V A S S E

STRUCTURE PLAN

OCTOBER 2021

(Amendment No. 1 - May 2024)

HATCH

VASSE

TITLE:	Vasse Structure Plan
PREPARED FOR:	Perron Developments Pty Ltd & Stawell Pty Ltd
AUTHOR:	D. Pearce
REFERENCE:	PGP VAS (H-367864)
STATUS:	Draft
VERSION:	Final
DATE OF RELEASE:	May 2024

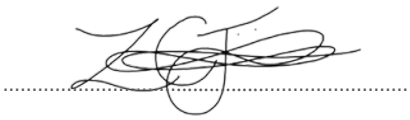
HATCH

ENDORSEMENT PAGE

IT IS CERTIFIED THAT AMENDMENT NO. 1 TO THE VASSE STRUCTURE PLAN WAS APPROVED BY RESOLUTION OF THE WESTERN AUSTRALIAN PLANNING COMMISSION ON:

26 SEPTEMBER 2025

Signed for and on behalf of the Western Australian Planning Commission:



an officer of the Commission duly authorised by the Commission pursuant to section 24 of the *Planning and Development Act 2005* for that purpose.

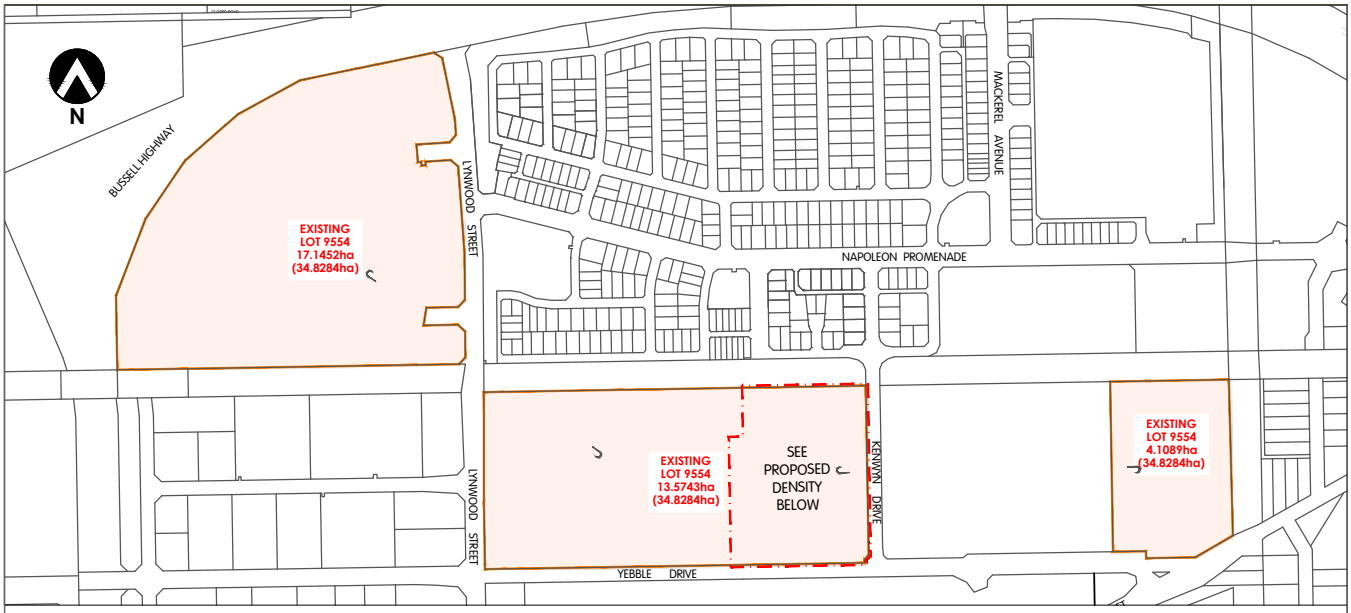
TABLE OF AMENDMENTS

AMENDMENT NO.	SUMMARY OF THE AMENDMENT	AMENDMENT TYPE	DATE APPROVED BY WAPC
1	Realignment of Northerly Street	Minor	26 SEPTEMBER 2025

TABLE OF DENSITY PLANS

DENSITY PLAN NO.	AREA OF DENSITY PLAN APPLICATION	DATE ENDORSED BY WAPC
WAPC Ref. No. 158 018 (RD1011C)	Dawson Stage 4A	2nd September 2019 (Subdivision) 10th March 2020 (Revised Plan Approval)
WAPC Ref. No. 159 061 (RD1304B)	Dawson Stage 4B	5th June 2020
WAPC Ref. No. 160 204 (RD1308D)	Dawson Stage 5A	2nd March 2021
WAPC Ref. Nos. 161 473 and 162 483 (RD1167A)	Dawson Stages 5B and 6	7th March 2024
WAPC Ref. No. 163 957 (RD1161E)	Dawson Stages 6C and D	22nd December 2023
WAPC Ref. No. 200848 (RD1168D)	Dawson Stages 6	24th February 2025

Residential Density Code Plan – WAPC Ref. No.158 018 (RD1011C)



LOCATION PLAN – EXISTING LOT

DETAIL – PROPOSED RESIDENTIAL DENSITY

LEGEND

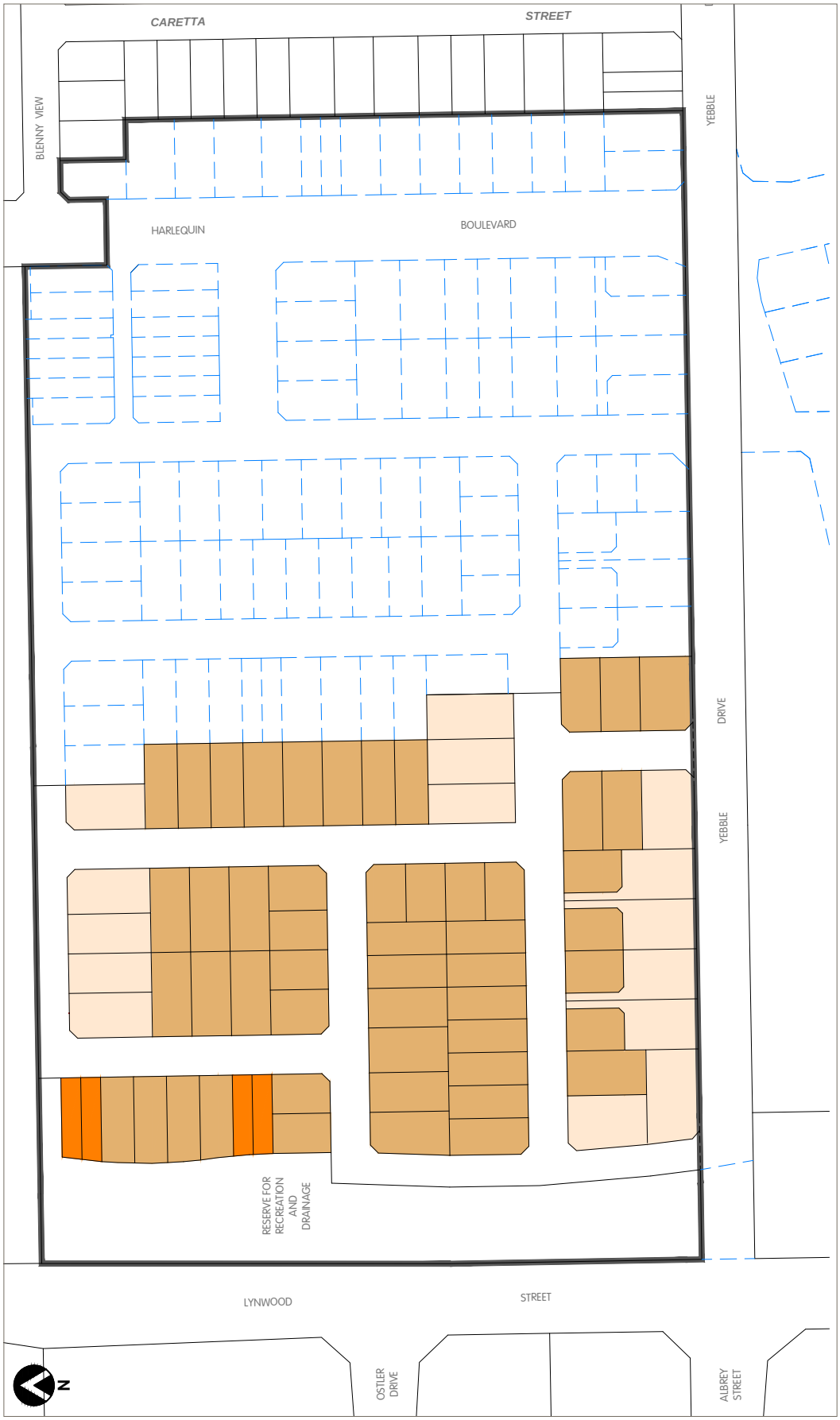
- EXISTING LOT 9554
- DETAIL - PROPOSED DENSITY AREA
- PROPOSED LOT BOUNDARY
- EXISTING LOT BOUNDARIES
- EXISTING LOT BOUNDARIES TO BE REMOVED
- FUTURE LOT BOUNDARIES
- 9007 EXISTING LOT NUMBERS

YIELD RESIDENTIAL DENSITY

R20	53
R30	23
R40	6
TOTAL	**82**

Residential Density Code Plan – WAPC Ref. No. 159 061 (RD1304B)

Residential Density Code Plan – WAPC Ref. No. 160 204 (RD1308D)

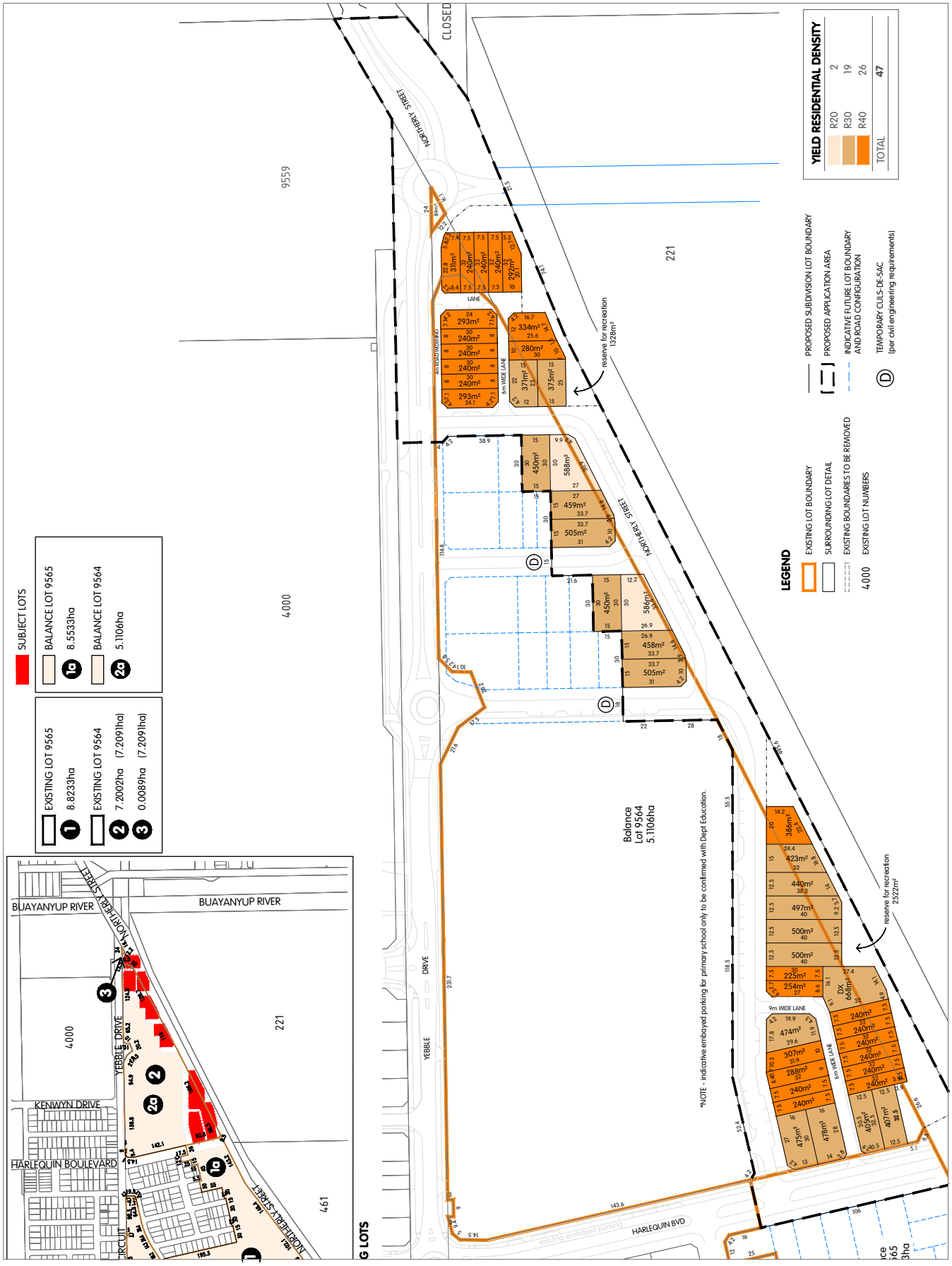


YIELD RESIDENTIAL DENSITY	
R20	15
R30	51
R40	4
TOTAL	**70**

Residential Density Code Plan – WAPC Ref. Nos. 161 473 and 162 483 (RD1167A)

Residential Density Code Plan – WAPC Ref. No. 163 957 (RD1161E)

Residential Density Code Plan – WAPC Ref. No. 200848 (RD1169D)



SUMMARY

The Vasse Structure Plan (VSP) applies to the land previously included within the Vasse Development Area Development Guide Plan (DGP), approved by the WAPC on 16th April 2018.

Preparation of the VSP is in response to proposals contained within Amendment No. 28 (A28) to Local Planning Scheme No. 21 (LPS21) gazetted 16th February 2021.

A28, amongst other things, 'normalises' the developed portions of the current DGP area by zoning them under LPS21 and to rezone the undeveloped portions of the former DGP area to proposed 'Urban Development', 'Industrial Development' and 'Vasse Townsite' zones for which a Structure Plan is required to facilitate subdivision and development. Endorsement of the VSP satisfies this requirement for the 'Urban Development' and 'Industrial Development' zones within the Estate designated in A28 as 'Special Provision Area 68' (Vasse 'Urban Development' zone).

The VSP includes the following undeveloped areas included in the former DGP:

- The remaining portion of the Dawson residential village (comprising residential, educational uses and public open space), generally south of the Wadandi Track;
- The Vasse Light Industrial Estate (Stage Two) for which an approved Local Development Plan exists (currently portion of Lot 9554 Napoleon Promenade);
- The future Armstrong residential village (Lot 461 Florence Road and Lot 221 Northerly Street);
- Land reserved for 'Recreation' west of Lynwood Street (Lot 9052 Northerly Street); and
- Another private landholding east of the Buayanyup Drain, sometimes referred to as the 'Reading Land' (Lot 250 Kaloorup Road).

The VSP provides the overarching planning framework to ensure development of these areas is undertaken in a coordinated and systematic manner and has been prepared in accordance with the requirements of the Planning and Development (Local Planning Scheme) Regulations 2015 and the Structure Plan Framework (August 2015).

Amendment No. 1 proposes modification to the alignment of Northerly Street to reduce regional traffic through the Estate and a re-prioritisation to local traffic on Yebble Drive and Harlequin Boulevard. The changes include modification to the residential design of the area adjacent Northerly Street to respond to the redesign, as well the removal of areas previously identified as facilitating R50/60 residential development.

ITEM	DATA
Total area covered by the structure plan	138.61 hectares
Area of each land use proposed:	
• **Residential**	110.66 hectares
• **Industrial**	17.45 hectares
Estimated number of dwellings	1,533 dwellings [1]
Estimated residential density	22.22 dwellings per site hectare
Estimated population	3,832 persons [2]
Number of primary schools	1 (4.00 hectares)
Estimated area and percentage of public open space	9.75 hectares (11.18%)[3]

[1] Presumes 450sqm average lot size
[2] Average 2.5 people per household (2016 Census)
[3] Includes 6.35ha surplus from 'normalised' portion of Dawson Village

CONTENTS

PART 1: IMPLEMENTATION

1 STRUCTURE PLAN AREA

The Vasse Structure Plan (VSP) applies to the land contained within the inner edge of the line denoting the Structure Plan boundary shown on the Structure Plan Map (Plan No. 1).

2 OPERATION

The date the Structure Plan comes into effect is the date the Structure Plan is endorsed by the WAPC.

3 SUBDIVISION AND DEVELOPMENT REQUIREMENTS

3.1 Land Use Zones and Reserves

Plan No. 1 outlines land use, zones and reserves applicable within the VSP area.

3.2 Staging

For lots adjacent to Rendezvous and Florence Roads for which further design is required (being within areas noted on Plan No. 1 as 'Indicative Design Only') larger lot sizes and / or a suitable landscape buffer are to be considered at the design stage.

3.3 Notifications on Title

In respect of applications for the subdivision of land the City of Busselton may recommend to the WAPC that conditions of subdivision approval be imposed requiring the following notifications on title pursuant to Section 165 of the Planning and Development Act 2005:

a. For all lots within the VSP area, notification that the land is in close proximity to known mosquito breeding areas.

b. For lots created within 500 metres of the southern boundary of the SP area (adjacent Florence Rd and Rendezvous Rd) notification of the potential for dust, spray, noise and other amenity impacts due to the adjoining, approved agricultural uses and practices.

3.4 Public Open Space

The provision of a minimum of 10% Public Open Space (POS) will be provided in accordance with the WAPC's Liveable Neighbourhoods. POS is to be provided generally in accordance with Plan No. 1 and the POS Schedule included at Appendix 1, with an updated POS Schedule to be provided at the time of subdivision for determination by the WAPC, upon the advice of the City of Busselton.

3.5 Residential Density

3.5.1 Density

a. Plan No. 1 defines the residential density code, or residential density code range, that apply to specific areas within the VSP. Except where already specified on Plan No. 1, lot specific residential densities, within the defined residential density ranges, are to be assigned in accordance with a Residential Density Code Plan approved by the WAPC.

b. A Residential Density Code Plan is to be submitted at the time of subdivision to the WAPC and shall be consistent with the SP, the Residential Density Ranges identified on Plan No. 1 and the locational criteria contained in Clause 3.5.2.

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 Residential Density Code Plan shall form part of the SP and shall be used for the determination of future development applications.

e. Variations to the Residential Density Code Plan will require further approval of the WAPC, with a revised Residential Density Code Plan submitted generally consistent with the approved plan of subdivision issued by the WAPC. The revised Residential Density Code Plan shall be consistent with Residential Density ranges identified on Plan 1 and the locational criteria contained in Clause 3.5.2.

f. A revised Residential Density Code Plan, consistent with Clause 3.5.1(e) will replace, wholly or partially, the previously approved Residential Density Code Plan, and shall then form part of the SP as outlined in Clause 3.5.1(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;
   iii. The purposes of facilitating the provision of access, service or infrastructure; or
   iv. Land which by virtue of its zoning or reservation under the SP cannot be developed for residential purposes.

3.5.2 Locational Criteria

The allocation of residential densities shall be in accordance with the following criteria:

a. R20 applies as the base code except where identified in clauses (b) and (c) below.

b. Where depicted on Plan 1, a density range from R25 - R40 may be applied to lots that comply with the following criteria:
   i. Lots adjacent to public open space;
   ii. Lots fronting Neighbourhood Connector Roads;
   iii. Lots abutting a laneway;
   iv. Lots at end of street blocks; or
   v. Within street blocks to accommodate a wider variety of lot sizes and resultant housing types to facilitate housing diversity.

