This analysis is supported by extensive technical analysis and reporting which is appended to the Structure Plan as described below:

Appendix 1 - Environmental Assessment Report - Emerge Associates.

Appendix 2 - Hydrology (Local Water Management Strategy) - Emerge Associates.

Appendix 3 - Bushfire - Emerge Associates.

Appendix 4 - Traffic and Transport Assessment - Stantec.

Appendix 5 - Servicing - Stantec.

As demonstrated below, there are some environmental and physical attributes which warrant further consideration and site-specific responses. These are not constraints to development, but rather opportunities to deliver a Plan that is site responsive, and respectful of the natural and physical setting in which it is located.

Further analysis of the physical and environmental context of the site is set out in the following sections.

3.1 Vegetation and Flora

Environmental consultants Emerge Associates have undertaken a detailed assessment of the environmental features and attributes of the Structure Plan area. In relation to vegetation and flora, Emerge has concluded that:

- There are no protected (Federal or State) vegetation or flora within the Structure Plan area.
- There are unlikely to be any threatened or priority flora, or threatened or priority ecological communities on the site based on the limited vegetation and the disturbed nature of the site.
- Scattered remnant paddock trees, predominantly *Agonis flexuosa* (peppermint) with some *Eucalyptus rudis* (flooded gum) adjacent to a low-lying area in the south-west, are located across the Structure Plan. This includes remnant peppermint tree stands within the north-east portion of the Structure Plan (lot 12) following existing fence lines.
- The condition of the vegetation across the site is largely degraded due to historical agricultural uses.

From Emerge's analysis it can be concluded that the presence of these trees and vegetation on the site is not a constraint to more intensive forms of land use. There are opportunities to recognise some of these mature trees in areas of public open space, larger residential lots and wider road reserves where practicable.

3.2 Fauna

The environmental assessment undertaken by Emerge indicates that the Structure Plan area is unlikely to provide important habitat for conservation significant species such as the three black cockatoo species (Carnaby's, Baudin's and forest red tailed) or western ringtail possum.

The scattered paddock trees are unlikely to support breeding or foraging by the three black cockatoo species, with peppermint trees a low priority foraging species and not known to support breeding. The scattered trees are also unlikely to support western ringtail possum, given the lack of understorey and mid-storey species and also the lack of canopy connectivity and connection to other areas of remnant vegetation adjacent to the site.

Emerge notes that the vegetation located within the Caves Road reserve to the north of the site may support habitat for fauna species, particularly western ringtail possum, given it has a well-connected canopy and is connected to other areas of intact native vegetation. Development of the Structure Plan area will not result in any significant disturbance of this area as it is located outside of the site boundary, and any clearing will be limited to a narrow access road to Caves Road in the location of the current access driveway to lot 4.

3.3 Landform and Landscape

The Structure Plan area is relatively flat and level, with the majority of the site, including the northern and eastern areas sitting at or around 2.5m – 3m AHD. The site does fall away slightly to the south, coinciding with the mapped flood fringe and floodway area. A finished level of 3m AHD for all buildings is required in order to meet the requirements of the City's CHRMAP. This can be achieved with minimal fill across the majority of the site, while the lower lying areas will be retained as multiple use public open space, performing drainage and recreation functions for future residents, and ensuring that the existing landform is recognised appropriately.

The current landscape qualities of the site are predominantly rural in nature, with broadacre pasture areas and some scattered trees and vegetation. There are no ridgelines, elevated positions or mapped views of significance within the Structure Plan area or nearby which warrant a specific landscape response.

The vegetation within the Caves Road reserve, ranging from approximately 5m up to 70m in width, screens the Structure Plan area from view from Caves Road and ensures that the landscape visible from the Caves Road transport route will not be significantly altered.

There are opportunities for the Structure Plan design to respect and respond to the rural character of the landscape through retention of mature trees and dispersion of public open space generously throughout the Structure Plan area, and to provide a managed interface to Caves Road where required.

3.4 Floodways and Wetlands

The Department of Water and Environmental Regulation has confirmed that a small area within the low-lying south western portion of lot 4 is identified as a floodway, while the area immediately surrounding is classified as flood fringe. The floodway is essentially a small 'offshoot' of the main floodway located further to the south and outside of the Structure Plan area. The floodway and flood fringe are shown at Figure 7.

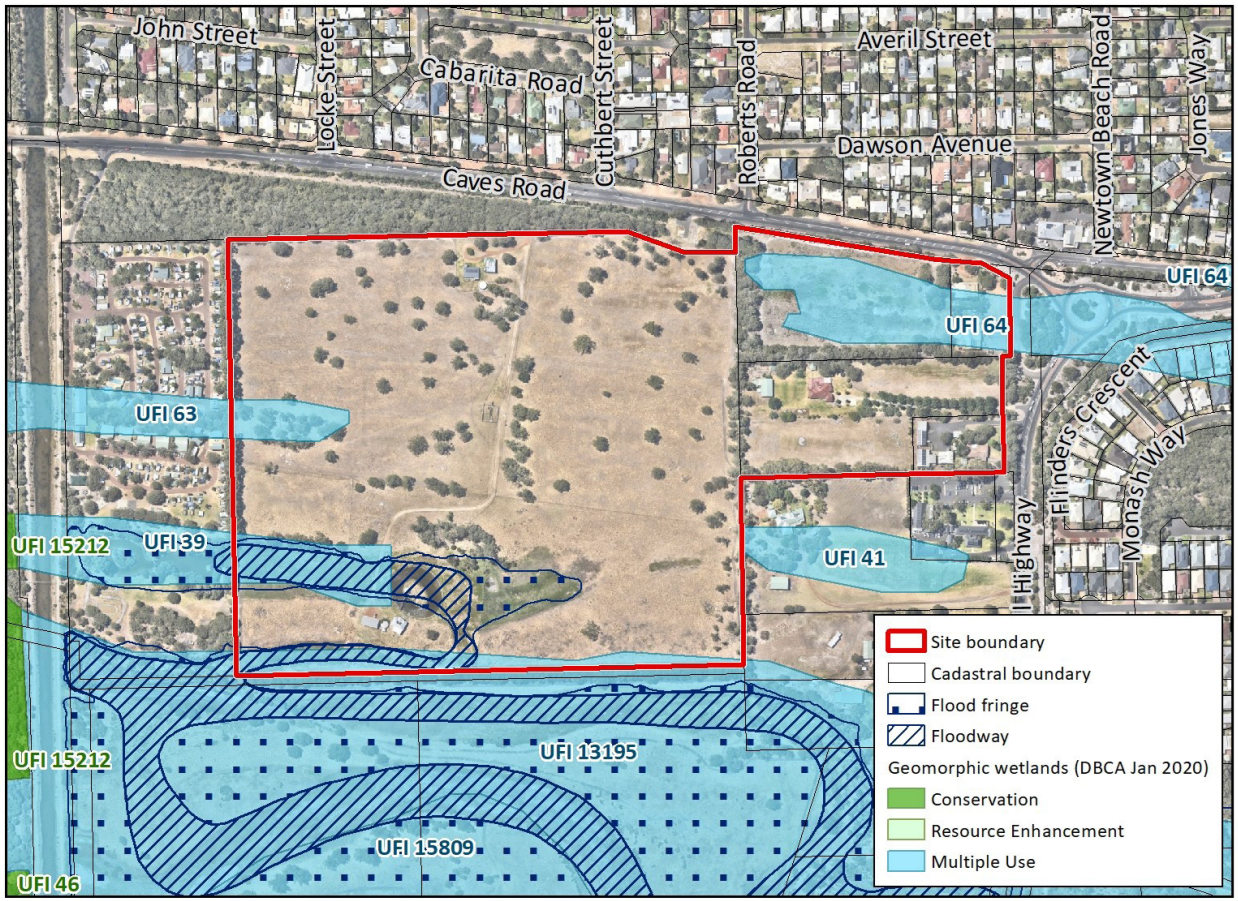


Figure 7 Floodway and Waterway Features Mapping



The presence of a floodway in and adjacent to the Structure Plan area is not a constraint to the development of the remainder of the Structure Plan area. The floodway can be accommodated and integrated within larger areas of public open space, and is capable of being used as part of the broader open space network when not in flood.

Pre-lodgement consultation with the DWER has confirmed that the flood fringe may be filled and developed and does not require any specific treatment.

There are no Conservation Category Wetlands or Resource Enhancement Wetlands identified within the site. A small portion of the Structure Plan area in the south and west is mapped as Multiple Use Wetland (MUW), and a smaller MUW is located in the northeast of the site. MUWs are not a constraint to development and are generally not required to be retained or accommodated spatially. Further consideration of floodways and MUWs will be set out in the Local Water Management Strategy at Appendix 2, and at future stages of the planning process in accordance with the WAPC's Better Urban Water Management Guidelines.

3.5 Surface and Groundwater

Consistent with the overall topography, surface water and stormwater runoff typically drains in the southerly direction towards the floodway at the southern boundary of the Structure Plan area. Sandy soils, particularly in the northern half of the site, allow for a good rate of infiltration at source, ensuring that there is minimal need for conveyance swales and / or large detention basins.

Groundwater monitoring indicates that the winter peak typically sits at or around 1.19 m below ground level (BGL) in the north-eastern portion of the site; and 1.54 m BGL in the central southern portion of the site. The maximum groundwater level beneath the site therefore ranges from 2.1m AHD along the eastern boundary to 1.5m AHD in the south eastern corner of the site. Given the majority of the site will sit at or above 3.0m AHD, the groundwater is not a constraint to development and can be managed through the subdivision and development processes in the usual manner.

3.6 Bushfire

The entire Structure Plan area is designated as 'bushfire prone' by the Office of Bushfire Risk Management (OBRM) mapping, however detailed assessment confirms that bushfire is not a constraint to development, and that the bushfire risks, which are located external to the site, can be easily managed through the imposition of appropriate interfaces, setbacks and bushfire attack level (BAL) construction requirements where necessary.

The most significant bushfire hazards external to the Structure Plan area are the vegetation within the Caves Road reserve to the north, and grassland vegetation (including a strip of trees) to the south (and the boundary shared with the Broadwater Nature Reserve Swamp). Temporary grassland hazards exist to the east, associated with existing rural lots proposed for future urban development.

BAL ratings of BAL-29 or lower for residential lots can easily be achieved through provision of setbacks to the bushfire hazards adjacent to the site, through a combination of wide public road reserves, public open space, and in limited scenarios the imposition of larger setback requirements within the lots. A map depicting the likely BAL ratings is depicted at Figure 8. The outcomes of the BMP are discussed further in Section 4.7.

3.7 Aboriginal and European Heritage

The Structure Plan area does not contain any Aboriginal heritage sites or places. There is an 'Other Heritage Place' (ID 5337), which is mapped as extending slightly into the western portion of the site, however it is understood that it is likely to be associated with the drain further to the west based on information provided in the Buayanyup River Action Plan (Geographe Catchment Council 2010), where the Aboriginal site is described as being associated with the drain.

Newtown House, which forms part of the Amelia Park complex, is located within Lot 11 (5850) Bussell Highway, adjacent to the Structure Plan area. Newtown House is recognised by the City of Busselton as having local (European) heritage value. Urbanisation of the Structure Plan area is unlikely to impact the heritage values associated with Newtown House owing to its substantial setback from the northern lot boundary, being the site's only boundary with the Structure Plan area.

3.8 Regional Road Network – Access and Capacity

The Structure Plan area abuts Bussell Highway and Caves Road to the east and north respectively. Both of these roads are regional roads under the care and control of Main Roads WA, ensuring direct and efficient access from the Structure Plan area to the external road network. Gaining safe and efficient access to and from the regional network is an important consideration for the urbanisation of the Structure Plan area.

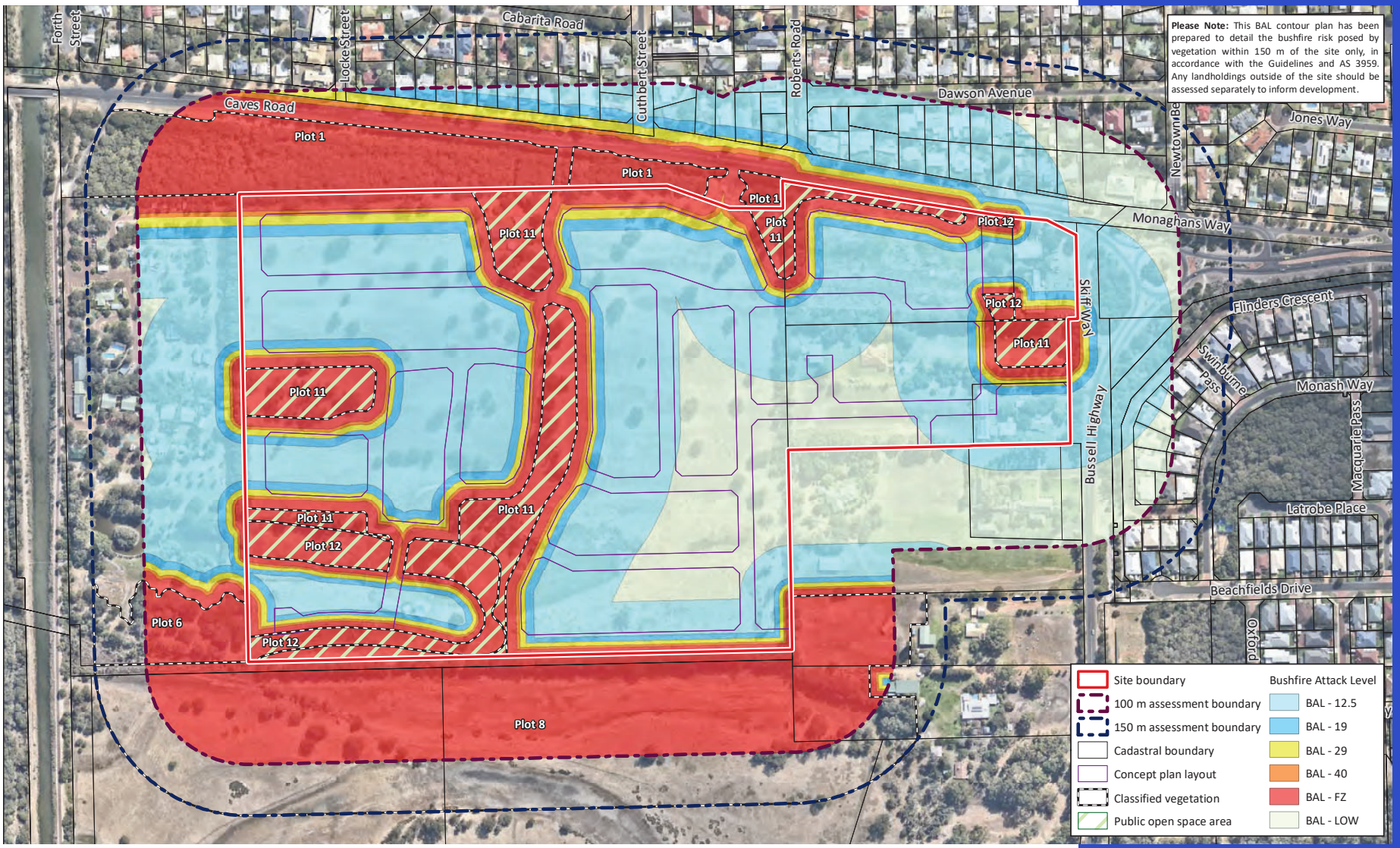


Figure 8 BAL Contours

3.8.1 Future Regional Road Network

There is a planned regional road linking Vasse to Dunsborough (referred to as the Vasse - Dunsborough Link or 'VDL') which is intended to relieve the pressure on Caves Road, and provide a more efficient connection between Vasse and Dunsborough. The alignment definition phase of the project is now complete, and Main Roads is now in the preliminary design and land acquisition phases. Notwithstanding, the timing for construction of the VDL is unknown, and not within Main Roads' 5-year capital budget.

Once operational, the VDL will have a significant impact on traffic volumes on Caves Road, with a reduction in the order of 80% being forecast by Main Roads (8,000 vpd down to 1,600vpd). The reduced traffic volumes enable improved access and permeability to Caves Road and minimise the need for significant intersection infrastructure such as roundabouts or traffic signals to be installed.

3.8.2 Access to the Regional Road Network

Given the uncertainties around timing of the VDL, it is necessary to investigate whether the Structure Plan area can gain access to the regional road network even if the VDL does not eventuate within the timeframe that the Structure Plan area is fully developed.

Stantec has undertaken a review of the regional road network, its capacity to accommodate any additional traffic arising from the Structure Plan area, and the most suitable locations and types of intersections to the regional network. Their investigations included extensive consultation with Main Roads WA in order to confirm future planning for the regional network, and to demonstrate that the transport characteristics of the Structure Plan are acceptable.

Main Roads has accepted Stantec's findings in principle and has confirmed that there are no fatal flaws from a traffic perspective which would prevent the development of the Structure Plan area. A copy of Main Roads' preliminary advice is appended to Stantec's traffic report at Appendix 4.

As demonstrated through Stantec's analysis, and as confirmed by Main Roads WA, access to the regional road network from the Structure Plan area can be achieved safely and efficiently without impacting the operation of any part of the regional road network.

3.9 Traffic Noise

As noted in the previous section, Bussell Highway and Caves Road are both identified as 'other significant freight/traffic route' under *State Planning Policy 5.4 Road and Rail Noise* (SPP 5.4). In accordance with SPP 5.4, consideration of noise for sensitive land uses is required within a 200m trigger distance of the road carriageway edge, which includes a portion of the site. As evidenced by the extensive residential development adjacent to both Caves Road and Bussell Highway in the immediate vicinity of the site, it is clear that traffic noise is not a constraint to development.

Under SPP 5.4, new noise sensitive land uses (which includes residential development) within the trigger distance of an existing transport corridor are required to meet the criteria outlined in Table 3.

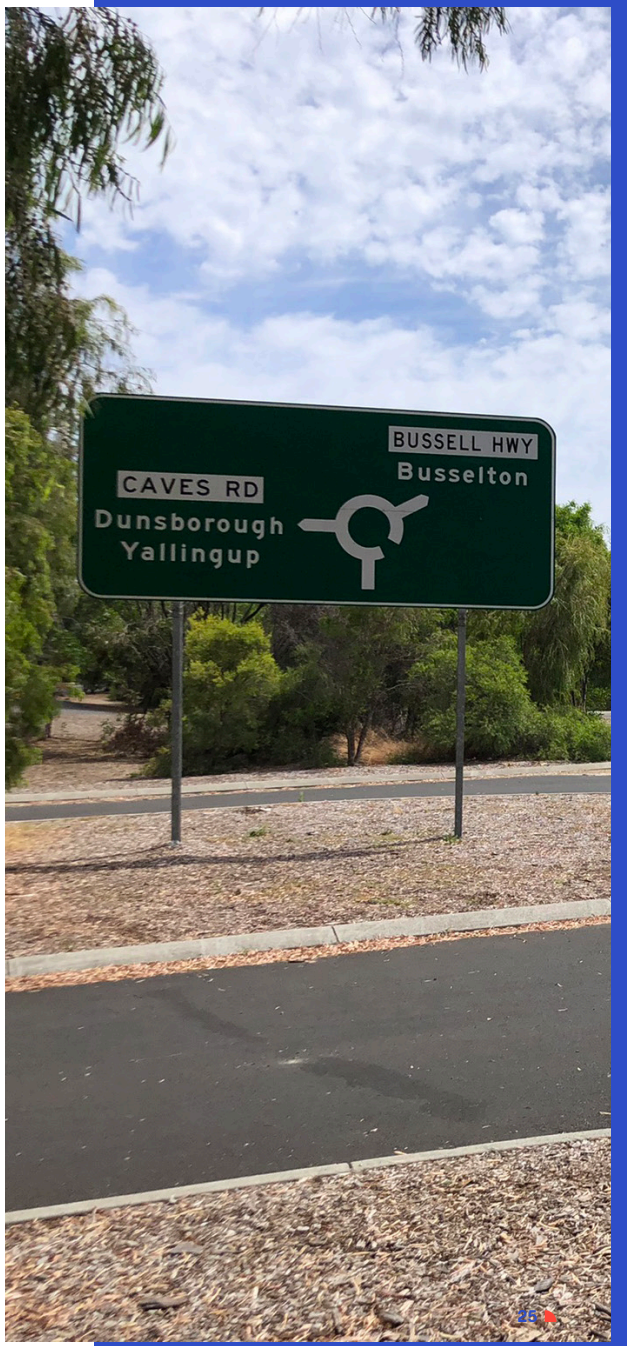


Table 3: Noise targets as outlined within SPP 5.4

Proposal type	New/upgrade	Noise targets		
		Outdoor		Indoor
		Day (LAeq(Day) dB) (6 am -10 pm)	Night (LAeq (Night) dB) (10 pm – 6 am)	(LAeq dB)
Noise sensitive land-use and/or development	New noise sensitive land use and/or development within the trigger distance of an existing/proposed transport corridor.	55	50	L_{Aeq}(Night) dB) 40 (living and work areas) L_{Aeq}(Night) dB) 35 (bedrooms)

Noise exposure forecast tables provided as part of the implementation guidelines for SPP 5.4 indicate noise impacts requiring treatment (quiet house design) could occur for dwellings less than 40m from the road carriageway, based on this being a 1-2 lane road with a speed limit between 60 – 80 km/hr and in a rural area (as opposed to an Urban Region Scheme area). Noise impacts can be managed as per the standard planning and development process, including use of setbacks and quiet house design, with the implementation guidelines indicating the following:

- Within 0 – 20 m of the road carriage way, noise target could be exceeded between 3-7 dB, and quiet house design package B could apply; and
- Within 20 – 40 m of the road carriage way, the noise target could be exceeded by between 1-3 dB, and quiet house design package A could apply.

It should be noted that any noise impacts arising from Caves Road are likely to decrease in future due to the forecast decrease in traffic volumes along these routes over time once the Vasse – Dunsborough Link is delivered.

This preliminary analysis demonstrates that not only is traffic noise not a constraint to development, but also that an acceptable standard of noise attenuation can be achieved without having to construct a physical barrier such as a wall or bund. As such, the road noise will not have any impact on the Structure Plan from a spatial perspective.

The noise assessment is part of the Environmental Assessment included at Appendix 1.



3.10 Servicing

Consulting civil engineers Stantec have undertaken a review of the availability of existing services in the locality, and their capacity to service the Structure Plan area when developed.

Stantec's findings confirm that all major service infrastructure currently exists within close proximity to the Structure Plan area, without any major upgrades or feeder extensions required to service the increased load demands from the Structure Plan area. A brief summary of Stantec's findings is below, while the full servicing report is included at Appendix 5.

3.10.1 Earthworks

Stantec's analysis demonstrates that the Structure Plan area is capable of accommodating finished floor levels (FFL) of at least 3.0m AHD to meet the requirements of SPP2.6. In order to achieve FFLs of 3.0m or greater, and to maintain adequate clearance to ground water, some imported fill will be required however this will be minimal compared to other lower lying urban areas in greater Busselton and is not a constraint to development. The Local Water Management Strategy includes some preliminary lot and invert levels, with more detailed earthworks modelling to be undertaken at subdivision stage.

Final lot, road and public open space levels will be determined at detailed design stage in consultation with the City of Busselton.

3.10.2 Wastewater

The Structure Plan area is required to be serviced with reticulated sewerage in accordance with the Government Sewerage Policy. Stantec's analysis confirms that there are existing Water Corporation assets adjacent to the site which have been sized and located such that they will service the entire Structure Plan area.

Water Corporation has a gravity sewer network that services the catchment north of Caves Road, while two sewer pressure mains are located within the southern verge of Caves Road. A Type 40 sewer pump station (Busselton Pump Station No. 24) is located on Caves Road adjacent to the north eastern corner of Lot 4. This pump station collects sewage from the surrounding gravity sewer north and east of Lot 4, and pumps it to the Type 90 pump station located within the light industrial development in Vasse via the 200mm diameter sewer pressure main. This pump station has capacity to service the Structure Plan area once it is fully developed.

Consistent with the EPA's Guidance Statement 3 *Separation Distances between Industrial and Sensitive Land Uses*, a Type 40 WWPS requires a 10m odour buffer from the wet well location. In this instance the wet well is set back more than 10m from the Structure Plan boundary, and as such, will not have any implications for the Structure Plan design.

A map depicting the location of the pump station in relation to the Structure Plan area is shown at Figure 9.

3.10.3 Reticulated Water

The Structure Plan area will be provided with reticulated potable water via the two existing water mains within the Caves Road reserve. Civil engineers Stantec are currently working with Busselton Water to progress hydraulic modeling to determine whether there is sufficient capacity in the DN250 water main in Caves Road. In the event that there is not sufficient capacity, the DN375 main can be extended into the site from the eastern end of the Structure Plan. Regardless of the preferred method of delivery, there is an available potable water supply available to the Structure Plan area.

3.10.4 Underground Power

The Structure Plan area has access to the existing HV underground cables located in the Caves Road reserve (south side). Western Power has confirmed that there is sufficient capacity in the network to service the Structure Plan area once it is fully developed.

3.10.5 Gas

There is an existing gas main in the Bussell Highway reservation to the east of the site. ATCO has confirmed that there is sufficient capacity in the network to accommodate a connection serving the Structure Plan area without any additional upgrades required.

3.10.6 Telecommunications

There is an existing NBN fibre optic cable located in the Caves Road reserve which can provide a connection to the Structure Plan area. A fibre-ready pit and conduit network will be installed as part of subdivision works to service two lots per pit so that future residents have access to the NBN network as soon as it is made available to the Structure Plan area.





Figure 9 Sewer Pump Station

Part 4 – Abbey South Structure Plan

The Structure Plan takes into consideration all of the site characteristics, local context, policy context, and the physical opportunities and constraints identified in the previous sections of this report, and demonstrates an indicative urban form that is efficient, robust, and responds to the local character.

The Structure Plan map is included as Figure 10, while an indicative Concept Plan is Figure 11. The Concept Plan demonstrates one possible manner in which the site could be developed consistent with the Structure Plan map and implementation provisions.

4.1 Structure Plan Guiding Principles

Development of the Structure Plan and Concept Plan is based on the following key principles:

- Ensure a landscape-led plan where the focus has been on understanding the local vernacular and characteristics that make Abbey a unique place within the Geographe region and the broader South West region, and using this to inform the overall design of the site.
- Address the principles of SPP6.1 by maintaining and enhancing the vegetated buffer to Caves Road.
- Provide for a range of residential densities and housing typologies that recognise the local context and market conditions, as well as achieving key planning objectives.
- Respond to the existing commercial land uses and provide for their continuing evolution over time through a flexible framework.
- Enable a highly connected, pedestrian-friendly neighbourhood where walkability and access to local convenience and amenity is paramount, and car-dependence for local trips is minimised.
- Recognise and retain existing mature trees within areas of public open space and widened road reserves wherever practicable.
- Incorporate drainage detention and treatment areas into the broader open space network in a manner that maximises useability and amenity of the open space.
- Minimise access points to the external road network to minimise disruption to the regional network and retain the integrity of the ecological linkage within the Caves Road reserve.
- Recognise the mapped floodway within a broader expanse of open space, to enable full integration of the drainage and floodway functions within high-amenity, useable public open space reserves, and to ensure that road crossings do not impede the flow of water in flood events.
- Respect and retain the existing site levels and topography where possible in order to minimise the need for fill, and to achieve a minimum finished floor level of 3.0m AHD for residential lots.
- Include wider local road reserves where appropriate to accommodate bushfire setbacks and roadside swales, and to provide a suitable interface to the RAC Holiday Park on the western boundary.

The following subsections summarise the key attributes of the Structure Plan and how it responds to the site and policy context.

4.2 Urban Form

Based on the principles described in the previous section, the Structure Plan adopts a contemporary urban form that allows for a high degree of permeability and walkability on both the east-west and north-south axis. This 'modified grid' pattern of subdivision allows for efficient distribution of vehicle traffic, provides a safer environment for pedestrians and cyclists, and ensures that open space areas are typically visible and accessible within direct line of sight from almost every dwelling.

In this instance the modified grid layout has been adapted to recognise key attributes of the site including the mature peppermint and eucalypt trees throughout, the natural floodway area to the south, and the interface to Caves Road.

Crossings over the floodway are minimised so as to not impede water flow in storm events. This has the effect of creating a small residential peninsula in the south of the Structure Plan area. The Structure Plan ensures that this peninsula is limited to those areas with higher ground level and no environmental or physical constraints, and identifies a low density code of R10 which better responds to the natural setting and context.

Managed interfaces are provided through wider local access roads along the western and northern boundaries of the Structure Plan area to ensure adequate setbacks for bushfire mitigation, as well as to respect and retain the existing vegetated interface to Caves Road. A short cap road has been shown in the north eastern corner of the Structure Plan area (lot 12) to enable the retention of the existing trees within the Caves Road reserve, as well as to provide a landscaped interface to Caves Road and avoid the appearance of rear fences when viewed from Caves Road.



Figure 10 Structure Plan Map



Figure 11 Concept Plan

4.3 Land Use

Given the relatively 'contained' nature of the Structure Plan Area, and the fact that it is located some distance from any of the major centres, opportunities for employment and / or tourism generating land uses within the Structure Plan area are extremely limited, and the most suitable land use for this area is residential housing in order to accommodate greater Busselton's growing population.

The Structure Plan shows a predominantly residential zoning, with potential for small scale commercial and / or tourism uses at lot 402 (The Shed Markets) to complement the existing local centre on the opposite side of the intersection of Caves Road and Bussell Highway.

The Structure Plan presumes that the existing commercial land uses fronting Bussell Highway will remain in place for the short to medium term, however is flexible and sufficiently robust that it can accommodate changes to the intensity of these uses over time. This has been primarily achieved by providing vegetated interfaces to the existing commercial uses in order to protect the amenity and function of both uses, and allocating appropriate density codes to promote a range of housing typologies if and when the market demands this level of diversity.

With the exception of lot 402 (local centre), and the areas of public open space (recreation reserve) described further in the following sections, the entirety of the Structure Plan area is zoned Residential. As well as residential housing, the Residential zone allows for other community-based land uses such as aged care facilities, childcare centres and places of worship to be approved in the future should the market demand such services.

Lot 402 is zoned Local Centre in recognition of its current land use (The Shed Markets) as well as its potential to complement the existing local centre on the opposite side of the Caves Road / Bussell Highway intersection. The Structure Plan includes a requirement that a Local Development Plan be prepared prior to subdivision or development of the Local Centre zone in order to better coordinate and guide an appropriate land use and built form outcome in this location. Furthermore, in order to ensure that the proposed local centre zone does not compromise or compete with the existing local centre (Monaghan's Corner), the Structure Plan restricts retail floor space within the proposed local centre zone to not more than 300m2 NLA.

4.4 Housing Density and Yield

The Structure Plan has the potential to yield approximately 350-400 dwellings at full development. Densities are mixed through the Structure Plan area, with potential for higher medium density (R60) located closer to the corner of Bussell Highway and Caves Road, where access to the existing local centre, commercial uses and the coast is easily achieved.

An R20-R40 density code range has been applied to the majority of the site, which will allow for a range of lot sizes from 180m2 up to 900m2 in area, accommodating a diverse range of housing types and price points. The R20 code will serve as the 'base' density code, with opportunities to apply the higher code to lots in the higher amenity locations such as adjacent to POS and within a 400m walkable catchment of the local centre. Lower densities of R10 are provided for on the southern 'peninsula' adjacent to the floodway. This lower code recognises that this area is well suited to lower density housing due to the distance from the nearest amenities, and the engineering challenges and costs associated with constructing typical urban lots in this location. It is envisaged that this area will accommodate a small number of lots between 1,000m2 – 2,000m2 in area, with the filled areas limited to the building envelopes of the dwellings to minimise fill and retaining requirements.

The Local Centre zoned area has been allocated a density code of R60 to promote mixed use development incorporating some form of medium density housing.

4.5 Open Space

The Structure Plan delivers an integrated network of open space that responds to and respects the natural features of the site, whilst also providing for way-finding, connectivity and a high standard of amenity throughout the Structure Plan area. The following sections summarise the overall principles and the specific form of the public open space network within the Structure Plan area, while the POS and Landscape Strategy at Appendix 6 provides further detail as to the form and function of the POS network.



4.5.1 Open Space Principles

The allocation, distribution and function of public open space is based on the following core principles:

- **Connected** – A strong north-south green spine is provided through the centre of the Structure Plan area that connects residents with Caves Road and Abbey Beach through a network of paths, vegetation and open green spaces.
- **Multi-functional** – Each open space area is multi-functional, combining integrated stormwater / drainage treatment and management with open areas for passive recreation and informal play, while also respecting and responding to the existing vegetation to ensure a high standard of amenity across all open space areas.
- **Environmentally Responsive** – The open space network is responsive to its environment and context through the retention of mature trees and vegetation, and its recognition of the natural topography and the floodway area to the south. The floodway area in particular will be fully integrated within the broader open space network, while at the same time remaining largely unmodified in order to continue to serve its primary function as a floodway for major storm events.
- **Respectful** – The open space can function as either an irrigated or non-irrigated network of high quality open space, ensuring that future restrictions on irrigation will not adversely impact the POS network.
- **Accessible** – Consistent with Liveable Neighbourhoods, all residential areas are comfortably within 150m-300m safe walking distance to the nearest local park, while the local road network has been designed to terminate at and / or connect open space areas wherever practicable.
- **Equitable** – The open space has been distributed throughout the Structure Plan area such that each individual landholding is capable of achieving a minimum of 10% POS as a standalone subdivision if required.

Landscape Architects Emerge Associates have prepared an open space strategy and landscape concepts to demonstrate how these open space areas can potentially be developed to incorporate the abovementioned principles. Emerge's concepts include both an irrigated and non-irrigated concept for each POS area, ensuring that in the event that an adquate water allocation cannot be secured, the POS will continue to be highly functional and of the highest quality. A copy of Emerge's POS Strategy and concepts is included as Appendix 6, and the overall landscape concept for the Structure Plan is shown at Figure 12.

4.5.2 Open Space Investigation Area

As noted in section 2 of this report, the Leeuwin – Naturaliste Sub-regional Strategy identifies the southern portion of the Structure Plan area as 'Public Open Space Investigation'.

As discussed and agreed with the WAPC and Department of Planning, Lands and Heritage in November 2021, the Open Space Investigation area does not necessarily dictate that the entire area should be set aside for conservation or recreation purposes. Rather, it is recognition of the land's current 'Conservation' zoning and the need for further work to be done to determine the extent of land needed for flooding / drainage / conservation and recreation purposes. It was agreed that this Structure Plan is the most appropriate 'vehicle' through which to carry out the necessary investigations. These investigations are set out in considerable detail in the report contained at Appendix 8 to this Structure Plan. Appendix 8 examines the portion of the Open Space Investigation Area within the Structure Plan boundary with respect to its environmental and hydrological value, as well as the open space requirements for the area, and addresses all of the WAPC's criteria as set out in Appendix 1 of the Leeuwin – Naturaliste Sub-regional Strategy.

As demonstrated in the Open Space Investigation Report at Appendix 8, as well as the Environmental Assessment and Local Water Management Strategy, the natural values of this Investigation Area are limited to the portion of mapped floodway itself, which was identified in section 3.4 and identified spatially in Figure 7. There are no distinct flora, fauna, wetland, heritage or other environmental values located in this area which would prevent its development. Further, the area is not well suited to other forms of passive or active open space given its location on the periphery of the structure plan area, and the lack of any suitable natural amenity in this location.

Consistent with good urban planning principles, the Structure Plan leaves the floodway area unmodified in order to retain the pre-development hydrology. It then integrates the floodway into a broader expanse of open space, ensuring that it will be entirely useable through the summer months and in drier periods, whilst still retaining its core function as an unmodified floodway.

The recognition of the floodway and integration within the broader POS network is balanced against the Liveable Neighbourhoods principle of ensuring urban land and potential urban land is used efficiently and effectively to meet the needs of a growing population.



Figure 12 Landscape Concept

4.5.3 Public Open Space Schedule

The Structure Plan includes five main areas of public open space, comprising approximately 4.7ha, or 15% (gross) of the Structure Plan area. When applying Liveable Neighbourhoods credits and deductions, the Structure Plan provides 3.2ha of 'creditable' open space, which equates to 11.2% of the gross subdivisible area. This is demonstrated further in the POS Schedule at Table 4 below.

Table 4 – Public Open Space Schedule

Lots 4 & 12 Caves Road and Lots 14, 15 & 402 Bussell Highway
PUBLIC OPEN SPACE SCHEDULE

Gross Site Area						**30.497[1]**
	Deductions					
	Local Centre Zone				0.582	
	100 year Floodway				1.289	
	1 in 1 year drainage in POS				0.102	
	Total Deductions					**1.973**
Gross Subdivisible Area (GSA) [2]						**28.524**
Public Open Space Contribution					**10% of GSA**	**2.85**
2%	Max % of Restricted Public Open Space Permitted				0.57	
8%	Min % of Unrestricted Public Open Space to be provided				2.28	
Public Open Space Breakdown						
POS Ref	**Description**	**Gross Area[3]**	**1 in 1 year**	**1:5y ARI (>1 year and up to 5 year ARI)**	**Other Restricted POS (buffer)**	**Unrestricted POS Area**
1	Entry Park	0.5412	0.0115	0.0261	0	0.5036
2	Western Park	0.6034	0.0125	0.0277	0	0.5633
3	Green Corridor	1.451	0.0435	0.0	0	1.3580
4	Eastern Park	0.4238	0.0204	0.0386	0.14	0.2183
5	Bussell Park	0.3874	0.0138	0.0241	0	0.3063
TOTALS		**3.41ha**	**0.1017**	**0.1165**	**0.14**	**2.9495**
	Total Non-Credited POS[4]				**1.396**	**0.00%**
	Total Restricted Use POS				**0.2565**	**0.9%**
	Total Unrestricted POS				**2.9495**	**10.14%**
	Total Creditable POS Provision				**3.206**	**11.2%**

Notes:

1. *All numerical values in this table are expressed in hectares (ha) unless otherwise shown.*
2. *In accordance with Liveable Neighbourhoods, the gross subdivisible area includes house lots, access roads, and any land incidental to the subdivision. The gross subdivisible area does not include areas for schools, shopping centres, infrastructure, dedicated drainage sites not having a recreational function and land set aside for arterial roads and other non-residential uses.*
3. *The Gross Subdivisible Area excludes the mapped floodway area.*
4. *The non-credited POS (i.e. POS which is treated as a deduction) includes all areas of POS which are not included in the 10% calculation. This includes the 1:1 year bio-retention areas as well as the total area of the mapped floodway.*
5. *The 10m vegetated buffer to Caves Road is included as Restricted Use open space as agreed with the City of Busselton.*

The size and function of the POS network is subject to further refinement and revision at subdivision stage, at which point it may be necessary to prepare an updated POS schedule. A provision has been included in the Implementation section of the Structure Plan to require an updated POS Schedule to be submitted at subdivision stage where changes to the POS network are proposed.

4.5.4 Public Open Space Description

The following provides a brief description of the function and intent of each of the five POS areas identified on the Structure Plan map.

POS 1 – Entry Park (5,400m²)

The entry park is located immediately to the west of the main entry to the Structure Plan area from Caves Road. It has been deliberately located to capture the existing mature vegetation that currently surrounds the homestead, and to provide a strong sense of arrival when entering the estate from Caves Road. As well as a playground, and potentially a sales office in the short term, POS 1 will accommodate a shallow drainage basin which will be integrated with the trees and surrounding open space area in accordance with best-practice landscape design.

An indicative landscape concept of POS 1 is shown at Figure 13.

POS 2 – Western Park (6,000m²)

The western park has been deliberately located to capture the mature Marri trees and other eucalypts in this location. At present these trees are paddock trees with minimal understory, and as such are well suited to providing a shady recreation space without creating a bushfire hazard for nearby residents. The unvegetated area at the eastern end of this park will accommodate a small amount of drainage from the surrounding roads, while the rest of the park will be parkland-cleared and landscaped to a high standard.

POS 3 – Green Corridor (2.7ha)

At approximately 2.7ha, POS 3 is the largest POS area in the Structure Plan. At the northern end POS 3 creates a seamless extension to the south from the entry park, and captures a number of the better-quality eucalypts and peppermint trees within this central spine. Towards the southern end POS 3 accommodates the mapped floodway area, which, although entirely useable as an active kick-about space, will largely be unmodified due to the need to convey floodwater in major storm events. For the purposes of calculating POS credits, the floodway area has been treated as a non-creditable deduction, however in reality will provide a high level of useability and visual amenity as part of the broader POS network.

POS 3 encircles the low-density peninsula in the south west corner of the site, and has the potential to provide a pedestrian / cycle connection to the dual use path that runs along the Buayanyup Drain to the west of the site via the Fox Road reserve.

Overall, POS 3 provides an important role in pedestrian and cyclist connectivity between the southern portion of the Structure Plan area and Caves Road, as well as passive recreation opportunities and amenity for future residents.

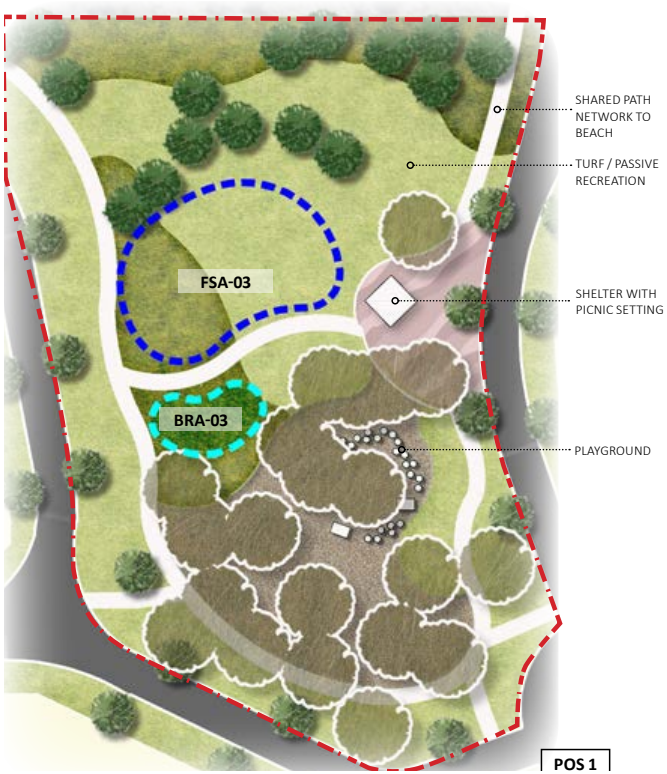
POS 4 – Eastern Park (4,200m²)

The eastern park has been located to capture the grove of peppermint trees that sit along the boundary between lots 4 and 12 Caves Road. These trees provide a southward extension of the vegetation in the Caves Road reserve, and a precinct-defining break in the perimeter road that runs along the northern end of the Structure Plan area. It is intended that with the exception of some thinning and maintenance within this park, the existing trees will largely be undisturbed and retained.

The eastern park also provides opportunities for a 10m wide landscaped buffer between Caves Road and the residential area. As agreed with the City of Busselton, the portion of POS 4 that forms the buffer (1,400m2) is restricted open space for the purposes of calculating POS credits.



Figure 13 Landscape Concept



PUBLIC OPEN SPACE 1

POS TYPOLOGY

- Feature park

SIZE

- POS 1 = 6520m²

BRA-03

- 1%AEP TWL (m2) 110
- Volume (m3) 41
- Slope 1:6
- Depth (m) 0.5

FSA-03

- 1%AEP TWL (m2) 540
- Volume (m³) 309
- Slope 1:6
- Depth (m) 1.0

CONCEPT

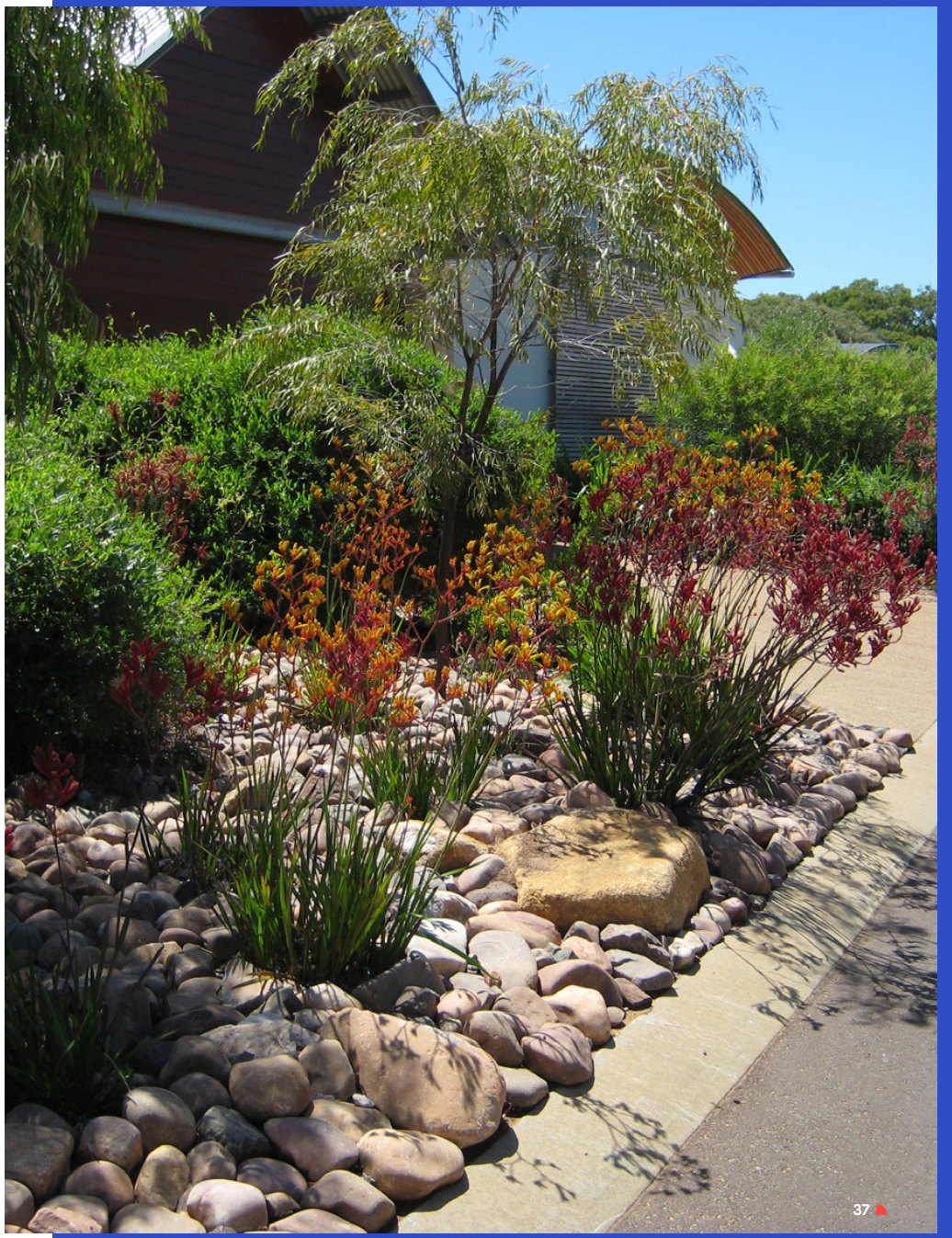
- Feature park immediately west of the main entry providing a strong sense of arrival playful open space under retained existing vegetation
- Community focal area with space for small events.

FUNCTIONS / MATERIALS

- Passive turf recreation under existing tree shade
- Combination of nature play and custom play under tree canopy
- Shade structure and picnic facilities
- Part of the cycle/jogging network to the beach

ENVIRONMENTAL CONSIDERATIONS

- Source local materials where possible
- Large grouping of existing trees to be retained for shade and fauna habitat
- Water-wise native planting selection
- Flood storage provision



POS 5 – Bussell Park (3,900m²)

POS 5 is located adjacent to the Local Centre zone and provides important pedestrian connectivity between the local centre, Bussell Highway, and the balance of the Structure Plan area to the east. POS 5 allows for vegetation retention along the existing boundary between lots 402, 12 and 14, and will facilitate the retention of some mature peppermint trees in a managed setting. As well as providing a local drainage function, POS 5 provides opportunities for passive recreation through a picnic node, play area and shared path network.

4.6 Drainage and Water Management

Emerge has prepared a local water management strategy (LWMS) which meets the requirements of Better Urban Water Management (WAPC 2008), and demonstrates how both ground and surface water can be managed as part of the development of the Structure Plan area. A plan depicting the overall drainage catchments and strategy is Figure 14.

The LWMS has been prepared in consultation with the Department of Water and Environmental Regulation (DWER) and the City of Busselton to ensure it can meet their requirements. The LWMS takes an integrated water cycle management approach and application of Water Sensitive Urban Design (WSUD) principles to provide improvements in the management of water. The key principles of integrated water cycle management considered in the LWMS include:

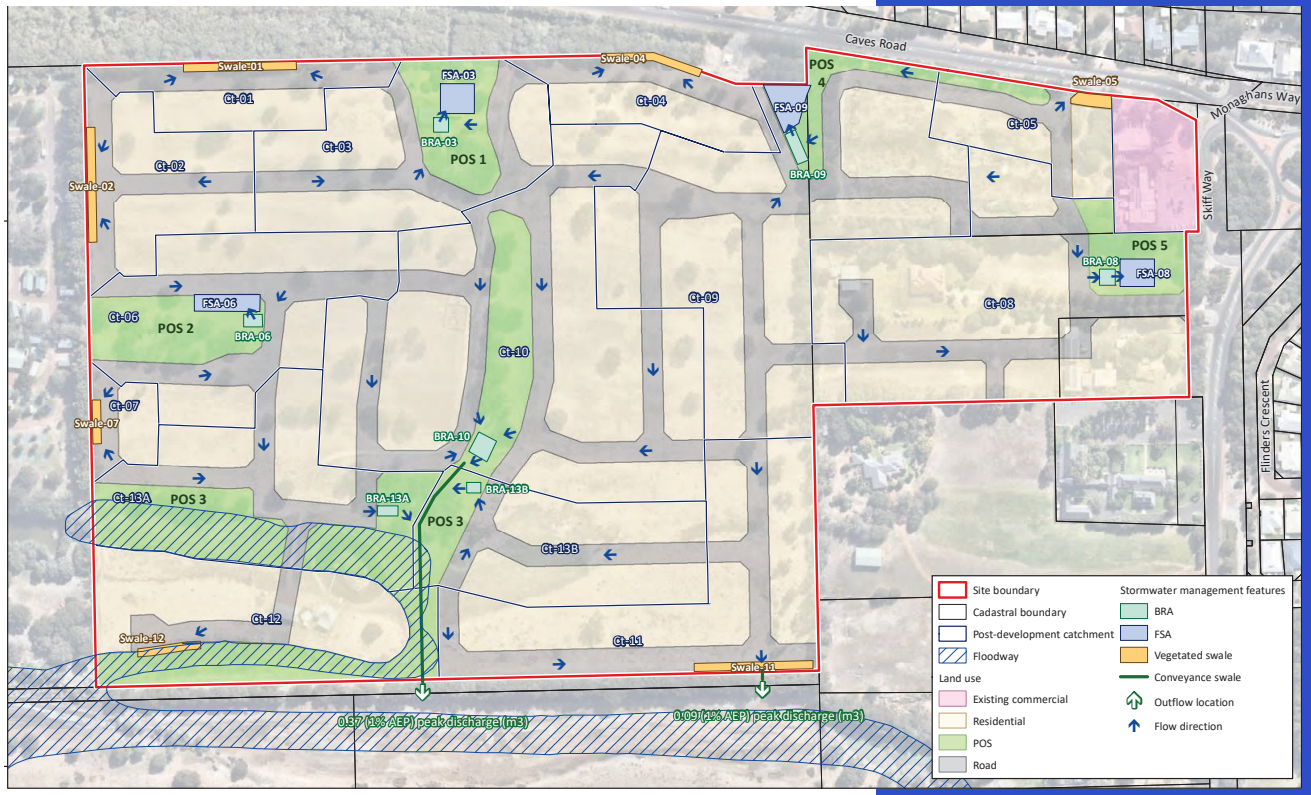


Figure 14 Drainage Strategy

- Considering all water sources, including wastewater, surface water and groundwater.
- Integrating water and land use planning.
- Allocating and using water sustainably and equitably.
- Integrating water use with natural water processes.
- Adopting a whole catchment integration of natural resource
  use and management.

The LWMS integrated water cycle management approach addresses not only physical and environmental aspects of water resource use and planning, but also integrates other social and economic concerns. Proposed water management design objectives seek to deliver best practice outcomes in terms of:

- Water consumption/conservation;
- Surface water management;
- Groundwater management.

The integrated water cycle management for the site is based on the agreed environmental values for receiving environments, which are detailed in the LWMS in Appendix 2, and feedback from DWER and City of Busselton. The water management approach proposed in the LWMS and Structure Plan is summarised below.

4.6.1 Water Supply and Conservation

The overall approach to water supply is to utilise scheme water provided via Busselton Water and implement best practise water conservation measures (e.g. water efficient fixtures, use of water sensitive urban design (WSUD) measures, and planting of water wise species) to reduce water demand. Non-potable water for irrigation at lot scale will also be provided by scheme water within private lots and potentially rainwater tanks if installed by lot owner. The key approach for public open space (POS) will be to retain as many of the existing trees as possible, to minimise water use and provide amenity. The surrounding POS areas will be either unirrigated or temporarily supplied (e.g. by watercart) during an establishment period.

4.6.2 Stormwater Management

All residential lots will retain stormwater runoff up to the major (1% annual exceedance probability (AEP)) rainfall event. This is possible given the permeable soils and large lot sizes (500-600m^2) where infiltration will occur within soakwells and pervious lot areas, which will also serve to treat the first 15 mm. Runoff from road reserves and POS areas will be treated as close to source as possible using either vegetated roadside swales or a vegetated bio retention area (BRA) where treatment will occur via contact with vegetation and the underlying soil profile. The majority of catchments will either have a POS area that will contain a BRA and a flood storage area (FSA) and catchments with no POS will contain a vegetated swale that will be designed to treat the first 15 mm and retain/detain runoff up to the 1% AEP event. This approach will ensure that the 1% AEP pre-development peak discharge rate and volume is not exceeded and hydraulic connectivity to the adjacent Broadwater Nature Reserve Swamp (BNRS) is maintained.

Consistent with the local character, road runoff will be discharged to bio-retention areas or swales via flush kerbs wherever practicable.

4.6.3 Groundwater Management

Groundwater management will include appropriate clearance of stormwater infrastructure above maximum groundwater levels to facilitate infiltration. These levels are conservatively set to provide mitigation against future rises in groundwater levels which could occur in the future due to potential sea level rise. Adopting a minimum finished floor level of 3m AHD accommodates for adaptive development planning required by the City under the Coastal Hazard Risk Management and Adaptation Plan whilst also providing lots with appropriate clearance to groundwater. Groundwater quality will be improved with a change in land use and the use of WSUD measures.

The LWMS demonstrates that the concepts described above can be achieved by the spatial layout of the Structure Plan. It also provides guidance for future development/design stages to ensure that the water management criteria proposed can be achieved, and to ensure that an integrated water cycle management and best practise WSUD approach can be achieved by the implementation of the Structure Plan.

4.7 Bushfire Mitigation

The entire Structure Plan area is identified as bushfire prone by the State bushfire mapping. The site-specific Bushfire Management Plan prepared by Emerge Associates and included as Appendix 3 confirms that the bushfire hazards are limited to:

- Forest (Class A) vegetation, associated with existing remnant vegetation to the north of the site within the Caves Road reserve.
- Scrub (Class D) vegetation, associated with the RAC Busselton Holiday Park situated to the west of the site, and the proposed landscaped buffer to Caves Road adjacent to Lot 12.
- Grassland (Class G) vegetation, associated with existing paddock areas to the south and south-east of the site.

The BMP confirms that a BAL rating of BAL-29 or lower can be achieved through the inclusion of a minimum 21m separation between the edge of the hazard and the dwelling.

The Structure Plan responds to these hazards by including a 20m road reserve along the western and northern perimeters of lot 4 which, when coupled with the front setback of the dwelling, will ensure an adequate asset protection zone to achieve a suitable BAL rating. In the

south western corner of the Structure Plan where there is no perimeter road, the necessary asset protection zone can be achieved through an 8m setback within the lot. Given the low density coding and minimum lot size of 1,000m^2, the 8m setback is easily achievable and can be enforced either via a building envelope plan, LDP, or a BAL assessment at building licence stage.

Furthermore, in accordance with the Bushfire Guidelines, the Structure Plan identifies multiple egress routes from the site, including a secondary emergency egress through the central POS area so that in the event of a bushfire, residents of the western precinct can safely leave the area and move away from the fire. This egress is not intended as a public road, but rather a trafficable crossing through the central POS area. The form, function and management of this emergency egress will be confirmed as part of the detailed landscape design and implementation of the Bushfire Management Plan at subdivision stage.

4.8 Road Network

The Structure Plan makes provision for a comprehensive and connected road network, as described below.

4.8.1 Access to the Regional Network

The Structure Plan includes three access points to the regional road network – to Caves Road in two locations and Bussell Highway in one location. This includes a full movement 'T' intersection onto Caves Road approximately midway between Cuthbert Street and Locke Street to the north. This intersection will serve as the primary access to the Structure Plan area for the short and medium terms. Its functional capacity to service the entire Structure Plan area has been confirmed by Stantec's modelling and is supported in principle by Main Roads WA. A second full movement 'T' intersection is provided further to the east on Caves Road, and a left in/left out intersection is provided to Bussell Highway to the south of Skiff Way in the same approximate alignment as the current crossover to lot 14.

Main Roads has advised that some minor modifications to Caves Road and the existing turn pockets may be required in order to accommodate the new intersections, however Stantec has advised that these modifications are not fatal flaws and can be accommodated through the civil design process at subdivision stage.

In the longer term, the Structure Plan is able to accommodate a second future connection to Bussell Highway further to the south (if required) which could be extended through lot 8 Bussell Highway to connect to the highway. The Structure Plan does not propose this intersection – nor does it rely on it to be able to achieve access to the regional network, however it does allow for a future connection to be constructed by others should it be deemed necessary in the future.

4.8.2 Internal Road Network

The Structure Plan establishes the key principles and functions of the internal road network, with further refinement to occur at subdivision stage once site-specific considerations such as earthworks are better understood. The Structure Plan map depicts an indicative local street network. It is important to note that this network is subject to further refinement at subdivision stage, and the network depicted in the Structure Plan is not intended to be binding on the future subdivider.

Internally, the road network has been designed with the intention of maximising permeability and walkability whilst minimising the need for significant amounts of fill. The road network also provides opportunities for vegetation retention, drainage detention and bushfire buffers within road reserves.

Due to the higher concentration of vehicle traffic, the primary access street into the Structure Plan area from Caves Road is designated as an 'Access Street B' with an indicative reserve width of 16.5m – 17.9m as defined by Liveable Neighbourhoods. A plan depicting the location of the Access Street B is shown at Figure 15.

All other streets in the Structure Plan area are forecast to carry less than 1,000 vpd and are designated as Access Street D. Typically, these access streets will be within a 15m reserve (6m pavement and 4.5m verges) with the exception of the perimeter roads which are wider reserves of 20m, intended to accommodate bushfire setbacks and drainage swales within the wider verge. An indicative cross section of the perimeter road is shown at Figure 16, and demonstrates how the reserve can accommodate the drainage swale as well as the road pavement and other infrastructure.

There may also be some localised instances where the road reserve is widened to accommodate an existing tree within the verge. These will be determined at Structure Plan stage once a detailed tree survey has been completed and earthworks design levels are confirmed.

4.8.3 Pedestrian and Cyclist Network

The Structure Plan provides a highly permeable layout with strong north-south and east-west linkages.

The north-south linkage is via the central open space corridor which connects the southern end of the Structure Plan area to Caves Road via an almost uninterrupted open space network. Once at Caves Road, pedestrians can access Abbey Beach and the Geographe Bay Principal Shared Path via Cuthbert Street and Roberts Road to the north.

The primary east-west linkages are along the northern perimeter road and through POS 1 and 4, or via any number of the east-west local access streets that cross the Structure Plan area. These linkages greatly improve connectivity between the RAC Holiday Park to the west and the local centre, tavern, and Shed Markets to the north-east.

Figure 15 Road Hierarchy Map

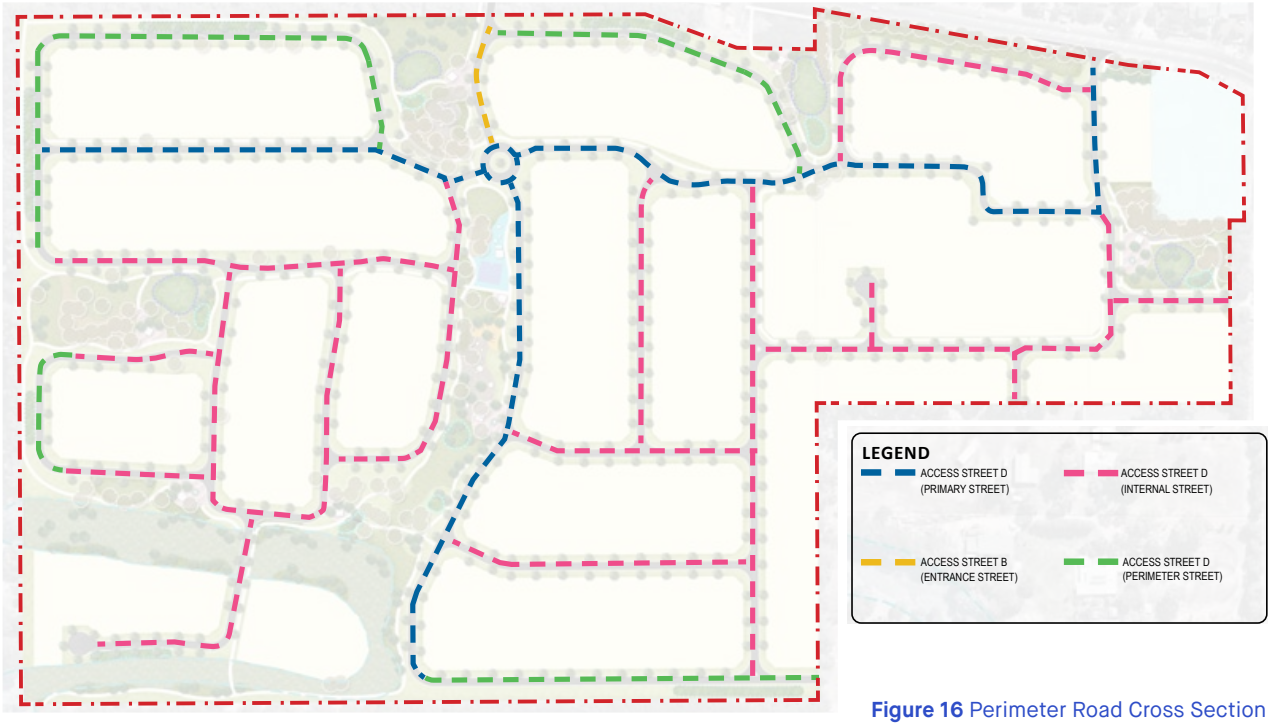
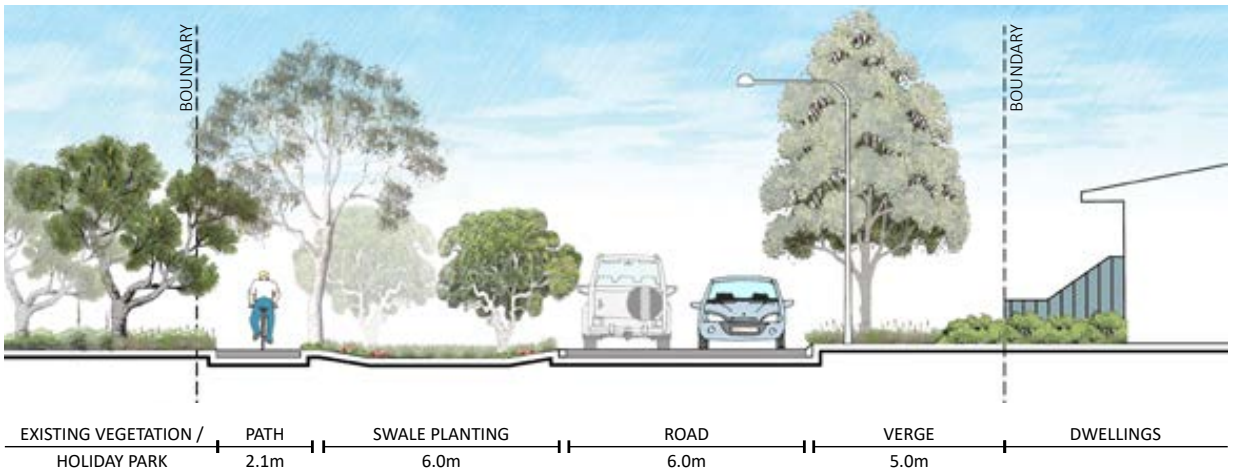


Figure 16 Perimeter Road Cross Section



Due to the low traffic volumes on all roads there is no need for designated on road cycle lanes, while footpaths and shared paths provide safe conveyance for pedestrians and other vulnerable road users.

Footpath locations and widths will be determined in consultation with the City of Busselton at the detailed design stage of the project.

4.9 Delivery Staging and Development Contributions

Due to the minimal site preparation required as well as the availability of services and accessibility from the regional road network, the first stages of the Structure Plan can feasibly be delivered to the market within 24 months.

Development staging is likely to proceed southwards in an orderly manner, with the initial stages to occur at the northern end of the site to allow for up-front connection to the existing services within the Caves Road reserve. It is envisaged that the areas fronting Bussell Highway will be the last to develop, however it is open for these landowners to commence earlier provided services can be extended in an efficient and cost-effective manner. A preliminary staging plan has been prepared by Stantec, and is included as Figure 17.

Due to the largely consolidated ownership, equitable distribution of open space, and cooperation between landowners, there is no need to implement a Development Contribution Plan at this stage. Any cost-sharing can be resolved through private agreements between landowners / developers. On this basis, staging and infrastructure cost sharing is not a constraint to development.

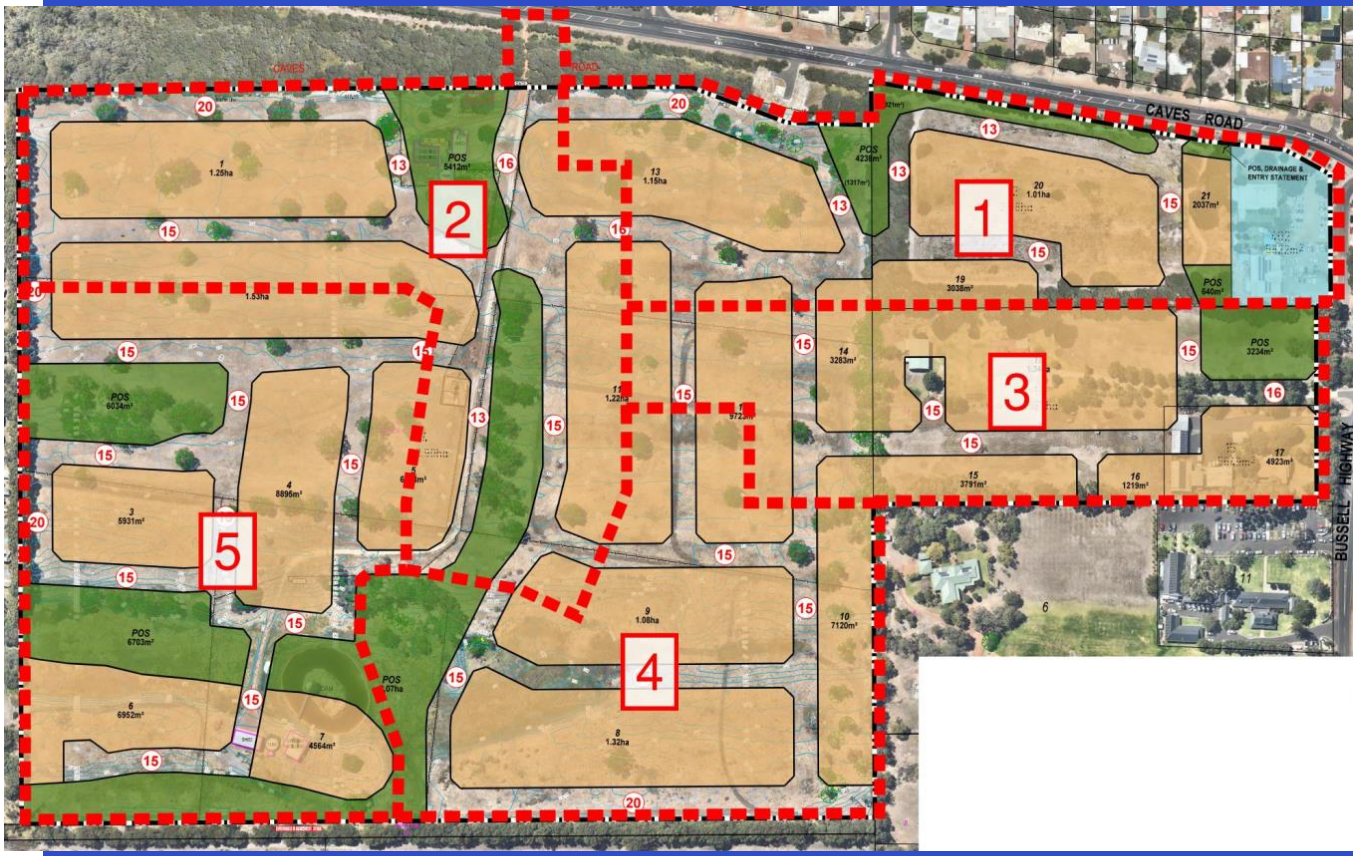
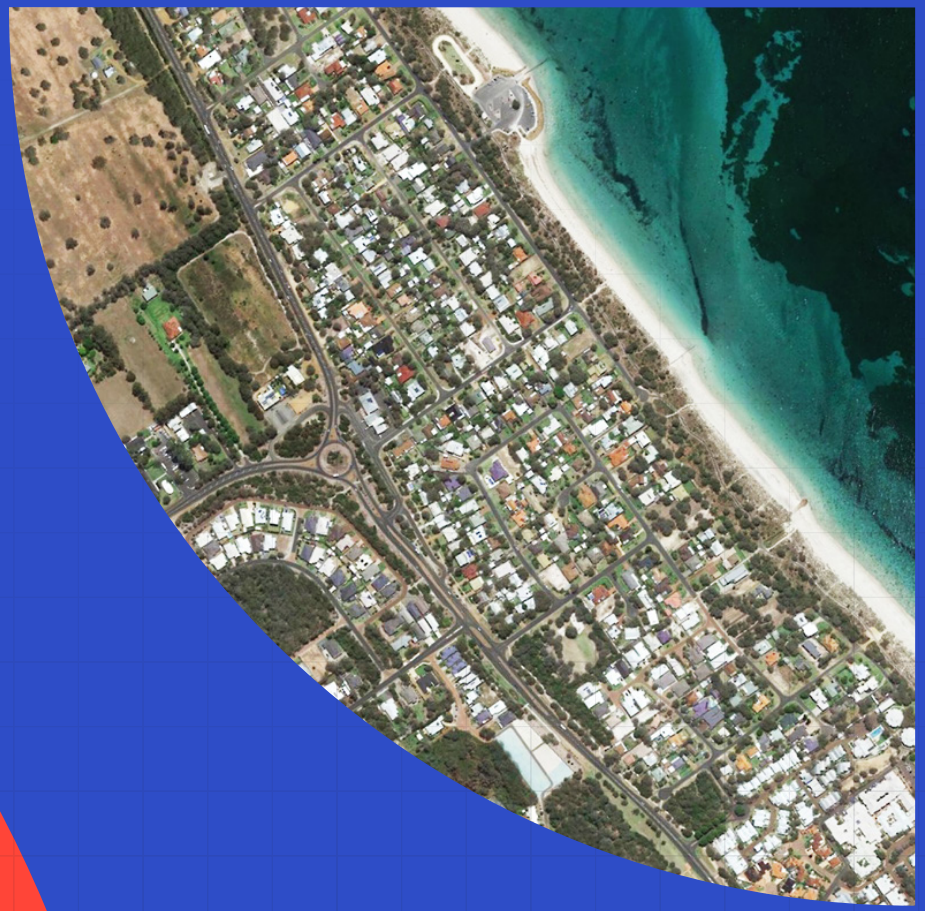


Figure 17 Preliminary Staging Plan



Appendix 1

Environmental Assessment – Emerge Associates

Rise Urban

AGILE PLANNING FOR THE NEW NORMAL

emerge ASSOCIATES
Integrated Science & Design

Environmental Assessment and Management Strategy

Abbey South Structure Plan Area

Project No: EP20-141(04)

Prepared for Various Landowners
December 2022



Document Control

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Executive Summary

This Environmental Assessment and Management Strategy (EAMS) has been prepared on behalf of various landowners (the proponent) to support a scheme amendment and structure plan over Lots 4, 12 and 402 Caves Road, and Lots 14 and 15 Bussell Highway, Abbey (also described as the 'Abbey South Structure Plan Area' and herein referred to as 'the site') for future residential development. The site encompasses 30.52 hectares (ha) and is found approximately 9 km west of the Busselton town centre. The site is generally bound by Bussell Highway to the east, Caves Road to the north, the RAC Busselton Holiday Park to the west and an existing nature reserve/agricultural area to the south.

The site has been historically cleared to support agricultural land use and contains pasture areas with scattered trees. This is in accordance with the uses permitted under the current 'rural' and 'conservation' zoning under the City of Busselton Local Planning Scheme (LSP) No. 21. The scheme amendment proposes to rezone the site to 'urban development' (or similar), which will support urban development. This is in line with the *Leeuwin-Naturaliste Sub-regional Strategy* (DPLH 2021), which identified the majority of the site as suitable for 'Urban', while the southern portion of Lot 4, which corresponds with the current 'conservation' zoning, has been identified as 'Open Space Investigation'.

This EAMS has been prepared for the site to support the proposed scheme amendment and future development and provides a synthesis of information relating to the environmental features, attributes and values. It outlines how these environmental values should be considered and can be managed as part of the proposed development.

The environmental attributes and values relevant to the site are summarised below and include:

- Site topography ranges from 2 metres Australian Height Datum (mAHD) within the southern portion of the site to 3 mAHD in the northern portion of the site, with the exception of a depression within the southern portion of the site, which has elevations of approximately 1 mAHD.
- Available regional mapping has identified a 'moderate to low' risk of acid sulfate soils (ASS) occurring within 3 m of the natural soil surface across the majority of the site. Within the southern third of the site, it is mapped as having a 'high to moderate' risk of ASS occurring within 3 m of the natural soil surface.
- The site is located within approximately 400 m of Geographe Bay, with the northern portion of the site located within the 2120 coastal erosion hazard line (and recommended coastal management area) based on the City of Busselton Coastal Hazard Risk Management and Adaption Plan (CHRMAP).
- The entire site has been historically cleared of native vegetation and is composed of cleared paddocks, with only scattered remnant trees remaining. It is highly unlikely that the site contains threatened or priority flora species, threatened or priority ecological communities or habitat that in its current condition provides important for conservation significant fauna species.
- Limited regional groundwater level information is available. Emerge Associates undertook monthly groundwater monitoring between July 2021 and November 2021 and July 2022 and November 2022 within five monitoring bores across the site. The results indicate the annual winter peak groundwater level ranges between 1.19 metres below ground level (mBGL) and 1.54

mBGL. The maximum groundwater level beneath the site therefore ranges from 2.1 mAHD along the eastern boundary to 1.5 mAHD in the south-eastern corner of the site.

- Four multiple use wetlands (MUWs) are located within the southern, south-western and north-eastern portions of the site. A 1% annual exceedance probability (AEP) floodway and flood fringe area is located within the lower south-western portion of the site and is associated with The Broadwater and the Broadwater Nature Reserve Swamp, located approximately 100 m south of the site. Buayanyup River Main Drain is a sub-A drain located approximately 180 m west of the site and discharges north to Geographe Bay.
- An 'other heritage place' (ID 5337), which is described as 'skeletal material/burial' for the purposes of the *Aboriginal Heritage Act 1972*. This feature is likely to be associated with the Buayanyup River Main Drain and not within the site.
- Caves Road and Bussell Highway abuts the northern and eastern boundaries of the site respectively, and are identified as 'other significant freight/traffic route' under *State Planning Policy 5.4 Road and Rail Noise* (SPP 5.4). Portions of the site are identified within the associated road noise impact trigger distances.
- The site is designated as a bushfire prone area under the state-*wide Map of Bush Fire Prone Areas* prepared by the Office of Bushfire Risk Management (OBRM). A bushfire hazard level assessment for the existing vegetation indicates that the majority of the site is subject to a 'moderate' bushfire hazard, as it is largely cleared paddocks, and this will be removed as development progresses.

Based on the environmental values or attributes identified within the site, this EAMS provides recommendations for environmental management considerations for future development of the site, including:

- **Coastal**: A finished level of 2.7 mAHD for all buildings is required in order to meet the requirements of the City of Busselton's CHRMAP. This can be achieved with minimal additional fill required across the majority of the site.
- **Acid sulfate soils**: it is possible that future investigations and management will be required at subdivision, particularly if services are likely to be installed below the permanent groundwater table. This can be managed through the standard subdivision approval process.
- **Flora, vegetation and fauna:** The site has been historically cleared of native vegetation with only pasture and scattered remnant trees remaining. The management of vegetation and fauna values as part of future development of the site can be appropriately managed through the standard subdivision process. The proposed structure plan proposes areas of public open space in locations to maximise retention of existing trees, and to provide green linkages across the site and between areas of remnant vegetation or nature reserve outside the site. The proposed urban development will provide an opportunity to increase the composition of plant species and vegetation structure, improving biological diversity and ecological integrity as well as vegetation connection (supporting fauna movement and flora dispersion).
- **Hydrology:** The 1% AEP floodway has been accommodated within public open space, while flood fringe areas will be subject to minor filling to ensure the minimum floor level (based on 1% AEP flooding with development of the flood fringe) is achieved. Water management within the site will ensure the first 15 mm of stormwater is treated and retained within the development so that the pre-development discharge rate and volumes are not exceeded, and water quality is

improved. Separation to groundwater is able to be achieved based on the proposed minimum 2.7 mAHD lot finished floor levels (which includes that required to manage coastal processes). Future development will be supported by Urban Water Management Plan(s) as per the standard subdivision process.

- **Heritage:** A portion of an 'Other Heritage Place' (ID 5337) is mapped as extending into the western portion of the site. As it is an 'other heritage site' and not considered to be 'a site' as defined by the *Aboriginal Heritage Act 1972*, no specific approval is required under the existing enacted Aboriginal heritage legislation.
- **Road noise**: Consideration of noise has been undertaken in accordance with SPP 5.4, and indicates that noise impacts can be addressed through the 'deemed-to-satisfy' pathway. This can be managed through the standard subdivision process, and through the application of quiet house design.
- **Bushfire management:** Bushfire hazards (classified vegetation) that have the potential to impact the site are associated with forest vegetation immediately to the north of the site (within the Caves Road reserve), grassland vegetation within rural landholdings to the south-east (considered to be temporary hazards) and within the Broadwater Nature Reserve Swamp to the south, as well as future public open space areas (which as per consultation with the City of Busselton has been assumed to be a bushfire hazard). The proposed structure plan layout accommodates required setbacks to achieve a bushfire attack level (BAL) rating of BAL-29 or less (as per *State Planning Policy 3.7 Planning in Bushfire Prone Areas*) to identified bushfire hazards through the proposed road or through development cells that can accommodate in-lot setbacks. Development within the site is not reliant on vegetation modification or management external to the site, or management within public open space areas. Where management of public open space is able to occur, this would reduce BAL ratings within development cells.

Overall, there are no significant environmental issues or constraints within the site that would preclude the entire site from being rezoned to 'urban development' (or similar) under the City of Busselton Local Planning Scheme No. 21 and being developed in accordance with the structure plan. The proposed structure plan provides for the retention and protection of the existing floodway, maximising retention of existing trees and addressing bushfire risk without relying on modification to existing remnant native vegetation. The key environmental value associated with the 'Open Space Investigation' area identified within the *Leeuwin-Naturaliste Sub-regional Strategy* (DPLH 2021) requiring consideration is the floodway feature, which has been fully accommodated within public open space, with the remainder of the ''Open Space Investigation' area able to support urban development.

The environmental values can be appropriately accommodated through the implementation of the structure plan and standard subdivision process.

Table of Contents

1 Introduction 1

1.1 Background 1
1.2 Purpose of this report 1

2 Planning and Environmental Assessment Concept 2

2.1 Existing zoning and reservations 2
2.2 Leeuwin-Naturaliste Sub-regional Strategy 2
2.3 Future land use planning processes 3
2.3.1 Proposed local planning scheme amendment 3
2.3.2 Structure Plan 4
2.3.3 Subdivision and development 4
2.4 Future environmental assessment processes 5
2.4.1 *Environmental Protection Act 1986* – Section 48 5
2.4.2 Environmental Protection Act 1986 – Section 38 5
2.4.3 Environment Protection and Biodiversity Conservation Act 1999 6
2.5 Future offset requirements 6

3 Existing Environment 7

3.1 Climate 7
3.2 Landform and soils 8
3.2.1 Topography 8
3.2.2 Landform, soils and geology 8
3.2.3 Acid Sulfate Soils 9
3.2.4 Land capability 9
3.3 Biodiversity and natural area assets 10
3.3.1 Flora and vegetation 10
3.3.1.1 Vegetation condition 11
3.3.1.2 Threatened and priority ecological communities 13
3.3.1.3 Threatened and priority flora 14
3.3.2 Terrestrial fauna 15
3.3.3 Conservation reserves 16
3.3.3.1 DBCA managed lands 16
3.3.3.2 City of Busselton managed lands 17
3.3.4 Ecological linkages 17
3.3.5 Environmentally Sensitive Areas 17
3.4 Hydrology 17
3.4.1 Groundwater 17
3.4.2 Surface water 18
3.4.3 Wetlands 19
3.4.4 Public drinking water source area 20
3.5 Coastal processes 20
3.6 Heritage 20
3.6.1 Aboriginal heritage 20
3.6.2 Non-Indigenous heritage 21
3.7 Other land use considerations 21
3.7.1 Historic and existing land uses 21
3.7.2 Potential site contamination 21
3.7.3 Mosquitos and nuisance insects 22
3.8 Surrounding land uses 22
3.9 Bushfire hazard 23

4 Environmental Factors Considered by the EPA 26

4.1 Environmental principles 26
4.2 Key environmental factors 27

5 Impact Assessment and Management Approach 34

5.1 Coastal Processes 34
5.1.1 Policy framework, site context and management objectives 34
5.1.2 Structure plan layout considerations for coastal processes 34
5.1.3 Future coastal management requirements 35
5.2 Flora and vegetation 36
5.2.1 Policy framework, site context and management objectives 36
5.2.2 Structure plan layout considerations for flora and vegetation 36
5.2.3 Future flora and vegetation management requirements 36
5.3 Acid sulfate soils 37
5.3.1 Policy framework, site context and management objectives 37
5.3.2 Structure plan layout considerations for acid sulfate soils 37
5.3.3 Future acid sulfate soils management requirements 37
5.4 Native fauna 38
5.4.1 Policy framework, site context and management objectives 38
5.4.2 Structure plan layout considerations for terrestrial fauna 38
5.4.3 Future terrestrial fauna management requirements 39
5.5 Hydrology 39
5.5.1 Policy framework, site context and management objectives 39
5.5.2 Structure plan layout considerations for hydrology 40
5.5.2.1 Floodway 40
5.5.2.2 Surface water and groundwater 40
5.5.3 Future management requirements 40
5.5.3.1 Floodway 40
5.5.3.2 Surface water and groundwater 41
5.5.3.3 Overall 42
5.6 Acoustic impacts – Bussell Highway and Caves Road 42
5.6.1 Policy framework, site context and management objectives 42
5.6.2 Structure plan layout considerations for management of acoustic impacts 43
5.6.3 Future acoustic management requirements 44
5.7 Bushfire management 45
5.7.1 Policy framework, site context and management objectives 45
5.7.2 Structure plan layout considerations for bushfire management 45
5.7.3 Future bushfire management requirements 46

6 Implementation Framework 48

7 Conclusions 51

8 References 53

8.1 General references 53
8.2 Online references 57

List of Tables

Table 1: Summary of threatened and priority ecological communities with potential to occur in general area . 14
Table 2: Annual winter peak (mBGL) collected between August and November 2021 and August and November 2022 18
Table 3: EP Act Principles 26
Table 4: EPA factors applicable to the site. Shaded green cells indicate factors relevant for further assessment. 28
Table 5: Noise targets as outlined within SPP 5.4 43
Table 6: Environmental management framework implementation table 49

List of Plates

Plate 1: City of Busselton Local Planning Scheme (No. 21) Zones and Reserves..... 2
Plate 2: Average monthly temperature and rainfall at the Busselton Aero station (station number 009603) (BoM 2022) 7
Plate 3: Vegetation Complexes (DBCA 2021b) 10
Plate 4: Paddock grass extending through the south-western portion of the site (associated with the floodway area). Trees in background are located outside the site, adjacent to the southern boundary 12
Plate 5: Paddock grasses and paddock trees (Agonis flexuosa), found across the majority of the site..... 12
Plate 6: Existing commercial uses (The Shed Markets), currently established within the north-eastern corner of the site 13
Plate 7: Geomorphic Wetlands (DBCA 2022a) 19
Plate 8: SPP 5.4 'other significant freight/traffic routes' 200 m trigger distance..... 23
Plate 9: Areas within and surrounding the site identified as 'bushfire prone areas' (as indicated in purple) under the state-wide Map of Bush Fire Prone Areas (OBRM 2021).. 25

Figures

Figure 1: Site Location and Topography
Figure 2: Soils and Geology
Figure 3: Acid Sulfate Soil Risk Mapping
Figure 4: Existing Hydrological Features
Figure 5: Aboriginal and Non-Indigenous Heritage Values
Figure 6: Bushfire Hazard Level
Figure 7: Key Management Considerations

Appendices

Appendix A

Structure Plan and Concept Plan (Rise Urban 2022)

Appendix B

List of conservation significant flora and fauna

List of Abbreviations

Table A1: Abbreviations – General terms

General terms	
ASS	Acid sulfate soils
BAL	Bushfire Attack Level
BHL	Bushfire hazard level
BMP	Bushfire Management Plan
EAMS	Environmental Assessment and Management Strategy
ESA	Environmentally sensitive area
LWMS	Local Water Management Strategy
MNES	Matters of National Environmental Significance
PEC	Priority ecological community
TEC	Threatened ecological community

Table A2: Abbreviations – units of measurement

Units of measurement	
ha	Hectare
km	Kilometre
m	Metre
mAHD	metres in relation to the Australian Height Datum
mBGL	metres below ground level
mm	Millimetre

Table A3: Abbreviations – Organisations

Organisations	
BoM	Bureau of Meteorology
DAFF	Department of Agriculture, Fisheries and Forestry
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DFES	Department of Fire and Emergency Services
DoW	Department of Water (now DWER)
DPIRD	Department of Primary Industries and Regional Development
DPLH	Department of Planning, Lands and Heritage
DWER	Department of Water and Environmental Regulation
EPA	Environmental Protection Authority
OBRM	Office of Bushfire Risk Management
WALGA	Western Australia Local Government Association
WAPC	Western Australian Planning Commission

Table A4: Abbreviations –Legislation or standards

Legislation	
AH Act	*Aboriginal Heritage Act 1972*
AS 3959	Australian Standard 3959-2018 Construction of buildings in bushfire prone areas
BC Act	*Biodiversity Conservation Act 2016*
EP Act	Environmental Protection Act 1986
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999

Table A5: Abbreviations – Planning terms

Planning terms	
LPS	Local Planning Scheme
LSP	Local Structure Plan
SPP	State Planning Policy
Guidelines	Guidelines for Planning in Bushfire Prone Areas version 1.4 (DPLH & WAPC 2021)

1 Introduction

1.1 Background

Various landowners (the proponent) are proposing a scheme amendment and structure plan over Lots 4, 12 and 402 Caves Road, and Lots 14 and 15 Bussell Highway, Abbey (herein referred to as the 'site') to facilitate future residential development. The site encompasses 30.52 hectares (ha) and is situated approximately 8 km west of the Busselton town centre. The location of the site is shown in **Figure 1**.

A structure plan (and concept development plan) has been prepared to support the scheme amendment process and will be approved as part of the same process. This has been included in **Appendix A** and is discussed further in **Section 2.**

1.2 Purpose of this report

Emerge Associates were engaged to prepare an Environmental Assessment and Management Strategy (EAMS) to inform and support the scheme amendment and structure plan process, by assessing the potential environmental impacts that could arise from the land use change and subsequent development of the site, in accordance with the requirements of the Western Australian Planning Commission (WAPC).

This EAMS has been prepared by Emerge Associates to provide a synthesis of information regarding the environmental values and attributes of the site. Specifically, this report:

- Discusses the land use planning context and the proposed development of the site (**Section 2**).
- Identifies the existing environmental values and attributes of the site (**Section 3**).
- Outlines how the objectives of the Environmental Protection Authority (EPA) relating to each environmental factor can be met (**Section 4**).
- Outlines how the existing environment and key considerations can be managed as part of the future planning and development process (**Section 5**).

The EAMS is the key supporting environmental document for the scheme amendment and structure plan, to ultimately facilitate consideration of relevant environmental issues by the City of Busselton and various state government agencies and authorities. It is consistent with the requirements for environmental reporting as outlined in the Western Australian Planning Commission's (WAPC's) *Structure Plan Framework* (WAPC 2015b).

2 Planning and Environmental Assessment Concept

2.1 Existing zoning and reservations

The northern portion of the site is currently zoned 'rural' under the City of Busselton Local Planning Scheme No. 21 (LPS No.21), while the southern portion of the site is currently zoned 'conservation', as shown in **Plate 1**. The site is also identified as part of a number of 'special control areas', including landscape value, wetland and floodway and require protection or consideration of these values.

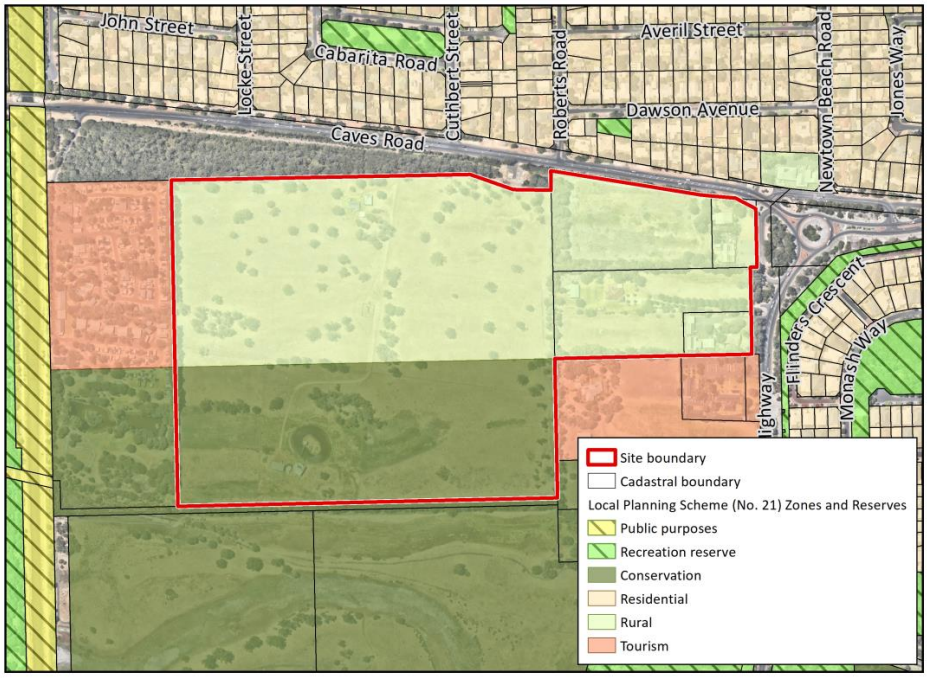

Plate 1: City of Busselton Local Planning Scheme (No. 21) Zones and Reserves

2.2 Leeuwin-Naturaliste Sub-regional Strategy

The Department of Planning, Lands and Heritage (DPLH), on behalf of the Western Australian Planning Commission (WAPC) released the *Leeuwin-Naturaliste Sub-regional Strategy* in December 2021, providing guidance to the City of Busselton and the Shire of Augusta-Margaret River on strategic issues, as well as support for the preparation of new local planning strategies and local planning schemes (DPLH 2021).

The site is identified within the *Leeuwin-Naturaliste Sub-regional Strategy* (DPLH 2021) as the 'Abbey Planning Investigation Area', which is subjected to further planning investigations to consider its suitability for a possible change of use to future tourism, aged care, mixed use and/or medium density residential.

The strategy identified the following key considerations for the Abbey Planning Investigation Area:

- Biodiversity value protection
- Bushfire risk
- Drainage
- Landscape value protection
- Protection of significant environmental values
- Utility services capacity
- Water source impact (groundwater and surface water)
- Biodiversity values (adjacent wetlands to south)
- Provision of land for employment generating activities
- Transition/interface with adjacent tourist uses (caravan park to west, boutique uses to east).

In accordance with the key considerations mentioned above, DPLH undertook detailed investigations within the area in 2021. WAPC resolved to amend the strategy as follows:

- The following lots amended to 'Urban':
  - Lot 12 on Diagram 43998
  - Lot 14 on Diagram 96590
  - Lot 15 on Diagram 96590
  - Lot 402 on Deposited Plan 252489
  - Northern portion of Lot 4 on Diagram 46285
- The following lot amended to 'Open Space Investigation':
  - Southern portion of Lot 4 on Diagram 46285

The above lots are inclusive of the site, providing strategic support for the proposed land use change. A summary of how the 'key' planning issues related to the environmental matters, including the 'Open Space Investigation' area, have been addressed as part of the structure plan is provided in **Section 5** and **Section 6**.

2.3 Future land use planning processes

2.3.1 Proposed local planning scheme amendment

Requests to amend the City of Busselton LPS No. 21 will be lodged with the respective state and local authorities, in order to appropriately rezone the site to be consistent with the structure plan and enable future urban development.

As part of the scheme amendment process, the City of Busselton will refer the amendment to the Environmental Protection Authority (EPA) pursuant to Section 48A of the *Environmental Protection Act 1986* (EP Act) to determine whether environmental assessment under Part IV of the EP Act will be required. The EPA will advise the City of Busselton if any environmental factors or potential significant impacts are identified as requiring assessment and advice or recommendations may be provided regarding future development within the site. This is undertaken prior to the scheme

amendment request being advertised to the public. The environmental factors and objectives considered by the EPA are discussed further in **Section 5**.

Following receipt of input from the EPA, the scheme amendment will be sent to the Western Australian Planning Commission (WAPC) pursuant to the *Planning and Development Act 2005*, who will similarly advise on if the amendment can be advertised. Following this, the scheme amendment will be publicly advertised with a decision on the scheme amendment made subsequently. This is considered further in **Section 2.4**.

2.3.2 Structure Plan

Following amendment to the City of Busselton LPS No. 21, a structure plan/s would typically be prepared. Based on the scale of the site and land ownership, the scheme amendment and structure plan stages will be addressed concurrently for the site, through the same documentation and plan. The purpose of a structure plan is to address planning scheme provisions and to provide a more detailed layout of the proposed urban land use and would include identification of features such as residential development cells, local reserves and the local road network. This has already been prepared and is considered as part of this document.

The EPA is not involved in the assessment of structure plans, given they are not able to be referred to the EPA for assessment under either Section 38 or Section 48A of the EP Act where a scheme amendment has been considered.

2.3.3 Subdivision and development

Following approval of the structure plan, the structure plan area will be subdivided and developed for urban land uses. The subdivision application process will need to address the requirements of any relevant local scheme provisions or other requirements included within the approved structure plan. Once issued, subdivision approval/s would include a range of conditions, some of which may relate to environmental matters, which will need to be implemented as part of the subdivision and development process, before titles for subdivided lots are issued. Other components of development may be progressed through development approval, for example forward bulk earthworks or other non-subdivisional works.

It is anticipated that all environmental impacts associated with implementation of urban subdivision and development works across the site will be considered by the EPA under Section 48A of the EP Act at the City of Busselton LPS No. 21 scheme amendment stages.

2.4 Future environmental assessment processes

2.4.1 *Environmental Protection Act 1986* – Section 48

All amendments to regional and local planning schemes (such as the City of Busselton LPS No. 21) are required to be referred to the EPA by the responsible authority under Section 48A of the EP Act. The EPA then makes one of the following determinations on the proposed scheme amendment:

- **The proposed scheme amendment should not be assessed by the EPA**, on the basis that it is considered unlikely to result in significant environmental impacts. In making this determination, the EPA may choose to also provide informal advice in relation to how environmental factors are expected to be addressed as part of future stages of the planning and development process.
- **The proposed scheme amendment should be assessed by the EPA**, on the basis that it is considered likely to result in significant environmental impacts. An environmental impact assessment process is then undertaken, and the Minister for Environment may then choose to issue a Ministerial Statement allowing the scheme to be implemented.
- **The proposed scheme amendment is by its nature incapable of being made environmentally acceptable.**

The structure plan considered by this EAMS is intended to support a scheme amendment process for the City of Busselton LPS No. 21 to establish an 'urban development' zone over the site, to address the recommendations of the Leeuwin-Naturaliste Sub-regional Strategy and to support implementation of the structure plan. As such, it is expected that it will be referred to the EPA pursuant to Section 48A of the EP Act by the responsible authority (City of Busselton) to the EPA.

2.4.2 Environmental Protection Act 1986 – Section 38

Section 38 of the EP Act enables any person to refer a proposal likely to have a significant impact on the environment to the EPA, who then decide whether or not to assess the proposal.

Section 48I outlines that any proposal likely to have a significant impact on the environment, but which is within an area and for a land use that is subject to an assessed scheme (i.e. a scheme for which a determination has been made by the EPA under Section 48A), is not required to be referred to the EPA under Section 38 of the EP Act.

Given the environmental impacts associated with implementation of urban subdivision and development works across the site will be considered by the EPA under Section 48A of the EP Act (at the City of Busselton LPS No. 21 scheme amendment stage), it is not anticipated that the implementation of urban development works within the site will be referred under Section 38 of the EP Act. However, this only applies to proposed works which are consistent with those considered through the Section 48A process and where their potential environmental impacts were considered by the EPA. The EPA may choose to defer assessment of environmental factors to subsequent stages of the planning process, which would mean Section 48I would not apply in such instances.

2.4.3 Environment Protection and Biodiversity Conservation Act 1999

Any proposed action which is likely to result in significant impacts to Matters of National Environmental Significance (MNES) listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is required to be referred to the Commonwealth Department of Agriculture, Fisheries and Forestry (DAFF) to determine whether it requires assessment under the EPBC Act.

The site is not considered to contain occurrences or habitat for MNES, and maximises retention of scattered remnant trees across the site. Referral pursuant to the EPBC Act is unlikely to be required.

In any case, the timing of EPBC Act referrals is not directly linked to the state planning processes. In an urban development context, EPBC Act referrals are typically undertaken once the development layout has been determined (for example, after the approval of the structure plan) such that the impacts to MNES can be quantified. As such, it is expected that if any EPBC Act referral is determined to be required to enable implementation of the structure plan, this would likely be made at future stages of the land use planning process, subsequent to finalisation of the structure plan process.

2.5 Future offset requirements

Under separate State and Commonwealth environmental policy frameworks, if a potential impact to an environmental value cannot be suitably mitigated through avoidance, minimisation and/or rehabilitation measures such that a significant residual impact remains, then environmental offsets may be required to counterbalance the proposed environmental impacts. This principle is applied to the environmental assessment process administered under both State and Commonwealth environmental protection legislation (the EP Act and EPBC Act, respectively).

With regard to environmental matters afforded protection under the State EP Act and in the context of local scheme amendments to be progressed across the site, the structure plan (considered in detail in **Section 5**) provides suitable mitigation of potential impacts through impact avoidance and minimisation measures, such that there will be no significant residual impacts for each of the relevant environmental factors. As such, no offsets are considered likely to be required for environmental matters protected under the EP Act.

With regard to MNES afforded protection under the Commonwealth EPBC Act, the structure plan provides mitigation of potential impacts through impact avoidance and minimisation measures. MNES are unlikely to be impacted by development of the site, and offsets are unlikely to be required.

3 Existing Environment

In order to understand the environmental values within or nearby to the site and consider appropriate management responses, Emerge Associates have reviewed a range of information sources, including local and regional reports, databases, mapping and site-specific investigations. The outcomes of these investigations are discussed in the following sections.

3.1 Climate

The climate of the site is described as Mediterranean, which is described as having hot, dry summers and moderately wet, mild winters. Since 1970, there has been an approximate 16% decline in the April to October rainfall within the southwest of Australia, with the May to July rainfall seeing the largest decrease at 20% (CSIRO-BoM 2020). In conjunction with this, Australia's climate has warmed by approximately 1°C since 1910, for both surface air temperature and sea surface temperature (CSIRO-BoM 2020).

Temperature and rainfall records are available from the Bureau of Meteorology (BoM). The Busselton Aero (site 009603) is the closest recording weather station, located approximately 16 km south-east of the site. Based on the weather data collected from 1997 to 2022, the local area experiences an average of 692.4 mm of annual rainfall. The temperature data recorded indicates an average maximum temperature of 30.2°C in January, and an average minimum temperature 7.0°C in July, as detailed within **Plate 2** (BoM 2022).

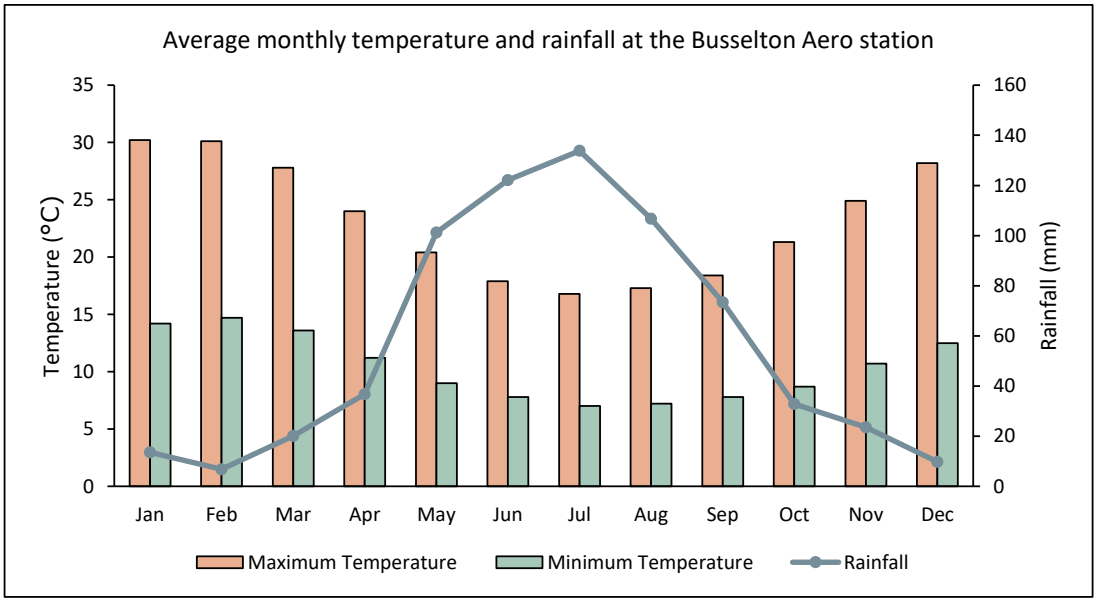

Plate 2: Average monthly temperature and rainfall at the Busselton Aero station (station number 009603) (BoM 2022)

3.2 Landform and soils

3.2.1 Topography

Elevation generally ranges from 2 m Australian height datum (mAHD) within the southern portion of the site to 3 mAHD within the northern portion of the site. An exception to these elevations is a depression associated with a portion of the site mapped as floodway (discussed further in **Section 0**) within the southern portion of the site and has elevations of around 1 mAHD. The topographic contours are shown within **Figure 1**.

3.2.2 Landform, soils and geology

Landform and soils influence vegetation types at a regional and local scale. The site occurs on the Swan Coastal Plain, which is the geomorphic unit that characterises much of the coast along the south-west of Western Australia.

An analysis of resource mapping supplied by the Department of Primary Industries and Regional Development (DPIRD 2022) indicates that the site is underlain by the Quindalup South System and the Vasse System. The Quindalup South System expands across the majority of the site and is described as coastal dunes of the Swan Coastal Plain, with calcareous deep sands and yellow sands. The Vasse System occupies the south-western portion of the site and is described as poorly drained estuarine flats, of the Swan Coastal Plain, which contains tidal flat soil, saline wet soil and pale deep sand.

A closer analysis of regional soil mapping prepared at a scale of 1:50 000 indicates that two soil units occur within the site. This mapping has been prepared as part of a series of geological maps published by the Geological Survey of Western Australia (Jordan 1986; Belford 1987; Leonhard 1991) and also outlines the expected broad level capability of soil and rock units to accommodate various land uses. The soils mapped within the site are shown in **Figure 2** and include:

- Calcareous Sand (S13) across the majority of the site, which is described as 'white, medium-grained, rounded quartz and shell debris; well sorted'. This soil unit is noted as having a variable thickness, dependent upon degree of estuarine and marine modification, and can sometimes occur over limestone (LS7),
- Clayey Peaty Sand (Spc1), in the south-western and north-eastern portions of the site, which is described as 'grey to black quartz sand with variable organic content; minor clays'. This soil unit is noted as being subject to seasonal flooding owing to the higher water table.

The soil and landform profiles over the site were further confirmed through the installation of five groundwater monitoring bores in June 2021 (shown in **Figure 2**). The bores were installed across the site to depths ranging between 5 m below ground level (mBGL) to 7 mBGL. The bore logs indicate that topsoil is generally comprised of coarse calcareous sand with depths ranging between 3 m to 7 m. This layer was either the final depth of the monitoring bore or was underlain with one of the following:

- Clayey sand with a thickness of 1 m extending from 5 mBGL to 6 mBGL, or;

- Sandy clay extending to depths between 3 mBGL to 4 mBGL, further overlying clay and rock that extends to depths of approximately 5 mBGL.

The bore logs suggest that the soils in the northern portion of the site are sandy and moving south, sandy clay soils become more prominent at shallower depths. This is detailed further within the Local Water Management Strategy (LWMS) (Emerge Associates 2022b).

3.2.3 Acid Sulfate Soils

Acid sulfate soils (ASS) is the name commonly given to naturally occurring soils and sediment containing iron sulphide materials. In their natural state ASS are generally present in waterlogged anoxic conditions and do not present any risk to the environment. When oxidised, ASS produce sulphuric acid, which can pose risks to the surrounding environment, infrastructure and human health.

ASS risk mapping (DWER 2017a) indicates that the northern two-thirds of the site is mapped as having a 'moderate to low' risk of ASS within 3 m of the natural soil surface, whilst the southern third of the site (which roughly aligns with areas identified as wetland features, discussed further in **Section 3.4.3**) and the north-eastern corner is mapped as having a 'high to moderate' risk of ASS within 3 m of the natural surface. The ASS risk mapping applicable to the site is shown in **Figure 3.**

3.2.4 Land capability

The Busselton Margaret River Augusta Land Capability Study is a broad-scale assessment completed to determine the general capacity of land in the broader region to sustain agricultural land uses such as grazing, viticulture, horticulture/market gardening, orchard crops and forestry (Lantzke 1990). It has been reviewed as part of understanding the suitability of the land for the proposed future development.

The Quindalup/Vasse coast land system within the site lists the following land use capabilities:

- They do not support good pasture due to low fertility and poor moisture availability.
- Generally unsuitable for horticulture and forestry due to their exposure to salt spray, low-ground water quality, low fertility and poor moisture availability.
- There are few areas suitable for soaks.

Of the soil types identified within the site, the Quindalup Flats (Quindalup South System) has minor to moderate physical limitations for housing, whilst the Quindalup Wet Flats (Vasse System) has moderate to major limitations. Neither of these soil types, however, are capable to support agricultural activities including grazing, market gardens, vineyards, orchards and forestry. There is high representation of the moderate to high capability land throughout the broader area, and development of the site would not decrease available agricultural land to any significant extent.

3.3 Biodiversity and natural area assets

3.3.1 Flora and vegetation

Vegetation can be described and mapped at different scales or units in order to illustrate general patterns in its distribution. At a continental scale the *Interim Biogeographic Regionalisation of Australia* (IBRA) identifies the Swan Coastal Plain (Environment Australia 2000).

At a finer scale, native vegetation within the site and adjacent land can be classified based on regional vegetation associations. Vegetation complex mapping undertaken by Department of Biodiversity, Conservation and Attractions (DBCA 2021b) identifies the Quindalup Complex over the majority of the site and the surrounding land to the north, east and west. The land to the south as well as the southern portion of the site, however, has been mapped as the Vasse Complex. Each complex has been described below, and illustrated on **Plate 3**:

- Quindalup Complex (55): Coastal dune complex consisting mainly of two alliances - the strand and fore-dune alliance and the mobile and stable dune alliance. Local variations include the low closed forest of *Melaleuca lanceolata* (Rottnest Teatree) - *Callitris preissii* (Rottnest Island Pine), the closed scrub of *Acacia rostellifera* (Summer-scented Wattle) and the low closed *Agonis flexuosa* (Peppermint) forest of Geographe Bay.
- Vasse Complex (57): Mixture of the closed scrub of Melaleuca species fringing woodland of *Eucalyptus rudis* (Flooded Gum) - Melaleuca species and open forest of *Eucalyptus gomphocephala* (Tuart) - *Eucalyptus marginata* (Jarrah) - *Corymbia calophylla* (Marri). Will include areas dominated by *Tecticornia* and *Sarcocornia* species (Samphire) near Mandurah and south of the Capel River.

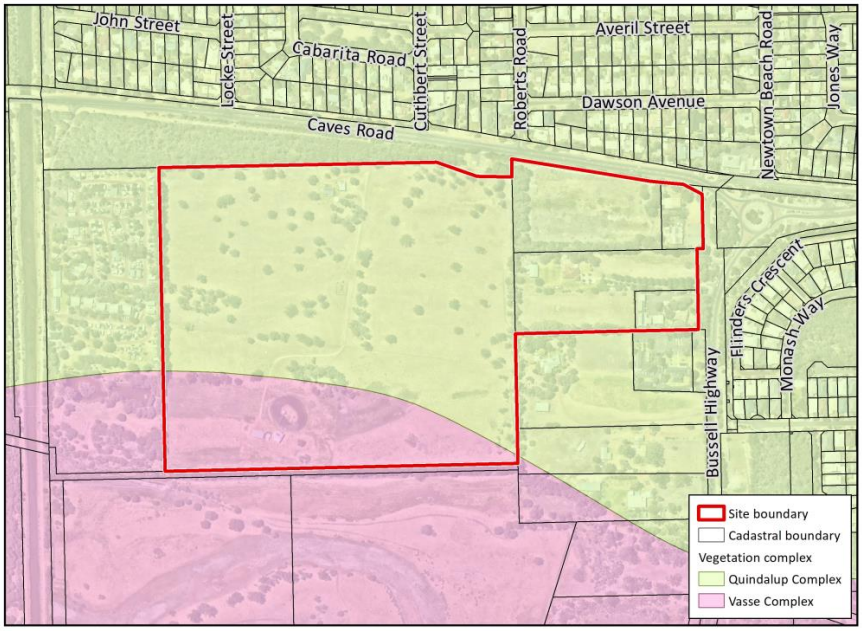

Plate 3: Vegetation Complexes (DBCA 2021b)

Studies have indicated that the loss of biodiversity caused by habitat fragmentation is significantly greater once a habitat type falls below 30% of its original extent (Miles 2001). The Environmental Protection Authority's (EPA) (2008) *Guidance Statement No. 33 Environmental Guidance for Planning and Development* identified a standard level of native vegetation retention of at least 30% of the pre-clearing extent of the vegetation complex in a bioregion. Within the south-west, the Quindalup Complex has 60.49% of its pre-European extent remaining, whilst the Vasse complex has 31.40% of its pre-European extent remaining (Government of Western Australia 2019).

3.3.1.1 Vegetation condition

Based on a review of publicly available aerial photography, the site has been cleared of a majority of native vegetation since at least 1970 (Landgate 2022). It has been used for general agricultural purposes, such as grazing, for a number of years, and more recently commercial operations have commenced within the north-eastern portion of the site, including an ice factory and fresh food market.

No site-specific flora and vegetation surveys have been undertaken within the site. However, environmental scientists from Emerge Associates have completed numerous site visits including November 2020, November 2021, December 2021 and July 2022, and observed the ecological values within the site. The observations based on aerial photography were supported by the site observations, with the site predominantly cleared of native vegetation, an only number of scattered remnant paddock trees (predominantly *Agonis flexuosa* (peppermint), and scattered *Eucalyptus rudis* (flooded gum)) remaining over paddock grasses. This is consistent with the native vegetation mapping for Western Australia (DPIRD 2020), which identified only small areas of native vegetation in the north-eastern and south-eastern portion of the site, associated with denser clumps of vegetation along existing fence lines (which align with areas of peppermint trees). The DPIRD mapping identified native vegetation immediately north of the site (within Caves Road reserve), and along the southern boundary.

Examples of the vegetation values within the site are illustrated within **Plate 4, Plate 5**, and **Plate 6**.



Plate 4: Paddock grass extending through the south-western portion of the site (associated with the floodway area). Trees in background are located outside the site, adjacent to the southern boundary



Plate 5: Paddock grasses and paddock trees (Agonis flexuosa), found across the majority of the site



Plate 6: Existing commercial uses (The Shed Markets), currently established within the north-eastern corner of the site

3.3.1.2 Threatened and priority ecological communities

An ecological community is a naturally occurring group of native plants, animals and other organisms that are interacting in a unique habitat. An ecological community's structure, composition and distribution are influenced by environmental factors such as soil type, position in the landscape, altitude, climate and water availability (DBCA 2020). 'Threatened ecological communities' (TECs) are ecological communities that are recognised as rare or under threat and therefore warrant special protection.

Selected TECs are afforded statutory protection at a federal level under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). TECs listed under the EPBC Act are assigned a conservation status. Any action likely to have a significant impact on a community listed under the EPBC Act requires Ministerial approval.

TECs are also listed within Western Australia under the *Biodiversity Conservation Act 2016* (BC Act) and the Biodiversity Conservation Regulations 2018 (BC Regulations). Their significance is also acknowledged through other state environmental approval processes such as 'environmental impact assessment' pursuant to Part IV of the *Environmental Protection Act 1986* (EP Act) and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*.

A plant community that is under consideration for listing as a TEC in Western Australia, but does not yet meet survey criteria or has not been adequately defined, may be listed as a 'priority ecological community' (PEC). Listing as a PEC is similarly considered during state approval processes.

A review of the publicly available datasets (NatureMap (DBCA 2021a), Locate SLIP (Landgate 2022), Protected Matters Search Tool (PMST) (DCCEEW 2022)indicates a number of threatened ecological communities (TECs), priority ecological communities (PECs), may occur in the general area, and are outlined in **Table 1**.

Table 1: Summary of threatened and priority ecological communities with potential to occur in general area

Community based on database search	Conservation status	
	State	Federal
Banksia Woodlands of the Swan Coastal Plain	• Priority 3	• Endangered
Clay Pans of the Swan Coastal Plain (is a composite of four communities, with 'Dense shrublands on clay flats' found in general area)	Vulnerable (Dense shrublands on clay flats)	Critically Endangered
Quindalup Eucalyptus gomphocephala and/or Agonis flexuosa woodlands	Priority 3	-
Subtropical and Temperate Coastal Saltmarsh	Priority 3	Vulnerable
Tuart (*Eucalyptus gomphocephala*) Woodlands and Forest of the Swan Coastal Plain	Priority 3	Critically Endangered

No detailed flora and vegetation surveys have been completed, however based on the detailed site observations (discussed above), none of these values are likely to be present given the highly disturbed nature of the site, with the site dominated by paddock grasses with occasional *Agonis flexuosa* and eucalypts (*Eucalyptus rudis*) present as paddock trees.

3.3.1.3 Threatened and priority flora

Certain flora species that are considered to be rare or under threat warrant special protection under federal and/or state legislation. At a federal level, flora species may be listed as 'threatened' pursuant to the EPBC Act. Threatened flora species listed under the EPBC Act are assigned a conservation status according to attributes such as population size and geographic distribution. Any action likely to have a significant impact on a taxon listed under the EPBC Act requires Ministerial approval.

At a state level, plant species may also be classed as 'threatened' under the BC Act. Similarly, it is an offence to 'take' or 'disturb' threatened flora listed under the BC Act without Ministerial approval.

Flora species that do not currently meet the criteria for listing as threatened but are potentially rare or threatened may be added to the DBCA's *Priority Flora List*. These species are classified into 'priority' levels based on threat. Whilst priority species are not under direct statutory protection, they are considered during State approval processes.

A review of the publicly available datasets (NatureMap (DBCA 2021a), Locate SLIP (Landgate 2022), Protected Matters Search Tool (PMST (DCCEEW 2022) indicates a number of threatened flora (TF) or priority flora (PF) may occur in the general area, with a list provided in **Appendix B**.

No detailed flora and vegetation surveys have been completed, however based on the detailed site observations, none of these values are likely to be present given the highly disturbed nature of the site, with the site dominated by paddock grasses and scattered paddock trees.

3.3.2 Terrestrial fauna

No site-specific fauna surveys have been undertaken within the site, and consideration of fauna values have been based on the habitat that may be present within the site, which is usually closely linked with native vegetation extent and condition. As discussed in **Section 3.3.1**, the site has been historically cleared of native vegetation and is composed of paddock grasses with scattered paddock trees.

Fauna species that are considered to be rare or under threat warrant special protection under state and/or federal legislation. At a federal level, fauna species may be listed as 'threatened' pursuant to the EPBC Act and any action likely to have a significant impact on a listed threatened species requires approval from the federal Minister for the Environment.

At a state level, fauna species are listed as 'threatened' under section sections 13, 19 and 26(2) of the BC Act. It is an offence to 'take' or 'disturb' threatened fauna without Ministerial approval. In addition to this, the Department of Biodiversity Conservation and Attractions (DBCA) maintains a list of priority fauna species which, while not considered threatened under the BC Act and therefore not protected directly, involve some concern over their long-term survival.

To understand the extent of significant fauna species that are likely to occur within the local area, searches were undertaken of the DBCA's NatureMap database (DBCA 2021a) and the federal Department of Climate Change, Energy, the Environment and Water (DCCEEW) Protected Matters Search Tool (DCCEEW 2022), with the outcomes outlined in **Appendix B**. It is important to note that these searches do not take into account the types and condition of fauna habitat occurring on the site but are based on the proximity of the site to known occurrence of significant species. The following species of conservation significance were identified as potentially occurring within the vicinity of the site:

- Baudin's Black-Cockatoo (*Calyptorhynchus baudinii*) (state and federally listed).
- Carnaby`s Black-Cockatoo (*Calyptorhynchus latirostris*) (state and federally listed).
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) (state and federally listed).
- Western Ringtail Possum (*Pseudocheirus occidentalis*) (state and federally listed).

With regard to black cockatoos, the site is not mapped as an area with known roosting habitat for the three black cockatoo species (DBCA 2019c), nor is the site mapped as an area with known breeding habitat (DBCA 2019b). This was further supported by the outcomes documented within the 2019 Great Cocky Count Survey Report (DBCA 2019a). During the detailed site visit, Emerge Associates identified that the scattered paddocks trees within the site are predominantly *Agonis*

flexuosa and would not provide important habitat for the three black cockatoo species. In particular, *Agonis flexuosa* is a low priority foraging plant and is not known to support roosting or breeding.

For western ringtail possum, while it is acknowledged that the site is within the 'core habitat' area defined within the federal government's referral guidelines, this is largely based on acknowledging that suitable habitat could occur and potential impacts to this species should be considered. Emerge Associates have considered the federal government referral guidelines as well as the detailed conservation advice and recovery plan (DPAW 2017) for this species in understanding the habitat values provided by the site, and potential impacts on this species. The scattered paddock trees may provide some foraging habitat for western ringtail possum, however the scattered trees are not considered to be important or critical habitat (as defined by the recovery plan (DPAW 2017)) due to the lack of canopy connectivity and connection to other areas of remnant vegetation adjacent to the site, a key habitat requirement for western ringtail possum. Without this connection, possums would need to transit through open areas where they are at risk of predation, and is therefore not a preference. It is anticipated that development of the site would improve the habitat values provided by the site for this species, and is discussed further in **Section 5.4**.

The site is considered to have overall low biodiversity value from a fauna perspective due to the lack of native vegetation within the site, when compared to surrounding remnant vegetation within the Caves Road reserve to the north, and areas of intact native vegetation within the Locke Nature Reserve further to the west. This is primarily due to the lack of understorey vegetation and connectivity between the scattered trees.

3.3.3 Conservation reserves

3.3.3.1 DBCA managed lands

DBCA has tenure of or interests in numerous areas of land across the state for a range of purposes. Tenure categories include national parks, nature reserves, conservation parks, marine parks, marine nature reserves, marine management areas, section 5(1)(g) reserves, state forest and timber reserves. These areas are mapped within the *Legislated Lands and Waters* (DBCA 2022c) and *Lands of Interest* (DBCA 2022b) datasets. The *Legislated Lands and Waters* (DBCA 2022c) dataset includes lands subject to the following legislation; the *Conservation and Land Management Act 1984* , *Swan and Canning Rivers Management Act 2006* and lands identified under the *Land Administration Act 1997*. The *Lands of Interest* (DBCA 2022b) dataset includes all other lands of which DBCA is recognised as the manager but is not vested under any act. These lands comprise of crown land and freehold land which DBCA has been acknowledged by the Department of Planning, Lands and Heritage (DPLH) as the responsible agency.

No DBCA managed lands have been identified within the site. The Locke Nature Reserve is located approximately 230 m west of the site, whilst the Ngari Capes Marine Park is located approximately 450 m north of the site.

3.3.3.2 City of Busselton managed lands

There is no City of Busselton managed conservation land identified within the site or immediately adjacent.

3.3.4 Ecological linkages

Ecological linkages are linear landscape elements that allow the movement of fauna, flora and genetic material between areas of remnant habitat. This exchange of genetic material between vegetation remnants improves the viability of those remnants by allowing greater access to breeding partners and food sources, refuge from disturbances such as fire and maintenance of genetic diversity of plant communities and populations. Ecological linkages are ideally continuous or near-continuous as the more fractured a linkage is, the less ease flora and fauna have in moving within the corridor (Alan Tingay and Associates 1998).

The Perth Biodiversity Project, supported by the Western Australia Local Government Association (WALGA), have identified and mapped regional ecological linkages within the Perth Metropolitan Region (WALGA and PBP 2004). This study was extended beyond the Perth Metropolitan Region through the South West Biodiversity Project, resulting in the identification and mapping of the South West regional ecological linkages (Molloy *et al.* 2009).

There are no mapped ecological linkages within the site, however, ecological linkage no. 65 is identified to the south of the site, associated with the Broadwater Nature Reserve Swamp (DEC 2009).

3.3.5 Environmentally Sensitive Areas

'Environmentally sensitive areas' (ESAs) are prescribed under the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* and have been identified to protect native vegetation values of areas surrounding significant, threatened or scheduled flora, vegetation communities or ecosystems. Exemptions under the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* do not apply within ESAs. However, exemptions under Schedule 6 of the *Environmental Protection Act 1986* (EP Act) still apply, including any clearing in accordance with a subdivision approval under the *Planning and Development Act 2005* (a recognised exemption under the Schedule 6 of the EP Act).

No ESAs are mapped within the site. An ESA is situated approximately 180 m west of the site (DWER 2021), associated with a conservation category wetland feature.

3.4 Hydrology

3.4.1 Groundwater

The site is within the Busselton-Capel groundwater management area and the Dunsborough-Vasse subarea. The *Water Register* (DWER 2022c) indicates that the site is underlain by a multi-layered system, which includes following aquifers:

- Superficial Swan – unconfined
- Leederville – confined
- Sue Coal Measures – confined

The *Water Register* indicates that the Superficial Swan and Leederville aquifers are fully allocated, whilst the Sue Coal Measure has water allocation available.

Emerge Associates undertook monthly groundwater monitoring at the five monitoring bores across the site, between July 2021 and November 2021, and July 2022 and November 2022. The results are summarised in **Table 2** and indicate that the maximum groundwater level (MGL) within the site occurred across different months (between August to October) and ranged from 1.19 mBGL in the north-eastern portion of site to 1.54 mBGL in the lower central section of the site. The highest groundwater levels occurred in 2021 compared to 2022. The monitoring bore locations and indicative groundwater levels are shown in **Figure 4**.

Table 2: Annual winter peak (mBGL) collected between August and November 2021 and August and November 2022

Bore ID	Depth to groundwater (mBGL)									
	July		August		September		October		November	
	2021	2022	2021	2022	2021	2022	2021	2022	2021	2022
MW1	2.26	1.95	1.49	1.78	1.77	1.9	**1.32**	2.05	1.55	2.15
MW2	1.74	1.83	1.52	1.46	**1.19**	1.458	1.29	1.67	2.04	1.74
MW3	1.82	2.16	**1.54**	1.84	1.69	1.907	1.77	2.08	2.44	2.19
Error! Reference source not found.MW4	2.41	2.7	2.10	2.73	2.19	2.833	**1.25**	2.47	1.99	2.57
MW5	1.60	1.99	**1.26**	1.58	1.39	1.627	1.79	1.81	1.74	1.9

* **Bold** values indicate the groundwater level monitoring event where the annual winter peak was recorded.

Groundwater quality sampling undertaken in August 2021 and September 2022 by Emerge Associates as part of the groundwater monitoring program indicate that the nutrient concentrations recorded are not inconsistent with what would be expected for historical agricultural land in the region. This is further detailed within the LWMS (Emerge Associates 2022b).

3.4.2 Surface water

A review of the publicly available flood mapping database and subsequent information provided by DWER (Seewraj 2021) indicates that a 1% annual exceedance probability (AEP) event floodway and flood fringe is located within the south-western corner of the site, as shown in **Figure 4**. This floodway connects to the Broadwater Nature Reserve Swamp (BNRS) floodway immediately south of the site. According to flood mapping the flood height of the adjacent floodway is approximately 1.65 mAHD in a 1% AEP event (WAWA 1987).

The Buayanyup Main Drain (BMD) and Sub A drain located between Florence Road and the coastal outlet is located approximately 180 m west of the site, as shown in **Figure 4**. This drain is highly modified in the downstream reach and discharges north to Geographe Bay, which is 400 m north of the site. The Buayanyup drainage system is managed by Water Corporation and provides rural drainage from upstream catchments, safely catering and maintaining flood water conveyance up to the 5% AEP event.

The BNRS is located immediately south of the site and positioned between the BMD and the Vasse Diversion Drain (VDD), which is approximately 6 km to the east of the site. It acts as a large regional surface water retention area prior to discharging to the VDD. This area to the south is subject to flooding, and in a 1% AEP rainfall event flood levels are likely to peak at 1.66 mAHD in the BNRS (JDA 2017).

3.4.3 Wetlands

A review of the Geomorphic Wetlands of the Swan Coastal Plain dataset (DBCA 2022a) indicates thata number of multiple use wetlands (MUWs) are identified within the site. This includes three MUWs in the southern and south-western portions of the site (unique feature identification (UFI) #39, #63, #13195); and one MUW (UFI #64) within the north-eastern portion of the site. The location of the MUWs area shown in **Plate 7**.

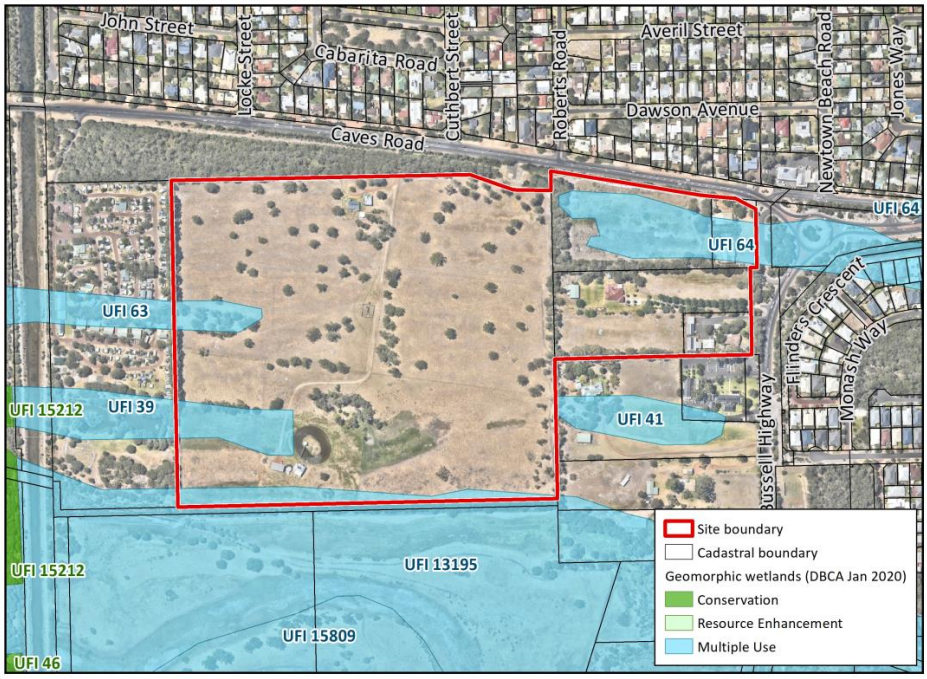

Plate 7: Geomorphic Wetlands (DBCA 2022a)

No conservation category wetlands (CCWs) are present within the site or within close proximity. A CCW is located west of Buayanyup Drain, however is more than 225 m from the site.

The presence of a wetland can indicate that groundwater may be close to the surface at different periods of the year. As part of the site visit, and based on discussions with the landowners, it appears that waterlogging may occur in areas identified as a MUW (particularly in winter).

3.4.4 Public drinking water source area

Public drinking water source areas (PDWSAs) are proclaimed by the DWER to protect identified drinking water sources, including surface water and groundwater sources (DoW 2009). They are proclaimed under the *Metropolitan Water Supply, Sewerage and Drainage Act 1909* or the *Country Areas Water Supply Act 1947* as Water Reserves, Catchment Areas or Underground Water Pollution Control Areas. PDWSAs provide the population with the majority of its drinking water supplies and can be vulnerable to contamination from a range of land uses. Once an area is identified as a PDWSA, consideration needs to be given to the intended land use and associated activities to ensure that they are appropriate in meeting the water protection quality objectives of the area.

The site is not within a PDWSA (DWER 2022b).

3.5 Coastal processes

The site is situated approximately 400 m south of Geographe Bay and coastal hazard risk mapping prepared by the City of Busselton (2022) indicates that it could be subjected to coastal hazards, such as erosion and inundation based on a sea level rise of 0.9 m. The northern portion of the site is identified within the 2120 erosion hazard line, and the Coastal Hazard Risk Management and Adaption Plan (CHRMAP) (City of Busselton 2022) notes that storm surge inundation could be as high as 2.5 mAHD based on present sea levels. With the combined effects of climate change and sea level rise, it is expected that the sites vulnerability to these coastal processes will increase in the future, and the City's CHRMAP requires a minimum finished floor of 2.7 mAHD to be achieved.

A review of *Coastal Risk Australia* (NGIS 2022) indicates that the southern portion of the site may also be inundated during high tide events as a result of a similar sea level rise (0.84 m based on *Coastal Risk Australia* modelling) by 2100. The area of inundation is predicted to occur within the existing floodway and flood fringe, as depicted in **Figure 4**.

3.6 Heritage

3.6.1 Aboriginal heritage

The Aboriginal Heritage Inquiry System (AHIS) is maintained pursuant to Section 38 of the *Aboriginal Heritage Act 1972* by the Department of Planning, Lands and Heritage (DPLH), and contains information on registered Aboriginal heritages sites and other heritage places throughout Western Australia. In accordance with the *Aboriginal Heritage Due Diligence Guidelines* (DAA 2013), a search of the AHIS online database (DPLH 2022) was undertaken.

A portion of an 'Other Heritage Place' (ID 5337) is mapped as extending into the western portion of the site, as shown on **Figure 5**. This feature is described as 'skeletal material/burial' and is likely to be

associated with the drain further to the west (supported by information provided in the Buayanyup River Action Plan (Geographe Catchment Council 2010)) where the Aboriginal site is described as being associated with the drain.

3.6.2 Non-Indigenous heritage

In order to determine the actual or potential presence of sites or features of non-indigenous heritage significance within the site, a review of readily available information at a federal, state and local government level was undertaken to determine if any of the following occur within the site:

- World Heritage Sites.
- National Heritage Places.
- Commonwealth Heritage Places.
- Sites listed in the State Register of Heritage Places.
- Sites listed in the City of Busselton Heritage Register.

A desktop search of the State Heritage Office database, which includes state and local lists (Heritage Council of WA 2021), the Australian Heritage Database, which includes the National and Commonwealth Heritage Lists (Environment 2019) and the City of Busselton Heritage Register (City of Busselton 2014) indicates that there are no heritage sites listed within the site. The Newtown House (associated with Amelia Park Lodge) is located immediately south of the site, as shown in **Figure 5**. This feature is identified as having local heritage value and will not be impacted by development within the site.

3.7 Other land use considerations

3.7.1 Historic and existing land uses

As outlined previously, based on a review of publicly available aerial photography, the site has been cleared of a majority of native vegetation since at least 1970 (Landgate 2022). It has been used for general agricultural purposes, such as grazing, for a number of years, and more recently commercial operations have commenced within the north-eastern portion of the site, including an ice factory and fresh food market.

3.7.2 Potential site contamination

Consideration of the potential for contamination has been undertaken in accordance with *Assessment and management of contaminated sites: Contaminated sites guidelines* (DER 2014) and included the following:

- A review of the DWER *Contaminated Sites Database* (DWER 2022a). The site or nearby was not identified as being 'contaminated – remediation required', 'contaminated – restricted use' or 'remediated for restricted use'.
- A detailed review of available historic aerial photography, to understand if potentially contaminating activities could have occurred within the site, such as intensive agriculture, market gardens, landfilling or other activities considered a risk of contamination.

- A review of previous and existing land uses within the site, based on information from the landowner.

The historic and current ongoing agricultural (grazing) land use present across the site is not identified as a potentially contaminating land use, and therefore in accordance with *Assessment and management of contaminated sites: Contaminated sites guidelines* (DER 2014), is not considered to represent any significant risk of potential for contamination within the site.

A review of the Department of Defence Unexploded Ordnance (UXO) search tool (Department of Defence 2022) did not identify any potential UXO occurrences within the local area.

3.7.3 Mosquitos and nuisance insects

Mosquitos and other nuisance insects (midges, etc.) are a concern for local governments and health authorities, given they can spread disease (such as Ross River virus with mosquitos), cause nuisance to the community, and affect both health and lifestyle.

Given the presence of a constructed waterbody within the southern portion of the site and a seasonal natural waterbody further to the south, and the potential presence for standing water, a preliminary assessment under the Department of Health (DoH) *Chironomid midge and mosquito risk assessment guide for constructed waterbodies* (Department of Health 2007)) has been undertaken for the site. The assessment indicates that:

- For the existing waterbody within the south-western portion of the site, it has been identified as achieving a 'medium risk' rating, which can be described as 'increased probability of midge or mosquito breeding so as to create a problem. Requires improved monitoring and ongoing maintenance in order to prevent problems from occurring'.
- While the assessment guide is not specifically applicable to determining risk for a natural water feature, risk for the water feature to the south has been considered and it is likely to have a 'medium' risk rating as well. The existing strip of vegetation between the water feature to the south and the site is likely to provide a barrier to mosquito and midge movement based on prevailing south-westerly winds.

The existing waterbody is likely to be removed as part of the proposed development, and standing water within the site will be managed through the implementation of the LWMS (Emerge Associates 2022b), discussed further in **Section 4**.

3.8 Surrounding land uses

Land uses surrounding the site include residential development (i.e. public open space, footpaths, roads, dwellings, commercial enterprises) and rural pursuits/farmland (i.e. grazing, tourist accommodation, conservation land). A review of the surrounding land uses and outcomes from the site visits identified the following land uses and features:

- Caves Road is located immediately north of the site, with land zoned 'residential' under the City of Busselton LPS No.21 and Geographe Bay further north.

- Bussell Highway is located immediately to the east of the site. Land zoned 'residential' under the City of Busselton LPS No.21 is located further to the east.
- Land zoned 'conservation' under the City of Busselton LPS No.21 is located to the south of the site, and is associated with the BNRS. The zoning for this area also includes 'special control areas', addressing landscape value, wetland and floodway.
- An RAC holiday/caravan park is located immediately to the west of the site, with Buayanyup Drain further to the west. A large area of remnant vegetation exists further to the west and is reserved 'recreation' under the City of Busselton LPS No.21 and is associated with Locke Nature Reserve.

Caves Road and Bussell Highway are regional distributor roads, and identified as an 'other significant freight/traffic route' in Schedule 2 South West of *State Planning Policy 5.4 Road and Rail Noise* (SPP 5.4) (WAPC 2019b). The purpose of SPP 5.4 is to minimise the adverse impact of road and rail noise on noise-sensitive land use and/or development within the specified trigger distance of strategic freight and major traffic routes and other significant freight and traffic routes. In accordance with SPP 5.4, consideration of noise for sensitive land uses is required within 200 m of the road carriageway edge. The location of these roads in relation to the site and areas where considerations subject to SPP 5.4 (and in particular potential noise impacts) will apply are shown in **Plate 8**.

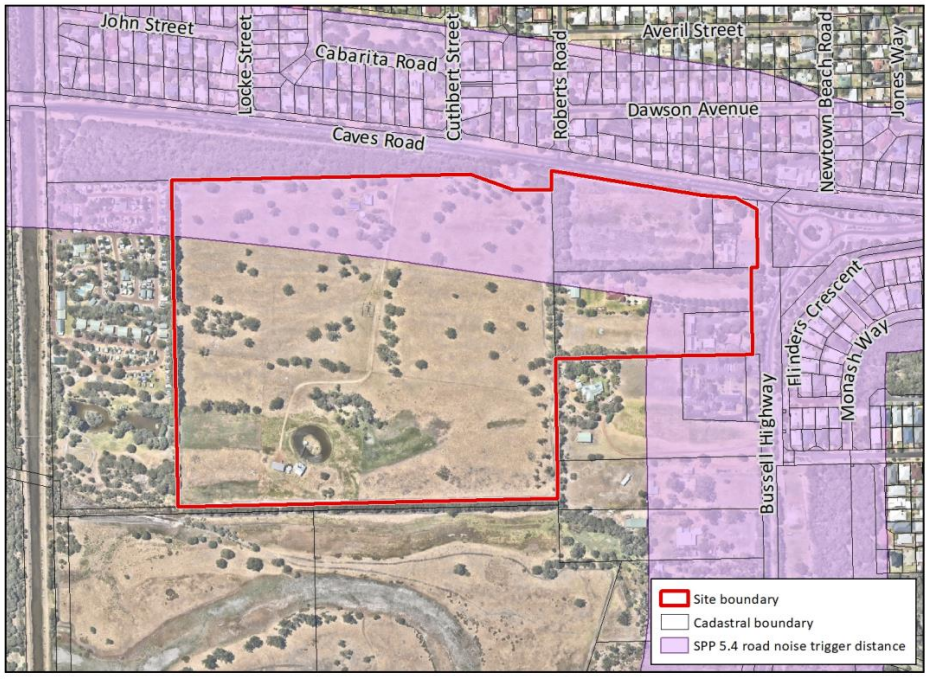

Plate 8: SPP 5.4 'other significant freight/traffic routes' 200 m trigger distance

3.9 Bushfire hazard

The entire site is designated as a 'bushfire prone area' in the state *Map of Bush Fire Prone Areas* (OBRM 2021) and is shown in **Plate 9**.

A Bushfire Management Plan (BMP) (Emerge Associates 2022a) has been prepared to support the proposed scheme amendment and structure plan and considers the potential mitigation and management of bushfire risks in accordance with *State Planning Policy 3.7 Planning in Bushfire Prone Areas* (SPP 3.7) (WAPC 2015a) and the *Guidelines for Planning in Bushfire Prone Areas Version 1.4* (the Guidelines) (DPLH & WAPC 2021).

In accordance with SPP 3.7 and the Guidelines, existing bushfire hazards within and nearby to the site have been identified and then classified pursuant to *Australian Standard 3959:2018 Construction of buildings in bushfire prone areas* (AS 3959), in order to understand the current bushfire risk to the site. Areas of bushfire hazard include:

- Vegetation within the site, namely:
  - Woodland vegetation, associated with remnant vegetation along the boundary between Lot 4 and Lot 12, within the north-eastern portion of the site.
  - Scrub vegetation, associated with vegetation adjacent to Caves Road in Lot 12.
  - Grassland vegetation, identified across the majority of the site, associated with existing cleared paddocks with scattered paddock trees.
- Vegetation external to the site, namely:
  - Existing forest vegetation associated with existing remnant vegetation to the north of the site within Caves Road reserve.
  - Scrub vegetation associated with remnant vegetation within the RAC Busselton Holiday Park, and situated to the south-west of the site.
  - Grassland vegetation to the south and south-east, associated with cleared land which is regularly grazed and/or subject to inundation.

Bushfire hazard level mapping completed for the site in accordance with the Guidelines indicates it is largely subject to a 'Moderate' bushfire hazard, associated with the areas of paddock areas (identified as grassland) (Emerge Associates 2022a). A small patch of an 'Extreme' bushfire hazard is situated within the north-eastern portion, associated with the woodland vegetation along the boundary between Lot 4 and Lot 12. This is shown in **Figure 6**.

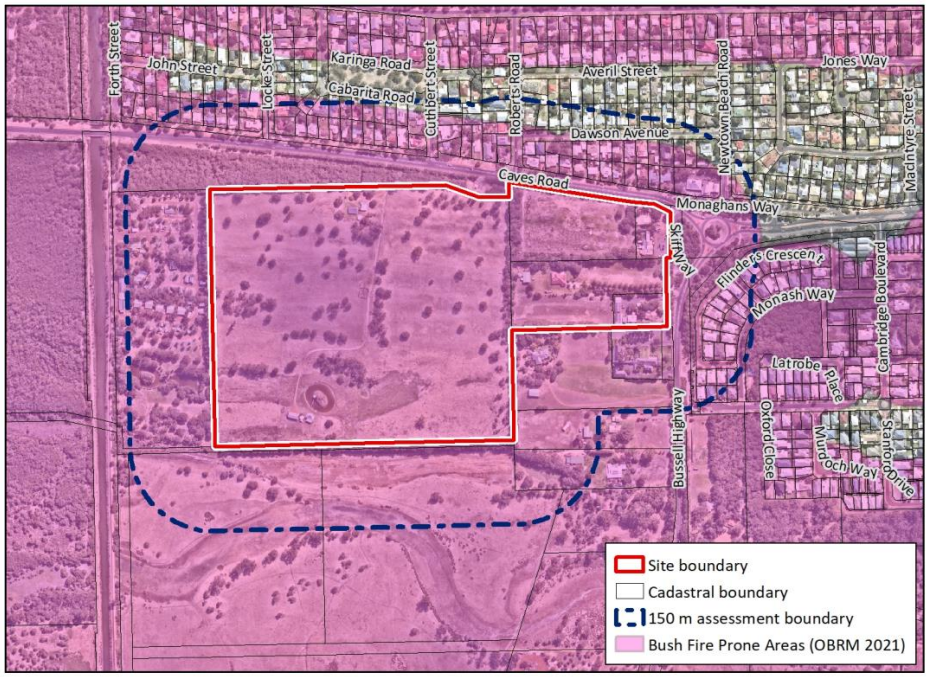

Plate 9: Areas within and surrounding the site identified as 'bushfire prone areas' (as indicated in purple) under the state-wide Map of Bush Fire Prone Areas (OBRM 2021).

4 Environmental Factors Considered by the EPA

4.1 Environmental principles

The five principles of environmental protection in Western Australia are set out in Section 4A of the EP Act. The manner in which these principles have been considered within the scheme amendment and structure plan and will be addressed through future planning (subdivision) and development stages is presented in **Table 3**. Further detail on the environmental values within the site and proposed management are considered in the sections further below.

Table 3: EP Act Principles

Principle	Consideration
1. The precautionary principle Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In application of this precautionary principle, decisions should be guided by: a. careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and b. an assessment of the risk-weighted consequences of various options.	The proponent has addressed the precautionary principle by developing a suitable understanding of the environmental values of the site (flora, vegetation, fauna, wetlands, surface water, groundwater, noise and geotechnical conditions) such that decisions regarding the structure plan and its design can be made without the risk of any potentially unknown environmental values being impacted. The structure plan (provided within **Appendix A**) has been informed by and responds to the outcomes of site investigations, through the adoption of an impact-avoidance approach to mitigate potential environmental impacts. This reduces the risk of significant environmental impacts occurring, which reduces any potential environmental risks associated with future implementation of the structure plan.
2. The principle of intergenerational equity The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.	Environmental values within the site are currently located within a number of privately owned land parcels, which are not accessible to the public, nor are these environmental values currently managed or actively enhanced. Whilst implementation of the structure plan may result in some environmental impacts, significant impact avoidance measures have been incorporated into the structure plan layout, through the proposed public open space network. As such, implementation of the structure plan will allow for the proposed public open space areas (containing environmental values) to be transferred into public land tenure and ownership, and managed in the long-term. This will ensure that environmental values within the site will be accessible to the public and will be maintained and enhanced in the long-term for the benefit of future generations.
3. The principle of the conservation of biological diversity and ecological integrity Conservation of biological diversity and ecological integrity should be a fundamental consideration.	The site has been historically cleared to support agricultural land uses, however the remaining values, namely remnant scattered trees and the floodway feature (i.e. the areas offering potential values of conservation significance) are being retained within public open space providing opportunities for preservation and enhancement, responding to this principle. The future retention of environmental values within the site will support the improvement of biological diversity and ecological integrity.

Table 3: EP Act Principles (continued)

Principle	Consideration
4. Principles relating to improved valuation, pricing and incentive mechanisms a. Environmental factors should be included in the valuation of assets and services. b. The polluter pays principles – those who generate pollution and waste should bear the cost of containment, avoidance and abatement. c. The users of goods and services should pay prices based on the full life-cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste. d. Environmental goals, having been established, should be pursued in the most cost-effective way, by establishing incentive structure, including market mechanisms, which enable those best placed to maximise benefits and/or minimise costs to develop their own solution and responses to environmental problems.	Smaller, isolated and more disturbed areas of environmental values are typically less ecologically viable and can be more difficult to maintain or restore in the long-term, and ongoing management costs become increasingly higher, which is generally not practical for land management authorities. In some situations, these areas are suitable to support multiple uses, whereby some environmental characteristics can be retained (for example mature trees) while also allowing other recreational activities or drainage functions. The public open space network has been located to maximise existing tree retention, and through a central corridor of public open space, also provide an opportunity to increase movement of ecological values across the landscape between areas of existing remnant vegetation and/or landscape value (e.g. the floodway). Use and disposal of goods, services and waste will be managed in accordance with existing state and local arrangements, with waste minimisation measures being explored by the City of Busselton. The site minimises the requirement for use of natural resources, such as fill, with the majority of the site achieving the required minimum finished floor level of 2.7 mAHD to meet coastal hazard responses (which also addresses flooding risks).
5. The principle of waste minimisation All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.	Future implementation of urban development across the site will take all reasonable and practical measures to minimise the generation of waste and its discharge into the environment.

4.2 Key environmental factors

The EPA policy framework (EPA 2021) considers 13 environmental factors, relating to five themes; sea, land, water, air and people. For each of these factors, the EPA has identified an environmental objective aimed towards ensuring the objects and principles of the EP Act are achieved. **Table 4** outlines each of these environmental factors, the EPA's stated objective and a scoping assessment of whether each of the listed environmental factors are applicable to the scheme amendment and structure plan.

The environmental factors determined to be applicable to the site are discussed in detail in **Section 5**. Other relevant matters not addressed through the factors, such as bushfire are also addressed in **Section 5.** Investigations utilised to support the understanding of values within the site and nearby have included a Local Water Management Strategy (LWMS) (Emerge Associates 2022b) and a Bushfire Management Plan (BMP) (Emerge Associates 2022a).

Table 4: EPA factors applicable to the site. Shaded green cells indicate factors relevant for further assessment.

Factor (or part of factor) considered further in Section 5

Theme	Factor	Definition of factor	Objective	Can the proposed future development meet the EPA objective?	EAMS section
Sea	Benthic Communities and Habitats	Benthic communities are biological communities that live in or on the seabed.	To protect benthic communities and habitats so that biological diversity and ecological integrity are maintained.	The site is situated approximately 400 m inland from the coast and does not contain or interact with the marine environment. This is not an applicable factor for the site or any associated future urban development.	Not applicable
	Coastal Processes	Coastal processes relate to 'any action of natural forces on the coastal environment'.	To maintain the geophysical processes that shape coastal morphology so that the environmental values of the coast are protected.	In response to the sea level rising projections, the City of Busselton has developed an adaptation plan to accommodate the potential coastal inundation impact of a 0.2% annual exceedance (AEP) storm event (which is equivalent to a 1:500 year average recurrence interval (ARI)). The adaptation plan is detailed within the CHRMAP (City of Busselton 2022) and provides coastal development planning requirements that need to be implemented in future development. This includes meeting a minimum finished floor level of 2.7 mAHD within the site, which is achievable based on existing topographic contours and with minimal additional fill likely to be required. Therefore, the proposed future development can meet the EPA objective.	**Section 5.1**
	Marine Environmental Quality	Relates to coastal waters and estuaries and the level of contaminants in water, sediments or biota or to changes in the physical or chemical properties of waters and sediments relative to a natural state.	To maintain the quality of water, sediment and biota so that environmental values are protected.	The site is situated approximately 400 m inland from the coast and does not contain or interact with the marine environment. This is not an applicable factor for the structure plan or any associated future urban development of the site.	Not applicable
	Marine Fauna	It is described as 'animals that live in the ocean or rely on the ocean for all or part of their lives'.	To protect marine fauna so that biological diversity and ecological integrity are maintained.	The site is situated approximately 400 m inland from the coast and does not contain or interact with the marine environment. This is not an applicable factor for the structure plan or any associated future urban development of the site.	Not applicable

Table 4: EPA factors applicable to the site. Shaded green cells indicate factors relevant for further assessment. (continued)

Factor (or part of factor) considered further in Section 5

Theme	Factor	Definition of factor	Objective	Can the proposed future development meet the EPA objective?	EAMS section
Land	Flora and Vegetation	Flora is defined as native vascular plants, while vegetation relates to groupings of different flora patterned across the landscape.	To protect flora and vegetation so that biological diversity and ecological integrity are maintained.	The site is predominantly cleared of native vegetation, with only a small number of scattered paddock trees remaining over paddock grasses. No TF, PF, TECs or PECS are likely to occur within the site. Public open space areas have been located to maximise the retention of existing trees. Overall, the proposed development of the site will be able to contribute to improving the flora and vegetation values within the site given the proposed public open space network, which will provide an opportunity to increase the composition of plant species and vegetation structure, improving biological diversity and ecological integrity. Therefore, the proposed future development can meet the EPA objective.	**Section 5.2**
	Landforms	Relate to 'the distinctive, recognisable physical features of the earth's surface having a characteristic shape produced by natural processes. A landform is defined by the combination of its geology (composition) and morphology (form)'.	To maintain the variety and integrity of significant physical landforms so that environmental values are protected.	No significant landforms have been identified within the site. The function of soils will be maintained as part of the proposed future development of the site through the standard planning and development process. This will include the use of appropriate fill material (if/where it is required). Therefore, the proposed future development can meet the EPA objective.	Not applicable
	Subterranean Fauna	This relates to fauna which live their entire lives (obligate) below the surface of the earth and include stygofauna (aquatic/living in groundwater) and troglofauna (air-breathing/living in caves and voids).	To protect subterranean fauna so that biological diversity and ecological integrity are maintained.	It is unlikely that the site supports any significant habitat values for subterranean fauna, given the key known habitat types (such as calcretes, fractured rock aquifers and karst limestone) do not occur. Whilst there is some uncertainty as to the specific occurrence of subterranean fauna, the risk of any significant impacts to subterranean fauna as a result of any future urban development is low, due to the proposed groundwater management strategy, as discussed in relation to the inland waters factor. Therefore, the proposed future development can meet the EPA objective.	Not applicable

Table 4: EPA factors applicable to the site. Shaded green cells indicate factors relevant for further assessment. (continued)

Factor (or part of factor) considered further in Section 5

Theme	Factor	Definition of factor	Objective	Can the proposed future development meet the EPA objective?	EAMS section
Land (continued from above	Terrestrial Environmental Quality	Relates to 'the chemical, physical, biological and aesthetic characteristics of soils'	To maintain the quality of land and soils so that environmental values are protected.	Regional ASS risk mapping (DWER 2017b) identifies the southern portion a 'high to moderate' risk of ASS within 3 m of the natural surface, while the northern portion of the site has a 'moderate to low risk'. The extent of ASS which is encountered and potentially disturbed, and any management requirements, will be largely dependent upon the future extent of excavation below the natural soil surface and any potential dewatering activities associated with development of the site. For the purposes of the proposed scheme amendment and structure plan, ASS is not considered to pose a significant constraint to the change in land use. Furthermore, any future ASS considerations can be identified and suitably managed at future planning stages in accordance with the WAPC's *Acid Sulfate Soils Planning Guidelines* (2008a). Therefore, the proposed future development can meet the EPA objective.	**Section 5.3**
	Terrestrial Fauna	It relates to animals living on land or using land (including aquatic systems) for all or part of their lives.	To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.	Overall, the site is considered to have low biodiversity value from a fauna perspective due to the lack of intact native vegetation and connected canopy within the site, particularly when compared to surrounding remnant vegetation within Caves Road to the north and Locke Nature Reserve to the west. It is unlikely that the site would contain any habitat critical to the survival of any terrestrial fauna species or any species of conservation significance based on relevant conservation advice and recovery plans, particularly those mentioned in **Section 3.3.2**. As outlined above, public open space has been located to maximise the retention of existing trees, and the proposed development of the site will be able to contribute to improving the fauna and fauna habitat values within the site given the proposed public open space network, which will provide an opportunity to increase connection across the site to existing vegetated areas/areas of environmental value, to support movement and use by native fauna (particularly western ringtail possum). Therefore, the proposed future development can meet the EPA objective.	**Section 5.4**

Table 4: EPA factors applicable to the site. Shaded green cells indicate factors relevant for further assessment. (continued)

Factor (or part of factor) considered further in Section 5

Theme	Factor	Definition of factor	Objective	Can the proposed future development meet the EPA objective?	EAMS section
Water	Inland Waters	Inland waters are described as 'the occurrence, distribution, connectivity, movement, and quantity (hydrological regimes) of inland water including its chemical, physical, biological and aesthetic characteristics (quality)'. It includes groundwater and surface water.	To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected.	The existing floodway has been accommodated with the public open space network and is fully retained, while the flood fringe is proposed to be developed in accordance with DWER requirements. The quality of surface water and groundwater will be managed in accordance with the Better Urban Water Management (BUWM) Framework (WAPC 2008c), as detailed in the LWMS (Emerge Associates 2022b) and includes maintenance of the post development environment in accordance with the pre-development environment (e.g. volume of surface water entering and leaving the site), and the integration of water quality management measures into the future design of the built form, road network and public open space (e.g. water sensitive urban design). While wetland features have been identified within the site, these features do not require any specific protection and can be managed through the maintaining hydrological function as per the BUWM Framework. Therefore, the proposed future development can meet the EPA objective.	**Section 5.5**
Air	Air Quality	Air quality relates to 'the chemical, physical, biological and aesthetic characteristics of air'. The EPA defines 'air' as all the air above the ground up to and including the stratosphere.	To maintain air quality and minimise emissions so that environmental values are protected.	The proposed future development of the site is unlikely to introduce land uses that would detrimentally impact air quality, or impact air quality differently to typical residential development already present in the broader area. In addition, the development of the site does not propose any sensitive land uses to be established in proximity to any existing operations whose emissions significantly impact air quality. As such, this is not an applicable factor for the proposed residential development of the site. Therefore, the proposed future development can meet the EPA objective.	Not applicable
	Greenhouse Gas Emissions	Relates to six categories of greenhouse gases namely carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), sulphur hexafluoride (SF6), hydro fluorocarbons (HFCs) and perfluorocarbons (PFCs) and their production.	To protect the environment and to prevent, control and abate pollution and environmental harm.	Future development of the site is expected to produce a similar amount of greenhouse gas emissions to the existing residential development north of the site. Only limited clearing of vegetation (i.e. largely associated with removal of pasture grass and a low number of remnant trees) will be required and additional plants/trees will be introduced within public open space, to assist with sequestration of greenhouse gases. Therefore, the proposed future development can meet the EPA objective.	Not applicable

Table 4: EPA factors applicable to the site. Shaded green cells indicate factors relevant for further assessment. (continued)

Factor (or part of factor) considered further in Section 5

Theme	Factor	Definition of factor	Objective	Can the proposed future development meet the EPA objective?	EAMS section
People	Social Surroundings	Social surroundings are referenced within the EP Act, and relate to a person's 'aesthetic, cultural, economic and social surroundings to the extent that those surroundings directly affect or are affected by [their] physical or biological surroundings'. Social surroundings include a range of considerations such as Aboriginal heritage and culture, natural and historic heritage (such as State register of Heritage Places), Amenity (visual, noise, odour dust and similar e.g. nuicance insects) and economic benefits.	To protect social surroundings from significant harm.	<u>Aboriginal heritage</u> A portion of an 'Other Heritage Place' (ID 5337) is mapped as extending into the western portion of the site. It is unlikely that Section 18 approval pursuant to the *Aboriginal Heritage Act 1972* (AHA) (or new legislation, once in effect) will be required given the 'Other Heritage Place' status of the site and that available information indicates this value is associated with Buayanyup Drain further to the west. Under the *Aboriginal Heritage Act 1972*, all Aboriginal sites are protected whether they are known or not. Therefore, as part of future ground disturbing activities, if Aboriginal artefacts or sites (not previously identified) are uncovered, works will need to cease and a suitably qualified expert be brought in to survey the potential site, with additional consent pursuant to the *Aboriginal Heritage Act 1972* sought if necessary. This can be managed throughout the standard development process. Any requirements pursuant to new legislation or processes will be considered if/as these come into effect, and where required implemented, as part of the future development process. No further consideration required in this EAMS. <u>Non-indigenous heritage</u> No non-Indigenous heritage sites were identified within the site. Immediately south of the site is Newtown House, which has historic and aesthetic significance. It is understood that the current land use will not be impacted. No further consideration required in this EAMS. <u>Road and rail noise</u> Given the site is adjacent to existing residential development that has already been developed for residential purposes next to Bussell Highway, it is considered that traffic noise does not present a fatal flaw to the rezoning of the site to 'urban development'. As discussed further in **Section 5.6**, it will be possible to manage noise impacts through the 'deemed-to-satisfy' pathway under SPP 5.4 and the associated implementation guidelines, which provides outlines of separation distances and associated quiet house design treatments.	**Section 5.6** with regard to amenity impacts associated with noise. No other social surrounding elements require detailed consideration in this EAMS.

Table 4: EPA factors applicable to the site. Shaded green cells indicate factors relevant for further assessment. (continued)

Factor (or part of factor) considered further in Section 5

Theme	Factor	Definition of factor	Objective	Can the proposed future development meet the EPA objective?	EAMS section
People (continued from above)	Social Surroundings (continued from above)	(continued from above)	(continued from above)	Amenity The site is located within a 'landscape value' area under the City of Busselton LPS No. 21, within which the City seeks to determine if the proposed development is compatible (as far as practicable) with the existing scenic and rural character and whether it will materially affect wildlife refuge, wetlands, coastal environment of Aboriginal sites. The development within the site is unlikely to significantly change the scenic character of the area given existing vegetation external to the site (which mostly blocks existing views into the site) will be maintained. The proposed public open space network will contribute to improved amenity as well as opportunity for the broader community to recreate within the site and connect to the existing path and trail network associated with Buayanyup Drain to the west, and coastal areas to the north. No further consideration required in this EAMS. Mosquito and nuisance insects The site is located near large existing waterbodies, and may be subject to impacts from nearby nuisance (mosquito and midge etc.) populations, particularly from the south (associated with the BRNS). Existing vegetation adjacent to the southern boundary of the site will be not be impacted by the development within the site, and provides a barrier to mosquito and nuisance insect movement based on prevailing winds, as per the Department of Health Mosquito Management Manual. The development is unlikely to increase areas of stagnant water which provides the potential for mosquitoes to breed, with drainage infrastructure designed to remove and infiltrate water as quickly as possible. The management of mosquitoes can be managed through the subdivision and development process. No further consideration required in this EAMS. Overall, the EPA objective with regard to this factor can be achieved. Road noise is further considered in in **Section 5.6**.	**Section 5.6** with regard to amenity impacts associated with noise. No other social surrounding elements require detailed consideration in this EAMS.
	Human Health	Human health is described as 'a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity'	To protect human health from significant harm.	This factor is specific to the consideration of radiation in relation to human health, as other health considerations are managed through the other factors. Radiation is not a relevant consideration for development of or within the site. Therefore, the proposed future development can meet the EPA objective.	Not applicable

5 Impact Assessment and Management Approach

This section outlines spatial layout considerations that should be accommodated within the structure plan to respond to the relevant environmental attributes and values within the site, as well as any environmental management requirements that will need to be accommodated within future planning and development stages.

Only those environmental values and attributes that require specific consideration based on their presence within the site, and/or the applicable legislation and policy requirements have been included in this section (as summarised in **Table 4**).

5.1 Coastal Processes

5.1.1 Policy framework, site context and management objectives

In the context of environmental impact assessment, the EPA's objective for coastal processes is 'to maintain the geophysical processes that shape coastal morphology so that the environmental values of the coast are protected' (EPA 2016d). The City of Busselton CHRMAP (City of Busselton 2022) (which was recently adopted by Council) seeks to '*guide the identification of appropriate areas for the sustainable use of the coast for housing, tourism, recreation, ocean access, commercial and other activities'*, whilst protecting, conserving and enhancing coastal zone values.

The CHRMAP for the City of Busselton has been prepared based on a sea level rise of 0.9 m by the year 2120, in accordance with *State Coastal Planning Policy* (SPP 2.6) (WAPC 2013). Specific to the site, and as outlined within **Section 3.5**, the northern portion of the site is within the 2120 coastal erosion hazard line, and the floodway area may be subject to inundation due to storm surge. A finished level of 2.7 mAHD for all buildings is required in order to meet the requirements of the CHRMAP (City of Busselton 2022), and City of Busselton have also identified the need to engage with Water Corporation after 2040 to ensure the continued maintenance and improvement of the eastern bank of the Buayanyup Drain (to address storm surge/inundation considerations to the east, which includes the site).

The objective for future management of coastal processes within the site will be principally focused around ensuring finished floor levels for buildings meet the minimum 2.7 mAHD, and the flooding associated with future storm surge can be accommodated within the floodway.

5.1.2 Structure plan layout considerations for coastal processes

The structure plan has responded to coastal processes by ensuring the floodway is maintained, with it fully accommodated within areas of public open space. As outlined above, the City of Busselton have already identified the potential risk of inundation as a result of sea level rise and/or storm surge and working with the Water Corporation to ensure Buayanyup Drain is maintained and improved through to 2120.

No other spatial response is required for future development (particularly built form), with the coastal process response to be accommodated through modification of the landform, and ensuring a minimum floor level of 2.7 mAHD is achieved.

5.1.3 Future coastal management requirements

As part of the future development within the site, the City of Busselton have identified a minimum finished floor level (FFL) of 2.7 mAHD to mitigate against the predicted inundation risk. Recently the City of Busselton adopted the recommendations of the CHRMAP (City of Busselton 2022), which includes:

- Defining a 'Coastal Management Area' based on the coastal hazard erosion lines. This will ensure adaptation recommendations are addressed at all levels within the City of Busselton, particularly within the planning process.
- That the adaptation pathways for each of the management areas (as outlined within the CHRMAP) are implemented. For the site, this includes achieving minimum finished floor levels of 2.7 mAHD, and investing (with State agencies) in storm surge event protection along Buayanyup Drain.

Protection of the floodway and application of finished floor level requirements will be able to be accommodated as part of engineering approvals through the standard subdivision process, with a number of model subdivision conditions (WAPC and DPLH 2021) able to be applied, namely D3 and D4 which requires:

D3 Engineering drawings and specifications are to be submitted and approved, and works undertaken in accordance with the approved engineering drawings and specifications and approved plan of subdivision, for the filling and/or draining of the land, including ensuring that stormwater is contained on-site, or appropriately treated and connected to the local drainage system. Engineering drawings and specifications are to be in accordance with an approved Urban Water Management Plan (UWMP) for the site, or where no UWMP exists, to the satisfaction of the Western Australian Planning Commission. (Local Government)

D4 The land being filled, stabilised, drained and/or graded as required to ensure that:

a) lots can accommodate their intended development; and

b) finished ground levels at the boundaries of the lot(s) the subject of this approval match or otherwise coordinate with the existing and/or proposed finished ground levels of the land abutting; and

c) stormwater is contained on-site, or appropriately treated and connected to the local drainage system. (Local Government).

5.2 Flora and vegetation

5.2.1 Policy framework, site context and management objectives

In the context of environmental impact assessment, the EPA objective for flora and vegetation is '*to protect flora and vegetation so that biological diversity and ecological integrity are maintained*' (EPA 2016e). Where a proposal may potentially impact upon flora and vegetation values, the following mitigation hierarchy should be applied to minimise potential impacts:

1. **Avoid** impacts
2. Minimise impacts
3. Offset impacts.

The site is largely cleared of native vegetation and is composed of cleared paddocks with scattered remnant native trees (predominantly peppermint trees). The vegetation within the site is unlikely to contain conservation significant values (e.g. TF, PF, TEC or PEC) given the highly disturbed nature of the site.

The objective for future management of flora and vegetation within the site will be principally focused around maximising the retention of remnant trees in public open space areas.

5.2.2 Structure plan layout considerations for flora and vegetation

Avoidance and minimisation of impacts to flora and vegetation values has been achieved through the strategic location of public open space areas and wider road reserves, to align with areas of existing remnant native trees. Existing trees are proposed to be retained wherever possible.

The spatial layout also proposes either hard edges (in the form of perimeter roads) or a public open space interface (shown in **Figure 7** and **Appendix A**), providing for a clear delineated management boundary between higher value remnant native vegetation values surrounding the site.

5.2.3 Future flora and vegetation management requirements

The remnant vegetation proposed to be retained within the public open space areas (as shown in **Figure 7**) will be protected and enhanced as part of future development, to improve the biodiversity values of the area and contribute to ecological linkages across the landscape. This will include identification and protection of the remnant trees as part of the subdivision process.

The specific design of the public open space areas, including plant species and possible revegetation, will be confirmed as part of future detailed design through the subdivision process, as will any management measures to ensure protection of this vegetation as part of construction activities. No conservation areas are proposed within this development.

It is expected that a number of future subdivision approval conditions will ensure protection of the remnant vegetation proposed for retention, including model subdivision condition EN1, EN2, and EN7 (WAPC and DPLH 2021), which requires:

EN1 - Prior to the commencement of subdivisional works a foreshore/ environmental/ bushland/tree/ wetland/wildlife protection [DELETE AS APPLICABLE] management plan for [INSERT VALUE] is to be prepared and approved to ensure the protection and management of the sites environmental assets

with satisfactory arrangements being made for the implementation of the approved plan. Department of Water and Environmental Regulation) OR (Local Government) OR (Department of Biodiversity, Conservation and Attractions) [DELETE AS APPLICABLE]

EN2 - Prior to the commencement of subdivisional works, measures being taken to ensure the identification and protection of any vegetation on the site worthy of retention that is not impacted by subdivisional works, prior to commencement of subdivisional works. (Local Government)

EN7 - Prior to subdivisional works in the foreshore/waterway area, a plan is to be submitted and approved, detailing the waterway crossing and indicating how design and construction will minimise detrimental impacts on the waterway form and function. The waterway crossing plan is to be implemented as part of the subdivisional works. (Department of Water and Environmental Regulation)

5.3 Acid sulfate soils

5.3.1 Policy framework, site context and management objectives

In the context of environmental impact assessment, the EPA's objective for ASS is *'to maintain the quality of land and soils so that environmental values are protected'* (EPA 2016b). The application of the mitigation hierarchy should be applied to avoid or minimise impacts to terrestrial environmental quality where possible.

The DWER, through the WAPC, ensures ASS are adequately managed during the land use planning and development process. The objective of the DWER's ASS policy framework is to manage ASS appropriately to prevent the release of metals, nutrients and acidity into the soil and groundwater system that may adversely affect the natural and built environment and human health.

The regional mapping produced by DWER indicates that the northern two-thirds of the site is located within an area identified as 'moderate – low' risk of ASS occurring within 3 m of the natural soil surface, while the southern third of the site is identified as having a 'high to moderate' risk of ASS.

The principal management objective for ASS within the site is to ensure that any future development that may disturb ASS is appropriately managed to avoid impacts on the environment.

5.3.2 Structure plan layout considerations for acid sulfate soils

ASS management does not require any spatial consideration within the structure plan, and any ASS risk can be appropriately managed through future development planning.

5.3.3 Future acid sulfate soils management requirements

ASS is only likely to be a consideration if excavation (primarily for services, and in particular sewer) extends below the permanent groundwater table. It is possible, depending upon the extent of cut and fill within the site and location of services, that excavation could occur below the permanent groundwater table and if this is the case, additional ASS investigations may be required and could include the preparation of an Acid Sulfate Soils and Dewatering Management Plan. This is a well-established process which appropriately manages ASS risk.

Where a 'high to moderate' risk of ASS is identified in the regional mapping, the WAPC will apply a standard subdivision condition (model subdivision condition EN8 (WAPC and DPLH 2021)), which states:

An acid sulphate soils self-assessment form and, if required as a result of the self-assessment an acid sulphate soils report and an acid sulphate soils management plan shall be submitted to and approved by the Department of Water and Environmental Regulation (DWER) before any subdivision works or development are commenced. Where an acid sulphate soil management plan is required to be submitted, all subdivision works shall be carried out in accordance with the approved management plan (Department of Water and Environmental Regulation).

The requirement for further ASS management will be confirmed in accordance with any subdivision conditions and/or as part of future development once detailed design has progressed.

5.4 Native fauna

5.4.1 Policy framework, site context and management objectives

In the context of environmental impact assessment, the EPA's objective for terrestrial fauna is *'to protect fauna so that biological diversity and ecological integrity are maintained'* (EPA 2016c). The application of the mitigation hierarchy should be applied to avoid or minimise impacts to terrestrial fauna where possible.

The EPBC Act also provides protection for listed 'threatened' species, including western ringtail possums and black cockatoos, which may potentially use habitat within the site. Any proposed action which is considered likely to result in a 'significant' impact upon these species, which are identified as Matters of National Environmental Significance (MNES), should be referred to the Commonwealth Department of Agriculture, Fisheries and Forestry (DAFF).

The scattered paddock trees within the site are unlikely to provide important or significant habitat for conservation significant species such as western ringtail possum or the three black cockatoo species based on conservation advice and recovery plans for these species. The vegetation within the site would not support roosting or breeding by black cockatoos and is only considered low quality foraging habitat. Due to the lack of canopy connection and connection to other contiguous areas of remnant native vegetation (without having to cross large open areas by ground movement), western ringtail possums are also unlikely to use the site and it would not meet important or critical habitat requirements.

The management objective for fauna within the site will be principally focused on maximising retention of existing vegetation values within public open space areas and ensuring development works are undertaken in a manner that minimises harm to native fauna.

5.4.2 Structure plan layout considerations for terrestrial fauna

Spatial consideration has been given to fauna habitat, through the strategic location of public open space and wider road reserves to maximise the retention of existing remnant native trees (see **Figure 7**). Intersection of existing native vegetation within the Caves Road reserve has been minimised, with a single connection to Caves Road through the more intact vegetation located in accordance with the

existing driveway in the central northern portion of the site. A second connection to Caves Road is located in areas subject to historic disturbance and ongoing vegetation management (to reduce vegetation near existing powerlines).

5.4.3 Future terrestrial fauna management requirements

The location of the proposed public open space areas within the site maximises the retention of the existing paddock trees, particularly larger groupings of trees, rather than all the individual trees scattered throughout the site. The proposed public open space network, and planting of these areas will improve the presence of refuge habitat for fauna species (particularly western ringtail possum), and improve vegetation connectivity and an ability for fauna to move across the landscape between patches of intact native vegetation to the north, and the nature reserve to the south.

Existing trees will be modified or removed as part of the proposed development and fauna may be disturbed as part of this process. Management of fauna as part of the detailed design and construction for the proposed development will be based on minimising harm to fauna (particularly the western ringtail possums) and can be addressed through the preparation and implementation of a fauna management plan as part of subdivision. Measures to be implemented may include:

- Bunting/flagging of trees to be retained so that it is clear which trees are to be avoided.
- Undertaking preclearing inspections of tree/vegetation proposed for removal/modification. This may include a trapping and relocation program for western ringtail possums.
- Using a fauna spotter during demolition and clearing works to avoid impacts to fauna wherever possible and to rescue trans-locatable fauna that are disturbed during clearing works to assist them to disperse safely or capture them for later translocation as appropriate.
- Application of correct fauna handling procedures to reduce stress on any captured animals.

It is likely that this will be a condition of future subdivision approval, based on application of model subdivision condition EN1 (WAPC and DPLH 2021), which requires:

EN1 - Prior to the commencement of subdivisional works a foreshore/ environmental/ bushland/ tree/wetland/wildlife protection [DELETE AS APPLICABLE] management plan for [INSERT VALUE] is to be prepared and approved to ensure the protection and management of the sites environmental assets with satisfactory arrangements being made for the implementation of the approved plan. (Department of Water and Environmental Regulation) OR (Local Government) OR (Department of Biodiversity, Conservation and Attractions) [DELETE AS APPLICABLE]

5.5 Hydrology

5.5.1 Policy framework, site context and management objectives

In the context of environmental impact assessment, the EPA's objective for inland waters is *'to maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected'* (EPA 2018).

In addition, the *State Water Strategy for Western Australia* (Government of WA 2003) and *Better Urban Water Management* (WAPC 2008b) endorses the promotion of integrated water cycle management and application of water sensitive urban design (WSUD) principles to provide

improvements in the management of stormwater, and to increase the efficient use of other existing water supplies. The mapped floodway within the southern portion of the site is a key feature that needs to be managed, to ensure downstream users are not detrimentally impacted. A number of MUWs are identified within the site, however the presence of a MUW would not preclude development within the site and do not require any specific protection or spatial consideration. The hydrological function of the MUW will need to be considered/maintained as development progresses.