3.6 Areas Subject to Future Structure Planning

On land identified as 'Subject to future structure planning on the Structure Plan Map, consideration should be given to the following when preparing a Structure Plan:

a. Preparation of a Traffic Impact Assessment Report to determine the function and hierarchy of the road network, including (as required):
   i. Cross sectional diagrams of Northerly Street, Florence Road and Rendezvous Road depicting their future intended design, and intersection and access considerations onto those roads.

b. Preparation of a Flora, Vegetation and Fauna Report to determine the potential environmental impacts and inform areas to be retained, protected, and managed. Areas identified as high value/suitability should be incorporated into areas of Public Open Space.

4 LOCAL DEVELOPMENT PLANS

a. Local Development Plans (LDP's) are to be prepared in accordance with Part 6 of Schedule 2 – Deemed Provisions for Local Planning Schemes, Planning and Development (Local Planning Schemes) Regulations 2015, prior to any subdivision and/or development that is affected by the following design considerations:

   i. Lots with vehicle access from a laneway;

   ii. Lots with direct interface to POS;

   iii. Lots that propose grouped or multiple dwelling development;

   iv. Lots affected by an Asset Protection Zone;

   v. Lots zoned 'Industrial';

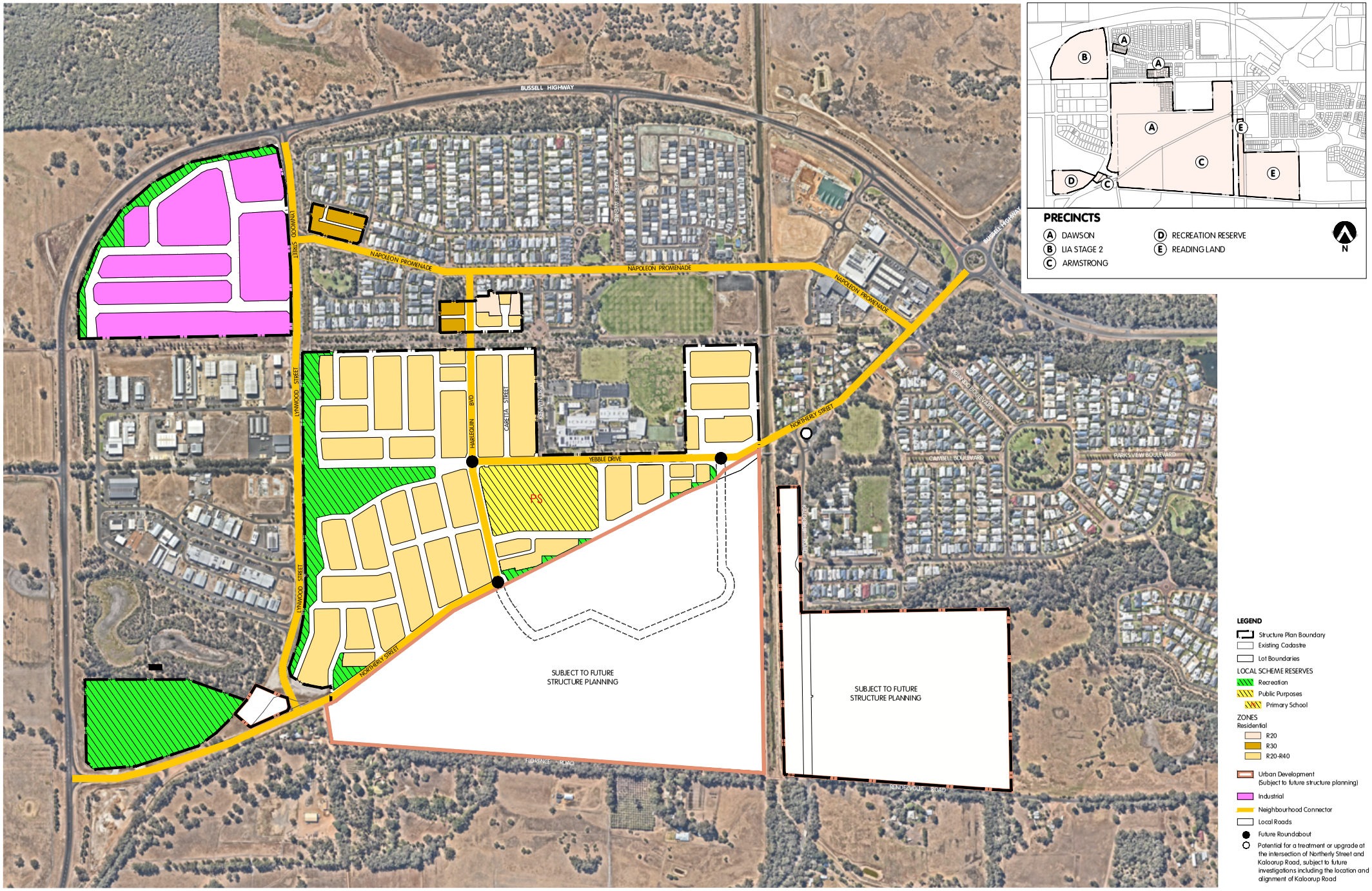
   vi. Lots accommodating a drainage easement; and

   vii. Where required to facilitate tree retention.

b. LDP's may address (but are not limited to) consideration of fencing abutting POS, school sites or childcare premises, street and lot boundary setbacks, boundary walls, building and wall height and width, setbacks and widths of garages and carports, restrictions to vehicle access, parking standards, dwelling orientation, outdoor living area and open space, overshadowing and visual privacy.

5 ADDITIONAL INFORMATION

ADDITIONAL INFORMATION	APPROVAL STAGE	CONSULTATION REQUIRED
Mosquito Management Strategy	Condition of subdivision approval	City of Busselton and Department of Health
A Local Water Management Strategy is required for each undeveloped area to support a Structure Plan where an overarching Urban Water Management Plan has not been developed and approved within SP68.	Structure Plan	DWER and City of Busselton
Urban Water Management Plan	Condition of subdivision approval	City of Busselton
The proponent shall prepare a Traffic Management and Implementation Plan addressing access and downgrading prior to any Structure Plan approval adjacent to Northerly Street	Structure Plan	City of Busselton



PRECINCTS

- (A) DAWSON
- (B) LIA STAGE 2
- (C) ARMSTRONG
- (D) RECREATION RESERVE
- (E) READING LAND

N

LEGEND

- Structure Plan Boundary
- Existing Cadastre
- Lot Boundaries

LOCAL SCHEME RESERVES
- Recreation
- Public Purposes
- Primary School

ZONES
Residential
- R20
- R30
- R20-R40

- Urban Development (Subject to future structure planning)
- Industrial
- Neighbourhood Connector
- Local Roads
- Future Roundabout
- Potential for a treatment or upgrade at the intersection of Northerly Street and Kaloorup Road, subject to future investigations including the location and alignment of Kaloorup Road

VASSE

CADASTRAL INFORMATION
SUBJECT LANDGATE SUP
YYMMDD: 160503
DWG REF: dwg.dgn
PROJECTION: MGA94

AERIAL PHOTOGRAPHY
SOURCE: NEARMAP
YYMMDD: 240402

HATCH

SIZE A1 1:4000
0 metres 40 80 120 160 200

REV	DESCRIPTION	YYMMDD	DRAWN	APPR'D
O.2	WAPC MODIFICATIONS	250610	RS	DP
O.1	MINOR LOT BOUNDARIES	240701	SB	DP
O	UPDATED NEIGHBOURHOOD CONNECTOR	240516	SB	DP
N	UPDATED STRUCTURE PLAN DESIGN	240503	RS	RG
M	WAPC MODIFICATIONS FOR ENDORSEMENT	230827	SB	DP
L	UPDATE ZONING	201117	SB	DP
K	UPDATED STRUCTURE PLAN DESIGN	191101	SB	DP

AMENDMENT No.1
Vasse Structure Plan
City of Busselton

REF NO. **PGP VAS** | DRAW NO. **RD1200** | REV **O.2**

PART 2: EXPLANATORY

1 INTRODUCTION AND PURPOSE

The Vasse Structure Plan (VSP) applies to the land previously included within the Vasse Development Area Development Guide Plan (DGP) approved by the WAPC on 16th April 2018 and supersedes this planning instrument.

The VSP provides the overarching planning framework for the land to ensure future development of these areas is undertaken in a coordinated and systematic manner. The SP has been prepared in accordance with the requirements of the Planning and Development (Local Planning Scheme) Regulations 2015 and the Structure Plan Framework (August 2015), ensuring that the applicable planning controls are consistent with the requirements of the current State and local planning framework.

The VSP also responds to modifications to the planning framework contained within Amendment No. 28 (A28) to Local Planning Scheme No. 21 (LPS21) gazetted 16th February 2021. A28, amongst other things, 'normalises' the developed portions of the current DGP area by zoning them under LPS21 and to rezone the undeveloped portions of the former DGP area to proposed 'Urban Development', 'Industrial Development' and 'Vasse Townsite' zones for which a Structure Plan is required to facilitate subdivision and development. Endorsement of the VSP satisfies this requirement for the 'Urban Development' and 'Industrial Development' zones within the Estate designated in A28 as 'Special Provision Area 68' (Vasse 'Urban Development' zone).

The VSP includes the following undeveloped areas included in the former DGP:

- The remaining portion of the Dawson residential village (comprising residential, educational uses and public open space), generally south of the Wadandi Track;
- The Vasse Light Industrial Estate (Stage Two) for which an approved Local Development Plan and subdivision approval apply;
- The future Armstrong residential village (Lot 461 Florence Road and Lot 221 Northerly Street);
- Land reserved for 'Recreation' west of Lynwood Street (Lot 9052 Northerly Street) which has since been developed in part as a service station; and
- Another private landholding east of the Buayanyup Drain, referred to as the 'Reading Land' (Lot 250 Kaloorup Road).

The Vasse Village Centre, formerly included in the DGP, is now included in 'Special Provision Area 65' of the Scheme and subject to a separate Precinct Structure Plan.

Amendment No. 1 to the Structure Plan proposes modification to the alignment of Northerly Street to reduce regional traffic through the Estate and a re-prioritisation to local traffic on Yebble Drive and Harlequin Boulevard. The proposed realignment is supported by new traffic modelling that demonstrates the suitability of the proposed modifications to the road network. The Amendment also incorporates a range of minor cadastral updates to reflect recent subdivision approvals through the area.

2 CONTEXT AND LAND DESCRIPTION

2.1 Local and Regional Context

The Vasse Estate is situated approximately 60km south west of Bunbury and 250km south of Perth. Within the local context, Vasse is situated 10km west of the Busselton Town Centre, 14km east of Dunsborough and 40km north of Margaret River.

The Estate takes primary access from Bussell Highway and the Busselton Bypass, which provide convenient access to the townsite from all regional destinations including Busselton, Margaret River, Augusta, Dunsborough and Yallingup.

Significant development has already occurred within the Estate, with the developed areas now 'normalised' under the Scheme. These areas comprise:

1. Birchfields Village, comprising approximately 600 lots, developed between 2003 and 2007;
2. Stage One of the Vasse Light Industrial Area, west of Lynwood Street, containing approximately 130 industrial lots;
3. The regionally significant Wadandi Track (formerly known as the Rails to Trails corridor) which bisects Vasse from east to west; and
4. Several hundred lots north of the Wadandi Track, forming the northern portion of Dawson Village, and to the south the Cape Naturalise Secondary College.

The balance of land remaining within the Estate to be developed is included in the VSP, with areas such as the future Armstrong Village and the Reading Land subject to detailed design as part of future structure planning.

Figure 1 Regional Context

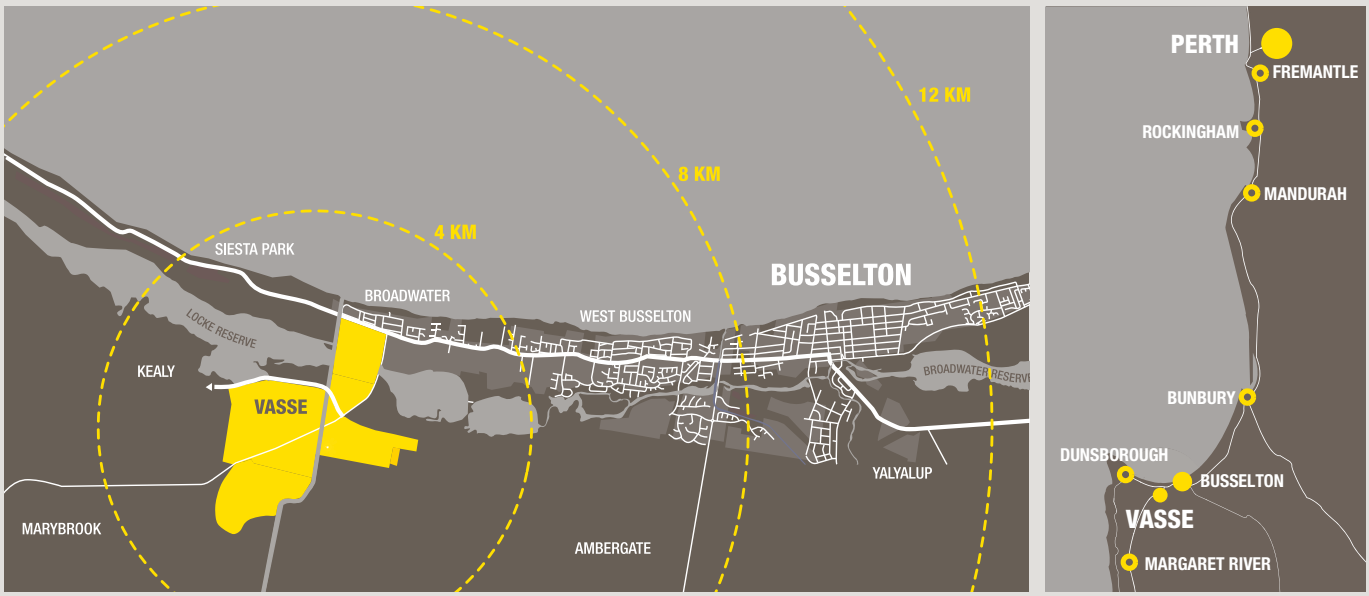


Figure 2 Local Context

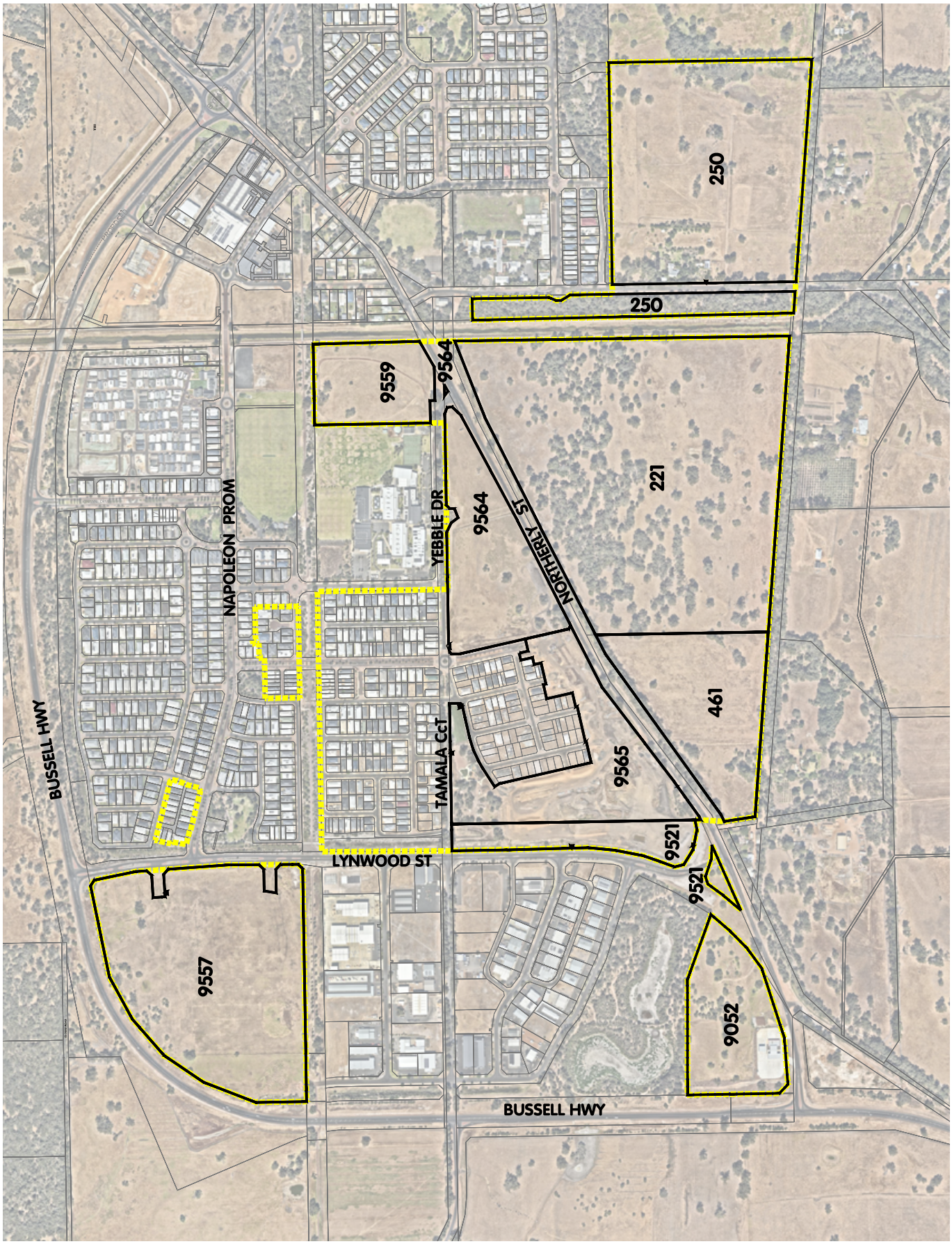
2.2 Legal Description and Ownership

The VSP area comprises predominantly private land, held by the various legal entities controlled by the Vasse joint venture partners, Perron Developments Pty Ltd and Stawell Pty Ltd, with two other sites separately held in private ownership.

Current land and Title details for the major landholdings that are yet to be developed are summarised in the table below (and will be updated progressively as development proceeds).