Based on the values identified the principal management objective for hydrology in the site will be to ensure that the floodway is maintained and that groundwater and surface water is appropriately infiltrated and treated to not impact on the broader area, based on WSUD.

5.5.2 Structure plan layout considerations for hydrology

5.5.2.1 Floodway

The floodway within the southern portion of the site has been fully accommodated and integrated within an area of public open space. This area is proposed to perform an important drainage function, however, will also remain predominantly as useable and unrestricted open space.

5.5.2.2 Surface water and groundwater

In accordance with the LWMS (Emerge Associates 2022b) that has been prepared for the site, the structure plan has accommodated flood mitigation, flow management and treatment of surface water by providing appropriately sized road reserves to convey, treat and store stormwater, as well as a public opens space areas of a suitable size to accommodate required bioretention areas and flood storage areas, to manage water quality and to enable the predevelopment hydrology conditions to be maintained (particularly downstream).

5.5.3 Future management requirements

The LWMS provides a framework for the future delivery of a best practice approach to integrated water cycle management utilising water sensitive urban design (WSUD) principles and provides for the management of groundwater and surface water within the site. It has been prepared in accordance with relevant DWER requirements and considers the site-specific values. The LWMS will be a key document guiding future development and can be referred to for further detail, particularly with regard to determined water management criteria and water quality management objectives.

The LWMS (Emerge Associates 2022b) proposes water supply and conservation, stormwater management and groundwater management strategies to ensure water values are managed appropriately within the site. These strategies have been summarised below.

5.5.3.1 Floodway

The floodway will be fully accommodated with the public open space and will provide a conveyance function as well as maintain hydraulic connectivity to southern BNRS. The stormwater management network will be designed to maintain clearance between bioretention retention areas and maximum flood levels to ensure they are able to infiltrate and provide appropriate drainage. The design lot

levels adjacent to the floodway will be such that finished floor levels are at least 500 mm above the maximum flood level to ensure protection from flooding during major rainfall events.

5.5.3.2 Surface water and groundwater

Water supply and conservation

The overall approach to water supply is to utilise scheme water provided via Busselton Water and implement best practise water conservation measures (e.g. water efficient fixtures, use of WSUD measures, and planting of water wise species) to reduce water demand. Non-potable water for irrigation at lot scale will also be provided by scheme water within private lots and potentially rainwater tanks if installed by lot owner. The key approach for public open space will be to retain as many trees as possible, to minimise water use and provide amenity. The public open space areas will be either unirrigated or temporarily supplied (e.g. by watercart) during an establishment period; no ongoing permanent irrigation of public open space areas is proposed (unless a non-potable water supply source is secured).

Stormwater management

The principle behind the stormwater management strategy within the site is to ensure that the pre-development 1% AEP peak flow rate and volume discharging offsite is not exceeded post-development.

Stormwater management will involve the following:

- Manage runoff from the small rainfall event (i.e. first 15 mm) within the site at source of as close as practicably possible either within lots, through the use of roadside swales and/or bioretention areas. Treatment will occur via contact with vegetation and the underlying soil profile.
- The majority of catchments will either have a public open space area that will contain a bioretention area and a flood storage area and catchments with no public open space will contain a vegetated swale that will be designed to treat the first 15 mm and retain/detail runoff up to the 1% AEP event.
- Ensure the major rainfall event (1% AEP) peak flow rates and volumes do not exceed the pre-development environment and hydraulic connectivity to the BNRS is maintained.
- Finished floor levels must be a minimum of 2.7 mAHD (to meet coastal process requirements) and/or at least 500 mm above the adjacent 1% AEP flood level.
- Finished floor levels must have at least 500 mm clearance above the major event top water levels in onsite retention and detention structures.
- Reduce nutrients loads by applying appropriate non-structural measures, such as vegetated roadside swales or a vegetated bio retention area where treatment will occur via contact with vegetation and the underlying soil profile.

Stormwater management infrastructure proposed within the site includes:

- Pit and pipe network within road reserves
- Flush kerbing
- Vegetated swales
- Bioretention areas

- Flood storage areas.

Groundwater Management

Groundwater management will involve providing suitable separation between finished floor levels and groundwater and minimising risk of nutrient enrichment, and will be based on the following:

- The invert level of bioretention area and flood storage areas will have a minimum of 300 mm clearance above the maximum groundwater level.
- Providing adequate consideration of future sea level rise and the influence it will have on groundwater levels beneath the site.
- Minimising the risk of nutrient enrichment to downstream surface water bodies from groundwater sources through the treatment of stormwater within the bioretention areas and swales via filtration and adsorption of pollutants/nutrients.

5.5.3.3 Overall

The WAPC typically apply a standard condition on subdivision approval (model subdivision condition D2 (WAPC and DPLH 2021)), requiring the preparation of an Urban Water Management Plan (UWMP) which states:

Prior to the commencement of subdivisional works, an urban water management plan is to be prepared and approved, in consultation with the Department of Water and Environmental Regulation, consistent with any approved Local Water Management Strategy. (Local Government).

Generally, an UWMP will address the following considerations specific to subdivision and development stages in close consideration of the engineering design:

- The detailed drainage design based on civil designs
- Imported fill specifications and requirements
- Implementation of water conservation strategies
- Non-structural water quality improvement measures
- Management and maintenance requirements
- Construction period management strategy
- Monitoring and evaluation program.

5.6 Acoustic impacts – Bussell Highway and Caves Road

5.6.1 Policy framework, site context and management objectives

In the context of environmental impact assessment, the EPA's objective for social surroundings (which includes consideration of impacts to amenity from factors such as noise) is *'to protect social surroundings from significant harm'* and includes the '*ability for people to live and recreate within their surroundings without any unreasonable interference with their health, welfare, convenience and comfort*' (EPA 2016a).

While social surrounds encompass a number of different considerations, specific to the site, impacts from road noise are the key consideration that has the potential to cause harm. SPP 5.4 (WAPC 2019b) recognises that excessive noise has the potential to affect the health and amenity of a

community as a whole, as well as the wellbeing of individuals. The policy aims to protect people from unreasonable levels of transport noise by establishing a standardised set of criteria to be used in the assessment of development proposals. Under SPP 5.4, new noise sensitive land uses (which includes residential development) within the trigger distance of an existing transport corridor is required to meet the criteria outlined in **Table 5**.

Table 5: Noise targets as outlined within SPP 5.4

Proposal type	New/upgrade	Noise targets		
		Outdoor		Indoor
		Day (L_{Aeq}(Day) dB) (6 am -10 pm)	Night (L_{Aeq}(Night) dB) (10 pm – 6 am)	(L_{Aeq} dB)
Noise sensitive land-use and/or development	New noise sensitive land use and/or development within the trigger distance of an existing/proposed transport corridor.	55	50	L_{Aeq}(Night) dB) 40 (living and work areas) L_{Aeq}(Night) dB) 35 (bedrooms)

Where the targets are exceeded, an assessment is required to determine the likely level of transport noise and management/mitigation required.

The application of SPP 5.4 is to consider anticipated traffic volumes for the next 20 years from when the noise assessment is undertaken. In the application of the noise targets, the objective is to achieve:

- Indoor noise levels specified in *Table 2-1* in noise-sensitive areas (e.g. bedrooms and living rooms of houses and school classrooms); and
- A reasonable degree of acoustic amenity for outdoor living areas on each residential lot. For non-residential noise-sensitive developments, for example schools and childcare centres, the design of outdoor areas should take into consideration the noise target.

The site is located adjacent to Caves Road and Bussell Highway, which is identified as an 'other significant freight/traffic route' in SPP 5.4 (DPLH 2019), and where development is located within the 200 m trigger value road noise impacts on sensitive land uses and/or development should be considered. This means noise will be a relevant consideration for future development in the northern and eastern portion of the site.

The principle management objective for acoustic impacts is to protect future residents from unreasonable levels of transport noise.

5.6.2 Structure plan layout considerations for management of acoustic impacts

The *Road and Rail Noise Guidelines* (WAPC 2019a) provides a conservative exposure noise forecast table, which enables proponents to undertake a simple initial screening assessment to estimate the potential risk of noise impacts on future residents. Based on the type of road (other significant freight/traffic route), the location of the road (rural), the speed limit of the road (60-80 km/hr) and number of lanes adjacent to the site (1-2 lanes), the *Road and Rail Noise Guidelines* (WAPC 2019a) indicates that noise impacts from Caves Road and Bussell Highway are likely to require management up to 40 m from the road carriageway. Noise impacts can be managed as per the standard planning

and development process, including use of setbacks and quiet house design, with the implementation guidelines indicating the following:

- Within 0 – 20 m of the road carriage way, noise target could be exceeded between 3-7 dB, and quiet house design package B could apply; and
- Within 20 – 40 m of the road carriage way, the noise target could be exceeded by between 1-3 dB, and quiet house design package A could apply.

Therefore, while noise impacts are possible within the noise trigger area identified in **Figure 7**, these can be addressed through 'deemed-to-comply' construction design considerations (e.g. quiet house design) which will reduce noise levels to acceptable levels. On this basis no specific spatial response is proposed within the structure plan, and management of noise can be resolved in further detail at the time of subdivision.

5.6.3 Future acoustic management requirements

Given the site is adjacent to existing residential development that has already been developed for residential purposes next to Caves Road and Bussell Highway, traffic noise is considered to be able to be managed through the typical urban/residential development process.

It is highly likely that road noise impacts can be managed through the 'deemed-to-comply' pathway of SPP 5.4 and the associated implementation guidelines, which provides detail on separation distances and associated quiet house design treatments (briefly considered above).

It is expected that future subdivision approval conditions will ensure appropriate management of noise in accordance the relevant standards, including model subdivision condition T24 (WAPC and DPLH 2021), which requires:

T24 – A notification, pursuant to Section 165 of the Planning and Development Act 2005 is to be placed on the certificate(s) of title of the proposed lot(s). Notice of this notification is to be included on the diagram or plan of survey (deposited plan). The notification is to state as follows:

This lot is situated in the vicinity of a transport corridor and is currently affected, or may in the future be affected by transport noise. Additional planning and building requirements may apply to development on this land to achieve an acceptable level of noise reduction. (Western Australian Planning Commission)

Noise impacts from Caves Road and Bussell Highway can be managed through a 'deemed-to-comply' pathway, and if required a detailed acoustic assessment can be undertaken to support subdivision when more detailed site-specific information (e.g. proposed final development layout, finished lot levels) is available.

5.7 Bushfire management

5.7.1 Policy framework, site context and management objectives

State Planning Policy 3.7 Planning in Bushfire Prone Areas (SPP 3.7) (WAPC 2015a) stipulates that any development proposal which occurs partly or wholly within a designated bushfire prone area is required to be accompanied by a bushfire management plan (BMP). The preparation of a BMP is required to incorporate the following tasks:

- Classification of existing vegetation and effective slope within the site and surrounding 150 m, in accordance with AS 3959 (Standards Australia 2018).
- Assessment of bushfire hazard levels within the site and surrounding 150 m, in accordance with the Guidelines (DPLH & WAPC 2021).
- Completion of an indicative Bushfire Attack Level (BAL) assessment and preparation of an associated BAL contour plan.
- Assessment of the structure plan design against the bushfire protection criteria, in accordance with the Guidelines (DPLH & WAPC 2021).

Policy objective 5.4 of SPP 3.7 specifies that development is required to:

"…achieve an appropriate balance between bushfire risk management measures and biodiversity conservation values, environmental protection and biodiversity management and landscape amenity."

This policy objective ensures that future development appropriately considers the bushfire risks, and provides appropriate separation from any identified risks without negatively impacting existing environmental values.

Bushfire hazards have been identified external to the site (discussed in **Section 3.9** and the BMP (Emerge Associates 2022a)), and for the purposes of the assessment to support the scheme amendment and structure plan process, it has been assumed any hazards identified external to the site will remain in the long-term. Grassland vegetation to the south-east of the site, however, is considered a temporary hazard, associated with existing rural lots likely to be subject to future residential development. Proposed public open space areas within the site have been assumed to be a bushfire hazard and have been identified as classified vegetation (and therefore effectively means 'no management' is assumed for the purposes of the bushfire assessment), following consultation with the City of Busselton.

The principal management objective for the bushfire risk to the site is to ensure that the risk to future people, property and infrastructure is appropriately minimised without negatively impacting on environmental values within or surrounding the site.

5.7.2 Structure plan layout considerations for bushfire management

In accordance with the BMP (Emerge Associates 2022a) prepared for the site, the structure plan has provided an appropriate spatial response to bushfire risk through:

- Ensuring future development areas will be able to accommodate the separation necessary to enable habitable buildings to achieve a bushfire attack level (BAL) rating of BAL-29 or less

without requiring clearing or modification of remnant native vegetation in areas surrounding the site. This has been achieved through the location of proposed roads between future lots and areas of bushfire hazard and/or providing lots of an appropriate size to accommodate necessary separation. Areas within the site assessed as being subject to BAL-FZ and BAL-40 (and able to support a habitable building) are shown in **Figure 7**.

- An integrated internal road network that connects with the existing external public road network and provides access to multiple destinations, supporting appropriate emergency evacuation and response.

5.7.3 Future bushfire management requirements

The BMP (Emerge Associates 2022a) demonstrates that SPP 3.7 and the bushfire protection criteria (outlined within the Guidelines (DPLH & WAPC 2021)) can be satisfied through an 'acceptable solution' approach without compromising environmental values within or nearby to the site. No fuel load management of remnant native vegetation outside the site has been assumed as part of addressing bushfire risk.

Going forward and based on satisfying the bushfire protection criteria, detailed design and construction will need to consider the following:

- Providing appropriate separation between bushfire hazards and future habitable buildings to achieve a bushfire attack level (BAL) rating of BAL-29 or less, with portions of the site likely to be subject to BAL-LOW. This is through the use of perimeter public roads and in-lot setbacks.
- Providing access to multiple destinations via Caves Road and Bussell Highway. A number of no-through roads are currently proposed as part of managing site constraints (floodway, vegetation retention, land ownership) and temporary staging of development, however all are less than 200 m in length and able to meet the acceptable solution. The western-most development cell currently only has a single road access in and out, however this will be addressed through provision of an emergency access way (or similar) at future stages as part of designing around retained trees and drainage features.
- Meeting water supply requirements through a reticulated water scheme and provision of hydrants.

A revised BMP may be required to support future subdivision applications, particularly if vegetation management assumptions are different, or the development layout is different to that assessed as part of the BMP. The BMP will need to respond to the subdivision design (and/or stage of development). It is likely that the WAPC will include a number of standard conditions on the subdivision approval, including F1, F2 and F3 (WAPC and DPLH 2021) which states:

F1- Information is to be provided to demonstrate that the measures contained in the bushfire management plan [NAME/DATE] that address the following [LIST AS REQUIRED] have been implemented during subdivisional works. This information should include a notice of 'Certification by Bushfire Consultant'.

F2 – Notification, pursuant to Section 165 of the Planning and Development Act 2005, is to be placed on the certificate(s) of title of the proposed lot(s) with a Bushfire Attack Level (BAL) rating of 12.5 or above, advising of the existence of a hazard or other factor. Notice of this notification is to be included on the diagram or plan of survey (deposited plan). The notification is to state as follows:

"This land is within a bushfire prone area as designated by an Order made by the Fire and Emergency Services Commissioner and is/ may be subject to a Bushfire Management Plan [RENAME/DELETE AS APPLICABLE]. Additional planning and building requirements may apply to development on this land" (Western Australian Planning Commission)

F3 – A plan is to be provided to identify areas of the proposed lot(s) that have been assessed as BAL-40 or BAL-Flame Zone.

A restrictive covenant to the benefit of the local government, pursuant to section 129BA of the Transfer of Land Act 1893, is to be placed on the certificate(s) of title of the proposed lot(s) advising of the existence of a restriction on the use of the land within areas that have been assessed as BAL-40 or BAL-Flame Zone. Notice of this restriction is to be included on the diagram or plan of survey (deposited plan). The restrictive covenant is to state as follows:

"No habitable buildings are to be built within areas identified as BAL-40 or BAL-Flame Zone". (Local Government)

6 Implementation Framework

The structure plan for the site has been prepared to be consistent with *Leeuwin-Naturaliste Sub-regional Strategy* (DPLH 2021) and can address the key issues identified for the strategy as they relate to the environment. A summary of the key environmental planning considerations (as detailed previously in **Section 2.2**) and how the proposed structure plan addresses these is outlined below:

- *Biodiversity value protection* – which the design approach for the structure plan seeking to maximise retention of existing remnant native trees, the main biodiversity value within the site.
- *Bushfire risk* – with no management of vegetation external to the site assumed in order to meet the requirements of SPP 3.7.
- *Drainage* – the floodway has been fully accommodated within public open space, and sufficient areas have been provided to manage minor and major rainfall events and match pre-development flow rates.
- *Landscape value protection* – Existing vegetation around the perimeter of the site will be largely maintained, meaning views of the site are unlikely to be significantly different compared to the current/existing views, and the public open space areas will provide for green corridors across the site, providing continuity/connection with the natural elements.
- *Water source impact (groundwater and surface water)* – the floodway has been accommodated within the site, and surface water and groundwater will be treated (via WSUD features) to improve water quality leaving the site.
- *Biodiversity values (adjacent wetlands to south)* – a management interface between the site and the BNRS to the south has been accommodated through the proposed perimeter roads and public open space network, minimising potential for incursion of weeds and edge effects. The public open space corridor through the centre of the site provides a landscape connection for vegetation and fauna values to move between existing areas of vegetation and/or the wetland, while the hydrological connectivity has been maintained through the water management approach.

As previously discussed in **Section 2.2**, the southern portion of the site is identified as an 'Open Space Investigation' area and aligns with the current conservation zoning under the City of Busselton LPS No. 21. The investigations through the EAMS and LWMS indicate that the key environmental value associated with the 'Open Space Investigation' area is the floodway. This value has been fully accommodated within the public open space network (summarised above), with the hydrological function able to be maintained in accordance with the LWMS. No other environmental values are present within the southern portion of the site that would prevent urban development from being supported.

A summary of how the scheme amendment and structure plan responds to the environmental values and attributes within the site (based on the EPA factors) is provided in **Table 6**. The table also outlines the future management likely to be required as part of the subdivision and development process, and how the values can be managed within the existing development framework.

Table 6: Environmental management framework implementation table

Factor	Structure plan phase	Subdivision phase	Part of development works
Coastal processes	• Identification of coastal processes that may impact the site, including consideration of the City of Busselton CHRMAP. • Spatial provision for the floodway, which may be subject to storm surge inundation as part of sea-level rise.	• Preparation of an Urban Water Management Plan (UWMP). • Preparation of earthwork plans and engineering drawings, addressing finished floor levels. • Spatial provision for the floodway.	• Implementation of the UWMP. • Design and implementation of drainage reserves/ management features as per the requirements of the UWMP. • Implementation of earthworks and engineering drawings.
Flora and vegetation	• Assessment of flora and vegetation values present within the site and identification of conservation significant values. • Spatial provision public open space to maximise retention of remnant paddock trees.	• Undertake detailed analysis of final subdivision layout and engineering design to determine tree retention opportunities. • Provision for public open space areas and wider road reserves to retain trees where possible. • Preparation of vegetation / tree management plan to ensure values are protected and to satisfy subdivision conditions.	• Ensure trees proposed for retention (in public open space) are protected, accommodate these as part of construction and landscaping works.
Terrestrial environmental quality	• Consider ASS risk mapping as prepared by DWER. No spatial response in structure plan required. • Consider presence of contamination from historic land uses. No spatial response required.	• If required, completion of the ASS self-assessment form (as prepared by the DPLH). • If required, preparation of an Acid Sulfate Soil and Dewatering Management Plan.	• If required, implementation of an Acid Sulfate Soil and Dewatering Management Plan.
Fauna	• Assessment of fauna habitat and preliminary consideration of habitat retention opportunities. • Spatial provision public open space to maximise retention of remnant paddock trees.	• Undertake detailed analysis of final subdivision layout and engineering design to determine further potential tree retention opportunities. • Provision for public open space and wider road reserves, to retain trees where possible. • Preparation of vegetation / fauna management plan(s) to ensure values are protected and to satisfy subdivision conditions.	• Ensure trees proposed for retention are protected, accommodate these as part of construction and landscaping works. • Implement pre-clearance checks and/or management plan requirements to ensure fauna is managed appropriately to minimise harm. • If required, obtain and implement licences pursuant to the *Biodiversity Conservation Act 2016* to disturb/relocate fauna prior to works commencing.

Table 6: Environmental management framework implementation table (continued)

Factor	Structure plan phase	Subdivision phase	Part of development works
Inland waters	• Preparation of a Local Water Management Strategy (LWMS). • Spatial provision for floodway, bioretention areas, stormwater conveyance and flood storage areas to accommodate stormwater, groundwater and flood events.	• Preparation of an Urban Water Management Plan (UWMP). • Spatial provision for floodway, bioretention areas and flood storage areas.	• Implementation of the UWMP. • Design and implementation of drainage reserves/ management features as per the requirements of the UWMP.
Social surroundings	• Noise impacts • Understand presence of land uses that require setbacks to sensitive land uses and consider future development requirements. Caves Road and Bussell Highway are located adjacent to the northern and eastern boundary of the site respectively and require consideration pursuant to SPP 5.4.	• Noise impacts • Where required, demonstrate appropriate separation is provided between the future habitable buildings and Caves Road and Bussell Highway to achieve appropriate quiet house design responses. This may include preparation of an acoustic assessment / noise management plan, where the 'deemed-to-comply' pathway is not achievable or considered appropriate. • Spatial provision to address noise impacts, including lots of an appropriate depth to accommodate quiet house design or similar.	• Noise impacts • Where required, implementation of the recommendations of an acoustic assessment / noise management plan. • As part of building licence (by future lot owners) ensure buildings are constructed to appropriate requirements (e.g. quiet house design).
Bushfire risk	• Preparation of a BMP in accordance with SPP 3.7 and the Guidelines. • Provision for road reserves and appropriately sized development areas to accommodate setbacks to achieve BAL-29 or less from identified bushfire risk. • Provision for a road network that connects the site to the existing public road network and provides access to multiple destinations.	• Provision for separation between habitable buildings and identified bushfire hazards, including through use of road reserves and/or appropriately sized lots. No management should be assumed in areas of retained vegetation external to the site. This also applies to public open space unless agreed with the City of Busselton. • Provision for an appropriate road network that provides access to multiple destinations. • If required, prepare an updated BMP to support the subdivision application.	• Demonstrate compliance with an BMP in accordance with SPP 3.7 and the Guidelines. • Where identified as low threat in the BMP, design, implement and maintain public areas to achieve low threat in accordance with Section 2.2.3.2 of AS 3959. • As part of building licence (by future lot owners) ensure buildings are constructed to appropriate BAL requirements.

7 Conclusions

Various landowners are progressing a scheme amendment and structure plan for Lots 4, 12 and 402 Caves Road, and Lots 14 and 15 Bussell Highway, Abbey to support residential development within the site. This is in accordance with the *Leeuwin-Naturaliste Sub-regional Strategy* (DPLH 2021) which indicates urban/residential land uses could be supported subject to resolution of managing particular considerations, including (but not limited to) biodiversity values, bushfire risk, landscape vales, nearby wetland features and the 'Open Space Investigation' area. This EAMS been prepared to inform and support the proposed scheme amendment and structure plan by assessing the potential environmental impacts that could arise from the land use change and subsequent development of the site. The environmental attributes and values identified within the site and adjacent land have been outlined in **Section 3** of this document and consideration of potential impacts on environmental values have been outlined within **Section 4** and **Section 5**.

Overall, the proposed scheme amendment is unlikely to result in development that would significantly impact environmental attributes or values, or nearby land uses as the proposed residential development can be suitably managed through the standard planning and development process. In particular:

- **Coastal**: A finished level of 2.7 mAHD for all buildings is required in order to meet the requirements of the City of Busselton's CHRMAP. This can be achieved with minimal additional fill required across the majority of the site.
- **Acid sulfate soils**: it is possible that future investigations and management will be required at subdivision, particularly if services are likely to be installed below the permanent groundwater table. This can be managed through the standard subdivision approval process.
- **Flora, vegetation and fauna:** The site has been historically cleared of native vegetation with only pasture and scattered remnant trees remaining. The management of vegetation and fauna values as part of future development of the site can be appropriately managed through the standard subdivision process. The proposed structure plan proposes areas of public open space in locations to maximise retention of existing trees, and to provide green linkages across the site and between areas of remnant vegetation or nature reserve outside the site. The proposed urban development will provide an opportunity to increase the composition of plant species and vegetation structure, improving biological diversity and ecological integrity as well as vegetation connection (supporting fauna movement and flora dispersion).
- **Hydrology:** The 1% AEP floodway has been accommodated within public open space, while flood fringe areas will be subject to minor filling to ensure the minimum floor level (based on 1% AEP flooding with development of the flood fringe) is achieved. Water management within the site will ensure the first 15 mm of stormwater is treated and retained within the development so that the pre-development discharge rate and volumes are not exceeded, and water quality is improved. Separation to groundwater is able to be achieved based on the proposed minimum 2.7 mAHD lot finished floor levels (and includes that required for managing coastal processes). Future development will be supported by Urban Water Management Plan(s) as per the standard subdivision process.
- **Heritage:** A portion of an 'Other Heritage Place' (ID 5337) is mapped as extending into the western portion of the site. As it is an 'other heritage site' and not considered to be 'a site' as

defined by the *Aboriginal Heritage Act 1972*, no specific approval is required under the existing enacted Aboriginal heritage legislation.

- **Road noise**: Consideration of noise has been undertaken in accordance with SPP 5.4, and indicates that noise impacts can be addressed through the 'deemed-to-satisfy' pathway. This can be managed through the standard subdivision process, and through the application of quiet house design.
- **Bushfire management:** Bushfire hazards (classified vegetation) that have the potential to impact the site are associated with forest vegetation immediately to the north of the site (within the Caves Road reserve), grassland vegetation within rural landholdings to the south-east (considered to be temporary hazards) and within the Broadwater Nature Reserve Swamp to the south, as well as future public open space areas (which as per consultation with the City of Busselton has been assumed to be a bushfire hazard). The proposed structure plan layout accommodates required setbacks to achieve a bushfire attack level (BAL) rating of BAL-29 or less (as per *State Planning Policy 3.7 Planning in Bushfire Prone Areas*) to identified bushfire hazards through the proposed road or through development cells that can accommodate in-lot setbacks. Development within the site is not reliant on vegetation modification or management external to the site, or management within public open space areas.

The key environmental planning considerations associated with the *Leeuwin-Naturaliste Sub-regional Strategy* have been addressed appropriately through the proposed structure plan. The environmental value associated with the 'Open Space Investigation' area is the floodway feature, which has been fully accommodated within public open space and hydrological function managed through implementation of the LWMS, with the remainder of the 'Open Space Investigation' area able to support urban development.

Overall, the environmental attributes and values of the site can be appropriately accommodated through the future planning processes. There are no significant environmental issues or constraints within the site to the extent that it would preclude the entire site from being rezoned to support urban development.

8 References

8.1 General references

Alan Tingay and Associates 1998, A Strategic Plan for Perth's Greenways - Final Report. December 1998.

Belford, S. 1987, Busselton Sheet 1930 I - Environmental Geology Series, Western Australia.

Bureau of Meteorology (BoM) 2022, Summary Statistics Busselton Aero, <http://www.bom.gov.au/climate/averages/tables/cw_009603.shtml>.

City of Busselton 2014, Heritage List.

City of Busselton 2022, Coastal Hazard Risk Management and Adaption Plan.

Commonwealth Scientific and Industrial Research Organisation and the Bureau of Meteorology (CSIRO-BoM) 2020, State of the Climate, Australia.

Department of Aboriginal Affairs (DAA) 2013, Aboriginal Heritage Due Diligence Guidelines (Version 3.0), Department of Aboriginal Affairs, Perth.

DBCA 2019a, The 2019 Great Cocky Count: A community-based survey for Carnaby's Black-Cockatoo (Calyptorhynchus latirostris), Baudin's Black-Cockatoo (Calyptorhynchus baudinii) and Forest Red-tailed Black-Cockatoo (Calyptorhynchus banksii naso), Perth.

C. a. A. Department of Biodiversity (DBCA) 2019b, Black Cockatoo Breeding Sites - Buffered (DBCA-063), <https://catalogue.data.wa.gov.au/dataset/black-cockatoo-breeding-sites-buffered>.

C. a. A. Department of Biodiversity (DBCA) 2019c, Black Cockatoo Roosting Sites - Buffered (DBCA-064), <https://catalogue.data.wa.gov.au/dataset/black-cockatoo-roosting-sites-buffered>.

Department of Biodiversity Conservation and Attractions (DBCA) 2020, Priority Ecological Communities for Western Australia Version 30.

C. a. A. Department of Biodiversity (DBCA) 2021a, NatureMap, <https://naturemap.dbca.wa.gov.au/>.

Department of Biodiversity, Conservation and Attractions (DBCA) 2021b, Vegetation Complexes - Swan Coastal Plain (DBCA-046), Perth, Western Australia, <https://catalogue.data.wa.gov.au/dataset/vegetation-complexes-swan-coastal-plain>.

Department of Biodiversity Conservation and Attractions (DBCA) 2022a, Geomorphic Wetlands, Swan Coastal Plain (DBCA-019), WA, <https://catalogue.data.wa.gov.au/dataset/geomorphic-wetlands-swan-coastal-plain>.

C. a. A. Department of Biodiversity (DBCA) 2022b, Lands of Interest (DBCA-012), <https://catalogue.data.wa.gov.au/dataset/dbca-lands-of-interest>.

C. a. A. Department of Biodiversity (DBCA) 2022c, Legislated Lands and Waters (DBCA-011), <https://catalogue.data.wa.gov.au/dataset/dbca-legislated-lands-and-waters>.

E. Department of Climate Change, the Environment and Water, (DCCEEW) 2022, Protected Matters Search Tool, <https://pmst.awe.gov.au/#/map?lng=131.52832031250003&lat=-28.671310915880834&zoom=5&baseLayers=Imagery,ImageryLabels>.

Department of Environment and Conservation (DEC) 2009, South West Regional Ecological Linkages Axis Lines, <https://catalogue.data.wa.gov.au/dataset/south-west-regional-ecological-linkages-axis-lines>.

Department of Defence 2022, Unexploded Ordnance, <https://www.whereisuxo.org.au/>.

Department of Health 2007, Chironomid midge and mosquito risk assessment guide for constructed waterbodies, Perth, Western Australia.

Department of Water (DoW) 2009, Water Quality Protection Note No. 75. Proclaimed public drinking water source areas, Government of Western Australia, Perth.

Department of Primary Industries and Regional Development (DPIRD) 2020, Current Extent of Native vegetation - Western Australia dataset (DPIRD-005), Perth, Western Australia.

Department of Primary Industries and Regional Development (DPIRD) 2022, Soil Landscape Mapping - Systems (DPIRD-064).

Department of Planning, Lands and Heritage, (DPLH) 2019, State Planning Policy 5.4 - Road and Rail Noise: Schedule 2. South West.

L. a. H. Department of Planning (DPLH) 2021, Leeuwin-Naturaliste Sub-regional Strategy Western Australian Planning Commission, Perth.

Department of Planning, Lands and Heritage (DPLH) 2022, Aboriginal Heritage Inquiry Service, <https://espatial.dplh.wa.gov.au/AHIS/index.html?viewer=AHIS>.

Department of Planning, Lands and Heritage, and Western Australian Planning Commission, (DPLH & WAPC) 2021, Guidelines for Planning in Bushfire Prone Areas Version 1.4, Perth, Western Australia.

Department of Water and Environmental Regulation (DWER) 2017a, Acid Sulfate Soil Risk Map, Swan Coastal Plain (DWER-055).

Department of Water, and Environmental Regulation (DWER) 2017b, Acid Sulphate Soil Risk Map, Lower South West, Shared Location Information Platform (SLIP).

Department of Water and Environmental Regulation (DWER) 2021, Clearing Regulations - Environmentally Sensitive Areas (DWER-046), <https://catalogue.data.wa.gov.au/dataset/clearing-regulations-environmentally-sensitive-areas-dwer-046>.

Department of Water and Environmental Regulation (DWER) 2022a, Contaminated Sites Database, <https://catalogue.data.wa.gov.au/dataset/contaminated-reported-sites-dwer-059>.

Department of Water and Environmental Regulation (DWER) 2022b, Public Drinking Water Source Areas (DWER-033), WA, <https://catalogue.data.wa.gov.au/dataset/public-drinking-water-source-areas>.

Department of Water and Environment Regulation (DWER) 2022c, Water Register, <https://maps.water.wa.gov.au/#/webmap/register>.

Emerge Associates 2022a, Bushfire Management Plan - Abbey South Structure Plan Area, EP20-141(05)--011 SJB, Version 1.

Emerge Associates 2022b, Local Water Management Strategy: Abbey South Structure Plan Area, EP20-141(03)--009 AJI, Version 1.

Environment Australia 2000, Revision of the Interim Biogeographic Regionalisation for Australia (IBRA) and Development of Version 5.1 - Summary Report, Department of Environment and Heritage.

Environment, D. o. A. W. a. 2019, Australian Heritage Database, <https://www.environment.gov.au/cgi-bin/ahdb/search.pl?mode=search_results;list_code=NHL;legal_status=65>.

Environmental Protection Authority (EPA) 2016a, Environmental Factor Guideline - Social Surroundings, Perth.

Environmental Protection Authority (EPA) 2016b, Environmental Factor Guideline - Terrestrial Environmental Quality.

Environmental Protection Authority (EPA) 2016c, Environmental Factor Guideline - Terrestrial Fauna, Western Australia.

Environmental Protection Authority (EPA) 2016d, Environmental Factor Guideline – Coastal Processes Perth.

Environmental Protection Authority (EPA) 2016e, Environmental Factor Guideline – Flora and Vegetation, Perth.

Environmental Protection Authority (EPA) 2018, Environmental Factor Guideline - Inland Waters.

Environmental Protection Authority (EPA) 2021, Statement of Environmental Principles, Factors, Objectives and aims of EIA.

Geographe Catchment Council 2010, Buayanyup River Action Plan.

Government of WA 2003, A State Water Strategy for Western Australia, Perth.

Government of Western Australia 2019, 2018 South West Vegetation Complex Statistics. Current as of March 2019, WA Department of Biodiversity, Conservation and Attractions, Perth.

Hall, Marnham, Langford 2000, Western Australia 1:50 000 Regolith-Landform Resources Series, Cowaramup – Mentelle first edition.

Heritage Council of WA 2021, inHerit, <http://inherit.stateheritage.wa.gov.au/Public/>.

JDA 2017, Hydrualic review and breach modelling of Buayanyup Drain.

Jordan, J. E. 1986, Armadale Part Sheets 2033 I and 2133 IV, Geological Survey of Western Australia, Department on Minerals and Energy, Perth.

Western Australia Land Information Authority (Landgate) 2022, Landgate Map Viewer Plus, <https://map-viewer-plus.app.landgate.wa.gov.au/index.html>.

Lantzke, P. T. a. N. 1990, Busselton, Margaret River, Augusta: land capability study, Department of Agriculture and Food.

Leonhard, E. 1991, Yallingup Sheet IV and Part Sheet 1830 I - Environmental Geology Series, Western Australia.

Miles, C. 2001, NSW Murray Catchment Biodiversity Action Plan, Nature Conservation Working Group Inc, Albury, New South Wales.

Molloy, S., Wood, J., Hall, S., Wallrodt, S. and Whisson, G. 2009, South West Regional Ecological Linkages Technical Report, Western Australian Local Government Association and Department of Environment and Conservation, Perth.

NGIS 2022, Coastal Risk Australia, <https://www.coastalrisk.com.au/viewer>.

Office of Bushfire Risk Management (OBRM) 2021, Map of Bush Fire Prone Areas, Landgate, https://maps.slip.wa.gov.au/landgate/bushfireprone/.

Standards Australia 2018, AS 3959:2018 Construction of buildings in bushfire-prone areas, Sydney.

Western Australian Local Government Association and Perth Biodiversity Project (WALGA and PBP) 2004, Local Government Biodiversity Planning Guidelines for the Perth Metropolitan Region, Perth.

W. A. P. Commission (WAPC) 2008a, Acid Sulfate Soils Planning Guidelines, Perth.

Western Australian Planning Commission (WAPC) 2008b, Better Urban Water Management Perth.

Western Australian Planning Commission (WAPC) 2008c, Better Urban Water Management Framework.

Western Australian Planning Commission (WAPC) 2013, State Planning Policy No. 2.6 State Coastal Planning Policy Perth.

Western Australian Planning Commission (WAPC) 2015a, State Planning Policy 3.7 Planning in Bushfire Prone Areas, Perth.

Western Australian Planning Commission (WAPC) 2015b, Structure Plan Framework, Planning and Development (Local Planning Schemes) Regulations 2015.

Western Australian Planning Commission (WAPC) 2019a, Road and Rail Noise Guidelines.

Western Australian Planning Commission (WAPC) 2019b, State Planning Policy 5.4 Road and Rail Noise, Perth, Western Australia.

Western Australian Planning Commission and Department of Planning, Lands and Heritage (WAPC and DPLH) 2021, Model Subdivision Conditions Schedule.

Water Authority of Western Australia (WAWA) 1987, Busselton Regional Flood Study - Water Resources Directorate Report No WS4.

8.2 Online references

The online resources that have been utilised in the preparation of this report are referenced in **Section 8.1**, with access date information provided in **Table R1**.

Table R 1: Access dates for online references

Reference	Date accessed	Website or dataset name
(BoM 2022)	21 July 2022	Summary Statistics Busselton Aero
(DPIRD 2022)	21 July 2022	Soil Landscape Mapping – Systems (DPIRD-064)
(DWER 2017a)	21 July 2022	Acid Sulfate Soil Risk Map, Swan Coastal Plain (DWER-055)
(DBCA 2021b)	21 July 2022	Vegetation Complexes Swan Coastal Plain (DBCA-046)
(DBCA 2021a)	27 February 2021	NatureMap
(DPIRD 2020)	21 July 2022	Native Vegetation Extent (DPIRD-005)
(Landgate 2022)	22 July 2022	Map Viewer Plus
(DCCEEW 2022)	05 August 2022	Protected Matters Search Tool
(DWER 2021)	22 July 2022	Clearing Regulations – Environmentally Sensitive Areas (DWER-046)
(DEC 2009)	22 July 2022	South West Regional Ecological Linkages Axis Lines
(DBCA 2022c)	22 July 2022	Legislated Lands and Waters (DBCA-011)
(DBCA 2022b)	22 July 2022	Lands of Interest (DBCA-012)
(DBCA 2022a)	22 July 2022	Geomorphic Wetlands, Swan Coastal Plain (DBCA-019)
(DWER 2022b)	22 July 2022	Public Drinking Water Source Areas (DWER-033)
(DWER 2022a)	22 July 2022	Contaminated Sites Database
(Department of Defence 2022)	22 July 2022	Unexploded Ordnance
(DPLH 2022)	22 July 2022	Aboriginal Heritage Inquiry System
(DWER 2022c)	22 July 2022	Water Register
(DBCA 2019c)	25 July 2022	Black Cockatoo Roosting Sites - Buffered (DBCA-064)
(DBCA 2019b)	25 July 2022	Black Cockatoo Breeding Sites - Buffered (DBCA-063)
(NGIS 2022)	01 August 2022	Coastal Risk Australia 2100

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Figures

Figure 1: Site Location and Topography

Figure 2: Soils and Geology

Figure 3: Acid Sulfate Soil Risk Mapping

Figure 4: Existing Hydrological Features

Figure 5: Aboriginal and Non-Indigenous Heritage Values

Figure 6: Bushfire Hazard Level

Figure 7: Key Management Considerations

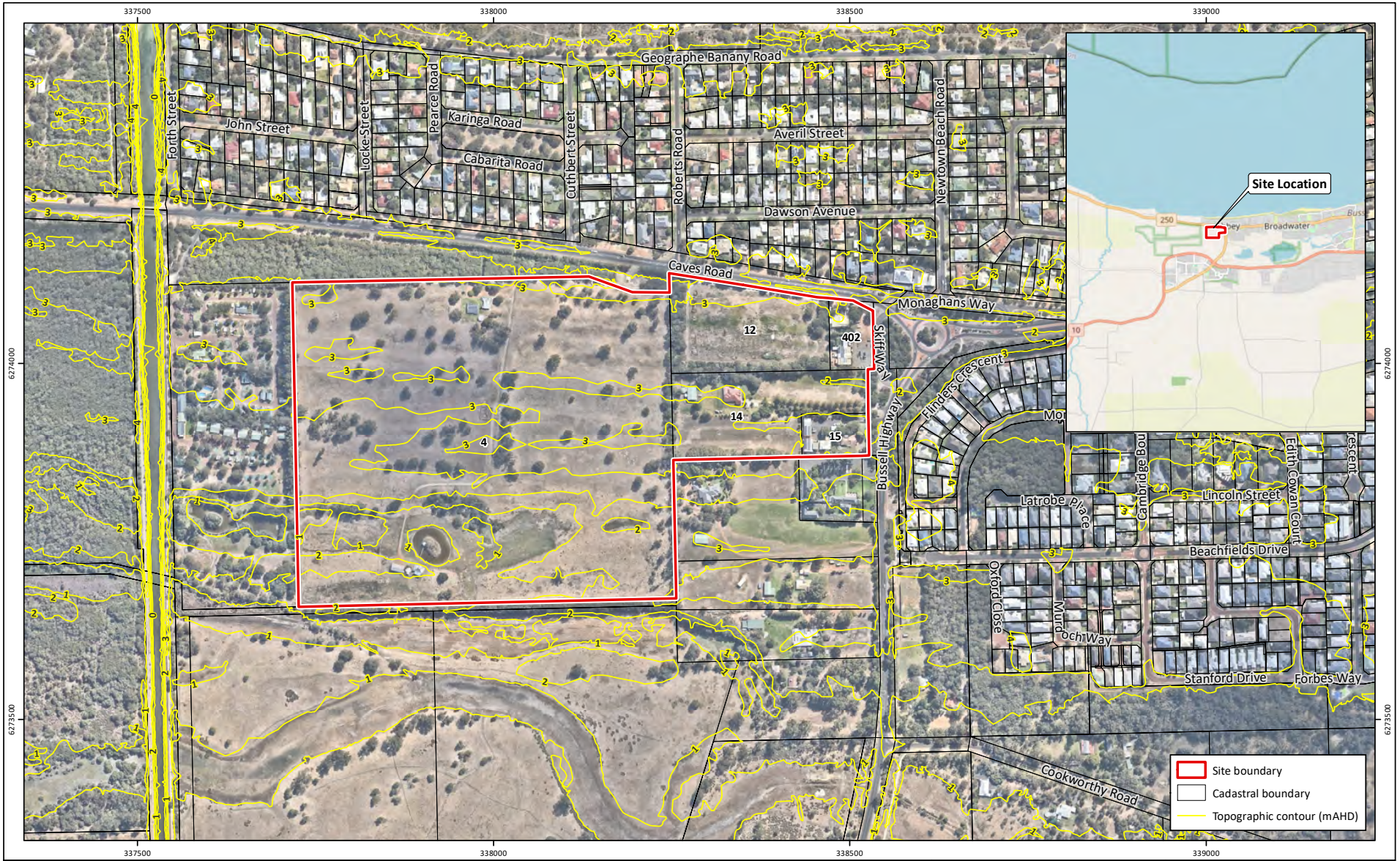

Figure 1: **Site Location and Topographic Contours**

Project: Environmental Assessment and Management Strategy
Abbey South Structure Plan Area
Client: Various Landowners

Plan Number:
EP20-141(04)--F43
Drawn: GAR
Date: 25/07/2022
Checked: SJB
Approved: KK
Date: 05/08/2022

N

0 100 200 300
Metres
Scale: 1:7,000@A4
GDA 1994 MGA Zone 50

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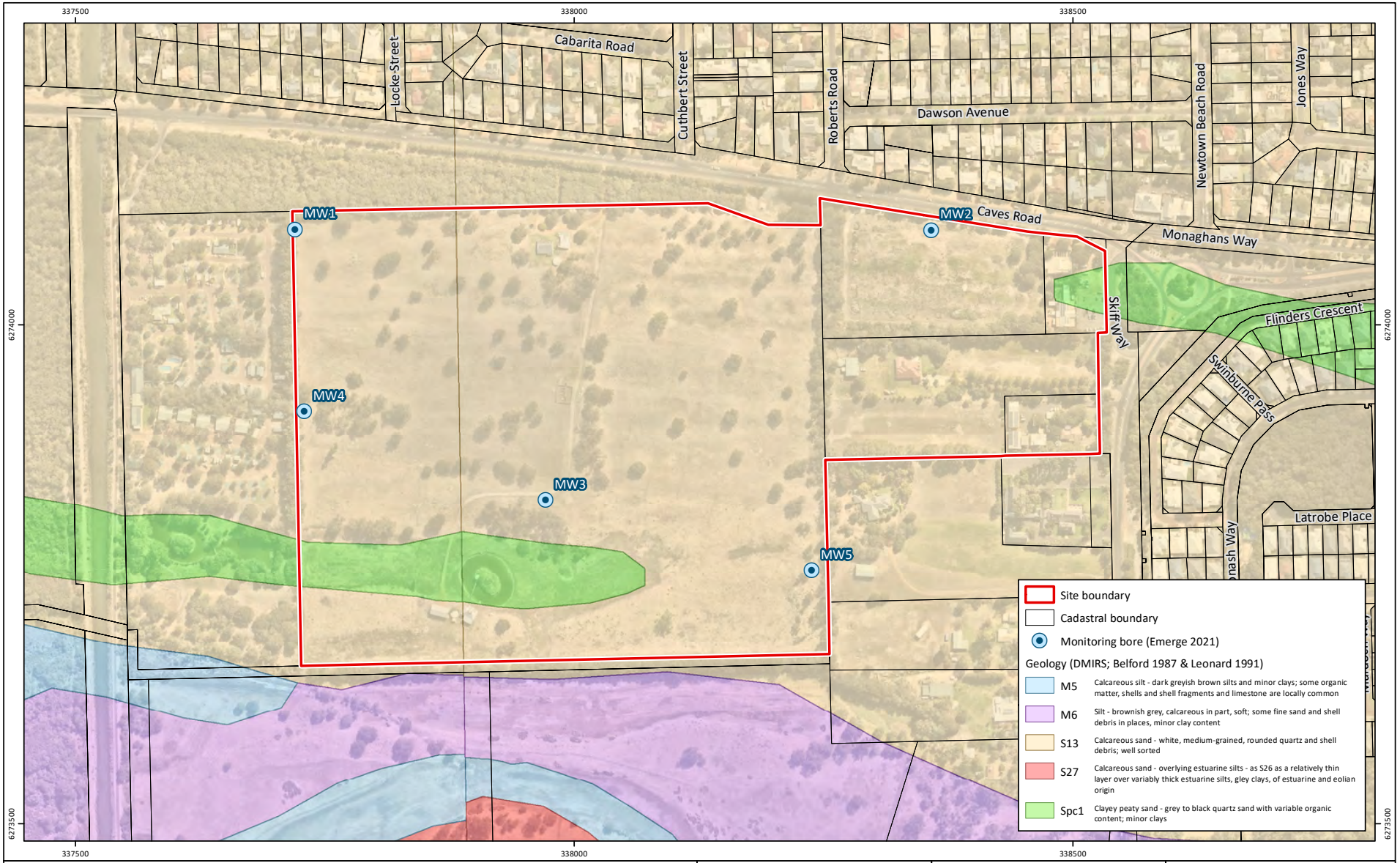

Figure 2: Soils and Geology

Project: Environmental Assessment and Management Strategy
Abbey South Structure Plan Area
Client: Various Landowners

Plan Number:
EP20-141(04)--F45
Drawn: GAR
Date: 25/07/2022
Checked: SJB
Approved: KK
Date: 05/08/2022

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Metres
Scale: 1:5,000@A4
GDA 1994 MGA Zone 50

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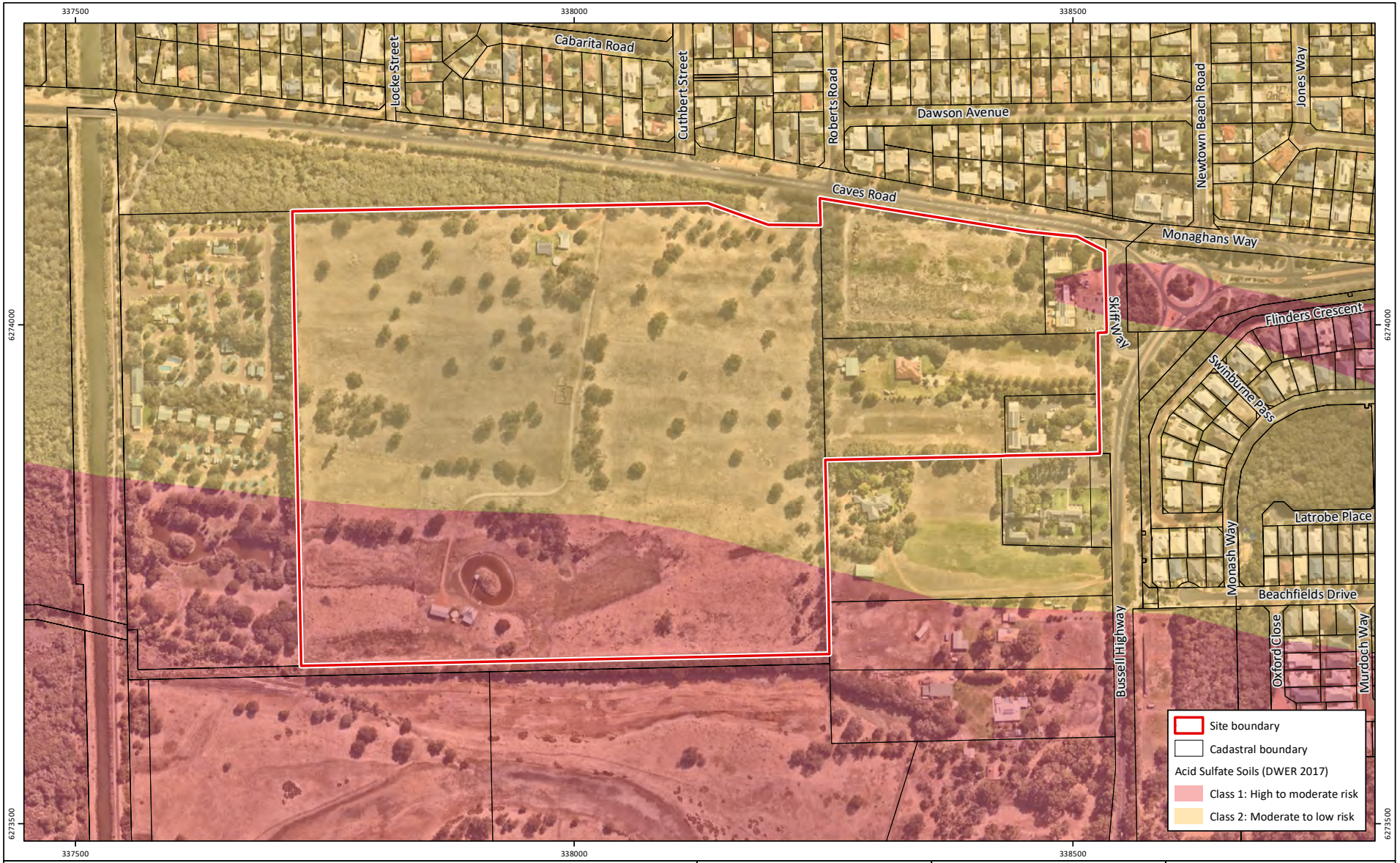

Figure 3: Acid Sulfate Soil Risk Mapping

Project: Environmental Assessment and Management Strategy
Abbey South Structure Plan Area
Client: Various Landowners

Plan Number:
EP20-141(04)--F46
Drawn: GAR
Date: 25/07/2022
Checked: SJB
Approved: KK
Date: 05/08/2022

N

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Metres
Scale: 1:5,000@A4
GDA 1994 MGA Zone 50

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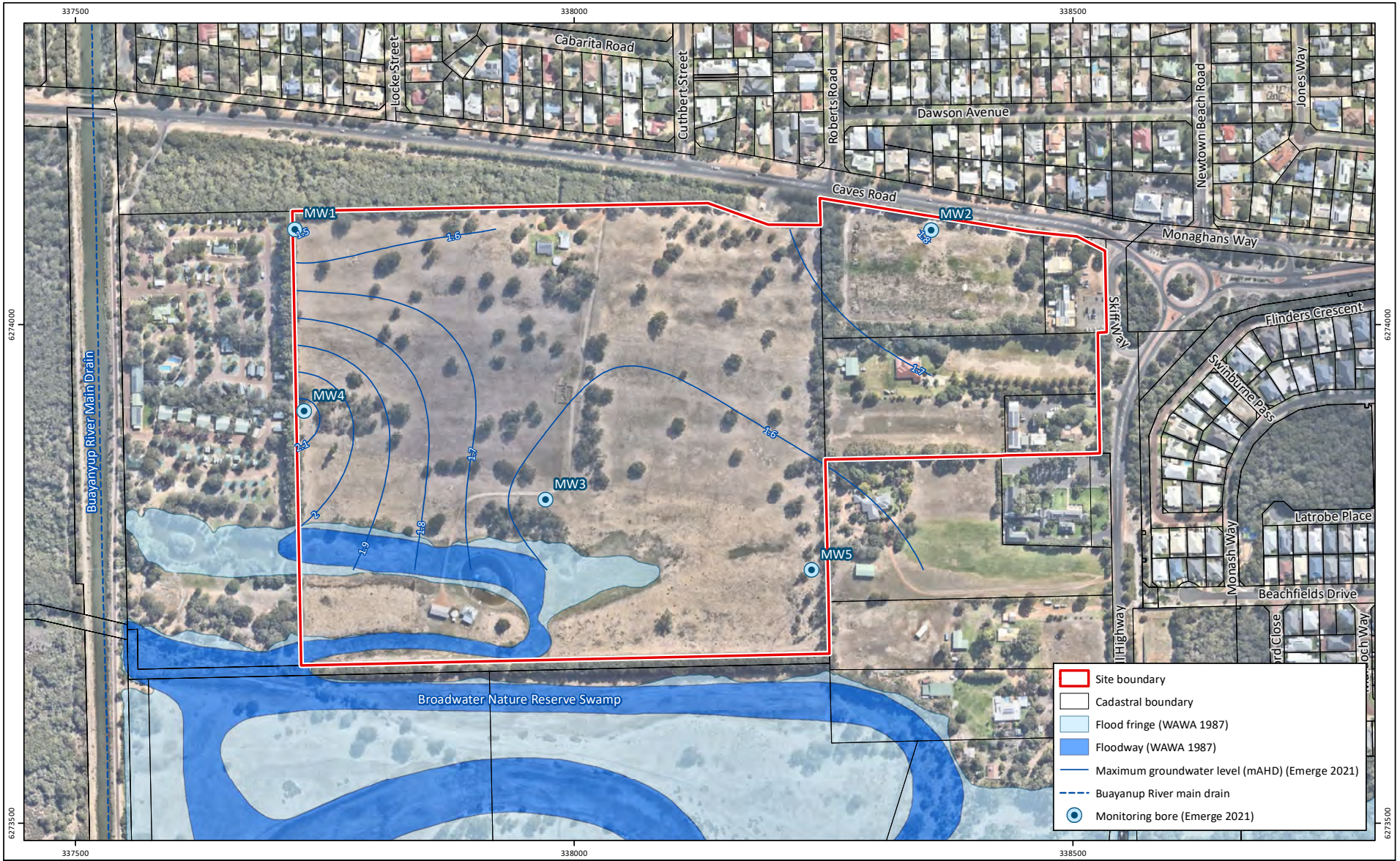

Figure 4: Existing Hydrological Features

Project: Environmental Assessment and Management Strategy
Abbey South Structure Plan Area
Client: Various Landowners

Plan Number:
EP20-141(04)--F49
Drawn: GAR
Date: 25/07/2022
Checked: SJB
Approved: KK
Date: 05/08/2022

N

0 100 200
Metres
Scale: 1:5,000@A4
GDA 1994 MGA Zone 50

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Figure 5: Aboriginal and Non-Indigenous Heritage Values

Project: Environmental Assessment and Management Strategy
Abbey South Structure Plan Area
Client: Various Landowners

Plan Number:
EP20-141(04)--F51
Drawn: GAR
Date: 25/07/2022
Checked: SJB
Approved: KK
Date: 05/08/2022

N

0 100 200
Metres
Scale: 1:5,000@A4
GDA 1994 MGA Zone 50

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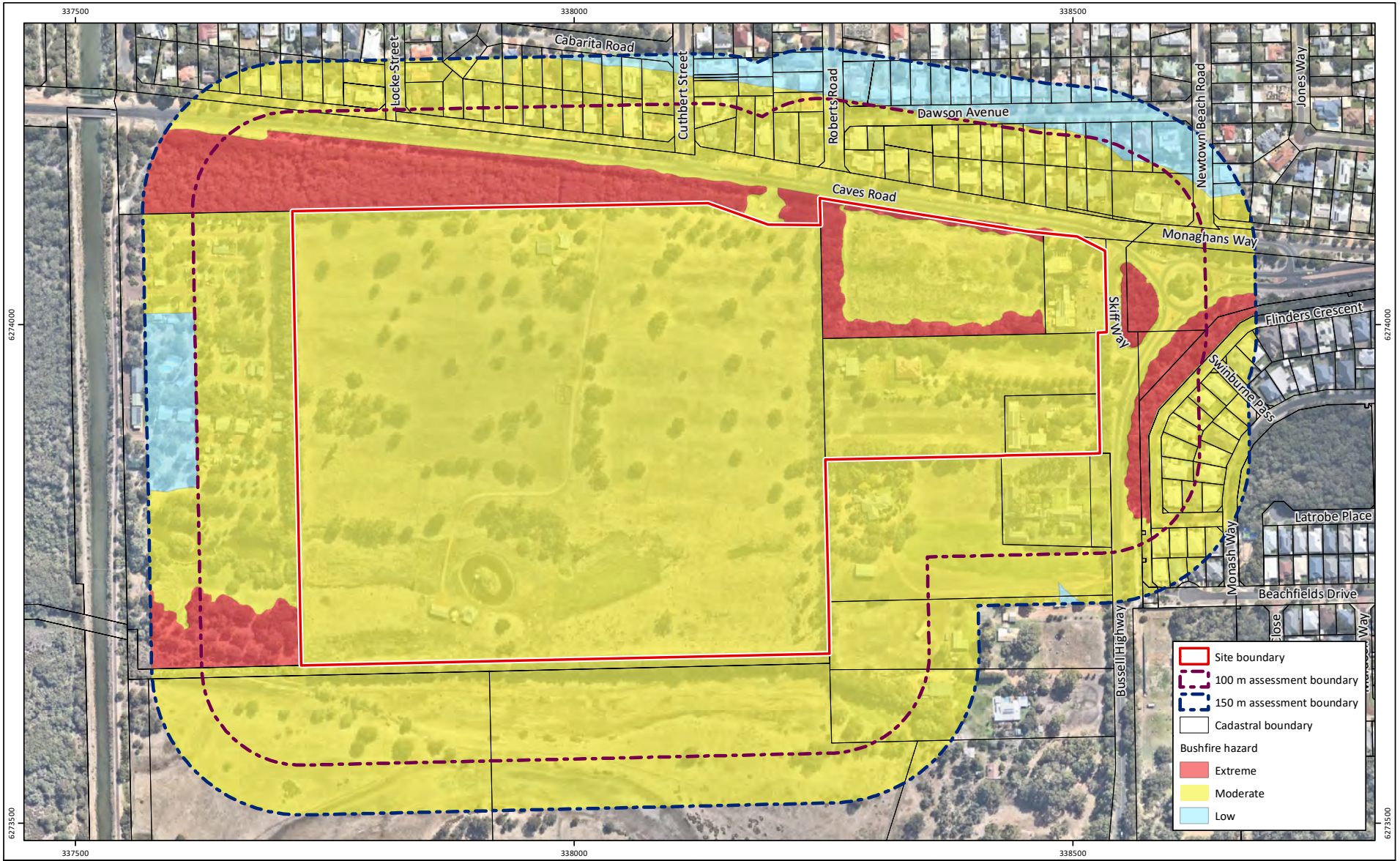

Figure 6: Bushfire Hazard Level

Project: Environmental Assessment and Management Strategy
Abbey South Structure Plan Area
Client: Various Landowners

Plan Number:
EP20-141(04)--F53
Drawn: GAR
Date: 25/07/2022
Checked: SJB
Approved: KK
Date: 05/08/2022

N

0 100 200
Metres
Scale: 1:5,000@A4
GDA 1994 MGA Zone 50

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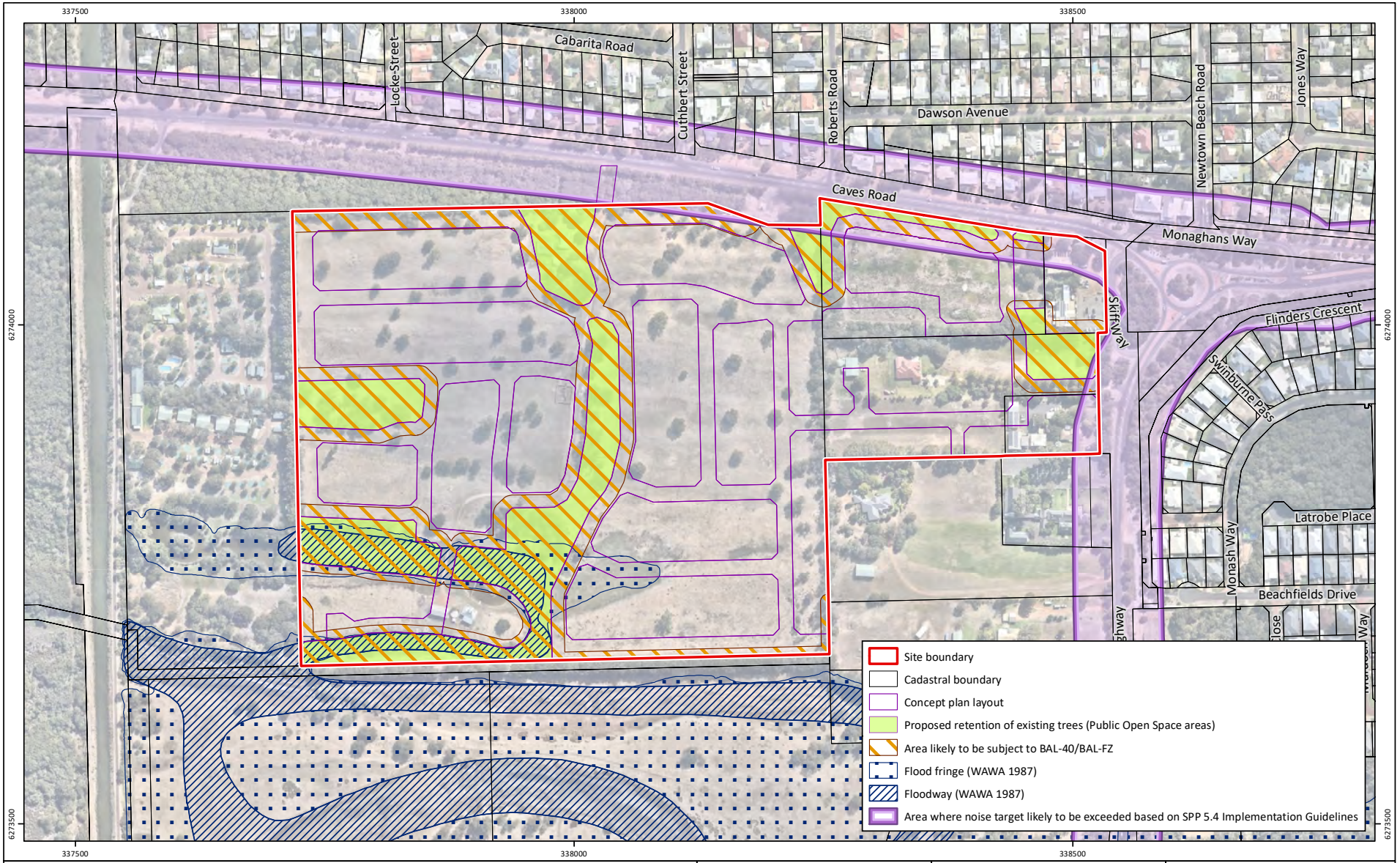

Figure 7: Key Management Considerations

Project: Environmental Assessment and Management Strategy
Abbey South Structure Plan Area
Client: Various Landowners

Plan Number:
EP20-141(04)--F55b
Drawn: GAR
Date: 07/12/2022
Checked: KK
Approved: KK
Date: 13/12/2022

N

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Metres
Scale: 1:5,000@A4
GDA 1994 MGA Zone 50

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Appendix A

Structure Plan and Concept Plan (Rise Urban 2022)



0 25 50 75 100 125m

DRAFT

LOCAL STRUCTURE PLAN

LOTS 4 & 12 CAVES ROAD & LOTS 14, 15 & 402 BUSSELL HIGHWAY, ABBEY.

NOTE:

Base Data supplied by Landgate / Denada Surveys
Aerial Photo - Feb 2019
Projection - BCG94
Areas and dimensions shown are subject to final survey calculations.

Revision	Date	Item
A	29/6/22	Initial Issue

LEGEND

- STRUCTURE PLAN BOUNDARY
- RESIDENTIAL R10
- RESIDENTIAL R20 - R40
- RESIDENTIAL R60
- RECREATION RESERVE
- LOCAL CENTRE (R60)
- FLOODWAY
- PERIMETER ROAD
- ACCESS STREET B
- HIGHER ORDER CYCLE PATH
- ACCESS STREET D (INDICATIVE ONLY)
- FUTURE PEDESTRIAN / CYCLE CONNECTION TO BUAYANYUP DRAIN CYCLE PATH
- EMERGENCY SECONDARY EGRESS
- POS NUMBER
- ROUNDABOUT
- FULL MOVEMENT INTERSECTION
- LEFT IN / LEFT OUT INTERSECTION

-	:	CLIENT
A3@1:2,500	:	SCALE
15 December 2022	:	DATE
IA Abbey-2-001	:	PLAN No
B	:	REVISION
C.L.	:	PLANNER
B.L	:	DRAWN

Rise Urban
AGILE PLANNING FOR THE NEW NORMAL

ABBEY PLANNING INVESTIGATION AREA

CONCEPT LAYOUT PLAN 5 DECEMBER 2022



Appendix B

List of conservation significant flora and fauna

Table B1: Threatened and priority flora potentially occurring within 5 km of the site based on relevant database searches

Threatened and priority flora species based on database searches	Conservation status		Habitat Likely to be present within the site
	Federal	State	
Acacia flagelliformis	-	Priority 4	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.
Acacia semitrullata	-	Priority 4	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.
Banksia nivea subsp. uliginosa (Swamp Honeypot)	Endangered	Threatened	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.
Banksia squarrosa subsp. argillacea (Whicher Range Dryandra)	Vulnerable	Threatened	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.
Banksia sessilis	-	Priority 4	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.
Boronia captata subsp. Gracili	-	Priority 3	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.
Brachyscias verecundus (Ironstone Brachyscias)	Critically endangered	Critically endangered	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.
Caladenia busselliana	Critically Endangered	Endangered	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.
Caladenia huegelii	Endangered	Threatened	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.
Caladenia procera (Carbunup King Spider Orchid)	Critically Endangered	Threatened	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.
Caladenia viridescens	Endangered	Threatened	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.
Chamelaucium sp. S coastal plain (R.D.Royce 4872)	Vulnerable	Threatened	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.
Cyathochaeta teretifolia	-	Priority 3	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.

Table B1: Threatened and priority flora potentially occurring within 5 km of the site based on relevant database searches (continued)

Threatened and priority flora species based on database searches	Conservation status		Habitat Likely to be present within the site
	Federal	State	
Daviesia elongata subsp. elongata	Vulnerable	-	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.
Diuris micrantha	Vulnerable	Threatened	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.
Drakaea elastica	Endangered	Threatened	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.
Drakaea micrantha (Dwarf Hammer-orchid)	Vulnerable	Threatened	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.
Gastrolobium papilio (Butterfly-leaved Gastrolobium)	Endangered	Threatened	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.
Grevillea brachystylis subsp. Grandis (Large-flowered Short-styled Grevillea)	Critically endangered	Threatened	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.
Grevillea elongata	Vulnerable	Threatened	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.
Johnsonia inconspicua	-	Priority 3	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.
Lambertia echinata subsp. occidentalis (Western Prickly Honeysuckle)	Endangered	Threatened	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.
Lepyrodia heleocharoides	-	Priority 3	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.
Petrophile latericola	Endangered	Threatened	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.
Pimelea ciliata subsp. longituba	-	Priority 3	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.
Pultenaea pinifolia	-	Priority 3	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.

Table B1: Threatened and priority flora potentially occurring within 5 km of the site based on relevant database searches (continued)

Threatened and priority flora species based on database searches	Conservation status		Habitat Likely to be present within the site
	Federal	State	
Synaphea sp. Fairbridge Farm (D. Papenfus 696)	Critically endangered	Threatened	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.
Tetraria australiensis	Vulnerable	Threatened	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.
Thysanotus glaucus	-	Priority 4	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.
Verticordia densiflora var. pedunculata	Endangered	Threatened	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.
Verticordia lehmannii	-	Priority 4	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.
Verticordia plumosa var. ananeotes	Endangered	Threatened	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.
Verticordia plumosa var. vassensis	Endangered	Threatened	Unlikely, area is grazed and free of vegetation apart from scattered paddock trees.

Table B2: Threatened and priority fauna occurring within 10 km of the site based on relevant database searches.

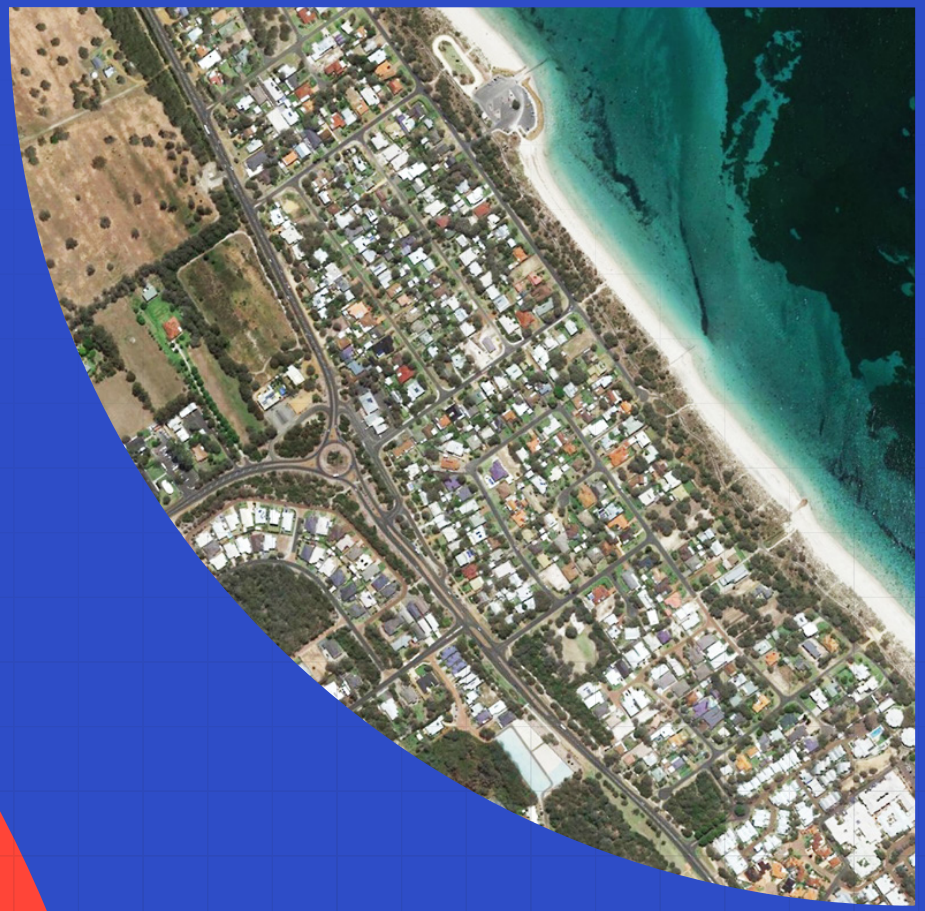
Species		Conservation status		Habitat likely to be present within the site
Common name	Scientific name	State	Federal	
Birds				
Amsterdam albatross	*Diomedea amsterdamensis*		Endangered	No
Australasian bittern	*Botaurus poiciloptilus*	Endangered	Endangered	Possible. May opportunistically fly over the site in search of prey.
Australian fairy tern	*Sternula nereis nereis*	Vulnerable	Vulnerable and migratory	Unlikely. May opportunistically fly over the site in search of prey.
Australian lesser noddy	*Anous tenuirostris*	Endangered	Vulnerable	Unlikely. May opportunistically fly over the site in search of prey.
Baudin's cockatoo	*Zanda baudinii*	Endangered	Endangered	Possible. *Agonis flexuosa* is low quality foraging habitat, and site unlikely to provide roosting or breeding habitat.
Black-browed albatross	*Thalassarche melanophris*	Vulnerable	Vulnerable and migratory	No
Blue petrel	*Halobaena caerulea*		Vulnerable	No
Cambell albatross	*Thalassarche impavida*	Vulnerable	Vulnerable and mirgratory	No
Carnaby's cockatoo	*Zanda latirostris*	Endangered	Endangered	Possible. *Agonis flexuosa* is low quality foraging habitat, and site unlikely to provide roosting or breeding habitat.
Curlew sandpiper	*Calidris ferruginea*	Critically endangered	Critically endangered and migratory	No
Eastern curlew	*Numenius madagascariensis*	Critically endangered	Critically endangered and migratory	No
Fairy prion (southern)	*Pachyptila turtur*	-	Vulnerable	No
Forest red-tailed black cockatoo	*Calyptorhynchus banksii naso*	Vulnerable	Vulnerable and migratory	Possible. *Agonis flexuosa* is low quality foraging habitat, and site unlikely to provide roosting or breeding habitat.
Greater sand plover	*Charadrius leschenaultia*	-	Vulnerable and migratory	No
Grey falcon	*Falco hypoleucos*	-	Vulnerable	No
Indian yellow-nose albatross	*Thalassarche carteri*	-	Vulnerable and Migratory	No
Lesser sand plover	*Charadrius mongolus*		Endangered and migratory	No

Table B2: Threatened and priority fauna occurring within 10 km of the site based on relevant database searches. (continued)

Species		Conservation status		Habitat likely to be present within the site
Common name	Scientific name	State	Federal	
Birds (continued)				
Night parrot	*Pezoporus occidentalis*	Critically Endangered	Endangered	No
Northern giant petrel	*Macronectes halli*		Vulnerable and Migratory	No
Northern royal albatross	*Diomedea sanfordi*		Endangered and migratory	No
Northern siberian bar-tailed godwit	*Limosa lapponica menzbieri*	Critically Endangered and Migratory	Critically Endangered	No
Pacific swift	*Apus pacificus*	Migratory		Unlikely. May opportunistically fly over the site in search of prey.
Peregrine falcon	*Falco peregrinus*	Other specially protected species		Unlikely. May opportunistically fly over the site in search of prey.
Red knot	*Calidris canutus*	Endangered	Endangered and migratory	No
Shy albatross	*Thalassarche cauta*	Vulnerable	Endangered and migratory	No
Soft-plumaged petrel	*Pterodroma mollis*		Vulnerable	No
Sooty albatross	*Phoebetria fusca*		Vulnerable and migratory	No
Southern giant-petrel	*Macronectes giganteus*		Endangered and migratory	No
Southern royal albatross	*Diomedea epomophora*	Vulnerable	Vulnerable and migratory	No
Tristan albatross	*Diomedea dabbenena*	Critically Endangered	Endangered and migratory	No
Wandering albatross	*Calidris ruficollis*	Vulnerable	Vulnerable and migratory	No
White-capped albatross	*Haliaeetus leucogaster*	Vulnerable	Vulnerable and migratory	No
Mammals				
Australian sea-lion	*Neophoca cinerea*	-	Endangered	No
Blue whale	*Balaenoptera musculus*	-	Endangered	No
Chudtich	*Dasyurus geoffroii*	Vulnerable	Vulnerable	Marginal, prefers larger intact areas of native vegetation.

Table B2: Threatened and priority fauna occurring within 10 km of the site based on relevant database searches. (continued)

Species		Conservation status		Habitat likely to be present within the site
Common name	Scientific name	State	Federal	
Mammals (continued)				
Quenda	*Isodon fusciventer*	Priority 4		Unlikely, as there is no lower dense vegetation on site.
Southern right whale	*Eubalaena australis*		Endangered	No
South-western brush-tailed phascogale	*Phascogale tapoatafa wambenger*	Critically endangered		Unlikely, tree hollows suitable for habitat does not exist on site.
Western false pipistelle	*Falsisrellus mackenziei*	Priority 4		Unlikely, hollow logs suitable for habitat does not exist on site.
Western ringtail possum	*Pseudocheirus occidentalis*	Critically endangered	Critically endangered	Marginal, associated with remnant paddock trees which is not likely to be critical habitat due to lack of canopy connection.
Fish				
Southern bluefin tuna	*Thunnus maccoyii*	Vulnerable	Conservation Dependent	No
Balston's pygmy perch	*Nannatherina balstoni*		Vulnerable	Unlikely, floodway is ephemeral.
Eastern school shark	*Galeorhinus galeus*		Conservation Dependent	No
Scalloped hammerhead	*Sphyrna lewini*		Conservation Dependent	No
Whale shark	*Rhincodon typus*		Vulnerable	No
Great white shark	*Carcharondon carcharias*		Vulnerable	No
Freshwater sawfish	*Pristis pristis*		Vulnerable	No
Grey nurse shark	*Carcharias taurus*		Vulnerable	No
Reptile				
Loggerhead Turtle	*Caretta caretta*		Endangered	Unlikely, floodway is ephemeral.
Leatherback Turtle	*Dermochelys coriacea*		Endangered	Unlikely, floodway is ephemeral.
Flatback Turtle	*Natator depressus*		Vulnerable	Unlikely, floodway is ephemeral.
Green Turtle	*Chelonia mydas*		Vulnerable	Unlikely, floodway is ephemeral.
Invertebrate/other				
Carters freshwater mussel	*Westralunio carteri*	Vulnerable	Vulnerable	Unlikely, floodway is ephemeral.
Dunsborough Burrowing Crayfish	*Engaewa reducta*		Critically Endangered	Unlikely, floodway is ephemeral.



Appendix 2

Local Water Management Strategy – Emerge Associates

Rise Urban

AGILE PLANNING FOR THE NEW NORMAL

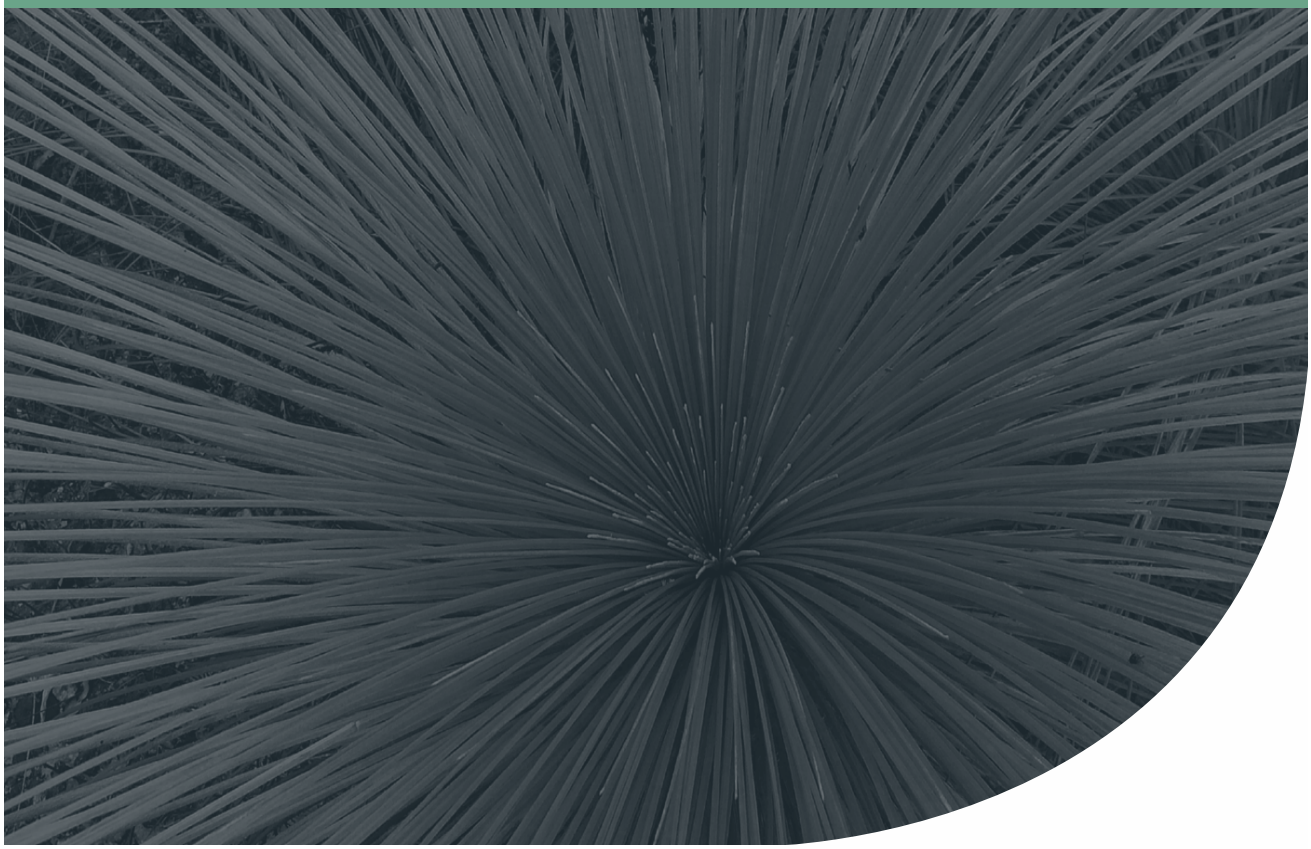
emerge ASSOCIATES
Integrated Science & Design

Local Water Management Strategy

Abbey South Structure Plan Area

Project No: EP20-141(03)

Prepared for the Abbey Landowners Group
December 2022



Document Control

Doc name:	Local Water Management Strategy Lots 4 & 12 Caves Road, Abbey				
Doc no.:	EP20-141(03)—009B AJI				
Version	**Date**	**Author**		**Reviewer**	
1	July 2022	April Irwin	AJI	Dave Coremans	DPC
	Send for review to client				
A	August 2022	April Irwin	AJI	Dave Coremans	DPC
	For agency submission				
B	December 2022	April Irwin	AJI	Dave Coremans	DPC
	For agency submission				

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Executive Summary

The Landowner Group (the proponent) is progressing with a residential development of Lot 4 & Lot 12 Caves Road & Lots 14, 15 & 402 Bussell Highway, Abbey (herein referred to as 'the site').

The site is approximately 30.5ha in size and is located within the City of Busselton. It is bounded by Caves Road to the north, Bussell Highway to the east, an RAC holiday park to the west and existing agricultural areas to the south. The location of the site is shown in **Figure 1**.

Emerge Associates (Emerge) have been engaged by the proponent to prepare a local water management strategy (LWMS) for the development that meets the requirements of *Better Urban Water Management* (WAPC 2008), and expectations of the relevant State and Local agencies including Department of Water and Environmental Management (DWER) and the City of Busselton.

In summary, environmental investigations undertaken across the site indicate that:

- Historically the site has been used for general agricultural purposes (i.e. cattle grazing) and in minor part for commercial operations (i.e. icecream factory and fresh food market).
- The majority of the site has now been cleared leaving small pockets of native vegetation remaining.
- The mean annual rainfall is 807 mm, with the heaviest rainfall months occurring between May and August.
- Topography of the site ranges from 2 m AHD within the southern portion of the site to 3 mAHD in the northern and south-eastern portion of the site, with the exception of a depression within the southern portion of the site, which has elevations of approximately 1 mAHD.
- The site is split between two soil type systems; the northern/upper part of the site is within the Quindalup South System, whilst the southern/lower portion of the site is mapped as occurring within the Vasse System.
- The installation of monitoring bores across the site described the subsurface conditions beneath the site as mostly sand to depths up to 5 mBGL to 7 mBGL. The presence of clay starts to become more prominent in the deeper soil profile closer to BNRS. Sandy clay was found extending to depths between 3 mBGL to 4 mBGL, further overlying clay and rock extending to depths of approximately 5 mBGL.
- The northern two-thirds of the site is mapped as having a 'moderate to low' risk of ASS occurring within 3 m of the natural soil surface, whist the southern third of the site (which approximately aligns with areas identified as a wetland feature) is mapped as a 'high to moderate' risk of ASS occurring within 3 m of the natural soil surface.
- The site is located within a sewerage sensitive area (feature type '*E*' and '*F*') due to being within 2 km of coastal embankments and within 1 km of significant wetlands, respectively.
- The remaining native vegetation onsite includes individual paddock trees, predominantly *Agonis flexuosa* (peppermint), *Eucalyptus rudis* in lower lying areas or planted eucalypts.
- Four MUWs have been identified within the site.
- A floodway and flood fringe area is located within the lower south-western portion of the site, which is connected to the BNRS, located approximately 100 m south of the site.
- Flood mapping of the BNRS indicates that the 1% AEP flood elevation at the southern end of the site is 1.65m AHD.

- According to coastal risk inundation mapping, the floodway and flood fringe within the site are predicted to undergo further inundation of 0.84 m under the highest tide in 2100, resulting in a future flood elevation of up to 2.49 mAHD.
- Results from the pre-development surface runoff modelling of the site indicate that the 1% AEP peak flow rate leaving the site along the southern boundary is 1.1 m^3/s, and that the total volume discharging from the site in this same event is 0.5 m^3/s.
- The annual winter peak groundwater level was recorded between August 2021 to November 2022 and ranged between 1.19 mBGL to 1.54 mBGL. The MGL beneath the site therefore ranges from 2.1 mAHD along the eastern boundary to 1.5 mAHD in the southeastern corner of the site.
- Analysis of groundwater quality samples collected in August 2021 and September 2022 found that TP ranged between 0.04 mg/L to 0.64 mg/L and TN ranged between 0.7 mg/L to 3.2 mg/L. It is noted that the nutrient concentrations recorded are not inconsistent with what would be expected for historical agricultural land in the region.

Water supply and conservation

There is no confirmed water supply to irrigate the site currently confirmed, however investigations are being undertaken to source a sustainable water supply. The site will implement best practise water conservation measures (e.g. water efficient fixtures, use of water sensitive urban design (WSUD) measures, and planting of water wise species) to reduce water demand. Non-potable water can potentially be provided by rainwater tanks if installed by lot owner. The key approach for POS will be to retain as many trees as possible, to minimise water use and provide amenity. The surrounding POS areas will be either unirrigated or temporarily supplied (e.g. by watercart) during an establishment period; no ongoing permanent irrigation of POS areas is proposed, unless an alternative water supply can be secured.

Stormwater Management

All residential lots will retain stormwater runoff up to the major (1% AEP) rainfall event. This is possible given the permeable soils and large lot sizes (500-600m2), where infiltration will occur within soakwells and previous lot areas, which will also serve to treat the first 15 mm. Runoff from road reserves and POS areas will be treated as close to source as possible using either vegetated roadside swales or a vegetated bio retention area (BRA) where treatment will occur via contact with vegetation and the underlying soil profile. The majority of catchments will either have a POS area that will contain a BRA and a flood storage area (FSA) and catchments with no POS will contain a vegetated swale that will be designed to treat the first 15 mm and retain/detain runoff up to the 1% AEP event. This approach will ensure that the 1% AEP pre-development peak discharge rate and volume is not exceeded and hydraulic connectivity to the adjacent Broadwater Nature Reserve Swamp (BNRS) is maintained.

Groundwater Management

Groundwater management will include adequate clearance between inverts of storage infrastructure and maximum groundwater levels to facilitate infiltration and mitigate risk against potential future sea level rising influencing groundwater levels. Adopting a minimum finished floor level of 3.00 mAHD accommodates for adaptive development planning required by the City under the *Coastal*

hazard Risk Management and Adaptation Plan (CoB 2021). Groundwater quality will be improved with a change in landuse and the use of WSUD measures.

The LWMS demonstrates that the concepts described above can be achieved by the spatial layout of the Structure Plan. It also provides guidance for future development/design stages to ensure that the water management criteria proposed can be achieved, and to ensure that an integrated water cycle management and best practice WSUD approach can be achieved by the implementation of the Structure Plan.

The design criteria and the manner in which the detailed designs achieve compliance with the design criteria are provided in **Table E 1**.

Table E1: Water management criteria and compliance

Management Element	Criteria Number	Criteria Description	Manner in which compliance has been achieved	Responsibility for implementation	When implemented
Water Conservation	WC1	Utilise fit-for-purpose water sources throughout the development.	Residential lots will be connected to the local reticulated potable water supply network	Proponent	Detailed drainage design and implementation
			Installation of water efficient fittings and appliances within residential lots.	Lot owner	At point of sale
			Rainwater tanks may be implemented by lot owners	Lot owner	Following house construction
			Adoption of waterwise gardening practices by lot owners.	Lot owner	At point of sale
			Adoption of native waterwise species adapted to seasonal changes	Proponent	Landscape design and implementation
			Education regarding water conservation provided to lot purchasers	Proponent	At point of sale
	WC2	POS will be irrigated at no more than 7,500 kL/ha/year	During the temporary period of vegetation establishment, WWG measures will be implemented to ensure that no more than 7,500kL/ha/year is used for irrigation.	Proponent	Landscape design and implementation
Stormwater Management	SW1	Manage runoff from the small rainfall event (i.e. first 15 mm) within the site at source or as close as practicably possible.	Lots will retain the first 15 mm of rainfall within pervious garden areas.	Lot owner	Building approval
			Runoff from the road reserve and POS will be retained and treated within vegetated BRAs and swales. Treatment will occur via vegetation and the underlying soil profile which will adsorb nutrients and pollutants prior to reaching groundwater.	Proponent	Detailed drainage and landscape design and implementation

Table E1: Water management criteria and compliance

Management Element	Criteria Number	Criteria Description	Manner in which compliance has been achieved	Responsibility for implementation	When implemented
Stormwater Management	SW2	Ensure the major rainfall event (1% AEP) peak flow rates and volumes do not exceed the pre-development environment.	The major storm (1% AEP) event will be retained within lots and infiltrate onsite and runoff from road reserves and POS will be retained in FSAs and swales. Part of the runoff generated across the site will be conveyed and discharged offsite along the southern boundary to ensure pre-development hydrology is not exceeded.	Proponent	Detailed drainage design and implementation
			The pre-development peak flow rate and volume exiting the site is 1.1 m^3/s and 3,082 m^2 has not been exceeded, and post-development modelling shows the peak flow rate and volume is 0.5 m^3/s and 2,622 m^3, respectively.	Proponent	Detailed drainage design and implementation
	SW3	Finished floor levels must be minimum of 2.7 mAHD (to meet coastal process requirements) and at least 500 mm above the adjacent 1% AEP flood level	In accordance with the 'Coastal Hazard Risk Management and Adaption Plan' (CoB 2021), all dwellings will achieve a FFL of 2.7 mAHD or at least 500 mm above the 1% AEP flood level, as shown in **Table 6.**	Proponent	Detailed earthworks and drainage design and implementation
	SW4	Finished floor levels must have at least 500 mm clearance above the major event top water levels (TWLs) in onsite retention and detention structures.	All residential lots adjacent to retention and detention structures will provide a minimum of 500 mm clearance from the TWL. As shown in **Table 6**, the minimum clearance achieves this criteria. Future civil designs to support UWMPs will confirm that lots will have sufficient clearance (> 500 mm) to major event TWLs within BRAs, FSAs and swales.	Proponent	Detailed earthworks and drainage design and implementation
	SW5	Reduce nutrient loads by applying appropriate non-structural measures.	Construction stage measures (e.g. silt fences, other temporary measures).	Proponent	Detailed earthworks, drainage and landscape design/implementation
			Landscaping will adopt waterwise planting practices that will reduce the amount of fertiliser required.	Maintenance contractor/Lot owner	Landscape implementation

Table E1: Water management criteria and compliance

Management Element	Criteria Number	Criteria Description	Manner in which compliance has been achieved	Responsibility for implementation	When implemented
Stormwater Management	SW5	Reduce nutrient loads by applying appropriate non-structural measures.	Education of lot owners regarding fertiliser use and waterwise gardening practices.	Proponent	Point of sale
			Street sweeping will occur to prevent sediments entering swales and the FSA.	Proponent then the City after handover	Post construction
			BRAs and swales will be vegetated and underlain by a 300 mm to 500 mm layer of soil suitable for nutrient removal.	Proponent	Landscape design and implementation
			Maintenance of nutrient stripping vegetation and removal of sediments within BRAs and swales.	Proponent	Landscape design and implementation
			Maintenance of POS, BRAs, swales and FSAs	Maintenance contractor	Two years following construction
Groundwater	GW1	The invert level of drainage basins must have a minimum of 300 mm clearance above the maximum groundwater level.	Drainage basins will be designed to ensure the invert level provides a minimum of 300 mm clearance from the underlying MGL.	Proponent	Detailed earthworks and drainage design, and implementation
	GW2	Provide adequate consideration for the future sea level rise and the influence it will have on groundwater levels beneath the site.	The inverts of basins and swales have been designed to provide a 300 mm clearance from the MGL. This will provide adequate protection from potential sea level rises influencing the rise of groundwater levels. Where appropriate subsoils can be provided to facilitate the free drainage.	Proponent	Detailed earthworks and drainage design, and implementation
	GW3	Minimise the risk of nutrient enrichment to downstream surface water bodies from groundwater sources.	Change in landuse from agricultural to residential will reduce the total nutrient loads infiltrating into the underlying groundwater. Infiltration via BRAs and vegetated swales will also provide treatment via filtration and adsorption of pollutants/nutrients.	Proponent	Detailed earthworks, drainage and landscape design, and implementation

Table of Contents

1 Introduction 4

1.1 Background 4
1.2 Planning context 4
1.3 Purpose 4
1.4 Policy framework 4
1.5 Previous studies 5
1.5.1 Hydraulic Review and Breach Modelling of Buayanyup Drain 5
1.6 LWMS objectives 5

2 Proposed Development 7

3 Existing Environment 8

3.1 Sources of information 8
3.2 Historical and current land uses 8
3.3 Climate 8
3.4 Topography 8
3.5 Geotechnical conditions 9
3.5.1 Regional geology 9
3.5.2 Local geology and soils 9
3.5.3 Acid sulfate soils 9
3.6 Environmentally sensitive areas 9
3.7 Sewage sensitive areas 9
3.8 Flora and fauna 10
3.9 Surface water 10
3.9.1 Wetlands 10
3.9.2 Pre-development modelling 11
3.10 Groundwater 11
3.10.1 Groundwater resources 11
3.10.2 Groundwater levels 11
3.10.3 Groundwater quality 12
3.11 Climate change 13
3.12 Summary of existing environment 14

4 Design Criteria and Objectives 16

4.1 Integrated water cycle management 16
4.2 Water conservation 16
4.3 Stormwater management 17
4.4 Groundwater management 17

5 Water Conservation Strategy 18

5.1 Fit-for-purpose water use 18
5.1.1 Scheme water 18
5.1.2 Groundwater 18
5.1.3 Rainwater tanks 18
5.2 Water Conservation measures 18
5.2.1 Water efficient fixtures and appliances 18
5.2.2 Water wise gardens 19
5.3 Wastewater management 20
5.4 Water conservation criteria compliance summary 20

6 Stormwater Management Strategy 21

6.1 Lot drainage 21
6.2 Development drainage 21

6.2.1 Road drainage network 21
6.2.2 Vegetated swales 21
6.2.3 Bio-retention areas 22
6.2.4 Flood storage areas 23
6.2.5 Existing retained floodway 23
6.3 Stormwater management design 24
6.3.1 Small rainfall event 24
6.3.2 Flood storage 24
6.3.2.1 Imported fill 26
6.3.3 Maintaining pre-development peak flow rates 26
6.4 Non-structural stormwater management measures 27
6.5 Stormwater design criteria compliance 28

7 Groundwater Management 29

7.1 Groundwater level management 29
7.2 Groundwater quality management 30
7.3 Groundwater design criteria compliance 30

8 Subdivision and Urban Water Management Plans 31

8.1 Implementation of water conservation strategies 31
8.2 Modelling and configuration of drainage structures 31
8.3 Non-structural water quality improvement measures 32
8.4 Construction period management strategy 32
8.5 Management and maintenance requirements 32
8.6 Floodway management 32

9 Monitoring 33

9.1 Pre-development monitoring 33
9.2 Post-development monitoring 33
9.2.1 Condition monitoring 33
9.2.2 Groundwater monitoring 33
9.3 Post-development guideline values 34
9.4 Reporting 34

10 Implementation 35

10.1 Roles and responsibility 35
10.2 Funding 35
10.3 Review 35

11 References 36

11.1 General references 36
11.2 Online references 38

List of Tables

Table 1: Measured groundwater levels. 12
Table 2: Groundwater quality results 13
Table 3: Water conservation compliance summary 20
Table 4: Small event (first 15 mm) treatment requirements 24
Table 5: Stormwater flood storage requirements from the minor (20% AEP) and major (1% AEP) event. 25
Table 6: Summary of clearances between storage structure 1% AEP TWLs and the FFL of adjacent lots. 25
Table 7: Summary of surface runoff modelling for minor and major peak flow rates and volumes. 27
Table 8: Stormwater management compliance summary 28
Table 9: Summary of clearances between the MGL and invert of storage structures 29
Table 10: Groundwater management compliance summary 30
Table 11: Groundwater monitoring program summary 34
Table 12: Water quality monitoring trigger values. 34

List of Plates

Plate 1: Prediction inundation scenario – High (medium confidence) (NGIS 2022) 13

Figures

Figure 1: Site Locality
Figure 2: Topography
Figure 3: Soil Landscape Mapping
Figure 4: Acid Sulfate Soil Mapping
Figure 5: Sewage Sensitive Area
Figure 6: Existing Hydrological Features
Figure 7: Geomorphic Wetlands
Figure 8: Stormwater Management Plan
Figure 9: Inundation Plan: First 15 mm
Figure 10: Inundation Plan: 20% AEP event
Figure 11: Inundation Plan: 1% AEP event

Appendices

Appendix A

Local Structure Plan – Rise Urban

Appendix B

Modelling Assumptions Report – Emerge Associates

Appendix C

Educational material

Appendix D

Landscape Master Plan – Emerge Associates

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Abbreviation Tables

Table A1: Abbreviations – Organisations

Organisations	
ANZECC	Australian and New Zealand Environment and Conservation Council
BoM	Bureau of Meteorology
DoW	Department of Water (now DWER)
DPLH	Department of Planning, Land and Heritage
DWER	Department of Water and Environmental Regulation
WAPC	Western Australia Planning Commission

Table A2: Abbreviations – General terms

General terms	
ASS	Acid sulfate soil
BMD	Buayanyup Main drain
BMP	Best management practices
BRA	Bio retention area
BUWM	Better urban water management
BNRS	Broadwater Nature Reserve Swamp
CCW	Conservation category wetland
ESA	Environmentally sensitive area
FFL	Finished floor level
FSA	Flood storage area
LSP	Local structure plan
LWMS	Local water management strategy
NWQMS	National water quality management strategy
POS	Public open space
MUW	Multiple use wetland
UFI	Unique feature identifier
UWMP	Urban water management plan
WEFA	Water efficient fixtures and appliances
WSUD	Water sensitive urban design
WWG	Water wise gardens

Table A4: Abbreviations – units of measurement

Units of measurement	
AEP	Annual exceedance probability
ha	Hectare
kL	Kilolitres
m	Metre
m^2	Square metre
m^3	Cubic metre
m^3/s	Cubic metres per second
m AHD	m in relation to the Australian height datum
M BGL	m below ground level
mg/L	Milligrams per litre
mm	Millimetre

1 Introduction

1.1 Background

The Abbey Landowner Group (the proponent), coordinated by Rise Urban, is progressing development of Lot 4 & Lot 12 Caves Road & Lots 14, 15 & 402 Bussell Highway, Abbey (herein referred to as 'the site') for residential purposes. The site is approximately 30.5 ha in size and is located within the City of Busselton (CoB) and is shown in **Figure 1**. It is bounded by vegetation adjacent to Caves Road to the north, Bussell Highway to the east, an RAC holiday park to the west and existing agricultural areas/Broadwater Nature Reserve Swamp (BNRS) to the south.

The development will consist of residential lots, public open space (POS) areas and retained floodway associated with the BNRS. The proposed development is discussed further in **Section 2** and the local structure plan (LSP) is shown in **Appendix A**.

1.2 Planning context

Under the City's Local Planning Scheme No.21 (DPLH 2019), part of Lot 4 and Lot 12 Caves Rd and Lots 14, 15 & 402 Bussell Hwy, is zoned as 'rural'. The lower portion of Lot 4 Caves Road adjacent to BNRS is zoned as 'conservation'.

1.3 Purpose

It is important that the manner in which water will be managed is clearly documented early in the planning process, and this should be in a manner which avoids potential flooding, protects the environment and considers future climate change. This approach provides the framework for actions and measures to achieve the desired outcomes during development.

This local water management strategy (LWMS) details the water management approach to support the development of the site, and is intended to satisfy the requirements of *Better Urban Water Management* (WAPC 2008), and to address the expectations of the Department of Water and Environmental Regulation (DWER) and the CoB.

1.4 Policy framework

There are a number of Local and State Government policies of relevance to the development. These policies include:

- *State Water Strategy* (Government of WA 2003)
- *State Planning Policy 2.9 Water Resources* (WAPC 2006a)
- *State Planning Policy 2.6 Coastal Planning* (WAPC 2013)
- *State Planning Policy 6.1 Leeuwin-Naturaliste Ridge* (WAPC 1998)
- *Statement of Planning Policy No. 3: Urban Growth and Settlement* (WAPC 2006b)
- *State Water Plan* (Government of WA 2007)
- *Liveable Neighbourhoods Edition 4* (WAPC 2009a)
- *Planning Bulletin No. 64: Acid Sulfate Soils* (WAPC 2009b)

- *Water Wise Perth-Two Year Action Plan (Government of WA 2019)*.

In addition to the above policies, there are a number of published guidelines and standards available that provide direction regarding the water discharge characteristics that developments should aim to achieve. These are key inputs that relate either directly or indirectly to the development of the site and include:

- *Australian Runoff Quality* (Engineers Australia 2006)
- *Stormwater Management Manual for Western Australia* (DoW 2007a)
- *Guidance Statement No. 33: Environmental Guidance for Planning and Development* (EPA 2008)
- *Better Urban Water Management (BUWM)* (WAPC 2008)
- *Decision Process for Stormwater Management in Western Australia (DWER 2017)*
- *A National Water Quality Management Strategy* (Australian Government 2018)
- *Australian Rainfall and Runoff* (Ball J *et al.* 2019).

1.5 Previous studies

1.5.1 Hydraulic Review and Breach Modelling of Buayanyup Drain

The primary objectives of this study undertaken on behalf of Water Corporation was to assess the existing capacity of the Buayanyup Main Drain (BMD) and Sub A drain located between Florence Road and the coastal outlet, and to investigate the potential flooding impacts if the levee banks were to breach. To undertake the assessment, a detailed model was constructed to characterise the hydrodynamic flow conditions occurring in the BMD and its major tributary, the Sub-A Drain.

The parameters built into the model enabled the identification of where the likely locations of breaches may occur. In relation to the site, the identified a breach location which would provide the highest risk of flooding occurring within the site. The breaching of BXS5 on the eastern levee in a 1% annual exceedance probability (AEP) event would impact the lower portion of the site where the floodway and flood fringe (discussed in **Section 3.9**) is located. In the extreme case of a 60 m width breach, the floodway within the site could potentially experience flooding heights of 2.15 metres Australian height datum (mAHD) (further discussed in **Section 6.3.2**).

1.6 LWMS objectives

This LWMS has been developed in consideration of the objectives and principles detailed in the *Better Urban Water Management* (BUWM) (WAPC 2008). It is intended to support the development within the site and is based on the following major objectives:

- Provide a broad level stormwater management framework to support future development.
- Treat the first 15 mm and retain stormwater runoff within the development so that the pre-development discharge rate and volumes are not exceeded.
- Ensure that sufficient land area is set aside in the LSP to manage stormwater runoff.
- Protect future residences and adjacent areas against potential flooding as a result of developing the site and/or breaches to the BMD levee.
- Consider and respond to the implications of future sea level rise due to climate change

- Develop a water conservation strategy for the site that will ensure the efficient use of all water resources.
- Incorporate appropriate best management practices (BMPs) and water sensitive urban design (WSUD) approaches into the development that address the environmental and water management issues identified.
- Reduce pollutant loads discharged from the development into the downstream environment.
- Minimise ongoing operation and maintenance costs for the land owners and the City.
- Gain support from DWER and CoB for the proposed strategy to manage water within the site.

Detailed objectives for water management within the site are further discussed in **Section 4**.

2 Proposed Development

The LSP will allow for the creation of the following land uses:

- Low density residential lots (typically between 500-600 m^2)
- POS areas
- Internal road network.

The stormwater management approach proposes to include the following WSUD measures (discussed further in **Section 6**) that will be incorporated into road reserves and POS**.**

- Vegetated roadside swales
- Bio-retention areas (BRAs)
- Flood storage areas (FSAs)
- Waterwise landscaping design and approaches at both lot and estate scale.

The LSP is provided in **Appendix A.**

3 Existing Environment

3.1 Sources of information

The following sources of information were used to provide a broad regional environmental context to the site:

- *Weather and Climate Statistics* (BoM 2022)
- *Perth Groundwater Map* (DWER 2022c)
- *Water Register* (DWER 2022f)
- *Water Information Reporting* (DWER 2022e)
- *Acid Sulfate Soils (ASS) Risk Mapping* (DWER 2022a)
- *Geomorphic Wetlands of the Swan Coastal Plain Database* (DBCA 2022a)
- *Landgate Map View Plus* (Landgate 2022)

3.2 Historical and current land uses

Based on a review of publicly available aerial photography, the site has been cleared of a majority of native vegetation since at least 1970 (Landgate 2021). It has been used for general agricultural purposes (e.g. grazing), for a number of years, and more recently commercial operations have commenced within the minor north-eastern portion of the site, including an ice factory and fresh food market.

Currently, two residential houses are located on Lot 4 Caves Rd (one in the northern portion and one in the southern portion). Strips of remnant native vegetation exist in the eastern portion of the site (along lot boundaries) and individual paddock trees (predominantly *Agonis flexuosa*) are present throughout the site.

3.3 Climate

The site experiences a warm and temperate climate, and the winter months have much higher rainfall than the summer months. The closest weather station to the site which records rainfall and temperature data is located in Busselton (Bureau of Meteorology (BoM) station number 9515). Based on weather data collected from 1877 to 2022 at this weather station, the local area experiences an average 807 mm of annual rainfall, mean annual maximum temperature of 22 °C and a mean minimum temperature of 10.4 °C (BoM 2022). The highest average rainfall months occur between May and August.

3.4 Topography

The entire site is relatively low lying with a slight south-westerly aspect. Elevation of most of the site generally ranges from approximately 2 m Australian height datum (mAHD) within the southern portion of the site to 3 mAHD within the northern and south-eastern portion of the site. An exception to these elevations is a depression associated with the floodway connected to the BNRS

which is located within the southern portion of the site and has elevations of around 1 mAHD. The topographic contours are shown within **Figure 2**.

3.5 Geotechnical conditions

3.5.1 Regional geology

Land resource mapping prepared by the Department of Primary Industries and Regional Development (DPIRD 2020) identifies the majority of the site as occurring within the Quindalup South System, whilst the south-western portion of the site is mapped as occurring within the Vasse System. The soil groups identified across the site are shown within **Figure 3**.

The Quindalup South System is described as coastal dunes of the Swan Coastal Plain, with calcareous deep sands and yellow sands. Whilst the Vasse System is described as poorly drained estuarine flats, of the Swan Coastal Plain, which contains tidal flat soil, saline wet soil and pale deep sand.

3.5.2 Local geology and soils

A total of five monitoring bores were installed across the site in June 2021, to depths ranging between 5 m below ground level (mBGL) to 7 mBGL. The bore logs indicate that topsoil is generally comprised of coarse calcareous sand with depths ranging between 3 m to 7 m. This layer was either the final depth of the monitoring bore or was underlain with one of the following:

- Clayey sand with a thickness of 1 m extending from 5 mBGL to 6 mBGL, or;
- Sandy clay extending to depths between 3 mBGL to 4 mBGL, further overlying clay and rock that extends to depths of approximately 5 mBGL.

The bore logs suggest that the soils in the northern portion of the site are sandy and moving towards to the southern portion of the site, sandy clay soils become more prominent at shallower depths. See bore locations and soil mapping in **Figure 3**.

3.5.3 Acid sulfate soils

ASS risk mapping (DWER 2022a) indicates that the northern two-thirds of the site is mapped as having a 'moderate to low' risk of ASS within 3 m of the natural soil surface, whilst the southern third of the site (which roughly aligns with areas identified as wetland features) is mapped as having a 'high to moderate' risk of ASS within 3 m of the natural surface. The ASS risk mapping applicable to the site is shown in **Figure 4**.

3.6 Environmentally sensitive areas

No environmentally sensitive areas are located within the site.

3.7 Sewage sensitive areas

The site is located within a sewerage sensitive area based on the *Government Sewerage Policy* dataset (DPLH 2020). The entire site is classed as both type *'E'* and *'F',* due to being within 2 km of

coastal embankments and within 1km of significant wetlands, respectively. The sewage sensitive area mapping is shown in **Figure 5**.

3.8 Flora and fauna

As described in **Section 3.2**, a large portion of the site has historically been cleared of native vegetation. Strips of remnant native vegetation exist in the eastern portion of the site (along existing lot boundaries) and individual paddock trees are present throughout the site. Site inspection confirmed that these paddock trees are predominantly *Agonis flexuosa* (peppermint), *Eucalyptus rudis* in lower lying areas or planted eucalypts.

3.9 Surface water

A review of the publicly available flood mapping database (DWER 2022) and subsequent information provided by DWER indicates that a 1% AEP event floodway and flood fringe is located within the south-western corner of the site, as shown in **Figure 6**. This floodway connects to the BNRS floodway immediately south of the site. According to flood mapping (DWER 2022) the flood height of the adjacent floodway is approximately 1.65 mAHD in a 1% AEP event.

As discussed in **Section 1.5.1**, The BMD is located approximately 180 m west of the site. This drain is highly modified in the downstream reach and discharges north to Geographe Bay, which is 400 m north of the site. The Buayanyup drainage system is managed by Water Corporation and provides rural drainage from upstream catchments, safely catering and maintaining flood water conveyance up to the 5% AEP event.

The BNRS is located immediately south of the site and positioned between the BMD and the Vasse Diversion Drain (VDD). It acts a large regional surface water retention area prior to discharging to the VDD via the outlet floodgates. A one-way culvert exists in the western extent of the BNRS providing a hydraulic connection into the BMD. The average annual groundwater level in the BNRS is approximately 0.8 mAHD (JDA 2017). In 1998, JDA prepared a water balance model estimating the 1% AEP event peak flood level in the BNRS to reach 1.66 mAHD. However, this model was undertaken over 10 years ago and is likely superseded by the Hydraulic Review and Breach Modelling of Buayanyup Drain (JDA 2017).

3.9.1 Wetlands

A review of the Geomorphic Wetlands of the Swan Coastal Plain dataset (DBCA 2020) indicates that:

- A number of multiple use wetlands (MUWs) are identified within the site, including four MUWs in the southern and south western portions of the site (unique feature identification (UFI) #39, #41, #63, #13195); and one MUW (UFI #64) within the north-eastern portion of the site. The location of the MUWs area shown in **Figure 7**.
- No conservation category wetlands (CCWs) are present within the site or within close proximity.
- A CCW is located west of Buayanyup Drain, however is more than 225 m from the site.

The presence of a wetland can indicate that groundwater may be close to the surface at different periods of the year. As part of the site visit, and based on discussions with the landowners, it appears that waterlogging may occur in areas identified as MUW (particularly in winter).

3.9.2 Pre-development modelling

Catchment analysis and hydrological and hydraulic (surface runoff) modelling of the site has been undertaken (using XPSWMM software) to provide a representation of the pre-development environment. The catchment analysis indicates that the site is close to the top of catchment, and most of the site is self retained and lesser part of the site discharging runoff at the southern boundary into the BNRS. The surface runoff modelling indicates that the 1% AEP peak flow rate leaving the site along the southern boundary is 1.1 m^3/s. The modelling assumptions report is contained in **Appendix B**.

3.10 Groundwater

3.10.1 Groundwater resources

The site is within the Busselton-Capel groundwater management area and the Dunsborough-Vasse subarea. The *Water Register* (DWER 2022) indicates that the site is underlain by a multi-layered system, including the following aquifers:

- Superficial Swan – unconfined
- Leederville – confined
- Sue Coal Measures – confined

The Water Register indicates that the Superficial and Leederville aquifers are all fully allocated, however there is potentially allocation available in the Sue Coal Measures. This aquifer exists at a greater depth and may be problematic to access and or to successfully extract water from.

3.10.2 Groundwater levels

The *Perth Groundwater Map* (DWER 2022d) indicates that no groundwater data is publicly available for the site. However, Emerge Associates undertook groundwater monitoring of the five monitoring bores across the site monthly between July to November in 2021 and 2022, with results shown in **Table 1**. The monitoring results indicate that the maximum groundwater level (MGL) occurred across different months (between August to October in 2021) and ranged from 1.19 mBGL in the north eastern portion of site to 1.54 mBGL in the lower central section of the site.

Table 1: Measured groundwater levels.

Bore ID	Depth to groundwater (mBGL)									
	Jul-21	Jul-22	Aug-21	Aug-22	Sep-21	Sep-22	Oct-21	Oct-22	Nov-21	Nov-22
MW1	2.26	1.95	1.49	1.78	1.77	1.9	1.32	2.05	1.55	2.15
MW2	1.74	1.83	1.52	1.46	1.19	1.458	1.29	1.67	2.04	1.74
MW3	1.82	2.16	1.54	1.84	1.69	1.907	1.77	2.08	2.44	2.19
MW4	2.41	2.7	2.10	2.73	2.19	2.833	1.25	2.47	1.99	2.57
MW5	1.60	1.99	1.26	1.58	1.39	1.627	1.79	1.81	1.74	1.9

Bold values – Indicates the groundwater level monitoring round where the 2021 annual winter peak was recorded.

The locations of bores and MGL contours derived from the data provided in **Table 1** are shown on **Figure 2.**

3.10.3 Groundwater quality

Groundwater quality sampling was undertaken by Emerge Associates in August 2021 and September 2022, with the results provided in **Table 2.** Whilst intended to be applied to surface water, comparison of groundwater quality to the *National Water Quality Management Strategy* (NWQMS) (Australian Government 2018) guideline values for lowland rivers (i.e. surface water), the sample results from both monitoring rounds indicate that all locations were within the guideline range for pH, except for MW01 that experienced a minor exceedance of the upper trigger value. All sites except for one exceeded the total nitrogen (TN) guideline value of 1.2 mg/L and all sites, except one (MW2 in Sept-22) exceeded the total phosphorous (TP) guideline value of 0.065 mg/L. While described as an 'exceedance', as indicated the trigger values described are intended to be applied to surface water, and not necessarily to groundwater. Further, the nutrient concentrations recorded are not inconsistent with what would be expected for historical agricultural land in the region. The comparison of results should therefore be viewed as providing context to the site conditions, but does not necessarily indicate cause for concern or action.

Table 2: Groundwater quality results

Monitoring location	Monitoring round	pH	EC	DO	TN	Ammonia	TKN	TP
		-	µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L
NWQMS (Australian Government 2018)		6.5 - 8	-	-	1.2			0.065
MW1	Aug-21	7.55	985	2.72	3.2	<0.01	1.4	0.64
	Sept-22	8.05	636	0.46	1.8	0.15	1.2	0.14
MW2	Aug-21	7.35	861	0.18	0.8	0.31	0.7	0.16
	Sept-22	7.45	709	0.55	0.7	0.02	0.3	0.04
MW3	Aug-21	7.59	745	3.61	1.4	<0.01	0.8	0.21
	Sept-22	7.64	663	3.79	3.2	0.02	1.3	0.23
MW4	Aug-21	7.47	1798	1.64	1.5	0.02	1.2	0.19
	Sept-22	7.71	1377	0.85	3.2	0.07	3.2	0.41
MW5	Aug-21	7.25	1690	2.07	3.1	<0.01	1.0	0.09
	Sept-22	7.39	1485	1.45	1.8	0.05	1.1	0.30

3.11 Climate change

A review of *Coastal Risk Australia* (NGIS 2022) indicated that the lower southern portion of the site that contains a floodway is predicted to become inundated by a further 0.84 m under the highest tide event by 2100 (See **Plate 1**). This predicted inundation scenario is classed as high risk with a medium confidence. Given the potential for further sea level rise of 0.84 m, the flood height of the adjacent floodway has the potential to be 2.49 mAHD.



Plate 1: Prediction inundation scenario – High (medium confidence) (NGIS 2022)

In response to the sea level rising projections, the City have developed a draft adaptation plan to accommodate for the potential coastal inundation impact of a 0.2% annual exceedance (AEP) storm event (which is equivalent to a 1:500 year average recurrence interval (ARI). The adaptation plan is detailed within the document '*Coastal hazard Risk Management and Adaptation Plan*' (CHRMAP) (CoB 2021) and provides coastal development planning requirements that need to be implemented in future development.

The planning response to mitigate inundation risk of future development within the Abbey region is to establish a minimum finished floor level (FFL) of 2.7 mAHD. The northern portion of the site is located within the City's 2120 coastal erosion hazard line within the Abbey Coastal Management Area, therefore triggering the minimum FFL of dwellings to be 2.7 mAHD.

3.12 Summary of existing environment

In summary, environmental investigations undertaken during the LWMS indicate that:

- Historically the site has been used for general agricultural purposes (i.e. cattle grazing) and in minor part for commercial operations (i.e. ice cream factory and fresh food market).
- The majority of the site has now been cleared leaving small pockets of native vegetation remaining.
- The mean annual rainfall is 807 mm, with the heaviest rainfall months occurring between May and August.
- Topography of the site ranges from 2 m AHD within the southern portion of the site to 3 mAHD in the northern and south-eastern portion of the site, with the exception of a depression within the southern portion of the site, which has elevations of approximately 1 mAHD.
- The site is split between two soil type systems; the northern/upper part of the site is within the Quindalup South System, whilst the southern/lower portion of the site is mapped as occurring within the Vasse System.
- The installation of monitoring bores across the site described the subsurface conditions beneath the site as mostly sand to depths up to 5 mBGL to 7 mBGL. The presence of clay starts to become more prominent in the deeper soil profile closer to BNRS. Sandy clay was found extending to depths between 3 mBGL to 4 mBGL, further overlying clay and rock extending to depths of approximately 5 mBGL.
- The northern two-thirds of the site is mapped as having a 'moderate to low' risk of ASS occurring within 3 m of the natural soil surface, whist the southern third of the site (which approximately aligns with areas identified as a wetland feature) is mapped as a 'high to moderate' risk of ASS occurring within 3 m of the natural soil surface.
- The site is located within a sewerage sensitive area (feature type '*E*' and '*F*') due to being within 2 km of coastal embankments and within 1 km of significant wetlands, respectively.
- The remaining native vegetation onsite includes individual paddock trees, predominantly *Agonis flexuosa* (peppermint), *Eucalyptus rudis* in lower lying areas or planted eucalypts.
- Four MUWs have been identified within the site.
- A floodway and flood fringe area is located within the lower south-western portion of the site, which is connected to the BNRS, located approximately 100 m south of the site.
- Flood mapping of the BNRS indicates that the 1% AEP flood elevation at the southern end of the site is 1.65m AHD.

- According to coastal risk inundation mapping, the floodway and flood fringe within the site are predicted to undergo further inundation of 0.84 m under the highest tide in 2100, resulting in a future flood elevation of up to 2.49 mAHD.
- Results from the pre-development surface runoff modelling of the site indicate that the 1% AEP peak flow rate leaving the site along the southern boundary is 1.1 m^3/s, and that the total volume discharging from the site in this same event is 0.5 m^3/s.
- The annual winter peak groundwater level was recorded between August 2021 to October 2021 and ranged between 1.19 mBGL to 1.54 mBGL. The MGL beneath the site therefore ranges from 2.1 mAHD along the eastern boundary to 1.5 mAHD in the south eastern corner of the site.
- Analysis of groundwater quality samples collected in August 2021 and September 2022 found that TP ranged between 0.04 mg/L to 0.64 mg/L and TN ranged between 0.7 mg/L to 3.2 mg/L. It is noted that the nutrient concentrations recorded are not inconsistent with what would be expected for historical agricultural land in the region.

4 Design Criteria and Objectives

This section outlines the objectives and design criteria that this LWMS and future water management plans must achieve. The water management strategy includes water conservation, surface water management and groundwater management.

4.1 Integrated water cycle management

The *State Water Strategy* (Government of WA 2003) and *BUWM* (WAPC 2008) endorses integrated water cycle management and application of WSUD principles to provide improvements in the management of surface water, and to increase the efficient use of other existing water supplies. The key principles of integrated water cycle management include:

- Considering all water sources, including wastewater, surface water and groundwater.
- Integrating water and land use planning.
- Allocating and using water sustainably and equitably.
- Integrating water use with natural water processes.
- Adopting a whole catchment integration of natural resource use and management.

Integrated water cycle management addresses not only physical and environmental aspects of water resource use and planning, but also integrates other social and economic concerns. Water management design objectives should therefore seek to deliver best practice outcomes in terms of:

- Water conservation/consumption
- Surface water management
- Groundwater management.

The first step in applying integrated water cycle management is to establish agreed environmental values for receiving environments. The existing environmental context of the site has been discussed in **Section 3**. Guidance regarding environmental values and criteria is provided by a number of National and State policies and guidelines, as well as previous studies relevant to the site. These were detailed in **Section 1.4** and **Section 1.5**, respectively.

4.2 Water conservation

This LWMS proposes the following water conservation criteria:

Criteria WC1 Utilise fit-for-purpose water sources throughout the development.

Criteria WC2 POS to be irrigated at no more than 7,500kL/ha/year

The manner in which the above objectives will be achieved is further detailed in **Section 5**.

4.3 Stormwater management

This LWMS proposes the following stormwater design criteria:

Criteria SW1 Manage runoff from the small rainfall event (i.e. first 15 mm) within the site at source or as close as practicably possible.

Criteria SW2 Ensure the major rainfall event (1% AEP) peak flow rates and volumes do not exceed the pre-development environment.

Criteria SW3 Finished floor levels must be a minimum of 2.7 mAHD (to meet coastal process requirements) and at least 500 mm above the adjacent 1% AEP flood level.

Criteria SW4 Finished floor levels must have at least 500 mm clearance above the major event top water levels (TWLs) in onsite retention and detention structures.

Criteria SW5 Reduce nutrient loads by applying appropriate non-structural measures.

The manner in which these objectives will be achieved is further detailed in **Section 6**.

4.4 Groundwater management

This LWMS proposes the following groundwater management criteria:

Criteria GW1 The invert level of drainage basins must have a minimum of 300 mm clearance above the maximum groundwater level.

Criteria GW2 Provide adequate consideration for future sea level rise and the influence it will have on groundwater levels beneath the site

Criteria GW3 Minimise the risk of nutrient enrichment to downstream surface water bodies from groundwater sources.

The manner in which these objectives will be achieved is further detailed in **Section 7**.

5 Water Conservation Strategy

5.1 Fit-for-purpose water use

To minimise the use of water, a fit-for-purpose supply and the conservation of water via adoption of best management approaches is strongly encouraged.

The measures outlined below will assist in achieving **Criteria WC1** and **WC2**.

5.1.1 Scheme water

Scheme water within the CoB is currently supplied by Busselton water. The site is proposed to be connected to the local reticulated potable water supply (i.e. scheme water).

5.1.2 Groundwater

The site may require some measure of irrigation of POS area during establishment of vegetation and/or water may be required to facilitate earthworks at the site. The site is however capable of being developed to a high standard even without a permanent water supply due to the extensive retained trees and floodway areas that remain green through all seasons. Currently there is no groundwater allocation held by the proponent for irrigation, however if an allocation becomes available and attained, a trade partner provided an irrigation supply, or the deeper Sue Coal Measures were accessible these would provide an appropriate source of non-potable water for irrigation.

5.1.3 Rainwater tanks

Harvested rainwater can be used in lots for some irrigation requirements however this will need to be supplemented with scheme water during the lower rainfall months. During the higher rainfall months, the majority of the harvested rainwater could be used to supplement internal building non-potable uses. This water efficiency strategy recommends that rainwater tanks are implemented and that the harvested water is used in washing machines, toilets and hot water systems. It is not mandatory to install rainwater tanks and uptake rates are expected to be consistent with typical uptake rates in the region.

5.2 Water Conservation measures

The development will utilise water wise garden (WWG) principles for lot scale gardens and estate landscaping. Water efficient fixtures and appliances (WEFA) are important approaches to ensure that lot water use is minimised. These measures are further discussed in the following Sections.

5.2.1 Water efficient fixtures and appliances

Significant reductions in in-house water uses can be achieved with the use of WEFA and the water conservation strategy recommends that all dwellings use WEFA. Water efficient fittings will be implemented by the lot owner during building construction, while uptake of water efficient

appliances can be encouraged by the proponent through provision of educational materials at point of sale. Examples of educational material are provided in **Appendix C.**

The above measures will assist in achieving **Criteria WC1**.

5.2.2 Water wise gardens

Reductions in water use for irrigation by employing water efficiency measures can significantly reduce the total water usage. The following water efficiency measures will be used/promoted:

- Retain as many remnant native trees and vegetation as practical.
- Landscape planting to occur during the winter months (i.e. May to August), where the rainfall can supplement establishment.
- The planting species palette will adopt local native waterwise species, adapted to the seasonal changes and tolerant against dry months with little to no rainfall.
- No permanent irrigation should be undertaken (unless a groundwater allocation can be obtained).
- If utilised, irrigation should not occur during winter months.
- Use of turf is to be avoided unless a permanent irrigation supply is available.
- Where required, soil to be improved with soil conditioner certified to Australian Standard AS4454 to a minimum depth of 150 mm if turf is to be planted and a minimum depth of 300 mm for garden beds.
- Implementation of hydrozoning design practices, which will group plant species with similar/equivalent water requirements.
- The adoption of xeriscaped gardens (garden beds are landscaped using ‘waterwise plants’) where possible.
- Street trees to be mulched to 75 mm with a product certified to Australian Standard AS4454.
- Community awareness of water conservation will be promoted at the point of sale and during the development sales lifespan.

WWG principles will be utilised within POS, road reserves and where relevant within lots. Permanent irrigation of POS areas is not currently proposed, however it is recognised that some selective irrigation of POS may be required if rainfall proves to be insufficient and/or during establishment. If this were the case, water would be imported via water cart and hand watering would be undertaken. Uptake of WWG practices for lot landscaping will be encouraged by the proponent at the point of sale of lots through the provision of educational material (see examples provided in **Appendix C**).

Whilst a permanent source of water has not at this stage been sourced, investigations are underway to obtain a suitable allocation. The Landscape Strategy (contained in Appendix D) presents tow strategies, one where there is no permanent water for irrigation (to demonstrate that appropriate amenity can be achieved) and one where an irrigation source is available. The amount of irrigated versus non-irrigated POS will be confirmed at the detailed designs stage in consultation with the City.

The above measures will assist in achieving **Criteria WC1**.

5.3 Wastewater management

The site is proposed to be connected to the reticulated wastewater network servicing the surrounding area.

5.4 Water conservation criteria compliance summary

A summary of the proposed water conservation design criteria and how these will be addressed within the site is provided in **Table 3**.

Table 3: Water conservation compliance summary

Criteria number	Criteria description	Manner in which compliance will be achieved
WC1	Utilise fit-for-purpose water sources throughout the development.	There is currently no ongoing permanent irrigation proposed for the site, unless a groundwater allocation can be secured. The development will utilise WWG principles for lot scale gardens and estate landscaping. Water efficient fittings will be implemented by the lot owner during building construction, while uptake of water efficient appliances can be encouraged by the proponent through provision of educational materials at point of sale.
		Residential lots will be connected to the local reticulated potable water supply that is supplied by Busselton Water.
		Rainwater tanks many be adopted by residents to meet some lot scale non-potable needs
		Installation of water efficient fittings and appliances within residential lots.
		Adoption of waterwise gardening practices by lot owners.
		Adoption of native waterwise species adapted to seasonal changes
		Education regarding water conservation provided to lot purchasers
WC2	POS to be irrigated at no more than 7,500kL/ha/year	During the temporary period of vegetation establishment, WWG measures will be implemented to ensure that no more than 7,500kL/ha/year is used for irrigation.

6 Stormwater Management Strategy

The principle behind the stormwater management strategy is to ensure that the pre-development 1% AEP peak flow rate and volume discharging offsite is not exceeded post-development. This will be achieved by ensuring runoff up to the 1% AEP rainfall event is retained in lots and/or treated as close to source as possible. Runoff which exceeds the capacity of BRAs will be directed to a flood storage area (FSA) to infiltrate onsite or to be discharged offsite at the southern boundary and at a flow rate which mimics the existing hydrology.

The stormwater management approach that is proposed for the site is discussed in the following sections. Water management infrastructure proposed includes:

- Pit and pipe network within road reserves
- Flush kerbing
- Vegetated swales
- BRA
- FSA

Detailed hydrological and hydraulic modelling using XPSWM has been completed to determine the required size of stormwater management infrastructure. The assumptions/methodology for this is detailed in the Modelling Assumptions Report provided in **Appendix B** and discussed further in the following sections.

6.1 Lot drainage

Given the large size of lots (500 – 600 m^2) and sandy soils, all residential lots will adopt soakwells and have sufficient pervious garden area to be able to retain stormwater runoff up to the 1% AEP event. This is possible due to the high permeability of the sandy soils underlying the majority of the site and/or sand fill that will be imported to achieve the required finished floor levels, which will have a high capacity to infiltrate runoff.

6.2 Development drainage

6.2.1 Road drainage network

A traditional pit and pipe network will collect runoff from road reserves/pavement. The piped drainage network will be designed to convey runoff from up to the 20% AEP event to downstream BRAs and FSAs, where eventually stormwater will infiltrate or discharge offsite. The road drainage network may also incorporate flush kerbing where BRAs and/or roadside swales are adjacent to road pavement.

6.2.2 Vegetated swales

Roadside swales will be provided for those catchments that do not contain a POS area that could contain a BRA or FSA. These swales will be located within road reserve and will provide water quality treatment for frequent rainfall events (i.e. for the first 15mm - see **Table 4**) and retention for runoff

up to the 1% AEP event (see **Table 7**). Road reserves will be graded for runoff to be directed to either a pipe network and/or into swales via flush kerbing, where water quality treatment and infiltration up to the 1% AEP event will occur. The drainage network may also include local portions of road pavement directed to the roadside swales via flush kerbing or kerb breaks, reducing the need for a concrete piped network. Swales will typically be up to 6 m wide, have 1:6 side slopes, and have a maximum depth up to 500 mm. All road reserves where swales are proposed will be wide enough to accommodate the proposed swales.

Discharge from swales for runoff up to 1% AEP event may occur in some (southern) areas of the site, where these catchments have been identified as having a pre-development outflow. In the event runoff is discharged off site, it will be directed towards the southern boundary that will discharge at a rate not exceeding the pre-development peak flow rate and volume. This would occur via weir structure or similar and via overland flow.

A vegetated conveyance swale will be located within the central POS area running through the middle of the site to collect runoff from the BRAs from contributing catchments that naturally discharge southwards and offsite to the BNRS.

Swales will be vegetated using plant species with high nutrient uptake capacities and low water requirements, consistent with the *Vegetation guidelines for stormwater biofilters in the South West of Western Australia* (Monash University 2014). They will be underlain with a soil suitable for water quality treatment (which may include an engineered or amended soil mixture) for nutrient removal purposes. It is also acceptable to utilise existing soils where these can be demonstrated to provide an appropriate permeability and nutrient removal function.

Swales will assist in achieving **Criteria SW1**, **SW2** and **SW5**.

6.2.3 Bio-retention areas

Runoff from the small rainfall event not retained higher in catchments will be conveyed and treated within vegetated BRAs, located within a downstream POS area. BRAs have been sized to treat the small rainfall event (i.e. first 15 mm) from the road reserve. They will provide water quality treatment by removing fine sediments, trace metals, nutrients, bacteria and organics. Design characteristics of BRAs include:

- Vegetated with native nutrient removing plant species
- 1:3 side slopes
- 500 mm depth
- Underlain by 500 mm of soil suitable for water quality treatment.

BRAs will be planted with native vegetation to encourage biological nutrient uptake, consistent with the *Vegetation guidelines for stormwater biofilters in the south-west of Western Australia* (Monash University 2014). As per vegetated swales, they will also be underlain with soil media that has a high phosphorous index (PRI) (>PRI 10) or equivalent to increase nutrient removal from runoff during infiltration. It is also acceptable to utilise existing soils where these can be demonstrated to provide an appropriate permeability and nutrient removal function.

BRAs are not designed to be permanently wet. Instead, stormwater will infiltrate into the underlying soil medium, or will overland flow to the adjacent FSA. If required, subsoil drains may also be utilised beneath the BRAs to ensure they can dry out in an acceptable time between storm events, however the conceptual approach developed to lot levels and the recorded MGL indicate that there will be sufficient clearance between MGL and BRA inverts (see **Section 6.3.1**).

The size and spatial requirements for BRAs are shown in **Table 4** and location of BRAs are shown in **Figure 8.** The BRAs have also been strategically located to allow for the retention of as many remnant native trees as possible. BRAs will assist in achieving **Criteria SW1**, **SW3** and **SW5.**

6.2.4 Flood storage areas

Surface runoff from impervious road pavement up to the major (1% AEP) event are to be retained within FSAs, thereby maintaining the pre-development hydrological regime (for the northern part of the site there is no site discharge and runoff is therefore infiltrated onsite).

FSAs will be designed according to the following parameters:

- 1:6 side slopes
- Maximum depth of 1.2 m. Current modelling has been undertaken assuming depths of 1.0 m, thereby providing design flexibility and a level of conservatism.
- Minimum 500 mm clearance from MGL
- Finished floor levels of adjacent lots will be 500 mm above the 1% AEP event top water level.

Further geotechnical investigations are required to be undertaken within the site, and this will include the proposed locations of BRAs/FSAs/swales. The retention of remnant native trees will also be taken into consideration when selecting the ultimate location of FSAs. The measured infiltration rate will need inform the final BRA/FSA designs.

The use of FSAs will assist in achieving **Criteria SW2** and **SW4**.

6.2.5 Existing retained floodway

As discussed in **Section 3.10**, a floodway and flood fringe is located in the southern portion of the site and is proposed to be retained and integrated within the southern POS area.

The floodway will become inundated as a result of intermittent stormwater entering the system, both from the site and possibly from the BNRS in major flood events. The retention of this floodway will also provide conveyance and maintain hydraulic connectivity to southern BNRS.

A clearance of at least 500 mm will be maintained between inverts of the FSAs and maximum flood levels to ensure they are able to infiltrate and provide appropriate drainage. The design lot levels adjacent to the floodway will be such that FFLs of adjacent lots will be at least 500 mm above the maximum flood level of the BNRS (I.e. 1.65 mAHD) to ensure protection from flooding during major rainfall events.

Providing appropriate vertical clearance of finished floor levels above top water levels in infiltration basins and the 1% AEP flood levels of the BNRS will assist in achieving **Criteria SW3 and SW4.**

6.3 Stormwater management design

The stormwater management plan, which shows the location of water management features is shown on **Figure 8**, and this has been designed to achieve the objectives and criteria stated in **Section 6**. Two landscape concept plans are provided in **Appendix D,** demonstrating the manner in which water management features has been incorporated and the amenity that will be achieved depending on whether POS will be irrigated or non-irrigated. Surface runoff modelling undertaken using XPSWMM has been used to inform the design of stormwater infrastructure with modelling assumptions and methodology provided in **Appendix B**.

6.3.1 Small rainfall event

Runoff from the road reserve will be conveyed to either a vegetated swale or BRA for water quality treatment of the small (first 15 mm) rainfall event. The size and spatial requirements of water quality treatment assets are presented in **Table 4**, and inundation resulting from the small event is shown in **Figure 9**.

Table 4: Small event (first 15 mm) treatment requirements

Catchment	POS no.	Treatment structure	Depth (mm)	TWL surface area (m^2)	Volume (m^3)
Ct-01	-	Swale-01	0.06	289	16
Ct-02	-	Swale-02	0.05	294	15
Ct-03	POS-1	BRA-03	0.50	115	45
Ct-04	-	Swale-04	0.04	248	10
Ct-05	-	Swale-05	0.08	125	9
Ct-06	POS-2	BRA-06	0.50	125	50
Ct-07	-	Swale-07	0.09	84	7
Ct-08	POS-5	BRA-08	0.50	138	53
Ct-09	POS-4	BRA-09	0.50	204	84
Ct-10	POS-3	BRA-10	0.50	245	100
Ct-11	-	Swale-11	0.39	203	57
Ct-12	-	Swale-12	0.08	137	11
Ct-13 A	POS-3	BRA-13A	0.50	110	40
Ct-13 B	POS-3	BRA-13B	0.50	80	30

6.3.2 Flood storage

Runoff from all events greater than the small event will be managed within FSAs or swales located across the site. The proposed locations of these features are shown in **Figure 8** and the storage requirements which will assist in achieving **Criteria SW2**, **SW3**, **SW4**, and **SW5**. The volumes, top water levels and areas in response to a 20% AEP and 1% AEP events are provided in **Table 5**. Inundation resulting from the minor and major events is shown in **Figure 10** and **Figure 11**, respectively.

Table 5: Stormwater flood storage requirements from the minor (20% AEP) and major (1% AEP) event.

Catchment and storage type	POS no.	Minor storm event			Major storm event		
		Depth (m)	TWL surface area (m2)	Volume (m3)	Depth (m)	TWL surface area (m2)	Volume (m3)
Ct-01 Swale	-	0.21	354	65	0.50	497	187
Ct-02 Swale	-	0.20	356	61	0.5	510	195
Ct-03 FSA	POS-1	0.41	261	78	1.00	545	310
Ct-04 Swale	-	0.21	314	56	0.50	455	170
Ct-05 Swale	-	0.25	174	35	0.50	263	89
Ct-06 FSA	POS-2	0.36	277	76	1.00	595	350
Ct-07 Swale	-	0.27	129	26	0.50	200	65
Ct-08 FSA	POS-5	0.43	241	71	1.00	503	281
Ct-09 FSA	POS-4	0.39	386	118	1.00	728	451
Ct-11 Swale	-	0.14	516	67	0.50	-	-
Ct-12 Swale	-	0.24	183	35	0.50	280	95

To ensure infrastructure and assets are adequately protected against potential flooding events and/or breaches of the BMD levee (as discussed in **Section 1.5.1**) all FFLs will be provided a 500 mm clearance from the TWL of adjacent WSUD structures. In some cases, in order to achieve the required minimum FFL, permeable sand fill will need to be imported. As shown in **Table 6**, the minimum clearance is 500 mm, achieving **Criteria SW3** and **SW4**.

Table 6: Summary of clearances between storage structure 1% AEP TWLs and the FFL of adjacent lots.

Storage structure	POS no.	Invert (mAHD)	1% AEP TWL (mAHD)	Minimum FFL (mAHD)	Clearance (m) between TWL and FFL
Ct-01 Swale	-	1.85	2.35	2.85	500
Ct-02 Swale	-	2.15	2.65	3.15	500
Ct-03 FSA	POS-1	1.90	2.90	3.40	500
Ct-04 Swale	-	1.95	2.45	2.95	500
Ct-05 Swale	-	2.20	2.70	3.20	500
Ct-06 FSA	POS-2	2.20	3.20	3.70	500
Ct-07 Swale	-	2.35	2.85	3.35	500
Ct-08 FSA	POS-5	1.98	2.98	3.48	500
Ct-09 FSA	POS-4	2.02	3.02	3.52	500

Table 6: Summary of clearances between storage structure 1% AEP TWLs and the FFL of adjacent lots (continued).

Storage structure	POS no.	Invert (mAHD)	1% AEP TWL (mAHD)	Minimum FFL (mAHD)	Clearance (mm) between TWL and FFL
Ct-10 BRA	POS-3	1.89	2.39	2.89	500
Ct-11 Swale	-	1.80	2.30	2.80	500
Ct-12 Swale		2.15	2.65	3.15	500
Ct-13A BRA	POS-3	1.92	2.42	2.92	500
Ct13B BRA	POS-3	1.89	2.39	2.89	500

6.3.2.1 Imported fill

Imported fill will likely be utilised to achieve the minimum FFL required to facilitate appropriate vertical separation from major event flood levels in BRAs and FSAs. The specification for fill and proposed depths will likely also be influenced by the desired geotechnical classification, which is yet to be determined. Imported fill should aim to achieve a permeability of 4 m/day. Where a lower permeability specification of fill is adopted consideration of this should be made within surface runoff modelling, fill depth assumptions and any other aspects relying on infiltration.

6.3.3 Maintaining pre-development peak flow rates

As mentioned in **Section 3.10.2**, the pre-development peak flow rate and volume discharging offsite in a 1% AEP event is 1.1 m^3/s and 3,082 m^3, respectively. In order to avoid exceeding this flow rate and volume, whilst also considering any potential breaches of the BMD that could result in increased flood levels, the conceptual drainage design involves the retention of upstream catchments within FSAs. The retention of the 1% AEP event in upstream catchments ensures that those catchments contributing to discharge offsite will not exceed the pre-development hydrology and lessen the potential impact to the southern floodway in the event of a potential BMD breach.

The catchments that discharge the minor and major event offsite are Ct-10, Ct-11, Ct-13A, and Ct-13B (shown in **Figure 8**, along with catchments that are proposed to retain up to the 1% AEP event). The surface runoff modelling indicates that the post-development 1% AEP peak flow rate and volume leaving the site via the southern conveyance swale is 0.5 m^3/s and 2,622 m^3, respectively (see **Table 7**), which is slightly less than the pre-development hydrology. The detailed methodology and catchment analysis for the surface runoff modelling is outlined in the modelling assumptions report provided in **Appendix B.**

Table 7: Summary of surface runoff modelling for minor and major peak flow rates and volumes.

Outflow location	20% AEP peak discharge (m^3/s)		1% AEP peak discharge (m^3/s)		1% AEP peak volume (m^3)	
	Pre-development	Post-development	Pre-development	Post-development	Pre-development	Post-development
Outflow-01	0.33	0.136	1.1	0.37	3,082	2,622
Outflow-02		0.044		0.09		
Total	0.33	0.18	1.1	0.46	3,082	2,622

It is possible that the future design approach and storage volumes could be refined and outflow rates and volumes increase up to the pre-development peak flow rates and volumes, however at this stage the lower peak outflow rate and volume allows for future design evolution in a manner which can mitigate the risk of increases to the land area required for flood retention and detention.

On this basis, **Criteria SW2** is achieved.

6.4 Non-structural stormwater management measures

A number of non-structural measures will be implemented across the site to help reduce nutrient loads within stormwater runoff. These measures include:

- Minimising fertiliser use to establish and maintain vegetation within BRAs, POS, swales, and road verges.
- Use of drought tolerant species that require minimal water and nutrients.
- Street sweeping.
- Maintenance of BRAs, FSAs, swales and the pipe network to remove sediments and other pollutants.
- Education of residents regarding fertiliser use and nutrient absorbing vegetation species within lots. Examples of educational materials are provided in **Appendix C.**

The above measures will assist in achieving **Criteria SW4.**

6.5 Stormwater design criteria compliance

A summary of the proposed stormwater management design criteria and how these will be addressed within the development is provided in **Table 8**.

Table 8: Stormwater management compliance summary

Criteria number	Criteria description	Manner in which compliance will be achieved
SW1	Manage runoff from the small rainfall event (i.e. first 15 mm) within the site at source or as close as practicably possible.	Lots will retain the first 15 mm of rainfall within pervious garden areas.
		Runoff from the road reserve and POS will be retained and treated within vegetated BRAs and swales. Treatment will occur via vegetation and the underlying soil profile which will adsorb nutrients and pollutants prior to reaching groundwater.
SW2	Ensure the major rainfall event (1% AEP) peak flow rates and volumes do not exceed the pre development environment.	The major storm (1% AEP) event will be retained within lots and infiltrate onsite and runoff from road reserves and POS will be retained in FSAs and swales. Part of the runoff generated across the site will be conveyed and discharged offsite along the southern boundary to ensure pre-development hydrology is not exceeded.
		The pre-development peak flow rate and volume exiting the site is 1.1 m^3/s and 3,082 m^2 has not been exceeded, and post-development modelling shows the peak flow rate and volume is 0.5 m^3/s and 2,622 m^3, respectively.
SW3	Finished floor levels must be a minimum of 2.7 mAHD (to meet coastal process requirements) or at least 500 mm above adjacent the 1% AEP flood level.	In accordance with the 'Coastal Hazard Risk Management and Adaption Plan' (CoB 2021), all dwellings will achieve a FFL of 2.7 mAHD or at least 500 mm above the 1% AEP flood level, as shown in **Table 6.**
SW4	Finished lot levels must have at least 500 mm clearance above the major event top water levels (TWLs) in onsite retention and detention structures.	All residential lots adjacent to retention and detention structures will provide a minimum of 500 mm clearance from the TWL. As shown in **Table 6**, the minimum clearance achieves this criteria. Future civil designs to support UWMPs will confirm that lots will have sufficient clearance (> 500 mm) to major event TWLs within BRAs, FSAs and swales.
SW5	Reduce nutrient loads by applying appropriate non-structural measures.	The following measures will reduce nutrients and treat stormwater runoff prior to discharge offsite: • Construction stage measures (e.g. silt fences, other temporary measures). • Landscaping will adopt waterwise planting practices that will reduce the amount of fertiliser required. • Education of lot owners regarding fertiliser use and waterwise gardening practices. • Street sweeping will occur to prevent sediments entering swales and BRAs. • The swales and BRAs will be vegetated and underlain by a 300 mm to 500 mm layer of soil suitable for nutrient removal. • Maintenance of nutrient stripping vegetation and removal of sediments within swales and BRAs.

7 Groundwater Management

Groundwater management at the site will incorporate measures relating to both levels and quality, as discussed in the following sections.

7.1 Groundwater level management

As discussed in Section **3.11.2**, the MGL is a minimum of 1.19 m below the natural surface for the majority of the site, therefore clearance to groundwater is not a significant site constraint. However, in the event of a potential BMD levee breach or future sea level rising occurring, to ensure the protection of the drainage infrastructure, the inverts of storage basins are assumed to achieve a minimum of 300 mm clearance to existing MGLs across the site. **Table 9** demonstrates that this will be achieved within all storage structures.

Table 9: Summary of clearances between the MGL and invert of storage structures

Catchment	MGL (mAHD)	Minimum invert (mAHD)	Clearance (mm)
Ct-01 Swale	1.55	1.85	300
Ct-02 Swale	1.85	2.15	300
Ct-03 FSA	1.60	1.9	300
Ct-04 Swale	1.65	1.95	300
Ct-05 Swale	1.90	2.2	300
Ct-06 FSA	1.90	2.2	300
Ct-07 Swale	2.05	2.35	300
Ct-08 FSA	1.68	1.98	300
Ct-09 FSA	1.72	2.02	300
Ct-10 BRA	1.59	1.89	300
Ct-11 Swale	1.50	1.8	300
Ct-12 Swale	1.85	2.15	300
Ct-13A BRA	1.62	1.92	300
Ct13B BRA	1.59	1.89	300

The potential for groundwater to rise post-development in response to future sea level rise has been considered, and a conservative approach has been taken to design stormwater infrastructure (e.g. FSAs are assumed to be 1.0m deep and these could be reconfigured with the ample POS areas provided by the structure plan). Whilst not required to meet current design assumptions, subsoil drains can also potentially be used at the base of BRAs to ensure these dry out in an acceptable timeframe and between storm events. These could be retrofitted if required in the future to respond to changing conditions. If subsoils are required, subsoil drains will require free draining outlets to ensure they remain free draining.

7.2 Groundwater quality management

As discussed in **Section 3.11.3**, baseline groundwater quality data has been collected from beneath the site. The overall objective is to maintain or improve the quality of groundwater beneath the site. This will firstly be achieved by the change in landuse (from agricultural use to residential), thereby reducing the total nutrient loads infiltrating into the soil profile.

The adoption of a WSUD approach within stormwater infrastructure and WWG approach to landscaping, will result in a improvement to water quality being discharged from the site.

As discussed in **Section 6.2**, the proposed stormwater quality treatment infrastructure may include a combination of structural (e.g. BRAs, swales) and non-structural measures (e.g. vegetation, soil media) to manage surface water quality on site. Retention of small event runoff will provide treatment of stormwater runoff through interaction with vegetation and soils prior to infiltration. Non-structural measures (detailed in **Section 6.4**) will similarly reduce the nutrient loading into the underlying groundwater.

Groundwater quality will be maintained or improved via the following:

- Lot scale landscape design and management to minimise/avoid the application of nutrients.
- Minimal to no fertiliser use to establish and maintain vegetation within open space areas.
- Appropriate treatment of small rainfall event runoff.

7.3 Groundwater design criteria compliance

A summary of the proposed groundwater design criteria and how these are addressed within the development area is provided in **Table 10**.

Table 10: Groundwater management compliance summary

Criteria number	Criteria description	Manner in which compliance will be achieved
GW1	The invert level of drainage basins must have a minimum of 300 mm clearance above the or maximum groundwater level.	Drainage basins will be designed to ensure the invert level provides a minimum of 300 mm clearance from the underlying MGL.
GW2	Provide adequate consideration for the future sea level rise and the influence it have on the groundwater levels beneath the site.	The inverts of basins and swales have been designed to provide a 300 mm clearance from the MGL. This will provide adequate protection from potential sea level rises influencing the rise of groundwater levels. Where appropriate subsoils can be provided to facilitate the free drainage.
GW3	Minimise the risk of nutrient enrichment to downstream surface water bodies from groundwater sources.	Change in landuse from agricultural to residential will reduce the total nutrient loads infiltrating into the underlying groundwater. Infiltration via BRAs and vegetated swales will also provide treatment via filtration and adsorption of pollutants/nutrients.

8 Subdivision and Urban Water Management Plans

The requirement to undertake preparation of more detailed water management plans to support subdivision is generally imposed as a condition of subdivision. The development of any future UWMP should follow the guidance provided in *Urban Water Management Plans: Guidelines for Preparing Plans and for Complying with Subdivision Conditions* (DoW 2008).

While strategies have been provided within this LWMS that address planning for water management, it is a logical progression that future subdivision designs and the supportive UWMP will clarify details not provided within the LWMS. The main areas that will require further clarification within the future UWMP include:

- Implementation of water conservation strategies
- Modelling and configuration of the drainage structures
- Non-structural water quality improvement measures
- Construction period management strategy
- Management and maintenance requirements
- Floodway management.

These are further detailed in the following sections.

8.1 Implementation of water conservation strategies

A number of potential measures to conserve water have been presented within this LWMS (see **Section 5**). These water conservation strategies will be incorporated into the design and the ongoing maintenance of POS. Landscape design measures that will be incorporated into the water conservation strategy will be further detailed within the future UWMP.

It is expected that where any temporary irrigation for establishment is proposed, the future UWMP will demonstrate that an adequate water source has been obtained to meet irrigation requirements.

The manner in which the developer intends to promote water conservation measures discussed in this LWMS to future lot owners will also be discussed within the future UWMP.

8.2 Modelling and configuration of drainage structures

The design of the drainage system to date has been undertaken at an appropriate level for local structure planning and surface runoff modelling of the stormwater drainage system will be reviewed once detailed drainage design has commenced.

It is acknowledged that the drainage strategies documented in this LWMS are based upon broad-scale assumptions. These assumptions are considered adequate for development of treatment and drainage structures and are of an appropriate level of detail. However, if the site layout is refined then verification of proposed subdivision drainage designs will be undertaken by modelling the catchments serviced by the drainage network. Such modelling will allow verification that the development undertaken within the structure planning area is consistent with this LWMS. This would also likely include allowing the peak flow rate to be increased up to the 1.1 m^3/s identified by pre-

development modelling. It is anticipated that this will occur during the subdivision design process and detailed within the future UWMP.

The exact location and shape of stormwater management assets will therefore need to be specified and presented within the future UWMP.

8.3 Non-structural water quality improvement measures

Guidance for the development and implementation of non-structural water quality improvement measures is provided within the *Stormwater Management Manual for Western Australia* (DoW 2007b). Some measures will be more appropriately implemented at a local government level, such as street sweeping, however many can be implemented relatively easily within the design and maintenance of the subdivision.

It is expected that the future UWMP will provide reference to measures such as public education (through measures such as signage that may be implemented to raise awareness).

8.4 Construction period management strategy

It is anticipated that the construction stage will require some management of various aspects (e.g. dust, surface runoff, noise, traffic etc.). The management measures undertaken for construction management will be addressed either in the future UWMP or a separate Construction Management Plan (CMP).

8.5 Management and maintenance requirements

The management measures to be implemented to address surface water quality (BRAs and swales) will require ongoing maintenance. It is therefore expected that future UWMPs will provide detailed management and maintenance plans that will set out maintenance actions (e.g. gross pollutant removal), timing (e.g. how often it will occur), locations (e.g. exactly where it will occur) and responsibilities (e.g. who will be responsible for carrying out the actions). Given that approval from CoB will be sought for the proposed measures, it is anticipated that consultation with these agencies will be undertaken and referral to guiding policies and documents will be made.

8.6 Floodway management

Given the presence of the floodway area and likely expectations on function and amenity, it is expected that the management requirements and design considerations for the floodway will need to be appropriately documented. Any relevant aspects from the proposed approach to managing the floodway will need to be considered during detailed design process. This may include consideration of placement WSUD assets, vegetative planting and access for maintenance.

These management and design considerations (i.e. those relevant to water management) will be included in the future UWMP.

9 Monitoring

9.1 Pre-development monitoring

The pre-development monitoring of groundwater levels and quality data collected by Emerge Associates in 2021 (see **Section 3.11**) is being supplemented by additional monitoring during winter 2022. The completed groundwater monitoring will be used to inform concept civil and landscape designs and further refine guideline values discussed in **Section 3.11.2**. Any additional monitoring data undertaken prior to the future UWMPs and detailed civil design process will be used to further refine/inform (if necessary) the civil and landscape designs and will be reported on in the UWMP.

9.2 Post-development monitoring

9.2.1 Condition monitoring

The overall condition of the development will be monitored on a bi-annual basis from completion of the civil and landscaping works, if required by CoB. A visual assessment will be undertaken to monitor the overall condition of the development, with the aim to ascertain that the maintenance activities (which will be detailed in the future UWMP as described in **Section 8**) are achieving the overall management objectives for the development. The parameters that will be monitored include:

- Gross pollutants
- Terrestrial weeds
- Vegetation density
- Paths, benches, walkways and other infrastructure.

The management and maintenance objectives will be detailed within the future UWMP along with details of the corresponding monitoring program. Condition monitoring will continue for a period of two years to ensure that the development is in a satisfactory condition at a point of management handover of POS to the CoB.

9.2.2 Groundwater monitoring

The pre-development monitoring bore locations (shown in **Figure 6**) will be retained where possible or be reinstalled on site and used within post-development monitoring to provide direct comparison, if required by CoB. It may be appropriate for some bore locations to be moved to facilitate the intended monitoring (e.g. where bores will be located within private lots these would not be retained or reinstated).

Post-development groundwater quality monitoring will be carried out to ensure that the proposed WSUD measures, mentioned in **Section 6.2**, are working effectively. Groundwater bores should be located at the upstream and downstream ends of at least one representative POS area containing a BRA. The bores should be monitored quarterly for a period of two years from practical completion of the BRAs and swales to provide an upstream/downstream comparison. The monitoring program is summarised in **Table 11.**

Table 11: Groundwater monitoring program summary

Monitoring Type	Locations	Frequency	Parameters	Length of monitoring
Groundwater	Existing bores (where possible to retain) Bores upstream and downstream of on representative POS area	Quarterly (typically Jan, April, July, Oct).	In situ pH, EC, temperature. Sample TSS, TN, TKN, NH_4, NOX, TP, FRP	From landscape completion to handover (minimum 2 years)
				Duration of works and 2 years post-completion of final stage

9.3 Post-development guideline values

Groundwater quality trigger values for the site have been derived in consideration of the pre-development monitoring (see **Section 3.11.3**) and the *National Water Quality Management Strategy* (Australian Government 2018) guideline values. While trigger values have been defined in **Table 12**, the water quality data over the site is varied and guideline values are considered to be dynamic and should be reviewed regularly and in consideration of any additional data obtained.

Table 12: Water quality monitoring trigger values

Analyte	Short-term groundwater quality guideline values	Long-term groundwater quality guideline values
TN as N (mg/L)	3.2	1.2
TP as P (mg/L)	0.21	0.065

9.4 Reporting

A post-development monitoring report will be prepared on conclusion of the two-year monitoring period, and will be made available to the City on request.

10 Implementation

The LWMS is a key supportive document for the LSP. The development of the LWMS has been undertaken with the intention of providing a structure within which subsequent development can occur consistent with an integrated water cycle management approach. It is also intended to provide overall guidance to the general stormwater management principles for the area and to guide the development of the future UWMP.

10.1 Roles and responsibility

The LWMS provides a framework that the proponent can utilise to assist in establishing stormwater management methods that have been based upon the existing environment, are consistent with relevant State and Local Government policies and have been endorsed by the CoB. The responsibility for working within the framework established within the LWMS rests with the developer, although it is anticipated that the future UWMP will be developed in consultation with the CoB and DWER and in consideration of other relevant policies and documents.

10.2 Funding

The cost of implementing the management strategies outlined in this LWMS will be borne solely by the proponent, with the exception of lot scale measures, which will be borne by the lot purchaser.

10.3 Review

It is not anticipated that this LWMS will be reviewed, unless the development undergoes significant change post-lodgement of the LWMS. If the development is substantially modified, surface runoff modelling undertaken for this LWMS will need to be reviewed and the criteria proposed revised to ensure that all are still appropriate.

The following stage of development is subdivision, and it is likely that a condition of subdivision approval will be to prepare a UWMP. **Section 8** discusses water management aspects that should be reviewed/revised at UWMP stage.

The next stage of development following the UWMP is single lot or multiple dwelling developments. It is recognised that certain elements of the LWMS and the UWMP will not be implemented until this late stage, and that there is little or no statutory control that can be applied to ensure the implementation of any remaining measures. While the remaining measures are unlikely to be enforced at this stage their implementation could be encouraged by the CoB through policy (or modification of these where necessary), building licence or awareness programs (such as the Busselton Water Waterwise Irrigation Garden Program).

11 References

11.1 General references

The references listed below have been considered as part of preparing this document.

Australian Government 2018, *Charter: National Water Quality Management Strategy*.

Ball J, Babister M, Nathan R, Weeks W, Weinmann E, Retallick M and Testoni I (Editors) 2019, *Australian Rainfall and Runoff: A Guide to Flood Estimation*, Commonwealth of Australia (Geoscience Australia).

Bureau of Meteorology (BoM) 2022, *Climate Data Online*, <http://www.bom.gov.au/climate/data/>.

City of Busselton (CoB) 2021, *Coastal hazard risk management and adaption plan*.

Department of Biodiversity Conservation and Attractions (DBCA) 2022a, *Geomorphic wetlands of the Swan Coastal Plain database*.

Department of Biodiversity, Conservation and Attractions (DBCA) 2022b, *NatureMap*, <https://naturemap.dbca.wa.gov.au/>.

Department of Water (DoW) 2007a, *Stormwater Management Manual for Western Australia*, Perth.

Department of Water (DoW) 2007b, *Stormwater Management Manual for Western Australia*, Department of Water.

Department of Water (DoW) 2008, *Urban Water Management Plans: Guidelines for Preparing Plans and for Complying with Subdivision Conditions*, Perth.

Department of Primary Industries and Regional Development (DPIRD) 2019, *Soil Landscape Mapping - Best Available (DPIRD-027)*, Perth, WA.

Department of Planning, Lands and Heritage (DPLH) 2019, *City of Busselton Local Planning Scheme No.21*, Perth.

Department of Water and Environmental Regulation (DWER) 2017, *Decision Process for Stormwater Management in Western Australia*, Government of Western Australia, Perth.

Department of Water and Environmental Regulation (DWER) 2022a, *Acid sulfate soils risk mapping*.

Department of Water and Environmental Regulation (DWER) 2022b, *FPM 1 in 100 (1%) AEP Floodway and Flood Fringe Areas (DOW-041)*.

Department of Water and Environmental Regulation (DWER) 2022c, *Groundwater Map*, <https://maps.water.wa.gov.au/Groundwater/>.

Department of Water and Environmental Regulation (DWER) 2022d, *Perth Groundwater Map*, <https://maps.water.wa.gov.au/Groundwater/>.

Department of Water and Environmental Regulation (DWER) 2022e, *Water Information Reporting*, <http://wir.water.wa.gov.au/Pages/Water-Information-Reporting.aspx>.

Department of Water and Environmental Regulation (DWER) 2022f, *Water Register*, <https://maps.water.wa.gov.au/#/webmap/register>.

Engineers Australia 2006, *Australian Runoff Quality: A guide to Water Sensitive Urban Design*, National Committee for Water Engineering, Engineers Australia, Canberra.

Environmental Protection Authority (EPA) 2008, *Guidance Statement No. 33. Environmental Guidance for Planning and Development*, Perth.

Government of WA 2003, *A State Water Strategy for Western Australia*, Perth.

Government of WA 2007, *State Water Plan*, Perth.

Government of WA 2019, *Waterwise Perth-Action Plan*.

JDA 2017, *Hydrualic review and breach modelling of Buayanyup Drain*.

Western Australia Land Information Authority (Landgate) 2022, *Landgate Map Viewer Plus*, <https://map-viewer-plus.app.landgate.wa.gov.au/index.html>.

Monash University 2014, *Vegetation Guidelines for Stormwater Biofilters within South-west of Western Australia* Melbourne.

NGIS 2022, *Coastal Risk Australia*, <https://www.coastalrisk.com.au/viewer>.

Western Australian Planning Commission (WAPC) 1998, *Statement of Planning Policy 6.1 - Leeuwin Naturaliste Ridge Policy*, Perth.

Western Australian Planning Commission (WAPC) 2006a, *State Planning Policy 2.9: Water Resources*, Gazetted in December 2006, Perth.

Western Australian Planning Commission (WAPC) 2006b, *Statement of Planning Policy 3: Urban Growth and Settlement*, State of Western Australia, Perth.

Western Australian Planning Commission (WAPC) 2008, *Better Urban Water Management*, Perth.

Western Australian Planning Commission (WAPC) 2009a, *Liveable Neighbourhoods (Edition 4)*, Western Australian Planning Commission and Department for Planning and Infrastructure, Perth.

Western Australian Planning Commission (WAPC) 2009b, *Planning Bulletin 64/2009: Acid Sulfate Soils*, Perth.

Western Australian Planning Commission (WAPC) 2013, *State Planning Policy No. 2.6 State Coastal Planning Policy* Perth.

11.2 Online references

The online resources that have been utilised in the preparation of this report are referenced in **Section 4.1**, with access date information provided in **Table R1**.

Table R 1 Access dates for online references

Reference	Date accessed	Website or dataset name
(BoM 2022)	14 April 2022	Bureau of Meterology
(NGIS 2022)	19 April 2022	Coastal Risk Australia
(Landgate 2022)	14 April 2022	Landgate Map Viewer
(DBCA 2022b)	14 April 2022	NatureMap
(DPIRD 2019)	14 April 2022	Soil Landscape Mapping
(DWER 2022b)	19 April 2022	Western Australia Floodplain Mapping

Figures

Figure 1: Site Locality

Figure 2: Topography

Figure 3: Soil Landscape Mapping

Figure 4: Acid Sulfate Soil Mapping

Figure 5: Sewage Sensitive Area

Figure 6: Existing Hydrological Features

Figure 7: Geomorphic Wetlands

Figure 8: Stormwater Management Plan

Figure 9: Inundation Plan: First 15 mm

Figure 10: Inundation Plan: 20% AEP event

Figure 11: Inundation Plan: 1% AEP event

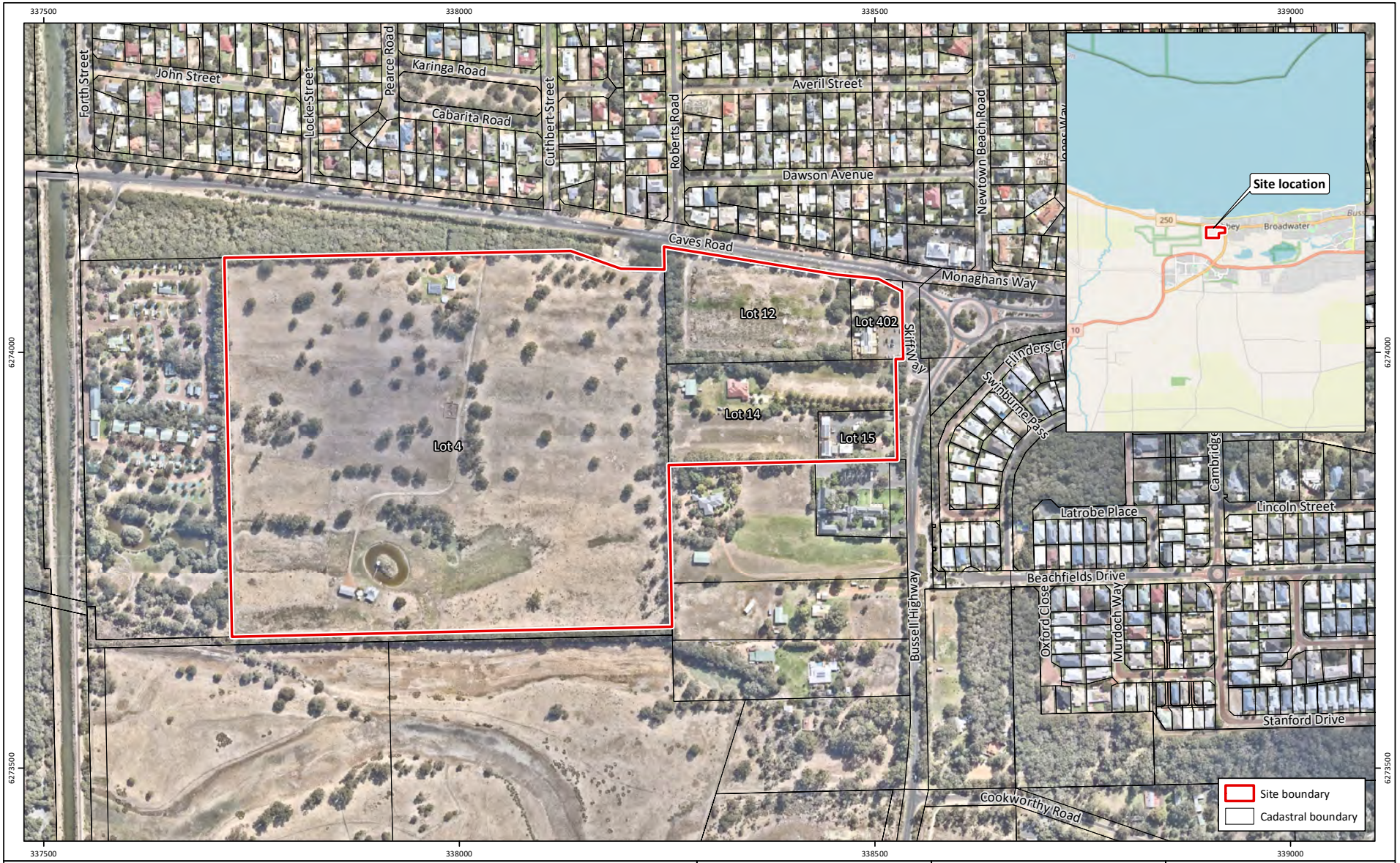

Figure 1: Site Locality

Project:	Local Water Management Strategy Lot 4 and 12 Caves Road, Abbey
Client:	Landowner Group

Plan Number:
EP20-141(03)--F17

Drawn:	WJC
Date:	15/06/2022
Checked:	AJI
Approved:	DPC
Date:	21/07/2022

N

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Metres
Scale: 1:6,000@A4
GDA 1994 MGA Zone 50

emerge ASSOCIATES

While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used
©Landgate (2021). Nearmap Imagery date: 06/04/2022



Figure 2: Topography

Project: Local Water Management Strategy
Lot 4 and 12 Caves Road, Abbey
Client: Landowner Group

Plan Number:
EP20-141(03)--F18a
Drawn: WJC
Date: 16/06/2022
Checked: AJI
Approved: DPC
Date: 20/12/2022

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Metres
Scale: 1:4,500@A4
GDA 1994 MGA Zone 50

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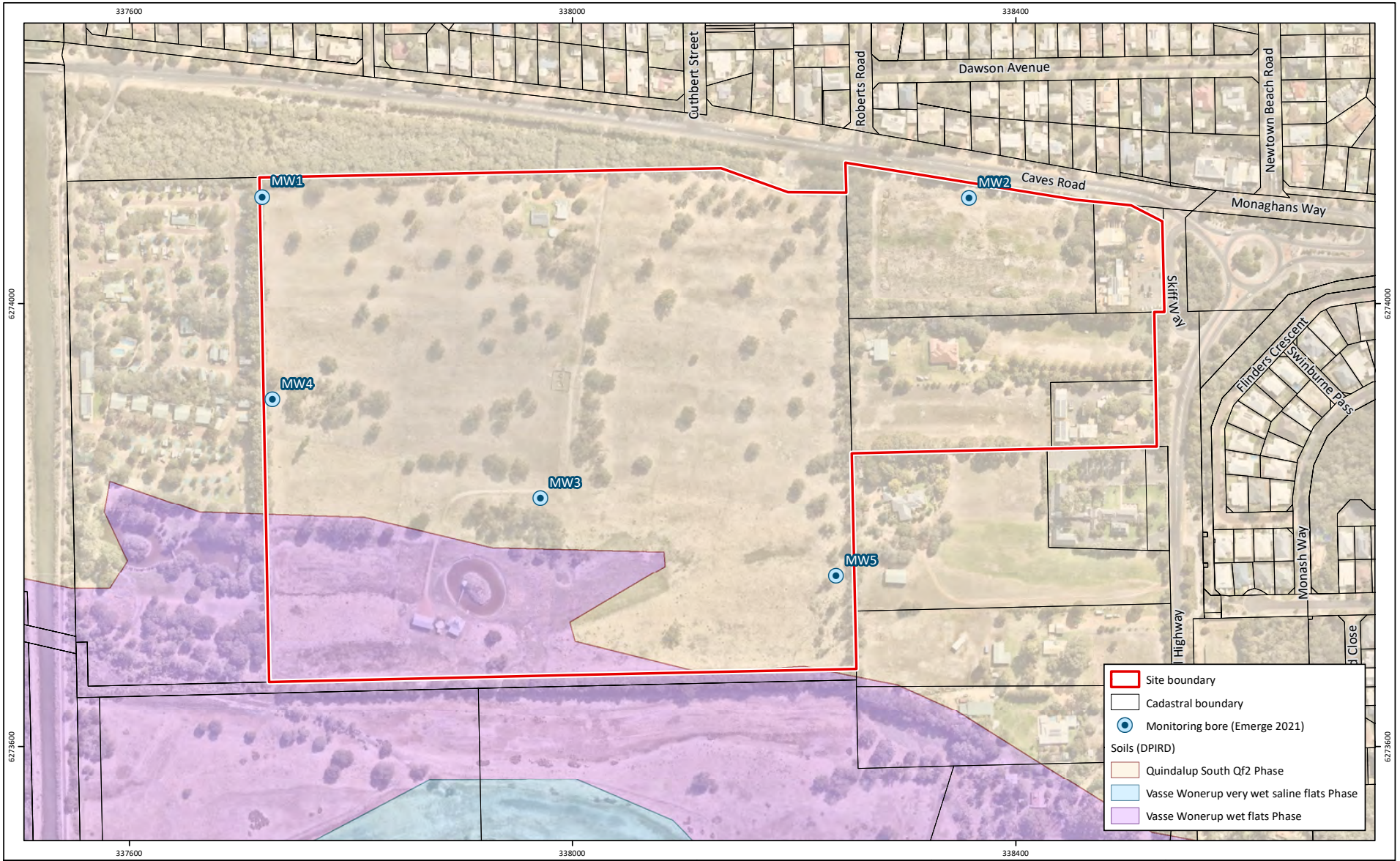

Figure 3: Soil Landscape Mapping

Project: Local Water Management Strategy
Lot 4 and 12 Caves Road, Abbey
Client: Landowner Group

Plan Number:
EP20-141(03)--F19
Drawn: WJC
Date: 15/06/2022
Checked: AJI
Approved: DPC
Date: 21/07/2022

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Metres
Scale: 1:4,500@A4
GDA 1994 MGA Zone 50

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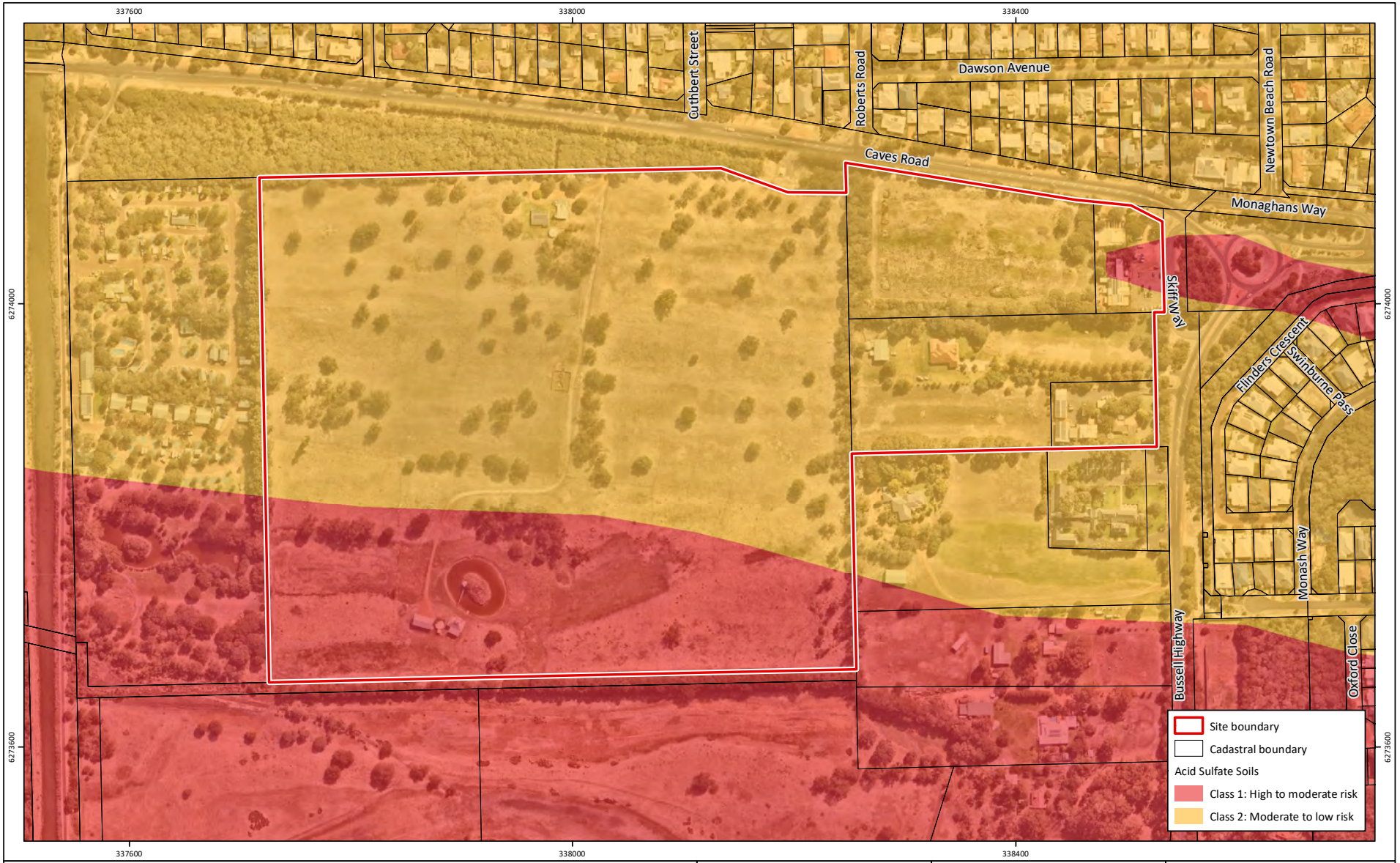

Figure 4: Acid Sulfate Soil Mapping

Project: Local Water Management Strategy
Lot 4 and 12 Caves Road, Abbey
Client: Landowner Group

Plan Number:
EP20-141(03)--F20
Drawn: WJC
Date: 15/06/2022
Checked: AJI
Approved: DPC
Date: 21/07/2022

N

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Metres
Scale: 1:4,500@A4
GDA 1994 MGA Zone 50

emerge ASSOCIATES

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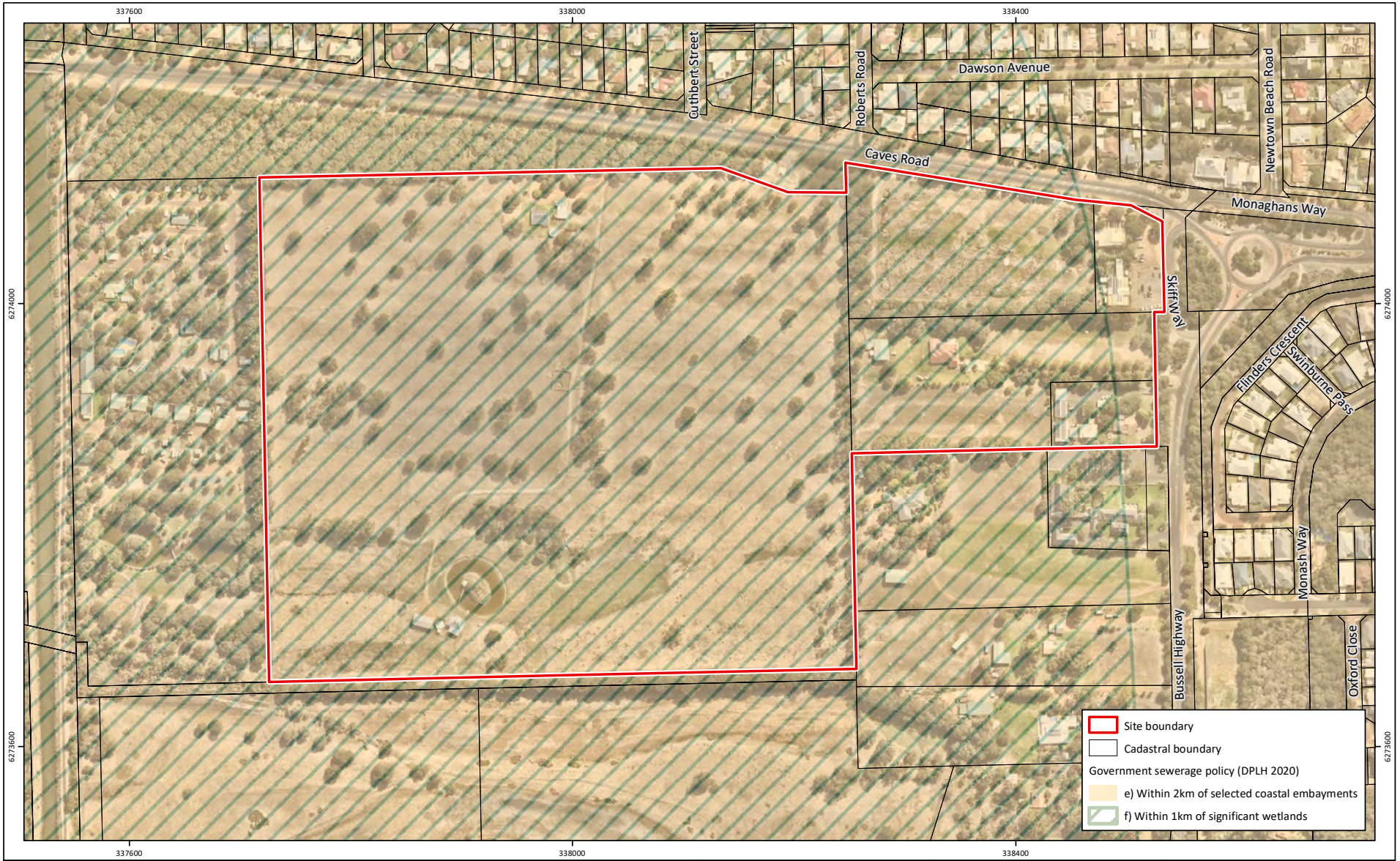

Figure 5: Sewage Sensitive Areas

Project: Local Water Management Strategy
Lot 4 and 12 Caves Road, Abbey
Client: Landowner Group

Plan Number:
EP20-141(03)--F21
Drawn: WJC
Date: 15/06/2022
Checked: AJI
Approved: DPC
Date: 21/07/2022

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Metres
Scale: 1:4,500@A4
GDA 1994 MGA Zone 50

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Figure 6: Existing Hydrological Features

Project: Local Water Management Strategy
Lot 4 and 12 Caves Road, Abbey
Client: Landowner Group

Plan Number:
EP20-141(03)--F22
Drawn: WJC
Date: 16/06/2022
Checked: AJI
Approved: DPC
Date: 21/07/2022

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Scale: 1:4,500@A4
GDA 1994 MGA Zone 50

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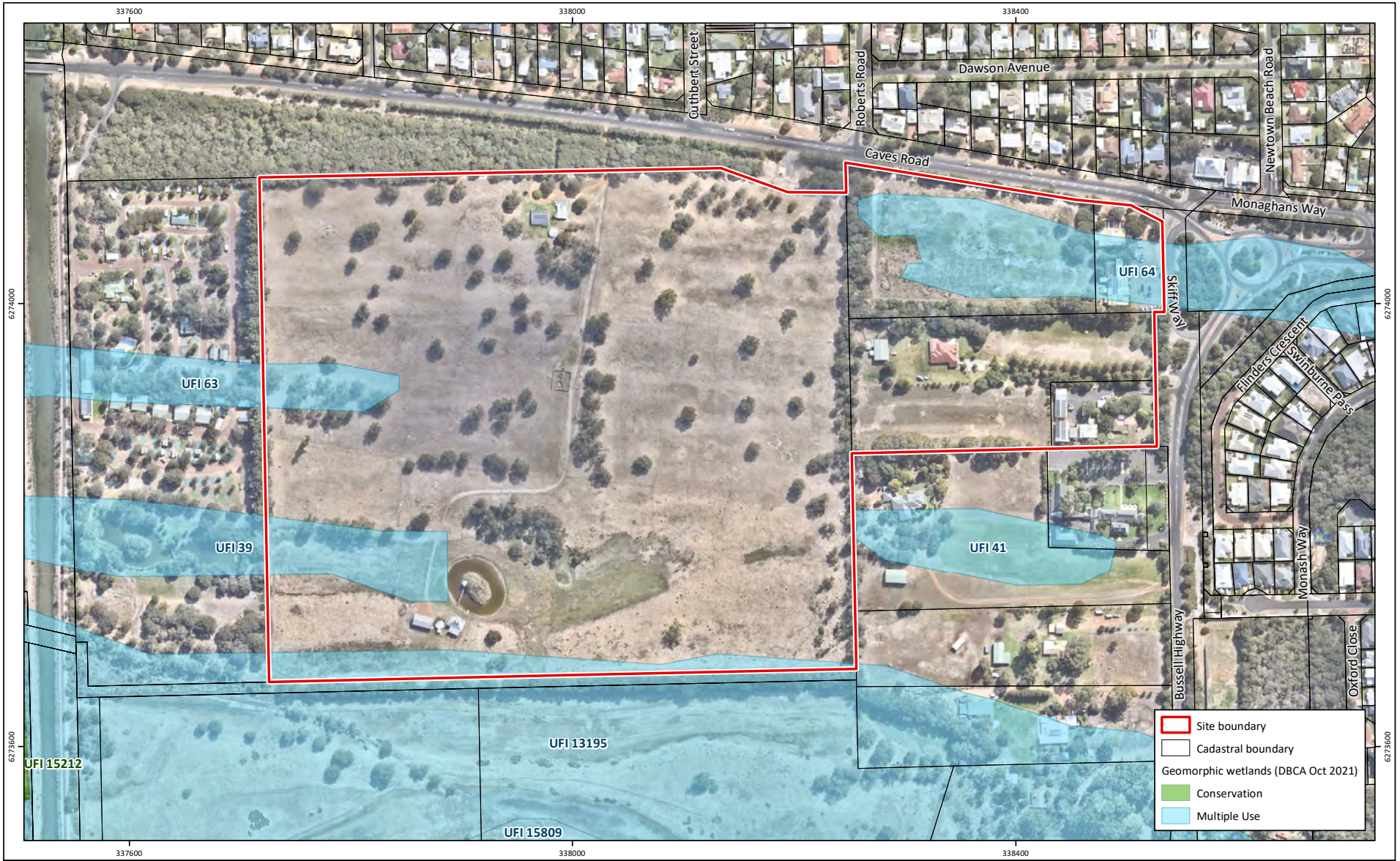

Figure 7: Geomorphic Wetlands

Project: Local Water Management Strategy
Lot 4 and 12 Caves Road, Abbey
Client: Landowner Group

Plan Number:
EP20-141(03)--F23
Drawn: WJC
Date: 15/06/2022
Checked: AJI
Approved: DPC
Date: 21/07/2022

N

0 75 150
Metres
Scale: 1:4,500@A4
GDA 1994 MGA Zone 50

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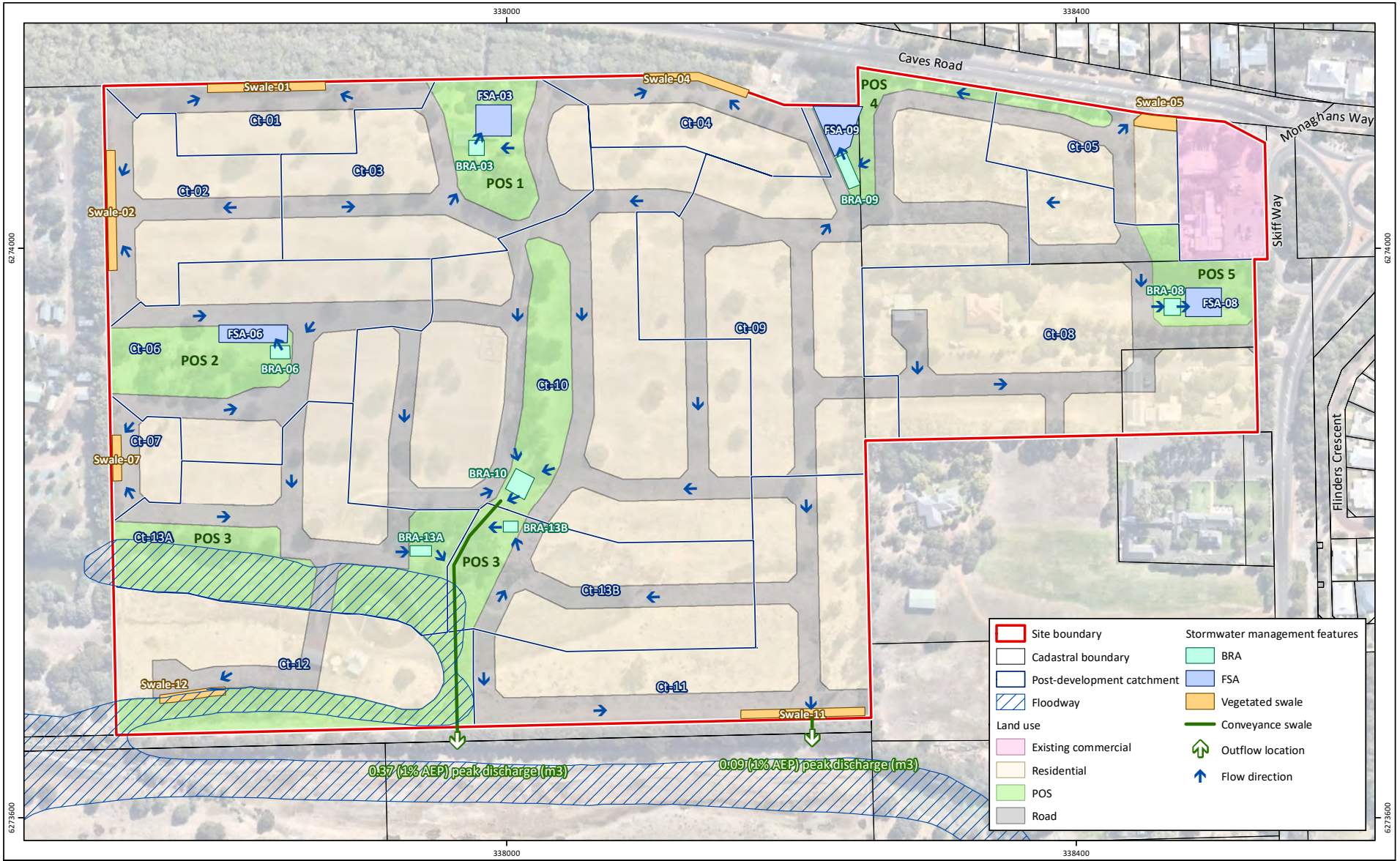

Figure 8: Stormwater Management Plan

Project: Local Water Management Strategy
Lot 4 and 12 Caves Road, Abbey
Client: Landowner Group

Plan Number:
EP20-141(03)--F24a
Drawn: WJC
Date: 19/12/2022
Checked: AJI
Approved: DPC
Date: 20/12/2022

N

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Metres
Scale: 1:3,500@A4
GDA 1994 MGA Zone 50

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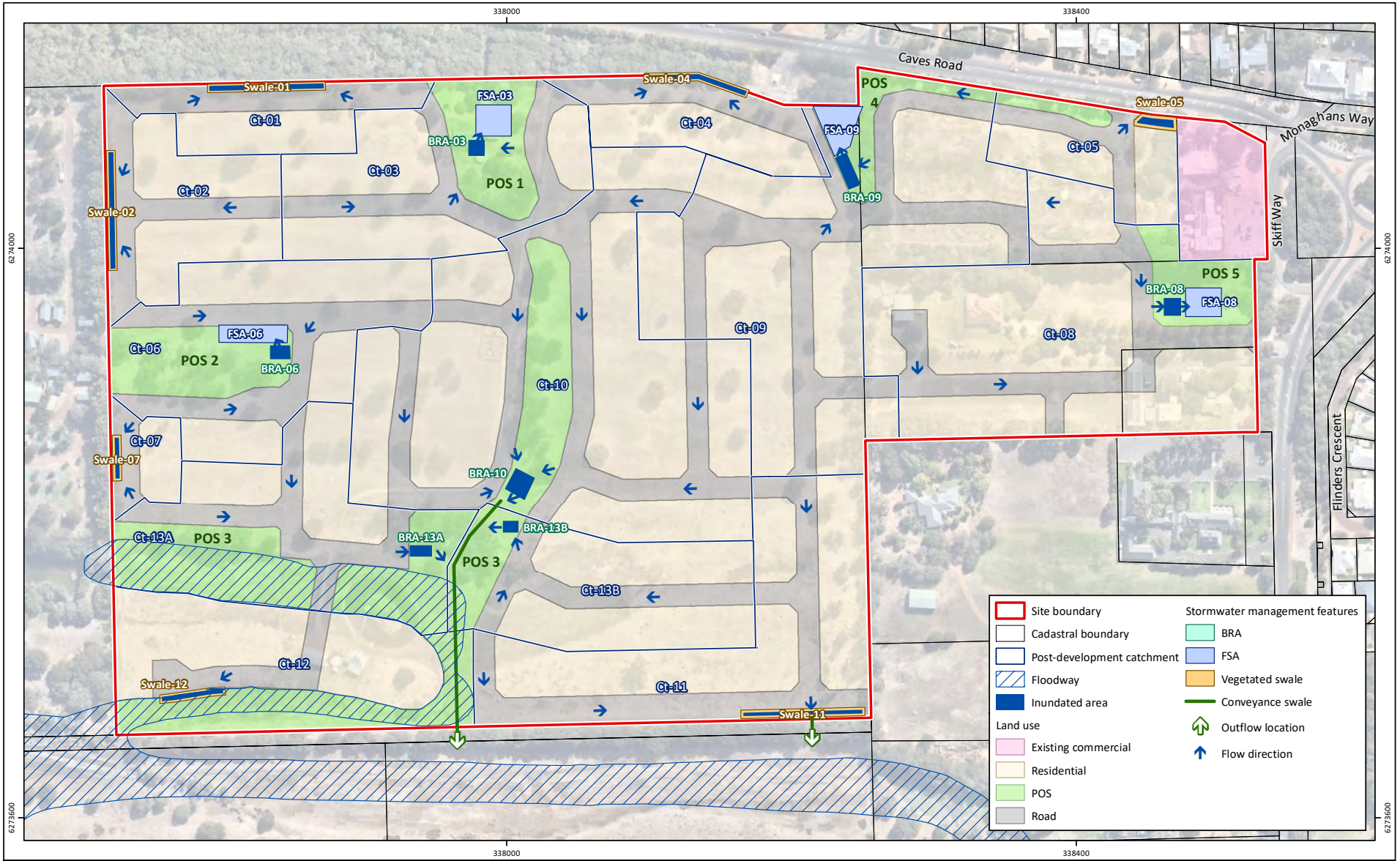

Figure 9: Inundation Plan - First 15mm

Project: Local Water Management Strategy
Lot 4 and 12 Caves Road, Abbey
Client: Landowner Group

Plan Number:
EP20-141(03)--F25a
Drawn: WJC
Date: 19/12/2022
Checked: AJI
Approved: DPC
Date: 20/12/2022

N

0 50 100
Metres
Scale: 1:3,500@A4
GDA 1994 MGA Zone 50

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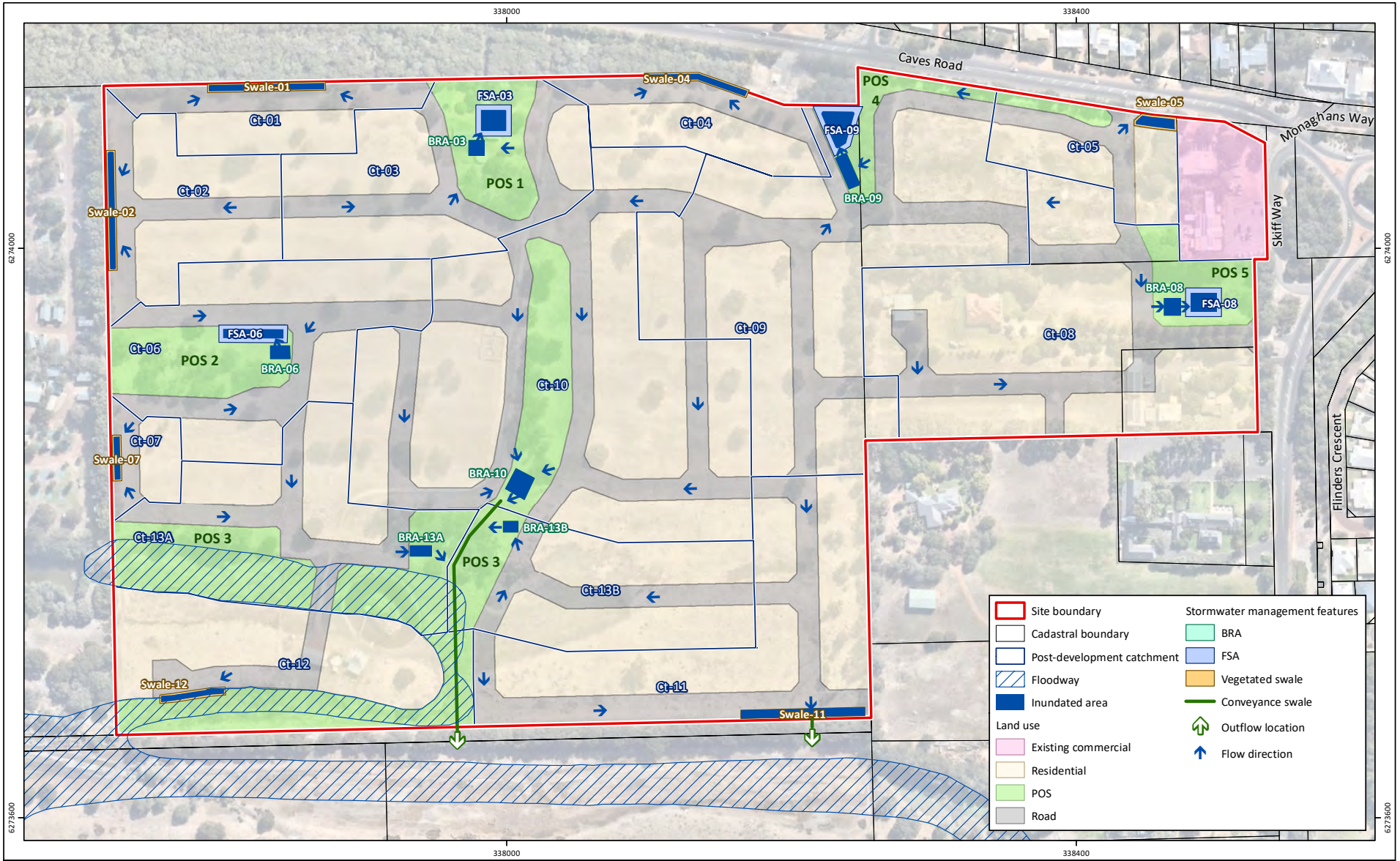

Figure 10: Inundation Plan - 20% AEP Event

Project: Local Water Management Strategy
Lot 4 and 12 Caves Road, Abbey
Client: Landowner Group

Plan Number:
EP20-141(03)--F26a
Drawn: WJC
Date: 19/12/2022
Checked: AJI
Approved: DPC
Date: 20/12/2022

N

0 50 100
Metres
Scale: 1:3,500@A4
GDA 1994 MGA Zone 50

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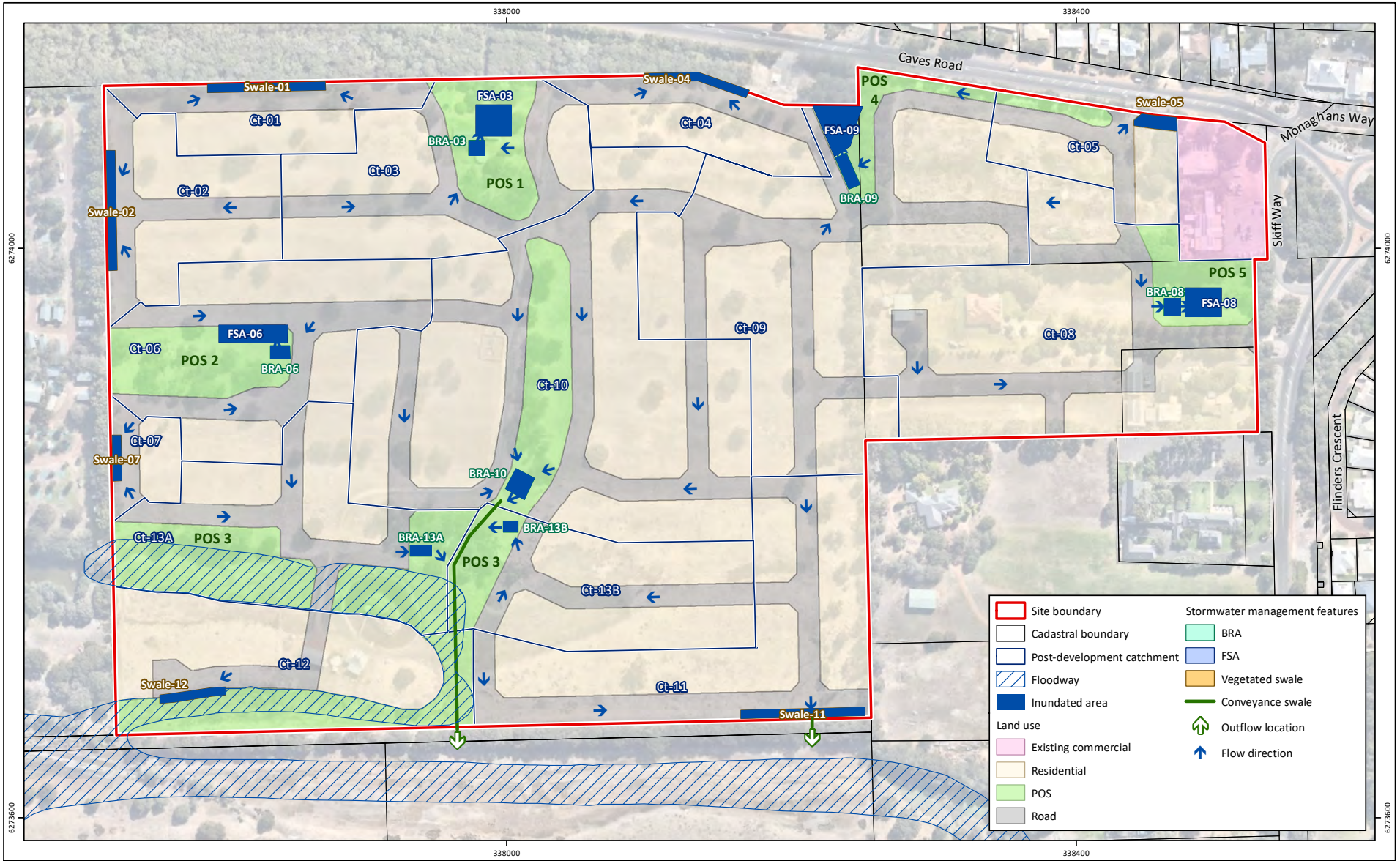

Figure 11: Inundation Plan - 1% AEP Event

Project: Local Water Management Strategy
Lot 4 and 12 Caves Road, Abbey
Client: Landowner Group

Plan Number:
EP20-141(03)--F27a
Drawn: WJC
Date: 19/12/2022
Checked: AJI
Approved: DPC
Date: 20/12/2022

N

0 50 100
Metres
Scale: 1:3,500@A4
GDA 1994 MGA Zone 50

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Appendix A

Local Structure Plan – Rise Urban



0 25 50 75 100 125m

DRAFT

LOCAL STRUCTURE PLAN

LOTS 4 & 12 CAVES ROAD & LOTS 14, 15 & 402 BUSSELL HIGHWAY, ABBEY.

NOTE:

Base Data supplied by Landgate / Denada Surveys
Aerial Photo - Feb 2019
Projection - BCG94
Areas and dimensions shown are subject to final survey calculations.

Revision	Date	Item
A	29/6/22	Initial Issue

LEGEND

- STRUCTURE PLAN BOUNDARY
- RESIDENTIAL R10
- RESIDENTIAL R20 - R40
- RESIDENTIAL R60
- RECREATION RESERVE
- LOCAL CENTRE (R60)
- FLOODWAY
- PERIMETER ROAD
- ACCESS STREET B
- HIGHER ORDER CYCLE PATH
- ACCESS STREET D (INDICATIVE ONLY)
- FUTURE PEDESTRIAN / CYCLE CONNECTION TO BUAYANYUP DRAIN CYCLE PATH
- EMERGENCY SECONDARY EGRESS
- POS NUMBER
- ROUNDABOUT
- FULL MOVEMENT INTERSECTION
- LEFT IN / LEFT OUT INTERSECTION

-	:	CLIENT
A3@1:2,500	:	SCALE
15 December 2022	:	DATE
IA Abbey-2-001	:	PLAN No
B	:	REVISION
C.L.	:	PLANNER
B.L	:	DRAWN

Rise Urban
AGILE PLANNING FOR THE NEW NORMAL

Appendix B

Modelling Assumptions Report – Emerge Associates



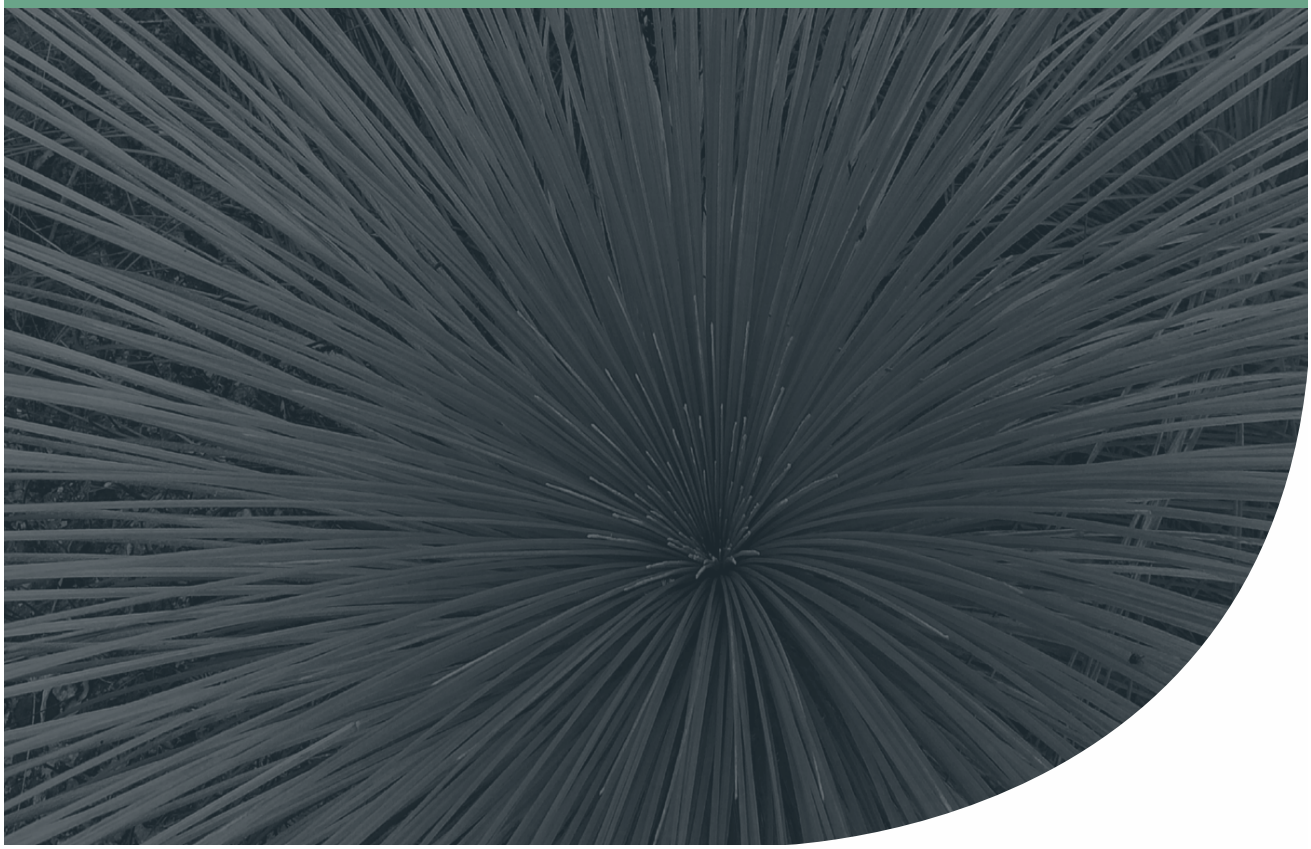
emerge ASSOCIATES
Integrated Science & Design

Abbey South Structure Plan Area

Modelling Assumptions Report

Project No: EP20-141(03)

Prepared for the Abbey Landowners Group
December 2022



Document Control

Doc name:	Abbey South Structure Plan Area Modelling Assumptions Report				
Doc no.:	EP20-141(03)—013A AJI				
Version	**Date**	**Author**		**Reviewer**	
1	July 2022	April Irwin	AJI	Dave Coremans	DPC
	Prepared to support the LWMS				
A	December 2022	April Irwin	AJI	Dave Coremans	DPC
	Prepared to support the LWMS				

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Table of Contents

1 Background 1

2 Methodology 2

2.1 Rainfall 2

3 Pre development model 3

3.1 Pre-development model 3
3.2 Discharge 3

4 Post-development model 4

5 References 6

5.1 General references 6
5.2 Online references 6

List of Tables

Table 1: Pre-development parameters 3
Table 2: Pre-development catchment areas (ha) 3
Table 3: Pre-development discharges 3
Table 4: Post-development parameters 4
Table 5: Post-development catchment areas (ha) 4

1 Background

This report provides a summary of the detailed hydrological and hydraulic modelling that was undertaken to inform the Abbey South Structure Plan Area local water management strategy (LWMS). The LWMS details the drainage design for the residential development located on Lot 4 & Lot 12 Caves Road & Lots 14, 15 & 402 Bussell Highway, Abbey.

The site covers approximately 30.5 ha and is bound by Caves Road to the north, Bussell Highway to the east, an RAC holiday park to the west and existing agricultural areas to the south.

2 Methodology

XPSWMM hydrological and hydraulic modelling software was used to calculate the surface water runoff volumes. The hydrological component of the software uses the Laurenson non-linear runoff-routing method to simulate runoff from design storm events. Key assumptions regarding the hydrological model include:

- Runoff is proportional to slope, area, infiltration and percentage of imperviousness of a catchment.
- Sub-catchment areas and slopes are determined from surveyed topographical data and earthworks plans.
- Infiltration rates and percentage imperviousness have been selected based on experience with model preparation for similar soil conditions.

Runoff from each sub-catchment is routed through the catchment using the hydraulic component of XPSWMM. Generally, assumptions associated with the hydraulic component of the model include:

- Virtual links (i.e. purely for model construction, not equivalent to flow path onsite) between nodes within a sub-catchment are given the length of 10 m and slope of 0.05 to minimise the lag time of conveying the water from a sub-catchment node to a 'storage' node, a 'dummy intermediate' node or a conduit/link.
- Links between sub-catchment storages act as conveyance channels (e.g. sheet flow within roads in a 1% annual exceedance probability (AEP)). These links are given lengths and slopes that are representative of the site conditions and actual pathway lengths between catchments.
- All channels are designed with a width of 5 m, roughness of 0.2 (Manning's n) and are trapezoidal in shape. This allows for easy conveyance and represents concrete pipes and road surfaces within the model.
- Where relevant roadside swales, bio-retention areas (BRAs), and flood storage areas (FSAs) are modelled as nodal-reservoirs with infiltration depth-rating curves to account for differential infiltration rates with changing depth.

2.1 Rainfall

The ensemble temporal patterns obtained from the Australian Rainfall and Runoff (AR&R) Data Hub (AR&R 2019) were used for the rainfall analysis.

Up to eight durations ranging between 1 hour and 72 hours were tested, with the peak flood elevation being assessed as the determining result.

Following the process suggested by AR&R (Ball J et al. 2019), the highest mean duration was selected as the critical duration. AR&R also recommends that when it is not practical to run the entire ensemble array, the ensemble that produces the result closest to the mean (for the critical duration) should be adopted. The 1 hour duration ensemble 6 and the 3 hour duration ensemble 5 was adopted for the 1% AEP and 20% AEP events respectively. The post-development durations were either 3 or 6 hours and the ensembles were assigned depending on the storage location and type.

3 Pre development model

3.1 Pre-development model

Pre-development modelling was undertaken to determine the discharge from the site. An initial loss proportional loss model was adopted to account for catchment losses. Loss values, roughness and runoff coefficients were based on site conditions, as shown in **Table 1**. The northern portion of the site is assumed to be fully retained and does not contribute to discharge offsite. The pre-development catchments are shown in **Figure 1**.

Table 1: Pre-development parameters

Land type	Initial loss (mm)	Continuing loss	Manning's n
Sandy	25	2.5	0.035
Clayey	15	1.5	0.035

The pre-development catchment areas and land use types were digitised using aerial photography and these are shown in **Table 2**.

Table 2: Pre-development catchment areas (ha)

Sub-catchment	Slope	Area (ha)
Ct-01	0.025	8.9
Ct-02	0.025	1.2

3.2 Discharge

The pre-development peak flow rate and volume leaving the site as determined by the XPSWMM model is summarised in **Table 3**.

Table 3: Pre-development discharges

AEP event	Discharge (m^3/s)	Volume (m^3)
20% AEP	0.3	1591
1% AEP	1.1	3,082

4 Post-development model

An initial loss continuing loss model was adopted to account for post-development catchment losses. The post-development catchment area, land types and loss values were based on the structure plan design, typical infiltration rates for the soils which occur onsite and based on project team experience. Post-development catchment areas and land types within the site were informed by the structure plan provided by Rise Urban (catchments were slightly modified based on localised topography). **Table 4** summarises the loss parameters used within the post-development model.

Table 4: Post-development parameters

Land type	Initial loss (mm)	Continual loss (mm)	Roughness
Road Surface	1	0.1	0.02
Road Verge	9	1.5	0.05
Lot impervious	**Fully retained**		
POS	25	2.5	0.05

A summary of post-development catchment information is provided in **Table 5**. The assumption for lots is that they will fully retain all runoff up to a 1% AEP event and not contribute to storage basins and swales or discharge offsite. The post-development catchment layout is shown in **Figure 2** and runoff storage locations are shown in **Figure 8** of the LWMS (Emerge Associates 2022).

Table 5: Post-development catchment areas (ha)

Catchment	Slope	Road pavement	Road verge	POS
Ct-01	0.025	0.261	0.174	0
Ct-02	0.004	0.279	0.186	0
Ct-03	0.005	0.332	0.2272	0.537
Ct-04	0.010	0.234	0.156	0
Ct-05	0.002	0.153	0.095	0.117
Ct-06	0.003	0.399	0.266	0.603
Ct-07	0.025	0.090	0.060	0
Ct-08	0.001	0.467	0.311	0.387
Ct-09	0.002	0.728	0.486	0.330
Ct-10	0.002	0.869	0.579	0.605
Ct-11	0.006	0.576	0.384	0
Ct-12	0.001	0.158	0.105	0.741
Ct-13a	0.006	0.319	0.213	1.127
Ct-13b	0.005	0.230	0.092	0.280

The following assumptions were incorporated into the model:

- Lots
  - Lots will retain the 1% AEP event on lot using soakwells and infiltration in pervious garden areas.
  - Garden areas in lots will have high infiltration rates as it is likely that sand-based landscape mix or mulch will be used.
- Road reserve
  - There will be no infiltration on roads and pavements. There will however be some minor absorption storage loss which is accounted for in the initial and continuing loss values.
  - Road reserve contains 60% pervious verge and 40% impervious bitumen areas.
- Basin catchments and POS
  - Basin catchment areas (basin footprint and contributing open space) are assumed to be 100% pervious.
  - Basin catchment areas will likely contain landscaped or remnant vegetation.
- Storage
  - BRAs retain runoff from events up to and including the frequent event (i.e. first 15 mm).
  - BRAs have 1:3 side slopes and maximum depth of 500 mm.
  - Swales have 1:6 side slopes and maximum depth of 500 mm.
  - FSAs have 1:6 side slopes and maximum depth of 1 m.
  - FSAs and swales retain runoff from events up to and including the 1% AEP event.
- Infiltration
  - A hydraulic conductivity of 5 m/day is assumed.
  - BRAs will be vegetated and used for treatment; therefore a 50% clogging factor is applied.
  - Infiltration through the base area and side slopes of the FSAs are considered in the overall infiltration rating curve for these areas.
- Evapotranspiration
  - Volumes leaving the system through evapotranspiration were assumed to be negligible when compared to the total runoff volume and since the duration of the model run was comparatively short. XPSWMM default evapotranspiration assumptions are therefore used.

5 References

5.1 General references

The references listed below have been considered as part of preparing this document.

Emerge Associates 2022, *Abbey South Structure Plan Area: Local Water Management Strategy*, EP20-141(03)--009 AJI, 1.

5.2 Online references

Australian Rainfall and Runoff (AR&R) 2021, ARR Data Hub, viewed 1 December 2021, Available from: <https://data.arr-software.org/>.

Bureau of Meteorology (BoM) 2021a, Climate Data Online, viewed 1 December 2021, Available from, <http://www.bom.gov.au/water/designRainfalls/revised-ifd/>.

Bureau of Meteorology (BoM) 2021b, Design Rainfall Data System (2016), viewed 1 December 2021, Available from, <http://www.bom.gov.au/water/designRainfalls/revised-ifd/>.

Figures

Figure 1: Pre-development Catchments.

Figure 2: Post-development catchments.

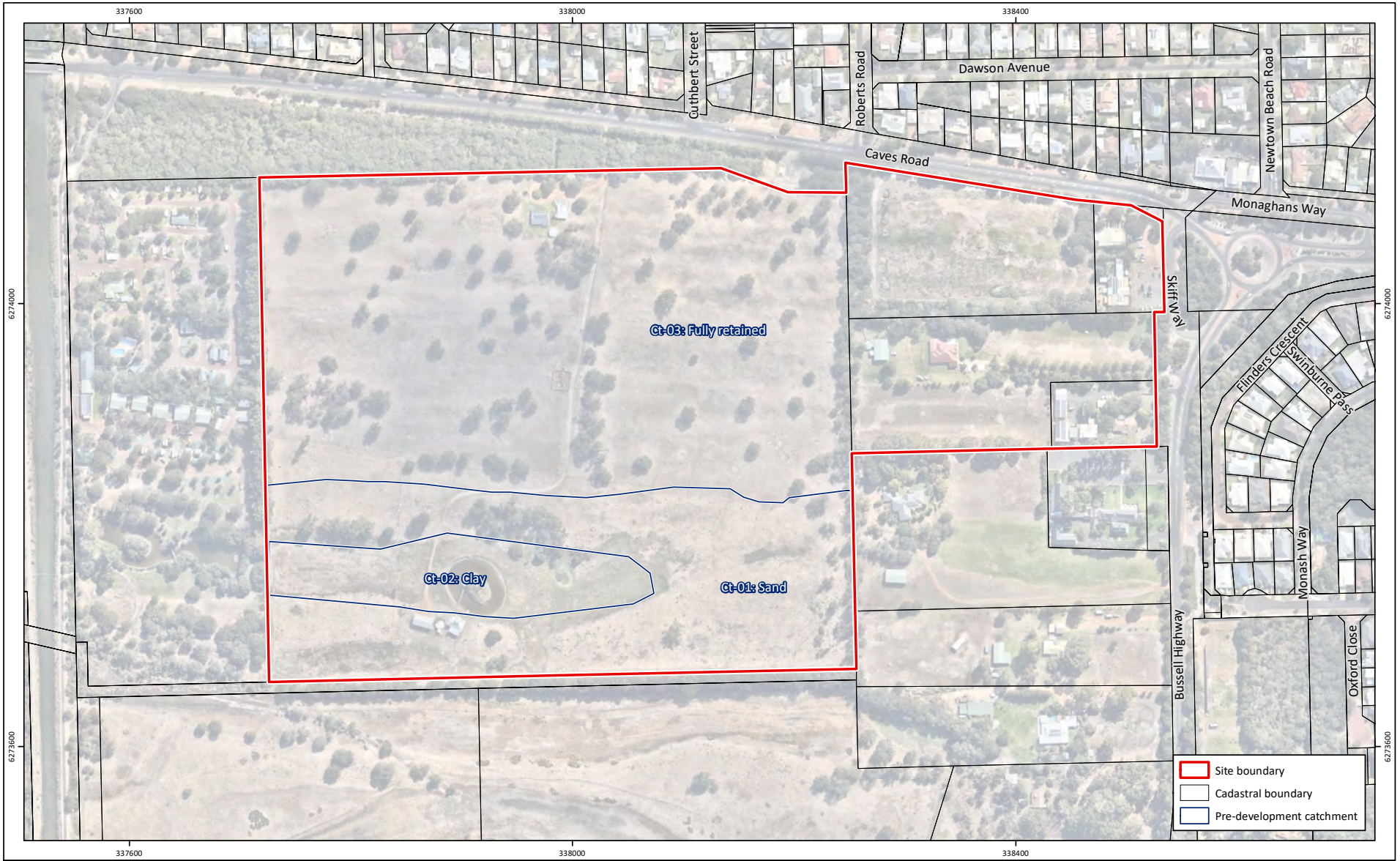

Figure 1: Pre-development Catchments

Project: Modelling Assumption Report
Abbey South Structure Plan Area
Client: Landowner Group

Plan Number:
EP20-141(03)--F28
Drawn: WJC
Date: 13/07/2022
Checked: AJI
Approved: DPC
Date: 21/07/2022

N

0 75 150
Metres
Scale: 1:4,500@A4
GDA 1994 MGA Zone 50

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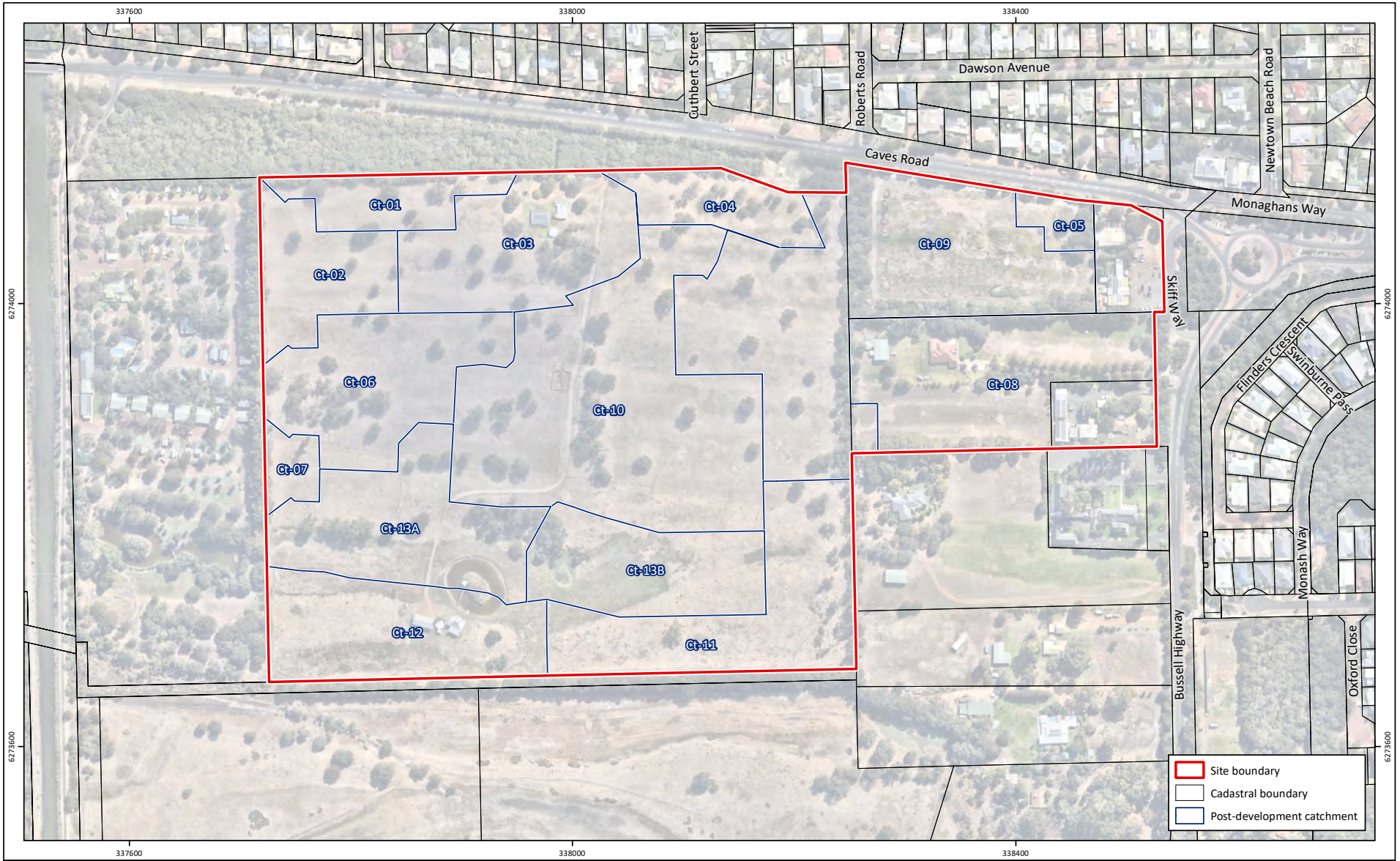

Figure 2: Post-development Catchments

Project: Modelling Assumption Report
Abbey South Structure Plan Area
Client: Landowner Group

Plan Number:
EP20-141(03)--F29
Drawn: WJC
Date: 13/07/2022
Checked: AJI
Approved: DPC
Date: 21/07/2022

N

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Metres
Scale: 1:4,500@A4
GDA 1994 MGA Zone 50

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Appendix C

Educational material

Planning your planting

Create 'watering zones' in your garden by grouping plants with similar watering needs. This will allow you to make more efficient use of your garden water by ensuring that no plants are over or under watered.

The Waterwise 'Drop Zone' system makes it easy to identify a plant's water requirements. This system divides plants into one of three groups depending on their watering needs. 'Three Drop' plants require the most watering (usually every second day in summer), whereas 'Two Drop' and 'One Drop' plants require less watering respectively.

It's also important to reticulate only once on your allocated days, either before 9am or after 6pm. Look for the Waterwise 'Drop Zone' system at your local Waterwise garden centre. To find the centre closest to you, visit www.watercorporation.com.au or call the Waterwise Helpline on 13 10 39.

Remember, a small amount of planning now can save plenty of water in the future.

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Perth WA 6000
Ph (08) 6364 7600
Fax (08) 6364 7601
www.water.wa.gov.au

DOW210858



Government of **Western Australia**
Department of **Water**

Planting a local native garden

Looking after all our water needs









In an era of rising temperatures and decreasing rainfall it is important to look at how we use water in our gardens.

Did you know?

About half of the water typically used in our homes is actually used to water the garden (and of that almost all is used to water lawns).

Many of us water lawns that we simply don't use, or water more than we need to. Similarly, often the plant species in our gardens are exotic and not entirely suitable to our climate – needing more water to survive.

Why go native?

- Local native plants are best suited to the local climate, conditions and soil. Therefore they require minimal inputs such as water, fertiliser and maintenance.
- They attract local wildlife, insects and birds and provide corridors of biodiversity in developed areas.
- They have minimal impact on the environment – unlike many introduced species, which have become bushland weeds and prove difficult and expensive to eradicate.
- They represent local heritage, teaching us about nature and our local identity.

Mulch. Mulch. Mulch.

If everyone fully utilised mulch in the garden, a much lower percentage of household water usage would end up on the garden.

The even better news is that mulching is very easy! Raw materials like woodchips and tree clippings are best, but any organic mulch will suffice. Simply spread at least 50mm of mulch over the whole planting area, leaving a small amount of breathing space at the base of the stem. This mulch won't need to be topped up again until autumn. Be sure not to turn or disturb the mulch as this will break the fine feeder roots that develop between the mulch and the soil.

In addition to mulch, a wetting agent can help overcome water repellence in soils, allowing water to penetrate the soil more quickly and in larger amounts. You can find wetting agents at your local nursery or garden centre.

Want to know more?

The Department of Water is committed to making sure that the water needs of Western Australia are met now, and in the future. Small steps we each take can make a big difference to the sustainability of our precious water supply. If you would like to know more, visit the Department of Water website – www.water.wa.gov.au.

Key tips for reducing groundwater use

- Design gardens and landscaping to enhance absorption of rain into the ground and to minimise evaporation – by using local native garden beds, mulch and subsurface irrigation etc.
- Keep planted areas dense and group plants with similar water needs together and make use of windbreaks.
- Prepare the soil before planting to ensure that plants can make the most of the water they need.
- Re-use water from the home in the garden – this includes bucketing greywater from the laundry and bathroom as well as water from downpipes connected to your house gutters. You can also install a subsurface greywater reuse system. For further information, contact your local council or visit www.water.wa.gov.au

Key tips for protecting our groundwater

- **Reduce your reliance on bore water.** Our rainfall has reduced, which means less water to recharge our aquifers. Continued housing development in some areas can increase the number of new garden bores and the use of groundwater.

  The Department of Water has drawn up a map of Perth's groundwater area with boundaries showing which areas are better suited for bores.

- **Design gardens and landscaping to enhance maximum absorption of rainfall into the groundwater and minimise evaporation.** Use local native plants, mulch and subsurface irrigation.
- **Reduce your use of fertilisers and chemicals.** These can contaminate groundwater, particularly products high in phosphate.
- **Reduce water use through a variety of water saving mechanisms in the home and garden.**
- **Re-use water from the home in the garden – this includes bucketing greywater from the laundry and bathroom as well as water from downpipes connected to your house gutters. You can also install a subsurface greywater reuse system. For further information, contact your local council or visit www.water.wa.gov.au**

For your watering days and other information on water saving in homes and gardens visit www.watercorporation.com.au or call 1800 508 55

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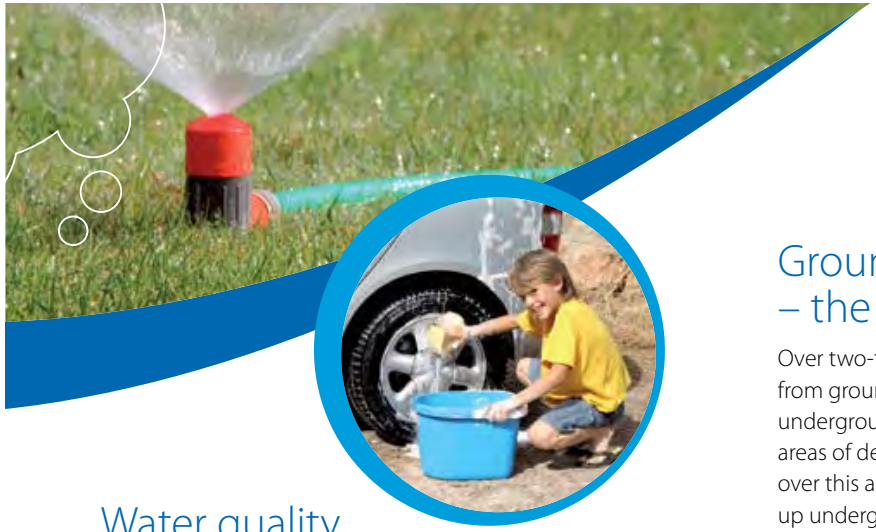
Government of **Western Australia**
Department of **Water**

Looking after all our water needs

Extracting groundwater



Water quality

The quality of groundwater can be affected in many ways.

- The use of lawn and garden fertilisers heavy in phosphate is a major issue in Perth. Phosphates easily soak through the sand plain into the aquifer, rivers, ocean, creeks and swamps. This results in aquatic life dying and the growth of dangerous algae in freshwater lakes and rivers.
- Oils, paint thinners, various workshop chemicals – if poured into the sandy soil – will soak through to the aquifer and create long-term pollution issues.
- Heavy metal particles are dangerous to our health, as are hydrocarbons. These come from vehicle fuel systems, brake linings and exhaust systems. When vehicles are parked on private driveways and carports, such material will wash into your private soak wells and eventually into the aquifer. Remember to clean out your soak wells annually, to remove any leaf and pollutant build-up. This will also aid in the efficiency of your soak wells and reduce internal flooding problems.

Groundwater – the situation

Over two-thirds of Perth's water supply comes from groundwater. The Perth region has an underground geology which includes large areas of deep sand and limestone. Rain falling over this area and running off the hills builds up underground as a shallow semi-freshwater aquifer, which is available for household bores in some areas.

The freshwater aquifer is renewed each year with rainfall. With rainfall continuing to decline in Perth, and more homes being equipped with bores, the draw on the aquifer is increasing, thus creating a threat to ongoing bore water supply.

Groundwater recharge

Traditionally, stormwater run-off from roofs and roads and other surfaces has been collected in drainage pipes and exported into the ocean or waterways.

This 'lost' water can be a valuable resource to recharge a shallow groundwater aquifer. Sandy soils are extremely permeable and well suited to infiltration of stormwater to increase groundwater levels.

Recharging the groundwater aquifer with stormwater helps manage the local water cycle balance and prevents problems associated with increased bore water extraction, acid sulphate soils, salinity and waterlogging.

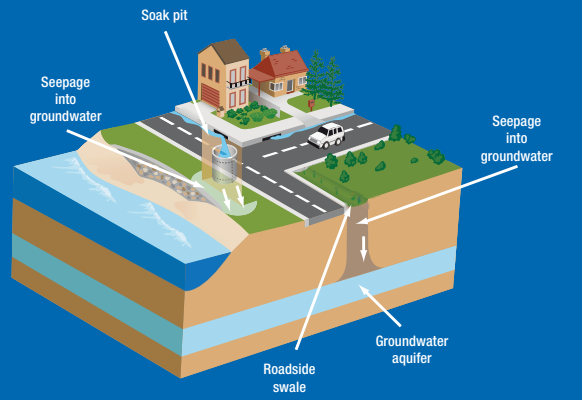


Managing local stormwater

'Stormwater' is a term used to describe the water which runs off surfaces such as houses and driveways and flows down into drains and stormwater pipes.

Poor stormwater management can damage not only individual properties but the environment in general. Local councils invest significant amounts of money into operating and maintaining the stormwater network.

Maximising infiltration of stormwater into groundwater can be achieved by replacing traditional drainage pipes with infiltration devices such as soakage pits and bioretention swales, as illustrated below.



Government of Western Australia
Department of Water

Looking after all our water needs

Water sensitive urban design

Rainwater storage and reuse systems

Summary

Rainwater storage systems are a simple method of capturing rainwater, traditionally from roofs, for use as an alternative water supply source and to reduce consumption of scheme water. When installed and maintained in accordance with recommended guidelines, they can provide a high quality source of water.

This brochure is part of a series that explain various aspects of water sensitive urban design. Please see *Water sensitive urban design in Western Australia* for background information on water sensitive urban design.

Main benefits

- Rainwater storage systems reduce the demand on potable water supplies.
- More rainwater is harvested when the tank is plumbed inside the house for uses such as toilet flushing. This creates a consistent drawdown on the tank supply, so there is always space to collect rainwater.
- They reduce the amount of directly connected impervious areas.
- They reduce stormwater peak flow rates and volumes.
- They reduce water supply peak flow rates and volumes.
- They can be retrofitted in houses and other buildings, including in high density urban areas.
- They can provide a water supply for (water sensitive) urban gardens and reduce the heat island effect in high density urban landscapes.

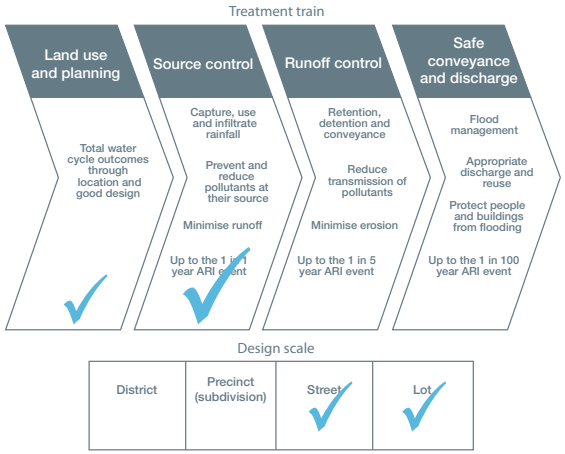
Design factors

- Put 'first flush' devices and mesh screens over all inlets and outlets to minimise maintenance requirements and preserve water quality.
- Designs for stormwater management include an air gap with trickle feed discharge level control and may include an infiltration trench or soakwell, depending on site characteristics.
- Storage can be above or below ground.
- Match storage size to collection area, end use, rainfall quantity and seasonal variability.
- Larger storage sizes are required where rainfall is unreliable and alternative supplies are not available.

Target pollutants

Rainwater storage systems are not designed to achieve direct improvements in stormwater quality.

Where they can be used in the water sensitive urban design process





Concrete underground tank



Slimline domestic rainwater tank



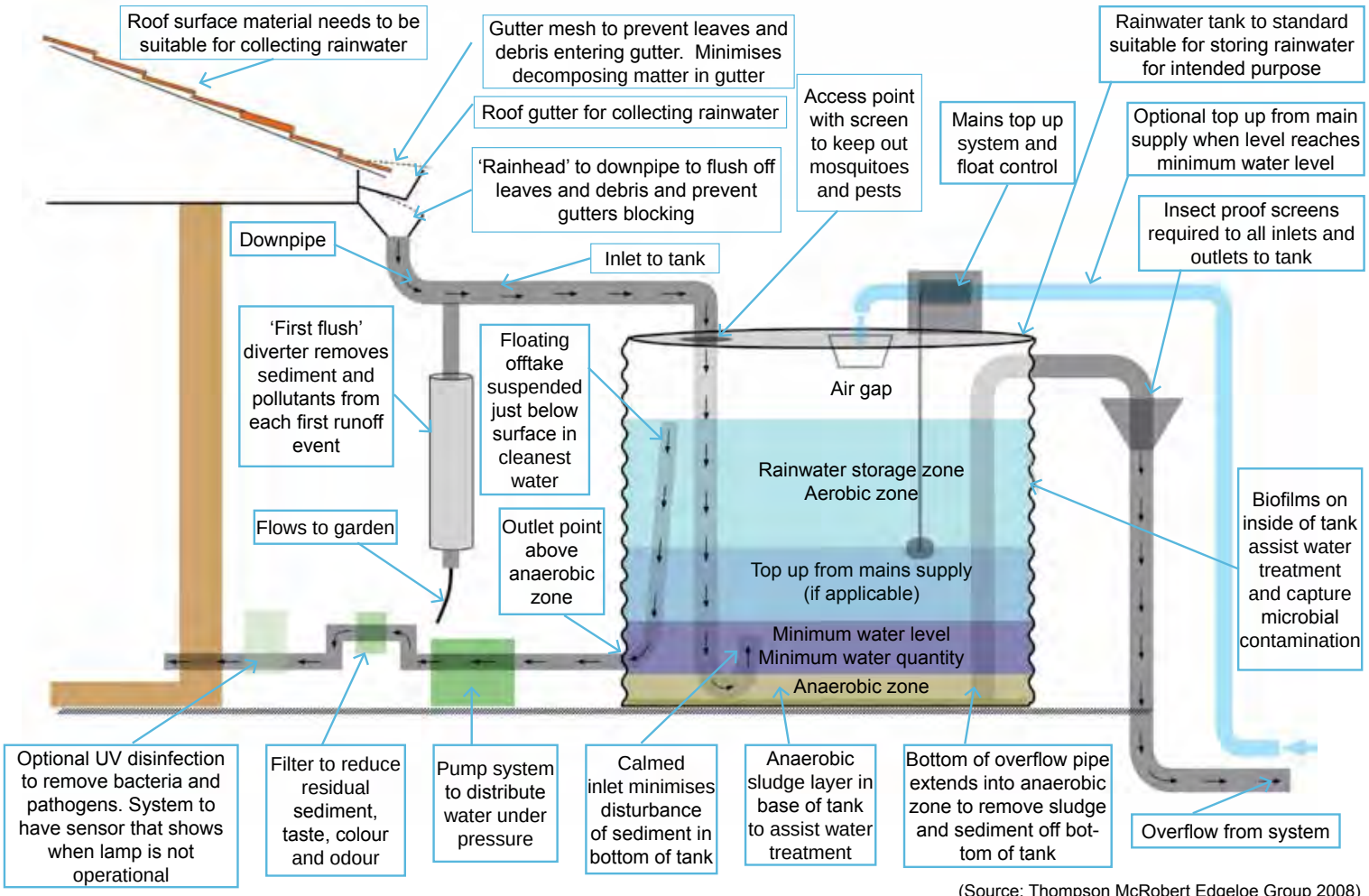
Poly domestic rainwater tanks

Looking after all our water needs

Water sensitive urban design

Rainwater storage and reuse systems

Example of above ground rainwater tank



(Source: Thompson McRobert Edgeloe Group 2008)

The department acknowledges the past project contributions of the Leschenault Catchment Council.

Required reading

Australian runoff quality: a guide to water sensitive urban design, 2006, Engineers Australia, available at <www.arq.org.au>.

Rainwater tank design and installation handbook, 2008, HB230-2008, Standards Australia.

Stormwater management manual for Western Australia, 2004–07, Department of Water, available at <www.water.wa.gov.au>. See Section 2.1 of Chapter 9 – Structural controls.

Testing of products for use in contact with drinking water, 2005, AS/NZS 4020:2005, Standards Australia.

Urban rainwater collection guidelines, Department of Health, Western Australia.

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www.water.wa.gov.au

June 2011
21592_100_06/11

Saving water in the garden.



Government of **Western Australia**
Department of **Water**

Did you know?

Pot plants use a lot more water than plants in the ground. They're more exposed to the sun and wind, only store a small amount of water and dry out faster, so you water them more.







- Reduce your lawn cover. Most of the water used in our homes goes on the lawn.
- Plant local natives. They require less water and fertiliser.
- Mulch. Organic mulches reduce evaporation and restrict weed growth.
- Collect rainwater. This will save scheme water.
- Water deeply. Watering slower, for longer, less often encourages deep root growth.
- Use greywater. Re-use your laundry and bathroom water on your garden.
- Install a drip irrigation system. This will deliver water straight to the root system.
- Landscape. Group plants to suit watering needs. Keep high water use plants together.
- Use a pool cover. It will reduce evaporation by up to 97%, saving water and money.
- Maintain. Check taps and reticulation regularly for leaks and blockages.

Looking after all our water needs

Grow local native plants and save water.

Government of **Western Australia**
Department of **Water**



Did you know?

About half the water typically used in our homes is used to water the garden, generally lawns. Many of us water a large lawn and only use part of that lawn. Some of us overwater even those parts of the lawn we do use regularly. Think about the areas of lawn you use regularly and whether you can reduce the amount of watering. Similarly, often the plant species in our gardens are exotic and not suitable to our climate, needing more water to survive. These can be regrouped together and more waterwise plants put in their place.





- Local native plants are best suited to the local climate, conditions and soil.
- They require less water, fertiliser and maintenance.
- They attract local wildlife, insects and birds.
- They have minimal impact on the environment, unlike some introduced species which have become bushland weeds.
- Local plants represent local heritage, teaching us about nature and our local identity.

Looking after all our water needs

Government of **Western Australia**
Department of **Water**

Protect and maintain our local water supplies. FertiliseWISE.

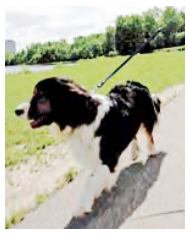


Did you know?

Fertilisers are a major contributor to surface and groundwater contamination. They run off into the stormwater system through roadside drains, collect in sumps and leach into the groundwater system. They also wash into the rivers and sea, creeks and swamps where they can do major damage to reefs and aquatic life.







WHAT YOU CAN DO TO HELP

• Minimise lawn areas and use plants that don't use fertiliser • Grow local native plants – they require less water and fertiliser • Where possible, use organic fertilisers • If you must use a chemical fertiliser, look for one that is phosphorus free. Use a nitrogen to phosphorus to potassium (N:P:K) ratio of 10:0:6. • Use a slow release fertiliser • Only apply in spring or early autumn, not in winter or summer • Fertilise only when symptoms of deficiency occur (e.g. yellowing) • Use liquid fertiliser if you have a subsurface irrigation system • Compost your garden waste • Don't fertilise near waterways or road verges • Don't let grass clippings or leaves go down the drain • Wash your car on the lawn (if you have any) not on the driveway • Pick up after your dog • Use phosphorus-free detergents (always read the labels)

Looking after all our water needs

Top 5 tips for saving water in the kitchen

Did you know the kitchen is a major consumer of water in the home using around 10 per cent of total household water for consumption for cooking, cleaning, washing or drinking?

If you follow these simple tips you can reduce your use dramatically.

- If you have a leaking tap, replace the washer or other components as required. Dripping taps can waste 30 – 200 litres of water per day.
- Look for dishwashers that have a National Water Conservation or WELS Label. The best water rating achieved by dishwashers is 5 stars.
- To avoid wasting warm water from a running tap when you first turn it on, collect it in a bottle or a jug and store it in the fridge until it is cool enough to drink.
- Only use dishwashers when you have full load.
- When boiling vegetables, use enough water to cover them and keep the lid on the saucepan. Your vegetables will boil quicker and it will save you water and power.

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LWC➔DOW313617



Government of **Western Australia**
Department of **Water**

WATER SAVING TIPS

Saving water in the home

Looking after all our water needs



In southern Western Australia, water resources are under pressure due to reduced rainfall, increased population and other factors.

With the current pressure on Western Australia's water resources, it's time for us all to do our bit to protect and maintain them.

Did you know?

In the typical house, the use of showers, clothes washing machines and toilets can consume more than three quarters of all indoor water use. In the majority of homes, all of this quality drinking water is used once then goes to the sewer. There are now simple, low cost ways of reducing this water use whilst saving on your water costs.



Water use in the home and garden

Consider the following to reduce water use:

- Don't use drinking quality water to water your garden. Use bore water and/or water recycled from showers and clothes washing machines (grey water).
- Use covers on swimming pools and spas, to reduce evaporation. Evaporation can remove more water from a pool per year than toilet use in a home.
- A home can be cooled in summer using good orientation, window shading, natural ventilation and fans. This could remove the need for an air conditioner, particularly evaporative, where large amounts of water are used.
- All new houses must adhere to the criteria of 5 Star Plus for water efficiency, but the guidelines can also be used when renovating to help create a more waterwise home.
- Install flow control aerators on taps. They are inexpensive and can reduce water flow by 50 per cent.

Find out more

For information on greywater use and systems visit the Department of Health website at www.health.wa.gov.au
For waterwise tips see the Water Corporation website at www.watercorporation.com.au and follow the "Being Waterwise" links.
To find out more visit www.water.wa.gov.au







What you can do to help?

- **Buy and install water smart fittings and appliances in the kitchen, bathroom and laundry.** Low flow showers and taps, systems that store colder water while the hot tap is reaching the desired temperature, toilets with lower flush volumes, waterless toilets, front loading washing machines etc are all modern ways of saving on water use and cost.
- **Consider installing rainwater tanks**. The stored water can be used in a number of ways, even in Perth where there are less summer rain events. Such water can be plumbed into toilets and reduce the use of high-quality treated scheme water for flushing.
- **Install a waterwise garden and/or irrigation system.** The garden and irrigation system can be designed to minimize water use.

Use products and services with the Smart Approved WaterMark label. This is a water saving program for outdoor water use and ensures any product bearing the label will save water.

Visit www.smartwatermark.org for more information

Appendix D

Landscape Master Plan – Emerge Associates



ABBEY SOUTH STRUCTURE PLAN

ABBEY LANDSCAPE MASTERPLAN

DWG EMG-60-3
REV D
DATE 20-12-22
SCALE 1 : 2500 @ A3

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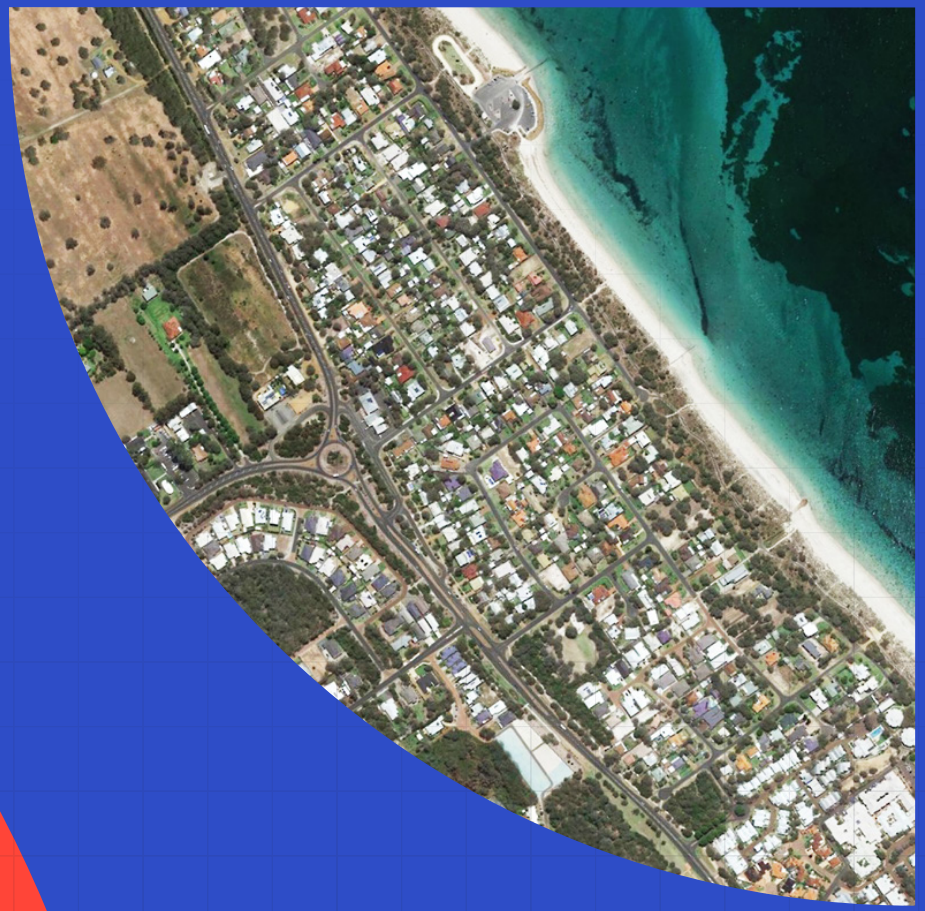
emerge ASSOCIATES



Appendix 3

Bushfire Management Plan – Emerge Associates

Rise Urban

AGILE PLANNING FOR THE NEW NORMAL

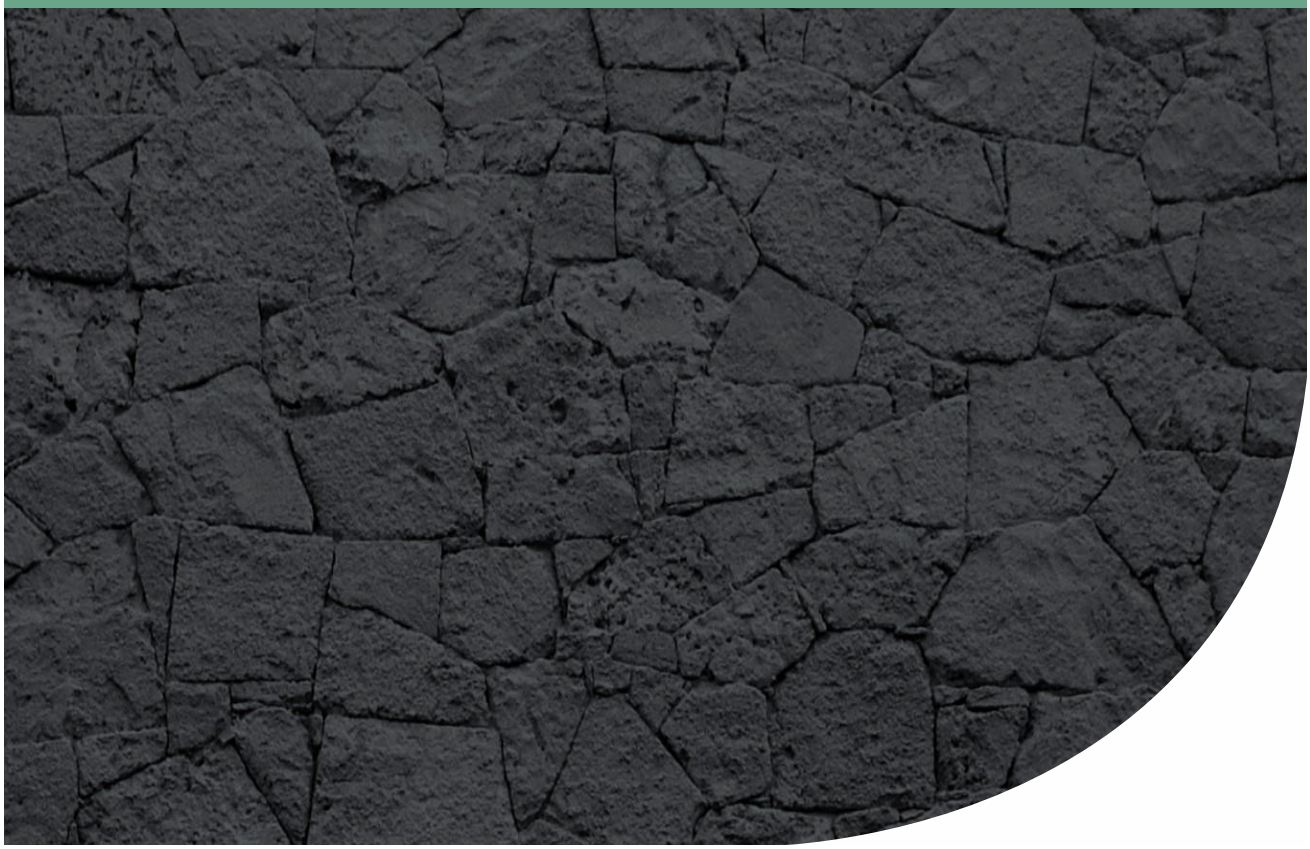
emerge ASSOCIATES
Integrated Science & Design

Bushfire Management Plan

Abbey South Structure Plan Area

Project No: EP20-141(05)

Prepared for Various Landowners
December 2022



Document Control

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Doc no.:	EP20-141(05)—011b SJB				
Version	Date	Author		Reviewer	
1	July 2022	Sarah Beukes	SJB	Kirsten Knox	KK
				Dana Elphinstone	DAE
	Report issued for client review.				
A	September 2022	Kirsten Knox	KK	Dana Elphinstone	DAE
	Update following City of Busselton comments.				
B	December 2022	Kirsten Knox	KK	Dana Elphinstone	DAE
	Updated to address revised structure plan – minor changes to layout.				

Disclaimer:

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This document has been prepared primarily to consider the layout of development and/or the appropriate building construction standards applicable to development, where relevant. The measures outlined are considered to be prudent minimum standards only based on the standards prescribed by the relevant authorities. The level of bushfire risk mitigation achieved will depend upon the actions of the landowner or occupiers of the land and is not the responsibility of the author. The relevant local government and fire authority (i.e. Department of Fire and Emergency Services or local bushfire brigade) should be approached for guidance on preparing for and responding to a bushfire.

Notwithstanding the precautions recommended in this document, it should always be remembered that bushfires burn under a wide range of conditions which can be unpredictable. An element of risk, no matter how small, will always remain. The objective of the Australian Standard AS 3959-2018 is to "prescribe particular construction details for buildings to reduce the risk of ignition from a bushfire while the front passes" (Standards Australia 2018). Building to the standards outlined in AS 3959 does not guarantee a building will survive a bushfire or that lives will not be lost.

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Executive Summary

Emerge Associates have been engaged by a number of landowners (the proponent), to support a scheme amendment and structure plan over Lots 4, 12 and 402 Caves Road, and 14 and 15 Bussell Highway, Abbey (also described as the 'Abbey South Structure Plan Area' and herein referred to as the 'site') for future residential development. The site encompasses 30.52 hectares (ha) and is bound by Bussell Highway to the east, Caves Road to the north, the RAC Busselton Holiday Park to the west and an existing nature reserve/agricultural area to the south.

The site is currently zoned 'rural' and 'conservation' under the City of Busselton Local Planning Scheme 21. It is also situated within the *Leeuwin-Naturaliste Sub-regional Strategy* (DPLH 2019a) and is identified as the 'Abbey Planning Investigation Area', to be considered for development as future tourism, aged care, mixed use and/or medium density residential.

The site is located within a 'bushfire prone area' under the state-wide Map of Bush Fire Prone Areas prepared by the Office of Bushfire Risk Management (OBRM) (2021). The identification of a site within an area declared as bushfire prone necessitates further assessment of the determined bushfire risk affecting the site in accordance with *Australian Standard 3959:2018 Construction of buildings in bushfire prone areas* (AS 3959), and the satisfactory compliance of the proposal with the policy measures described in *State Planning Policy 3.7 Planning in Bushfire Prone Areas* (SPP 3.7) (WAPC 2015) and the *Guidelines for Planning in Bushfire Prone Areas Version 1.4* (the Guidelines) (DPLH & WAPC 2021).

The purpose of this bushfire management plan (BMP) is to assess the bushfire hazards, both within and nearby the site, and identify the 'management' strategies required to ensure the development of the land is consistent with the intent of SPP 3.7 - *to preserve life and reduce the impact of bushfire on property and infrastructure.* The policy intent can be met by demonstrating compliance with the policy objectives, and policy measures informed by the bushfire protection criteria in the Guidelines and satisfaction of its four elements. Each element in the bushfire protection criteria can be met by utilising an acceptable solution or a performance principle.

This BMP has followed the requirements of SPP 3.7 to identify bushfire risk and the bushfire protection measures that will make the land suitable for its intended purpose. As part of this, a Bushfire Attack Level (BAL) assessment involving the classification and condition of vegetation within 150 m of the site has been undertaken.

The existing vegetation within the site and 150 m of the site has been classified in accordance with AS 3959, which has then informed a bushfire hazard level (BHL) assessment for the existing vegetation conditions. This BHL assessment indicates that the majority of the site is subject to a 'moderate' bushfire hazard as it is largely cleared paddock areas.

As part of assessing the long-term bushfire risk to the site, vegetation classifications have been detailed for the post-development scenario. While it is anticipated that future public open space (POS) areas within the site will be maintained and could achieve low threat in accordance with Section 2.2.3.2 of AS 3959, in accordance with consultation with the City of Busselton, all areas of POS have been assumed to be a bushfire hazard with a vegetation classification applied (and outlined

below). The following bushfire hazards were identified as applicable to the site following residential development:

- Forest (Class A) vegetation, associated with existing remnant vegetation to the north of the site, which is assumed to remain in the long-term.
- Scrub (Class D) vegetation, associated with areas of POS within the site (which will include planting/garden areas), as well as a small area of unmanaged vegetation within the southern portion of the RAC Busselton Holiday Park, situated to the west of the site. The POS areas include areas of existing trees, which will from part of the scrub classification.
- Grassland (Class G) vegetation, associated with existing paddock areas to the south and south-east of the site. This area, while associated with the Broadwater Nature Reserve Swamp, has been cleared since at least 1970, and is subject to grazing by kangaroos and is subject to regular inundation. Given the long-term presence of grass in this area, grassland is considered an appropriate classification. Grassland has also been applied to a number of POS areas within the site, based on the City's request and current classification (and anticipated planting approach).

In order to resolve the potential for bushfire to affect the site, a post development scenario has been assumed in which all classified vegetation within future residential lots and road reserves within the site will be removed and converted to non-vegetated (exclusion 2.2.3.2(e)) and low threat vegetation (exclusion 2.2.3.2(f)). If some or all POS areas are able to be managed to achieve low threat vegetation, this will reduce the BAL rating impacts on lot areas within the site.

A number of small areas of vegetation adjacent to Caves Road and Bussell Highway will be excluded as a bushfire hazard due as development in the site removes contiguous classified vegetation. All other classified vegetation outside the site, is assumed to remain in its existing condition and therefore pose a bushfire risk to the site in the long-term.

Compliance Assessment

The outcomes of this BMP demonstrate that as development progresses, it will be possible for an acceptable solution to be adopted for each of the applicable bushfire protection criteria outlined in the Guidelines. This includes:

- **Location:** The site is largely subject to a moderate bushfire hazard level based on existing conditions. The proposed development is at a higher order strategic planning stage, and the site will, overall, include sufficient area to enable all habitable buildings to achieve BAL-29 or lower in the post-development scenario (i.e. following implementation of clearing/vegetation modification) to accommodate future residential development. The majority of the site will be subject to BAL-LOW upon completion of development.
- **Siting and Design:** The site accommodates a suitable asset protection zone (APZ) for all proposed lots generally through the provision of a perimeter public road network, enabling the majority of lots to achieve BAL-29 or less. A small portion of the development cells within the site in the east, south-east and south-west will be subject to BAL-FZ and BAL-40 as a result of identified grassland bushfire hazards, either temporary hazards identified within adjacent rural lots, or assumed bushfire risk from vegetation within the POS areas (either associated with the floodway, or small pocket parks). Due to the size of the development cells, it would be possible

to accommodate the minimum 8 m setback from these hazards to achieve BAL-29. This can be considered when lot layout is addressed at future subdivision stages.

- **Vehicular Access:** Vehicle access to multiple destinations can be provided, with the site providing direct access to Caves Road to the north and Bussell Highway to the east, which provide access to Dunsborough, Busselton and Vasse town sites. Two permanent no-through roads are proposed in the structure plan, as part of supporting retention of existing buildings and vegetation, managing access across the identified floodway and supporting and enabling efficient development across various existing landowners. The proposed permanent no-through roads are less than 200 m in length and can meet the acceptable solution. Two temporary no-through roads will be present as a result of staged development in the broader area, however, they are less than 200 m in length and therefore meet the acceptable solution. The western-most development cell currently only has one public road in and out, and this is to support retaining as many existing trees as possible within a POS corridor through the central portion of the site and balancing drainage requirements. Additional access to this cell can be accommodated in the form of an emergency access way across the POS. The specific form and location of the second access can be determined at future development stages, as part of accommodating drainage design and tree retention.
- **Water:** the proposed future residential development will be serviced by a reticulated water network and provision of hydrants.

The management/mitigation measures to be implemented through the future development of the site, as discussed in this BMP, demonstrate that the acceptable solutions and the intent of each element can be met. Accordingly, having regard to clause 6.11 of SPP 3.7, the precautionary principle has been satisfied.

Table of Contents

1 Introduction 1

1.1 Background 1
1.2 Aim of this report 2
1.3 Statutory policy and framework 3
1.4 Description of the proposed development 3
1.5 Description of land characteristics 3

2 Environmental Considerations 5

2.1 Native vegetation – modification and clearing 7
2.2 Revegetation and landscape plans 7

3 Bushfire Assessment Results 8

3.1 Vegetation classification 8
3.2 Assessment outputs 20
3.2.1 BHL assessment 20
3.2.2 BAL assessment 20
3.2.2.1 Assumptions 20
3.2.2.2 BAL outputs 22

4 Identification of Bushfire Hazard Issues 23

4.1 Temporary hazards 23
4.2 Permanent hazards 23

5 Assessment Against the Bushfire Protection Criteria 25

5.1 Additional management strategies 29
5.1.1 Future approval considerations 29
5.1.2 Landscape management 29
5.1.3 Within the site 29
5.1.3.1 Surrounding the site 30
5.1.4 City of Busselton annual firebreak notice 30
5.1.5 Vulnerable or high-risk land uses 30
5.1.6 Public education and preparedness 31

6 Responsibilities for Implementation and Management of Bushfire Measures 32

7 Applicant Declaration 34

7.1 Accreditation 34
7.2 Declaration 34

8 References 35

8.1 General references 35
8.2 Online references 35

List of Tables

Table 1: Summary of potential environmental considerations that may be associated with the site (based on a search of the SLIP databases) 5
Table 2: Pre-development vegetation classification and/or exclusions, effective slope and future management 10
Table 3: Summary of the assumed post-development vegetation classification and associated effective slope within the site and 150 m in accordance with Table 2.5 (AS3959) 21
Table 4: Setback distances based on vegetation classification and effective slope and Table 2.5 of AS 3959, as determined by the method 1 BAL assessment 22
Table 5: Assessment against the bushfire protection criteria from the Guidelines 25
Table 6: Responsibilities for the implementation of this BMP 32

List of Plates

Plate 1: Areas within and surrounding the site identified as 'bushfire prone areas' (as indicated in purple) under the state-wide Map of Bush Fire Prone Areas (OBRM 2021). 1
Plate 2: Hydrological features present within the site and broader area (DBCA 2020) 4
Plate 3: The five fuel layers in a forest environment that could be associated with fire behaviour (Gould et al. 2007) 9
Plate 4: Excerpt of Table 6 from The Guidelines (DPLH & WAPC 2021) 28

Figures

Figure 1: Site Location and Topographic Contours
Figure 2: Pre-development AS 3959 Vegetation Classifications
Figure 3: Pre-Development Bushfire Hazard Level
Figure 4: Post-development As 3959 Vegetation Classifications and Effective Slope
Figure 5: Bushfire Attack Level Contour Plan
Figure 6: Spatial Representation of Bushfire Management Strategies

Appendices

Appendix A

Structure Plan and Concept Plan (Rise Urban 2022)

Appendix B

Landscape plan (Emerge Associates 2022)

List of Abbreviations

Table A1: Abbreviations – General terms

General terms	
AHD	Australian Height Datum
AS	Australian Standard
APZ	Asset Protection Zone
BAL	Bushfire Attack Level
BMP	Bushfire Management Plan
BPAD	Bushfire Planning and Design
Developable land	*Position Statement: Planning in bushfire prone areas - Demonstrating Elements 1: Location and Element 2: Siting and design* (DPLH 2019b) has outlined that 'developable land' is "*land that can accommodate a habitable dwelling and would not generally include areas of BAL-40 and/or BAL-FZ, areas within the local government setback and areas subject to environmental constraints*".
ESA	Environmentally Sensitive Area
EAW	Emergency access way
FDI	Fire Danger Index
FSAR	Fire Service Access Route
FZ	Flame Zone
Habitable building	As defined in Planning and Development (Local Planning Schemes) Regulations 2015, a 'habitable building' is *"a permanent or temporary structure on land that –* (a) is fully or partially enclosed; and (b) has at least one wall of solid material and a roof of solid material; and (c) is used for a purpose that involves the use of the interior of the structure by people for living, working, studying or being entertained"
SLIP	Shared Location Information Platform
TEC	Threatened ecological community

Table A2: Abbreviations – Organisations

Organisations	
DBCA	Department of Biodiversity Conservation and Attractions
DFES	Department of Fire and Emergency Services
DPLH	Department of Planning, Lands and Heritage
DWER	Department of Water and Environment Regulation
EPA	Environmental Protection Authority
OBRM	Office of Bushfire Risk Management
WAPC	Western Australian Planning Commission
WASAT	Western Australian State Administrative Tribunal

Table A3: Abbreviations – Legislation and policies

Legislation	
AS 3959	Australian Standard 3959-2018 Construction of buildings in bushfire prone areas
Guidelines	Guidelines for Planning in Bushfire Prone Areas version 1.4 (DPLH & WAPC 2021)
NCC	National Construction Code
SPP 3.7	*State Planning Policy 3.7 Planning in Bushfire Prone Areas* (WAPC 2015)

Table A4: Abbreviations – Planning and building terms

Planning and building terms	
LPS	Local Planning Scheme

Table A5: Abbreviations – units of measurement

Units of measurement	
cm	Centimetre
ha	Hectare
m	Metre
m^2	square metre
m AHD	m in relation to the Australian height datum
mm	Millimetre

1 Introduction

1.1 Background

Various landowners (the proponent) are progressing a scheme amendment and structure plan over Lots 4, 12 and 402 Caves Road, and 14 and 15 Bussell Highway, Abbey (herein referred to as the 'site') to facilitate future residential development. The proposed structure plan and concept plan are provided in **Appendix A**. The site is 35.76 ha in size and is bound by Bussell Highway to the east, Caves Road to the north, the RAC Busselton Holiday Park to the west and the Broadwater Nature Reserve Swamp to the south, as shown in **Figure 1**.

The site is located within a 'bushfire prone area' under the state-wide Map of Bush Fire Prone Areas prepared by the Office of Bushfire Risk Management (OBRM) (2021) as shown in **Plate 1**. The identification of a site within an area declared as bushfire prone necessitates a further assessment of the determined bushfire risk affecting the site in accordance with *Australian Standard 3959:2018 Construction of buildings in bushfire prone areas* (AS 3959), and the satisfactory compliance of the proposal with the policy measures described in *State Planning Policy 3.7 Planning in Bushfire Prone Areas* (SPP 3.7) (WAPC 2015) and the *Guidelines for Planning in Bushfire Prone Areas Version 1.4* (the Guidelines) (DPLH & WAPC 2021).

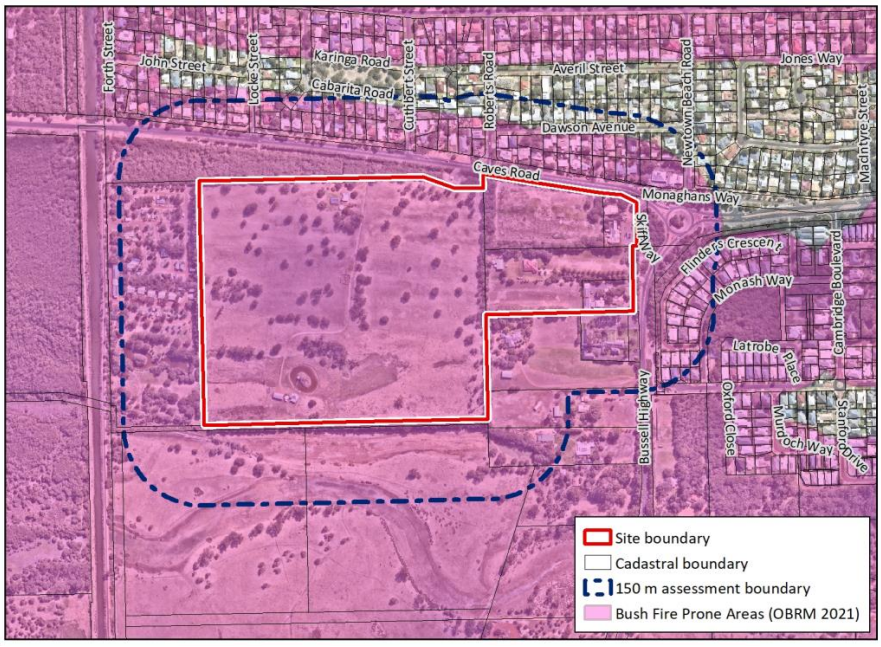

Plate 1: Areas within and surrounding the site identified as 'bushfire prone areas' (as indicated in purple) under the state-wide Map of Bush Fire Prone Areas (OBRM 2021).

The purpose of SPP 3.7 and its policy intent is to preserve life and reduce the impact of bushfire on property and infrastructure through effective risk-based land use planning. Importantly, it is risk-based, requiring a methodical approach to identify and evaluate the hazards and provide the treatments to ameliorate these hazards to an acceptable level. SPP 3.7 requires that the determining authority give consideration to the precautionary principle (clause 6.11 in SPP 3.7) and they must be

satisfied that the potential for significant adverse impacts can be adequately reduced or managed. In particular:

> *SPP 3.7 does not require that there be no increase at all in the threat of bushfire to people property or infrastructure. Rather, as is seen in clause 2 of SPP 3.7, the intention of the policy is to 'implement effective, risk¬based land use planning and development to preserve life and **reduce the impact of bushfire on property and infrastructure'**.* (emphasis added) [1]

1.2 Aim of this report

The aim of this BMP is to assess bushfire hazards within the site and nearby areas and ensure that the threat posed by any identified hazards can be appropriately mitigated and managed and demonstrate satisfaction of clause 6.11 of SPP 3.7 (the precautionary principle). This BMP has been prepared to support the rezoning and structure planning of the site and addresses the requirements of SPP 3.7 (WAPC 2015), the Guidelines (DPLH & WAPC 2021) and AS 3959 (Standards Australia 2018). The document provides an assessment of the general bushfire management strategies to be considered as part of the future residential development within the site and includes:

- Overview of the proposed development (see **Section 1.4**).
- An assessment of the existing classified vegetation in the vicinity of the site (within 150 m) and consideration of bushfire hazards that will exist in the post-development scenario (**Section 3**).
- Commentary on how future development can achieve the bushfire protection criteria outlined within the Guidelines (**Section 5**).
- An outline of the roles and responsibilities associated with implementing this BMP (see **Section 6**).

[1] Harmanis Holdings No. 2 Pty Ltd and Western Australian Planning Commission [2019] WASAT 43 (Harmanis).

1.3 Statutory policy and framework

The following key legislation, policies and guidelines are relevant to the preparation of a bushfire management plan:

- *Bush Fires Act 1954*
- *Fire and Emergency Services Act 1998*
- *Planning and Development Act 2005* and associated regulations
- *Building Act 2011* and associated regulations
- *State Planning Policy 3.7 Planning in Bushfire Prone Areas* (WAPC 2015)
- *Guidelines for Planning in Bushfire Prone Areas Version 1.4* (DPLH & WAPC 2021)
- *Australian Standard AS 3959 – 2018 Construction of buildings in bushfire prone areas* (Standards Australia 2018)

1.4 Description of the proposed development

The northern portion of the site is currently zoned 'rural' under the City of Busselton Local Planning Scheme No. 21 (LPS No.21), whilst the southern portion of the site is currently zoned 'conservation', and an area within the eastern portion of the site is zoned 'tourism'. The site is also identified as part of a number of 'special control areas', with wetland, floodway and landscape values. Through the scheme amendment, the site is proposed to be rezoned to 'development' or similar, and is supported by a structure plan which will guide future subdivision and development. The structure plan and concept plan (Rise Urban 2022) has been provided in **Appendix A**. The proposed development within the site will include:

- Residential lots of various sizes, typically between 500-600 m^2
- A commercial precinct, on the corner of Caves Road and Bussell Highway.
- Interconnected road network, including perimeter roads and external connections to Caves Road and Bussell Highway.
- Public open space (POS) areas, supporting retention of existing trees and available for future residents to use for passive and active recreation.

1.5 Description of land characteristics

The entire site is relatively low lying with a slight south-westerly aspect. Elevation ranges from approximately 2 m Australian Height Datum (m AHD) within the southern portion of the site to 3 m AHD within the northern and south-eastern portion of the site. A depression is located within the southern portion of the site, associated with a floodway, with elevations of around 1 m AHD.

The site is characterised by largely cleared areas composed of paddock grasses that have been used for livestock grazing. More recently, commercial operations have commenced within the north-eastern portion of the site, including an ice factory and fresh food market. Strips of remnant native vegetation exist in the eastern portion of the site (along lot boundaries) and individual paddock trees (predominantly *Agonis flexuosa*) are present throughout the site.

A review of the Geomorphic Wetlands of the Swan Coastal Plain dataset (DBCA 2020) indicates that a number of multiple use wetland (MUWs) are identified within the site, and include four MUWs in the

southern and south-western portions of the site (unique feature identification (UFI) 39, 41 63, 13195); and one MUW within the north-eastern portion of the site (UFI 64). These are shown in **Plate 2.**

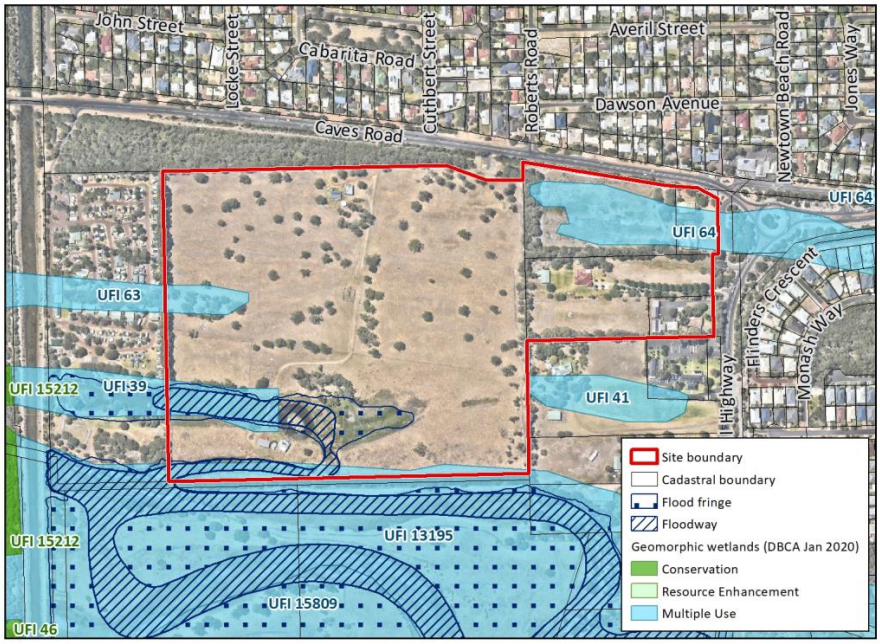

Plate 2: Hydrological features present within the site and broader area (DBCA 2020)

From a broader context perspective, an RAC holiday/caravan park is located immediately to the west of the site, with Buayanyup Drain located immediately adjacent to the western boundary of the park. To the north and east of the site, land use is more urbanised and associated with existing urban/residential development, whilst land use to the south of the site is part of the Broadwater Nature Reserve Swamp. This reserve has been cleared since at least 1970, and has been subject to historic livestock grazing, with heavy ongoing grazing by kangaroos and is also subject to regular inundation.

2 Environmental Considerations

In accordance with the *Bushfire Management Plan – BAL Contour* template prepared by the Department of Planning, Lands and Heritage (DPLH) (2018), this BMP has considered whether there are any environmental values that may require specific consideration through either protection, retention or revegetation. To support this, a review of publicly available databases has been undertaken, with particular reference to the Shared Location Information Platform (SLIP) databases and investigations undertaken to support the scheme amendment and structure plan, including a Local Water Management Strategy (LWMS) (ref) and an Environmental Assessment and Management Strategy (ref). A summary of the search results has been provided in **Table 1**.

Key environmental considerations for future development of the site and management of bushfire risk include the remnant native vegetation to the immediate north of the site, and a floodway and flood fringe within the south-western portion of the site.

Table 1: Summary of potential environmental considerations that may be associated with the site (based on a search of the SLIP databases)

Key environmental feature (information in brackets refers to mapping data source)	Yes / no / potentially occurring within the site	If yes / potentially, describe the value that may be impacted
Conservation category wetlands and buffers (DBCA-019)	No	No conservation category wetlands (CCW) are present within the site. A conservation category wetland is mapped 225 m west of the site. No buffer extends into the site.
RAMSAR wetlands (DBCA-010)	No	Not applicable. No RAMSAR wetlands are located within or adjacent to the site.
Waterways (Hydrography Linear (Hierarchy) (DWER-031))	Yes	An offshoot of the floodway and flood fringe, associated with the Broadwater River and its main floodplain, is mapped within the south-western portion of the site. This area is currently composed largely of paddock grasses, with the flood fringe able to be developed and the floodway to be protected within POS areas. The Buayanyup Drain occurs 180 m west of the site.
Threatened and priority flora (DBCA-036)	No	Following a review of the publicly available datasets, a number of threatened flora or priority flora may occur in the general area. Whilst a detailed flora and vegetation survey has not been completed for the site, the site is cleared of remnant native vegetation, apart from occasional *Agonis flexuosa* and eucalypts (*Eucalyptus rudis*) present as paddock trees, and is composed of paddock grasses. It is highly unlikely that threatened or priority flora species occur within the site.
Threatened and priority fauna (DBCA-037)	No	A review of publicly available databases indicates that a number of conservation significant species may occur within the site or nearby, including the three black cockatoo species (Carnaby's, Baudin's and forest red-tailed) and the western ringtail possum. No detailed fauna or fauna habitat surveys have been completed for the site, however as outlined above, the site is cleared of remnant native vegetation, apart from occasional *Agonis flexuosa* and eucalypts (*Eucalyptus rudis*) present as paddock trees, and is composed of paddock grasses. It is highly unlikely the site would provide important habitat for threatened or priority fauna species.

Table 1: Summary of potential environmental considerations that may be associated with the site (based on a search of the SLIP databases) (continued)

Key environmental feature (information in brackets refers to mapping data source)	Yes / no / potentially occurring within the site	If yes / potentially, describe the value that may be impacted
Threatened ecological communities (TEC) (DBCA-038)	No.	A review of the publicly available datasets and our knowledge of the area, indicates a number of threatened ecological communities (TECs), priority ecological communities (PECs) may occur in the general area. As outlined above, while no detailed flora and vegetation surveys have been completed, none of these values are likely to be present given the highly disturbed nature of the site, with the site dominated by paddock grasses with occasional *Agonis flexuosa* and eucalypts (*Eucalyptus rudis*) present as paddock trees.
Department of Biodiversity Conservation and Attractions (DBCA) controlled lands or waters (DBCA-011)	No	Not applicable. No DBCA controlled lands or waters exist within or adjacent to the site.
Clearing regulations – Environmentally Sensitive Areas (DWER-046)	No	The site is not mapped as an environmentally sensitive area (ESA). An ESA is mapped approximately 170 m to the west.
Conservation Covenants Western Australia (DPIRD-023)	No	Not applicable.
Aboriginal heritage (DPLH-001)	Yes	A portion of an 'Other Heritage Place' (ID 5337) is mapped as extending into the western portion of the site. This feature is described as 'skeletal material/burial' and is likely to be associated with the drain further to the west (supported by information provided in the Buayanyup River Action Plan (Geographe Catchment Council 2010) where the Aboriginal site is described as being associated with the drain). As it is an 'other heritage site', no specific approval is required under the existing enacted Aboriginal heritage legislation.
Non-indigenous heritage (DPLH-090)	No	No non-indigenous heritage sites were identified within the site. A non-indigenous heritage site (Place No. 5354, 'Newtown House') occurs immediately south of the site, adjacent to Bussell Highway. It is understood the current land uses will continue and will not be impacted by future urban development within the remainder of the site. Therefore, no specific consideration from an approval or management perspective is likely to be required.

2.1 Native vegetation – modification and clearing

As outlined above, the site has historically been cleared and mainly supports paddock grasses. Native vegetation comprises scattered native trees, or trees along fence lines only.

No areas of native vegetation outside the site are proposed to be modified or cleared by the proponent as part of the proposed development.

With regard to bushfire management, native vegetation clearing within the site may be required to enable the relevant siting and access requirements of typical subdivision development as well as the Guidelines to be achieved and would be associated with clearing to establish:

- Future lots
- Asset protection zones (APZs)
- Public roads
- POS areas.

Where clearing of native vegetation is undertaken in accordance with a future subdivision approval under the *Planning and Development Act 2005*, it is exempt from requiring a clearing permit under Schedule 6 of the *Environmental Protection Act 1986* (EP Act). Additionally, a clearing permit will not be required where other exemptions pursuant to the *Environmental Protection Act 1986* such as those associated with or Section 33 of the *Bush Fires Act 1954* or Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (where outside and ESA) exist, such as those associated with a approved buildings and other structures (through building licence).

2.2 Revegetation and landscape plans

No revegetation is proposed. However, following consultation with the City of Busselton, while it is anticipated that future POS areas within the site will be maintained and could achieve low threat in accordance with Section 2.2.3.2 of AS 3959, all areas of POS have been assumed to be a bushfire hazard with a vegetation classification applied (and outlined further below). Therefore, no management is assumed.

3 Bushfire Assessment Results

Bushfire risk for the site has been appropriately considered both in context to the site and potential impact upon the site using AS 3959 and the Guidelines.

The objective of AS 3959 is to reduce the risk of ignition and loss of a building to bushfire. It provides a consistent method for determining a radiant heat level (radiant heat flux) as a primary consideration of bushfire attack. AS 3959 measures the Bushfire Attack Level (BAL) as the radiant heat level (kW/m^2) over a distance of 100 m. AS 3959 also prescribes deemed-to-satisfy construction responses that can resist the determined radiant heat level at a given distance from the fire. It is based on six Bushfire Attack Level (BAL) ratings: BAL-LOW, BAL-12.5, BAL-19, BAL-29, BAL-40 and BAL-FZ.

A BAL contour plan has been prepared in accordance with Appendix Three of the Guidelines and Method 1 of AS 3959 to determine the BAL ratings likely to be applicable to future buildings. This has been based on the vegetation classifications and the effective slope under the vegetation, with the result presented on the BAL contour plan.

To support the proposed scheme amendment and structure planning process, the following has been undertaken and are discussed further below:

- Bushfire hazard levels (BHL) within and nearby to the site have been determined in accordance with Appendix Two of the Guidelines and based on the pre-development vegetation classification detailed in **Table 2**.
- In accordance with Appendix Five of the Guidelines, a method 1 BAL assessment has been undertaken to demonstrate that the proposed development areas can achieve BAL-29 or less, based on the post-development vegetation classifications and effective slope detailed in **Table 3**.

3.1 Vegetation classification

Assessing bushfire hazards takes into account the vegetation classifications and exclusions within the site and surrounding area for a minimum of 100 m, in accordance with AS 3959 and the Guidelines. The assignment of vegetation classifications is based on an assessment of vegetation structure, which includes consideration of the various fuel layers of different vegetation types, as outlined in **Plate 3**. These defined fuel layers are considered when determining the classification of vegetation and associated BAL contours. The BMP considers vegetation within the site and nearby areas based on current conditions, observed through the site visit (termed 'pre-development'), and changes to that vegetation that will occur as a result of implementing the proposed development (termed 'post-development').

An assessment of existing vegetation and effective slope within the site and surrounding 150 m was undertaken over multiple site visits in November 2020, November 2021, December 2021 and June 2022, in accordance with AS 3959 and the Guidelines. Each distinguishable pre-development vegetation plot (based on existing conditions) is described in **Table 2** and shown in **Figure 2**. Existing

bushfire hazard levels (based on vegetation identified in **Figure 2**) are shown in **Figure 3** and discussed in **Section 3.2.1.**

Not all vegetation is a classified bushfire risk. Vegetation and ground covers that are exempt from classification as a potential hazard is identified as a low threat under Section 2.2.3.2 of AS 3959. Low threat vegetation includes the following:

a. *Any vegetation that is more than 100 m from the site.*
b. *Single areas of vegetation less than 1 ha in area and not within 100 m of other areas of vegetation being classified.*
c. *Multiple areas of vegetation less than 0.25 ha in area and not within 20 m of the site, or each other, or of other areas of vegetation being classified.*
d. *Strips of vegetation less than 20 m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20 m of the site or each other, or other areas of vegetation being classified.*
e. *Non-vegetated areas, that is, areas permanently cleared of vegetation, including waterways, exposed beaches, roads, footpaths, buildings and rocky outcrops.*
f. *Vegetation regarded as a low threat due to factors such as flammability, moisture content or fuel load. This includes grassland managed in a minimal fuel condition, mangroves and other saline wetlands, maintained lawns, golf courses (such as playing areas and fairways), maintained public reserves and parklands, sporting fields, vineyards, orchards, banana plantations, market gardens (and other non-curing crops), cultivated gardens, commercial nurseries, nature strips and windbreaks.*



Plate 3: The five fuel layers in a forest environment that could be associated with fire behaviour (Gould et al. 2007)

The post-development vegetation classifications are shown in **Figure 4** and are based on the assumptions detailed in **Section 3.2.2**.

Table 2: Pre-development vegetation classification and/or exclusions, effective slope and future management

Photo ID:	1	**Plot:**	1
Vegetation Classification or Exclusion Clause			
Forest (flat / upslope)			
Description / Justification for Classification			
Plot 1 contains Class A (forest) vegetation and is situated immediately north of the site. The vegetation has a multi-tiered fuel structure, with an overstorey of Peppermint trees (*Agonis flexuosa*) reaching between 10 – 15 metres in height and providing more than 30% foliage cover. The understorey is primarily comprised of juvenile trees and the Coastal Sword-Sedge (*Lepidosperma gladiatum*).			



Photo ID:	2	**Plot:**	1
Vegetation Classification or Exclusion Clause			
Forest (flat / upslope)			
Description / Justification for Classification			
Plot 1 contains Class A (forest) vegetation and is situated immediately north of the site. The vegetation has a multi-tiered fuel structure, with an overstorey of Peppermint trees (*Agonis flexuosa*) reaching between 10 – 15 metres in height and providing more than 30% foliage cover. The understorey is primarily comprised of juvenile trees and the Coastal Sword-Sedge (*Lepidosperma gladiatum*).			



Photo ID:	3	**Plot:**	2
Vegetation Classification or Exclusion Clause			
Woodland (Flat / Upslope)			
Description / Justification for Classification			
Vegetation within Plot 2 consists of a Class B (woodland) structure with an overstorey of Peppermint trees (*Agonis flexuosa*) with an understorey of sporadic unmanaged grassland. The overstorey reaches an approximate height of 15 m and as per Appendix B of AS 3959, mid-storey/understorey fuels are the defining factor, rather than canopy cover. Plot 2 is situated within the north-eastern corner of the site (Lot 12).			



Table 2: Pre-development vegetation classification and/or exclusions, effective slope and future management (continued)

Photo ID:	4	**Plot:**	2
Vegetation Classification or Exclusion Clause			
Woodland (flat / upslope)			
Description / Justification for Classification			
Vegetation within Plot 2 consists of a Class B (woodland) structure with an overstorey of Peppermint trees (*Agonis flexuosa*) with an understorey of sporadic unmanaged grassland. The overstorey reaches an approximate height of 15 m and as per Appendix B of AS 3959, mid-storey/understorey fuels are the defining factor, rather than canopy cover. Plot 2 is situated within the north-eastern corner of the site (Lot 12).			
Photo ID:	5	**Plot:**	3
Vegetation Classification or Exclusion Clause			
Scrub (flat / upslope)			
Description / Justification for Classification			
Plot 3 contains Class D (scrub) vegetation, which reaches an approximate height of 4 m to 6 m. The understorey contains grasses greater than 100 mm in length. Photo 5 illustrates the presence of Caves Road to the north and a mineral earth firebreak to the south.			
Photo ID:	6	**Plot:**	5
Vegetation Classification or Exclusion Clause			
Scrub (flat / upslope)			
Description / Justification for Classification			
Plot 5 contains Class D (scrub) vegetation, which reaches an approximate height of 4 m to 6 m. There is evidence of some understorey management, but also a consistent fuel load structure from ground to canopy and accordingly has been conservatively assessed as scrub vegetation. Bussell Highway separates Plot 5 from the site, as illustrated within Photo 6.			

Table 2: Pre-development vegetation classification and/or exclusions, effective slope and future management (continued)

Photo ID:	7	**Plot:**	5
Vegetation Classification or Exclusion Clause			
Scrub (flat / upslope)			
Description / Justification for Classification			
Plot 5 contains Class D (scrub) vegetation, which reaches an approximate height of 4 m to 6 m. There is evidence of some understorey management with an inconsistent fuel load from ground to canopy and accordingly has been conservatively assessed as scrub vegetation.			



Photo ID:	8	**Plot:**	6
Vegetation Classification or Exclusion Clause			
Scrub (flat / upslope)			
Description / Justification for Classification			
Plot 6 contains Class D (scrub) vegetation, which reaches an approximate height of 4 m to 6m. Plot 6 is situated to the south-west of the site, within the RAC Busselton Holiday Park and is unmanaged. It contains vegetation with a consistent fuel load structure from ground to canopy.			

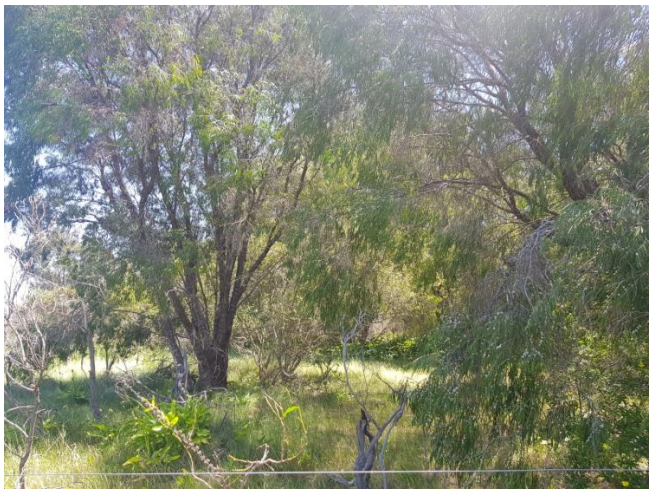

Photo ID:	9	**Plot:**	7
Vegetation Classification or Exclusion Clause			
Grassland (flat / upslope)			
Description / Justification for Classification			
Plot 7 contains Class G (grassland) vegetation, which occupies the majority of the site. Within this plot, the grass is unmanaged and greater than 100 mm in length, with shrubs and trees being less than 10% foliage cover overstorey.			



Table 2: Pre-development vegetation classification and/or exclusions, effective slope and future management (continued)

Photo ID:	10	**Plot:**	7
Vegetation Classification or Exclusion Clause			
Grassland (flat / upslope)			
Description / Justification for Classification			
Plot 7 contains Class G (grassland) vegetation, which occupies the majority of the site. Within this Plot, the grass is unmanaged and greater than 100 mm in length, with trees forming less than 10% overall foliage cover.			



Photo ID:	11	**Plot:**	7
Vegetation Classification or Exclusion Clause			
Grassland (flat / upslope)			
Description / Justification for Classification			
Plot 7 contains Class G (grassland) vegetation, which occupies the majority of the site. Within this plot, the grass is unmanaged and greater than 100 mm in length, with trees less than 10% overall foliage cover. Photo 15 was taken at the southern extent of the site (Lot 4) and illustrates the row of trees separating the site from the lot to the south.			



Photo ID:	12	**Plot:**	7
Vegetation Classification or Exclusion Clause			
Grassland (flat / upslope)			
Description / Justification for Classification			
Plot 7 contains Class G (grassland) vegetation, which occupies the majority of the site. Photo 16 shows grassland vegetation in foreground and background, with trees forming less than 10% overall foliage cover.			



Table 2: Pre-development vegetation classification and/or exclusions, effective slope and future management (continued)

Photo ID:	13	**Plot:**	7
Vegetation Classification or Exclusion Clause			
Grassland (flat / upslope)			
Description / Justification for Classification			
Plot 7 contains Class G (grassland) vegetation, which occupies the majority of the site and is shown in the foreground and mid-ground of Photo 13. Within this plot, the grass is unmanaged and greater than 100 mm in length, with trees forming less than 10% foliage cover overall.			



Photo ID:	14	**Plot:**	7
Vegetation Classification or Exclusion Clause			
Grassland (flat / upslope)			
Description / Justification for Classification			
Plot 7 contains Class G (grassland) vegetation, which occupies the majority of the site and shown in the mid-ground of Photo 14. Within this plot, the grass is unmanaged and greater than 100 mm in length, with trees less than 10% foliage cover overall.			



Photo ID:	15	**Plot:**	7
Vegetation Classification or Exclusion Clause			
Grassland (flat / upslope)			
Description / Justification for Classification			
Plot 7 contains Class G (grassland) vegetation, which occupies the majority of the site. Within this plot, the grass is unmanaged and greater than 100 mm in length, with trees less than 10% foliage cover overall.			



Table 2: Pre-development vegetation classification and/or exclusions, effective slope and future management (continued)

Photo ID:	16	**Plot:**	8
Vegetation Classification or Exclusion Clause			
Grassland (flat / upslope)			
Description / Justification for Classification			
Plot 8 also comprises Class G (grassland) vegetation, where the grass is unmanaged and greater than 100 mm in length. Photo 16 (mid-ground to background) and aerial imagery illustrates that the Broadwater Nature Reserve Swamp to the south comprise pasture grasses with scattered trees and shrubs less than 10% foliage cover.			



Photo ID:	17	**Plot:**	8
Vegetation Classification or Exclusion Clause			
Grassland (flat / upslope)			
Description / Justification for Classification			
Plot 8 also comprises Class G (grassland) vegetation, where the grass is unmanaged and greater than 100 mm in length. Photo 17 and aerial imagery illustrates that the land situated to the south (comprise pasture grasses. Photo 17 shows the row of trees adjacent to the southern boundary of the site, which when considered as part of the broader area form less than 10% foliage cover.			



Photo ID:	18	**Plot:**	8
Vegetation Classification or Exclusion Clause			
Grassland (flat / upslope)			
Description / Justification for Classification			
Plot 8 also comprises Class G (grassland) vegetation, where the grass is unmanaged and greater than 100 mm in length. Photo 18 and aerial imagery illustrates that the rural lots situated to the south-east comprise pasture grasses with sheds and outbuildings also visible in the background.			



Table 2: Pre-development vegetation classification and/or exclusions, effective slope and future management (continued)

Photo ID:	19	**Plot:**	9
Vegetation Classification or Exclusion Clause			
Exclusion 2.2.3.2 (e)			
Description / Justification for Classification			
Plot 9 contains non-vegetated areas, which have been excluded in accordance with Clause 2.2.3.2 (e). Photo 19 illustrates a sealed bitumen road (Caves Road) and carparking area associated with a wastewater pump station. Class G (grassland) is present within the foreground of the photograph, which is associated with Plot 7.			
Photo ID:	20	**Plot:**	9
Vegetation Classification or Exclusion Clause			
Exclusion 2.2.3.2 (e)			
Description / Justification for Classification			
Plot 9 contains non-vegetated areas, which have been excluded in accordance with Clause 2.2.3.2 (e). Photo 20 illustrates a sealed bitumen road (Caves Road). Class A (Forest) vegetation, associated with Plot 1, is situated to the left within the photo.			
Photo ID:	21	**Plot:**	9
Vegetation Classification or Exclusion Clause			
Exclusion 2.2.3.2 (e)			
Description / Justification for Classification			
Plot 9 contains non-vegetated areas, which have been excluded in accordance with Clause 2.2.3.2 (e). Photo 21 illustrates a sealed bitumen road (Roberts Road and Dawson Avenue).			

Table 2: Pre-development vegetation classification and/or exclusions, effective slope and future management (continued)

Photo ID:	22	**Plot:**	9
Vegetation Classification or Exclusion Clause			
Exclusion 2.2.3.2 (e)			
Description / Justification for Classification			
Plot 9 contains non-vegetated areas, which have been excluded in accordance with Clause 2.2.3.2 (e). Photo 22 illustrates a sealed bitumen road (Bussell Highway). Maintained vegetation is also present within the road reserve.			
Photo ID:	23	**Plot:**	9
Vegetation Classification or Exclusion Clause			
Exclusion 2.2.3.2 (e)			
Description / Justification for Classification			
Plot 9 contains non-vegetated areas, which have been excluded in accordance with Clause 2.2.3.2 (e). Photo 23 illustrates a sealed bitumen road (Caves Road). Maintained vegetation is also present within the road reserve.			
Photo ID:	24	**Plot:**	9
Vegetation Classification or Exclusion Clause			
Exclusion 2.2.3.2 (e)			
Description / Justification for Classification			
Plot 9 contains non-vegetated areas, which have been excluded in accordance with Clause 2.2.3.2 (e). Photo 24 illustrates a sealed carpark associated with the Shed Markets. Maintained gardens are also present. The large trees present within the rear of the photograph are associated with the woodland vegetation (Plot 2).			

Table 2: Pre-development vegetation classification and/or exclusions, effective slope and future management (continued)

Photo ID:	25	**Plot:**	10
Vegetation Classification or Exclusion Clause			
Exclusion 2.2.3.2 (f)			
Description / Justification for Classification			
Plot 10 consists of low threat vegetation associated with large private landholdings and the RAC Busselton Holiday Park, which has been excluded in accordance with Clause 2.2.3.2 (f). Photo 25 illustrates that the grass and fine fuel load is maintained to a length less than 100 mm (foreground is within the site, associated with Plot 7).			
Photo ID:	26	**Plot:**	10
Vegetation Classification or Exclusion Clause			
Exclusion 2.2.3.2 (f)			
Description / Justification for Classification			
Plot 10 consists of low threat vegetation associated with the RAC Busselton Holiday Park, which has been excluded in accordance with Clause 2.2.3.2 (f). Photo 26 illustrates that the grass and fine fuel load is maintained to a length less than 100 mm (in background, foreground is within the site, associated with Plot 7).			
Photo ID:	27	**Plot:**	10
Vegetation Classification or Exclusion Clause			
Exclusion 2.2.3.2 (f)			
Description / Justification for Classification			
Plot 10 consists of low threat vegetation associated the RAC Busselton Holiday Park, which has been excluded in accordance with Clause 2.2.3.2 (f). Photo 27 illustrates that the grass and fine fuel load is maintained (in the mid/background, foreground is within the site, associated with Plot 8) and numerous buildings/structures are established.			

Table 2: Pre-development vegetation classification and/or exclusions, effective slope and future management (continued)

Photo ID:	28	Plot:	10
Vegetation Classification or Exclusion Clause			
Exclusion 2.2.3.2 (f)			
Description / Justification for Classification			
A small area of retained remnant vegetation contains a well-managed perimeter, with a regularly maintained understorey/midstorey (including low pruning of branches), including footpaths and play areas. The portion within 150 m of the is identified as low threat, with a fenced unmanaged portion further east.			



3.2 Assessment outputs

3.2.1 BHL assessment

A BHL assessment has been prepared for the site and surrounding 150 m based on the existing vegetation conditions (see **Figure 2**), with the hazard ratings determined in accordance with Appendix Two of the Guidelines and shown in **Figure 3**.

The outcomes of the assessment indicate that the site and surrounding 150 m assessment area include predominantly moderate bushfire hazards, associated with existing unmanaged grassland. Patches of forest and scrub vegetation (largely associated with native vegetation within road reserves) are identified as an extreme hazard. The majority of the vegetation within the site will be modified, and following development, large portions of the site will be subject to a low bushfire hazard.

3.2.2 BAL assessment

3.2.2.1 Assumptions

The BAL assessment for the site has been undertaken in accordance with Method 1 of AS 3959 to determine the maximum heat flux to which future dwellings within the site are likely to be exposed.

The vegetation classification and effective slope applicable to vegetation within or nearby to the site in the post-development scenario have been summarised in **Table 3**. Overall, the BAL assessment criteria assumed includes:

- **Designated FDI**: 80
- **Flame Temperatures**: 1090 K
- **Vegetation classification**: forest (Class A), scrub (Class D) and grassland (Class G), see **Figure 4** and summarised in **Table 3**.
- **Effective slope beneath classified vegetation**: flat/upslope, as outlined in **Figure 4** and summarised in **Table 3**.
- **Setback distances**: as per Table 2.5 in AS 3959 with the relevant distances used to inform the BAL contour plan summarised in **Table 4** with the BAL contour provided in **Figure 5**.
- Vegetation within the RAC Busselton Holiday Park appears well managed and is assumed to remain so given the ongoing use of the site, despite the tree canopy present along the western boundary. Vegetation situated within the southern portion of the holiday park is unmanaged and has been classified as scrub (Class D).
- Remnant native vegetation situated immediately north of the site is assumed to remain in the long term.
- POS areas, as per City of Busselton requirements, have been assumed to pose a bushfire hazard, even though future management of these spaces is likely.
- Public roads will be installed by the developer to the minimum standards required under Appendix Four of the Guidelines and maintained by the City of Busselton in the long term.
- Areas of low threat vegetation outside the site will continue to be managed and/or considered to achieve low threat (in accordance with Section 2.2.3.2 of AS 3959) based on the existing maintenance regimes, and/or as per the City of Busselton Fire Break Notice.

- Classified vegetation that has been identified outside of the proponent's landholdings has been assumed to remain in its current state (unless stated otherwise) and will therefore continue to be a bushfire hazard to development within the site.
- Areas of grassland can include up to 10% foliage cover from shrubs and trees, per AS 3959.

Table 3: Summary of the assumed post-development vegetation classification and associated effective slope within the site and 150 m in accordance with Table 2.5 (AS3959)

Plot number	Pre-development vegetation classification	Post-development vegetation classification	Effective slope
Plot 1	Class A – Forest	Class A – Forest	Flat/upslope
Plot 2	Class B – Woodland	Exclusion 2.2.3.2 (e) – existing woodland will be cleared to support construction of roads and lots, or will be managed at the rear of future residential lots.	Not applicable
Plot 3	Class D – Scrub	Exclusion 2.2.3.2 (e) – existing scrub will be removed to support construction of roads and lots.	Not applicable
Plot 4	Class D – Scrub	Exclusion 2.2.3.2 (c) – less than 0.25 ha in size and more than 20 m from other classified vegetation following development of the site.	Flat/upslope
Plot 5	Class D – Scrub	Exclusion 2.2.3.2 (b) – less than 1 ha in size and more than 100 m from classified vegetation following development of the site.	Flat/upslope
Plot 6	Class D – Scrub	Class D – Scrub	Flat/upslope
Plot 7	Class G – Grassland	Exclusion 2.2.3.2 (e) – including developed areas within the site.	Flat/upslope
Plot 8	Class G – Grassland	Class G – Grassland	Flat/upslope
Plot 9	Exclusion 2.2.3.2 (e)	Exclusion 2.2.3.2 (e) – including developed areas within the site.	Not applicable
Plot 10	Exclusion 2.2.3.2 (f)	Exclusion 2.2.3.2 (f) – associated with existing managed POS and/or adjacent landholdings (including RAC Holiday Park)	Not applicable
Plot 11	Class B – Woodland / Class G – Grassland	Class D – Scrub – associated with POS areas that will include planted areas (including gardens, turf and hardscape/play elements) and retained paddock trees. This includes the stand of woodland, where the trees are retained but due to their height and potential future planting for screening purposes, will be more 'Scrub' vegetation. As per City of Busselton requirements, POS is required to be identified as a bushfire hazard, even though management of the POS is likely to occur. Scrub classification is suitable based on likely parkland/garden bed planting (height less than 6 m), and would not achieve a forest classification.	Flat/upslope
Plot 12	Class G – Grassland	Class G – Grassland – associated with the floodway and a small pocket parks. As per City of Busselton requirements, these areas are required to be identified as a bushfire hazard, even though management of the POS is likely to occur. Grassland classification is assumed based on the likely planting approach (grass and sedge planting with trees less than 10% foliage cover) and eventual public use of the space.	Flat-upslope

3.2.2.2 BAL outputs

The BAL assessment completed for the site indicates that that the majority of the areas proposed for residential development (and therefore future habitable buildings) can achieve BAL-29 or below based on the proposed concept plan, as shown in **Figure 5**. Small portions of residential land are subject to BAL-40 and BAL-FZ, however the higher ratings are generally associated with temporary hazards (refer to **section 4.1**) and there is sufficient area to accommodate habitable buildings within BAL-29 or below using in-lot setbacks and can be addressed as part of the future detailed planning process.

Table 4 provides a summary of the setback distances necessary from classified vegetation to achieve the indicated BAL ratings, with the BAL contour plan (**Figure 5**) being a visual representation of these distances. The setback distances are based on the post-development classified vegetation and effective slope (described in **Table 3** and shown in **Figure 4**), and are taken from Table 2.5 of AS 3959.

Table 4: Setback distances based on vegetation classification and effective slope and Table 2.5 of AS 3959, as determined by the method 1 BAL assessment

Plot number	Vegetation classification (see Figure 4)	Effective slope (see Figure 4)	Distance to vegetation (from Table 2.5 of AS 3959)	BAL rating (see Figure 5)
Plot 1	Forest (Class A)	Flat/upslope (0°)	< 16 m	BAL-FZ
			16 - < 21 m	BAL-40
			21 - < 31 m	BAL-29
			31 - < 42 m	BAL-19
			42 - < 100 m	BAL-12.5
			> 100 m	BAL-LOW
Plot 6 and 11	Scrub (Class D)	Flat/upslope (0°)	< 10 m	BAL-FZ
			10 - < 13 m	BAL-40
			13 - < 19 m	BAL-29
			19 - < 27 m	BAL-19
			27 - < 100 m	BAL-12.5
			> 100 m	BAL-LOW
Plot 8 and 12	Grassland (Class G)	Flat/upslope (0°)	< 6 m	BAL-FZ
			6 - < 8 m	BAL-40
			8 - < 12 m	BAL-29
			12 - < 17 m	BAL-19
			17 - < 50 m	BAL-12.5
			> 50 m	BAL-LOW

4 Identification of Bushfire Hazard Issues

From a bushfire hazard management perspective, the key issues that are likely to require management and/or consideration as part of future development within the site include:

- Provision of appropriate separation distances from permanent bushfire hazards to ensure a BAL rating of BAL-29 or less can be achieved for future habitable buildings. This includes allowances for areas of existing remnant vegetation associated with the Class A forest to the north of the site, Class D scrub vegetation to the south-west and Class G grassland to the south and south-east of the site.
- Provision of appropriate vehicular access to ensure that when development within the site is fully constructed, egress to at least two different destinations will be available to future residents and emergency personnel. This may include the use of temporary no through roads and/or emergency access ways (EAWs) as part of internal staging of the subdivision, until the full road network associated with the development is constructed.
- Provision of appropriate water supply dedicated to firefighting purposes (i.e. reticulated water supply and associated hydrant network).

These issues are considered further in **Section 5.**

4.1 Temporary hazards

Grassland vegetation to the south-east of the site is considered a temporary hazard, associated with existing rural lots likely to be subject to future residential development. This vegetation has been identified as a bushfire hazard for the purposes of this assessment given timing for development is unknown.

As part of staged development within the site, temporary Class G grassland hazards may be present, however if a minimum 50 m-wide area around each stage (where within the proponent's landholding) is managed, resulting BAL ratings can be mitigated. Vegetation will need to be managed by the proponent until the long-term residential development progresses.

4.2 Permanent hazards

Within the site, the proposed POS areas have been assumed to be a bushfire hazard, with vegetation classifications of scrub (Class D) and grassland (Class G) assumed depending upon the pre-development and likely use (including screening function to Bussell Highway proposed where existing vegetation is present). The majority of the POS areas are assumed to achieve a 'scrub' classification, which is considered a conservative assessment of bushfire risk given these areas will contain a mix of turf, mulched garden beds, footpaths, hardscape areas and play areas. The floodway area is assumed to be grassland, to reflect likely grass/sedge planting to accommodate recreation and drainage (similar for the pocket parks in the east).

Outside the site, the surrounding 150 m comprises areas of classified vegetation, with large areas of low threat vegetation and non-vegetated land. Classified vegetation surrounding the site includes:

- Class A – Forest vegetation situated immediately north of the site, adjacent to Caves Road.
- Class D – Scrub vegetation to the south-west, associated with unmanaged vegetation within the RAC Busselton Holiday Park.
- Class G – Unmanaged grassland vegetation to the south of the site, associated with a long-term cleared area identified as the Broadwater Nature Reserve Swamp and subject to heavy ongoing grazing and regular inundation.

5 Assessment Against the Bushfire Protection Criteria

This BMP provides an outline of the mitigation strategies that will ensure that as development progresses within the site, an acceptable solution can be adopted for each of the bushfire protection criteria detailed within Appendix Four of the Guidelines. The bushfire protection criteria identified in the Guidelines and applicable/addressed as part of this BMP are:

- Element 1: Location of the development
- Element 2: Siting and design of the development
- Element 3: Vehicular access
- Element 4: Water supply.

As part of future development, it is likely that an 'acceptable solution' will be able to address the intent of all four bushfire protection criteria. A summary of how this can be achieved and an associated compliance statement for each has been provided in **Table 5.**

Table 5: Assessment against the bushfire protection criteria from the Guidelines

Bushfire protection criteria	Proposed bushfire management strategies
Element 1: Location	
A1.1 Development location	Element 1 (through *Position Statement: Planning in bushfire prone areas – Demonstrating Element 1: Location and Element 2: Siting and design* (DPLH 2019b)) is an applicable consideration for intensification of land use as part of strategic planning, to determine the appropriate allocation of land for various land uses. In this instance, the rezoning of the site from 'rural', 'conservation' and 'tourism' under the City of Busselton Local Planning Scheme No. 21 (LPS No.21) is intended to provide opportunities for future residential development of the site. This is in accordance with the *Leeuwin-Naturaliste Subregional Strategy (DPLH 2019a)* which identifies the site for tourism, aged care, mixed use and/or medium density residential development. The majority of the site is identified as a moderate hazard, associated with the existing cleared paddocks identified as grassland vegetation. The site addresses Clause 6.2 (b) of SPP 3.7, which requires development to have a moderate hazard level rating or be able to achieve BAL-29 or less, either before or as part of implementing the proposed development. The future residential development cells will be in areas of low hazard once development is progressed and will be able to achieve BAL-29 or less. Small portions of some of the development cell may be subject to BAL-40 and BAL-FZ as a result of identified grassland bushfire hazards, either temporary hazards identified within adjacent rural lots, or assumed bushfire risk from vegetation within the POS areas (either associated with the floodway, or small pocket parks which will likely have management), however the development cell contains sufficient area to accommodate habitable buildings within BAL-29 or below using in-lot setbacks. This can be addressed as part of the future planning process. Consideration of achieving BAL-29 or less for development is addressed under Element 2 further below. Therefore, the proposal complies with **A1.1**.

Table 5: Assessment against the bushfire protection criteria from the Guidelines (continued)

Bushfire protection criteria	Proposed bushfire management strategies
Element 2: Siting and design	
A2.1 Asset Protection Zone	All proposed development areas that are intended to support habitable buildings are able to achieve an asset protection zone (APZ) with sufficient separation from classified vegetation to achieve BAL-29 or below. Separation from permanent bushfire hazards is provided within the structure plan through the management of future lots, and the strategic placement of public roads. Overall, the development cells within the site are suitably sized to accommodate the minimum separation distances (outlined in **Table 4** and shown in **Figure 5**) required to achieve BAL-29 or less at future habitable buildings/developable land[2]. As part of future detailed planning, consideration should be given to any identified bushfire hazards, and the spatial provisions to enable appropriate setbacks (which form the basis for the APZ) to be accommodated, including the provision of public roads and in-lot setbacks (if required). Therefore, the proposal complies with **A2.1**.
Element 3: Vehicular access	
A3.1 Public roads	Surrounding public roads (i.e. Caves Road, Bussell Highway) and all new internal public roads can and will be able to comply with the minimum standards outlined in Appendix Four of the Guidelines (DPLH & WAPC 2021). The concept plan indicates road reserves will likely vary between 16 m and 20 m wide, meeting neighbourhood connectors and access street requirements, as per the IPWEA guidelines (refer to **Plate 4** further below). Therefore, the proposal complies with **A3.1**.
A3.2a Multiple access routes	The site has direct frontage to Caves Road to the north and Bussell Highway to the east, providing opportunities to accommodate egress to different destinations as shown in the structure plan and proposed concept plan provided in **Appendix B**. The site will connect to Caves Road via two access points, and to Bussell Highway via one access points, with connections generally shown in **Figure 6**. Caves Road and Bussell Highway are major regional connectors, providing egress to the south, east and west (Vasse, Dunsborough and Busselton townsites). Existing areas of residential development are located to the north and east. Following development of the site, the site will be part of a residential built out area. The proposed development complies with **A3.2a**. As part of future planning, future residential development should provide for an interconnected road network which can connect with the existing public road network, ensuring two access routes to at least two different destinations is available to future occupants at all times, and may include the use of temporary emergency access ways (EAWs) as part of staged development. The specific layout for future internal roads and connections to the existing surrounding public roads will be determined as part of future subdivision stages however given the existing public road network surrounding the site, future development can comply with the requirements of the Guidelines.

[2] *Position Statement: Planning in bushfire prone areas - Demonstrating Elements 1: Location and Element 2: Siting and design* Department of Planning, Lands and Heritage (DPLH) 2019b, *Position Statement: Planning in bushfire prone areas - Demonstrating Element 1: Location and Element 2: Siting and design*, Western Australian Planning Commission. has outlined that 'developable land' is "*land that can accommodate a habitable dwelling and would not generally include areas of BAL-40 and/or BAL-FZ, areas within the local government setback and areas subject to environmental constraints"*.

Table 5: Assessment against the bushfire protection criteria from the Guidelines (continued)

Bushfire protection criteria	Proposed bushfire management strategies
Element 3: Vehicular access (continued)	
A3.2b Emergency access way	Given the development will be able to provide egress to at least two different destinations (in line with Acceptable Solution A3.2a), it is unlikely an emergency access way (EAWs) will be required. It is possible that the western-most development cell may have a single internal access road to/from the cell. This may be required to enable retention of existing vegetation and manage the drainage and floodway within the POS network. The provision of access to multiple destinations can be addressed through provision of a public road connection or emergency access way within the southern central portion of the site, as shown in **Figure 6** and **Appendix B**. The use of an EAW, based on site constraints, would satisfy the requirements of the Guidelines. If any EAWs (including temporary EAWs as part of staged development) are proposed they will need to comply with the minimum technical requirements outlined in Appendix Four of the Guidelines, or as agreed with the City of Busselton, including trafficability, width and length of the road. The proposed development can comply with **A3.2b**.
A3.3 Through-roads	Two permanent no-through roads are proposed in the site, as part of supporting retention of existing buildings, managing access across the identified floodway and supporting and enabling efficient development across various existing landowners. All the proposed permanent no-through roads are less than 200 m in length and can meet the acceptable solution (see **Appendix B** and **Figure 6**). Two temporary no-through roads will be present as a result of undeveloped land to the south-east (see **Appendix B** and **Figure 6**), which has no determined timeframes for development at this stage. These no through roads are less than 200 m in length and can meet the acceptable solution. Where no through-roads are proposed, these will need to comply with the minimum requirements outlined in Appendix Four of the Guidelines, including provision of an appropriate turn-around area. Where temporary no through-roads are required as part of staged development, these should also comply with Appendix Four of the Guidelines or as agreed with the City of Busselton. The proposal is able to comply with **A3.3.**
A3.4a Perimeter roads	The structure plan and concept plan (see **Appendix B**) indicates internal perimeter roads will be provided around all areas identified as a possible bushfire hazard to future residential development cells, with the exception of residential cells adjoining areas of scrub vegetation to the south-west, commercial development to the east where the development cell is abutted by small pocket parks that are assumed to achieve a grassland (Class G) classification; and temporary grassland bushfire hazards to the south-east. The required setbacks to these hazards can be accommodated within the development cell and as part of future lot design. In accordance with the Guidelines, a perimeter road is not required for grassland vegetation. The future development of the cell adjoining the scrub vegetation (external to the south-west of the site) is anticipated to be larger lots. There is sufficient area to provide suitable access and/or separation from classified vegetation. Management will be confirmed during detailed design. The proposed development complies with **A3.4a**.
A3.4b Fire service access route	None proposed as this stage. As outlined above, the future road layout within the site will be designed as part of future planning stages. However, given the development will be able to provide egress to two different destinations (in line with Acceptable Solution A3.1), and the site is bounded by existing public roads that will provide firefighter access around the perimeter of the site (see **Figure 6**), as well as internal perimeter roads, it is unlikely that any fire service access routes (FSARs) will be required. If any FSARs are proposed in the future, they will need to comply with the requirements of the Guidelines (or as agreed with the City of Busselton).

Table 5: Assessment against the bushfire protection criteria from the Guidelines (continued)

Bushfire protection criteria	Proposed bushfire management strategies
Element 3: Vehicular access (continued)	
A3.5 Battle-axe access legs	None proposed at this stage. As part of the future development of the site, while battle-axe access legs should be avoided where possible within designated bushfire prone areas, if proposed as part of future development, their inclusion will need to be justified and will need to address the minimum standards outlined in Appendix Four of the Guidelines which includes technical requirements in Table 6 (reproduced in **Plate 4**).
A3.6 Private driveways	None proposed at this stage based on the density of residential development. If private driveways longer than 70 m are proposed they will need to comply with the requirements of the Guidelines, including Table 6 of the Guidelines.
Element 4: Water	
A4.1 Identification of future water supply	The proposed development is located in an area that is serviced by reticulated water supply, which will be expanded to include the site, as confirmed by Busselton Water (Stantec 2021).
A4.2 Provision of water for fire fighting purposes	Not applicable at this stage in the process. The site will be serviced by a network of reticulated water hydrants as per the relevant water supply authority requirements (Busselton Water) (or as otherwise determined by a relevant approval authority).

Table 6: Vehicular access technical requirements

TECHNICAL REQUIREMENTS	1 Public roads	2 Emergency access way[1]	3 Fire service access route[1]	4 Battle-axe and private driveways[2]
Minimum trafficable surface (metres)	In accordance with A3.1	6	6	4
Minimum horizontal clearance (metres)	N/A	6	6	6
Minimum vertical clearance (metres)	4.5			
Minimum weight capacity (tonnes)	15			
Maximum grade unsealed road[3]	As outlined in the IPWEA Subdivision Guidelines	1:10 (10%)		
Maximum grade sealed road[3]		1:7 (14.3%)		
Maximum average grade sealed road		1:10 (10%)		
Minimum inner radius of road curves (metres)		8.5		

Notes:
[1] To have crossfalls between 3 and 6%.
[2] Where driveways and battle-axe legs are not required to comply with the widths in A3.5 or A3.6, they are to comply with the Residential Design Codes and Development Control Policy 2.2 Residential Subdivision.
[3] Dips must have no more than a 1 in 8 (12.5% -7.1 degree) entry and exit angle.

Plate 4: Excerpt of Table 6 from The Guidelines (DPLH & WAPC 2021)

5.1 Additional management strategies

5.1.1 Future approval considerations

A BAL assessment has been prepared for the site to demonstrate that best practice management strategies can be adopted through future planning and implementation stages to ameliorate the bushfire hazards (i.e. habitable buildings can be located in areas of BAL-29 or less) that would otherwise impact upon its future development.

It is likely a BMP, or as a minimum a bushfire statement, will be required to support future subdivision for the site, to detail how the proposed development layout has or will address the bushfire protection criteria based on the recommendations outlined within this BMP, as well as to determine the likely BAL ratings applicable to the future habitable buildings based on hazards applicable to that stage of development.

Where proposed to be constructed and within a designated bushfire prone area, future Class 1, 2, 3 and 10a buildings in an area subject to a BAL rating of BAL-12.5 or higher will need to satisfy higher construction standards in accordance with the National Construction Code (NCC) (i.e. AS 3959 or the National Association for Steel-framed Housing (NASH) Standard).

5.1.2 Landscape management

5.1.3 Within the site

Public open space (POS) areas

In accordance with the requirements of the City of Busselton, all POS areas proposed as part of development within the site have been identified as classified vegetation and a bushfire hazard (scrub or grassland depending upon the pre-development scenario and expected use/purpose). No ongoing management has been assumed in these POS areas for bushfire purposes, although it is noted from an amenity, public use and community expectation perspective management is likely to occur.

The design and construction of POS areas is generally a condition of subdivision approval, and the detailed design will be determined in collaboration with the City of Busselton as part of the standard development process (and based on typical maintenance requirements for urban/residential areas). A landscape master plan has been prepared and is provided in **Appendix B** showing intended uses/approach.

Managed areas

It is recommended that as part of the staged development within the site and to minimise the impacts of temporary (grassland) hazards on proposed lots, the proponent should manage a minimum 50 m-wide area immediately surrounding each subdivision stage (where within their broader landholding) to a low threat standard. This would include permanently removing the grass vegetation (the vegetation classification applicable to the site in its current condition) and/or regularly throughout any year mowing/slashing the grass to 100 mm in height or less. This would be maintained by the proponent until residential development progresses.

Within public road reserves

The proposed road reserves will be designed and maintained to achieve a low threat sin accordance with Section 2.2.3.2 (e) and (f) of AS 3959, as shown in **Figure 4** and will be the responsibility of the proponent initially until handover to the City of Busselton.

5.1.3.1 Surrounding the site

Public open space and road reserves

Areas of existing public open space will continue to be maintained by the City of Busselton and or Main Road Western Australia in accordance with the existing maintenance regimes.

Within private landholdings

The private landholdings surrounding the site are assumed to be managed by the applicable landowners in accordance with the City of Busselton firebreak notice in perpetuity.

5.1.4 City of Busselton annual firebreak notice

The City of Busselton releases a firebreak notice annually (or as required) to provide a framework for bushfire management within the City. The City of Busselton is able to enforce this order in accordance with Section 33(1) of the *Bush Fires Act 1954* and landowners will need to ensure compliance with the fire break notice, as published, or any directions provided by the City of Busselton.

Following development for residential purposes, all lots will be required under the firebreak notice to:

- Remove all hazardous material from the whole of the land except living trees. In the area remaining, vegetation is to be maintained to a height no greater than 10 centimetres; this includes piles of timber, branches and other vegetation.
- Tree branches shall be removed or pruned to ensure a clear separation of at least 3 metres from the eaves of all buildings and 5 metres above the top of the roof. Branches that may fall on the house must also be removed.

In addition, all lots subject to an approved bushfire management plan through subdivision will be required to comply with that plan. Based on this BMP, and similar provisions applying, all areas within the site will need to be managed to achieve low threat in accordance with Section 2.2.3.2 of AS 3959.

5.1.5 Vulnerable or high-risk land uses

Currently, no high-risk land uses, as defined under SPP 3.7, are proposed within the site as part of the scheme amendment or structure plan.

Where high-risk or vulnerable land uses are proposed in the future, these will need to address the requirements of policy measure 6.6 of SPP 3.7, including the assessment of bushfire risk and/or the preparation of an emergency evacuation plan (for vulnerable land uses) or risk management plan (for high-risk land uses) where subject to a BAL rating greater than BAL-LOW. This will be dealt with as

part of future detailed planning stages. The location of the site in an area of largely moderate bushfire hazard (which will transition to low with residential development) and connection to the public road network, including Caves Road and Bussell Highway, means key considerations such as separation from bushfire hazards and emergency access will be able to be addressed.

5.1.6 Public education and preparedness

Community bushfire safety is a shared responsibility between individuals, the community, government and fire agencies. DFES has an extensive Community Bushfire Education Program including a range of publications, a website and Bushfire Ready Groups. The DFES website (https://www.dfes.wa.gov.au/bushfire/prepare/) provides a range of materials to help the community prepare for and survive the bushfire season.

The City of Busselton provides bushfire safety advice to residents available from their website. Professional, qualified consultants also offer bushfire safety advice and relevant services to residents and businesses in high-risk areas in addition that that provided in this BMP.

In the case of a bushfire in the area, advice would be provided to residents and businesses by DFES, the DBCA and/or the City of Busselton on any specific recommendations with regard to responding to the bushfire, including evacuation if required. It is recommended that future residents make themselves aware of their responsibilities with regard to preparing for and responding to a potential bushfire that may impact them, their family and property, regardless of the BAL rating their properties are subject to.

6 Responsibilities for Implementation and Management of Bushfire Measures

Subject to the approval of the proposed scheme amendment and structure plan, development within the site for residential purposes will be implemented through the preparation of future subdivision application(s).

Table 6 outlines the future responsibilities of the proponent (developer) and the City of Busselton associated with implementing the proposed scheme amendment and structure plan, with reference to future mitigation measures to be accommodated as part of subdivision (in particular, consideration of spatial layout requirements). These responsibilities will need to be considered as part of the subsequent planning process.

Additional bushfire mitigation responsibilities will be required at subdivision for the residential development of the site, including responsibilities for future lot owners.

Table 6: Responsibilities for the implementation of this BMP

Proponent – to support the scheme amendment, structure plan and future subdivision		
No.	**Implementation and management actions**	**Timing**
1	Provide a copy of this BMP to the relevant decision makers to support the approval of the proposed scheme amendment and structure plan.	To support the scheme amendment and structure plan approval process.
2	Following approval of the scheme amendment, prepare a BMP or bushfire statement (as required) in accordance with SPP 3.7, the Guidelines (as updated) and AS 3959 to support future subdivision within portions of the site that are designated as bushfire prone areas under the *Map of Bush Fire Prone Areas*. This should be based on the proposed spatial layout of the development. Where the assumptions and outcomes of this BMP are met through subdivision design, the decision-maker may rely on this BMP for subdivision approval at their discretion.	To support future subdivision.
3	Where applicable, as part of the subdivision process, make spatial provisions for: • A suitable public road network that provides egress to at least two different destinations and meets the technical requirements of Table 6 within Appendix Four of the Guidelines (or as updated), or as otherwise determined by a bushfire consultant and relevant approval authority. Where required, this can include the use of emergency access ways (permanent or temporary) to address staged development considerations. • Where possible, avoid no through roads and battle-axe access legs as part of the spatial layout. If these are proposed as part of future development, they will need to be justified from a planning/development perspective and consistent with the minimum requirements outlined in Appendix Four of the Guidelines (or as updated), or as otherwise determined by a bushfire consultant and relevant approval authority. • Ensure future habitable buildings are able to be located in an area subject to BAL-29 or less. The minimum separation distances between habitable buildings and classified vegetation to achieve BAL-29 should be in accordance with **Table 4** in this BMP or as specified in subsequent BAL assessments. These separation distances can be accommodated through locating public roads between the habitable building and classified vegetation and/or ensuring proposed residential lots are adequately sized to ensure BAL-29 is not exceeded at the future dwelling (and use of in-lot setbacks). • A water supply dedicated to firefighting purposes in the form of a reticulated network of water hydrants	To support future structure planning and/or subdivision.

Table 6: Responsibilities for the implementation of this BMP (continued)

City of Busselton - ongoing		
No.	**Implementation and management actions**	**Timing**
1	Monitoring vegetation fuel loads in public reserves and liaising with relevant stakeholders to maintain fuel loads at minimal fuel levels, where required/applicable.	Ongoing, as required
2	Maintaining public road reserves under their management to appropriate standards, where required/applicable.	Ongoing, as required
3	Monitoring compliance with the City of Busselton annual firebreak notice and enforcing requirements as required.	Ongoing, as required

7 Applicant Declaration

7.1 Accreditation

This BMP has been prepared by Emerge Associates who have a number of team members who have undertaken BPAD Level 1 and Level 2 training and are in the process of gaining formal accreditation. Emerge Associates have been providing bushfire risk management advice for more than eight years, undertaking detailed bushfire assessments (and associated approvals) to support the land use development industry.

Dana Elphinstone is a Fire Protection Association of Australia (FPAA) Level 2 Bushfire Planning and Design (BPAD) accredited practitioner in Western Australia and is also accredited as a Bushfire Hazard Practitioner in Tasmania (BFP-146) with over seven years' experience.

7.2 Declaration

I declare that the information provided is true and correct to the best of my knowledge.

Signature:



Name: Dana Elphinstone

Company: Emerge Associates

Date: 15 December 2022

BPAD Accreditation: Level 2 BPAD no. 52565

8 References

8.1 General references

Department of Biodiversity, Conservation and Attractions (DBCA) 2020, *Geomorphic Wetlands, Swan Coastal Plain (DBCA-019)*.

L. a. H. Department of Planning (DPLH) 2019a, *Leeuwin-Naturaliste Sub-regional Strategy* Western Australian Planning Commission, Perth.

Department of Planning, Lands and Heritage (DPLH) 2019b, *Position Statement: Planning in bushfire prone areas - Demonstrating Element 1: Location and Element 2: Siting and design*, Western Australian Planning Commission.

Department of Planning, Lands and Heritage, and Western Australian Planning Commission, (DPLH & WAPC) 2021, *Guidelines for Planning in Bushfire Prone Areas Version 1.4*, Perth, Western Australia.

Office of Bushfire Risk Management (OBRM) 2021, *Map of Bush Fire Prone Areas*, Landgate, https://maps.slip.wa.gov.au/landgate/bushfireprone/.

Standards Australia 2018, *AS 3959:2018 Construction of buildings in bushfire-prone areas*, Sydney.

Stantec 2021, *Engineering Servicing Report*, 36075, 2.

Western Australian Planning Commission (WAPC) 2015, *State Planning Policy 3.7 Planning in Bushfire Prone Areas*, Perth.

8.2 Online references

The online resources that have been utilised in the preparation of this report are referenced in **Section 8.1**, with access date information provided in **Table R-1**.

Table R 1 Access dates for online references

Reference	Date accessed	Website or dataset name
(OBRM 2021)	18 July 2022	Map of Bushfire Prone Areas

Figures

Figure 1: Site Location and Topographic Contours

Figure 2: Pre-development AS 3959 Vegetation Classifications

Figure 3: Pre-Development Bushfire Hazard Level

Figure 4: Post-development As 3959 Vegetation Classifications and Effective Slope

Figure 5: Bushfire Attack Level Contour Plan

Figure 6: Spatial Representation of Bushfire Management Strategies

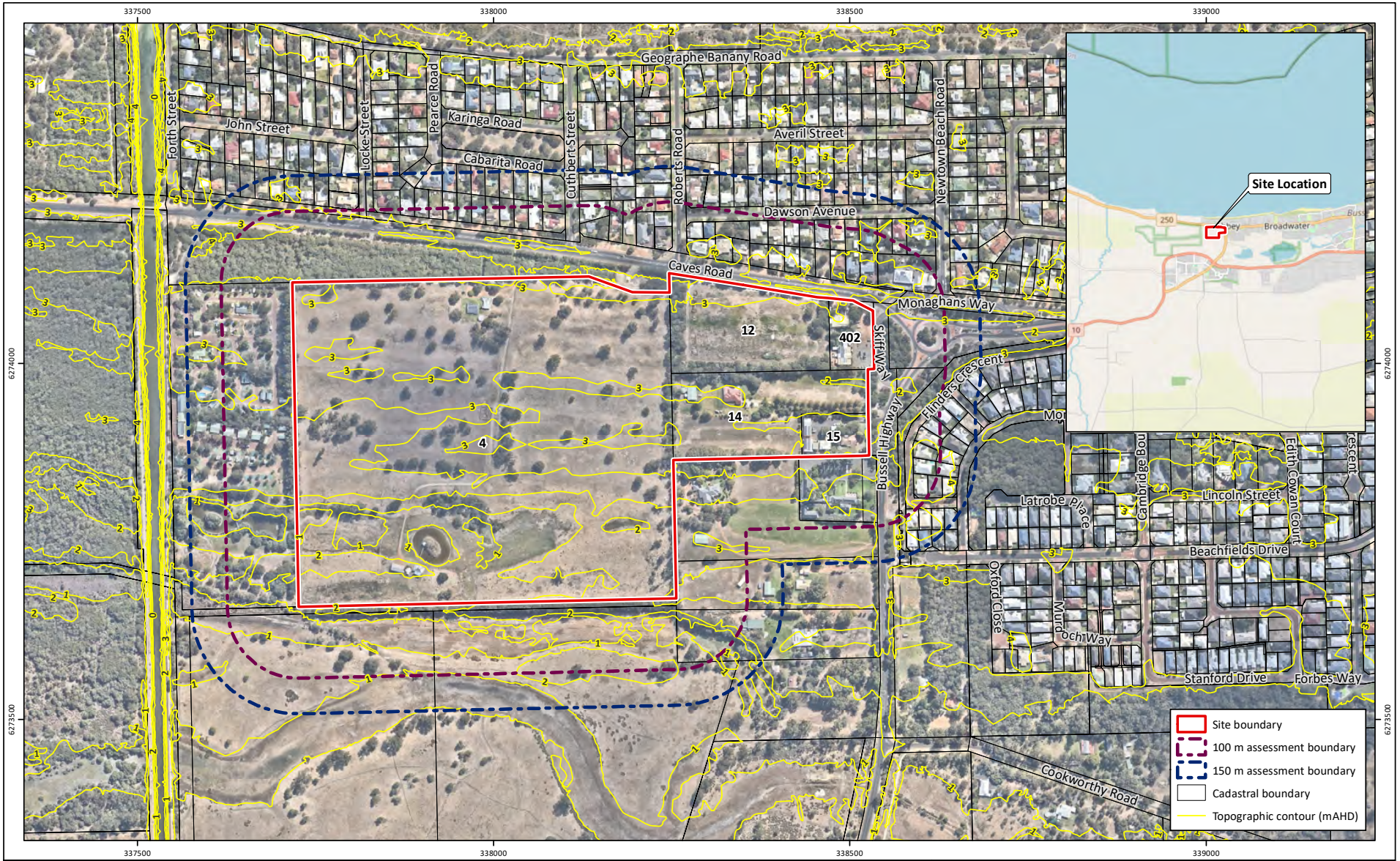

Figure 1: Site Location and Topographic Contours

Project: Bushfire Management Plan
Abbey South Structure Plan Area
Client: Various Landowners

Plan Number:
EP20-141(05)--F31
Drawn: GAR
Date: 18/07/2022
Checked: SJB
Approved: KK
Date: 28/07/2022

N

0 100 200 300
Metres
Scale: 1:7,000@A4
GDA 1994 MGA Zone 50

emerge ASSOCIATES

While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used
©Landgate (2021). Nearmap Imagery date: 06/04/2022

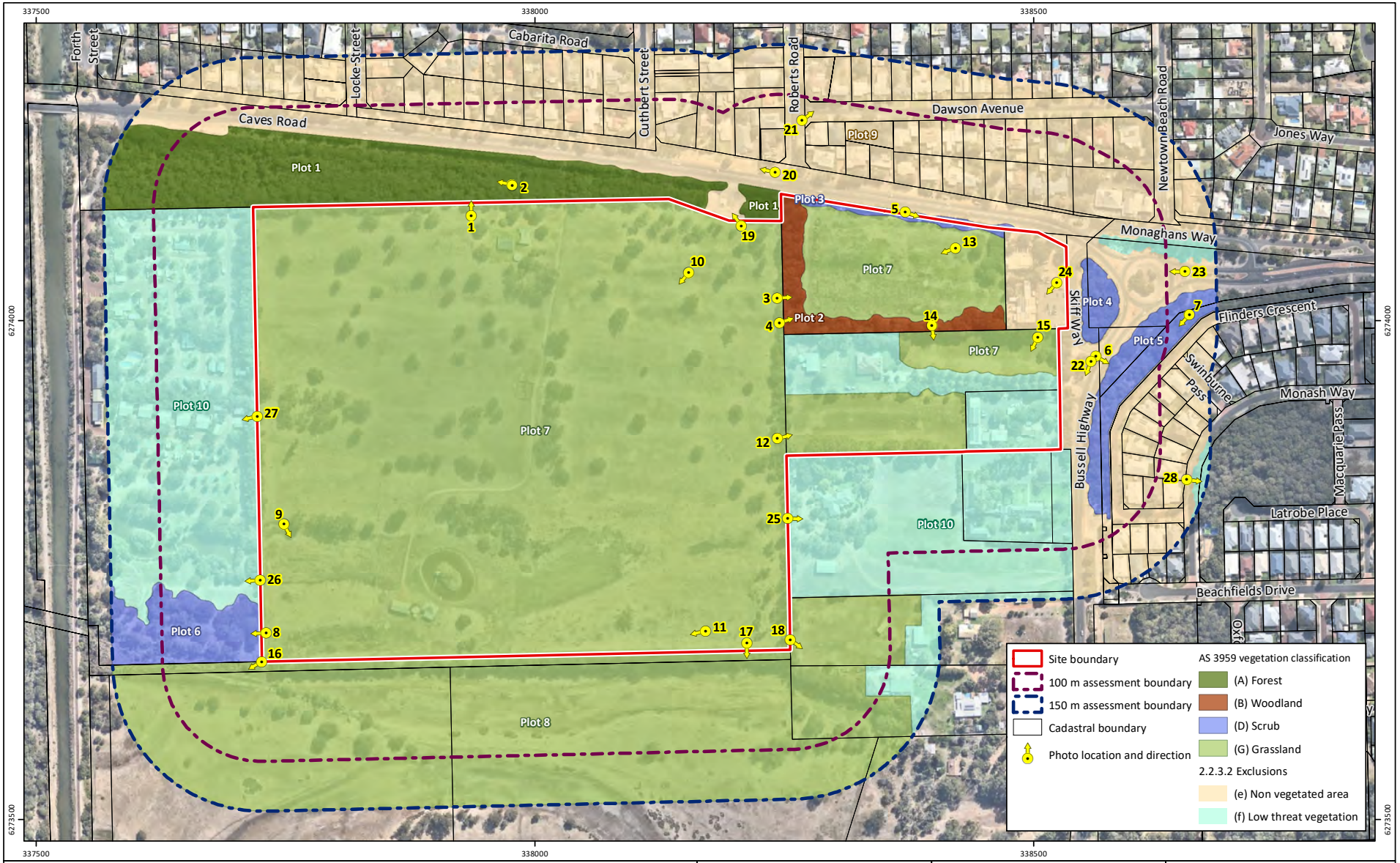

Figure 2: **Pre-Development AS 3959 Vegetation Classifications**

Project: Bushfire Management Plan
Abbey South Structure Plan Area
Client: Various Landowners

Plan Number: EP20-141(05)--F32
Drawn: GAR
Date: 18/07/2022
Checked: SJB
Approved: KK
Date: 28/07/2022

N

0 100 200
Metres
Scale: 1:5,000@A4
GDA 1994 MGA Zone 50

emerge ASSOCIATES

While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used
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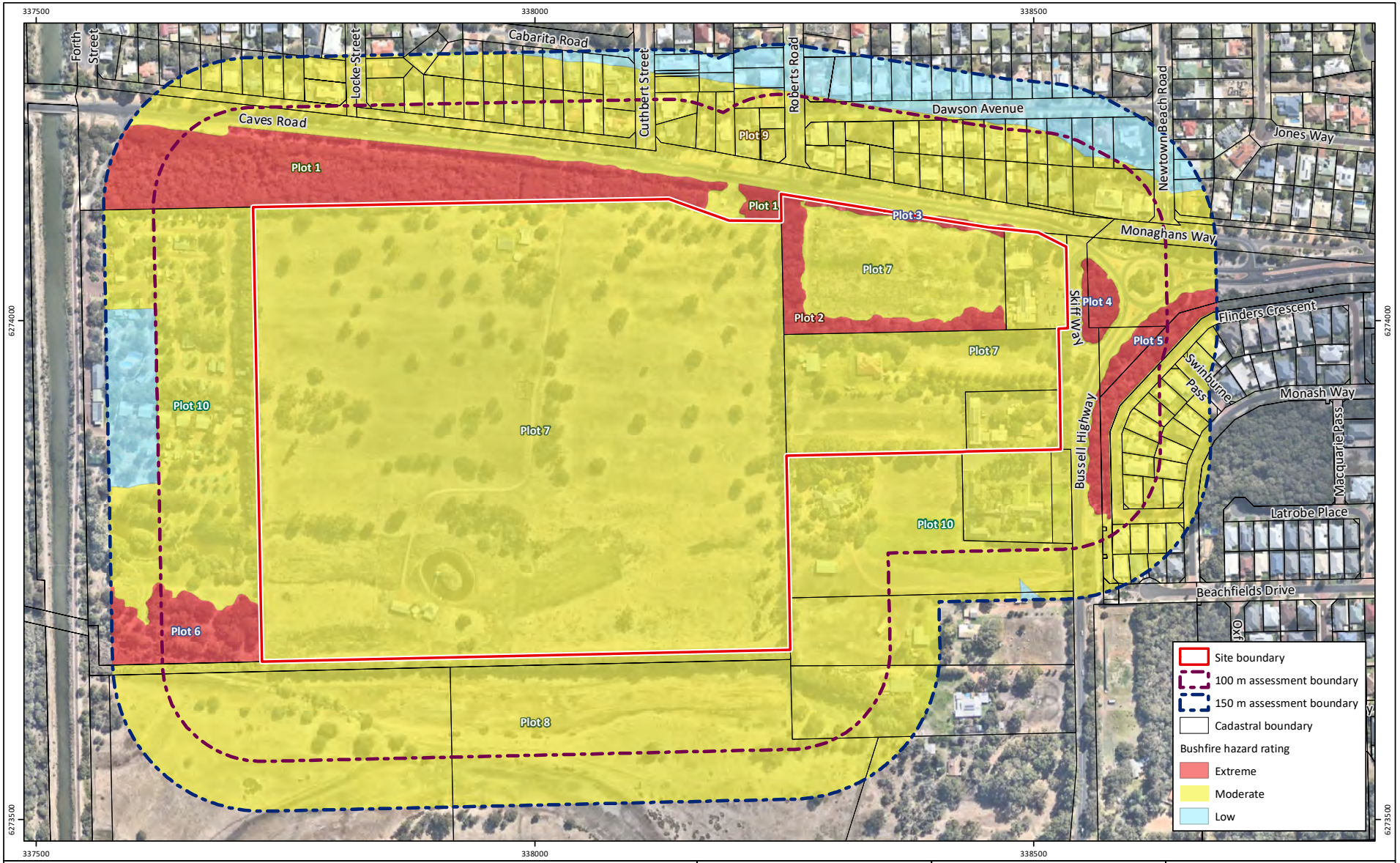

Figure 3: Pre-Development Bushfire Hazard Level

Project: Bushfire Management Plan
Abbey South Structure Plan Area
Client: Various Landowners

Plan Number:
EP20-141(05)--F33
Drawn: GAR
Date: 18/07/2022
Checked: SJB
Approved: KK
Date: 28/07/2022

N

0 100 200
Metres
Scale: 1:5,000@A4
GDA 1994 MGA Zone 50

emerge ASSOCIATES

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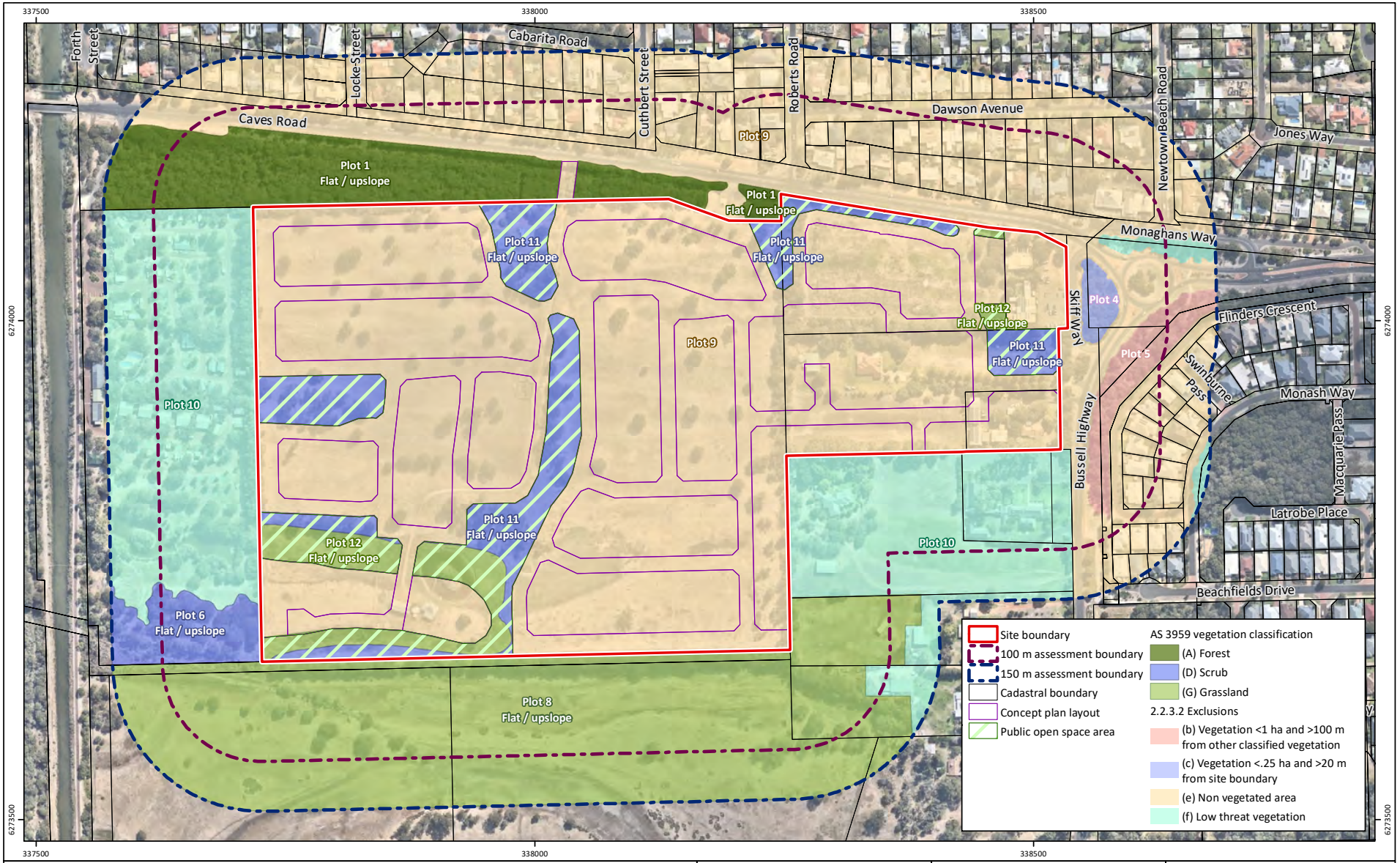

Figure 4: **Post-Development AS 3959 Vegetation Classification and Effective Slope**

Project: Bushfire Management Plan
Abbey South Structure Plan Area
Client: Various Landowners

Plan Number:
EP20-141(05)--F34b
Drawn: GAR
Date: 07/12/2022
Checked: KK
Approved: DAE
Date: 13/12/2022

N

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Metres
Scale: 1:5,000@A4
GDA 1994 MGA Zone 50

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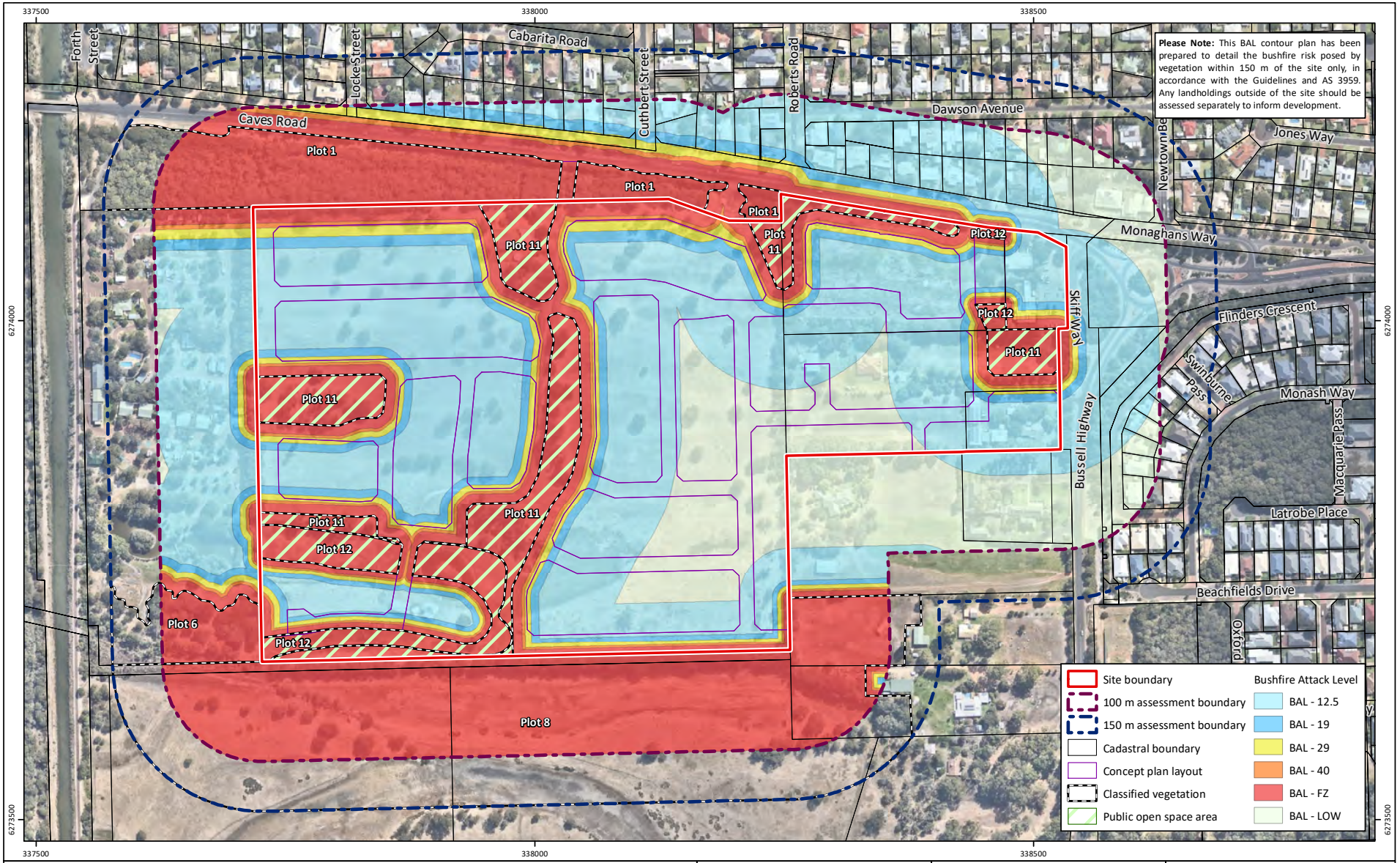

Figure 5: Bushfire Attack Level Contour Plan

Project: Bushfire Management Plan
Abbey South Structure Plan Area
Client: Various Landowners

Plan Number:
EP20-141(05)--F35b
Drawn: GAR
Date: 07/12/2022
Checked: KK
Approved: DAE
Date: 13/12/2022

N

0 100 200
Metres
Scale: 1:5,000@A4
GDA 1994 MGA Zone 50

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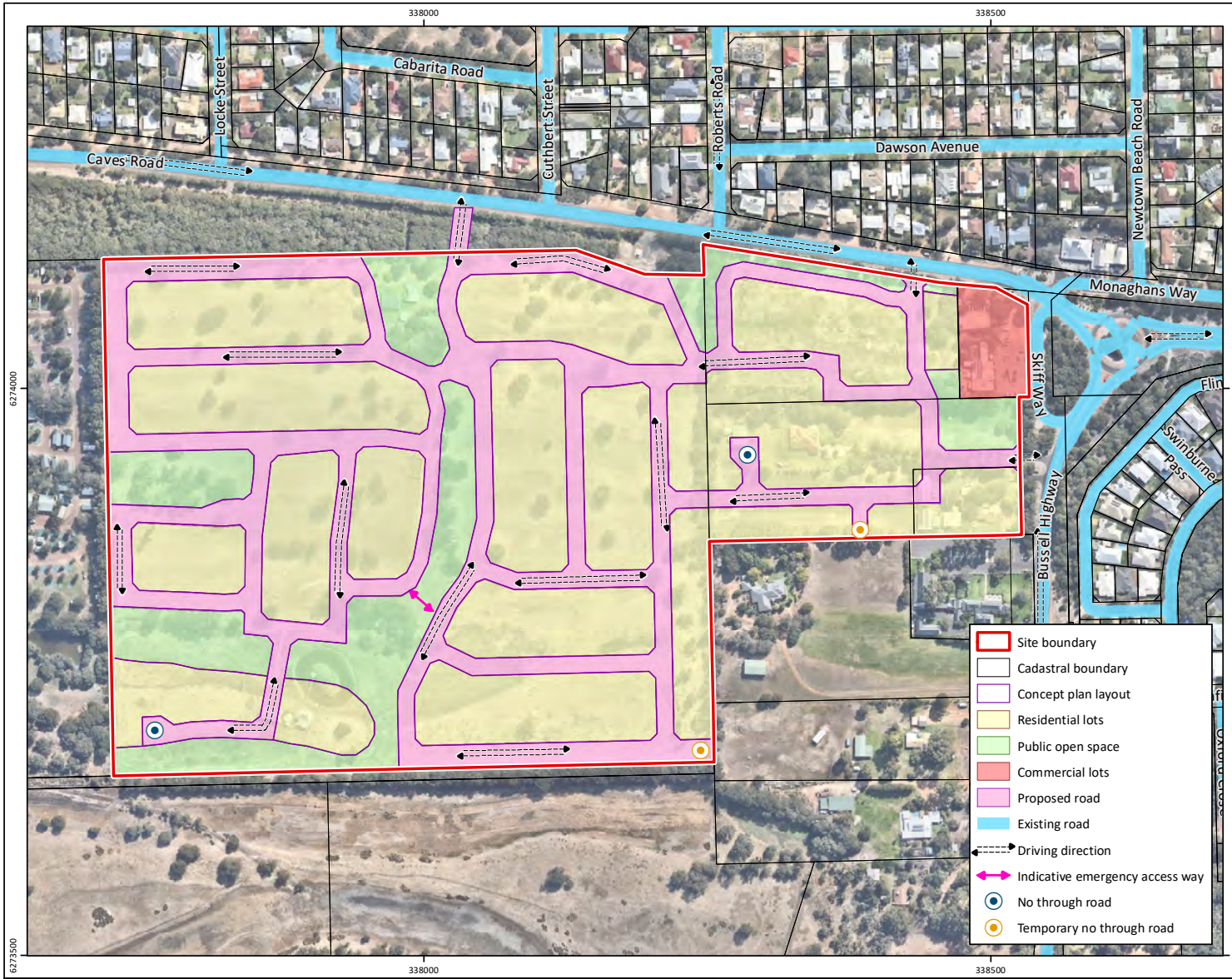

Asset protection zones (APZs)
All habitable buildings should achieve BAL-29 or less. Asset protection zones will be required around future habitable buildings to achieve BAL-29 or lower. These will be installed within areas of managed public open space/public road reserves or within lots (e.g. as carparks, drive ways, manicured lawn/gardens etc).