DESCRIPTION	LEGAL AREA	REGISTERED PROPRIETOR
Lot 9557 Napoleon Promenade on Plan 418745 (Vasse Light Industrial Estate Stage Two)	17.14ha	Perron Developments Pty Ltd Stawell Pty Ltd
Lot 9559 Yebble Drive on Plan 418745	4.11ha	
Lot 9564 Yebble Drive on Plan 424323	7.21ha	
Lot 9565 Northerly Street on Plan 425525	8.82ha	
Lot 461 Florence Road and Lot 221 Northerly Street on Plan 301732 (Armstrong Village)	41.65ha	
Lot 9521 Napoleon Promenade on Plan 52479	3.46ha	
Lot 250 Kaloorup Road on Plan 58596 (Reading Land)	21.5696ha	Reading, Fredrick Ross
Lot 9052 Northerly Street on Plan 404728	5.813ha	Vasse Commercial Pty Ltd

Figure 3 Aerial Location Map with Lot Details



3 PLANNING AND GOVERNANCE

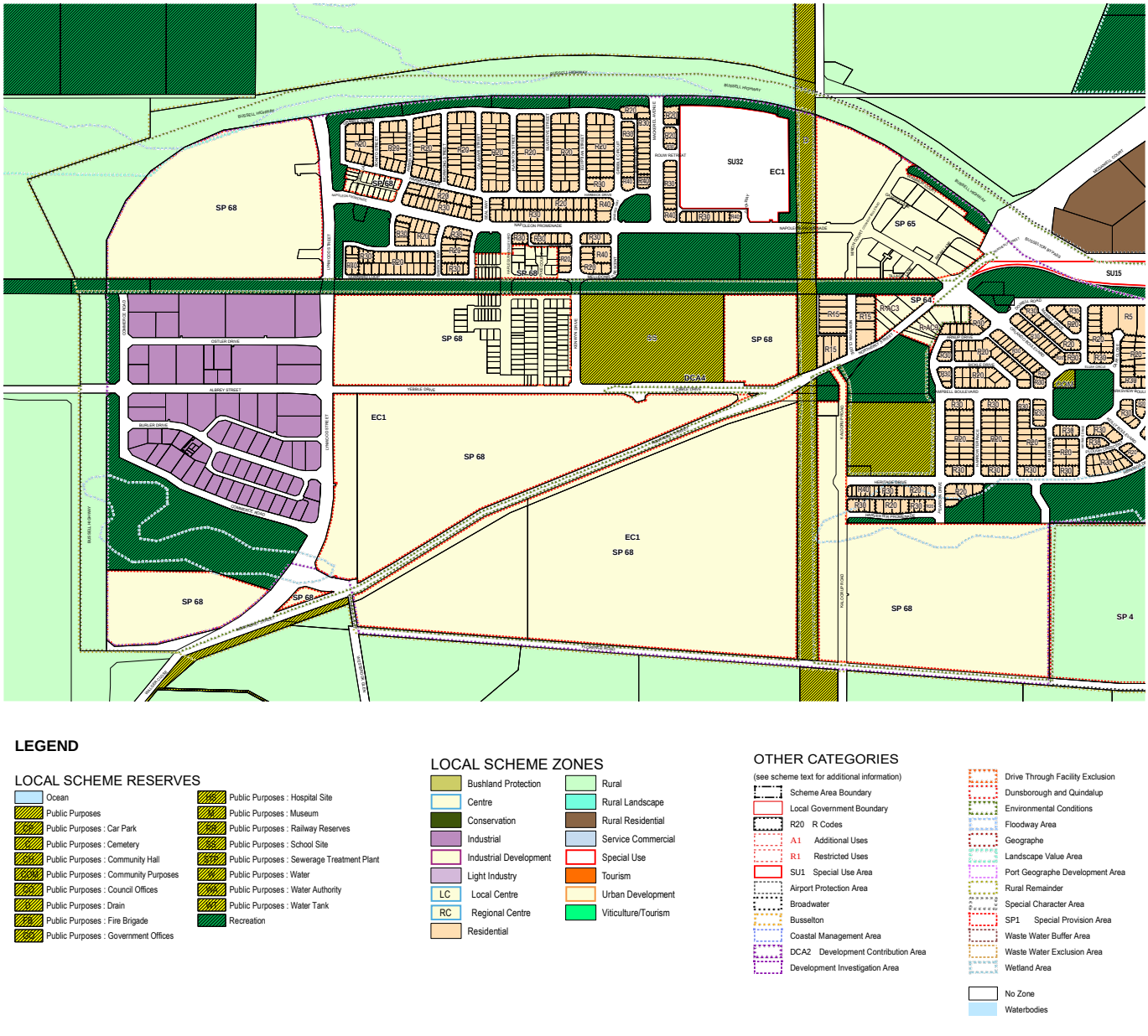
3.1 Local Planning Framework

3.1.1 City of Busselton Local Planning Scheme No. 21

The VSP area is zoned 'Urban Development", comprising the whole of the area subject to 'Special Provision Area 68' (SPA68) in the Scheme. SPA68 sets out the following special provisions applicable to the land in the table below.

Portions of the SP Area are also subject to 'Special Control Area - Environmental Conditions Area 1' (EC1) set out at Schedule 7 of the Scheme. Relevant requirements relating to the preparation of a Drainage and Nutrient Management Plan, and the assessment of impacts of former agricultural practices have been satisfied by the adoption of the Vasse Drainage, Nutrient and Pollution Management Plan 2006 (as amended).

Figure 4 LPS No.21 Zoning



The SP Area forms part of 'Special Control Area – Development Contributions Area 4 - Vasse' (DC4) set out at Schedule 10 of the Scheme, which applies to Vasse Estate, the endorsed Vasse Townsite Structure Plan, the endorsed Heron Lake Structure Plan and the Vasse Village Centre Structure Plan. Contributions are levied as conditions of subdivision and fund the following infrastructure items:

1. Upgrading of Newtown Oval
2. Development of a consolidated and integrated active open space facility adjacent to the Cape Naturaliste College to be known as the 'Vasse Sporting Complex'
3. Community purposes site adjacent to the Village Centre

For context, land adjacent the SP Area is zoned / reserved as follows:

- The Wadandi Track which bisects the VSP is reserved for 'Recreation'.
- The Buayanyup Drain passing through the SP area is reserved for 'Public - Purposes Drain'.
- The adjacent portion of the Busselton Bypass and Lynwood Street are zoned 'Rural' and no zone respectively.

SPECIAL PROVISION	SATISFACTION
1. Notwithstanding the requirement for a structure plan for land in a Development Zone a single integrated Structure Plan shall be required for the whole of Special Provision Area 68.	Endorsement of the VSP will satisfy this requirement.
2. Lot 221 Northerly Street, Vasse contains important environmental values including, but not limited to, poorly represented vegetation and habitat for Western Ringtail Possum (Pseudocheirus occidentalis) and Black Cockatoo species (Calyptohynchus latirostis, Calyptohynchus baudinii and Calyptohynchus bandsi naso). Future structure planning should require these environmental values to be retained, managed and protected for conservation purposes.	To be addressed as part of detailed future structure planning for Lot 221 (Armstrong Village).
3. For residential areas of SP68 a minimum front setback of 4 metres applies to dwellings and structures (excluding driveways) to facilitate provision of drainage.	Applicable to development and may be addressed via Local Development Plans as a condition of subdivision approval (if required).

3.1.2 City of Busselton Local Planning Strategy (2019)

The Busselton Local Planning Strategy is intended to guide the long term strategic planning of the Busselton region. It sets out a Settlement Framework that is consistent with State Planning Policy 6.1 Leeuwin-Naturaliste Ridge and the South West Planning and Infrastructure Framework. The Strategy identifies Vasse together with Busselton as part of the Busselton-Vasse Urban Area. This region is identified as accommodating most of the anticipated population growth within the district, through the development of existing zoned areas and infill development in strategic locations.

The Strategy identifies Vasse as a current growth area that is 'already zoned and structure plans approved', with an approximate potential population of 5,000 people. The VSP accords with the Local Planning Strategy by supporting and pro-actively planning for the urban expansion of the Busselton-Vasse Urban Area within the established urban growth framework.

3.2 State Planning Framework

3.2.1 State Planning Strategy 2050 (WAPC, 2014) and Statement of Planning Policy No. 1 - State Planning Framework (WAPC, 2017)

The State Planning Strategy (SPS) was prepared by the WAPC as a whole of Government approach to guide sustainable land use planning throughout the State to 2050. The SPS is aimed at developing a cooperative land use planning system to help the State achieve a number of key goals including Strong and resilient regions, Sustainable communities, Infrastructure planning and coordination and Conservation.

The SPS sets out the key principles relating to environment, community, economy, infrastructure, regional development and governance to guide the way in which future planning decisions are made.

The SPS highlights the interplay of Sub-regional Strategies and structure plans in the implementation of Regional and Local Planning Strategies respectively as part of the delivery of the State's strategic priorities.

State Planning Policy No. 1: State Planning Framework (SPP1) restates and expands upon the key principles of the State Planning Strategy in planning for sustainable land use and development. It brings together existing State and regional policies, strategies, and guidelines within a central State Planning Framework (Framework) as a context for decision-making on land use and development in Western Australia.

The VSP accords with the State Planning Strategy by supporting regional growth in line with a forecast doubling of the State's population, accommodated by a diverse range of well-connected and vibrant communities and regional centres that are resilient, active and respectful of cultural difference.

3.2.2 State Planning Policy 6.1 Leeuwin-Naturaliste Ridge (WAPC, 1998)

SPP 6.1 provides the strategic planning framework for the Leeuwin-Naturalise region establishing the greater vision, guidance and land use distribution. The Policy promotes sustainable development, conservation, and land and resource management. It seeks to provide assistance to those managing land use change, enable greater consistency between the two local governments, give clear regional-level advice to proponents of development, and provide a reference to guide development and conservation.

SPP 6.1 encourages Vasse to be developed as an independent and clearly defined settlement designed to be responsive to the local characteristics of the existing settlement, recommending the application of innovative building styles, landscape elements and other townscape principles to create a distinctive sense of place that is characteristic of the locality and integrated with the local environment.

The VSP accords with the Policy by catering for population growth consistent with the objectives of the Policy as part of a new urban settlement located to enhance the region's economic, social and environmental functions, while promoting quality and innovation in urban design and built form.

3.2.3 Leeuwin Naturaliste Sub-regional Planning Strategy (WAPC, 2019)

The Leeuwin Naturaliste Sub-regional Planning Strategy (LNSPS) is an overarching strategic plan to guide the future planning and development of all the land within the Shire of Augusta-Margaret River and the City of Busselton subject to State Planning Policy 6.1 Leeuwin-Naturaliste Ridge.

The Strategy confirms Vasse as the fourth largest town in the Region, and when developed to capacity based on current zoning, will be equivalent in population to Dunsborough's current population, which is currently classified as a 'Major Town'.

The VSP supports the objectives of the Sub-regional Strategy by facilitating growth and development consistent with the regional settlement hierarchy, is well planned and reflects the current government positions, state planning policies and best planning practices with regard to the environment, landscape, urban design and economic development.

3.2.4 Statement of Planning Policy 3: Urban Growth and Settlement (WAPC, 2006)

This Policy sets out the principles and considerations to apply to planning for urban growth settlement in Western Australia. The Policy aims to facilitate sustainable patterns of urban growth and settlement.

The VSP accords with the objectives of the Policy by supporting a sustainable and well-planned pattern of settlement consistent with SPP 6.1 which includes a wide variety of housing, commercial, employment, recreation facilities and open space.

3.2.5 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) directs how land use should address bushfire risk management in Western Australia. It applies to all land designated as bushfire prone as highlighted on the Map of Bush Fire Prone Areas.

SPP 3.7 seeks to guide the implementation of effective risk-based land use planning and development to preserve life and reduce the impact of bushfire on property and infrastructure. It applies to all higher order strategic planning documents, strategic planning proposals, subdivision and development applications located in designated bushfire prone areas (unless exemptions apply).

The Structure Plan is supported by a Bushfire Management Plan (BMP) (Strategen JBS&G, June 2020 – Appendix 2) which addresses the requirements under Policy Measures 6.2 and 6.3 of SPP 3.7 and the related Guidelines for Planning in Bushfire- Prone Areas Version 1.4 (the Guidelines; WAPC 2021), and in accordance with AS 3959- 2018 Construction of Buildings in Bushfire- Prone Areas (AS 3959; SA 2018).

3.2.6 Liveable Neighbourhoods Operational Policy (WAPC,2009)

Liveable Neighbourhoods (LN) is the WAPC's principal policy for the design and assessment of structure plans and subdivision for new urban areas, inclusive of both greenfield and large urban infill sites.

The policy intends that the neighbourhood should be the basic building block for urban development with interconnected and integrated neighbourhoods clustered into well defined towns and communities. New urban areas are intended to be comprehensively planned as sustainable communities which provide local facilities, services, public transport and job opportunities within easy reach by walking or cycling, reducing dependence on the private car for travel. In addition to meeting day to day needs, neighbourhoods will be designed to build a strong sense of place and community by providing for a mix of housing types and households, creating the opportunity for social interaction and designing at a human scale so that streets are attractive, convenient and safe public spaces.

The Structure Plan design implements the recommendations of LN with respect to each of the relevant Precinct Design Elements.

3.2.7 South West Regional Blueprint (2014)

The South West Regional Blueprint is a regional strategy produced by the South West Development Commission which identifies the strategic imperatives of the region. It analyses the factors contributing to the development of the South West and presents an agenda for both the social and economic development of the region, setting out key principles to guide future growth.

The Vasse Village PSP supports the principles and objectives of the Regional Blueprint by contributing to the provision of new housing, employment, infrastructure and businesses that will be required to accommodate a future population of 500,000 people in the South West by the year 2050.

3.2.8 South West Regional Planning and Infrastructure Framework (WAPC, 2015)

The South West Framework is a broad planning blueprint which seeks to guide the future development of the South West region over the the next 20 years. The Framework provides the position of both the State Government and the WAPC in relation to the future planning of the south west, to serve as a broad guide for investment decisions.

The Framework emphasizes the growth potential of the City of Busselton, with the continued development of the Vasse Estate supporting the realization of the Framework's vision for greater Busselton as a hub of diversified industrial and commercial sectors, via development of the Light Industrial Area and educational opportunity associated with the future primary school.

4 SITE CONDITIONS

The VSP has regard for key site conditions and constraints and does not modify the approach to site conditions which has supported development of the area to date, including the previously approved DGP and OSP. The response to site conditions outlined below reflects the existing approach in accordance with previous approvals for the area.

4.1 Environmental Considerations

A vegetation and flora survey was undertaken over the entire Vasse Estate (RPS, 2006) to determine the presence or otherwise of significant vegetation or flora. The survey results indicate that the vegetation and flora has been severely impacted by the site's historical agricultural use, notably the grazing of livestock. The majority of the SP area is largely cleared of native vegetation, with no native flora species remaining except for scattered trees.

A Level 2 Flora and Vegetation Survey of the future Armstrong Village area was conducted in November 2014. The surveyed area is predominantly parkland cleared and contains isolated individuals and clusters of mature trees with little or no associated understorey. No Threatened Species listed under the EPBC Act or gazetted as Declared Rare Flora (Threatened) pursuant to the [then] WA Wildlife Conservation Act 1950 (now Biodiversity Conservation Act 2016) were recorded during the survey. No State Priority flora species were recorded.

A Black Cockatoo and Western Ringtailed Possum (WRP) Habitat Assessment of the future Armstrong Village area was also conducted in November 2014. The mature trees identified in the Flora and Vegetation Survey were found to have the potential to be habitat for Black Cockatoo and WRP. Mature Eucalypts that were of sufficient size to be defined as potential breeding trees for Black Cockatoo were identified. A relatively small number of WRP were observed.

The presence of the Black Cockatoo and WRP habitat has influenced the ongoing urban design process. Habitat is being considered for incorporation into future public open space so that the trees can be retained. Nevertheless, it is impractical to retain all habitat and achieve a good urban design outcome and thus some will need to be cleared. The Environmental Protection Authority considered that the impacts posed by the development did not warrant formal assessment under the Environmental Protection Act (1986).

The proposed clearing of the habitat is currently being assessed under the Federal Environment Protection and Biodiversity Conservation Act (1999). Relevant outcomes of the environmental assessment processes will be incorporated into the final design as part of future structure planning for the Armstrong Village area.

4.2 Landform

The VSP area is generally flat and low lying. The site consists of pale and olive-yellow sands derived from Tamala Limestone. The soils of the site comprise sands of varying depths to a maximum of 1.80 metres below the natural surface.

Testing of soils for acid sulphate was carried out to DBCA specifications as part of the development of the Birchfields residential village. This involved limited sampling of the remainder of the Vasse project area. On the basis of these sampling results the DBCA agreed that future development within the Vasse project area will be self-regulated.

Whilst the VSP area is predominantly a low-risk area for Acid Sulphate Soils (ASS), there is the potential for ASS in clays deeper than 2m below ground surface. It is expected that development excavation will aim to avoid depths greater than 2 metres, as well as clay soil areas. Should excavation exceed 2 metres or affect clay soils, the onus is on the developer to manage the issue through appropriate ASS testing and management (if required).

4.3 Hydrology

The VSP is subject to the Vasse Newtown Western Catchment Drainage Nutrient and Pollutant Management Plan (DNPMP) originally approved by the Department of Water on the 30th October 2006, in conformance with the principles of Water Sensitive Urban Design (Whelans et al 1993).

Per the DNPMP, the 1 year 1 hour (15.4mm) rainfall (based on ARR 1987) or first 15mm of rainfall (based on ARR 2019) within the SP area will be managed by retention and treatment at source, with water quality treatment provided by soakwells on lots and vegetated swales.

The minor drainage system is defined as the series of pipes, kerbs and gutters etc. designed to carry runoff generated by frequent rainfall events up to 20% Annual Exceedance Probability (AEP) or 5 year Average Recurrence Interval (ARI). The minor drainage incorporates a treatment train of best management practice water quality structural controls such as vegetated swale and storage systems that provide water quality treatment from the proposed development.

The major drainage system is defined as the arrangement of roads, drainage reserves, detention basins, vegetated swales and open space planned to provide safe passage of stormwater runoff from major events which exceed the capacity of the minor system. This is typically greater than 20% AEP and up to 1% AEP (5 year ARI to 100 year ARI).

For consistency with the Better Urban Water Management Framework (WAPC, 2008), several documents have since been issued for development within the current VSP area as detailed planning has progressed, including:

- Precinct A DAWSON North of Rails for Trails Reserve within Stage 3: Vasse Newtown, Dawson Village Stages 3+ UWMP (JDA, 2015);
- Precinct B LIA Stage 2: Vasse Newtown Catchment A Surface Water Review (JDA, 2015);
- Precinct A DAWSON Stages 4A, 4B1 and 4B2: Vasse Newtown, Dawson Village Stages 3+ UWMP (JDA, 2015) and Vasse Newtown, Dawson Village Stages 3+ UWMP Addendum 1 (JDA, 2020); and
- Precinct A DAWSON Stages 5 and 6: Vasse Estate, Dawson Village Stages 5 & 6 UWMP (JDA, 2020).
- Precinct A DAWSON Stages 5 and 6 UWMP Addendum 1 (JDA, 2022)
- Precinct A DAWSON Stages 6C and 6D: Vasse Estate, Dawsons Village Stages 6C and 6D Stormwater & Groundwater Management Plan (JDA, 2025)

For stormwater drainage design, Precinct A Dawson North of Rails for Trails Reserve, Stages 4A, 4B1 and 4B2 are designed to be consistent with Australian Rainfall and Runoff (ARR) (Inst. Engrs Aust., 1987). Precinct A Stages 5 and 6, Precincts C, D and E are designed to be consistent with ARR 2019 (Ball et al, 2019)."

4.4 Bushfire Hazard

The VSP is accompanied by a BMP prepared as a strategic guide to demonstrate how development compliance will be delivered at future planning stages in accordance with Schedule 2 Part 10A of the Regulations, Policy Measures 6.2 and 6.3 of State Planning Policy 3.7 Planning in Bushfire Prone Areas, as well as the supporting Guidelines for Planning in Bushfire Prone Areas.

The BMP concludes that the bushfire hazards within and adjacent to the project area and the associated bushfire risks are readily manageable through standard management responses outlined in the Guidelines and AS 3959. Implementation of the proposed management measures will enable the project area to be developed with a manageable level of bushfire risk whilst maintaining full compliance with the Guidelines and AS 3959.