Building construction requirements
Where designated bushfire prone, future Class 1, 2, 3 and associated 10a buildings will need to be constructed in accordance with BAL ratings determined in accordance with AS 3959.

Vehicle access
- All public roads are to be constructed in accordance with the requirements of the Guidelines.
- All future development will be able to achieve two access routes upon completion of development. For the western residential cell, this can include use of an emergency access way (EAW). If required as part of subdivision design, the EAW should meet the minimum requirements of the Guidelines.
- As part of staged development, unless agreed otherwise with the City of Busselton, temporary access roads can be used, and can be longer than 500 m (in recognition that different landowners may progress development over different timeframes). This should be in accordance with the Guidelines.
- No-through roads will likely be required as part balancing constraints such as different land ownership, retention of vegetation and management of the floodway. Where required, these are to meet the requirements of Appendix Four of the Guidelines, including:

+Will be a maximum length of 200 m, unless agreed otherwise with the City of Busselton or connected with an EAW;
+Will achieve public road requirements as per A3.2 of Appendix Four in the Guidelines, unless agreed otherwise with the City of Busselton; and
+The turnaround area will achieve the dimensions outlined in Figure 24 of Appendix Four of the Guidelines.

Water supply
The development will be serviced by a reticulated water supply and a network of hydrants.

Figure 6: Spatial Representation of Bushfire Management Features

Project: Bushfire Management Plan
Abbey South Structure Plan Area
Client: Various Landowners

Plan Number:
EP20-141(05)--F36a
Drawn: GAR
Date: 07/12/2022
Checked: KK
Approved: DAE
Date: 13/12/2022

N

0 50 100 150
Metres
Scale: 1:5,000@A4
GDA 1994 MGA Zone 50

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Appendix A

Structure Plan and Concept Plan (Rise Urban 2022)





0 25 50 75 100 125m

DRAFT

LOCAL STRUCTURE PLAN

LOTS 4 & 12 CAVES ROAD & LOTS 14, 15 & 402 BUSSELL HIGHWAY, ABBEY.

NOTE:

Base Data supplied by Landgate / Denada Surveys
Aerial Photo - Feb 2019
Projection - BCG94
Areas and dimensions shown are subject to final survey calculations.

Revision	Date	Item
A	29/6/22	Initial Issue

LEGEND

- STRUCTURE PLAN BOUNDARY
- RESIDENTIAL R10
- RESIDENTIAL R20 - R40
- RESIDENTIAL R60
- RECREATION RESERVE
- LOCAL CENTRE (R60)
- FLOODWAY
- PERIMETER ROAD
- ACCESS STREET B
- HIGHER ORDER CYCLE PATH
- ACCESS STREET D (INDICATIVE ONLY)
- FUTURE PEDESTRIAN / CYCLE CONNECTION TO BUAYANYUP DRAIN CYCLE PATH
- EMERGENCY SECONDARY EGRESS
- POS NUMBER
- ROUNDABOUT
- FULL MOVEMENT INTERSECTION
- LEFT IN / LEFT OUT INTERSECTION

-	:	CLIENT
A3@1:2,500	:	SCALE
15 December 2022	:	DATE
IA Abbey-2-001	:	PLAN No
B	:	REVISION
C.L.	:	PLANNER
B.L	:	DRAWN

Rise Urban
AGILE PLANNING FOR THE NEW NORMAL

ABBEY PLANNING INVESTIGATION AREA

CONCEPT LAYOUT PLAN 5 DECEMBER 2022



Appendix B

Landscape plan (Emerge Associates 2022)



ABBEY SOUTH STRUCTURE PLAN

ABBEY LANDSCAPE MASTERPLAN

DWG EMG-60-3
REV D
DATE 20-12-22
SCALE 1 : 2500 @ A3

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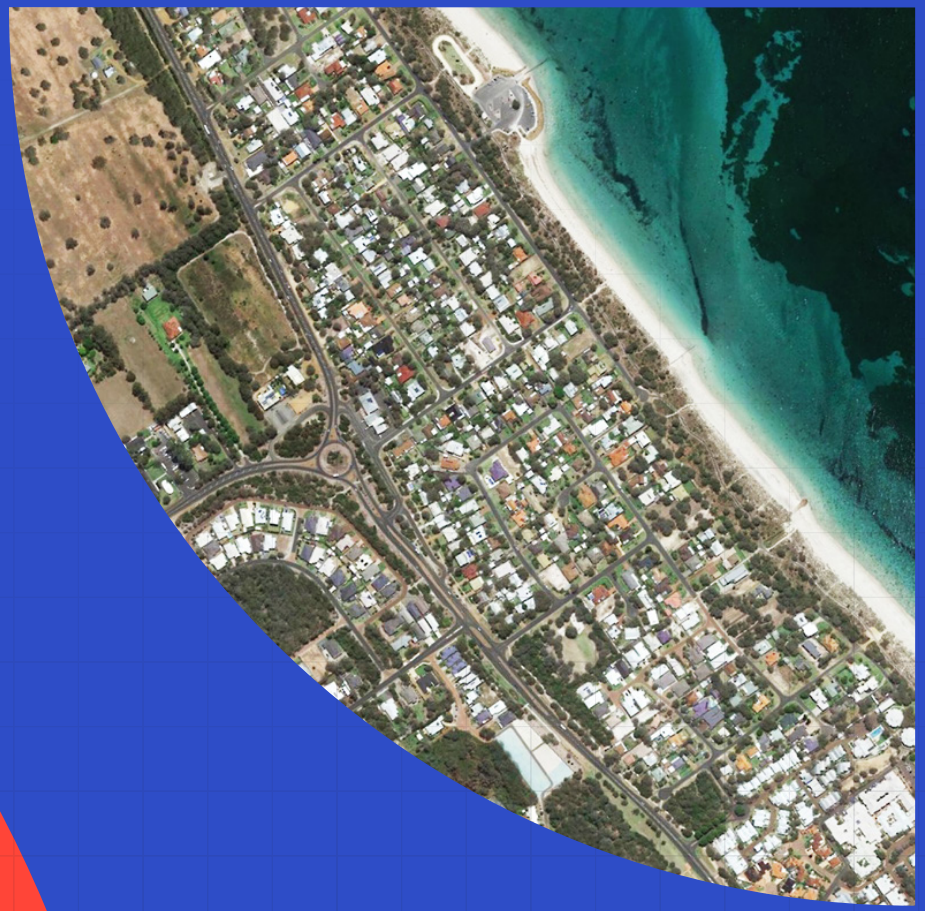

Appendix 4

Traffic and Transport Assessment – Stantec

Rise Urban
AGILE PLANNING FOR THE NEW NORMAL

Stantec

TRANSPORT IMPACT ASSESSMENT
Abbey Planning Investigation Area

15 December 2022

Prepared for:
Landowners Group

Prepared by:
Rodney Ding

Project Number:
300303385

Transport Impact Assessment

Revision	Description	Author	Date	Quality Check	Date	Independent Review	Date
a	Draft	RD	18/04/22	Tanya Moran	27/04/22		
b	Revised Draft based on updated concept	RD	29/07/22				
0	Final	RD	05/08/22	AO	8/8/2022	RD	08/08/22
1	Revised Final – address final comments	RD	16/08/22	SH	16/08/22	RD	19/08/22
2	Revised Final – address final edits	RD	22/08/22			RD	22/08/22
3	Revised Final – updated concept plan	RD	15/12/22			RD	15/12/22

Transport Impact Assessment

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Prepared by: 

Signature

Rodney Ding

Reviewed by: 

Signature

Alix Oakes

Approved by: 

Signature

Rodney Ding

Project Number: 300303385

Table of Contents

EXECUTIVE SUMMARY ..... **III**

ACRONYMS / ABBREVIATIONS ..... **IV**

1 INTRODUCTION **1**
1.1 Background & Proposal 1
1.2 Purpose of this Report 2
1.3 Summary of Key Findings 2
1.4 References 2

2 LOCAL STRUCTURE PLAN OUTLINE **4**
2.1 Regional Context 4
2.2 Proposed Land Uses 4
2.3 Attractors or Generators of Traffic (non-residential) 5

3 EXISTING SITUATION **6**
3.1 Subject Site 6
3.2 Existing Movement Network 7
3.2.1 Roads 7
3.2.2 Pedestrian and Cycle Network 8
3.2.3 Public Transport 10
3.3 Existing Road Network (Within 2km) 10
3.4 Traffic Counts 10

4 PROPOSED INTERNAL & EXTERNAL TRANSPORT NETWORKS **12**
4.1 Changes to Existing Road Network 12
4.1.1 Vasse-Dunsborough Link (VDL) & Busselton Outer Bypass (BOB) 12
4.2 Proposed Road Layout and Access Points 13
4.3 Proposed Road Hierarchy, Road Reserve Widths and Speed Limits 14
4.3.1 Access Streets Cross Sections 16
4.4 Intersection Controls 18
4.5 Pedestrian/Cycle Networks and Crossing Facilities 18

5 INTEGRATION WITH SURROUNDING AREA **20**
5.1 Surrounding Attractors 20
5.2 Proposed Changes to Land Uses within 800m 20

6 ANALYSIS OF INTERNAL AND EXTERNAL TRANSPORT NETWORKS **22**
6.1 Structure Plan Traffic 22
6.1.1 Subject Site Traffic Generators 22
6.1.2 Internal Traffic ATtractors 22
6.2 Traffic Distribution 23
6.3 Extraneous (Through) Traffic 24
6.4 Design Traffic Flows (i.e., Total Traffic) 24
6.5 Access Strategy 25
6.6 Pedestrian / Cycle Networks 28
6.7 Safe Routes to Schools 29
6.8 Access to Public Transport 30
6.9 Assessment of Intersections 30
6.9.2 Performance Assessment 31

7 CONCLUSION **33**

LIST OF TABLES

Table 3-1: Existing Public Transport Facilities within proximity to the subject site 10

Table 4-1: Liveable Neighbourhoods Road Characteristics 15
Table 4-2: Internal Road Network as per proposed Concept Plan 18
Table 4-3: Indicative Road Network as per Liveable Neighbourhood 2009 18
Table 6-1: Internal Road Network 22
Table 6-2: Traffic Generation by Zone 22
Table 6-3: Estimated Daily Traffic Distribution Percentage of Traffic Generated 23
Table 6-4: Estimated Daily Traffic Distribution of Traffic Generated 23
Table 6-5: Ultimate Intersection Performance – +20 years Approx. 2042 32

LIST OF FIGURES

Figure 1-1: City of Busselton Local Planning Strategy 2019 1
Figure 2-1: Site Location 4
Figure 2-2: Concept Plan Layout (July 2022) 5
Figure 3-1: Subject Site Aerial (Nearmap) 6
Figure 3-2: Land Zoning Map (City of Busselton Intramaps) 7
Figure 3-3: Road Network Hierarchy (Main Roads Road Information Map) 8
Figure 3-4: Cycle Path Network 9
Figure 3-5: Current Bus Network Map (PTA Bus Routes) 10
Figure 3-6: MRWA TrafficMap Traffic Counts 11
Figure 4-1: Regional Road Changes 13
Figure 4-2: Site Access Intersection Locations 14
Figure 4-3: Road Hierarchy within Development (Access Street B in red; Access Street D all others) 16
Figure 4-4: Access Street B Indicative Cross Section (Liveable Neighbourhoods 2009) 17
Figure 4-5: Access Street C Indicative Cross Section (Liveable Neighbourhoods 2009) 17
Figure 4-6: Access Street D Indicative Cross Section (Liveable Neighbourhoods 2009) 17
Figure 4-7: Proposed 2050 Cycling Network for Busselton 19
Figure 5-1: Planning Investigation Areas 21
Figure 6-1: Traffic Volumes and Distribution 24
Figure 6-2: Bussell Highway Access for Access 3 to Lots 14 & 15 26
Figure 6-3: Proposed Access Points 27
Figure 6-4: Proposed Access Points (in red) Location to Existing Intersections 28
Figure 6-5: Pedestrian Crossing Amenity – WAPC TIA Guidelines Volume 4 29
Figure 6-6: Desirable Crossing Spacing – WAPC TIA Guidelines Volume 4 29

LIST OF APPENDICES

APPENDIX A ROAD HIERARCHY ASSESSMENT 1

APPENDIX B STRUCTURE PLAN CONCEPT PLAN 2

Executive Summary

A proposed joint 'Scheme Amendment' and 'Local Structure Plan' on Lots 4 & 12 Caves Road and Lots 14, 15 & 402 Bussell Highway in Abbey (the 'subject site') has been prepared to guide the future subdivision and development of approximately 30.5Ha of currently zoned rural land. The subject site is bounded by Caves Road to the north and a short section of Bussell Highway to the east along with other adjacent properties to the west and south.

The proposed local structure plan includes an anticipated 350-400 residential dwellings and public open spaces.

This Transport Impact Assessment (TIA) report has been prepared by Stantec in support of the scheme amendment and local structure plan for Lots 4 & 12 Caves Road and Lots 14, 15 & 402 Bussell Highway.

The TIA addresses the transport aspects of the proposed land use in line with the following key objectives:

- To integrate with the district context. The subject site is directly adjacent to the main arterials of Caves Road and Bussell Highway.
- To assess the level of transport integration between the local structure plan area and the key adjoining transport network consisting of Caves Road and Bussell Highway.
- To determine the high-level impacts of the traffic generation, active transport needs and public transport needs by the local structure plan on the surrounding land uses and transport network.
- To determine the necessary road hierarchy and form to adhere to *Liveable Neighbourhoods 2009*.

Further to this executive summary, the transport investigation outcomes are provided in the Conclusion.

Acronyms / Abbreviations

ASP	Approved Structure Plan
DoT	Department of Transport
DSP	District Structure Plan
ITE	Institute of Transport Engineers
LTCN	Long-Term Cycle Network
MRWA	Main Roads Western Australia
PSP	Principal Shared Path
PTA	Public Transport Authority
SLK	Straight Line Kilometre
TIA	Transport Impact Assessment
WAPC	Western Australia Planning Commission

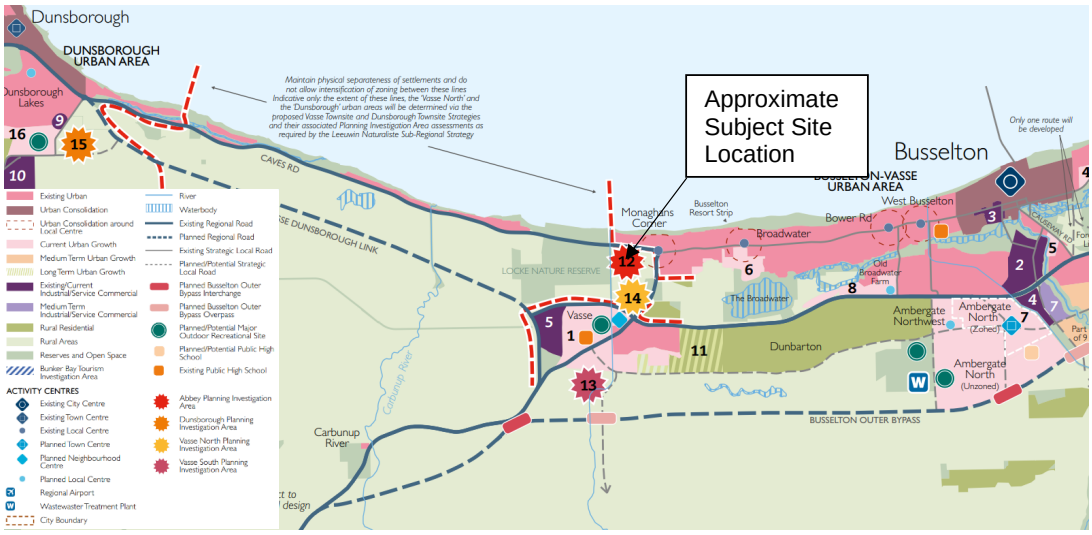
1 Introduction

1.1 Background & Proposal

Stantec has been engaged by private landowner groups to assist with the development of a local structure plan in conjunction with the submission of a scheme amendment for Lots 4 & 12 Caves Road and Lots 14, 15 and 402 Bussell Highway in Abbey. A Transport Impact Assessment (TIA) is required for the local structure plan to predict and assess the traffic generated by the development and the resulting impact to local roads as well as other transport related impacts.

Prior to this TIA, Stantec undertook a high-level traffic assessment of the impacts of the anticipated land use yields on the adjoining road network which has also informed this TIA. Refer Appendix A.

The development of the local structure plan for the subject site forms part of the *City of Busselton Local Planning Strategy 2019* as shown in Figure 1-1. The subject site is internally a greenfield site with the external accesses servicing adjacent brownfield sites, located just to the south of Abbey Beach, approximately 8.5km from the Busselton city centre and approximately 15km from the Dunsborough town centre.



Source: City of Busselton Local Planning Strategy 2019

Figure 1-1: City of Busselton Local Planning Strategy 2019

The City of Busselton currently has several approved structure plans (ASP) within or near the wider Abbey area. This includes Vasse Newtown ASP to the south near the intersection of Bussell Highway and the Busselton Bypass. To the south of the subject site is another Planning Investigation Area, this for Vasse North.

Future regional road planning in the vicinity involves the development of the Vasse-Dunsborough Link (VDL), being an extension of the Busselton Bypass from west of Vasse Newtown to Dunsborough. Access to the subject site is proposed to be direct from Caves Road, where traffic flows are expected

to decrease significantly with the introduction of the VDL providing the main link to Dunsborough to service key through regional traffic (rather than structure plan traffic).

1.2 Purpose of this Report

Volume 2 of the *Western Australian Planning Commission Transport Assessment Guidelines* (WAPC Guidelines) provides direction on the preparation of a TIA for Planning Schemes, Structure Pans and Activity Centre Plans. The WAPC Guidelines identify that a TIA for a scheme amendment and/or structure plan, is to provide an assessment of a wider area within a district and demonstrate overall conformity with any overarching District Structure Plan or similar.

The current WAPC Guidelines requires planning scheme amendments and structure plans to be supported by a transport impact assessment.

This TIA details the methodology and findings, which was prepared in line with the WAPC Guidelines and takes account of the City of Busselton's planning policies. This TIA considers the integration of the subject with the existing and proposed transport networks including walking, cycling, public transport, and vehicular travel and considers the potential impact of the proposed development.

In preparing this TIA, consideration was given to the impact of the VDL and nearby subdivision plans (where available) to determine the impact of those developments on the subject site and vice versa. Specifically, these relate to the objectives of the WAPC Guidelines, which are:

- assess the proposed internal transport networks with respect to accessibility, circulation, and safety for all modes, that is, vehicles, public transport, pedestrians and cyclists;
- assess the level of transport integration between the structure plan area and the surrounding land uses;
- determine the impacts of the traffic generated by the structure plan area on the surrounding land uses; and
- determine the impacts of the traffic generated by the structure plan area on the surrounding transport networks.

1.3 Summary of Key Findings

From a traffic and transport point of view, the following key provisions are immediately identified for this TIA:

- Appropriate connections are provided to the external road network that carries traffic fit-for-its function, including proximity to existing intersections.

1.4 References

In preparing this report, reference has been made to the following:

- WAPC Transport Assessment Guidelines for Development, August 2016
- Concept Plan for the proposed development prepared by Rise Urban dated 18/07/2022

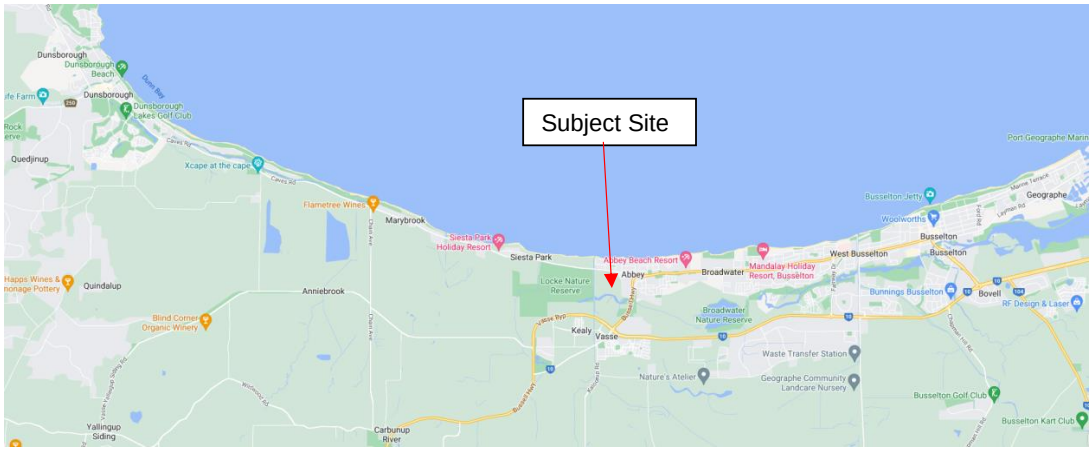
Transport Impact Assessment
1 Introduction

- Liveable Neighbourhoods Guidelines 2009
- City of Busselton Local Planning Scheme No. 21
- various technical data as referenced in this report and other documents as nominated.

2 Local Structure Plan Outline

2.1 Regional Context

The subject site is in the suburb of Abbey, within the City of Busselton. The site is approximately 8.5km west of the Busselton city centre and approximately 15km from the Dunsborough townsite (see Figure 2-1).



Source: Google Maps

Figure 2-1: Site Location

2.2 Proposed Land Uses

It is proposed that there will be approximately 350-400 residential lots, mostly single residential. These lots range from 180m^2 to 2,000m^2, with majority being approximately 500m^2. There are four Public Open Space areas proposed, with a main north-south POS located central to the structure plan area. A breakdown of the local structure plan land use allocation is provided below:

- 350-400 Residential lots
- 4.6Ha Public Open Space.

The concept layout plan is shown in Figure 2-2 and Appendix B.



Figure 2-2: Concept Layout Plan (December 2022)

2.3 Attractors or Generators of Traffic (non-residential)

The general non-residential traffic attractors or generators to the structure plan area involve only the public open spaces (POS).

The POS open these spaces to various opportunities including playgrounds, dog parks and other recreational activities such as tennis, skateboarding and soccer. Some on-street parking abutting the POS is recommended to facilitate the full use of the area. There may be a small amount of non-structure plan traffic attracted to these areas, but this is not considered significant.

3 Existing Situation

3.1 Subject Site

The subject site comprises of the area bounded by Caves Road to the north and Bussell Highway to the east. No direct road accesses are proposed to adjoining development to the west and as there are wetlands to the south, no street connectivity is proposed through it.

The site is currently zoned “Rural” under the Local Planning Scheme 21 and is intended to be rezoned “Urban Development” via a Scheme amendment to provide a head of power for this local structure plan.

North of the site is existing residential development between Caves Road and Geographe Bay beach. To the west and south of the site is rural development, although there is another Urban Expansion Area on the south side of the wetlands area. At the eastern side of the subject site there are presently small commercial uses fronting Bussell Highway.

The latest aerial image of the subject site from Nearmap is shown in Figure 3-1, with the Land Zoning map provided in Figure 3-2.

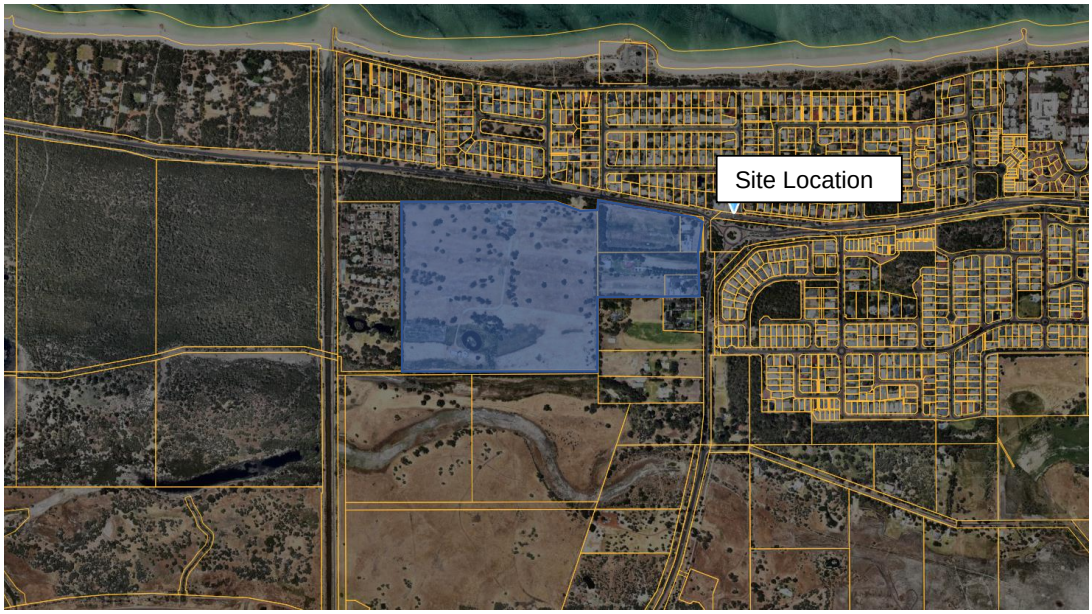


Figure 3-1: Subject Site Aerial (Nearmap)



Figure 3-2: Land Zoning Map (City of Busselton Intramaps)

3.2 Existing Movement Network

3.2.1 ROADS

The subject site lies at the gateway to the south-west region of Western Australia, beyond the Busselton townsite. There are two key road linkages to this south-west region, and these are Caves Road (east-west) and Bussell Highway (north-south). These are summarised below with a regional overview shown in Figure 2.

Caves Road

- Access to Dunsborough
- Access to Yallingup
- Currently carrying ~9,700 vehicles per day (vpd) in 2021/22
- Speed Zone at 70km/h
- Cape to Cape connection.
- No crashes recorded along the local structure plan frontage in the last 5 years to 2020.

Bussell Highway

- Major road
- Access to Vasse
- Access to Margaret River
- Currently carrying ~10,100vpd in 2021/22

- Speed Zone at 70km/h near roundabout, 80km/h further to south
- Two crashes have been reported on Bussell Highway frontage in the last 5 years to 2020.

Additionally, there has been three crashes reported at the Caves Road / Bussell Highway roundabout in the last 5 years to 2020.

The current road network hierarchy within the vicinity is shown in Figure 3-3.

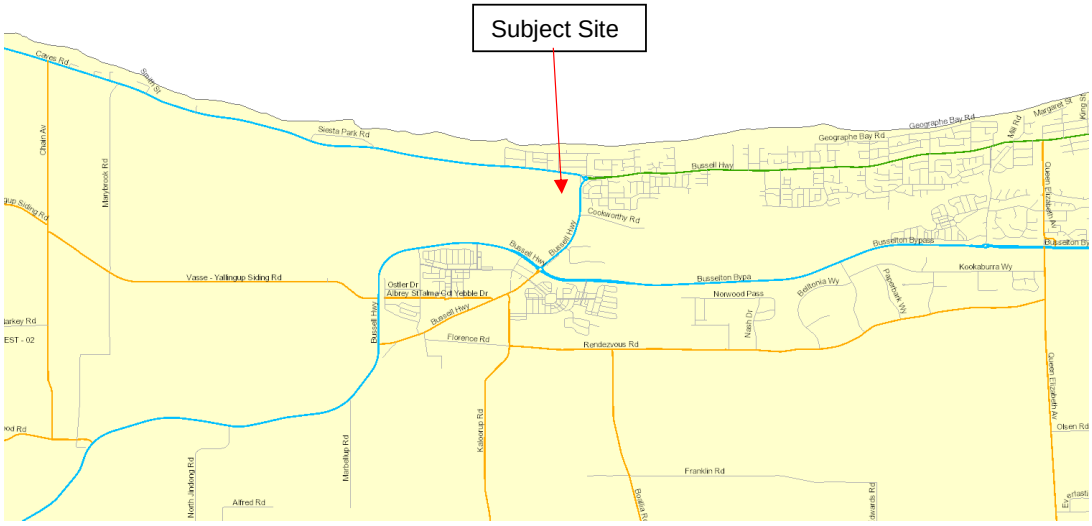


Figure 3-3: Road Network Hierarchy (Main Roads Road Information Map)

3.2.2 PEDESTRIAN AND CYCLE NETWORK

The key corridors indicated on the *City of Busselton Key Bicycle Routes Map* are Bussell Highway to the east of the subject site connecting Vasse to the Geographe Path running along the Geographe Bay foreshore. This Geographe Path connects Busselton City Centre with Dunsborough, refer to Figure 3-4 on the following page.

In addition to these dedicated paths, Caves Roads has 1.5m wide sealed shoulders on both sides of the roadway. While not ideal under Safe System Engineering principles, cycling on these shoulders adjacent to vehicles travelling greater than 30k/hr speeds without a physical separation, these shoulders are used by experienced cyclists if desired when riding on the road.

Transport Impact Assessment
3 Existing Situation

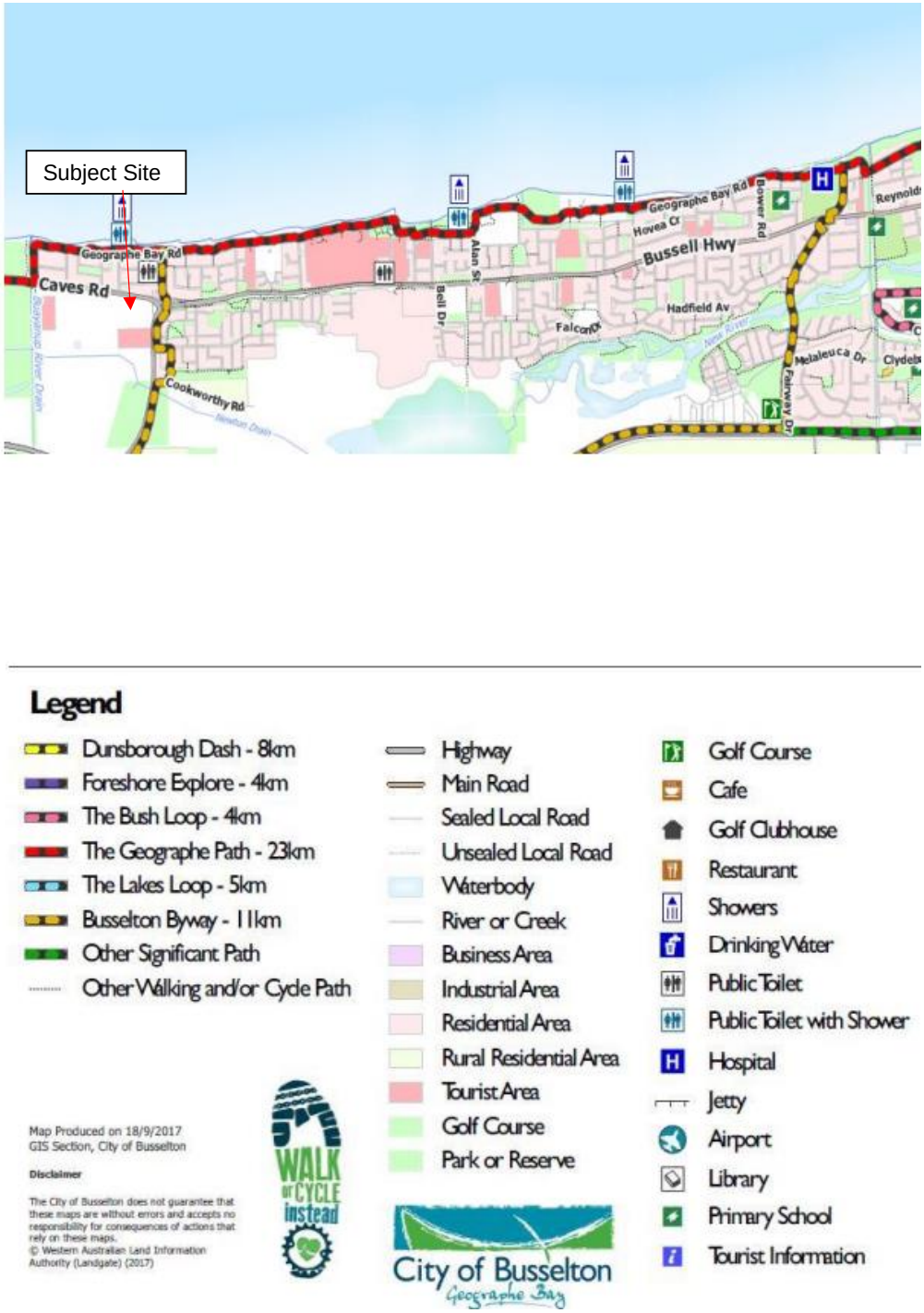


Figure 3-4: Cycle Path Network

3.2.3 PUBLIC TRANSPORT

Currently, the closest public transport services or facilities operating near the subject site are immediately in front of the site on Caves Road as shown in Table 3-1.

Table 3-1: Existing Public Transport Facilities within proximity to the subject site

Service	Route No.	Route Description	Distance to Nearest Stop	Significant Destinations on Route	Frequency On/Off Peak
Bus	815	Busselton to Dunsborough	In front of subject site	Busselton & Dunsborough and local schools along Bussell Highway	1-3 hours

The bus network map for bus service 815 is shown in Figure 3-5.

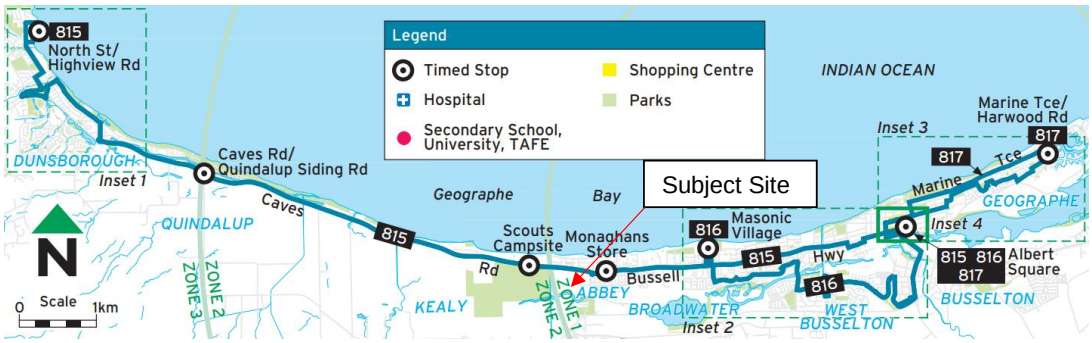


Figure 3-5: Current Bus Network Map (PTA Bus Routes)

3.3 Existing Road Network (Within 2km)

The existing higher order roads (Main Roads WA Local Distributor or above) within 2km of the subject site include Caves Road which connects Dunsborough with the roundabout at the intersection of Bussell Highway and Caves Road, and Bussell Highway which runs from this same roundabout southwards through various towns along Bussell Highway as it extends all the way though to Augusta, as shown previously in Figure 3-3.

As such, Bussell Highway is carrying and intended to carry a high proportion of regional through traffic. Main Roads WA access policy is that access intersections to lower order roads should be provided wherever possible, in lieu of to/from higher speed, higher volume, higher order (highway) roads.

3.4 Traffic Counts

Nearby traffic counts available are on Caves Road west of the subject site and Bussell Highway between Caves Road and the Busselton Bypass. Figure 3-6 shows the 7-day average daily traffic counts for 2021/22 available through the MRWA TrafficMap. This shows approximately 9,700vpd on Caves Road and 10,100vpd on Bussell Highway.

Transport Impact Assessment
3 Existing Situation

Traffic flows on Caves Road (the current main connecting road between Dunsborough and Busselton) have increased at a linear rate of approximately 162vpd per annum or approximately 1.8% per annum based on traffic counts from 2011/12 to 2020/21.

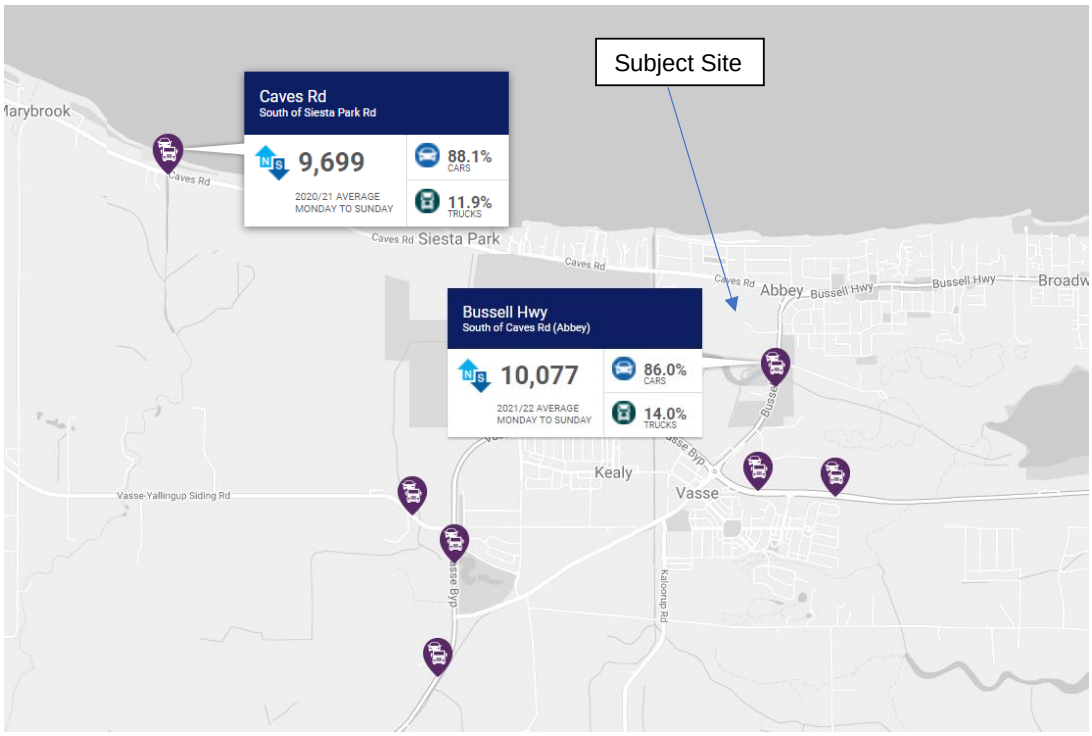


Figure 3-6: MRWA TrafficMap Traffic Counts

4 Proposed Internal & External Transport Networks

4.1 Changes to Existing Road Network

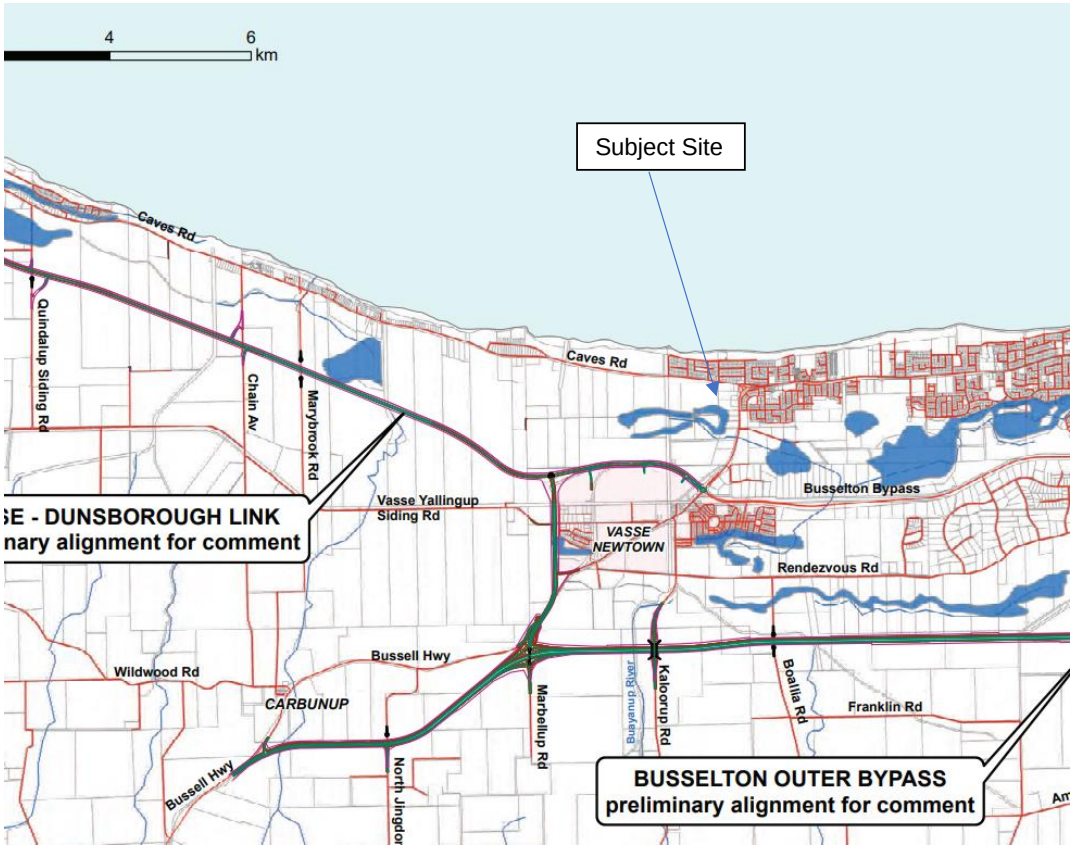
4.1.1 VASSE-DUNSBOROUGH LINK (VDL) & BUSSELTON OUTER BYPASS (BOB)

Early consultation with Main Roads WA has confirmed that the VDL & BOB are two key regional projects near the subject site. They are in the early planning stages and have not been included on any near-term construction programs (within the next 5 years). However, planning is such that the VDL is proposed to connect Dunsborough to Vasse whilst the BOB is proposed to provide an outer bypass of Busselton and the current Busselton Bypass. Refer to Figure 4-1.

Some of the traffic impacts of these regional planned projects have been assessed and are summarised below:

- The VDL & BOB will greatly alter regional traffic flows, reducing Caves Road traffic significantly and increasing traffic on Bussell Highway
- Modelling by others for MRWA has shown VDL & BOB are expected to decrease traffic volumes on Caves Road by ~80% to ~1,600-2,000vpd
- Bussell Highway traffic is expected to increase due to redistribution from ~10,000vpd to possibly ~15,000 to 20,000vpd in the immediate term (i.e. up to double the current volumes)
- Currently neither VDL & BOB projects are in Main Roads' 5-year forward budget.

For the above reasons the proposed local structure plan avoids direct access to Bussell Highway where traffic flows are expected to increase by an amount which is significant. Conversely, traffic flows on Caves Road are expected to decrease significantly. This is appropriate, given the function of Bussell Highway in a regional context when compared with Caves Road.



(Source: Main Roads WA)

Figure 4-1: Regional Road Changes

4.2 Proposed Road Layout and Access Points

The indicative concept plan for the local structure plan indicates the following.

1. The main northern entrance to the subject site is via the western all movement intersection connecting to Caves Road.
2. A secondary all movement access is proposed on Caves Road between Roberts Road and Bussell Highway.
3. A minor access is proposed onto Bussell Highway south of Skiff Way providing left-in/left-out access at Bussell Highway.
4. Caves Road provides the northern boundary of the site area, and the Bussell Highway becomes the eastern boundary.
5. Future development of Lots 6 and 8 Bussell Highway will allow an additional access through to Bussell Highway (as was requested by Main Roads WA South West Region in early consultation) intersecting much further south along Bussell Highway.

6. There are a total of 3 proposed intersection connections of the local structure plan to the external road network. These three accesses are proposed to allow each landowner group to develop individually without reliance of the provision of access through adjacent undeveloped lots.



Figure 4-2: Site Access Intersection Locations

4.3 Proposed Road Hierarchy, Road Reserve Widths and Speed Limits

The road hierarchy within the subject site area can be determined in accordance with Element 2 of *Liveable Neighbourhoods 2009* focusing on the function of the streets within a local structure plan as well as predicted traffic volumes. As such, the concept plan features a higher order local access street, being the main north to south connection, and other lower order local access streets for the remainder of the internal street network.

Liveable Neighbourhoods 2009 categorises streets into *Arterials*, *Neighbourhood Connectors*, and *Local Access Streets* dependant on traffic volumes, intended operation and functionality. Arterial roads are primarily for the connection of district and regional traffic, providing wider road carriageways to facilitate the safe and effective movement of vehicular traffic as a priority and as such are not consistent with the requirements of the road network within the site area.

The higher order roads within the site area will fall into the *Neighbourhood Connector* category of road. Neighbourhood Connector A roads have a theoretical maximum of 7,000vpd, typically with embayed on-street parking, and pedestrian and cycle facilities within a shared path or footpath.

Neighbourhood Collector B roads have a maximum of 3,000vpd typically with on-street parking and shared path facilities.

Access Streets generally provide direct access to fronting properties and can cater for up to 3,000vpd in various formats. Within the context of this proposed local structure plan, most traffic flows are expected to be below 1,000vpd throughout.

Table 4-1 details the road types that are most appropriate to be applied to the roads within the subject site area, noting the street width is indicative only and subject to leniencies where certain criteria is met.

Table 4-1: Liveable Neighbourhoods Road Characteristics

Road Type	Classification	Target Speed (km/h)	Max Volumes (vpd)	Indicative Road Reserve Width	Indicative Street Width
Access Streets	Access Street B	40	3,000	16.5-17.9m	6.0m
	Access Street C	40	3,000	15.4m	7.2m
	Access Street D	30	1,000	14.2m	6.0m

The traffic volumes to assist determination of the road hierarchy is based upon the expected traffic generated from within the subject site plus any external influences (background traffic) for any through roads.

The main north to south connection, south of the proposed roundabout will need to accommodate traffic volumes just below the limit of an Access Street D, this the same for all other street sections throughout the site. The section of street north of the proposed roundabout intersection with Caves Road is expected to have traffic flows above 1,000vpd but less than 3,000vpd. Given this, the street cross section should be as that for an Access Street B or C in this section. Being the main link into the local structure plan area, it is recommended that an Access Street B cross section be adopted and allow embayed parking on one or both sides of the street.

All other roads within the site area can be allocated as Access Street D, with an indicative road reserve width of up to 14.2m. It is not expected that the daily volumes will exceed 1,000 on the proposed Access Streets fronting residential dwellings. Refer to Figure 4-3. The Access Street B cross section is denoted in **red** and all other streets are to be Access Street D.

The City's *Engineering & Works Services Standards & Specifications* suggests for Access Ways a reserve width of 12-16m, these being very much the same as Access Streets in Liveable Neighbourhoods. So, it appears there is opportunity to reduce the road reserves and maximise developable land. It is noted that the road reserves in the development areas such as Vasse Newtown are typically 16m.



Figure 4-3: Road Hierarchy within Development (Access Street B in red; Access Street D all others)

4.3.1 ACCESS STREETS CROSS SECTIONS

The Local Access Streets within the site area provide a maximum cross section of 20m fronting bush land as a means of bush fire buffer, other streets within the site provide 15-16m wide road reservations. This generally adheres to the requirement of higher order Access Street C and therefore satisfy for Access Street D, considering potential leniencies that could be applied through the design process dependent on the level of pedestrian and cyclist path connections/facilities, on road parking provisions and due to local practices within the City noted above.

Example cross sections of Access Street B, C and D are shown below in Figure 4-4 to Figure 4-6.

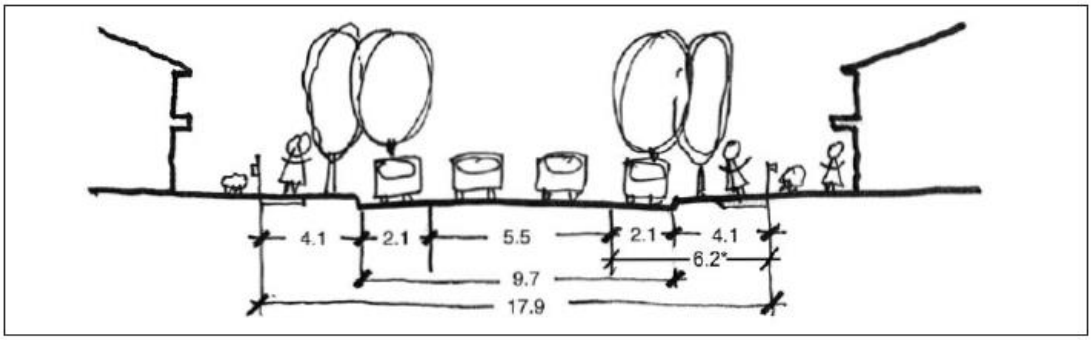


Figure 4-4: Access Street B Indicative Cross Section (Liveable Neighbourhoods 2009)

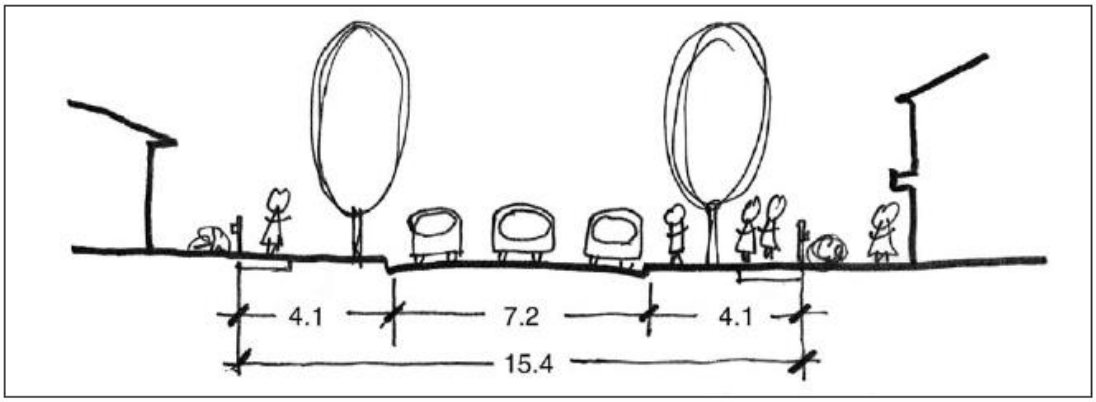


Figure 4-5: Access Street C Indicative Cross Section (Liveable Neighbourhoods 2009)

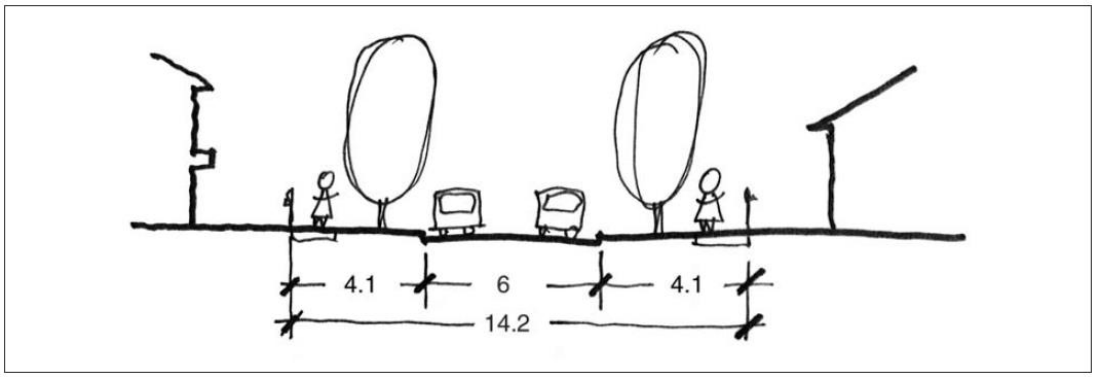


Figure 4-6: Access Street D Indicative Cross Section (Liveable Neighbourhoods 2009)

The road reserve widths proposed within the provided concept plan are deemed acceptable overall with potential opportunities to further refine/reduce the proposed widths as discussed above. A more detailed assessment will be undertaken post the scheme amendment and local structure plan approval, on further development of the cross sections, path connections and lot frontages.

The internal road network consists of two types of roads and cross section configurations, detailed in Table 4-2.

Table 4-2: Internal Road Network as per proposed Concept Plan

Road Type	Road Reserve Width (m)	Verge (m)	Carriageway including Parking (m)	Median (m)	Verge (m)
Alongside POS	13	4.5	6.0	-	2.5
15m wide Streets	15	4.5	6.0	-	4.5
16m wide Streets	16	5.0	6.0	-	5.0
Fronting Bushland	20	5.0	6.0	-	9.0

Table 4-3: Indicative Road Network as per Liveable Neighbourhood 2009

Road Type	Road Reserve Width (m)	Verge (m)	Carriageway including parking (m)	Median (m)	Verge (m)
Alongside POS	13.2	4.1	6.0	-	3.1
Access Street B	17.9	4.1	9.7 (p/r/p)	-	4.1
Access Street C	15.4	4.1	7.2	-	4.1
Access Street D	14.2	4.1	6.0	-	4.1

The above widths are indicative with flexibility to be reduced based on the discussions provided within Section 4.3.

4.4 Intersection Controls

The concept plan proposes that all intersections onto the current adjoining road network to be all-movement intersections, except for the left-in/left-out at the Bussell Highway intersection. The intersection controls are expected to be either formalised Give Way or Stop control, based on assessment of the available sight distances at next stages of design.

There may be channelisation required to provide for left and right turn pockets either exiting the subject site or turning from Caves Road.

Internal intersection controls are proposed to include one roundabout at the intersection of the main north-south access street and the first main east-west street. All other intersections will be priority-controlled T-intersections.

4.5 Pedestrian/Cycle Networks and Crossing Facilities

The *Draft Leeuwin-Naturaliste 2050 Cycling Strategy* outlines the provision of a Primary Route along Caves Road from its current intersection with Bussell Highway and the current Geographe Path near

Transport Impact Assessment
4 Proposed Internal & External Transport Networks

Forth Street. In addition, a local path is proposed along Cuthbert Street connecting the Geographe Path with the new Caves Road Primary Route, refer to Figure 4-7below.

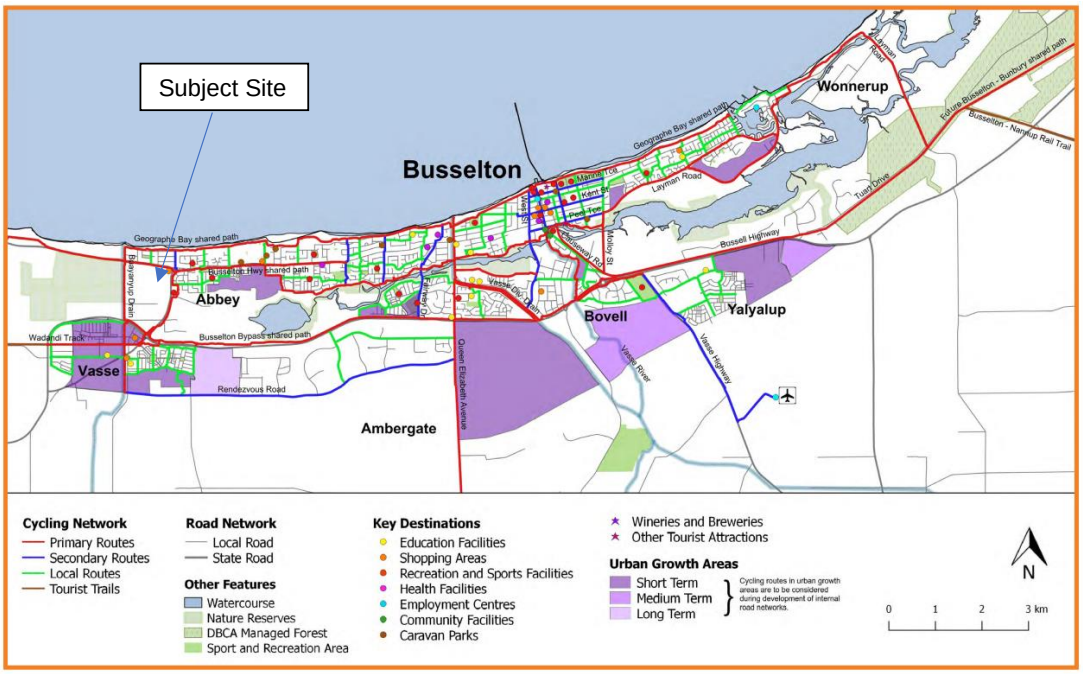


Figure 4-7: Proposed 2050 Cycling Network for Busselton

5 Integration with Surrounding Area

5.1 Surrounding Attractors

The predominant land use surrounding the subject site is residential development or other currently rural development. The major trip attractions for residents of the subject site will be located beyond a 5km radius from the centre of the development. There are other smaller secondary attractions closer. The attractions include:

- Busselton city centre (~8.5km)
- Dunsborough town centre (~15km)
- Vasse Newtown (~2km)
- Vasse Primary School (~2.5km)
- Abbey Beach (~0.5km).
- "The Shed" (~0.1km)

Access to both Abbey Beach and The Shed will likely be via pedestrian or cyclist routes/facilities. To provide access to these attractions, appropriate facilities (footpaths/shared paths and crossing points) will need to be provided internally and across Caves Road near Cuthbert Street (to connect to the future Cuthbert Street cycling link).

5.2 Proposed Changes to Land Uses within 800m

The concept layout plan includes the following developments to take place within the subject site:

- 350-400 residential lots with an average size of 500m^2
- 4 separate public open spaces from 565m^2 to 2.1Ha.

In addition to the internal developments, there is a Future Urban Area under consideration south of the subject site on the other side of the southern wetlands, refer to Figure 5-1 below, noted as Vasse North. This development is assumed to be a similar residential development and thus there is expected to be little in the way of attractions between the subject site and Vasse North.

Transport Impact Assessment
5 Integration with Surrounding Area



Figure 5-1: Planning Investigation Area & Subject Site

6 Analysis of Internal and External Transport Networks

6.1 Structure Plan Traffic

6.1.1 SUBJECT SITE TRAFFIC GENERATORS

The estimated traffic generation and distribution to the internal road network has been undertaken, applying typical generation rates to the land uses within the site area based on those provided in the *WAPC Transport Impact Assessment Guidelines*. The rates shown in Table 6-1 have been applied to the land uses. These rates are 25% higher than the typical daily generation rate of 8 trips per dwelling and corresponding peak hour rates, to provide a robust assessment of the traffic impacts.

Table 6-1: Internal Road Network

Land Use	Units	Daily Trip	AM Trip	PM Trip	Source
Residential Dwellings	Dwelling	10*	0.75*	1.0*	WAPC

Note: Rates are 25% more than typical generation rates

The site area was divided into traffic generating 'zones', and an approximate distribution applied to the internal and then onto the adjoining surrounding roads. Refer to Table 6-2.

Table 6-2: Traffic Generation by Zone

Area	Daily Traffic** (vpd)	AM (vph)	AM In (vph)	AM Out (vph)	PM (vph)	PM In (vph)	PM Out (vph)
W	2,100	160	40	120	210	140	70
NE	700	50	15	35	70	45	25
E	700	50	15	35	70	45	25
Total*	**3,500**	260	70	190	350	230	120

Rounded to the nearest 5/10, totals may differ from above due to rounding

The residential traffic will be distributed to the north and east via the main road connections, with most of the traffic entering the subject site from the north via the main north-south street proposed to/from Caves Road. Assessing the relating proximity of the major attractors of traffic external to the local structure plan (Busselton city centre, Dunsborough town centre and Vasse Newtown commercial centre) the expected distribution from the subject site has been assessed as approximately:

- 10% to/from the west
- 90% to/from the east/south along Caves Road/Bussell Highway.

6.1.2 INTERNAL TRAFFIC ATTRACTORS

The only attractor of trips to the local structure plan possible are the POS proposed within the structure plan area. The expected amount of traffic to be generated to this is expected to be minimal as the areas of POS are not district level, are wholly passive and therefore the 25% increase in

standard traffic generation rates being applied in this assessment is expected to be more than counted for in the traffic generation for the POS.

6.2 Traffic Distribution

The traffic distribution of the roads within and surrounding the subject site area can be broadly assumed to determine a high-level 'bracket' of likely traffic volumes. A summary of the distribution applied to establish likely traffic volumes is provided in Table 6-3 and Table 6-4 and takes into consideration internal and external traffic attractors and commuter routes.

Table 6-3: Estimated Daily Traffic Distribution Percentage of Traffic Generated

Area	West	East	South
W	10%	60%	30%
NE	10%	60%	30%
E	10%	60%	30%

Table 6-4: Estimated Daily Traffic Distribution of Traffic Generated

Area	West	East	South
W	210	1,060	630
NE	70	420	210
E	70	420	210

Consideration of current rates of growth in traffic flows on affected roads over a 20-year period, the cumulative impact of the above traffic volumes results in:

- Caves Road west of the subject site carrying in the order of 13,300vpd
- Caves Road near the subject site carrying in the order of 15,300vpd
- Bussell Highway to the south carrying in the order of 14,300vpd
- Bussell Highway to the east carrying in the order of 17,900vpd.

The above assumes that neither the VDL nor the BOB are constructed. If these are constructed and noting the previously discussed redistribution in traffic flows, the expected traffic flows on the same external roads are in the order of:

- Caves Road west of the subject site carrying in the order of 2,350vpd
- Caves Road near the subject site carrying in the order of 4,300vpd
- Bussell Highway to the south carrying in the order of 16,000 to 21,000vpd
- Bussell Highway to the east carrying in the order of 17,900vpd.

6.3 Extraneous (Through) Traffic

With the nature of the street connections proposed to the adjoining road network there is not expected to be any desire for through traffic through the local structure plan. There is only expected to be the structure plan generated traffic, which is very low (refer Figure 6-1), travelling to and from the subject site via the connecting streets onto Caves Road and Bussell Highway.

6.4 Design Traffic Flows (i.e., Total Traffic)

With the finished local structure plan, the main entry to the subject site is expected to be via the main western north-south street connecting with Caves Road between Locke Street and Cuthbert Street. A secondary access onto Caves Road will carry significantly less traffic where it connects to Caves Road between Roberts Road and the Caves Road/Bussell Highway roundabout. Finally, a minor left-in/left-out connection onto Bussell Highway south of the roundabout is expected to carry similar traffic flows to the previous intersection.

The transport network of the local structure plan area is permeable to the north and east. The structure plan area does not rely solely on a single road or access point to spread the traffic volumes through to the external network.



Figure 6-1: Traffic Volumes and Distribution

6.5 Access Strategy

The access arrangements to and from the structure plan area need to consider the wider area when considering the strategy for access, such as access to the Busselton city centre and other major external attractors. These include:

North of the Site

- **Access 1** – a full movement intersection at the connection of Caves Road and the main proposed north-south street, providing access to/from the western portion of the structure plan area[1].
- **Access 2** – a full movement intersection at the connection of Caves Road and the connecting street from the north-east cell.[2].

East of the Site

- **Access 3** - a left-in/left-out proposed for intersection where it intersects with Bussell Highway. It is proposed to extend the median island on the southern approach to the Caves Road roundabout further south so as to limit the movements to left-in/left-out. Refer to Figure 6-2 below.

[1] This access will allow Lot 4 to commence development independent of any other lots within the structure plan area.
[2] This access will allow Lot 12 to commence development independent of any other lots within the structure plan area.

Transport Impact Assessment
6 Analysis of Internal and External Transport Networks



Figure 6-2: Bussell Highway Access for Access 3 to Lots 14 & 15

Transport Impact Assessment
6 Analysis of Internal and External Transport Networks



Figure 6-3: Proposed Access Points

Regarding the Access 1 and 2 intersections on Caves Road, the off-sets of the proposed intersections are approximately 175m from the current location of Roberts Road and 215m from Locke Street on the north side of Caves Road. These off-sets will allow the provision of right turn lanes on Caves Road on the western approaches to each of the intersections. This length of turn lane is based on the current 70km/h speed limit and the current 85th percentile speeds of vehicles, which are in the 65 to 69km/h during daylight periods where there are higher traffic flows. For a 70km/h speed of approach for vehicles, the right turn and left turn pockets with a stop condition at the end are required to be 75m in length. Providing back-to-back right turn pockets (the case suggested in this case) a separation of approximately 170m would be required to account for intersection set-back and separation of the back-to-back turn pockets. This arrangement would thus fit within the approximate 175m off-set between Roberts Road and Access 2 and 215m between Locke Street and Access 1. Refer to Figure 6-4 showing the proposed location of the structure plan area intersections on Caves Road and the current intersections on Caves Road.

The provision of the back-to-back turn pockets may require limiting some access to properties on north side of Caves Road to left-in/left-out access, but that would achieve a safety improvement with reducing unmanaged turns to and from Caves Road.

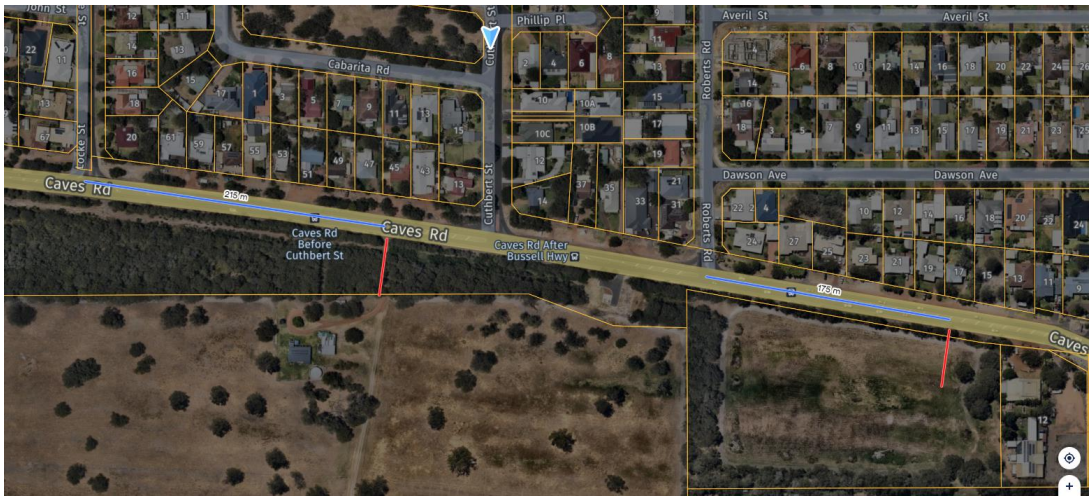


Figure 6-4: Proposed Access Points (in red) Location to Existing Intersections

6.6 Pedestrian / Cycle Networks

The structure plan area has been designed with all new streets as two-lane streets, and when assessing the internal road streets for pedestrians and cyclists, there are no streets that are identified as being difficult to cross due to the expected traffic volumes. WAPC Guidelines notes for a two-lane divided (or with pedestrian refuge islands) road, traffic volumes of above 2,800 vpd will affect the ability for pedestrians to cross. With the maximum total expected traffic volume on the main north-south street in the order of 2,000vpd at its northern end near Caves Road, the peak hour traffic volumes will be less than this specified guide.

All other local access streets are expected to have traffic volumes significantly less than 1,000vpd. At this level, on-street cycling will be relatively safe with if the low target design speeds of 30-40km/h are implemented/achieved. In addition to this, footpaths are expected to be provided on at least one side of every street in the local structure plan area. This is important for access for the structure plan area to the existing commercial centre the near the NE corner of the site (The Shed) at the intersection of Caves Road and Bussell Highway. This may require the provision of footpath connections along the southern side of Caves Road and within Skiff Way to complete the connection from within the structure plan area to the commercial area on Skiff Way.

The proposed footpath network will also facilitate access to the bus stops on Caves Road and the Abbey Beach/Geographe Bay foreshore, access through Roberts Road or Cuthbert Street on the north side of Caves Road. Finally, the structure plan provides for a future connection to the shared path along the Buayanyup Drain, which connects the Caves Road PSP to the Vasse Town Centre via a cycleway along the Buayanyup Drain bund.

Table 3: Traffic volumes affecting pedestrian crossing amenity

Road cross-section	Traffic volume affecting ability of pedestrians to cross * (vehicles per hour – two-way)
2 lane undivided	1,100 vph
2 lane divided (or with pedestrian refuge islands)	2,800 vph
4 lane undivided (without pedestrian refuge islands)	700 vph
4 lane divided (or with pedestrian refuge islands)	1,600 vph

Figure 6-5: Pedestrian Crossing Amenity – WAPC TIA Guidelines Volume 4

Table 4: Maximum desirable spacings for safe pedestrian crossings

Road type	Maximum spacing of safe pedestrian crossing facilities*
Arterial – minimal frontage activity	400 metres
Arterial – significant frontage activity	200 metres
Local distributor/Neighbourhood connector	100 metres

Figure 6-6: Desirable Crossing Spacing – WAPC TIA Guidelines Volume 4

The future detailed design of the roads should incorporate and prioritise the movements of pedestrians and cyclists at the streets and intersections, while still providing acceptable level of service for vehicle traffic. Connectivity across Caves Road for bus stop access and access to the foreshore will also need to be considered in the future detailed design of the access points onto Caves Road.

6.7 Safe Routes to Schools

There are no schools proposed within the local structure plan area nor are there any within a walkable catchment 800m distance of the structure plan area. The nearest school is Vasse Primary School, located approximately 2.5km from the structure plan area. As such, access to this school will be required to be provided by private vehicles or coach/public transport. As discussed in Section 6.6 it is reiterated that the structure plan provides for a future connection to the shared path along the Buayanyup Drain, which connects the Caves Road PSP to the Vasse Town Centre via a cycleway along the Buayanyup Drain bund.

Older children may ride to the school and if they do decide to, there is the Busselton Byway located on the eastern side of Bussell Highway, this will be ultimately extended further along the eastern side of Bussell Highway, near Skiff Way. Access to this can be gained through Access 3 and then across Bussell Highway where there is an approximate 3m wide traffic island. This wide island provides pedestrians refuge for crossing Bussell Highway to allow for a two-stage crossing.

6.8 Access to Public Transport

Current bus routes use Caves Road with stops immediately in front of the local structure plan area. There are presently no footpaths along Caves Road to facilitate access to these stops, although there is a proposal to provide a shared path as identified in the *Draft Leeuwin-Naturaliste 2050 Cycling Strategy*. To facilitate access to these stops from the structure plan area, safe crossing points should be provided on Caves Road, and these could be detailed in the future detailed planning stage.

6.9 Assessment of Intersections

6.9.1 LEVEL OF SERVICE CONCEPTS

The Level of Service (LoS) concept describes the quality of traffic service in terms of six levels, designated A to F, with LoS A representing the best operating condition (i.e., at or close to free flow), and LoS F being the poorest (i.e., forced flow). More specifically:

LoS A: Primarily free flow operations at average travel speeds, usually about 90% of the FFS (free flow speed) for the given street class. Vehicles are completely unimpeded in their ability to manoeuvre within the traffic stream. Control delay at signalised intersections is less than 10 seconds. At non-signalised movements at intersections, the average control delay is less than 10 seconds;

LoS B: Reasonably unimpeded operations at average travel speeds, usually about 70% of the FFS for the street class. The ability to manoeuvre within the traffic stream is only slightly restricted, and control delays at signalised intersections are between 10 and 20 seconds. At non-signalised movements at intersections the average control delay is between 10 and 15 seconds;

LoS C: Stable operations; however, ability to manoeuvre and change lanes in mid-block locations may be more restricted than at LoS B, and longer queues, adverse signal coordination, or both may contribute to lower average travel speeds of about 50% of the FFS for the street class. Signalised intersection delays are between 20 and 35 seconds. At non-signalised movements at intersections the average control delay is between 15 and 25 seconds;

LoS D: A range in which small increases in flow may cause substantial increases in delay and decreases in travel speed. LoS D may be due to adverse signal progression, inappropriate signal timing, high volumes, or a combination of these factors. Average travel speeds are about 40% of FFS. Signalised intersection delays are between 35 and 55 seconds. At non-signalised movements at intersections the average control delay is between 25 and 35 seconds;

LoS E: Characterised by significant delays and average travel speeds of 33% of the FFS or less. Such operations are caused by a combination of adverse progression, high signal density, high volumes, extensive delays at critical intersections (between 55 and 80 seconds), and inappropriate signal timing. At non-signalised movements at intersections the average control delay is between 35 and 50 seconds; and,

LoS F: Characterised by urban street flow at extremely low speeds, typically 25% to 33% of the FFS. Intersection congestion is likely at critical signalised locations, with high delays (more than 80 seconds), high volumes, and extensive queuing. At non-signalised movements at intersections the average control delay is greater than 50 seconds.

In addition to the above:

Average Delay: is the average of all travel time delays for vehicles through the intersection; and,

Queue: is the queue length below which 95% of all observed queue lengths fall.

Degree of Saturation (DoS): Ratio of the traffic flow to the capacity for that lane/movement.

The above has been summarised below.

Level of Service		Control delay per vehicle in seconds (d)	
		Sign Control	Signals
A	Excellent	d ≤ 10	d ≤ 10
B	Very Good	10 ≤ d ≤ 15	10 ≤ d ≤ 20
C	Good	15 ≤ d ≤ 25	20 ≤ d ≤ 35
D	Acceptable	25 ≤ d ≤ 35	35 ≤ d ≤ 55
E	Poor	35 ≤ d ≤ 50	55 ≤ d ≤ 80
F	Very Poor	50 < d	80 < d

6.9.2 PERFORMANCE ASSESSMENT

Within the traffic assessment it has been assumed that all intersections will follow the arrangement detailed in the current concept plan, being two full movement intersections on Caves Road and a left-in/left-out intersection on Bussell Highway.

To allow the development of the land across each of the separate lots independently, the local structure plan proposes these three access points as a minimum.

All bordering higher-order roads are expected to have traffic volumes within the typical maximum recommended traffic flows as provided in *Liveable Neighbourhoods 2009*. Caves Road and Bussell Highway have a maximum daily traffic carrying capacity of approximately 15,000vpd.

The site accesses on Caves Road will be offset approximately 175m and 215m from the current intersections on the north side of Caves Road (being Roberts Road and Locke Street respectively). These offsets will allow for sufficient right turn pocket lengths plus taper, on the western approach to the new proposed intersection.

The Access 3 intersection is proposed to intersect as a left-in/left-out with Bussell Highway. This access will allow all movements though the use of the well-located roundabout. It will allow a left turn out from the local structure plan area onto Bussell Highway.

As a worst case, the impact of ALL local structure plan traffic using a single access point on Caves Road was assessed, based on the worst-case scenario of the VDL and BOB not constructed and thus

traffic flows on Caves Road is modelled to be the highest possible. The result of this assessment is shown below in Table 6-5.

Table 6-5: Ultimate Intersection Performance – +20 years Approx. 2042

Location	Approach Crit. Mvt.	DOS	LOS	Ave. Delay	95th %ile Q
Access 1 (AM)	Site (South) – RT	0.56#	C#	21s	19m#
	Caves Rd (East) – LT	0.03	A	7s	1m
	Caves Rd (West) – RT	0.01	A	8s	0m
	Intersection	**0.56**	**C**	**3s**	**19m**
Access 2 (PM)	Site (South) – RT	0.40#	C#	21s	12m#
	Caves Rd (East) – LT	0.10	A	7s	4m
	Caves Rd (West) – RT	0.02	A	8s	1m
	Intersection	**0.40**	**C**	**3s**	**12m**

As can be seen, there is expected to be minimal to no queuing on Caves Road as most vehicles will be turning to and from the east in the direction of the Busselton city centre. Also, there is expected to be acceptable delays for vehicles turning right from the local structure plan area onto Caves Road with delays in the order of 21s in both the AM and PM peaks, a low DoS and overall LoS C for this movement in both peaks.

Based on the above, the other proposed Access 2 onto Caves Road is expected to operate at a significantly better manner in both the AM and PM and traffic flows are expected to be about one-fifth (700vpd versus the 3,500vpd) assessed in the results above.

The main internal intersection roundabout is expected to carry traffic flows well within the capacity of a roundabout, with the maximum flows of approximately 1,800vpd on the northern leg and no more than 800vpd on any other leg. At these levels of traffic flows, there is expected to be minimal queuing and delays at the roundabout and thus no queuing back onto Caves Road.

7 Conclusion

Based on the analysis and discussions presented within this report, the following conclusions are made for the Scheme Amendment and Local Structure Plan application for Lots 4 & 12 Caves Road and Lots 14 & 15 Bussell Highway in Abbey (subject site):

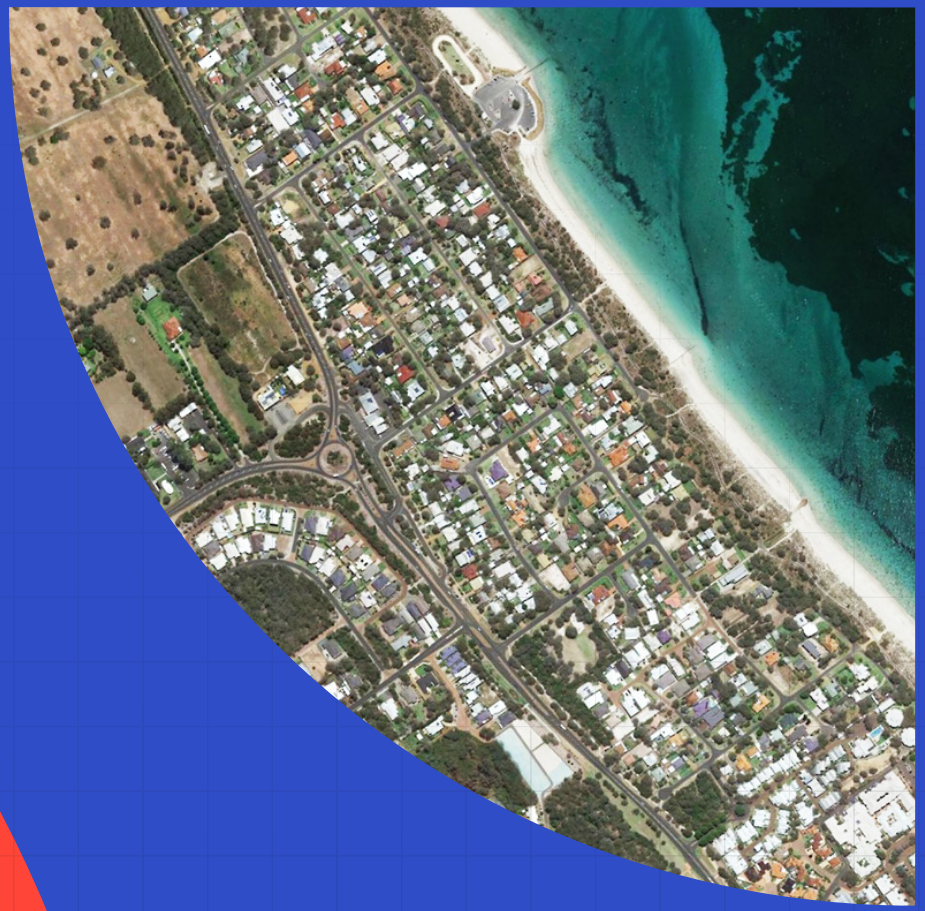
- The subject site covers approximately 30.5Ha of land area located immediately south of Caves Road and southwest of the intersection roundabout of Caves Road and Bussell Highway.
- It is proposed that the area will be developed into approximately 350-400 residential lots and public open space.
- The site is bound by:
    - Bussell Highway to the east
    - Wetlands to the south
    - Rural and tourism development to the west
    - Caves Road to the north.
- No through traffic is designed for or expected within the local structure plan area.
- The future VDL and BOB projects will affect the traffic flows on both Caves Road and Bussell Highway, but that will only lead to improved operation of the proposed new access for Caves Road to the local structure plan area. The Bussell Highway access is limited to left turn movements from Caves Road and left turn movements to Bussell Highway via Skiff Way, as per existing and therefore would not have any significant detrimental traffic impact.
- The local structure plan area will need to be developed in accordance with the requirements of *Liveable Neighbourhoods,* specifically regarding the provision of pedestrian and cycle paths and connections, and road cross sections that adequately accommodate the anticipated traffic volumes. Providing direct connections between the subject site and bus stops, the existing vibrant commercial precinct on the SW corner of Caves Road / Bussell Highway, the foreshore and bike paths will ensure pedestrian and cyclist desire lines are catered for and reduce the travel distance between main attractors.
- Vehicle access to and from the local structure plan area has been confirmed to be able to operate as a single intersection with full traffic flows in 20 years' time on Caves Road assuming no VDL or BOB projects. This is an unlikely scenario given VDL and BOB projects are planned for beyond the next 5 years; however, indicates how low the traffic generating characteristics are of this private landowner group's development proposal under the Planning Investigation Area.
- Intersections on Caves Road are proposed to be T-junctions with sufficient right turn pocket lengths between current intersections on the north side of Caves Road.

- The Bussell Highway connection is proposed through a new left-in/left-out intersection near a current all movement crossover. This will require extension of a traffic island southwards from the Caves Road roundabout so to limit movements to left-in/left-out.
- Overall, the local structure plan area is proposed to generate approximately 3,500 vehicle trips per day. This traffic will be mostly dispersed to the north to access Caves Road, with less traffic accessing Bussell Highway via the loop road.
- The road network hierarchy within the structure plan area has been determined based on daily flows and in accordance with *Liveable Neighbourhoods 2009*. Given the very low generating characteristics of the proposal, traffic volumes will be accommodated for in the surrounding road network. Caves Road and Bussell Highway are able to cater for the ultimate traffic flows in 20 years' time being a combination of current traffic growth on these roads and expected traffic flows from the local structure plan area.
- Internally all streets within the local structure plan area will be designated as Access Streets of varying levels dependant on their traffic flows and function. Only a single higher order street (Access Street B) is noted at the northern end of the main north-south access street near Caves Road.
- Although the existing public transport services are limited in the area there is direct access to these services. Access to these for patrons will need to be considered in more detail at a later subdivision stage with footpaths and traffic islands provided on Caves Road for crossing refuge.

The high-level determination of this TIA is that the development this local structure plan, under the assumed traffic generation and distributions noted is not expected to significantly compromise the surrounding movement transport network. It can be concluded from the information presented in this TIA that the proposed Scheme Amendment and Local Structure Plan should be supported by the future traffic network. Accordingly, overall, the transport characteristics of the local structure plan are considered acceptable.

Appendix A Road Hierarchy Assessment

Appendix B Structure Plan Concept Plan



Appendix 5

Servicing Strategy – Stantec

Rise Urban

AGILE PLANNING FOR THE NEW NORMAL

Lots 4 & 12 Caves Road and Lots 14,15 & 402 Bussell Highway, Abbey

Civil, Electrical and Communications

Engineering Servicing Report

Revision 005 – 09 December 2022

Ref: 301250161

PREPARED FOR:

Venetia Ariane Stewart Testamentary Trust and
Michael Andrew St Patrick Stewart Testamentary Trust and
Lowe Pty Ltd and Phil Lukin Pty Ltd
c/- Rise Urban Attn: Cameron Leckey

PREPARED BY:

Richard Martin/Rhys Fowler

Stantec

Revision

Revision	Date	Comment	Prepared By	Approved By
001	21 January 2021	Original issue	R. Martin	R. Martin
002	08 March 2021	Secondary area added	R. Martin	R. Martin
003	26 May 2022	Updated servicing advice. Report template updated.	R. Fowler	R. Martin
004	26 July 2022	Staging section added. Earthworks section added. Concept plan updated. Study area updated	R. Fowler	R. Martin
005	09 December 2022	Updated concept plan 003g	M. Kottaram	R. Martin

Contents

Executive Summary 1

1. General 2

1.1 Introduction 2
1.2 Site Description 2

2. Earthworks 4

3. Sewerage 5

3.1 Existing Infrastructure 5
3.2 Proposed Development Servicing 6

4. Potable Water 7

4.1 Existing Infrastructure 7
4.2 Proposed Development Servicing 7

5. Underground Power 8

5.1 Existing Infrastructure 8
5.2 Infrastructure Capacity / Proposed Upgrades 8

6. Communications 9

7. Gas 10

7.1 Existing Infrastructure 10
7.2 Proposed Development Servicing 10

8. Noise 11

9. Development Staging 12

Contents

Appendix A Concept Development Layout

Appendix B Water Corporation Correspondence

Appendix C Busselton Water Correspondence

Appendix D ATCO Gas Correspondence

Executive Summary

Stantec Australia Pty Ltd (Stantec) has been commissioned to prepare a desktop engineering servicing report for the area comprising Lots 4 & 12 Caves Road and Lots 14, 15 & 402 Bussell Highway, Abbey (the Site) within the City of Busselton.

A concept subdivision layout has been prepared by Rise Urban and is included as *Appendix A*. The information presented in this report is based on the concept subdivision layout, preliminary advice from the relevant service providers/authorities, and their available strategic planning information.

The desktop review has identified that infrastructure exists within close proximity to the Site which can be extended to provide the proposed development with the services discussed within this report.

1. General

1.1 Introduction

Stantec Australia Pty Ltd (Stantec) has been commissioned to prepare a desktop engineering servicing report for the area comprising Lots 4 & 12 Caves Road and Lots 14, 15 & 402 Bussell Highway, Abbey (the Site) within the City of Busselton. *Figure 2* below provides an overview of the Site.

A concept subdivision layout has been prepared by Rise Urban and is included as *Appendix A*. The information presented in this report is based on the concept subdivision layout, preliminary advice from the relevant service providers/authorities, and their available strategic planning information.

1.2 Site Description

1.2.1 Site Location, Topography, and Existing Features

The Site is located near the intersection of Caves Road and Bussell Highway, Abbey within the City of Busselton, approximately 8km west of the Busselton CBD.



Figure 1: Site Location

Figure 2 on the following page indicates that the Site is typically parkland cleared of vegetation, with several small pockets of trees remaining. A number of dwellings and structures exist across the Site, particularly to the east where various businesses are also located. Ground levels across cleared potions of the Site range between approximately 3.60mAHD and 1.00mAHD, with ground levels generally being highest at a central 'ridge' that runs approximately east-west. There are lower lying areas to the north (up to Caves Road) and particularly to the south (down to the Vasse Estuary). An existing dam is located in the south-west corner of the Site, in a low-lying area that is within the 1%AEP floodplain of the Vasse Estuary.

Acid Sulfate Soil (ASS) risk mapping published by the Department of Water and Environmental Regulation, as presented in *Figure 3*, indicates most of the Site sits within an area identified as having 'moderate to low risk of ASS occurring within 3m of natural soil surface…'. The southern portion of the site is within an area identified as having 'high to moderate risk of ASS occurring within 3m of the natural soil surface'.



Figure 2: Site Overview (Imagery: Nearmap, dated 06/04/2022)

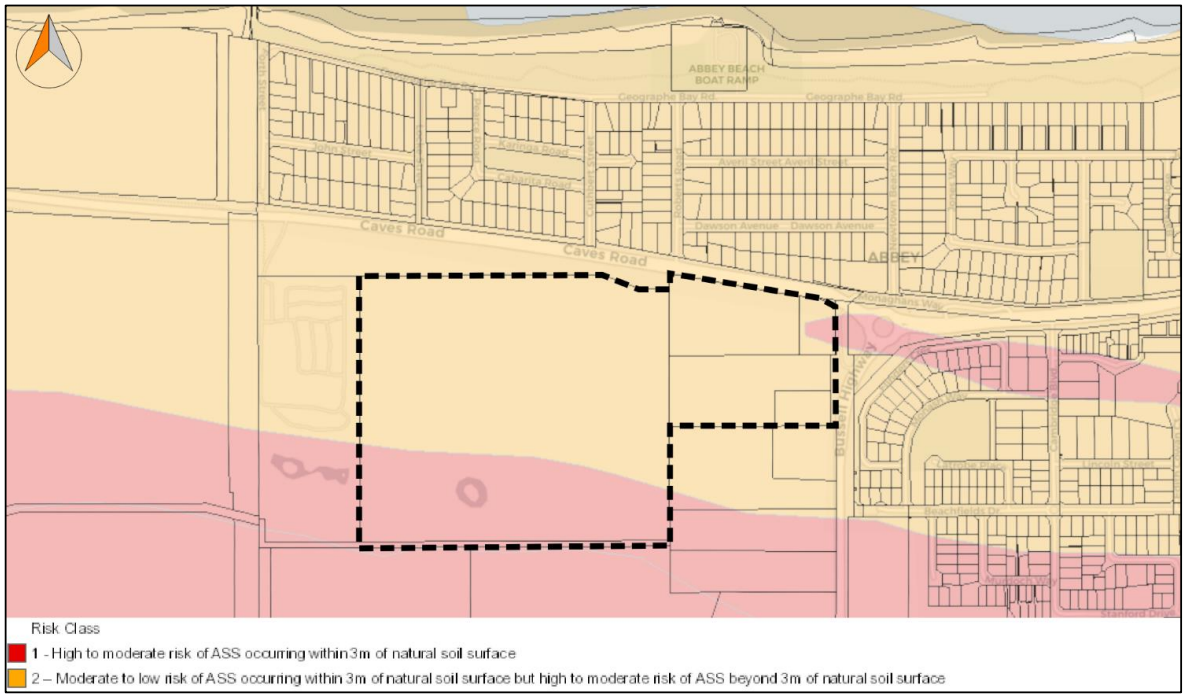


Figure 3: ASS Risk Mapping (Department of Water and Environmental Regulation)

2. Earthworks

Earthworks will be required to facilitate the proposed development of the Site. It is understood that, in general, earthworks will be designed and undertaken to achieve the following:

- Align with the overall drainage strategy for the Site as outlined in a Local Water Management Strategy.
- Aim to mimic the pre-development shaping and catchment flow of the land.
- Retain trees across the Site where it is feasible to do so.
- Allow for a minimum habitable finished floor level of 3.00mAHD to address coastal inundation risk.
- No filling is proposed to be undertaken within the designated floodway.

An existing dam within the Site may require filling depending on the proposed development layout. If filling of the dam is necessary, it is recommended that specific geotechnical advice is sought on the requirements for doing so.

3. Sewerage

3.1 Existing Infrastructure

Water Corporation operates a gravity sewerage network in the area surrounding the Site, with their existing infrastructure depicted in *Figure 4*. The existing gravity sewerage network is predominantly located north of Caves Road and gravitates to an existing wastewater pump station (WWPS), Busselton PS24, on the southern side of Caves Rd adjacent the Site.

Busselton PS24 discharges via a DN200 pressure main that pumps to an existing WWPS south of the Site adjacent the Vasse Bypass, and from there ultimately east to Water Corporation's wastewater treatment plant on Queen Elizabeth Avenue.



Figure 4: Existing Water Corporation Sewerage Infrastructure

3.2 Proposed Development Servicing

The proposed development area is located within Water Corporation's SD090 Busselton Long Term Sewer Planning (SD090) scheme boundary. This scheme planning shows that the Site is located within the catchment of an existing pump station (Busselton PS24) and will be serviced via DN150 gravity sewers extending from the PS24 site.

An extract from Water Corporation's SD090 document is included as *Figure 5*.

Water Corporation's ESInet system indicates the existing gravity sewers at the Busselton PS24 site are approximately 7m deep, which should be sufficient to service the proposed development of the Site.

Stantec contacted the Water Corporation as part of these investigations, who confirmed the proposed development can be serviced via gravity sewers extending from the existing Busselton PS24 site. A copy of correspondence with Water Corporation is included as *Appendix B*.

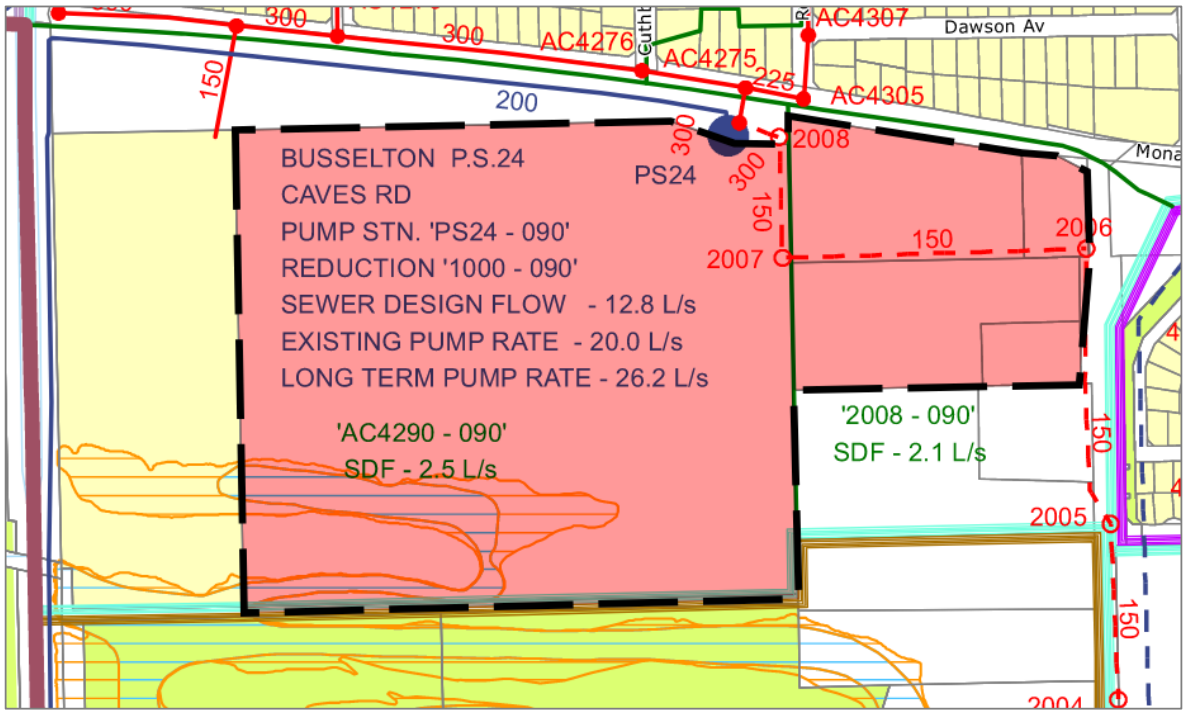


Figure 5: Extract from Water Corporation SD090

4. Potable Water

4.1 Existing Infrastructure

Busselton Water operates a reticulated potable water network in the area surrounding the Site. As indicated in *Figure 6*,

Busselton Water has an existing DN250 water main on the northern side of Caves Road, and an existing DN375 main on the eastern side of Bussell Highway. Busselton Water also has smaller diameter water mains servicing the surrounding areas which are not shown in *Figure 6* for clarity.

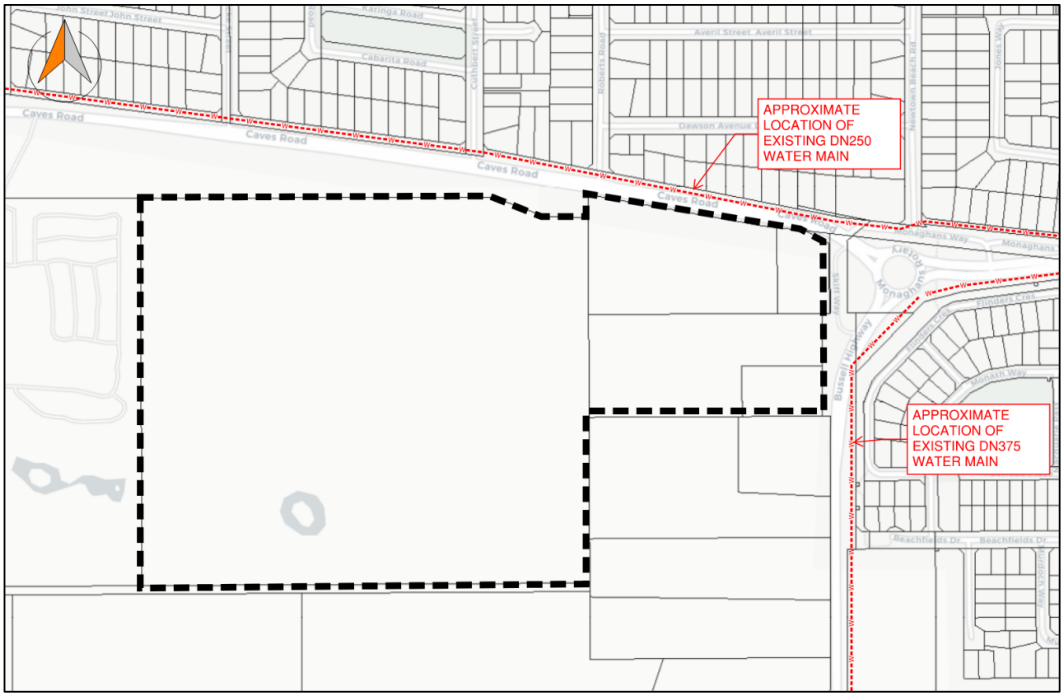


Figure 6: Existing Water Main Locations (smaller reticulation mains not shown)

4.2 Proposed Development Servicing

Busselton Water was contacted to provide advice on the requirements for servicing the proposed development of the Site with potable water. Busselton Water advised that the existing DN250 main on the northern side of Caves Road is unlikely to have sufficient capacity to service the proposed development, however this can only be confirmed by detailed investigations and hydraulic modelling. Busselton Water advised that, if the existing DN250 main does not have sufficient capacity, an extension from the existing DN375 main east of Bussell Highway is likely to be required.

Stantec queried Busselton Water on whether only the initial stage(s) of development, or a certain number of lots, could be serviced from the DN250 main, with extension from the DN375 main undertaken as further development continues. Busselton Water advised that this was unlikely to be possible, but a hydraulic review at the Developer's cost would be required to be able to confirm this.

Busselton Water also advised that an extension from their DN375 main is not part of their capital works program in the next ten years and would likely need developer funding. Stantec has queried Busselton Water on the process for having this mains extension included within their capital works program sooner, however at the time of preparing this report a response has not yet been received.

A copy of correspondence with Busselton Water is included as *Appendix C*.

5. Underground Power

5.1 Existing Infrastructure

An analysis of Western Power's DFIS system has been conducted to determine the existing power supply configuration surrounding the development. The existing Western Power network surrounding the site consists of the following:

- High voltage (HV) underground cables from the Caves Rd / Bussell Hwy intersection, in a westerly direction through to the Busselton Holiday Park. This HV line is located within the Caves Rd reserve up to Roberts Rd, after which it deviates south and then west to the southern side of the native landscape strip. The existing underground cable can remain in place, provided the alignment does not clash with any proposed services or roads within the proposed subdivision.
- HV underground cable from the south-western corner of the Site to the existing residence. It is likely that Western Power will require that this cable be removed, and that the existing residence be re-supplied from the new internal power network.
- HV underground cable from the Caves Rd / Bussell Hwy intersection, in a southerly direction (eastern corner of the Site in vicinity of the existing market site). Provided this cable is in the correct alignment and does not clash with any proposed services, it is likely that Western Power will allow this cable to remain in place as it currently services the market site.
- Existing supply to Ice Factory. We are unable to locate the power supply for this site, but it is likely to be an underground low voltage connection from either the market site, or from the existing overhead line on the eastern side of Bussell Hwy. It is likely that Western Power will allow this service to remain in place.

5.2 Infrastructure Capacity / Proposed Upgrades

Based on the proposed development, it is likely that the site power demand will be in the vicinity of 1.5-2 MVA. This is based on the standard Western Power load allocation of 4.7kVA per lot for residential lots and 200kVa/ha for commercial lots.

The Western Power Network Capacity Mapping Tool indicates that the forecasted remaining capacity for this area for 2021 is in the order of 15-20MVA (20/01/2021). This figure indicates that capacity is available at the zone substation, however we are unable to confirm whether any off-site feeder upgrades may be required to service the development. This can only be confirmed via a formal Western Power Feasibility or Design Information Package application.

In order to service the proposed subdivision, it is likely that a new switchgear site will be established near the new entrance (opposite Roberts Rd). The new HV switch will be supplied by cutting into the existing HV underground cable and will supply two transformers within the subdivision. Transformers should be installed within public open spaces as they have fire exclusion zones that significantly reduce usable space within residential lots.

It should be noted that due to the dynamic nature of Western Power's network, infrastructure requirements and connection points referred above may differ when applications are placed in the future. It is recommended that a planning study be undertaken closer to the date of proposed load uptake to determine if the existing network has the capacity to service the proposed development.

6. Communications

The proposed development will require a fibre ready pit and conduit network to be installed at the Developer's cost.

The pit and conduit will be designed in accordance with NBN standards and will be installed in the telecommunications alignment within the internal road reserves. Once installed and inspected, ownership of the pit and conduit network will be transferred to NBN.

An analysis of NBN's DBYD has been conducted in order to determine the location of the existing NBN network that would supply the proposed pit and conduit network. The nearest existing NBN network is located within the road reserve on the Northern side of Caves Road. Based on the proposed development, it is likely that the connection will initially originate from existing pits along Caves Road (opposite Roberts Rd). Minor works (relocations) may be required in this vicinity to accommodate the new connection to the subdivision.

It should be noted that due to the dynamic nature of NBN's network, infrastructure requirements and connection points referred above may differ when applications are placed in the future.

In addition to the new pit and conduit network, the developer will be required to remove all existing telecommunications infrastructure that may be located within the proposed new lots.

7. Gas

7.1 Existing Infrastructure

ATCO Gas operates a reticulated gas network in the area surrounding the Site. The closest infrastructure to the Site is an existing DN160 main located on the eastern side of Bussell Highway as indicated in *Figure 7*. ATCO Gas does not currently have infrastructure north of Caves Road or west of Bussell Highway.



Figure 7: Existing Gas Main Location (other gas reticulation not shown)

7.2 Proposed Development Servicing

ATCO Gas was contacted to provide advice on the requirements for servicing the proposed development of the Site with reticulated gas. ATCO Gas advised that their existing DN160 main has capacity to service the proposed development of the Site. ATCO Gas also advised that a new DN160 main would need to be extended to the Site from the existing Bussell Highway main. The location and length of the required mains extension will depend on staging of the proposed development.

When the scope of the mains extension is known ATCO Gas would prepare a business case and assess whether they would contribute towards any of the mains extension cost or whether the Developer would be required to fully fund costs.

Internally to the development, ATCO Gas would design the gas reticulation network. It is anticipated that they may fund the installation of the internal gas reticulation into a common trench provided by the Developer (as is common for developments in the area), however this can only be confirmed by ATCO Gas at the time of detailed design.

A copy of correspondence with ATCO Gas is included as *Appendix D*.

8. Noise

Based on the proximity of the Site to Caves Road and Bussell Highway, it is recommended that the potential noise and acoustic impacts on the proposed development are considered. It is recommended that a suitably qualified acoustic specialist be consulted to determine whether specific acoustic treatments may be warranted (e.g. noise bund / noise wall, setbacks, building requirements, notices on titles etc.).

9. Development Staging

Development of the Site will be undertaken in a staged manner with an indicative staging layout shown in *Figure 8* below.

Development is likely to commence in the northern portion of the Site adjacent Caves Road where services can be extended into the Site from their existing locations.

The initial stages of development will likely include the two proposed entry points from Caves Road, with development then continuing south in an orderly and logical manner to allow extensions of constructed infrastructure.

It should be noted that, depending on the final staging layout and the staged construction of roads, temporary emergency access tracks may be required to provide additional access/egress routes until a sufficient number of road connections are constructed.

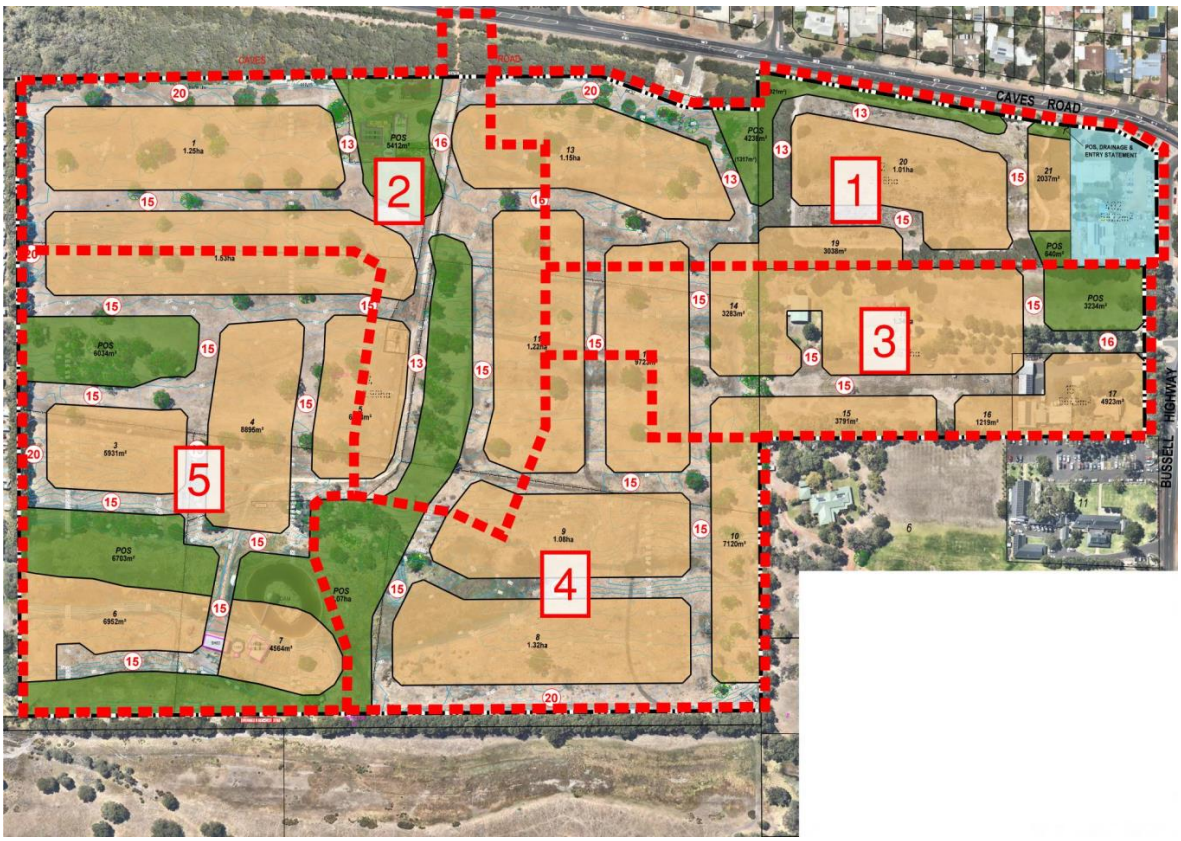


Figure 8: Indicative Development Staging

Appendix A
Concept Development Layout

ABBEY PLANNING INVESTIGATION AREA

CONCEPT LAYOUT PLAN 5 DECEMBER 2022



Appendix B
Water Corporation Correspondence

Fowler, Rhys

From: Rajiv Narendranathan <Rajiv.Narendranathan@watercorporation.com.au>
Sent: Wednesday, 25 May 2022 5:06 PM
To: Rob Pettersson
Subject: FW: SEWER SERVICES TO RESIIDENTIAL (300L's) DEVELOPMENT PROPOSAL: Caves Rd, Abbey (SF0009373)
Attachments: caves rd abbey.pdf; SEWER SERVICES TO RESIIDENTIAL (300L's) DEVELOPMENT PROPOSAL: Caves Rd, Abbey (SF0009373)

Hi Rob,

Following this email and the original one attached, the development for 300 residential houses residential houses can be accommodated by the proposed DN150 gravity network feeding into the proposed AC #2008.

Please let me know if you have any questions/comments.

Thanks,

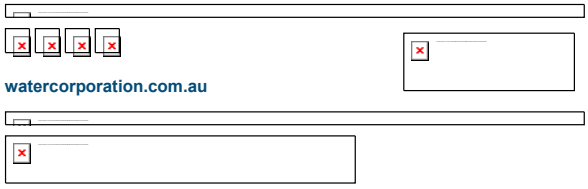
Rajiv Narendranathan
Principal, WW Conveyance (acting)
Customer Networks (Regional)
Water Corporation
T: (08) 9420 2860
M: 0424 757 372

From: Rob Pettersson <Rob.Pettersson@watercorporation.com.au>
Sent: Wednesday, 18 May 2022 10:24 AM
To: Customer Networks Regional Inbox <CustomerNetworksRegionalInbox@watercorporation.com.au>
Subject: FW: SEWER SERVICES TO RESIIDENTIAL (300L's) DEVELOPMENT PROPOSAL: Caves Rd, Abbey (SF0009373)

Further details from consultant - Stantec

Rob Pettersson
Adv - Network Expansion
Development Services

E Rob.Pettersson@watercorporation.com.au
T (08) 9420 3970



Please consider the environment before printing this email.

From: Fowler, Rhys <rhys.fowler@stantec.com>
Sent: Wednesday, 18 May 2022 9:52 AM
To: Rob Pettersson <Rob.Pettersson@watercorporation.com.au>
Subject: RE: SEWER SERVICES TO RESIIDENTIAL (300L's) DEVELOPMENT PROPOSAL: Caves Rd, Abbey (SF0009373)

Hi Rob,

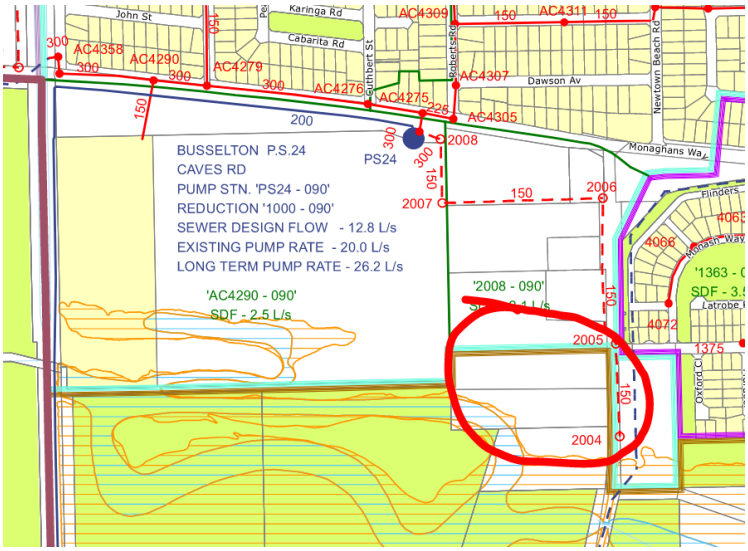
Thanks for your email.

The attached concept plan is all that is currently available.
We are preparing a servicing report which will support a structure plan, so at this stage just needing confirmation that the site would be serviced via extension of DN150 sewers from the existing PS24 WWPS on Caves Rd as per SD090.

The only query would be the area circled below, which is shown outside the catchment of PS24? Is there a reason this area couldn't be included within the catchment?

Just to clarify – the first stage of development could start within the next few years but the development as a whole would be over a longer period.

Thanks,



Rhys Fowler
Civil Engineer

Direct: +61 8 9717 6103
rhys.fowler@stantec.com

Stantec Australia Pty Ltd

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From: Rob Pettersson <Rob.Pettersson@watercorporation.com.au>
Sent: Wednesday, 18 May 2022 9:08 AM
To: Fowler, Rhys <rhys.fowler@stantec.com>
Subject: SEWER SERVICES TO RESIIDENTIAL (300L's) DEVELOPMENT PROPOSAL: Caves Rd, Abbey (SF0009373)

Hi Rhys,

Can you please provide any further details for this 2 year development. That is, WAPC reference, Structure/rezoning plan, Development plan,

Thanks

Rob Pettersson
Adv - Network Expansion
Development Services

E Rob.Pettersson@watercorporation.com.au
T (08) 9420 3970

watercorporation.com.au

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Appendix C
Busselton Water Correspondence

From: Peter Campbell Hicks <peter.campbellhicks@busseltonwater.wa.gov.au>
Sent: Wednesday, 25 May 2022 3:17 PM
To: Fowler, Rhys; Chris Temple
Cc: Martin, Richard
Subject: RE: Servicing Advice - Lot 4 Caves Rd, Abbey and adjacent lots

Hi Rhys,

Please see below.

Kind regards,

Peter Campbell-Hicks
Planning Coordinator

0407 086 948 | busseltonwater.wa.gov.au | 1 Fairbairn Road Busselton WA 6280 | PO Box 57 Busselton WA 6280

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From: Fowler, Rhys <rhys.fowler@stantec.com>
Sent: Wednesday, 25 May 2022 2:31 PM
To: Peter Campbell Hicks <peter.campbellhicks@busseltonwater.wa.gov.au>; Chris Temple <chris.temple@busseltonwater.wa.gov.au>
Cc: Martin, Richard <richard.martin2@stantec.com>
Subject: RE: Servicing Advice - Lot 4 Caves Rd, Abbey and adjacent lots

Hi Peter & Chris,

Thanks for the call to discuss this project. I've summarised the main points below – can you please confirm this is as discussed.

- The existing DN250 main in Caves Rd is close to capacity. It is unlikely this main would have the ability to service the proposed development (but this can only be confirmed by detailed investigations and hydraulic modelling)
- If the existing DN250 is not adequate, an extension from the existing DN375mm trunk main East of Bussell Hwy is likely to be required. ~~It is likely the proposed development would instead need to be serviced from the existing DN375 main east of Bussell Hwy.~~
- The extension is not part of Busselton Water's Capital program in the next 10 years and would likely need developer funding. ~~t is unlikely that the extension from the existing DN375 main to service the site would be part of Busselton Water's capital works program, and would likely need to be developer funded.~~
- The above is all subject to more detailed investigations and the timing of development.

Given that the first stages of development would likely be adjacent Caves Rd, would there be potential for the initial stage(s) or a certain number of lots to be serviced from the existing DN250 main? With the extension from the DN375 main undertaken as development of further stages continues and moves east to Bussell Hwy? Unlikely, given how close it is to capacity, however a hydraulic review would be required to answer, a quote would be provided for works.

Thanks,

Rhys Fowler
Civil Engineer

Direct: +61 8 9717 6103
rhys.fowler@stantec.com

Stantec Australia Pty Ltd

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From: Fowler, Rhys
Sent: Wednesday, 25 May 2022 1:29 PM
To: Peter Campbell Hicks <peter.campbellhicks@busseltonwater.wa.gov.au>
Cc: Martin, Richard <richard.martin2@stantec.com>
Subject: RE: Servicing Advice - Lot 4 Caves Rd, Abbey and adjacent lots

Hi Peter,

Thanks for the email.

Unfortunately at this stage the only additional information I have is that the development could yield approx. 300 residential lots in total.
The first stage could commence in the second half of next year, and then rate of development would be market driven. If you needed an estimate, then could potentially assume one stage of maybe 30-40 lots per year.

We are unsure of their plans for re-zoning etc. but we've been asked to investigate the entire area as shown on the concept plan.

Hope this helps.

Regards,

Rhys Fowler
Civil Engineer

Direct: +61 8 9717 6103
rhys.fowler@stantec.com

Stantec Australia Pty Ltd

Better Together, Even If We're Apart. Read more about Stantec's COVID-19 response, including remote working and business continuity measures.

From: Peter Campbell Hicks <peter.campbellhicks@busseltonwater.wa.gov.au>
Sent: Wednesday, 25 May 2022 12:17 PM
To: Fowler, Rhys <rhys.fowler@stantec.com>
Cc: Martin, Richard <richard.martin2@stantec.com>
Subject: RE: Servicing Advice - Lot 4 Caves Rd, Abbey and adjacent lots

Hi Rhys,

Apologies for the delay.

Do you have a few more rough details at this stage of number of services and rough project timeline you are referring?

The 250mm trunk main is very close to capacity currently on peak days (particularly in the summer we've just had) and only at the hydraulic review stage will we be able to give final confirmation.

The new drawing/ concept plan, is also over a bigger area than the City of Busselton's Local Planning Scheme, which we'd previously anticipated. Is this likely to be the size of the scheme?

Kind regards,

Peter Campbell-Hicks

Planning Coordinator

0407 086 948 | busseltonwater.wa.gov.au | 1 Fairbairn Road Busselton WA 6280 | PO Box 57 Busselton WA 6280

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From: Fowler, Rhys <rhys.fowler@stantec.com>
Sent: Wednesday, 25 May 2022 8:53 AM
To: Peter Campbell Hicks <peter.campbellhicks@busseltonwater.wa.gov.au>
Cc: Martin, Richard <richard.martin2@stantec.com>
Subject: RE: Servicing Advice - Lot 4 Caves Rd, Abbey and adjacent lots

Hi Peter,

We are needing to finalise our report for the Developer by the end of this week – are you please able to advise when Busselton Water's advice/confirmation of the below will be available?

Regards,

Rhys Fowler
Civil Engineer

Direct: +61 8 9717 6103
rhys.fowler@stantec.com

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From: Fowler, Rhys
Sent: Thursday, 12 May 2022 3:18 PM
To: Peter Campbell-Hicks <peter.campbellhicks@busseltonwater.wa.gov.au>
Cc: Martin, Richard <richard.martin2@stantec.com>
Subject: Servicing Advice - Lot 4 Caves Rd, Abbey and adjacent lots

Hi Peter,

We have been asked to obtain updated servicing advice for the proposed development indicated on the attached sketch.

Jarrad has previously provided the below advice.
Can you please advise if Jarrad's previous advice is still current, and that the proposed development area can be serviced from the existing Caved Rd DN250 main without need for network upgrades or reinforcement?

Google Maps link to location

Thanks,

Rhys Fowler
Civil Engineer

Direct: +61 8 9717 6103
rhys.fowler@stantec.com

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From: Jarrad Leaver <jarrad.leaver@busseltonwater.wa.gov.au>
Sent: Wednesday, 13 January 2021 9:05 AM
To: Martin, Richard <richard.martin2@stantec.com>
Subject: RE: Lot 4 Caves Road, Abbey

Hi Richard,

There is provision for the water to come from the 250mm Main on the north side of Caves road, on the map provided there will be two connections from this main near 17 and 7 as depicted numerically on the map. The 250mm main will be sufficient to supply the area

As per usual when the time comes this would need to be hydraulically designed by BW.

Thanks

Jarrad Leaver
Planning / Safety Officer

+61 8 9781 0516 | 0417 910 637
busseltonwater.wa.gov.au | 1 Fairbairn Road Busselton WA 6280 | PO Box 57 Busselton WA 6280



From: Martin, Richard <richard.martin2@stantec.com>
Sent: Wednesday, 13 January 2021 8:17 AM
To: Jarrad Leaver <jarrad.leaver@busseltonwater.wa.gov.au>
Subject: Lot 4 Caves Road, Abbey

Hi Jarrad,

I am doing a servicing report for the landholding shown on the attached plan and need to have a look at where the water will come from and if there are any potential infrastructure upgrades etc.

Are you able to please provide some advice.

Cheers

Richard Martin
Group Leader - Principal, Busselton

Office: +61 8 9754 4244
Direct: +61 8 9717 6101
Mobile: +61 423 232 963
richard.martin2@stantec.com

Stantec Australia Pty Ltd
PO Box 1276, 10/44-48 Queen Street, Busselton
Western Australia 6280
Australia



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Appendix D
ATCO Gas Correspondence

From: Asset Services <Asset.Services@atco.com>
Sent: Tuesday, 17 May 2022 5:36 PM
To: ATCO Gas AU – Land Development; Fowler, Rhys
Cc: Deacon, Lee; See, Mabel; Enquiries; Martin, Richard; Hoyne, Ben
Subject: RE: [ATCO Ref - 8902] - Lots 4 and 12 Caves Rd, + Lots 14, 15, + 402 Bussell Hwy, Abbey

Hi Rhys

Based on modelling, the PEHP network for the area has available capacity for the new lots and a proposed main extension of DN160PE is required from the existing DN160PE mains on Bussell Highway. We will design the gas supply network within the lots once the estate plan is available which will branch out from the proposed DN160PE main.

Assumptions:

PEHP Busselton 30 – Severe Winter

Thank you.

Regards

Sophia Henry
Asset Planning Engineer
ATCO, Gas Division, Australia

P. +61 8 6163 5073
A. 81 Prinsep Road, Jandakot, Western Australia, 6164
atco.com.au Facebook Twitter LinkedIn



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We pay respect to their cultures, Elders past and present, and in the spirit of reconciliation, we commit to working together for our shared future.

From: ATCO Gas AU – Land Development <Land.Development@atco.com>
Sent: Monday, 16 May 2022 10:54 AM
To: Fowler, Rhys <rhys.fowler@stantec.com>
Cc: Deacon, Lee <Lee.Deacon@atco.com>; See, Mabel <Mabel.See@atco.com>; Enquiries <Enquiries@atco.com>; Martin, Richard <richard.martin2@stantec.com>; Asset Services <Asset.Services@atco.com>; Anak Henry, Sophia <sophia.anakhenry@atco.com>
Subject: RE: [ATCO Ref - 8902] - Lots 4 and 12 Caves Rd, + Lots 14, 15, + 402 Bussell Hwy, Abbey

HI Rhys

ATCO will be in touch with you soon to provide your requested servicing advice.

Thanks

Lewis Searle
GIS Analyst

Gas, Australia

P. +61 8 6163 5160
A. 81 Prinsep Road, Jandakot, Western Australia, 6164
atco.com.au Facebook Twitter LinkedIn



From: Fowler, Rhys <rhys.fowler@stantec.com>
Sent: Friday, 13 May 2022 4:56 PM
To: ATCO Gas AU – Land Development <Land.Development@atco.com>
Cc: Deacon, Lee <Lee.Deacon@atco.com>; See, Mabel <Mabel.See@atco.com>; Enquiries <Enquiries@atco.com>; Martin, Richard <richard.martin2@stantec.com>
Subject: RE: Lots 4 and 12 Caves Rd, Abbey - Gas Servicing Advice - Please pass on all available up-to-date information on this project

Caution – This email is from an external source. If you are concerned about this message, please forward it to spam@atco.com for analysis.
Hi Lewis,

Thanks for your email.

This project is in early stages so there is not yet a precal or water plans available, and unfortunately I'm unsure when or by who the previous advice from ATCO came from.
The provided concept plan is all that is currently available. The development would yield approximately 300 residential lots.

At this stage we not requiring any design, and are just seeking advice on whether ATCO's existing network has capacity to service the proposed development from the existing main to the east in Bussell Hwy.

Have a great weekend.

Thankyou,

Rhys Fowler
Civil Engineer

Direct: +61 8 9717 6103
rhys.fowler@stantec.com

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From: ATCO Gas AU – Land Development <Land.Development@atco.com>
Sent: Friday, 13 May 2022 4:23 PM
To: Fowler, Rhys <rhys.fowler@stantec.com>; Martin, Richard <richard.martin2@stantec.com>
Cc: Deacon, Lee <Lee.Deacon@atco.com>; See, Mabel <Mabel.See@atco.com>; ATCO Gas AU – Land Development <Land.Development@atco.com>; Enquiries <Enquiries@atco.com>
Subject: RE: Lots 4 and 12 Caves Rd, Abbey - Gas Servicing Advice - Please pass on all available up-to-date information on this project
Importance: High

Hi, we would need to see all available up-to-date information on this project before this previous undertaking given to you could be positively endorsed (not sure when ATCO made this statement?).

Please pass on the latest, up to date ***common trenching water plans in pdf format, plus the precal cadastral CAD file in .dwg or .dgn format,*** so we can update our GIS to show the latest lot configuration. Using the water plan and the latest cadastre we with then be able to get a better idea of exactly how the lots within your project may be serviced, and any associated servicing costs that may be applicable.

Please continue to address future communication to Land.Development@atco.com

Lewis Searle
GIS Analyst
Gas, Australia

P. +61 8 6163 5160
A. 81 Prinsep Road, Jandakot, Western Australia, 6164
atco.com.au **Facebook** **Twitter** **LinkedIn**

From: See, Mabel <Mabel.See@atco.com>
Sent: Friday, 13 May 2022 3:56 PM
To: ATCO Gas AU – Land Development <Land.Development@atco.com>
Cc: Deacon, Lee <Lee.Deacon@atco.com>
Subject: FW: Lots 4 and 12 Caves Rd, Abbey - Gas Servicing Advice

Hi Lewis and Lee,

I believe this sits with your team? Please see email below.

Regards,

Mabel See
Senior Asset Planning Engineer
ATCO, Gas Division, Australia

P. +61 8 6163 5042
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From: Enquiries <Enquiries@atco.com>
Sent: Friday, 13 May 2022 3:37 PM
To: *AGA GAS AU – Asset Services escalation <AssetServicesEscalation@atco.com>; Engineering Services <eservices@atco.com>

Cc: Enquiries <Enquiries@atco.com>
Subject: FW: Lots 4 and 12 Caves Rd, Abbey - Gas Servicing Advice

Hi,

Please see below email

Kind Regards,

Alex
Senior Customer Service Representative
ATCO, Gas Division, Australia

P. +61 13 13 56

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From: Fowler, Rhys <rhys.fowler@stantec.com>
Sent: Thursday, 12 May 2022 3:38 PM
To: Enquiries <Enquiries@atco.com>
Cc: Martin, Richard <richard.martin2@stantec.com>
Subject: Lots 4 and 12 Caves Rd, Abbey - Gas Servicing Advice

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Hi,

We have been commissioned to investigate servicing requirements for the attached proposed development.
Google Maps link to location

I understand ATCO has a DN160 main to the east of the site along Bussell Hwy.
The below excerpt from a previous report on this landholding mentions verbal discussions with ATCO where it was advised that the development could be serviced from this existing main.

Can you please confirm if this advice is still current, and that the proposed development could be serviced with gas from the existing main without need for network upgrades or reinforcements?

Thankyou,

> There are existing gas mains east of the proposed development site within Bussell Highway. No m within adjacent Caves Road reserve.
>
> At the time of preparing this desktop assessment, ATCO had verbally advised Stantec that a connecti 160 PE 350Kpa main in the eastern verge of Bussell Highway could provide a supply for the proposed d no network upgrades or reinforcement required.

Regards,

Rhys Fowler
Civil Engineer

Office: +61 8 9754 4244
Direct: +61 8 9717 6103
rhys.fowler@stantec.com

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PO Box 1276, 10/44-48 Queen Street
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Western Australia 6280
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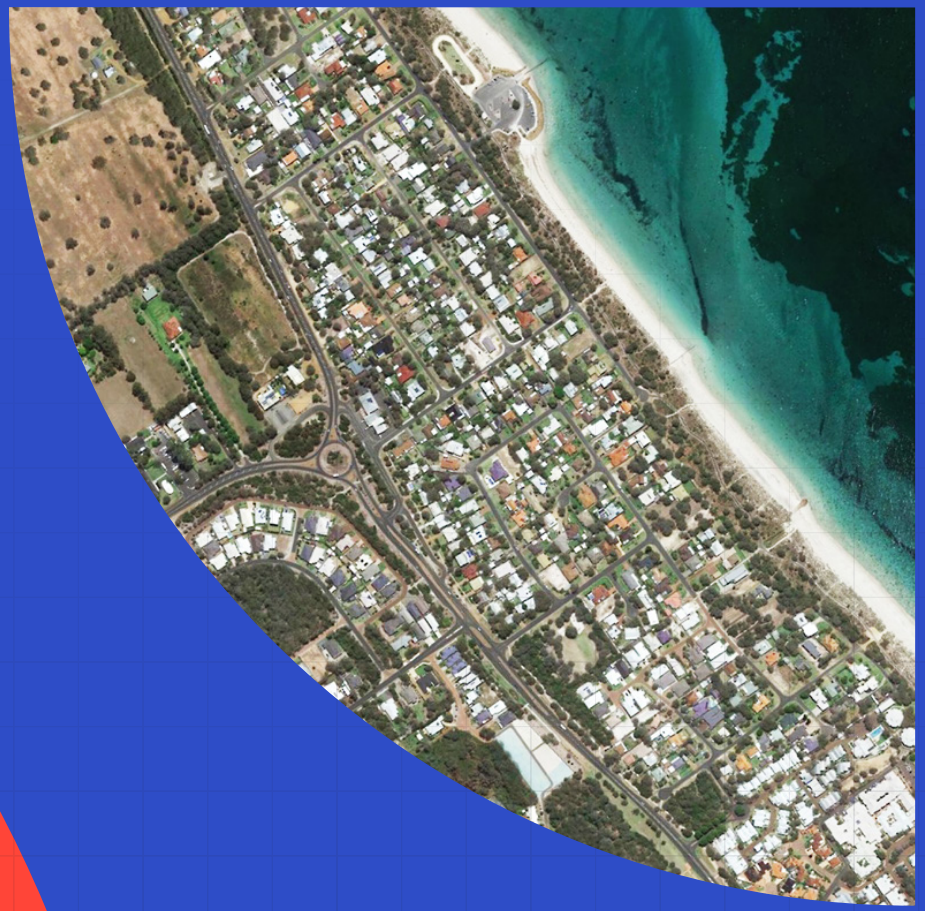

Appendix 6

POS and Landscape Strategy – Emerge Associates

Rise Urban

AGILE PLANNING FOR THE NEW NORMAL



ABBEY SOUTH STRUCTURE PLAN

LANDSCAPE REPORT

JANUARY 2023

REV E

emerge ASSOCIATES

CONTENTS

1.0 LANDSCAPE MASTERPLAN 3

2.0 POS 1 AND 6 LANDSCAPE CONCEPT PLAN 4

3.0 POS 4 LANDSCAPE CONCEPT PLAN 5

4.0 POS 2 AND 5 LANDSCAPE CONCEPT PLAN 6

5.0 POS 3A LANDSCAPE CONCEPT PLAN 7

6.0 POS 3B AND 3C LANDSCAPE CONCEPT PLAN 8

7.0 DRAINAGE STRATEGY 9

8.0 STREETSCAPE MASTERPLAN 10

9.0 ROAD RESERVE TYPICAL SECTION 11

10.0 IRRIGATION STRATEGY 12

11.0 MAINTENANCE STRATEGY 13



LEGEND

EXISTING LARGE TREES · BASIN & SWALES · PICNIC SETTING · DRINK FOUNTAIN · YOUTH FACILITY · TURF MOUNDING · BBQ · FITNESS NODE · EMERGENCY ACCESS · FLOOD WAY · ROADSIDE SWALE · EXISTING TREE

OPEN TURF · DUAL USE PATH · PLAYGROUND · COMPOSITE TIMBER DECKING · BENCH SEAT · BIKE PATH · PUBLIC ART OPPORTUNITY · PARK SHELTER · ENTRY FEATURE · EMERGENCY ACCESS · FUTURE PATH CONNECTION · BRA · FSA

ABBEY SOUTH STRUCTURE PLAN

ABBEY LANDSCAPE MASTERPLAN

DWG EMG-60-3
REV E
DATE 06-01-23
SCALE 1 : 2500 @ A3

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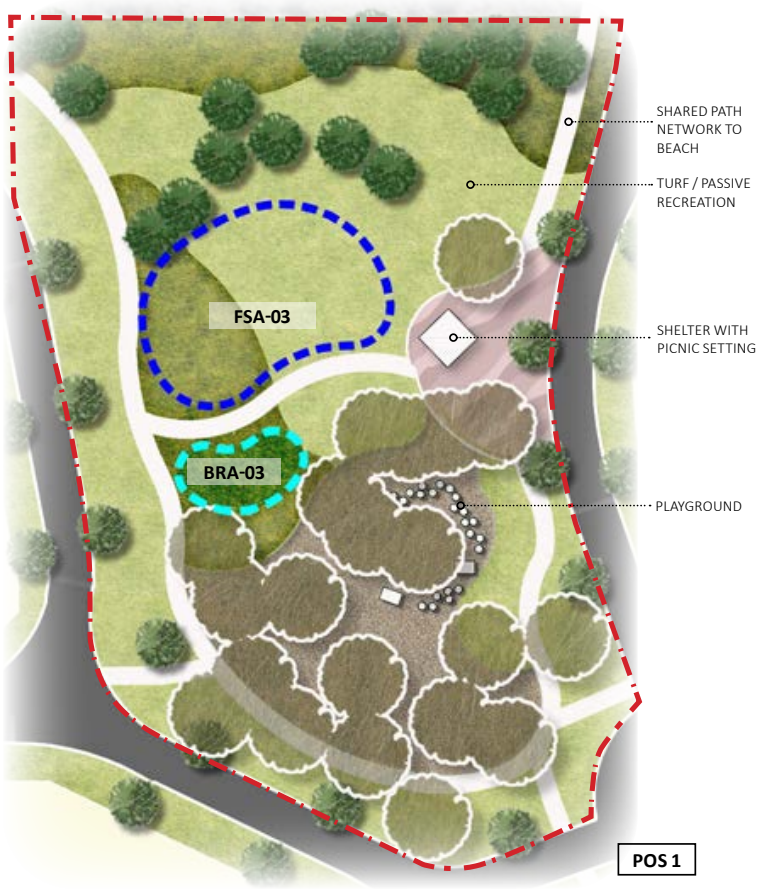
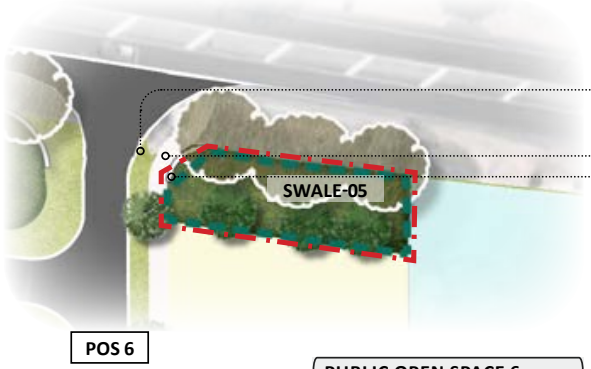
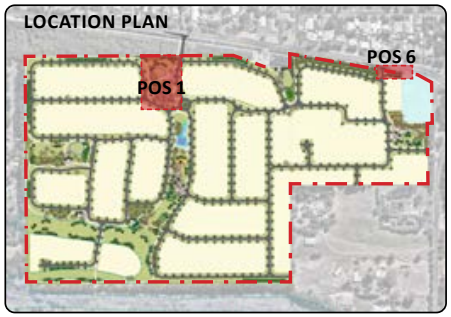






PUBLIC OPEN SPACE 1

POS TYPOLOGY
- Feature park

SIZE
- POS 1 = 6520m²

BRA-03

1%AEP TWL (m2)	110
Volume (m3)	41
Slope	1:6
Depth (m)	0.5

FSA-03

1%AEP TWL (m2)	540
Volume (m³)	309
Slope	1:6
Depth (m)	1.0

CONCEPT
- Feature park immediately west of the main entry providing a strong sense of arrival playful open space under retained existing vegetation
- Community focal area with space for small events.

FUNCTIONS / MATERIALS
- Passive turf recreation under existing tree shade
- Combination of nature play and custom play under tree canopy
- Shade structure and picnic facilities
- Part of the cycle/jogging network to the beach

ENVIRONMENTAL CONSIDERATIONS
- Source local materials where possible
- Large grouping of existing trees to be retained for shade and fauna habitat
- Water-wise native planting selection
- Flood storage provision

PUBLIC OPEN SPACE 6

POS TYPOLOGY
- Entry POS

SIZE
- POS 6 = 286 m²

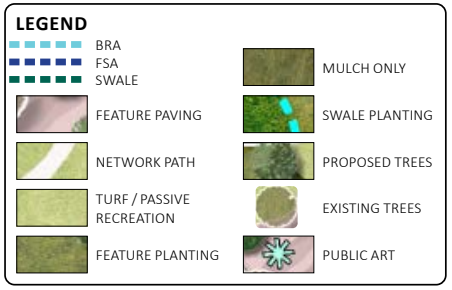
SWALE-05

1%AEP TWL (m2)	262.298
Volume (m3)	88.477
Slope	1:6
Depth (m)	0.5

CONCEPT
- Pocket park and main entry, closest to the Bussell Highway providing a strong sense of arrival
- Area of retained existing vegetation

FUNCTIONS / MATERIALS
- Maximise shade with tree retention
- Landscape treatment interface to water treatment swale
- Part of the cycle/jogging path network and connection to broader precinct
- Vegetation buffer to screen off Caves Road

ENVIRONMENTAL CONSIDERATIONS
- Large grouping of existing vegetation to be retained for shade and fauna habitat
- Water treatment planting selection to swale







ABBEY SOUTH STRUCTURE PLAN
POS 1 AND 6 LANDSCAPE CONCEPT PLAN

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DATE 06-01-23
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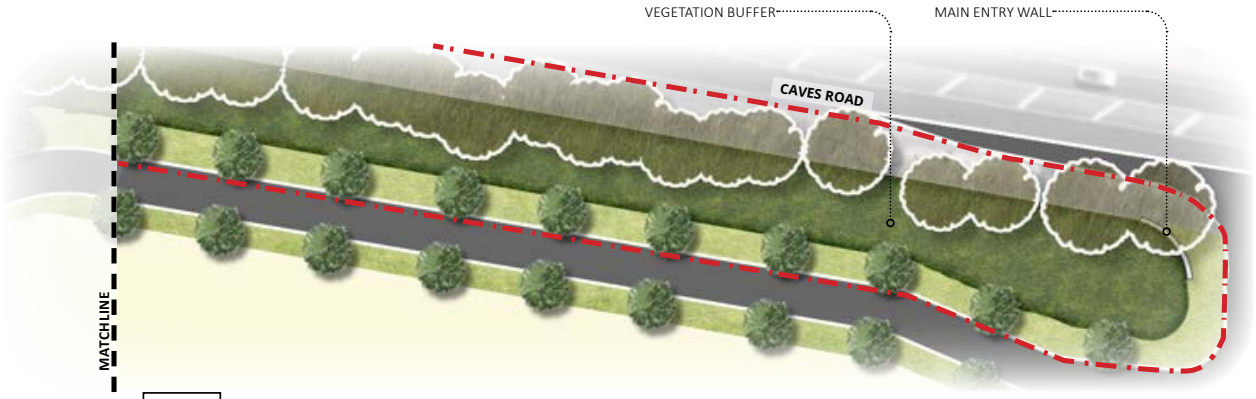
POS 4



POS 4

PUBLIC OPEN SPACE 4

POS TYPOLOGY
- Local POS

SIZE
- POS 4 = 3455 m²

BRA-09

1%AEP TWL (m2)	204
Volume (m3)	83.405
Slope	1:6
Depth (m)	0.5

FSA-09

1%AEP TWL (m2)	728
Volume (m³)	451
Slope	1:6
Depth (m)	1.0

CONCEPT
- Provide a local park to cater for residents within a 200-400m walkable catchment .
- Large area of retained trees.

FUNCTIONS / MATERIALS
- Truf- informal kick-about area
- Maximise shade with tree retention
- Picnic facilities for family/friends gatherings
- Part of the cycle/jogging path network and connection to broader precinct
- Vegetation buffer to screen off Caves Road

ENVIRONMENTAL CONSIDERATIONS
- Large grouping of existing vegetation to be retained
- Water treatment planting selection to Bio-Retention Basin
- Water-wise native planting selection
- Flood storage provision

LOCATION PLAN



LEGEND

BRA
FSA
FEATURE PAVING
NETWORK PATH
PLANTING AREAS
GROUNDCOVERS
MULCH ONLY
SWALE PLANTING
PROPOSED TREES
EXISTING TREES
PUBLIC ART





ABBEY SOUTH STRUCTURE PLAN
POS 4 LANDSCAPE CONCEPT PLAN

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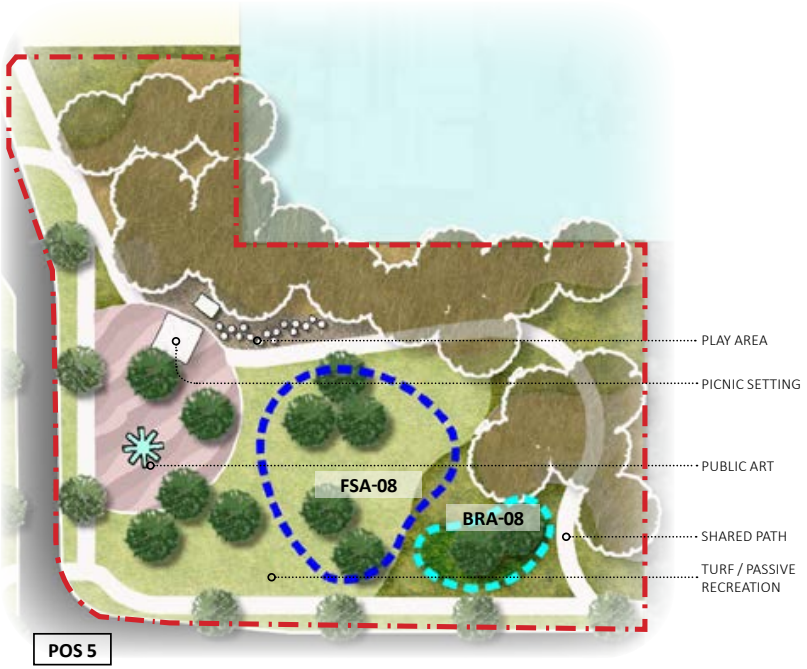








PUBLIC OPEN SPACE 5

POS TYPOLOGY
- Local POS

SIZE
- POS 5 = 3420 m²

BRA-08

• 1%AEP TWL (m2)	137.906
• Volume (m3)	52.855
• Slope	1:6
• Depth (m)	0.5

FSA-08

• 1%AEP TWL (m2)	503
• Volume (m³)	281
• Slope	1:6
• Depth (m)	1.0

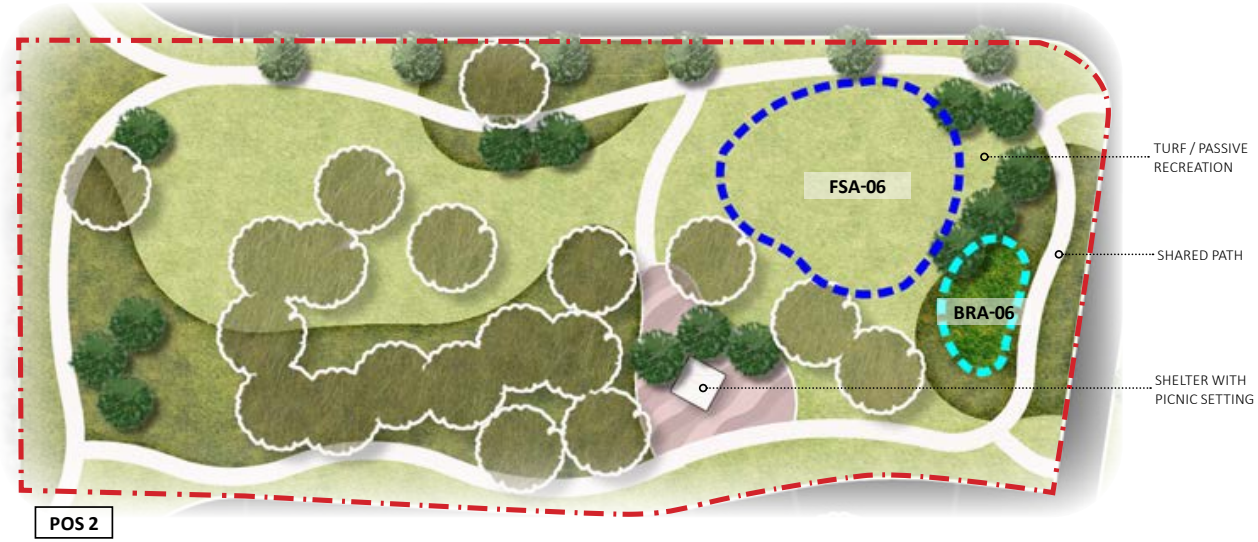
CONCEPT
- Provide a local park to cater for residents within a 200-400m walkable catchment. Provision of play elements to service commercial uses to the south.

FUNCTIONS / MATERIALS
- Turf- informal kick-about area
- Maximise shade with tree retention
- Picnic facilities for family/friends gatherings
- Play elements

ENVIRONMENTAL CONSIDERATIONS
- Water-wise native planting selection
- Water treatment planting selection to Bio-Retention Basins
- Flood storage provision

LEGEND

- BRA
- FSA
- FEATURE PAVING
- NETWORK PATH
- PLANTING AREAS
- GROUNDCOVERS
- MULCH ONLY
- SWALE PLANTING
- PROPOSED TREES
- EXISTING TREES
- PUBLIC ART



PUBLIC OPEN SPACE 2

POS TYPOLOGY
- Local POS

SIZE
- POS 2 = 6034m²

BRA-06

• 1%AEP TWL (m2)	123
• Volume (m3)	46
• Slope	1:6
• Depth (m)	0.5

FSA-06

• 1%AEP TWL (m2)	589.21
• Volume (m³)	345.139
• Slope	1:6
• Depth (m)	1.0

CONCEPT
- Provide a local park to cater for residents within a 200-400m walkable catchment. Park of the green network on the East – West alignment.

FUNCTIONS / MATERIALS
- Large active turf- informal kick-about area
- Maximise shade with tree retention
- Shelter and picnic facilities for family/friends gatherings
- Part of the cycle/jogging path network and connection to broader precinct.

ENVIRONMENTAL CONSIDERATIONS
- Large grouping of existing trees to be retained for shade and fauna habitat provision
- Water-wise native planting selection
- Water treatment planting selection to Bio-Retention Basin
- Flood storage provision
- Vegetation to meet low threat requirements under AS 3959 with ongoing management to maintain minimal fuel load

ABBEY SOUTH STRUCTURE PLAN

POS 2 AND 5 LANDSCAPE CONCEPT PLAN

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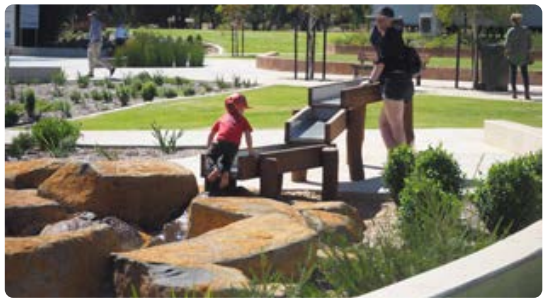







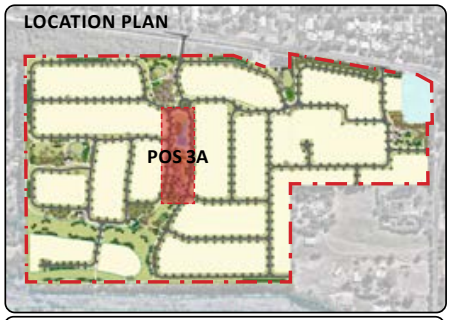

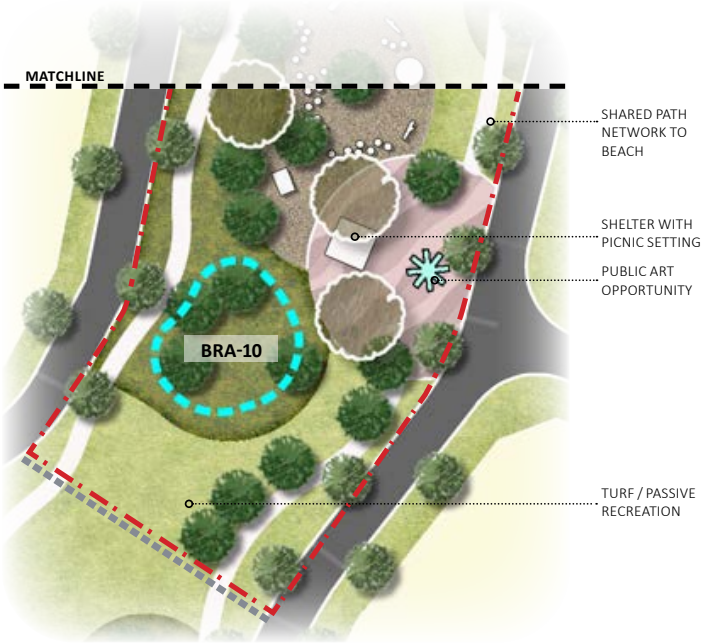

LEGEND

- BRA
- FSA
- FEATURE PAVING
- NETWORK PATH
- PLANTING AREAS
- GROUNDCOVERS
- MULCH ONLY
- SWALE PLANTING
- PROPOSED TREES
- EXISTING TREES
- PUBLIC ART

PUBLIC OPEN SPACE 3A

POS TYPOLOGY
- Neighbourhood POS

SIZE
- POS 3A, 3B & 3C = 27,000 m²

BRA-10

1%AEP TWL (m2)	244
Volume (m3)	100
Slope	1:6
Depth (m)	0.5

CONCEPT
- Part of the central linear POS that connects through the residential area linking to the coast providing active recreational park catering for ages include youth ranges
- Providing a large accessible play space with interest for all ages
- Fitness-centric space to promote well-being and active lifestyle playing sports or parkour elements
- Existing tree to be protected and retained

FUNCTIONS / MATERIALS
- Turf- informal kick-about area
- Maximise shade with tree retention
- Active play spaces. Combination of nature play and custom play for all ages under
- Shade structures, picnic amenities and barbecues
- Part of the cycle/jogging network and connection to the wider precinct path network

ENVIRONMENTAL CONSIDERATIONS
- Large grouping of existing trees to be retained for shade and fauna habitat
- Water-wise native planting selection
- Water treatment planting selection to Bio-Retention Basin
- Flood storage provision
- Vegetation to meet low threat requirements under AS 3959 with ongoing management to maintain minimal fuel load

ABBEY SOUTH STRUCTURE PLAN
POS 3A LANDSCAPE CONCEPT PLAN

DWG EMG-60-7
REV E
DATE 06-01-23
SCALE 1 : 600 @ A3
0 3 6 9 12 15 m

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emerge ASSOCIATES

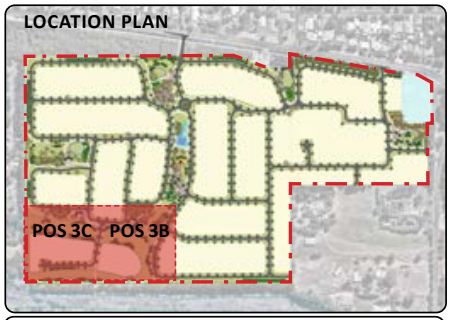








LOCATION PLAN



LEGEND

- BRA
- FSA
- FLOOD WAY
- FEATURE PAVING
- NETWORK PATH
- PLANTING AREA
- GROUNDCOVERS
- MEADOW GRASSES
- SWALE PLANTING
- PROPOSED TREES
- EXISTING TREES
- PUBLIC ART

PUBLIC OPEN SPACE 3B & 3C

POS TYPOLOGY
- Neighbourhood POS and flood way area

SIZE
- POS 3A, 3B & 3C = 27,000 m^2

SWALE-12

1%AEP TWL (m2)	276.632
Volume (m3)	94.064
Slope	1:6
Depth (m)	0.5

BRA-13A

1%AEP TWL (m2)	105
Volume (m3)	38
Slope	1:6
Depth (m)	0.5

BRA-13B

1%AEP TWL (m2)	77
Volume (m^3)	27
Slope	1:6
Depth (m)	0.5

CONCEPT
- Provide a soft landscaped interface on the western edge with a large meadow grasses
- Provision of a maintained parkland interface for residences, retaining existing vegetation allowing for flood way considerations

FUNCTIONS / MATERIALS
- Landscape treatment interface to flood storage area and water treatment swale
- Picnic facilities for family/friends gathering
- Passive turf recreation areas
- Part of the cycle/jogging network and connection to the broader cycle path network

ENVIRONMENTAL CONSIDERATIONS
- Water-wise native planting selection to Bio-retention areas
- Floodway and storage provision
- Vegetation to meet low threat requirements under AS 3959 with ongoing management to maintain minimal fuel load

ABBEY SOUTH STRUCTURE PLAN
POS 3B AND 3C LANDSCAPE CONCEPT PLAN

DWG EMG-60-8
REV E
DATE 06-01-23
SCALE 1 : 1000 @ A3

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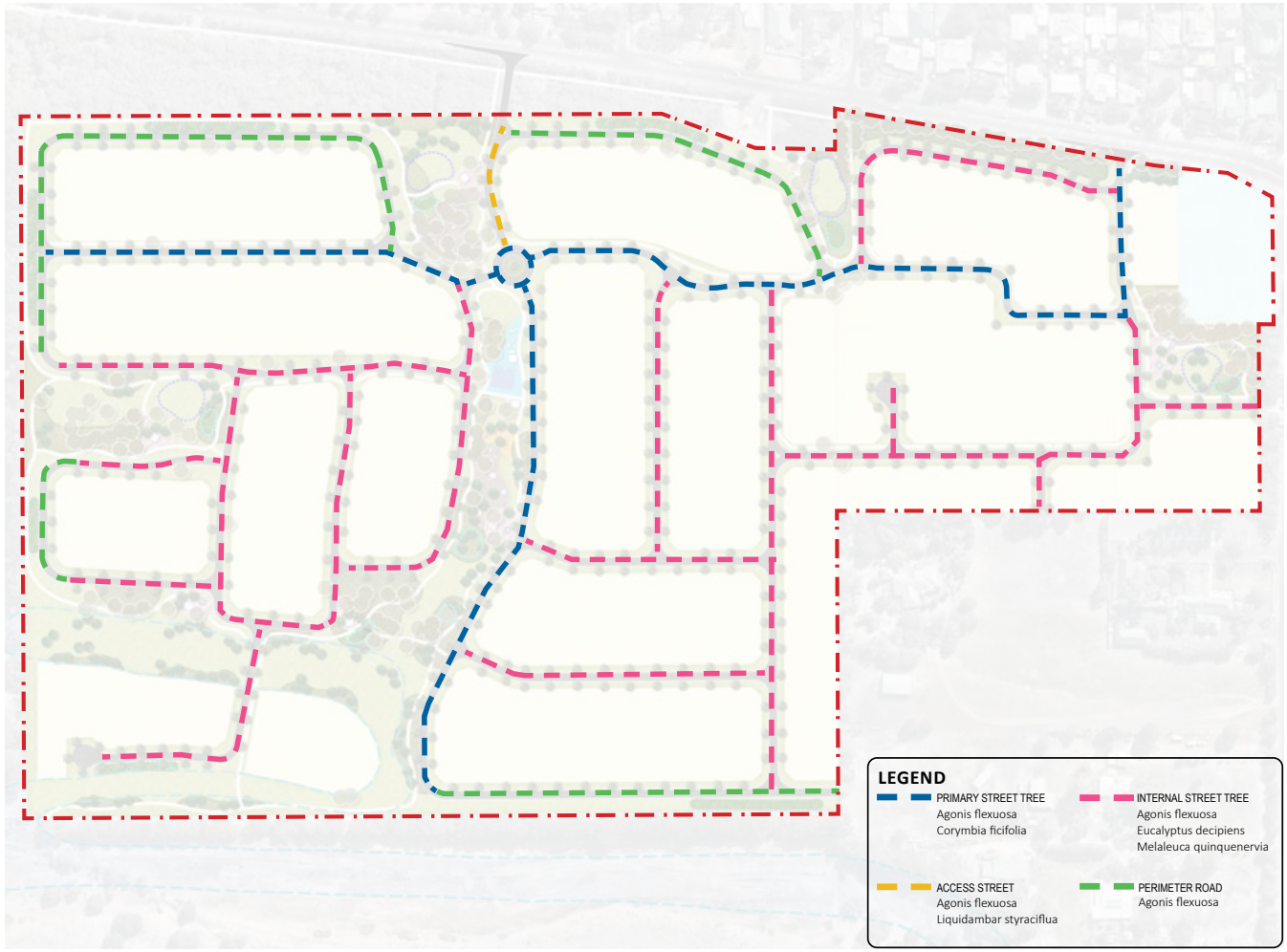
DRAINAGE STRATEGY

All stormwater from the development will be directed into a system of bio-retention treatment areas constructed along the edges of the POS. These devices will be sized to treat the flows from the small rainfall event in accordance with the principles of the Department of Water and Environmental Regulation. Storm events in excess of these will be directed into flood storage areas also typically located within POS. Flood storage areas will be planted with native species. Bio-retention areas will be located outside of Floodways.









STREETSCAPE PLAN

The Streetscape Planting Strategy design will be translated through different palettes of street trees providing legibility through the development.

Tree species selected are waterwise, fast growing, reliable and readily available whilst providing shade and amenity to each street. The proposed species below offer consistencies in appearance with differences in size and scale. Larger, taller trees are shown around POS areas and along north-south roads as the major connector roads through the development. A consistant mix of tree species are shown on minor local roads.



Agonis flexuosa
WA Peppermint



Corymbia ficifolia
Red flowering gum



Liquidambar styraciflua
Star-leaved gum



Eucalyptus decipiens
Redheart moit



Melaleuca quinquenervia
Broad-leaved paperbark

ABBEY SOUTH STRUCTURE PLAN
STREETSCAPE MASTERPLAN

DWG EMG-60-10
REV E
DATE 06-01-23
SCALE 1 : 3000 @ A3
0 15 30 45 60 75 m

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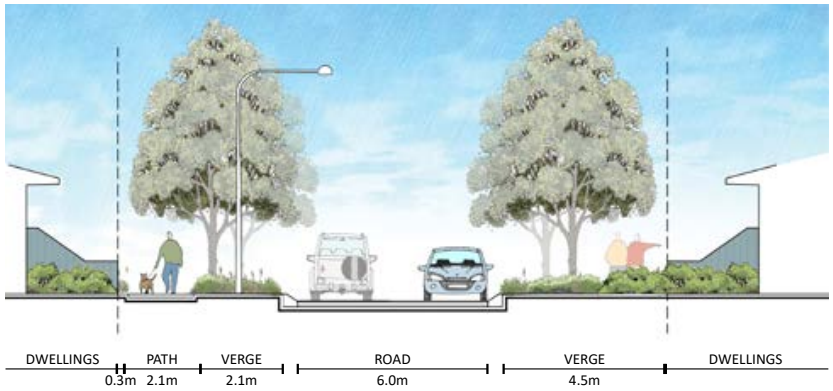
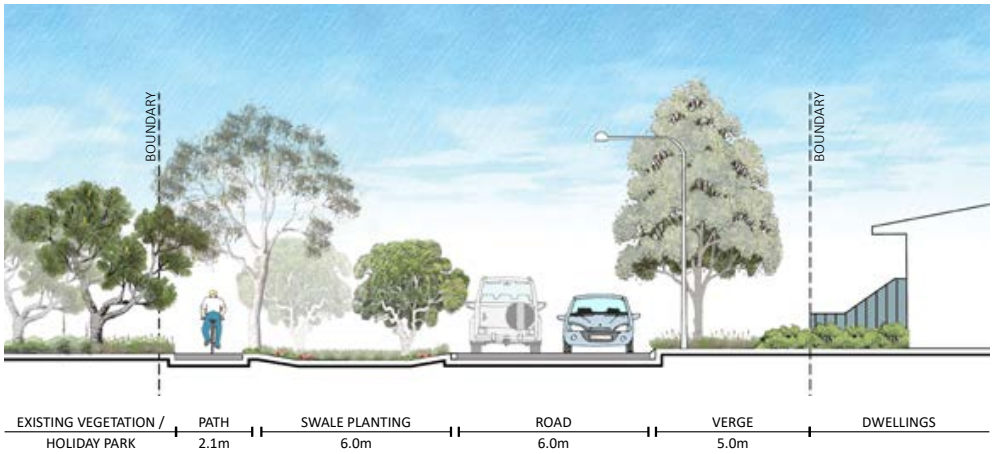


15M ROAD RESERVE TYPICAL SECTION



20M ROAD RESERVE TYPICAL SECTION

ABBEY SOUTH STRUCTURE PLAN
ROAD RESERVE TYPICAL SECTION

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DATE 06-01-23
SCALE 1 : 150 @ A3
0 0.75 1.5 2.25 3 3.75 m

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IRRIGATION STRATEGY

The planting design of all Streetscape and Public Open Space areas will consist of predominantly native species. Planting design is proposed to include a water sensitive design approach and will also seek to reduce irrigation rates over the long term to planting areas to promote a longer term water saving strategy for the development.

Hydrozoning will also provide a supplementary design principle whereby groups of plants with similar irrigation demand needs will be grouped together. This will facilitate irrigation efficiencies that can be made across the scheme.

Areas within the drainage swales, retention basins and revegetation areas are proposed to be in the main non-irrigated. Swales and basins and will be planted with native sedges and rushes to facilitate with the drainage engineering required for the site. The water table in these areas will be close to the surface particularly in winter months possibly limiting the need for irrigation within swale. Revegetation areas will be planted with endemic native species.

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MAINTENANCE STRATEGY

In all cases, a maintenance regime will be in place inclusive of general maintenance minimisation through design practices and will aim to use sustainable maintenance practices. This includes, but is not limited to, defined edges and borders, minimal and preferably alternate approaches to pesticides, controlled and minimized fertilizer use.

Maintenance will be undertaken via general access to all public accessible areas. Light maintenance vehicles can access all public areas and can adjoin all private areas within the development. This will occur initially via the road system and then by careful access over landscaped grass areas and select areas of the pedestrian path system. Use of removable bollards will limit and control unauthorize access to link areas between roads.

Maintenance will be managed by the development for the first 2 years minimum. The 2 year maintenance timeframe may be extended in certain locations at the developer's discretion in liaison with the City.

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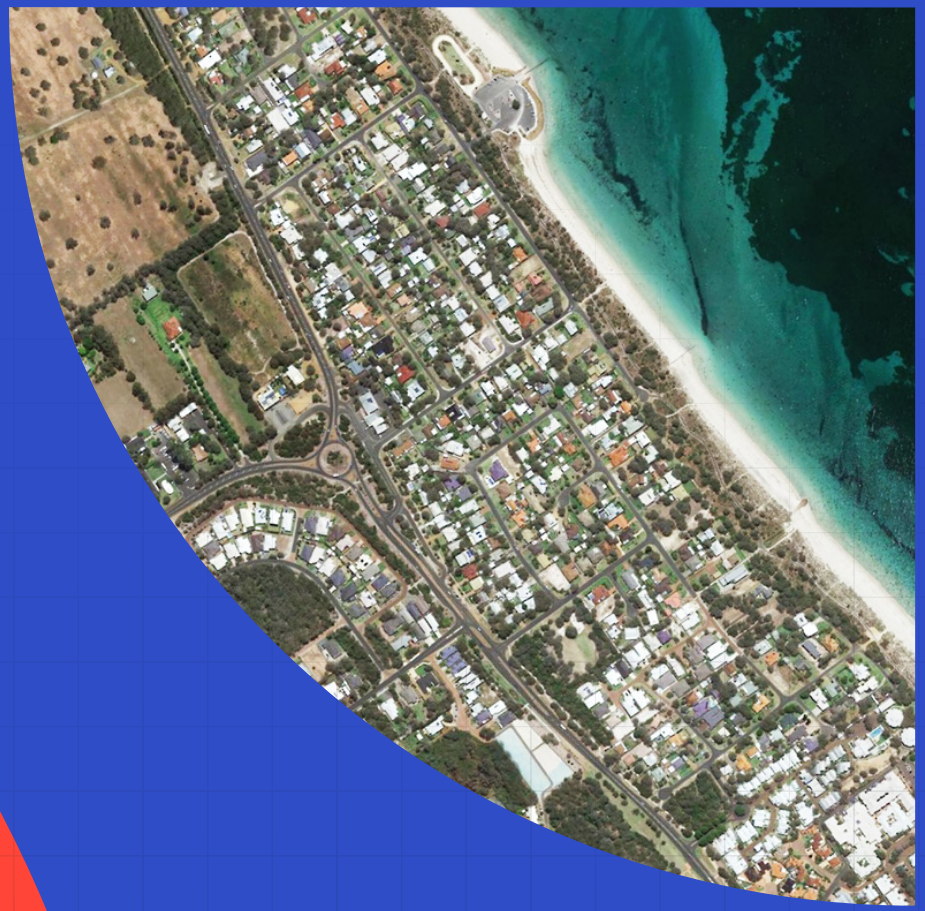


Appendix 7

Abbey South Structure Plan and Concept Plan – Rise Urban and Studio CFM

Rise Urban

AGILE PLANNING FOR THE NEW NORMAL



0 25 50 75 100 125m

DRAFT

LOCAL STRUCTURE PLAN

LOTS 4 & 12 CAVES ROAD & LOTS 14, 15 & 402 BUSSELL HIGHWAY, ABBEY.

NOTE:

Base Data supplied by Landgate / Denada Surveys
Aerial Photo - Feb 2019
Projection - BCG94
Areas and dimensions shown are subject to final survey calculations.

Revision	Date	Item
A	29/6/22	Initial Issue

LEGEND

- STRUCTURE PLAN BOUNDARY
- RESIDENTIAL R10
- RESIDENTIAL R20 - R40
- RESIDENTIAL R60
- RECREATION RESERVE
- LOCAL CENTRE (R60)
- FLOODWAY
- PERIMETER ROAD
- ACCESS STREET B
- HIGHER ORDER CYCLE PATH
- ACCESS STREET D (INDICATIVE ONLY)
- FUTURE PEDESTRIAN / CYCLE CONNECTION TO BUAYANYUP DRAIN CYCLE PATH
- EMERGENCY SECONDARY EGRESS
- POS NUMBER
- ROUNDABOUT
- FULL MOVEMENT INTERSECTION
- LEFT IN / LEFT OUT INTERSECTION

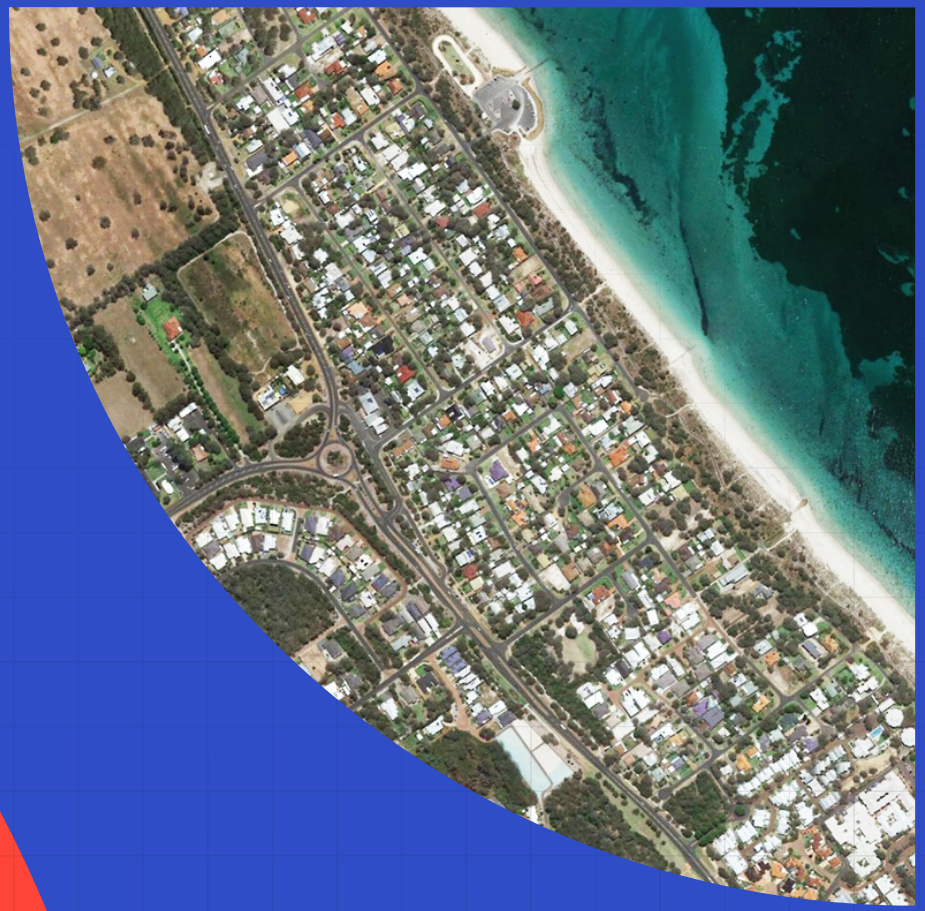
-	:	CLIENT
A3@1:2,500	:	SCALE
15 December 2022	:	DATE
IA Abbey-2-001	:	PLAN No
B	:	REVISION
C.L.	:	PLANNER
B.L	:	DRAWN

Rise Urban
AGILE PLANNING FOR THE NEW NORMAL

ABBEY PLANNING INVESTIGATION AREA

CONCEPT LAYOUT PLAN 5 DECEMBER 2022





Appendix 8

Open Space Investigation Report – Rise Urban

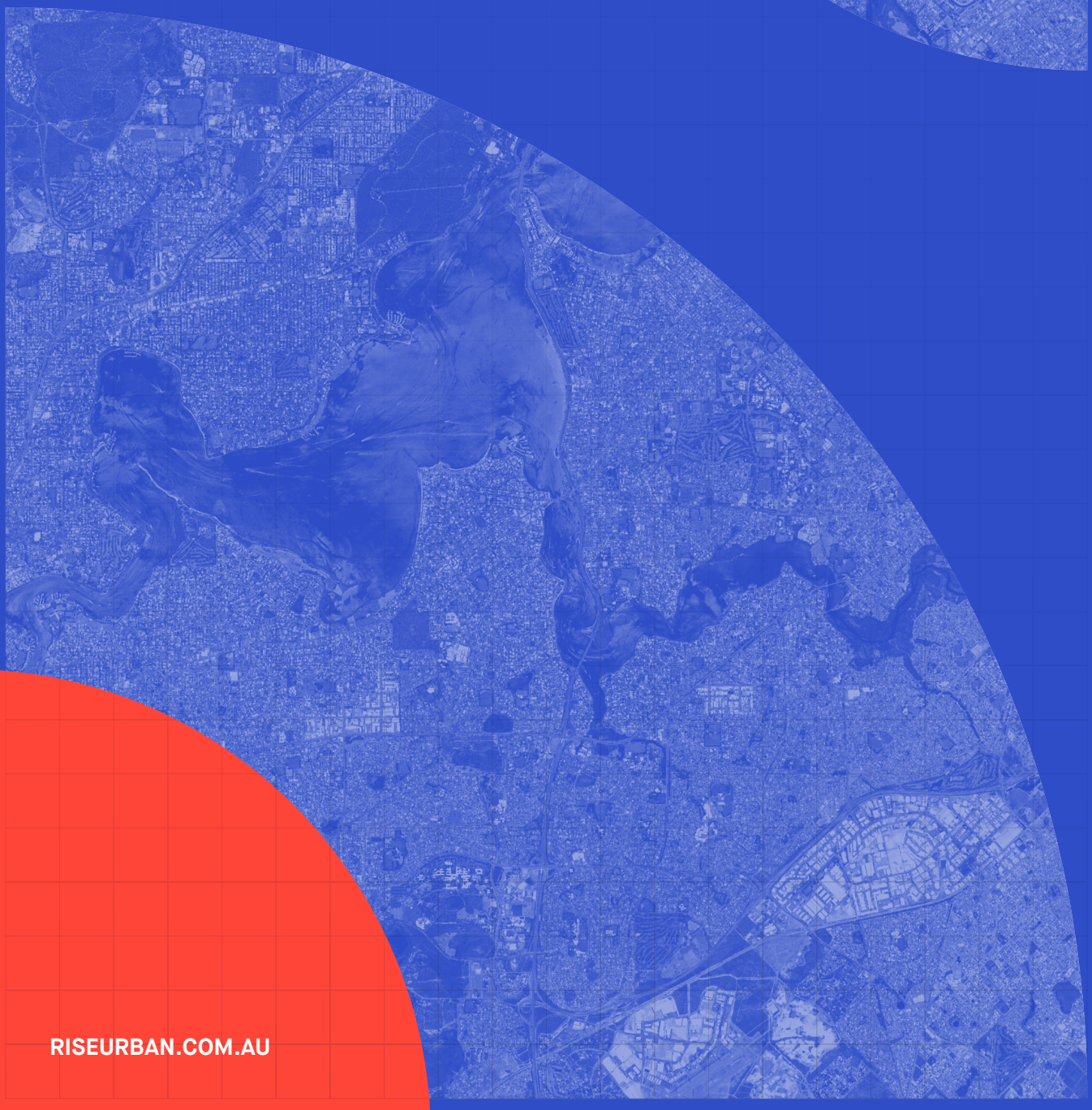
Rise Urban

AGILE PLANNING FOR THE NEW NORMAL

Rise Urban.

Abbey South Open Space Investigation Area

Assessment and Investigation Report



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Abbey South Open Space Investigation Area

Assessment and Investigation Report



Prepared for:	The Abbey Landowner Group
Prepared by:	Rise Urban Pty Ltd Suite 3 / 448 Roberts Road Subiaco WA 6008 Cameron@riseurban.com.au
Project Planner	Cameron Leckey – Director Nick Grindrod – Senior Planner
Job Code:	0152020
Doc Reference:	Rep23A-0152020
Issue No:	2 – Final for Lodgement
Date:	25 November 2022

Rise Urban

Table of Contents

1. **Introduction** 3
2. **Background** 4
3. **Description of the Open Space Investigation Area** 6
   - 3.1 **Broadwater Nature Reserve Swamp Floodplain** 8
   - 3.2 **Wetlands** 11
   - 3.3 **Trees and Vegetation** 12
   - 3.4 **Topography** 13
4. **Specific Matters to be Addressed** 14
   - 4.1 **Water Management** 14
   - 4.2 **Coastal Inundation** 15
   - 4.3 **Open Space Requirements** 16
5. **Conclusion** 19

Appendices:

Appendix 1 - Site Plan of Open Space Investigation Area

Appendix 2 - Site photos of Abbey OSI Area

Appendix 3 - DWER Floodway Mapping (DWER, 2021)

Appendix 4 - DWER Floodplain Factsheet (DWER, 2000)

Appendix 5 - Topographical map and cross sections (Rise Urban & Emerge Assoc, 2022)

1. Introduction

The purpose of this report is to address all of the key planning and environmental considerations associated with the area identified as 'Open Space Investigation' ("OSI") between the Abbey South Urban Area and Vasse North Urban Area as identified in the *Leeuwin - Naturaliste Sub-regional Strategy*.

The report summarises the key technical findings (environmental and hydrological) that have been resolved through the preparation of the Abbey South Structure Plan, and also uses information that is publicly available to assess the attributes of the southern portion of the OSI area that is located to the south of the Abbey South Structure Plan area (Vasse North OSI - lots 19 and 20).

It is intended that this report be read as a supporting addendum to the Abbey South Structure Plan, and should be read in conjunction with the Environmental Assessment Report, Local Water Management Strategy, and Landscape Strategy that form part of the Structure Plan.

This report considers the hydrological and environmental attributes of the entire OSI area, and identifies the common and differing characteristics between the Abbey South and Vasse North portions.

The investigations conclude that:

a) The Abbey South portion of the OSI area is noticeably different to Vasse North with respect to its topography / elevation, vegetation and surface water hydrology;
b) The key feature of the OSI area is the portion of the *Broadwater Nature Reserve Swamp Floodplain* that traverses the OSI area on an east-west axis. The large majority of the Floodplain is located to the south of the Abbey South OSI area.
c) There are no other significant environmental features or attributes within the Abbey South OSI.
d) The Local Water Management Strategy that supports the Abbey South Structure Plan considers water management for both the Abbey South OSI area, and the broader floodplain located to the south.
e) Key considerations of water management, coastal inundation and open space requirements, as identified in the *Leeuwin - Naturaliste Sub-regional Strategy* have all been adequately addressed across the Abbey South portion of the OSI area via the Abbey South Structure Plan.
f) The public open space depicted in the Abbey South Structure Plan adequately captures and fully retains the key hydrological and environmental attributes as well as allowing for broader passive recreation uses, consistent with the City's strategic planning for the broader area.
g) The balance of the OSI area within Abbey South that is not retained in public open space does not contain any significant environmental or hydrological features and is therefore not well suited to form part of the open space network for environmental or hydrological purposes. At between 2.3m and 3.5m AHD and almost entirely cleared of vegetation, the physical characteristics of this area are no different to the Abbey Urban area to the north. This area is therefore well suited to more intensive forms of development such as that proposed by the Abbey South Structure Plan, and its retention as public open space would be an inefficient use of developable land, resulting in a significant maintenance burden on the City of Busselton with little or no community benefit to be gained.

These findings and conclusions are discussed in further detail in the following sections of this report.

2. Background

The *Leeuwin - Naturaliste Sub-regional Strategy* ("the Strategy") was published by the Western Australian Planning Commission in May 2019 following extensive consultation and assessment of an earlier 2017 draft.

The *Abbey Planning Investigation Area* was not identified in the 2017 draft and was included in the final version following further consideration by the Department of Planning, Lands and Heritage and WAPC.

The Strategy is an overarching strategic land use planning document outlining the WAPC's approach to future planning and development within the City of Busselton and the Shire of Augusta-Margaret River over the next 20 years.

Section 5 of the 2019 Strategy identifies a range of universal and site-specific matters which are to be considered and addressed as part of the planning investigations for each of the Planning Investigation Areas. These matters are summarised in Table 2 below.

Table 1 – Planning Considerations for Abbey PIA as outlined in the Leeuwin Naturaliste Sub-regional Strategy (Section 5)

Universal Considerations	Site Specific Considerations
• Biodiversity value protection • Bushfire risk • Drainage • Landscape value protection • Protection of significant environmental values • Utility services capacity • Water source impact (groundwater and surface water)	• Biodiversity values (adjacent wetlands to south) • Provision of land for employment generating activities • Transition/interface with adjacent tourist uses (caravan park to west, boutique uses to east)

In April 2021 the Abbey landowner group submitted to the WAPC a suite of technical reports and studies that addressed all of the universal and site-specific considerations listed above.

All five of the PIAs identified in the Strategy were assessed and considered by the WAPC in October 2021, where in relation to the Abbey PIA, the WAPC resolved to (emphasis added):

1. *Designate the following lots as 'Urban':*
   - *Lot 12 on Diagram 43998*
   - *Lot 14 on Diagram 96590*
   - *Lot 15 on Diagram 96590*
   - *Lot 402 on Deposited Plan 252489*
   - *Northern portion of Lot 4 on Diagram 46285*

2. *Designate the following lots as 'Open Space Investigation':*
   - *Southern portion of Lot 4 on Diagram 46285.*

3. *Remove the Abbey Planning Investigation Area from the Strategy Plan.*

4. *Require the preparation of a single structure plan over the entirety of the land identified in (1) and (2) above. In addition to the information to be included in a structure plan outlined in Clause 16 of the Deemed Provisions, the structure plan is to set out the following:*

- ***a water management report*** *that takes into consideration the land to the south and addresses all water-related matters relevant to the proposal.*
- *measures to manage risk from* ***coastal inundation****.*
- ***open space requirements****.*

The WAPC also determined to include a description of the Open Space Investigation category in the Strategy to further clarify its intent. The definition, located on page 18 of the strategy states:

Open Space Investigation	*Further investigation is to consider factors that may be relevant to the intended open space purpose, such as wetland buffer and flood management requirements. The final extent of land required for open space purposes is to be determined through the investigation process and informed by appropriate studies, and may be larger, smaller or the same size as the area designated as 'Open Space Investigation'.*

Following the WAPC's October 2021 decision, the landowners and Rise Urban met with the WAPC Chair and Senior Department of Planning, Lands and Heritage officers to further clarify the purpose and intent of the Open Space Investigation (OSI) area, and to ensure that the future Structure Plan would align with the Commission's intent for the Investigation Area. At this meeting, it was agreed that a Structure Plan is the appropriate vehicle to determine the full extent of the open space area in the southern half of Lot 4. Further, it was acknowledged that the OSI designation:

a) Is "more of a question mark than a fixed line" and is intended to be refined through the structure plan process to determine which portions are suitable for open space and / or urban development.
b) Does not necessarily dictate that the land should be set aside for conservation or recreation purposes. Rather, it is intended that the Structure Plan should determine the extent of land needed for flooding / drainage / conservation and recreation purposes and ensure that this land is integrated into the broader urban area as part of an integrated and functional open space area.
c) The floodway and the hydrology of the area is the key site consideration for the investigation area.
d) Requires that water management, coastal inundation, and open space requirements are addressed in the structure plan.

These specific considerations are addressed in subsequent sections and appendices of this report.

Rise Urban

3. Description of the Open Space Investigation Area

The OSI area extends beyond the southern boundary of the Abbey South area and includes a significant portion of what was previously identified as the Vasse North PIA in the 2019 Strategy. Similarly to Abbey South, the Commission resolved to designate the northern portion of the Vasse North area as OSI, and the southern portion as Urban. An extract from the 2021 Strategy Map that depicts the OSI area in the green hatched area is Figure 1 below.

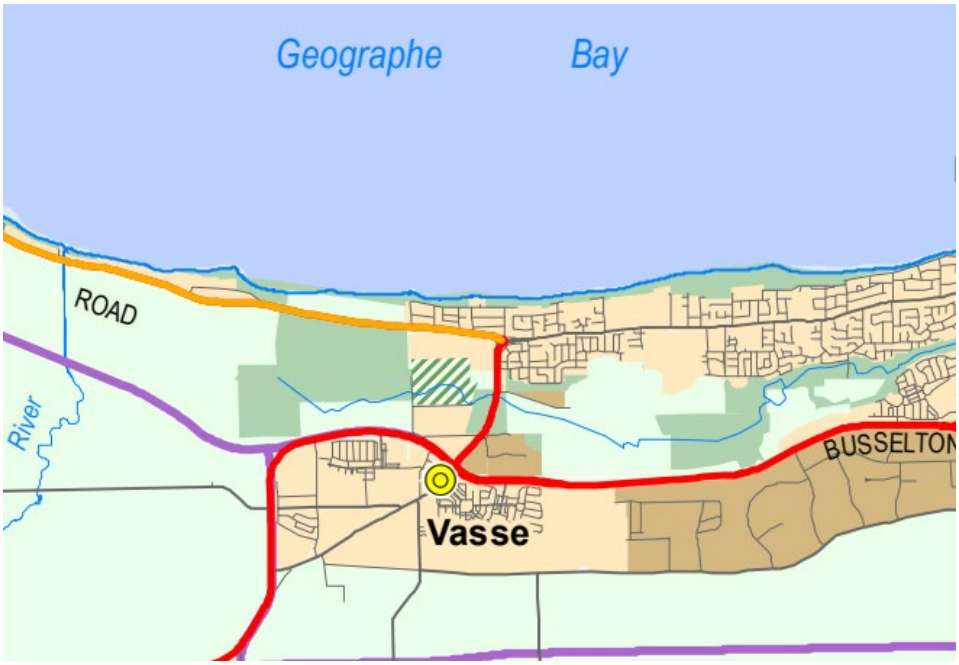

Figure 1 – extract from Leeuwin – Naturaliste Sub-regional Strategy (WAPC, 2021)

The combined extent of the OSI area aligns with the northern and southern boundaries of the current 'Conservation' zone of Local Planning Scheme 21. It should be noted the Conservation designation is a zone and not a reserve, and does not preclude all forms of development. Rather, it is intended to recognise land containing *special aesthetic, ecological or conservation values.* The land was designated OSI as recognition of the requirement for further studies to determine the extent of these values and how these relate to the open space requirements of the surrounding urban area. This report, along with the Abbey South Structure Plan demonstrates how those aesthetic, ecological and / or conservation values have been recognised and retained.

A site plan and aerial photo depicting the full extent of the OSI area for both Abbey South and Vasse North is Figure 2 and is also included as Appendix 1 to this report, while some images / photographs of the Abbey portion of the OSI taken between 2020 and 2022 are included as Appendix 2.

The combined OSI area is approximately 550m in width (north – south) and approximately 35ha in area. Of the 35ha, approximately 10ha is located within Lot 4 Caves Road (Abbey South OSI), and the balance 25ha within lots 19 and 20 (Vasse North OSI). A 10m wide unmade road reserve (Fox Road) separates Abbey South area from Vasse North. Fox Road contains good quality vegetation (predominantly peppermint trees) and due to its elevated topography of around 2.5m - 3m AHD, forms a physical bund between the Abbey South and the lower-lying Vasse North areas.

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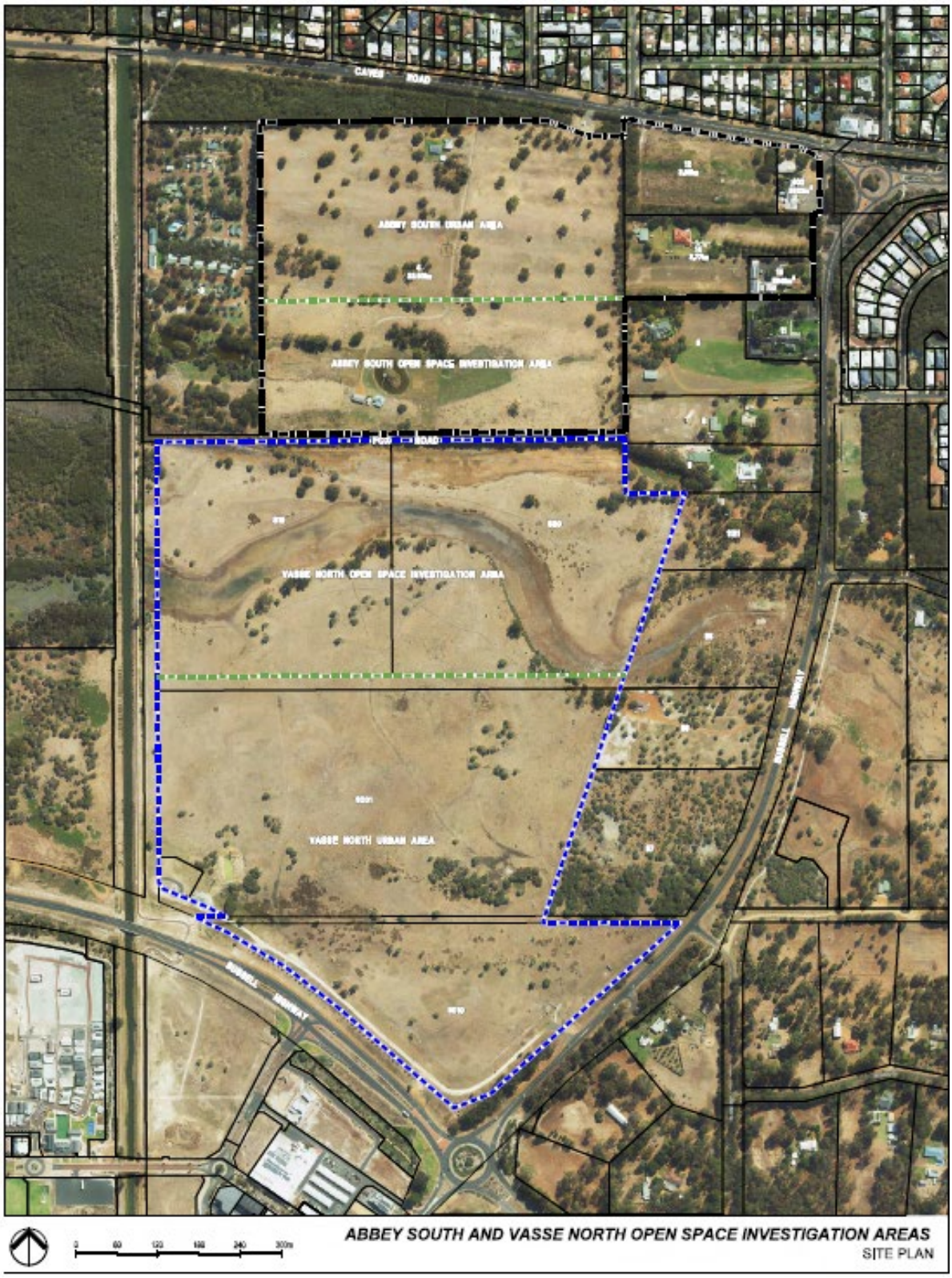

Figure 2 – Abbey South and Vasse North Open Space Investigation Areas

Rep23A-0152020

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3.1 Broadwater Nature Reserve Swamp Floodplain

As noted by the earlier planning investigations undertaken by the WAPC in 2021, the key significant natural feature of the OSI area is the Broadwater Nature Reserve Swamp (BNRS) floodplain, which comprises of both the 1% AEP event *floodway*, and the broader *flood fringe*.

DWER's mapping of the floodway area is shown at Figures 3 & 4 and Appendix 3. As demonstrated by the DWER mapping, the floodway is largely confined to Vasse North OSI, with the exception of a smaller offshoot to the north of the main channel, which is located within Abbey South OSI.

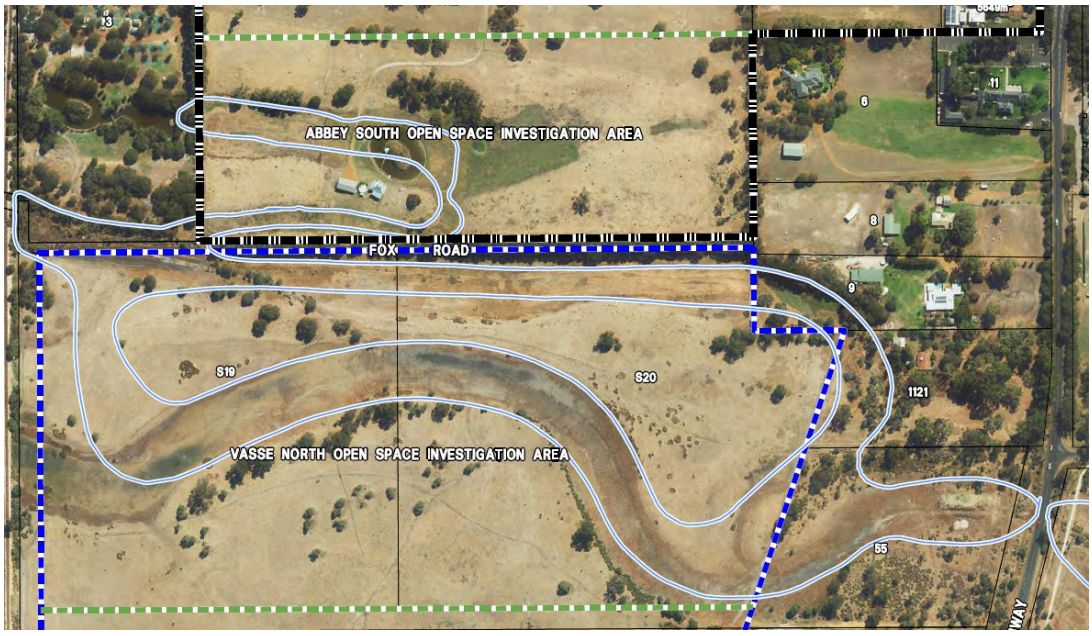


Figure 3 – DWER Floodway Mapping (source: DWER, 2021)

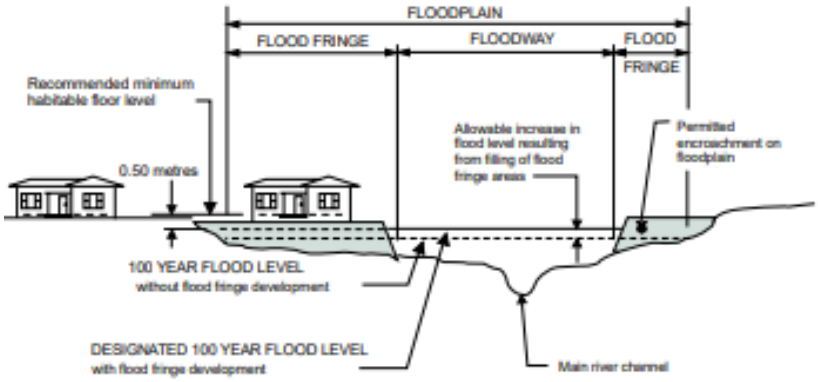
DWER, in its factsheet on Floodplain Management (DWER, 2000) defines the two components of the floodplain as follows:

Floodway *The river channel and a portion of the floodplain which forms the main flow path for floodwaters once the main channel has overflowed. If the floodway is even partially blocked then upstream flood levels may be raised and thereby affect areas which may not have been previously affected. Development in floodways is to be avoided wherever possible.*

Flood fringe *The area of the floodplain, outside of the floodway, which is affected by flooding but where development could be permitted provided appropriate measures are taken. These areas are generally covered by still or very slow moving waters during a 100 year ARI flood.*

- *Development (i.e. filling, building, etc) that is located within the flood fringe is considered acceptable with respect to major river flooding. However, a minimum habitable floor level of 0.50 metre above the adjacent 100 year flood level is recommended to ensure adequate flood protection.*

- *Development (i.e. filling, building, etc) that is located within the floodway and is considered obstructive to major river flows is not acceptable as it will increase flood levels upstream.*



Typical recommended floodplain management strategy.

Source: DWER Factsheet – Floodplain Management, 2000

Figure 4 depicts the extent of floodway and flood fringe within the Abbey South OSI area.



Figure 4 – Abbey PIA - DWER Floodway and Flood Fringe (source: Emerge Associates, 2022)

A full copy of DWER's factsheet is Appendix 4. Consistent with the Factsheet, DWER has advised that development within the flood fringe area of Abbey South is permissible subject to achieving a habitable floor level of 2.3m AHD or greater. This can be achieved either through the filling of the flood fringe area, or via a built-form response.

The gross area of the mapped *floodway* (DWER, 2021) within the combined Open Space Investigation area is 8.5ha, of which 1.3ha or 15% is located within Abbey South, while the

balance 7.2ha or 85% is within Vasse North. Similarly, the majority of the flood fringe is also within the Vasse North portion of the site, with only 0.85ha of the flood fringe being located within the Abbey South OSI area.

This is demonstrated further in Table 2 below.

Table 2 – Floodplain Summary

		Abbey South	Vasse North	Fox Road	Total
Breakdown of combined OSI Area comprising Abbey South, Vasse North and Fox Road	**Total OSI Area (ha)**	10.4	24.5	0.53	35.4ha
	DWER Floodway within OSI (ha)	1.33	7.22	0	8.55ha
	Portion of Total Floodway Area within OSI %	15%	85%	0%	100%
	DWER Flood Fringe within OSI* (ha)	0.85	16.51	0	17.36ha
	Portion of Flood Fringe Area within OSI	5%	95%	0%	100%
Comparison of individual OSI areas: (Vasse North vs Abbey South)	**Floodway as % of individual OSI area**	13%	29%	-	-
	Flood Fringe as % of individual OSI area	8%	67%	-	-
	Total area of individual OSI containing either floodway or flood fringe	2.18ha	23.73	-	-
	Floodway / fringe as % of individual OSI area	21%	96%	-	-

**DWER mapping also includes the majority of the Vasse North Urban Area (lot 9001) within the flood fringe – generally coinciding with the land that is 2m AHD or below.*

Table 2 demonstrates the considerable differences between the two OSI areas with respect to the recognised hydrological features. The key findings that can be drawn from Table 2 are:

- Approximately 96% of the Vasse North OSI area is encumbered by the floodplain (floodway + flood fringe), while only 21% of the Abbey South OSI area is similarly encumbered.
- The large majority (85%) of the mapped floodway area lies within the Vasse North portion of the OSI.

- Only 13% of the total Abbey South OSI is mapped as floodway. The rest of the OSI area is unencumbered.

As noted in the DWER's fact sheet and the advice provided to the Abbey South project team, the DWER's expectation is that the floodway itself is retained in full and is not filled, altered or developed such that there may be upstream or downstream implications.

The landowner's intentions for the Vasse North OSI area and the floodway in particular are unknown, and there is no formal structure plan or rezoning proposal at present. It is reasonable to expect that the DWER will require the full retention of the mapped floodway area within the Vasse North OSI as part of any future development within the Vasse North area, while development over the remaining area will be subject to the viability of filling the land to achieve adequate clearance for flood protection and coastal inundation.

Consistent with the DWER's advice, the Abbey South Structure Plan retains the full 1.33ha (or 13%) portion of the floodway within Abbey South OSI area as part of a broader contiguous open space area comprising more than 2.7ha (2.3ha of which is located within the designated Abbey South OSI area). It also retains the connection to the main floodway channel in the south western corner of the OSI area, ensuring that the pre-development site hydrology and the overall function of the floodway is retained.



Figure 5 – Image of Abbey South floodway. Photo taken from the western end of the site and facing east (source: Rise Urban, November 2021)

3.2 Wetlands

The OSI area does not contain any Conservation Category or Resource Enhancement wetlands. A small portion of Abbey South, and the entirety of Vasse North is mapped as Multiple Use (MU) wetland. MU wetlands are indicative of groundwater being close to the surface, but where no ecological values are present. The DWER does not generally require retention of MU wetlands unless other attributes (such as a floodway) are also present, and there are numerous examples of other MU wetlands being filled and developed throughout the Geographe region and beyond.

When MU wetlands are retained, the DWER and DBCA do not typically require any buffers for conservation purposes.

3.3 Trees and Vegetation

The OSI area is largely cleared of intact native vegetation and has been used for livestock grazing for the past 50 years. Remnant paddock trees are scattered throughout the area, with predominantly *Agonis flexuosa* (peppermint trees) within Abbey South, and *Melaleuca* (paperbark) species within Vasse North. Ground cover vegetation comprises solely of non-native paddock grasses.

Environmental consultants Emerge Associates have advised that the differing species of trees within the area are indicative of the topography and soil types, with peppermints preferring drier sandy soils, and melaleuca typically being found in lower-lying and wetter areas.

The Abbey South Structure Plan proposes to retain the majority of the mature trees within the central and western portions of the OSI area. The south eastern portion of Abbey South is almost entirely cleared with the exception of a scattering of small to medium size peppermint trees adjacent to the eastern boundary. These trees were observed by Emerge Associates to be:

a) in poor health due to historical land uses and damage from cattle;
b) likely to be deemed to be unsuitable from a safety perspective for retention in POS; and
c) unlikely to provide suitable habitat for black cockatoos or western ringtail possums due to low foraging value (in the case of cockatoos) and lack of canopy connectivity for possums.

Overall the ecological value of these trees is found to be very low, and their retention is not warranted on environmental grounds.



Figure 5 – Remnant peppermint trees in SE corner of Abbey South OSI area – facing north with eastern boundary on the RHS of image (source: Emerge Associates, 2022)

The condition and / or significance of vegetation within lots 19 and 20 has not been assessed as part of this review.

3.4 Topography

Topography within the OSI area varies considerably. In general terms the area slopes north to south. The highest point is in the north eastern portion of the OSI area, which sits at between 2.2m and 3.2m AHD. The eastern portion of Fox Road is higher again, at around 3.5m AHD. The land then drops away steeply on the southern side of Fox Road to around 1m AHD (coinciding with the main channel of the floodway) and then remains low at between 1m and 2m AHD throughout the Vasse North area.

The south western end of Abbey South drops from around 3.4m AHD at the northern end of the OSI area down to 1m AHD (corresponding to the floodway area) before climbing back up to between 2 and 3m AHD at Fox Road. From Fox Road the levels drop back down to between 1m – 1.6m AHD, and remain at this level for the remainder of the OSI area and beyond into the Vasse North urban area.

In order to further demonstrate the changes in levels across the site, a topographic map and longitudinal cross sections are included at Figure 6 and Appendix 5.

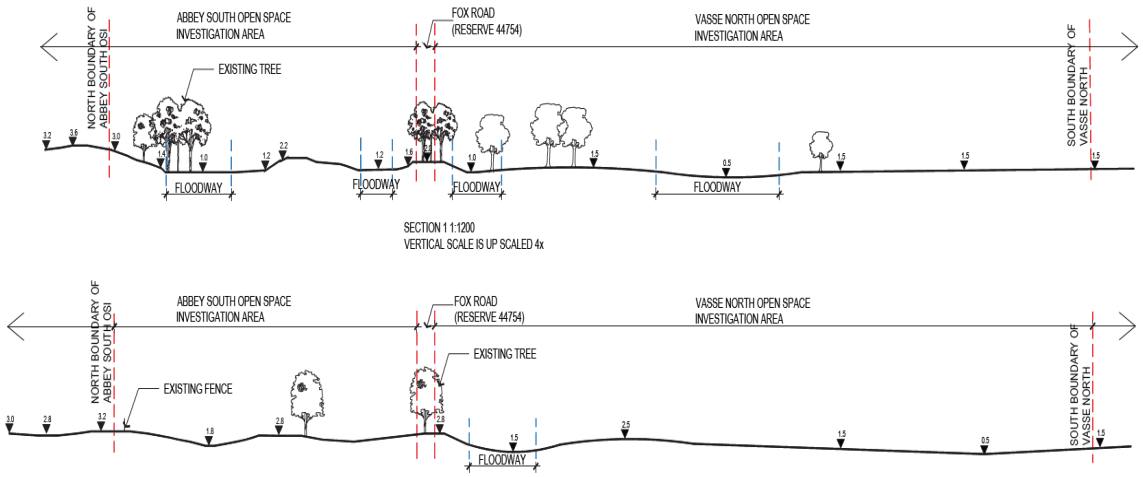


Figure 6 – Open Space Investigation Area Cross Sections (source: Emerge Associates) – upper cross-section western portion of site (N/S); lower cross-section eastern portion of site (N/S). Refer Appendix 5 for full versions.

4. Specific Matters to be Addressed

The following sections specifically reference and address the three key matters identified in the Leeuwin-Naturaliste Sub-regional Strategy that are to be considered as part of the further investigations into the suitability of the Abbey South OSI area for open space and / or urbanisation. These three key matters are:

1. Water management
2. Coastal inundation; and
3. Open space requirements.

Further discussion in relation to each matter is set out in the following sections.

4.1 Water Management

Consistent with the requirements of the Strategy, Emerge Associates has prepared a water management report in the form of a *Local Water Management Strategy* ("LWMS") which addresses the key hydrological considerations of the Abbey South Structure Plan area including the Abbey South OSI in both the pre-development and post-development stages.

Emerge engaged with DWER early in the formulation process of the LWMS, and were advised via email dated 23 February 2021 of the following considerations for the LWMS:

- The DWER mapping tool (online) is incorrect, and the flood fringe within the Abbey South area is in fact smaller than what is shown on the mapping tool. (Copy of the updated mapping was provided and is reflected in all structure plan documents).
- It is critical that the connectivity between the Vasse North and Abbey South portions of the mapped floodway is maintained.
- DWER has no objection to filling within the flood fringe area provided that a minimum habitable floor level of 2.3m AHD is achieved.

The LWMS is included in full as Appendix 2 to the Abbey South Structure Plan.

The key findings of the LWMS relevant to the Abbey OSI area are summarised below:

- As per DWER's advice, the floodway is fully retained within the proposed public open space area, and its connection to the broader (and main) floodway to the south has been fully retained within the site (south western corner) and is not proposed to be modified. The impact of flooding (and height) has been considered as part of the modelling undertaken to determine drainage areas and required public open space.
- Pre-development hydrological conditions are maintained based on the detention and retention of water within the site, accommodated through the proposed public open space network.
- No conservation category or resource enhancement wetlands are identified within the site, nor within 50 m of the site. Therefore no wetland features require specific protection, and no buffers for identified nearby values need to be accommodated within the site.
- The change in land use from rural / agricultural to residential will reduce the total nutrient loads infiltrating into the underlying groundwater.
- Infiltration via bio retention areas and vegetated swales will also provide treatment via filtration and adsorption of pollutants/nutrients and will improve water quality that is discharged into the floodway from its present state.
- Acid sulfate soils (ASS) can be managed through the standard development process, and is only an issue if the permanent groundwater is intersected. Based on the existing separation to groundwater and fill required within the site, deep excavation within the southern portion of the site is unlikely, and therefore disturbance of ASS will be low.

At the time of writing, the LWMS is still under assessment by both DWER and the City of Busselton. DWER provided some initial comments to the consultant team in September 2022, as is typical during the assessment of the LWMS. DWER has not raised any specific concerns pertaining to the proposed treatment of the floodway and flood fringe within the Abbey South OSI area.

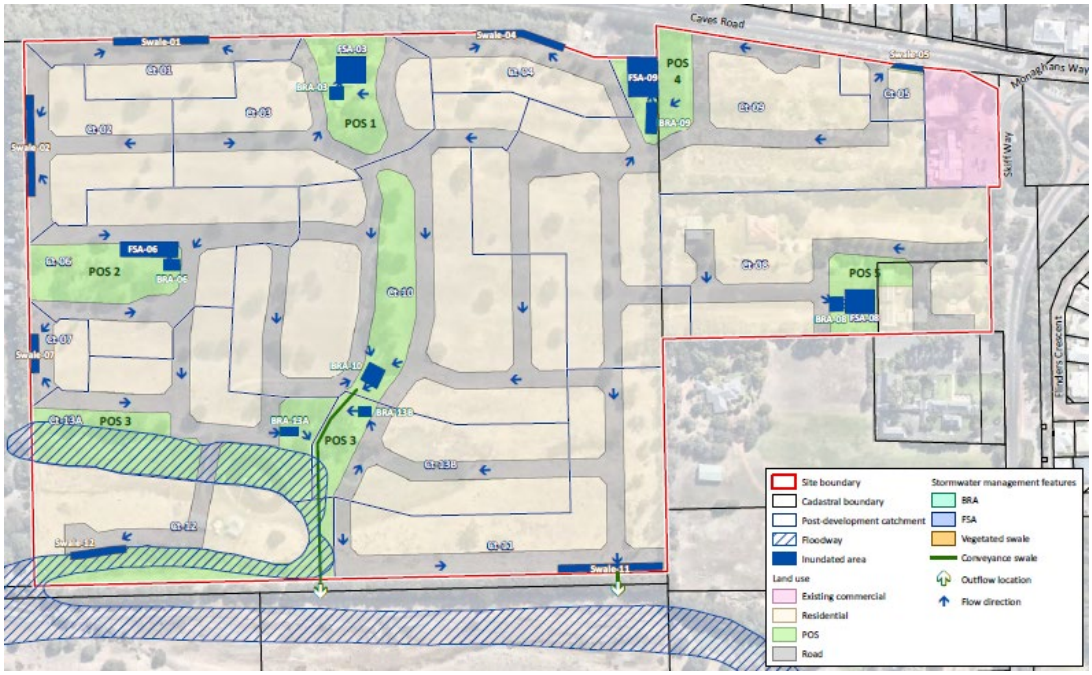


Figure 7 – Abbey South Inundation Plan – 1% AEP Event – extract from LWMS (source: Emerge Associates, 2022)

4.2 Coastal Inundation

The Strategy requires, as part of the Structure Plan for Abbey South, to consider *measures to manage risk of coastal inundation.*

The City of Busselton formally adopted its 'Coastal Hazard Risk Management and Adaptation Plan' in October 2022 (post-lodgement of the Abbey South Structure Plan).

The Coastal Hazard Risk Management and Adaptation Plan (CHRMAP) provides a long-term view of coastal hazards for the City and recommends pathways to adapt to future oceanic and coastal conditions, including coastal inundation. The CHRMAP aims to ensure that the City is strategically well-placed to contend with those hazards as and when they arise.

The Department of Transport had previously confirmed a flood level of 3.8m AHD is the forecast maximum flood level in the 100th year in a major storm event.

Instead of mandating 3.8m as a minimum finished floor level, which would have significant economic implications for all of Busselton, the CHRMAP recommends a medium - to long-term 'protect' strategy for inundation risk for the City's main urban/developed areas, including Abbey. That would entail the construction of a continuous seawall/bund or similar in the foreshore reserve for much of the coast. It would also entail works to prevent seawater entering urban areas via the various 'gaps' along the coast – such as drain and inlet entry channels.

The protect approach enables a reduced FFL requirement. The advertised version of the CHRMAP recommended a minimum FFL of 3.0m AHD across the entire Busselton coastal region. 3.0m AHD was chosen in recognition of the fact that it may take several decades to

implement the medium- to long-term protect strategy for inundation risk for the City's main urban/developed areas, and there is still a significant coastal inundation risk in the interim period.

Following advertising of the CHRMAP in early 2022, the Council resolved to reduce this minimum FFL requirement from 3.0m down to 2.7m AHD in areas where protection is proposed. The reduced level came about as a result of some detailed flood and storm modelling in the Port Geographe area. Page 60 of the CHRMAP explains further:

> *That modelling indicates that the level of a 1 in 500 year coastal storm surge with present day mean sea levels is 2.5m AHD (i.e. 2.5 metres above mean sea level), or 3.4m AHD with mean sea level 0.9 metres higher, rather than 2.9m AHD or 3.8m AHD respectively. That modelling, prepared by Baird Consultants for the developers (Aigle Royal) has been accepted by DoT, and there is not seen to be any reason why the figure would be higher for other parts of the City's coast. On the basis of that, it is considered that minimum FFLs for new development in areas where a medium- to long-term protect strategy for inundation risk is being proposed could be reduced from the originally proposed 3.0m AHD to 2.7m AHD. The reason that 2.5m AHD is not proposed is because some of the projected 0.9m sea level rise over the next 100 years will occur in the period between now and when the medium- to long-term protect strategy for inundation risk can actually be implemented.*

As a direct response to the risks associated with coastal inundation, the Abbey South Structure Plan includes a requirement for a minimum FFL of 3.0m in keeping with the advertised draft CHRMAP. Given that the final version, including the revised FFL of 2.7m AHD has now been formally adopted, it is expected that the Structure Plan will be amended to reduce the minimum required FFL accordingly. This will be pursued at an appropriate juncture in the assessment of the structure plan.

4.3 Open Space Requirements

The third consideration of the *Leeuwin Naturaliste Sub-regional Strategy* is "open space requirements". The Strategy does not go into any further detail as to what the open space requirements are, or whether there are additional open space requirements over and above the typical requirements that are set out in Liveable Neighbourhoods and form part of any urban development.

The open space requirements and provision for Abbey South, including detailed description and landscape concept plans for each area, is addressed in considerable detail in section 4.5 of the Structure Plan explanatory report, and section 4.5.2 deals specifically with the OSI area.

Overall, the Abbey South Structure Plan provides 4.7ha of public open space. This equates to more than 15% of the gross structure plan.5 area.

Even with the 1.3ha floodway and all of the other high frequency drainage areas deducted from the POS contribution, the Structure Plan still delivers more than 11.5% useable and creditable public open space (as defined by Liveable Neighbourhoods). This is around 13% or 3,700m^2 more creditable open space than the minimum requirement.

As per the advice provided to the landowners by the WAPC Chair and senior officers in November 2021, the Structure Plan integrates the floodway feature into the broader POS network, such that it provides a high amenity, functional area of open space, as opposed to an isolated and unusable area. This has resulted in the 1.3ha floodway area being incorporated into a larger 2.7ha area of contiguous open space that provides for a range of passive recreation and amenity functions, as well as retaining between 30 and 40 mature paddock trees.

In considering the suitability of the remainder of the Abbey South OSI area for open space, it should be noted that the remainder of the OSI area is largely cleared of trees, and does not contain any wetlands, waterways, floodways, or other natural features of note. As such, any

additional open space in this location would be purely for recreation purposes (passive or active), as opposed to providing any form of conservation.



Figure 8 – SE Corner of Abbey South OSI facing west. Fox Road on the LHS of picture (source: Rise Urban, 2021)

The City of Busselton has confirmed via its *Sport and Recreation Facilities Strategy 2020 – 2030* that it does not require any active open space (playing fields or sporting facilities) in this area, and prefers that active open space is located centrally within the Vasse urban area where there is a larger residential catchment and better accessibility. The *Sport and Recreation Facilities Strategy* has a clear preference for larger multi-purpose sporting facilities at the district and regional level of the hierarchy, as opposed to smaller neighbourhood level playing fields which are inefficient and difficult / costly to maintain.

The Abbey South OSI is not well suited for playing fields or other forms of active open space at either the neighbourhood or district scale given the separation from the bulk of the residential catchment, the lack of suitable land area to provide facilities of an appropriate scale (district open space is typically >10ha in area), and the potential conflict with the existing floodway, which is required to be retained even if the balance of the site was identified for active open space. Furthermore, groundwater in this area is fully allocated, meaning that there is no water available for irrigation purposes. As such, any open space in this area would have to be unirrigated unless the City could source a suitable water supply (i.e. by purchasing a groundwater licence or using scheme water) to maintain the open space in the longer term.

Having ruled out the suitability of the OSI for active open space, the only other possible open space use in this location is for passive recreation. In this regard, it should be noted that the Abbey South Structure Plan provides substantial areas for passive recreation (4.7ha in total). These areas incorporate paths, shelters, picnic / barbecue areas and playgrounds, as well as

retaining the best trees across the site and providing an integrated drainage and water management response consistent with best practice. The absence of any trees in the eastern half of the OSI area means that any passive open space in this location would lack shade and interest unless it was to be artificially created via shade structures, public art, play equipment, and other structures. The lack of irrigation water would once again be a significant constraint for POS in this area. Whilst this area could theoretically be adapted to be used as passive open space, there are more appropriate areas elsewhere which retain natural features and provide connectivity and recreation opportunities to residents. Passive open space in this location would not serve any planning, environmental or community benefit, and would result in an inefficient and inappropriate use of land that would be better utilised for more intensive forms of development.

In the Council report dated 16 November 2022 concerning the initiation of the Scheme Amendment for the Abbey South area, City of Busselton officers noted that:

> *The City has not independently identified any strategic basis for additional open space in this location. Further, there is general acceptance by officers that a portion of the 'Open Space Investigation' area is suitable for urban development.*

This view aligns with the City's Local Planning Strategy 2019, as well as the *Sport and Recreation Facilities Strategy 2020 – 2030,* and *Strategic Community Plan 2021-2031* – none of which identify the need for any specific open space infrastructure in the Abbey South area.

On this basis, and in considering the 'open space requirements' for Abbey South, the following key points are apparent:

- The Abbey South Structure Plan recognises and retains all of the significant environmental and hydrological features within the OSI area and incorporates them into larger areas of useable public open space.
- The balance of the OSI has little or no conservation value and is not constrained by any wetlands, floodplains or habitat.
- The Abbey South OSI is not well suited as active open space, and the City does not support active open space in this location.
- The Abbey South Structure Plan provides considerably more open space than the minimum requirement under WAPC Policy, and in a manner that is consistent with the objectives and requirements of *Liveable Neighbourhoods.*
- The City has no strategic plan or requirement for additional open space in this location; and does not wish for the Abbey South OSI to be designated as public open space in full due to the significant and ongoing maintenance burden that it would create, and with little or no community benefit in return.

From this, it can be concluded that the 'open space requirements' are adequately and appropriately addressed via the Abbey South Structure Plan, and that the remaining portions of the Abbey South OSI are not suitable for open space.

5. Conclusion

This report summaries the findings of the technical studies prepared over the OSI area, and addresses the specific matters identified in the Leeuwin-Naturalise Sub-regional Strategy.

The studies have determined that the Abbey South and Vasse North portions of the OSI area are physically very different. The entirety of the Vasse North portion is significantly constrained due to the presence of the main floodway channel and the low-lying nature of the land around it. This is in stark contrast to the Abbey South portion which, except for the areas that are proposed to be retained in open space, has few constraints and is on average more than a metre higher than the area to the south. Whilst a portion of the floodway is located within the Abbey South area, this is an offshoot rather than the main channel, and it does not 'flow' even in the most severe weather events. Notwithstanding, this floodway is proposed to be retained in full, as required by DWER, and will be integrated into the broader open space network, as required by the WAPC.

This report addresses the three key areas that are identified in the Leeuwin-Naturaliste Sub-regional Strategy, being water management, coastal inundation, and open space requirements, and demonstrates that the current structure plan is an adequate and appropriate response to these key matters.

As noted in the definition of Open Space Investigation on page 18 of the Strategy:

> *The final extent of land required for open space purposes is to be determined through the investigation process and informed by appropriate studies,* ***and may be larger, smaller or the same size*** *as the area designated as 'Open Space Investigation'.*

Retaining the entire OSI area as public open space would be a poor planning outcome as:

a) It is contrary to the City's strategic plan for open space in the area;
b) It does not contain any environmental or natural attributes that are worthy of retention, apart from those proposed to be retained and which are clearly identified on the Structure Plan;
c) It is not well suited for active open space / playing fields due to size and location constraints; and
d) Any passive recreation function in this area would require artificial shade and amenity if it is to be well utilised.

Overall, setting aside the entirety of the Abbey OSI area for open space is unnecessary, serves no planning purpose, and is an inefficient use of unconstrained land that is better suited for urban development.

Element 1 (page 2) of the WAPC's operational policy *Liveable Neighbourhoods 2009* actively discourages the unnecessary sterilisation of land that is suitable for urbanisation, and states (emphasis added):

> *Another aspect of urban development requiring critical review under Liveable Neighbourhoods is the amount of land set aside for various agency requirements, based on the conventional view that more is better.*
>
> *This applies, for example, to land allocation for environmental buffers, easements, foreshores, setbacks, acoustic barriers, street reserves and community facilities (eg schools).* ***This excessive approach to land use decreases urban efficiency, wastes land, decreases density, increases overall cost of urban development and contributes to urban sprawl.*** *Many of the issues or concerns can be dealt with by using appropriate urban design or built form solutions.*

When producing a structure plan, these various land requirement matters should be critically reviewed, to ensure that land is being used efficiently.

The Abbey South Structure Plan undertakes a critical review of the OSI area as required by both the *Leeuwin-Naturaliste Sub-regional Strategy* and *Liveable Neighbourhoods* and delivers an outcome that makes efficient use of the land, whilst still comfortably exceeding the minimum environmental and amenity expectations to deliver a high-quality and site responsive land use plan.

This land use efficiency will not only go some way towards addressing the critical housing shortage in the City of Busselton, but will also relieve some of the pressure to develop other less-suitable areas such as Vasse North and Ambergate, which are low-lying, flood prone areas that require a considerable amount of fill and / or have a number of natural constraints that are not found in the Abbey South OSI area.



Figure 9 – Eastern end of Abbey South OSI facing south west. Fox Road trees in the background (source: Rise Urban, 2021)

Appendix 1

Site Plan
Open Space Investigation Area



ABBEY SOUTH AND VASSE NORTH OPEN SPACE INVESTIGATION AREAS
SITE PLAN

NOTE:
Base Data supplied by Landgate.
Aerial Image supplied by Landgate (January 2021)
Areas and dimensions shown are subject to final survey calculations.

Revision	Date	Item
A	1/11/22	Initial Issue

LEGEND

ABBEY SOUTH PROJECT AREA

VASSE NORTH PROJECT AREA

-	:	CLIENT
A3@1:5,000	:	SCALE
9 November 2022	:	DATE
IA Abbey-5-010	:	PLAN No
A	:	REVISION
C.L.	:	PLANNER
B.L	:	DRAWN

Rise Urban
AGILE PLANNING FOR THE NEW NORMAL

Appendix 2

Abbey South OSI Area
Site Photos

Rise Urban

AGILE PLANNING FOR THE NEW NORMAL

Abbey South Open Space Investigation Area

Site photos (Nov 2020, Nov 2021 and Dec 2021)

Rise Urban Pty Ltd

Abbey South Open Space Investigation Area

Rise Urban



Site Plan
Abbey South OSI Area

Abbey South Open Space Investigation Area

Rise Urban



Site Plan
Combined OSI Area

Abbey South Open Space Investigation Area

Rise Urban



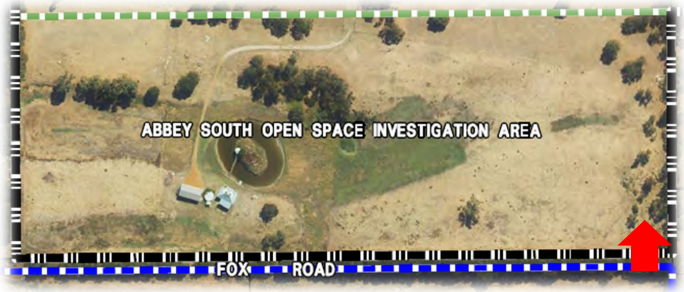


Image 1

South east corner of OSI area – facing north with boundary fence to lot 8 Bussell Highway on right

(Nov 2021)

Abbey South Open Space Investigation Area

Rise Urban





Image 2

SE Corner of OSI area – facing west with boundary fence to Fox Road on left

(Nov 2021)

Abbey South Open Space Investigation Area

Rise Urban





Image 3

Central eastern portion of the Abbey South OSI area – facing west / south west. Fox Road trees on left.

(Dec 2021)

Abbey South Open Space Investigation Area

Rise Urban



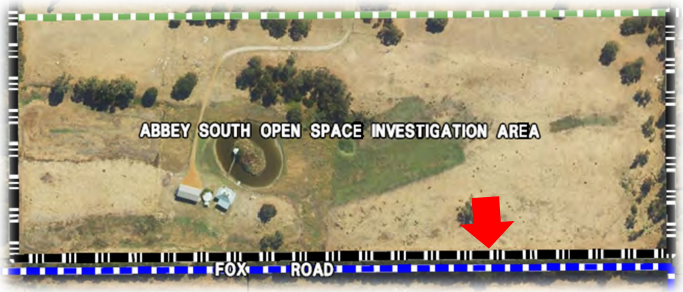


Image 4

Southern boundary of Abbey South OSI area facing south into Fox Road (immediate foreground) and Vasse North OSI area beyond. Note the elevated 'bund' in Fox Road

(Nov 2021)

Abbey South Open Space Investigation Area

Rise Urban





Image 5

South eastern boundary of Abbey South OSI area facing south into Fox Road (immediate foreground) and Vasse North OSI area and floodway beyond. Note the elevated 'bund' in Fox Road

(Nov 2022)

Abbey South Open Space Investigation Area

Rise Urban





Image 6
Eastern end of Abbey OSI facing west with Fox Road on left

(Nov 2022)

Abbey South Open Space Investigation Area

Rise Urban





Image 7

Eastern end of Fox Road and Abbey OSI, facing west

(March 2021)

Abbey South Open Space Investigation Area

Rise Urban





Image 8

Central portion of OSI area – facing north west. Trees in background to be retained in POS.

(Dec 2021)

Abbey South Open Space Investigation Area

Rise Urban





Image 9

north western corner of OSI – facing south with floodway in mid-ground and Fox Road in the distance

(Nov 2021)

Abbey South Open Space Investigation Area

Rise Urban





Image 10

Floodway at western end of the OSI area – facing south east (Nov 2021). Photo taken from the north bank. Trees on LHS to be retained in POS.

(Nov 2020)

Abbey South Open Space Investigation Area

Rise Urban





Image 11

Floodway at western end of the OSI area – facing south east (Nov 2021). Photo taken from the north bank. Trees on LHS to be retained in POS.

(Nov 2021)

Abbey South Open Space Investigation Area

Rise Urban





Image 12

Floodway at western end of the OSI area from south bank (standing on the future 'peninsula') – facing west Trees in background to be retained in POS.

(Dec 2021)

Abbey South Open Space Investigation Area





Image 13

Causeway track across floodway – facing south.

(Nov 2022)

Abbey South Open Space Investigation Area

Rise Urban





Image 14

Central portion of retained floodway – facing west. Trees to be retained in POS on right.

(Nov 2022)

Abbey South Open Space Investigation Area

Rise Urban





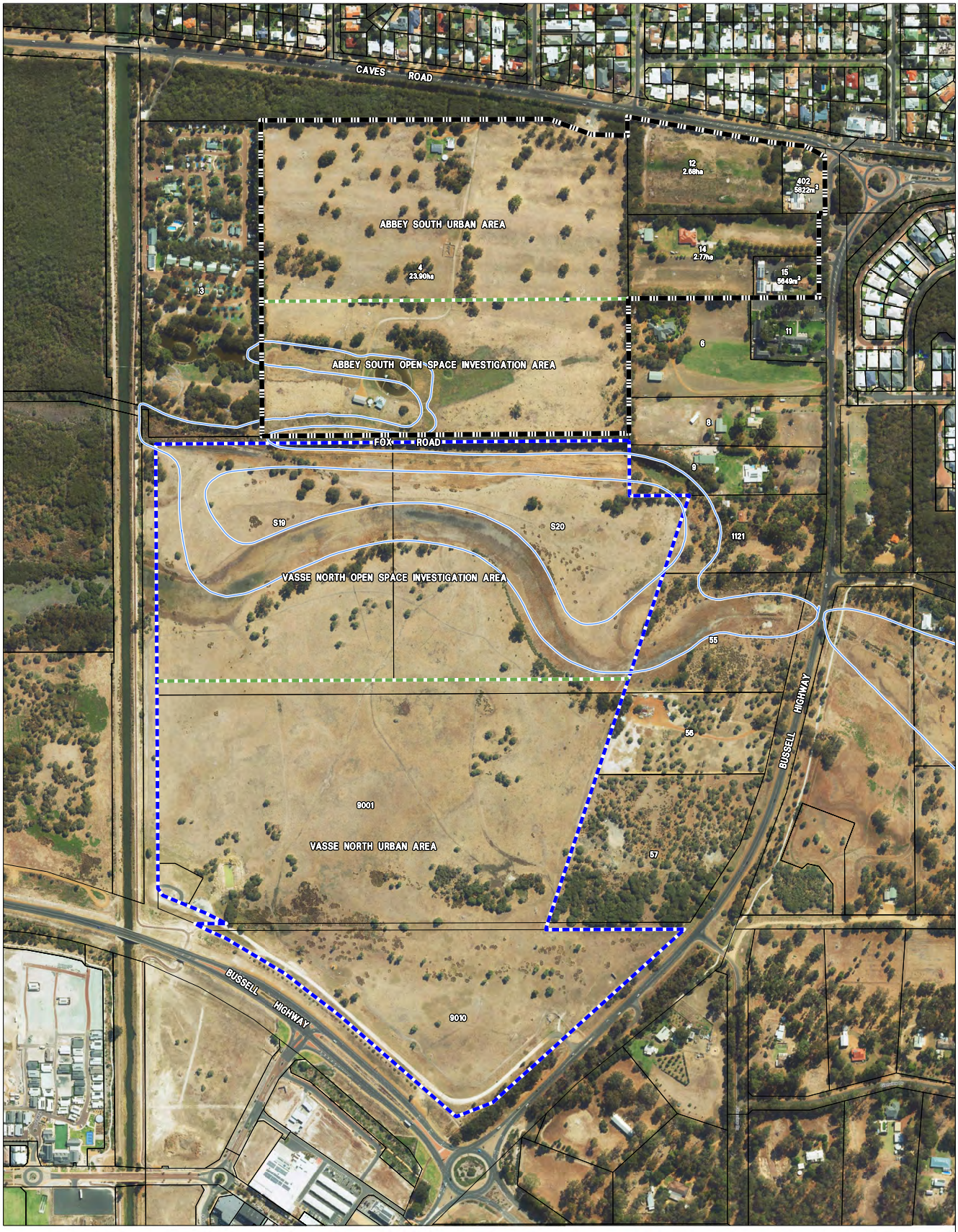
Image 15

Eastern portion of retained floodway – facing east. Trees on left to be retained in POS. Man made dam is to be removed and floodway reinstated

(Nov 2022)

Appendix 3

DWER Floodway Mapping (DWER, 2021)



0 60 120 180 240 300m

ABBEY SOUTH AND VASSE NORTH OPEN SPACE INVESTIGATION AREAS
SITE PLAN

NOTE:
Base Data supplied by Landgate.
Aerial Image supplied by Landgate (January 2021)
Areas and dimensions shown are subject to final survey calculations.

Revision	Date	Item
A	1/11/22	Initial Issue

LEGEND

- *ABBEY SOUTH PROJECT AREA*
- *VASSE NORTH PROJECT AREA*
- *FLOODWAY*

-	:	CLIENT
A3@1:5,000	:	SCALE
9 November 2022	:	DATE
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C.L.	:	PLANNER
B.L	:	DRAWN

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AGILE PLANNING FOR THE NEW NORMAL

Appendix 4

Floodplain Factsheet
DWER, 2000

GOVERNMENT OF WESTERN AUSTRALIA
WATER AND RIVERS COMMISSION JULY 2000

Water facts 14

Floodplain management

Floodplains continue to be under pressure for more intensive uses despite the significant flood risk. This pressure is increasing as desirable undeveloped land becomes scarce. This Water Facts describes the principles for good floodplain management and explains the roles of government agencies.

Severe floods do not occur frequently in this State so the extent of flooding and its consequences are usually soon forgotten. However, when flooding does occur, the resulting damage to property can be quite considerable (see Water Facts 13, Flooding in Western Australia).

In recognising the need to contain and lessen potential flood damage, the former Public Works Department in 1975 commenced floodplain mapping of major rivers throughout the State to provide planning bodies and local government with strategies for ensuring sound development on floodplains. This advisory service was continued by the former Water Authority between 1985 and 1996. Since then the service has been provided by the Water and Rivers Commission.

The floodplain management program has been providing a non-structural means of protecting future development from major flooding. Floodplain management strategies are an essential part of an integrated catchment management approach to development on floodplains and provide a high degree of flood protection.

Effective floodplain management requires co-operation and co-ordination between all three levels of government.

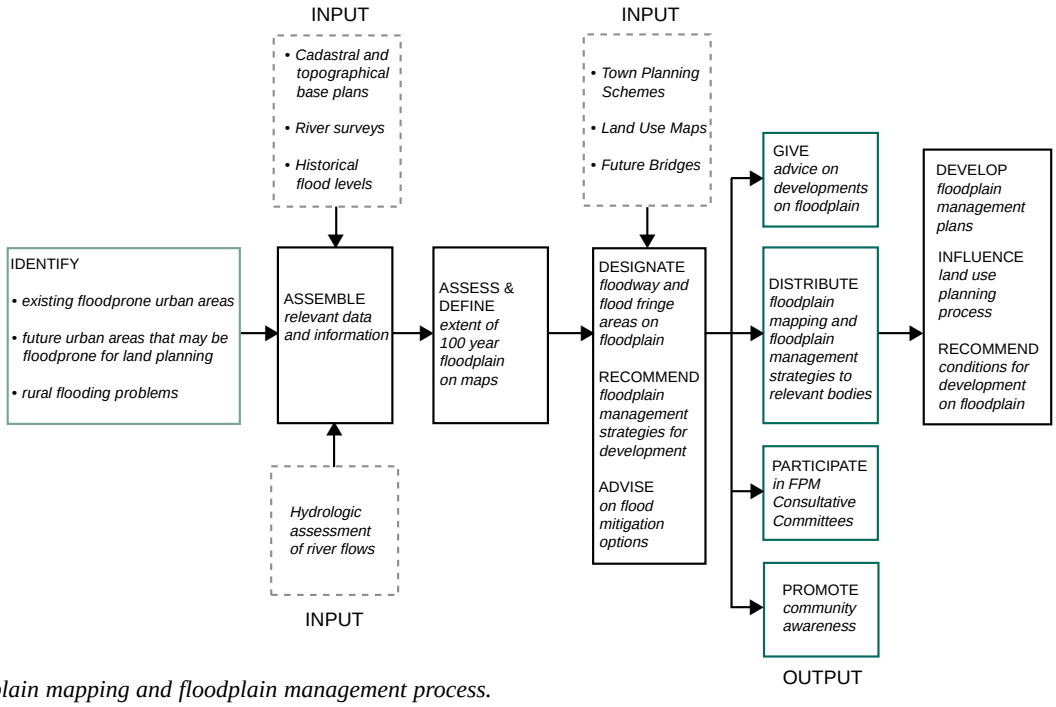
Principles of floodplain management

Floodplains should be managed for the benefit of the whole community so that the risk and damages are minimised and environmental values are protected. Sound floodplain management should:

- ensure land use minimises flood risk and damage costs;
- ensure all three levels of government and the local community accept their responsibilities in floodplain management;
- ensure appropriate floodplain mitigation measures minimise damage and are acceptable to the local community;
- promote the use of **non-structural*** rather than **structural**** mitigation measures where possible;
- ensure floodplain management measures have beneficial economic, social and environmental outcomes; and
- provide flood forecasting and warning systems and emergency management arrangements to help minimise the impact of flooding.

* **Non-structural measures** aim at reducing or avoiding the susceptibility of new developments to flood damage as well as reducing the impact of flooding on existing developments. They include land use and building controls, acquisition of land and relocation, effective flood forecasting and flood warning, creating public awareness and flood insurance.

** **Structural measures** physically modify the natural behaviour of flooding and are designed to reduce the frequency or impact of flooding on existing developments. They include levee banks, channel improvements, river diversions, retarding basins and flood mitigation dams.



Floodplain mapping and floodplain management process.

Terms commonly used in floodplain management

Average recurrence interval (ARI)

A statistical estimate of the average period in years between the occurrence of a flood of a given size or larger. The ARI of a flood event gives no indication of when a flood of that size will occur again.

100 year ARI flood

A flood having an average recurrence interval (ARI) of 100 years. This flood has a 1% chance of occurring in any one year and has a 50% chance of being experienced at least once in a person's life time. The 100 year ARI flood has been generally adopted in Australia and overseas as the basis for floodplain management planning.

Floodplain

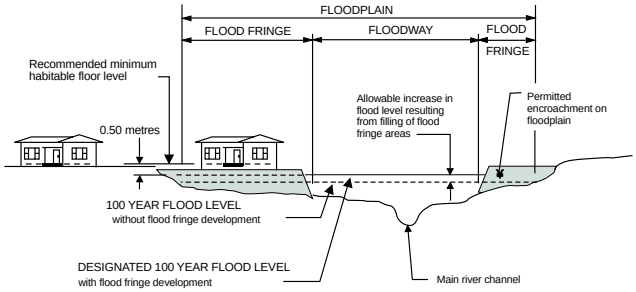
The portion of a river valley next to the river channel which is covered with water when the river overflows its banks during major river flows. The term also applies to land adjacent to estuaries which is subject to inundation during flooding.

Floodway

The river channel and a portion of the floodplain which forms the main flow path for floodwaters once the main channel has overflowed. If the floodway is even partially blocked then upstream flood levels may be raised and thereby affect areas which may not have been previously affected. Development in floodways is to be avoided wherever possible.

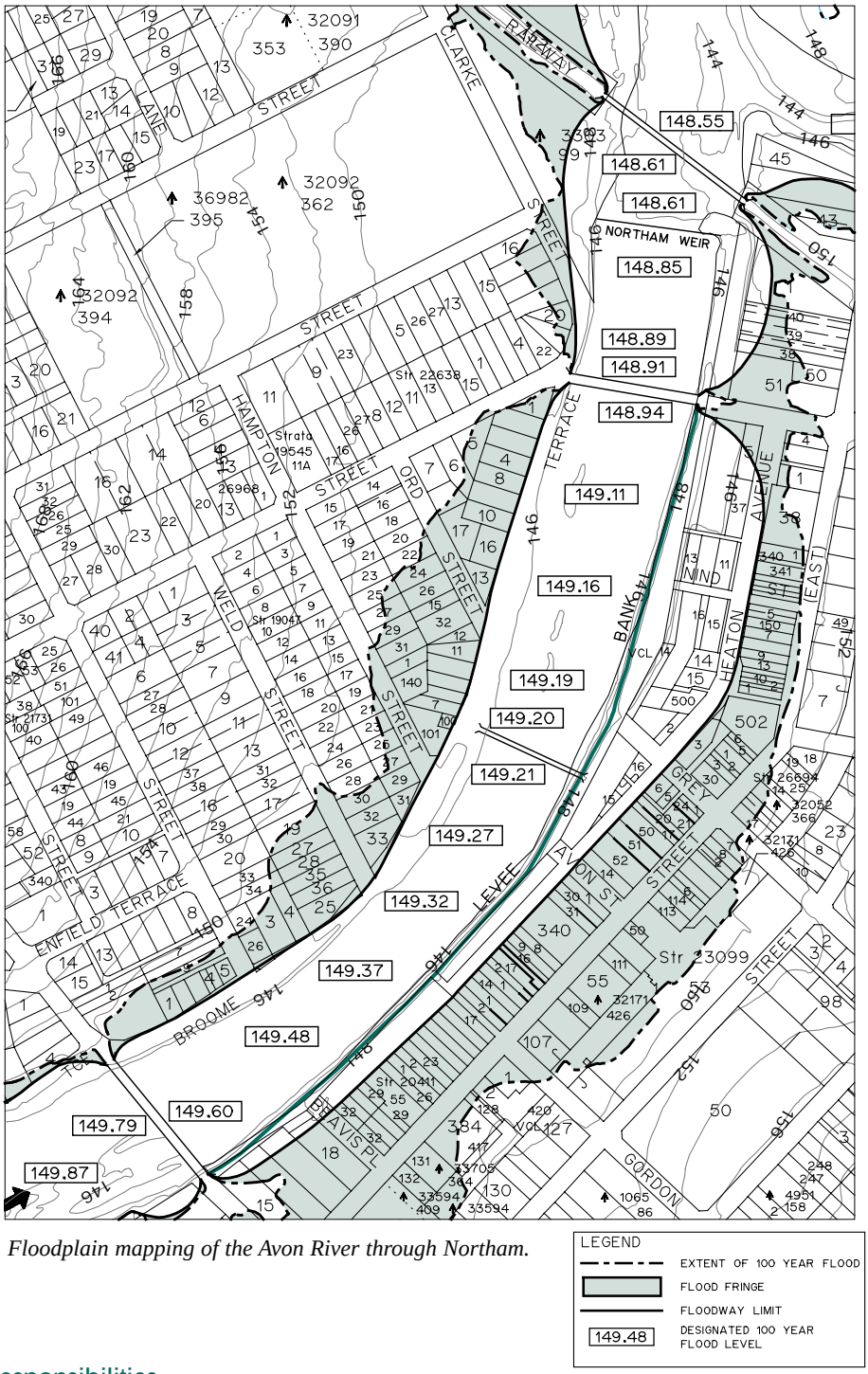
Flood fringe

The area of the floodplain, outside of the floodway, which is affected by flooding but where development could be permitted provided appropriate measures are taken. These areas are generally covered by still or very slow moving waters during a 100 year ARI flood.



Typical recommended floodplain management strategy.

- Development (i.e. filling, building, etc) that is located within the flood fringe is considered acceptable with respect to major river flooding. However, a minimum habitable floor level of 0.50 metre above the adjacent 100 year flood level is recommended to ensure adequate flood protection.
- Development (i.e. filling, building, etc) that is located within the floodway and is considered obstructive to major river flows is not acceptable as it will increase flood levels upstream.



Floodplain mapping of the Avon River through Northam.

Roles and responsibilities

Commonwealth Government

The Commonwealth Government has a general responsibility for the economic and social well being of the nation. The Commonwealth Government's role is to:

- encourage the development of effective long-term strategies for development on floodplains at a national level, provide financial assistance in the form of natural disaster relief payments when there is significant flood damage and disruption;
- provide flood forecasting and warning services; and
- develop, co-ordinate and support effective national emergency management arrangements.

Commonwealth financial assistance has been made available for floodplain management studies and the construction of flood mitigation works. This assistance is aimed at reducing the economic and social costs of flooding by encouraging local and regional acceptance of responsibilities for floodplain management.

State Government

The primary role of State Government is to develop appropriate standards and strategic approaches for floodplain management and to ensure that they are applied in a co-ordinated and integrated fashion across the State. This role involves the provision of expert technical support by the Water and Rivers Commission, land planning through the Ministry for Planning and provision of effective flood emergency management and planning through the State Emergency Service.

- **Water and Rivers Commission**
  The Water and Rivers Commission is the State Government's lead agency in floodplain mapping and providing floodplain management advice. In accordance with the *Water and Rivers Commission Act 1995* the Commission's function is to "develop plans for and provide advice on flood management".

  The Commission provides advice on development of floodplains with the object of promoting the wise use of floodplains while minimising flood risk and damage. In particular, its role is to:

  - collect and analyse flood data;
  - prepare floodplain maps of existing and future urban areas which are floodprone;
  - provide advice to the Ministry for Planning, Local Government and other agencies on flooding and recommend guidelines for sound development on floodplains; and
  - assist in flood forecasting in association with the Bureau of Meteorology for the issuing of flood warnings.

  The Commission, as a central advisory service for floodplain management, provides consistent minimum standards of flood protection throughout the State and provides impartial advice with regard to proposed development.

- **Ministry for Planning**
  The Ministry for Planning and the Western Australian Planning Commission are responsible for developing, reviewing, and implementing the land use planning system. The Ministry for Planning is responsible for advising the Western Australian Planning Commission on land use planning and policy matters. This is achieved through the preparation and review of Region Schemes, Corridor Plans, Town Planning Schemes and Scheme amendments and the development of planning policies.

- **State Emergency Service**
  The State Emergency Service (SES) is the Lead Combat Authority in emergency management and planning for floods. It is responsible for the preparation of the State Flood Strategy, Regional and Local Flood Emergency Plans. Effective local flood emergency planning requires close co-operation between SES, Local Government and Water and Rivers Commission.

Local Government

The principal role of Local Government in floodplain management is the implementation of floodplain management strategies. This is achieved by land and development controls through statutory planning and by various building regulations.

Councils are encouraged to incorporate floodplain management strategies and guidelines into their Town Planning Schemes or into a Council Policy Statement. Local Government should also actively promote and sustain flood awareness at the community level and make a significant contribution to flood emergency management and planning.

For more information contact

WATER AND RIVERS
COMMISSION

Level 2, Hyatt Centre
3 Plain Street
East Perth Western Australia 6004
Telephone: (08) 9278 0300
Facsimile: (08) 9278 0301
or your regional office
Website: http://www.wrc.wa.gov.au

CUSTOMER FOCUS
WESTERN AUSTRALIA

This Water Facts sheet is one in a series providing information on water issues of interest to the community. It was produced as part of the Waterways WA Program. Managing and enhancing our waterways for the future. Text by Rick Bretnall. Water Facts sheet project coordination by Heidi Oswald.

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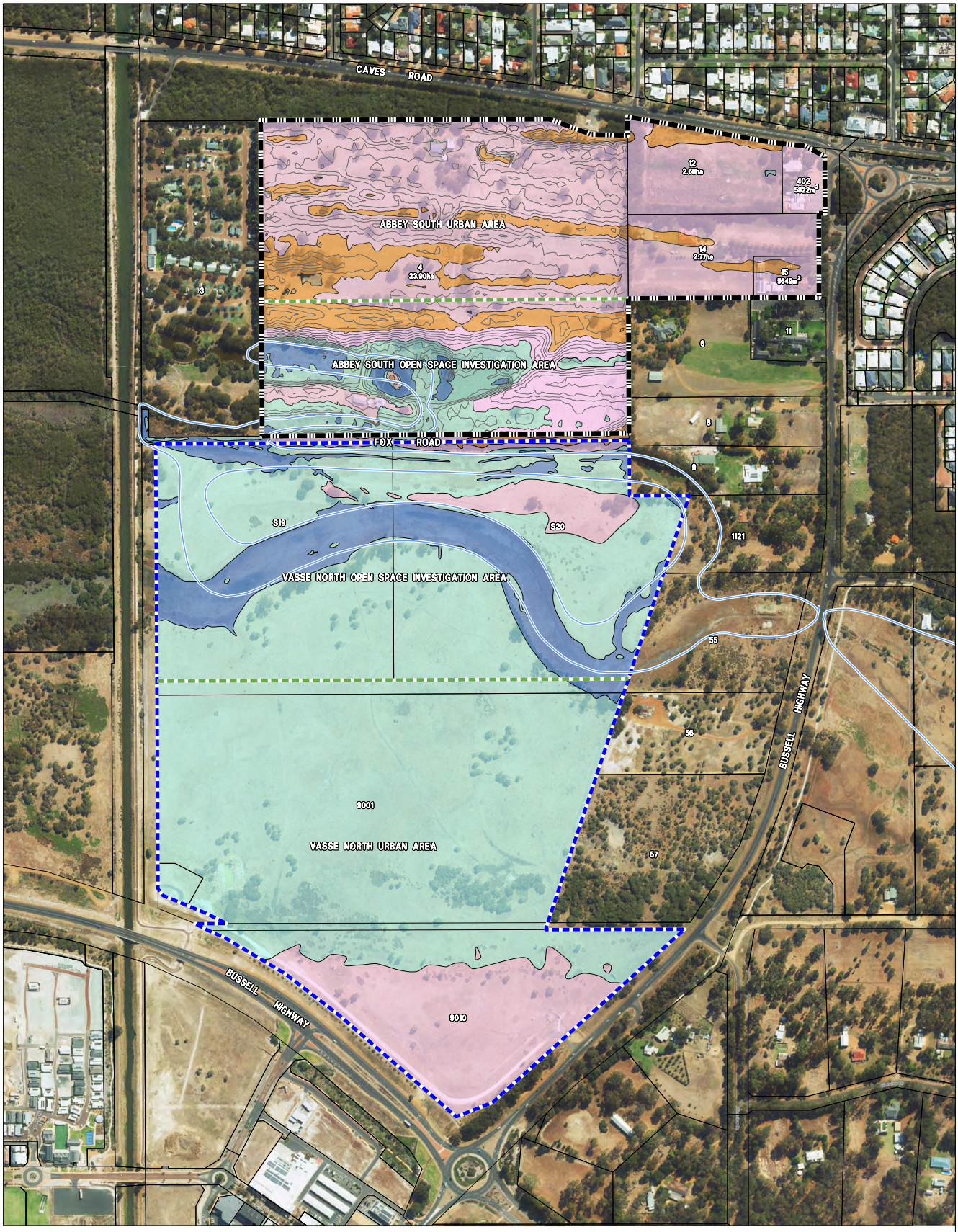
Appendix 5

Open Space Investigation Area
Topo Map and Cross Sections



0 60 120 180 240 300m

ABBEY SOUTH AND VASSE NORTH OPEN SPACE INVESTIGATION AREAS
TOPOGRAPHY MAP

NOTE:
Base Data supplied by Landgate.
Aerial Image supplied by Landgate (January 2021)
Areas and dimensions shown are subject to final survey calculations.

Revision	Date	Item
A	1/11/22	Initial Issue

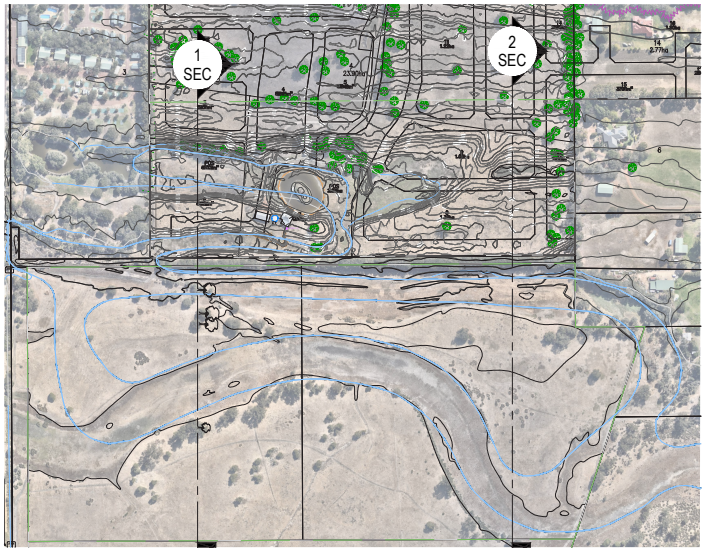
LEGEND

- SUBJECT LOT BOUNDARY
- OPEN SPACE / URBAN AREA BOUNDARY
- FLOODWAY

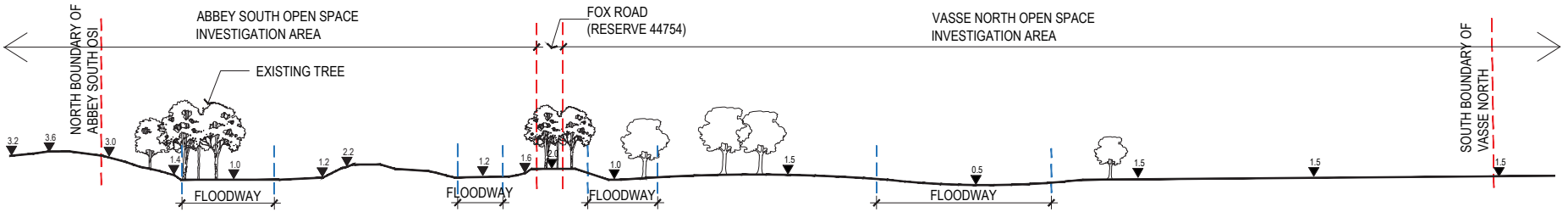
HEIGHT CONTOURS (AHD)
0 - 1m | 1 - 2m | 2 - 3m | 3 - 4m | 4 - 5m

-	:	CLIENT
A3@1:5,000	:	SCALE
4 November 2022	:	DATE
IA Abbey-5-010	:	PLAN No
A	:	REVISION
C.L.	:	PLANNER
B.L	:	DRAWN

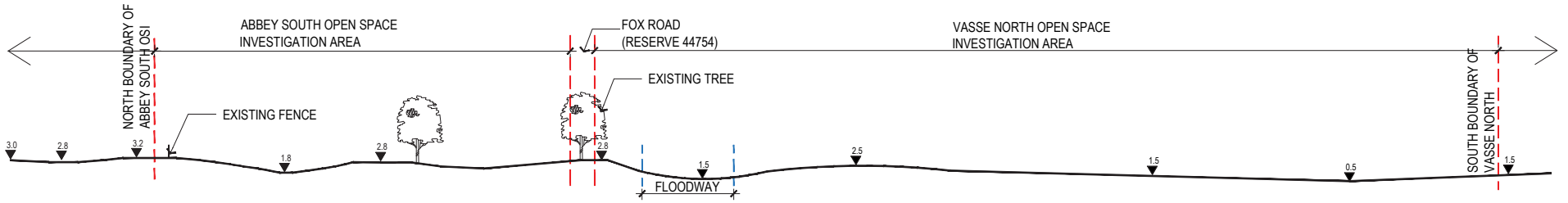
Rise Urban
AGILE PLANNING FOR THE NEW NORMAL



KEY PLAN



SECTION 1 1:1200
VERTICAL SCALE IS UP SCALED 4x



SECTION 2 1:1200
VERTICAL SCALE IS UP SCALED 4x

ABBEY
SECTION OF EXISTING TOPOGRAPHY

DWG EMG60
REV A
DATE NOV 2022
SCALE 1 : 1200 @ A3
0 6.0 12.0 18.0 24.0 30.0 m

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L:\C\CURRENT PROJECTS\EMG60 Abbey PIA\02 Concept & Reports\EMG60 Abbey PIA\INDD\EMG60 Abbey PIA Section.indd

emerge ASSOCIATES

Rise Urban.

AGILE PLANNING FOR THE NEW NORMAL

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CITY OF BUSSELTON

LOCAL PLANNING SCHEME No. 21

AMENDMENT No. '55'

Lots 4, 12 and 402 Caves Road and Lots 14 and 15 Bussell Highway, Abbey

File No: AMD21/0055

WAPC Ref:

MINISTER FOR PLANNING

PROPOSAL TO AMEND A TOWN PLANNING SCHEME

1.	LOCAL AUTHORITY	:	City of Busselton
2.	DESCRIPTION OF SCHEME	:	Local Planning Scheme No. 21
3.	TYPE OF SCHEME	:	District Zoning Scheme
4.	SERIAL No. OF AMENDMENT	:	Amendment No. '55'
5.	PROPOSAL	:	a) Insert 'Special Provision Area No. 76' into Schedule 3 of the Scheme; and b) Amend the Scheme Map by: i) replacing the 'Rural' and 'Conservation' zones over Lots 4, 12 and 402 Caves Road and Lots 14 and 15 Bussell Highway, Abbey with the 'Urban Development' zone; and ii) amending the boundary of the Landscape Value Area to align with the west, south and east boundaries of Lot 4 Caves Road, Abbey.

Planning and Development Act 2005

RESOLUTION TO ADOPT AMENDMENT TO LOCAL PLANNING SCHEME

City of Busselton

Local Planning Scheme No. 21

Amendment No. 55

RESOLVED that the Council, in pursuance of section 75 of the *Planning and Development Act 2005*, amend the above Local Planning Scheme by:

a) Inserting 'Special Provision Area No. 76' to read as follows –

No	Particulars of Land	Zone	Special Provisions
SP76	As identified on the Scheme map	Urban Development	1. A single structure plan is to be prepared for the entire Special Provision Area. 2. In addition to the information to be included in a structure plan outlined in Clause 16 of the Deemed Provisions, the structure plan is to set out the following: i. A water management report that takes into consideration the land to the south and addresses all water-related matters relevant to the proposal. ii. Measures to manage risk from coastal inundation. iii. Open space requirements. iv. Measures to retain, manage, and enhance environmental values associated with the Special Provision Area including remnant vegetation, potential habitat for Commonwealth and State listed threatened fauna species, ecological linkages and wetlands, within 'public open space', road reserves, and/or conservation areas (as identified on the Structure Plan). Such measures are required to also address linkages and connectivity with contiguous areas of similarly important remnant vegetation on land adjoining the special provision area as well as management measures to ensure the habitat functions of these areas are maintained and, where possible, enhanced. v. The provision of vegetated buffers to ensure appropriate visual screening and separation of development from main roads adjoining the Special Provision Area.

			vi. Measures to provide for the safe and efficient movement of pedestrians and cyclists to, from, and within the Special Provision Area, including crossings of main roads adjoining the Special Provision Area. 3. A Local Development Plan is to be prepared on Lots 12 and 402 Caves Road and Lots 14 and 15 Bussell Highway to address: i. Location of car parking, pedestrian access and vehicular/service access areas for development where adjacent or located on Lot 402; ii. Amenity of the locality and surrounds; and Landscape values and visual management considerations.

b) Amending the Scheme Map by:
   i) replacing the 'Rural' and 'Conservation' zones over Lots 4, 12 and 402 Caves Road and Lots 14 and 15 Bussell Highway, Abbey with the 'Urban Development' zone; and
   ii) amending the boundary of the Landscape Value Area to align with the west, south and east boundaries of Lot 4 Caves Road, Abbey.

The Amendment is standard under the provisions of the *Planning and Development (Local Planning Scheme) Regulations 2015* as it is:

a) an amendment that is consistent with a Local Planning Strategy for the Scheme that has been endorsed by the Commission; and
b) an amendment that does not result in any significant environmental, social, economic or governance impacts on land in the Scheme area.

Dated this……day of……2022

……
CHIEF EXECUTIVE OFFICER

AMENDMENT REPORT

City of Busselton Local Planning Scheme No. 21
Scheme Amendment No. 55

Table of Contents

EXECUTIVE SUMMARY *1*
PART 1 – PLANNING BACKGROUND *2*
1.1. Location and Property Description *2*
1.2. Background *2*
1.3. Structure Plan *3*
PART 2 – SCHEME PROPOSALS *4*
2.1 Existing Zoning *4*
2.2 Scheme Provisions *4*
2.3 Scheme Special Control Areas *4*
PART 3 – AMENDMENT PROPOSAL *6*
3.1 Need for Scheme Amendment *6*
3.2 Intent *7*
PART 4 – CONCLUSION *8*
SCHEME MAP ..... ***Error! Bookmark not defined.***

EXECUTIVE SUMMARY

This scheme amendment relates to the land generally south-west of the Caves Road-Bussell Highway intersection, in the suburb of Abbey adjacent to the western edge of the Busselton township. The purpose of this Scheme amendment is to enable future subdivision and development of the Abbey South precinct through implementation of the Abbey South Structure Plan.

The Abbey South Structure Plan is intended to be the key planning framework document that establishes how the Abbey South precinct will be developed, and demonstrates that urbanisation of the precinct will not have any adverse environmental, landscape or amenity impacts. The purpose of the Structure Plan is to enable the subdivision and development of the Abbey South precinct into a medium to low density residential community, while addressing and responding to all site features.

This scheme amendment and the Structure Plan are consistent with the State and Local level strategic planning frameworks that apply to the Abbey South precinct, and have been informed by previous investigations into the Abbey South Planning Investigation Area established by the WAPC's *Leeuwin-Naturaliste Sub-regional Strategy* (as amended).

This scheme amendment is limited to rezoning of the Abbey South precinct and removal of the Landscape Value Special Control Area from a small area of the precinct, and inserting Special Provision Area No. 76 into the Scheme to ensure that the Structure Plan for the precinct sufficiently addresses site features and strategic planning framework requirements. Once the new zoning is in place it will support implementation of the Structure Plan by providing a head of power and streamlining the process for further detailed planning and development of the precinct.

It is intended that this Scheme amendment will be processed in parallel with the Structure Plan to ensure consistency between the two documents, and to ensure a streamlined and transparent public consultation process.

PART 1 – PLANNING BACKGROUND

1.1. Location and Property Description

The Abbey South precinct is located approximately 8.5km west of the Busselton town centre, 15.5km east of the Dunsborough town centre, and approximately 2km north of the Vasse town centre. It comprises a significant portion of the last remaining undeveloped land with significant development potential north of Busselton Bypass and within the Busselton township.

The subject area comprises the entirety of five freehold lots within the former Abbey Planning Investigation Area as defined in the Leeuwin Naturaliste Sub-regional Strategy (otherwise known as Abbey South), totalling 30.5ha. Table 1 below summarises the legal description and ownership of each of the five lots.

Lot Number	Street Address	Street	Diagram	Land Area (ha)	Owner
12	N/A	Caves Road	43998	2.68	Lowe Pty Ltd and Lukin Pty Ltd
4	63	Caves Road	46285	23.91	Michael Stewart and Venetia Bennett
402	12	Caves Road	252489	0.58	Donna Michelle Carlyle Christopher Ronald Carlyle
14	5840	Bussell Highway	96590	2.77	Thomas Benford Norris Judith Doris Driver
15	5842	Bussell Highway	96590	0.56	Erica Pauline Maisey

1.2. Background

The *Leeuwin-Naturaliste Sub-regional Strategy* ("the Strategy") was published by the WAPC in May 2019 and identified five Planning Investigation Areas, one of which was the subject area. The five PIAs were assessed and considered by the WAPC in November 2021, where in relation to the Abbey South Precinct, the WAPC resolved to:

1. *Designate the following lots as 'Urban':*
   - *Lot 12 on Diagram 43998*
   - *Lot 14 on Diagram 96590*
   - *Lot 15 on Diagram 96590*
   - *Lot 402 on Deposited Plan 252489*
   - *Northern portion of Lot 4 on Diagram 46285*

2. *Designate the following lots as 'Open Space Investigation':*
   - *Southern portion of Lot 4 on Diagram 46285.*

3. *Remove the Abbey Planning Investigation Area from the Strategy Plan.*

4. *Require the preparation of a single structure plan over the entirety of the land identified in (1) and (2) above. In addition to the information to be included in a structure plan outlined in Clause 16 of the Deemed Provisions, the structure plan is to set out the following:*
   - *a water management report that takes into consideration the land to the south and addresses all water-related matters relevant to the proposal.*
   - *measures to manage risk from coastal inundation.*
   - *open space requirements.*

It is on the basis of this resolution of the WAPC that this amendment to the City of Busselton's Local Planning Scheme No. 21 (LPS21) and the Abbey South Structure Plan have been prepared. The specific considerations of the Public Open Space Investigation Area relating to water management, coastal inundation and open space requirements are addressed by the Structure Plan, and the extent of open space required to accommodate these values is identified on the Structure Plan map.

In relation to the Open Space Investigation designation, the WAPC confirmed in November 2021 that the Structure Plan is the appropriate vehicle to determine the full extent of the open space area in the south of Lot 4. Further, it was acknowledged that the Open Space Investigation area does not necessarily dictate that the land should be set aside for conservation or recreation purposes. Rather, it was intended that the Structure Plan should determine the extent of land needed for flooding / drainage purposes and ensure that this land is integrated into the broader urban area. The Structure Plan achieves this through the spatial identification of the key hydrological features, the allocation of sufficient open space to retain these features, and the integration of these features within a broader POS network.

1.3. Structure Plan

The Structure Plan is provided as Appendix 2 of this Scheme Amendment report, and includes the following technical reports as appendices:

- Environmental Assessment (Emerge Associates);
- Local Water Management Strategy (Emerge Associates);
- Bushfire Management Plan (Emerge Associates);
- Traffic and Transport Assessment (Stantec);
- Servicing Strategy (Stantec); and
- POS and Landscape Strategy (Emerge Associates).

It is intended that this Structure Plan be read in conjunction with this amendment proposal, and that the Structure Plan reports provide the necessary justification and technical detail to support this amendment.

Through these reports and the Structure Plan itself, key land use considerations such as flora, fauna, hydrology, drainage, bushfire, servicing and traffic have been extensively reviewed and resolved. Overall, the Structure Plan demonstrates that the site is well suited to urban development, and that physical features and constraints on the site can be managed through the structure plan and subdivision design process.

PART 2 – SCHEME PROPOSALS

2.1 Existing Zoning

The northern half of Lot 4, as well as the entirety of Lots 12, 14, 15 and 402, are currently zoned 'Rural' by LPS21. The southern half of Lot 4 is currently zoned 'Conservation'. It is unclear how the zoning boundary between the Conservation and Rural zones on Lot 4 was derived as it does not correspond to any specific natural feature on the site (i.e. contours, vegetation, wetlands etc).

Surrounding the subject area, Lot 3 Caves Road and Lots 6 and 11 Bussell Highway are zoned 'Tourism', which reflects the current uses of Lots 3 (RAC Busselton Holiday Park) and Lot 11 (Amelia Park Lodge). Lot 8 Bussell Highway is zoned 'Conservation', and is used for rural residential purposes. Lot 37 (Fox Road reserve) and the lower lying floodway to the south are also zoned 'Conservation'.

Caves Road and Bussell Highway are unzoned, however are under the care and control of Main Roads Western Australia, and therefore functionally operate as Regional Roads.

The existing zoning as shown on the Scheme Map is provided as Appendix 1 of this Scheme Amendment report.

2.2 Scheme Provisions

The zoning table refers all uses proposed within the Urban Development zone to Clause 3.4.3 of LPS21, which states the following:

"If the zoning table does not identify any permissible uses for land in a zone the local government may, in considering an application for development approval for land within the zone, have due regard to any of the following plans that apply to the land –

a) a structure plan;
b) an activity centre plan;
c) a local development plan."

This Clause enables the Structure Plan to take effect over the subject area, and to reference appropriate 'zones' and land use permissibility via the structure plan. The Structure Plan applies the Residential zone to the majority of the site, with the exception of lot 402, which is identified as Local Centre zone. The Structure Plan does not propose to vary any of the land use permissibility identified in LPS 21 for either of these zones.

2.3 Scheme Special Control Areas

The subject area is wholly or partially located within the following Scheme Special Control Areas:

<u>Landscape Value Area</u>
The portion of lot 4 that is currently zoned 'Conservation' is also located within the Landscape Value Area. All clearing and development in the Landscape Value area requires development

approval from the City of Busselton, and these proposals are required to be compatible with the existing landscape, viewscape or environmental values associated with the area. This Scheme amendment proposes to remove the Landscape Value Special Control area from the subject area, as implementation of the Structure Plan will significantly change the landscape of the area, thus rendering the Landscape Value area redundant.

Floodway and Wetland Areas

Irregular parts of the southern portion of Lot 4 (in the current 'Conservation' zone) are located within the Floodway Area and Wetland Area. There are no Conservation Category Wetlands or Resource Enhancement Wetlands within the amendment area, while the floodway is essentially a small 'offshoot' of the main floodway located further to the south and outside of the subject area. The boundaries of these Special Control Areas generally reflect the area of lot 4 that is low lying and prone to seasonal inundation. This area is addressed in detail in the Structure Plan and the accompanying Environmental Assessment and Local Water Management Strategy.

Development Contribution Area

The subject area is located within Development Contribution Area 1 – Community Infrastructure and as such is subject to development contributions for community and service infrastructure located throughout the City of Busselton. Development contributions become payable upon subdivision or development in accordance with the provisions of LPS 21 and SPP 3.6. This amendment does not propose to alter the DCA.

2.4 Scheme Special Provision Areas

This Scheme Amendment report proposes to include new 'Special Provision Area No. 76' in Schedule 3 to ensure that the intent of the Leeuwin-Naturaliste Sub-regional Strategy (LNSS) is reflected in LPS 21, and the site features are sufficiently addressed by the Structure Plan. It is proposed for the Special Provisions to require the following information to be included in the Structure Plan:

- A water management report addressing the land to the south of the Special Provision Area, as required for this site by the LNSS;
- Measures to manage risk from coastal inundation, as required for this site by the LNSS;
- Open space requirements, as required for this site by the LNSS;
- Measures to retain, manage and enhance environmental values, address linkages with similarly important remnant vegetation on adjoining land, and ensure that the habitat function of these areas are maintained or enhanced, as required by the City of Busselton;
- Provision of vegetated buffers between development and adjoining main roads, as required by State Planning Policy 6.1 Leeuwin-Naturaliste Ridge; and
- Provision of safe and efficient movement of pedestrians and cyclists to and from the Special Provision Area, as required by the City of Busselton.

A final Special Provision is proposed to require Local Development Plans to be prepared addressing the location of parking and access areas for Lots 12 and 402 and amenity, landscape and visual management for Lots 12, 14, 15 and 402, as required by the City of Busselton.

PART 3 – AMENDMENT PROPOSAL

The purpose of this Scheme amendment to LPS21 is to facilitate subdivision and development (urbanisation) of the Abbey South area through implementation of the Abbey South Structure Plan. Specifically, this proposal is to amend the Scheme Map by:

a) Inserting 'Special Provision Area No. 76' into Schedule 3 of the Scheme; and
b) Amending the Scheme Map by:
    i) replacing the 'Rural' and 'Conservation' zones over Lots 4, 12 and 402 Caves Road and Lots 14 and 15 Bussell Highway, Abbey with the 'Urban Development' zone; and
    ii) amending the boundary of the Landscape Value Area to align with the west, south and east boundaries of Lot 4 Caves Road, Abbey.

This Scheme amendment is consistent with the strategic direction for the subject area set out by applicable planning framework documents, including the Leeuwin-Naturaliste Sub-Regional Strategy, Statement of Planning Policy 6.1 Leeuwin Naturaliste Ridge Policy and the City of Busselton Local Planning Strategy.

The Planning Investigation Area process initiated pursuant to the Leeuwin-Naturaliste Sub-Regional Strategy resulted in the subject area being designated as 'Urban' and 'Open Space Investigation' under the Strategy, with the 'Open Space Investigation' designation to be resolved through the structure planning process. Now that the Structure Plan has been prepared, it is the appropriate time to rezone the subject area to enable development to occur in accordance with the Structure Plan.

3.1 Need for Scheme Amendment

Land supply and housing availability and affordability are significant issues in Busselton, and delivery of the Abbey South Structure Plan will help to relieve the current underlying market stresses causing these issues. The subject area is well suited for urbanisation from a delivery perspective, noting the following:

- The first stages of the Structure Plan can feasibly be delivered to the market within 1-2 years of approval, with a forecast yield of around 350-400 dwellings at full development.
- The large majority of the subject area is in single ownership, and landowners of nearly 90% of the subject area are interested in actively developing their land, ensuring that ownership and fragmentation will not be a constraint to ongoing delivery.
- There is currently high demand for fill and low supply in the south west, and as site levels generally sit at around 2.5m – 3m AHD, the amount of fill required to achieve flood clearance and servicing requirements is limited compared to other expansion areas around Busselton.
- All essential service infrastructure is "at the front door" of the subject area, reducing upfront construction and headworks costs and increasing the certainty of project costs for developers.

- The majority of the subject area is not constrained by complex environmental or flooding issues which could delay its delivery to the market.
- Proximity to the coast and existing commercial and tourist uses create opportunities for a mix of housing densities / typologies that does not exist in other greenfield areas.

This Scheme amendment is intended to unlock land that is comparatively simple to develop for urban (primarily residential) purposes, without unduly impacting on surrounding land uses, developments and environmental values.

3.2 Intent

The intent of amendment a) to the Scheme is to ensure that the intent of the Leeuwin – Naturaliste Sub-regional Strategy is reflected in LPS 21, and the site features and strategic planning framework requirements that relate to this site are sufficiently addressed by the Structure Plan and Local Development Plans where required.

The intent of amendment b i) to the Scheme is to enable the head of power contained within Clause 3.4.3 of the Scheme to be used to give the Structure Plan statutory effect over the subject area, and to deliver on the endorsed strategic vision for the site as expressed in the Leeuwin – Naturaliste Sub-regional Strategy.

The intent of amendment b ii) to the Scheme is to acknowledge that urbanisation of the southern portion of Lot 4 Caves Road, as enabled by the Structure Plan, will change the landscape from rural to urban and therefore no longer align with the intent of the Landscape Value Special Control Area. The Structure Plan has been designed to respond to the relevant environmental and landscape values of the subject area, and it is therefore appropriate for these values to be managed through application of the Structure Plan instead of LPS21.

Amendment b ii) will also improve the efficiency of the City's regulation of subdivision and development of the subject area. Clauses 5.4 and 6.1(b)(iii) of LPS21 require development approval to be obtained for all development and clearing of vegetation proposed within the Landscape Value area. Although the Structure Plan has been designed to maximise retention of vegetation, some vegetation will need to be cleared. It is most appropriate for management of this clearing to occur through the subdivision conditions clearance process, with the development application process being duplicative in this context. Similarly, it is most appropriate for single houses that meet the deemed-to-comply requirements of State Planning Policy 7.3 – Residential Design Codes Volume 1 to be assessed through the building permit process, with the development application process also being duplicative in this context.

PART 4 – CONCLUSION

This Scheme amendment will facilitate development of the Abbey South precinct, in line with previous investigations demonstrating that urbanisation of the subject area is appropriate. This amendment will enable further detailed planning to be undertaken for the subject area under the Abbey South Structure Plan, and ultimately urbanisation of the area consistent with orderly and proper planning principles. The only modifications proposed to LPS21 are to the Scheme map over the subject area, and insertion of Special Provision Area No. 76 to Schedule 3.

Rezoning of the subject area to 'Urban Development', removal of the Landscape Value Special Control Area and insertion of Special Provision Area No. 76 will provide a head of power for the Structure Plan and streamline the process for further detailed planning to be undertaken. This Scheme amendment and the Structure Plan are consistent with the State and Local level strategic planning frameworks that apply to the subject area.

Urbanisation of the subject area will enable the Busselton township to grow in an orderly and considered manner, while maintaining and respecting the environmental values and sense of place that are unique to the Busselton area.

PLANNING AND DEVELOPMENT ACT 2005

CITY OF BUSSELTON

LOCAL PLANNING SCHEME No. 21

AMENDMENT No. 55

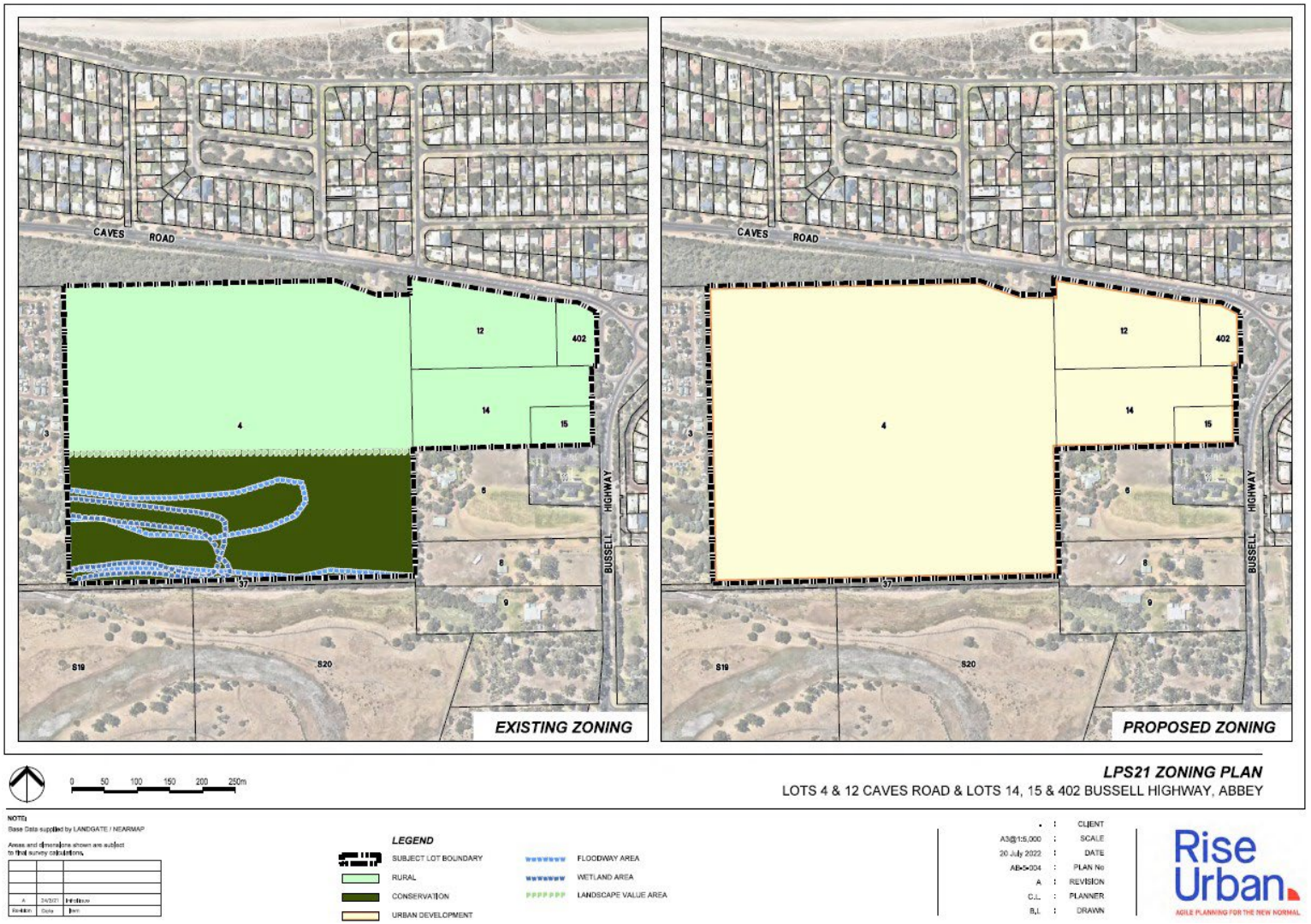
The City of Busselton under and by virtue of the powers conferred upon it in that behalf by the *Planning and Development Act 2005* hereby amends the above local planning scheme by:

a) Inserting 'Special Provision Area No. 76' to read as follows –

No	Particulars of Land	Zone	Special Provisions
SP76	As identified on the Scheme map	Urban Development	4. A single structure plan is to be prepared for the entire Special Provision Area. 5. In addition to the information to be included in a structure plan outlined in Clause 16 of the Deemed Provisions, the structure plan is to set out the following: vii. A water management report that takes into consideration the land to the south and addresses all water-related matters relevant to the proposal. viii. Measures to manage risk from coastal inundation. ix. Open space requirements. x. Measures to retain, manage, and enhance environmental values associated with the Special Provision Area including remnant vegetation, potential habitat for Commonwealth and State listed threatened fauna species, ecological linkages and wetlands, within 'public open space', road reserves, and/or conservation areas (as identified on the Structure Plan). Such measures are required to also address linkages and connectivity with contiguous areas of similarly important remnant vegetation on land adjoining the special provision area as well as management measures to ensure the habitat functions of these areas are maintained and, where possible, enhanced. xi. The provision of vegetated buffers to ensure appropriate visual screening and separation of development from main roads adjoining the Special Provision Area. xii. Measures to provide for the safe and efficient movement of pedestrians and cyclists to, from,

			and within the Special Provision Area, including crossings of main roads adjoining the Special Provision Area. 6. A Local Development Plan is to be prepared on Lots 12 and 402 Caves Road and Lots 14 and 15 Bussell Highway to address: i. Location of car parking, pedestrian access and vehicular/service access areas for development where adjacent or located on Lot 402; ii. Amenity of the locality and surrounds; and Landscape values and visual management considerations.

b) Amending the Scheme Map by:
   i) replacing the 'Rural' and 'Conservation' zones over Lots 4, 12 and 402 Caves Road and Lots 14 and 15 Bussell Highway, Abbey with the 'Urban Development' zone; and
   ii) amending the boundary of the Landscape Value Area to align with the west, south and east boundaries of Lot 4 Caves Road, Abbey.


CAVES ROAD
BUSSELL HIGHWAY
EXISTING ZONING
PROPOSED ZONING
0 50 100 150 200 250m
LPS21 ZONING PLAN
LOTS 4 & 12 CAVES ROAD & LOTS 14, 15 & 402 BUSSELL HIGHWAY, ABBEY
NOTE:
Base Data supplied by LANDGATE / NEARMAP
Areas and dimensions shown are subject to final survey calculations.
LEGEND
SUBJECT LOT BOUNDARY
RURAL
CONSERVATION
URBAN DEVELOPMENT
FLOODWAY AREA
WETLAND AREA
LANDSCAPE VALUE AREA
CLIENT
SCALE
DATE
PLAN No
REVISION
PLANNER
DRAWN
Rise Urban
AGILE PLANNING FOR THE NEW NORMAL

ADOPTION

Adopted by resolution of the Council of the City of Busselton at the Meeting of the Council held on the

…… day of …….. 20……

……
MAYOR

……
CHIEF EXECUTIVE OFFICER

FINAL APPROVAL

Adopted for Final Approval by resolution of the City of Busselton at the Meeting of the Council held on the …… day of …… 20…….. and the Common Seal of the City of Busselton was hereunto affixed by the authority of a resolution of the Council in the presence of:

……
MAYOR

……
CHIEF EXECUTIVE OFFICER

Recommended/Submitted for Final Approval

……
Delegated under S.16 of the
Planning & Development Act 2005

Date ……

Final Approval Granted

……
HON. MINISTER FOR PLANNING

Date ……

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

No.	NAME & ADDRESS	NATURE OF SUBMISSION	COMMENT	RECCOMENDTATION
1	Environmental Protection Authority Prime House, 8 Davidson Terrace Joondalup WA 6027	1. The Environmental Protection Authority (EPA) has considered the scheme amendment in accordance with the requirements of the *Environmental Protection Act 1986* (EP Act). The EPA considers that the scheme amendment is unlikely to have a significant effect on the environment and does not warrant formal assessment under Part IV of the EP Act. The EPA has based its decision on the original referral documentation and additional information provided by the City of Busselton (the City) for this amendment. 2. Flora and Vegetation and Terrestrial Fauna: The amendment area has historically been utilised for agricultural purposes (grazing) and as such, consists of mostly cleared rural land with some remnant trees scattered across the paddocks and along lot boundaries. An area of dense vegetation within the Caves Road reserve abuts the northern boundary of the amendment area and is likely to provide habitat for the Western Ringtail Possum (listed as Critically Endangered under the *Biodiversity Conservation Act 2016* and *Environment Protection and Biodiversity Conservation Act 1999)*. 3. The amendment proposes to insert provisions at Schedule 3 of the Scheme, to assist in managing native vegetation and fauna habitat through structure planning processes. The provisions require the preparation of a structure plan that sets out 'measures to retain, manage, and enhance environmental values associated with the Special Provision	1. Noted. 2. Noted. 3. Noted.	1. Modifications 1, 3, 8 and 14, as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		Area including remnant vegetation, potential habitat for Commonwealth and State listed threatened fauna species, ecological linkages and wetlands, within 'public open space', road reserves, and/or conservation areas (as identified on the Structure Plan).' The provisions also require that these measures address linkages and connectivity with lands adjoining the amendment area, and detail management measures to maintain and enhance the habitat functions of these areas.		
		4. The EPA supports the proposed provisions and provides the following additional advice: The EPA considers that the remnant vegetation within the amendment area, particularly the connected vegetation along the lot boundaries, may provide some habitat value and/or a corridor for localised fauna movement. It is noted that the referred structure plan proposes to retain much of the vegetation around the perimeter of the amendment area, and some within future Public Open Space (POS) areas. The EPA supports the further retention of existing vegetation and mitigation measures (such as rope bridges), particularly in areas providing canopy connectivity, and recommends that future development of the amendment area incorporates planting of preferred Western Ringtail Possum habitat species within the POS areas.	4. Noted. The SP will be modified to Include requirement for the preparation of a 'Street Tree Implementation Plan' at the subdivision stage to ensure that the Streetscape Planting Strategy contained in the Structure Plan is enacted to the satisfaction of the City. This strategy includes WRP habitat species.	
		5. The EPA notes and supports the proposed construction of northern access to Caves Road over an existing driveway	5. Noted. The road connection is now proposed further to the East to align with the	

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		footprint, to avoid clearing of Western Ringtail Possum habitat within the Caves Road reserve. 6. The EPA notes that implementation of the scheme amendment may result in indirect impacts including noise, dust and/or light emissions to adjoining areas of native vegetation and fauna habitat, and potential disturbance to Western Ringtail Possum individuals residing in these areas. Accordingly, the EPA recommends a fauna management plan (or similar) is prepared prior to works commencing, describing how potential impacts from construction and development will be mitigated and managed (e.g. fauna spotting, fencing, traffic calming measures, dust and noise amelioration). 7. Inland Waters and Coastal Processes. The amendment area contains portions of five mapped Multiple Use Wetlands (UFIs: 39, 41, 63, 64, 13195) which are subject to intermittent waterlogging. A large portion of the amendment area is within the mapped 1 in 100 Annual Exceedance Probability (AEP) Floodplain Development Control area for the 'Vasse-Wonnerup Estuaries, Broadwater and New River – Busselton.' The southern portion of the site is also within the mapped Floodplain Area and Floodway and Fringe Area for the Broadwater Nature Reserve Swamp (BNRS), located approximately 100m south of the amendment area boundary.	existing road network to the north. A further modification is proposed to minimise the impact of the road connection on the WRP corridor. 6. Noted. The Environmental Assessment and Management Strategy appended to the Structure Plan identifies that management of fauna will be given detailed consideration at subdivision stage. 7. Noted. 8. The LWMS provides that the predevelopment hydrological regime will be maintained and water quality will be improved through the removal of cattle grazing and the introduction of bio-retention areas to remove / reduce nutrient loading. The proponent is working with DWER and the City to rectify	

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		8. The EPA considers that implementation of the scheme amendment may result in a modified hydrological regime and reduced water quality discharging to the Buayanyup River Main Drain. 9. As above, it is noted that the amendment proposes to insert provisions at Schedule 3 of the Scheme, including a requirement for structure plans to include a water management report that 'takes into consideration the land to the south and addresses all water-related matters relevant to the proposal.' The EPA supports this provision and provides the following recommendations to further mitigate potential impacts from future development of the amendment area. 10. The EPA notes and supports the proposed exclusion of development within the mapped floodway areas, and most of the mapped wetland areas, by retaining them within future Public Open Space. However, the EPA notes that wetland buffers have not been discussed within the referral documentation. It is recommended that further consultation is undertaken with the Department of Biodiversity, Conservation and Attractions regarding the management of potential impacts and the application of buffers to further protect the wetlands. Consultation regarding the water management report should also be undertaken with the Department of Water and Environmental Regulation.	issues raised with the LWMS. A modification has been included in Attachment G to ensure all outstanding matters are addressed prior to WAPC determination of the SP. 9. Noted. 10. Noted. Modify Plan A: Structure Plan Map and Table 1 – Land Use Summary, to include the following buffer areas, in addition to existing Public Open Space provision: - A 10 metre to 30 metre wide landscaped Reserve (Recreation) to provide a transitional area from the boundary of the floodway area, with the exception of the existing dwelling.	

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		11. The EPA considers the proposed amendment as an opportunity to enhance the environmental value and function of the wetland areas as part of future development. Revegetation of the wetlands with native riparian species, and trees where suitable, may provide for improved water quality outcomes and assist in stormwater management, whilst also providing habitat.	11. Noted. The buffer area shall be appropriately revegetated with native plant species to enhance their function as wildlife corridors.	
		12. The EPA notes the requirement to fill portions of the amendment area to 3m AHD prior to development, to meet the coastal erosion hazard requirements under the City's *Coastal Hazard Risk Management and Adaptation Plan* (2022).	12. Noted.	
		13. Social Surroundings. The referral documents note that a lodged Aboriginal Heritage Site (ID: 5337) slightly overlaps a western portion of the amendment area and is likely to be associated with the Vasse Drain. The EPA recommends appropriate consultation, investigation and relevant management plans be undertaken prior to subsequent stages of planning to address potential impacts to Aboriginal heritage values. Such stages of planning should also be considered in accordance with the requirements of the *Aboriginal Cultural Heritage Act 2021* and the *Aboriginal Heritage Act 1972* (transitional period).	13. Noted. This was not deemed necessary at structure plan stage and will be further considered at the subdivision stage.	
		14. The EPA concludes that the scheme amendment can be managed to meet the EPA's environmental objectives for the above factors through the proposed scheme provisions.	14. Noted.	

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		Future planning requirements, and other statutory processes are also able to manage potential impacts. The EPA recommends its advice is implemented to further mitigate potential impacts to the above factors.		
2	Main Roads Western Australia PO Box 5010 Bunbury DC WA 6231	1. The proposal raises a number of network planning concerns which has not been addressed to Main Roads' satisfaction. In particular, Main Roads has concerns with the proposed external road connections onto Caves Road and Bussell Highway from a traffic safety and efficiency perspective. 2. Main Roads supports the expansion of the PIA boundary to accommodate a full movement primary access onto Bussell Highway to achieve a more efficient external movement network generally and to reduce traffic demands onto Caves Road, and to minimise environmental impacts associated with provision of road infrastructure requirements onto Caves Road. It is recommended that further investigation occur on Bussell Highway access in consultation with Main Roads. 3. The residential properties on the north of Caves Road benefit from and extensively utilise the existing right turn treatments and the painted median for right-turn storage. Main Roads note that the Proponent's position on this particular matter is that the painted median should be utilised for turn treatments, where required, and not be 'reserved' for general median storage purposes. Main Roads considers that one of the primary functions of a median reduces potential for vehicle conflicts that would otherwise be a significant issue to manage.	1. The proponent, Main Roads WA and City have subsequently developed revised intersection designs to improve traffic, safety and property access outcomes, as well as the provision of safe and efficient crossing facilities for pedestrians and cyclists.	1. Modifications 1, 3, 8, 9 and 13, as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		4. In this regard it is also noted that the proposed right turn treatments do not comply with relevant Austroads standards. 5. Network planning principles require any access to be justified on the basis of demonstrated traffic demands only and not to facilitate individual property development prospects (as proposed). 6. Lot 402 is identified as the proposed 'Local Centre' for the structure plan area and is currently accessed from Skiff Way. Main Roads has previously expressed in-principle concerns with the change in land use to commercial purposes given the access/network planning challenges that the property introduces due to its location at a rotary junction of two main roads and long term impact on the operation of the Monaghans rotary from a safety and operational perspective. Main Roads notes a number of crashes has been recorded at the rotary location which varies in type and intensity. 7. Main Roads considers that it would be appropriate to provide the local centre (Lot 402) with internal road frontage to the structure plan area to reduce traffic demands on Skiff Way and the Monaghans Rotary. This would include the closure of the northern end of Skiff Way and the existing driveway onto Caves Road. It is requested that the existing driveway for Lot 402 on Caves Road be decommissioned and removed at the earliest opportunity. 8. Main Roads wish to advise that no individual direct driveway access will be agreed to for the lots abutting Bussell Highway and all lots with frontage onto Bussell		

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		Highway will required to be internally accessed from the internal structure plan roads. 9. The introduction of 'back-to-back' turn treatments generally will impact the available use of/storage available in the median and introduce significant potential for traffic conflict to occur as some vehicles could be waiting in the through lanes to turn into their driveways on the north side and/or some may be waiting within the turn treatment itself to turn into their property driveway which will result in deficient deceleration conditions/stopping distances for vehicles intending to use/enter the turn treatment to turn right into the number of existing side roads on Caves Road. 10. The proposed road junctions onto Caves Road also requires a left turn treatment and insufficient road reserve width is available to accommodate such a treatment for the eastern access. Also, the proposed left-in-left out on Bussell Highway could raise further potential issues, including masking of existing access and driveways, potential future stacking issues from being located close to the roundabout, and the potential for rear-end crashes due to the lack of space for a slip lane/turn treatment. Main Roads' principle concern is to maintain traffic safety and function of the main roads. 11. Main Roads' current position remains that it would be appropriate for a single roundabout access to be developed for the PIA precinct in a suitable location on Caves Road to address its current concerns for Caves Road corridor. 12. Given the above, Main Roads does not support the current access approach/strategy onto Caves Road and Bussell		

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		Highway and recommend that further investigation be undertaken to determine all available access options, including provision of a roundabout(s) and expansion of the PIA boundary. 13. It is important to note that the Proponent has utilised traffic data/volumes from a remote counter location located a significant distance to the west of the PIA for analysis purposes which does not account for the existing traffic from the residential precinct to the north of the PIA or other residential (Siesta Park locality) and tourism developments to the west, and is therefore not deemed appropriate for traffic analysis/modelling purposes. It is considered necessary, in the first instance, to review the traffic data in the TIA to ensure that an appropriate/agreed 'base case' scenario is established for the purposes of further traffic analysis and modelling with development traffic, but also to provide a more representative traffic context for review of the potential impacts of the proposed access arrangements on the existing movement network and access arrangements for properties with direct vehicle access onto Caves Road. It is recommended that a separate off-line technical discussion between Main Roads and the Proponent's traffic engineering consultants be arranged to derive agreed traffic data for use in an updated TIA. 14. The Proponent has recently enquired whether there is potential to reduce the current speed zones on the external road network surrounding the PIA and Main Roads wish to advise that the current 70km/h speed zone on Caves Road will remain, however, there is potential scope for the		

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		80km/h speed zone on Bussell Highway to be reduced to 70km/h in the future. Main Roads also wish to advise in relation to the timing of the Vasse – Dunsborough Link road, that this proposal is still in the planning study stage and not funded for construction yet (i.e. not on the current 10 Year Capitol Works Program). Depending on availability of funding the VDL could be delivered in the 15 to 20 year network planning horizon. 15. Main Roads wish to confirm that any road widening associated with the proposal should be ceded free of cost to the Crown, due to the increase in traffic demands that would be generated by the new urban precinct, consistent with WAPC decisions elsewhere. 16. It is noted that the Draft Structure Plan defers the requirement for a Traffic Noise Assessment to the subdivision stage. It is recommended that a Traffic Noise Assessment be prepared prior to determination of the Draft Structure Plan once traffic volumes on the external road network have been agreed. 17. Given the issue identified with the PIA boundary and the access issues identified for Caves Road, it would be appropriate to arrange a meeting with the DPLH to discuss the matter in order to determine a way forward for agreement to an access strategy for the planning precinct.		
3	Department of Education 151 Royal Street East Perth WA 6004	1. Public schools surrounding the Abbey vicinity are either approaching or operating at accommodation capacity under current circumstances. The Department notes the proposed Structure Plan anticipates a yield of 350 – 400 dwellings and	1. Noted.	1. That the submission be noted.

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		therefore student accommodation capacity issues may be experienced in the short to medium term. 2. Notwithstanding this, the Department acknowledges a future public primary school, 'Vasse West Primary School' (planning name) is nominated within the Vasse Structure Plan. The future school is expected to accommodate the student demand from this proposal. 3. The Department will continue to closely monitor the student enrolment demand within the vicinity to ensure that public education needs are adequately met in accordance with the provisions of the Western Australian Planning Commission's Operational Policy 2.4 – Planning for School Sites.		
4	Department of Fire and Emergency Services Land Use Planning 20 Stockton Bend Cockburn Central WA 6164	Policy Measure 6.5 a) Preparation of a BAL Assessment: 1. Vegetation Classification Vegetation plot 4 cannot be substantiated as Class D Scrub as there is no photographic evidence provided in the BMP. Vegetation Plots 5 and 6 also cannot be substantiated as Class D Scrub with the evidence available. Photo IDs 6 & 7 show what appear to be large trees and foliage cover that appears to exceed 30%. No height sticks or alternative evidence supporting the height have been provided in the BMP. The BMP should detail specifically how the Class D Scrub classification was derived as opposed to as Class B Woodland or Class A Forest. If unsubstantiated, the vegetation classification should be revised to consider the vegetation at maturity as per AS3959:2018, or the resultant BAL ratings may be inaccurate. *Modification to the BMP is required.*	1. Noted. Modification required in accordance with DFES recommendation.	1. Modification 15, as contained in Attachment G – Schedule of Modifications, is required to address matters raised in the submission.

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		2. It is noted that Vegetation Plots 11 and 12 relate to Public Open Space to be created and that the BMP indicates a conservative approach has been taken in classifying the areas. Sufficient information should be provided to ensure that management will be undertaken in perpetuity. *The decision maker to be satisfied with the vegetation exclusions and vegetation management proposed.* 3. Vegetation Exclusion – Plots 4 & 5 Figure 4 (Post Development Vegetation Map) and Figure 5 (BAL Contour Plan) exclude Plots 4 and 5 referencing, respectively, AS3959 clauses 2.2.3.2c and b. DFES does not agree that the criteria provided for in AS 3959 are applicable to these lots. In particular: • Plot 4 appears to be within 20m of the development site so is not excludable under 2.2.3.2c; and • Plot 5 is over 1ha and is within 100m of classified vegetation so is not excludable under 2.2.3.2b. The vegetation exclusion is not supported by an enforceable mechanism. If unsubstantiated, the vegetation classification should be revised to consider the vegetation at maturity as per AS3959 and should be reflected in the relevant plans. *Modification to the BMP is required.* Policy Measure 6.3 c) Compliance with the Bushfire Protection Criteria: 4. Location, Siting and Design	2. DFES comments are noted, the City is supportive of the classification of Plots 11 and 12 and the associated management requirements. 3. Noted. Modification required in accordance with DFES recommendation. 4. Noted. Internal public roads have been designed to allow	

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		A1.1 & A2.1 – not demonstrated. The BAL ratings cannot be validated for the reasons outlined in the above table. The assessment at this level should inform the design and layout of subdivision and reduce the vulnerability of people and property form the impact of bushfire. The BAL Contour Map identifies areas of BAL-40/FZ within developable areas (residential) of the structure plan. The BMP acknowledges that the site has the potential for lots in BAL40/FZ. Strategic planning should provide for creation of lots not exposed to above BAL-29. In this case, siting and design should incorporate additional hazard separation from bushfire hazards through use of roads and managed public open space separating bushfire hazards and future development. There is an opportunity to review and redesign the structure plan to ensure all development is located in areas of BAL-29 or below without reliance on building setbacks at later planning stages. This could be achieved by the use of public roads or by a mechanism requiring management of future public open spaces to reduce the bushfire hazard. There is an opportunity to review and redesign the Structure Plan to achieve compliance with A1.1 and A2.1. *Modification to the BMP is required.* 5. Vehicular Access A3.3 – not demonstrated. Two permanent no-through roads and two temporary no-through roads are presented in the BMP. In bushfire prone areas, a cul-de-sac subdivision layout is not favoured because they do not provide access in different directions for residents. It is also noted that connection of the temporary no-through roads is reliant on	for additional area to provide for development sites at BAL 29 or below. Further front setbacks will provide additional separation. The site that is BAL 40/FZ requires a Local Development Plan that will address future bushfire requirements. 5. Secondary access is provided onto Bussell Highway and implementation is to be assessed further at subdivision stage. The function and management of this emergency egress will be confirmed as part of the	

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		development of land outside the control of the proponent and therefore has no timeframe / commitment for removal. A3.3 provides for including no-through roads only where it is demonstrated that no alternative road layout exists due to site constraints. The BMP does not provide evidence to support this and therefore DFES recommends that through roads are incorporated throughout the area. Evidence should also be provided that access will be provided for all lots at all future stages of planning. *Modification to the BMP is required.* 6. A3.4 – not demonstrated. In bushfire prone areas, lots with battle-axe access legs should be avoided because they often do not provide two-way access and egress for residents. DFES suggests the structure plan should be modified to ensure through access thereby avoiding need for a dead-end road. 7. A3.4 allows for roads to be set back from the perimeter under certain circumstances. There is a reliance on management of neighbouring properties to ensure that lots are not created in areas of BAL-40/FZ and the use of perimeter roads in these areas would remove this reliance. *Modification to the BMP is required.* 8. Recommendation - Compliance with Acceptable Solutions not demonstrated, modifications required. The scheme amendment and BMP have not adequately identified issues	detailed landscape design and implementation of the Bushfire Management Plan at subdivision stage. 6. Street blocks designed to avoid battle-axe lots and higher density achieved through side by side development. Subdivision is limited by density control on the 'peninsula' which is serviced by cul-de-sac due to the presence of a floodway. An emergency access route is provided to improve east – west access across the site. 7. The adjoining Caravan Park (Lot 3, 97 Caves Road Abbey) is managed land and is subject to Category 2 Firebreak and Fuel hazard reduction Notice. This comment is supported in terms of unrealistic requirements of land management for adjoining Lot 6. Modification to road layout to create perimeter	

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		arising from the bushfire hazard level assessment and considered how compliance with the bushfire protection criteria can be achieved at subsequent planning stages. The BMP has highlighted potential future issues to address before the Subdivision stage and any future BAL40/BAL FZ lots should be avoided and no through roads and cul-de-sacs should also be avoided. The decision maker should be satisfied the measures can be achieved. If the above bushfire management measures cannot be confirmed the outcomes within the BMP may be inaccurate.	road to increase separation and retain existing vegetation within road reserve that is present along boundary. 8. Noted.	
5	Department of Mines, Industry Regulation and Safety (DMIRS) 100 Plain Street East Perth WA 6004	1. The proposal raises no significant issues with respect to mineral and petroleum resources, geothermal energy, and basic raw materials. 2. DMIRS lodges no objections to the above LPS amendment and SP.	1. Noted.	1. That the submission be noted.
6	Water Corporation (Water Corp) PO Box 100 Leederville WA 6902	1. Drainage It should be noted that the Local Water Management Strategy (LWMS) attached to the proposed Abbey South Structure Plan is not correct and therefore both should not be accepted in their current state. 2. The subject area falls within the Busselton Drainage District, a rural drainage system. Developments within this catchment are required to contain the flows from a one in one-hundred-year storm event on site. Discharge to Water Corporation drains must be compensated to pre-development levels. The LWMS claims that it has complied with these conditions. But the Water Corporation considers	1. Noted. The proponent is working with DWER and the City to rectify issues raised with the LWMS. A modification has been included in Attachment G to ensure all outstanding matters are addressed prior to WAPC determination of the SP. 2. Noted.	1. Modification 14 in Attachment G – Schedule of Modifications is required to address the LWMS updates.

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		that the LWMS has failed to demonstrate these conditions have been met for the following reasons. 3. The estimate of 1% AEP peak predevelopment discharge obtained through modelling is high compared to many similar catchments. An indicative 1% AEP peak flow from a 30.5ha catchment would lie in the range of 0.2m3/s to 0.4m3/s. 4. Groundwater levels have been based on limited monitoring of seasonal level for only two years. As the Department of Water and Environmental Regulations requires, this monitoring data to be correlated to a nearby station where long-term data is available and the most likely maximum groundwater level would need to be identified. Any increase in reviewed groundwater level will require redesigning soak wells, Bio retention Area (BRAs), Flood Storage Areas (FSAs) and other drainage components. 5. The LWMS assumes a permeability of 4m/day for imported soil. However, when soak wells, BRA's and FSAs start infiltrating into the soil, it will become clogged, and the permeability will go down. A value of 1m/day is recommended. Considering all the above the soak wells, BRAs and FSAs need to be resized. 6. Wastewater Reticulated sewerage is currently available in the area. But upgrades to the scheme may be required. As shown in Appendix B of the Engineering Servicing Report the Water Corporation informed that "… the development for 300	3. Noted. Refer comment 1 above. 4. Noted. Ground water monitoring is ongoing. 5. Noted. Urban Water Management Plan to be prepared for entire Structure Plan Area at Subdivision stage. Post compaction testing required to confirm permeability compliance. 6. Noted. The proponent has been notified.	

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		residential houses residential houses can be accommodated by the proposed DN150 gravity network …" But the Abbey South Structure Plan Part 2 - Section 4.4 states " The Structure Plan has the potential to yield approximately 350 - 400 dwellings at full development." But it should be noted that the gravity network also needs to service the remainder of the Pump Station catchment. Therefor it is quite likely that upgrading of the current system may be required. The Water Corporation will therefore need to undertake a review of the scheme to determine what upgrades, if any, are required. The developer should contact the Water Corporation so that a review of the scheme can take place. 7. The developer is expected to provide all sewerage reticulation required for the development site. They should be laid within the existing and proposed road reserves, on the correct alignment and in accordance with the Utility Providers Code of Practice. In addition, the developer may be required to fund new works or the upgrading of existing works and protection of all works.	7. Noted. The proponent has been notified.	

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

7	Department of Water & Environmental Regulation PO Box 261 Bunbury WA 6231	1. Other than the comments on the LWMS there are no additional comments on the stricture plan report, however in resolving the outstanding items in the LWMS there may be knock on effects on the structure plan and associated reports. Importantly, there are matters that require consideration that may impact the ability to achieve the structure plan objectives, these include: • Analysis of groundwater conditions and how this may affect proposed stormwater infrastructure elevations and sizing, and the cycle path and outcome for the proposed R10 portion. • Availability of sand supplies and whether relevant assumptions have been made of its permeability and how this may affect proposed groundwater and stormwater infrastructure sizing and locations. • Stormwater modelling assumptions and how this may affect proposed stormwater infrastructure sizing. • The need for irrigated POS, and requirements to secure a groundwater allocation in a fully allocated system. • Consideration local flood impacts due to changed discharge volumes, noting that there is a risk of cumulative impacts in view that the land to the south is also proposed to be developed. • Whether sufficient effort is being made to comply with Special Provision 2iv of Scheme Amendment 55.	1. Noted. The majority of the issues raised are the subject of ongoing work between the proponent, the City, and the relevant state agencies. It is expected that resolution of the outstanding matters is achievable prior to WAPC consideration of the SP.	1. Modifications 1, 2, ,5, 11 and 14, as contained in Attachment G – Schedule of Modifications, are required to address several matters raised in the submission relating to the LWMS, wetland and floodway buffers, cycle path alignment, POS provision and management, and R10 Lots.

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		2. The Perth groundwater map was developed to help determining locations and depths needed for garden bores in the Perth metropolitan area, and it is not an appropriate resource for Busselton. Of note the Busselton Shallow - BN16S, with a screen inlet at 2.6 to 5.6 m BGL, is located less than 1km to the south east. While the lithology of this bore has not been assessed it is noted that seasonal peak GWLs in 2015 and 2016 were approx. 0.4m higher than in 2021. Noted. The second round of GWL monitoring was undertaken in 2022, providing greater insight into peak GWLs and included in the LWMS. The 2021 peak GWL remain the peak at all monitoring bores. It is also noted that the proximity of the site to the coast line will be reflected in GWLs due to coastal fluctuations. "BN16S also had lower levels (approx. 0.2m) for 2022 relative to levels in 2021, however the City has a policy of ensuring that infiltration systems have a separation of 300mm from the identified maximum likely groundwater level. Groundwater levels measured in BN16S in 2015 and 2016 were approx. 0.4m higher than in 2021. And it is unlikely that the variation in seasonal peaks of the superficial groundwater regime at this site will be influenced by the	2. Ground water monitoring ongoing. Final monitoring data to inform Urban Water Management Plan at subdivision stage.	

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		proximity to the coast. Due to being 400m plus away at its closest point and the relatively shallow superficial system. This has been verified by an analysis of observation bores SCPD24B and SCPD25B. More consideration is also suggested in that MW4 indicates the highest level, and relatively higher than MW1 even though being equal distance from the drain. It would be surprising if local topography and water features did not influence the groundwater contouring, which is not currently indicated. This could this be an anomaly and/or due to a locally perched system?		
		3. It is noted in Table 9 that the clearance from the minimum invert level of each infiltration systems is set at 300mm above the mapped 2021 onsite seasonal peak groundwater levels. Therefore, any increase in this level, will result in the City's required criteria not being met unless these structures are being underlain by subsoil to control groundwater. This will also result in much of the southern portion of POS3 being wet, and as such unusable by the community. The wet nature of this area, which will be kept at existing levels for flood management can be seen in aerial imagery. This will impact the ability to create a higher order cycle path, as shown on the structure plan. And may also create an undesirable outcome for the proposed R10 lots. In addition the road access to R10 will need	3. Noted. Modifications proposed to address the issued raised in the submission including POS inundation and buffers, coding of the R10 lots, and the alignment of the bike path.	

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		consideration in relation to how road access will be maintained to a standard acceptable to the City, while allowing connectivity for regional flood connectivity and storage. Further analysis of the groundwater regime and management approach, based on the above risks, is warranted." 4. Confirmation is required that the City would be accepting of a non-irrigated POS landscape strategy, in the event that a fit for purpose water source is not secured. Noting that the Superficial and Leederville groundwater resources are both fully allocated. Irrigation of POS area is not proposed within the Abbey South structure plan. Existing trees will be retained and if required a water cart will be used for any establishment of vegetation within the site. The City have stated that they will not support unirrigated POS and evidence of a secure fit for purpose water supply is required. 5. Retaining the 1% AEP on lot is not consistent with the City's stormwater policy. How will this be enforced at subdivision and lot development stages? Furthermore, assuming driveways will slope towards the road some discharge is likely to occur in the 20% and 1% AEP. In view of the flood risk for this development, the above two items will need to be confirmed as being acceptable to the City and it is recommended that as a minimum a	4. The Abbey South structure plan area will need to include POS with turf areas, therefore the City will not support unirrigated POS and evidence of a secure fit for purpose water supply is required. A modification has been proposed to remove any option for a non-irrigated landscape strategy. 5. Modification required to address matters raised in the submission as follows: • The retention of 1% AEP on residential lots is not supported by the City of Busselton and therefore updated stormwater modelling is required to be undertaken to the	

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		sensitivity analysis is undertaken due to the inability to hold the entire 20% and 1% AEP on lot interface with the road. In Section 6.2, text will be included detailing that the large lot sizes (typically between 500-600 m2) and the provision of soakwells to cater for the small event, lots will provide sufficient permeable area to facilitate infiltration within lots. A sensitivity analysis has been performed in the case that lots will not be able to retain the entire 20% and 1% AEP events within lot. The lot retention assumptions were changed so that there is no lot retention of the front yard (including driveway and footpath) - this area now directs all runoff towards the estate drainage (swales, BRAs and FSAs). The balance of lot is still fully retained on the basis that the lots are large and there is sufficient permeable area around the buildings to infiltrate any runoff which cannot be captured by soakwells. With lot assumptions having a contribution to downstream volumes, an additional 856 m3 will be directed to downstream storage areas in a 1% AEP event. Given that flood basins are only 1.0m deep these areas could still accomodate an additional 200mm there will be sufficient capacity within the site to accomodate the additional runoff. The peak flow rate will increase to 0.604 m3/s (which is still lower than the pre-dev peak flow rate of 1.1	satisfaction of the City of Busselton and the Department of Water & Environmental Regulation. • The requirement for the stormwater system to include sufficient retention and detention to accommodate additional drainage discharge from residential lots, so as not to result in a risk of increasing the flood levels in the area designated for management of catchment flood waters, and to allow for appropriate areas of active open space.	

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		m3/s) and the total volume discharging offsite will increase to 3724 m3 (which is marginally higher than pre-dev discharge volume of 3082 m3). The sensitivity analysis is acknowledged, including the ability of the proposed storage areas to manage the additional volumes. However, the amount of discharge off each lot has not been detailed so the coefficent of runoff can not be reviewed. It is recommended that the sensitivity analysis assesses up to 20% of lot areas discharging in the 20% and 1% AEP, as a minimum. In addition, the increase in the 1% AEP the total volume discharging offsite post development of 642m3 is a 20% increase, which is not deemed marginal. Special Provision 2i of Scheme Amendment 21 is relevant, and this increase needs to be considered in relation to the potential cumulative impacts of the area. Once the above has been resolved, taking into account any related items, such as connectivity to flood storage in comment 1 and fill criteria in comment 5, detail of the sensitivity analysis should be included in the LWMS, for future reference.		

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		6. It is stated that imported fill should aim to achieve a permeability of 4 m/day, yet the modelling report states that a hydraulic conductivity of 5 m/day is assumed. Furthermore no detail have been provided of any insitu permeability testing, noting the southern half of the site interfaces with the existing wetland which may have a lower permeability. The 4m/day recommendation is for general fill used across the site. The 5m/day model assumption is the permeability directly beneat the BRAs and basins - they are not the same thing. Note that BRAs also have a 50% clogging factor applied. Imported fill will be tested for permeability prior to bringing into the site, and if required the flood modelling could be revised to account for recommended design permeability. Note that Section 6.3.2.1 already specifies that flood modelling to inform designs should be revised according to the permeability rate of the fill utilised. The clogging factor for BRAs is noted and acknowledged. Section 6.3.2.1 states that "Imported fill will likely be utilised to achieve the minimum FFL required to facilitate appropriate vertical separation from major event flood levels in BRAs and FSAs. The specification for fill and proposed depths will likely also be influenced by the desired	6. To be resolved in the Urban Water Management Plan at subdivision stage.	

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		geotechnical classification, which is yet to be determined. Imported fill should aim to achieve a permeability of 4 m/day. Where a lower permeability specification of fill is adopted consideration of this should be made within surface runoff modelling, fill depth assumptions and any other aspects relying on infiltration." There is no discussion in the LWMS that an alternative fill is to be used for any of the infiltration devices, and the model assumption merely states that "A hydraulic conductivity of 5 m/day is assumed". This assumption would indicate 5 m/day has been applied to the entire area including BRAs (with a clogging factor), FRAs, swales, and soakwells. It is also relevant to consider available fill material in the area, the quality of sand for urban development is reducing and achieving 5 or 4 m/day once compacted is unlikely to be realistic. A permeability of 2 to 3 m/day is probably more realistic. Further clarification is required and should be included in the LWMS, noting a lower permeability will impact subsoil designs and may further impact off site discharge and as such may be relevant in relation to item 3. Imported fill should be tested in situ once placed.		

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		7. Consideration of both flow rate and volume is noted and supported for this development, to avoid cumulative impacts with the development to the south and in view of the constrained discharge into the Buayanyup Drain. 8. See comment 1 above, in relation to groundwater analysis. As mentioned in reponse to comment 1, the 2022 GWL monitoring did not record a higher peak than 2021, therefore Table 9 did not require revision of clearance As per comment 1. 9. Confirmation is required that development of the land zoned Conservation is acceptable by the City and DPLH. At the City of Busselton Council Meeting on 16th November, the Council resolved (unanimously) to initiate a scheme amendment to rezone the site from 'Rural' and 'Conservation' to 'Urban Development'. In a follow-up meeting with the City of Busselton planning officers following the Council meeting, Rise Urban (the project planner) confirmed the City's position, and they remain fully supportive of urban development within the 'Open Space Investigation Area' in Lot 4 (which aligns with the conservation zone). With regard to the DPLH position, it is our understanding that this will be worked through as part of the amendment process. The Department will reserve judgement on this matter until advice has been provided by DBCA.	7. Noted. 8. Ground water monitoring ongoing. To be verified and included in Urban Water Management Plan at subdivision stage. 9. Noted. DPLH have provided a submission addressing their position on the proposal. It is noted that the proposal will ultimately be assessed by the DPL and determined by the WAPC.	

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		10. Consideration is required of the connectivity with adjacent existing developed land. Specifically where, due to FLLs, retaining walls will be required and whether this will create a risk of increased groundwater expression and inundation on the lower lying adjacent land. The existing levels of the site and immediately adjacent site indicate 1-1.5m clearance from groundwater. There is therefore some measure of buffer if groundwater were to rise. Further, the existing floodway area will not be retained, thereby providing a pathway for both surface and groundwater to exit the site. In relation to groundwater, as per comment 1. Comments related to the existing floodway are assumed to mean "will be retained".	10. Noted. The LWMS shows no change to discharge rate and volume.	
		11. Noting the variation between existing ground levels, which are to be maintained to facilitate existing local drainage, and proposed FLLs of adjacent lots (and roads). The interface between the POS and roads/lots in the southern portion, where the existing 1% catchment floodway is to be maintained, requires more detail. Based on the structure plan and to maintain the floodway the current plan would require vertical retaining walls. Noted. This will need to be included in civil designs. To allow an informed assessment by the City, details are required of the likely retaining wall locations, lengths and heights. Once the City has determined their final position regarding	11. This interface has been addressed via the requirement via modification for a 10 metre to 30 metre wide buffer around the floodway. Details to be confirmed in UWMP at subdivision stage.	

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		this approach this detail should be included in the LWMS, and if accepted and where required should also reference the requirement for fencing (similar to comment 4). 12. There is no discussion of wetland buffers and looking at the landscape concept plans, the intention is for these areas to be incorporated into POS as opposed to enhancing any ecological and/or wetland function. Is this acceptable to the City and BDCA? The minor extent of weltands within the site are catergorised as Multiple Use wetlands. These do not typically require buffers and are not typically required to be retained for ecological or conservation purposes with specific management objectives or requirements. Notwithstanding it is the intention of the project to retain as much native vegetation as possible, and protect the hydrological functions of the features within the site - hence keeping the floodway features and also providing POS around these. Given the wetlands are Multiple Use the proponent is not going to self-propose a wetland buffer whose purspose is for conservation. Rather, they have elected to retain as much vegetation and function in these areas, and these are retained in POS. The Department will reserve judgement on this matter until advice has been provided by DBCA. After which the City will need to consider whether this minimalist approach for ecological	12. To address issues raised in submissions, officers have recommended modifications to the SP (included in Attachment G) to include a 10 metre to 30 metre wide landscaped buffer around the floodway. The buffer areas are primarily located in the area identified as an 'Open Space Investigation Area' in the LNSRS, and will be appropriately revegetated with native plant species to enhance their function as wildlife corridors. This may provide for improved water quality outcomes and assist in stormwater management, whilst also providing habitat. The location of the buffers will also reduce the amount of development on areas with	

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		function and corridors, with no enhancement, is acceptable and deemed to comply with special provision 2iv of scheme amendment 55. 13. The above comments need to be reviewed at the same time as reviewing LGA and DBCA comments, if there are any conflicts in LGA, DBCA and DWER comments it is expected that the consultant will mediate an agreed position. 14. All road reserves around the perimeter with swales are 20m wide, which is sufficient to accomodate the swales that are proposed. Text added in Section 6.2.2 "All road reserves where swales are proposed will be wide enough to accommodate the proposed swales.	medium to high likelihood of Acid Sulphate soils. 13. Noted. Consultation between parties has occurred where required. 14. Sufficient width has been confirmed.	
8	ATCO Gas Australia 81 Prinsep Road Jandakot WA 6164	1. ATCO Gas Australia (ATCO) has no objection to the proposed application, based on the information and plan provided.	1. Submission noted.	1. That the submission be noted.
9	Department of Health 189 Royal Street East Perth WA 6004	1. Water Supply and Wastewater Disposal. The development is required to connect to scheme water and reticulated sewerage and be in accordance with the Government Sewerage Policy 2019. Potable water must be of the quality as specified under the Australian Drinking Water Quality Guidelines 2011. 2. Public Health Impacts. DoH has a document on 'Evidence supporting the creation of environments that encourage healthy active living' which may assist you with planning elements related to this structure plan.	1. Noted. 2. Noted.	1. That the submission be noted.

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		3. Increased Density – Public Health Impacts. The City of Busselton should also use this opportunity to minimise potential negative impacts of the increased density development such as noise, odour, light and other lifestyle activities. Public health impacts draw attention to those issues, and they should be appropriately and adequately addressed at this stage. To minimise adverse impacts on the residential component, the City of Busselton could consider incorporation of additional sound proofing/insulation, double glazing on windows, or design aspects related to location of air conditioning units and other appropriate building/construction measures such as ensuring adequate ventilation requirements for wet areas. 4. Medical Entomology The subject land is in a region that regularly experiences significant problems with nuisance and disease carrying mosquitoes. These mosquitoes are known carriers of Ross River Virus (RRV) and Barmah Forest Virus (BFV). Human cases of RRV and BFV diseases occur annually in this general locality. The subject land is within 3km of mosquito dispersal distance from mosquito breeding sites at Locke Nature Reserve and Broadwater Nature Reserve. Mosquitoes will disperse from these sites to the subject land under favourable environmental conditions. There may also be seasonal freshwater mosquito breeding habitat within proximity to the subject land. Additionally, there is the	3. Noted. 4. City of Busselton environmental health officers have confirmed that a mosquito management plan will be required for the site, although this will be considered through the planning framework at subdivision stage.	

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		potential for mosquitoes to breed in on-site infrastructure and constructed water bodies if they are poorly designed. The above disease risks, as well as the lifestyle impacts of nuisance mosquitoes, will inevitably result in demands for the application of chemicals to control larval and/or adult mosquitoes. Environmental agencies may not automatically approve the use of such measures in and around environmentally significant wetlands. Therefore, it will be important that in-principle approval for effective mosquito control measures in and around these wetlands is obtained from the relevant environmental agencies before planning decisions are finalised. Prior to development, the DoH recommend a mosquito management plan (MMP) be developed and approved by both the Department and the City of Busselton to ensure the risk to the community of exposure to nuisance and/or disease carrying mosquitoes is considered. This MMP is to be approved by the local government and the Department prior to any development. In addition, due to the high-risk nature of the proposed development, the Department requires the following wording to be placed on all land title documents: "This lot is located near extensive mosquito breeding habitat and can experience substantial numbers of nuisance mosquitoes after certain environmental conditions. The mosquito species in the region are known vectors of Ross River Virus and other mosquito-borne diseases and the region is subject to annual outbreaks of these diseases."		

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

10	Department of Biodiversity, Conservation and Attractions (DBCA) Parks and Wildlife Service PO Box 1693 Bunbury WA 6230	Western Ringtail Possums 1. Recommendation 1: Western ringtail possum (WRP) habitat trees including single large-crowned mature peppermint trees and WRP corridor connections are retained and enhanced where possible to provide for WRP movement within and across the site including: - POS 4 Eastern Park – Consideration to extend the boundary further out to the existing firebreaks along the western and southern boundaries of Lot 12 to retain all the existing remnant vegetation as a WRP corridor connection. - Existing vegetated WRP corridor connections along all Lot 4 boundaries and the southern boundary of Lot 14. 2. Discussion: Western ringtail possums (WRP) are listed as critically endangered threatened species under the Biodiversity Conservation Act 2016 (BC Act) and the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). The Emerge Environmental Assessment and Management Strategy (December 2022) (EAMS) advises that no site-specific fauna surveys have been undertaken. WRP are prevalent in close proximity, primarily to the north of the site, and are expected to be onsite amongst both remnant patches of, and single large-crowned mature peppermint trees. DBCA considers that the various vegetated lot boundaries across the amendment area provide adequate corridor linkages for WRP to move to adjoining bushland areas that surround the site. The Rise Urban Local Structure Plan map (Revision B, December 2022) (LSP) depicts proposed recreation reserves as public open space (POS) areas. The vegetation along the Lot 4 eastern and Lots 12 & 14 western boundaries also functions as WRP habitat	1. Noted. The City has worked with the proponent to retain mature peppermint trees and WRP corridor connections where possible. Further modifications to the SP are proposed in Attachment G – Schedule of Modifications in order to enhance WRP habitat in the SP area. 2. Noted, as per the above point.	1. Modifications 1, 3 and 15, as contained in Attachment G – Schedule of Modifications, are required to address several matters raised in the submission relating to WRP habitat and Wetlands / Flooding.

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		providing a corridor linkage between POS 4 and the Lot 4 southern boundary. DBCA notes that the perimeter roads along the southern and western boundaries of Lot 4 are outside of the vegetated corridor, however these trees have not been identified for protection within the draft LSP. The vegetated portions of the western and southern boundaries of Lot 12 appear to be a more suitable WRP corridor than the northern boundary, that has been included within POS 4. The LSP Explanatory Report states that the Structure Plan depicts an indicative local street network that is subject to further refinement. If the recommended addition of the Lot 12 western and southern boundaries into POS 4 is considered, to negate the need for the primary access street to dissect the WRP corridor connection provided, the east-west section of the primary access street, including roundabout and cycle network could be reconfigured by 'flipping' the internal access street to the south that runs adjacent to the northern boundary of POS 2. The primary access street and cycle path could then continue all the way through to the eastern boundary of Lot 14 below the vegetated southern boundary of Lot 12. 3. Recommendation 2: The scheme Special Area provisions include a note stating "Western ringtail possums are known to occur within proximity to the area. WRP are listed as a threatened species under the Biodiversity Conservation Act 2016 (BC Act). Landowners and developers should be aware of their obligations and approval requirements relating to threatened fauna under the BC Act. Advice about these requirements can be obtained from the Department of Biodiversity, Conservation and Attractions".	3. The use of special provision areas is justified on that basis that site specific requirements are necessary. Broader consideration of planning mechanisms relating to WRP habitat will occur as part of the City of Busselton Local Planning	

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		4. Discussion: Future proponents of subdivision will need to be aware of their obligations under the BC Act for impacts that are likely to result in the take of WRP that may be present on site during clearing operations. Kangaroos 5. Recommendation 3: Landholders and land managers are advised of their responsibilities to manage any kangaroo populations that exist on lands that they own. 6. Discussion: The Bushfire Management Plan advises that the area to the south of the site is subject to heavy grazing by kangaroos. The responsibility for managing kangaroos on private property lies with the landowner or manager. In the context of development, the most opportune time to undertake kangaroo management to ensure populations don't become problematic, is early in the planning process when more management options are available. DBCA can provide advice on the range of management options to mitigate the impacts of significant kangaroo populations. Wetlands 7. Recommendation 4: Consultation is undertaken with the Department of Water and Environmental Regulation (DWER) regarding wetlands on Lot 4. 8. Discussion: Lot 4 contains an estuary peripheral multiple use wetland within its south-western portion. The wetland is hydrologically connected via the flood plain to surrounding broader wetland systems, including the Broadwater Nature Reserve wetlands.	Scheme review. 4. Noted, as per the above point. 5. Noted. 6. Noted. The proponent has received this information. 7. Noted. This has occurred and has resulted in proposed modifications to the SP as contained in Attachment G. 8. Noted.	

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

11	Department of Transport – Maritime 5 Newman Court Fremantle WA 6160	1. DoT Maritime Planning has no objection to the above proposal proceeding.	1. Noted.	1. That the submission be noted.
12	Department of Primary Industries and Regional Development 75 York Road Northam 6401	1. The Department of Primary Industries and Regional Development does not object to the proposal.	1. Noted.	1. That the submission be noted.
13	Department of Planning, Lands and Heritage – Coastal 140 William Street Perth WA 6000	1. The proposal, through amendment No.55, seeks to rezone Lots 4, 12 and 402 Caves Road and Lots 14 and 15 Bussell Highway, Abbey from the Rural and Conservation zones to Urban Development. The concurrent Abbey South Structure Plan seeks to guide the subdivision and future development of the Abbey South locality. It is estimated that the proposal would result in approximately 250 to 400 lots, housing an estimated 800 to 950 people. 2. City of Busselton CHRMAP The proposal is within Management Unit 11 – Abbey in the City's Coastal Hazard Risk Management and Adaption Plan (CHRMAP). The site includes land that falls within the 2120 coastal erosion hazard line, and is also identified to be impacted by coastal inundation. As set out in the CHRMAP the adaption pathway for the management unit is to protect from erosion hazards throughout the planning timeframe. For inundation the adaption pathway up to 2043 is accommodate, with protect proposed after 2043.	1. Noted. 2. Noted.	1. That the submission be noted. 2. Modification 12, as contained in Attachment G – Schedule of Modifications, is required to address matters raised in the submission.

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		The CHRMAP states: For the purposes of assessing the risk of inundation in the development of short-term management actions, and longer-term adaption pathways, the CHRMAP assumes that: - In the short-term (0-10 years) all areas below 2.5m AHD are a risk from inundation (this represents the majority of land within the Study Area). - In the longer-term (up to 100 years) all areas within the Study Area below 3.4m AHD are at risk from inundation. *study area refers to Geographe Bay (Old Dunsborough to Forrest Beach) - It is also noted that the CHRMAP indicates that the City is undertaking additional modelling for coastal inundation. 3. Coastal planning policy requirements The policy sets out the expectations for the delivery of adaption methods as determined by the CHRMAP. Where 'accommodation' adaption measures are proposed, such is the case for inundation in the short-term (up to 2043) for this site, clause 5.5(iii)(3) sets out that design and/or management strategies should be implemented to render the risks from the identified coastal hazard acceptable. Where 'protection' works are proposed, as is the case for inundation from 2043, clause 5.7(iii) requires that funding arrangements for the construction and ongoing care, control and maintenance be in place. And more generally clause 5.7(iv)(a) requires that coastal protection works, where necessary and justified should be adequately considered and planned as part of making decisions about land use, subdivision and development within the coastal	3. Noted. 4. This work is currently being carried out by the City of Busselton as part of the broader 'Busselton Storm Mitigation Project' and that the outcomes of this study will be reflected in a revised CHRMAP at some point in the future. The timing and outcomes of this study are not within the gift of the Abbey South landowners, and as such, it is not appropriate to prevent	

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		zone. The CHRMAP indicates that the required protection works for the eastern bank of the Buayanyup River Drain have not been scoped or costed, and the implementation of inundation protection works are not planned in the short term (up to 2043). Furthermore, the CHRMAP has not yet resolved the funding arrangements for the construction and ongoing care, control and maintenance of any of the protection works set out in the CHRMAP, as required by Clause 5.7 of SPP2.6 for protection works to be supported. Given the anticipated lifespan of residential development at the subject site would extend beyond 2043, it is necessary to address both accommodation and protection adaption measures for inundation for this site. In order to meet the requirements of SPP2.6, the scheme should include specific provisions to ensure that the proposed adaption measures are addressed and that future land owners are aware of the coastal hazard risks. As structure plans are only instruments of due regard, it is not sufficient to only include provisions or statements in the structure plan itself. 4. Recommendations In regard to SPP2.6, the Department supports the proposed amendment and associated structure plan, subject to the following matters being addressed: *Amendment Text* Amend Clause 2(ii) of the Special Provisions of SP76, to include the following additional sub-clauses: - 2 (ii). Measures to manage risk from coastal inundation; a. Prior to the commencement of subdivisional works for land deemed to be affected by coastal inundation, the coastal inundation hazard protection	subdivision while this is resolved. In the interim, a modification is proposed to reflect a minimum habitable floor level of 3.4m AHD, subject to further investigation and may be revised. - The CHRMAP identifies upgrades of the eastern bank of the Bauyanyup drain to the approximately height of 3.5m – 4.0m AHD to be undertaken within 2043-2073 timeframe and it is not a requirement that these works are to be completed immediately. It is the officer understanding that these works are to be further investigated prior to 2043 (in terms of costs and implementation) as there is a level of protection from 1 in 500 flood levels for the present day (up to	

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		works for the eastern bank of the Buayanyup River Drain as set out in the City of Busselton Coastal Hazard Risk and Adaption Plan (2022), are to be designed and costed, and associated funding arrangements (capital and recurrent costs) are to be resolved and in place. b. All development within land or lots deemed to be affected by coastal inundation will require prior development approval of the local government, to ensure development can accommodate inundation over the lifespan of the development. c. All habitable development is to have a minimum finished floor level of 3.0 metres AHD. d. A notification on title advising of the coastal hazard risk is to be applied as a condition of subdivision or development, for all land or lots deemed to be affected by coastal inundation in accordance with the City of Busselton Coastal Hazard and Risk Management Adaptation Plan (2022) and State Planning Policy 2.6 – State Coastal Planning Policy. 5. Structure Plan - The following text being added to the structure plan report "Prior to the commencement of subdivisional works, the coastal inundation hazard protection works for the eastern bank of the Buayanyup River Drain are to be designed and costed, as set out in the City of Busselton Coastal Hazard Risk and Adaption Plan (2022) and associated funding arrangements (capital and recurrent costs), are to be resolved and in place based	2043) which have been identified by studies referenced by the CHRMAP to be between 2.4-2.9m AHD. In the interim, a modification is proposed to reflect a minimum habitable floor level of 3.4m AHD, subject to further investigation. - Given that all lots will be required to have a FFL above 3.0m, there will be no 'lots deemed to be affected by inundation' and as such this clause is not required. - Noted. - Noted. 5. This work is currently being carried out by the City of Busselton as part of the broader 'Busselton Storm Mitigation Project' and that the outcomes of this study will be reflected in a revised CHRMAP at some point in the future. The timing and outcomes of this study are	

Attachment D – Schedule of Agency Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		on a cost-benefit and beneficiary pays principle including a benefit distribution analysis." - The technical appendices, being amended to reference a minimum FFL of 3.0m AHD throughout to address SPP2.6.	not within the gift of the Abbey South landowners, and as such, it is not appropriate to prevent subdivision while this is resolved. In the interim, a modification is proposed to reflect a minimum habitable floor level of 3.4m AHD, subject to further investigation and may be revised. 6. Noted. No objection.	
14	Department of Planning, Lands and Heritage – Land Use 140 William Street Perth WA 6000	1. The Land Use Management Division of the Department of Planning, Lands and Heritage (DPLH) has no comment to the amendments.	1. Noted.	1. That the submission be noted.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

TABLE 1: SUBMISSION NUMBER, SUBMITTER NAME AND LOCALITY

No.	SUBMITTER NAME & LOCALITY	No.	SUBMITTER NAME & LOCALITY	No.	SUBMITTER NAME & LOCALITY
1	Carla Hartnett Abbey WA 6280	**14**	Timothy Armstrong Abbey WA 6280	**27**	Jasmine Johnson Abbey WA 6280
2	Alexandra Seymour Abbey WA 6280	**15**	Peter Overington Abbey WA 6280	**28**	Jen Powell Abbey WA 6280
3	Kevin Seymour Northbridge WA 6003	**16**	Karri Misic Abbey WA 6280	**29**	Patrick Gaillard Abbey WA 6280
4	Jarryd Heldt Abbey WA 6280	**17**	Glenn Callegari Abbey WA 6280	**30**	Shane Parker Abbey WA 6280
5	Cameron Roberts Kealy WA 6280	**18**	Robert Feast Abbey WA 6280	**31**	Kaye Marwick Abbey WA 6280
6	Alison Seymour West Busselton WA 6280	**19**	Vivienne Manessis Abbey WA 6280	**32**	Kim Ross Abbey WA 6280
7	Jonathan Leach Abbey WA 6280	**20**	Dale Huntington Kealy WA 6280	**33**	Robert Ross Abbey WA 6280
8	Nola Fletcher Abbey WA 6280	**21**	Robert Hill Abbey WA 6280	**34**	Emily Hardbottle Yalyalup WA 6280
9	Oonagh Smith Abbey WA 6280	**22**	Carly Huntington Kealy WA 6280	**35**	Skye Scott Vasse WA 6280
10	Tara Patterson Abbey WA 6280	**23**	Gavin Pain Abbey WA 6280	**36**	Jennifer Robyn Sheridan Abbey WA 6280
11	Belinda Stocker Abbey WA 6280	**24**	William Kilner Abbey WA 6280	**37**	Rebecca Wisewould Broadwater WA 6280
12	Mike Jones Abbey WA 6280	**25**	Jennifer Noack Abbey WA 6280	**38**	Valerie Frearson-Lane Abbey WA 6280
13	Ian Marchant Abbey WA 6280	**26**	Kathy Leach Abbey WA 6280	**39**	Kevin Harris Abbey WA 6280

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

No.	SUBMITTER NAME & LOCALITY	No.	SUBMITTER NAME & LOCALITY	No.	SUBMITTER NAME & LOCALITY
40	Dan Pearce Perth WA 6000	**55**	Lynette Ward Dunsborough WA 6281	**70**	Susie Grainger Abbey WA 6280
41	Sylvia Annear Abbey WA 6280	**56**	Ralph Saunders Abbey WA 6280	**71**	Paul Willison Abbey WA 6280
42	Nigel Coote Abbey WA 6280	**57**	Lindsay Blyth Abbey WA 6280	**72**	Peter Davies Abbey WA 6280
43	Kenneth Noack Abbey WA 6280	**58**	Andrew McGarry Abbey WA 6280	**73**	Keith Grainger Abbey WA 6280
44	Darren Maccora Abbey WA 6280	**59**	Lynne Hewitt Abbey WA 6280	**74**	Fiona Ryan Abbey WA 6280
45	Stephen Jury Abbey WA 6280	**60**	Kathryn Saunders Abbey WA 6280	**75**	Jan Grainger Abbey WA 6280
46	Elise Parker Abbey WA 6280	**61**	Sara Hill Dunsborough WA 6281	**76**	Fiona Rumsa Busselton WA 6280
47	Naomi Grove Abbey WA 6280	**62**	Mark Kain Abbey WA 6280	**77**	Chris Bowen-Saint Abbey WA 6280
48	Robert Mulcahy Abbey WA 6280	**63**	Igor Misic Abbey WA 6280	**78**	Jane Bowen-Saint Abbey WA 6280
49	Jane Gillet Abbey WA 6280	**64**	Anja Misic Abbey WA 6280	**79**	Travis Cruden Abbey WA 6280
50	Steven Pursell Abbey WA 6280	**65**	Paul Ging Abbey WA 6280	**80**	Helena Nicholson Abbey WA 6280
51	Oliver Beards PO 6850	**66**	Dawn Blanchard Abbey WA 6280	**81**	Scott Creighton Abbey WA 6280
52	John Mulcahy Abbey WA 6280	**67**	Brian Blanchard Abbey WA 6280	**82**	Anna Windsor Abbey WA 6280
53	Rosemary Mulcahy Not Provided	**68**	Colin Woodford Abbey WA 6280	**83**	Jo-Ann Harty Vasse WA 6280
54	Carina Schumann Busselton WA 6280	**69**	Pimply Gimli Not Provided	**84**	Hayley Mills Abbey WA 6280

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

No.	SUBMITTER NAME & LOCALITY	No.	SUBMITTER NAME & LOCALITY	No.	SUBMITTER NAME & LOCALITY
85	Regina Chapman Abbey WA 6280	**88**	Gert Hoppe Abbey WA 6280		
86	Angela Kartsioukas 524 Geographe Bay Road Abbey WA	**89**	Scott and Denyce Crawford VASSE WA 6280		
87	Maureen Beaton Not Provided	**90**	Barbara Trichet Abbey WA 6280		

TABLE 2: SUBMISSION NUMBER, NATURE OF SUBMISSION, COMMENT AND RECOMENDATION

No.	NATURE OF SUBMISSION	COMMENT	RECCOMENDATION
1	1. We already have a busy road on Caves road. Then adding a new whole building development would make our area extremely business and hectic. We have a great peaceful neighbourhood with not much traffic around near our area. This will totally change this and ruin our little of pocket. The bypass needs to be done first before this so there is less traffic coming through our area.	1. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway.	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.
2	1. The Current Housing Crisis. With so many local residents struggling to find properties to buy and rent, the more land available to do so the better.	1. Noted.	1. That the submission be noted.
3	1. Increased traffic flow and introduction of hazardous T-Junctions, especially off Access 2 onto Caves Road with only 70m of straight line vision. As stated above the scheme will result in increased traffic flow onto Caves Rd with ~700vpd estimated in the scheme to access the development via Access 2, rather than continuing westward to the main Access 1 entry. 2. Given the timing for the Vasse-Dunsborough Link is unknown and is not even on the Main Roads radar	1. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway by pedestrians and cyclists.	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	for the next 5 years the predicted 2000vpd (the VDL will relieve from Caves Rd) will continue to grow until the bypass is created. Traffic is already bumper to bumper for 2-300m away from the roundabout during peak summer holidays periods. 3. The proposed Access 2 T-junction will only have 70m straight line visibility to the east along Caves Road. The introduction of more 'black spot' traffic intersections seems unfathomable. 4. The T-junction will also limit access to my Caves Rd property (No. 17) from Busselton. I will not be able to turn right at the intersection without adding to the congestion, unless traffic islands and turning bays are extended across the intersection. I will be forced to loop around Newton Beach Road or turn-around at Roberts Rd to access my property. 5. I also find it disappointing the Council has made no attempt to upgrade the aesthetics of the northern road verge along Caves Road. Extensive tree plantings (to soften the road noise) have occurred along Bussell Hwy leading into Busselton but no attempt has been made to improve the stretch of Caves Rd at Abbey. There are no bike tracks or bike lanes along this stretch of Caves Road, such any cyclist existing the proposed scheme's bike track will be forced to ride along Caves Road. This is not acceptable and not in keeping with the Council's attempts to create safe, family friendly communities. 6. The scheme seems like a missed opportunity to re-align this stretch of Caves Road either through the	2. Traffic modelling indicates that the Vasse Dunsborough Link is not required to facilitate the proposal. 3. Noted. 4. Noted. 5. Modification 1 to the SP requires: - The provision of safe and efficient crossing facilities across main roads for pedestrians and cyclists at convenient intervals. - A path network that provides safe and direct access to public transport (bus stops). - A higher order shared path on the northern side of Caves road adjacent the Structure Plan area. 6. Caves Road is operated and managed by Main Roads WA.	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	scheme (from Access 1 to Access 3) or along the southern boundary of the scheme. This would extend the affordable beachside (family friendly) housing opportunities on the northern side of Caves Rd.		
4	1. Offering some larger style blocks of land in an exclusive estate. Away from the normal smaller houses being developed in vasse.	1. Noted. The proposal includes a range of lot sizes to cater for a range of lifestyle preferences and price points.	1. That the submission be noted.
5	1. Great idea good for growth of community.	1. Noted.	1. That the submission be noted.
6	1. I have concerns regarding ingress and egress onto Caves Road near Monaghan's corner! I'm concerned that the extra build-up of traffic in the area will make it unsafe for my daughter and son-in-law to be able to access 17 Caves road safely and with cars speeding around the roundabout that it will create a black spot with accidents as it's too close to Bussell Highway. I've already seen near misses with the Shed Markets entry point on Caves road and have huge concerns that the visibility with the extra traffic this subdivision will create. I would prefer to see an entry point on Bussell Highway added to create more entry and exit points for people living in the new subdivision.	1. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway.	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.
7	1. Volume of traffic at the Monoghans corner intersection is already stretched to its limits with many accidents noted in the last 5 years. Traffic already backs up often down to the RAC park towards Dunsborough during busy periods. Lack of road infrastructure. 2. Lack of pavements - Speed of traffic making pedestrians crossing the road dangerous.	1. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 2. Noted. 3. The Environmental Assessment found that the majority of the Structure Plan area is	1. Modifications 1, 3 and 14, as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	3. Often the land earmarked sits under water during the winter period. The water has to go somewhere? 4. Flora and fauna destruction - Please please stop trying destroy our once beautiful Town. Slowly its appeal to visitors is being taken away. 5. We have a new hospital that cannot cope with numbers. Class sizes in local schools are at ridiculously high numbers. What plans are in place for new schools? All good and well the council cashing in and seeing dollar signs then not listening to ratepayers and wasting the money on projects that the ratepayers voted against.	capable of urban development, subject to floodway areas being provided as public open space. 4. Noted. 5. A future public primary school, 'Vasse West Primary School' (planning name) is nominated within the Vasse Structure Plan. The future school is expected to accommodate the student demand from this proposal.	
8	1. I believe the exit between Cuthbert and Locke street will result in many accidents. It is currently extremely difficult to turn right from Cuthbert to head towards Dunsborough. If you also add all the traffic which would be turning right to go to Busselton. I believe any exits from the new development on to Caves Road should be at the current Caravan Park exit opposite Forth Street and the roundabout on to Bussell Highway. The distance between the roundabout and the caravan park exit is minimal. The traffic from Dunsborough at times makes it impossible to turn right from Cuthbert and on many occasions it is necessary to go down towards beach on Cuthbert St. turn right and go up to Newtown Beach Road and enter roundabout there to head towards Dunsborough. I believe any further exit will result in many accidents.	1. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway.	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.
9	1. Entry and exits to lots are too close to roundabout which potentially could cause accidents. Entry and	1. The proponent, Main Roads WA and City are working on revised road designs to improve	1. Modifications 1, 3 and 9 as contained in Attachment G –

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	exits are too close to roundabout with speeds over 50kms.	traffic, safety and property access outcomes as identified in Modification 1.	Schedule of Modifications, are required to address matters raised in the submission.
10	1. We live at 21 caves road, right near the roundabout, and the amount accidents that happen, because of people speeding through that roundabout, as they head towards Dunsborough is insane. Throw in people breaking to enter an estate. DISASTER. There is so much traffic as is it on that roundabout, all day we have to listen to horns being tooted, the sound of breaks slamming as people come on and off that roundabout, and people at speed, coming around the bend heading towards Dunsborough, is so dangerous as it is. Throw in people all of a sudden breaking to turn off into an estate, is going to going cause more chaos. Please move it further up the other end, away from the main intersection/roundabout.	1. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway.	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.
11	1. I do not support the proposal as is currently proposed. We do not support the Proposed South Abbey development as presented. We are not against the area becoming residential, we just don't think the planners have taken into consideration the area & the impact such a tight development will have on it. 2. The Design: By creating cottage style blocks R20-R40 in this area, approximately 300 homes, with many families averaging 2 to 3 vehicles plus recreational vehicles (boats, caravans, Jet-skis etc). With home parking always at a premium, this often brings ugly front yards because they become glorified car parks. 3. We acknowledge there is plenty of green space in the planning of this development, but families want	1. Noted. 2. Noted. The R-Codes proposed will provide for a range of lot sizes and design typologies. Car storage will be provided for within the lot. On Street parking will also typically be available for additional vehicles. R20 - R40 areas are proposed to become R20 and a new area of residential R10 is proposed to provide for a lower density transition area. 3. Noted. 4. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission. 2. Modifications 1 and 7, as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	lifestyle, encompassing outdoor entertaining, workshops/sheds, and security for their possessions which a small block cannot offer. For people with lesser needs and a desire to be walking distance to the beach, there are plenty of current options, for smaller lots: Kealy, The Enclave, Abbey Watters, Broadwater and plenty of future plots that would have less impact on such a small part of an already busy road. If the development reduced the number of blocks by increasing the size of the lots on offer it would not only improve the overall amenity of the area but also return to the developer as good a return as the proposed tight infill. 4. The Traffic: Whilst the shire can say that Caves Road will eventually be a tourist road, many people will still use this road and by adding 2 more roads trying to access Caves Road daily, one Left turn only access, a road too close to an existing roundabout, that people don't actually know how to use correctly, is out right dangerous. From a practical point of view, why would the entry points not be lined up with Roberts & Cuthbert and either more roundabouts added or traffic lights. By having 5 access roads onto Caves Road, the roundabout and the diversion bridge, plus the caravan park traffic, you are creating more dangerous roads for traffic, not to mention NO safe place for pedestrians to cross, should they actually walk to the beach. This along with the 2 other developments in the Broadwater area a putting increased traffic flow on Bussell Highway that makes entry onto the highway east towards the Central	would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 5. The Abbey Foreshore is located outside of the project area. It is noted that the City is undertaking a separate project to select a new site and design for a regional recreational boating facility between Abbey and Dunsborough. This will ultimately provide additional capacity and reduce pressure on existing facilities. 6. Noted. Addressed above. 7. Noted.	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	Shopping Precinct very difficult. In your proposed plans, as traffic will struggle to execute Right Hand turns (easterly) towards Busselton Central, cars will take impatient risks or left turn, head towards Dunsborough & then hold up traffic to turn right down Cuthbert, Roberts or Locke streets, drive along Geographe Bay Road, then up Newtown Beach Road and congest traffic around the Monaghan's Shopping Precinct, especially vehicles heading to the Bypass as they will drive across the shop frontages. 5. The Impact: The Abbey Boat ramp is currently too small for the existing users and there is NO parking, in Abbey for beach goers with the current population. Currently Abbey Beach is also under immense pressure from vehicles parking into the vegetation and often parked on, across or over the bike path with no interest from Busselton City rangers. The parking bay at the western end of Abbey Beach is only capable of parking 10 Cars. The impact of the Kealy Subdivision can be clearly seen during the summer months and by adding a high density subdivision so close to the Abbey Beach, which is diminishing and eroding partially due to the vehicle abuse, this is only go to exacerbate the erosion due to vehicles and their passengers destroying vegetation. 6. With the Community now being more conscious of the environmental impact of clearing trees and reducing green open space why are these developments constantly increasing Heat Traps that		

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	only diminish the ambiance of living in a regional town. Has the shire a solution for: • Beach Parking • Safer roadways/ intersections • Pedestrian crossings • Room for Parking of multiple vehicles at the proposed residences. 7. Surely, if the developer is looking at this land as an economic gain, Large Blocks at a higher sell price (lifestyle beachside blocks) with less infrastructure required would be a reasonable outcome. By creating a small, unique development that is a little more exclusive and a lot more thoughtful to the environment, traffic management & which compliments the existing residential area across Caves Road, we think would be a satisfactory outcome for all concerned parties. PLEASE REVISE YOUR PLANS.		
12	1. Because I have no faith in the City Of Busselton to ensure that appropriate infrastructure and facilities will be put in place along the beachfront from Fourth road to the existing boat ramp that will cater for the additional traffic and pedestrians. 2. I am very concerned about the vehicular traffic flow along caves road and the access both ways from the development onto Caves road and entering the proposed development. My main concern is that apart from the two bins at the car park at the junction of Geographe Bay Road and Fourth Road there are zero facilities or adequate parking at this time, let alone further pressure caused by the	1. The Abbey Foreshore is located outside of the project area. It is noted that the City is undertaking a separate project to select a new site and design for a regional recreational boating facility between Abbey and Dunsborough. This will ultimately provide additional capacity and reduce pressure on existing facilities. 2. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	obvious increase in traffic and pedestrians. It seems the City of Busselton cannot even supply a roll of bags for dog shit let alone facilities to cater for the influx and impact of the human kind. Let's just see how this effects the already fragile coastline from Fourth Road to the East.	would also to enable the safe and efficient crossing of Caves Road and Bussell Highway.	
13	1. Caves road is currently under a lot of traffic as it is, this will only increase the volume on an already congested road. Alternative access / egress needs to be sourced, housing density reduced and how will the overflow / influx on the local beaches & boat ramp facilities already overflowing, current non existing car parks for existing residents only for that to be increased by 100%.	1. The Abbey Foreshore is located outside of the project area. It is noted that the City is undertaking a separate project to select a new site and design for a regional recreational boating facility between Abbey and Dunsborough. This will ultimately provide additional capacity and reduce pressure on existing facilities. 2. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway.	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.
14	1. In support of the development but concerned with the development of cycle path crossovers over Caves road from and to. Traffic along Caves Road at peak times can be arduous for me a wheelchair user and kids going to school. Dunsborough link needs fast-track. A more detailed impression of the cycle way and road entry points needs to be expressed for safety of all road users, cyclists and mobility users as currently the cross over near the RAC Holiday park is challenging at best, use of a mobility scooter due to lower height and bridge obstacles. Looking in the	1. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway.	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	Dunsborough direction is very restrictive due to these issues. An indication of how any future cycle paths will all link up once you cross Caves Road and connect to existing Old Abbey eg Cuthbert Street and Robert's Road including Monaghans shops etc.		
15	1. Objection. Increased traffic, impact on beach and environment. I feel the traffic on caves road has seen a significant increase over the last few years, the proposed subdivision and retail centre for another 875 to 1000 people will with no doubt cause more congestion on not only caves road, but also Bussell highway to Vasse. 2. Currently the boat ramp, beach traffic and noise at Abbey has also increased. The overflow carpark at the boat ramp is commonly full while trailers and cars park on the road. The carpark is consistently used for camping. 875 to 1000 people will only impact and compound an already existing problem.	1. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 2. The Abbey Foreshore is located outside of the project area. It is noted that the City is undertaking a separate project to select a new site and design for a regional recreational boating facility between Abbey and Dunsborough. This will ultimately provide additional capacity and reduce pressure on existing facilities.	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.
16	1. My primary concerns relate to traffic control and pedestrian safety, environmental degradation and subsequent wildlife displacement, and water management issues. 2. Of major concern is the proposed traffic management plan for the development in regards to Caves rd. The increased volume of traffic that will result from the development will put significant pressure on the already congested area, especially during peak times and holiday periods. 3. The development's proposed entry/exit on the existing driveway at 63 Caves Rd is unsuitable and	1. Noted. 2. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 3. Noted. 4. Noted. 5. Noted. 6. Noted.	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	poorly planned, and will increase the risk of vehicular accidents as well as pedestrian incidents, especially for children. The current speed limit of 70 will exacerbate these risks if it remains unchanged. 4. The failure to address pedestrians safety while crossing Caves rd could have significant consequences for the community. In this case, the entry/exit point at 63 Caves Rd requires pedestrians to cross the already busy Caves rd and walk or bike down Cuthbert St, which has no footpaths and both these issues pose a serious safety risk to pedestrians and cyclists. 5. It is essential to have provisions in place for safe pedestrian and cycle crossings. One solution could be to establish a pedestrian underpass at the already established bridge adjacent to the RAC Busselton Holiday Park. This would provide a safe and accessible route for pedestrians and cyclists to cross Caves Road without having to negotiate vehicular traffic. An underpass would also reduce the risk of accidents and improve safety for all road users. Alternatively traffic islands could be installed, or pedestrians could be directed to established safe crossings on Monaghans corner, East of the roundabout. 6. Utilising an underpass or pedestrian island at locations near Forth St or Newtown Beach rd would divert pedestrian traffic to the beach access via Newtown Beach Rd to the boat ramp; or via Forth St, which already have existing pathways leading to the beach and parking at the beach access point. These	7. The Abbey Foreshore is located outside of the project area. It is noted that the City is undertaking a separate project to select a new site and design for a regional recreational boating facility between Abbey and Dunsborough. This will ultimately provide additional capacity and reduce pressure on existing facilities. 8. Noted. 9. Noted. 10. The site largely consists of cleared agricultural (pastoral) land. The City has worked with the proponent to retain trees however the developer is only required to provide 10% of the site area as Public Open Space and trees have generally not been retained on lots. The Environmental Assessment found that the majority of the Structure Plan area is capable of urban development, subject to floodway areas being provided as public open space. 11. Noted.	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	routes offer parking and paved beach access, making them much safer for pedestrians and cyclists. Pedestrians would then have safe access to the beach via the established footpath on Forth st. 7. The lack of formal beach access at the end of Cuthbert St, and Locke st poses further problems. Pedestrians will likely use the existing informal track leading to the beach which will cause environmental destruction. It will result in more informal pathways being created through bush areas, destroying habitat and fragile vegetation. This will not only harm the environment but also pose risks to the safety of those traversing these unmarked paths. 8. Furthermore, the suburb has limited parking provisions at beach access points. This will further add to traffic safety issues as it will encourage residents and visitors to park on verges, and in protected and fragile bushland sections along the beach on Geographe Bay Rd. This issue needs to be addressed with adequate parking solutions to ensure that the development does not cause further disruption to the local area. 9. It is crucial that developers and local authorities take these safety issues seriously and work to find practical solutions that prioritize the safety of pedestrians and cyclists. Inadequate planning and a lack of infrastructure can have devastating consequences, so it is important to ensure that appropriate measures are put in place to keep members of the public safe. By addressing these		

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	concerns, we can create a more sustainable and safer community for all. 10. The proposed development also raises environmental concerns. The removal of large trees which provide critical habitat for the endangered ringtail possums will cause long-term environmental damage to the area. Furthermore, waterlogging issues are common in the proposed site, with floodplain areas that increase the risk to existing and proposed homes. 11. In light of these concerns, I strongly urge the local Busselton council to reject the proposed housing development in Abbey South until these issues can be adequately addressed. It is essential to ensure that any proposed development does not harm the safety, environmental, and social fabric of the local community.		
17	1. Why hasn't the feasibility of access via Bussell Hwy been explored and reported? Caves road bottlenecks at key times. This entrance creates a "turn right" to go to BUSSELTON or VASSE, left to Dunsborough. If it's off Bussell Hwy it's a turn left to BUSSELTON DUNSBOROUGH …turn right for VASSE. Has their been studies to work out which is best? 2. Any scope for R40 and R60 should be rejected. This density belongs near CBD's to create walk-to vibrancy. It's not going to deliver any favorable outcomes except for the developers financial returns on sale. Simply a cash grab. It's not the character of this part of BUSSELTON / ABBEY. Cars boats jet skis - how will this not be the ghetto of abbey. The trend of abbey suggests most of these homes built will be air	1. The current proposal features access to Bussell Highway via a left in left out intersection. A full movement intersection is not able to be accommodated at that location due to the proximity with the roundabout. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes. 2. The R-Codes proposed will provide for a range of lot sizes and design typologies. Car storage will be provided for within the lot. On Street parking will also typically be available for additional vehicles. R20 - R40 areas are proposed to become R20 and a new area of	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission. 2. Modifications 1 and 7, as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	bnbs. Meaning full homes and lots of vehicles exacerbated by tiny lot sizes. 3. Has it been deemed the site has no cultural significance?	residential R10 is proposed to provide for a lower density transition area. 3. A portion of an 'Other Heritage Place' (ID 5337) is mapped as extending into the western portion of the site. This feature is described as 'skeletal material/burial' and is likely to be associated with the drain further to the west (supported by information provided in the Buayanyup River Action Plan (Geographe Catchment Council 2010)) where the Aboriginal site is described as being associated with the drain. The EPA recommends appropriate consultation, investigation and relevant management plans be undertaken prior to subsequent stages of planning to address potential impacts to Aboriginal heritage values. This was not deemed necessary at structure plan stage and will be further considered as part of subdivision stage. Newtown House (associated with Amelia Park Lodge) is located immediately south of the site, and is identified as having local heritage value. It will not be impacted by development within the site.	
18	1. I would prefer to see more wetland /environmental use for floodways, the back of that property becomes a wetland in winter. Turning them into reedbeds for stormwater cleansing before draining back to Buayanup drain. I am opposed to the density issue (i would prefer less), the lack of concern for wetlands (	1. The Environmental Assessment found that the majority of the Structure Plan area is capable of urban development, subject to floodway areas being provided as public open space.	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	and the possibility of flooding to housing) and the effects on traffic entering to/from on Bussell Hway and Caves rd. I think the traffic on Bussell Hway near the roundabout will be horrendous. Possibly exacerbating traffic jams and incidents in times of peak use.	2. The R-Codes proposed will provide for a range of lot sizes and design typologies. Car storage will be provided for within the lot. On Street parking will also typically be available for additional vehicles. R20 - R40 areas are proposed to become R20 and a new area of residential R10 is proposed to provide for a lower density transition area. 3. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes.	2. Modifications 1 and 4, as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.
19	1. Traffic – Congestion. The current plans indicate 2 exits onto Caves Road and one onto Bussell Hwy. The Caves Road exits do not line up with the existing roads onto the north side of Caves Road. A development with 350-400 houses will increase the traffic onto the single lane Caves Road significantly and we foresee that people attempting to turn right from Abbey South towards the Busselton Hwy bypass will find it very difficult. It is likely that those exiting Abbey South will end up turning left onto Caves Road and then right into Locke, Cuthbert or Roberts Roads (all of which are very narrow roads) and 'rat run' along Geographe Bay Road to Newtown Beach Road and then cut through in front of the small group of shops to get back to the Bussell Hwy roundabout to enable them to access Bussell Hwy. This will inevitably cause traffic jams close to the roundabout and these will also be exacerbated by those exiting Abbey South on the Bussell Hwy exit. Traffic – Safety.	1. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes. 2. Noted. New development is not required to be carbon neutral and will contribute to climate change. The Residential Design Codes (R-Codes) control the design of residential dwellings encourage design consideration of the social, environmental and economic opportunities possible from new housing and an appropriate response to local amenity and place. 3. Noted. The Western Power Network Capacity Mapping Tool indicates that capacity is available at the zone substation. 4. The Department of Health and the Department of Education have not raised	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	Currently there is no safe place to cross Caves Road form Abbey South to the north side of Caves Road. The increase in population will inevitably lead to more people walking across from Abbey South to be able to enjoy Abbey Beach. With the increase in traffic and an already lack of safe crossing of Caves Road, we fear that it is only a matter of time before a person is injured or killed in a traffic accident. We believe that, if Abbey South is to go ahead, there needs to be space for an overpass to allow safe pedestrian crossing of Caves Road. 2. Climate. With the number of dwellings on small blocks, inevitably the houses will be quite large for the block size, be quite close to each other and there will not be adequate room for movement of air and green spaces. This will lead to increased heat which leads to worsening of climate change and the need for people to have large air conditioning units to have adequate cooling in their houses. 3. Services. We have lived in quite a few different regional and urban areas throughout Australia. The electricity power supply to Abbey is the most unreliable we have ever experienced. We have frequent loss of power, often coinciding with holiday periods so we believe that a lot of the power outages are due to excess use of an inadequate power supply system in our area. The addition of 350-400 more dwellings in the area will inevitably lead to even more power outages unless there is a significant upgrade to the electricity supply.	concerns regarding infrastructure. A new local school site has been identified in Vasse.	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	4. In addition an increase in population will increase demand for public services such as education & health services and the Busselton Hospital is already operating at full capacity.		
20	1. We need to develop areas that are less prone to flooding. 2. We need to keep a landscape corridor and buffer between caves road and Vasse and we need to keep Abbey as a nice and natural suburb. This area should be subject to strict landscaping provisions and allow the native flora and fauna to thrive. There should be a significant landscape corridor through to Dunsborough, Quindalup and Yallingup from Vasse/Abbey with Animal crossings and possibly some natural bushwalking. 3. There are plenty of other development sites including land along Northerly and Yalyallup/Provence. Other sites including south of the Vasse bypass would suit a development as well. I could support minimum land sizes of 1Ha.	1. The Environmental Assessment found that the majority of the Structure Plan area is capable of urban development, subject to floodway areas being provided as public open space. 2. The City of Busselton has conditioned the provision of vegetated buffers to ensure appropriate visual screening and separation of development from main roads adjoining the Special Provision Area. 3. Noted.	1. That the submission be noted.
21	1. We do not support the Abbey South Precinct development proposal. A submitted application to rezone an area classified as Rural & Conservation goes against the need for maintaining areas of conservation, particularly in an area of wetlands. Surely a proposal such as this should start with an EPA report on the impact this would have on current population of native fauna, and a survey of native flora in the area. This is crucial, before any development, to put in place protection guidelines.	1. The 'Conservation' zone reflects the floodway and flood fringe features on the southern portion of the Site. The Environmental Assessment found that the majority of the Structure Plan area is capable of urban development, subject to floodway areas being provided as public open space. The proposal was referred to the Environmental Protection Authority who recommended that a buffer area around the floodway be considered in accordance with SPA 76.	1. Modifications 1, 3 and 4, as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	2. Another concern for this proposal is a proper investigation into any culturally significant areas. Thorough research and consultation beforehand are much more preferable than contamination or destruction and apology afterwards. 3. Although availability of housing in the region is a concern, this area, already in fast growth, is not suitable for such a high-density proposal. Adding that amount of population and the subsequent draw on all utilities and substructure is a concern. Vasse Village is very functional and serving the needs of the local community, but does not need more population pressure. 4. Our concern is also the pressure on Abbey Beach. Already there are pedestrian and parking safety issues here, as people access the beach at the end of suburban streets. This also impinges on native vegetation along the beachfront and with current population numbers it is showing signs of degrading this.	Modifications are propose to address this matter. 2. A portion of an 'Other Heritage Place' (ID 5337) is mapped as extending into the western portion of the site. This feature is described as 'skeletal material/burial' and is likely to be associated with the drain further to the west (supported by information provided in the Buayanyup River Action Plan (Geographe Catchment Council 2010)) where the Aboriginal site is described as being associated with the drain. The EPA recommends appropriate consultation, investigation and relevant management plans be undertaken prior to subsequent stages of planning to address potential impacts to Aboriginal heritage values. This was not deemed necessary at structure plan stage and will be further considered as part of subdivision stage.Newtown House (associated with Amelia Park Lodge) is located immediately south of the site, and is identified as having local heritage value. It will not be impacted by development within the site. 3. The R-Codes proposed will provide for a range of lot sizes and design typologies. Car storage will be provided for within the lot. On Street parking will also typically be available for additional vehicles. R20 - R40 areas are proposed to become R20 and a new area of	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		residential R10 is proposed to provide for a lower density transition area. The portion of the site that is proposed to be coded R60 is in accordance with the City of Busselton Local Planning Strategy 2019. 4. The Abbey Foreshore is located outside of the project area. It is noted that the City is undertaking a separate project to select a new site and design for a regional recreational boating facility between Abbey and Dunsborough. This will ultimately provide additional capacity and reduce pressure on existing facilities.	
22	1. This should be kept as a reserve or nature corridor. There is all ready not enough peppi habitat for local and native wildlife that is critically endangered that seek refuge in this small area of land. NO MORE CLEARING OF ESTABLISHED NATIVE HABITATS!! Perhaps look at the Barron grass farm land that provides no oxygen, habitat, environmental benefit at all. No one is going to live in these houses if we can't live in this world.	2. Noted.	
23	1. Developing an intersection at this point along Caves Road would not be in the best interest of motorists that represent existing residents, Dunsborough/Yallingup & surrounds residents, tourists, public transport, commercial motorists (including delivery trucks and large haulage trucks) and future residents of the proposed development. It is also not in the best interest of future residents to design a high order cycle path to exit/enter the	1. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 2. The Environmental Assessment found that the majority of the Structure Plan area is capable of urban development, subject to	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	proposed development at that same point. There is a very real and significant threat of harm should an additional intersection intensify the complexity of the nearby roundabout. Our primary concern is for the safety of motorists, pedestrians and cyclists and our opinion should be considered with great weight due to us having resided in our home for over 23 years. We moved into our home while the intersection at Monaghan's was still a T-junction and all traffic to/from Dunsborough and Margaret River collided at this one point. This was an intersection of major congestion. We have witnessed the positive impact of upgrading the intersection to a roundabout, widening the road and the construction of the Busselton Bypass. The bulk of the Margaret River traffic has been alleviated, benefiting both the Busselton side of the roundabout and the Vasse side. However, there has been no mitigation of traffic for Dunsborough/Yallingup & surrounds, that is, the Caves Road side of the roundabout. Our current experience of the volume of traffic: • During busy periods each day, we often have to wait for a motorist to allow us to enter Caves Rd from our home. • Due to the heavy/fast flow of traffic coming off the roundabout we utilise the painted median strip as a safe space to wait to turn right into our home when travelling from Busselton (where the full movement intersection is proposed).	floodway areas being provided as public open space. The proposal was referred to the Environmental Protection Authority who recommended that a buffer area around the floodway be considered in accordance with SPA 76. Modifications are proposed to address this matter. 3. A portion of an 'Other Heritage Place' (ID 5337) is mapped as extending into the western portion of the site. This feature is described as 'skeletal material/burial' and is likely to be associated with the drain further to the west (supported by information provided in the Buayanyup River Action Plan (Geographe Catchment Council 2010)) where the Aboriginal site is described as being associated with the drain. The EPA recommends appropriate consultation, investigation and relevant management plans be undertaken prior to subsequent stages of planning to address potential impacts to Aboriginal heritage values. This was not deemed necessary at structure plan stage and will be further considered as part of subdivision stage. Newtown House (associated with Amelia Park Lodge) is located immediately south of the site, and is identified as having local heritage value. It will not be impacted by development within the site.	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	• During peak periods, including weekends and holidays, Dunsborough traffic can be banked back as far as Forth St. • Congestion during peak periods is reminiscent of the level of congestion experienced while the Monaghan's intersection was a T-junction. In addition, peak periods are more frequent due to an increase in population and greater number of tourists through the winter months. Although the roundabout allows the traffic to flow better, resulting in the congestion being alleviated at a reasonable rate, we consciously avoid leaving our home during peak periods. • When crossing the road, as pedestrians, to access the Shed Markets, we have to navigate reduced visibility, the volume of traffic entering the roundabout and the speed at which motorists exit the roundabout. This has been dangerous for us as individuals and significantly more dangerous as parents crossing with our family. • On any given day we witness numerous U-turns outside our house who have been confused as to how to access both the Shed Markets, the shops at Monaghan's and the Abbey Beach boat ramp.	4. The site largely consists of cleared agricultural (pastoral) land. The management of vegetation and fauna values as part of future development of the site must be appropriately managed through the standard subdivision process. In particular, adjoining remnant vegetation will need to be carefully considered when designing the road access to the site from Caves Road. 5. The Abbey Foreshore is located outside of the project area. It is noted that the City is undertaking a separate project to select a new site and design for a regional recreational boating facility between Abbey and Dunsborough. This will ultimately provide additional capacity and reduce pressure on existing facilities.	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	• In summary: The impact of adding a Full Movement Intersection to an already complex roundabout system with a high volume of traffic, speed and low visibility will result in greater threat of harm to motorists, pedestrians and cyclists. • There is no cycleway/footpath along Caves Road to support the proposed high order cycle path in the development plan. • The proposed intersection would directly impact our access and jeopardise our safety to enter and exit our own home. • We, therefore, object to the Full Movement Intersection on the basis that it does not safely connect the future residence of the development proposal to the community. 2. Environmental impact on the Wetlands (water table and wildlife). 3. Cultural significance. 4. Impact on local Possum and Kangaroo populations. Potential development of a kangaroo corridor between the Monaghan's roundabout and the Vasse roundabout, that ensures safe movement through feeding grounds. 5. Safe pedestrian access to the beach is required to minimise vehicular impact on protective dunes, where cars currently park along Geographe Bay Road from Forth St to the cul-de-sac near Newtown Beach Road.		