Amendment No. 1 is supported by a BMP Addendum - JBS&G, 2023 (Appendix 2a) that considers implications to the original BMP findings arising from the design modifications to Northerly Street and the adjacent portion of the Dawson residential Village (inclusive of the primary school). The proposed modifications to Northerly Street will still enable compliant through access and multiple access routes to be achieved as per the development design demonstrated in the JBS&G (2023) BMP addendum, which depicts multiple connections north to Yebble Drive and east-west connections more broadly. The assessment finds that no additional bushfire threats and consequent measures are required as a result of the proposed design changes and that the original bushfire management strategy remains applicable, which will deliver full compliance with the bushfire protection criteria of the Guidelines.

Aside from the preparation of BMPs to accompany future subdivisions and DA's where applicable, there are no further items to implement, enforce or review at this strategic stage of the planning process.

4.5 Heritage

The Aboriginal Sites Register was searched in February 2005 and confirmed that there are no Registered Aboriginal Heritage Sites within the Estate. With respect to European heritage, a search of the Heritage Council of Western Australia's heritage database confirms that there are no listed heritage sites within the VSP area.

4.6 Contamination

An assessment of the potential for contamination arising from past land use within the VSP area was conducted as part of a wider investigation at Vasse. No Organochlorine pesticides, dieldrin and DDT or its derivatives were detected that approached the Department of Water and Environmental Regulation (DWER) Health Investigation Levels for residential land use. Furthermore, the investigations did not identify groundwater contamination relating to the contaminants of concern but identified nutrient concentrations consistent with the general catchment.

Redevelopment of the land as detailed in the VSP is therefore acceptable and chemical residues in the soil are extremely unlikely to result in adverse health effects for future land users or receptors. On this basis, there is requirement for further investigation or remediation work, or restrictions to be applied in relation to redevelopment of the land for urban purposes.

4.7 Services

The servicing strategy for land within the SP area controlled by the Vasse Joint Venture Partners, west of the Buayanyup Drain is as follows:

- Mains sewer can be extended from adjacent landholdings and conveyed to existing pump stations within each catchment area. No additional pump stations or significant infrastructure is required to service these landholdings.
- Infrastructure such as water, power, gas and communications will all be made available to these areas and serviced via mains extensions from adjoining development areas.

The 'Reading Land' east of the Buayanyup Drain has been identified on Water Corporation scheme planning as being serviced in the future with sewer reticulation from the adjoining development in the north, which feeds into the existing pump station. No additional pump stations or significant infrastructure is anticipated to be required to service this landholding. It is also expected that infrastructure such as water, power, gas and communications will be supplied via an extension of existing mains located in the adjoining subdivision north of this site. These assumptions will require confirmation via an engineering servicing report to accompany future structure planning for the land.

5 AMENDMENT NO. 1 - REALIGNMENT OF NORTHERLY STREET

The primary purpose of Amendment No. 1 is the realignment of Northerly Street to reduce regional traffic through the Vasse Estate and to reprioritise local traffic on Yebble Drive and Harlequin Boulevard.

The Amendment foreshadows a future Structure Plan Amendment for the Armstrong residential neighbourhoood to the south which will resolve design and planning for this section of the Estate inclusive of the indicative connecting roads shown on the updated Plan 1.

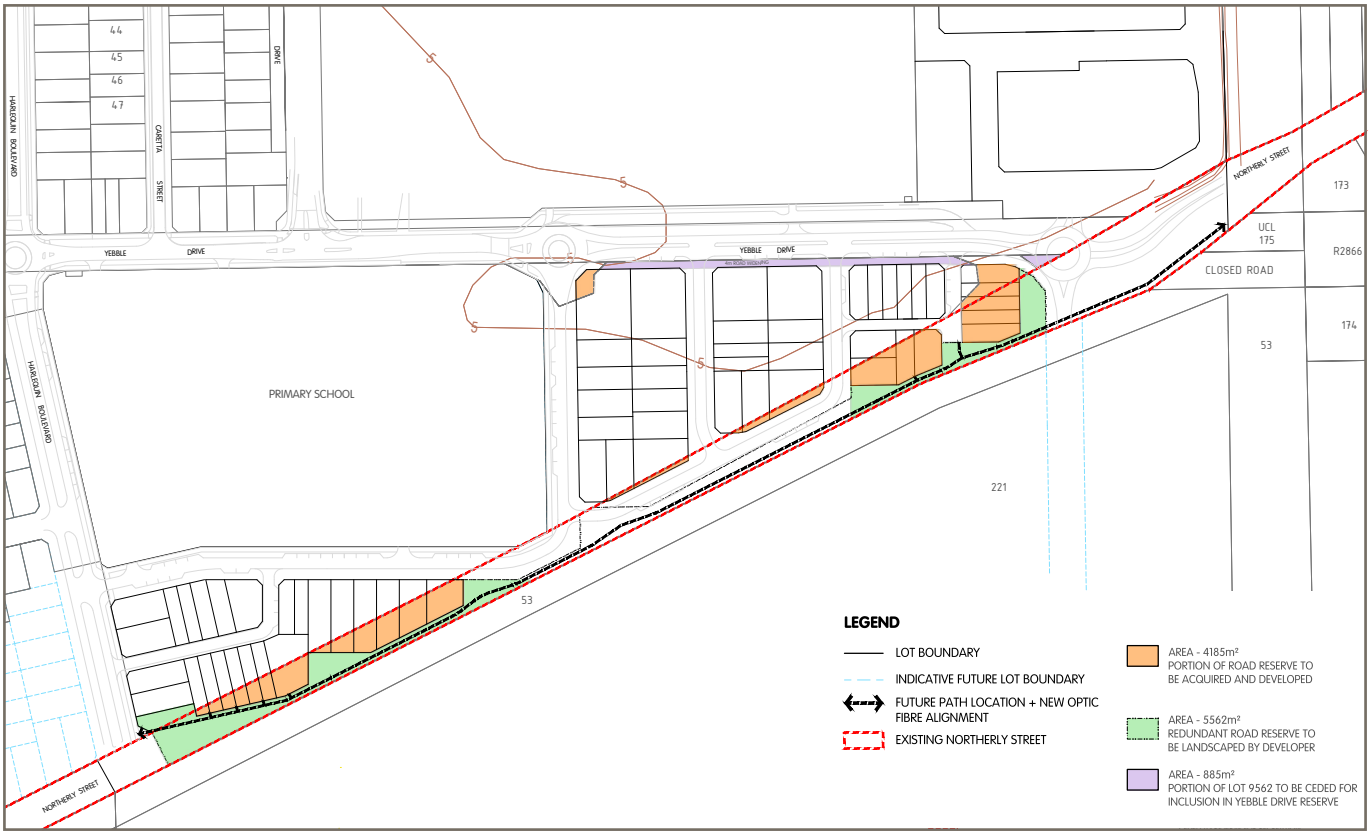
The Amendment also updates the Structure Plan to reflect recent subdivision approvals for the balance of the Dawson residential village south of Yebble Drive. This includes Stage 5b (WAPC Ref. No. 161 473), Stages 6a and b (WAPC Ref. No. 162 483) and Stages 6c and d (WAPC Ref. No. 163957). Stage 6c includes a modified design for the future Dawson Primary School.

5.1 Realignment of Northerly Street

The proposed realignment of Northerly Street affects the section of the road between Harlequin Boulevard and the intersection with Yebble Drive. Both of these intersections are proposed to be converted into roundabouts to facilitate traffic into the future Armstrong Village to the south.

The modified road network will redirect regional traffic from Northerly Street to the Bypass, while continuing to provide access for local traffic and users of Cape Naturaliste College and the future Dawson primary school.

Figure 5 Strategic Closure and Repurposing of Northerly Street (RD1501B)



The affected area of Northerly Street is proposed to be repurposed to facilitate adjacent residential development. Anticipated repurposing for each section is depicted at Figure 5 and comprises:

a. Areas to be closed and acquired by the developer for development, subject to the separate agreement and approvals with the respective agencies.

b. Areas to be retained as subdivisional roads. The existing road pavement will be removed and integrated with new road surfaces.

c. Retention of some sections as road reserve but landscaped by the developer as part of future subdivisional works. These areas will effectively function as open space and pedestrian / cyclist access through the area.

d. Portions of private land to be ceded to the Crown as part of proposed upgrades to the existing road network.

5.2 Transport Impact Assessment

The Amendment is accompanied by a new Transport Impact Assessment (TIA) which includes analysis of the proposed closure of portion of Northerly Street between Yebble Drive and Harlequin Boulevard. The TIA also updates the future traffic modelling for the whole of the approved Structure Plan area, confirming that that overall road network continues to operate effectively.

The specific study objectives of the TIA are to:

1. Identify and document the existing situation of the overall Vasse Structure Plan area.
2. Identify the future land use and traffic generation data for the existing and approved development areas, together with the proposed future development within the remaining areas (Armstrong Village).
3. Prepare a future traffic model (based on the current regional road alignments) to identify the future traffic flows, and resulting road and intersection modifications, resulting from the proposed strategic closure of portion of Northerly Street.
4. Make recommendations regarding the required road network for the modified road network, including recommended road layouts, intersection treatments, pedestrian/cyclist facilities, road hierarchy and resulting road reserves.
5. Assess the modified primary school site to confirm adjacent road layouts, provision for public transport access and pick-up/drop-off parking areas, plus pedestrian/cyclist networks to provide safe and accessible routes to school for all non-vehicle traffic modes.

The recommendations of the TIA include the following matters which are addressed in the planning for the area depicted in the Amendment and the related subdivision approvals. References to figures refer to figures from the TIA:

1. Figure 8 shows the recommended overall road hierarchy arising from the proposed closure of portion of Northerly Street, taking into account both the already-constructed road cross-sections (for Napoleon Promenade, Lynwood Street, Mackerel Avenue and Harlequin Boulevard), together with the additional requirements based on anticipated future traffic flows, pedestrian/cyclist facilities and possible future bus routes.
2. Figures 9 and 10 depict the treatment of respective road reserves, in particular:
   - Yebble Drive west of the primary school being upgraded to a Neighbourhood Connector A, with a 24 metre road reserve (to provide a 2-way divided roadway with on-road cycle lanes and footpaths on both sides as defined under Liveable Neighbourhoods) suitable for traffic flows in excess of 3,000 vehicles per day.
   - West of the existing roundabout that provides access to Cape Naturaliste College, Yebble Drive will operate as a Neighbourhood Connector B within its existing 20 metre road reserve, with no need for a central median.
3. Figure 4 shows the recommended future school bus routes post-development, with existing bus routes accessing Yebble Drive from the east but then extending to circulate anticlockwise around the new Dawson Primary School before accessing Cape Naturaliste College.
4. Figure 5 depicts the possible future public bus routes in the vicinity of Dawson South and Armstrong, with one bus route expected to utilise Napoleon Promenade and Lynwood Street to access the Light Industrial area, with a second bus route using Napoleon Promenade and Harlequin Boulevard to service the Dawson North, Dawson South and Armstrong residential areas.
5. Figure 6 shows the recommended pedestrian/cyclist facilities within the Estate, including the proposed neighbourhood connector roads with on-road cycle lanes plus paths on both sides, as well as significant Access Streets with no on-road cycle lanes but paths on both sides, and lower-order Access Streets with paths on one side only.

5.3 Dawson Primary School

The Amendment includes modification to the current configuration of the future Dawson Primary School arising from the proposed realignment of Northerly Street. The proposed changes align with the recent subdivision approval WAPC Ref. No. 163 957 and are the result of extensive discussions with the Department of Education to optimise the shape of the site and the relationship with the adjacent road network.

The school design and adjacent road network meet the requirements of Liveable Neighbourhoods, comprising a regular 4ha site with roads on all sides with minimum dimensions of 18m, 20m and 26m.

Access and road planning for the school is analysed in detail in the TIA (Appendix 3) which notes the following additional considerations:

1. On-street parking embayments will be provided on each of the west, south and east road frontages to provide for easy pick-up and drop-off, with vehicles able to access the school from any direction and circulate anti-clockwise around the entire site. Embayment parking is already constructed along the Harlequin Boulevard frontage.
2. School buses will circulate anti-clockwise around the site, with bus stops expected to be located along the southern road frontage.
3. Figure 7 of the TIA identifies the recommended ‘Safe routes to school’ demonstrating that direct, convenient and safe access routes will be available for pedestrians and cyclists accessing the new Primary School to/from all of the surrounding areas.

APPENDIX 1

PUBLIC OPEN SPACE SCHEDULE

APPENDIX 1: VASSE STRUCTURE PLAN_PUBLIC OPEN SPACE SCHEDULE (JUNE 2024)

PUBLIC OPEN SPACE SCHEDULE 1_VASSE ESTATE			
Site Area			**116.45 ha**
Less Deductions			
Primary School	4.00 ha		
POS 1 (Dedicated Drainage)	0.08 ha		
POS 2a (Drainage)	1.53 ha		
Light Industrial Area Stage 2 (inclusive of POS 3)	17.45 ha		
POS 5 (Recreation Reserve, Lot 9052 Northerly Street) [1]	5.81 ha		
Northerly + Lynwood St Intersection (future road reserve)	0.30 ha	29.21 ha	
Nett subdivisible area			**87.24 ha**
POS Required @ 10%			8.72 ha
May Comprise:			
Min. 80% unrestricted POS	6.98 ha		
Max. 20% restricted POS3	1.74 ha		

PUBLIC OPEN SPACE CONTRIBUTION					
POS Area	**Nett Area (ha)**	**Unrestricted (ha)**	**Restricted (ha)**	**Dedicated Drainage (ha)** [2]	**Delivered (Y/N)**
POS 1	1.90	1.73	0.09	0.08	N
POS 2b	0.95	0.95			N
POS 6a	0.25	0.25			N
POS 6b	0.25	0.25			N
POS 6c	0.13	0.13			N
POS Surplus (Dawson – Normalised) [3]	6.35	6.35			Y
Sub-Total	**9.83**	**9.66**	**0.09**	**0.08**	
Total Public Open Space Provision (Planned and Provided)		**9.75 ha**			**9.75ha**
POS Surplus [4]					**1.03 ha**

[1] Area has been deducted as surplus to requirements for POS and may be suitable for other uses subject to future structure planning

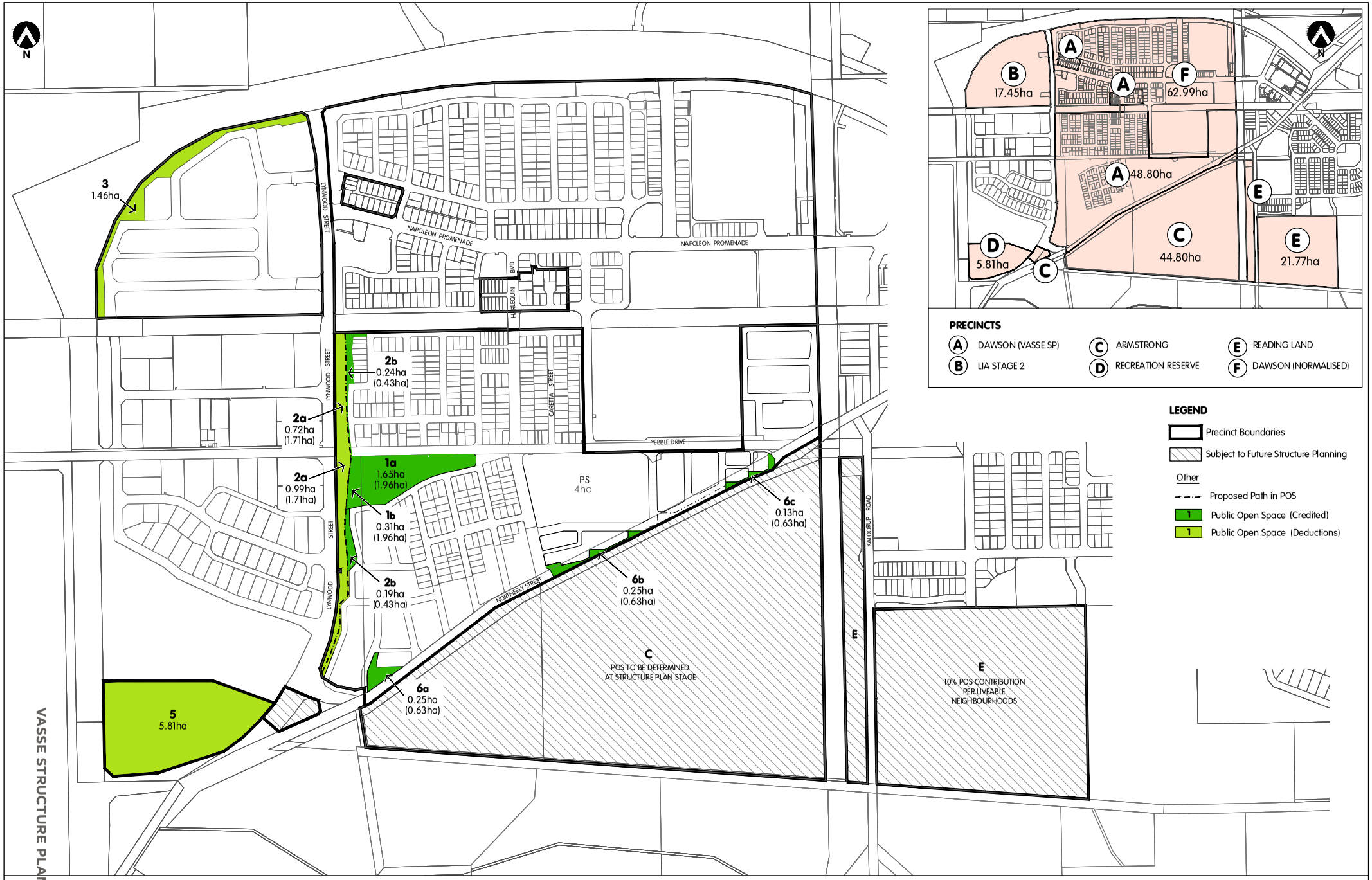
[2] Dedicated Drainage, deduction not included in POS

[3] Surplus of 6.35 ha from "Public Open Space Schedule_Dawson (Normalised) (April 2021)"

[4] Based on the surplus, POS provided within the balance of Dawson Village and the future Armstrong Village is at the discretion of the landowner.

PUBLIC OPEN SPACE SCHEDULE 2_READING LAND

PUBLIC OPEN SPACE SCHEDULE 2_READING LAND	
Site Area	**21.77 ha**
POS Contribution	
10% POS required per Liveable Neighbourhoods (to be determined as part of future structure planning)	



VASSE

CADASTRAL INFORMATION
SOURCE: LANDGATE-SLIP
YYMMDD: 160803
DWG REF: dawson
PROJECTION: MGA94
AERIAL PHOTOGRAPHY
SOURCE: N/A

HATCH

SIZE A3 1:7500

0 metres 75 150 225 300 375

REV	DESCRIPTION	YYMMDD	DRAWN	APPR'D
I.1	WAPC MODIFICATIONS	250610	RS	DRAFT
I	UPDATE DESIGN	240515	SB	DRAFT
H	UPDATED STRUCTURE PLAN DESIGN	240322	RG	DP
G	UPDATE POS 6	220421	SB	DP
F	PER CARRIAGEWAY MODIFICATION	220412	SB	DP
E	PER POS PGP DAW RD1 153A	220407	SB	DP
D	RE-ADJUST POS 2 AREA	210520	SB	DP

PUBLIC OPEN SPACE
Vasse Structure Plan
City of Busselton

JOB CODE **PGP VAS** DRAW NO. **RD1 204** REV. **I.1**

APPENDIX 2

BUSHFIRE MANAGEMENT PLAN

(Strategen JBS&G, June 2020)

FPA AUSTRALIA | Fire Protection Association Australia | Life. Property. Environment.