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

24	1. It does not provide an environmental impact statement relating to the "guiding principles" for this project contained in the Structure Plan. The Abbey South Structure Plan will create a framework for the future urban development of an anticipated 350+ dwellings, which will ultimately house a new community in the vicinity of 800-950 people. According to current figures over1300 residents live in Abbey and 2479 live in Vasse. So around 4000 people will be impacted by this proposal along with numerous commuters who will travel through this area. It amazes me there is no requirement to obtain an Environmental Impact statement from the Environmental Protection Authority! IN THE LIGHT OF THE GUIDING PRINCIPLES THIS WOULD HAVE BEEN A NECESSITY IN ORDER TO JUSTIFY WHAT IS HAPPENING! There is no consideration of existing environmental and physical assets making up the infrastructure of Abbey. 2. In summer Geographe Bay Rd becomes a war zone where on public holidays the people from surrounding areas descend upon this road/area in order to use our iconic beach or boat ramp. Consequently, they park illegally along the road on the beach side and walk through the diminishing dunes to the beach. I have lived here for over thirty four years and have watched this area be eroded by the sea and population increase. Most of the vegetation here is dying due to this activity. Soon the Shire will have to build a rock wall here to protect	1. The proposal is supported by an Environmental Assessment and Management Strategy (September 2022 - Emerge Associates) and was referred to the EPA for determination prior to public advertising. 2. The Abbey Foreshore is located outside of the project area. It is noted that the City is undertaking a separate project to select a new site and design for a regional recreational boating facility between Abbey and Dunsborough. This will ultimately provide additional capacity and reduce pressure on existing facilities. 3. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 4. Noted. Outside the scope of this proposal. 5. Noted. As per comment No. 1. 6. Noted. Outside the scope of this proposal. 7. The proposed development will have access to sufficient drinking water allocation. Sewage will be accommodated via a connection to the existing infrastructure.	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	houses and roads as they have with the beachfront in West Busselton. Has this problem been investigated….how many vehicles flow down Newtown Beach Rd at different times of the year, how many parking fines have been issued in this precinct and have residents been questioned about this? 3. Similarly, what is the flow of traffic along Caves Rd like at peak hours of the day and what do residents think about the possibility of 1000 more residents adding to this congestion? This failure to evaluate traffic movement in the Abbey precinct will impact the "vernacular" of that community. 4. The increase in the urban population will also have a serious impact upon the environment as many of these new residents have pets and because our laws regarding pet management are ineffective, our environment will be compromised. Dogs being off the leash in the beach area, faeces left wherever, dogs endangering cyclists and now scooters, increased dog attacks, native wildlife decimated by cats and finally Rangers being exhausted by trying to administer the mess! Recently, I was attacked by a Bull Mastif on Geographe Bay Rd and was traumatised by the experience. The Ranger interviewed me and took all the details. They could not find the dog or the owner even though pets are supposed to be registered and a fee paid….he said many people ignore the rules! I see that every day on the beachfront or riding my bicycle. How has this problem been factored into the planning? What data		

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	relating to dog attacks, cat numbers and pet ownership have been considered when drawing up strategies to be responsive to the environment in the principles that are stated in the application. 5. As previously stated, the Abbey Precinct has limited parking for beach users and shopper/patrons at Monaghan's Corner. Consequently, the only available area for parking is the areas now considered for the Abbey South Project along with the proposed petrol Station at the old market on the corner of Caves Rd and Bussell Hwy is 20 positions at Monoghans and approximately 10 at the beach front. Imagine the chaos that will occur at this intersection as people negotiate entry to the petrol station, the popular Claudio's Patisserie, the Fish Shop or a day at the beach. Considering there will be only one exit from the new estate, there seems to be a complete failure to review traffic flow or parking. It could end up like the mess in town where the roundabout near Kentucky Fried Chicken is a problem due to congestion. 6. Finally, the limited recreational facilities in the new proposal will contribute to more anti -social behaviour becoming prevalent in Abbey. Many young people are using the boat ramp area and beach to hoon around on in cars. The same situation happens at Forth Rd drain parking area. All this is anecdotal evidence garnered from neighbours and observations over recent years. What data have the police received/monitoring complaints in the Abbey area regarding community connectivity?		

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	7. The water table on the beach front at Abbey has been impacted by inland development over recent years and people with irrigation spears have had to go deeper to access water since the development of Vasse. Will investigation into the impact of further development at Abbey South on the water table be factored into decisions? Similarly, with the increase in population what will be done to address the sewerage problems created by this as our facilities seem to be at the optimum levels at the moment.		
25	1. The zoning to medium and high density urban development is not in keeping with the ' existing natural and built character of the locality'. Does not comply with Leeuwin Naturalists Strategy Plan. PS 1.13 being sensitive to the existing natural and built character of the locality'. The Abbey area is not medium and high density as proposed in this rezoning plan for Lot 4. 2. Increase traffic congestion on Caves Rd at the roads into and out of the redevelopment area. This being especially evident over summer holidays and long weekends. Expect waits of up to five minutes to get out onto the road. Will turning lanes be part of the project and will they encroach on the vegetation buffers and visual screening requirements? 3. I am worried that measures to protect remnant vegetation and habitats will fall by the wayside. Already, about 5 years ago, a huge number of trees were removed from lot 4. I can only guess that plans were already being discussed and the early tree	1. The R-Codes proposed will provide for a range of lot sizes and design typologies. Car storage will be provided for within the lot. On Street parking will also typically be available for additional vehicles. R20 - R40 areas are proposed to become R20 and a new area of residential R10 is proposed to provide for a lower density transition area. 2. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 3. Noted. The site largely consists of cleared agricultural (pastoral) land. The management of vegetation and fauna values as part of future development of the site must be appropriately managed through the standard subdivision process. Modifications are	1. Modifications 1, 3, 7 and 9, as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	removal was to bypass the exact objections we are currently making. 4. Infrastructure is not sufficiently developed to handle the increased population. Local beaches have no parking, hence car parked on roadside verges encroaching into native bush. Do the local primary and high schools have the facilities to cater for and increased population without putting current and future student's education standards at risk? I am not opposed to progress and development as we must look to the future but it needs to be done sympathetically. I know there are more plans in the pipeline for Monaghans and Lot 402. Perhaps a bigger picture for the area is in order.	proposed to improve tree retention and enhancement outcomes. 4. The Abbey Foreshore is located outside of the project area. It is noted that the City is undertaking a separate project to select a new site and design for a regional recreational boating facility between Abbey and Dunsborough. This will ultimately provide additional capacity and reduce pressure on existing facilities. The Department of Education has confirmed that sufficient capacity is available.	
26	1. I'd like to notify you of the rapid and unsustainable development of new housing developments in our area. While it may seem like more housing is needed to accommodate our growing population, the truth is that these developments often come at a cost to our quality of life. 2. One major concern is the lack of amenities in new housing developments. Developers often prioritize profit over community well-being, resulting in developments that lack parks, community centers, and other public spaces that foster social cohesion and promote health and wellness. This is particularly concerning for families with children, who need safe and accessible spaces to play and socialize. 3. Another major concern is the impact of new housing developments on traffic volumes. As new developments are built, traffic on already congested	1. Noted. 2. Noted. The development is required to provide a minimum of 10% of the site as public open space. Further, developers are required to pay a contribution to the City for each lot developed that is used to develop new community facilities. 3. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 4. Noted.	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	roads increases, leading to longer commute times, air pollution, and reduced safety for pedestrians and cyclists. This not only reduces our quality of life but also has negative impacts on our health and the environment. 4. The solution is clear: we must prioritize sustainable development that puts the needs of people and the environment first. This means pushing for stronger land use regulations that prioritize green space, public amenities, and sustainable transportation. It means working with developers to design developments that are in line with our values and needs, not just their profit margins. We have the power to make a difference. We can demand that our elected officials prioritize sustainable development, and we can use our voices and votes to hold them accountable. We can support community organizations that are working to promote sustainable development and protect our quality of life. In closing, I urge you to join me in advocating for sustainable development that puts people and the environment first. Together, we can build a better future for ourselves and our children.		
27	1. Local streets & parking do not support the increase in population. The wetlands will be detrimentally affected. Children will be less safe with the increase of traffic in local areas. The traffic in my street will increase as well as the numbers of cars parking - my children will be less safe in their bikes. People already speed passed.	1. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 2. The Environmental Assessment found that the majority of the Structure Plan area is	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		capable of urban development, subject to floodway areas being provided as public open space.	
28	1. Too much additional traffic congestion on Caves Road prior to the implementation of the Dunsborough link. Traffic congestion already horrific and hazardous when exiting beach side Abbey due to traffic coming from Dunsborough direction and heading towards Dunsborough. Unsafe to cross Caves Road. Dunsborough link needs to be made a priority to lessen the burden on Bussell Hwy (between Abbey & Vasse) and Caves Road. The traffic congestion is 10-fold when it's holiday season / public holidays. I suggest a car counting device be installed in several spots along Caves Road over the Easter Break to really bring emphasize how bad it is. Traffic islands on Caves Road may assist with making crossing of Caves Road slightly safer.	1. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 2. Traffic modelling demonstrates the Vasse Dunsborough Link is not required to facilitate the proposal.	3. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.
29	1. Firstly I have concerns re the road accesses to Caves road. Also the possible higher vehicle & foot traffic using Roberts Road where there is no footpath. Caves Road is already a very busy road especially during the morning & afternoon peak periods. This becomes extreme during holiday periods where it is not uncommon to have traffic banked back to past the RAC caravan park up to Monahan's roundabout. Having vehicles & or pedestrians trying to enter Caves Road will be	1. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 2. The Abbey Foreshore is located outside of the project area. It is noted that the City is undertaking a separate project to select a new site and design for a regional	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	extremely dangerous. The completion of the Caves Road bypass is required as a priority. 2. Also, I have concerns about probable increases to vehicle & pedestrian traffic along Roberts Road where there is no footpath, this despite us having to pay a contribution to the council for "footpaths" as part of our building approval to build our home?	recreational boating facility between Abbey and Dunsborough. This will ultimately provide additional capacity and reduce pressure on existing facilities.	
30	1. I object to this proposal for the following reasons - Under SPP 6.1 Leeuwin Naturaliste Ridge which is still currently the statutory State Planning Policy for this area the site is identified as a Wetland Amenity Area which in -Policies- states LUS 3.30 Rural landscape & coastal reserve buffers between Abbey and Vasse, and Dunsborough and Abbey will be maintained to avoid urban sprawl and to create distinct communities. LUS 3.33 The landscape separation of Abbey, Vasse and Dunsborough will be maintained. As SPP 6.1 has heirachy over LNSRS (which appears to have been implemented without local community consultation) I'm concerned this proposal does not reflect the intent of SPP6.1. 2. As stated in LNSRS 1.3 Key Planning Issues – Environment - 'The adverse impact of increased human activity along the coast on the marine environment' and 'Increasing competition and demand for coastal access for recreation, industry and tourism'. I have concerns over the further degradation of vegetation & dunes along Abbey foreshore (which is already under stress) from the increased human activity this proposal will bring.	1. The Leeuwin-Naturaliste Sub-regional Strategy 2019 (LNSRS) was amended by the State Government in 2021 at which time the northern portion of site was identified as suitable for Urban development. The southern portion of the site was identified as 'Open Space Investigation'. The floodway area that is immediately south of the site may continue to provide a buffer between Abbey and Vasse. Modification 3 to the SP is required to support LUS 3.33 of the LNSRS. 2. The Abbey Foreshore is located outside of the project area. It is noted that the City is undertaking a separate project to select a new site and design for a regional recreational boating facility between Abbey and Dunsborough. This will ultimately provide additional capacity and reduce pressure on existing facilities. 3. The proposal is generally considered to be low density in nature. Some medium density is proposed in specific suitable locations in accordance with the City of *Busselton Local Planning Strategy 2019*.	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	3. As stated in LNSRS 1.3 Key Planning Issues – Settlement - 'The need to retain each settlements distinct sense of place, community and lifestyle'. I'm concerned the high density of this proposal will adversely effect the current relaxed, quiet, community feel of this area. 4. I have concerns about the existing habitat pathway of Western Ringtail Possums being fragmented, particularly where entrance & exit roads cross the caves road reserve. 5. I am concerned if this proposal goes ahead it will set a precedent for land at Vasse North PIA to be treated the same which will further exacerbate the issues above. 6. I also feel the closing paragraph in Part 4 – Conclusion of the Amendment Report 'Urbanisation of the subject area will enable the Busselton township to grow in an orderly and considered manner, while maintaining and respecting the environmental values and sense of place that are unique to the Busselton area.' is misleading. An orderly approach to development would be to develop first those areas of land in proximity to Busselton designated and planned for such for the last 30 years where service headworks have been planned, road capacity exists and which do not conflict with specific objectives of SPP6.1.	4. Noted. Proposed new road reserves linking the Site to Caves Road may have a significant impact on the species due to fragmentation of existing habitat linkages. Fragmentation of these linkages means to create a disjuncture between patches that affects the ability of animals to move, for example habitat trees separated by more than six metres. Referral under the EPBC Act may be required due to multiple road reserves fragmenting the habitat linkage. Modification 1 is required to minimise impacts caused by road connections. 5. Modification 1 to the SP is required to support LUS 3.33 of the LNSRS. 6. Noted.	
31	1. There is no way the roads can deal with the amount of traffic that will come with this development. The traffic this amount of houses will generate cannot be dealt with the infrastructure in place now.	1. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	2. The size of the blocks is ridiculous, the type of dwellings that could be erected on those blocks will bring the area down.	would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 2. The majority of the site is coded R20 (with some new areas coded R10) which is a common coding for new residential areas and is broadly in keeping with the existing character of the locality.	required to address matters raised in the submission. 2. Modification 7, as contained in Attachment G – Schedule of Modifications, is required to address matters raised in the submission.
32	1. Busselton does not have the infrastructure to cope with a further increase in population. Wildlife impacted. As a retired ED nurse, who worked at Bunbury Hospital, the number of patients who were transferred from Busselton were numerous and I fear the increase in population from this development would make this situation worse. 2. Wildlife will be heavily impacted, where will the displace kangaroo mobs go ☹Native trees will be lost when the area is cleared, leading to endangered possums losing their homes. 3. Increased traffic could lead to more congestion and accidents. Fortunately we can walk to the beach from our house but have noticed the Newtown Beach area becoming more popular and with this means more cars parking along Geographe Bay Road due to no car park apart from the Boat ramp. 4. I do realise that people need homes to live in and Busselton has a severe shortage of rentals and this development would help alleviate this problem but how many of these new homes will become Air BnB ? Living on Cambridge Estate, where there are	1. Noted. 2. Noted. 3. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 4. The Abbey Foreshore is located outside of the project area. It is noted that the City is undertaking a separate project to select a new site and design for a regional recreational boating facility between Abbey and Dunsborough. This will ultimately provide additional capacity and reduce pressure on existing facilities. 5. Noted.	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	numerous ones, we notice the increase of inhabitants during holiday times.		
33	1. High increase to traffic on Caves Road. 2. Loss of wildlife habitat. 3. Will become a Airbnb estate with little or no affordable housing. As stated in para 7.	1. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 2. Noted. Modification 1 to the SP is required to enhance habitat provision. 3. Noted.	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.
34	1. Caves Road traffic entry points from 3 roads already difficult to navigate and pull out at peak times. In it's current form this proposal, having one road entry point onto Caves Road, is dangerous in my opinion. The traffic already on Caves Road is at peak at times. I pull out onto Caves Road driving to Dunsborough for work each day & into Busselton on weekends regularly, which traffic is already bad. Let alone if another road is added on the opposite side of Caves Road as an entry point. Just to note the recent March long weekend I drove back from Augusta on the Monday public holiday, I could not turn right into either of the 3 road entry points to Abbey beach side due to traffic banked up from Dunsborough - traffic had to stop to let me through. It would be crazy to have another road entry to Caves Road on the opposite side in the mix of a situation with a long weekend or peak school holidays. Suggestion would be a roundabout to keep the flow of traffic going (but would also bank it up more) but may be a safer way	1. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 2. The proposal is supported by an Environmental Assessment and Management Strategy (September 2022 - Emerge Associates) and was referred to the EPA for determination prior to public advertising. 3. Noted.	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	with vehicles pulling on to Caves Road from both sides of the road. Otherwise just wait until the bypass is complete before approving a traffic intersection like this for a property development. 2. Environmentally how is this development proceeding without an environmental impact statement? The wetlands and wildlife that is in the development area needs consideration and one would think this is required before the development is put out for public comment. 3. Please think about how this affects the small community of Abbey. We are a small community here. The owners of the Development 'Abbey Landowners' if they live here would know the affects the traffic would have on local residents using Caves Road on a daily basis - however if they do not live here and are not regular users of Caves Road then they may not realise the impact of their development proposal.		
34	1. Need more housing as the current housing isn't adequate and is seeing lots of families homeless and moving away from the area. Local business as struggling to hire people because there is nowhere for them to live.	1. Noted.	1. That the submission be noted.
35	1. Road and beach parking infrastructure does not currently exist to support the development. I am not opposed to the development in general, but council and main roads need to address a connection to the bypass via siesta park (or where possible). 2. I will support the development when infrastructure to support it has been completed.	1. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 2. Noted.	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	3. Building new developments without addressing its negative impact will greatly affect the future financial stability of our shire. 4. Regional growth is happening and that's great, council are responsible for making sure this is done in a sustainable way by showing future planning skills. 5. Abbey Boat ramp will grow hugely in population and more parking along the shore and safe vehicle access through to it need to be upgraded to ensure safety of residents, pedestrians and drivers. 6. More public transport and safe bike access needs to be introduced to the region.	3. Noted. 4. Noted. 5. The Abbey Foreshore is located outside of the project area. It is noted that the City is undertaking a separate project to select a new site and design for a regional recreational boating facility between Abbey and Dunsborough. This will ultimately provide additional capacity and reduce pressure on existing facilities. 6. The proposal includes a network of footpaths and a central higher order cycle path that will connect the development to the broader network. The Public Transport Authority did not provide comment on the proposal. A modification has been included to require the provision of additional shared paths and safe and efficient access to bus stops adjoining the SP area.	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

36	1. Already large areas of vegetation being removed for housing development in the shire. i.e. The Enclave development. Local integral wetland will be impacted by through foot/ vehicle access and local wildlife/ flora affected negatively. 2. Traffic congestion already severe during holiday season and start end of school times...Access points will make it virtually impossible and dangerous to get out. Pedestrian/cyclist access to beach side already dicey with speed limit and amount of traffic through this section. 3. Beach parking will not be adequate especially Buayanup River end. Already erosion happening due to inappropriate parking,walk throughs and natural erosion. 4. Flooding does occur at times and no amount of infill will deter it when it happens. This area is zoned Rural Conservation it should stay that. 5. The Busselton/ Vasse/ Abbey/ Marybrook/ Dunsborough environment needs large connected buffer zones not small fragmented lacking in diversity zones. 6. Housing is important but not to the detriment of the environment. That helps no one in the long term	1. The Environmental Assessment found that the majority of the Structure Plan area is capable of urban development, subject to floodway areas being provided as public open space. 2. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 3. The Abbey Foreshore is located outside of the project area. It is noted that the City is undertaking a separate project to select a new site and design for a regional recreational boating facility between Abbey and Dunsborough. This will ultimately provide additional capacity and reduce pressure on existing facilities. 4. Floodway areas have been accommodated within public open space. 5. Noted. Modification 1 to the SP is required to support LUS 3.33 of the LNSRS and to enhance habitat. 6. Noted.	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.
37	1. Flora and fauna destruction, development on wetlands, possum habitat loss, environmental impact, traffic congestion, noise and light pollution, access points, conservation zoning, flooding, cultural significance of the site, pedestrian safety, small lot sizes, changing the peaceful nature of the area, beach	1. Noted.	1. That the submission be noted.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	access, parking at the beach for all of the new residents.		
38	1. This proposal will negatively affect the local amenity - environmentally (immediate wetlands), socially - impact on local community and local fragile beachfront structure with the high increase in numbers using facilities/requiring inadequate infrastructure. 2. Traffic congestion - already Caves Road (Monaghan's Corner) is unable to support current usage adequately, and is seriously inadequate over high tourist-impact times. Traffic noise is negatively impacting the local community already. 3. The area is wetland sensitive and would result in significant flora and fauna destruction - no doubt there are other species as well as the endangered ringtail possum whose habitat and lives would be negatively impacted. Our coastal strip is fragile, wetland preservation is critical to the coast's wellbeing. There will also be significant negative impact on the water table. 4. Beach access/parking are already very challenging for residents - and for those who holiday in the area. 5. Pedestrian/cyclist activity in the suburb of Abbey is increasing with resultant safety concerns. 6. Whilst there is currently a housing crisis, any development of sensitive and fragile environments requires sensitive and ecologically sustainable action.	1. Noted. 2. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 3. The site largely consists of cleared agricultural (pastoral) land. The Environmental Assessment found that the majority of the Structure Plan area is capable of urban development, subject to floodway areas being provided as public open space. The management of vegetation and fauna values as part of future development of the site must be appropriately managed through the standard subdivision process. 4. The Abbey Foreshore is located outside of the project area. It is noted that the City is undertaking a separate project to select a new site and design for a regional recreational boating facility between Abbey and Dunsborough. This will ultimately provide additional capacity and reduce pressure on existing facilities. 5. Noted. Modification 1 is required to ensure that pedestrian and cyclist infrastructure is provided. 6. Noted.	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

39	1. To whom it may concern, I am writing this submission to register my disgust at the proposal to turn the Abbey area into a Perth suburban block size ghetto. 2. Apart from the area being designated as a wetland area under the State Planning Policy, the amount of R60 designated size blocks is unacceptable and portrays a money grabbing exercise by (A) the developers, and (B) the City of Busselton. 3. Planning designation for this area appears to have been altered without local community consultation, my understanding is that it has been rezoned from SSPP 6.1 which has hierarchy over LNSRS and does not reflect a wetland amenity area. 4. To allow this development to proceed in this area destroys the perception of a country town, that has attracted retirees and Sea Change people to the area. 5. If this is the response by the City of Busselton to that theory, then the residents of Abbey and the surrounding area may as well sell up and move to East Perth or Joondalup, where you can live in a treeless ghetto. 6. I would love to be convinced by the person/persons that have put forward this planning disaster, that they would be prepared to live in this crowded treeless ghetto. I am sure that when "they" moved to Busselton, they did so because they saw the relaxed lifestyle in Busselton and wanted to escape from the exact real-estate style disaster that they are proposing. 7. We as residents of the Vasse area enjoy a relaxed lifestyle, I am not opposed to "progress", but new	1. Noted. 2. Noted. The R60 portion of the proposal accords with the *City of Busselton Local Planning Strategy 2019*. 3. Noted. The State Government amended the LNSRS in 2021. 4. Noted. 5. Noted. 6. Noted. 7. Noted 8. Noted. The R60 portion of the proposal accords with the City of *Busselton Local Planning Strategy 2019*.	1. That the submission be noted.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	developments must reflect the lifestyle that we as Busselton residents have come to this area to enjoy, a community that is not crammed into boxes just because there is a money-making scheme put forward. This development if it goes ahead in its current form, it will destroy the Abbey environment, put stress on the coastal foreshore and the increase in local traffic and parking areas will require extensive redesign. 8. Please see reason, it isn't as though we are already running out of land to build on, we are in the country, not in South Perth where people are surrounded by freeways and constant traffic congestion. The amount of R60 lot sizes proposed is not conducive to the Abbey lifestyle and enviroment, and the lot numbers should be reduced and made at least R20.		
40	1. INTEGRATED MOVEMENT NETWORK There should be greater connectivity between the Abbey South and Vasse North, preferably a fully integrated road network which provides convenient, safe and high-quality access for pedestrians, cyclists and cars for north-south travel. This is recommended to be a centralised road connection connecting the Primary Street in the proposed SP with the central road depicted in the Vasse North concept design. We expect that this would have been a mandatory outcome had planning for Abbey South and Vasse North been progressed within the one Structure Plan process. At the very least provision should be made for emergency vehicle access to be possible between the two landholdings, which would preserve the	1. SPP 6.1 requires a buffer between Vasse and Abbey, "…rural landscape and coastal reserve buffers between Abbey and Vasse…..will be maintained to avoid urban sprawl and to create distinct communities" (LUS3.30) and LUS 3.33 "The landscape separation of Abbey, Vasse and Dunsborough will be maintained." The proposal to connect Abbey South and Vasse North as suggested is directly contrary to these principles of State Planning Policy 6.1. An integrated road network and development in close proximity to the floodway would not meet this requirement.	1. That the submission be noted. 2. Modifications 1 and 14, as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	option for future connectivity. Providing this connection now will future-proof the opportunity for direct connection to the Vasse Village Centre should this be required in the future. If not incorporated now, this opportunity will be lost. The connection will also serve an important intra-local function for access in the event of an emergency in the Vasse / Abbey area. At present there are only 4 road connections across the Broadwater Nature Reserve between the Abbey, Kealy and Bovell localities, comprising Bussell Hwy, Fairway Drive (5.5 km to the east), a more circuitous route using Swamp Hen Lane (4 km to the east) or Marybrook Road (6 km to the west). The proposed connection provides an important intermediate access to the Bypass in the event that Bussell Hwy is required to be closed (refer Attachment 3). The current planning process is the only evident opportunity to secure this important connection with no other land being suitable or available for this purpose. As part of an integrated north-south road network, cycle and pedestrian access will also be provisioned which will allow direct and safe internal movements to the potential TAFE facility and the Vasse Bypass pedestrian underpass that links into the Vasse Village, both located at the southern end of Vasse North. 2. INTEGRATED PLANNING WITH VASSE NORTH Considering the size and proximity of the two landholdings, structure planning should consider the two areas as a single, integrated planning unit, in which case the referred road connection would be	2. As part of its assessment of the 5 Planning Investigation Areas in the LNSRS, it was determined by the WAPC that a separate structure plan should be prepared over both the Abbey South and Vasse North precincts. This is in recognition of the different physical and environmental issues facing the two areas, and is also in recognition of the 470m (approx.) of floodplain that separates the two areas. Further, it is noted that vehicle connectivity is not one of the additional matters that the WAPC required to be considered in either structure plan. 3. Noted. DWER are working with the proponent to finalise the LWMS. Modification 14 is proposed to ensure that that LWMS is complainant and considers that broader drainage network. 4. Noted.	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	provided as a matter of course. Contrary to Section 1.4 of the Explanatory Report, there is no secret that planning is being actively advanced for Vasse North as an extension of the Vasse Estate. Technical reporting has been completed, and a revised Concept Plan has been prepared ahead of another joint planning session with the WAPC and the City, which would also include DWER. Subject to planning approval, Vasse North is anticipated to be the next development front of the Vasse Estate, with development commencing from 2025. Vasse North is anticipated to be developed ahead of the JV's Armstrong Precinct which has been delayed due to negotiations with Federal Environmental Regulators regarding an environmental offset for the potential removal of Western Ringtail habitat (Peppermint Trees) and Black Cockatoo breeding trees. The omission of any substantive reference to the Vasse North landholding in both the Amendment and SP documentation, as well as the City's reporting, is concerning, especially when Vasse North is similarly designated for Urban and Open Space Investigation in the LNSRS. This demonstrates that there has been inadequate consideration given to how the smaller Abbey South landholding of 30ha will integrate with the larger 60ha parcel of Vasse North. It is understandable that the Abbey South landowner group seeks to progress approval for its land expeditiously. However, considering that when developed both landholdings will form a single urban unit, the lack of integration is a significant oversight		

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	that should be addressed. The JV has previously met with representatives of the Abbey South landowner group to raise the issues outlined in this submission, however the submitted Structure Plan does not reflect any response to these matters. The JV is open to further discussion with the Abbey South proponents, facilitated by the City of Busselton / Department of Planning, Lands and Heritage to consider solutions to the issues raised in this submission. 3. DRAINAGE The proposed SP (Figure 14 of Explanatory Report) depicts two drainage outlets to the JV's Lot S20 required to connect drainage from the land to the wider drainage network. There has been no material discussion between the proponent and the JV seeking an integrated solution to this issue. The current design locks in the landowners of Vasse North to the proponent's drainage solution and this cannot be guaranteed. 4. RECOMMENDATION We recommend approval agencies convene a joint session between the proponents of Abbey South and Vasse North to ensure the matters outlined in this submission are properly considered and addressed before final decisions are made on the Abbey South rezoning and SP. This session would address: Provision of a road connection between the two landholdings, or at least the provision of emergency vehicle access as an interim solution that preserves the opportunity for future connection.		

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	An integrated drainage solution that has regard for the emerging design of the Vasse North land. Such other matters that arise from discussion that serve to better integrate the two landholdings to enhance local amenity, improve local environmental outcomes and future proof the area.		
41	1. I have concerns regarding increased traffic to an already congested area (especially during holiday times) including beach access, beach parking, pedestrian and cyclist safety. 2. Destruction of flora and fauna, possum habitat loss and destruction of wetlands 3. If the proposed development goes ahead it will destroy the "feel" of Abbey as well as put stress on the coastal foreshore.	1. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 2. The site largely consists of cleared agricultural (pastoral) land. The management of vegetation and fauna values as part of future development of the site must be appropriately managed through the standard subdivision process. Modifications proposed to address submitter comments. 3. Noted.	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.
42	1. I am not objecting to Amendment 51 as I see it as a foregone conclusion that rezoning will eventuate. My objection is to the high density population of up to 1000 people who will occupy a site of less than 30 hectares. The Associated Precinct Plan is out of character with the larger blocks and current zoning of beachside Abbey. There is a need for housing but a much better plan which is less invasive to existing residents should be considered. The majority R20 zoning with block sizes as low as 150m2 is scary as it will impact heavily on existing residents and the	1. The R-Codes proposed will provide for a range of lot sizes and design typologies. Car storage will be provided for within the lot. On Street parking will also typically be available for additional vehicles. R20 - R40 areas are proposed to become R20 and a new area of residential R10 is proposed to provide for a lower density transition area. 2. The Abbey Foreshore is located outside of the project area. It is noted that the City is undertaking a separate project to select a	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission. 2. Modifications 1 and 4, as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	amenities available. One impact will be to devalue Real Estate in beachside Abbey as with an additional 1000 residents within 400m cramped into a 30Hectare development, it will not be the lovely suburb it is today. Busselton has had many successful developments in the past which have had larger block sizes than 150m to 400m (Country Rd and Kalgarich come to mind). These have provided new residents with the opportunity to enjoy the environment here rather than a Perth metropolitan type of sub-division. 2. Amenities which will be heavily taxed will include beachside parking eventually requiring parking lots replace the nature reserve on the beach side of Geographe Bay Rd. The boat launching ramp will be in heavy demand and traffic movement along Caves Rd and Geographe Bay Rd will be congested. 3. There is no approved and funded plan to go ahead with the bypass to Dunsborough in the next 5 years so to put 2 T intersections into Caves Rd for access to this proposed development is ludicrous in light of the increased traffic congestion this will cause. 4. There is a clear lack of consideration for existing residents in this plan which would provide an opportunity for the developers to maximize profit with as many small block sizes as they can have approved, forever changing ABBEY.	new site and design for a regional recreational boating facility between Abbey and Dunsborough. This will ultimately provide additional capacity and reduce pressure on existing facilities. 3. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 4. Noted.	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

43	1. It is completely opposite the local design of the already established Abbey and Cambridge communities. I oppose the proposal for the rezoning for the development of South Abbey on the grounds of it being not 'compatible to the natural characteristics and traditional settlement patterns of the area.' (Lewin Ridge Naturalist Strategy). The suburb of Abbey and the adjoining Cambridge, are beautiful green environments full of trees, with green lawns and lush gardens. People have chosen to live in these communities for their proximity to the coast but also for the visual and aesthetic values of these areas. 2. They have pockets of peppy tress to provide natural homes for our possum population and other bird life. Quiet nature reserves and fantastic parks and open spaces for families. 3. This is what Abbey South should emulate. It should not be small mass produced accommodations squeezed together to maximize profits over community. Please, if you must rezone, make it a community for the people and not a South Abbey Slum.	1. The majority of the site is coded R20 – R40 which is a common coding for new residential areas and is broadly in keeping with the existing character of the locality. The provision of low to medium density coding will provide for a range of lot sizes, design typologies, and price points. 2. The design includes over 10% of the site as Public Open Space, including the retention of some existing trees. 3. Noted.	1. That the submission be noted.
44	1. I have been a resident of Abbey for 12 years and a resident of the City of Busselton for 28 years. I would first like to state that I am not against the overall proposal of Abbey South & the subdivision into residential lots. However, I believe there are a number of issues that should be addressed for the current proposal of Abbey South. These issues & suggestions are outlined below.	1. Noted. 2. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway.	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission. 2. Modifications 1 and 4, as contained in Attachment G – Schedule of Modifications, are

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	2. Entry & Exit into Abbey South Whilst not totally against the proposal, I believe there are a number of changes that could improve the subdivision. The proposal states that the primary access to the site will be via a full movement T intersection between Locke St and Cuthbert St. A second full movement T intersection is proposed further to the east on Caves Rd. I believe this should be reconsidered based on the following: - I would expect the more frequent vehicle travel for residents would be from Abbey South to Busselton (east) and Vasse (south) for work, school and shopping. Residents may therefore be inclined to take a short-cut & use the minor Eastern entry on Caves Rd or exit via Bussell Highway (left only) & doing a U-turn at the roundabout. - Traffic on Sundays mornings and at the end of long weekends is regularly banked up west of the Caves Rd/Bussell Hwy roundabout. This could have implications for vehicles turning right along Caves Rd from Abbey South. Suggested approach: The above issues may be alleviated by moving the main intersection to align with Cuthbert St so that a roundabout or median strip (similar to Cambridge Blvd/Bussell Hwy intersection) could be utilized OR the main intersection could be onto Bussell Highway via a full T intersection or roundabout. 3. Housing Density I believe the Council should reconsider the density of Abbey South. There are a number of subdivisions in	3. The R-Codes proposed will provide for a range of lot sizes and design typologies. Car storage will be provided for within the lot. On Street parking will also typically be available for additional vehicles. R20 - R40 areas are proposed to become R20 and a new area of residential R10 is proposed to provide for a lower density transition area. 4. Noted 5. Noted. The Leeuwin – Naturalist 2050 Cycling Strategy identifies several routes that are planned to join the site with the surrounding network. Namely the following routes are identified: Cuthbert Street (Local Route), Forth St / Buayanyup Drain (Primary Route – Constructed), Newtown Beach Road (Secondary Route), Bussell Highway (Primary Route) and Caves Road (Primary Route). 6. The Abbey Foreshore is located outside of the project area. It is noted that the City is undertaking a separate project to select a new site and design for a regional recreational boating facility between Abbey and Dunsborough. This will ultimately provide additional capacity and reduce pressure on existing facilities. 7. Noted.	required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	the City of Busselton that allow smaller & more affordable housing, for example Kealy, Yalyalup and the greater Dunsborough Lakes area. Given the attractiveness of this location being close to the beach & the ability to leave some existing established vegetation, rather than making this 'just another subdivision', Abbey South could have a unique offering with a larger proportion of lots between say 600 square metres – 2,000 square metres to make it a more unique & premium offering. This could make Abbey South a point of difference to other regional suburbs where they all look similar with mostly 400-500 square metre blocks and standard project style homes. 4. I believe higher density housing should be reserved for areas closer to main commercial areas and town centres like inner Dunsborough, Vasse & Busselton. 5. Cycle Paths and Beach Access Thought also needs to be given to the surrounding area to the north of Abbey South. The proposal seeks to maximise the use of cycle paths. One of the main attractions of Abbey South will be its close proximity to the beach. The current plan appears to only have 2 exits to the north on Caves Rd. If the cycle paths align with these intersections, it would mean that accessing the Abbey beach would require riding along Caves Rd to Locke St, Cuthbert St or Roberts Rd. Currently there are no cycleways or footpaths on any of these roads. Consideration should be given as to upgrading paths on these roads, or join Abbey South		

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	up to the existing shared use path that runs alongside Buayanyup Drain. 6. Abbey Beach Parking While Abbey South aims to encourage cycling and walking, many residents will still wish to drive to the nearest beach, being Abbey beach, due to a number of reasons eg. wanting to use kayaks, paddle boards or if they have young children. In peak periods over summer, the carparks at the mouth of Buayanyup Drain and Abbey boat ramp are already at capacity. Often they can be over capacity with cars having to park along Geographe Bay Rd. Council needs to consider the impact of Abbey South on existing infrastructure at Abbey beach. There are limited options for more car parking due to the small dune system. Possible options could include: 1. Extension of carpark at Abbey boat ramp (however there is limited space) 2. Introduce a new car park to the west of Buayanup Drain (there is already a sand track leading to the beach here). 7. Council should give due consideration to the above concerns of existing Abbey residents to ensure Abbey South integrates into the existing relaxed & peaceful Abbey locality.		
45	1. These small blocks <600m devalue the area and reduce quality of life to owners. small blocks lead to houses being rented, narrow streets limited on site parking for 4 plus cars - this is evident where ever these subdivision happen	1. The R-Codes proposed will provide for a range of lot sizes and design typologies. Car storage will be provided for within the lot. On Street parking will also typically be available for additional vehicles. R20 - R40 areas are proposed to become R20 and a new area of	1. That the submission be noted.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		residential R10 is proposed to provide for a lower density transition area.	
46	1. Under SPP 6.1 Leeuwin Naturaliste Ridge which is still currently the statutory State Planning Policy for this area the site is identified as a Wetland Amenity Area which in -Policies- states LUS 3.30 Rural landscape & coastal reserve buffers between Abbey and Vasse, and Dunsborough and Abbey will be maintained to avoid urban sprawl and to create distinct communities. LUS 3.33 The landscape separation of Abbey, Vasse and Dunsborough will be maintained. As SPP 6.1 has heirachy over LNSRS (which appears to have been implemented without local community consultation) I'm concerned this proposal does not reflect the intent of SPP6.1. 2. As stated in LNSRS 1.3 Key Planning Issues – Environment - 'The adverse impact of increased human activity along the coast on the marine environment' and 'Increasing competition and demandfor coastal access for recreation, industry and tourism'. I have concerns over the further degradation of vegetation & dunes along Abbey foreshore (which is already under stress) from the increased human activity this proposal will bring. 3. As stated in LNSRS 1.3 Key Planning Issues – Settlement - 'The need to retain each settlements distinct sense of place, community and lifestyle'. I'm concerned the high density of this proposal will adversely effect the current relaxed, quiet, community feel of this area.	1. The Leeuwin-Naturaliste Sub-regional Strategy 2019 (LNSRS) was amended by the State Government in 2021 at which time the northern portion of site was identified as suitable for Urban development. The southern portion of the site was identified as 'Open Space Investigation'. The floodway area that is immediately south of the site may continue to provide a buffer between Abbey and Vasse. Modification 3 to the SP is required to support LUS 3.33 of the LNSRS. 2. The Abbey Foreshore is located outside of the project area. It is noted that the City is undertaking a separate project to select a new site and design for a regional recreational boating facility between Abbey and Dunsborough. This will ultimately provide additional capacity and reduce pressure on existing facilities. 3. Noted. The City of Busselton has conditioned the provision of vegetated buffers to ensure appropriate visual screening and separation of development from main roads adjoining the Special Provision Area. 4. Proposed new road reserves linking the Site to Caves Road may have a significant impact on the species due to fragmentation of existing habitat linkages. Fragmentation of these linkages means to create a disjuncture	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	4. I have concerns about the existing habitat pathway of Western Ringtail Possums being fragmented, particularly where entrance & exit roads cross the caves road reserve. 5. I am concerned if this proposal goes ahead it will set a precedent for land at Vasse North PIA to be treated the same which will further exacerbate the issues above. 6. I also feel the closing paragraph in Part 4 – Conclusion of the Amendment Report 'Urbanisation of the subject area will enable the Busselton township to grow in an orderly and considered manner,while maintaining and respecting the environmental values and sense of place that are unique to the Busselton area.' is misleading. An orderly approach to development would be to develop first those areas of land in proximity to Busselton designated and planned for such for the last 30 years where service headworks have been planned, road capacity exists and which do not conflict with specific objectives of SPP6.1 (ie. Vasse, Yalyalup, Ambergate).	between patches that affects the ability of animals to move, for example habitat trees separated by more than six metres. Referral under the EPBC Act may be required due to multiple road reserves fragmenting the habitat linkage. Modification 1 is required to further minimise fragmentation impacts caused by road development. 5. Noted. 6. Noted.	
47	1. I object to the proposal to change the zoning from rural and conservation to urban development. My concerns are the huge impact it would have on native fauna and flora especially endangered ring tail possums and bandicoots that live in this area. I object to the proposal as it would destroy the habitat for endangered fauna that frequent the area such as bandicoots and ring tail possums.	1. The site largely consists of cleared agricultural (pastoral) land. The Environmental Assessment found that the majority of the Structure Plan area is capable of urban development, subject to floodway areas being provided as public open space. Modifications are required to further minimise fragmentation impacts caused by road development.	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	2. Caves road is already heavily congested and without a bypass being approved I feel this development is unsustainable. 3. The local schools are already at capacity and can not support more students without having detrimental effects on the communities. As a long term local I fully oppose this development.	2. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 3. The Department of Education has confirmed that sufficient capacity is available.	
48	1. The objection to the development relates predominantly to the impact of the development on: - Adverse impacts of Traffic on the local area and reliance on future, uncommitted road amendments and improvements; - Omission of any Sustainability measures in the Structure Plan, both at a Macro and Micro (built form) level; and - Lack of clarity regarding the development density targets. Impact of the development on the Local Area. 2. The traffic study for Caves Road uses average traffic flows and does not address peak flows which occur during holiday season. During these periods: a. Traffic queues along Caves Road from the Caves Road/Bussell Highway roundabout; and b. It is difficult to turn onto Caves Road from the nearby streets (particularly Roberts Road, Cuthbert Street and Locke Street). The traffic study (including acoustic study) and development entry/exit points rely on future road amendments which are not in the 5 year planning timeframe and which may never occur. It is already hazardous for	1. Noted. 2. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. An acoustic noise assessment will be undertaken prior to WAPC determination in accordance with Modification 8. 3. The Abbey Foreshore is located outside of the project area. It is noted that the City is undertaking a separate project to select a new site and design for a regional recreational boating facility between Abbey and Dunsborough. This will ultimately provide additional capacity and reduce pressure on existing facilities. 4. The proposal provides high level staging information that will be refined at the subdivision stage. 5. Liveable Neighbourhoods is the WAPC's operational policy for the design and	1. Modifications 1, 8 and 9, as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	pedestrians/cyclists/scooter riders to cross Caves Road for persons trying to access the local beach from South of Caves Road (e.g. to and from the RAC Caravan Park, to and from the walk path between Abbey and the Vasse shops). This development will increase the number of persons seeking to cross Caves Road; and 3. The proposal does not address the potential increase in vehicles parking along Geographe Bay Road (to visit the beach). There are already issues with car parking and boat trailer parking along this section of the road, with consequent damage to the bushland and interference with pedestrian access to the beach. 4. There does not appear to be any discussion on the staging of the construction of the development and how this may impact on the local area traffic and environment. 5. Impact off the development on the Environment. The structure plan does not address the impact of the built form on the environment and (aprt from some "educational material) is silent on initiatives to optimise the sustainability of the development. The Structure Plan Guiding principles do not even mention Sustainable Outcomes as a design principle. The development structure plan appears to rely entirely on the regulatory framework to deliver any sustainability outcomes. Clearly this is a "lowest possible" benchmark and indicates a complete disregard for the current environmental and climate change issues dominating policy in Government. The Structure Plan does not address construction impacts	assessment of new (greenfield) urban areas, and provides guidance as to key considerations such as urban form, housing density, road networks, schools and public open space. The Structure Plan has been designed to meet the principles of Liveable Neighbourhoods including the urban form, road hierarchy, public open space distribution and urban water management. 6. The R-Codes proposed will provide for a range of lot sizes and design typologies. Car storage will be provided for within the lot. On Street parking will also typically be available for additional vehicles. R20 - R40 areas are proposed to become R20 and a new area of residential R10 is proposed to provide for a lower density transition area.	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	(noise, dust, waste,) nor how any of these impacts will be mitigated during construction. The Landscape Masterplan is very general and does not appear to address proposed new planting of shade trees. 6. Development Density The structure plan provides density "estimates" but does not include an upper or a lower limit on density. There do not appear to be any indicative layouts of proposed dwelling arrangements for the development, and it is unclear whether any building envelope constraints (for apartments/grouped dwellings) are applicable.		
49	1. I do not support this proposal as I do not believe due diligence has been completed in regard to environmental impact, cultural significance and the impact of further development of this magnitude on the water table for the wetland area. I am very concerned regarding the re-zoning of this area and future adjacent areas in Vasse. Such a proposal will set an unacceptable precedent on land that is of significant environmental value.	1. The site largely consists of cleared agricultural (pastoral) land. The Environmental Assessment found that the majority of the Structure Plan area is capable of urban development, subject to floodway areas being provided as public open space. The management of vegetation and fauna values as part of future development of the site must be appropriately managed through the standard subdivision process.	1. That the submission be noted.
50	1. Development is too large, block sizes too small, density too high. There is no urgency for a development of this size with new land opening up in Vasse and Yalyalup. A scaled back version with fewer blocks of larger size would be more appropriate for the area. 2. Conservation zones need to be prioritised and protected, not developed. No valid reason to include the conservation area in the development or change	1. The R-Codes proposed will provide for a range of lot sizes and design typologies. Car storage will be provided for within the lot. On Street parking will also typically be available for additional vehicles. R20 - R40 areas are proposed to become R20 and a new area of residential R10 is proposed to provide for a lower density transition area.	1. Modifications 1 and 4, as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	its zoning status. If the conservation status of the land has been deemed of low value then the landowner should take responsibility for this rather than be allowed to profit from this neglect. 3. Increase in local traffic and pressure on beachfront. Parking and access points at nearby beaches insufficient and already under pressure due to increased use and climate change. Further population increases in the immediate areas will threaten the coastline and dune habitats.	2. The site largely consists of cleared agricultural (pastoral) land. The Environmental Assessment found that the majority of the Structure Plan area is capable of urban development, subject to floodway areas being provided as public open space. The management of vegetation and fauna values as part of future development of the site must be appropriately managed through the standard subdivision process. Modifications are required to enhance the site in accordance with SP76. 3. The Abbey Foreshore is located outside of the project area. It is noted that the City is undertaking a separate project to select a new site and design for a regional recreational boating facility between Abbey and Dunsborough. This will ultimately provide additional capacity and reduce pressure on existing facilities.	
51	1. Submission pertains to Lot 402 (12 Caves Road Abbey). Increasing permissible residential density. The Structure Plan proposes a residential density code of R60 for the subject site. The Leeuwin-Naturaliste Sub-regional Strategy and City of Busselton Local Planning Strategy both contemplate higher density in the wider region and locality. While the former describes a mixed-use development in the Abbey Planning Investigation Area, the latter contemplates increases in planned development density within urban growth areas as well as the	1. Noted.	1. That the submission be noted. 2. Modifications 6 and 16, as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	opportunity for high density housing and tourist accommodation within and around activity centres. The Leeuwin-Naturaliste Sub-regional Strategy specifically talks to the low residential density and ageing housing stock in the City while noting the significant constraint of the" ... high conservation status of the Western Ring tail Possum and the need to retain its habitat". Providing an increased residential density coding of R80 would simultaneously increase residential density, provide housing diversity and typologies suited to an ageing demographic and represent a move that seeks to reduce future habitat destruction as it relates to increasing housing supply. The City's Local Planning Strategy outlines strategies to achieve objectives related to growth within the City. Of these strategies, of note is the following: ... Support other proposals for redevelopment/consolidation (including through increases in permissible residential density) in existing urban areas, or for increases in planned development density in urban growth areas, especially in close proximity to activity centres or high amenity areas, such as in coastal locations, adiacent to open space, or which are close to significant community facilities. Planning for consolidation should have regard to Special Character Areas, amenity, streetscape and Western Ringtail Possum habitat. [emphasis added] 2. Increases in permissible density are suggested at suitable sites. Evidently, the subject site complies with the site characteristics outlined as:	2. Noted. The proposed coding of Lot 402 as R60 is considered to strike the most appropriate balance between intensification	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	1. The subject site is in an urban growth area; 2. Designated to be a Local Centre, opposite the Monaghans Local Centre and in close proximity to the Vasse Activity Centre; 3. In an area of high amenity, in a coastal location; and 4. Adjacent to the proposed public open space (POS). Furthermore, the subject site's prominent corner location and access to both Caves Road and Bussell Highway complement mixed-use development of a greater density. Increasing the residential density coding of the subject site to R80 will result in development being considered under Residential Design Codes (R-Codes) Volume 2. Under Volume 2 of the R-Codes, primary planning controls are more conducive to mixed-use development, as envisaged by the Structure Plan and relevant strategic documents. Volume 2 is also considered to be a superior instrument to consider elements related to design quality, environmental sustainability, internal amenity and public domain interface. Section 3.8.1 Part 2 of the proposed Structure Plan also refers to the planned regional road linkingVasse to Dunsborough (VOL). Outlined here is that Main Roads Western Australia has forecasted a reduction in the order of 80% as it relates to vehicles per day using Caves Road. The planned VOL is conducive to increased permissible density at the subject site. 3. Removal of the requirement for a Local Development Plan. Section 8 Part 1 of the proposed Structure Plan	as per the *City of Busselton Local Planning Strategy (2019*), the existing amenity and character of the area, and the unresolved access constraints associated with the site. Accordingly, R80 is not supported.	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	requires a Local Development Plan (LOP) to be prepared for any lot zoned Local Centre. The subject site is the only lot within the Structure Plan area designated Local Centre. The requirement of an LDP at the subject site is unjustified and unwarranted. An LOP is typically prepared to coordinate design and development and assist in achieving better built-form outcomes on constrained lots. Firstly, the subject site adjoins road reserves to the north and east, while adjoining future POS to the south. The only adjoining site with development potential is proposed Lot 21 which has direct road frontage to be used for access. There is therefore no need to coordinate development of the two adjoining lots as this is already readily addressed by the R-Codes and relevant local planning policies. Secondly, an LDP for a single site, in single ownership is a redundant planning instrument. An LOP, if implemented at the subject site, would require the decision maker to make judgements on the design of a building with less information than would be contained in a typical development application. The requirement for an LOP at the subject site is an unnecessary additional layer of planning assessment that would ultimately serve no purpose in the consideration of any development proposal. On this basis, we contend that the requirement of an LOP for the subject site by the proposed Structure Plan is unjustified. Schedule 2 Part 6 cl. 56, of the Planning and Development Regulations - Deemed Provisions allows for the	3. Not supported. Local Development Plans (LDPs) are required to be prepared and implemented pursuant to Part 6 of Schedule 2 of the *Planning and Development (Local Planning Schemes) Regulations 2015* for lots comprising one or more of the following site attributes: - Lots zoned Local Centre; - Lots with rear-loaded (laneway) vehicle access; - Lots that propose grouped or multiple dwelling development; - Lots with direct boundary frontage (primary or secondary) to an area of POS; - Lots located within an area with a density coding of R10; - Lots that are deemed to be affected by road noise. Lot 402 has four of the above attributes, and is also subject to SP76, which requires an LDP to address: - Location of car parking, pedestrian access and vehicular/service access areas for development where adjacent or located on Lot 402; - Amenity of the locality and surrounds; and Landscape values and visual management considerations. A modification to LDP requirement proposed under Special Provision 76 number 3 (ii) is supported (as detailed in Attachment G). It is	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	approval of development applications in the absence of an LDP if the decision maker is satisfied that: a) The proposed development does not conflict with the principles of orderly and proper planning; and b) The proposed development would not prejudice the overall development potential of the area. Imposing the requirement of an LOP at the subject site incurs our client unwarranted financial losses and does not reflect proper and orderly planning. Allow for additional permissible uses and minimise constraints Pursuant to the City's Local Planning Scheme No. 21 (LPS21), the objectives of the 'Local Centre' zone are: a) To provide for development at a scale sufficient to serve the Centre's catchment, but not detract from the commercial primacy of the Regional Centre and Centre zones. b) Providing for limited expansion of existing smaller centres to ensure access to services at a local level and building neighbourhood identity. c) To ensure that development provides for activation of the street and public spaces, high-quality design and a variety of land uses. 4. With respect to these objectives, and to encourage vibrant and successful activity centres that can adapt and respond to market demands, it is important not to unduly restrict the range of uses that may be contemplated in the Local Centre. We request that 'Aged Persons' Home' be included as a permissible use at the subject site. By providing for	considered that the intent of this provision is adequately addressed in the SP. 4. Supported. Provision of aged care accommodation accords with City of Busselton Local Planning Strategy (2019). Modification 12 recommended to include the following additional "A" uses over Lot 402, Caves Road Abbey WA:	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	aged care uses at the subject site the proposed structure plan would better align with both the Leeuwin-Naturaliste Sub-Regional Strategy and City's Local Planning Strategy, both of which denote the City's ageing demographic. The subject site's higher density, proximity to shops and services, POS and public transport is also conducive to aged care uses. Permitting aged care uses also allows for the possibility of an agglomeration of related uses such as a medical centre, consulting rooms and cafe - all of which are permissible uses within the Local Centre. 5. Section 4.3 Part 2 of the proposed Structure Plan limits retail floor space (RFA) within the proposed Local Centre zone to not more than 300m2 gross floor area. The justification for this is to protect the existing Local Centre - 'Monaghans Corner' from being compromised. Our client, the soon to be registered proprietor of the subject site, is also the registered proprietor of Lot 34 (20) Monaghans Way, Abbey (Monaghans Corner). As the City is aware, redevelopment of Monaghans Corner is currently being progressed, and is likely to commence in the near future. The local community, Elected Members and City officers, have made clear their strong desire for the continuation of the existing local businesses, during and following redevelopment. Ideally, the subject site may potentially accommodate those existing businesses, on a temporary or permanent basis, that are displaced by the redevelopment of Monaghans Corner. Furthermore, the Productivity Commission's report on the 'Economic Structure and	- Residential aged care facility. - Independent living complex. 5. Not supported. The City of Busselton Local Planning Strategy (2019) requires that the amount of shop retail floorspace shall be determined by more detailed planning processes and following retail sustainability analysis. Additionally, the site has substantial access constraints and expansion of GFA is opposed by MRWA. Accordingly, any increase in floor space would need to considered at the LDP / Development Application stage and must be supported by a retail sustainability analysis.	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	performance of the Australian Retail Jndustry'found that with respect to prescriptive local planning restrictions on retailers: To meet evolving product market requirements, store formats must also be allowed to adapt. Restrictions on store formats impact on a retailer's ability to adapt to new competition and changing consumer preferences within the market.1 State Planning Policy 4.2 Activity Centres (SPP4.2) entertains an RFA threshold of 1,ooom2 for a Local Centre, while draft SPP4.2 entertains an RFA threshold of 1,soom2 in consideration of this, our client's interests and intent, we request that the limit on retail floor space is increased to a modest 1,000m2. Our requests as they relate to additional permissible uses and minimising planning constraints align with the objectives of the Local Centre zone pursuant to LPS21. The subject site will complement the existing Local Centre at Monaghans Corner while not detracting from larger Centres and Regional Centres in Vasse, Dunsborough and Busselton. 6. OTHER CONSIDERATIONS Management of public open space The proposed structure plan includes a Bushfire Management Plan (BMP) prepared by Emerge Associates. The BM P includes a bushfire attack level (BAL) assessment criterion that assumes no ongoing management of POS for bushfire purposes. Under this assumption, a portion of the subject site is classified BAL- FZ.	6. Noted. It is considered that the LDP is the appropriate mechanism to address the bushfire matters relating to Lot 402.	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	By requiring a bushfire buffer at the subject site, the City is abrogating its responsibility to manage bushfire risk and placing the onus for bushfire management solely on the owners of affected lots. We expect that the City will maintain any POS within the structure plan for bushfire purposes negating any bushfire impacts on the subject site due to the location of the proposed POS. 7. CONCLUDING REMARKS Once again, on behalf of our clients, we would like to confirm our 'in principle' support for the proposed Structure Plan and associated Scheme Amendment. We respectfully request the City considers our recommendations as they relate to Lot 402 (12) Caves Road, Abbey. These recommendations are that: 1. The residential density coding of the subject site be increased to R80; 2. The requirement of an LDP for the subject site be removed; 3. Aged care uses be permitted at the subject site; 4. Increase the RFA limit; and 5. The City commits to ensure proper bushfire management of any proposed POS.	7. Noted.	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

52	1. Objection: Lack of consideration of environment, cultural heritage, pressure on local infrastructure, impacts on Abbey beach. 2. Lack of transparency as to developers. There was no discussion about investigation into culturally significant areas which is a gap in the proposal. 3. I am concerned the proposal impacts a Rural and Conversation zone by rezoning it. There is no EPA report on the consequence for wetland and native fauna and flora, this needs to be undertaken to ensure any development has strict guidelines for protection. 4. The proposal is too high density for the area, whilst housing is an issue, the area is already experiencing extremely high growth and the infrastructure is already straining under the load. Modelling on average traffic flows fails to take into account the mayhem that already occurs in the area on any holiday weekend, peak load on infrastructure needs to be considered. Travelling East or North from the subdivision will require a right hand turn which will be impossible in peak traffic. 5. There is a lack of transparency as to who is doing the development, who is "The Abbey Landholder Group" and are there any real or apparent conflicts of interests for scheme decision makers?	1. Noted. 2. A portion of an 'Other Heritage Place' (ID 5337) is mapped as extending into the western portion of the site. This feature is described as 'skeletal material/burial' and is likely to be associated with the drain further to the west (supported by information provided in the Buayanyup River Action Plan (Geographe Catchment Council 2010)) where the Aboriginal site is described as being associated with the drain. The EPA recommends appropriate consultation, investigation and relevant management plans be undertaken prior to subsequent stages of planning to address potential impacts to Aboriginal heritage values. This was not deemed necessary at structure plan stage and will be further considered as part of subdivision stage. Newtown House (associated with Amelia Park Lodge) is located immediately south of the site, and is identified as having local heritage value. It will not be impacted by development within the site. 3. The proposal is supported by an Environmental Assessment and Management Strategy (September 2022 - Emerge Associates) and was referred to the EPA for determination prior to public advertising. The Environmental Assessment found that the majority of the Structure Plan area is capable	1. Modifications 1, 3, 8 and 9, as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		of urban development, subject to floodway areas being provided as public open space. 4. The R-Codes proposed will provide for a range of lot sizes and design typologies. Car storage will be provided for within the lot. On Street parking will also typically be available for additional vehicles. R20 - R40 areas are proposed to become R20 and a new area of residential R10 is proposed to provide for a lower density transition area. 5. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. An acoustic noise assessment will be undertaken prior to WAPC determination in accordance with Modification 8. 6. The Abbey landowner group is comprised of private individuals that own the land in the structure plan area. The City of Busselton has no conflict of interest.	
53	1. Object: insufficient study work and pressure on Abbey Beach. The study seems to lack any reference to sustainability and environment. What will be the impact om ringtail possums, other fauna and flora. How will this wetlands be impacted and what areas of cultural heritage significance for the Wadandi people will be impacted? Whilst we acknowledge	1. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. An acoustic noise assessment will be	1. Modifications 1, 3, 8 and 9, as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	that housing is a concern our area has and continues to see huge growth. 2. The infrastructure to reflect that growth is not in place and any holiday weekend already turns Caves Rd and Monaghan's corners into grid lock, adding three more intersections and highly dense population with no alternative route is going to cause major distress for the local population. The bypass road isn't in the 5 year budget so until the bypass is built the development will be diabolical for locals. Who are "The Abbey Landholder Group", they have commissioned the report and the lack of transparency as to who parties that will benefit from the development raises concerns about conflict of interest with decision makers. Abbey Beach is already under major pressure with parking, pedestrian traffic through the narrow native vegetation corridor (which is all the holds back the winter storms from Geographe Bay road) and traffic congestion. There is no consideration of that in the report.	undertaken prior to WAPC determination in accordance with Modification 8. 2. The Abbey Foreshore is located outside of the project area. It is noted that the City is undertaking a separate project to select a new site and design for a regional recreational boating facility between Abbey and Dunsborough. This will ultimately provide additional capacity and reduce pressure on existing facilities. 3. The proposal provides high level staging information that will be refined at the subdivision stage. 4. Liveable Neighbourhoods is the WAPC's operational policy for the design and assessment of new (greenfield) urban areas, and provides guidance as to key considerations such as urban form, housing density, road networks, schools and public open space. The Structure Plan has been designed to meet the principles of Liveable Neighbourhoods including the urban form, road hierarchy, public open space distribution and urban water management. 5. The R-Codes proposed will provide for a range of lot sizes and design typologies. Car storage will be provided for within the lot. On Street parking will also typically be available for additional vehicles. R20 - R40 areas are proposed to become R20 and a new area of	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		residential R10 is proposed to provide for a lower density transition area.	
54	1. It's a wetland area. 2. The road infrastructure isn't there. It's so busy there already. 3. Can the schools even have further input. They are bursting already. So many more to list. 4. The entire southwest needs to sort infrastructure first before more developments. 5. Also these blocks are way to small.	1. The Environmental Assessment found that the majority of the Structure Plan area is capable of urban development, subject to floodway areas being provided as public open space. Modification 1 is proposed to provide a buffer around the floodway. 2. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 3. The Department of Education has confirmed that sufficient capacity exists. 4. Noted. 5. The R-Codes proposed will provide for a range of lot sizes and design typologies. Car storage will be provided for within the lot. On Street parking will also typically be available for additional vehicles. R20 - R40 areas are proposed to become R20 and a new area of residential R10 is proposed to provide for a lower density transition area.	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.
55	1. Lots 4 and 12 are parkland cleared (Figure 2) with mature Peppermint trees present. These trees are habitat for the endangered Ringtail Possum which is a threatened species under State and Commonwealth legislation. In Western Australia the species is listed as Critically Endangered fauna under the Biodiversity	1. The site largely consists of cleared agricultural (pastoral) land. The Environmental Assessment found that the majority of the Structure Plan area is capable of urban development, subject to floodway areas being provided as public open space.	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	Conservation Act 2016. It is incumbent upon the City to proactively protect their habitat and to strongly discourage clearing and destruction. The southern end of Lot 4 is low lying and prone to seasonal inundation. It is a Conservation Zone of the SCA (Wetland and Floodway Special Control Area). The WAPC have indicated this Conservation listed area and public open space warrants investigation for possible suitability as part of the Strategy Plan. Due to seasonal inundation and in the present climate of change this area should be considered as unsuitable for urban dwellings and should be retained as an environmental amenity and habitat into the future. I note that the Local Planning Scheme 21 scheme amendment removes the Landscape Value Special Control Area from the Structure Plan. It is my opinion that this amendment should be revoked and the Landscape Value SCA be reinstated. Figure 4. Current existing strip vegetation between the lots, and road verge screening vegetation, should be retained in its current state to provide habitat corridors for wildlife, shade, erosion mitigation, maintenance of soil health and a pleasant visual vista for locals and visitors alike. 2. The Structure Plan Guiding Principles state that this application be landscape-led, maintain a buffer on Caves Road, be a pedestrian friendly neighbourhood, provide appropriate and safe vehicle and pedestrian egress, address the ability of people to cross from the development to Monaghans Corner to the existing shops and the beach. Minimise disruption to regional	The management of vegetation and fauna values as part of future development of the site must be appropriately managed through the standard subdivision process. Proposed new road reserves linking the Site to Caves Road may have a significant impact on the species due to fragmentation of existing habitat linkages. Fragmentation of these linkages means to create a disjuncture between patches that affects the ability of animals to move, for example habitat trees separated by more than six metres. Referral under the EPBC Act may be required due to multiple road reserves fragmenting the habitat linkage. Modifications are required to meet the requirements of SPA 76 with regard to the provision of buffers and enhancement of the site. 2. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. Traffic modelling demonstrates the Vasse Dunsborough Link is not required to facilitate the proposal. 3. Noted. 4. Noted.	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	networks, i.e. traffic leaving and entering the development onto Caves Road (carrying increased traffic especially from the west as Dunsborough opens up new housing developments and acquires high rise residential and visitor developments in the near future). Concerted efforts need to be put in place by the City of Busselton to pressure Main Roads to budget for the Vasse-Dunsborough Link be built in the immediate future. 3. It is my deep wish should this development become a Development Application, that the Developers consider seriously and genuinely the aspirations listed in the Structure Plan Guiding Principles. It is time for developers to be to encouraged (pressured) to consider a wider range of key factors that take into account not only a one off profit benefit, but ongoing benefit for the environment and a place in which people can thrive. Plan and build homes, not houses for profit. 4. 'Agile Planning for the New Urban' – these are words from an old and dying paradigm - a 21st century outdated mantra for this re-zoning of land and possible development. And they fool no one. Yes, there is a need for more housing: varying block sizes that allow for shade trees to be preserved where they already exist room for new plantings and block sizes that address different living/family configurations. Affordable housing and renting opportunities for itinerant workers, young people coming into the market and social housing. I believe we have an opportunity at this point in human affairs		

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	to steer away from the old paradigms of greed, development and progress at all costs, and take stock of where this trajectory has landed the globe. Time to rejig the definition of 'progress', ditch the greed that was enshrined in the '80s, and design urban spaces with an intelligence that encompasses the whole and creates environments that foster human health, well-being and harmony; allowing all that sustains us to flourish.		
56	1. The Caves Rd west entry and exit. As members of the community, you know that Caves Rd during normal days (work hours) can be hazardous trying to get in or cross over to the other lane. When you add in holidays, weekends, special events, etc…it is next to impossible to get across. Adding the proposed entry/exit between Cuthbert St and Locke St will exacerbate the possibilities of serious traffic accidents. Recommendations: - Change the proposed west side Caves Rd entry/exit point to a left in/left out intersection. Use the 'T' intersection further to the east on Caves Rd as the full movement 'T' intersection. - Caves Rd has more congestion than the Bussell Highway, make that entry into a full movement 'T' intersection in conjunction with recommendation above. - Another option is to take out the west Caves Rd entry/exit all together. Cambridge housing area has limited entry/exit points so a precedent as been set for the area.	1. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. Traffic modelling demonstrates the Vasse Dunsborough Link is not required to facilitate the proposal. 2. The R-Codes proposed will provide for a range of lot sizes and design typologies. Car storage will be provided for within the lot. On Street parking will also typically be available for additional vehicles. R20 - R40 areas are proposed to become R20 and a new area of residential R10 is proposed to provide for a lower density transition area. 3. Noted. Public Open Space quantity and distribution has been provided for in accordance with Liveable Neighbourhoods planning requirements.	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	- Alternatively, if the intersection is approved as is, to mitigate possible accidents create a green zone at the end of Cuthbert St (just like Forth St to the west and Harnett St to the east). Residents will have to use safer roads coming in and out but should reduce the possibility of accidents with 3 roads entering Caves Rd in such close proximity. - Additionally build, not plan the Vasse-Dunsborough link. 2. Residential block sizes. I know that the WAPC Planning Investigation Area (PIA) took into consideration the Local Planning Strategy 2019 and the Leeuwin-Naturaliste Sub-regional Strategy 2019, "The Abbey PIA is well suited to more intensive forms of Urban development….adequate supply of affordable land, promoting a variety of housing choice remains available…." Need to take into consideration that the established Abbey community across Caves Rd doesn't have R60 block sizes. Recommendation: - Change proposal to have minimum block sizes of R30. Second and third order of effects are less traffic, less carbon emissions, less building material needed, more green space around homes, etc..This change to the development will be more in line with the established community blocks sizes. 3. Public Open Spaces (POS) is a great plan and is much needed in designing a new community. Meeting the core principles of being connected, multi-functional, environmentally responsive, respectful, accessible, and equitable might not check off all the blocks in	4. Noted. The City of Busselton significant growth potential over the medium and long term in terms of land and resource availability. 5. Noted.	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	this case. Looking at the POS diagram, most green zones are toward the middle and west of the development. Only two POS are in the east sectors with no other green spaces planned. The current plan does not meet the principles of being accessible or equitable. Recommendations: - Add a green corridor and/or additional park like area on the east side. - Reduce the number of blocks (R30) in the community to have more POS's. - Lumping this recommendation into green spaces, I know that the outer space on Caves Rd is to be kept as buffer. It has peppy trees for the Ring Tail Possum (not a fan but wife is). Recommend adding additional peppy trees especially along the eastern side on Caves Rd (help create a wider buffer) and within the planned POS's to provide habitat for the endangered possum. - Have the developers as part of the homeowners agreement that only native trees and bushes indigenous to the area are to be planted. This will reduce the amount of watering required and attract the local fauna. 4. This is just one of several planned housing developments within Busselton area. I know there is Local Planning Strategy 2019, Leeuwin-Naturaliste Sub-region Strategy 2019, Strategic Community Plan 2021-2031 and sure there is more documents to reference. Planning for communities is great but can		

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	city really absorb the population growth as projected in the Strategic Community Plan. 5. Recommendations: - a. Reassess the approved developments and ensure the Community Infrastructure can support the growth. - b. Reassess the current priorities that will have to support the growth (Vasse-Dunsborough link, public school capacity at all levels (not just the Ambergate North and Dunsborough future high schools), Utilities and infrastructure etc…Not everything can be built without increasing capacity (I know, preaching the choir). - c. From an Abbey resident, I didn't see any plans on improvements of the Abbey foreshore and boat ramp in order to handle the additional future traffic. Are there plans that I missed? I know the urban sprawl is inevitable and this area is highly sought after.		
57	1. Monahans roundabout can't cope with extra traffic/it struggles now; Any proposed alteration to R/about would impact our property. Any proposed changes to the Monahans Roundabout with the removal of any of the tree buffer zone will impact us hugely as we are the closest point to the roundabout and noise and lighting will be a problem to us. 2. Objection to the reclassing land to residential as there will be too many houses in the proposed area. Overcrowding will occur.	1. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 2. Noted. 3. The Abbey Foreshore is located outside of the project area. It is noted that the City is undertaking a separate project to select a new site and design for a regional	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	3. Lack of beach access and parking. The extra volume of residents will put a huge amount of pressure on the forshore, no parking or access points. Pedestrian crossing from development to the beach will be very dangerous. 4. Lack of schooling in the area will put a huge stress on infrastructure and existing facilities. 5. Wifi in our area is not terrific so the proposed extra 400 houses and 900 people would make it near on impossible to get any service.	recreational boating facility between Abbey and Dunsborough. This will ultimately provide additional capacity and reduce pressure on existing facilities. 4. The Department of Education has confirmed that sufficient capacity exists. 5. Noted.	
58	1. I support this so that others may enjoy the area of Abbey. Development will bring other needed amenities to the Abbey area which are needed as the area grows.	1. Noted.	1. That the submission be noted.
59	1. This sub-division and it's associated infrastructure can be successful and blend harmoniously with the current surrounding neighborhood, environment and facilities. There are other areas along Bussell Hwy much more suitable, such as the old drive-ins. I have grave concerns regarding traffic congestion, speed limits, access points, noise and light pollution, flora and fauna destruction, possum habitat loss, conservation zoning, waterlogging, flooding, wetland preservation, cultural significance of the site, beach access, beach parking, pedestrian and cyclist safety, small lot sizes, lack of local infrastructure, environmental impact, coastal inundation, as well as changes to the peaceful nature of the Abbey area. 2. Currently we have "hooning" activity in the area at any time of day, and particularly on Geographe Bay Road, this will no doubt increase and will be a real	1. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 2. The site largely consists of cleared agricultural (pastoral) land. The Environmental Assessment found that the majority of the Structure Plan area is capable of urban development, subject to floodway areas being provided as public open space. The management of vegetation and fauna values as part of future development of the site must be appropriately managed through the standard subdivision process.	1. Modifications 1, 3, 9 and 14, as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	danger to the increased numbers that will be using the area daily. There is no room along the foreshore for added parking for beach users so this will be a major problem and could lead to damage to our "dune" system which protects all of the area from the high water levels we see during the winter months, not too mention sea level rises we continually hear about as a result of climate change.	3. The Abbey Foreshore is located outside of the project area. It is noted that the City is undertaking a separate project to select a new site and design for a regional recreational boating facility between Abbey and Dunsborough. This will ultimately provide additional capacity and reduce pressure on existing facilities. 4. The R-Codes proposed will provide for a range of lot sizes and design typologies. Car storage will be provided for within the lot. On Street parking will also typically be available for additional vehicles. R20 - R40 areas are proposed to become R20 and a new area of residential R10 is proposed to provide for a lower density transition area.	
60	1. I oppose the Abbey South Structure Plan No 55 as it is not in the best interest of the residents of Abbey the greater Busselton area and is inherently flawed in so many ways. 2. Firstly, as it has already been mentioned and documented on the items for debate under Major Roads, the increase in traffic directly related to the proposed new development WILL cause. Increased traffic which will cause increased traffic accidents and very likely possible resulting loss of life or limbs. There has been much research and it doesn't take an expert to understand the cause and effect of having high traffic flow in built up areas will cause traffic accidents. The proposed one main exit road leading out of the development onto caves rd is	1. Noted. 2. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 3. The site largely consists of cleared agricultural (pastoral) land. The Environmental Assessment found that the majority of the Structure Plan area is capable of urban development, subject to floodway areas being provided as public open space. The management of vegetation and fauna values as part of future development of the	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	in a very high traffic area, especially during summer, holidays, weekends etc. The residents who will be mostly impacted are the ones living across from there on caves road, Cuthbert St and Locke St. There is a lot of young families with young children in the area and their parents' concerns are very justified. As already mentioned in the items for debate under Major Roads, "Caves Road and Busselton Highway are major roads ……." The roads form significant barriers to the SAFE and EFFICIENT MOVEMENT of pedestrians and cyclists to and from the site. THIS WILL CONTINUE TO WORSEN over time given the SIGNIFICANT ADDITIONAL DEMAND that will be generated following development of the site." 3. Second major flaw is the completely understated and underestimated effect from an Environmental stand. The project proposes to change the conservation and rural titles of the land to deem it Urban Development. Under the Busselton Councils own Climate Change portfolio it states, "The City of Busselton is committed to reducing its greenhouse emissions and managing the impacts of climate change, We recognise the ecological, social and cultural importance of wetlands and waterways". I don't think anyone can deny the fact that bulldozing down over 45h of rural and wetlands and filling it with over 400 houses is going to put a big burden on the environment. The area needs to be preserved back to its natural state as much as possible to help combat climate change. Parts of it are still habitat to much native flora and fauna and if the Busselton	site must be appropriately managed through the standard subdivision process. Proposed new road reserves linking the Site to Caves Road may have a significant impact on the species due to fragmentation of existing habitat linkages. Fragmentation of these linkages means to create a disjuncture between patches that affects the ability of animals to move, for example habitat trees separated by more than six metres. Referral under the EPBC Act may be required due to multiple road reserves fragmenting the habitat linkage. Modifications are required to ensure that the SP complies with the requirements of SP76. 4. Local infrastructure capacity is sufficient to accommodate the proposed development. 5. No measures are proposed for noise amelioration for existing properties outside of the Structure Plan area. 6. Noted.	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	Council are serious about Climate Change measures then the very minimum would be to keep all of the wetland area titled as Conservation and to insure a very large buffer zone is extended around it and as the EPA, .."suggested planting native plants indigenous to that particular area, making green pathway, providing canopy connectivity , even such use as rope bridges for the native wildlife.", especially our endangered Western Ringtail Possums. 4. Thirdly the proposed up to 400 houses can be calculated easily as to an extra 800 residents in Abbey area. Is the infrastructure in place to accommodate them? We already know the roads aren't and there will be accidents as a direct result of that. We know that the local schools are already at capacity, we know that fresh, clean, and safe water is already an issue. We know that the beaches are already eroding and the 800 + extra visitors with boats and Jet Ski and fishing are going to be a detrimental to the fragile underwater ecosystems. 5. There are multiple mentions of building Quiet houses to help buffer the noise. So, what about the residents already living in the area? What measures are being planned to help us sleep at night? This proposed subdivision will have a detrimental impact on the lives of all the current residents' beach side of caves roads. It will cause traffic to worsen to a level that could easily cause physical harm to our lives, homes and environment and the increase in noise will disturb our peace, rest and sleep in our own homes.		

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	6. Summarising, we do not want to turn green spaces into concrete jungles. We do not want our idyllic beach side community turned into a suburban sprawl and with all the noise and angst that causes but most importantly we want to feel safe, and we want the children to be safe from traffic accidents and roadside trauma. I oppose the Abbey South Structure Plan No 55 as it is not in the best interest of the residents of Abbey the greater Busselton area and is inherently flawed in so many ways.		
61	1. Excellent use of urban infill. Close to amenities and natural attractions. Should not impact local traffic in any way and will be well serviced by the surrounding retail precincts, schools and ancillary services.	1. Noted.	1. That the submission be noted.
62	1. Traffic on Caves Road and Bussell Highway bordering the proposed development is already congested, dangerous. The speed limit is to high on Caves Road making it very hard to enter the line of traffic from my address. complete Vasse Duns Bypass first pretty obviously greed and not need is behind Abbey South project..its way ahead of its time and should not be attempted before Vasse Dunsborough bypass has gone and existing infrastructure has been added to in order to catch up with the massive population increase the area has already taken place in Vasse, cambridge, broadwater. 2. Do your job, listen to and implement the will of the community, not the developers... I am writing to express my concerns about the new sub-division being proposed to be built across the road on Caves Road, Abbey. While I understand the need for	1. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. Traffic modelling demonstrates the Vasse Dunsborough Link is not required to facilitate the proposal.	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	development and growth in our community, I am particularly concerned about the intended intersections that are planned to impact Caves Rd and Bussell Hwy. 3. As you are likely aware Caves Rd and Bussell Hwy are already heavily trafficked roads, particularly during peak hours. The addition of several new intersections that will be entering and exiting the roads will only exacerbate this problem. I believe that these intersections will cause significant delays and pose a serious safety risk to drivers, cyclists and pedestrians. 4. Furthermore the increased traffic from the new sub-division will only add to congestion on Caves Rd and Bussell Hwy reaching well beyond the localised Abbey area. This will impact not only on those who live in the new development but also those who live and work in the surrounding areas. I strongly urge you to reconsider the planned intersections and instead explore alternative solutions that would minimize the impact on Caves Road and Bussell Hwy. This might include creating alternative access points that do not involve Caves Rd and Bussell Hwy. 5. There is no reference in the Abbey South Precinct Structure Plan of Main Roads Department monitoring of traffic on Caves Rd or Bussell Highway in Abbey being conducted. 6. To the residents who reside in the Abbey area, it is obvious that the extra traffic load created by the above mentioned development would bring Caves Road and Bussell Highway to a unsustainable traffic		

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	flow and should not be attempted until the Vasse / Dunsborough bypass is completed. 7. The other surrounding community infrastructure in Abbey and Vasse are already under significant pressure, ie; safe predestrian crossings, schools, sports grounds, beach parking and fragile coastal foreshore access. It would seem appropriate to be able to demonstrate future planning in these areas before attempting to increase the current population by the approximate 1000 people mentioned in the Abbey South Precinct Structure Plan.		
63	1. I am writing to express my strong opposition to the proposed housing development on Caves Road, Abbey South, for several reasons. Firstly, the current main roads infrastructure is unsuitable to support the increased traffic that would result from this development. The proposed development would lead to congestion on the already busy main roads and would pose a significant risk to the safety of pedestrians, cyclists, and motorists. The proposed entry road into the development that is west of Monaghans corner is asking for accidents. Will the council stand by and allow main roads to approve this? If so, counsillors will have blood on their hands when fatalities occur. 2. Secondly, the density zoning proposed for the development is inappropriate for the surrounding area. The proposed density of R60 housing is much higher than the current residential zoning in the area, mostly R15. This would negatively impact the character and amenity of the neighbourhood.	1. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 2. The R-Codes proposed will provide for a range of lot sizes and design typologies. Car storage will be provided for within the lot. On Street parking will also typically be available for additional vehicles. R20 - R40 areas are proposed to become R20 and a new area of residential R10 is proposed to provide for a lower density transition area. A small portion of the site is coded R60 which is in accordance with the *City of Busselton Local Planning Strategy 2019.* 3. The site largely consists of cleared agricultural (pastoral) land. The Environmental Assessment found that the	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	Additionally, the proposed development would place a burden on the existing infrastructure and services, including schools, healthcare facilities, and public transportation. R60 zoning is appropriate in the Vasse area where the raods have been built for volume, there are more appropriate shopping facilities and higher demand for medium density housing in the well-serviced area. 3. Finally, there are significant environmental concerns associated with the proposed development. The proposed site is home to several endangered species, including western ringtail possums and the development would result in the destruction of their natural habitat. This would have a devastating impact on the local ecosystem and biodiversity. It is the year 2023. Look at the state of the world and the environment. Do we really have to argue whether to destroy mature trees? It is a no-brainer. The council should be leading the way and say yes to the development with strict guidelines of ways to retain every mature tree on the property. It is absolutely appalling that the council would even consider allowing the removal of mature peppermint trees given the state of the global environment, not to mention the local environment and dwindling possum population. 4. In conclusion, I urge you to reconsider the proposed housing development at Abbey South. The unsuitable main roads infrastructure, inappropriate density zoning, and significant environmental concerns associated with the development make it unsuitable	majority of the Structure Plan area is capable of urban development, subject to floodway areas being provided as public open space. The management of vegetation and fauna values as part of future development of the site must be appropriately managed through the standard subdivision process. Proposed new road reserves linking the Site to Caves Road may have a significant impact on the species due to fragmentation of existing habitat linkages. Fragmentation of these linkages means to create a disjuncture between patches that affects the ability of animals to move, for example habitat trees separated by more than six metres. Referral under the EPBC Act may be required due to multiple road reserves fragmenting the habitat linkage. Modifications are required to ensure that the SP complies with the requirements of SP76. 4. Noted.	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	for the area. I implore you to take these concerns into account and make a decision that is in the best interest of the community and the environment.		
64	1. Firstly, the work trucks will make a lot of noise and dust, and it will be hard for me to play outside or concentrate on my homework. I think it will be dangerous too, with all the big trucks driving around. My friends and I will have to be careful not to get hurt. 2. Secondly, more houses will mean more people in my neighborhood, which is already busy. There won't be enough space for everyone to play or park their cars, and the roads will be too crowded. I'm worried that my friends won't be able to come over to play anymore because their parents won't let them cross the road because it will be too dangerous. 3. Lastly, I'm worried about the animals that live in the area. They will lose their homes if they cut down all the trees, and they won't have anywhere to go. I love seeing birds, possums, and kangaroos in my backyard, and I don't want them to die. 4. I hope you will listen to me. I am only ten but what you are doing now will mean that when I grow up, I won't be able to see a possum living in the wild. I am learning in school that it is very important to protect the environment for the future generations and that is why I am writing to you. Thank you for reading my letter.	1. Noted. 2. Noted. 3. Noted. Sufficient roads footpaths, parking, and public open space are provided within the new development. 4. The site largely consists of cleared agricultural (pastoral) land. The Environmental Assessment found that the majority of the Structure Plan area is capable of urban development, subject to floodway areas being provided as public open space. The management of vegetation and fauna values as part of future development of the site must be appropriately managed through the standard subdivision process. 5. Noted.	1. That the submission be noted.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

65	1. I do not support the above Development in its current Plan / Design. Housing blocks of R20 = R40 is not appropriate or needed in the Abbey South area, and best left to inner city developments. The Busselton, Vasse and Abbey areas are in themselves not yet developed or resourced enough at this stage to support such dense developments in a coastal and wetlands catchment. To accept such a development is to ignore the expert and considered advice of various Reports and Strategic Plans for this Coastal, Wetlands strip. 2. To add such extra Traffic Loads to the Abbey area is Extremely unsafe , especially considering the current increasing tourist and holiday loads that have not been resourced by either main roads or the Busselton Shire. The current construction of the Bussell Highway into Dual carriageway is excellent but the new construction catering for higher traffic loads will cause increased stress on the Busselton, Vasse and Abbey roads and resources, that have not caught up with such major infrastructure changes. The Vasse / Dunsborough Link is years away and I do not see how this Development adheres to the Link overall planning. This Link was obviously seen as a requirement, due to the existing and future Traffic Loads, on and around Caves road., where this Development is now planned. There are already constant and increased slow down for ambulance, police and fire services (requiring the need for sirens) along the Caves road especially from Monaghan's roundabout towards Dunsborough, plus holiday	1. The R-Codes proposed will provide for a range of lot sizes and design typologies. Car storage will be provided for within the lot. On Street parking will also typically be available for additional vehicles. R20 - R40 areas are proposed to become R20 and a new area of residential R10 is proposed to provide for a lower density transition area. A small portion of the site is coded R60 which is in accordance with the *City of Busselton Local Planning Strategy 2019.* 2. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. Traffic modelling demonstrates the Vasse Dunsborough Link is not required to facilitate the proposal. 3. Noted. 4. The proponent is continuing to work with the City of Busselton and DWER to finalise the overall drainage strategy and the LWMS to ensure compliance with the City of Busselton *Local Planning Policy No. 6.1 Stormwater Management*. Further, a buffer is required to be provided within landscaped POS around the floodway. Modifications are required to address submitter comments. 5. Noted.	1. Modifications 1, 3, 9 and 14, as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	traffic build up from Vasse Bypass roundabout to Monaghan's roundabout now on a more constant basis. So this Development will restrict that flow of traffic, hence Emergency services, even more with its incorporated new Road Intersections. 3. There is also a lack of enhanced Local Capacity to cater for the population increases in the Busselton area. The Busselton Health Campus is a prime example, but all services are under pressure. 4. What about Water Quality, ground water run off and ground water levels? Look at the state of the Vasse River, going on for years, with its associated housing and other developments causing it great stress on such a natural water flow. My understanding is that the area under consideration for this Development is in itself quite a fragile wetland area. 5. Surely we need to learn from past mistakes and help to leave ours kids and grandchildren a healthy and transparent community approach for all to enjoy. 6. Developments need to be community minded as there are enough impacts on the fabric of the Busselton and Abbey community with the constant increase in holiday rentals and Air B&B type housing. The Busselton Shire needs to take a better Social and Public spirited approach to any such Development or the heart and soul of the Busselton Shire catchment area will be forever lost. Housing density problems. Traffic load major issues. Environmental Wetlands and Coastal negative impacts. Not enough local Capacity re services. Local services	6. Noted.	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

66	1. I am a concerned resident at 45 Caves Road that does not support the development of Abbey South. I have lived in the Abbey area for 12 years with my husband and have 2 young boys. Over the years we have seen a lot of changes, primarily the amount of traffic that is now using Caves Road. 2. I feel that this development will permanently destroy the unique country and beachside experience of 'Abbey' for both locals and visitors. The size of the development and smaller lots will have a significant detrimental impact on the cultural and social values of this iconic area. They include the laid-back feel to the Abbey suburb and beaches. 3. This proposal is marked as 'landscape-led' and even though it is noted that some trees will stay, the clearing of established trees, some flora and valuable possum habitat, coupled with the increase in population, will result in detrimental impacts on the natural landscapes of the surrounding area and make it an unsafe place to live in, in terms of volume of traffic and traffic movement. 4. My main concerns with this development proposal are: The effect on myself and my family's lifestyle and mental health. Our property is directly opposite the planned main entrance. This will change our viewscape dramatically and result in increased light and noise pollution, as well an increase in life danger/accidents to myself and my family when entering and exiting our property from a significant increase in traffic and possible road modifications. It	1. Noted. 2. Noted. 3. The site largely consists of cleared agricultural (pastoral) land. The Environmental Assessment found that the majority of the Structure Plan area is capable of urban development, subject to floodway areas being provided as public open space. The management of vegetation and fauna values as part of future development of the site must be appropriately managed through the standard subdivision process. 4. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. Traffic modelling demonstrates the Vasse Dunsborough Link is not required to facilitate the proposal. 5. Noted. The City of Busselton has conditioned the provision of vegetated buffers to ensure appropriate visual screening and separation of development from main roads adjoining the Special Provision Area. Modifications are required to ensure that the SP complies with the requirements of SP76. 6. Detailed road design does not typically occur at structure plan stage. Modification 1	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	could also limit access to our property with our camper trailer with planned left in and left out modifications and Caves Road is not wide enough to accommodate major modifications without encroaching on existing residents. 5. Structure Plan part 2 states that 'a screened continuous strip of 10m dense mature vegetation against Caves Rd and a generous road reserve will be retained' and State Planning Policy 6.1 Leeuwin-Naturaliste Ridge (SPP6.1) emphasises the 'importance of buffers to maintain amenity and enhance character values. The SP should provide for augment buffers to ensure appropriate visual screening and separate development from adjoining major roads'. How is this possible for those at access points and how will we be compensated when we lose our existing tree lined viewscape and this rule is not bound. 6. The EPA supports the construction of the northern access to Caves Road as there is an existing driveway but also notes the importance of avoiding 'the clearance of Western Ringtail Possum Habitat within the Caves Road Reserve. What are plans to mitigate excessive removal of trees at the entrance to create roads? 7. This development will permanently destroy the unique country/beachside experience of Abbey for both locals and visitors. The size of the development & smaller lots will impact on the natural landscapes/traffic of the area & make it an unsafe place to live Action	ensures that WRP habitat and movement requirements will be provided for. 7. Noted, refer to point 4 above. 8. Noted, refer to point 4 above. 9. Noted, refer to point 4 above. 10. The site largely consists of cleared agricultural (pastoral) land. The Environmental Assessment found that the majority of the Structure Plan area is capable of urban development, subject to floodway areas being provided as public open space. The management of vegetation and fauna values as part of future development of the site must be appropriately managed through the standard subdivision process. Modification 1 is required to ensure that the SP complies with the requirements of SP76. 11. Noted. The Department of Education has advised that sufficient capacity exists (current and planned). 12. The Abbey Foreshore is located outside of the project area. It is noted that the City is undertaking a separate project to select a new site and design for a regional recreational boating facility between Abbey and Dunsborough. This will ultimately provide additional capacity and reduce pressure on existing facilities. 13. The R-Codes proposed will provide for a range of lot sizes and design typologies. Car storage will be provided for within the lot. On	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	- All development (including entrance) should be inconspicuous and set back behind the existing tree line to preserve it on Caves Road. -Consultation between main roads and residents at access points in regard to minor road modifications. -Guaranteed safe passage for turning and reversing on verge with camper trailer attached for access to our home (potential changes to road for T intersection). -Developers should consider and provide information on landscape values and visual management for residents affected directly by access points and compensate accordingly. 8. The increased traffic on an already busy and congested Caves Road (particularly during holiday time) and in turn safety to pedestrians and cyclists and our local wildlife. Council noted there would be 'significant additional demand generated by the site' and that Caves Road and Bussell Highway 'form significant barriers to the safe and efficient movement of pedestrians and cyclists to and from the site' and 'these conditions will worsen over time'. As a family, we currently ride our bikes to school along the drain road and can already be waiting to cross Caves Road for up to 5 minutes in the morning. Even then it feels unsafe and if a collision was to occur with car speeds of 70kmph, it would prove to be fatal. Lots of traffic (during peak periods) has also been known to go around the back of Abbey to avoid	Street parking will also typically be available for additional vehicles. R20 - R40 areas are proposed to become R20 and a new area of residential R10 is proposed to provide for a lower density transition area.	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	congestion on Caves Road causing potential accidents through the suburb. 9. During peak periods, the cars bank up to the roundabout past our house and would provide no access for residents leaving the proposed access point on SP. Traffic projections in the report do not account for other developments taking place in Dunsborough which will also significantly impact Caves Road. Action -Speed limit dropped to 50/60 -Underpass at the drain bridge to provide safe bicycle access from the development road to beach -Reconsider access points and the main entrance into the Bussell Highway which has more potential area to upgrade exit to provide a safer passage -Main roads to count cars in peak periods to get accurate figures – Easter? -Push through the Vasse-Dunsborough link road which is expected to reduce traffic on Caves by -80%. Direct access to Caves Road would then make sense!! 10. Possum habitat loss. Flora and Fauna destruction. Threat to wetlands. -Council notes that the 'entirety of the site, and the adjoining land area, is located within the core habitat for the critically endangered Western Ringtail Possum and that the mature peppi trees provide linkages particularly along the MRWA road reserve to the north. Disjuncture with access points on Caves Road will affect the ability of the animal to move'. The proposal seeks to amend to City Scheme 21 to rezone Abbey south area from Rural and		

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	Conservation to Urban development. It is noted that 'the structure plan will significantly change the landscape of the area rendering the 'high-landscape value area redundant'. This area forms part of the 'floodway area and wetland area' and the development is a violation of zoning rules. Council notes that the area is mapped as having a 'medium-high' risk of acid sulphate soils occurring within 3m of the natural soil surface' in parts of the SP. If these are disturbed the acid can cause damage to the surrounding environment and buildings. Onsite water disposal will have permanent detrimental impacts on the local flora and fauna, wetlands and to the historical Buayanyup Drain which feeds into our pristine ocean. The EPA (APP-0000158) and the Buayanyup River Report supports this notion of reduced water quality discharge. Emerge notes that no site-specific flora and vegetation surveys have been completed. -EPA has recommended a Flora/Fauna management plan is submitted prior to works commencing to protect local fauna from disturbance by noise and light emissions. -Referral to EPBC Act due to multiple road reserves and access points on Caves Road fragmenting the habitat linkage for possums. -EPA have called for a water management report -EPA have called for consultation with the Department of Biodiversity, Conservations and Attractions regarding the 'management of potential impacts and the application of wetland buffers' to		

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	limit impact (APP-0000158) -EPA to investigate further 11. Local infrastructure does not support the development. Vasse Primary School is bursting at the seams, as is Cape Naturaliste College and no more schools are planned for the area. 12. Our boat ramp and beaches cannot support extra vehicles and trailers. There is already illegal parking on the cycleway near Forth Street. The coastal inundation will cause quicker coastal erosion and environmental issues for our pristine and unique coastline. The area cannot accommodate more people, with the Vasse/Broadwater/ housing developments and expansion already underway. Postpone the development until the infrastructure is in place and VDL to support. 13. The small lot sizes do not fit with the character of Abbey. the SP R60 zoning does not align with Leeuwin Naturaliste Ridge Policy, Spp 6.1 which sets policy in relation to the landscape values within the Structure Plan of which PS3.2 states that 'Development must be responsive to local values and be compatible with the natural characteristics and traditional settlement patterns of the area'. Larger blocks like those that already exist in Abbey, that allow for trees and vegetation, would keep with natural landscape and the character of Abbey and allow possums and fauna to strive. Reports written are based on the development being zoned R20 lots. Then a portion of it is zoned R60. Action		

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	-Increase lot sizes to over 600m-800m2 and reduce population. This allows mature trees to be maintained and space to plant more trees should the community desire. - Reports based on R60 zoning as this will change run off rates and water table levels? In considering this proposal, I hope that you see reason and protect the safety and amenity of Abbey residents and the resident wildlife.		
67	1. I am a concerned resident at 45 Caves Road that does not support the development of Abbey South. I have lived in the Abbey area for 12 years with my wife and have 2 young boys. Over the years we have seen a lot of changes, primarily the amount of traffic that is now using Caves Road. I feel that this development will permanently destroy the unique country and beachside experience of 'Abbey' for both locals and visitors. The size of the development and smaller lots will have a significant detrimental impact on the cultural and social values of this iconic area. They include the laid-back feel to the Abbey suburb and beaches. This proposal is marked as 'landscape-led' and even though it is noted that some trees will stay, the clearing of established trees, some flora and valuable possum habitat, coupled with the increase in population, will result in detrimental impacts on the natural landscapes of the surrounding area and make it an unsafe place to live in, in terms of volume of traffic and traffic movement. 2. My main concerns with this development proposal are:	1. Noted. 2. Noted. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 3. Detailed road design does not typically occur at structure plan stage. Proposed new road reserves linking the Site to Caves Road may have a significant impact on the species due to fragmentation of existing habitat linkages. Fragmentation of these linkages means to create a disjuncture between patches that affects the ability of animals to move, for example habitat trees separated by more than six metres. Referral under the EPBC Act may be required due to multiple road reserves fragmenting the habitat linkage. The City of Busselton has conditioned the provision of vegetated buffers to ensure appropriate visual screening and separation	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	1) The effect on myself and my family's lifestyle and mental health Our property is directly opposite the planned main entrance. This will change our viewscape dramatically and result in increased light and noise pollution, as well an increase in life danger/accidents to myself and my family when entering and exiting our property from a significant increase in traffic and possible road modifications. It could also limit access to our property with our camper trailer with planned left in and left out modifications and Caves Road is not wide enough to accommodate major modifications without encroaching on existing residents. -Structure Plan part 2 states that 'a screened continuous strip of 10m dense mature vegetation against Caves Rd and a generous road reserve will be retained' and State Planning Policy 6.1 Leeuwin-Naturaliste Ridge (SPP6.1) emphasises the 'importance of buffers to maintain amenity and enhance character values. The SP should provide for augment buffers to ensure appropriate visual screening and separate development from adjoining major roads'. How is this possible for those at access points and how will we be compensated when we lose our existing tree lined viewscape and this rule is not bound. 3. The EPA supports the construction of the northern access to Caves Road as there is an existing driveway but also notes the importance of avoiding 'the clearance of Western Ringtail Possum Habitat within the Caves Road Reserve. What are plans to mitigate	of development from main roads adjoining the Special Provision Area. Modifications are required to ensure that the SP complies with the requirements of SP76. 4. Noted, refer to point 2 above. 5. Noted, refer to point 2 above. 6. Noted, refer to point 2 above. 7. The site largely consists of cleared agricultural (pastoral) land. The Environmental Assessment found that the majority of the Structure Plan area is capable of urban development, subject to floodway areas being provided as public open space. The management of vegetation and fauna values as part of future development of the site must be appropriately managed through the standard subdivision process. Modifications are required to ensure that the SP complies with the requirements of SP76. 8. Noted. The Department of Education has advised that sufficient capacity exists (current and planned). 9. The Abbey Foreshore is located outside of the project area. It is noted that the City is undertaking a separate project to select a new site and design for a regional recreational boating facility between Abbey and Dunsborough. This will ultimately provide additional capacity and reduce pressure on existing facilities.	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	excessive removal of trees at the entrance to create roads? Action -All development (including entrance) should be inconspicuous and set back behind the existing tree line to preserve it on Caves Road. -Consultation between main roads and residents at access points in regard to minor road modifications. -Guaranteed safe passage for turning and reversing on verge with camper trailer attached for access to our home (potential changes to road for T intersection). -Developers should consider and provide information on landscape values and visual management for residents affected directly by access points and compensate accordingly. 4. The increased traffic on an already busy and congested Caves Road (particularly during holiday time) and in turn safety to pedestrians and cyclists and our local wildlife. Council noted there would be 'significant additional demand generated by the site' and that Caves Road and Bussell Highway 'form significant barriers to the safe and efficient movement of pedestrians and cyclists to and from the site' and 'these conditions will worsen over time'. As a family, we currently ride our bikes to school along the drain road and can already be waiting to cross Caves Road for up to 5 minutes in the morning. Even then it feels unsafe and if a collision was to occur with car speeds of 70kmph, it would prove to be fatal.	10. The R-Codes proposed will provide for a range of lot sizes and design typologies. Car storage will be provided for within the lot. On Street parking will also typically be available for additional vehicles. R20 - R40 areas are proposed to become R20 and a new area of residential R10 is proposed to provide for a lower density transition area.	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	5. Lots of traffic (during peak periods) has also been known to go around the back of Abbey to avoid congestion on Caves Road causing potential accidents through the suburb. During peak periods, the cars bank up to the roundabout past our house and would provide no access for residents leaving the proposed access point on SP. Traffic projections in the report do not account for other developments taking place in Dunsborough which will also significantly impact Caves Road. 6. Action -Speed limit dropped to 50/60 -Underpass at the drain bridge to provide safe bicycle access from the development road to beach -Reconsider access points and the main entrance into the Bussell Highway which has more potential area to upgrade exit to provide a safer passage -Main roads to count cars in peak periods to get accurate figures – Easter? -Push through the Vasse-Dunsborough link road which is expected to reduce traffic on Caves by -80%. Direct access to Caves Road would then make sense!! 7. Possum habitat loss. Flora and Fauna destruction. Threat to wetlands. -Council notes that the 'entirety of the site, and the adjoining land area, is located within the core habitat for the critically endangered Western Ringtail Possum and that the mature peppi trees provide linkages particularly along the MRWA road reserve to the north. Disjuncture with access points on Caves Road		

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	will affect the ability of the animal to move'. The proposal seeks to amend to City Scheme 21 to rezone Abbey south area from Rural and Conservation to Urban development. It is noted that 'the structure plan will significantly change the landscape of the area rendering the 'high-landscape value area redundant'. This area forms part of the 'floodway area and wetland area' and the development is a violation of zoning rules. Council notes that the area is mapped as having a 'medium-high' risk of acid sulphate soils occurring within 3m of the natural soil surface' in parts of the SP. If these are disturbed the acid can cause damage to the surrounding environment and buildings. Onsite water disposal will have permanent detrimental impacts on the local flora and fauna, wetlands and to the historical Buayanyup Drain which feeds into our pristine ocean. The EPA (APP-0000158) and the Buayanyup River Report supports this notion of reduced water quality discharge. Emerge notes that no site-specific flora and vegetation surveys have been completed. Action -EPA has recommended a Flora/Fauna management plan is submitted prior to works commencing to protect local fauna from disturbance by noise and light emissions. -Referral to EPBC Act due to multiple road reserves and access points on Caves Road fragmenting the habitat linkage for possums. -EPA have called for a water management report -EPA have called for consultation with the		

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	Department of Biodiversity, Conservations and Attractions regarding the 'management of potential impacts and the application of wetland buffers' to limit impact (APP-0000158) -EPA to investigate further 8. Local infrastructure does not support the development. Vasse Primary School is bursting at the seams, as is Cape Naturaliste College and no more schools are planned for the area. 9. Our boat ramp and beaches cannot support extra vehicles and trailers. There is already illegal parking on the cycleway near Forth Street. The coastal inundation will cause quicker coastal erosion and environmental issues for our pristine and unique coastline. The area cannot accommodate more people, with the Vasse/Broadwater/ housing developments and expansion already underway. Postpone the development until the infrastructure is in place and VDL to support. 10. The small lot sizes do not fit with the character of Abbey. The SP R60 zoning does not align with Leeuwin Naturaliste Ridge Policy, Spp 6.1 which sets policy in relation to the landscape values within the Structure Plan of which PS3.2 states that 'Development must be responsive to local values and be compatible with the natural characteristics and traditional settlement patterns of the area'. Larger blocks like those that already exist in Abbey, that allow for trees and vegetation, would keep with natural landscape and		

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	the character of Abbey and allow possums and fauna to strive. Reports written are based on the development being zoned R20 lots. Then a portion of it is zoned R60. Action -Increase lot sizes to over 600m-800m2 and reduce population. This allows mature trees to be maintained and space to plant more trees should the community desire. - Reports based on R60 zoning as this will change run off rates and water table levels?		
68	1. The Western Australian Planning Commission (WAPC) Statement of Planning Policy No. 6.1 – Leeuwin Naturaliste Ridge Policy (SPP 6.1) determines that the Leeuwin-Naturaliste Ridge has "regional and State significance". It states: • "The Leeuwin-Naturaliste Ridge Statement of Planning Policy (LNRSPP) provides clear direction on future land use for the policy area." • "The LNRSPP applies over the scenically spectacular, narrow coastal strip' stretching from the nearshore waters of Cape Naturaliste to Cape Leeuwin and inland to Bussell Highway and the eastern extent of townsites along the highway." • "The purpose of the LNRSPP is to provide the strategic planning framework for the policy area for the next 30 years by providing greater vision, guidance and certainty of land use". -"All land use and development within the policy area will be consistent with the LNRSPP…" The land is designated Wetland Amenity Area and	1. The Leeuwin-Naturaliste Sub-regional Strategy 2019 (LNSRS) was amended by the State Government in 2021 at which time the northern portion of site was identified as suitable for Urban development. The southern portion of the site was identified as 'Open Space Investigation'. The floodway area that is immediately south of the site may continue to provide a buffer between Abbey and Vasse. Modification 1 is required to ensure that the SP complies with the requirements of SPP 6.1 LUS 3.3. 2. The LNSRS is a State Government document. 3. The amendment of the LNSRS provides the basis for the proposal. It is likely that all land currently designated for urban development will be required to meet demand in the medium term. 4. Noted. 5. Noted. Refer to point 1. 6. Noted.	1. Modification 1, as contained in Attachment G – Schedule of Modifications, is required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	crucially – Policy LUS 3.30 of SPP6.1 provides: "Rural landscape and coastal reserve buffers between Abbey and Vasse, and Dunsborough and Abbey will be maintained to avoid urban sprawl and to create distinct communities" 2. I have the following questions: 3. The officer comment in council item 13.1 on 16 November 2022 refers extensively to the Leeuwin-Naturaliste Sub-regional Strategy 2019 (LNSRS). Where was the public consultation or engagement with the Abbey community in relation to this Strategy? Does it meet the standard required of public consultation undertaken in relation to State Planning Policy 6.1? SPP 6.1 is the higher order document and as the local planning scheme is required to be amended only consistent with State Planning Policy why is a proposal that directly contradicts the SPP considered appropriate? 4. Why has this high amenity area (under SPP 6.1) that achieves the specific objectives of SPP 6.1, namely to retain a buffer between Abbey and Vasse, been designated for development when there is ample land in the Ambergate Vasse area? Land designated urban for development already exists to the south of Busselton, closer to services and infrastructure and on a scale that provides more efficient urban form and development outcomes. Significant investment has already been made to provide service infrastructure for these pre designated areas for the last 30 years.	7. When first published in May 2019, the Strategy identified five Planning Investigation Areas. Since that time those areas have been investigated by the WAPC and the Strategy has been amended to reflect the outcomes of those investigations.	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	5. The officer comments in the report of 16 November 2022 infer that the existing conservation zone of the subject land were designed to protect specific species. SPP 6.1 does not identify specific species, it does not need to – the zones are about protection of amenity and low levels of development in a general context . To suggest that conservation is not warranted as there is no evidence of significant rare species is misrepresenting the intent of SPP 6.1. 6. SPP 6.1 Policy LUS 3.30 states: 'Rural landscape and coastal reserve buffers between Abbey and Vasse, and Dunsborough and Abbey will be maintained to avoid urban sprawl and to create distinct communities' [emphasis added]. Rise Urban in their Explanatory Report dated 17 January 2023 refer to the Locke Nature Reserve to the west of the structure plan area as providing a buffer between Vasse and Dunsborough. The intent of the buffer in policy 3.30 above is to provide a buffer between Abbey and Vasse. The Locke Estate Nature Reserve is opposite the Locke Estate campsite which has been divided into 16 separate sections and is predominantly camping and caravan sites – it is not the township of Abbey. 7. SPP 6.1 Policy LUS 3.32 provides: "The environmental and recreation values of the Wetland Amenity Area will be protected while facilitating tourism development that responds to the natural and social values of the locality" This is not a tourism development, The Shed Markets, referred to by Rise Urban in part II of their		

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	Explanatory Report, are purely commercial. Furthermore, it is hard to see how the environmental values of the wetland amenity area will be protected by high density development. 8. The council report of 13 December 2017 recommended that the City indicate general support for the direction set out in the draft Leeuwin-Naturaliste Sub-Regional Planning Strategy (CoBLPS). Officer Comment within the report in relation to Abbey South states: "The WAPC did not support the inclusion of Abbey South in the advertised version of the City of Busselton Local Planning Strategy due to: inconsistency with SPP6.1; not identified in the existing planning framework; and the Minister for Planning's decision to refuse to grant final approval to Amendment 176 to the City's previous District Town Planning Scheme 20, which would have facilitated structure planning for urban development. In adopting the CoBLPS for final approval, the decision of Council included the recommendation that 'Abbey South' be considered at the strategic level for urban development through the LNSRS. The LNSRS does not support Abbey South and the feedback of Councillors at the recent briefing session on the LNSRS indicated acceptance of the position of the WAPC, with no further action on this element. Whilst it is considered that the Abbey South area may have urban development potential in the long term, there are not considered to be any further compelling arguments in favour of identifying the land for urban development at this time." What		

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	transpired between 2017 and 2019 to include the Abbey South lots in the LNSRS? What consultation was undertaken? The questions above in relation to the lack of consistency with State Planning Policy 6.1 are repeated.		
69	1. Ridiculous. My beard does the talking. Attachment provided featuring an image of Gimli from the Lord of the Rings.	1. Noted.	1. That the submission be noted.
70	1. To whom it may concern, I would like to voice my objections to the proposal LPS No.21 Amendment No.55 and Associated Precinct Plan. My reasons are as follows. too much pressure on currently overloaded Caves road. At least needs a traffic count or to come and visit this easter holidays. Hard to get out of abbey in ordinary weekday peak times already. 2. I disagree from changing from wetland conservation zoned area to urban. Certainly amazed in this day this can go ahead. Should not be removing any more peppermint trees - we should be planting more. Does the shire still care about the critically endangered ring tail possums?... I understand that this land under discussion on Caves road has been left to degrade and had buffulo previously grazing however there is a significant amount of native vegetation and certainly native flora and fauna that are worth considering. The wet lands are amazing. How can this go ahead without a full environmental report from the EPA? 3. Disagree with the block sizes as well as location. Why we would increase the pressure to this fragile area which enters and exits busy Caves road when there	1. Noted. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 2. The site largely consists of cleared agricultural (pastoral) land. The Environmental Assessment found that the majority of the Structure Plan area is capable of urban development, subject to floodway areas being provided as public open space. The management of vegetation and fauna values as part of future development of the site must be appropriately managed through the standard subdivision process. Proposed new road reserves linking the Site to Caves Road may have a significant impact on the species due to fragmentation of existing habitat linkages. Fragmentation of these linkages means to create a disjuncture between patches that affects the ability of animals to move, for example habitat trees	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	are sprawling cleared farms inland ideal for development. For example the Vasse Newtown suburb of Keally has improved the area. It has been built with great access to the suburb from main roads. The increased infrastructure with respect to shops and bike paths and green open spaces has been done well. 4. Pressure to the coastal strip at Abbey. There is clearly not enough infrastructure as it is for the surrounding Abbey beach boat ramp and the stretch to Buyanup drain. Please visit during summer to see cars parked on the fragile coastal strip and bicycle pathway. You will see the vegetation is being cleared by cars parking on it. There are no toilets and limited car parks at the forth st beach car park. A further 500-1000 people will place far too much pressure on the fragile area. 5. Finally future development should improve an area not add unnecessary pressure to an area along with environmental destruction. The increased infrastructure with respect to shops has been built tastefully and well. Unfortunately it seems only the developer benefits out of the caves road abbey south development. Not the locals, the environment, the road system or the possums. Please reconsider.	separated by more than six metres. Referral under the EPBC Act may be required due to multiple road reserves fragmenting the habitat linkage. Modifications are required to ensure that the SP complies with the requirements of SP76. 3. The R-Codes proposed will provide for a range of lot sizes and design typologies. Car storage will be provided for within the lot. On Street parking will also typically be available for additional vehicles. R20 - R40 areas are proposed to become R20 and a new area of residential R10 is proposed to provide for a lower density transition area. 4. The Abbey Foreshore is located outside of the project area. It is noted that the City is undertaking a separate project to select a new site and design for a regional recreational boating facility between Abbey and Dunsborough. This will ultimately provide additional capacity and reduce pressure on existing facilities. 5. Noted.	
71	1. Changing the zoning area from conservation to urban. Strange direction in and are with critically endangered ringtail possum species and seasonal wet lands with migratory birds. In this day and age surely we should be increasing our conservation zones and never removing them?	1. The site largely consists of cleared agricultural (pastoral) land. The Environmental Assessment found that the majority of the Structure Plan area is capable of urban development, subject to floodway areas being provided as public open space.	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	2. Lack of infra structure on the foreshore. Already have lots of pressure on the foreshore with traffic lining the thin coastal strip and parking on the bicycle path where it meets the road on summer weekends and holidays. There are no toilets at the Buyanup Drain end of Geographe Bay road and limited parking spaces. The pressure this puts on the area is already huge with increased rubbish (not put in bins), toilet paper and human waste and damage of fragile coastal strip. The increased pressure this development will place on the fragile coastal strip needs to be examined prior to any further development. 3. Style of development with tiny blocks to maximum profit. Surely they should be developing with the style of the south west and abbey in mind. Large blocks with walk trails and no loss of peppermint trees. 4. Concerned regarding Caves road increase pressure with increase traffic. Aware the bypass has been touted however this is still a while away. Already very difficult to turn out of abbey on to caves road. If development goes ahead then surely fit in to the local area which would involve large blocks with decreased environmental destruction and no peppermint tree loss.	The management of vegetation and fauna values as part of future development of the site must be appropriately managed through the standard subdivision process. Modifications are required to ensure that the SP complies with the requirements of SP76. 2. The Abbey Foreshore is located outside of the project area. It is noted that the City is undertaking a separate project to select a new site and design for a regional recreational boating facility between Abbey and Dunsborough. This will ultimately provide additional capacity and reduce pressure on existing facilities. 3. The R-Codes proposed will provide for a range of lot sizes and design typologies. Car storage will be provided for within the lot. On Street parking will also typically be available for additional vehicles. R20 - R40 areas are proposed to become R20 and a new area of residential R10 is proposed to provide for a lower density transition area. 4. Noted. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway.	
72	1. Traffic Issues, environments, lack of local infrastructure to accommodate population increase	1. Noted. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

		outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. Other matters raised are discussed in the Part two of the Structure Plan.	required to address matters raised in the submission.
73	1. Hello, I would like to voice my objections to the proposal LPS No.21 Amendment No.55 and Associated Precinct Plan. This area would appear a significant contributor for native flora and fauna and providing carbon credits to the locals. It is difficult to conceptualize any meaningful tree development with such small land areas for each landholder to in any way substitute for the clearing of the land. 2. I appreciate there is the pressure of population growth however there would appear to be adequate cleared land in the vicinity to develop and I feel strongly that this should be the approach for further development in this area and is the way forward with progressive development of the beautiful area we live in, to keep some harmony with nature balanced with population grow. This a quite different from NIMBY (Not In My BackYard), my suggesting a more rational development of the area with thought for the future and not being primarily related to the economic aspect of the landholders and the developers. 3. The new housing development with such small blocks with two to six occupants will put a significant increased pressure on traffic on caves rd which already causes difficulty in exiting from Abbey and with congestion at the roundabout on caves Road.	1. The site largely consists of cleared agricultural (pastoral) land. The Environmental Assessment found that the majority of the Structure Plan area is capable of urban development, subject to floodway areas being provided as public open space. The management of vegetation and fauna values as part of future development of the site must be appropriately managed through the standard subdivision process. 2. Noted. 3. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 4. Noted.	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	4. I sincerely hope you will listen to the Abbey, Vasse and Busselton peoples opinion on this development.		
74	1. I would like the blocks to be Kept at 450 square metres and above. Also a designated possum park reserve and local parks for the children to play in if you kept similar to Caimbridge that would be keeping me happy. I do support the development but I would like to keep the zoning of the block R20. Block sized 450+ sq metre size and I would also like to get a designated possum park reserve like Caimbridge estate.	1. The R-Codes proposed will provide for a range of lot sizes and design typologies. Car storage will be provided for within the lot. On Street parking will also typically be available for additional vehicles. R20 - R40 areas are proposed to become R20 and a new area of residential R10 is proposed to provide for a lower density transition area. 2. Over 10% of the site has been set aside for public open space.	1. That the submission be noted.
75	1. Hello I would like to voice my objections to the proposal LPS No.21 Amendment No.55 and Associated Precinct Plan. This area would appear a significant contributor for native flora and fauna and providing carbon credits to the locals. It is difficult to conceptualise any meaningful tree development with such small land areas for each landholder to in any way substitute for the clearing of the land. 2. I appreciate there is the pressure of population growth however there would appear to be adequate cleared land in the vicinity to develop and I feel strongly that this should be the approach for further development in this area and is the way forward with progressive development of the beautiful area we live live in, to keep some harmony with nature balanced with population grow. 3. This a quite different from NIMBY, my suggesting a more rational development of the area with thought	1. The site largely consists of cleared agricultural (pastoral) land. The Environmental Assessment found that the majority of the Structure Plan area is capable of urban development, subject to floodway areas being provided as public open space. The management of vegetation and fauna values as part of future development of the site must be appropriately managed through the standard subdivision process. 2. Noted. 3. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 4. Noted.	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	for the future and not being primarily related to the economic aspect of the landholders and the developers. 4. The new housing development with such small blocks with two to six occupants will put a significant increased pressure on traffic on caves rd which already causes difficulty in exiting from Abbey and with congestion at the roundabout on caves Road.		
76	1. Thank you for the opportunity to voice my thoughts and concerns to you, pertaining to the above proposed re-zoning of land south of Caves Road in Abbey. Lots 4 and 12 are parkland cleared (Figure 2) with mature Peppermint trees present. These trees are habitat for the endangered Ringtail Possum which is a threatened species under State and Commonwealth legislation. In Western Australia the species is listed as Critically Endangered fauna under the Biodiversity Conservation Act 2016. It is incumbent upon the City to proactively protect their habitat and to strongly discourage clearing and destruction. 2. The southern end of Lot 4 is low lying and prone to seasonal inundation. It is a Conservation Zone of the SCA (Wetland and Floodway Special Control Area). The WAPC have indicated this Conservation listed area and public open space warrants investigation for possible suitability as part of the Strategy Plan. Due to seasonal inundation and in the present climate of change this area should be considered as unsuitable for urban dwellings and should be retained as an environmental amenity and habitat into the future.	1. Noted. The alignment of roads and the requirement for buffers have mitigated some vegetation loss. Further corridor protection is proposed via Modifications. 2. The site largely consists of cleared agricultural (pastoral) land. The Environmental Assessment found that the majority of the Structure Plan area is capable of urban development, subject to floodway areas being provided as public open space. 3. Modifications are required to ensure that the SP complies with the requirements of SP76. 4. Noted. 5. Noted. 6. Noted. 7. Noted. The proposal is not reliant on the construction of the Vasse-Dunsborough link. 8. Noted. Lot layout and building siting is informed and guided by Liveable Neighborhoods and the Residential Design Codes.	1. Modifications 1 and 3, as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	It is noted that the Local Planning Scheme 21 scheme amendment removes the Landscape Value Special Control Area from the Structure Plan. This amendment should be revoked and the Landscape Value SCA be reinstated. Figure 4. 3. Current existing strip vegetation between the lots, and road verge screening vegetation, should be retained in its current state to provide habitat corridors for wildlife, shade, erosion mitigation, maintenance of soil health and a pleasant visual vista for locals and visitors alike. 4. Re-zoning of these Lots seems to be a foregone conclusion, so mention is made of the following for your serious consideration should the development be given permission to advance. 5. The Structure Plan Guiding Principles state that this application be landscape-led; maintain a buffer on Caves Road, be a pedestrian friendly neighbourhood, provide appropriate and safe vehicle and pedestrian egress, address the ability of people to cross from the development to Monaghans Corner to the existing shops and the beach. Minimise disruption to regional networks, i.e., traffic leaving and entering the development onto Caves Road (carrying increased traffic especially from the west as Dunsborough opens up new housing developments and acquires high rise residential and visitor developments in the near future). 6. Concerted efforts need to be put in place by the City of Busselton to pressure the developers to adhere to these Guiding Principles when the COB is making		

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	their determination. Pressure needs to be applied by the City to Main Roads for the Vasse-Dunsborough Link be built in the immediate future. It is imperative that should this development become a Development Application, the 7. Developers consider seriously and genuinely the aspirations listed in the Structure Plan Guiding Principles. Consideration should be given to block orientation so home builders have the opportunity to build north facing passive solar dwellings. It is time for developers to be to encouraged (pressured) to consider a wider range of key factors that take into account not only a one-off profit benefit, but ongoing benefit for the environment and a place in which people can thrive. Plan and build homes; not houses for profit.		
77	1. Traffic plan is unsafe, unrealistic and will create unsolvable problems along Caves rd. R zoning density is too high for the area. Environmental concerns have not been. I understand the need for development and housing, and do not oppose developing the site, however, the fact is that there are UNSOLVABLE traffic issues with having any kind of entrance onto Caves rd. It was not made for high volumes of traffic! If the development is to go ahead, traffic MUST enter off Bussell Hwy (and run along the southern border of the development site) or South to the join the Bypass. The footprint of a roundabout would not fit anywhere along Caves rd. The VDL will ease congestion to Dunsborough, but it's actually impossible for there to be any access points into the	1. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 2. The portion of the site that is proposed to be coded R60 is in accordance with the City of Busselton Local Planning Strategy 2019.	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	development off Caves road - it's not wide enough and there's not enough surrounding land to modify it! The traffic plan is ASKING FOR ACCIDENTS. Caves road is not wide enough to accommodate turning pockets and a T junction just before the Monoghans roundabout is fatalities waiting to happen. 2. That brings me to density. The R60 density should be put it in Vasse Newtown where they have the roads to support the extra traffic and the infrastructure to support the increased population. You should be within 400m of R60 to walk to the shops - but there will only be a wine bar there! Who wants to taste wine looking over a roundabout - watching all the accidents happen!!? Put the R60 in Vasse where people can walk to Coles, the postoffice and medical centers and where the road were purpose built to handle the volume!		
78	1. Of major concern is the impact on traffic on Caves Road and in particular Monoghans Corner roundabout. Whilst the report is detailed and says the road can handle the extra traffic, it fails to take into account all the other developments taking place in Dunsborough which will also impact significantly on Caves Road. We are told the VDL is another 10 years away. This needs to be in place before any further sizeable developments are granted. Then to find out our acess onto Caves Rd will be left hand turns only, all this will just add pressure to the roundabout and Newtown Beach Road (already used as a raceway short cut to avoid queues at Monoghans corner).	1. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 2. Noted. Existing and planned infrastructure is sufficient to accommodate the proposed development. 3. The site largely consists of cleared agricultural (pastoral) land. The Environmental Assessment found that the majority of the Structure Plan area is capable of urban development, subject to floodway	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	2. When are we going to think about infrastructure with all these planned developments? Vasse Primary is bursting at the seams, Cape Naturaliste college even after a recent extension is bursting at the seams. Parking is a huge issue in the area with cars often illegally parked on the cycleway down near Forth Street. But the biggest worry of all is the size of our hospital. How long will it be before all this development actually starts costing people their lives? 3. It is 2023. Do we really need to be arguing about cutting down mature peppermint tress and saving endangered species like the ringtail possum? All these flora and fauna should be protected and the development only allowed to happen if these species can remain in place. Why not build a development for the future. Something to be proud of. Something that intelligently speaks to the terrible state of our planet. Something that is better than the standard. It's about time to stand up and DO something great that is not focussed on profits but focussed on health, the environment and the future of our children and grandchildren.	areas being provided as public open space. The management of vegetation and fauna values as part of future development of the site must be appropriately managed through the standard subdivision process.	
79	1. I am writing to express my strong opposition to the proposed housing development on Caves Road Abbey South, for several reasons. Firstly, the current main roads infrastructure is unsuitable to support the increased traffic that would result from this development. The proposed development would lead to congestion on the already busy Caves Road	1. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 2. The R-Codes proposed will provide for a range of lot sizes and design typologies. Car	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	and would pose a significant risk to the safety of pedestrians, cyclists and motorists. 2. Secondly, the density zoning proposed for the development is inappropriate for the surrounding area. The proposed density of housing is much higher than the current residential zoning in the area, which would negatively impact the character and amenity of the neighbourhood. 3. Additionally the prosed development would place a burden on the existing infrastructure. It is already difficult enough for the local children to get access to sporting facilities due to high population growth, can we for once not bow down to the almighty dollar and the "charm" from all these developers and maintain the type of lifestyle that we want to maintain. I urge you to reconsider the proposed housing development at Abbey South.	storage will be provided for within the lot. On Street parking will also typically be available for additional vehicles. R20 - R40 areas are proposed to become R20 and a new area of residential R10 is proposed to provide for a lower density transition area. 3. Noted. Existing and planned infrastructure is sufficient to accommodate the proposed development.	
80	1. I write to oppose the rezoning of the Abbey South Precinct, replacing the 'Rural' and 'Conservation' zones over Lots 4, 12 and 402 Caves Road and Lots 14 and 15 Bussell Highway, Abbey with the 'Urban Development' zone. 2. The southern portion of Lot 4, which corresponds with the current 'conservation' zoning, has been identified as 'Open Space Investigation'. I ask what this actually means? 'Conservation' areas require very different human impact that 'Open Spaces'. Habitat for the local fauna and flora is essential and corridors for the movement of animals around the local area needs also to be created and/or preserved.	1. Noted. 2. Open Space Investigation: Further investigation is to consider factors that may be relevant to the intended open space purpose, such as wetland buffer and flood management requirements. The final extent of land required for open space purposes is to be determined through the investigation process and informed by appropriate studies, and may be larger, smaller or the same size as the area designated as 'Open Space Investigation'. 3. The site largely consists of cleared agricultural (pastoral) land. The	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	It is known that the area provides habitat for the critically endangered Western Ringtail Possum. 3. The site has been identified in the Environmental Assessment and Management Strategy prepared by the developers, Emerge Associates as part of a number of 'special control areas', including landscape value, wetland and floodway and require protection or consideration of these values. This is in fact in keeping with the current 'conservation' zoning and in opposition to the proposed urban rezoning? 4. My second concern about this proposed Urban rezoning is the proximity of the proposed development to the wetlands. It is stated that the proposed Structure plan provides for the retention and protection of the existing floodway, maximising retention of existing trees and addressing bushfire risk, without relying on modification to existing remnant native vegetation. But I question how this can be policed and guaranteed? Can the City of Busselton guarantee that this development would maintain all existing trees on the lots? Recent local developments including Broadwater Bayside Estate have seen 100% of peppermint woodland trees cleared. This is not acceptable. It is also stated in the report that limited regional groundwater level information is available and I question whether the data collected in 2021/2022 is sufficient to judge the capacity of the area to absorb the increased impact of this density of housing. A lay person can look at Google Maps satellite and see that there is a clear, low lying and permanent wet area occurring right in	Environmental Assessment found that the majority of the Structure Plan area is capable of urban development, subject to floodway areas being provided as public open space. The management of vegetation and fauna values as part of future development of the site must be appropriately managed through the standard subdivision process. Modification 1 is required to provide a buffer around the floodway area. 4. Noted. Refer to point 3. 5. The site is not mapped as an area with known roosting habitat for the three black cockatoo species, nor is the site mapped as an area with known breeding habitat. 6. Noted. Refer to point 3. Modification 1 is required to ensure that the SP complies with the requirements of SP76. 7. Noted. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 8. The Leeuwin-Naturaliste Sub-regional Strategy 2019 (LNSRS) was amended by the State Government in 2021 at which time the northern portion of site was identified as suitable for Urban development. The southern portion of the site was identified as 'Open Space Investigation'. The floodway	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	the middle of the proposed area for housing. This would obviously form part of the whole wetland ecosystem and it should be preserved under the conservation status, as it is currently zoned. 5. I also ask, has the area been surveyed for habitat or roosting of the red-tailed black cockatoo? This species is Federally protected and would be protected by the current conservation zoning of the area. 6. The northern, currently zoned rural, area of the proposed development certainly looks like it would have minimal impact on any existing vegetation as it is largely cleared, however the impact on the water table and interference with the general hydrology of the area is of concern. 7. As a resident of the Busselton area since 1970 and a local Abbey resident since 2013, I also have grave concerns for traffic access and egress, as well as pedestrian safety in the proposed area. At peak times access to Caves Road is nearly impossible. Adding a population as proposed with R20 or even R60 zoning would have drastic impact on traffic and put lives at risk. 8. A council report of 13 December 2017 recommended that the City indicate general support for the direction set out in the draft Leeuwin-Naturaliste Sub-Regional Planning Strategy (CoB LPS). In light of this I have the following questions: Firstly, the State Planning Policy 6.1 is the higher order document and as the local planning scheme is required to be amended only consistent with State	area that is immediately south of the site may continue to provide a buffer between Abbey and Vasse. 9. Noted. 10. Noted. 11. Noted. 12. When first published in May 2019, the Strategy identified five Planning Investigation Areas. Since that time those areas have been investigated by the WAPC and the Strategy has been amended to reflect the outcomes of those investigations. 13. Noted. Refer to point 8.	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	Planning Policy why is a proposal that directly contradicts the SPP considered appropriate? The officer comment in council item 13.1 on 16 November 2022 refers extensively to the Leeuwin-Naturaliste Sub-regional Strategy 2019 (LNSRS). Where was the public consultation or engagement with the Abbey community in relation to this Strategy? Does it meet the standard required of public consultation undertaken in relation to State Planning Policy 6.1? Why has this high amenity area (under SPP 6.1) that achieves the specific objectives of SPP 6.1, namely to retain a buffer between Abbey and Vasse, been designated for development when there is ample land in the Ambergate Vasse area? Land designated urban for development already exists to the south of Busselton, closer to services and infrastructure and on a scale that provides more efficient urban form and development outcomes. Significant investment has already been made to provide service infrastructure for these pre designated areas for the last 30 years. Rezoning an area from 'conservation' to urban is a backward step which cannot be reversed. 9. The officer comments in the report of 16 November 2022 infer that the existing conservation zone of the subject land were designed to protect specific species. SPP 6.1 does not identify specific species, it does not need to – the zones are about protection of amenity and low levels of development in a general context. To suggest that conservation is not		

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	warranted as there is no evidence of significant rare species is misrepresenting the intent of SPP 6.1. 10. SPP 6.1 Policy LUS 3.30 states: 'Rural landscape and coastal reserve buffers between Abbey and Vasse, and Dunsborough and Abbey will be maintained to avoid urban sprawl and to create distinct communities'. Rise Urban in their Explanatory Report dated 17 January 2023 refer to the Locke Nature Reserve to the west of the structure plan area as providing a buffer between Vasse and Dunsborough. The intent of the buffer in policy 3.30 above is to provide a buffer between Abbey and Vasse. The Locke Estate Nature Reserve is opposite the Locke Estate campsite which has been divided into 16 separate sections and is predominantly camping and caravan sites – it is not the township of Abbey. 11. SPP 6.1 Policy LUS 3.32 provides: "The environmental and recreation values of the Wetland Amenity Area will be protected while facilitating tourism development that responds to the natural and social values of the locality" This is not a tourism development, The Shed Markets, referred to by Rise Urban in part II of their Explanatory Report, are purely commercial. Furthermore, it is hard to see how the environmental values of the wetland amenity area will be protected by high density development. 12. Officer Comment within the report in relation to Abbey South states: "The WAPC did not support the inclusion of Abbey South in the advertised version of the City of Busselton Local Planning Strategy due to:		

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	inconsistency with SPP6.1; not identified in the existing planning framework; and the Minister for Planning's decision to refuse to grant final approval to Amendment 176 to the City's previous District Town Planning Scheme 20, which would have facilitated structure planning for urban development. In adopting the CoB LPS for final approval, the decision of Council included the recommendation that 'Abbey South' be considered at the strategic level for urban development through the LNSRS. The LNSRS does not support Abbey South and the feedback of Councillors at the recent briefing session on the LNSRS indicated acceptance of the position of the WAPC, with no further action on this element. Whilst it is considered that the Abbey South area may have urban development potential in the long term, there are not considered to be any further compelling arguments in favour of identifying the land for urban development at this time." I ask, what transpired between 2017 and 2019 to include the Abbey South lots in the LNSRS? What consultation was undertaken? The questions above in relation to the lack of consistency with State Planning Policy 6.1 are repeated. 13. I have raised many issues in this submission and repeat that I vehemently oppose re-zoning this land. I ask, why was it zoned conservation in the first place and subsequently what has changed that leads to a suggestion that this should be revoked? Surely, as habitat loss continues to occur and we recognise the necessity to maintain and enhance our biodiversity,		

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	we should preserve and conserve all areas zoned 'conservation'. Once it is lost, we can never get it back.		
81	1. I am concerned there hasn't been enough research into the impact it will have on the eco system that filters into the ocean and wildlife. Why has there nor been an environmental impact study done.	1. The site largely consists of cleared agricultural (pastoral) land. The Environmental Assessment found that the majority of the Structure Plan area is capable of urban development, subject to floodway areas being provided as public open space. The management of vegetation and fauna values as part of future development of the site must be appropriately managed through the standard subdivision process. The EPA have provided advice on the proposal and several modifications have been required to address matters raised in submissions.	1. That the submission be noted.
82	1. I am concerned there hasn't been enough research into the impact it will have on the eco system that filters into the ocean and wildlife. Will native flora and fauna be protected.	1. The site largely consists of cleared agricultural (pastoral) land. The Environmental Assessment found that the majority of the Structure Plan area is capable of urban development, subject to floodway areas being provided as public open space. The management of vegetation and fauna values as part of future development of the site must be appropriately managed through the standard subdivision process. The EPA have provided advice on the proposal and several modifications have been required to address matters raised in submissions.	1. That the submission be noted.
83	1. Lots 4 and 12 are parkland cleared (Figure 2) with mature Peppermint trees present. These trees are	1. The site largely consists of cleared agricultural (pastoral) land. The	1. Modifications 1, 3 and 9 as contained in Attachment G –

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	habitat for the endangered Ringtail Possum which is a threatened species under State and Commonwealth legislation. In Western Australia the species is listed as Critically Endangered fauna under the Biodiversity Conservation Act 2016. It is incumbent upon the City to proactively protect their habitat and to strongly discourage clearing and destruction. 2. The southern end of Lot 4 is low lying and prone to seasonal inundation. It is a Conservation Zone of the SCA (Wetland and Floodway Special Control Area). The WAPC have indicated this Conservation listed area and public open space warrants investigation for possible suitability as part of the Strategy Plan. Due to seasonal inundation and in the present climate of change this area should be considered as unsuitable for urban dwellings and should be retained as an environmental amenity and habitat into the future. It is noted that the Local Planning Scheme 21 scheme amendment removes the Landscape Value Special Control Area from the Structure Plan. This amendment should be revoked and the Landscape Value SCA be reinstated. Figure 4. 3. Current existing strip vegetation between the lots, and road verge screening vegetation, should be retained in its current state to provide habitat corridors for wildlife, shade, erosion mitigation, maintenance of soil health and a pleasant visual vista for locals and visitors alike. 4. Re-zoning of these Lots seems to be a foregone conclusion, so mention is made of the following for your serious consideration should the development	Environmental Assessment found that the majority of the Structure Plan area is capable of urban development, subject to floodway areas being provided as public open space. The management of vegetation and fauna values as part of future development of the site must be appropriately managed through the standard subdivision process. Modifications are required to minimise impact on WRP habitat and to enhance environmental outcomes associated with the development. 2. Noted. Refer point 1. Modification 1 is required to provide a 30m wide buffer around the floodway area. 3. Proposed new road reserves linking the Site to Caves Road may have a significant impact on the species due to fragmentation of existing habitat linkages. Fragmentation of these linkages means to create a disjuncture between patches that affects the ability of animals to move, for example habitat trees separated by more than six metres. Referral under the EPBC Act may be required due to multiple road reserves fragmenting the habitat linkage. The City of Busselton has conditioned the provision of vegetated buffers to ensure appropriate visual screening and separation of development from main roads adjoining the Special Provision Area.	Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	be given permission to advance. The Structure Plan Guiding Principles state that this application be landscape-led; maintain a buffer on Caves Road, be a pedestrian friendly neighbourhood, provide appropriate and safe vehicle and pedestrian egress, address the ability of people to cross from the development to Monaghans Corner to the existing shops and the beach. Minimise disruption to regional networks, i.e., traffic leaving and entering the development onto Caves Road (carrying increased traffic especially from the west as Dunsborough opens up new housing developments and acquires high rise residential and visitor developments in the near future). 5. Concerted efforts need to be put in place by the City of Busselton to pressure the developers to adhere to these Guiding Principles when the COB is making their determination. Pressure needs to be applied by the City to Main Roads for the Vasse-Dunsborough Link be built in the immediate future. It is imperative that should this development become a Development Application, the Developers consider seriously and genuinely the aspirations listed in the Structure Plan Guiding Principles. 6. Consideration should be given to block orientation so home builders have the opportunity to build north facing passive solar dwellings. It is time for developers to be to encouraged (pressured) to consider a wider range of key factors that take into account not only a one-off profit benefit, but ongoing benefit for the environment and a place in which	4. Noted. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 5. Noted. Traffic modelling demonstrates that the proposal is not reliant on the construction of the Vasse-Dunsborough link. 6. Noted. Lot layout and building siting is informed and guided by Liveable Neighborhoods and the Residential Design Codes.	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	people can thrive. Plan and build homes; not houses for profit.		
84	1. It will impact on the habitat on native wildlife. We already see numerous possums die on caves road. New development and more traffic will only increase this. 2. There will be a surplus of people using suburban roads to access the beach, creating more noise. It will negatively impact: - The local citizens of Abbey. More and more people will be using our roads to access the beaches - Increased amounts of pollution on our local roads and beaches. This includes noise, light and rubbish pollution. - Traffic along Caves road will increase and slow down commuters. 3. Possums! They are already at risk and their homes are in the areas that would be under development if this plan goes through. This also includes native wildlife	1. Noted. 2. It is noted that Local roads have sufficient capacity to accommodate increased traffic volumes. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 3. Noted. Several aspects of the proposal, as well as the Modifications proposed by officers, are targeted at minimising the impact of the development on WRPs and WRP habitat.	1. Modifications 1, 3 and 9 as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.
85	1. Caves Road traffic entry points from 3 roads already difficult to navigate and pull out at peak times. In its current form this proposal, having one road entry point onto Caves Road, is dangerous in my opinion. The traffic already on Caves Road is at peak at times. I pull out onto Caves Road driving to Dunsborough for work each day & into Busselton on weekends regularly, which traffic is already bad. Let alone if another road is added on the opposite side of Caves Road as an entry point. Just to note the recent March long weekend I drove back from Augusta on the	1. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 2. The proposal is supported by an Environmental Assessment and Management Strategy (September 2022 - Emerge Associates) and was referred to the EPA for determination prior to public advertising.	1. Modification 1, as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	Monday public holiday, I could not turn right into either of the 3 road entry points to Abbey beach side due to traffic banked up from Dunsborough - traffic had to stop to let me through. It would be crazy to have another road entry to Caves Road on the opposite side in the mix of a situation with a long weekend or peak school holidays. Suggestion would be a roundabout to keep the flow of traffic going (but would also bank it up more) but may be a safer way with vehicles pulling on to Caves Road from both sides of the road. Otherwise just wait until the bypass is complete before approving a traffic intersection like this for a property development. 2. Environmentally how is this development proceeding without an environmental impact statement? The wetlands and wildlife that is in the development area needs consideration and one would think this is required before the development is put out for public comment. 3. Please think about how this affects the small community of Abbey. We are a small community here. The owners of the Development 'Abbey Landowners' if they live here would know the affects the traffic would have on local residents using Caves Road on a daily basis - however if they do not live here and are not regular users of Caves Road then they may not realise the impact of their development proposal.	3. Noted.	
86	1. Geographe Bay rd is already so busy during summer with cars parked and blocking our driveways it is already dangerous for our our kids to cross the road	1. The Abbey Foreshore is located outside of the project area. It is noted that the City is undertaking a separate project to select a	1. That the submission be noted.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	with obstructed views. As you are aware there is only one toilet block at the already very busy boat . We already find Toilet paper in the bush opposite our property due to lack of toilets and extra people from vasse newtown, kealy and cambridge estate already flooding this stretch of beach.The cars parking on the side of the road are damaging the bush on the verge of the road and making crossing dangerous and also backing out of our driveways.	new site and design for a regional recreational boating facility between Abbey and Dunsborough. This will ultimately provide additional capacity and reduce pressure on existing facilities.	
87	1. Traffic congestion.... Caves Road is very busy especially during the Christmas holiday period and long weekends. It can be difficult to turn into Caves Road from both directions now, let alone when 800 other people take up residence in South Abbey. Pedestrian and Cyclist safety, particularly children.... There needs to be safe crossings or at least one underground crossing for people to access the beach. It's dangerous at the moment, especially near the RAC caravan park. Will get worse with people trying to access the beach from South Abbey 2. Beach parking....Already there is damage from vehicles encroaching on the natural bush in front of the beach. There is no designated parking, except the boat ramp. More people, more damage 3. Environmental damage....Knocking down more trees and natural vegetation is reckless. Apart from animals and birds losing habitat we become part of a concrete jungle with not enough trees or parkland. With climate change happening the more trees etc. left in situ the better	1. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 2. The Abbey Foreshore is located outside of the project area. It is noted that the City is undertaking a separate project to select a new site and design for a regional recreational boating facility between Abbey and Dunsborough. This will ultimately provide additional capacity and reduce pressure on existing facilities. 3. Noted. The site is mostly cleared of vegetation. The City has worked with the proponent to retain trees however the developer is only required to provide 10% of the site area as Public Open Space and trees have generally not been retained on lots. Modifications 1, 3 and 8 are required to	1. Modifications 1 and 3, as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	4. I am not against more development and housing but feel it needs to be addressed in a sympathetic way. Done in the right way it could be great	minimise impact on existing vegetation and to allow for the enhancement of buffer areas. 4. Noted.	
88	1. This is advise you that I object to the application for rezoning of the affected area for rural and conservation to urban development in its present form by the developers as it will change in my view the character of Abbey in view of the high density proposed of around 1000 people. 2. This will have serious effects on the traffic flow around Monaghans Traffic circle, especially as it is proposed to develop a shopping centre at the present site of the Shed Market Site. Existing public facilities such as Abbey boat ramp area will become totally overcrowded on public holidays.	1. Noted. The R-Codes proposed will provide for a range of lot sizes and design typologies. Car storage will be provided for within the lot. On Street parking will also typically be available for additional vehicles. R20 - R40 areas are proposed to become R20 and a new area of residential R10 is proposed to provide for a lower density transition area. 2. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes. Noted.	1. Modification 1, as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.
89	1. While I understand progress is a part of growing a community, please reconsider allowing this style, of Legoland subdivision to go ahead. The density and Zoning (some sneaky, R60 Zonings in there) creating further pressure on various aspects of the Vasse and surrounding environment. 2. Roads –Monaghan's Roundabout, Bussell Hwy, Caves Rd, this area is already a danger zone with traffic levels and congestion, it's like running the gauntlet through there with many near misses and accidents in this vicinity. Again, Monaghan's roundabout, travelling along the Bussell Hwy past Glenview Dr/Prise Rd, such poor signage, and street lighting, so dangerous! many accidents and near misses along this stretch of Hwy, death trap waiting to happen here, pretty much all year round now days, not just	1. Noted. The R-Codes proposed will provide for a range of lot sizes and design typologies. Car storage will be provided for within the lot. On Street parking will also typically be available for additional vehicles. R20 - R40 areas are proposed to become R20 and a new area of residential R10 is proposed to provide for a lower density transition area. The portion of the site that is proposed to be coded R60 is in accordance with the *City of Busselton Local Planning Strategy 2019*. 2. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes as identified in Modification 1. This	1. Modification 1, as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	peak tourist seasons. I know this is a Main Roads issue. They have been notified but Nil action to date. Do the maths with the proposed subdivision zonings, all those extra vehicles and people on the above-mentioned roads causing a ripple effect with pedestrians, cyclist, parking….I dread to think about the chaos in peak tourist season, school pickup times etc. 3. Beach Front - Geographe Bay Road/Roberts Rd and Newtown Beach Road, this is a shambles and has been for the past few years. Vehicles parked randomly on all angles along beachfront strip, knocking over the natural bush land, trying to find somewhere to park. It's absolute mayhem, especially in the warmer months… Do you really think adding an extra (potentially) 1000 people to the area will be healthy for the Beachfront? How will this area cope? Are the Developers prepared to fix this problem to accommodate the influx of so many people parking/walking along this stretch of beachfront? 4. Flora and Fauna - that have inhabited the area long before us. Such a shame as to where these wetlands birds and native animals will go?... eco system destroyed, driven out of their natural habitat due to this densely populated proposed subdivision. 5. Water Table - underground aquifers already getting sucked dry from large road works and infrastructure i.e. Bunbury/Busselton Bypass Road along with the general growth of the Busselton and surrounding population. Oh well we'll just pop another 1000 plus people and Commercial properties out there and	would also to enable the safe and efficient crossing of Caves Road and Bussell Highway. 3. The Abbey Foreshore is located outside of the project area. It is noted that the City is undertaking a separate project to select a new site and design for a regional recreational boating facility between Abbey and Dunsborough. This will ultimately provide additional capacity and reduce pressure on existing facilities. 4. The site largely consists of cleared agricultural (pastoral) land. The City has worked with the proponent to retain trees however the developer is only required to provide 10% of the site area as Public Open Space and trees have generally not been retained on lots. It is noted that the same outcome would be associated with a lower density residential development. 5. The proposed development will have access to sufficient drinking water allocation. 6. Noted. It is not ironic.	

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

	worry about the long-term effects, on ground water later. 6. It's ironic…My Husband and I visited City of Busselton, Shire Offices, Town Planning Dept. on the 8th Feb 2023. Here we sat and spoke with a young lady (Planner) and asked for some guidance in subdividing our 3ha property into 2 to 4 lots? We were told "That's not something the City of Busselton supports" We tried to keep our request for subdivision fair and reasonable (lot sizes) keeping the ambience, lifestyle, space and taking flora and fauna into consideration, but got knocked back. …yet across the road plans are being prepared for a development of colossal proportions. Why can't this proposed subdivision be more conservative with it Zoning? Larger lots to blend in with the surrounds. Sizing in the R10 or R5 range? Similar to the Country Road Estate, The Woods and alike. Keep a more natural, nature-based look in this location. I believe people move to the Vasse precinct for a tree and sea change, escape heavy traffic and live a lifestyle with a little space. It saddens me, along with a large majority of rate paying citizens in the Vasse and surrounding area that you are allowing, Greed and Profiteers to go ahead with such a condensed subdivision in this location. Please reconsider the density and major impact this proposed subdivision will have now and into the future. Yes open up some land to help with the housing issues but Please DON'T turn this particular location into Legoland.		

Attachment E – Schedule of Public Submissions

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

SUBMISSIONS CLOSE: 17 March 2023

OFFICER: Noah Scott-McDonald

90	1. I am writing on behalf of my husband and myself to let you know how worried we are about the proposed and future development to take place opposite our street. We live in Roberts Road where in summer and holiday times the traffic along Caves Road is very heavy. 2. If the residential development mainly consisted of large blocks it would be OK, but the plan showed very small blocks and rather dense living. As we are a thoroughfare to the beach, our street would become more of a race track! 3. I just ask that the Council please look at this development through the eyes of long term residents and not the property developers.	1. Noted. The proponent, Main Roads WA and City have developed revised road designs to improve traffic, safety and property access outcomes. 2. Noted. 3. Noted.	1. Modification 1, as contained in Attachment G – Schedule of Modifications, are required to address matters raised in the submission.

Attachment 7 – Schedule of Modifications

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

No.	STRUCTURE PLAN MODIFICATIONS	REASON
Structure Plan Map		
1.	Modify Plan A: Structure Plan Map to reflect the following: <u>Movement and Access</u> I. Remove current proposed access points onto Caves Road and the appropriate reconfiguration of the internal road and path network. II. Indicate by annotation the provision of a full access roundabout connection which aligns with and connects to Cuthbert Street. III. Indicate by annotation the provision of a (left-in / left-out) access point to Bussell Highway, consolidated with the southern end of Skiff Way. IV. Replace the 'Future pedestrian / cycle connection to Bauyanyup drain cycle path', with a higher order cycle path that connects to entire way to the Bauyanyup Drain Shared Path from the south western corner of the structure plan area, with an alignment and / or design that mitigates the impacts of the floodway on the functioning of the path. V. Include an internal perimeter road located wholly within Lot 4, 63 Caves Road ABBEY WA, running north to south adjacent to the eastern boundary, in such a manner that incorporates and preserves existing vegetation along the boundary fence line as shown in (Figure 1: Annotated Structure Plan Map). <u>Public Open Space and landscaping areas</u> VI. A 10 metre to 30 metre wide landscaped Reserve (Recreation) to preserve existing vegetation and provide a	<u>Movement and Access</u> Reconfiguration of the road access to Caves Road and Bussell Highway is required in response to submissions from Main Roads WA and public submissions. Modifications to Caves Road, namely the provision of a single full movement intersection in the form of a small footprint roundabout, would provide the most safe and efficient access/egress for vehicles. A full movement intersection access to Bussell Highway is not able to be accommodated due to the limited Structure Plan Area and its proximity to the roundabout (Caves Road and Bussell Highway intersection). Accordingly, a restricted movement intersection (left in / left out) providing access to Bussell Highway that is consolidated with the southern end of Skiff Way is supported. The development of the primary shared path network along Caves Road and Bussell Highway is required in accordance with the Leeuwin-Naturaliste 2050 Cycling Strategy (DoT). The current alignment of the higher order cycle path connecting to Bauyanyup Drain Shared Path from the south western corner of the site passes through floodway areas. This alignment will require the construction of a raised path (bridge or causeway) in order to avoid inundation by floodwaters. An alternate alignment utilising the 'peninsula' and the southern end of the adjoining RAC holiday park (through agreement with landowners) may be a more suitable option. The realignment of to provide a perimeter road referred to in (V) (approximately 30 metres from its current alignment) will provide improved setbacks from a BHL perspective, and will allow for the

Attachment 7 – Schedule of Modifications

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

	transitional area adjacent the northern and eastern boundaries of the floodway area, excluding the area of 'Residential R2.5' that contains existing buildings. VII. A 10 metre wide vegetated Reserve (Recreation) along southern and western boundaries of Lot 4, 63 Caves Road ABBEY WA, and adjacent road reserves. VIII. The area of 'Residential R10' surrounded by the floodway is to be replaced with 'Residential R2.5' in order to retain existing buildings on a single lot, and provide the remaining area as additional Public Open Space as shown in Figure 1: Annotated Structure Plan Map. <u>Residential Density Codes</u> IX. Replace residential density code of R20-40 with a base code of R20. X. Introduce new areas of 'Residential R10' (replacing some areas or Residential R20) along the southern edge of the Structure Plan area as shown in Figure 1: Annotated Structure Plan Map.	retention of an established vegetation corridor within the road reserve that runs parallel along the boundary line. <u>Public Open Space and landscaping areas</u> State Planning Policy 6.1 Leeuwin-Naturaliste Ridge (SPP6.1) emphasises the importance of buffers to maintain amenity and character values. The 10m to 30m wide landscaped buffer around the floodway shall be provided in accordance with DC 2.3. A 10 metre vegetated buffer, as applied at the northern boundary of Lot 12, will improve visual separation from Vasse North and the adjoining Caravan Park. The buffer areas are primarily located in the area identified as an Open Space Investigation area in the LNSRS and shall be appropriately revegetated with native plant species to enhance their function as wildlife corridors. <u>Residential Density Codes</u> The base code of R20 is to provide for: • Higher density development (R20-R40) in line with refined criteria (Part 1 section 6.3.2) • A more realistic allocation of the likely density outcome. • Allowance more effective allocation of density in line with the Medium Density Housing Code for lots R30-R40. The introduction of a 30 metre wide buffer from the boundary of the floodway renders the area currently proposed as R10 Residential unsuitable for intensive development. A coding of Residential R2.5 provides an option to retain the existing dwelling. New areas of Residential R10 are proposed in response to submissions and will provide both a greater diversity of lot sizes and a lower density transition from natural areas to urban Areas.

Attachment 7 – Schedule of Modifications

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

Structure Plan text		
2.	Revise Table 1 – Land Use Summary, to include the following buffer areas (as shown in Figure 1: Annotated Structure Plan Map).	For consistency with the above modifications.
3.	Modify Section 6.5 Road Network to address the following – a) The structure plan area is to: I. Provide higher order shared path on Caves Road adjacent the Structure Plan area. II. A path network that provides safe and direct access to public transport (bus stops). III. Replace the 'Future pedestrian / cycle connection to Bauyanyup drain cycle path', with a higher order cycle path that connects to entire way to the Bauyanyup Drain Shared Path from the south western corner of the structure plan area, with an alignment and / or design that mitigates the impacts of the floodway on the functioning of the path IV. Include the requirement for all internal and external connecting path infrastructure (cycle and pedestrian) to be funded and constructed by the proponent as part of the subdivision works. b) Caves Road access is to: I. Minimise loss of vegetation through the implementation of a small footprint design. II. Minimise disturbance to Western Ringtail Possum habitat and include remedial works (Possum rope bridges and tree planting) where disturbance is unavoidable. III. Minimise the impact to property access on northern side of Caves Road.	Reconfiguration of the road access to Caves Road and Bussell Highway is required in response to submissions from Main Roads WA and public submissions. Modifications to Caves Road, namely the provision of a single full movement intersection in the form of a roundabout, would help to ensure that that the structure plan provides safe access/egress for vehicles. Refer to Modification 9 below for additional detail. A full movement intersection access to Bussell Highway is not able to be accommodated due to the limited Structure Plan Area and its proximity to the roundabout (Caves Road and Bussell Highway intersection). Accordingly, a restricted movement intersection (left-in / left-out) providing access to Bussell Highway that is consolidated with the southern end of Skiff Way is supported. The development of the primary shared path network along Caves Road and Bussell Highway is required in accordance with the Leeuwin-Naturaliste 2050 Cycling Strategy (DoT). The current alignment of the higher order cycle path connecting to Bauyanyup Drain Shared Path from the south western corner of the site passes through floodway areas. This alignment will require the construction of a raised path (bridge or causeway) in order to avoid inundation by floodwaters. An alternate alignment utilising the 'peninsula' and the southern end of the adjoining RAC holiday park (through agreement with landowners) may be a more suitable option.

Attachment 7 – Schedule of Modifications

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

	IV. Provide safe and efficient crossing facilities across main roads for pedestrians and cyclists, including median island refuges, at convenient intervals. c) Bussell Highway access is to: I. Provide a restricted movement intersection (left-in / left-out) providing access to Bussell Highway, consolidated with the southern end of Skiff Way. II. Provide safe and efficient crossing facilities across main roads for pedestrians and cyclists, including median island refuges, at convenient intervals.	
4.	Modify Part 1, Section 6.3.2 Density Ranges to: I. Replace the first three paragraphs with 'R20 is the base code where identified on figure 1 below. A high density up to R40 may be applied to R20 residential zoned lots where one or more of the following locational criteria applies:' II. Modify (c) to read 'The lot is on Lot 12 or Lot 14 and within a 400m walkable catchment of a local centre.' III. A final paragraph to describe that the use of the density R30-40, on the ends of street blocks or for entire streets will provide consistent streetscapes as set out in the Medium Density Housing Code (State Planning Policy 7.3).	The application of R20 as a base code is a realistic identification of the predominate density which is subject to specific location criteria which should only apply to development at a higher density to provide neighbours which are walkable, safe, close to POS and local centres. For consistency with the Medium Density Housing Code (State Planning Policy 7.3) which applies to lots R30 and above.
5.	Modify Part 1, Section 6.4 Public Open Space of the Structure Plan to include a requirement for the provision of an area of unrestricted Public Open Space between 3,000m^2 and 5,000m^2 in size that is irrigated, turfed and is suitable for active uses.	The Structure Plan currently does not identify an area of open space for active use. The identification of a turfed area of between 3,000m^2 and 5,000m^2 in size is in accordance with the Liveable Neighbourhoods guidance for a 'Neighbourhood' park serving a population of 600 to 800 people. At the subdivision stage the City's *Engineering and Works Services Standards and Specifications Section 9(b) Landscape Irrigation System Specifications* must be adhered to.