BPAD Bushfire Planning & Design

Bushfire Management Plan Coversheet

This Coversheet and accompanying Bushfire Management Plan has been prepared and issued by a person accredited by Fire Protection Association Australia under the Bushfire Planning and Design (BPAD) Accreditation Scheme.

Bushfire Management Plan and Site Details

Site Address / Plan Reference: Vasse Structure Plan area

Suburb: Vasse **State:** WA **P/code:** 6280

Local government area: City of Busselton

Description of the planning proposal: Structure Plan amendment

BMP Plan / Reference Number: 57047 **Version:** R01 Rev 1 **Date of Issue:** 11/06/2020

Client / Business Name: JV of Perron Developments P/L & Stawell P/L

Reason for referral to DFES	Yes	No
Has the BAL been calculated by a method other than method 1 as outlined in AS3959 (tick no if AS3959 method 1 has been used to calculate the BAL)?	☐	☑
Have any of the bushfire protection criteria elements been addressed through the use of a performance principle (tick no if only acceptable solutions have been used to address all of the BPC elements)?	☐	☑
Is the proposal any of the following special development types (see SPP 3.7 for definitions)?		
Unavoidable development (in BAL-40 or BAL-FZ)	☐	☑
Strategic planning proposal (including rezoning applications)	☑	☐
Minor development (in BAL-40 or BAL-FZ)	☐	☑
High risk land-use	☐	☑
Vulnerable land-use	☐	☑

If the development is a special development type as listed above, explain why the proposal is considered to be one of the above listed classifications (E.g. considered vulnerable land-use as the development is for accommodation of the elderly, etc.)?
The proposal is a strategic planning proposal (i.e. Structure Plan amendment)

Note: The decision maker (e.g. local government or the WAPC) should only refer the proposal to DFES for comment if one (or more) of the above answers are ticked "Yes".

BPAD Accredited Practitioner Details and Declaration

Name	Accreditation Level	Accreditation No.	Accreditation Expiry
Zac Cockerill	Level 2	BPAD 37803	31/08/2020
Company		**Contact No.**	
Strategen-JBS&G		9792 4797	

I declare that the information provided within this bushfire management plan is to the best of my knowledge true and correct

Signature of Practitioner **Date** 11/06/2020

JV of Perron Developments P/L & Stawell P/L

Bushfire Management Plan (Structure Plan)

Vasse Structure Plan

11 June 2020

57047/125871 (Rev 1)

JBS&G Australia Pty Ltd T/A Strategen-JBS&G

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Appendices

1. Proposal details

1.1 Background

RobertsDay, on behalf of the Joint Venture (JV) of Perron Developments P/L and Stawell P/L, is seeking to lodge a Structure Plan amendment to guide ongoing urban development within the Vasse Structure Plan (VSP) area, located in the City of Busselton. The project area encompasses the following precincts within the VSP, which are at various stages of planning approval and development/construction:

- Dawson
- Light Industrial Area Stage 2
- Northerly Street
- Armstrong
- Reading Land
- Recreation Reserve.

The Structure Plan amendment is contained in Figure 1, which identifies:

- residential development cells with a range of R-code densities
- industrial development cells
- special purpose heritage site
- primary school site and public purposes site
- indicative internal road layout and neighbourhood connectors
- areas of recreation for Public Open Space (POS) and drainage.

1.2 Site description

The project area occupies a combination of existing developed urban land within the VSP (including residential and industrial development, POS and drainage) and a large proportion of undeveloped rural land currently subject to livestock grazing. The project area is surrounded by the following (see Figure 2):

- existing developed stages of Dawson Precinct, Vasse Bypass, farmland (pasture) and Locke Nature Reserve to the north
- Florence Road, farmland (pasture) and hobby farms to the south
- Vasse Bypass, Vasse-Yallingup Siding Road, farmland (pasture) to the west
- predominantly built portions of Vasse Newtown and farmland (pasture) to the east.

A portion of the project area is designated as bushfire prone on the *Map of Bush Fire Prone Areas* (DFES 2019), as indicated in Plate 1.

1.3 Purpose

This Bushfire Management Plan (BMP) has been prepared to address requirements under *Policy Measure 6.3 of State Planning Policy 3.7 Planning in Bushfire-Prone Areas* (SPP 3.7; WAPC 2015) and *Guidelines for Planning in Bushfire-Prone Areas* (the Guidelines; WAPC 2017).

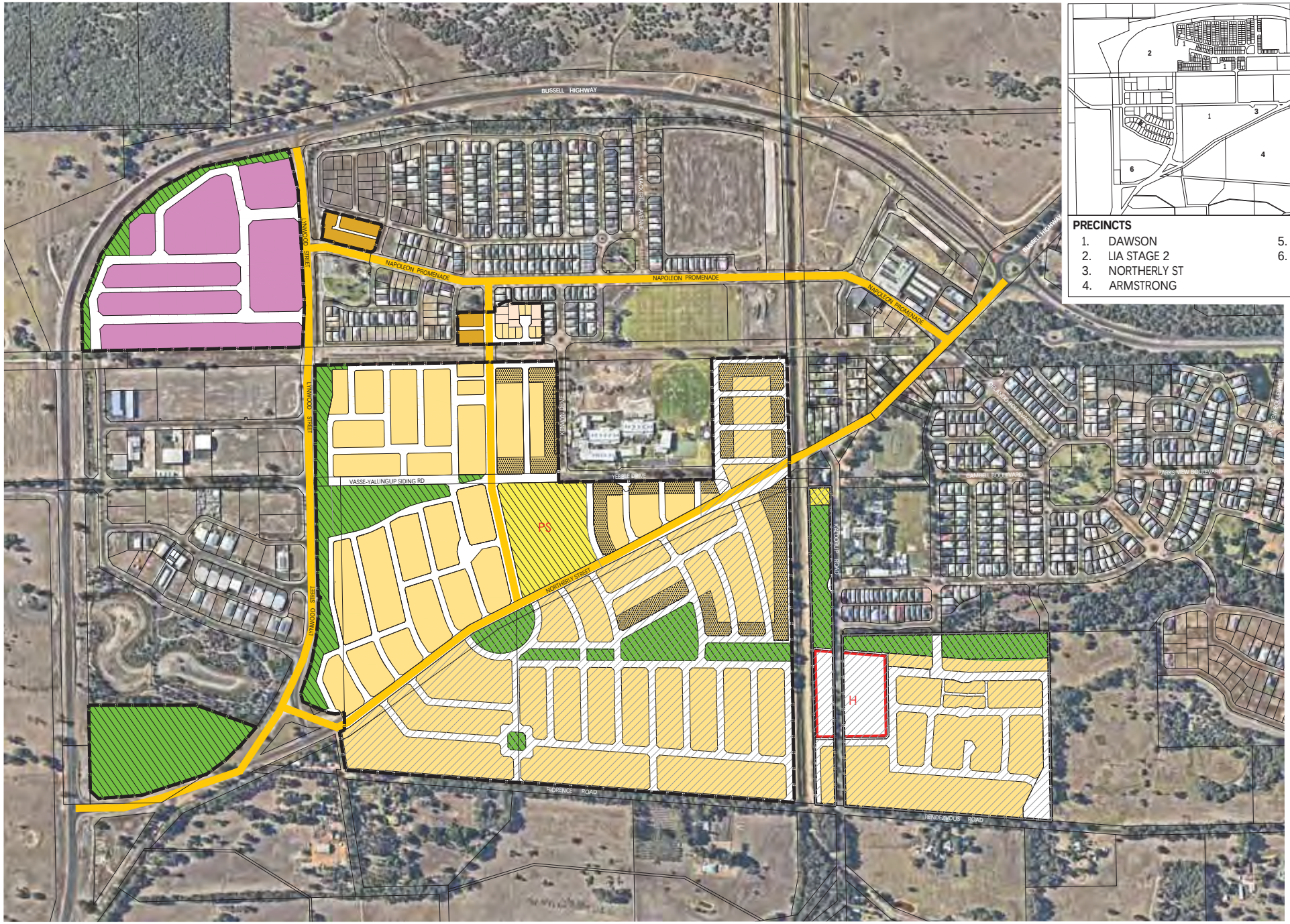
1.4 Other plans/reports

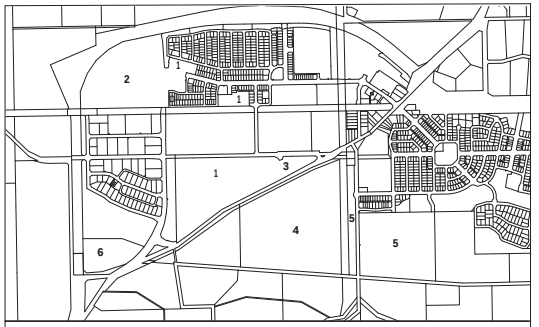
Other reports that have been prepared for the project area include:

- Bushfire Attack Level contour assessment Stages 3A & 3B Dawson Estate, Vasse (Strategen 2016).

There are no other bushfire or environmental reports or assessments known to have been prepared previously for the project area.

Plate 1: Map of Bush Fire Prone Areas (DFES 2019)





PRECINCTS

1. DAWSON
2. LIA STAGE 2
3. NORTHERLY ST
4. ARMSTRONG
5. READING LAND
6. RECREATION RESERVE

LEGEND

- Structure Plan Boundary
- Existing Cadastre
- Lot Boundaries

LOCAL SCHEME RESERVES

- Recreation
- Public Purposes
- Primary School

ZONES

Residential

- R20
- R30
- R20-R40
- R50 or R60 permissible subject to compliance with Cl.3.5.2(c)

- Industrial
- Special Purpose - Heritage
- Neighbourhood Connector
- Local Roads
- Indicative Design Only

VASSE

CADASTRAL INFORMATION
SOURCE: LANDGATE-SLIP
YYMMDD: 200803
DWG REF: dlwmain
PROJECTION: MGA94

AERIAL PHOTOGRAPHY
SOURCE: NEARMAP
YYMMDD:

SIZE A1 1:4000

0 metres 40 80 120 160 200

REV	DESCRIPTION	YYMMDD	DRAWN	APP'D
K	UPDATED STRUCTURE PLAN DESIGN	191101	SB	DF
J	UPDATED STRUCTURE PLAN DESIGN	191010	SB	-
I	MODIFY R50-R60 DENSITY CODE	190725	SB	DF
H	UPDATED R-CODES	190626	SB	DF
G	UPDATED STRUCTURE PLAN	190225	II	DF
F	UPDATED STRUCTURE PLAN	181019	II	DF
E	UPDATED STRUCTURE PLAN	180903	II	DF

PLAN No.1
Vasse Structure Plan
City of Busselton

REF NO.	DRAW NO.	REV.
PGP VAS	**RDI 200**	**K**

Legend:

- Project area
- 100m assessment area
- 150m assessment area
- Cadastral boundary
- Indicative future development

strategen JBS&G

Job No: 57047	
Client: JV Perron Developments & Stawell	
Version: A	Date: 08-Jun-2020
Drawn By: cthatcher	Checked By: BM
Scale 1:7,250	Z

0 100 200
metres

Coord. Sys. GDA 1994 MGA Zone 50

Vasse Structure Plan
Bushfire Management Plan

SITE OVERVIEW

FIGURE 2

File Name: \\008pmpmr004v001.jbsg.aust\JBS Perth\Projects\1)Open\JV Perron Developments & Stawell\57047 Vasse Structure Plan BMP\GIS\Maps\R01 Rev A\57047_02_SiteOverview.mxd
Reference: www.nearmap.com© - Imagery Date: 17 April 2020

2. Environmental considerations

2.1 Native vegetation - modification and clearing

The project area is predominantly cleared and comprises a large proportion of open pasture that holds limited value in the form of habitat for conservation significant species. Potential habitat for conservation significant fauna (such as overstorey eucalypts for Black Cockatoo and peppermint trees for Western Ringtail Possum) will be retained throughout on-site POS, street-scaping and individual development cells where possible to mitigate potential environment impacts.

A search of publicly available environmental data relating to the project area has been undertaken and is summarised in Table 1.

Table 1: Summary of environmental values

Environmental value	Not mapped as occurring within or adjacent to the project area	Mapped as occurring within or adjacent to the project area		Description
		Within	Adjacent	
Environmentally Sensitive Area		✓	✓	An Environmentally Sensitive Area is mapped within a vegetation corridor located in the southern portion of the project area. Another two Environmentally Sensitive Areas are mapped 150 m to the north (associated with Locke Reserve) and 2 km to the east.
Swan Bioplan Regionally Significant Natural Area	✓			N/A.
Ecological linkages	✓			N/A.
Wetlands		✓	✓	Multiple Use Wetlands are mapped as occurring within and adjacent to the project area. To the east of the project area a Resource Enhancement Wetland is mapped as occurring, while a Conservation Category Wetland occurs to the north. No Ramsar wetlands are present.
Waterways	✓			N/A.
Threatened Ecological Communities listed under the EPBC Act		✓	✓	The project area and adjacent areas are mapped as containing Threatened Ecological Communities. Endangered Banksia Woodlands of the Swan Coastal Plain TEC are mapped as being likely to occur both within, and adjacent to the project area. No Tuart Woodlands are mapped as occurring.
Threatened and priority flora			✓	A Priority 3 Flora species is mapped as occurring 1 km to the east of the project area while a Threatened Flora species is mapped as occurring 1.5 km to the east of the project area. A Priority 4 Flora species occurs 2.5 km to the north-east of the project area.
Fauna habitat listed under the EPBC Act		✓	✓	The project area is mapped as containing potential feeding areas for Carnaby's Black Cockatoo and Western Ringtail Possum. No Quenda habitat is mapped as occurring.
Threatened and priority fauna		✓	✓	Numerous Threatened Fauna species are mapped as occurring within and adjacent to the project area. A Priority Fauna species is also mapped as occurring within the project area, with one also mapped to the north of the project area. Another Protected Fauna species is mapped as occurring 2.5 km to the east of the project area.
Bush Forever Site	✓			N/A.

Environmental value	Not mapped as occurring within or adjacent to the project area	Mapped as occurring within or adjacent to the project area		Description
		Within	Adjacent	
DBCA managed lands and waters (includes legislated lands and waters and lands of interest)			✓	Locke Nature Reserve is located to the north of the project area.
Conservation covenants	✓			N/A.

In response to identification of the above environmental values, the Structure Plan aims to avoid clearing of potential habitat for conservation significant fauna where possible. Strategen-JBS&G understands the potential environmental impacts of the proposal are currently being addressed as part of standard state and federal environmental referral, assessment and approvals processes.

2.2 Revegetation / Landscape Plans

Revegetation has already occurred throughout some developed POS areas, including the existing wetland POS cell to the southwest, which has been assigned a vegetation classification of Class A forest and Class D scrub accordingly. Additional revegetation may occur throughout the east-west POS corridor in the south/southeast of the project area, which has been assigned a precautionary classification of Class B woodland in the absence of detailed landscape design. This revegetation aims to maintain and restore potential habitat for Black Cockatoo and Western Ringtail Possum. Existing recreational areas, active POS, narrow drainage corridors and public access ways, particularly in those areas of the site that are already developed/constructed north of Northerly Street, have been landscaped to a low threat state in accordance with Clauses 2.2.3.2 (e) and (f) and have been excluded from bushfire prone designation and vegetation classification accordingly.

The full extent of native vegetation to be retained, revegetated and landscaped to a low threat state within the project area will be determined at future planning stages through the development of a detailed landscaping plan to accompany each stage of subdivision. A landscape masterplan (see Appendix A) has been prepared and includes a conceptual plan for POS areas, which are expected to comprise a combination of retained native vegetation/revegetation and low threat landscaping within passive and active POS. Furthermore, City of Busselton correspondence has confirmed that:

- the Rails to Trails walk corridor orientated east-west in the north (refer to Figure 4) will be subject to formal landscaping (including a dual use pathway) and the City is satisfied that it will be established and maintained in low threat state post-development
- the City is satisfied that all POS vegetation exclusions identified in the post-development vegetation classification map (refer to Figure 4) will be supported by approved landscaping plans at the subdivision stage.

The remainder of the project area will be built/landscaped to achieve exclusion under Clauses 2.2.3.2 (e) and (f). In addition, some small pockets of retained vegetation are excludable under Clause 2.2.3.2 (b) as being less than 1 ha in area and greater than 100 m from any other areas of classified vegetation. The transition of the site from pre to post-development conditions in terms of vegetation classifications and exclusions is considered further in Section 3.1.

3. Bushfire assessment results

3.1 Assessment inputs

3.1.1 Vegetation classification

Strategen-JBS&G assessed classified vegetation and exclusions within 150 m of the project area through on-ground verification on 17 July 2019 in accordance with *AS 3959—2018 Construction of Buildings in Bushfire-Prone Areas* (AS 3959; SA 2018) and the *Visual Guide for Bushfire Risk Assessment in Western Australia* (DoP 2016). Georeferenced site photos and a description of the vegetation classifications and exclusions are contained in Appendix B and depicted in Figure 3 (pre-development conditions) and Figure 4 (post-development conditions).

Regional vegetation surveys and mapping of the Swan Coastal Plain indicates the project area and adjacent land is contained within the Vasse Complex, Yoongarillup Complex and Karrakatta Complex – Central and South. These vegetation complexes are described as:

- Vasse Complex: Mixture of closed scrub of paperbark (*Melaleuca* spp.), fringing woodland of flooded gum (*Eucalyptus rudis*) – paperbark (*Melaleuca* spp.) and open woodland forest of tuart (*Eucalyptus gomphocephala*) – jarrah (*Eucalyptus marginata*) – *marri* (*Corymbia calophylla*). Will include areas dominated by *Tecticornia* and *Sarcocornia* samphire (salt tolerant succulent) species near Mandurah and south of the Capel River
- Yoongarillup Complex: Woodland to tall woodland of tuart (*Eucalyptus gomphocephala*) with peppermint (*Agonis flexuosa*) in the second storey. Less consistently, open forest of (*Eucalyptus gomphocephala*) – jarrah (*Eucalyptus marginata*) – marri (*Corymbia calophylla*). South of Bunbury is characterized by flooded gum (*Eucalyptus rudis*) – paperbark (*Melaleuca*) species open forests
- Karrakatta Complex – Central and South: Predominantly open forest of tuart (Eucalyptus *gomphocephala*) – jarrah (*Eucalyptus marginata*) – marri (*Eucalyptus calophylla*) and woodland of jarrah (*Eucalyptus marginata*) – Banksia (*Banksia* spp).

The vegetation complexes described above are consistent with the vegetation structures observed during the site assessment:

- areas mapped as Class A forest are dominated by a mixture of marri/tuart/jarrah overstorey with a mid-storey of juvenile trees and shrubs
- Class B woodland areas are also dominated by marri/tuart/jarrah overstorey but exist in a sparse array of retained canopy trees and lack the mid-storey component of the fuel structure due to previous grazing land use
- Class B woodland areas also apply to remnant pockets of retained peppermint canopy lacking in mid/understorey fuel
- the two wetland areas adjacent to Commerce Road and Heritage Drive comprise a closed paperbark scrub with fringing forest of flooded gum
- the majority of the project area comprises Class G grassland as a result of the broad extent of pasture grasses commensurate with the livestock grazing land use.

Excluded areas within and surrounding the project area comprise the following:

- excluded under Clause 2.2.3.2 (e): non-vegetated areas (i.e. footpaths, buildings, roads, water bodies, etc)
- excluded under Clause 2.2.3.2 (f): low threat areas (i.e. grass maintained below 100 mm in height with enforceability for ongoing management under the City's annual firebreak notice, existing low threat landscaped and managed POS areas (including the active recreation space and public access corridor occupied by Rails to Trails walk corridor), manicured lawns, residential gardens, orchards, etc)
- small pockets of retained vegetation that are less than 1 ha in size and located greater than 100 m from any other classified vegetation.

As previously stated, the above exclusions are supported by City of Busselton correspondence, which confirms that:

- the Rails to Trails walk corridor orientated east-west in the north (refer to Figure 4) will be subject to formal landscaping (including a dual use pathway) and the City is satisfied that it will be established and maintained in low threat state post-development
- the City is satisfied that all POS vegetation exclusions identified in the post-development vegetation classification map (refer to Figure 4) will be supported by approved landscaping plans at the subdivision stage.

3.1.2 Effective slope

Strategen-JBS&G assessed effective slope under classified vegetation through on-ground verification on 17 July 2019 in accordance with AS 3959. Results were cross-referenced with DPIRD 2m contour data, which is depicted in Figure 3 (pre-development conditions) and Figure 4 (post-development conditions).

The topography of the project area and surrounding land is characterised by flat and low-lying land, typical of the surrounding Vasse and Busselton locales. Elevation ranges from 2 m to the north and within the project area to 6 m to the south. All land under classified vegetation has an effective slope of 0 degrees (i.e. flat/upslope).

3.1.3 Pre-development inputs

A summary of the assessed pre-development classified vegetation, exclusions and effective slope within the project area and adjacent 150 m are listed in Table 2 and illustrated in Figure 3.

Table 2: Pre-development vegetation classifications/exclusions and effective slope

Vegetation plot	Vegetation classification	Effective slope	Comments
1	Class A Forest	Flat/upslope (0°)	Forest vegetation dominated by a mixture of marri/tuart/jarrah overstorey with a mid-storey of juvenile trees and shrubs. Located within Locke Nature Reserve to the northwest, surrounding the two wetland areas to the southwest and southeast of the project area and alongside the main drain running north-south within the eastern portion of the project area.
2	Class B Woodland	Flat/upslope (0°)	Vegetation dominated by sparse eucalypts or peppermints with a grazed understorey. Occurs within the grazed portions of the project area, within road reserves and throughout rural-residential properties to the south of the project area.
3	Class D Scrub	Flat/upslope (0°)	Closed paperbark scrub occurring throughout the two wetland areas adjacent to Commerce Road (southwest) and Heritage Drive (southeast) comprising a continuous vertical fuel profile greater than 2 m in height.
4	Class G Grassland	Flat/upslope (0°)	Areas dominated by a fine fuel structure associated with grassland/pasture in various states of management throughout the project area and adjacent land.
5	Excluded – Clause 2.2.3.2 [b]	N/A	Small pockets of retained POS vegetation less than 1 ha in size and greater than 100 m from other areas of classified vegetation.
6	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	Non-vegetated areas (i.e. footpaths, buildings, roads, water bodies) and low threat vegetation (i.e. grass maintained below 100 mm in height with enforceability for ongoing maintenance, landscaped and managed POS, manicured lawns, residential gardens, orchards, etc).

3.1.4 Post-development inputs

A summary of the expected post-development classified vegetation, exclusions and effective slope within the assessment area are listed in Table 3 and illustrated in Figure 4.

The post-development vegetation classifications and exclusions for all land external to the project area are expected to remain the same as for the pre-development conditions. However, the internal site area will be largely modified to a low threat state as a result of ongoing urban development and associated exclusion of land.

Table 3: Post-development vegetation classifications/exclusions and effective slope

Vegetation plot	Vegetation classification	Effective slope	Comments
1	Class A Forest	Flat/upslope (0°)	Minor clearing of this plot will be required where it occurs within the heritage site and adjacent POS.
2	Class B Woodland	Flat/upslope (0°)	A portion of this plot will be retained/rehabilitated within the central POS corridor.
3	Class D Scrub	Flat/upslope (0°)	No change from pre-development extent, except for fragmentation of a small vegetated cell central to the site that subsequently becomes excludable under Clause 2.2.3.2 (b).
4	Class G Grassland	Flat/upslope (0°)	Largely cleared as part of the proposed development, with remnant grassland areas being limited to adjacent rural properties.
5	Excluded – Clause 2.2.3.2 [b]	N/A	Pockets of vegetation isolated from classified vegetation as a result of proposed development.
6	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	Maintenance of existing cleared/low threat footprint.
7	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	Area to be modified to a low threat state (i.e. proposed development areas and low threat POS to be constructed/established as part of the proposal.

Legend:

- Project area
- 100m assessment area
- 150m assessment area
- POS
- Heritage
- Primary school
- Public purposes
- Rails to Trails walk trail corridor

Vegetation classification

- Class A Forest
- Class B Woodland
- Class D Scrub
- Class G Grassland
- Excluded under Clause 2.2.3.2 (b)
- Excluded under Clause 2.2.3.2 (e) & (f)
- Indicative future development
- Photo points and direction
- Surface elevation (mAHD)

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0 100 200 metres

Coord. Sys. GDA 1994 MGA Zone 50

Vasse Structure Plan
Bushfire Management Plan

PRE-DEVELOPMENT VEGETATION CLASSIFICATION AND EFFECTIVE SLOPE

FIGURE 4

File Name: \\008pmpmr004v001.jbsg.aust\JBS Perth\Projects\1)Open\JV Perron Developments & Stawell\57047 Vasse Structure Plan BMP\GIS\Maps\R01 Rev A\57047_04_PreDevVegClassSlope.mxd
Reference: www.nearmap.com© - Imagery Date: 17 April 2020

Legend:

- Project area
- 100m assessment area
- 150m assessment area
- POS
- Heritage
- Primary school
- Public purposes
- Rails to Trails walk trail corridor

Vegetation classification

- Class A Forest
- Class B Woodland
- Class D Scrub
- Class G Grassland
- Excluded under Clause 2.2.3.2 (b)
- Excluded under Clause 2.2.3.2 (e) & (f)
- Area to be modified to a non-vegetated or low threat state
- Indicative future development
- Surface elevation (mAHD)

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Scale 1:7,250	Z

0 100 200 metres

Coord. Sys. GDA 1994 MGA Zone 50

Vasse Structure Plan
Bushfire Management Plan

POST-DEVELOPMENT VEGETATION CLASSIFICATION AND EFFECTIVE SLOPE

FIGURE 5

File Name: \\008pmpmr004v001.jbsg.aust\JBS Perth\Projects\1)Open\JV Perron Developments & Stawell\57047 Vasse Structure Plan BMP\GIS\Maps\R01 Rev A\57047_05_PostDevVegClassSlope.mxd
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3.2 Assessment outputs

3.2.1 Bushfire Hazard Level (BHL) assessment

Pre and post-development vegetation extents have been assigned a Bushfire Hazard Level (BHL) in accordance with the methodology detailed in Appendix Two of the Guidelines, as outlined in Table 4.

Table 4: Bushfire hazard levels and characteristics

Bushfire hazard level	Characteristics*
Extreme	• Class A Forest • Class B Woodland (05) • Class D Scrub • Any classified vegetation with a greater than 10° slope.
Moderate	• Class B Low woodland (07) • Class C Shrubland • Class E Mallee/Mulga • Class G Grassland, including sown pasture and crops • Class G Grassland: Open woodland (06), Low open woodland (08), Open shrubland (09) • Vegetation that has a low hazard level but is within 100 metres of vegetation classified as a moderate or extreme hazard, is to adopt a moderate hazard level.
Low	• Low threat vegetation may include areas of maintained lawns, golf courses, public recreation reserves and parklands, vineyards, orchards, cultivated gardens, commercial nurseries, nature strips and windbreaks • Managed grassland in a minimal fuel condition (insufficient fuel is available to significantly increase the severity of the bushfire attack). For example, short-cropped grass to a nominal height of 100 millimetre • Non-vegetated areas including waterways, roads, footpaths, buildings and rock outcrops.
*Vegetation classifications from AS 3959-2018 Table 2.3.	

3.2.1.1 Pre-development

Strategen-JBS&G has mapped the pre-development BHLs within the project area and adjacent 150 m wide assessment area. The BHLs have been assessed on the basis of the vegetation discussed in Section 3.1.3 (i.e. the current pre-development extent of classified vegetation and exclusions within and surrounding the project area).

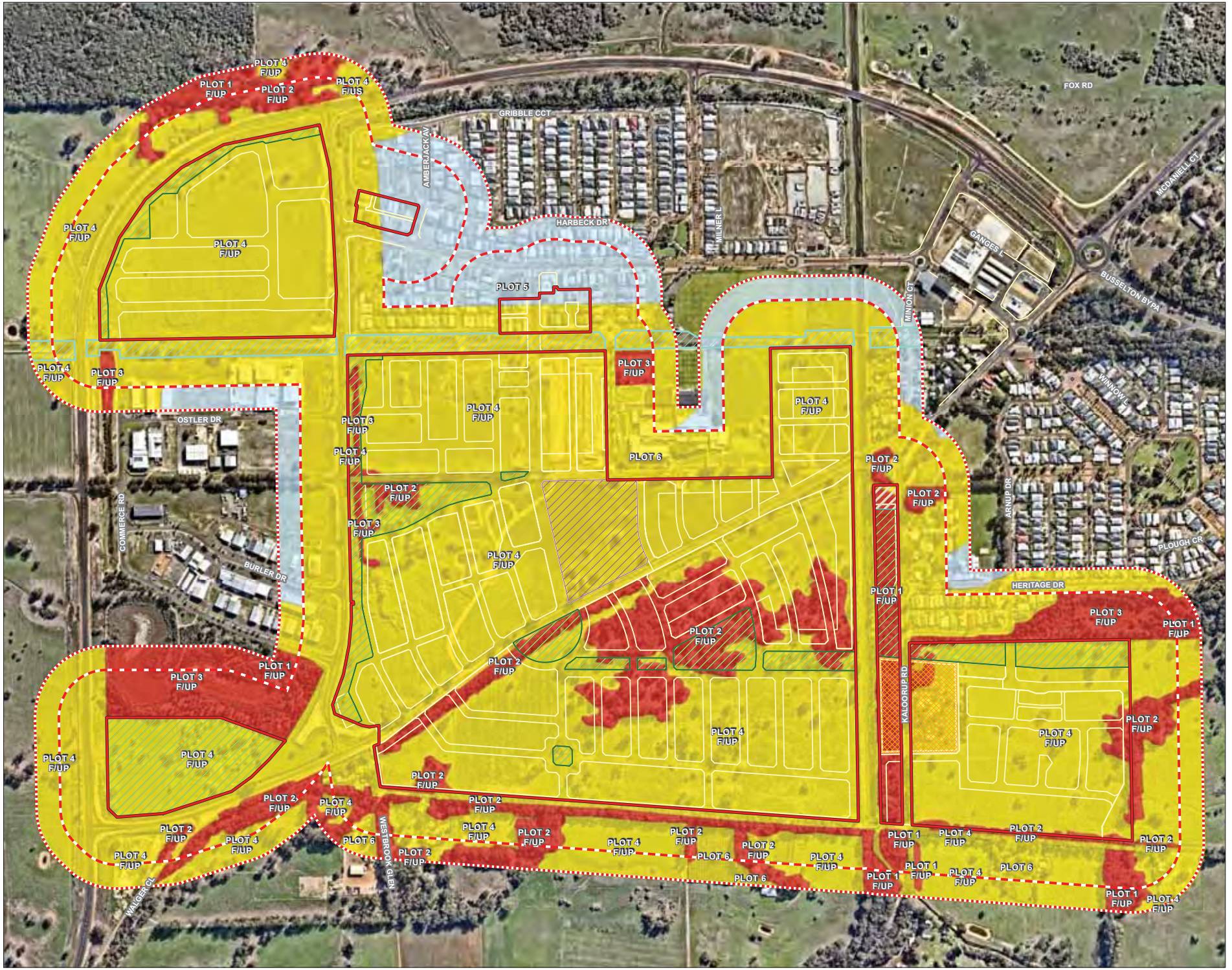
The pre-development BHL assessment (refer to Figure 5) indicates that based on the existing vegetation, the project area contains land with Low, Moderate and Extreme BHLs. Pre-development BHLs take into account City advice confirming that:

- the Rails to Trails walk corridor orientated east-west in the north (refer to Figure 5) will be subject to formal landscaping (including a dual use pathway) and the City is satisfied that it will be established and maintained in low threat state post-development
- the City is satisfied that all POS vegetation exclusions identified in the post-development vegetation classification map (refer to Figure 5) will be supported by approved landscaping plans at the subdivision stage.

3.2.1.2 Post-development

Strategen-JBS&G has mapped the expected post-development BHLs to demonstrate that future BHLs will be reduced to acceptable levels to enable compliant subdivision development to occur within the project area. The BHLs have been assigned on the basis of the vegetation discussed in Section 3.1.4 and the expected reduction in classified vegetation extent and exclusions within and surrounding the project area following completion of development.

The post-development BHL assessment (refer to Figure 6) demonstrates that all future habitable development will be located on land with either a Low or Moderate BHL.



Legend:

- Project area
- 100m assessment area
- 150m assessment area
- POS
- Heritage
- Primary school
- Public purposes
- Rails to Trails walk trail corridor
- Indicative future development

Hazard level

- Extreme
- Moderate
- Low

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0 100 200
metres

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Vasse Structure Plan
Bushfire Management Plan

PRE-DEVELOPMENT BHL ASSESSMENT

FIGURE 6

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Legend:

- Project area
- 100m assessment area
- 150m assessment area
- POS
- Heritage
- Primary school
- Public purposes
- Rails to Trails walk trail corridor
- Indicative future development

Hazard level

- Extreme
- Moderate
- Low

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0 100 200
metres

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Vasse Structure Plan
Bushfire Management Plan

POST-DEVELOPMENT BHL ASSESSMENT

FIGURE 7

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4. Identification of bushfire hazard issues

4.1 Bushfire context

The predominant bushfire risk to the project area is from the broad extent of surrounding rural land and associated grassland hazard, which has the potential to impact the site with moderate levels of radiant heat and ember attack. This risk is deemed readily manageable in consideration of the proposal as per standard Guideline acceptable solutions, including response through existing perimeter roads (i.e. Florence Road to the south, and Vasse Bypass to the north and west) and associated separation, access and water, working in concert with BAL-rated construction where required.

Areas of Class A forest in proximity to the project area (Locke Nature Reserve to the northwest; wetland POS in the southeast and southwest; and adjacent to the Buayanyup Drain running north-south parallel to Kaloorup Road), although limited in their size and location, could result in elevated levels of radiant heat and ember attack exposure under conducive bushfire weather conditions. However, existing defendable space provided in the form of the Vasse Bypass, internal roads, managed POS and the Buayanyup Drain is expected to provide sufficient separation to achieve a manageable reduction in the level of radiant heat exposure. BAL-rated construction will also be implemented where required.

Future retention and rehabilitation of woodland fuels throughout the east-west POS corridor is a potential source of bushfire risk. However, the POS cells will consist of fragmented, narrow corridors and adjacent development design will respond through perimeter roads for separation, access and water supply, working in concert with BAL-rated construction where required. The proposed response is in accordance with Guideline acceptable solutions and considered adequate to manage the inherent bushfire risk.

The existing extent of urban development throughout Vasse to the north, northeast and east of the project area, combined with the proposed extent of urban development resulting from the proposal is expected to provide a significant reduction in the capacity for bushfire spread, escalation and impact to life and property in the locality.

Strategen-JBS&G considers that the bushfire risk to proposed development posed by the abovementioned hazards can be managed through standard application of acceptable solutions under the Guidelines, as well as through a direct bushfire suppression response if required. Bushfire mitigation strategies applicable to the proposed development are addressed in Section 5 of this BMP.

4.2 Bushfire hazard issues

Examination of strategic development design in accordance with the Structure Plan and pre and post-development BHLs has identified the following bushfire hazard issues to be considered at future planning stages:

1. On completion, the proposal will result in a predominant non-vegetated and low threat landscaped outcome with limited bushfire risk exposure. However, where BMPs are required to accompany future subdivision application, there will need to be appropriate consideration of staging mechanisms (i.e. low threat staging buffers and vehicular access) to manage any interim/temporary hazards/risks posed by adjacent undeveloped stages.
2. Based on Structure Plan design, proposed development cells have been sited such that each can achieve compliant BAL-29 separation distances adjacent to classified vegetation, including:
    a. 21 m adjacent to Class A forest
    b. 14 m adjacent to Class B woodland

c. 13 m adjacent to Class D scrub

d. 8 m adjacent to Class G grassland.

The above separation distances can be delivered through the use of interfacing roads, low threat landscaped POS and/or development setbacks. With regards to the POS within Lot 250 Kaloorup Road in the southeast of the project area, Strategen-JBS&G understands that the road network and development cells are indicative only and subject to future structure planning and design, which will respond to the identified bushfire risk at that time (i.e. through implementation of APZs or relocation of roads to provide adequate separation from classified vegetation to achieve BAL- 29). Where BMPs are required to accompany future subdivision application, detailed BAL contour maps will be required to specify compliant APZ provisions where necessary to demonstrate that ratings of BAL-29 or lower will be delivered.

3. Further clarification is required to confirm the assumptions made with regards to classified vegetation versus exclusions throughout POS areas. Where BMPs are required to accompany future subdivision application, sufficient detail will be required to inform the area of retained vegetation, the area of proposed revegetation/rehabilitation and the area of proposed low threat landscaping. This will be required in the form of a detailed landscape plan and appropriate environmental input with regards to retention of fauna habitat.
4. The project area is already well-serviced by the existing public road network and there is sufficient scope to ensure that all proposed development is provided with multiple access connections to the existing public road network, primarily in Lynwood Street, Napoleon Promenade, Northerly Street, Vasse-Yallingup Siding Road, Kaloorup Road, Harlequin Boulevard, Vasse Bypass, Florence Road and Rendezvous Road. There is unlikely to be any requirement or need to provide permanent Emergency Access Ways (EAWs) or fire service access routes. However, provision of temporary compliant EAWs or cul-de-sacs may be required to service proposed development during an interim staging period.
5. Three permanent cul-de-sacs result from the proposed Structure Plan, including:
    a. an existing compliant cul-de-sac approved and constructed as part of a previous Dawson Precinct subdivision, which is not situated within a designated bushfire prone area
    b. a proposed compliant cul-de-sac in the southeast of the project area (Reading Land Precinct), which will not be situated in a designated bushfire prone area post-development (i.e. subject to BAL-Low)
    c. a proposed compliant cul-de-sac situated near the intersection of Northerly Street and Lynwood Street, which cannot be avoided given proximity to the existing intersection of Northerly and Lynwood
6. A compliant reticulated water supply and network of street hydrants is considered readily achievable given the existing reticulated water services in the area and ongoing extension of the street hydrant network along proposed public roads.
7. A built form response in the form of BAL-rated construction will be required for future Class 1, 2, 3 and associated Class 10a buildings in response to any proposed lots situated in a designated bushfire prone area subject to a rating of BAL-12.5 to BAL-29.
8. Development of the proposed Primary School may need to have consideration of a BMP accompanied by a Bushfire Emergency Evacuation Plan (BEEP) to support lodgement at the Development Application (DA) stage.

Based on the above, Strategen-JBS&G considers the bushfire hazards within and adjacent to the project area and the associated bushfire risks are readily manageable through standard management responses outlined in the Guidelines and AS 3959.

5. Assessment against the bushfire protection criteria

5.1 Compliance table

An acceptable solutions assessment against the bushfire protection criteria is provided in Table 5.