Attachment 7 – Schedule of Modifications

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

6.	Modify Part 1, Section 6.6.2 Land Use, to include the following additional "A" uses over Lot 402, Caves Road Abbey WA: • Residential aged care facility. Independent living complex.	Modification recommended in response to submission. Provision of aged care accommodation accords with *City of Busselton Local Planning Strategy* (2019). As the modification is deemed not to be significant it is not addressed further in the Council report.
7.	Modify Plan Section 8.0 Local Development Plans to delete the dot point referring to 'lots located with an area with a density coding of R10'	For consistency with the above modifications.
8.	Modify Part 1, Section 9.0 Further Subdivision Reporting to: • Remove 'Traffic Noise Assessment' Include requirement for the preparation of a 'Street Tree Implementation Plan'.	A traffic noise assessment must be completed prior to the WAPC determination of the Structure Plan under State Planning Policy 5.4 Road and Rail Noise. A street tree implementation plan is required to ensure that the Streetscape Planting Strategy contained in the Structure Plan is enacted to the satisfaction of the City.
9.	Modify Part 2, Section 3.8.2 Regional Road Network and Capacity to address the following: I. A full access roundabout connection on Bussell Highway has been identified as the preferred option by Main Roads WA and the City of Busselton which would ultimately negate the need for a roundabout on Caves Road. II. The Structure Plan area would need to be extended further south to allow for the provision of a full access intersection onto Bussell Highway. III. Revision of the final two paragraphs within 3.8.2. in line with the above text and the reference to 'Main Roads has accepted Stantec's findings' should be replaced with contemporary investigations undertaken by PJA consultants.	Consistent with Main Roads WA advice and the City of Busselton following review of access arrangements by the City of Busselton in accordance with traffic information provided by PJA consultants.
10.	Modify Part 2, Section 4.5.3 Public Open Space Schedule to reflect modifications to the quantum of Public Open Space.	Administrative.

Attachment 7 – Schedule of Modifications

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

11.	Modify Part 2, Section 4.6.1 Water Supply and Conservation of the Structure Plan report to remove the option for unirrigated Public Open Space.	The City of Busselton will not accept unirrigated Public Open Space.
12.	Modify Part 2 of the Structure Plan report, and relevant technical appendices, as follows: • Reflect a minimum finished floor level of 3.4m AHD and revise references to the City of Busselton *Coastal Hazard Risk Management and Adaption Plan* as required. That the requirement to achieve a finished floor level of 3.4m AHD is subject to further investigation and may be revised.	The *Coastal Hazard Risk Management and Adaption Plan* (CHRMAP) recommends that further modelling is undertaken to inform decisions about coastal inundation, but in the absence of that, indicates that in areas where there is not a long-term, integrated coastal inundation protection strategy, that minimum FFLs for new development should be 3.4 AHD to accommodate coastal inundation hazard (note that figure includes 0.9m allowance for projected sea level rise). The CHRMAP does recommend a long-term, integrated coastal inundation protection strategy for the Abbey area, consisting of foreshore works to raise and reinforce the coastal foreshore reserve, together with the raising and reinforcing of the eastern bank of the Buayanyup Drain. The CHRMAP recommends that occur in the medium-term, meaning that the minimum FFL for new development be set at approximately 2.7 AHD. At this point, however, the additional modelling recommended by the CHRMAP has not been undertaken – although it is underway – and there is no clear or detailed plan for implementation of a long-term, integrated coastal inundation protection strategy. Importantly, the costs associated with such a strategy are not known, and nor is there a funding strategy. Based on the above, especially where greenfields (rather than infill) development is concerned, a conservative approach should be taken. It is considered that the minimum FFL should be set at 3.4 AHD on the basis that the coastal modelling project currently underway which could provide a basis for a lower minimum FFL.
13.	Modify the Structure Plan report to include findings and modifications (if required) resulting from a Traffic Noise Assessment, to be included as an appendix, and that is to be	Bussell Highway and Caves Road are both identified as 'significant traffic routes' under State Planning Policy 5.4 Road and Rail Noise, and a portion of the Structure Plan area is within the mapped trigger distance (200m from the corridor). As such, traffic noise must be

Attachment 7 – Schedule of Modifications

PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

	undertaken in consultation with Main Roads WA, prior to the WAPC determination of the Structure Plan.	assessed as part of the rezoning and structure planning processes to accurately identify those areas that will be affected by noise, and to ensure adequate mitigation measures are in place for noise-sensitive uses. Accordingly a Traffic Noise Assessment and Management Plan shall be prepared by the proponent in consultation with and Main Roads WA, outlining possible additional noise mitigation measures as well as responsibilities and commitments, prior to the WAPC determination of the Structure Plan.
14.	Modification of the Local Water Management Strategy and update of Plan A: Structure Plan Map and the Structure Plan report (as required) to address the following: • The retention of 1% AEP on residential lots is not supported by the City of Busselton and therefore updated stormwater modelling is required to be undertaken to the satisfaction of the City of Busselton and the Department of Water & Environmental Regulation. The requirement for the stormwater system to include sufficient retention and detention to accommodate additional drainage discharge from residential lots, so as not to result in a risk of increasing the flood levels in the area designated for management of catchment flood waters, and to allow for appropriate areas of active open space.	Required in response to submissions from DWER, DBCA and Water Corporation, and to ensure compliance with the City of Busselton *Local Planning Policy No. 6.1 Stormwater Management*. The proponent is continuing to work with the City of Busselton and DWER to finalise the overall drainage strategy and the LWMS.
15.	Modify the Bushfire Management Plan as follows: • Include sufficient evidence to support vegetation classifications. • Classify vegetation Plots 4 & 5 in figure 4 (Post Development Vegetation Map) and Figure 5 (BAL Contour Plan) and modify plans accordingly. • Include an internal perimeter road located wholly within Lot 4, 63 Caves Road ABBEY WA, running north to south adjacent to the eastern boundary, in such a manner that	Modifications required in response to submissions from the Department of Fire and Emergency Services.

Attachment 7 – Schedule of Modifications

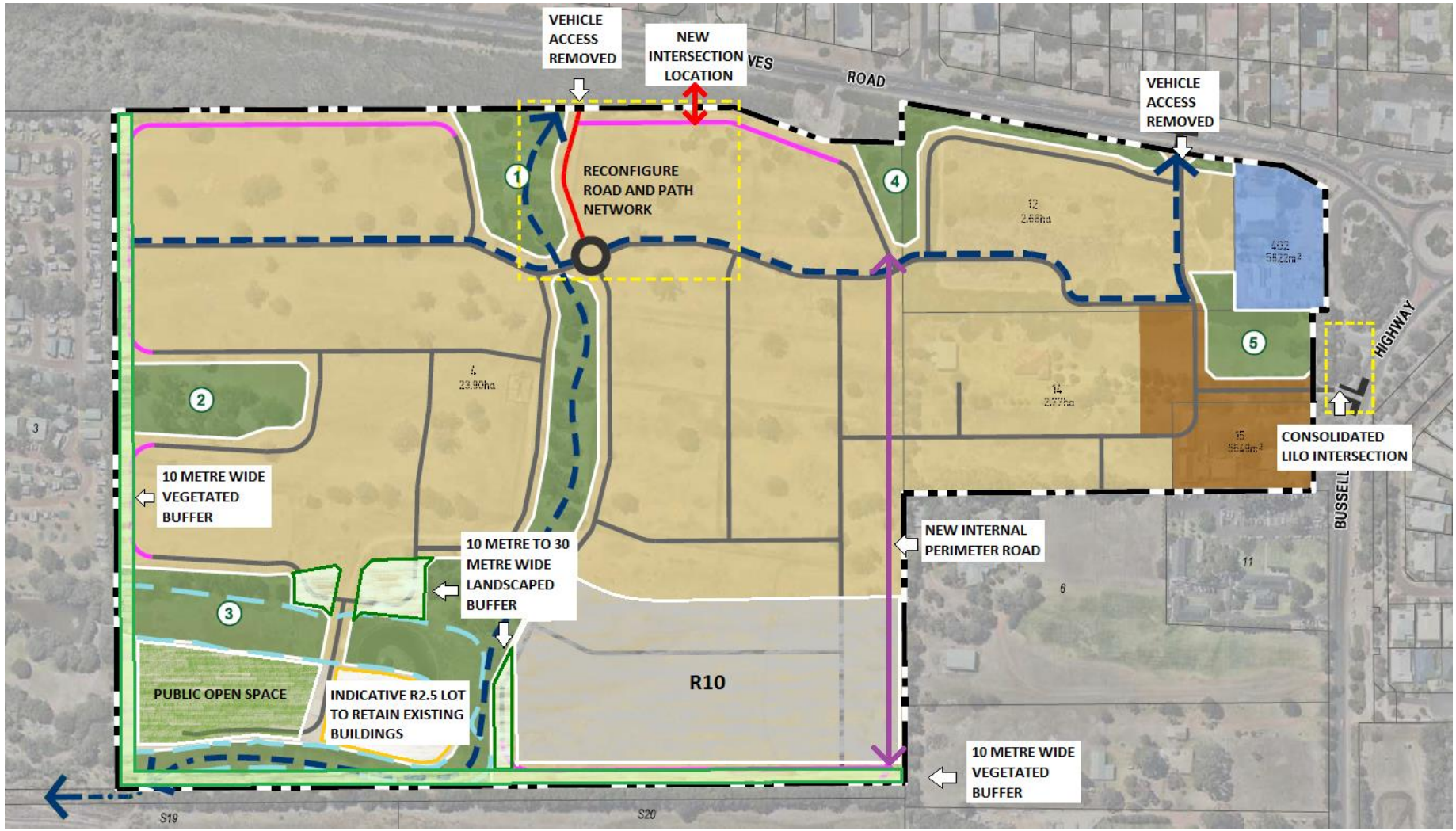
PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

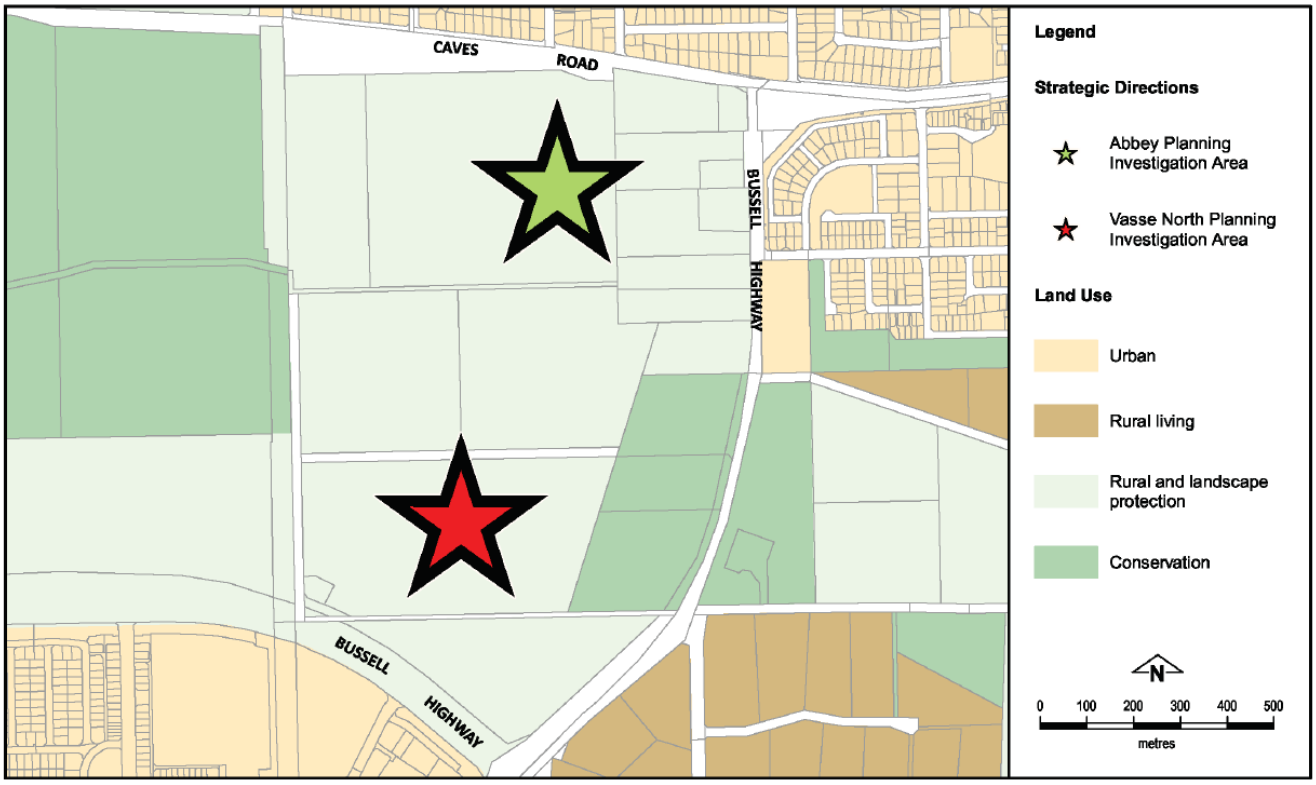
	incorporates and preserves existing vegetation along the boundary fence line (Figure 1: Annotated Structure Plan Map).	
No.	• **AMENDMENT MODIFICATION**	**REASON**
16.	Modify Special Provision 76 number 3 (ii) by deleting the following text: *Amenity of the locality and surrounds;*	Modification recommended in response to submission. The intent of the provision is adequately addressed in the SP.

Attachment 7 – Schedule of Modifications

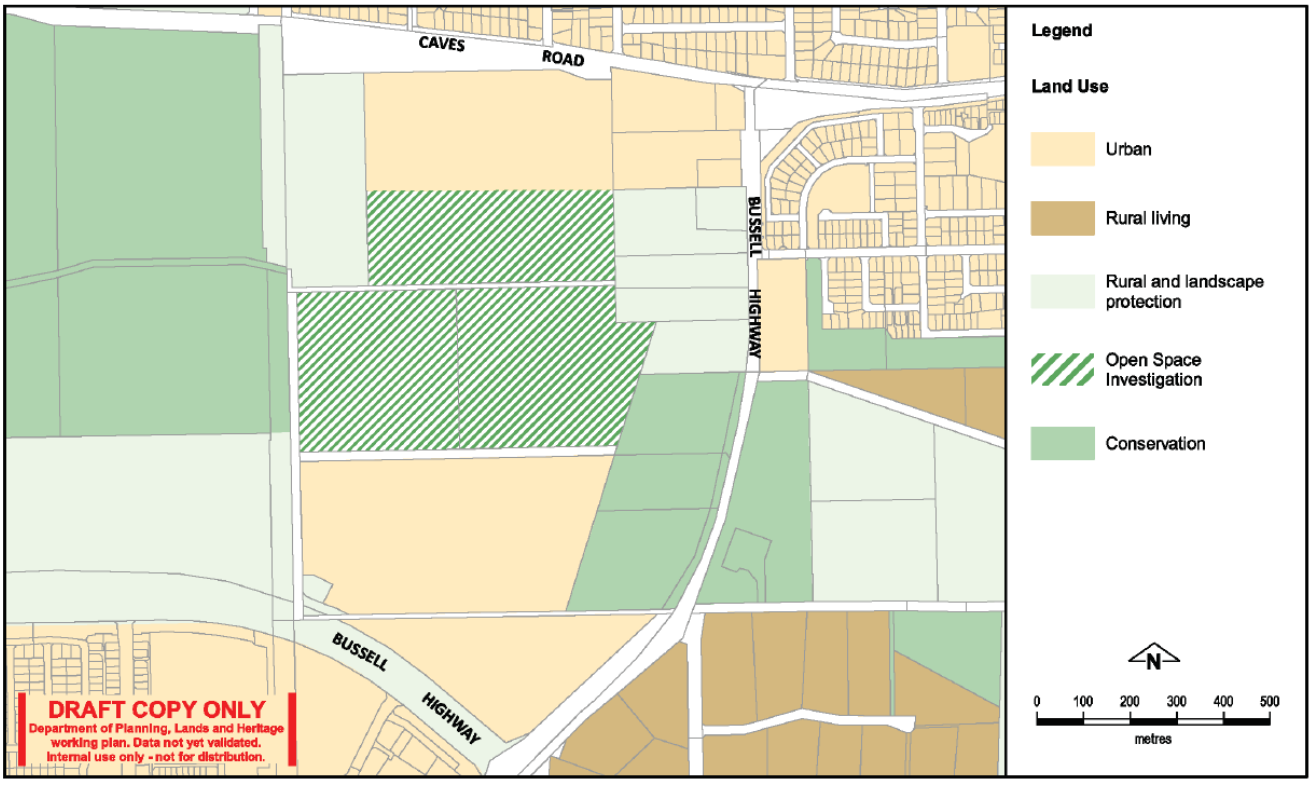
PROPOSAL: ABBEY SOUTH STRUCTURE PLAN AND ASSOCIATED AMENDMENT NO. 55 TO LOCAL PLANNING SCHEME NO. 21

FIGURE 1: ANNOTATED STRUCTURE PLAN MAP





LNSRS PLANNING INVESTIGATION AREAS 2019 (NOW DELETED)



LNSRS AS AMENDED

Technical Note

Project: Abbey South LSP

Subject: Access Assessment

Client:	Rise Urban	**Version:**	B
Project No:	07028	**Author:**	Rodney Ding
Date:	7 July 2023	**Approved:**	Tanya Moran

1 Introduction

This technical note has been prepared to document all possible vehicular access options to service Abbey South Structure Plan. This technical note is a response to City of Busselton's council meeting decision in June 2023 to defer the entire Structure Plan approval with a request for the project team further explore all possible alternatives to a Caves Road access with Main Roads WA and other stakeholders. The traffic and land impacts of all proposed access arrangements explored, are documented herein in support of an endorsed access strategy for Abbey South Structure Plan (SP).

The Abbey South SP land is located on the southwest corner of the intersection of Caves Road and Bussell Highway at what is locally known as Monaghan's Rotary.

The assessment of the proposed SP access onto Caves Road was initially assessed using Main Roads WA count site data on Caves Road which was recently collected in 2020/21. It has been advised by Main Roads that this data, although current and provided an average AADT, was not appropriate to use due to it being too far west from the site (at the RAC Caravan Park).

To address this comment of traffic volumes and to explore all potential access options, a full reassessment of options has been undertaken and is detailed below.

In summary, it has been determined by the ongoing discussions and assessments that the most appropriate access to the SP is a combination of the following:

LOCATION Level 27St Martins Tower
44 St Georges Terrace
Perth
WA 6000
Australia

TELEPHONE +61 370 330 210
EMAIL contact@pja.com.au

WEBSITE pja.com.au

- Direct access onto Caves Road in the form of a new T-junction incorporating left and right turn pockets on the Caves Road approaches;
- A left in/left out (LILO) intersection (preferred) or a left-out (LO) on Bussell Highway.

2 Bussell Highway Access

A full roundabout access through the southern adjacent site (Lot 8 Caves Road frontage) onto Bussell Hwy was a preferred connection for Main Roads. Of critical importance to the Abbey SP approval process is that this landholding is not within the Abbey SP area and is not within the 'gift' of the Abbey landowner group to be able to deliver.

As such, a Bussell Highway access to the proposed SP can only be of a minor access type along the available frontage with the main access always having been proposed via Caves Road which is of a significantly lower order road (lower order roads are always favoured by Main Road access policy) and has less vegetation and traffic impacts.

Notwithstanding, in respect of the preferred Bussell Highway access, the intersections explored have been:

1 LILO intersection, incorporating a left turn pocket on the southern approach.
2 LO intersection limiting movements to left turn out only from the SP, towards Monaghan's Rotary.
3 Full movement intersection.

The above access types are discussed in more detail below.

(1) LILO intersection (refer illustration SK302)

This intersection type is proposed to be located at the position where Skiff Way currently exits onto Bussell Highway, south of Monaghan's Rotary, refer to SK302 at Appendix A. This is the ONLY location that a LILO can be safely located along the frontage, as the intersection will require a left turn lane on the southern approach to the highway intersection.

The start of this left turn lane would be positioned approximately 15m from the tangent point of the Amelia Park Lodge main car park crossover.

This left turn pocket also assumes that Ice Works crossovers on Lot 15 are closed and that the crossover to Lot 14 is also closed as this forms part of the SP.

Positive:

This option also allows the closure of the Caves Road access to Skiff Way as desired by Main Roads WA, with a conversion of Skiff Way to two-way movements.

(2) LO intersection (SK303)

In recognising the proximity of the left turn pocket on the southern approach to the LILO with existing crossovers, a simpler LO was considered, refer to SK303 in Appendix A.

Positive:

- This option will allow the closure of the Skiff Way crossover on Bussell Highway thereby minimising the number of conflict points on the highway but retains the entry from Caves Road.
- The exit from Skiff Way onto Bussell Highway would also be left out movement for all traffic.
- In effect, this option combines driveways and relocates Skiff Way approximately 40m to the south away from the Monaghan's Rotary.

(3) Full movement intersection (SK301)

This option was suggested to be explored by the City of Busselton in June 2023 as an alternative to the Caves Road full movement access to appease Main Roads, refer to SK301 in Appendix A.

The location of an all-movement intersection is fixed by the required distance of the commencement of a right turn pocket on the northern approach as vehicles exit the Monaghan's Rotary. Based on the likely 50km/h roundabout exit speed, the commencement of the right turn pocket should be positioned at the closest 5m from the roundabout exit, this being the Approach Sight Distance/Stopping Sight Distance. The right turn pocket is then designed on an approach speed of 60km/h as vehicles reach the commencement of the right turn pocket (55m), plus an allowance for 3 vehicles stopped to turn right (20m).

These dimensions fix the northern most position for the intersection.

Due to the 80km/h approach speed from the south of Amelia Park (90km/h design speed), the left turn pocket on that approach should be 120m in length.

Negative:

- This turn pocket impacts the crossovers of Amelia Park, these being the main car park and the service area for this site.

- This arrangement is not appropriate as two crossovers fall within the 'functional area' (per Austroads) of the proposed intersection, which is unsafe.

3 Caves Road Access

The access to Caves Road has been proposed to be an all-movement access as this is a lower order road to alternative frontages and their limitations. Caves Road is also expected to significantly reduce in through traffic volume in the future with strategic road network planned in the area (VDL) making it safer by reducing crash exposure.

In looking at the types of access, reasons cited by Main Roads WA in early consultation has been based on providing an access that has minimal impacts to right turning access to abutting properties on the north side of Caves Road and also in limiting the disturbance to vegetation on the south side of Caves Road.

(1) Main Roads Roundabout Option

The first option being advocated by Main Roads is a large 4-way roundabout at the intersection of Roberts Road. This will need to accommodate RAV 4s (27.5m long trucks) which Caves Road is classified for. The roundabout will also incorporate design features to reduce vehicle speeds from an approach speed of 70km/h to 30km/h prior to negotiating the roundabout for pedestrian and cyclist safety also negotiating the roundabout.

The Main Roads roundabout option also shown in Appendix B.

This treatment is estimated to require the clearing of approximately 4,200m^2 of vegetation (approximately 3.5 times more vegetation impacts than the SP recommended T-junction) and will likely impact two property accesses at a minimum.

The roundabout is seen to be problematic for pedestrian and cyclist access, as large roundabouts are statistically more unsafe for the most vulnerable road users, people walking and wheeling and cyclists.

(2) Main Roads T-junction Option

Main Roads has also prepared as an alternative T-junction access to the 4-way roundabout. This option includes significant channelization with the likely clearing of approximately 5,300m^2 of vegetation (approximate 4.4 times more vegetation impacts than the SP recommended preferred T-junction) as well as impacting access to two properties on the north side of Caves

Road. Of the three Caves Road access option, this option is expected to have the most significant impact on vegetation clearing.

This Main Roads T-junction option is shown at Appendix B.

The additional localised widening with medians provides additional utility to the intersection, but this is offset by the vegetation clearing.

(3) Caves Road Proposed Access (SK300)

The safest form of intersection type which also limits the above impacts was found to be a full movement T-junction in a simpler form. This has been proposed to be located between Locke Street and Cuthbert Street and be of similar format to the current intersection treatments at these same intersections.

The SP recommended treatment is shown in SK300 at Appendix B.

This has a right turn pocket on the western approach and a left turn pocket on the eastern approach to the intersection. This option also limits the disturbance of vegetation with a simple road link from the SP through the vegetation of the Caves Road verge, which is sufficient to cater the modal demands at this location.

The left and right turn pocket lengths, widths and tapers have been designed in accordance with Austroads. In addition to this, there is the provision of a solid traffic island to allow a protected road crossing for pedestrians to/from the beach, near to Roberts Road desire line. Approximately 1,200m^2 of vegetation area would need to be cleared for this simpler full-movement T-junction option.

The proposed right turn lane on the western approach will impact five (5) properties on the north side of Caves Road but will still allow westbound traffic to turn right into driveways of these properties. All other property access will remain unimpacted.

4 Updated Access Assessment

The assessment of the impacts of the proposed SP had previously been undertaken on the basis of a single access point onto Caves Road.

This assessment within the Transport Impact Assessment included as assumption of traffic flows for the SP based on a higher trip rate of 10 trips per dwelling and had based the Caves Road traffic flows on the Main Roads traffic count site 51133 on Caves Road, south of Siesta Park Road. The latest traffic counts available at this site were in 2020/21 and these have been based on

long term counts, not just a single day, but over a period of at least 7 days and over 24 hours for each of those days.

Due to the distance between the proposed SP and this count site, Main Roads had advised that the traffic flows from the count site were not appropriate, due to the distance from the LSP and that there would possibly be additional traffic closer to the Monaghan's Rotary.

With the Main Roads count site data located away from the proposed SP, in attempts to resolve an access strategy with Main Roads, Main Roads had advised that the department held Tomtom data nearer to the SP which was said could be provided to allow the project team an updated assessment. There was a period of 3 months where approaches to Main Roads for the release of this data were made, were not fruitful, and that the end result was that the data would not be released due to licensing restrictions of the data provider, despite the project team only requesting order of traffic flows on Caves Road for a sanity check. A summary of the approaches to Main Roads for the data is below:

30/03/2023	MRWA to the CoB stating that the Tomtom data used by MRWA significantly higher than count site 51133. Data to be refined and made available.
13/04/23	PJA requested Tomtom data from MRWA
During 05/23	Repeated phone calls to MRWA seeking data. Main Roads finally advised data had licensing release issues.
During 06/23	To circumvent licensing issues, PJA then requested to get an order of hourly flows available on Caves Road to enable a sensitivity check on the TIA flows.
07/23	No response.

PJA has since sourced traffic counts undertaken directly in front of the SP area, at the Monaghan's Rotary in November 2020. These traffic counts are attached as Appendix C. This data was recorded over 2-hour periods in the AM and PM peaks and on one day, this being a Wednesday when the weather was fine.

The comparison in traffic flows recorded at count site 51133 (averaged over an extended period) and from the Monaghan's Rotary in November 2020 surveys (based on two peak hour surveys on a single day) for Caves Road are summarised in Appendix D and Table 1. It can be seen that the November **2020 one day traffic counts are 30% higher than the 2022 count site** 51133 data in the AM Peak and 46% higher in the PM peak.

Table 1: Caves Road Traffic Flows Comparison

Period	Direction	Count Site 51133	Monaghan's Rotary	Difference
AM Peak	Northbound	450	590	+31%
	Southbound	345	440	+28%
	Total	**795**	**1,030**	**+30%**
PM Peak	Northbound	385	630	+64%
	Southbound	430	560	+30%
	Total	**815**	**1,190**	**+46%**

The differences between the Main Roads count site 51133 data and the November 2020 traffic counts have been discussed in more detail in Appendix D.

In summary of the traffic volumes assessed, the expected traffic flows on Caves Road at count site 51133 without any effect of the VDL or BOB has been estimated to be approximately 11,050vpd in 2033 and approximately 12,350 vpd in 2041 . Based on the 30% higher one day peak hour traffic flows collected from November 2020, the traffic flows on Caves Road near the SP are expected to be approximately 15,250vpd in 2033 and approximately 17,050vpd in 2041 (with no VDL or BOB in place in 20 years time).

In a meeting between Main Roads WA and the project team on 7 July 2023, the higher traffic flows for use as basis of future intersection assessment was not disputed by Main Roads WA. As such, agreement at the meeting brings the traffic volume data set for use to a close.

Ultimate Development Horizon:

On advice from the Applicant, the full development of the SP is expected in approximately 8-10 years, and Transport Impact Assessment Guidelines, WAPC (2016) states that structure plans should be assessed at full development. Section 10.9.1 from Volume 2 Planning Schemes, Structure Plans and Activity Centre Plans states:

"The analysis of the transport networks should therefore be undertaken for the (assumed) year of full development."

In this case, it has been assumed that ultimate development will occur by 2033.

In adoption of the full SP requirements with a higher volume base, the specified WAPC generation rates of 8 trips a dwelling is adopted in the assessment of the traffic expected to be generated by the SP. Based on a proposed 350 dwellings, this equates to 2,800 trips per day to and from the SP, noting this was a higher 3,500 in the TIA.

Detailed outputs are in Appendix E, with a summary below in Table 2.

Table 2: SIDRA Summaries – 2033 with 8 trips per Dwelling

Lane	AM Peak				PM Peak			
	DoS	Ave. Delay (s)	LoS	95th %ile Q (m)	DoS	Ave. Delay (s)	LoS	95th %ile Q (m)
Proposed Caves Road Intersection								
LSP S LT	0.06	7	A	1.4	0.03	8	A	0.3
LSP S RT	*0.41*	*26*	*D*	*12*	*0.28*	*30*	*D*	*7*
Caves Rd E LT	0.03	6	A	0	0.08	6	A	0
Caves Rd E TH	0.29	0.1	A	0	0.36	0.1	A	0
Caves Rd W TH	0.38	0.1	A	0	0.41	0.1	A	0
Caves Rd W RT	*0.02*	*9*	*A*	*0.5*	*0.06*	*11*	*B*	*1.5*
Intersection	**0.41**	**2**	**D**	**12**	**0.41**	**2**	**D**	**7**
Proposed Bussell Hwy Intersection								
Bussell Hwy S TH	0.35	0.1	A	0	0.60	0.4	A	0
Bussell Hwy N TH	0.42	0	A	0	0.31	0	A	0
LSP W LT	*0.10*	*7*	*A*	*2.6*	*0.08*	*8*	*A*	*0.6*
Intersection	**0.42**	**0.5**	**A**	**2.6**	**0.60**	**0.5**	**A**	**0.6**

Bussell Highway LO Option:

The summary of the LO Option is provided below.

The provision of a left turn exit from the SP area is expected halve the number of vehicles expected to turn right from the SP onto Caves Road. Traffic turning right from Caves Road (expected to be 80% of traffic exiting the LSP with 20% turning left towards Dunsborough) is then expected to drive to Busselton (half of the 80% of 40% of total LSP traffic) or Vasse (again 40%) and then return in the opposite direction.

For 2033, and assuming a left out only onto Bussell Highway, the Caves Road intersection is expected to operate within acceptable parameters.

The assessment also found the left turn onto Bussell Highway, as a route to travel south to Vasse, is about 25s quicker than exiting onto Caves Road and turning right at Monaghan's Rotary to travel south to Vasse. This route may well be the preferred route exiting the SP, due to easier left turn exit from the SP, and thus there may be less traffic turning right from the proposed SP road onto Caves Road, as modelled above. This would only improve the above expected good operation of the intersection.

However, conservatively assuming an equal distribution of right turn traffic onto Caves Road and left turn traffic onto Bussell Highway, the critical movements for the entire SP, the right turn from the SP onto Caves Road is expected to have a LOS D (26s delay) and DOS 0.41 in the AM

peak and LOS D (30s delay) and DOS 0.28 in the PM peak. The SP approach is expected to have 20s delays for all movements in the AM peak and 23s in the PM peak. These figures are based on the 2033 traffic flow scenario and the two intersection **delays are both well below the WAPC threshold of 45s for a critical movement and 35s for the approach for all movements**.

The previously adopted 10 trips per dwelling was also stress tested and the results are still at LOS D and delays for the right turn of about 30s. Again, both acceptable and within WAPC assessment requirements.

Finally, a 2041 scenario was examined with 8 trips per dwelling and the intersection was found to still be below the thresholds.

In further testing of various access arrangements, what was found was that if the left turn onto Bussell Highway was not provided, the proposed Caves Road intersection would be just beyond WAPC thresholds in the AM peak with LOS E (48s) and DOS 0.83 in 2033. This based on 8 trips per dwelling. If it was 10 trips per dwelling the results will be worse with the right turn operating at a LOS F, thus failing.

Thus, at the very least a left turn onto Bussell Highway is required to provide additional capacity when exiting the SP. The left turn entry into the SP from the south, right turn from the north and a right turn exit from the Bussell Hwy access are not required to make the SP work.

However, a LILO will add additional capacity to the SP accesses whilst a full movement intersection cannot be physically accommodated on this section of Bussell Highway between Amelia Park and Monaghan's Rotary.

If a full movement intersection on Bussell Highway could be constructed, which the above physical assessment has shown, it cannot, this intersection is expected to work only until 2038, when the right turn exit from the LSP experiences excessive delays. The full movement intersection on Caves Road with LILO/LO on Bussell Highway has shown it can operate to approximately 2048. This option gives the better long-term resilience of the LSP accesses.

The above was presented to Main Roads WA in a meeting on 7 July 2023. The outcomes of these discussions are included in the summary.

5 Summary

Traffic volumes collected from Monaghan's Rotary was accepted for use by Main Roads WA.

A full movement priority-controlled intersection on Bussell Highway cannot fit within the current constraints on the section from Monaghan's Rotary to Amelia Park Lodge. Main Roads WA agreed this option was problematic. A full intersection onto Bussell Highway is expected to fail by 2038 (5 years of operational life from full development).

A LILO treatment on Bussell Highway can fit but Main Roads WA noted potential drainage issues across Skiff Way which would need to be resolved in next stages of planning; however Main Roads accepted that a LILO treatment on Bussell Highway can possibly allow closure of the Skiff Way entry at Caves Road as desired by Main Roads.

A LO only to Bussell Highway was agreed by Main Roads WA to be pursued by the project team as it closed off the existing Skiff Way access to Bussell Highway as desired by Main Roads.

A Caves Road access was not disputed by Main Roads WA. Main Roads prefer a roundabout but did concede that the T-intersection option (with the 2 stage right turn) could be taken forward as a Plan B.

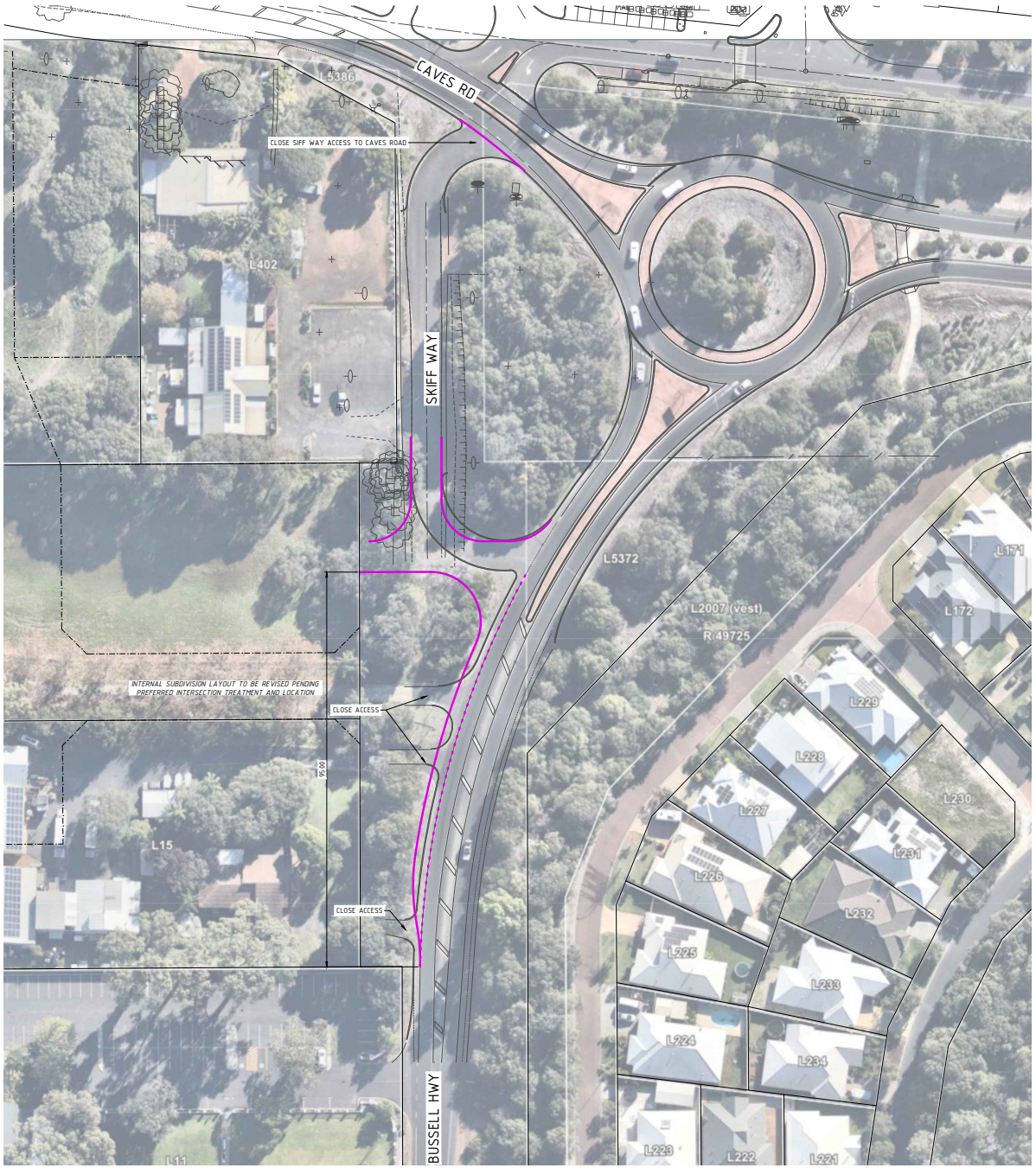
A 4-way roundabout on Caves Road with required pre-deflections and RAV access will have a significant impact on vegetation and does impact on property access. Main Roads WA suggested property access to the north would not be impacted by a roundabout.

A simpler Caves Road full movement priority-controlled intersection on Caves Road (without a 2-stage turn) has been found to operate satisfactorily and it is the position of the Applicant that this is all that is needed, operationally and for safety, with the traffic distribution assistance of a LO onto Bussell Highway to make the access safer (reducing crash exposure).

The simpler Caves Road T-junction minimises the impacts to both existing properties and a significant reduction in vegetation clearing.

The findings of all access options presented indicates the Structure Plan's overall access arrangement should be a full movement T-junction on Caves Road and a LO on Bussell Highway. This arrangement will be able to cater for traffic growth to the full development of the LSP in 2033 but can still operate satisfactorily beyond 2041 to approximately 2048.

Appendix A Bussell Highway Intersections



SK302
BUSSELL HIGHWAY - LEFT IN LEFT OUT

0 5 10 20 30m
SCALE 1:500 @ ORIGINAL SHEET SIZE A1

JDSi CONSULTING ENGINEERS

REV	DATE	DRAWN	
B	2023.07.05	RDF	NOTES ADDED
A	2023.07.03	RDF	ORIGINAL ISSUE

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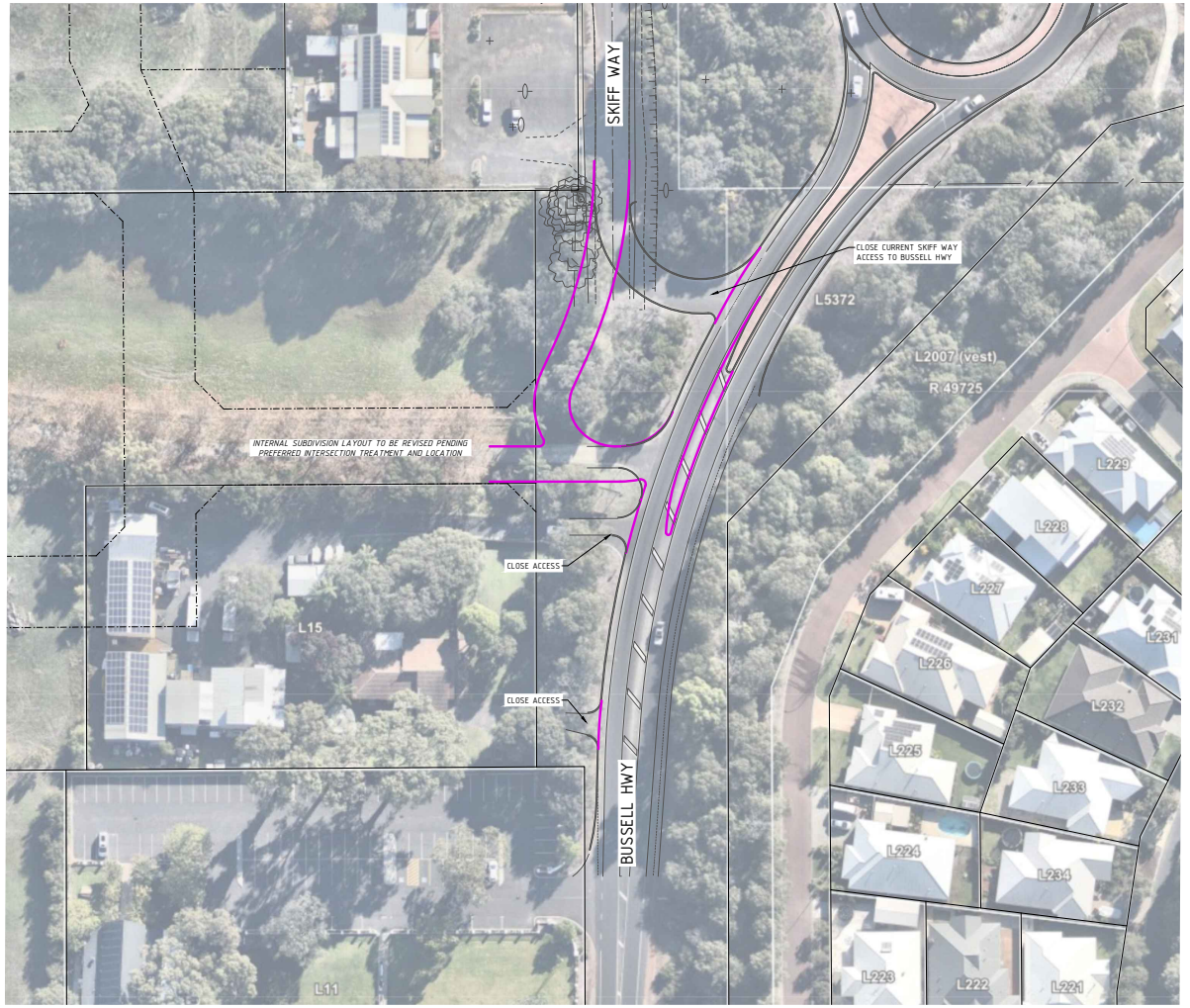
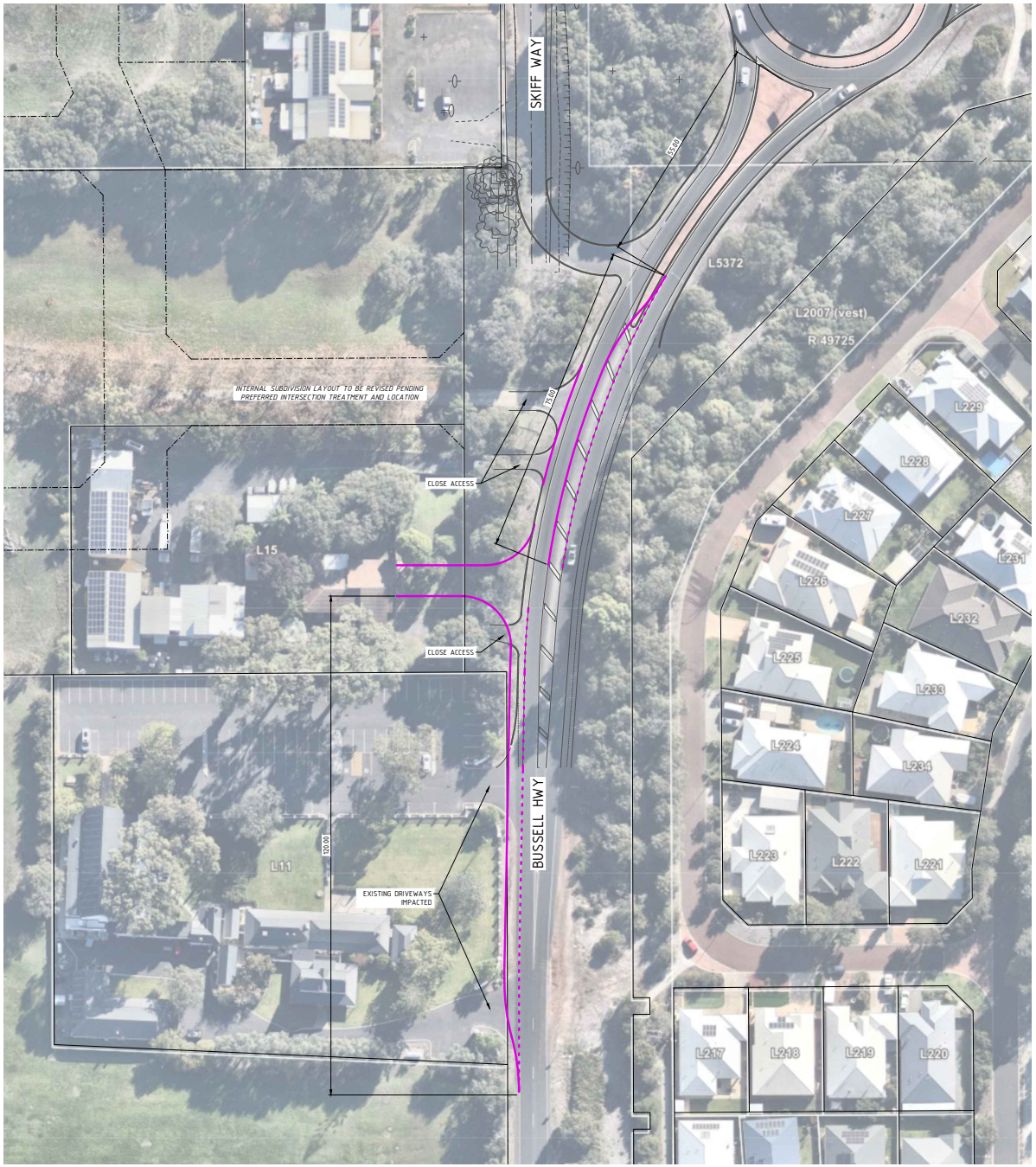


JDSi CONSULTING ENGINEERS

SK303
BUSSELL HIGHWAY - LEFT OUT ONLY
0 5 10 20 30m
SCALE 1:500 @ ORIGINAL SHEET SIZE A1

REV	DATE	DRAWN	
B	2023.07.05	RDF	NOTES ADDED
A	2023.07.03	RDF	ORIGINAL ISSUE

Plotted By: rfowler Plot Date: 05/07/23 - 08:45 Cad File: I:\JDS232202\JDS232202.0\02 CIVIL\Drawings\Sketches\JDS232202.0_SK303.dwg



SK301
BUSSELL HIGHWAY - FULL MOVEMENT INTERSECTION

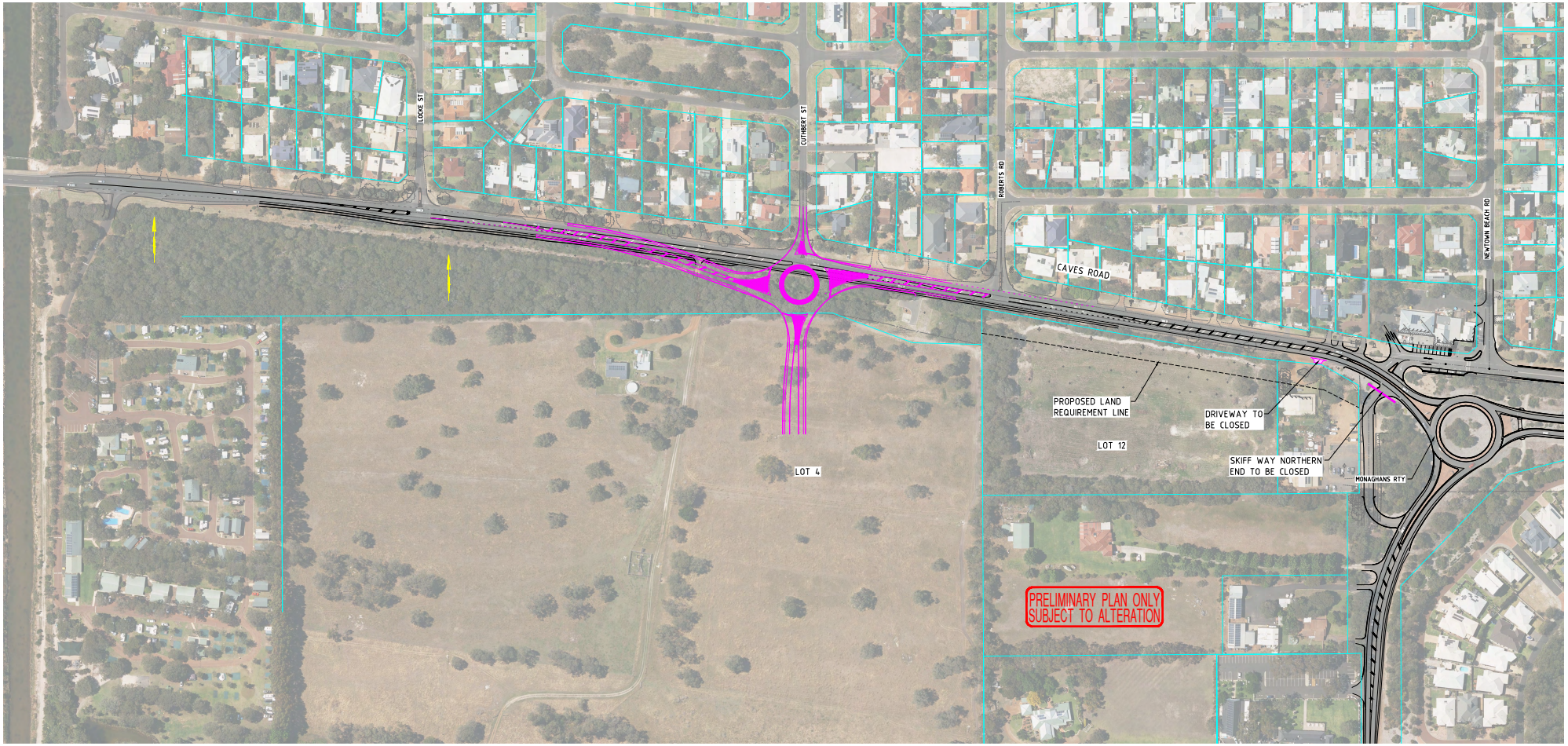
0 5 10 20 30m
SCALE 1:500 @ ORIGINAL SHEET SIZE A1

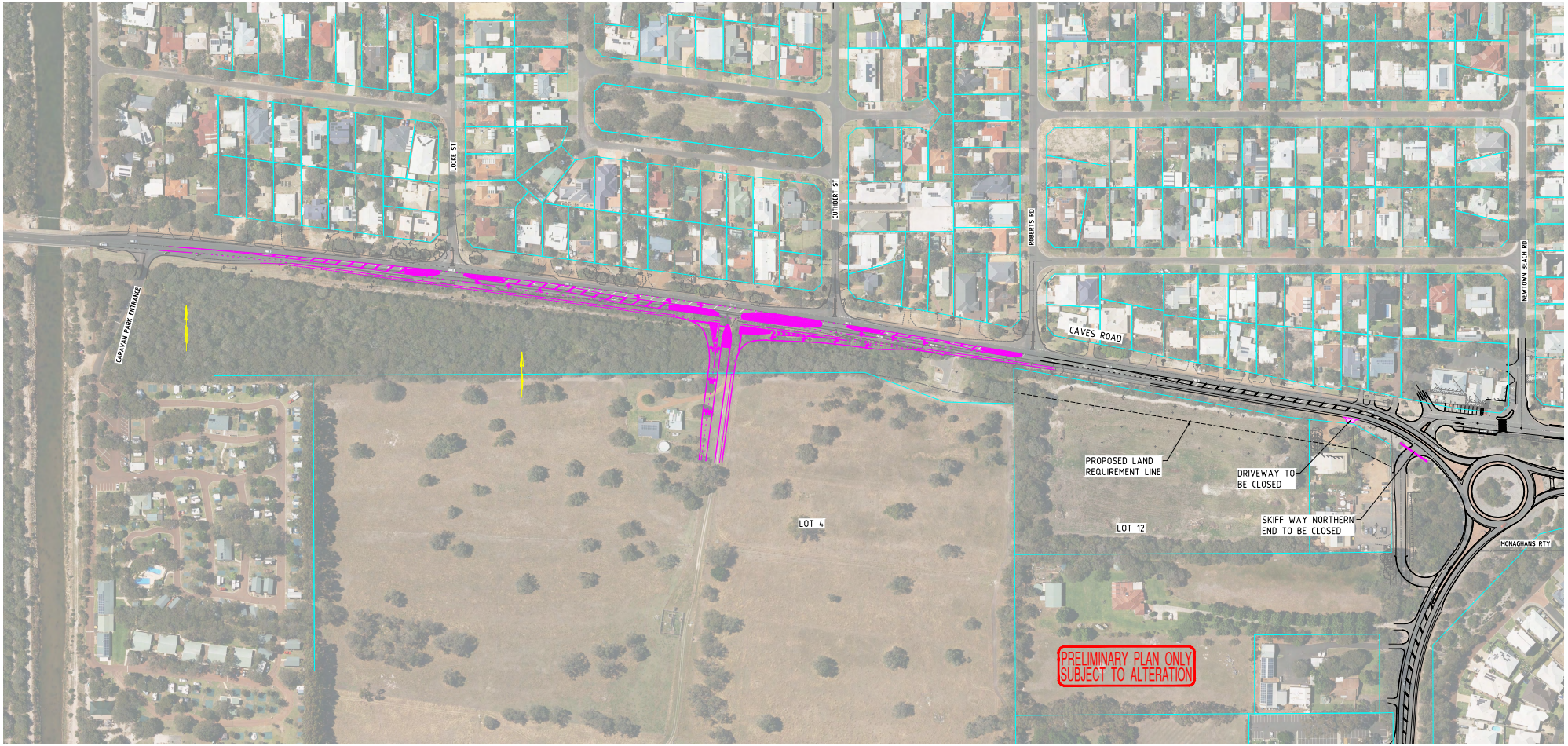
JDSi
CONSULTING ENGINEERS

REV	DATE	DRAWN	
B	2023.07.05	RDF	NOTES ADDED
A	2023.07.03	RDF	ORIGINAL ISSUE

Plotted By: rfowler Plot Date: 05/07/23 - 08:44 Cad File: I:\JDS232202\JDS232202.0\02 CIVIL\Drawings\Sketches\JDS232202.0_SK301.dwg

Appendix B Caves Road Access Options


LOCKE ST
CUTHBERT ST
ROBERTS RD
NEWTOWN BEACH RD
CAVES ROAD
PROPOSED LAND REQUIREMENT LINE
DRIVEWAY TO BE CLOSED
LOT 12
LOT 4
SKIFF WAY NORTHERN END TO BE CLOSED
MONAGHANS RTY
PRELIMINARY PLAN ONLY SUBJECT TO ALTERATION
PRINTED : 24/05/2023 11:19:46 AM
1:1000
I:\Bunbury Projects\M043 Caves Road\01.60_02.60_slk_lot_12_subdivision_bcg94\Concept\Drawings\Sketches\M43-Lot-12-roundabout-option2-2023-May-v3.dwg



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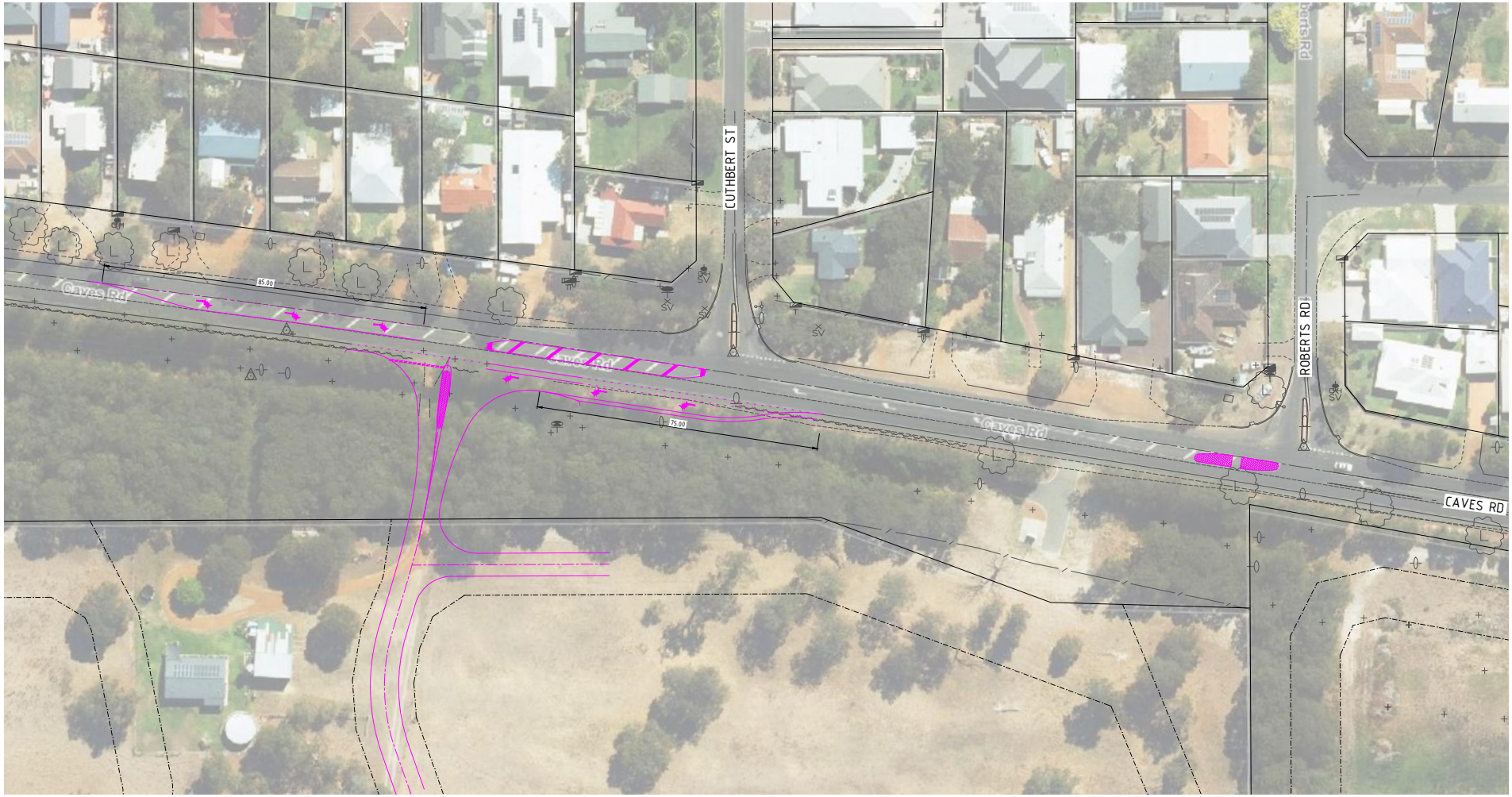

SK300

0 5 10 20 30m
SCALE 1:500 @ ORIGINAL SHEET SIZE A1

JDSi CONSULTING ENGINEERS

REV	DATE	DRAWN	
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B	2023.03.15	RDF	EASTERN TURN POCKET AMENDED
A	2023.03.09	RDF	ORIGINAL ISSUE

Plotted By: rfowler Plot Date: 02/06/23 - 08:13 Cad File: I:\JDS232202\JDS232202.0\02 CIVIL\Drawings\Sketches\JDS232202.0_SK300.dwg

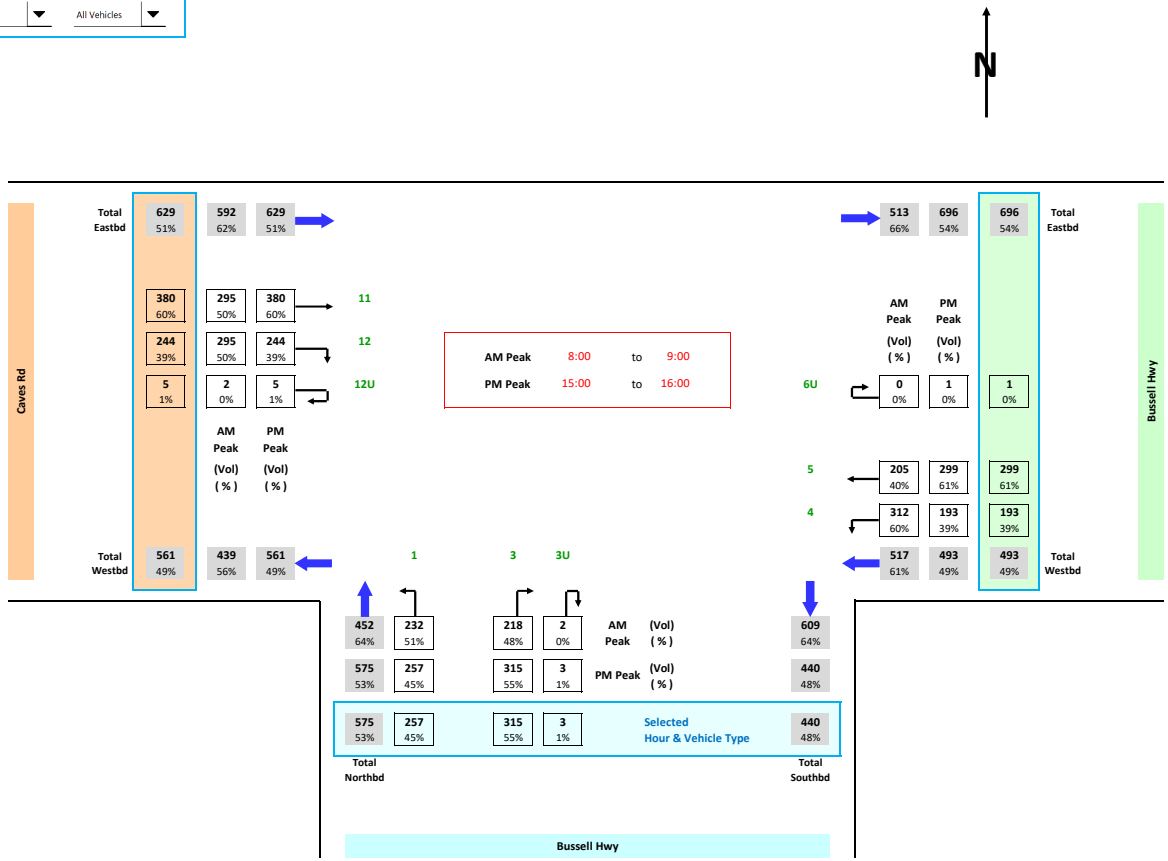
Appendix C Monaghan Rotary Traffic Flows

Job No. : AUWA6985
Client : PJA
Suburb : Abbey LSP
Location : 1. Bussell Hwy / Caves Rd

Day/Date : Wed, 25th Nov 2020
Weather : Fine
Description : Classified Intersection Count
: Intersection Diagram

MATRIX Traffic and Transport Data

Hour Starting	Vehicle Type
15:00	All Vehicles



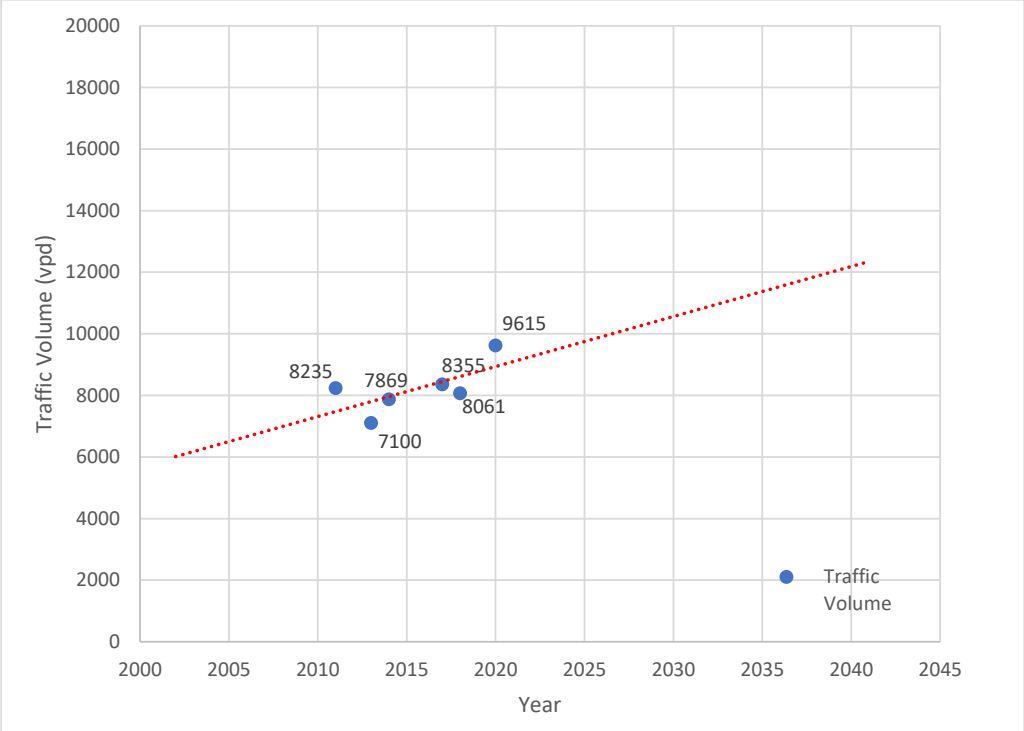
Appendix D Technical Assessment of Traffic Flow Differences

In reviewing the traffic flows at count site 51133, the growth rate was found to be 1.82% per annum, based on a straight line of best fit/long-term average traffic flows (from 2011 to 2020).

In addition, the traffic flows observed in 2020/21 for this count site of 9,615vpd were found to be approximately 680vpd above the line of best fit, thus about 7.6% above the long-term average value of 8,935vpd. For the 6 data points from 2011 to 2020, these were found to vary from 9.0% below to 10.2% above the long-term average line, thus there has been some variance in actual traffic flows as compared to the long-term average line of best fit. It would not be appropriate to utilise the actual observed traffic flows for a particular year, as these would not be truly representative of an average traffic flow.

The graphical representation of the traffic flows described are shown below in **Error! Reference source not found.**.

Figure 1: Traffic Flow v Year (Caves Road Count Site 51133)



With the traffic flows observed in November 2020, these were scaled down by a similar factor of 7.6%, to a normalized traffic flow more representative of the long-term average traffic flows.

For 2033, based on the line of best fit, the expected traffic flows on Caves Road at count site 51133 without any effect of the VDL or BOB should be approximately 11,050 whilst in 2041 this is expected to be approximately 12,350. Based on the recorded peak hour traffic flows from November, the traffic flows on Caves Road near the SP are expected to be approximately 15,250 in 2033 and approximately 17,050 in 2041.

Appendix E Sidra Intersection Outputs

Caves Road AM Peak 2033

LANE SUMMARY

▽ Site: 101 [LSP Access AM - mod RAB Vols (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New Site
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis: Constant Number of Years = 13

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: LSP Access															
Lane 1	44	0.0	44	0.0	810	0.055	100	7.0	LOS A	0.2	1.4	Short	20	0.0	NA
Lane 2	88	0.0	88	0.0	213	0.414	100	26.5	LOS D	1.6	11.6	Full	500	0.0	0.0
Approach	133	0.0	133	0.0		0.414		20.0	LOS C	1.6	11.6				
East: Caves Road															
Lane 1	59	0.0	59	0.0	1847	0.032	100	6.4	LOS A	0.0	0.0	Short	75	0.0	NA
Lane 2	528	5.7	528	5.7	1848	0.286	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	587	5.1	587	5.1		0.286		0.7	NA	0.0	0.0				
West: Caves Road															
Lane 1	712	5.7	712	5.7	1857	0.383	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	15	0.0	15	0.0	828	0.018	100	8.9	LOS A	0.1	0.5	Short	75	0.0	NA
Approach	727	5.6	727	5.6		0.383		0.3	NA	0.1	0.5				
All Vehicles	1446	4.9	1446	4.9		0.414		2.3	NA	1.6	11.6				

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Minor Road Approach LOS values are based on average delay for all lanes (v/c not used).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Bussell Hwy AM Peak 2033

LANE SUMMARY

▽ Site: 101vv [Bussell Dev AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New Site
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis: Constant Number of Years = 13

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Bussell Hwy															
Lane 1	620	10.1	620	10.1	1772	0.350	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	620	10.1	620	10.1		0.350		0.1	NA	0.0	0.0				
North: Bussell Hwy															
Lane 1	759	6.3	759	6.3	1822	0.417	100	0.0	LOS A	0.0	0.0	Full	70	0.0	0.0
Approach	759	6.3	759	6.3		0.417		0.0	NA	0.0	0.0				
West: LSP															
Lane 1	88	0.0	88	0.0	905	0.098	100	7.2	LOS A	0.4	2.6	Full	500	0.0	0.0
Approach	88	0.0	88	0.0		0.098		7.2	LOS A	0.4	2.6				
All Vehicles	1468	7.5	1468	7.5		0.417		0.5	NA	0.4	2.6				

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Minor Road Approach LOS values are based on average delay for all lanes (v/c not used).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Caves Road PM Peak 2033

LANE SUMMARY

▽ Site: 101 [LSP Access PM - mod RAB Vols (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New Site
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis: Constant Number of Years = 13

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: LSP Access															
Lane 1	22	0.0	22	0.0	681	0.032	100	8.0	LOS A	0.1	0.8	Short	20	0.0	NA
Lane 2	44	0.0	44	0.0	159	0.277	100	30.2	LOS D	0.9	6.7	Full	220	0.0	0.0
Approach	66	0.0	66	0.0		0.277		22.8	LOS C	0.9	6.7				
East: Caves Road															
Lane 1	147	0.0	147	0.0	1847	0.080	100	6.4	LOS A	0.0	0.0	Short	75	0.0	NA
Lane 2	675	4.3	675	4.3	1873	0.360	100	0.1	LOS A	0.0	0.0	Full	560	0.0	0.0
Approach	822	3.5	822	3.5		0.360		1.2	NA	0.0	0.0				
West: Caves Road															
Lane 1	757	5.6	757	5.6	1847	0.410	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	37	0.0	37	0.0	643	0.057	100	10.6	LOS B	0.2	1.5	Short	75	0.0	NA
Approach	793	5.3	793	5.3		0.410		0.6	NA	0.2	1.5				
All Vehicles	1682	4.2	1682	4.2		0.410		1.8	NA	0.9	6.7				

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Minor Road Approach LOS values are based on average delay for all lanes (v/c not used).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Bussell Hwy PM Peak 2033

LANE SUMMARY

▽ Site: 101vv [Bussell Dev PM (Site Folder: General)]

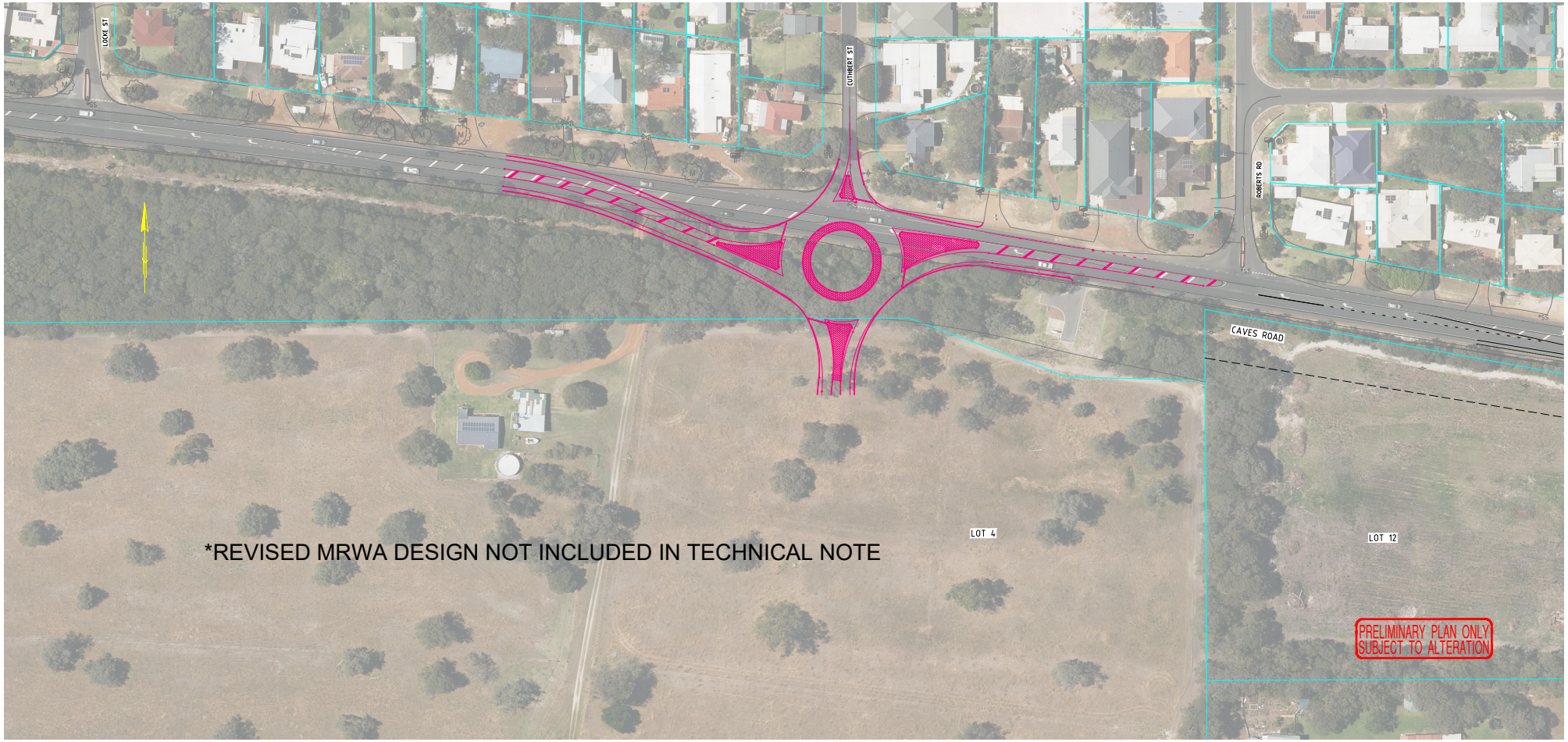
Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New Site
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis: Constant Number of Years = 13

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Bussell Hwy															
Lane 1	769	8.1	769	8.1	1807	0.426	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	769	8.1	769	8.1		0.426		0.1	NA	0.0	0.0				
North: Bussell Hwy															
Lane 1	554	8.6	554	8.6	1779	0.311	100	0.0	LOS A	0.0	0.0	Full	70	0.0	0.0
Approach	554	8.6	554	8.6		0.311		0.0	NA	0.0	0.0				
West: LSP															
Lane 1	44	0.0	44	0.0	752	0.059	100	8.1	LOS A	0.2	1.5	Full	500	0.0	0.0
Approach	44	0.0	44	0.0		0.059		8.1	LOS A	0.2	1.5				
All Vehicles	1367	8.1	1367	8.1		0.426		0.3	NA	0.2	1.5				

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Minor Road Approach LOS values are based on average delay for all lanes (v/c not used).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.


LOCKE ST
CUTHBERT ST
ROBERTS RD
CAVES ROAD
LOT 4
LOT 12
*REVISED MRWA DESIGN NOT INCLUDED IN TECHNICAL NOTE
PRELIMINARY PLAN ONLY
SUBJECT TO ALTERATION
PRINTED : 13/07/2023 03:11:02 PM
1:500
I:\Bunbury Projects\M043 Caves Road\01.60_02.60_slk_lot_12_subdivision_bcg94\Concept\Drawings\Sketches\M43-Lot-12-roundabout-option2-2023-July-v2.dwg

Stantec

Memo

To:	City of Busselton	From:	Andreas Wang, Stantec
File:		Date:	26 July 2023

Reference: CW42307025

INTRODUCTION

This technical memorandum documents the findings of a peer review undertaken for the Access Assessment Technical Note prepared by PJA (Version B, dated July 2023), which documents possible vehicular access options to service Abbey South. This memo presents recommendations to improve the assessment and commentary on the intersection options provided.

ROUNDABOUT SAFETY

The technical note indicates that the proposed roundabout on Caves Road would be designed to reduce vehicles from 70km/h to 30km/h on the approach to the roundabout. This is typically achieved via the use of reverse curves as shown in the appended drawings. However, Caves Road forms part of the Restricted Access Vehicle class 4 network, the roundabout would need to be designed to accommodate these vehicles and the effectiveness of these curves would therefore be limited due to the width of the lanes. Other speed reduction measures include raised platforms on the approach to provide vertical deflection, however, these are typically discouraged on RAV routes.

It is stated in the technical memorandum that "*large roundabouts are statistically more unsafe* [sic] *for the most vulnerable road users, people walking and wheeling and cyclists*." However, no reference is provided to support this statement. In general, roundabouts are perceived by pedestrians and cyclists to be less safe, however there is limited to evidence to suggest that actual safety is diminished. Benefits of pedestrian crossings at single-lane roundabouts include reduced vehicle speeds and reduced crossing distances for pedestrians (i.e. 1 lane per direction at a time). While there is evidence that multilane roundabouts can be less safe for cyclists (Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings Management, 2020), the proposal is only for single lane roundabout as shown below.

Roundabout Option on Caves Road

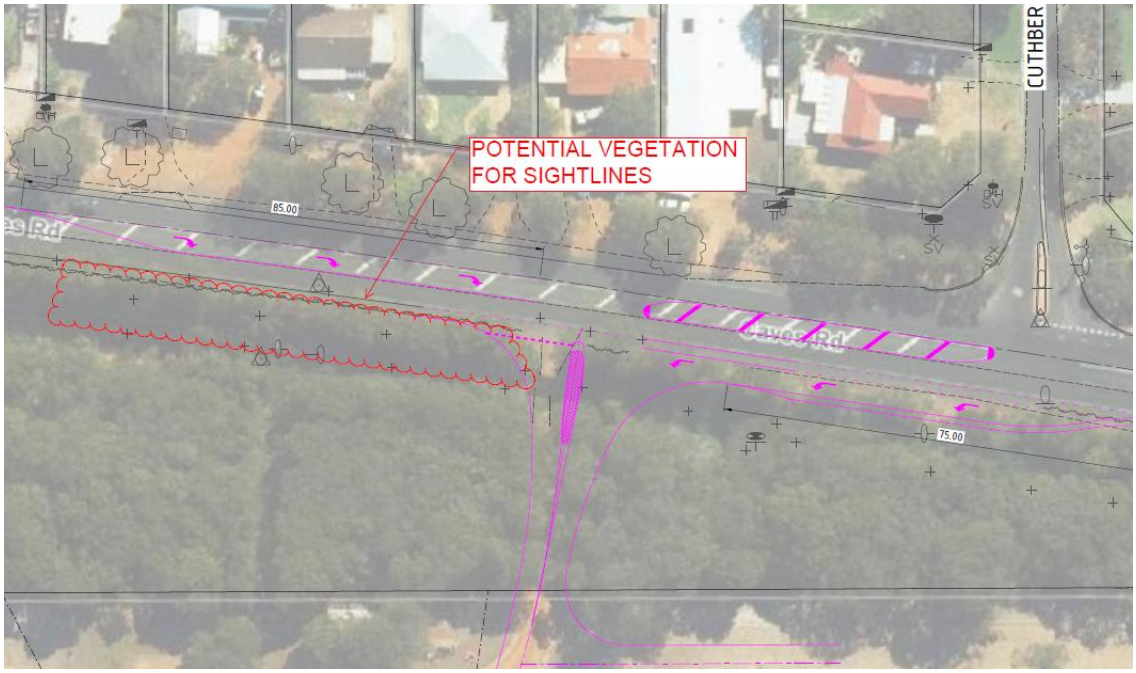


Reference: CW42307025

INTERSECTION TYPES – BENEFITS AND IMPLICATIONS

The technical note makes certain claims about the type of intersection without a solid basis. The note states that the benefits of the utility of an unsignalised intersection on Caves Road with wide medians (enough to allow vehicle storage) would be offset by the vegetation clearing. The claim is subjective, and the benefits and implications cannot be compared this simply. A proper analysis into the required vegetation removal against the benefits of a wide median intersection would need to be investigated to support this claim. It is possible that more of the vegetation for the undivided intersection will need to be removed for sightline purposes as shown below.

Potential Vegetation Removal Required for Sightlines



Similarly, the technical note states that the undivided unsignalised T-Intersection is the safest option without significant vegetation clearing, however more specifically it is the only reasonably practicable option remaining and safety is not a key benefit of this intersection type. For example, a left-in-left-out arrangement would be safer.

TRAFFIC VOLUMES AND ANALYSIS

Throughout this technical note, a daily trip generation rate of 8 trips per dwelling was adopted, whereas the Transport Impact Assessment (TIA) adopted a robust rate of 10 trips per dwelling per day. It is unclear why a lower rate was applied for this assessment as the rates should be applied consistently. It is recommended that the analysis should be re-run with a 10 trips per dwelling per day assumption, consistent with the TIA.

The technical note states that "*the provision of a left turn exit from the SP (Structure Plan) area is expected halve the number of vehicles expected to turn right from the SP onto Caves Road*". Given the proposed road layout within the SP that tends to direct traffic towards Caves Road, this traffic distribution

may be optimistic as the route for the majority of the SP area would involve driving through a number of winding internal roads. The TIA traffic volumes indicated 2,700vpd would use Caves Road, while 700vpd would use Bussell Highway, as shown below. Again, the distribution of traffic should be consistent with the TIA. It was identified in the technical note that if a Bussell Highway exit from the SP cannot be accommodated, the higher trip rate of 10vpd per dwelling rate would cause the Caves Road intersection to fail.

Structure Plan Traffic Distribution



It is noted that as the right turn traffic onto Caves Road begins to congest that traffic will tend to favour the left turn onto Bussell Highway instead due to a 25s reduction in travel time, however, this does not note the additional travel time to get to the Bussell Highway exit in the first place. Notwithstanding, it is valid that residents will not wait in excessive queues to turn right onto Caves Road if there is a suitable alternative to turn left onto Bussell Highway instead, particularly given the latter is also the safer option.

July 26, 2023

City of Busselton
Page 4 of 5

Reference: CW42307025

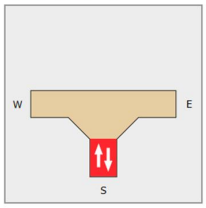
SIDRA PARAMETERS

A review was undertaken of the SIDRA file “07028_SIDRA_01_abbey_lsp_210723_for_CoB” with reference to the Main Roads WA Operational Modelling Guidelines (OMG).

The review identified that while the majority of the parameters and inputs had been set up in accordance with the OMG, it was noted that the “Exiting Flow Effect” value had been changed from the default 50% to 10% for the left and right turns from the SP area to Caves Road. The values of 10% adopted in the SIDRA model has a substantial impact on the intersection performance, with the average delay for the minor leg increasing from 30 seconds to 95 seconds if the default SIDRA values are adopted. While the OMG does not provide specific guidance on the Exiting Flow Effect parameters, modelling guidelines in other jurisdictions in Australia recommend that the Exiting Flow Effect parameters not be changed. It is therefore recommended that evidence be provided to support this change.

SIDRA Default Parameters

Approach Selector



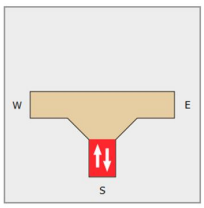
LSP Access

Gap Acceptance Data

From South to Exit:	W	E
	L2	R2
Vehicle Movements Opposing		
Apply TWSC Calibration	☑	☑
Critical Gap	5.00 sec	7.00 sec
Follow-up Headway	3.00 sec	4.00 sec
Minimum Departures (vehicles per minute)	0.1	0.1
Exiting Flow Effect	50 %	50 %
Percent Opposed by Nearest Lane Only	100.0 %	0.0 %
Main Crossing Pedestrians Opposing		
Opposing Peds (Unsig)	Prg(Flow ▾	Prg(Flow ▾

Adopted SIDRA Parameters

Approach Selector



LSP Access

Gap Acceptance Data

From South to Exit:	W	E
	L2	R2
Vehicle Movements Opposing		
Apply TWSC Calibration	☑	☑
Critical Gap	5.00 sec	7.00 sec
Follow-up Headway	3.00 sec	4.00 sec
Minimum Departures (vehicles per minute)	0.1	0.1
Exiting Flow Effect	10 %	10 %
Percent Opposed by Nearest Lane Only	100.0 %	0.0 %
Main Crossing Pedestrians Opposing		
Opposing Peds (Unsig)	Prg(Flow ▾	Prg(Flow ▾

The SIDRA intersection layout assumes that the intersection approach from the SP will be sufficiently wide to allow vehicles to queue side-by-side for approximately 20m (approximately 3 car lengths). Measurements should be provided to confirm the intersection approach is sufficiently wide to allow to this, while consideration should also be given to whether this is a desired outcome as vehicles queued side-by-side in this manner will often obstruct each other’s sight-lines.

Reference: CW42307025

SUMMARY

This technical memorandum reviewed a technical note by PJA regarding the access arrangements for the Abbey SP. The following recommendations are made about the assessment:

1. Adopt 10 trips per dwelling per day to be consistent with the TIA.
2. Review the distribution of traffic to Bussell Highway versus Caves Road to be consistent with the TIA.
3. Conduct a thorough analysis into the benefits of providing a wide median intersection treatment against the consequence of additional vegetation removal.
4. Provide SIDRA results for all intersection types for a transparent assessment of the intersection types.
5. Adopt the SIDRA default values of 50% for the Exiting Flow Effect or provide robust evidence to justify the departure from the default values.
6. Provide measurements to confirm the availability of 20m storage length for vehicles to queue side-by-side on the SP intersection approach.

It is recommended that the preferred access arrangement be reviewed with respect to the findings from the revised/updated assessment.

Technical Note

Project: Abbey

Subject: Response to Request for Information

Client:	For City of Busselton	**Version:**	A
Project No:	07028	**Author:**	Rodney Ding and Tanya Moran
Date:	3 August 2023	**Approved:**	Tanya Moran

1 Purpose

The purpose of this technical note is to document responses to City of Busselton's request for additional information in email dated 2nd August 2023 (copy below) for the Abbey Structure Plan (SP).

> Thank you for meeting with City staff yesterday.
>
> Following on from this meeting and actions resulting from - could the information below by SIDRA adjustment or justification please be provided by midday tomorrow:
>
> 1. Adopt 10 trips (8 used) per dwelling per day to be consistent with the TIA.
> 2. Review the distribution of traffic to Bussell Highway versus Caves Road to be consistent with the TIA (the technical note presents ~ 50/50 distribution between Caves and Bussell at full development whereas the TIA presents a majority of traffic using Caves Road)
> 3. Confirm the availability of 20m storage length for vehicles to queue side by side on the SP intersection approach.
> 4. The impact on vegetation to maintain adequate sight-lines.
> 5. Adopt the SIDRA default values of 50% for the Exiting Flow Effect.
> 6. The SIDRA files PDF of the results tables for the two staged intersection onto Caves Road.
> 7. Justification cited for t-intersection v roundabout.
>
> City staff intend to present the item as supplemental to Council on 16 August as a result we have additional time to consider the above information before finalising our recommendation to Council.

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Perth
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Australia

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EMAIL contact@pja.com.au

WEBSITE pja.com.au

1.1 RFI 1) Adopt 10 trips (8 used) per dwelling per day to be consistent with the TIA

1.1.1 The 10 trips per dwelling assumed in the original TIA was used as a worst case to stress test the single point of access at Caves Road, when the traffic flows were based on Count Site 51133 flows.

1.1.2 In subsequent discussions with Main Roads, it was requested that the November 2020 one day turning counts at Monaghan's Rotary were to be used instead as it represented a location directly outside the SP. PJA has always flagged that there are always variations to daily counts but would oblige in using these higher counts as basis for analysis even through these were significantly higher (30% higher in the AM Peak and 46% higher in the PM peak) than the Main Roads annual average daily traffic (AADT) count site. As such the base traffic data used for the SIDRA analysis is a *higher conservative traffic data set*.

1.1.3 With such a difference in base data, PJA reverted back to the WAPC standard rates for residential single dwelling; 8 trips per dwelling being the WA industry accepted rate (Volume 2, Transport Impact Assessment Guidelines, WAPC, 2016). These rates have subsequently been used.

1.1.4 Notwithstanding the above, the previous 10 trips per dwelling have now been used as specifically requested by the City for a *higher conservative trip generation estimate*, the updated Sidra assessments are attached. This is based on a current expected maximum yield of 320 dwellings (previously 350) due to lower densities occurring within the SP as a result of the City's requested modifications including areas of R10 and inclusion of additional POS and buffers. Rise Urban has advised that based on the new density limitations, it is likely the final yield will be closer to 300 residential lots so the 320 dwellings is a *higher conservative lot number estimate*.

1.1.5 The effect of the higher 10 trip rate, higher base counts and 320 lot yields are:

- Original 350 dwellings with 10 trips per dwelling - 3,500 trips per day
- WAPC rate of 8 trips per dwelling for 350 dwellings - 2,800 trips per day
- Current expected maximum yield of 320 dwellings and 10 trips per dwelling - 3,200 trips per day
- Current expected maximum yield of 320 dwellings and 8 trips per dwelling - 2,560 trips per day.

1.2 RFI 2) Review the distribution of traffic to Bussell Highway versus Caves Road to be consistent with the TIA (the technical note presents ~ 50/50 distribution between Caves and Bussell at full development whereas the TIA presents a majority of traffic using Caves Road)

1.2.1 The original TIA assessed a worst-case scenario to demonstrate the SP could operate with a single access onto Caves Road and 100% of traffic wanting to head to Busselton and Vasse turning right onto Caves Road.

1.2.2 Since the TIA was submitted, further consultation with Main Roads WA has progressed to exclude (delete) the Caves Road second access and add a left-out access onto Bussell Highway from the SP.

1.2.3 The attached revised Sidra assessment has various sensitivity scenarios including the above landed option. The left turn out to Bussell Highway is expected to distribute 50% of the SP traffic that would otherwise all turn right at Caves Road at a single access. This is expected as the travel time from the SP to Vasse was found to be quicker using the direct left turn onto Bussell Highway, perform a U-turn at Monaghan's Rotary and then travel south to Vasse.

1.3 RFI 3) Confirm the availability of 20m storage length for vehicles to queue side by side on the SP intersection approach

1.3.1 This is available. This can be included in the detailed design element within a 20m wide road reservation on the SP leg approach to Caves Road.

1.4 RFI 4) The impact on vegetation to maintain adequate sight-lines

1.4.1 Vegetation will need to be cleared to accommodate an intersection (as compact as possible is the aim) and no additional clearing is anticipated to accommodate sight lines outside the required clearing to accommodate the intersection.

1.4.2 The amount of clearing expected for the roundabout is expected to be in the order of 3,000m^2 compared to approximately 2,800m^2 for the two staged turn T-junction. The 2 Stage T junction is located on the alignment of the existing driveway to Lot 4, which further reduces the extent of clearing by the above noted approximately 200m^2 difference.

1.4.3 Note that under both scenarios, detailed survey and design will need to occur before a precise extent of clearing can be determined.

1.5 RFI 5) Adopt the SIDRA default values of 50% for the Exiting Flow Effect

1.5.1 For the proposed T-junction (either 2-stage or single-stage turn), left turn vehicles will be in a left turn pocket and thus drivers turning from the SP road will be confident that that vehicle is indeed turning left hence the possible use of 0% exiting flow effect. However, there will be a proportion of drivers that will want to be more cautious, hence PJA had used 10% and not 0%.

1.5.2 Notwithstanding, at the request of the City, the 50% value has been adopted and the impact of this higher percentage is now included in the updated SIDRA assessments attached. From a SIDRA platform assumption perspective, it should be noted that this 50% value is for a basic arrangement where traffic turning left into the side street would turn from the main (through) traffic lane. It is to model the effect of drivers entering the major road from the minor leg not being sure if a vehicle with their indicator on is going to turn left or in fact continuing straight. So, here a conservative parameter is used once again.

1.6 RFI 6) The SIDRA files PDF of the results tables for the two staged intersection onto Caves Road

1.6.1 The updated Sidra files (.sip) are attached with the submission of this technical note and the outputs are attached as PDFs at Attachment A.

1.6.2 The three (3) scenarios in the revised Sidra (.sip) files are:

- 2-stage T-junction onto Caves Road with 10 trips/dwelling for the now expected maximum 320 dwelling yield. This is based on the 30-46% higher November 2020 traffic flows and modelled for a 2041 time horizon assuming no VDL/BOB. There is no Bussell Highway left turn out included, as a stress test to Caves Road.
- 2-stage T-junction onto Caves Road with 10 trips/dwelling for the now expected maximum 320 dwelling yield. This is based on the higher November 2020 traffic flows and modelled for a 2041 time horizon assuming no VDL/BOB. There IS the Bussell Highway left turn out included.
- Large roundabout option at the intersection of Cuthbert Street and Caves Road. Assumes 10 trips/dwelling for 320 dwellings with no Bussell Highway left turn out included. This is based on the higher November 2020 traffic flows and modelled for a 2041 time horizon assuming no VDL/BOB.

1.6.3 The summary of the SIDRA results are shown below in the following tables.

Table 1: Single T Access on Caves Road

Critical Movement	Performance Measure			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
AM Peak				
Caves Road/SP 2-Stage T				
SP LT	0.06	7	A	1.5
SP RT	0.30	12	B	7.5
Caves Road West Approach RT	0.02	10	B	0.5
Intersection	**0.43**	**4**	**A**	**7.5**
PM Peak				
Caves Road/SP 2-Stage T				
SP LT	0.03	8	A	1
SP RT	0.16	13	B	4
Caves Road West Approach RT	0.07	12	B	1.5
Intersection	**0.45**	**3**	**A**	**4**

Table 2: T Access on Caves Road with Bussell Hwy Left Turn Out

Critical Movement	Performance Measure			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
AM Peak				
Caves Road/LSP 2-Stage T				
SP LT	0.06	7	A	1.5
SP RT	0.15	11	B	3
Caves Road West Approach RT	0.02	10	B	0.5
Intersection	**0.43**	**3**	**A**	**3**
Bussell Hwy/LSP LTO				
SP LT	0.14	9	A	4
Intersection	**0.63**	**0.5**	**A**	**4**
PM PEAK				
Caves Road/SP 2-Stage T				
SP LT	0.03	8	A	1
SP RT	0.08	12	B	2
Caves Road West Approach RT	0.07	12	B	2
Intersection	**0.45**	**3**	**A**	**2**
Bussell Hwy/SP LTO				
SP LT	0.13	9	A	3
Intersection	**0.59**	**0.5**	**A**	**3**

Table 3: Single Access Roundabout on Caves Road

Approach	Performance Measure			
	Degree of Saturation	Average Delay (s)	Level of Service	95th %ile Q (m)
AM Peak				
Caves Road/LSP/Cuthbert Street				
LSP Approach	0.29	10	B	15
Caves Road East Approach	0.42	4	A	29
Cuthbert Street	0.08	10	B	4
Caves Road West Approach	0.66	6	A	56
Intersection	**0.66**	**6**	**A**	**56**
PM Peak				
Caves Road/LSP/Cuthbert Street				
LSP Approach	0.18	11	B	10
Caves Road East Approach	0.60	5	A	52
Cuthbert Street	0.05	10	B	3
Caves Road West Approach	0.64	6	A	58
Intersection	**0.64**	**6**	**A**	**58**

1.6.4 Not included in the above assessments is the effect of a potential left turn into the SP from Bussell Highway which is understood to be favoured by the City. A Bussell Highway left turn in would add capacity to enter the SP area and would therefore take traffic demands from Caves Road and improve the performance of the proposed Caves Road intersection. However, a left turn in at Bussell Highway may impact Amelia Park Lodge driveway crossover and was not favoured by Main Roads WA.

1.7 RFI 7) Justification cited for t-intersection v roundabout

1.7.1 The type of intersection control that is most effective for Caves Road as raised by the City is:

- Safety
- Performance (efficiency)
- Location (site specific constraints and opportunities)
- Design.

1.7.2 As a summary of the discussions provided further below, the best intersection form there is a T-junction, as follows:

	T-junction	Roundabout
Safety	No/minimal crashes expected, acceptable safety for pedestrians and cyclists	Evident of higher crash numbers and more severe crashes at similar roundabouts. Likelihood of crashes from Monaghan's Rotary also transferring to the new roundabout location at Cuthbert Street, poor safety for pedestrians and cyclists
Performance	Minimal delays to 2041	Expected to delay ALL traffic on Caves Road with queues up to 60m length extending further to the west. Additional delays for exiting SP traffic.
Location	acceptable between two intersections	acceptable at a 4-way intersection
Design	Able to accommodate appropriate design elements with less obvious clearing.	Able to accommodate appropriate design elements, larger and more obvious loss of vegetation due to large diameter. Pre-deflection (missing from the MRWA design) which if implemented will have a more significant impact on property access.

1.7.3 T-intersection Justification

Location: The T-intersection location was purposely placed at the existing cleared access track to the site to minimise further vegetation clearing. This was specifically referenced and supported by the EPA in the comments provided on the Scheme Amendment. This is located between Cuthbert Street and Locke Street.

Design: The T-intersection design allows the inclusion of adequate and appropriate turn pocket lengths on both approaches. The now negotiated (with Main Roads) 2-stage turn T-intersection design allows gaps in the median for vehicles to turn from Caves Road into existing properties fronting Caves Road on the north side of the road. This was cited as an important consideration for Main Roads.

Performance: The T-intersection performance, the Sidra assessments of the 2-stage intersection is noted to operate at **LOS A** (12 seconds delay in the worst PM peak) in 2041 even with no

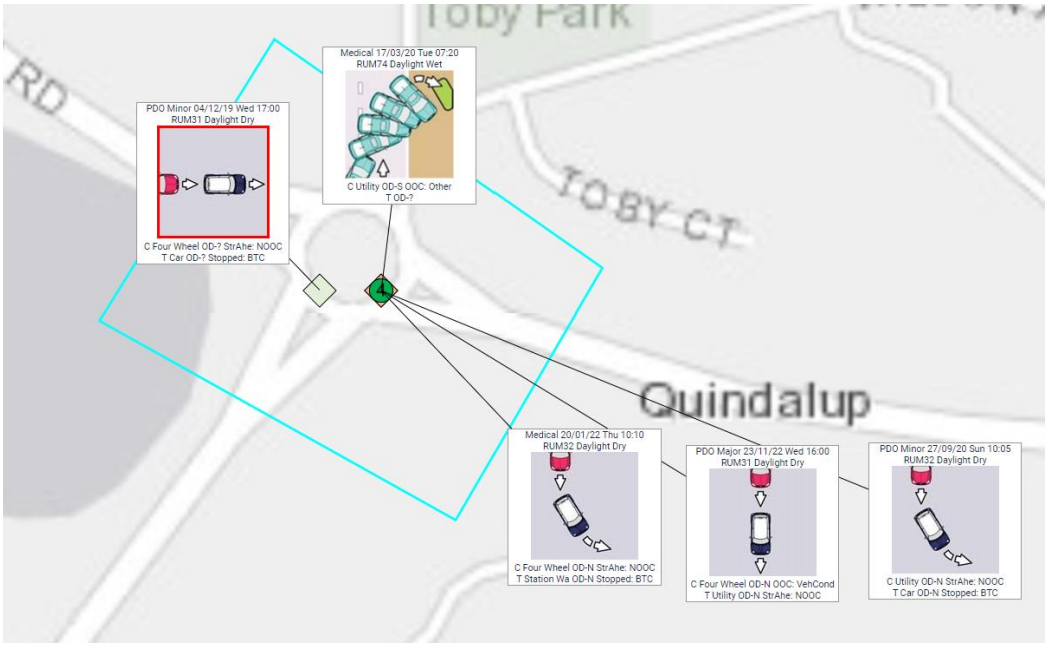
VDL/BOB traffic in place. Operationally, this is as good as it gets even with the most conservative assumptions applied.

Safety: The T-intersection can be designed safely and this is evident through Main Roads WA recorded crash records comparison between T-intersections in the wider area versus roundabouts in the wider area. Note also that PJA are accredited road safety auditors and Safe System Assessors with more than 50 years of combined experience and are confident that the T-intersection can and does meet the applicable safety standards and requirements.

There are a number of high severity crashes (hospitalisation and medical) at Monaghan's Rotary roundabout.



Main Roads WA noted in consultation that their expectation that the proposed Cuthbert Street roundabout will be of a similar design and size (60m diameter) to the existing 4-way roundabout at Commonage Road / Caves Road in Dunsborough. This roundabout has had five crashes with one resulting in medical attention the other property damage and a hit object crash resulting in medical attention. Again, these are rear end crashes on the eastern approach (so a mirror to Cuthbert Street western approach) and demonstrates another example of a roundabout with approach speeds resulting in serious crashes.



On the contrary, along the T-intersections across Caves Road west and east of Monaghan's Rotary, there are NO recorded crashes. There are some intersections on Bussell Highway east of Monaghan's Rotary (namely Cambridge Boulevard) that are similar to the proposed 2-stage T-intersection, and these have had no crashes recorded in the past five years. So any safety issues with the 2-stage T-intersection are perceived only, and not actual.

1.7.4 At this point, the assessment of the proposed 2-stage T-junction has NO ISSUES in consideration of all of the above. On that basis there is no further need to assess any other type of control.

1.7.5 If, the assessment had shown that the performance of the proposed T-intersection would fail at some point then another form of intersection control/location etc would have need to be considered. This might have been a roundabout in the preferred location of the T-junction or at another location along the Caves Road frontage. This may have then required the location of a roundabout to align with an intersection to the north. This is not the case for this access.

1.7.6 If there had been a notable crash history on this section of Caves Road at the intersections to the north, a roundabout or traffic signals may have been an appropriate treatment to both treat that crash history and access issue to the SP. Again, this not the case here, so there is no need for a higher order intersection.

1.7.7 *Table 3.6 of Austroads Guide to Traffic Management (AGTM) Part 6* (copied below) provides a broad guide to the suitability of the type of traffic control in relation to the functional classification of roads (based on operational and safe system objectives). It is based on a general appreciation of the need to provide a satisfactory level of safety and mobility on arterial roads. In some cases, the suitability is obvious whilst in other cases traffic analysis and examination of other factors is required to determine the most appropriate form of control at a site. The needs of **all road users** should be taken into account when selecting the most appropriate form of traffic control. For example, while roundabouts are generally safer than other types of at-grade intersection for motor vehicle occupants, they do not offer the same extent of benefits for cyclists and motorcyclists (Austroads 2015c).

Caves Road is part of the Primary road network in Main Roads WA Functional Road Hierarchy and the SP Access is to be an 'Access Road'. Based on Table 1.1 (on the following page) of *Main Roads guidelines for the selection of intersection controls*, a Stop or Give-Way intersection is 'Most likely to be an appropriate treatment' (per below).

In contrast, a roundabout is 'Usually an inappropriate treatment'.

Table 3: Suitability of types of traffic control to different road types based on operational and Safe System Objectives

	Primary Distributor (excluding Freeways)	Distributor A	Distributor B & Local Distributor	Access Road
Traffic Signals				
Primary Distributor (excluding Freeways)	O	O	O	X
Distributor A	O	O	O	X
Distributor B & Local Distributor	O	O	X	X
Access Road	X	X	X	X
Roundabouts				
Primary Distributor (excluding Freeways)	A	A	X	X
Distributor A	A	A	A	X
Distributor B & Local Distributor	X	A	A	O
Access Road	X	X	O	O
STOP signs or GIVE WAY signs				
Primary Distributor (excluding Freeways)	X / (O)	X / (O)	A	A
Distributor A	X / (O)	X / (O)	A	A
Distributor B & Local Distributor	A	A	A	A
Access Road	A	A	A	A
Legend: A = Most likely to be an appropriate treatment O = May be an appropriate treatment X = Usually an inappropriate treatment				

Source: Adapted from (Austroads, 2013)

Source: Table 1.1 – Roundabouts and Traffic Signals, Guidelines for the Selection of Intersection Control (Main Roads Western Australia, 2015)

1.7.8 The proposed T-intersection option will still allow a traffic island near Roberts Road and this will allow a longer section of road to be used by pedestrians to cross Caves Road. This is considered safe as there has been no recorded crashes involving pedestrians crossing Bussell Highway east of the rotary, again where a similar treatment as what is being proposed exists.

1.7.9 The T-junction option will allow keen on-road cyclists that may want to use Caves Road to continue to do so. On the contrary, the roundabout (which cannot be 'small footprint') with currently noted high-speed approaches, with currently noted high volumes and classified large RAV 4 vehicles (27.5m long truck) are notably unsafe for cyclists and pedestrians for a multitude of documented reasons.

"Roundabouts are likely to present significant obstacles to safe movements of people walking and riding bikes where any of the following conditions are met:

- *vehicle speeds exceed 30 km/h on the roundabout or at crossing locations (as is the case here); and*
- *users find it difficult to predict a safe gap in traffic because of vehicle volumes, sight lines or geometry that requires them to consider vehicle movements from multiple directions.*

Older people, children, and people with disability may find appropriate gap selection at roundabouts particularly challenging". (Department of Transport and Main Roads, Qld, 2023).

"Roundabouts are especially difficult for pedestrians who are blind or have low vision". (Burtt, 2014) (Waka Kotahi).

" Because of these issues, Roundabouts are commonly perceived by cyclists and pedestrians as one of the most hazardous forms of intersection control on the road network." (VicRoads, 2016).

Further reading can be found at:

- https://austroads.com.au/publications/road-design/ap-r542-17/media/AP-R542-17-Bicycle_Safety_at_Roundabouts.pdf
- TEM Vol 3 Part 2.15A - VicRoads Guidance on Pedestrian and Cyclist Treatments at Roundabouts (Brochure)
- https://austroads.com.au/publications/road-design/ap-r687-23/media/AP-R687-23_Update_to_Guide_to_Road_Design_Intersections.pdf
- Queensland Guide to Traffic Management Part 6: Section 4
- Queensland Supplement to Guide to Road Design Part 4B Roundabouts – Section 5

- https://www.nzta.govt.nz/walking-cycling-and-public-transport/walking/walking-standards-and-guidelines/pedestrian-network-guidance/design/intersections/roundabouts/

1.7.10 A proposed roundabout at this location cannot be a small footprint or compact and will have to be large (up to 60m inscribed diameter) to cater for Semi-trailers and RAV 4s. This has been adopted for all existing roundabouts along Caves Road, and Main Roads has confirmed that the same requirements will apply for the Abbey South SP access. A roundabout of this size will lead to large amounts of vegetation to be cleared with a large 40-50m wide clearing and gap created in the vegetation opposite Cuthbert Street. Additional infrastructure to try and keep cyclists and pedestrians safe will be required adding to more land take. In contrast, the proposed T-junction would require a smaller amount of clearing (about 2,800m2), mostly along the edge of Caves Road on the approaches with a small amount of clearing either side of the current access driveway. The T-junction will thus be less impactful to drivers and residents and meet all other design considerations.

1.7.11 In summary, from our experience and expertise in road and traffic engineering across Western Australia, are firmly of the view that the T intersection provides a safer, and more fit-for-purpose intersection design than the roundabout in this location and having regard to the surrounding and future context.

1.7.12 PJA is also of the view that the T intersection better meets the criteria established by the City of Busselton Council at the meeting of 21 June 2023, which was to determine an appropriate intersection treatment that best:

a) Limits vegetation removal;

b) Limits the impacts to access / egress for lots on the northern side of Caves Road; and

c) Provides for pedestrian safety.

The 2-stage T-intersection outperforms the roundabout in all three of these criteria and therefore should be the adopted position of staff in their recommendation to Council in August 2023.

Attachment A – Sidra Outputs

LANE SUMMARY

Site: 101 [LSP Access AM - mod RAB Vols - 2-stage Leg 1 - 10 trips (Site Folder: 10 Trips/Single Access - T)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2-Stage AM - 10 trips per (Network Folder: 10 Trips/Single Access - T)]

New Site
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis: Constant Number of Years = 21

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: LSP Access															
Lane 1	51	0.0	51	0.0	922	0.055	100	7.0	LOS A	0.2	1.5	Short	20	0.0	NA
Lane 2	202	0.0	202	0.0	727	0.278	100	6.4	LOS A	1.0	7.3	Full	500	-13.8 N3	0.0
Approach	253	0.0	253	0.0		0.278		6.5	LOS A	1.0	7.3				
East: Caves Road															
Lane 1	67	0.0	67	0.0	1847	0.036	100	6.4	LOS A	0.0	0.0	Short	75	0.0	NA
Lane 2	590	5.7	590	5.7	1848	0.319	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	658	5.1	658	5.1		0.319		0.7	NA	0.0	0.0				
North: Median															
Lane 1	17	0.0	17	0.0	819	0.021	100	3.7	LOS A	0.1	0.5	Full	6	0.0	0.0
Approach	17	0.0	17	0.0		0.021		3.7	LOS A	0.1	0.5				
All Vehicles	927	3.6	927	3.6		0.319		2.4	NA	1.0	7.3				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

N3 Capacity Adjustment due to downstream lane blockage determined by the program.

Approach Lane Flows (veh/h)

South: LSP Access

Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	51	-	51	0.0	922	0.055	100	0.0	2
Lane 2	-	202	202	0.0	727	0.278	100	NA	NA
Approach	51	202	253	0.0		0.278			

East: Caves Road

Mov. From E To Exit:	L2 S	T1 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	67	-	67	0.0	1847	0.036	100	0.0	2

Lane 2	-	590	590	5.7	1848	0.319	100	NA	NA
Approach	67	590	658	5.1		0.319			
North: Median									
Mov. From N To Exit:	T1 S	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	17	17	0.0		819	0.021	100	NA	NA
Approach	17	17	0.0			0.021			
	Total	%HV	Deg.Satn (v/c)						
All Vehicles	927	3.6	0.319						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: LSP Access				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Caves Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: Median				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101 [LSP Access AM - mod RAB Vols - 2-stage Leg 2 - 10 trips (Site Folder: 10 Trips/Single Access - T)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2-Stage AM - 10 trips per (Network Folder: 10 Trips/Single Access - T)]

New Site
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis: Constant Number of Years = 21

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Median															
Lane 1	202	0.0	202	0.0	678	0.298	100	5.6	LOS A	1.1	7.9	Full	6	0.0	13.8
Approach	202	0.0	202	0.0		0.298		5.6	LOS A	1.1	7.9				
West: Caves Road															
Lane 1	796	5.7	796	5.7	1857	0.429	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	17	0.0	17	0.0	1828	0.009	100	6.3	LOS A	0.0	0.0	Short	75	0.0	NA
Approach	813	5.6	813	5.6		0.429		0.3	NA	0.0	0.0				
All Vehicles	1015	4.5	1015	4.5		0.429		1.3	NA	1.1	7.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Approach Lane Flows (veh/h)

South: Median

Mov. From S To Exit:	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	202	202	0.0	678	0.298	100	NA	NA
Approach	202	202	0.0		0.298			

West: Caves Road

Mov. From W To Exit:	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	796	-	796	5.7	1857	0.429	100	NA	NA
Lane 2	-	17	17	0.0	1828	0.009	100	0.0	1
Approach	796	17	813	5.6		0.429			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1015	4.5	0.429

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Median				
Lane 1	0.0	0.0	0.0	0.0
West: Caves Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101 [LSP Access PM - mod RAB Vols - 2-stage Leg 1 - 10 trips (Site Folder: 10 Trips/Single Access - T)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2-Stage PM - 10 trips per (Network Folder: 10 Trips/Single Access - T)]

New Site
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis: Constant Number of Years = 21

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: LSP Access															
Lane 1	25	0.0	25	0.0	746	0.034	100	8.0	LOS A	0.1	0.9	Short	20	0.0	NA
Lane 2	101	0.0	101	0.0	653	0.155	100	7.5	LOS A	0.5	3.9	Full	500	0.0	0.0
Approach	126	0.0	126	0.0		0.155		7.6	LOS A	0.5	3.9				
East: Caves Road															
Lane 1	168	0.0	168	0.0	1847	0.091	100	6.4	LOS A	0.0	0.0	Short	75	0.0	NA
Lane 2	754	4.5	754	4.5	1873	0.403	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	923	3.6	923	3.6		0.403		1.3	NA	0.0	0.0				
North: Median															
Lane 1	42	0.0	42	0.0	605	0.070	100	5.7	LOS A	0.2	1.7	Full	6	0.0	0.0
Approach	42	0.0	42	0.0		0.070		5.7	LOS A	0.2	1.7				
All Vehicles	1091	3.1	1091	3.1		0.403		2.2	NA	0.5	3.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Approach Lane Flows (veh/h)

South: LSP Access

Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	25	-	25	0.0	746	0.034	100	0.0	2
Lane 2	-	101	101	0.0	653	0.155	100	NA	NA
Approach	25	101	126	0.0		0.155			

East: Caves Road

Mov. From E To Exit:	L2 S	T1 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	168	-	168	0.0	1847	0.091	100	0.0	2
Lane 2	-	754	754	4.5	1873	0.403	100	NA	NA

Approach	168	754	923	3.6		0.403			
North: Median									
Mov. From N To Exit:	T1 S	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	42	42	0.0		605	0.070	100	NA	NA
Approach	42	42	0.0			0.070			
	Total	%HV	Deg.Satn (v/c)						
All Vehicles	1091	3.1	0.403						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: LSP Access				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Caves Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: Median				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101 [LSP Access PM - mod RAB Vols - 2-stage Leg 2 - 10 trips (Site Folder: 10 Trips/Single Access - T)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2-Stage PM - 10 trips per (Network Folder: 10 Trips/Single Access - T)]

New Site
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis: Constant Number of Years = 21

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Median															
Lane 1	101	0.0	101	0.0	634	0.159	100	5.3	LOS A	0.5	3.5	Full	6	0.0	0.0
Approach	101	0.0	101	0.0		0.159		5.3	LOS A	0.5	3.5				
West: Caves Road															
Lane 1	846	5.4	846	5.4	1864	0.454	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	42	0.0	42	0.0	1828	0.023	100	6.3	LOS A	0.0	0.0	Short	75	0.0	NA
Approach	888	5.1	888	5.1		0.454		0.4	NA	0.0	0.0				
All Vehicles	989	4.6	989	4.6		0.454		0.9	NA	0.5	3.5				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Approach Lane Flows (veh/h)

South: Median

Mov. From S To Exit:	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	101	101	0.0	634	0.159	100	NA	NA
Approach	101	101	0.0		0.159			

West: Caves Road

Mov. From W To Exit:	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	846	-	846	5.4	1864	0.454	100	NA	NA
Lane 2	-	42	42	0.0	1828	0.023	100	0.0	1
Approach	846	42	888	5.1		0.454			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	989	4.6	0.454

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Median				
Lane 1	0.0	0.0	0.0	0.0
West: Caves Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101 [LSP Access AM - mod RAB Vols - 2-stage Leg 1 - 10 trips (Site Folder: 10 Trips/w Bussell Access - T)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2-Stage AM - 10 trips per (Network Folder: 10 Trips/w Bussell Access - T)]

New Site
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis: Constant Number of Years = 21

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: LSP Access															
Lane 1	51	0.0	51	0.0	922	0.055	100	7.0	LOS A	0.2	1.5	Short	20	0.0	NA
Lane 2	101	0.0	101	0.0	843	0.120	100	5.9	LOS A	0.4	3.1	Full	500	0.0	0.0
Approach	152	0.0	152	0.0		0.120		6.2	LOS A	0.4	3.1				
East: Caves Road															
Lane 1	67	0.0	67	0.0	1847	0.036	100	6.4	LOS A	0.0	0.0	Short	75	0.0	NA
Lane 2	590	5.7	590	5.7	1848	0.319	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	658	5.1	658	5.1		0.319		0.7	NA	0.0	0.0				
North: Median															
Lane 1	17	0.0	17	0.0	819	0.021	100	3.7	LOS A	0.1	0.5	Full	6	0.0	0.0
Approach	17	0.0	17	0.0		0.021		3.7	LOS A	0.1	0.5				
All Vehicles	826	4.1	826	4.1		0.319		1.8	NA	0.4	3.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Approach Lane Flows (veh/h)

South: LSP Access

Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	51	-	51	0.0	922	0.055	100	0.0	2
Lane 2	-	101	101	0.0	843	0.120	100	NA	NA
Approach	51	101	152	0.0		0.120			

East: Caves Road

Mov. From E To Exit:	L2 S	T1 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	67	-	67	0.0	1847	0.036	100	0.0	2
Lane 2	-	590	590	5.7	1848	0.319	100	NA	NA

Approach	67	590	658	5.1		0.319			
North: Median									
Mov. From N To Exit:	T1 S	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	17	17	0.0		819	0.021	100	NA	NA
Approach	17	17	0.0			0.021			
	Total	%HV	Deg.Satn (v/c)						
All Vehicles	826	4.1	0.319						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: LSP Access				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Caves Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: Median				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101 [LSP Access AM - mod RAB Vols - 2-stage Leg 2 - 10 trips (Site Folder: 10 Trips/w Bussell Access - T)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2-Stage AM - 10 trips per (Network Folder: 10 Trips/w Bussell Access - T)]

New Site
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis: Constant Number of Years = 21

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Median															
Lane 1	101	0.0	101	0.0	678	0.149	100	4.8	LOS A	0.5	3.3	Full	6	0.0	0.0
Approach	101	0.0	101	0.0		0.149		4.8	LOS A	0.5	3.3				
West: Caves Road															
Lane 1	796	5.7	796	5.7	1857	0.429	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	17	0.0	17	0.0	1828	0.009	100	6.3	LOS A	0.0	0.0	Short	75	0.0	NA
Approach	813	5.6	813	5.6		0.429		0.3	NA	0.0	0.0				
All Vehicles	914	5.0	914	5.0		0.429		0.8	NA	0.5	3.3				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Approach Lane Flows (veh/h)

South: Median

Mov. From S To Exit:	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	101	101	0.0	678	0.149	100	NA	NA
Approach	101	101	0.0		0.149			

West: Caves Road

Mov. From W To Exit:	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	796	-	796	5.7	1857	0.429	100	NA	NA
Lane 2	-	17	17	0.0	1828	0.009	100	0.0	1
Approach	796	17	813	5.6		0.429			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	914	5.0	0.429

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Median				
Lane 1	0.0	0.0	0.0	0.0
West: Caves Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101vv [Bussell Dev AM (Site Folder: 10 Trips/w Bussell Access - T)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New Site
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis: Constant Number of Years = 21

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Bussell Hwy															
Lane 1	809	11.0	809	11.0	1756	0.461	100	0.2	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	809	11.0	809	11.0		0.461		0.2	NA	0.0	0.0				
North: Bussell Hwy															
Lane 1	1148	5.9	1148	5.9	1830	0.627	100	0.0	LOS A	0.0	0.0	Full	70	0.0	0.0
Approach	1148	5.9	1148	5.9		0.627		0.0	NA	0.0	0.0				
West: LSP															
Lane 1	101	0.0	101	0.0	697	0.145	100	8.7	LOS A	0.5	3.8	Full	500	0.0	0.0
Approach	101	0.0	101	0.0		0.145		8.7	LOS A	0.5	3.8				
All Vehicles	2058	7.6	2058	7.6		0.627		0.5	NA	0.5	3.8				

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Minor Road Approach LOS values are based on average delay for all lanes (v/c not used).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Approach Lane Flows (veh/h)

South: Bussell Hwy									
Mov. From S To Exit:	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	809	809	11.0	1756	0.461	100	NA	NA	
Approach	809	809	11.0		0.461				
North: Bussell Hwy									
Mov. From N To Exit:	T1 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	1148	1148	5.9	1830	0.627	100	NA	NA	
Approach	1148	1148	5.9		0.627				
West: LSP									
Mov. From W To Exit:	L2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	

Lane 1	101	101	0.0	697	0.145	100	NA	NA
Approach	101	101	0.0		0.145			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	2058	7.6	0.627

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bussell Hwy				
Lane 1	0.0	0.0	0.0	0.0
North: Bussell Hwy				
Lane 1	0.0	0.0	0.0	0.0
West: LSP				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101 [LSP Access PM - mod RAB Vols - 2-stage Leg 1 - 10 trips (Site Folder: 10 Trips/w Bussell Access - T)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2-Stage PM - 10 trips per (Network Folder: 10 Trips/w Bussell Access - T)]

New Site
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis: Constant Number of Years = 21

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: LSP Access															
Lane 1	25	0.0	25	0.0	746	0.034	100	8.0	LOS A	0.1	0.9	Short	20	0.0	NA
Lane 2	51	0.0	51	0.0	653	0.077	100	7.3	LOS A	0.3	1.9	Full	500	0.0	0.0
Approach	76	0.0	76	0.0		0.077		7.5	LOS A	0.3	1.9				
East: Caves Road															
Lane 1	168	0.0	168	0.0	1847	0.091	100	6.4	LOS A	0.0	0.0	Short	75	0.0	NA
Lane 2	754	4.5	754	4.5	1873	0.403	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	923	3.6	923	3.6		0.403		1.3	NA	0.0	0.0				
North: Median															
Lane 1	42	0.0	42	0.0	605	0.070	100	5.7	LOS A	0.2	1.7	Full	6	0.0	0.0
Approach	42	0.0	42	0.0		0.070		5.7	LOS A	0.2	1.7				
All Vehicles	1041	3.2	1041	3.2		0.403		1.9	NA	0.3	1.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Approach Lane Flows (veh/h)

South: LSP Access

Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	25	-	25	0.0	746	0.034	100	0.0	2
Lane 2	-	51	51	0.0	653	0.077	100	NA	NA
Approach	25	51	76	0.0		0.077			

East: Caves Road

Mov. From E To Exit:	L2 S	T1 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	168	-	168	0.0	1847	0.091	100	0.0	2
Lane 2	-	754	754	4.5	1873	0.403	100	NA	NA

Approach	168	754	923	3.6		0.403			
North: Median									
Mov. From N To Exit:	T1 S	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	42	42	0.0		605	0.070	100	NA	NA
Approach	42	42	0.0			0.070			
	Total	%HV	Deg.Satn (v/c)						
All Vehicles	1041	3.2	0.403						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: LSP Access				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Caves Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: Median				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101 [LSP Access PM - mod RAB Vols - 2-stage Leg 2 - 10 trips (Site Folder: 10 Trips/w Bussell Access - T)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2-Stage PM - 10 trips per (Network Folder: 10 Trips/w Bussell Access - T)]

New Site
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis: Constant Number of Years = 21

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Median															
Lane 1	51	0.0	51	0.0	634	0.080	100	5.0	LOS A	0.2	1.7	Full	6	0.0	0.0
Approach	51	0.0	51	0.0		0.080		5.0	LOS A	0.2	1.7				
West: Caves Road															
Lane 1	846	5.4	846	5.4	1864	0.454	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	42	0.0	42	0.0	1828	0.023	100	6.3	LOS A	0.0	0.0	Short	75	0.0	NA
Approach	888	5.1	888	5.1		0.454		0.4	NA	0.0	0.0				
All Vehicles	938	4.9	938	4.9		0.454		0.7	NA	0.2	1.7				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Approach Lane Flows (veh/h)

South: Median

Mov. From S To Exit:	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	51	51	0.0	634	0.080	100	NA	NA
Approach	51	51	0.0		0.080			

West: Caves Road

Mov. From W To Exit:	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	846	-	846	5.4	1864	0.454	100	NA	NA
Lane 2	-	42	42	0.0	1828	0.023	100	0.0	1
Approach	846	42	888	5.1		0.454			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	938	4.9	0.454

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Median				
Lane 1	0.0	0.0	0.0	0.0
West: Caves Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101vv [Bussell Dev PM (Site Folder: 10 Trips/w Bussell Access - T)]

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New Site
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis: Constant Number of Years = 13

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Bussell Hwy															
Lane 1	722	10.3	722	10.3	1768	0.408	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	722	10.3	722	10.3		0.408		0.1	NA	0.0	0.0				
North: Bussell Hwy															
Lane 1	897	6.3	897	6.3	1822	0.493	100	0.0	LOS A	0.0	0.0	Full	70	0.0	0.0
Approach	897	6.3	897	6.3		0.493		0.0	NA	0.0	0.0				
West: LSP															
Lane 1	88	0.0	88	0.0	792	0.112	100	7.9	LOS A	0.4	2.9	Full	500	0.0	0.0
Approach	88	0.0	88	0.0		0.112		7.9	LOS A	0.4	2.9				
All Vehicles	1708	7.7	1708	7.7		0.493		0.5	NA	0.4	2.9				

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Minor Road Approach LOS values are based on average delay for all lanes (v/c not used).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Approach Lane Flows (veh/h)

South: Bussell Hwy

Mov. From S To Exit:	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	722	722	10.3	1768	0.408	100	NA	NA
Approach	722	722	10.3		0.408			

North: Bussell Hwy

Mov. From N To Exit:	T1 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	897	897	6.3	1822	0.493	100	NA	NA
Approach	897	897	6.3		0.493			

West: LSP

Mov. From W To Exit:	L2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	88	88	0.0	792	0.112	100	NA	NA
Approach	88	88	0.0		0.112			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1708	7.7	0.493

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Bussell Hwy				
Lane 1	0.0	0.0	0.0	0.0
North: Bussell Hwy				
Lane 1	0.0	0.0	0.0	0.0
West: LSP				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101v [LSP Access AM - mod RAB Vols - 10 trips (Site Folder: 10 Trips/Single Access - RAB)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New Site
Site Category: (None)
Roundabout
Design Life Analysis: Constant Number of Years = 21

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: LSP Access															
Lane 1[d]	263	0.0	263	0.0	911	0.289	100	10.3	LOS B	2.0	15.0	Full	500	0.0	0.0
Approach	263	0.0	263	0.0		0.289		10.3	LOS B	2.0	15.0				
East: Caves Road															
Lane 1[d]	668	5.0	668	5.0	1600	0.417	100	4.4	LOS A	3.7	29.0	Full	500	0.0	0.0
Approach	668	5.0	668	5.0		0.417		4.4	LOS A	3.7	29.0				
North: Cuthbert St															
Lane 1[d]	42	0.0	42	0.0	562	0.075	100	10.2	LOS B	0.6	4.1	Full	500	0.0	0.0
Approach	42	0.0	42	0.0		0.075		10.2	LOS B	0.6	4.1				
West: Caves Road															
Lane 1[d]	823	5.6	823	5.6	1246	0.661	100	6.3	LOS A	7.2	56.3	Full	500	0.0	0.0
Approach	823	5.6	823	5.6		0.661		6.3	LOS A	7.2	56.3				
All Vehicles	1797	4.4	1797	4.4		0.661		6.3	LOS A	7.2	56.3				

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: LSP Access

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	51	11	202	263	0.0	911	0.289	100	NA	NA
Approach	51	11	202	263	0.0		0.289			

East: Caves Road

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	67	590	11	668	5.0	1600	0.417	100	NA	NA

Approach	67	590	11	668	5.0		0.417				
North: Cuthbert St											
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	21	11	11	42	0.0	562	0.075	100	NA	NA	
Approach	21	11	11	42	0.0		0.075				
West: Caves Road											
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	11	796	17	823	5.6	1246	0.661	100	NA	NA	
Approach	11	796	17	823	5.6		0.661				

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1797	4.4	0.661

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate sec veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: LSP Access				
Lane 1	0.0	0.0	0.0	0.0
East: Caves Road				
Lane 1	0.0	0.0	0.0	0.0
North: Cuthbert St				
Lane 1	0.0	0.0	0.0	0.0
West: Caves Road				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 101v [LSP Access PM - mod RAB Vols - 10 trips (Site Folder: 10 Trips/Single Access - RAB)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New Site
Site Category: (None)
Roundabout
Design Life Analysis: Constant Number of Years = 21

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: LSP Access															
Lane 1[d]	137	0.0	137	0.0	747	0.183	100	11.4	LOS B	1.3	9.7	Full	500	0.0	0.0
Approach	137	0.0	137	0.0		0.183		11.4	LOS B	1.3	9.7				
East: Caves Road															
Lane 1[d]	944	3.6	944	3.6	1566	0.603	100	4.8	LOS A	6.7	51.7	Full	500	0.0	0.0
Approach	944	3.6	944	3.6		0.603		4.8	LOS A	6.7	51.7				
North: Cuthbert St															
Lane 1[d]	32	0.0	32	0.0	599	0.053	100	10.1	LOS B	0.4	2.8	Full	500	0.0	0.0
Approach	32	0.0	32	0.0		0.053		10.1	LOS B	0.4	2.8				
West: Caves Road															
Lane 1[d]	898	5.1	898	5.1	1397	0.643	100	5.7	LOS A	7.5	58.5	Full	500	0.0	0.0
Approach	898	5.1	898	5.1		0.643		5.7	LOS A	7.5	58.5				
All Vehicles	2010	3.9	2010	3.9		0.643		5.7	LOS A	7.5	58.5				

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: LSP Access

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	25	11	101	137	0.0	747	0.183	100	NA	NA
Approach	25	11	101	137	0.0		0.183			

East: Caves Road

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	168	754	21	944	3.6	1566	0.603	100	NA	NA

Approach	168	754	21	944	3.6		0.603				
North: Cuthbert St											
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	11	11	11	32	0.0	599	0.053	100	NA	NA	
Approach	11	11	11	32	0.0		0.053				
West: Caves Road											
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	11	846	42	898	5.1	1397	0.643	100	NA	NA	
Approach	11	846	42	898	5.1		0.643				

	Total	%HV	Deg.Satn (v/c)
All Vehicles	2010	3.9	0.643

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Flow Rate sec	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: LSP Access				
Lane 1	0.0	0.0	0.0	0.0
East: Caves Road				
Lane 1	0.0	0.0	0.0	0.0
North: Cuthbert St				
Lane 1	0.0	0.0	0.0	0.0
West: Caves Road				
Lane 1	0.0	0.0	0.0	0.0

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EXCAVATION – REHABILITATION MANAGEMENT PLAN

CONTINUATION OF SAND EXCAVATION

LOT 4205 GALE ROAD KALOORUP



PIGGOTT SAND SUPPLIES

City of Busselton

8 August 2023

MR and JL Piggott T/AS

PIGGOTT SAND SUPPLIES
153 Yoongarillup Road, Sabina River, WA, 6280
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Summary

A sand resource has been excavated from Lot 4205 that is suitable for fill sand with some deeper coarse sand that is capable of use for filtration and specialty uses.

Approvals for the sand extraction under DA15/0519 expired in November 2022 and renewal is sought along with an extension to the extraction area.

This documentation provides the background for an application for Planning Approval and Extractive Industries Licence to extract the resource.

The sand extends to depth but it is anticipated that the pit will be 1 – 3 metres deep.

City of Busselton, Planning, "Rural Land Use and Development" Policy, 2010 compliments the Local Planning Scheme and has policies with respect to the extraction of sand.

Policy 5A Extractive Industry Provisions seeks the protection and staged use of basic raw materials whilst minimizing environmental and social impacts.

As Lot 4205 is zoned "Agriculture" it lies within Policy Area 3 – "Extractive Industry Less Constrained" in City of Busselton, "Rural Land Use and Development" Policy, 2010.

The current excavation areas are set back from Gale Road. Transport will be to Gale Road and then along Gale Road to the east with some transport to the west for sand such as going to Margaret River.

The volume of resource delineated in the proposal is about 11 hectares with approximately 1.5 of these already excavated.

The rate of excavation is anticipated to be up to 50,000 m^3 per year. The number of trucks traversing the site will be variable but average up to 10 laden trucks per day. For large contracts there may be 20 per day and at other times less than 5 per day.

A 5 year length of approval is requested.

The loading and access of each truck will normally take approximately 3 minutes and would be achieved using one loader or excavator.

The proposal complies with the all Buffer Guidelines to sensitive premises.

Table 1: Site Summary

ASPECT	PROPOSAL CHARACTERISTIC
EXCAVATION	
Total area of excavation applied for, including the land already open	Proposed excavation – 11 hectares approx. Around 1.5 hectares has been excavated. 20 metre setbacks to the property boundaries are provided. ***See Figure 15 for the Final Contour Plan and Figure 14 for the Staging Plan.***
Rate of excavation based on average anticipated volumes.	Generally up to 50,000 m^3 per year of sand. The total volume of sand is around 255,000 m^3,
Life of project	5 years
Area cleared per year	Clearing within the northern portion of Lot 4205 has been undertaken in accordance with CPS 6766/2 which expired in 2022. No additional clearing is proposed apart from that already undertaken.
Dewatering requirements	Nil
Maximum depth of excavations	0.5 - 4 metres as required to a separation of 0.5 metres to the highest winter water table. ***See Figure 15 for the Final Contour Plan and Figure 14 for the Staging Plan and Figures 13 for the groundwater elevations.***
PROCESSING	
Resources	No processing of the sand is anticipated.
Water requirements	Nil
Water supply source	On site farm supplies.
INFRASTRUCTURE	
Total area of plant and stock	0.5 ha. The only plant will be a loader and excavator, the same as currently operates.
Area of settling basins	Water will be retained in the pit.
Fuel storage	No fuel storage. All fuel and maintenance will be brought to site as required.
TRANSPORT	
Truck movements	Variable but average up to 10 laden trucks per day. For large contracts there may be 20 per day and at other times less than 5 per day.
Access	Gale Road. There is an existing constructed and used access.
WORKFORCE	
Construction	Opening the pit consists of topsoil removal prior to excavation, and the formation of the access road.
Operation	2 - 4 persons

Hours of operation	Hours of operation will be 7.00 am to 5.00 pm Monday to Friday and Saturday 7.00 am to 1.00 pm inclusive for rehabilitation only, excluding public holidays. There will also be school bus curfews between 7.30 am to 8.40 am and between 3.30 pm to 4.20 pm.

This Excavation and Management Plan has been prepared addressing the factors outlined in EPA Guidance Statement 33, *Environmental Guidance for Planning and Development 2005 and Department of Planning Guidelines for Extractive Industries*.

Safety Management

All quarries operate under the provisions of the *Work Health and Safety (Mines) Regulations 2022*. These are administered by the Department of Mines Industry Regulation and Safety.

The regulation is achieved through the DMIRS Safety Regulations and Reporting Systems (SRS).

Officers from the Safety Division of the DMIRS regularly inspect the operations in relation to health and safety.

Environmental Management

The environmental management is designed to reflect best practise, outlined in particular in;

> Department of Resources, Energy and Tourism (Commonwealth), 2011, *A Guide to Leading Practice Sustainable Development in Mining*, and guidelines produced by Environmental Protection Authority, Department of Water, Environment Regulation, Department of Mines Industry Regulation and Safety, Western Australia Planning Commission and the Local Authority.

The Environmental Risk Matrix in this document is considered to the principles of AS/NZS ISO 140001:2016 (Environmental Management Systems) and AS/NZS ISO 19011:2019 (Guidelines for auditing Management Systems). The principles of AS/NZS 31000:2018 (Risk Management Guidelines) are also used when considering any risks.

Contents

SUMMARY
RISK ASSESSMENT
1.0 INTRODUCTION 1
1.1 Proposal 1
1.2 Existing Approvals 1
1.3 Importance and Rationale 1
1.4 Requested Planning Approval 1
1.5 Proponent 2
1.6 Location and Ownership 2
1.7 Description of the Resource 2
1.8 Aims of the Proposal 3
2.0 PLANNING ASSESSMENT 5
2.1 Current Land use 5
2.2 Proposed Land use 5
2.3 End Use 5
2.4 Land Zonings and Policies 5
2.4.1State Government Policies and Planning Schemes 5
State Planning Policy 1.0, State Planning Framework Policy 5
State Planning Policy 1.0 State Planning Framework. 6
State Planning Strategy, 2050 (2014) 6
State Planning Policy No 2.5, Rural Planning, 2016 7
State Planning Policy No 2.4, Basic Raw Materials, 2021 8
State Planning Policy No 4.1, State Industrial Buffer Policy 9
2.4.2 Local Government Policies and Planning Schemes 9
City of Busselton Local Planning Scheme Number 21 9
City of Busselton Local Rural Planning Strategy 2006 10
City of Busselton, Planning Policy 5 “Rural Land Use and Development” Policy, 2010 11
2.4.3 Local Government Extractive Industries Licence 11
2.4.4 Current Land Zonings 11
2.4.6 Legislative Framework 11
2.4.7 Stakeholders 16
2.5 Heritage 18
2.6 Complaints Mechanism 18
3.0 Buffers and Social Impacts 20
3.1 Consideration of nearby sensitive premises 20
3.2 Policies 20
3.2.1Generic and State Buffers 20
City of Busselton Rural Areas and Land Use Development Policy - 2010 22
Setback to adjoining properties 22
4.0 EXISTING ENVIRONMENT 23
4.1 Climate 23
4.2 Geology and Geomorphology 23
4.3 Soils and Regolith 25
4.4 Acid Sulfate 26
4.5 Hydrogeology 28
Surface Water 28
4.6 Flora and Vegetation 30
4.7 Fauna 31
4.8 Wetlands 31
5.0 PROJECT DESCRIPTION 34
5.1 Extraction and Processing 34
Controls 34

Construction Time 34
Excavation Procedures 34
5.2 Pit Design and Staging 35
Final Contours 35
Geotechnical parameters 36
5.3 Processing 36
5.4 Stockpiles 36
5.5 Equipment 36
5.6 Hours of Operation 37
5.7 Access and Security 37
Maintenance of Internal Roads 37
External 37
Scale and Intensity of the transport 37
5.8 Water Use 38
5.9 Workforce 38
5.10 Safety 38
6.0 ENVIRONMENTAL IMPACTS AND MANAGEMENT 39
6.1 Aesthetics 39
6.2 Noise Management 42
6.2.1 Regulatory Framework 42
6.2.2 Environmental Noise Management 43
6.2.3 Occupational Noise 46
6.3 Dust Management 47
6.3.1 Nature of Dust from Sand 47
6.3.2 Dust Standards 48
6.3.3 Dust Risk 49
6.3.4 Tree Belts and Buffer Management 51
6.3.6 Dust Management 52
4.4Water Management 57
7.0 Biodiversity Management 58
7.1 Flora 58
7.2 Fauna 58
7.3 Wetlands 58
7.4 Weed Management 58
7.5 Dieback Management 61
8.0 Rehabilitation and Closure 66
8.1 Background 66
8.2 Closure Objectives 66
8.3 Materials Inventory 66
8.5 Monitoring 79
REFERENCES 83

FIGURES

Figure 1: Lot 4205 and separation distances 3
Figure 2: Aerial photograph.... 4
Figure 3: View north across the sand resource. The vegetation in the background was cleared under CPS 6766/2 See Figure 2 for a later aerial photograph 23
Figure 4: Sand resource at the existing pit 24
Figure 5: Surface soil acidity mapping. DPIRD showing the sand resources as <3% risk of surface soil acidity 27
Figure 6: DPIRD subsoil acidity risk mapping showing the sand resources as having < 3% or 3-10% risk of subsoil acidity 28
Figure 7: Clearing Permit CPS 6766/2 now expired.... 30
Figure 8: Tree planting of *Agonis flexuosa* as required by CPS 6766/2 on the fenceline to the north of the pit. 31
Figure 9: Wetland Mapping....33
Figure 10: Floor of the current excavation under closure by re-contouring and spreading with topsoil in Winter 2022.... 69
Figure 11: Excavated floor of the pit under revegetation to pasture.... 70

ATTACHED FIGURES

Figure 12: Existing Contours
Figure 13: Summary of the groundwater elevations
Figure 14: Staging
Figure 16: Final Contours

TABLES

Table 1: Site Summary i
Table 2: Lot Details 2
Table 3: State Planning Strategy BRM Supply.... 6
Table 4: Legislative Framework 12
Table 5: Stakeholder Register.... 16
Table 6: Wetland Classifications (Semeniuk 1995)....32
Table 7: DBCA wetland management categories (Semeniuk 1995)....32
Table 8: Noise management.... 43
Table 9: Dust Risk (DWER 2011 Guidelines) 50
Table 10: Dust Management Actions 52
Table 11: Weed Management 59
Table 12: Dieback Management.... 63
Table 13: Materials Inventory 66
Table 14: Temporary Closure 68
Table 15: Site Closure and Rehabilitation.... 71
Table 16: Monitoring and Remediation.... 79

ATTACHED APPENDICES

1 Water Management Plan – Accendo Australia April 2023

1.0 INTRODUCTION

1.1 Proposal

A sand resource is identified on Lot 4205, Gale Road, Kaloorup and has been approved for sand extraction.

This proposal seeks renewal of the sand excavation.

1.2 Existing Approvals

Approvals for sand extraction under DA15/0519 expired in November 2022 and renewal is sought along with an extension to the extraction area.

A Clearing Permit CPS 6766/2 for vegetation within the northern portion of the Lot expired on the 13th of April 2022 .

1.3 Importance and Rationale

The importance of sand for local developments such as in the City of Busselton is recognised by the Western Australian Planning Commission in State Planning Policy 2.5, Rural Planning (2016) and SPP 2.4 (2021).

Sand is in short supply in the City of Busselton and the Shire of Augusta - Margaret River and nearby areas, which are undergoing significant development. Those developments require fill sand for foundations and to lift the elevation of low lying land for construction.

In addition to the general fill sand available on Lot 4205 there are deposits of coarse sand that can be used for filter and other specialty sands.

1.4 Requested Planning Approval

The proposal is seen as a temporary land use during, which valuable basic raw materials are extracted and the land returned to productive pasture which will have the land capability improved.

The proposal is to renew the approvals for sand excavation for 5 years.

1.5 Proponent

The proponent is, the current operator of the sand pit on site.

MR and JL Piggott T/AS PIGGOTT SAND SUPPLIES

Contact can be made through

Manager

PIGGOTT SAND SUPPLIES

153 Yoongarillup Road, Sabina River, WA, 6280
Phone 0427 533 218

1.6 Location and Ownership

The land is described as;

Table 2: Lot Details

LOT	ROAD	LOCATION	VOLUME	FOLIO	PLAN
4205	Gale Road Kaloorup		1511	663	208196

Landholders – V A and S M Edwards

1.7 Description of the Resource

The sand is a sub rounded to rounded quartz sand generally medium to coarse grained; with a significant portion of the grains being larger than 1.5 mm

The resource area has been investigated using an excavator digging test holes. The sand varies from yellow to white and from 0.5 – 4 metres deep with an average of around 3 metres.

The sand occurs as a discontinuous sheet of coarse sand overlain by finer fill sand derived from the ocean when the sea lapped the Whicher Scarp.

The finer overlying surface sand that occurs in places appears to be of aeolian origin, and extends to 1 – 2.0 metres depth

1.8 Aims of the Proposal

- Provide a supply of white and yellow quartz and fill sand.
- Continue to provide a supply of sand for the construction industry to be used in the local Busselton to Margaret River Region together with a small amount of coarser sand that is suitable for filtration and other special purposes.
- Maximise the use of basic raw materials in the local area, to enable greenhouse gases, transport, and other environmental issues associated with alternative resources, to be minimised.
- Help to keep the prices of local basic raw materials at the lowest possible levels, by maintaining small transport distances. This benefits the whole community.
- Comply with *State Planning Policy No 2.5, Rural Planning 2016*, and *SPP 2.4 Basic Raw Materials (2021)*, which states that basic raw materials should be taken prior to sterilisation of the area by development.
- Increase the carrying capacity and land capability of the soils by lowering the land surface to enable it to hold soil moisture through summer.

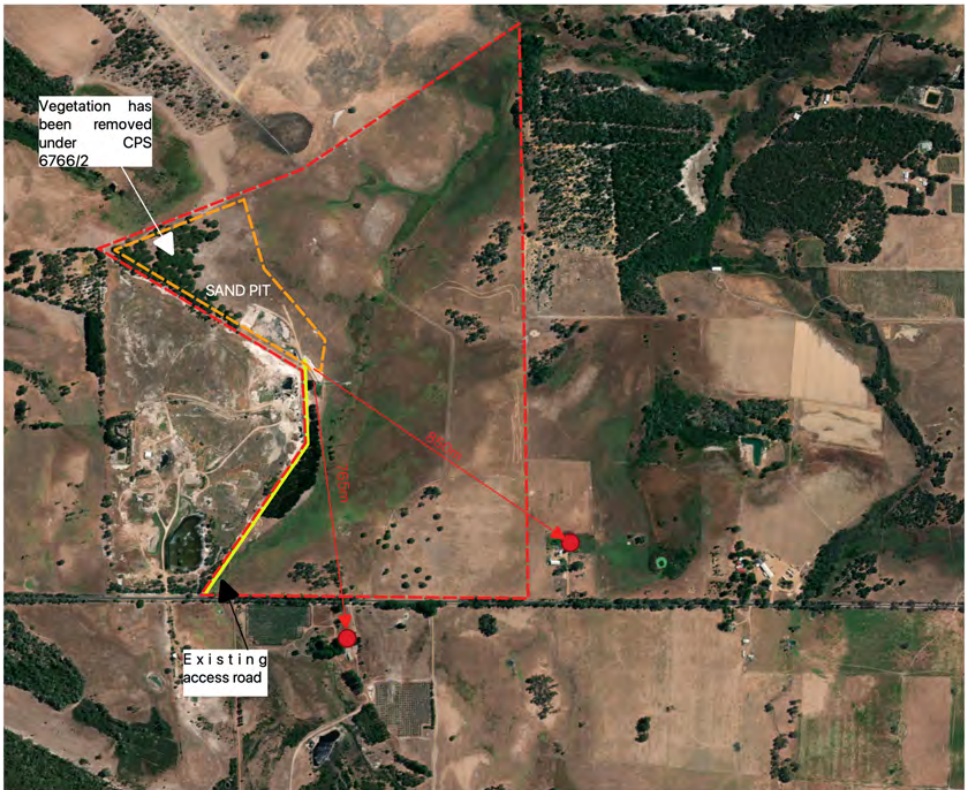


Figure 1: Lot 4205 and separation distances

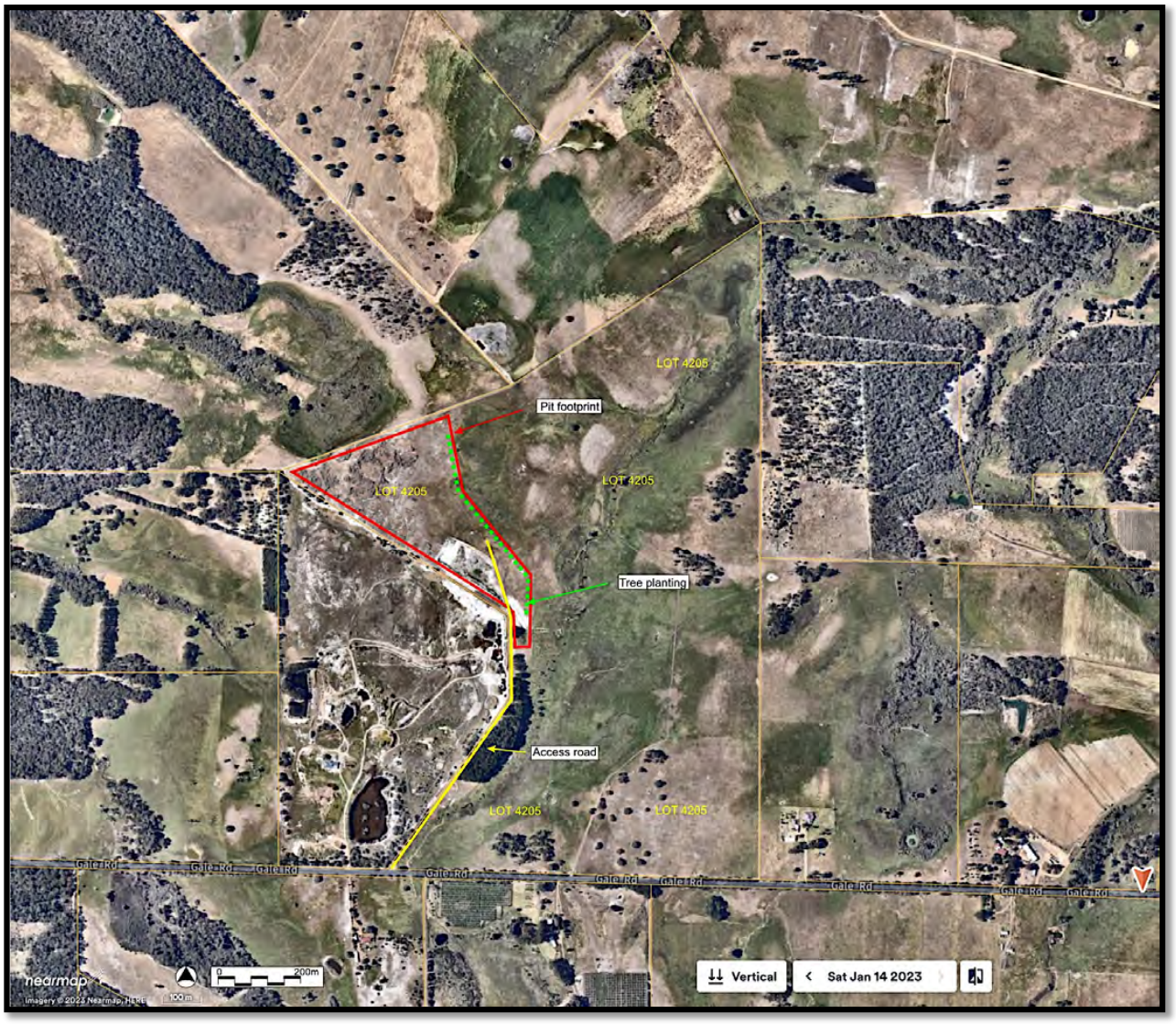


Figure 2: Aerial photograph

2.0 PLANNING ASSESSMENT

2.1 Current Land use

Lot 4205 is a grazing property, that lies in a local area of existing quarries that extract sand and gravel

This site is an existing sand pit that is proposed to be renewed.

The extraction area is cleared apart from scattered regrowth trees of Peppermint *Agonis flexuosa* and Marri *Corymbia calophylla* on the sand resource.

There are no dwellings within 500 metres. Figure 1.

The same transport route will be used to Gale Road which has recently been widened and upgraded.

2.2 Proposed Land use

- Sand extraction.
- Restoration of the subject land on which the agricultural capability of the land has been enhanced.

2.3 End Use

After sand excavation the land will be returned to improved productive agricultural land.

The contoured surface will therefore be restored slopes and form that match the adjoining landform and land uses.

2.4 Land Zonings and Policies

2.4.1 State Government Policies and Planning Schemes

State Planning Policy 1.0, State Planning Framework Policy

The State Planning Policy Framework provides for the implementation of a planning framework through the recognition and implementation of Regional Planning Policies above Local Planning Schemes and Policies.

Within each layer of planning there are a number of key policies and strategies to provide guidance to planning and development to enable sustainable communities to develop, expand and prosper without compromising the environment and future generations.

Planning is governed under the *Planning and Development Act 2005*. This Act enables Government to introduce State and Regional Planning Schemes, Policies and Strategies to provide direction for future planning. The State and Regional Schemes sit above Town Planning Schemes and Strategies introduced by Local Government.

Strategies and Policies provide guidance on how planning is to be undertaken and how proposed developments are to be considered. These Strategies and Policies are at the State, Regional and Local levels.

Schemes are gazetted documents that provide for consideration and approval of proposed developments. These are normally at the Regional and Local Level.

In addition to the documents produced under the *Planning and Development Act 2005*, the *Local Government Act 1995* provides Local Governments with a mechanism to prepare Local Laws to manage issues of local significance.

With respect to the supply of sand, the overarching document is the;

State Planning Policy 1.0 State Planning Framework.

A number of State Policies have been released under the State Planning Framework Policy.

State Planning Policy 2.0, Environment and Natural Resources Policy
State Planning Policy 2.4, Basic Raw Materials
State Planning Policy No 2.5, Agricultural and Rural Land Use Planning
State Planning Policy No 4.1, State Industrial Buffer Policy

These are considered in turn.

A number of other key State Government Policies are also relevant to the local regional planning such as the State Planning Strategy 2050 released in 2014.

State Planning Strategy, 2050 (2014)

State Planning Strategy 2050 comprises a range of strategies, actions, policies and plans to guide the planning and development of regional and local areas in Western Australia and assists in achieving a coordinated response to the planning challenges and issues of the future by State and Local Governments.

The approach in the strategy considers Basic Raw Materials as listed below.

Table 3: State Planning Strategy BRM Supply

ELEMENT	2050 OUTCOMES	MEASUREMENT	ASPIRATIONS
Basic raw material (BRM) supply	Accessible and affordable supplies of BRM are available close to demand	The cost of supplying basic raw materials to the building and construction industry	➢ Appropriate polices are in place to manage existing and future BRM supplies over the long term. ➢ BRM are optimally used for their highest purpose. ➢ The securing of BRM sites is managed through robust strategic sequential land use planning and development control prior to final land use ➢ Demand for BRM is partly managed through compact settlement structures that contain high-density built form.

The environmental management of the quarry has been developed to minimise short and long term impacts on the local community and environment.

The operations have been designed to continue to provide good environmental management that minimises environmental change and enables continued rural land uses.

State Planning Policy 2.0, Environment and Natural Resources Policy

This policy provides for the protection of all natural resources under a number of sections;

5.1 General Measures
5.2 Water Quality including stormwater and wetlands
5.3 Air Quality
5.4 Soil and Land Quality
5.5 Biodiversity
5.6 Agricultural Land and Rangelands
5.7 Minerals Petroleum and Basic Raw Materials
5.8 Marine Resources and Aquaculture
5.9 Landscape
5.10 Greenhouse Gas Emissions and Energy Efficiency.

In addition to recognising the importance of protecting air quality, soil and land quality, water and wetlands and landscapes, the importance of Basic Raw Materials to the community is identified with reference to *SPP 2.4 Basic Raw Materials*, *State Gravel Strategy 1998* and State Lime Strategy 2001. See Section 2.1 of this management plan.

Section 5.7 of SPP 2.0, deals with Minerals, Petroleum and Basic Raw Materials.

Part of Section 5.7 states;

> *Basic raw materials include sand, clay, hard rock, limestone and gravel together with other construction and road building requirements. A ready supply of basic raw materials close to development areas is required in order to keep down the cost of land development and the price of housing.*

Planning strategies, schemes and decision making should:

> *Identify and protect important basic raw materials and provide for their extraction and use in accordance with State Planning Policy No 10 (2.4); Basic Raw Materials.*
>
> *Support sequencing of uses where appropriate to maximise options and resultant benefits to community and the environment.*

The other factors of the natural environment are provided with the best protection possible, by this management plan, by selection of the site, operational staging and footprint and rehabilitation, bearing in mind the constraints of excavating and processing the resource.

State Planning Policy No 2.5, Rural Planning, 2016

SPP 2.5 Agricultural and Rural land Use Planning predominantly deals with the continued rural use of suitable land and its protection for the future. The policy was updated in December 2016 and provides strong measures to identify, protect and use basic raw materials.

SPP 2.5 does reiterate the need to protect and use basic raw materials, although SPP 2.4 (2021) is Statewide and now supersedes SPP 2.5 with respect to Basic Raw Materials.

Basic Raw Materials are included in the definitions as;

> *Sand (including silica sand), clay, hard rock, limestone (including metalurgical limestone), agricultural lime, gravel, gypsum, and other construction materials. The materials may be of State, regional or local significance depending on the resource location, size, relative scarcity, value and demand for the product.*

Amongst seeking to protect agricultural values, Policy Objective 4 (c) states

> *Outside the Perth and Peel Planning regions, secure significant basic raw material resources and provide for their extraction.*

Section 5.9 deals with Basic Raw Materials and seeks to achieve the following in an environmentally acceptable manner;

> *Protect the resources until the resource is extracted (5.9.a)*
>
> *Identify significant basic raw materials on sub-regional and local planning strategies, region and local planning schemes (5.9.b, 5.9.c, 5.9.d)*
>
> *The extraction of basic raw materials should not be generally prohibited (5.9.e)*
>
> *Provide for sequential land use (5.9.f)*
>
> *Limit sensitive land uses to locations demonstrated to not limit existing or potential extraction of basic raw materials (5.9.g)*
>
> *Provide for the consideration of native vegetation or significant biodiversity values and may require retention and protection of vegetation and environmental assets (5.9.h)*
>
> *Have regard for the potential impacts of fragmentation and connectivity of native vegetation (5.9.i)*
>
> *Maintain adequate buffers to protect water quality in public drinking water source areas (5.9j).*

SPP 2.5 also supports preventing conflicting land uses (5.12.1), supports the generic buffers recommended by other Government documents such as the EPA Guidelines for separation distances (5.12.3), and seeks to restrict subdivision from impinging on basic raw material resources.

Policy SPP 2.5 is also supported by Guidelines that seek to protect the Landscape and secure Transport Routes.

State Planning Policy No 2.4, Basic Raw Materials, 2021

The updated Basic Raw Materials policy now covers the State and takes over the functions relating to BRM from SPP 2.5. The Policy seeks to identify and protect Regionally Significant Basic Raw Materials in addition to local basic raw materials that are operating, or resources that have been identified.

The support for Basic Raw Materials also considers the various planning and environmental matters and considerations with establishing and operating quarries. The proposed renewal of planning approval recognizes the staged use of an identified sand resource in line with the Policy.

State Planning Policy No 4.1, State Industrial Buffer Policy

SPP 4.1 discusses the need to consider adjoining land uses when locating buffers but does not prescribe set buffers for operations such as this. The development and processing of the resource has been designed to maintain maximum buffer distances. In situations where the buffers are less, actions such as the provision of perimeter bunding to provide visual and noise management, tree planting and operational procedures are used to mitigate and reduce impacts.

This is discussed further in *Section 2.11 Surrounding Landuses and Buffers* of the document.

Basic Raw Materials Demand and Supply Study for the Bunbury – Busselton Region draft 2012

In August 2012, the Department of Planning and the WAPC released the draft Basic Raw Materials Demand and Supply Study for the Bunbury – Busselton Region.

The document is used to determine the future requirements for the various basic raw materials in the local urban developments and the Bunbury – Busselton Region. It predicts that by 2021 an additional 8706 dwellings will be required in the region.

A total of 43 753 000 cubic metres sand is predicted to be required until 2030 alone so fill sand such as this is a much needed commodity.

2.4.2 Local Government Policies and Planning Schemes

The City of Busselton has one Local Planning Scheme; TPS 21.

The City of Busselton also has a land use strategy to provide a context for local planning within the regional planning strategies;

- *City of Busselton Local Planning Policy 5, Rural Land Use and Development Policy 2010.*

In addition the City of Busselton has an extractive industry bylaw;

Lot 4205 lies within Policy Area 3 for Extractive Industries.

The relevant policies have all been considered with respect to this application. The Quarry complies with, or is compatible with, all policies, strategies and schemes.

City of Busselton Local Planning Scheme Number 21

The City of Busselton Scheme 21 lists the site as occurring in the Agriculture Zone.

The Agriculture Zone aims to preserve agricultural land uses and not compromise the landscape and natural environment.

Extractive Industries are an "A" use within that zone. Approval under Local Planning Scheme 21 is normally granted with a number of conditions as per the existing sand pit.

City of Busselton Local Rural Planning Strategy 2006

The Local Rural Planning Strategy recognises the need for basic raw materials, including sand in Section 2.5 Minerals and Basic Raw Materials.

Also recognised is the Rural Landscape which is protected by visual management in the design and operation of the sand extraction and included in Section 5.1 Aesthetics.

The other issues raised for this precinct are addressed within the design and operation of the sand extraction, with the land to be returned to productive pasture.

City of Busselton, Planning Policy 5 "Rural Land Use and Development" Policy, 2010

The City of Busselton, Planning Policy 5, "Rural Land Use and Development" Policy, 2010 compliments the Local Planning Scheme and has policies with respect to the extraction of sand.

Policy 5A Extractive Industry Provisions seeks the protection and staged use of basic raw materials whilst minimizing environmental and social impacts. The Policy outlines a comprehensive set of assessments and management with respect to extractive industries, including, but not limited to;

- Visual Assessment,
- Route Assessment and Transportation,
- Community Referral by the City,
- Environmental Considerations,
- Buffers and setbacks,
- Dust and Noise,
- Land Clearing,
- Water Tables and Acid Sulfate conditions,
- Site Restoration and Rehabilitation.

2.4.3 Local Government Extractive Industries Licence

An Extractive Industries Licence is issued under City of Busselton Local Law and will be concurrently applied for.

2.4.4 Current Land Zonings

Lot 4205 is zoned "Agriculture".

Lot 4205 lies in Policy Area 3 – "Extractive Industry Constrained" in City of Busselton, Planning Policy 5, "Rural Land Use and Development" Policy, 2010

2.4.6 Legislative Framework

There have been no significant changes to the scale and nature of the local land uses over the past few years.

Table 4: Legislative Framework

Legislation	Environmental Factor regulated/affected	Discussion	Action
Aboriginal Heritage Act 1972	Aboriginal heritage sites	Recorded Heritage Sites A database search of DPLH has been conducted and no Registered Site or other Heritage Places recorded or listed (September 2021).	A commitment is made to halt activities that may impact on a site if any is found during excavation, pending assessment by consultants.
Planning and Development Act 2005. *City of Busselton LPS 21.*	Development approvals for on site constructions and any ensuing environmental impacts.	Planning Consent is required from the City of Busselton under City of Busselton LPS 21.	A concurrent application for development approval and Extractive Industries Licence is lodged.
City of Busselton, Planning Policy 5 "Rural Land Use and Development" Policy, 2010	The application and management of quarries is covered by the Policy.	This assessment and Management Plan has considered the issues outlined in the Policy and has addressed them and other factors as necessary.	The Excavation and rehabilitation Plan uses "Best Practise" to mitigate potential environment and social impacts.
City of Busselton Extractive Industries Local Law 2010	The operations of the quarry are regulated by both the Planning Approval and Extractive Industries Licence	An Extractive Industries Licence is required.	An application for an Extractive Industry Licence is concurrently lodged.
Health Act 1911	Environmental and health impacts from waste water treatment and community health.	No matters of significance that would trigger this legislation have been identified.	The proposal complies with the Health Department Guideline for Dust separation. (See Dust Management) No waste materials will be disposed of on site.
Department of Planning, Land and Heritage Transport Impact Guidelines 2016	New developments may need to consider transport options.	This is a small sand pit located in an area where sand and gravel extraction has occurred for many years. This operation will be similar to the existing sand pit in terms of access and scale of activities or transport.	Discussions have been held with the City of Busselton with respect to road maintenance.

Western Australian Planning Commission Planning Bulletin 111/2016	New developments may need to consider fire risk and mitigation such as a bushfire policy and BAL attack document.	This is the renewal of an existing sand pit with no structures that present a fire risk or other proposed activities that will increase the fire risk. The pit acts as a fire management zone as it is devoid of vegetation.	No assessment is required because there are no significant fire risk and WAPC 2016 Planning Bulletin 111/2016 does not require a BAL Attack assessment. No structures or developments are present on site or are proposed.
Environmental Protection Act 1986 *Part IV* - Assessment	Referred to the EPA if the project is or may constitute a significant environmental impact.	This is a small sand pit in an area where small quarries are common.	No referral to the EPA will be required as this is the renewal of an existing sand pit, with impacts too low to trigger a "Significant Environmental Impact".
Environmental Protection Act 1986 *Part V* – DWER Licence	Environmental factors that may be significantly impacted related to Prescribed Premises- Processing and Screening	No screening or washing of sand is proposed.	A DWER Licence will be applied for prior to activities which triggers the "Prescribed Premises"; 5 000 tonnes per annum if required.
Environmental Protection (Noise) Regulations 1997	Noise impacts.	The excavation is located over 500 metres from any sensitive premises with other existing and old extraction close by. The proposed excavation therefore complies with the EPA generic buffer guidelines.	Noted. See Noise Management.
Environmental Protection (Clearing of Native Vegetation) Regulations 2004	Clearing and disturbance of native vegetation.	Clearing Permit under the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* is required *under the Regulations*.	No additional clearing of native vegetation is proposed other than that already undertaken under the now expired CPS 6766/2.

Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)	Matters listed on the EPBC database.	The matters listed under the *EPBC Act 1999* which might apply to this site are Black Cockatoo habitat and Western Ring Tail Possum Habitat. The listed matter that might apply is the Western Ringtail Possum. There will be no impact on species preferred for feeding or breeding habitats for Black Cockatoos. The Western Ringtail Possum is listed as "Vulnerable" under the *EPBC Act 1999*.	The proposal does not require the clearing of Black Cockatoo habit. The potential for impact on Western Ringtail and Brushtail Possums is considered low for the following reasons. • The clearing of Peppermint trees is minimised and was considered in the granting of CPS 6766/2. • Additional Peppermit trees have been planted as an offset to the clearing in Permit CPS 6766/2. *Agonis flexuosa* are planted along the new fence line to the north east of the pit.
Biodiversity Conservation Act 2016 (WA)	Provides for the protection of flora and fauna.	The clearing of vegetation is covered under the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004.* There is potential for Western Ringtail Possums to live locally. These are listed as "Vulnerable".	The proposal does not require the clearing of Black Cockatoo habit with the only vegetation to be impacted being isolated regrowth Peppermint. The potential for impact on Possums is considered low for the following reasons. • The clearing of Peppermint trees is minimised with the scattered trees to be retained apart from those approved for clearing under CPS 6766/2.
Conservation and Land Management Act 1984	Parks and Reserves and issues relating to flora and fauna.	There are no known issues or nearby reserves that will trigger this legislation.	Noted.
Heritage Act 2018 (WA)	Heritage	No heritage matters are identified locally or on quarry footprint. DPLH databases were searched.	Noted.

Waterways Conservation Act 1976	Water quality and management of surface water	There are no watercourses on the extraction site although a creekline runs along the eastern side of the excavations and previously approved operations.	A Water Management Plan has been prepared and is attached.
Rights in Water and Irrigation Act 1914	Water quality and management of surface water	See above	See above.
Country Areas Water Supply (CAWS) Act 1947	Water supplies	The site lies within Geographe Bay Rivers Surface Water Protection Area.	Noted
State Agreement Acts	Specific acts that relate to certain large projects that may impact on some locations.	Not applicable	
Contaminated Sites Act 2003	Contaminated materials that may arise from excavation or be used in excavation and processing.	The only factor that is likely to fall under this category is the storage and use of maintenance items and on site maintenance.	No materials are present or to be used which would trigger this legislation apart from normal fuel and maintenance.
Dangerous Goods Safety Act 2004	Potential for dangerous good to impact on the environment.	Refers to fuel, which is required and blasting under the *Dangerous Goods Safety (Explosives) Regulations 2007*.	Fuel and Servicing Management Plans are included in the attached Water Management Plan.
Work Health and Safety (Mines) Regulations 2022.	Safety and management of mining operations which in turn may impact on the environment.	Compliance with the Project Management Plan when it is submitted and approved.	***Mine Safety*** The site will be registered under the SRS and a Project Management Plan, Risk Assessment and Emergency plans approved. The Project Management Plan addresses all aspects of mining. The SRS System addresses ongoing Health and Safety.

2.4.7 Stakeholders

The Proposal will be advertised to the local property owners as part of the consideration by the City of Busselton.

Piggott Sand Supplies have consulted with all adjoining property owners and have held discussions with the City of Busselton.

Table 5: Stakeholder Register

Stakeholder	Date - Timing	Potential Considerations	Proponent Response - Outcome
Internal Stakeholders			
Internal Management	• Ongoing • Day to day management of the operations, • Future directions and ownership.		• The methods of operation are not proposed to be significantly different from other sand quarries in the local area or from other sand extraction operations conducted to the northwest in the City of Busselton.
External Stakeholders			
EPA	• This is a small sand pit in an area where small quarries are common		• No referral is necessary. • The existing pit which is being renewed was not assessed by the EPA.
Department of Biodiversity Conservation and Land Management	• Manages native flora and fauna		• No additional clearing of native vegetation is proposed other than that already undertaken under the now expired CPS 6766/2.
City of Busselton	• Provides Planning approval under Local Planning Scheme 21. • Issues Extractive Industries Licence for the quarry under the Local Law. • Regulates land zonings and planning in conjunction with the Western Australian Planning Commission • Controls the measures used to prevent bush fires. • Regulates truck use on local roads.		• Piggott Sand Supplies will work with the City of Busselton on complying with the conditions and minimising local impacts. • There have been discussions between the proponent and the City of Busselton with respect to the entrance from Gale Road and the potential for continuing the sand extraction. • Gale Road has recently been upgraded and is sealed.
Nearby Residents	• The sand pit has setbacks and buffers exceeding 500 metres. • There are no proposed changes to the scale and type of operations.		• Piggott Sand Supples operates the current sand pit. • The sand pit was approved for Lot 4205 and this is applied to be renewed.
Department of Lands Planning and Heritage (DAA) and traditional land holders	• Maintains heritage databases		• Department of Planning Lands and Heritage database has been searched and no sites have been found.
DWER	• May provide advice on aspects of environmental impact and management. • Issues clearing permits under the *Environmental Protection Act 1986*. (Not required)		• No additional clearing of native vegetation is proposed other than that already undertaken under the now expired CPS 6766/2.

	• Published guidelines for water quality management for extractive industries. • Licenses bores and oversees water use. • Has control over the management of ground and surface water in the area, including water catchments.	• Complies with DWER Guidelines for water management and separation to the groundwater of > 2 metres, generally and with the 0.5 metres separation provided by the South West Guideline for extractive industries. • The Water Management Plan is attached. • The site lies within Geographe Bay Rivers Surface Water Protection Area.
	• A DWER Licence is required under *Part IV of the Environmental Protection Act 1986* for crushing or screening if the annual volumes exceed 5000 - 50 000 tonnes. (Category 70 Prescribed Premises).	• A DWER Licence will be applied for, if screening or washing exceeds 5 000 tonnes per year. • Currently no screening or washing of the sand is proposed.
DMIRS Safety Division	• Conditions on the safety of the operations. • Controls the safety and methods of excavation through the *Work Health and Safety (Mines) Regulations 2022.*	• The pit will be registered with DMIRS under the *Work Health and Safety (Mines) Regulations 2022.*

2.5 Heritage

A search of the Department of Aboriginal Affairs database on Lot 4205 did not show any Registered Sites or any Other Heritage Sites.

Should any archaeological site be uncovered, work will cease in that area pending an assessment of the site by an independent consultant, traditional owners and the Department of Planning, Lands and Heritage as required.

2.6 Complaints Mechanism

The following complaints mechanism is proposed.

- The contact details will be displayed at the entrance to the operations.
- A complaints book will be provided and maintained.
- Upon receipt of a complaint it will be investigated and action taken if the complaint is determined to be legitimate.
- When a complaint is found to be legitimate, any reasonable actions to mitigate the cause of the complaint will be taken, to prevent a recurrence of the situation in the future.

- Details of any complaints, the date and time, means by which the complaint was made, the nature of the complaint, the complainant, investigations and any resulting actions and the reasons, will be recorded in the Complaints Book.

- The City of Busselton will be informed of any complaint or any other report provided to a Government Department within 24 hours by email or phone.

- The complaints book will be made available for viewing or requested details made available to the City or any other official upon request.

- See also Dust Management at Section 6.3.5

3.0 BUFFERS AND SOCIAL IMPACTS

There are no proposed changes to the scale and nature of the excavations. The access points and intensity of excavation will not change. There will be another extraction area added near Gale Road.

3.1 Consideration of nearby sensitive premises

The quarry is designed to maximise the setbacks to the closest sensitive premises.

The main environmental issues identified in relation to buffers and setbacks to sensitive premises, in addition to those generally recognised by the various Government and Published guidance's are;

- Visual amenity
- Dust management
- Noise management
- Local amenity
- Cumulative impacts of quarries

3.2 Policies

3.2.1 Generic and State Buffers

A number of Government Policies relate to buffer distances and the protection of basic raw materials. State Planning Policy No 4.1, State Industrial Buffer Policy, (draft July 2004) discusses the need to consider adjoining land uses when locating buffers but does not prescribe set buffers for operations such as this.

SPP 4.1 discusses the need to provide buffers both on site and offsite with respect to industry including extractive industries. It does not however specify any distance for the buffer, but notes that site specific studies should be prepared that will demonstrate that the extractive industry can operate in a manner compatible with nearby sensitive premises.

The State Industrial Policy 4.1 does not specify a set buffer distance, but notes that buffers are to be based on "scientific study" and are flexible. It further specifies the buffers by reference to other documentation such as the Environmental Protection Policies, EPA and DWER standards and DPLH Generic Industrial Buffer Guidelines; that is the EPA 300 - 500 metre generic buffer used in SPP 2.4 and SPP 2.5 that is used in the absence of supporting or scientific studies and information.

EPA guidance "Separation Distances between Industrial and Sensitive Land Uses", June 2005 lists the generic buffers for sand quarries as 300 – 500 metres depending on the extent of processing.

The Draft DWER Buffer Guidelines (DER 2015) have been withdrawn.

The buffer documents and SPP 2.4 all now defer to the EPA 2005 Guidance Statement.

Both SPP 2.4 and 2.5 support preventing conflicting land uses (SPP 2.5, Section 5.12.1), support the generic buffers recommended by other Government documents such as the EPA Guidelines for separation distances (SPP 2.5 Section 5.12.3), and seek to restrict subdivision from impinging on basic raw material resources.

The issue of appropriate buffers is a matter of the distance and protection measures to prevent impact on adjoining land users. This applies mainly to noise, dust and visual impact, all of which are treated separately.

The walls of the pit, perimeter bunding and nature of the ridge landform will be used to reduce noise transmission.

Excavation will continue to be worked from inside out on the floor of the pit working below natural ground level with a perimeter low bund of topsoil stored to be respread at the end of mining.

There are no residential properties near the existing excavation area, with over 500 metres separation to all sensitive premises. Figure 1. The closest sensitive receptors are located approximately 700 m or greater to the south and south east of the extraction area.

The only potential for dust will be from the access road and that applies no matter which part of the sand resource is excavated.