Table 5: Compliance with the bushfire protection criteria of the Guidelines

Bushfire protection criteria	Method of compliance Acceptable solutions	Proposed bushfire management strategies
Element 1: Location	A1.1 Development location	The post-development BHL assessment (Figure 6) identifies that on completion of development, all developable land will comprise either a Low or Moderate bushfire hazard level.
Element 2: Siting and design	A2.1 Asset Protection Zone	Separation distances sufficient to achieve BAL-29 can be achieved for all development areas through the use of interfacing roads, low threat landscaped POS and/or development setbacks. The required separation distances (including APZs where required) will be identified for each stage of subdivision application where required based confirmed lot layout and BAL contour assessment. Based on the vegetation classifications identified during the site assessment, the following separation distances will apply: • 21m from Class A forest, flat/upslope • 14m from Class B woodland, flat/upslope • 13m from Class D scrub, flat/upslope • 8m from Class G grassland, flat/upslope. Any identified APZs are to be established and maintained in accordance with Schedule 1 of the Guidelines (Appendix C).
Element 3: Vehicular access	A3.1 Two access routes	The project area is already well-serviced by the existing public road network and there is sufficient scope to ensure that all proposed development is provided with multiple access connections to the existing public road network, primarily in Lynwood Street, Napoleon Promenade, Northerly Street, Vasse-Yallingup Siding Road, Kaloorup Road, Harlequin Boulevard, Vasse Bypass, Florence Road and Rendezvous Road. Provision of temporary compliant EAWs or cul-de-sacs may be required to service proposed development during an interim staging period and ensure two access routes are available for all development stages.
	A3.2 Public road	All future public roads are to be constructed to relevant technical requirements of the Guidelines (see Appendix D).
	A3.3 Cul-de-sac (including a dead-end-road)	Three permanent cul-de-sacs result from the proposed Structure Plan, including: • an existing compliant cul-de-sac approved and constructed as part of a previous Dawson Precinct subdivision, which is not situated within a designated bushfire prone area • a proposed compliant cul-de-sac in the southeast of the project area (Reading Land Precinct), which will not be situated in a designated bushfire prone area post-development (i.e. subject to BAL-Low) • a proposed compliant cul-de-sac situated near the intersection of Northerly Street and Lynwood Street, which cannot be avoided given proximity to the existing intersection of Northerly and Lynwood The proposed cul-de-sacs and any temporary cul-de-sacs required as part of staging will be less than 200 m in length, will include minimum 17.5 m diameter turn-around heads and are to be constructed to the relevant technical requirements of the Guidelines (see Appendix D).
	A3.4 Battle-axe	N/A – no battle-axes are proposed as part of the development and the project area is not serviced by an existing battle-axe.
	A3.5 Private driveway longer than 50 m	N/A – the proposed lots are of size where all future habitable development will be located within 50 m of a public road.

Bushfire protection criteria	Method of compliance Acceptable solutions	Proposed bushfire management strategies
	A3.6 Emergency access way	No permanent EAWs are proposed, however, if development and vehicular access construction is to be staged, any temporary EAWs are to be constructed to the relevant technical requirements of the Guidelines (see Appendix D).
	A3.7 Fire service access routes (perimeter roads)	N/A – no fire service access routes (FSARs) are proposed or required to deliver perimeter access around the development given the extent of existing perimeter public access roads.
	A3.8 Firebreak width	Each stage of development is required to comply with the requirements of Acceptable Solution A3.8 and the annual City Firebreak Notice as amended (refer to Appendix F), including provision of firebreaks on balance titles and fuel hazard reduction on residential lots.
Element 4: Water	A4.1 Reticulated areas	The proposed development will be connected to reticulated water supply via surrounding development in accordance with Water Corporations Design Standard 63 requirements, which will meet the technical requirements of the Guidelines specified in Appendix E.
	A4.2 Non-reticulated areas	N/A – the proposed subdivision is located within an existing reticulated area.
	A4.3 Individual lots within non-reticulated areas (Only for use if creating 1 additional lot and cannot be applied cumulatively)	N/A – the proposed subdivision is located within an existing reticulated area.

6. Responsibilities for implementation and management of the bushfire measures

This BMP has been prepared as a strategic guide to demonstrate how development compliance will be delivered at future planning stages in accordance with the Guidelines. Aside from the preparation of future BMPs to accompany future subdivisions and DAs where applicable, there are no further items to implement, enforce or review at this strategic stage of the planning process.

Future BMPs prepared for subsequent subdivisions and DAs are to meet the relevant commitments outlined in this strategic level BMP, address the relevant requirements of SPP 3.7 (i.e. Policy Measures 6.4 and 6.5 respectively) and demonstrate in detail how the proposed development will adopt the relevant acceptable solutions and meet the bushfire performance criteria of the Guidelines. Future BMPs are to include the following detailed information:

- proposed lot layout, including residential lots, industrial lots, primary school lot, heritage lot, roads, POS/drainage areas, etc
- detailed POS landscape plans to confirm the final extent of classified vegetation (retained or revegetated) and exclusions (non-vegetated areas and low threat vegetation)
- final determination of post development classified vegetation extent, exclusions and effective slope
- BAL contour mapping to demonstrate that proposed development areas will achieve BAL–29 or lower
- width and alignment of compliant APZs/setbacks where required
- confirmation of how bushfire management will be addressed during development staging, including consideration of low threat staging buffers and vehicular access (temporary cul-de-sacs/EAWs)
- proposed approach to fuel management throughout POS, vacant land, staging buffers, adjacent properties and road verges; or application of AS 3959 in response to classified vegetation
- vehicular access provisions, including demonstration that a minimum of two access routes will be achieved for each stage of development in accordance with Acceptable Solution A3.1
- reticulated water supply provisions and network of street hydrants
- demonstration of compliance with the bushfire protection criteria of the Guidelines
- requirements for any proposed vulnerable land uses (e.g. primary school), including provision of a BMP and BEEP to accompany the DA
- requirements for any proposed high-risk land uses (e.g. service stations), including provision of a BMP and Bushfire Risk Management Plan to accompany the DA
- requirements for BMP compliance reporting as a condition of subdivision
- notification on Title for any future residential lots with a rating of BAL–12.5 or greater as a condition of subdivision
- compliance requirements with the current City's annual firebreak notice
- construction of Class 1, 2, 3 or associated 10a buildings in accordance with AS 3959 to the assessed BAL ratings where applicable

- proposed implementation and audit program outlining all measures requiring implementation and the appropriate timing and responsibilities for implementation.

On the basis of the information contained in this BMP, Strategen-JBS&G considers the bushfire hazards within and adjacent to the project area and the associated bushfire risks are readily manageable through standard management responses outlined in the Guidelines and AS 3959. Strategen-JBS&G considers that on implementation of the proposed management measures, the project area will be able to be developed with a manageable level of bushfire risk whilst maintaining full compliance with the Guidelines and AS 3959.

7. References

Department of Fire and Emergency Services (DFES) 2019, *Map of Bush Fire Prone Areas*, [Online], Government of Western Australia, available from: https://maps.slip.wa.gov.au/landgate/bushfireprone/, [18/11/2019].

Department of Planning (DoP) 2016, *Visual guide for bushfire risk assessment in Western Australia*, Department of Planning, Perth.

Standards Australia (SA) 2018, Australian Standard *AS 3959–2018 Construction of Buildings in Bushfire-prone Areas*, Standards Australia, Sydney.

Strategen Environmental (Strategen) 2019, *Bushfire Attack Level contour assessment Stages 3A & 3B Dawson Estate, Vasse*, Strategen, Perth/Bunbury.

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

Western Australian Planning Commission (WAPC) 2017, *Guidelines for Planning in Bushfire Prone Areas, Version 1.3 August 2017*, Western Australian Planning Commission, Perth.

8. Limitations

Scope of services

This report ("the report") has been prepared by Strategen-JBS&G in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and Strategen-JBS&G. In some circumstances, a range of factors such as time, budget, access and/or site disturbance constraints may have limited the scope of services. This report is strictly limited to the matters stated in it and is not to be read as extending, by implication, to any other matter in connection with the matters addressed in it.

Reliance on data

In preparing the report, Strategen-JBS&G has relied upon data and other information provided by the Client and other individuals and organisations, most of which are referred to in the report ("the data"). Except as otherwise expressly stated in the report, Strategen-JBS&G has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report ("conclusions") are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. Strategen-JBS&G has also not attempted to determine whether any material matter has been omitted from the data. Strategen-JBS&G will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to Strategen-JBS&G. The making of any assumption does not imply that Strategen-JBS&G has made any enquiry to verify the correctness of that assumption.

The report is based on conditions encountered and information received at the time of preparation of this report or the time that site investigations were carried out. Strategen-JBS&G disclaims responsibility for any changes that may have occurred after this time. This report and any legal issues arising from it are governed by and construed in accordance with the law of Western Australia as at the date of this report.

Environmental conclusions

Within the limitations imposed by the scope of services, the preparation of this report has been undertaken and performed in a professional manner, in accordance with generally accepted environmental consulting practices. No other warranty, whether express or implied, is made.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

Strategen-JBS&G accepts no liability for use or interpretation by any person or body other than the client who commissioned the works. This report should not be reproduced without prior approval by the client, or amended in any way without prior approval by Strategen-JBS&G, and should not be relied upon by other parties, who should make their own enquiries.

Appendix A Landscape concept

Appendix B Vegetation plot photos and description

Photo ID: 1a

Photo ID: 1b

Photo ID: 1c

Photo ID: 1d

Photo ID: 1e

Photo ID: 1f

Photo ID: 1g

Photo ID: 1h

Photo ID: 1i

Photo ID: 1j

Photo ID: 1k

Plot number		Plot 1
Vegetation classification	**Pre-development**	Class A Forest
	Post-development	Combination of Class A forest and excluded under Clauses 2.2.3.2 (e) and (f) as some areas will be modified to a low threat state
Description / justification		Forest vegetation dominated by a mixture of marri/tuart/jarrah overstorey with a mid-storey of juvenile trees and shrubs.

Photo ID: 2a

Photo ID: 2b

Photo ID: 2c

Photo ID: 2d

Photo ID: 2e

Photo ID: 2f

Photo ID: 2g

Photo ID: 2h

Photo ID: 2i

Photo ID: 2j

Photo ID: 2k

Photo ID: 2l

Photo ID: 2m

Photo ID: 2n

Photo ID: 2o

Photo ID: 2p

Photo ID: 2q

Plot number		Plot 2
Vegetation classification	**Pre-development**	Class B Woodland
	Post-development	Combination of Class B woodland and excluded under Clauses 2.2.3.2 (e) and (f) as some areas will be modified to a low threat state
Description / justification		Vegetation dominated by eucalypts or peppermints with a grazed understorey.

Photo ID: 3a

Photo ID: 3b

Photo ID: 3c

Photo ID: 3d

Photo ID: 3e

Plot number		Plot 3
Vegetation classification	**Pre-development**	Class D Scrub
	Post-development	Combination of Class D scrub and excluded under Clauses 2.2.3.2 (e) and (f) as some areas will be modified to a low threat state
Description / justification		Closed paperbark scrub occurring throughout the two wetland areas adjacent to Commerce Road and Heritage Drive comprising a continuous vertical fuel profile.

Photo ID: 4a

Photo ID: 4b

Photo ID: 4c

Photo ID: 4d

Photo ID: 4e

Photo ID: 4f

Photo ID: 4g

Photo ID: 4h

Photo ID: 4i

Photo ID: 4j

Photo ID: 4k

Photo ID: 4l

Photo ID: 4m

Photo ID: 4n

Photo ID: 4o

Photo ID: 4p

Photo ID: 4q

Photo ID: 4r

Photo ID: 4s

Plot number		Plot 4
Vegetation classification	**Pre-development**	Class G Grassland
	Post-development	Combination of Class G grassland and excluded under Clauses 2.2.3.2 (e) and (f) as some areas will be modified to a low threat state
Description / justification		Areas dominated by a fine fuel structure associated with grassland/pasture in various states of management throughout the project area and adjacent land.

Photo ID: 5a

Photo ID: 5b

Plot number		Plot 5
Vegetation classification	**Pre-development**	Combination of Class D and excluded under Clause 2.2.3.2 (b)
	Post-development	Excluded – Clause 2.2.3.2 [b]
Description / justification		POS from previous stages of Dawson Estate planted with dense vegetation, which will be greater than 100 m from other areas of classified vegetation following clearing of the project area.

Photo ID: 6a

Photo ID: 6b

Photo ID: 6c

Photo ID: 6d

Photo ID: 6e

Photo ID: 6f

Photo ID: 6g

Photo ID: 6h

Photo ID: 6i

Photo ID: 6j

Photo ID: 6k

Photo ID: 6l

Photo ID: 6m

Photo ID: 6n

Photo ID: 6o

Photo ID: 6p

Photo ID: 6q

Photo ID: 6r

Photo ID: 6s

Photo ID: 6t

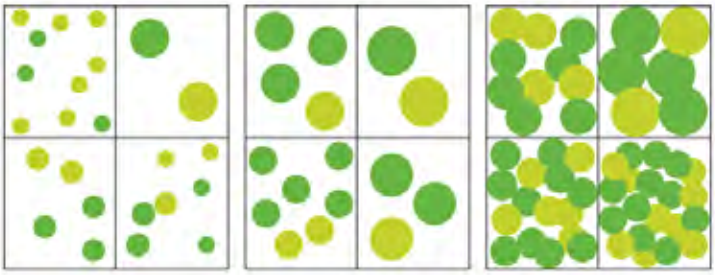
Photo ID: 6u

Plot number		Plot 6
Vegetation classification	**Pre-development**	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])
	Post-development	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])
Description / justification		Non-vegetated areas (i.e. footpaths, buildings, roads, mulched areas, water bodies) and low threat areas (grass maintained below 100 mm in height, managed POS, manicured lawns, residential gardens, orchards) throughout the project area and adjacent land.

Appendix C APZ standards (Schedule 1 of the Guidelines)

Schedule 1: Standards for Asset Protection Zones

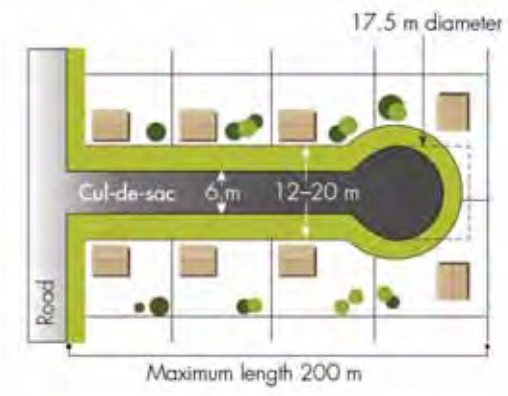
- **Fences:** within the APZ are constructed from non-combustible materials (e.g. iron, brick, limestone, metal post and wire). It is recommended that solid or slatted non-combustible perimeter fences are used.
- **Objects:** within 10 metres of a building, combustible objects must not be located close to the vulnerable parts of the building i.e. windows and doors.
- **Fine Fuel load:** combustible dead vegetation matter less than 6 millimetres in thickness reduced to and maintained at an average of two tonnes per hectare.
- **Trees (> 5 metres in height):** trunks at maturity should be a minimum distance of 6 metres from all elevations of the building, branches at maturity should not touch or overhang the building, lower branches should be removed to a height of 2 metres above the ground and or surface vegetation, canopy cover should be less than 15% with tree canopies at maturity well spread to at least 5 metres apart as to not form a continuous canopy.



- **Shrubs (0.5 metres to 5 metres in height):** should not be located under trees or within 3 metres of buildings, should not be planted in clumps greater than 5m2 in area, clumps of shrubs should be separated from each other and any exposed window or door by at least 10 metres. Shrubs greater than 5 metres in height are to be treated as trees.
- **Ground covers (<0.5 metres in height):** can be planted under trees but must be properly maintained to remove dead plant material and any parts within 2 metres of a structure, but 3 metres from windows or doors if greater than 100 millimetres in height. Ground covers greater than 0.5 metres in height are to be treated as shrubs.
- **Grass:** should be managed to maintain a height of 100 millimetres or less.

Appendix D Vehicular access technical standards of the Guidelines

Public roads	
Acceptable solution A3.2	A public road is to meet the requirements in Table 1, Column 1.
Explanatory note E3.2	Trafficable surface: Widths quoted for access routes refer to the width of the trafficable surface. A six metre trafficable surface does not necessarily mean paving width. It could, for example, include four metre wide paving one metre wide constructed road shoulders. In special circumstances, where eight lots or less are being serviced, a public road with a minimum trafficable surface of four metres for a maximum distance of 90 metres may be provided subject to the approval of both the local government and Department of Fire and Emergency Services. Public road design: All roads should allow for two-way traffic to allow conventional two-wheel drive vehicles and fire appliances to travel safely on them. 

Cul-de-sac (including a dead-end road)	
Acceptable solution A3.3	A cul-de-sac and/ or a dead end road should be avoided in bushfire prone areas. Where no alternative exists (i.e. the lot layout already exists and/ or will need to be demonstrated by the proponent), the following requirements are to be achieved: • Requirements in Table 1, Column 2 • Maximum length: 200 metres (if public emergency access is provided between cul-de-sac heads maximum length can be increased to 600 metres provided no more than eight lots are serviced and the emergency access way is no more than 600 metres) • Turn-around area requirements, including a minimum 17.5 metre diameter head.
Explanatory note E3.3	In bushfire prone areas, a cul-de-sac subdivision layout is not favoured because they do not provide access in different directions for residents. In some instances it may be possible to provide an emergency access way between cul-de-sac heads to a maximum distance of 600 metres, so as to achieve two-way access. Such links must be provided as right of ways or public access easements in gross to ensure accessibility to the public and fire services during an emergency. A cul-de-sac in a bushfire prone area is to connect to a public road that allows for travel in two directions in order to address Acceptable Solution A3.1. 

Emergency access way	
Acceptable solution A3.6	An access way that does not provide through access to a public road is to be avoided in bushfire prone areas. Where no alternative exists (this will need to be demonstrated by the proponent), an emergency access way is to be provided as an alternative link to a public road during emergencies. An emergency access way is to meet all of the following requirements: • Requirements in Table 1, Column 4 • No further than 600 metres from a public road • Provided as right of way or public access easement in gross to ensure accessibility to the public and fire services during an emergency • Must be signposted.
Explanatory note E3.6	An emergency access way is not a preferred option however may be used to link up with roads to allow alternative access and egress during emergencies where traffic flow designs do not allow for two-way access. Such access should be provided as a right-of-way or easement in gross to ensure accessibility to the public and fire emergency services during an emergency. The access should comply with minimum standards for a public road and should be signposted. Where gates are used to control traffic flow during non-emergency periods, these must not be locked. Emergency access ways are to be no longer than 600 metres and must be adequately signposted where they adjoin public roads. Where an emergency access way is constructed on private land, a right of way or easement in gross is to be established. 

Technical requirement	1	2	3	4	5
	Public road	Cul-de-sac	Private driveway longer than 50 m	Emergency access way	Fire service access routes
Minimum trafficable surface (m)	6*	6	4	6*	6*
Horizontal distance (m)	6	6	6	6	6
Vertical clearance (m)	4.5	N/A	4.5	4.5	4.5
Maximum grade <50 m	1 in 10	1 in 10	1 in 10	1 in 10	1 in 10
Minimum weight capacity (t)	15	15	15	15	15
Maximum crossfall	1 in 33	1 in 33	1 in 33	1 in 33	1 in 33
Curves minimum inner radius	8.5	8.5	8.5	8.5	8.5
* Refer to E3.2 Public roads: Trafficable surface					

Appendix E Water technical standards of the Guidelines

Reticulated areas	
Acceptable solution A4.1	The subdivision, development or land use is provided with a reticulated water supply in accordance with the specifications of the relevant water supply authority and Department of Fire and Emergency Services.
Explanatory note E4.1	Water supply authorities in Western Australia include the Water Corporation, Aqwest and the Busselton Water Board. The Water Corporation's 'No. 63 Water Reticulation Standard' is deemed to be the baseline criterion for developments and should be applied unless local water supply authorities' conditions apply.