Noise is managed under the *Environmental Protection (Noise) Regulations 1997.* The Regulations must be complied with no matter what the setbacks or buffers area, or the pit cannot operate. Based on other quarries, and with just the use of a loader or an excavator, compliance with the Noise Regulations will be able to be achieved at both the existing approved pits and the additional southern pit. The design of the excavation is to provide noise screening by locating the topsoil bunds along the south and west of the proposed southern pit as discussed under Noise Management 5.2.

On the basis of the site specific review the sand pit can therefore comply with the EPA Generic Buffer Guidelines as extraction can be completed without either Dust or Noise Impacts.

City of Busselton Rural Areas and Land Use Development Policy - 2010

Section 5A of the Policy; Extractive Industry Provisions Section 6.2 provides for some setbacks.

Section 6.2.1 limits extractive industries to 500 metres from a tourist facility where the owners object. Section 6.2.2 Limits the setback to 500 metres from a dwelling where the owner objects with Section 6.2.3 limiting the separation to generally no closer than 300 metres depending on the size and scale of the operation. Figure 1.

City of Busselton Policy 5A – Rural Areas land Use and Development Policy provides guidelines for the buffers to sensitive premises.

The proposed quarry complies with the City of Busselton Rural Areas and Land Use Development Policy – 2010, with sensitive premises having setbacks of over 500 metres. Figure 1

Setback to adjoining properties

A setback of 20 metres from the property boundary will be maintained at all stages as provided for in the City of Busselton *Local Planning Policy No 2.3 Extractive Industry*.

4.0 EXISTING ENVIRONMENT

4.1 Climate

The climate of the area is classified as Mediterranean with warm to hot summers and cool wet winters.

The closest weather recording station is Busselton Aero (Station 9603). Temperatures are highest on average in January, at approximately 30.2°C. July has the lowest average temperature of the year of 6.9°C.

Average annual rainfall for the area is 680 mm. Most of the rain falls during the winter months April to October inclusive. Evaporation exceeds rainfall in all but the wetter months.

During the summer months the dominant wind in the mornings is from the south-east at 10-14 knots, swinging to the south-west at 20-25 knots in the afternoon. During winter, the winds are most commonly 10-14 knots with no dominant prevailing directions. During storms winds from the west and north-west can reach 40 knots (BoM 2022).



Figure 3: View north across the sand resource. The vegetation in the background was cleared under CPS 6766/2 See Figure 2 for a later aerial photograph

4.2 Geology and Geomorphology

The sand lies between the Leeuwin Complex and the Yilgarn Craton in a down faulted basin filled with Permian overlain by Cretaceous sediments.

The land system is the Yelverton System (DPIRD Mapping) that now lies above the Whicher Scarp and was formed as a north facing bay at a time of higher sea level.

The general formation of the sand systems are thought to be coastal dunes, for the surface finer sands, with the basal coarse sands.

The sand overlies the silty sediments of Cretaceous age. Only the sand resource will be taken and the underlying silty materials will not be disturbed.

The geology is discussed in *Wilde S A and D R Nelson, 2001, Geology of the Western Yilgarn Craton and Leeuwin Complex, Western Australia – Field Guide, Geological Survey of Western Australia and Marnham J R, G J Hall* and *R L Langford, 2000, Regolith-Landform Resources of the Cowaramup-Mentelle 1 : 50 000 Sheet, Geological Survey of Western Australia.*

The sand resource lies on the plateau erosion surface that sits across the site. The sand resource is located on a plateau sand and gravel ridge that rises from around 64 metres AHD in the east to 74 metres AHD for the existing sand excavation.

The proposed southern pit lies at 72 metres to 76 metres AHD.



Figure 4: Sand resource at the existing pit

4.3 Soils and Regolith

The soils and excavation of sands are well known from the existing pit that has operated and currently operate on Lot 4205.

The resource typically has a grey to brownish grey sand up to 100 mm thick over leached white silica sand grading to coarse white sand at depth.

The finer sand overlies discontinuous thin layers of coarser sand.

Under the sand is the sandy loam subsoils that are developed on the Cretaceous sediments. These materials occur below the base of the sand excavation and will not be disturbed. These soils are classified as being part of the Whicher Scarp Soil Landscape System. (DPIRD mapping).

The soils are well described in *Marnham J R, G J Hall and R L Langford, 2000, Regolith-Landform Resources of the Cowaramup-Mentelle 1 : 50 000 Sheet, Geological Survey of Western Australia.*

4.4 Acid Sulfate

There has been an increased interest in acid sulfate soils since the release of WAPC Planning Bulletin 64.

However the interest has been over-reactive, with assessments sought and risk applied in many areas where there is no geological risk or evidence of acid sulfate potential or actual conditions.

The most definitive survey procedure was produced by the Acid Sulfate Soil Management Advisory Committee NSW, 1998, in their *Acid Sulfate Manual.* This Manual formed the basis for much of the assessment procedures in Australia, including those adopted by the Western Australian Planning Commission and the Department of Water Environment Regulation.

DWER 2015 released two documents, Identification and investigation of acid sulphate soils and acidic landscapes and *Treatment and management of soil and water in acid sulphate soil landscapes.* These two documents provide the guidelines for Western Australia.

The *Acid Sulfate Manual (DPLH)* adopts the procedure of reviewing the published data followed up by field assessment, which has been completed for this site. If a geological risk is determined, then a Preliminary Acid Sulfate Assessment is conducted.

Lot 4205 and the surrounding land has been visited by Lindsay Stephens of Landform Research, and the faces and sand resources observed on a number of occasions and the current pit.

On site the soils are sand that are oxidised and do not carry any significant risk of acid sulphate potential. This concurs with Nattaporn-Prakongkep, R J Gilkes, B Singh and S Wong, 2011, *Mineralogy and chemistry of sandy soils in the Perth metropolitan area of the Swan Coastal Plain*, Department of Environment and Conservation who concluded that there is no risk of acid sulfate soils in sands unless there is peat or organoferricrete present and excavation proceeds below the water table. In such situations no testing would be required because there is no risk. Neither organoferricrete or peat are present in the current pit.

There have been numerous sand excavations in the local area in similar geological and soil conditions without the development of acidic soils or run off.

Whilst the soils on site are podsolised sandy soils, the soils dry out in summer and are not under reducing conditions all year round. The soil water on this site originates from direct infiltration from precipitation down to the underlying silty Cretaceous sediments. From there the water builds up in winter and flows laterally to the nearest watercourse, across the centre of Lot 4205. In summer that soil moisture reduces and the sands dry out.

Lot 4205 lies outside the acid sulphate mapping of the Swan Coastal Plain, the mapping extends to just north of the subject land which has similar characteristics of Low to with Moderate Risk for the saturated water courses, drainage and wet areas. The same applies for Lot 4205 and is shown on the soil acidity mapping provided by DPIRD where the sand ridges and resources have low surface soil acidity rising at depth The higher risks are all associated with the drainage lines and wet areas.

That mapping shows that the sand resource has <3% risk of surface soil acidity with a pH <4.5 and a 3% or 3 – 10% risk of soil acidity for the subsoils which will in effect be the sand resource. Figures 5 and 6.

The risk of acid sulfate conditions is therefore low as explained above as the soils dry out in summer, leading to oxidising conditions. The other factor is the high annual rainfall and shallow soils, which lead to flushing of nutrients from the soils, and reduced levels of soil sulfur, also reducing the risk of the development of sulfides in the soils.



Figure 5: Surface soil acidity mapping. DPIRD showing the sand resources as <3% risk of surface soil acidity



Figure 6: DPIRD subsoil acidity risk mapping showing the sand resources as having < 3% or 3-10% risk of subsoil acidity

4.5 Hydrogeology

See the attached Water Management Plan

Surface Water

There is no surface runoff of water on the sand resource due to the porosity and permeability of the sand, with precipitation draining to the water table where it seeps to the watercourse.

Only the areas that are well above the water table have been selected for excavation. In summer the local soils dry out, but in winter the rate of precipitation wets the sand. There are no winter-wet conditions.

The extractions sites are not subject to any watercourses or flood paths.

A setback of at least 20 m has been maintained to all surface water features.

Groundwater

The site sits within the South West Groundwater Areas Allocation Plan 2000 and lies in the Dunsborough – Vasse Subarea for Superficial and Leederville Formation. The underlying Yarragadee Aquifer will not be impacted.

There is generally no surface runoff of water from the sand due to the porosity and permeability of the sand, with precipitation draining to the water table. It has been estimated that 30% of the rainfall will reach the superficial aquifer with an unknown amount filtering into the deeper aquifers, based on the pasture on the sand.

See Figure 13 and 15 for the Final Contour Plan, groundwater separation.

The resource area is elevated with a shallow seasonal superficial water table perched at the top of the underlying Cretaceous sediments when the vertical infiltration rate is exceeded by the winter precipitation. That means that the winter perched water table slopes from the north west down to the south east.

The infiltration rates ensure that the sand does not become saturated and water drops to the floor of the pit and then moves laterally towards the watercourse.

In reality it is only the Superficial Aquifer that is relevant to this proposal in terms of the depth to groundwater beneath the base of the sand pit.

There are no acid sulfate or salinity issues, with the soils and water being fresh and elevated in the landscape. See Section 2.4 Acid Sulfate.

In the south west, the Department of Water South West Region Guidelines Water Resource Considerations for Extractive Industries and WQPN 15 (2019) permits a maximum excavation of 0.5 metres above the highest winter water table which after rehabilitation allows for a final separation of 0.7 metres to the highest winter water table.

The excavation of sand from the site complies with the DOW South West guidelines and WPQN 15 and uses the management actions wherever there is environmental benefit.

The management of ground and surface water is addressed in the attached Water Management Plan.

4.6 Flora and Vegetation

All clearing within the extraction area has already taken place under a now expired Clearing Permit (CPS 6766/2). As part of that Permit 180 additional *Agonis flexuosa* trees was to be installed. These are already planted and growing. The trees will be maintained and any mortalities will be replanted. Figures 2 and 8 for the replanting locations.

No additional clearing is proposed. See Figure 2 for a later aerial photograph.

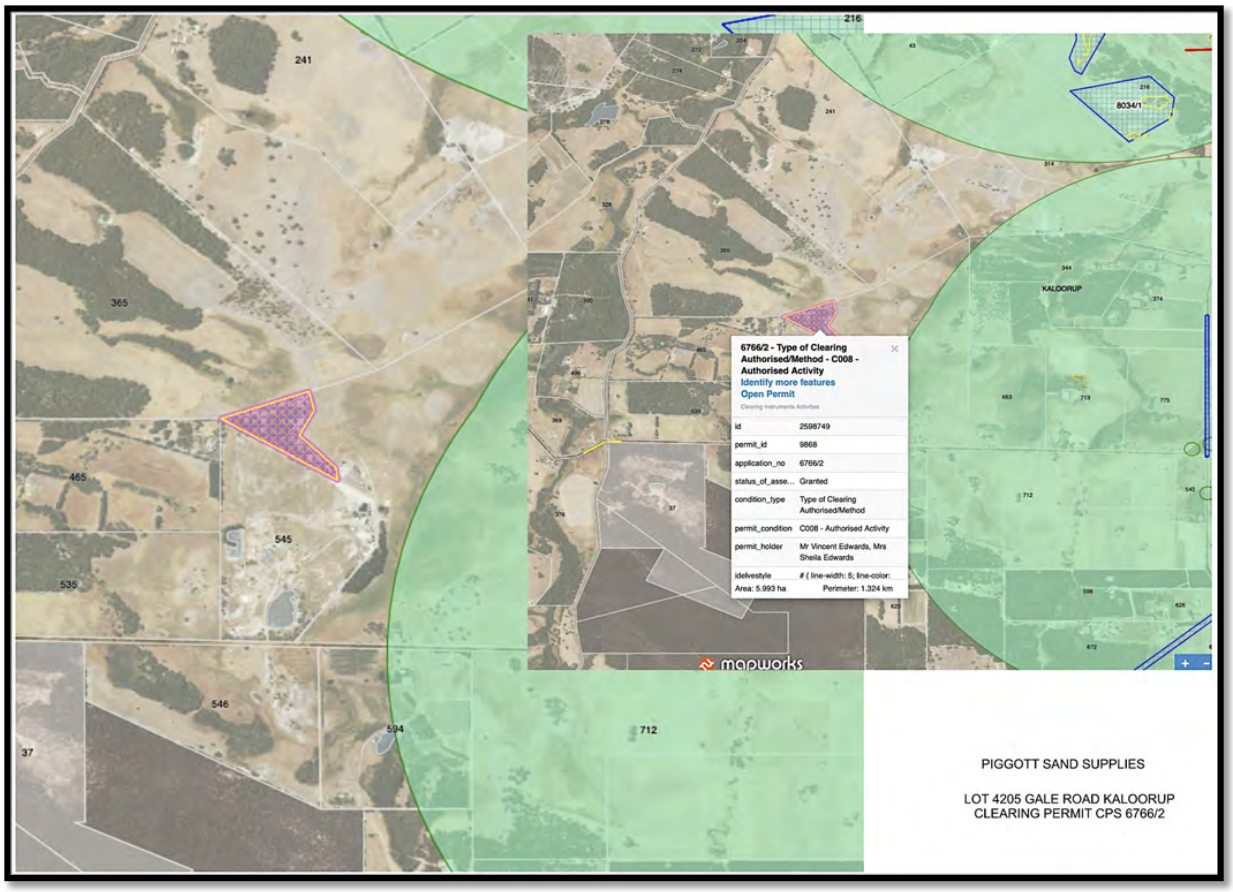


Figure 7: Clearing Permit CPS 6766/2 now expired.



Figure 8: Tree planting of *Agonis flexuosa* as required by CPS 6766/2 on the fenceline to the north of the pit.

4.7 Fauna

The fauna on site will have already be significantly depleted by the clearing as there are just scattered Peppermint trees on site.

The proposal does not require the clearing of Black Cockatoo habitat.

The potential for impact on Possums is considered low for the following reasons.

- The clearing of Peppermint trees is minimised.
- The main sand resource which has been approved previously is approved for clearing under CPS 6766/2. The Clearing Permit also requires the planting of offset native plants and trees which are already planted.

4.8 Wetlands

Wetlands within Western Australia are classified on the basis of landform and water permanence pursuant to the Semeniuk (1995) classification system.

Table 6: Wetland classifications (Semeniuk 1995).

Water Longevity	Landform				
	Basin	Channel	Flat	Slope	Highland
Permanent Inundation	Lake	River	-	-	-
Seasonal Inundation	Sumpland	Creek	Floodplain	-	-
Intermittent Inundation	Playa	Wadi	Barlkarra	-	-
Seasonal Waterlogging	Dampland	Trough	Palusplain	Paluslope	Palusmont

Areas of wetlands in Western Australia have been mapped and this mapping has been converted into a digital dataset that is maintained by the Department of Biodiversity, Conservation and Attractions (DBCA) and is referred to as the '*Geomorphic Wetlands of the South West*' dataset. This dataset contains information on geomorphic wetland types and assigns management categories that guide the recommended management approach for each wetland area. The wetland management categories and management objectives are listed in **Table 7**.

Table 7: DBCA wetland management categories (Semeniuk 1995).

Category	Description	Management Objectives
Conservation	Wetlands support a high level of ecological attributes and functions.	Highest priority wetlands. Objective is to preserve and protect the existing conservation values of the wetlands through various mechanisms including: • Reservation in national parks, crown reserves and State owned land, • Protection under Environmental Protection Policies, and • Wetland covenanting by landowners. No development or clearing is considered appropriate. These are the most valuable wetlands and any activity that may lead to further loss or degradation is inappropriate.
Resource Enhancement	Wetlands which may have been partially modified but still support substantial ecological attributes and functions	Priority wetlands. Ultimate objective is to manage, restore and protect towards improving their conservation value. These wetlands have the potential to be restored to Conservation category. This can be achieved by restoring wetland function, structure and biodiversity.
Multiple Use	Wetlands with few remaining attributes and functions	Use, development and management should be considered in the context of ecologically sustainable development and best management practice catchment planning through landcare.

There is one Resource Enhancement (RE) wetland (UFI 17) associated with the Buayanyup River and one Multiple Use (MU) wetland (UFI 283) mapped within the property (refer to **Figure 9**). The excavation footprint has been designed to ensure at least a 20 m buffer from the RE wetland is maintained at all times.

MU wetlands are assessed as possessing few remaining ecological attributes and functions, which is characteristic of these mapped areas within the property. While such wetlands can still contribute to regional or landscape ecosystem management, including hydrological function, they are considered to have low intrinsic ecological value. Typically, they have minimal or no native vegetation remaining (less than 10%). Accordingly, there is no legislative requirement to protect or retain them and as such MU wetlands do not preclude development.

The management objective for MU wetlands is to preserve the hydrological functions in the context of the proposed development (EPA 2008). The current water cycle within the subject site consists of inputs from rainwater bring infiltrated on site or flowing through the drainage lines into the wider drainage system. The development is not proposing to alter this process, with all water being retained within the excavated areas to enable infiltration through stormwater pirs to ensure water quality is maintained.



Figure 9: Wetland Mapping.

5.0 PROJECT DESCRIPTION

5.1 Extraction and Processing

Controls

Excavation is conducted to conform to the *Work Health and Safety (Mines) Regulations 2022.*

The operations are managed by a licensed Senior Site Executive and are regularly inspected by the District Inspector of Resources Safety, DMIRS

The excavation and rehabilitation of the sand pit will continue to be conducted in accordance with this Excavation – Rehabilitation Management Plan.

Construction Time

The construction time will be minimal as the sand excavation is already operating on site. The access and road transport will not change, although with the upgrade of Gale Road traffic will travel both to the east and west.

Excavation Procedures

The steps in the excavation are to be unchanged and will continue to be;

- Topsoil will be removed and recovered for spreading directly onto areas to be revegetated.
- If topsoil cannot be directly transferred it will be stored in low dumps at the perimeter of the excavation footprint. For the southern resource that will be along the southern and western sides of the proposed pit where the bunding will be formed to around 2 metres high.
- There will be little or no overburden, which will consist of subgrade sand.
- Sand will be excavated from the floor of the pit to a depth of 0.5 - 4 metres.
- The sand to be used for fill will be loaded directly to road truck by loader or excavator. The loader will stay at the face and the road trucks will be restricted to access roads spreading out from the centre of the operational area. Drivers will be instructed to stay in their trucks within the loading area.
- The loader or excavator will work at the face, approaching the face in a perpendicular manner to enable the natural slump of sand, to make the working face safe.
- Trucks will be confined to a dedicated ring road that will be moved as required as the face progress. Drivers will be required to stay in their trucks while in the loading area.
- All vehicles will have radio contact.

- At the completion of excavation, the final contours of the excavation will be a slightly undulating surface at between 71.7 to 72.9 m AHD. See the Concept Final Contour Plan. The batters will be graded to ensure the final slopes form an interim stable land surface in compliance with the *Work Health and Safety (Mines) Regulations 2022* and DMIRS Guidelines and the steepest slopes being at 1 : 5 vertical to horizontal.

- Rehabilitation will progressively follow mining, wherever possible, with completed areas of the excavation being returned to productive pasture as soon as practicable.

5.2 Pit Design and Staging

A perimeter buffer of 20 metres is provided to adjoining lots in compliance with Section 6.4 City of Busselton Policy 5A – Rural Areas land Use and Development Policy.

See the current contour plan at Figure 12

See Figure 15 for the Final Contour Plan, Figure 14 Staging Plan.

Final Contours

For weathered or deposited materials such as sand, a recommended steepest batter slope of 1 : 5 vertical to horizontal will be established, with a gently undulating floor of the pit. As the pit will average only 1 - 3 metres deep the final land surface will be similar to the existing land surface except that it will be slightly lower. Figures 12 to 15

The final contours depend on the groundwater elevations that are discussed in in detail in the attached Water Management Plan. The groundwater elevations are shown in Figure 13.

A grounds survey completed by G and W Surveys on 21 September 2022 shows that the groundwater elevation is the same as previously measured and is consistent with the proposed final contours of the current proposal. Figure 13.

The site was surveyed in September 2020 to check elevations of the groundwater across various parts of the site. Elevations were also obtained in winter 2021 by Landform research from natural water levels on Lot 4205. The site was reviewed again on 20 November 2021 when the hydrogeology was again reviewed by Landform Research who found the maximum groundwater elevations consistent with the 2020 data.

Piezometers were installed in winter 2022 and the maximum groundwater elevations surveyed by G and W Surveys on 21 September 2022 at the time of the maximum water table The various groundwater elevations and monitoring bores are provided in Figures 13.

The elevation of the water tables replicates the previously surveyed and assessed levels found in the 2020 surveys and is consistent with the data provided by Landform Research in 2021. All data demonstrates that the final land surface as proposed of 71.7 metres AHD in the east and 72.9 metres AHD in the west provides the required 0.7 metre separation to the highest known water table which ranges from 71 metres AHD in the east and 72.2 metres AHD in the west. Compare Figures 12, 13 and 15.

The surveys in September 2020, the observations by Landform Research in 2021 and the groundwater surveys of the piezometer elevations on 21 September 2022 are all consistent.

The groundwater therefore has over 2 years of monitoring and demonstrates that the elevations are consistent with the current proposal. That is the concept final contour plan provided in this proposal remains consistent with the maximum groundwater elevations.

Further, this proposal and the ground surveys demonstrate that the 2016 approval for the sand excavation the 71 metre AHD pit floor was demonstrated to be too low and that the elevation needed to be 71.5 – 72 metres AHD as per the current approval.

The survey also demonstrates that the site complies with the excavated land is consistent with this proposal. Figures 12 and 15.

Rehabilitation to pasture will be progressive, but, because of the nature of the excavation, will be restricted to completed faces. Batters will be rehabilitated when formed. Figures 10 and 11 shows the excavated floor under pasture.

Geotechnical parameters

The sand pit has steeply sloping faces during excavation in compliance with the DMIRS face angles for sand excavation. These will be battered down to 1 : 5 vertical to horizontal as a geotechnically stable landform that can be used for agricultural purposes.

5.3 Processing

The sand is sold as fill without any processing.

5.4 Stockpiles

Stockpiles are not generally required. If required stockpiles will be located on the floor of the pit and be a maximum of 2 metres high, in compliance with the City Local planning policy.

This will mean that the stockpiles are not anticipated to be visible from Gale Road.

5.5 Equipment

Currently there are no facilities on site.

- A loader will excavate sand and load the trucks.
- An excavator will be used for higher faces and specialty work.
- The only other vehicles are the road trucks
- Refueling will be conducted from mobile tanker on the adjacent gravel hardstand area with a spill kit available. There will be no fuel stored on site.

- Major maintenance will continue to be conducted offsite.

5.6 Hours of Operation

Hours of operation will be 7.00 am to 5.00 pm Monday to Friday and Saturday 7.00 am to 1.00 pm (for rehabilitation works only) inclusive, excluding public holidays. There will also be school bus curfews between 7.30 am to 8.40 am and between 3.30 pm to 4.20 pm.

5.7 Access and Security

The access road from Gale Road is already established and in use for rural activities and the existing sand excavations. Figures 1 and 2.

The site will be secured by locked gates when it is not being actively worked. The boundary fencing will be maintained to prevent inadvertent and unauthorised entry.

Warning signs for trucks will continue to be used to alert road users to the entrance onto Gale Road. Maintenance of signage will be undertaken by the proponent through liaison with the City of Busselton.

Maintenance of Internal Roads

The access road is maintained and watered as necessary, as described in the Dust Management.

- Access roads on site are unsealed and are constructed from insitu materials (gravel)
- The internal access roads are already constructed and will be maintained.
- In the event that repair of access roads is required, gravel will be provided, with a well graded particle distribution to be used on locations requiring repair and resurfacing.
- As required a water cart will provide sufficient water to compliment the compaction process and provide dust suppression in the summer drier months

External

Gale Road has been used for the transport of sand and gravel for many years.

Transport will be along Gale Road east and west. Gale Road has recently been widened and sealed by the Shire of Busselton. It has been used for the transport of sand from the existing pit and therefore, as upgraded, it will be suitable for the continued transport of sand. Most transport to Busselton and north will travel west with only local traffic or destinations travelling east.

The crossover is gravel and is already constructed in the western portion of Lot 4205 and will continue to be used.

Scale and Intensity of the transport

Road transport will use a variety of road approved vehicles such as rigid trucks, semi-trailers or rigid (8) wheeler trucks to a 5 axle dog trailer depending on the contractor vehicle.

The proposed scale and intensity of the transport is not proposed to change.

The number of truck movements will vary throughout the year depending on the size of contracts but up to an anticipated 50,000 m^3 per year will average 10 laden truck movements per day. For large contracts there may be 20 per day and at other times less than 5 per day.

A road maintenance agreement will be determined with the City of Busselton based on the *City of Busselton Planning Policy 5, Rural Land Use and Development Policy 2010.*

5.8 Water Use

There is not anticipated to be any significant requirement for water use. The only water use will be limited water as required for dust suppression on the access road.

A rounded figure of 1 000 litres or 1 kL water use per day is anticipated based on past experience at other pits and on site, for dust suppression. For 50 - 100 days of full water requirements in a year, considering the extraction volumes, winter and other wet days, the water requirements are anticipated to be 100 kL of water for dust suppression annually.

5.9 Workforce

The workforce will vary, depending on the level of operation and market demands, but usually 2 – 4 persons will work on site plus truck drivers as they access the operations.

5.10 Safety

Excavation safety

Excavation will be conducted to *Work Health and Safety (Mines) Regulations 2022*. Excavation practices, and operations procedures are in compliance with the Act. Health and safety issues are overseen by the DMIRS.

The site is registered under the DMIRS SRS reporting system for minesites and quarries.

All vehicles have two way radio capability with the pit channel displayed at the entrance to the pit. No light vehicles are permitted on site without registering with mobile plant on site. Full personal protection is required for all persons on site at all times.

Emergency

The site is within mobile phone contact and all vehicles are equipped with two way radios.

Personal protection is worn by all persons on site, with a minimum of hi – viz, safety boots, long clothing, hearing and eye protection and helmets when near the face or operating machinery.

Road trucks are to be separated from the operating loader/excavator. Site warning signs and directions will be installed as required to maintain safety.

Safety bunds or temporary fences will be used above any active vertical faces.

Warning signs are maintained as required.

Staff and contractors are inducted to the site.

Where applicable Safe Operating Procedure Sheets are made available for hazards. Workers and staff on all sites are trained in the use of the procedures and all employees provided with site induction and training as necessary prior to commencing work on the site.

Fire Management

The excavation area will form a natural firebreak; the access road will also assist. Water available on site can be used for fire fighting.

Western Australian Planning Commission Planning Bulletin 111/2016 provides for an exemption of a bushfire plan requirement because there will be no structures that will burn and the open ground will form a fire break and there are no changes proposed to the sand extraction.

As there is not anticipated to be any change to the annual amounts of sand extracted from Lot 4205, and there are no proposed developments, no fire Management Plan and BAL is required for this site.

The management actions that are used to minimise fire risk are summarised below.

- Vehicles will be restricted to operational area, particularly on high fire risk days.
- Diesel rather than petrol powered vehicles are used.
- Perimeter fire breaks will be maintained for Lot 4205.
- The mobile plant on site will be available to assist with emergency fire management when safe to do so.
- Water supplies will be drawn from existing farm supplies, with the proposed dam to supply water.
- The farm fire fighting unit is available for fire management.
- The site is secured from unauthorised access by maintaining the existing fencing and locked gates.
- Public access is not be permitted.
- An emergency muster area is provided.
- On site communications and worker induction and training is provided.
- The site is within mobile phone range, the surrounding area is relatively flat and any bushfire smoke will readily be noticed.

6.0 ENVIRONMENTAL IMPACTS AND MANAGEMENT

The aims of the Environmental Management Program are to minimise the effects of sand excavation on the local environment and return the area to a landform compatible with the surrounding area.

6.1 Aesthetics

Guidance on visual impact is contained in *Department of Planning, 2007, Visual Landscape Planning in Western Australia (DoP 2007*). Guidance can also be found in *Forest Commission of Victoria, undated, Landscape Types of Victoria.*

The existing pit is set back a minimum of 500 metres from Gale Road behind a pasture and scattered to isolated tree buffer. The remainder of the pit along the northern boundary of Lot 4205 is 1 km from Gale Road. Figure 1.

To assess the potential for the site to be visible the local roads and Gale Road were driven to determine the potential for the pit to be seen. Google Earth Pro was then used to generate sight lines from the pit back to the nearby land uses and from Gale Road back towards the pit.

The pit is sufficiently far away not to cause a significant visual impact. It will continue to be worked by loader on the floor of the pit or by excavator on the surface. As they are sufficient far away from Gale Road not particular direction of excavation will be required. Excavation will generally be south to north into the low ridges.

In part there is some vegetation along Gale Road that also provides some visual screening.

- Perimeter bunding of topsoil pushed off the resource ahead of excavation will be used to minimise the viewsheds, particularly from Gale Road. Topsoil will be pushed into low bunds 2 metres high along the perimeter of the excavation area. As the floor of the pit will be around 2 metres deep there will be four metres of landform (pit depth and perimeter topsoil bund) to provide visual protection to the east.

- The the pits to have approval renewed are all 500 – 1000 metres plus from Gale Road. Figure 1.

- Gale Road has in part some roadside verge vegetation.

- The access road is at low elevation and truck movements are not visible.

- Progressive revegetation to pasture of all completed, excavated or disturbed areas will be implemented.

- The amount of ground open at any one time will be minimised.

- Additional trees have already been planted around the main resource area and will in time assist visual management. Figures 2 and 8.

- Night time activities will not be used.

- Excavation will be conducted behind perimeter bunding in more visually sensitive areas, in particular the proposed southern pit.

Light Overspill

It is not proposed that the facility will operate at night. The only lighting that might be required at night could be security lighting. Security lighting is located to minimise light visibility from roads and neighbours.

There are no proposed changes to the lighting and operational times.

6.2 NOISE MANAGEMENT

6.2.1 Regulatory Framework

Noise can originate from a number of operations and may impact on onsite workers, or travel offsite and impact on external sensitive premises. Both potential noise impacts are addressed by reducing the noise generated from the quarrying and processing operations.

Offsite noise is governed by the *Environmental Protection (Noise) Regulations 1997.*

The Environmental Protection (Noise) Regulations 1997, require that sensitive premises including dwellings in non industrial and rural areas, are not subjected to general noise levels (excluding blasting), during the hours 7.00 am to 7.00 pm Monday to Saturday that exceed 45 dBA. Allowable noise to 55 dBA is permitted for up to 10% of the time and to 65 dBA for 1% of the time. Noise levels are not to exceed 65 dBA during normal working hours.

Between 9.00 am and 7.00 pm on Sundays and Public Holidays, and between 7.00 pm and 10.00 pm on all days, the base level is 40 dBA.

At night, between 10.00 pm and 7.00 am Mondays to Saturday, and before 9.00 am on Sundays and Public Holidays the permitted level drops to 35 dBA.

The 10% and 1% “time above” allowances apply at night and on Sundays and Public Holidays as well.

There are penalties for tonality of 5 dB, modulation 5 dB and 10 dB for impulsiveness, that are added to the permitted levels. That is, if the noise is tonal or modulated the permitted levels drop by 5 dB. Impulsiveness is not likely to be relevant for the quarry under normal circumstances.

The Noise Regulations provide for Construction Noise exemptions to enable construction of the site such as the building of the screening bund and opening the pits.

Influencing factors that raise the allowable noise levels are activities such as external industrial noise, some nearby land uses and busy roads. These are not relevant to this site.

Under Schedule 1 of the Noise Regulations the premises on which the extraction of basic raw materials are extracted, is classified as Industrial Land for the purposes of calculating influencing factors. This was defined as the whole cadastral boundaries in State Administrative Tribunal decision {2013} WASAT 139, Bushbeach v City of Mandurah. In this case the premises is quite small and approximates the area of disturbance and will have little impact on the influencing factors.

At a distance greater than 15 metres from the sensitive premises (eg dwelling), and commercial premises, a base level of 60 dBA applies at all times, with the 10% time permitted to be up to 75 dBA and the 1% permitted to be up to 80 dBA. For industrial premises the base level is 65 dBA at all times with the 10% time permitted to be up to 80 dBA and the 1% permitted to be up to 90 dBA.

Excavation will be worked from inside out on the floor of the pit working below natural ground level with a perimeter low bund of topsoil stored to be respread at closure.

Based on the nature of the sand, equipment used and excavation methods, the extraction of sand has the lowest impact and even the generic buffer of 300 metres is too large for noise mitigation based on the proximity of dwellings to sand pits in the Perth and Peel Regions and in other parts of the State.

There are no residential properties near the existing excavation areas, with over 500 metres separation to all sensitive premises. Figure 1.

6.2.2 Environmental Noise Management

Based on the experience of Landform Research and the operation of many other sand quarries the proposed sand excavation will easily be able to comply with the Noise Regulations at the closest dwellings.

Table 8: Noise management

General Noise	Management
Objectives	**The Operations will comply with the *Environmental Protection (Noise) Regulations 1997.***
Legislation and Guidelines	*Environmental Protection (Noise) Regulations 1997.* DWER Works Approval and Licence under *Part V of the Environmental Protection Act 1986* will be applied for in relation to the screening of sand in excess of 5,000 tonnes per year. At this time screening of the sand is not anticipated.
Planning Management	**Noise Regulations** • Piggott Sand Supplies is committed to compliance with the *Noise Regulations.* • The *Noise Regulations* provide for Construction Noise exemptions to enable construction of the site such as the building of the western screening bund. **Site Selection** • The site has been selected based on the resource location, and the excavations designed to maximise the setbacks and noise impacts to the closest sensitive premises. • The main access road and crossover is already in place. **Close Sensitive Premises** • The sand pits that are to have their approvals renewed lie between 500 and 1000 metres from Gale Road and sensitive premises.
Construction Management	**Construction of Bunding and Pit Preparation** • The first excavations will be the pushing of topsoil and overburden to the east to form an eastern perimeter bund to 2 metres high. • The pits will operate behind the bund at an excavation of 1 – 3 metres depth. • The main access road is already constructed and in use. **Design and Construction of the Quarry** • The operation of the quarry is designed to minimise noise generation and carry.

Operational Management	**Haul Road** • The main access road is already constructed and in use **Quarry Operations** • As there are several types of mobile plant there is some flexibility in which plant to use (loader or excavator) to extract the sand and therefore there is flexibility in managing or reducing noise levels if required. • All plant will be maintained in good condition with efficient mufflers and noise shielding. • Lights or low frequency frog beepers are to be used rather than high pitched beepers to restrict noise intrusion. • All equipment is fitted sound suppression equipment as applicable. **Truck Movements** • Truck movements along internal roads will be restricted to the existing hardstand. • Trucks will enter and leave the site directly from Gale Road. • Transport on Public Roads is exempt from the Noise Regulations. • Internal roads will be maintained in good condition to minimise the banging of trays and other potential noise impacts. **Operational Site Code** • Piggott Sand Supplies have site codes in place and will be used on this site. • This may include limiting the number and type of plant operating at any one time as required to maintain compliance with the Noise Regulations. **Contingencies** • Shutdown will be used to save fuel and maintenance costs in addition to noise minimisation. • There is good flexibility to plan the equipment use to reduce noise levels further even though that is not necessary for compliance with the Noise Regulations. This can include the location of the plant, number and type of plant operating at any one time, use of bunding or shielding, changing the mobile plant, providing better silencing etc. **Operating Hours** • Quarrying and processing operations are to be conducted during normal working hours between 7.00 am to 5.00 pm, Monday to Friday and 7.00 am to 1.00 pm Saturday (for rehabilitation works only) excluding Public Holidays. There will also be school bus curfews between 7.30 am to 8.40 am and between 3.30 pm to 4.20 pm.
Monitoring	**Complaints** • A complaints recording and investigation procedure is to be implemented and maintained. • All complaints will be recorded, investigated and if substantiated action taken to correct the issue raised. • Where possible the complainant will be contacted to explain the procedures and actions taken to resolve the issue. • As far as is known no complaints relating to noise have been received in relation to the current sand excavation.

6.2.3 Occupational Noise

The management of occupational noise is normally handled by providing all necessary hearing protection, as well as conducting worker inductions and educational programs for all staff, and hearing tests which are required. Regular site audits of quarry and mining operations are normally conducted by the Department of Mines Industry Regulation and Safety.

- Piggott Sand Supplies conducts site induction and training for all personnel at all their sites.

Personal Noise Protection

As part of its commitments, Piggott Sand Supplies are pro-active with worker safety awareness;

- by providing all necessary safety equipment such as ear protection,
- identifying sections of the plant where hearing protection is required, as well as,
- conducting induction and educational programs for its staff.
- Compliance with *Work Health and Safety (Mines) Regulations 2022*

The DMIRS conducts regular inspections of all quarries.

6.3 Dust Management

6.3.1 Nature of Dust from Sand

The greatest proportion of dust in any quarry is visible dust. Dust during quarrying operations is only a problem when there is inadequate management of the dust risk. Most management consists of wetting down the products and keeping them moist, with other management being the use of screens and curtains on processing plant.

Sand excavations develop little or no dust during normal excavation as shown by the lack of dust in the existing operations over the years.

Most dust on a sand site is generated;

- during vehicle movements on hard surface such as roads when the road is dry. This is not related to the sand but rather the gravel of the road and is the same as any rural gravel road.

- when soil are dry, during land clearing and the movement of topsoil by excavation or respreading. The only materials released are the fine organic grey particles in the topsoil and only when the topsoil is completely dry. The sand grains are too large to blow or create dust, and therefore there is no risk of silica dust from sand excavations.

Even if the sand was screened at some point in the future, little dust is generated and can be readily treated. For such screening activity a DWER Works Approval and Licence will be required to processing excess of 5,000 tonnes per year under *the Environmental Protection Act 1986 Part (V*). Dust will be considered by the DWER at that time if screening was to be used and some form of dust management normally conditioned on any approval.

Commonly called "dust," scientists and regulators refer to the term particulate matter (or PM) to describe the range of particles that exists in the air or in air breathed in.

Particulate matter exists naturally in the atmosphere, eg sea-salt spray and pollens. Small sized PM can be increased due to human activities such as vehicle exhaust, industrial processes, power stations, mining, farming and wood heaters, or smoke from bushfires.

Exposure to small sized PM can be associated with health and amenity impacts if the exposure is excessive.

The likely risk of these impacts depends on a range of factors including the size, structure and composition of the PM. The various dust particle size is also explained in *DEC (DWER) 2011 Guideline for Managing the Impacts of Dust and Associated Contaminants from Land Development Sites, Contaminated Sites Remediation and other Related Activities. This Guideline supersedes the 1996 Guideline.*

Particulate matter needs to be suspended in the air to carry any distance, and will only carry short distances if the grains are too large to move. Sand grains are too large to become suspended. The particles that are able to be suspended are called Suspended Particulate Matter and the total amount of that is referred to as TSP.

Dust Composition

There is data specifically from mining, (predominantly coal) from New South Wales (NSW Health) where particulate levels have been measured to be;

PM <2.5 microns as 2 – 5% of emissions (One micron is 1 / 1000 of 1 mm).

PM< 2.5 are invisible and called "fine particles". They are the main health issue and are caused by vehicle emissions whether they are along roads or on private land. Vehicle emissions will not occur at night or at other times when the site is not active. ***This type of dust risk for the sand excavation is very low and similar to normal farm activities.***

PM 2.5 – PM10 microns as 15 – 45%

PM 10 (particles between 2.5 and 10 microns) are invisible and called "coarse particles". They can be breathed in, but are removed by alveoli and mucous. (NSW Health). This dust may be generated when land is cleared and topsoil disturbed or the site is subject to traffic in summer. On this site the particles will be organic and are unlikely to be generated as the soils stay moist all year round with the rainfall through all months of the year and capillary action through the soils. ***This type of dust risk for the sand excavation is very low.***

PM>10 microns as 50 – 70%

PM>10 is visible dust and, based on the resource which is sand will not apply as the particles are too large. ***This type of dust risk for the sand excavation is very low.***

Normally all sizes of dust are generated together, and there will be visible dust being generated when invisible dust is being formed. Therefore any visible dust present is a good sign and an early indicator of a dust risk. A summary of the sources and proportions of dust is shown in; *NSW EPA and NSW Ministry of Health Environmental Health Branch 2015, Review of the health impacts of emission sources, types and levels of particulate matter air pollution in the ambient air in NSW.*

6.3.2 Dust Standards

To provide for air quality in populated areas an Australian Standard was established.

The Ambient Air Quality NEPM as an instrument was established in 1998 under the *National Environment Protection Act 1994* (NEPC Act) to provide a nationally consistent framework for monitoring and reporting on six common ambient air pollutants – carbon monoxide, lead, nitrogen dioxide, photochemical oxidants (ozone), sulfur dioxide and particulate matter (PM) as the larger size fraction of PM10. It was varied in 2003 to include smaller sized particles, PM2.5.

Following much review and consultation, the Air NEPM was amended on 4 February 2016 to upgrade the PM2.5 and to add *1-year average PM10 of 25 µg/*m^3 to complement the 24-hour average PM10 of 50 µg/m^3.

An exceedance of 1-day average standards in excess of normal historical fluctuations and background levels, was also added and is directly related to bushfire, jurisdiction-authorised hazard reduction burning or continental-scale windblown dust.

Western Australia has a goal of achieving the National Environment Protection Standard for PM10 in ambient air, in line with the National Environment Protection (Ambient Air Quality) Measure (NEPM), based on the PM10 for a daily PM10 (visible dust) level that did not exceed 50 µg/m3, with an allowance only for exceedances for 'exceptional' events, such as bushfires.

The NEPM is applicable to populated areas as it has been found that at operating quarries in the Rural Area dust management is readily achieved in compliance with the NEPM standards by normal dust management that involves the identification and treatment of visible dust as a very effective means of managing dust. Those methods are used on this site.

In 2011 the DWER released Dust Management Guidelines that acknowledged the NEPM standards but rely on visual dust management. Visual dust management is the norm for quarries in Western Australia and in DWER Licences because it has been found to be the most effective with mechanical monitoring found not to offer any advantage.

Sand excavation is at the lowest risk from dust, producing very little dust material. The sand particles are comparatively large and only move in stronger winds by bouncing, when dry and are readily stopped by any vegetation, even pasture.

The NEPM standards are not applicable to this type of sand excavation because the sand is too large to form dust and the amount of impact of potential dust particles is so low. Also there are no proposed changes to the scale and intensity of sand excavation and there have been no complaints relating to dust as far as is known.

6.3.3 Dust Risk

The dust risk assessment is based on the *DEC (DWER) 2011 Guideline for Managing the Impacts of Dust and Associated Contaminants from Land Development Sites, Contaminated Sites Remediation and other Related Activities.*

DEC (DWER) 2011 Guidelines provide for dust risk assessments to be conducted, management proposed and implemented and a visual monitoring procedure and complaints mechanism to be used.

The Guidelines are for uncontrolled sites or for sites to determine what management of dust might be necessary. Therefore two scores have been used in the risk assessment.

- From the assessment of the setbacks of the proposed operations and prevailing winds, the main risk is from the easterly winds on mornings, especially in summer when the soils, hardstand and stockpiles are at their driest.

Table 9: Dust Risk (DWER 2011 Guidelines)

PART A Number	Item	Score
		Sand excavation on the current sand pits and resources.
1	Nuisance potential of the material	Low when trafficked and untreated - 2.
2	Topography and vegetation screening	Medium screening - 6
3	Area of site activities	Active trafficked areas at any one time are 1 - 5 hectares in area - 3
4	Type of work being undertaken	Bulk earthworks - 9
	Summer total without dust measures	Maximum = 20

PART B Number	Item	Score
		Sand excavation on the current sand pits and resources.
1	Distance to premises	Premises between 500 – 1000 metres – 6.
2	Effect of prevailing wind	No affected - 1
	Total Part B	Maximum Premises = 7

Activity	Calculated Score Part A x Part B	Allocated Risk of Dust
Sand excavation on the current sand pits and resources.	**Maximum** **Premises A and B = 20 x 7= 140**	**Classification 1** **Negligible Risk,** No recommended actions or contingencies required for the dwellings. Dust management will be required for pit best practice and worker environment.

The dust risk assessment based on the *DEC (DWER) 2011* shows a "Negligible" Risk.

Jones D N, L Bemede, A R F Bond, C Dexter and C L Strong, 2016, Dust as a contributor to the road effect zone: a case study from a minor forest road in Australia, Australian Journal of Environmental Management Volume 23, No 1 p 67 – 80 noted that dust deposition at a distance of 40 metres from a gravel road in forest varied from 8% to 30% of the deposition at the roadside depending on the level of vegetation cover. They also found that mammals were not significantly impacted by the dust compared to when the road was sealed.

The same will apply to this site, on the gravel access road, but only if it was dry, has no capillary action from below and has fine particles, all conditions which are not likely to occur and are not normally observed on the existing access road.

Further the excavation will be undertaken from the floor of the pit with the wall of the pit and the perimeter bund providing around 4 metres of wind protection.

6.3.4 Tree Belts and Buffer Management

Dust particles are readily stopped by tree belts and distance, with which the site complies. Tree belts slow the wind and allow the dust to settle but on this site it is the travel distances that provide the protection.

The Queensland Guidelines predominantly relate to agricultural spray drift, but based on particle size also relates to dust.

The Guidelines provide for a buffer of 300 metres for open agricultural land, which is applicable to the proposed operations, dropping down to 40 metres where an effective tree belt is in place. The Western Australian Department of Health also uses the same guidelines. The Guidelines are based on field studies and demonstrate the effectiveness of tree belts and distance in providing screening against particulate travel.

On this site it is noted that the distance to the closest sensitive premises is a minimum of 650 metres along relatively flat ground. That land surface has isolated trees and pasture. Figure 1.

The buffer distances are able to manage dust as prescribed by the Department of Natural Resources Queensland (1997) *Planning Guidelines: separating agricultural and residential land uses and Department of Health WA, 2012* which used the same guidelines. The sand pit complies with the Guidelines.

6.3.5 Monitoring of Excessive Dust

Even if dust risk was a potential problem, it can be readily managed.

When dust visual trigger conditions are detected and/or alerted, relevant action is taken. This can include additional water suppression, modification of procedure, delay until more favourable conditions are present, use of alternative equipment etc.

Human monitoring can detect potential dust risks prior to, and take action prior to, significant dust being generated.

The auditable condition is visible dust crossing the boundary of the premises; the lot boundary. This is the condition used on Department of Water Environmental Regulation Licences and all other quarries such as sand, limestone, gravel and hard rock quarries in Western Australia and has worked well in the past.

It is also the method used by the DMIRS and DWER to rapidly assess occupational dust on site.

The quarry manager and leading hand are ultimately responsible for site supervision of dust. They will travel around the operations and pit frequently and are in two way radio contact with all mobile plant.

All operators on site are to be instructed to be vigilant to dust generation and management and report any excessive dust or potential dust management issues.

Visual monitoring is even more effective when complemented by an extensive reporting and complaints process and this will be used.

As far as is known there have been no complaints relating to dust from this excavation within the past five years.

6.3.6 Dust Management

Table 10: Dust Management Actions

Activity	Dust Management
Objectives	Minimal dust moving off site and minimum dust generated on site or from the access roads. No visible dust to cross the boundary of Lot 4205. No dust impact on the two dwellings.
Legislation and Guidelines	*WQPN 15 Extractive Industries near sensitive water resources (2019)* *DEC (DWER) 2011 Guideline for Managing the Impacts of Dust and Associated Contaminants from Land Development Sites, Contaminated Sites Remediation and other Related Activities.* Department of Natural Resources Queensland (1997) *Planning Guidelines: separating agricultural and residential land uses and Department of Health WA, 2012* which used the same guidelines
Construction - Clearing	**Land Clearing – Opening – Construction of perimeter bunds** • This involves removing the topsoil for use in revegetation and construction of the screening bunds. • Construction will take place when the soils are moist. If conducted in summer water will be used to wet down the soils and overburden prior to removal if dust is generated. • Roads and traffic areas will be wetted down as required. • Clearing and reinstating pasture, topsoil and overburden will be confined to the wetter months, April to October, where possible. • If winds are sufficiently strong, or other weather conditions are unacceptable and negate the effects of dust management, operations will cease until conditions improve and compliance can be achieved.

Activity	Dust Management
Operation	**Excavation** • No changes to the current methods of sand excavation are proposed. • The excavation of sand is free from dust as the particle sizes are too large and the sand stays moist from capillary action. • Excavation will normally be undertaken by the loader or excavator loading to a road truck. • Excavation will be undertaken as low in the pit as permitted by the quarry planning to provide maximum shelter for dust protection and behind the perimeter bund. • Trafficked roads and hard stand will be wetted down or treated if required. • Internal roads and hardstand surfaces will be maintained in good condition (free of potholes, rills and product spillages) and with suitable grades. • A water truck will be available for wetting down if required, although this has not been necessary during past excavation. • If winds are sufficiently strong, or other weather conditions are unacceptable and negate the effects of dust management, operations will cease until conditions improve and compliance can be achieved. **Processing and Stockpile** • Stockpiles will only be used if the sand is too wet to load. • No screening of sand is proposed. • Plant location, and approach with respect to wind directions, will be used to minimise impact on operators. • If winds are sufficiently strong, or other weather conditions are unacceptable to negate the effects of dust management, operations will cease until conditions improve and compliance can be achieved. **Unattended Site** • Sign will be maintained at the entrance to the pit with details and contacts of the operator who can be contacted if excess duct is generated. • The operator contacts will be provided to the closest dwellings to enable contact if excess dust is generated. • As far as is known there have been no issues with past sand operations and dust even when the site has not been attended.
External Transport	**Access and Road Transport** • The access road and crossover are constructed and are in use. • All loads for transport outside the pit will be covered. • All trucks will be required to be dust free and not carrying pebbles and other materials outside the tray. • The hardstand is to be maintained in good condition (free of potholes, rills and product spillages). • Loader drivers are instructed on the best means of loading to minimise overflow and spillage. • Trucks are to be inspected by their drivers prior to leaving the site and brushed down as necessary to remove loose materials.

Activity	Dust Management
Occupational Dust	**On Site Health and Amenity** • Occupational dust associated with the quarrying processes falls under the *Work Health and Safety (Mines) Regulations 2022* overseen by the DMIRS who regularly inspect the site. Included in the program are personal dust monitoring assessments. If on site dust is managed offsite dust risk is also managed. • Operations will cease if conditions are not favourable or when visible dust is crossing the boundary. • The latest weather conditions to increase the awareness of dust risk. • On site induction training will include observation and mitigation where possible of all dust emissions.
Rehabilitation	**Rehabilitation** • Scheduled activities such as topsoil spreading are to be undertaken at times when the materials are less likely to blow or during suitable wind conditions. • If winds are sufficiently strong, or other weather conditions are unacceptable and negate the effects of dust management, operations will cease until conditions improve and compliance can be achieved.

Monitoring	**Monitoring** • The most effective dust monitoring is the sighting of visible dust. Dust can be detected as soon as it leaves the wheels of vehicles and detection is not reliant on dust travelling to a machine monitor located near the boundary. • The auditable condition is visible dust crossing the boundary of the premises; the lot boundary. This is the condition used on DWER Licences and all other quarries such as sand, limestone, gravel and hard rock quarries in Western Australia and has worked well in the past. • The Quarry Manager/leading hand will then organise the appropriate dust management to reduce or mitigate dust. • The trigger for dust management is the generation of visual dust. • A commitment is made that no visible dust will cross the boundary of Lot 4205. • All on site operators are instructed to visually monitor dust, report and treat any visible dust. **Complaints** • All complaints relating to dust are to be investigated immediately on receipt of a complaint. • A record of all dust complaints is to be maintained together with the mitigation measures to be used to reduce the dust impacts. Also see Section 2.6 Complaints. **Appendix 3.** **Procedures to be adopted following a complaint from a land development site** The procedures to be adopted by the developer following receipt of a dust-related complaint from a member of the public should be as follows: • Record the details of the complaint as specified below. The complaint form should be retained by the developer and be made available upon request by the local government or an authorised DEP officer. • Take measures to control any excessive dust by implementing the contingency arrangements which have been specified for the agreed site classification. • If the developer regards the complaint to be unjustified, then the developer should forward the details of the complaint to the local government within 24 hours. As a guide, the procedures to be adopted by local government, following receipt of a dust-related complaint from a member of the public or passed on by the developer, should be as follows: • Record the details of the complaint as specified below or on a local government-approved complaint form. The complaint form should be retained by the local government and be made available upon request to an authorised DEP officer. • Evaluate the complaint by conducting a visual inspection, preferably as soon as possible, taking into account the prevailing weather conditions which were being experienced at the time the complaint was lodged. • If the complaint is valid, instruct the developer to take measures to control any excessive dust by implementing the contingency arrangements which have been specified for the agreed site classification. • If the local government regards the complaint to be unjustified, contact the complainant and inform them of these findings. • If the local government is unable to resolve the complaint, after exhausting all possible avenues, then the local government may request advice from the DEP.

4.4 Water Management

Water Management is addressed in the attached Water Management Plan.

7.0 BIODIVERSITY MANAGEMENT

7.1 Flora

The excavation area is cleared and will be returned to pasture and productive agricultural land of pasture.

Clearing Permit CPS 6766 is in place and requires the planting of a belt of trees which are already planted and growing well. CPS 6766 enables the clearing of some Peppermint in the north western corner. Figures 1, 2, 8 and 12.

No further clearing is proposed.

7.2 Fauna

The excavation areas are predominantly pasture apart from scattered Peppermint (*Agonis flexuosa*) on the southern resource.

The fauna on site will already be significantly depleted by the clearing as there are just scattered Peppermint trees on site.

The clearing permitted by CPS 6766 considered the potential impact on local fauna and required the planting of some additional trees which has been completed.

7.3 Wetlands

There are two wetlands located within the property as discussed in Section 4.8. A buffer of at least 20 m will be maintained from the RE wetland at all times.

7.4 Weed Management

The weed management will continue to form part of the normal farm management to prevent the introduction and or spread of significant environmental weeds. Weed management is to be used to minimise impact on adjoining remnant vegetation and on adjoining properties as well as maintaining the agricultural capability of the farm for the end use of the land.

The management is based on the *Guidelines, Department of Environment and Energy, Arrive Clean, Leave Clean,* which relates to the management of weeds and plant diseases.

Weeds can be Declared under the nomination, and control of weeds falls under the lists of Declared Pests under the *Biosecurity Agriculture Management Act 2007, Agriculture and Related Resources Protection Act 1976* or *Weeds of National Significance, (Commonwealth Biosecurity Act 2015).* Other weeds are not Declared but may be classified as Environmental Weeds because they are well known for impacting on vegetation.

Similar management is used to manage plant diseases. Generally if the actions on weeds are taken the risk of spread of plant pathogens is also reduced.

The land is stocked and it has been noted in other locations that once stock are removed the weed species tend to increase and spread. It is likely that grazing removes the weed seedlings but once that pressure is removed the weeds are able to grow to maturity and seed.

Therefore areas where stock are removed may require greater weed management than for normal pasture management.

Inspections conducted to monitor the presence and introduction of weeds will be carried out twice per year, in spring and autumn when weeds are best treated with herbicide.

Weeds are most readily treated when actively growing before they set seed, by treating from the edges of the infestation back to the most dense infestation.

Table 11: Weed Management

WEED MANAGEMENT			
Environmental Objectives	***There will be no additional weed species or extensions or density of the existing loading of exotic plants.***		
Legislation and Guidelines	*Biosecurity and Agriculture Management Act 2007*.		
Item	**Management**	**Timing**	**Area**
Management of Weeds	**Weeds are most likely to impact on;** • Disturbed areas such as overburden dumps, topsoil stockpiles. • Edges of access roads and the stockpile and processing area. • Pasture where stock are removed. • Edges of firebreaks. **The main sources of weeds are likely to be;** • Weeds spread through the movement of topsoil during land clearing and construction earthworks which produces soft moist soils where weeds can gain a fast hold. • Spread of existing weeds currently on site. • Rubbish dumped by the public. • Materials or waste brought to site by employees. • Soil and seeds from vehicles arriving at site. This often applies to trucks that have carried something else such as grain, or vehicles to be used in earthworks. • Wind blown seed from surrounding land as would apply to Cotton Bush. • Birds and other vectors. This is more common than is often given credit for. eg Solanum species and Blackberries.		
	Development of the Pit • A pre-topsoil clearing inspection will be carried out to delineate weed impacted areas and devise a treatment method for each infestation. Preferably treat weeds prior to commencing earthworks. • All vehicles and equipment to be used on site, will be clean and free from soil or plant material when arriving at site. • Vehicles accessing the site, whether they be road trucks or light vehicles, will be required to be clean prior to leaving developed areas. Dirty vehicles will not be permitted to enter the site.	Prior to clearing	Access road, stockpile and other construction areas.

	Operations and Closure • No soil and vegetation will be brought to the site apart from that to be used in rehabilitation and that is to be weed free. • A dedicated sweep out and treatment station for trucks will be provided if required, where any weed germinations from the truck sweep out are able to be identified and dealt with by mechanical removal or spraying. • Plants and seeds to be used in rehabilitation will be free from weeds.	Operations	All areas
Monitoring of Weeds	**Monitoring** • Inspect clearing, disturbance activities, topsoil dumps prior to rehabilitation and revegetated areas. • Visually inspect operational and adjoining areas and revegetation at least twice annually. These inspections will utilise experienced staff or on site staff who have been trained in the identification of the weed species occurring on site. • Provide inspections of gutters, drains, access roads and surface water treatment areas where there is an increased risk of weed introductions. • Edge vegetation, disturbed areas and areas of increased soil moisture will be regularly monitored and treated as appropriate.	Operations twice yearly. Prior to closure. Revegetation twice yearly for three years following closure.	All areas
Actions	**Treatment of Weed Infestations** • Weed management will form part of and supplement normal pasture management. • Any significant weeds or weed infestations will be treated. • Treatment of weeds will be undertaken prior to commencement of earthworks. • Weed will also be pre-treated prior to the reestablishment of pasture. • Illegally dumped rubbish is removed promptly. • Weeds will be sprayed with broad spectrum spray prior to planting or seeding in weed affected soils and when they occur on pasture or in revegetation. • Large plants such as Castor Oil plants and Declared Weeds will be periodically grubbed out or spot sprayed with a herbicide. • Weed affected top soils may need to be taken offsite, or used in weed affected areas. • Weed management will work from least affected areas to most affected. • Declared weeds are to be treated promptly by mechanical action or spraying.	Prior to commencement of earthworks. Prior to the establishment of pasture. When weeds are present and as a minimum twice yearly.	All areas

7.5 Dieback Management

Phytophthora cinamomi is restricted to the areas greater than the 600 mm rainfall isohyets and may occur on this site. Dieback of vegetation is often attributed to *Phytophthora cinamomi* even though there are other *Phytophthora* species and other diseases such as *Armillaria* that can cause dieback like symptoms.

Dieback is not an issue for pasture re-establishment but the principles of biosecurity, crop management and normal farm best practice include practices that minimise pathogen risk.

Dieback of vegetation is often attributed to *Phytophthora cinamomi* even though there are other *Phytophthora* species and other diseases such as *Armillaria* that can cause dieback like symptoms. Microscopic soil-borne fungi of the genus *Phytophthora* kill a wide range of native plants and can cause severe damage to many vegetation types, particularly those from the families Proteaceae, Epacridaceae, Xanthorrhoeaceae and Myrtaceae.

No obvious evidence of dieback diseases have been observed by Landform Research, but with such disturbance there will be no real means of determining whether *Phytophthora* is present

With the lack of understorey and susceptible species, there are limited opportunities to lead to the spread of dieback. Dieback is normally carried by water and spore movement downslope with little or no spread upslope and requires susceptible vegetation to grow and reproduce. Dieback is not spread by pasture as grass is resistant to dieback.

In many ways the management of the site for plant pathogens is similar to that for the management of weeds, and the two management practices are therefore considered together.

It is unclear whether dieback or other pathogens already occur on site, with the level of disturbance, previous activities and the degree of disturbance to vegetation it may be that pathogens already exist. However as part of normal best practice, plant disease management actions will be used.

Table 6: Dieback Management

DIEBACK MANAGEMENT			
Environmental Objectives	No specific dieback environmental objective is warranted because of the very low risk to as there are few susceptible trees and no nearby native vegetation.		
Legislation and Guidelines			
Baseline Data	*DBCA 2017, Phytophthora Dieback Management Manual,* Forest and Ecosystem Management FEM079. *Dieback Working Group 2005, Management of Phytophthora Dieback in Extractive Industries.* *Dieback Working Group, 2000, Managing Phytophthora Dieback, Guidelines for Local Government.*		
Item	**Management**	**Timing**	**Area**
Management of Dieback	• Any topsoil and overburden storage is to be located in dry areas around the pit perimeter. • Quarry traffic is to be restricted to the designated access roads, pit and stockpile areas apart from clearing land and maintaining fire breaks. • Trucks will only travel along the defined access road. • On leaving the property most truck traffic will be confined to bitumen roads to their destination and return. That run is considered low risk for dieback and trucks will not require cleaning during the transport phase. • As defined by best practice, Piggott Sand Supplies will require vehicles used onsite or for transport to be clean and free from soil or plant material prior to arriving on site from an area known or thought to be dieback infected. • Cleaning is to be conducted offsite and all drivers and plant operators are to be made aware of the need to have clean trucks and plant when initially arriving on or accessing the site. • The site is to be secured from unwanted access by maintaining the existing perimeter fencing, gates. • A hygienic site is maintained by not bringing any soil or plant material onto the site except for rehabilitation purposes or from known dieback free areas. • All plants, seeds, and other materials used in rehabilitation, are to be sourced from dieback free areas. • Illegally dumped rubbish or material will be promptly removed from site. • Rehabilitated surfaces are to be free draining and not contain wet or waterlogged conditions. • The Weed Management Policy will be complied with.	All times	All areas

Monitoring of Dieback	**Monitoring** • No dieback monitoring is proposed or required for normal soil conditions.	Annual review	

8.0 REHABILITATION AND CLOSURE

8.1 Background

The excavated area was cleared prior to excavation and will be returned to pasture.

Experience by Landform Research in rehabilitation of sand quarries has shown that when completed well there is no need for irrigation of the rehabilitation and in the local areas.

Proposed Final Contours are a similar land surface to the current surface with the surface lowered by around 2 – 3 metres. See the attached Concept Final Contour Plan.

The depth will be determined by the base floor having a separation to the highest water table of 0.7 metres as outlined in the attached Updated Water Management Plan.

An audit checklist of the potential materials that may be present from mining, at closure is presented below.

8.2 Closure Objectives

- Stable post-mining landscape, and the minimisation of wind and water erosion.
- Match slopes and landform to those of the surrounding local area.
- Maximum slopes of 1 : 5 vertical to horizontal are to be provided.
- Provide for the protection of the local groundwater resource in terms of both quality and quantity.
- Achieve weed species at levels not likely to threaten the pasture and land uses.

8.3 Materials Inventory

The materials inventory is a checklist of the materials that might occur when extracting materials from the ground and does not necessarily indicate that such materials are present on site.

Table 7: Materials Inventory

Type	Comment	Treatment	Reference
Soil	Topsoil is natural and contains no detrimental materials.	None required. To be used in rehabilitation.	
Subsoils - Overburden	Subsoil sand is natural and contains no detrimental materials.	Non required. Generally taken as resource.	
Waste rock and non surface material and tailings	Not present. In sand.	None required.	
Saline surface water	The water quality is fresh.	No treatment necessary	
Saline ground water	The water quality is fresh.	No treatment necessary	
Acidic materials and drainage	Not present. The sand does not contain sulfides and there is no risk of acidic materials developing. Concurs with *Nattaporn-Prakongkep, R J Gilkes, B Singh and S Wong, 2011, Mineralogy and chemistry of sandy soils in the Perth metropolitan area of the Swan Coastal Plain, Department of Environment and Conservation.*	No treatment necessary.	Field geological examination by Landform Research. See Section 4.4 Acid Sulfate.
Sodic or dispersive materials	The water quality is fresh and there are no dispersive clays or susceptible materials.		Field geological examination by Landform Research
Asbestos – asbestiform minerals	None present.		Field geological examination
Radioactive materials	Not present	The sand is quartz and does not contain abnormal levels of radioactive minerals.	Published WA Geological Survey radiometric mapping
Metallic or chemical materials	Not present	No metallic or sulfidic materials or minerals are present in the sands.	Field geological examination and experience and published information.
Tailings storage	No tailings will be generated.		
Dangerous Goods and Hazardous Materials	**FUEL** The various plant will be refueled from mobile tanker. ***None will remain on closure***.	Any soil or other materials with drips and spills will be removed offsite to an approved waste site or location.	Attached Water Management
	SERVICE MATERIALS All servicing will be conducted offsite. ***None will remain on closure***	Any wastes will be collected and removed from site promptly to an approved recycling or waste disposal area. All servicing will be conducted offsite.	Attached Water Management
General waste		Regularly removed from site to an approved disposal area	Attached Water Management

8.4 Closure Implementation

Seasonal Closure

Table 8: Temporary Closure

CLOSURE OBJECTIVE		Actions for Care and Maintenance Greater than 12 months
1.0 COMPLIANCE		
1.1	All legally binding conditions and commitments relevant to closure and rehabilitation will be met.	Prior to undertaking temporary closure. ➢ Review the latest documentation. ➢ Assess compliance with the conditions and commitments
2.0 SAFETY		
2.1	Make the site safe.	Prior to vacating; ➢ Secure the site and any plant or structures to be left. ➢ Mobile plant and other equipment not required will be removed from site. ➢ The site will be cleaned, structures not required will be removed. ➢ Provide fencing, bunding, signage or other measures as required to provide a safe site, particularly above any faces. ➢ Faces and the landform are to comply with DMIRS Safety Guidelines and be stable for the long term. ➢ Provide locked gates or log access restraints as required or maintain staff on site. ➢ Check and maintain perimeter fences. ➢ Visual audit of completed ground, to verify compliance.
3.0 HYDROGEOLOGY		
3.1	Ensure that there are no materials that could cause pollution or environmental harm.	➢ Remove fuel service materials. ➢ Remove any materials from which leaching may occur.
4.0 BIODIVERSITY		
4.1	Minimise the risk to on site or offsite biodiversity.	➢ Implement the Dieback Management. ➢ Implement the Weed Management. ➢ Inspect the site for Significant Environmental and Declared weeds. Treat accordingly
5.0 STAKEHOLDERS		
5.1	Ensure stakeholder issues are considered.	➢ Prior to temporary closure, as necessary, consult with the relevant stakeholders to check whether the closure planning, where possible, considers their interests and carry them out as necessary. If care and maintenance continues modify procedures in response to changes in stakeholder position, policies or conditions.

Permanent Closure

The closure planning will be updated from time to time as the excavation progresses forwards. This will include both anticipated costs and procedures.

The following procedures will be used for final closure and rehabilitation of any stage of excavation and on completion of the sand pit.

- The closure of completed areas of the operations will be progressive with closure of all remaining ground at the end of operations.
- Maintenance and monitoring will be conducted until completion criteria is met. A three year cut off is provided for rehabilitated soils.
- Unexpected or early closure will be completed in the same way as permanent closure below but the full rehabilitation will be completed as one operation.



Figure 10: Floor of the current excavation under closure by re-contouring and spreading with topsoil in Winter 2022



Figure 11: Excavated floor of the pit under revegetation to pasture.

Table 9: Site Closure and Rehabilitation

Closure Stage	Methodology	Timing
GENERAL		
Compliance with all legally binding conditions and commitments.	**Legal Compliance** • Prior to closure, stakeholders will be consulted to check whether the closure planning, where possible, considers their interests, and carry them out as necessary. • The latest documentation will be reviewed to determine whether there are any outstanding stakeholder issues. • All legal requirements and commitments and conditions of approval will be complied with. This includes Planning Approval, Extractive Industries Licence, Clearing Permit, DWER Licence and any other relevant legally binding conditions. **Audit** • *An audit table of all conditions and commitments that relate to closure and conducting an audit of those items upon the completion of each stage of rehabilitation and annually until sign off, will be compiled and used to verify the closure process.*	Prior to and at closure
Removal of non natural materials	**Non Natural Materials** • All non natural inert materials associated with quarrying will be collected and removed from site unless required for internal roads. This includes plant, buildings and other structures or materials not required for future farming or other uses. • If not required, roadbase, hardstand and any other inert materials left over from the site operations will be scraped and picked up and will be used to backfill the pit faces or reused. **Audit** • *Visual audit for non natural materials on site prior to closure of each completed stage.*	At closure of each completed area and final closure

Closure Stage	Methodology	Timing
Removal of wastes from site.	**Waste Removal** • There will be no tailings, adverse soil or other materials or features on site and none are proposed during future excavations. • A visual audit of completed ground will be conducted, to verify compliance with "no contamination to be left". • Soil testing will be undertaken if there is evidence of adverse materials remaining such as fuel spills. Any hydrocarbon contaminated soils will be removed offsite to an approved landfill. • Any potential contaminated areas such as refuelling zones will be assessed and sample tested as necessary and any contaminated materials removed and the area remediated. • If contaminated sites are identified, they will be treated in accordance with the *Contaminated Sites Act 2003 (WA).* • As a result of any testing, remediation will be undertaken to ensure that the site is not contaminated. **Audit** • *Visual audit for non natural materials on site prior to closure of each completed stage.*	At closure of each completed area and final closure
LANDFORM AND SOILS		

Closure Stage	Methodology	Timing
Geotechnical stability and safety.	**Geotechnical** • The highest faces will be around 2 – 3 metres with shallow sloping angles and will carry no geotechnical risk during excavation. • Even so the faces will be pushed down to a steepest slope of 1 : 5 vertical to horizontal slope. • Push down or backfill faces and slopes. • The surface will be undulating with similar slopes to the pre – mined condition. • The excavated floor is to be undulating at > 0.7 m separation to the locally perched seasonal water table • The excavated surface is to be resistant to wind and water erosion. **Audit** • *Visual observations and survey of the landforms to confirm compliance.* **Safety** • Compliance with the *Work Health and Safety (Mines) Regulations 2022.* • All areas will be inspected to ensure the land surfaces and access points are stable to erosion from wind and water. • Holes, sumps drains, ditches and the like will be filled and removed. • Visual observations of the landforms. An audit of the completed land will be made to verify compliance. **Audit** • *Daily site audit, by quarry manager when the site is operating.*	Construction of interim or the final land surfaces.

Closure Stage	Methodology	Timing
Ground Preparation for revegetation.	**Landform Reconstruction** • Dieback and Weed Management principles will be used. • All ground once occupied such as hardstand and roads that are not required for future uses to be deep ripped if required and soils reconstructed. • Perimeter bunding will be pushed down into the pit and spread to recreate the soil. • Complete the activities to make the site safe. • Faces and the landform are to comply with DMIRS Guidelines and be stable for the long term. • The remnant sand spur along the western boundary of Lot 4205 will be maintained as per the DWER and City requirements, even though this creates an inconsistent land form of an non-natural spur. • The batters will be formed to comply with DMIRS and geotechnical requirements. **Preparation for Revegetation** • The soils will be constructed from overburden and subsoils. • Fill and backfill areas will be left soft and undulating as the planting substrate. • Where available and weed free, topsoil, will be used to reconstruct the soil profile. **Audit** • *Visual observations and survey of the landforms to confirm compliance.*	At closure of any completed disturbed ground or stage of operations and at final closure.
The surfaces are to be free from erosion.	**Slope Erosion** • With such low slopes and the highly permeable nature of the sand, water erosion will not be an issue. • The sand is coarse and moist and will not blow or be subject to wind erosion. • The pit will retain surface water runoff. **Audit** • *Visual observations and survey of the landforms to confirm compliance.*	Monitoring of erosion for three years or until stable.
HYDROGEOLOGY		

Closure Stage	Methodology	Timing
Surface and ground water regimes.	**Water Regimes** • The surface will be undulating with similar slopes to the pre – mined condition. • The excavated floor is to be undulating at 0.5 metres separation to the locally perched seasonal water table with maximum batter slopes less than 1 : 5 vertical to horizontal. • The excavated surface is to be resistant to wind and water erosion. • Surface water drainage will be similar to the current drainage in quantity and direction of flows. • The pits will be open to downslope to ensure free surface water drainage and maintain environmental flows. • The drainage lines will be retained and not impacted. • The remnant sand spur along the western boundary of Lot 4205 will be maintained as per the DWER and City requirements. **Audit** Visual observations and survey of the landforms to confirm compliance.	
REVEGETATION		
Weed and Dieback	**Hygiene** • Implement the Dieback Management. • Implement the Weed Management.	All stages of revegetation

Revegetation	**Revegetation** • Any disturbed areas that are no longer required will be rehabilitated using the methods described above within 12 months of becoming available. Rehabilitation will be to pasture. • Topsoil cover of a minimum of 200 mm will be pushed to the edge of the current excavation in separate windrows where available. Topsoil will be respread as the final surface covering. • Soil amendments, where available may be brought to site to improve the soil reconstruction. • The preferred method of revegetation is to use the pasture seed from existing topsoil on pasture areas. However this may be deficient and additional seed is likely to be required. • The sowing of pasture and crop will be integrated into the normal farming systems. Seeds of pasture species will be spread by normal farm practice at rates and species determined by the land holder with advice from either a consultant or the Department of Primary Industries and Regional Development. • The pasture species will be matched to the soil types and rainfall. The location falls into the "High Rainfall Coastal" planting regime with sandy soils. Suitable perennial legumes include Birdsfoot trefoil, Lucerne, Strawberry Clover, and Sulla. Perennial pasture includes Perennial Ryegrass, Phalaris, Cocksfoot, and Summer Active Tall Fescue, Kikuyu and Rhodes Grass. Annual pasture species include Italian Ryegrass, Serradella, subterranean clover. • The actual species used will be determined by the individual season, nature of the rainfall in the preceding months and stocking/hay production proposed by the landholder which may change from time to time. • Seeding rates are 2 – 5 kg/ha depending on the species used; for example Ryegrass is seeded at 3 kg/ha whereas Rhodes Grass is seeded at 4 kg/ha. • Pre-seeding weed control will be used where topsoils contain weed species. • Any weeds likely to significantly impact on the rehabilitation will be sprayed with Roundup or other herbicide or grubbed out, depending on the species involved. Fusilade will be used where grasses present an impediment to rehabilitation **Fertiliser** • Fertiliser will be used as required and will add nutrients to the ground water. If used a fertiliser containing low nitrogen, phosphorous and potassium, and trace elements, is recommended to be only used at each tube plant. **Tree Belt Planting** • 180 *Agonis flexuosa* were planted as part of the offset for clearing and are establishing, Figure 2. Where the tube plants do not succeed they will be replanted.	At closure of any completed disturbed ground or stage of operations and at final closure. Monitoring will be maintained until completion criteria is met and stabilised for 3 years.

Closure Stage	Methodology	Timing

	Audit
	
	• *During late summer an assessment of the success of the rehabilitation will be made to determine the rehabilitation requirements for the following winter.*
	• *Monitoring includes visual assessments and, where necessary, counts to determine the success of the rehabilitation and restoration, as follows;*
	  ○ *Pasture density*
	  ○ *Pasture growth*
	  ○ *Pasture regeneration*
	  ○ *Weed infestation*
	• *Steps will be taken to correct any deficiencies in the pasture.*	

8.5 Monitoring

Table 10: Monitoring and Remediation

	CLOSURE OBJECTIVE		Completion Criteria	Measurement Tools	Performance Indicators	Remediation
1.0 COMPLIANCE						
1.1	All legally binding conditions and commitments relevant to mine closure and rehabilitation will be met.	1.1a	➢ The disturbed land will be made safe and in compliance with the *Mines Safety and Inspection Act.*	➢ Conduct an audit of all legally binding conditions.	➢ All legally binding conditions have been complied with. ➢ Audit at least annually. ➢ Monitor for 3 years.	➢ Reform the land surface and bring the operation into line with the conditions and legal requirements.
		1.1b	➢ Comply with the requirements of the Planning Consent and Extractive Industries Licence.	➢ Conduct an audit of the environmental conditions. ➢ This includes Clearing Permits, DWER Licences and other conditions.	➢ All conditions have been complied with. ➢ Audit at least annually. ➢ Monitor for 3 years.	➢ Undertake any action that is necessary to bring the site into compliance.
2.0 LANDFORM AND SOILS						
2.1	All non natural structures, with mining will be removed.	2.1	➢ The site will be cleaned, and non natural materials associated with mining will be removed.	➢ Visual audit of completed ground, to verify compliance.	➢ No non natural structures will be retained on site. ➢ Conduct at closure.	➢ Remove any foreign materials.
2.2	All wastes will be removed from site.	2.2a	➢ All non local hardstand and roads will be collected and removed or buried in a safe location.	➢ Visual audit of completed ground, to verify compliance. ➢ Discussion with staff and operators.	➢ Non local materials associated with excavation ➢ Conduct at closure.	➢ Remove or bury non natural materials.
		2.2b	➢ Any contaminated soil or materials will be removed to an approved waste disposal site.	➢ Visual audit of completed ground, to verify compliance. ➢ Discussion with staff. ➢ Soil testing if there is evidence of material remaining.	➢ No visual evidence or sample data (if conducted) of contaminated or waste materials. ➢ Conduct at closure.	➢ Remove any remaining facilities and remediate or remove any contaminated soil. ➢ Retest and remediate as necessary.

2.3	The land surface will be visually similar to the surrounding landform.	2.3	➢ The land surface will be visually similar to the surrounding landform.	➢ Visual observations from the key viewscapes.	➢ The land surface will be visually similar to the surrounding landform.	➢ Repeat the relevant site closure procedures.
2.4	The land surface and soils are to be capable of supporting pasture.	2.4	➢ Reconstructed soil properties will be appropriate to pasture.	➢ Visually observe the land surface.	➢ At closure and for 3 years or sign off.	➢ Repeat the relevant site closure procedures with respect to soil preparation.
3.0 HYDROGEOLOGY						
3.1	The reformed surface be 0.5m metres above the highest groundwater table.	3.1	➢ The rehabilitated surface will have a separation of be 0.7 metres above the highest groundwater table.	➢ Implement site survey. ➢ Use piezometers or test pits as necessary to confirm compliance. ➢ Visual observations and site survey.	➢ Floor to be undulating some 2 - 3 metres on average below the natural surface and 0.7 metre separation to the highest winter water table.	➢ Reform the land surface with backfill or other measures to bring the surface into compliance.
4.0 BIODIVERSITY						
4.1	The rehabilitated areas will, in time, form sustainable pasture.	4.1	➢ The rehabilitated areas will be pasture. ➢ The tree planting required by CPS 6766 will be planted and maintained.	➢ Conduct visual audits and as necessary plant counts.	➢ The rehabilitated areas will be pasture with clumps of trees and local native vegetation.	➢ Where deficient, provide additional tube planting or seeding.
4.2	The re-established surface will be free from Declared or Significant Environmental weeds that could compromise the success of the rehabilitation or impact on adjoining vegetation.	4.2	➢ No significant infestations of environmental or declared weeds.	➢ Visual audits. ➢ Maintain ongoing records.	➢ Exotic and weed species will not compromise rehabilitated areas.	➢ Undertake additional weed management such as spraying or mechanical removal. ➢ Continue monitoring and management to check compliance. ➢ Repeat as necessary.
5.0 STAKEHOLDERS						

5.1	Ensure stakeholder issues are considered.	5.1	➢ Prior to closure, consult any relevant stakeholders to check whether the closure planning considers their interests.	➢ Verify the closure plan against the Stakeholder interests. ➢ Site audit and discussions with operators.	➢ Stakeholder interests are incorporated into the closure planning where possible.	1. Undertake any action that is required to meet the requirements of the stakeholders. 2. Repeat as necessary.
6.0 SAFETY						
6.1	The site will be left safe for parkland pasture end use.	6.1	➢ The disturbed land will be made safe and in compliance with the *Mines Safety and Inspection Act 1994 and* DMIRS Mine Closure Guidelines.	➢ Visual audit of completed ground, to verify compliance. ➢ Discussion with staff.	➢ Faces and the landform are to comply with DMIRS Guidelines and be stable for the long term.	➢ Undertake any action that is necessary to make the site safe.

REFERENCES

Abeysinghe P B, 2003, *Silica resources of Western Australia, Geological Survey of Western Australia, Mineral Resources Bulletin No 21.*

Australian Geomechanics Society, 2003*, Engineering Geology of Perth, Parts 1 and 2, Volume 38 No 3 and No 4.*

Basic Raw Materials Demand and Supply Study for the Bunbury – Busselton Region draft 2012

Bastian L V, 1996, *Residual soil mineralogy and dune subdivision, Swan Coastal Plain, Western Australia, Australian Journal of Earth Sciences 43, 31-44.*

Brearley A, 2005, Swanland, *Estuaries and Coastal lagoons of South-western Australia, University of Western Australia press*.

Chamber of Commerce and Industry, 1995 and 1996, *Managing the Basic Raw Materials of Perth and the Outer Metropolitan Region*, Parts 1 and 2.

City of Busselton has one Local Planning Scheme; TPS 21.

City of Busselton Local Rural Planning Strategy 2006

City of Busselton, Planning Policy 5 "Rural Land Use and Development" Policy, 2010

DBCA 2017, Phytophthora Dieback Management Manual, Forest and Ecosystem Management FEM079.

Department of Conservation and Land Management, 1980, *Atlas of Natural Resources of the Darling System.*

Department of Environmental Protection, 1996*, Land development sites and impacts on air quality: A guideline for the prevention of dust and smoke pollution from land development sites in Western Australia.* Department of Environmental Protection, Perth.

DWER 2015 *Identification and investigation of acid sulphate soils and acidic landscapes* and *Treatment and management of soil and water in acid sulphate soil landscapes*

Department of Environment and Conservation, 2011 *Guideline for Managing the Impacts of Dust and Associated Contaminants from Land Development Sites, Contaminated Sites Remediation and other Related Activities.*

Department of Environmental Protection (1997b*). Environment Protection (Noise) Regulations 1997: Summary of the Regulations.* Department of Environmental Protection, Perth.

Department of Minerals and Energy (1991). *Environmental Management of Quarries: Development, Operation and Rehabilitation Guidelines.* DOIR, Perth.

Department of Natural Resources Queensland (1997) *Planning Guidelines: separating agricultural and residential land uses.*

Department of Water 2010 *Murray Drainage and Water Management Plan.*

DWER 2012*, WQPN 13, Dewatering of soils at construction sites*

DWER 2019*, WQPN 15, Basic raw materials extraction.*

DWER, 2013, *Water resource considerations when controlling groundwater levels in urban development.*

Firman J B, 2006, *Ancient weathering zones, pedocretes and palaeosols on the Australian Precambrian shield and in adjoining sedimentary basins: a review, IN Journal of the Royal Society of Western Australia, Volume 89 part 2.*

Geological Survey of Western Australia, 1990, *Geology and Mineral Resources of Western Australia, Memoir 3.*

Gozzard J R, 1987, *Information on Industrial Minerals - Coastal Plain between Lancelin and Fremantle, Geological Survey of Western Australia record 1978/11.*

Jones D N, L Bemede, A R F Bond, C Dexter and C L Strong, 2016, Dust as a contributor to the road effect zone: a case study from a minor forest road in Australia, Australian Journal of Environmental Management Volume 23, No 1 p 67 – 80

Marnham J R, G J Hall and R L Langford, 2000, *Regolith-Landform Resources of the Cowaramup-Mentelle 1 : 50 000 Sheet*, Geological Survey of Western Australia.

National Environment Protection Act 1994 (NEPC Act)

Nattaporn-Prakongkep, R J Gilkes, B Singh and S Wong, 2011, *Mineralogy and chemistry of sandy soils in the Perth metropolitan area of the Swan Coastal Plain*, Department of Environment and Conservation

Playford, P E, A E Cockbain and G H Low, 1976, *Geology of the Perth Basin Western Australia, Geological Survey of Western Australia Bulletin 124.*

Safstrom R and N Short, 2012, *Agriculture futures: Potential rural uses on the Palusplain,* Department of Agriculture and Food Resources Management Technical Report 372.

State Planning Policy No 2.4, Basic Raw Materials, 2021

Townley L R et al, 1993,", *Volume 3 Interaction Between Lakes, Wetlands and Unconfined Aquifers",* Water Authority of Western Australia and EPA,

Western Australian Planning Commission, *State Planning Policy 1.0 State Planning Framework.*

Western Australian Planning Commission, *State Planning Policy 2.0, Environment and Natural Resources Policy.*

Western Australian Planning Commission, *State Planning Policy No 2.5, Agricultural and Rural Land Use Planning.*

Western Australian Planning Commission, State Planning Policy No 4.1, State Industrial Buffer Policy.

Wilde S A and D R Nelson, 2001, *Geology of the Western Yilgarn Craton and Leeuwin Complex, Western Australia – Field Guide,* Geological Survey of Western Australia.

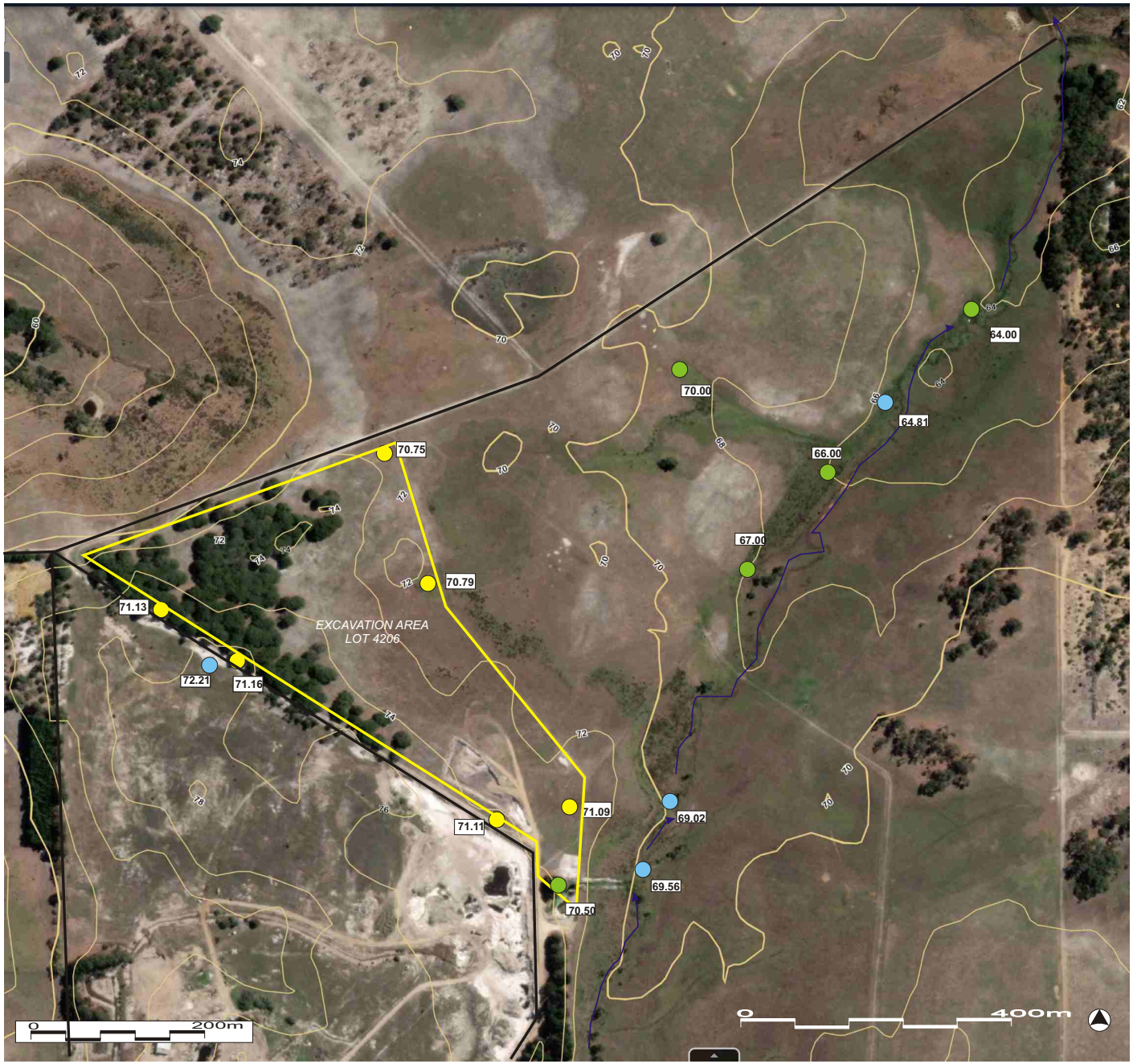


View south showing the constructed drain

PIGGOTT SAND SUPPLIES

LOT 4205 GALE ROAD KALOORUP
EXISTING CONTOURS
PRE-EXCAVATION

FIGURE 12



64.81 G and W Surveys Groundwater elevation September 2020 (m AHD)

64.81 G and W Surveys water elevation September 2022 Water monitoring bore elevations. (m AHD)

64.00 Air photo max groundwater elevation interpretation (m AHD) Winter 2021

Landform Research

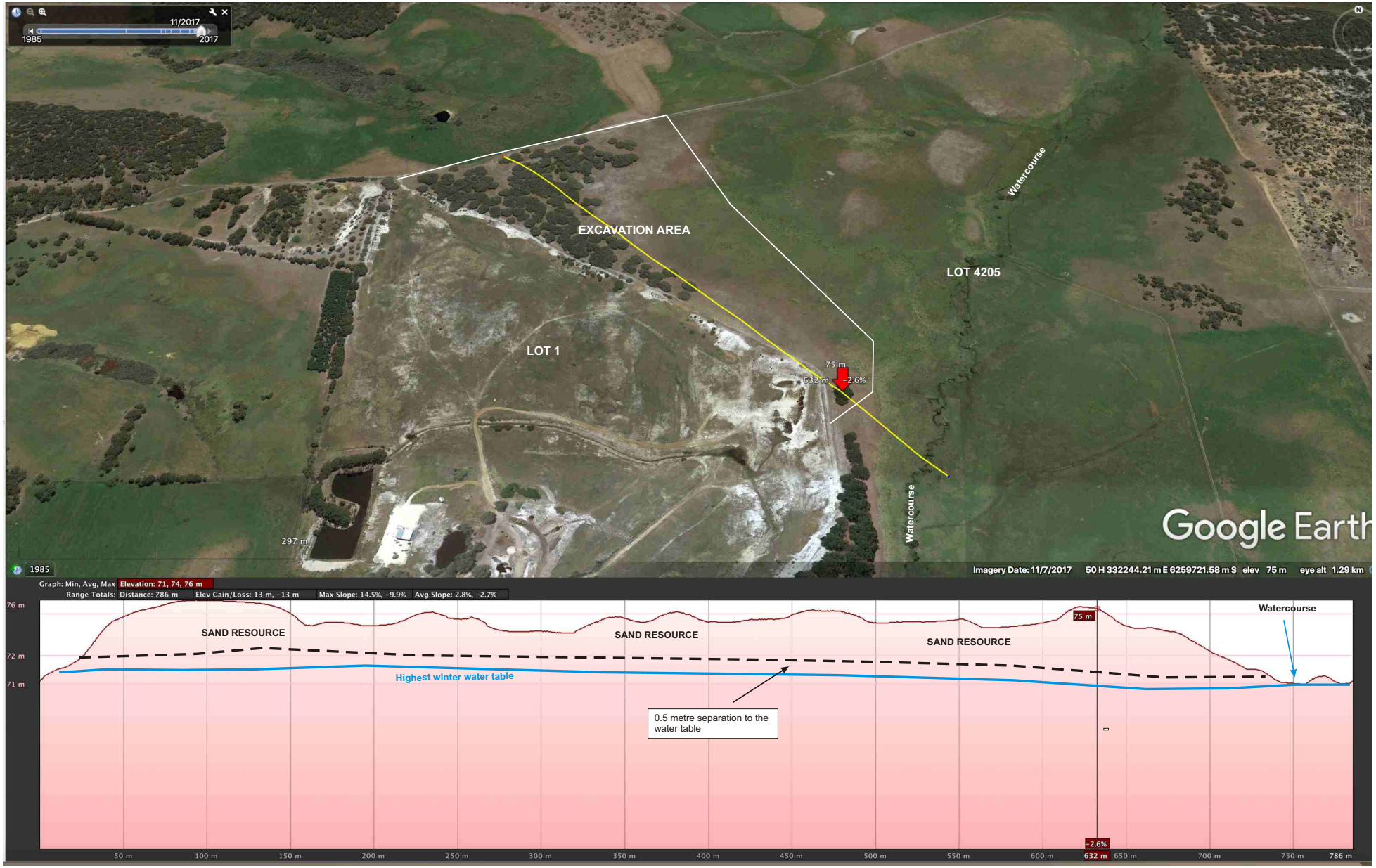
PIGGOTT SAND SUPPLIES

LOT 4205 GALE ROAD KALOORUP
GROUNDWATER ELEVATIONS
PRE-EXCAVATION CONTOURS

FIGURE 13



FIGURE 14
LOT 4205 GALE RD,
KALOORUP STAGING
PLAN



PIGGOTT SAND SUPPLIES
LOT 4205 GALE ROAD KALOORUP
SECTION LINES AND FINAL CONTOUR ELEVATIONS

FIGURE 15

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WATER MANAGEMENT PLAN

LOT 4205 GALE ROAD, KALOORUP

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CONTENTS

1 INTRODUCTION 1
1.1 BACKGROUND 1
1.2 PURPOSE AND SCOPE 1
2 EXISTING ENVIRONMENT 2
2.1 LOCATION 2
2.2 LAND USE 2
2.3 TOPOGRAPHY AND SOILS 2
2.4 CLIMATE 2
2.5 HYDROLOGY 3
3 EXTRACTION ACTIVITIES 6
3.1 OPERATIONAL WORKS 6
3.1.1 Truck Movements 6
3.1.2 Gravel Extraction 6
3.1.3 Final Contours 6
3.1.4 Equipment 7
3.1.5 Water Usage 7
4 POTENTIAL IMPACTS AND MANAGEMENT 8
4.1 SURFACE WATER 8
4.2 DRAINAGE 8
4.3 GROUNDWATER 10
4.4 HYDROCARBONS AND DANGEROUS GOODS MANAGEMENT 10
REFERENCES 12
FIGURES 13

TABLES

Table 1. Maximum groundwater and excavation levels.....3

Table 2. Wetland Classifications (Semeniuk 1995).....4

Table 3. DBCA wetland management categories (Semeinuk 1995).....4

Table 4. Equipment.....7

Table 5. Risk assessment associated with surface water and stormwater.....9

Table 6. Risk assessment associated with groundwater.....10

Table 7. Hydrocarbon and dangerous goods management measures.....10

Table 8. Risk assessment associated with the uncontrolled discharge of contaminants.....11

FIGURES

Figure 1. Site Locality

Figure 2. Site Extent

Figure 3. Topographical Features

Figure 4. Groundwater Elevations

Figure 5. Surface Water Features

1 INTRODUCTION

1.1 Background

Piggott Sand Supplies Pty Ltd (the applicant) is currently extracting sand from an 11 hectare (ha) area (herein referred to as the subject site) located within Lot 4205 Gale Road, Kaloorup (refer to **Figure 1** and **Figure 2**) under Development Approval DA15/0519 with an expiry date of November 2022. An application to renew this DA and Extractive Industry Licence (EIL) and extend the resource area to a new sand resource in the south of the Lot has been submitted to the City of Busselton.

The available volume of sand, *insitu* volume of approximately 255,000 m^3, is to be extracted. The subject site will be excavated to an approximate maximum depth ranging between 0.5 to 4 metres (m) below ground level (BGL), commencing in the south and moving in a northerly direction. The post extraction landform will be similar visually and in form with the pre-excavation landform with batter slopes of no less than 1:5 vertical to horizontal.

1.2 Purpose and Scope

The purpose of this Water Management Plan (WMP) is to review the risks and control measures to appropriately manage and minimise the environmental impacts of the extractive industry on both groundwater and surface water in proximity to the subject site.

The scope of the WMP is to cover the following:

- Legislative and regulatory compliance;
- Existing environment;
- Risk assessment water quality impacts;
- Mitigation and measurement measures; and
- Roles and responsibilities in relation to water management.

2 EXISTING ENVIRONMENT

2.1 Location

The subject site is located within Lot 4205 Gale Road, Kaloorup. The Lot is wholly owned by V. A and S. M Edwards. The subject site is located within the municipality of the City of Busselton, approximately 20 km southeast of the Busselton town centre and approximately 200 km south of Perth (refer to **Figure 1**).

2.2 Land Use

The subject site is zoned 'Rural' pursuant to the City of Busselton's *Local Planning Scheme No. 21*. The proposed extraction area has largely been cleared of remnant vegetation under a now expired clearing permit (CPS 6766/2). No further clearing is required. Land use abutting the boundaries of the subject site is rural, including a range of grazing, pastoral and extractive industry land uses.

2.3 Topography and Soils

The current topography of the subject site can be described as undulating with the elevation ranging from 72 m Australian Heigh Datum (AHD) to 76 m AHD (refer to **Figure 3**).

The subject site is located within the Donnybrook Sunkland Zone landform consisting of "*moderately dissected lateritic plateau on Perth Basin sedimentary rocks. Soils are formed in lateritic colluviam, weathered in-situ sedimentary rocks and alluvium (poorly drained sandy alluvial plain in the south*", and the Whicher Scarp System described as "*Low scarp and raised platform on the northern edge of the Donnybrook Sunkland. Sandy gravel and pale deep sands, loamy gravel and non-saline wet soils."* (Tille 2006).

Within the Whicher Scarp System, the subject site is located within the following sub-systems:

- Yelverton deep sandy flats phase – Level to gently undulating raised shelf, lying 10 – 40 m above the Swan Coastal Plain. The soils are mainly sands.
- Yelverton wet flats Phase – Poorly drained depressions of the shelf surface. Soils are non-saline wet soils and grey-brown sands and loams.

The soils present within the subject site consist typically of a grey to brownish grey sand up to 100 mm thick over leached white silica sand grading to coarse white sand at depth. The finer sand overlies discontinuous thin layers of coarser sand. Under the sand is the sandy loam subsoils that are developed on the Cretaceous sediments. These materials occur below the base of the sand excavation and will not be disturbed (Landform Resources 2023).

2.4 Climate

The climate of the locality is classified as Mediterranean with warm to hot summers and cool wet winters.

The closest weather recording station is Busselton Aero (Station 9603). Temperatures are highest on average in January, at approximately 30.2°C. July has the lowest average temperature of the year of 6.9°C.

Rainfall for the area is approximately 680 mm per annum with approximately 89% of the rain falling during the winter months, April to October inclusive. Evaporation exceeds rainfall in all but the wettest winter months.

During the summer months the dominant wind in the mornings is from the south-east at 10-14 knots, swinging to the south-west at 20-25 knots in the afternoon. During winter, the winds are most commonly

10-14 knots with no dominant prevailing direction. During storms winds from the west and north-west can reach 40 knots (BoM 2020).

Rainfall intensity has been calculated using the Bureau of Meteorology (BoM) Intensity-Frequency-Duration (IFD) data system which yields the two hour 10 year average return interval storm event for the subject site as 42 mm/hr.

2.5 Hydrology

2.5.1 Groundwater

The subject site is located within the proclaimed Busselton-Capel Groundwater Area and lies in the Dunsborough – Vasse Subarea for the Superficial and Leederville formations (Landform Research, 2023). There is a Superficial Aquifer present within the subject site that is, at times, overlain by a temporary winter perched water table sitting on top of the underlying Cretaceous beds at the level of the iron inundated sand that also contains some carbonaceous material (Landform Research, 2023). These Cretaceous sediments, which are slightly less permeable, enable the heavier winter rainfall to build up on the surface in the overlying sand layers and flow downhill towards the watercourse on site.

Groundwater levels were initially assessed to support the 2016 Development Application which indicated that extraction levels of 71 m AHD were sufficient to maintain a 0.5 m separation to maximum groundwater level. Further investigations were undertaken in 2020, 2021 and 2022. Based on this information, maximum groundwater contours have been mapped (refer to **Figure 4**). To maintain at least 0.5 m separation to groundwater, the maximum excavation within each cell will be to depths outlined within **Table 1** below.

Table 1. Maximum groundwater and excavation levels.

Cell	Maximum groundwater level (m AHD)	Maximum excavation level (m AHD)	Maximum surface elevation (m AHD)	Maximum excavation level (BGL)
1	71	71.5	72	0.5
2	71	71.5	74	2.5
3	70.75	71.25	74	2.75
4	71.5	72	76	4
5	71.5	72	74	2

2.5.2 Surface Water

The subject site is located in the Buayanyup subarea of the *Rights in Water and Irrigation Act* (RiWI Act) which is a component of the proclaimed Geographe Bay Rivers surface water area. Surface water to the west of the subject site enters the Carbunup Catchment, whilst to the east water drains into the Buayanyup Catchment. The subject site is not proclaimed under the *Country Areas Water Supply Act 1947* as a public drinking water source area.

A watercourse, the Buayanyup River, runs to the east of the site and a swale and dam are located to the south of the site (refer to **Figure 5**). A buffer of 20 m has been maintained from all surface water features.

Wetlands within Western Australia are classified on the basis of landform and water permanence pursuant to the Semeniuk (1995) classification system (refer to **Table 2**).

Table 2. Wetland classifications (Semeniuk 1995).

Water Longevity	Landform				
	Basin	Channel	Flat	Slope	Highland
Permanent Inundation	Lake	River	-	-	-
Seasonal Inundation	Sumpland	Creek	Floodplain	-	-
Intermittent Inundation	Playa	Wadi	Barlkarra	-	-
Seasonal Waterlogging	Dampland	Trough	Palusplain	Paluslope	Palusmont

Areas of wetlands in Western Australia have been mapped and this mapping has been converted into a digital dataset that is maintained by the Department of Biodiversity, Conservation and Attractions (DBCA) and is referred to as the '*Geomorphic Wetlands of the South West*' dataset. This dataset contains information on geomorphic wetland types and assigns management categories that guide the recommended management approach for each wetland area. The wetland management categories and management objectives are listed in **Table 3**.

Table 3. DBCA wetland management categories (Semeniuk 1995).

Category	Description	Management Objectives
Conservation	Wetlands support a high level of ecological attributes and functions.	Highest priority wetlands. Objective is to preserve and protect the existing conservation values of the wetlands through various mechanisms including: • Reservation in national parks, crown reserves and State owned land, • Protection under Environmental Protection Policies, and • Wetland covenanting by landowners. No development or clearing is considered appropriate. These are the most valuable wetlands and any activity that may lead to further loss or degradation is inappropriate.
Resource Enhancement	Wetlands which may have been partially modified but still support substantial ecological attributes and functions	Priority wetlands. Ultimate objective is to manage, restore and protect towards improving their conservation value. These wetlands have the potential to be restored to Conservation category. This can be achieved by restoring wetland function, structure and biodiversity.
Multiple Use	Wetlands with few remaining attributes and functions	Use, development and management should be considered in the context of ecologically sustainable development and best management practice catchment planning through landcare.

There is one Resource Enhancement (RE) wetland (UFI 17) associated with the Buayanyup River and one Multiple Use (MU) wetland (UFI 283) mapped within the property (refer to **Figure 5**) and an RE wetland (UFI 12) located to the west of the property boundary. The excavation footprint has been designed to ensure a 20 m buffer from the RE wetlands is maintained at all times.

MU wetlands are assessed as possessing few remaining ecological attributes and functions, which is characteristic of these mapped areas within the property. While such wetlands can still contribute to regional or landscape ecosystem management, including hydrological function, they are considered to have low intrinsic ecological value. Typically, they have minimal or no native vegetation remaining (less

than 10%). Accordingly, there is no legislative requirement to protect or retain them and as such MU wetlands do not preclude development.

The management objective for MU wetlands is to preserve the hydrological functions in the context of the proposed development (EPA 2008). The current water cycle within the subject site consists of inputs from rainwater bring infiltrated on site or flowing through the drainage lines into the wider drainage system. The development is not proposing to alter this process, with all water being retained within the excavated areas to enable infiltration through stormwater pirs to ensure water quality is maintained.

3 EXTRACTION ACTIVITIES

The sand quarry will cover an area of approximately 11 ha, with a current maximum elevation ranging from 72 m AHD to 76 m AHD. It will be excavated to a maximum depth ranging between 0.5 m to 4 m BGL commencing in the south and moving in a northerly direction.

It is estimated that the total maximum volume of sand to be removed will be approximately 255, 000 m^3 with approximately 50,000 m^3 excavated each year, depending on supply and demand.

The planned end use of the quarry is to restore a natural soil profile and return the area to pasture, ensuring that there is no net loss of agricultural land.

3.1 Operational Works

3.1.1 Truck Movements

Access from the property will be via Gale Road heading east with some transport to the west for transportation to Margaret River (Landform Research, 2023).

The number of trucks traversing the site will be variable but average up to 10 laden trucks per day. For large contracts there may be 20 per day and at other times less than 5 per day (Landform Research 2022).

Given the highly variable nature of the campaigns, these calculations are estimates only, there may be periods in which these daily truck numbers are exceeded.

3.1.2 Sand Extraction

The sand within the subject site can be removed with an excavator or loader without the need for blasting. No crushing or screening of material onsite is proposed.

A summary of the proposed extraction activities is provided below:

- The topsoil (nominally 20 cm of the soil profile) and overburden (if present) will be stripped and recovered for spreading directly onto areas to be revegetated.
- Where topsoil cannot be directly transferred for rehabilitation, it will be stored in low stockpiles (no greater than 2 m) at the perimeter of the excavation footprint. For the southern recourse that will be along the southern and western sides of the proposed pit.
- An excavator or front-end loader will be used to excavate the sand material.
- Excavation will commence in the south of the site moving in a northerly direction. The face and the walls of the pit will act as noise barriers.
- Upon completion of each cell, the cell will be reformed and back filled, where subgrade material is available, to achieve the proposed final contours.
- At the end of excavation, the floor of the quarry will be deep ripped, covered by overburden and topsoil, and rehabilitated to a constructed soil.

3.1.3 Final Contours

The slope of the final contours of the quarry will be an undulating surface between 71.5 to 72.2 m AHD which is consistent with the adjoining land.

Maximum groundwater contours have been mapped from the available data and the maximum groundwater elevation in each cell, along with maximum excavation levels is presented within **Table 1**.

Slopes of the batters at the end of excavation will be retained at 1:5 vertical to horizontal.

3.1.4 Equipment

All operational equipment will work on the quarry floor to provide maximum sound and visual screening. All equipment and infrastructure will be fully portable to facilitate movement throughout the site as required for staged quarrying operations. The site will be secured by locked gates when it is not being actively worked. The boundary fencing will be maintained to prevent inadvertent and unauthorised entry.

Onsite facilities will be kept to a minimum and importantly, no fuel or chemicals will be stored onsite.

Equipment and facilities that may be used onsite are provided in the Table below.

Table 4. Equipment.

Equipment	Description
Water tanker	Used for dust suppression on the access roads and working floors when required.
Loader	Loaders will be used for the movement of sand and loading road trucks.
Excavator	An excavator may be used for the removal of sand material.
Fuel storage	No fuel will be stored onsite.
Light vehicles	Access to and around the site.

3.1.5 Water Usage

Water is only required for dust suppression within the quarry and the gravel access road.

4 POTENTIAL IMPACTS AND MANAGEMENT

The Section provides and overview of the potential impacts to water resources associated with the proposed land use, and the proposed management measures to address the identified impacts.

4.1 Surface Water

The current water cycle within the subject site consists of inputs from rainwater largely flowing in a downhill (south-easterly) direction into the wider drainage system. Rainwater in the most northern portion of the subject site flows to the northwest towards the Carbunup Catchment. The development is not proposing to alter this process.

Any surface water falling outside of the pit will be diverted around the pit by the perimeter bunds to the drainage system. Surface water retained within the excavated areas will either evaporate or infiltrate through the pit ensuring water quality to the drainage system is maintained.

The subject site is located adjacent to an RE wetland to the southeast and northwest (refer to **Figure 5**). A buffer of at least 20 m from the excavation area to the mapped boundary of the RE wetlands will be maintained.

4.2 Drainage

The DWER recommendation is that surface water runoff produced within the excavation area from the two hour 10 year average return interval storm event should be contained within the pit (DoW 2014). Rainfall intensity has been calculated using the Bureau of Meteorology (BoM) Intensity-Frequency-Duration (IFD) data system (BoM 2021), which yields the two hour 10 year average return interval storm event for the site as 42 mm. For every 1.0 ha of excavation open, it is calculated that a holding volume of 420 m^3 is required. Since the size of the open area will not exceed 2.0 ha at any time, it is calculated that a holding volume of 840 m^3 is required. To achieve a holding volume of 840 m^3 an area approximately 42 m by 20 m by 1 m deep is required. This will easily be achieved within each of the 2 ha stages.

During excavation activities, the surface will be internally drained, with the gradients in the cells being constructed to ensure that no surface water runoff occurs.

Previous excavations have resulted in the perched groundwater flowing into the base of the pit, inundating the pit and requiring the installation of a drainage channel to remove the water (refer to **Plates 1** and **2**).



Plate 1: Pit prior to drainage



Plate 2: Drained floor, still to be backfilled **Drain removed**

The drainage channel has been backfilled to ensure no water from the pit drains to the RE wetland through the swale. If further drainage is required within the pit, an infiltration basin will be constructed to allow for infiltration to occur rather than direct discharge to the wetland (refer to **Figure 5**).

A risk assessment relating to surface water and stormwater runoff in consideration of the proposed management measures is provided below. The residual risk associated with sedimentation and erosion from stormwater runoff during the operation of the extractive industry is considered low.

Table 5. Risk assessment associated with surface water and stormwater.

Hazard	Source of Hazard	Potential Impacts	Mitigation	Likelihood	Consequence	Residual Risk
Erosion and sedimentation	Uncontrolled and contaminated stormwater runoff	Erosion and sedimentation resulting in poor surface water quality in the Buayanyup or Carbunup River.	Contain any potentially sediment laden surface water within the pit. Cells constructed with a gradient to ensure that stormwater is contained within the excavation footprint.	1	2	Low

4.3 Groundwater

Groundwater will not be extracted or dewatered during the operation of the quarry and therefore, no impacts to groundwater levels are proposed.

Maximum excavation levels are estimated to be between 0.5 to 4 m BGL so a minimum estimated separation of 0.5 m from the maximum groundwater level will be maintained at all times. The final contours of the quarry will provide an undulating surface ranging from 71.5 to 72.2 m AHD which is consistent with the adjoining land.

The extraction and processing of sand is a chemically free operation with the liquids used being lubricants for machinery and fuel. There will be no storage of chemicals or fuel on the subject site.

Table 6. Risk assessment associated with groundwater.

Hazard	Source of Hazard	Potential Impacts	Mitigation	Likelihood	Consequence	Residual Risk
Contamination of groundwater	Machinery	Contamination of groundwater impacting localised water table	Maintenance of at least 0.5 m separation from groundwater at all times.	1	2	Low

4.4 Hydrocarbons and Dangerous Goods Management

Hydrocarbons are the only dangerous goods that will be utilised within the proposed subject site for the operation of machinery. However, storage of hydrocarbons on the subject site will not occur.

Servicing of machinery and equipment will not occur onsite further reducing the possibility of contamination.

There is the minor possibility for soil and water contamination as a result of incidental hydrocarbon leakages or spills during the operation of machinery and refuelling of vehicles. In such instances the management measures specified below will be implemented.

Table 7. Hydrocarbon and dangerous goods management measures.

Timing	Management Measure
During quarry operations	Mobile refuelling of equipment and vehicles will be undertaken on a gravel hardstand outside of the extraction area.
	Spill kits containing appropriate equipment for control, containment and cleanup of hydrocarbon and chemical spills will be available in appropriate locations onsite and maintained.
	No vehicles or machinery are to be serviced or cleaned within the subject site.

A risk assessment to determine the residual risk associated with the uncontrolled discharge of contaminants is provided below. The risk assessment indicates that with the application of suitable management measures the potential risk associated with uncontrolled discharges is 'Low'.

Table 8. Risk assessment associated with the uncontrolled discharge of contaminants.

Hazard	Source of Hazard	Potential Impacts	Mitigation	Likelihood	Consequence	Residual Risk
Uncontrolled discharge of contaminants to land	Machinery	Contamination of soils and/or water	Refer to Management Measures provided in **Table 7**.	1	2	Low

REFERENCES

Barnesby, B.A. and Proulx-Nixon, M.E. (2000). *Land resources from Harvey to Capel on the Swan Coastal Plain, Western Australia - Sheets 1 and 2.* Land Resources Maps No. 23/1 and 23/2. Agriculture Western Australia.

Churchward, H.M. and McArthur, W.M. (1978). Landforms and soils of the Darling System, Western Australia. In *'Atlas of Natural Resources, Darling System, Western Australia'*. Department of Conservation and Environment, Western Australia.

Davidson, W. A. (1995). *Hydrogeology and groundwater resources of the Perth Region, WA*. Geological Survey of Western Australia. Bulletin 142. 257 pp.

Deeney, A. (1989) *Geology and Groundwater Resources of the superficial formations between Pinjarra and Bunbury, Perth Basin.*

Department of Parks and Wildlife (DBCA) (2004). *Geomorphic Wetlands of the Swan Coastal Plain dataset*.

Department of Water (DoW) (2014). *South West Region Guideline, Water resource considerations for extractive industries.* DoW, Perth WA.

Environmental Protection Authority (EPA) (2006). *Guidance Statement No.10 for the Assessment of Environmental Factors (in accordance with the EP Act 1986: Levels of Assessment for Proposals Affecting Natural Areas Within the System 6 Region and Swan Coastal Plain Portion of the System 1 Region.*

Environmental Protection Authority (EPA) (2009). *South West Regional Ecological Linkages.* Bulletin No 8. Retrieved from: http://epa.wa.gov.au/EPADocLib/3040_SWREL_EPB821009.pdf

Geological Survey of Western Australia (1978). *Geology and mineral resources of Western Australia, memoir 3*. Geological Survey of Western Australia, Perth, WA.

Heddle, E.M., Loneragan, O.W. and Havel, J.J. (1980). *Darling Systems – Vegetation Complexes, In: Atlas of Natural Resources Darling System*, Western Australia, Department of Conservation and Environment, Perth.

Semeniuk, C. A. & Semeniuk, V. (1995). *A geomorphic approach to global classification for inland wetlands*. Vegetation, 118, 103-124.

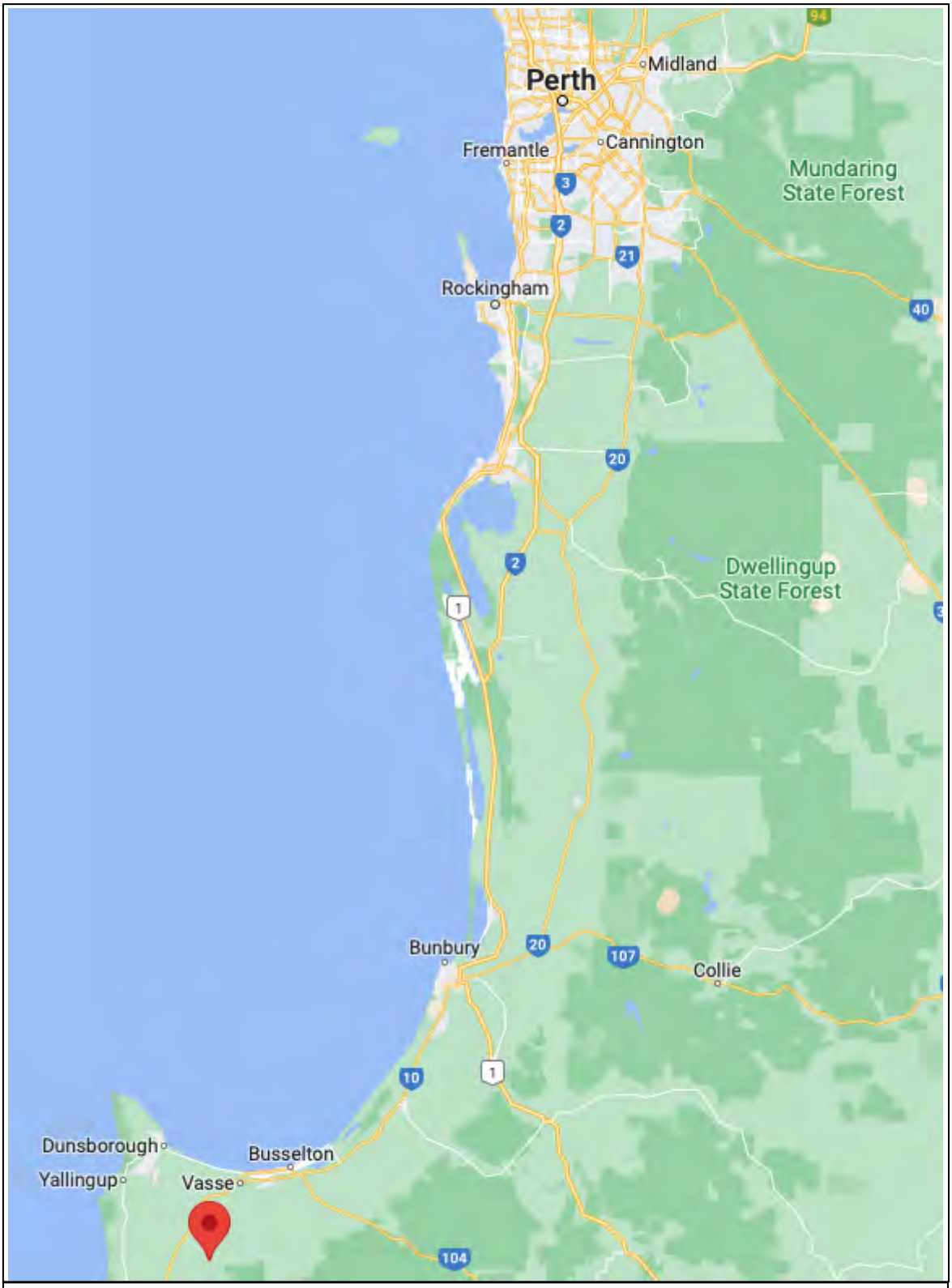
Thackway, R, and Cresswell, ID, (Eds) (1995). *An Interim Biogeographic Regionalisation for Australia: a framework for establishing the national system of reserves*, Version 4.0. Australian Nature Conservation Agency, Canberra.

Tille, P (2006). Soil-Landscape Zones of the WA Rangelands and Interior.

Tille, P J, Mathwin, T W, and George, R J (2001). *South west hydrological information package : understanding and managing hydrological issues on agricultural land in the south west of Western Australia.* Department of Primary Industries and Regional Development, Western Australia, Perth. Bulletin 4488.

Western Australian Planning Commission (WAPC) (2007). *Planning Bulletin No. 64: Acid Sulfate Soils*, Western Australian Planning Commission, Western Australia.

FIGURES



PROJECT	Lot 4205 Gale Road, Kaloorup	Project Number	Drawing Number	Revision
DRAWING TITLE	Figure 1 – Site Locality	2321	Figure 1	A
CLIENT	Piggott Sand Supplies Pty Ltd	Designed PN Drawn PN	Checked Approved	
		Date	26/042/2023	
		Local Authority	City of Busselton	
		Sheet 1 of 1		

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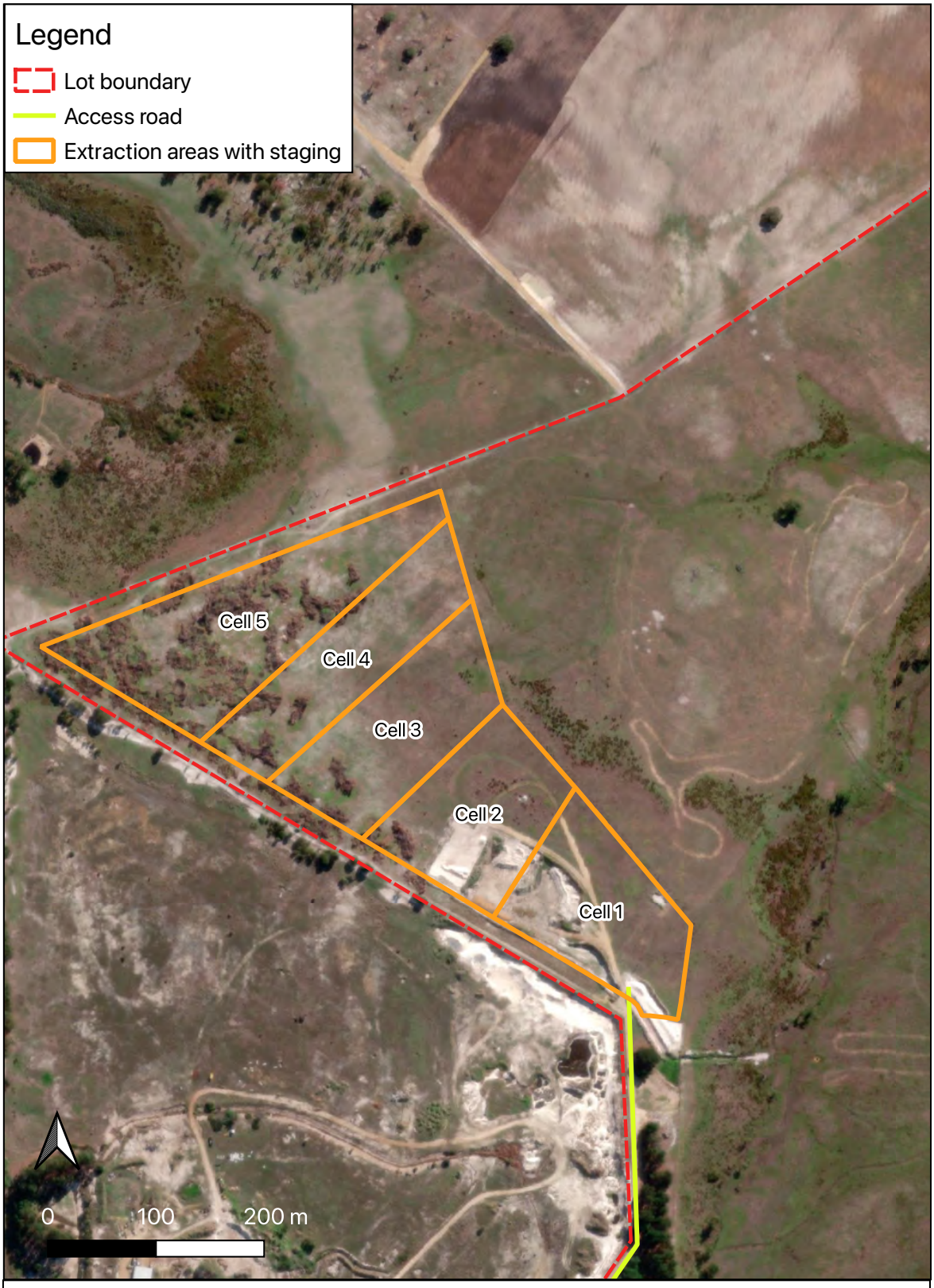

PROJECT	Lot 4205 Gale Road, Kaloorup	Project Number	Drawing Number	Revision
		2321	Figure 2	B
DRAWING TITLE	Figure 2 – Site Extent	Designed PN	Checked	
		Drawn PN	Approved	
CLIENT	Piggott Sand Supplies Pty Ltd	Date	18/07/2023	
		Local Authority	City of Busselton	
		Sheet 1 of 1		

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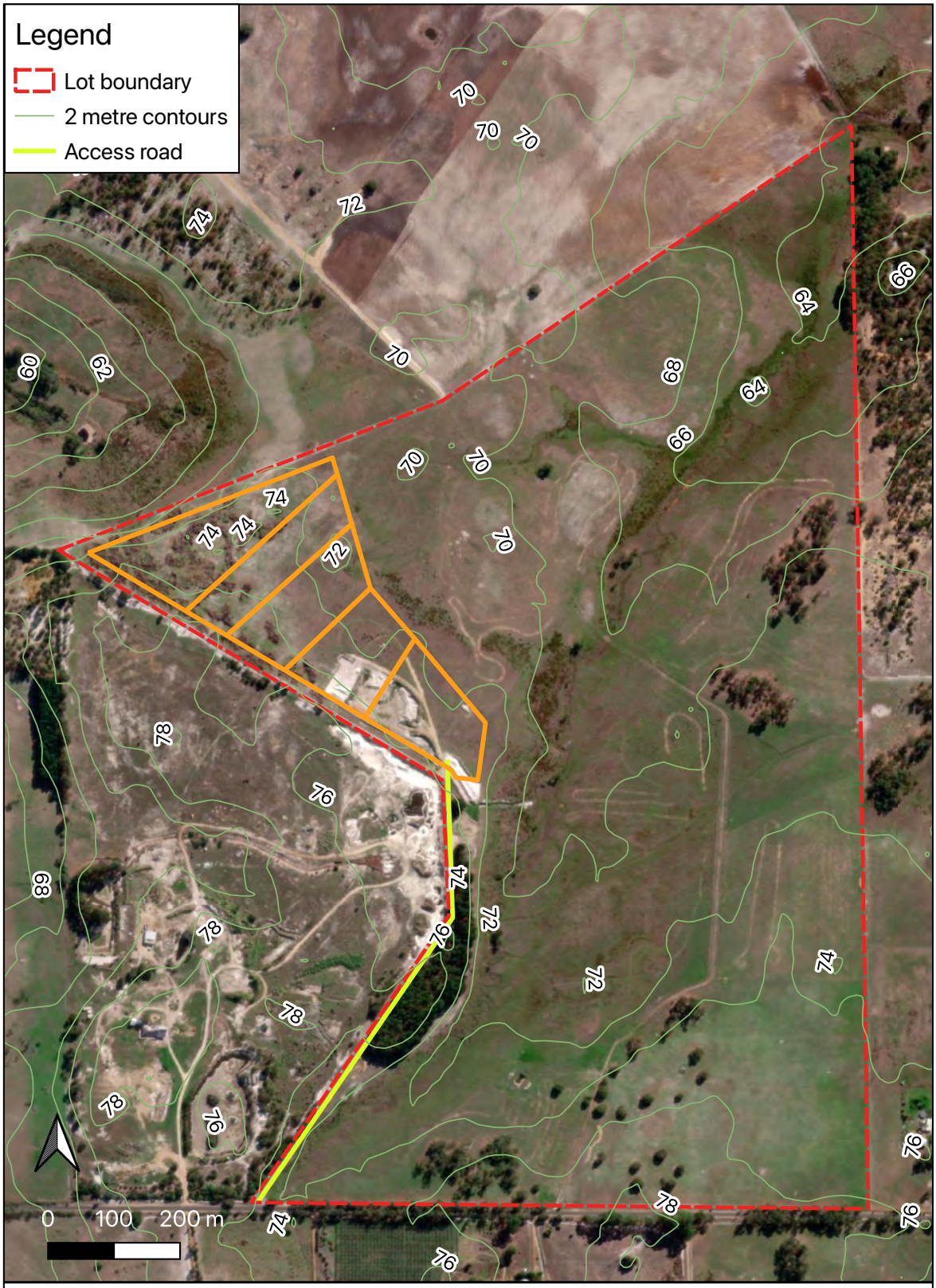

PROJECT	Lot 4205 Gale Road, Kaloorup	Project Number	Drawing Number	Revision
		2321	Figure 3	B
DRAWING TITLE	Figure 3 – Topographical Features	Designed PN	Checked	
		Drawn PN	Approved	
CLIENT	Piggott Sand Supplies Pty Ltd	Date	18/07/2023	
		Local Authority	City of Busselton	
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PROJECT	Lot 4205 Gale Road, Kaloorup	Project Number	Drawing Number	Revision
		2321	Figure 4	B
DRAWING TITLE	Figure 4 – Groundwater Elevations			
		Designed PN	Checked	
CLIENT	Piggott Sand Supplies Pty Ltd	Drawn PN	Approved	
		Date	17/07/2023	
		Local Authority	City of Busselton	
		Sheet 1 of 1		

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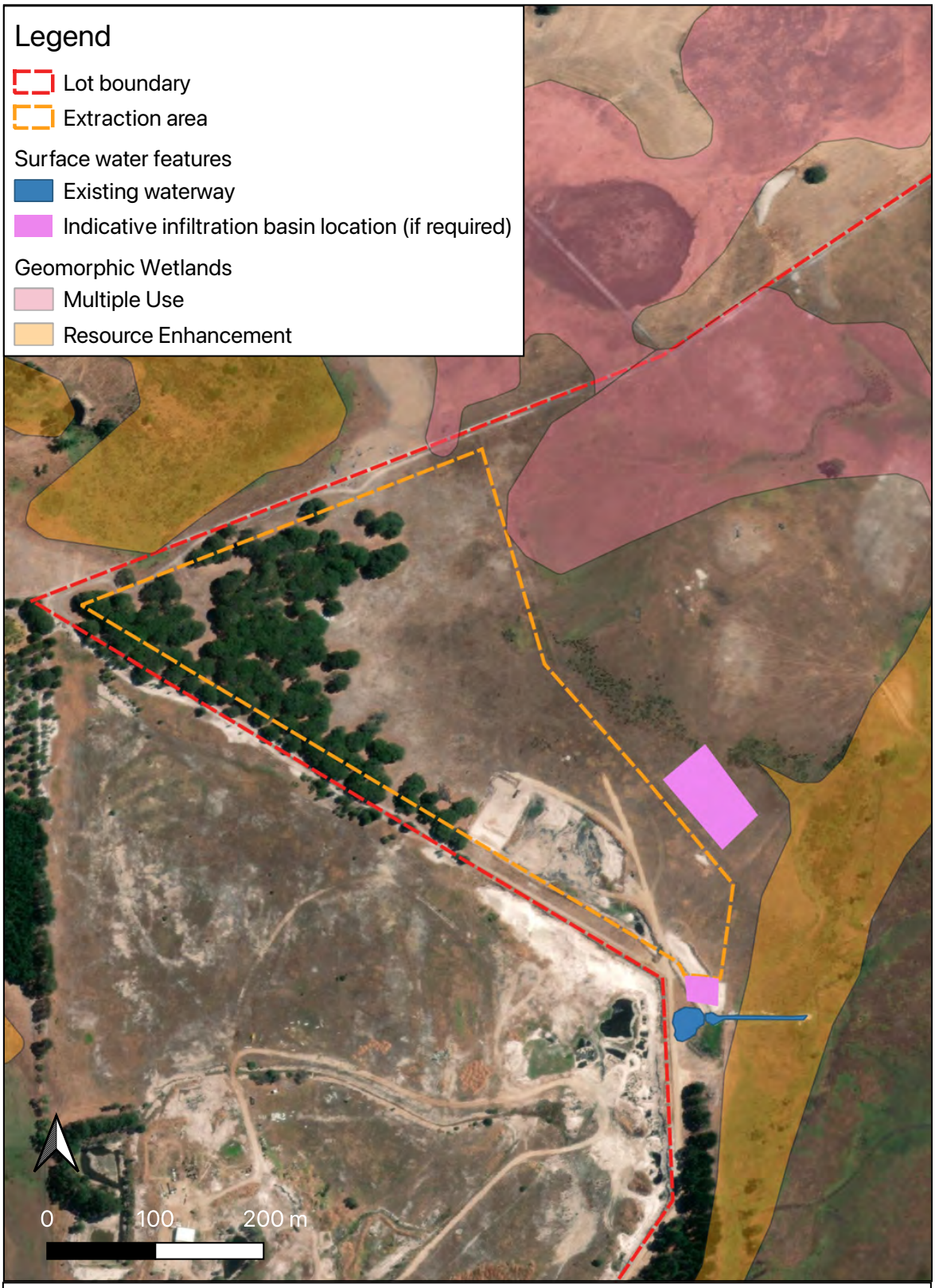

PROJECT	Lot 4205 Gale Road, Kaloorup	Project Number	Drawing Number	Revision
		2321	Figure 5	A
DRAWING TITLE	Figure 5 – Surface Water Features			
CLIENT	Piggott Sand Supplies Pty Ltd	Designed PN	Checked	
		Drawn PN	Approved	
		Date	28/04/2023	
		Local Authority	City of Busselton	
		Sheet 1 of 1		

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DACP21/0822

PLANNING HISTORY FOR Lot 4205 Gale Road Kaloorup

Doc No	Date	Document	Comment / Summary
01	06/05/2021	DA Application form dated by property owners Vince & Sheila Edwards	Document Set ID 4708480
02	16/09/2021	DA Application sent to City from Consultant (LS) on behalf of V&SE • Application form • Management Plans • Certificate of Title • Development Application checklist	Document Set ID 4708480
03	29/09/2021	Registered on ECM by Planning Admin • Application form • Management Plans • Certificate of Title • Development Application checklist	
04	29/09/2021	DA21/0822 Tech1 file created by Planning Admin	
05	29/09/2021	Pre-accepted for Assessment checklist completed by Planning Admin	
06	04/10/2021	DACP21/0049 Compliance investigation created for operator allegedly breaching water table and constructing drainage channel out to wetland	
07	29/10/2021	Compliance work in conjunction with Planning, Operator and Consultant and arrange meeting at the City office to assist with determining best method moving forward to meet acceptability criteria for Management Plans and third party Agency requirements e.g. DWER, DBCA, DPIRD etc. <u>Meeting scope</u> • No current DA (City is aware of the new application) • Water table has been intercepted (confirmed by DWER) • Rehabilitation of the site to mitigate water table interception • A drainage channel has been constructed leading out to a wetland (outside of expired DA extraction area e.g. cell A) • Extraction/removal of sand from the site since expiration of expired DA	
08	11/11/2021	Compliance send email to Operator/Consultant listing key points of meeting attended on 29/10/21 detailing required documentation to be submitted to City to proceed with Application; • Provide documented Rehabilitation Project Management Plan • Provide copy of Site Survey report/s (confirming AHD levels) • Provide copy of any Water or Bore monitoring report/s (confirming levels) • Provide written advice of plan to/or not to submit DA for Drainage Channel (aka swale drain) • Provide copy of recent pictures taken by you of site showing pit floor germination Agreed during the meeting the City will provide the following; • Copy of meeting held Friday 29th October 2021 ‘voice recording’ • Copy of excerpt/s from DWER email (6th October 2021) confirming the identification of the of ground water • Copy of excerpt/s from DWER email (21st October 2021) regarding the risk of possible environmental harm caused by the exposure of the water table during extractive industry operations, and the subsequent drainage of pit water to nearby wetlands. • Copy of drone footage taken by COB licensed drone operator (30th September 2021)	Document Set ID 4747735
09	15/11/2021	Planning ‘Request for Additional Information Prior to Initial Assessment’ notes prepared internally	Document Set ID 4749436
10	24/11/2021	Planning ‘Request for Additional Information Prior to Initial Assessment’ PDF format • General Policy Provisions • Development plans • Dust Management Plan • Groundwater Monitoring and Management • Surface water • Wetlands • Rehabilitation Plan • Road Network	Document Set ID 4756359

		• Pit Design and Levels • Deletion of buffer	
11	07/12/2021	Consultant replies to Compliance/Planning email (11/11/2021) with insufficient/incomplete information required following 29/10/21 meeting requesting further information and modifications to previously submitted Management Plans.	Document Set ID 4827057
12	15/12/2021	Consultant emails Compliance requesting update from email sent on 07/12/2021	
13	20/12/2021	Compliance replies to Consultant advising the Application is being reviewed in consultation with Planning.	
14	20/12/2021	Consultant emails Compliance requesting City generated photography of site in addition to requesting copy of City arranged 'contour survey'	
15	20/12/2021	Request for contour survey and photography forwarded from Compliance to Planning to ensure transparency of Application progress	
16	21/12/2021	Compliance request assistance from Planning to contact Consultant and advise Application process as still require water monitoring, Management Plans modified to meet minimum acceptability standard	
17	29/12/2021	Consultant emails Compliance advising Management Plan has been reviewed with comments but not modifications for; • Management Plan *There has been no need to change anything, and I have not changed anything in the Management Plan as submitted in September apart from the date on the cover and the additions to the index.* *The drain was described as a swale drain and will be made to that form during the excavation of that section of the pit. The drain was cut to remove the water ponded in the pit and was required to enable the floor of the pit to be rehabilitated.* NOTE: drain is not a swale drain e.g. drain with vegetation growing throughout to assist in reduction of sediment etc. Drain was barren sand and directed out to RAMSAR wetland. • Water Management *In order to make the hydrogeology easier to understand I added more information and text to the Water Management Plan and added the word Hydrogeology on that cover. Even though the text has changed, no changes were required to the actual Hydrogeology or water management was required changing in baseline date, elevations, final land surface and the like.* • Comments by the City • Comment on Condition from the 2016 DA	Document Set ID 4782801
18	30/12/2021	Planning email operator HP with WORD format • Request for Additional Information Prior to Initial Assessment WORD format for operator to edit	Document Set ID 4780329
19	31/12/2021	Consultant emails Planning advising • *We did not answer these previously as there is no record of receiving them.* • *Neither I nor Piggott Sand Supplies have any record of an email or letter.* • *Anyway please find the response the comments prepared by the City of Busselton and dated 14 November 2021.* • *Unfortunately I have only received the documentation today 31 December 2021. Even so the updated information submitted on 29 December 2021 addresses the issues raised.*	Document Set ID 4782981
20	31/12/2021	Operator emails Director (Planning & Development Services) requesting; • *Temporary/short-term approval to reinstate operations and extract the exposed stripped and stockpiled sand.* • *Due to reasons out of Piggott Sand Supplies control (Covid-19 and a shortage of local consultants), the previous DA has expired* • *Temporary/ Short term approval would further assist with the rehabilitation of the existing cell.*	Document Set ID 4800270
21	31/12/2021	Director (Planning & Development Services) internal email to discuss further with City Manager (Development Services).	Document Set ID 4800270
22	07/01/2022	Planner hands over Application to City Planner (JD) as (MY) resigns from City	Document Set ID 4783482
23	13/01/2022	Operator emails Planning advising • *outstanding documents are those that were emailed to (MY) on 31/12/21.*	Document Set ID 4788092
24	14/01/2022	Manager (Development Services) request information from Compliance for likely success of acceptable rehabilitation if temporary Approval were to be granted to remove stockpiles. Compliance advise appears to be 'insufficient topsoil/resource' to be available to support removal of remaining stock to achieve minimum 500mm above water table.	Document Set ID 4827056
25	17/01/2022	Planner emails Operator and Consultant reiterating required modifications to management plans as changes required continue to not be addressed City Planner also makes reference to City request for further information made on 30/12/21.	
26	17/01/2022	Consultant replies to Planner and advises/continues to contest; • *If as a result of a conditional approval any and all changes etc can be included in an updated management plan so that the final management plan will reflect the conditions of approval.* • *Staging Plan* • *Buffers – Setbacks*	Document Set ID 4796890

		'The application is to cut to the property boundary and if an agreement can be obtained with the neighbour to the west the boundary could be cut rough and the fence lowered. If the boundary to the west cannot be cut through then it is proposed to leave the fence line in place and both lots will then batter the land down from a point about 5 metres inside the fence line down to the pit. NOTE: minimum 20metres off the boundary is required standard. • Length of approval • Referral to DWER	
27	01/02/2022	Planner emails Consultant and makes comment on previous Consultant requests whilst reiterating minimum requirements for boundary setbacks etc.; • *Dimensions of each proposed excavation cell stage as well as the area of each cell, the proposed setbacks from the lot boundary.* • *Capacity of the proposed water truck as well as where the water will be sourced from.* • *Will be reviewed by DWER who will deem whether they are acceptable.* • *Any necessary clearing permits will need be obtained by DWER, the City is not the responsible authority for these).* • *Engineering Services may require additional information at a later stage* • *The buffer will be required to be marked on plans, unfortunately the City is unable to support the deletion of the buffer.*	Document Set ID 4797398
28	01/02/2022	Consultant replies to Planner with information Consultant forwarded to Operator and advises/contests; • *Everything is OK. The pit depth will be determined by the DWER* • *Stumbling block is the 20 metre buffer*	Document Set ID 4806061
29	08/02/2022	Manager (Development Services) advises Senior Planner to inform the Operator that the City will not support a temporary Approval to remove remaining stockpile.	Document Set ID 4827056
30	11/02/2022	Planner emails Consultant • *Can accept the development application without the 20m buffer designated on the plans and it will be assessed through the development approval process. Please have the applicant respond with the additional information.*	Document Set ID 4806061
31	17/02/2022	Compliance internal email with Planner re: progression of Application and required rehabilitation of exposed cell which formed part of previous and expired DA (NOTE: not rehabilitated to acceptable standard as of 27/06/23). Compliance team working in conjunction with Planning to assist in a suitable outcome for all parties e.g. • *Rehabilitation of exposed cell* • *Application approved meeting all minimum standards for boundary setbacks* • *Minimum distance above water table (500mm above not 300mm above)* • *Closure of constructed drainage channel aka swale drain out to wetland,* • *Maintain minimum rehabilitation batter slopes (1:5 not 1:4 or less),* • *Minimum 200mm topsoil,* • *On rehab finished ground level 700mm above water table (500mm DWER then 200mm topsoil).*	Document Set ID 4809842
32	01/03/2022	Planner emails Consultant requesting clarification and reiterating minimum standard that needed to be reflected in submitted management plans before sending to agencies for Comment or sent out for Advertising; • *City is unlikely to support the removal of these stockpiles as there are concerns there will be insufficient sand left to rehabilitate the excavation works and return the land to a productive state. Retention of stockpiles of sand is considered essential in the successful rehabilitation of current DA21/0822 as well as the expired DA15/0519.* • *The Rehabilitation Project Management Plan for this area states that "a drainage swale will be left through the centre of the closed pit". The City has received advice from DWER strongly advising against a drainage swale being left through the centre of the closed pit. DWER have indicated there could be several detrimental impacts to the surrounding riparian zone.* • *The swale drain that leads out to the wetland needs to be backfilled as per advice from DWER due to the significant environmental harm it may cause.* • *The City is advising that 500mm of backfill will be considered acceptable to backfill the pit.* • *The rehab slope would ideally be graded to 1:5 in and around the pit edge.* • *The existing pit floor (aka Cell 'A' in the latest Development Application) could go ahead and be rehabilitated*	Document Set ID 4818394
33	01/03/2022	Consultant replies to Planner contesting guidance provided by the City and DWER; • *there has been no communication from the City in response to the submission of the Management Plans etc apart from yourself. The only other communication was two emails both basically saying that the matter was being dealt with.* • *comments from the DWER do not appear to match the emails provided by the City from the DWER* • *Items from the meeting of the 29 October 2021 for whatever reason were not emailed to us and were not received by the proponent until late December.* • *I have still not received any information or responses from the Compliance Section relating to the meeting of 29 October 2021, which is a little unusual as I prepared the Management Plans.* • *It still remains unclear what the City's position is with respect to the buffers.*	Document Set ID 4827057

34	02/03/2022	Senior Planner internal email to City Manager (Development Services) advising of Consultant concern. City Planner advises taking Consultant through ongoing issues and concerns that still require modification to management plans as Consultant continue to contest e.g. • Proposal - removal of top soil stock piles resulting in not enough top soil for rehab and adequate separate to ground water table. • No setback/buffer to the western lot boundary • Drains into wetland	Document Set ID 4827059
35	02/03/2022	Consultant emails Senior Planner advising extractive site extractive cell division has been changed. NOTE: Map only, not included in submitted management plans.	Document Set ID 4827060
36	03/03/2022	Request for Payment • Applications will not commence assessment until all relevant fees are receipted. • The City endeavours to determine an application within 60 days of payment, or within 90 days where adjoining landowner and/or agency referrals are required.	Document Set ID 4820574
37	03/03/2022	Consultant email DWER (Cc. the City) explaining the site water management plan and drainage channel; • *prevent the flooding of the existing pit and to enable future excavation without any flooding of the pit.* • *The pit was opened up slope which caused the problem, when it should have been opened in the east at the lowest point forming the base floor and working west. It was that problem and the nature of the hydrogeology that caused the pit to flood after rains in winter.* • *Whilst a temporary drain was cut last winter to lower the water in the pit that drain will be backfilled and will be formed into a gentle swale where the water table remains below the base of the pit.* NOTE: Drainage channel still not cut off and backfilled 26/06/2023). • *By not starting the pit at the lowest point in the east a "dam" was created as the temporary perched water table was intersected in the west.* • *The drain that has been cut is temporary and will be backfilled to ensure there is a minimum of 500 mm separation to the water table* • *If the water table remains exposed the floor elevation will have to be lifted until it is demonstrated that there is the 500 mm separation*	Document Set ID 4827062
38	03/03/2022	Senior Planner emails Consultant to arrange City of meeting to discuss further (arranged for 11/03/2023) City Planner, Compliance and DWER meeting with Operator and Consultant.	Document Set ID 4827062
39	08/03/2022	DWER email Senior Planner advising; • *the exposure of groundwater/the water table in the pit during extractive industry operations, and* • *unauthorised drainage (via a channel/swale) of pit water to nearby wetlands, i.e. the riparian zone of/and the Buayanyup River* • *It should also be noted that it is highly likely the groundwater being drained is moving from the west to east toward Lot 4205 from Lot 1, Lot 1 being a site reported as 'Possibly contaminated - investigation required.*	Document Set ID 4827063
40	09/03/2022	DWER email Senior Planner reiterating; • ***The filling and rehabilitation of the drain dug during previous extractive activities is a priority action****. The proponent must have a practical action plan for this rehab. and a clear timeline for completion. It would be reasonable to suggest that no commercial production shall commence until the drain remediation is substantially completed (bearing in mind that some of the 'new' sand resource may be needed for the rehab.)* • *Any approval conditions should include extraction being limited to a single cell at a time. For practicality, rehabilitation of a cell shall be substantially completed to the satisfaction of the City, prior to extraction commencing in the following cell.* • *I have asked LS to produce a plan of the groundwater contours beneath the proposed pit (cells). Ideally these would be at a 0.5m AHD accuracy and enable the City to fix pit floor levels in mAHD, rather than a general statement about remaining 0.5m clear of the maximum water table. I believe being prescriptive will assist the proponents in achieving compliance.*	Document Set ID 4827065
41	09/03/2022	Consultant emails Senior Planner advising of conversation with DWER; • *provided a plan of the maximum perched and regional groundwater contour elevations* • *presence of the hard pan in part of the pit has meant that the maximum winter perched groundwater elevations are slightly higher than the lat approval of 71 metres AHD across the floor.* • *was agreed with DWER that it is preferable for the fence line buffer between Lot 4205 and Lot 1 to the west to stay in place, but as provided in the Management Plan of December 2021 the 20 metre setback is requested to be battered down from the fence line.* • *important that excavation commences in the south east to enable the swale to be developed and the steep old disturbances in that area to be improved.*	Document Set ID 4827066
42	11/03/2022	Planner emails Operator and follows up 'Request for Payment'	
43	14/03/2022	Planner emails Operator and follows up 'Request for Payment'	
44	15/03/2022	Senior Planner emails Consultant to confirm that recent (and attached) management plans are the most current version.	Document Set ID 4827500
45	15/03/2022	Complex Development Application form completed by City Senior Planner, request Comment from; • Engineering • DMIRS • DWER • Main Roads WA	Document Set ID 4827452

		• DPIRD • DBCA • Geological Survey WA	
46	15/03/2022	Consultant replies to Senior Planner, continuing to suggest the City nor DWER has replied to email requests and contest City guidance; • *from not receiving correspondence from the various people at the City of Busselton so we had to try and guess what to provide* • *seems to be divergent opinions between the various parts of the City* • *speaking to Brendan Kelly we discussed leaving the 20 metre boundary buffer in place and it was agreed that would be the case* • *discussed the ability to batter the 20 metres down to the pit floor from 5 metres inside the property boundary. I though we agreed that was OK, however Brendan may have misunderstood or referred to the 20 metre buffer only.* • *I have had no response from Brendan Kelly so I am unclear what his recommendation is or whether DWER is comfortable with battering the 20 metre boundary buffer down to the pit floor.* • *Rehabilitation Plan was provided as a result of the meeting at the City on 29 October 2021.* • *The planning comments were not received from the City until 29 December 2021, but luckily the revised management plan covered all the issues anyway.* • *My suggestion is;* • *Slotting the new two new figures in the Management Plan for better advertising and City of Busselton processes.* • *Delete the Rehabilitation Plan as it is covered by the new Development Approval. It is all in the management plan.* • *Completing the compliance reshaping of the swale during operations and not prior to that.*	Document Set ID 4828285
47	15/03/2022	Senior Planner replies to Consultant and will confirm with DWER.	
48	15/03/2022	Senior Planner emails DWER to confirm Consultant request for clarification re; boundaries and minimum batters DWER advise accordingly that it remains a City call, and preferable to 1:6 but DWER has no jurisdiction.	Document Set ID 4828287
49	17/03/2022	City Advertises Development Application – to make comment before 20/04/2022.	Document Set ID 4831155
50	17/03/2022	Senior Planner replies to Consultant advising of DWER and City Director (Planning & Development Services) confirmation; • *20m setback is required is under the City's Local Planning Policy and therefore the City does have the ability to vary the setback. To what extent we are willing to vary the setback would need to be determined following advertising and further assessment of the proposal.* • *As previously advised, I would recommend you apply for the setback that you want and we will advertise the application and asses accordingly.* • *In light of the above can you please update the relevant documentation ready for consultant next week.*	Document Set ID 4833656
51	19/03/2022	Consultant replies to Senior Planner • *figures and text consistent with the 20 metre setback being retained with a 5 metre zone along the fence left as natural land surface and then battered down to the floor of the pit.* • *deleted the rehabilitation plan as that is all covered by the new application*	Document Set ID 4833656
52	21/03/2022	City sends Application and associated management plans to Agencies for Comment.	Document Set ID 4834422
53	21/03/2022	City send Application to nearby residents for comment.	Document Set ID 4834423
54	02/04/2022	City receives advice from neighbour via email - does not support Application.	
55	13/04/2022	City receives Comment from DWER; • *should not be approved until there is substantial progress on this rehabilitation work, to the satisfaction of the City. The Department supports the City's position:* • *No stockpiles or top soil are to be removed from Lot 4205 – All remaining stockpiles and top soil are to remain on the site and are to be utilised for rehabilitation works.* • *Cells AE and AW (as marked on the staging plan) are to be rehabilitated as soon as possible such that a minimum separation of 500mm from the final finished ground level to the maximum seasonal ground water table is achieved.* • *No other works are to occur on the site until the proponent's current application, DA21/0822, has been determined by the City.* • *With respect to the current application, there is a strong probability that groundwater close to the surface - the shallow seasonal superficial water table - will inhibit the extraction of sand from the new (proposed) extraction areas. The Department strongly recommends that the proponent be advised to install monitoring piezometers on site, to confirm the levels of this groundwater, prior to this winter. This is necessary to inform any EI plan.* • *This site, in context of DA21/0822, will be subject to further communication from the Department, following a review of the DA*	Document Set ID 4850431
56	16/04/2022	City receives advice from neighbour via 'Your Say' - does not support Application.	Document Set ID 4860074
57	19/04/2022	City receives advice from neighbour via 'Your Say' - does not support Application.	Document Set ID 4860074
58	19/04/2022	City receives advice from neighbour via 'Your Say' - does not support Application.	Document Set ID 4860074
59	21/04/2022	City receives Comment from DPIRD; • *The Department of Primary Industries and Regional Development (DPIRD) does not support the renewal of the licence due to the following concerns.*	Document Set ID 4853530

		• *The water table was intersected during the previous extraction phase and the area will have to be filled and rehabilitated to the satisfaction of the before any continuation of the Extractive Industry is approved.* • *The applicant did not provide any site-specific information regarding the water table and DPIRD is concerned that without this information, there is no guarantee that the 0.5m separation to the maximum seasonal ground water table will be achieved. Failure to adhere to the 0.5m separation to the maximum seasonal ground water table can potentially sterilise and/or significantly restrict the future agricultural production of the land.*	
60	25/04/2022	City receives Comment from neighbour via email - does not support Application. • Noting that 20 metre boundary buffer should remain due to possible contamination risk by next door neighbour property (lot 1 Gale Road).	Document Set ID 4859121
61	02/05/2022	City receives Comment from neighbour via email – does not support Application.	Document Set ID 4860540
62	03/05/2022	City receives further Comment from DWER; • *the proponent excavated a drain from the pit area, essentially to cause the drainage of intercepted groundwater from the pit into the nearby Buayanyup River, a Resource Enhancement wetland.* • *The Department does not accept this as being an appropriate management strategy* • *It becomes clear that the WMP (p.10) supports ongoing drainage of groundwater in the EI area, apparently both during and after extraction* • *Irrespective of the proponent's claim that "drainage will simply replicate the existing hydrology" the Department does not support the proposal.* • *The Department is of the view that a pre-excavation monitoring program, using a network of onsite piezometers, will help establish the highest groundwater level beneath the proposed EI cells.* • *The Department does not accept exposure of the water table during excavation for any period of time.* • *DA21/0822 has not presented a case where the Department can support approval, where it would appear the project is highly likely to intercept with the water table.* • *the Department notes concern from the Department of Primary Industries and Regional Development that imprudent excavation could potentially sterilise and/or significantly restrict the future agricultural production of the land.*	Document Set ID 4861652
63	04/05/2022	City receives Comment from neighbour via email - does not support Application.	Document Set ID 4862444
64	10/05/2022	Compliance emails Operator and requests progress for rehabilitation works to cell and backfill of drainage channel.	Document Set ID 4865117
65	17/05/2022	Operator replies to Compliance and advises required rehabilitation of cell and backfill of drain has not been completed, due to covid and machinery break down, expected time of repairs August 2022.	
66	19/05/2022	Compliance reply to operator advising acceptance of repair times as per guidance provided by Operator e.g. August 2022.	Document Set ID 4871423
67	20/05/2022	City receives Comment from DBCA; • *DBCA recommends that a minimum 10 metre buffer be provided between the extraction and adjacent retained trees and planted WA Peppermint trees, to protect the vegetation from accidental vehicle damage and vegetation root compaction. The 10 metre buffer should be demarcated to clearly identify the vehicle exclusion area.*	Document Set ID 4872723
68	09/06/2022	Senior Planner emails Operator and requests further information following Agency Comments and highlights criterion missing from submitted management plans; • *20 metre setback to the western lot boundaries to be maintained* • *Supporting information submitted as part of the development application does not include site specific data or information to quantify maximum seasonal groundwater.* • *insufficient information has been provided to demonstrate that adequate separation to the groundwater table.* • *Hydrogeology and Water Management, indicates that the previous extractive operations on the site have breached the water table and therefore it is considered that there is a high risk that this will likely occur again.* • *on-site piezometers and a report prepared by a suitably qualified hydrologist will need to be prepared over this winter season and submitted to the City prior the application progressing.* • *Timeframe to be amended to 5 years (not 10 years).* • *Excavation depth within the report will need to be updated in line with the information obtained from the additional water monitoring* • *Quantity of material, Stockpile heights and locations, truck movements, rehabilitation, environmental management, dust management etc.*	Document Set ID 4884554
69	04/07/2022	Development Control Unit – Engineering recommendation. • *Constructed, sealed and drained crossover to the City's specifications i.e. 10 meters plus the expected length of any vehicle expected to use the access with at least 20m of seal from the sealed edge of the road.* NOTE: Instruction to hard seal by City previously has continuously been contested and not been carried out by Operator (identified during Compliance audit and Operator notified in writing 15/07/2022).	Document Set ID 4831116
70	25/07/2022	Consultant replies to Senior Planner (email sent to Consultant requesting further information 09/06/2022) Contests City guidance to; • Maintain 20metre boundary buffer • Rehabilitation • Dust Management Plan	

		• Stockpiles Consultant requests copy of DWER and DPIRD comments.	
71	12/08/2022	Senior Planner replies to Consultant and provides DWER and DPIRD comments.	
72	23/08/2022	Senior Planner discusses with Compliance, Compliance provide email with detailed information and further comment for; • 20 metre setback • Haulage routes • Rehabilitation • Dust Management Plan • Stockpiles NOTE: Referencing Local Planning Policy 2.3 Extractive Industries, item 4.2.4.5 Policy Areas 2 & 3 for further information and DWER clearing permit (CPS 6766/2).	Document Set ID 4936491
73	29/08/2022	Senior Planner emails Consultant and provides detailed guidance (as consulted with Compliance 23/08/2022) of what is required to modify previously submitted management plans following Comment from DWER and DPIRD.	Document Set ID 4939281
74	10/11/2022	Compliance receives phone call from Operator and replies by email confirming; • *Previous correspondence by Senior Planner requesting further information and detailing required modifications to management plans* • *Maintaining the 20metre boundary buffer* • *Reiterating Cell 1 to be rehabilitated* • *Guidance to use the "My Project Quick Guide" and the "DA Checklist for Applicants" to assist in ensuring all required setbacks, measurements and documents etc. are submitted.* • *Confirm if LS remains as your Consultant or if you are preparing and/or modifying required documentation internally.*	Document Set ID 4995727
75	22/11/2022	City receives phone call from Owner in regards to the boundary fence between Lot 1 and Lot 4205 Gale Road. Owner blames Lot 1 owner of destroying fence due to their previous extraction activities.	Document Set ID 5003836
76	16/01/2023	Consultant emails Senior Planner advising of updates still required on management plans. As per item 74 above.	Document Set ID 5040800
77	16/01/2023	Senior Planner emails Consultant and advises of Compliance Officer/Planning Administration being point of contact for the Application moving forward.	Document Set ID 5040800
78	17/01/2023	Compliance Officer/Planning Administration provides Manager (Regulatory Services) detailed information and pictures of fence degradation dating back from 2019 to 2023 in addition to Consultant request that 20metre boundary buffer be negated.	Document Set ID 5035893
79	24/01/2023	Compliance Officer emails Consultant and Operator and reiterates in detail the remaining items that still require addressing in the modified management plan before progressing with the delegated Authority Approval. • *'The City sincerely appreciates your attention to these matters and are looking forward to moving onto and providing Approval as soon as is practicable upon receipt of the modified Management Plan/s'.* • *Management Plan requires the 2022 water monitoring piezometer results to be included for comment by DWER.* *Include as much information as possible if only 4 measurements were taken during the course of 2022 (as advised by Hayley Piggott)* *Include survey as well to support measurement results* • *Please ensure any updated aerials or plans contained within relevant management plans include information and data pertinent to Lot 4205 only and no other surrounding lots not owned or operated by V Edwards and/or B&H Piggott.* • *The Dust Management Plan requires modification to 'remove' reference to the 'crusher'.* • *The following steps are still required for completion prior to the issuing of the Permit to Commence Certificate; to which the City will progress as expediently as possible;* 1. *Development Approval* 2. *Prior to Commencement Conditions* 3. *Legal Agreement* 4. *Caveat* 5. *Bonds*	Document Set ID 5040800
80	03/03/2023	Consultant emails Compliance Officer/Planning Administration submitting modified management plan.	Document Set ID 5068155
81	07/03/2023	Compliance Officer/Planning Administration replies to Consultant and thanks for modified management plans.	Document Set ID 5068156
82	09/03/2023	Compliance Officer/Planning Administration completes thorough review of modified management plans and identifies management plans still do not meet minimum criteria as required for acceptability.	Document Set ID 5078462
83	10/03/2023	Compliance Officer/Planning Administration emails Operator and Consultant and advises of review carried out (09/03/2023) and notes *'document does not meet the minimum standard acceptable for approval'.* And reiterates multiple attempts made by the City to suitably inform the operator and Consultant of required changes to meet minimum standard and references the following dates of email correspondence;	Document Set ID 5071414

		• 24/01/2023 • 16/01/2023 • 10/11/2022 • 29/08/2022 • 12/08/2022 • 25/07/2022 • 09/06/2022 *'The City acknowledges that non-adoption of the guidance provided by the City to modify the relevant management plan/s to support extractive industry (sand) application may be an oversight on this occasion and will grant an extension of time to C.O.B. Friday 14th April 2023 to modify accordingly, however if the relevant management plan/s are not modified as per the guidance to achieve minimum acceptable standard the City may look to refuse under delegation'.*	
84	12/04/2023	Newly appointed Consultant emails Compliance Officer/Planning Administration and requests copies of previous correspondence between the City and past Consultant with the intent of modifying the management plans to meet acceptable standard.	Document Set ID 5093595
85	12/04/2023	Compliance Officer/Planning Administration replies to newly appointed Consultant and sends required email correspondence and confirms that the City will extend submission of management plans to 28th April 2023 as requested by newly appointed Consultant. Whilst advising that further modified management plans will be required to be re-submitted to DWER and DPIRD as these Agencies were not in support of previously submitted management plans.	Document Set ID 5093595
86	28/04/2023	Newly appointed Consultant emails Compliance Officer/Planning Administration modified management plans as required.	Document Set ID 5104610
87	05/05/2023	Newly appointed Consultant emails Senior Compliance Officer and forwards copy of management plans requesting to *'review these as soon as possible as the proponent is urgently looking for a response on this matter'.*	Document Set ID 5111860
88	05/05/2023	Senior Compliance Officer receives very unhappy phone call from Operator in regards to Application progress, requests email (item 87 above) be forwarded onto Senior Planner to manage.	Document Set ID 5111860
89	08/05/2023	Senior Planner emails Compliance Officer/Planning Administration and attests that management plans have been re-submitted as required by newly appointed Consultant and requests confirmation if Advertising is required.	Document Set ID 5111860
90	08/05/2023	Compliance Officer/Planning Administration replies to Senior Planner and confirms management plans being reviewed.	Document Set ID 5111860
91	08/05/2023	Compliance Officer/Planning Administration reviews modified management plans as re-submitted by newly appointed Consultant noting that all required items appeared to have been addressed to acceptable standard and advises Senior Planner of acceptability.	Document Set ID 5118794
92	31/05/2023	City Re-Advertises Development Application – to make Comment before 12/07/2023.	Document Set ID 5131124
93	31/05/2023	City send Application to nearby residents for Comment.	Document Set ID 5134913
94	31/05/2023	City send Application to Agencies for Comment.	Document Set ID 5131124
95	22/06/2023	DWER email City and advise; • *Previously, the Department raised concerns about prior EI operations on Lot 4205, specifically: the exposure of the ground water table in the pit during preceding extractive industry operations, and the subsequent drainage of that pit water into the nearby Buayanyup River.* • *Consequently, due to the presence of the large volumes of exposed groundwater, it is understood that the City required the EI proponent to rehabilitate the site, which included backfilling a ditch that was constructed to remove water from the pit to the river.* • *The Department hold the view that further work needs to be completed to establish the nature of ground water in the EI area. This includes monitoring of the existing piezometers over this winter, to supplement the data already collected, sporadic as that might be.* • *Extrapolated groundwater contours should be provided to the City in order that they are able to assess the project with appropriate diligence.* • *If the proponent is reluctant to undertake this work, the option is for the City to condition any approval with maximum pit floor levels 1 metre or more (rather than 0.5 metre) above what is the currently surmised highest seasonal groundwater level.* • *At the same time the City should impose the condition:* *"If any groundwater interception occurs during extraction that breaches the extractive industry licence conditions", the proponent shall cease work and provide an advice notice to the local government authority within 24 hours, followed by agreed remedial action".* • *It is noteworthy that the Piggott Plan is largely a repeat of previous planning documents lodged to support a DA in March 2022* • *Noting that further groundwater monitoring is required, and it is understood some has been done, it is appropriate that the City ask for a more specific statement on the highest seasonal groundwater level, in keeping with the principals of due diligence.*	Document Set ID 5153059

During the Application period the Application has seen the file be handed across;

- 3 Planners (MY, JD, DM)
- 3 Seniors Planners (SN, LR, LH)
- 1 part time Planning Administration Officer (SDV)

Drainage channel (aka swale drain cut and leading out to wetland) from cell 1A.









"Rehabilitated" cell 1A (current state of rehabilitation; not to acceptability standard of Compliance for return of bonds where applicable).

- Surface water leading out to drainage channel
- Gravel access road leading down into cell 1A
- Cell 1A appears to not be ploughed, sewn with pasture seed (natural vegetation/grasses/weeds regrowth) as per expired rehabilitation management plan
- Identifiable visual impact/depression in remaining ground surface









SUMMARY OF SUBMISSIONS

PROPOSAL: INDUSTRY – EXTRACTIVE (SAND) – LOT 4205 GALE ROAD KALOORUP

SUBMISSIONS CLOSE: 14 July 2023

OFFICER: Louise Hughes

No.	NAME	NATURE OF SUBMISSION	APPLICANT COMMENT	OFFICER COMMENT
External Agencies				
1.	Main Roads	No objections	Noted	Noted
2.	Department of Water & Environmental Regulation	Further to our prior communications and today's site inspection at Lot 4205 Gale Road, Kaloorup (Lot 4205). • BACKGROUND The City of Busselton (City) referred this Extractive Industry (EI) Development Application (DA) to the Department of Water and Environmental Regulation (Department) for advice. Over time, there has been extensive consultation regarding the DA and associated documentation: - 'Excavation – Rehabilitation Management Plan, Continuation of Sand Excavation, Lot 4205 Gale Road, Kaloorup Piggott Sand Supplies, April 2023' (Piggott Plan) - 'Water Management Plan Lot 4205 Gale Road, Kaloorup ACCENDO, April 2023' (WMP) Subsequently, a site inspection was arranged at Lot 4205 on 13 July 2023, attended by: o Brendan Kelly (Department) o Louise Hughes (City) o Brad and Hayley Piggott (Piggott Sand Supplies) o Kirsten Muir-Thomson (ACCENDO Australia) The inspection was towards facilitating a resolution of the DA. • ON SITE On site, the Department reiterated its concerns about the potential for exposure of the groundwater table during EI operations, as has occurred previously. As such the Department will require: 1. A review of the proposed pit floor levels in all future EI stages, based on professional hydrogeological advice. The Department holds the view that further work must be completed to establish the nature of ground water levels beneath the EI area, prior to any approval. It is understood that this will include monitoring of existing piezometers over this winter and survey levels of existing groundwater expressions, to supplement data already collected. Extrapolated groundwater contours should be provided to the City in order that the project can be assessed with appropriate diligence. The Department also considered that: 2. Any DA should be conditioned to permit only one stage to be worked at one time.	Noted. WMP has been updated to reflect comments provided by DWER. Ongoing monitoring of piezometers will be undertaken and extrapolated groundwater contours will be provided.	Noted, see officer comment section.

SUMMARY OF SUBMISSIONS
PROPOSAL: INDUSTRY – EXTRACTIVE (SAND) – LOT 4205 GALE ROAD KALOORUP
SUBMISSIONS CLOSE: 14 July 2023
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		Given the uncertainty about the levels of groundwater, the Department considers it prudent to also limit the EI area disturbance to one stage at a time, enabling adaptive management, if groundwater became present. It was essentially agreed that the new hydrogeological work should provide groundwater contours for each stage, in context of a Staging Plan. PROPOSED CONDITION: Extraction must be undertaken in accordance with the Staging Plan, as approved by the local government. Commencement of the subsequent extraction stage shall be subject to the previous extraction site having been substantially completed, to the satisfaction of the local government. 3. Maximum pit floor depths are to be conditioned by DA approval. Maximum pit floor depth should be confirmed in metres AHD, following review of new hydrogeological work PROPOSED CONDITION: Excavation shall only be undertaken to the maximum depth of xxxx m AHD, unless otherwise approved by the LGA in consultation with the Department of Water and Environmental Regulation, following site specific groundwater monitoring being undertaken. In addition to the above: 4. No dewatering works are to be undertaken without consultation. PROPOSED CONDITION: If any groundwater interception occurs during extraction that breaches the extractive industry licence conditions), the proponent shall cease work and provide an advice notice to the local government authority within 24 hours, followed by agreed remedial action. Broadly, the proposed extraction is to be implemented in accordance with the Department's Water quality protection note (WQPN) no. 15 'Basic raw materials extraction' where appropriate to ensure environmental risks are appropriately mitigated. With regard to the above, the Department is in a position to review any draft conditions to ensure they are suitable and reflect current undertsandings.		
3.	Department of Biodiversity Conservation and Attractions	The Department of Biodiversity Conservation and Attractions Parks and Wildlife Service South West Region (DBCA) has no comments on the above proposal. It is considered that the proposal and any potential environmental impacts will be appropriately addressed through the existing planning framework.	Noted	Noted

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	Parks and Wildlife Service South West Region (DBCA)	Thank you for the opportunity to comment on the on this application.		
Public Submissions				
1.	Jarrad Froome KALOORUP	This will bring so much noise and disruption to a nice quiet area	Proposed works are consistent with that already approved for the site.	See officer comment section.
2.	Daniel Cladingboel KALOORUP	Dust issues I have been alerted too from the past work conducted on site. The work they have been currently conducting is very noisy and the trucks haven't started leaving consistently yet. also the traffic management they will be pulling out very close to our driveway and its risky	Proposed works are consistent with that already approved for the site.	See officer comment section.
3.	Megan Flowers KALOORUP	It will negatively impact on the aesthetics of the local area (noise pollution) and the quality of life for adjacent land holders, and, pose an increased road risk to us and our children. Please refer to the attached document for more detailed information.	Proposed works are consistent with that already approved for the site.	See officer comment section.
4.	Deborah & Mark Pettersson KALOORUP **SUBMISSION 1**	To whom it may concern, As adjoining landowners of Lot 4205, Gale Road, Kaloorup we wish to update and resubmit our original letter of opposition to a proposed 10 year license for the continuation of sand extraction at the above address. Our major concerns still apply: 1. An independent hydrology report that is current needs to be provided by the proponents that clearly addresses the minimum separation of 1 meter between the maximum extraction depth and the maximum water table depth. (the water erosion and flooding occurring on the northern corner boundary is an example of problems to come. 2. It is proposed that a perimeter buffer of 20 meters be deleted on the northern boundary of Lot 1 , Gale Road and Lot 4205's southern boundary, to maximize the amount of sand extraction. This is not acceptable. 3. There is a memorial lodged on the site of Lot 1, Gale Road , we believe, as it is a suspected contaminated site that needs further investigation. If the City of Busselton allow the removal of this buffer, we see this as a breach of compliance with Policy 5A, Rural Areas Land Use and Development Policy.	1. Hydrology concerns have been addressed with DWER in the updated WMP. 2. A 20m buffer to all boundaries will be maintained. 3. As above. 4. As above. 5. A five year licence is being requested. Saturday works are restricted to rehabilitation works only reducing the	See officer comment section.

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		Removing this buffer is problematic due to the need to contain any possible contaminated material from Lot 1. Extracting this sand would involve heavy machinery movements between the two properties thus disturbing any contaminated material. 4. Removing the perimeter buffer of 20 meters could also set a precedence. The 20 meter buffer in Policy5A is here to protect neighbouring farms and their fence lines. (what is to prevent the proponents of Lot 4205 and the owner of Lot 1, continuing further to extract more sand on other boundaries?) 5. The 10 year license time is unacceptable to us. .It has always been 5 years. Compliance issues tend to arise in longer time frames. So too are Saturday work hours from 7am to 2pm. This is unfair for neighbours who have to put up with noise all through the working week. We hope that the City of Busselton will consider the points we have raised. Sincerely,	impact on neighbouring properties.	
5.	Deborah & Mark Pettersson KALOORUP **SUBMISSION 2**	DA2I/0822- Industry- Extractive (Sand) - Lot 4205 Plan 208196 Gale Road, Kaloorup. To whom it may concern, As adjoining landowners of Lot 4205 Gale Road, Kaloorup, we wish to formally oppose the proposed 10 year license for the continuation of sand extraction at the above property. We are aware that sand is a valuable resource for the community but so too is agriculture. We have lived on our property at 465 Gibb Road , Kaloorup for 30 years and in that time we have managed our vineyard of 5 acres and in the last few years we have now invested in the breeding of Hereford cattle. Sand and gravel extraction has become more widespread throughout the shire of Busselton, during this time. In fact, Gale Road is a very busy thoroughfare for many earthmoving contractors. Leeuwin Civil, Vasse Transport, Piggot Sand Supplies and various other smaller companies. The owners of Lot 4205, Gale Road, originally received an extractive industry license from the City of Busselton for a five year period only, commencing 13-4-2016. (DA15/0519) The applicants are now applying for a 10 year length of approval. The hours of operation have included Saturdays from 7a.m. to 2p.m. inclusive.	In relation to the 10 year period and the working hours please refer to response above. No vegetation clearing is required. In relation to the hydrology report, please refer to the response above. In relation to transport, the size of trucks nor the number of trucks is proposed to change from the already approved licence. In relation to the removal of the 20m buffer please refer to the response above, a	Noted. See officer comment section.

SUMMARY OF SUBMISSIONS

PROPOSAL: INDUSTRY – EXTRACTIVE (SAND) – LOT 4205 GALE ROAD KALOORUP

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		This is not acceptable. Working hours have always excluded weekends and 5 year license approvals have been the norm. Vince and Sheila Edwards, had to apply for a clearing permit for Lot 4205 in order to extract further amounts of sand. The native vegetation to be cleared included over 180, two hundred year old peppermint trees. (possible habitat of the endangered western ringtail possum) A conditional clearing permit was granted, whereby, during the clearing process, fauna specialists were to be present, to retrieve and relocate any possible possums. Over the last few months, clearing has occurred. It has been hurried and appears that no regard at all has been made to keep setbacks and minimize the amount of native vegetation to be cleared. Within the clearing permit - 6766/2, it is stated that the conditions are: 1. Avoid, minimize and reduce the impacts and extent of clearing. This has not been adhered to. At present, we are speaking with Craig Jacques from DWER about whether there was a fauna specialist during the clearing. Further details are yet to be determined. Within the applicants' proposal it is stated that "the sand extends to depth but it is anticipated that the pit will be 1-4 metres deep with an average of 3 metres. '-4'- Extractive industry license DA15/0519 requires a minimum separation of 1 metre between the maximum extraction depth and the maximum water table depth. 1/3 Version: 1, Version Date: 05/07/2023 Document Set ID: 5156995 5/1/22, 12:21 PM Augusta/Margaret River Shire - Google Docs A current hydrology report needs to be made available from the proponents. Transport of sand is another issue. Gale Road West has many safety concerns. Last week, a Leeuwin Civil truck rolled over at the Carbunup River bridge and caused considerable damage. There are 90 degree bends with poor vision and with the numerous sand pits in the area, this is becoming more of a danger.	20 m buffer will be maintained from all property boundaries.	

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		On Gale Road west, there is Middle Earth bike trails, the Beer Farm and now a proposed school of 1500 pupils. Our final concern with regards to DA21/0822 is a major issue, that being the removal of a perimeter buffer of 20 metres. It is proposed that the buffer, in compliance with section 6.4, City of Busselton Policy 5A- rural areas land use and development policy- be deleted. This would have huge ramifications with the neighbouring property, Lot 1, Gale Road. Lot 1, Gale Road has a memorial lodged on the site due to buried contaminated waste. "A memorial lodged on a site will restrict the site from being subdivided, amalgamated or gaining approval from a local government for development" We have been speaking with Andrew Miller, senior manager of contaminated sites about this matter. The proposed removal of perimeter buffers at Lot 4205, is problematic. It is likely to increase sediment transportation via soil erosion. We see the 20 metre buffer as a protective sand bund that is containing any possible contaminated runoff from Lot 1. If the buffer was removed there would be heavy machinery movements disturbing the ground, in which there could be asbestos material. We see this as irresponsible and risky.		