Appendix F City of Busselton Firebreak Notice

BUSH FIRES ACT 1954

PROPERTY COMPLIANCE REQUIREMENTS

Compliance inspections of land will be carried out from 16 November 2019, to assess landowner(s) or occupier(s) of land compliance with the City of Busselton Firebreak and Fuel Hazard Reduction Notice.

- **Rural Residential, Urban and Industrial Land requirements must be compliant by 16 November 2019**
- **Rural Land requirements must be compliant by 15 December 2019**

Local Government may serve a notice pursuant to Section 33 of the *Bush Fires Act 1954*, requiring the property owner to undertake any extra work to reduce the impact of a fire

- **Rural Residential, Urban and Rural Land requirements must be maintained in accordance with the table overleaf until 12 May 2020** or a later date if the compliance period is extended, in which case a notice will be placed in the local newspaper

FIRE PERMITS

- Permits to burn are required for the whole of the restricted periods and can only be obtained from the Fire Control Officer for your area
- Permits are to be obtained before burning commences (the permit holder must be in possession of the permit during the burn)

FIRE PERMIT APPLICATION

Before you call a Fire Control Officer ensure you have the following information

- Who will be the three able bodied persons in attendance at all times whilst the fire is alight including contact phone number?
- What is the address of the property for which the permit applies?
- What fire fighting equipment and resources will you have at the fire front and is it in good working order?
- What is the size of burn to take place?
- Are there firebreaks installed and can a fire unit get access to the area?
- What material are you burning? Is it dry? Are there any plastics, tyres, treated posts or woods in the piles or area to be burnt? If so, remove them to a safe place.
- Ensure you give 72 hours notice to the Fire Control Officer first; and
- Ensure you notify neighbours 72 hours prior to commencing your burn

For further advice, contact your local Fire Control Officer, as advertised in the City of Busselton's Community Directory or on the City of Busselton website www.busselton.wa.gov.au

GENERAL REQUIREMENTS

- **Garden Refuse Urban Areas (Town sites):** No garden refuse is permitted to be burnt on the ground, in the open air or in an outdoor incinerator within the urban areas of Busselton and Dunsborough town sites at any time of the year
- **Garden Refuse Rural Residential Areas (non-Town sites):** The burning of garden refuse is prohibited from 14 December to 28 February. **During the restricted burning period**, 2 November to 14 December and 1 March to 12 May each year, permits are required to be obtained from the Fire Control Officer in your area for the burning of any garden refuse
- **Burning of toxic materials** and **rubbish** is prohibited at all times
- **Camp fires** are prohibited within the City during the restricted and prohibited burning period
- **Wood** and **coal fuelled barbecues,** including wood fired pizza ovens and chimineas are banned during a total fire ban or in any period when the fire danger forecast is 'Very High' or above
- **Wood fired pizza ovens** must have a spark arrestor fitted
- **Warning:** The use of electric fences during periods of 'Very High' or above may cause fire
- **Owners of tractors** with down swept exhaust systems are encouraged to have an approved spark arrestor fitted as provided in the *Bush Fires Act 1954*
- **Welding, Cutting** and **Grinding Equipment:** A person shall not operate this equipment during the restricted/prohibited burning times on land which is under crop, pasture, stubble and bush unless one working fire extinguisher is provided, work area is clear of flammable materials and there is compliance with any other controls required by a Fire Control Officer.
- **Welding, cutting** and **grinding equipment** is **not permitted** to be used anywhere within the City of Busselton when the fire index is '**extreme**' or above

FIRE DANGER RATING

For the current fire danger rating visit Department of Fire & Emergency Services (DFES) website www.dfes.wa.gov.au or Bureau of Meteorology (BOM) website www.bom.gov.au

CONTRACTORS

Please be advised, if you engage a contractor to gain compliance with this notice it is the property owner, **not the contractor**, who is responsible for the standard and quality of the fire prevention work undertaken and required to be compliant by 16 November (or 15 December if Rural Land) each year and maintained as per this notice throughout whole the fire season.

CONTACT US

For further fire safety information visit the City of Busselton website www.busselton.wa.gov.au or Department of Fire & Emergency Services (DFES) website www.dfes.wa.gov.au

IMPORTANT DATES

The below dates may change due to seasonal fire conditions in which case details will be published in the local newspaper.

RESTRICTED

BURNING PERMITS ARE REQUIRED FROM
2 November 2019 to 14 December 2019 inclusive
and
1 March 2020 to 12 May 2020 inclusive

BURNING PROHIBITED

ALL FIRES PROHIBITED
15 December 2019 to 28 February 2020 inclusive

COMPLIANCE DATE

- **Completion of firebreaks/fuel hazard reduction on all rural residential, urban and industrial land is required to be completed by 16 November 2019 and must be maintained until 12 May 2020**
- **Completion of firebreaks/fuel hazard reduction on all rural land is required to be completed by 15 December 2019 and must be maintained until 12 May 2020**
- **Burning on public holidays during the restricted fire season is prohibited**

Applications for a variation of this the Firebreak and Fuel Hazard Reduction Notice, where ground considerations or environmental concerns prevent compliance with the requirements of this Notice, must be lodged in writing together with a Firebreak and Fuel Hazard Reduction Notice Variation form, prior to 31 October 2019

The hardest aspect of fire prevention is explaining to your family why you didn't undertake any!

Actions speak louder than words and actions save lives

Should you require further clarification of the information contained in this notice please do not hesitate to contact the City's Ranger and Emergency Services Department on (08) 9781 0444.

City of Busselton
Geographe Bay

FIREBREAK AND FUEL HAZARD REDUCTION NOTICE

ARE YOU BUSHFIRE READY?

2019/2020 BUSH FIRE SEASON

FIRST AND FINAL NOTICE

Bush Fires Act 1954

Take notice that pursuant to Part 3 Division 6 Section 33 of the *Bush Fires Act 1954*, landowner(s) or occupier(s) of land shall construct firebreaks and carry out fire prevention work in accordance with the City of Busselton Firebreak and Fuel Hazard Reduction Notice.

Failure to comply with this notice may result in a

$5,000 FINE

Fire Prevention Starts with You!

RING 000 FOR ALL FIRES

FIREBREAK CATEGORY CODE AND SUMMARY OF REQUIREMENTS

ALL REQUIREMENTS IN THIS NOTICE ARE TO BE MAINTAINED THROUGHOUT THE ENTIRE DURATION OF THE FIRE SEASON (1 DECEMBER TO 12 MAY EACH YEAR).
FAILURE TO COMPLY MAY RESULT IN A $5,000 FINE

PLEASE BE ADVISED THAT YOUR PROPERTY MUST COMPLY WITH CATEGORY REQUIREMENTS AS NOTED BY A TICK IN COLUMN A, B, C OR D

CATEGORY	A	B	C	D
It is the land owner's responsibility to identify the category that relates to their property and to ensure the necessary fire prevention works are completed on time. Please contact the City if you are unsure of your category.				
CATEGORY 1 **RURAL** Except plantations and vineyards (for tourist chalets, refer to Estate Fire Management Plan or Individual Fire Management Plan) Sections A, C and D apply to this category.	✓		✓	✓
CATEGORY 2 **URBAN RESIDENTIAL & INDUSTRIAL - COMMERCIAL** Sections A, B, D and E1 Trees, apply to this category. Refer to section E - Interpretation and Additional Requirements (E1 Trees).	✓	✓		✓
CATEGORY 3 & 4 **PLANTATIONS** Fire Management Plan applies	N/A	N/A	N/A	N/A
CATEGORY 5 **PROTEA PLANTATIONS / VINEYARDS** (For tourist chalets, refer to Estate Fire Management Plan or Individual Fire Management Plan) Sections A, B, C and D apply to this category.	✓	✓	✓	✓
CATEGORY 6 **RURAL RESIDENTIAL - LOTS WITH INDIVIDUAL (MINERAL EARTH) BOUNDARY BREAKS** Sections A, B, C and D apply to this category unless the property is subject to Estate Fire Management Plan or Individual Fire Management Plan	✓	✓	✓	✓
CATEGORY 7 **RURAL RESIDENTIAL - LOTS WITH A STRATEGIC FIREBREAK ON ONE OR MORE BOUNDARIES** Sections A, B, C and D apply to this category unless the property is subject to Estate Fire Management Plan or Individual Fire Management Plan	✓	✓	✓	✓
CATEGORY 8 **RURAL RESIDENTIAL - LOTS WITHIN A STRATEGIC FIREBREAK AREA WITH NO STRATEGIC FIREBREAKS ON THE LOT BOUNDARIES** Sections B, C and D apply to this category unless the property is subject to Estate Fire Management Plan or Individual Fire Management Plan		✓	✓	✓

A - Firebreak – The term firebreak includes a mineral earth firebreak. A mineral earth firebreak means a 3 metre wide area of the owner(s)/occupiers(s) land, cleared and maintained totally clear of all vegetation material (living or dead) so there is only mineral earth left. Any overhanging trees and other vegetation must be pruned to a height of 5 metres above the ground level of a mineral earth firebreak.

Category 1 – Rural: A mineral earth **FIREBREAK** shall be constructed **3 metres** wide, except in pasture or crop areas where a **FIREBREAK** shall be **2 metres** wide. **FIREBREAKS** shall be located adjacent to all external boundaries of the land. Where the land area exceeds 120 hectares, an additional **FIREBREAK** must divide the land into areas of not more than 120 hectares with each part completely surrounded by a **FIREBREAK.**

Category 2 - Urban Residential and Industrial-Commercial: Where the area of land exceeds 2024m² (½ acre) a mineral earth **FIREBREAK** shall be constructed and maintained at least **3 metres** wide and within **6 metres** of the inside of all external boundaries of the land. Where the area of land is 2024m² (½ acre) or less, hazardous material must be removed in accordance with section **B - Fuel Reduction (refer to B1).**

Category 5 - Protea Plantations/Vineyards: A mineral earth **FIREBREAK** shall be 3 metres wide. A low fuel area is to be maintained in accordance with section **B - Fuel Reduction (refer to B2).**

Category 6 and 7 - Rural Residential: A mineral earth **FIREBREAK** shall be constructed **3 metres** wide. On Category 6 Rural Residential land with pasture or crop, a **FIREBREAK** shall be **2 metres** wide and located within **6 metres** of all external boundaries of the land. For Category 7 Rural Residential land, free access along a Strategic **FIREBREAK** is to be maintained at all times and including across the boundary of a lot, by means of a **3.5 metres wide field gate** in the adjoining lot boundary fence.

B - Fuel Reduction

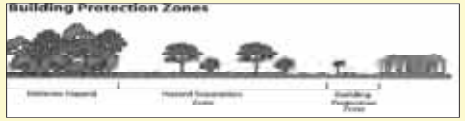
1) **Category 2 - Urban Residential and Industrial-Commercial:** Where the area of land is 2024m² (½ acre) or less, **ALL HAZARDOUS MATERIAL** must be removed from the whole of the land except living trees. In the area remaining, vegetation is to be maintained to a height of no greater than **10 centimetres**; this includes piles of timber, branches and other vegetation. Trees shall be pruned in accordance with section **E – Interpretation and Additional Requirements (refer to E1).**
2) **Category 5 - Protea Plantations/Vineyards:** A **5 metre** low fuel area is to be maintained between the **3 metre FIREBREAK** and the plantation/vineyard area. In this area, vegetation is to be maintained to a height of no greater than **10 centimetres**; this includes piles of timber, branches and other vegetation.
3) **Category 6, 7 and 8 - Rural Residential:** Parkland clearing must be carried out in all open paddocks and along the boundary of the property. Clearing means that all dead vegetation and dry grasses (excluding approved crops, pasture areas and living trees/shrubs) including piles of timber and disused materials must be maintained to a height of no greater than **10 centimetres**.

C - Building Protection Zones (BPZ) - This is a modified area of reduced fuel immediately surrounding a building

BPZ's starve the fire by reducing the fuel levels around your house. These requirements are designed to reduce the fire's intensity and minimise the likelihood of flame contact with buildings. The BPZ gives more protection to families should a fire threaten suddenly and they cannot leave. It also provides extra protection for fire fighters and property owners who may decide to stay with their property.

A BPZ shall be provided for buildings in bush fire prone areas. The surroundings of buildings must comply with the following requirements:

1) The BPZ for existing buildings must be at least 20 metres from any external wall of the building unless varied under an approved Fire Management Plan (FMP) in accordance with section **E - Interpretation and Additional Requirements (refer to E4).**
2) The minimum BPZ for buildings constructed after 1 November 2011, in all cases shall be 25 metres.
3) The BPZ must be located within the boundary of the lot that the building is situated on.
4) Hazardous/flammable materials must not exceed the maximum fuel load specified in Point 5 below with grass areas not exceeding a height greater than 10 cm.
5) Fuel loads must be reduced and maintained at 2 tonne per hectare.
6) Isolated trees and shrubs may be retained, however, the first 5 metres around all buildings is to be clear of all hazardous/flammable materials.
7) Reticulated gardens in the BPZ shall be maintained to a height of no greater than 500 millimetres.
8) Wood piles must be at least 10 metres away from habitable dwellings.
9) Trees in the BPZ must comply with section **E - Interpretation and Additional Requirements (refer to E1).**
10) Where the land has an approved FMP, compliance must be achieved in accordance with the FMP. The FMP may vary the above BPZ requirements.
11) A Hazard Separation Zone (HSZ) is also recommended in the absence of a Fire Management Plan. **Section E - Interpretation and Additional Requirements (refer to E3).**



D – Fuel Storage & Haystack Protection Zones

A **3 metre** mineral earth **FIREBREAK** shall be located within **6 metres** of fuel storage tanks, sheds, gas cylinders and haystacks. The mineral earth firebreak shall be maintained so that it is totally clear of all material (living or dead).

E – Interpretation and Additional Requirements

1) **Trees** On **Urban, Industrial, Rural,** and **Rural Residential** land, all tree branches must be removed or pruned to ensure a clear separation of at least **3 metres** back 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 the **BPZ** the following is 'recommended'; the spacing of individual or groups of trees should be 15 metres apart to provide for a 5 metres separation between tree crowns. There is also a requirement of 2.5 metres between trees and power lines so they do not come into contact and start a fire or bring down a power line.
2) **Hazardous and Flammable Materials** means the accumulation of fuel including burn piles (living or dead) such as leaf litter, twigs, trash, bush, dead trees and scrub capable of carrying a running fire, but excludes standing living trees and isolated shrubs. **NOTE**: All remaining vegetation, piles of timber, branches and other living vegetation must be maintained to a height of no greater than 10 centimetres. To measure and determine fuel loads use DFES's *Visual Fuel Load Guide* at http://www.dfes.wa.gov.au/safetyinformation/fire/bushfire/pages/publications.aspx#5 and select *Visual Fuel Load Guide Swan Coastal (Part 1 & 2)*. Surface bush fire fuels should be kept low to the ground.
3) **Hazard Separation Zones (HSZ)** A HSZ is a modified area of reduced fuel load outside of the BPZ and is recommended to assist in reducing the fires intensity when flames are approaching buildings. Both the BPZ and the HSZ are essential strategies for the protection of buildings. A HSZ covers the area 75 metres outside the BPZ.
The HSZ should be modified to have a maximum fuel load of 6-8 tonne per hectare. This can be implemented by fuel reduction methods such as burning, mowing and slashing to remove the hazard. This should not require the removal of living trees or shrubs. **REMEMBER:** reduce the fuel level of the fire to lower the intensity of the blaze. Further information on fuel loading can be found in the *Visual Fuel Load Guide* available by calling DFES or via their website at www.dfes.wa.gov.au
4) **Fire Management Plan (FMP)** A FMP is a comprehensive plan for the prevention and control of bushfires which may apply to individual land holdings. A notification, pursuant to the Transfer of Land Act 1893 (as amended) may be placed on the Certificate(s) of Title of the land for medium to long term fire management to reduce the occurrence and minimise the impact of uncontrolled bush fires, thereby reducing the threat to life, property and the environment. The land owner must comply with the FMP. **Building in bush fire prone areas**, new dwellings and other forms of accommodation, as well as additions to existing buildings are to be constructed in accordance with in *Australian Standard 3959-2009*. In designated bush fire prone areas, the minimum BPZ in all cases shall be 25 metres. Further information on this and other information relating to fire safety issues can be found on the City's website www.busselton.wa.gov.au

Document Status

Report version	Rev No.	Purpose	Author	Reviewed and Approved for Issue	
				Name	Date
Draft Report	Rev A	For review by client	Brodie Mastrangelo (BPAD 45985, Level 1)	Zac Cockerill (BPAD 37803, Level 2)	25 November 2019
Final Report	Rev 0	Issued for use: to accompany Structure Plan amendment	Zac Cockerill (BPAD 37803, Level 2)	Zac Cockerill (BPAD 37803, Level 2)	26 November 2019
Final Report	**Rev 1**	**Issued for use: amended to address DFES and City of Busselton comments**	**Brodie Mastrangelo (BPAD 45985, Level 1) / Zac Cockerill (BPAD 37803, Level 2)**	**Zac Cockerill (BPAD 37803, Level 2)**	**11 June 2020**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APPENDIX 2A

BUSHFIRE MANAGEMENT PLAN ADDENDUM

(JBS&G, June 2023)

Bushfire Management Plan Coversheet

This Coversheet and accompanying Bushfire Management Plan has been prepared and issued by a person accredited by Fire Protection Association Australia under the Bushfire Planning and Design (BPAD) Accreditation Scheme.

Bushfire Management Plan and Site Details

Site Address / Plan Reference: Dawson Stages 6C and 6D

Suburb: Vasse **State:** WA **P/code:** 6280

Local government area: City of Busselton

Description of the planning proposal: Subdivision Application

BMP Plan / Reference Number: 64008/150,650 **Version:** M01 Rev 1 **Date of Issue:** 18/06/2025

Client / Business Name: JV of Perron Developments P/L & Stawell P/L

Reason for referral to DFES	Yes	No
Has the BAL been calculated by a method other than method 1 as outlined in AS3959 (tick no if AS3959 method 1 has been used to calculate the BAL)?	☐	☑
Have any of the bushfire protection criteria elements been addressed through the use of a performance principle (tick no if only acceptable solutions have been used to address all of the BPC elements)?	☐	☑
Is the proposal any of the following special development types (see SPP 3.7 for definitions)?		
Unavoidable development (in BAL-40 or BAL-FZ)	☐	☑
Strategic planning proposal (including rezoning applications)	☐	☑
Minor development (in BAL-40 or BAL-FZ)	☐	☑
High risk land-use	☐	☑
Vulnerable land-use	☐	☑

If the development is a special development type as listed above, explain why the proposal is considered to be one of the above listed classifications (E.g. considered vulnerable land-use as the development is for accommodation of the elderly, etc.)?
N/A

Note: The decision maker (e.g. local government or the WAPC) should only refer the proposal to DFES for comment if one (or more) of the above answers are ticked "Yes".

BPAD Accredited Practitioner Details and Declaration

Name	Accreditation Level	Accreditation No.	Accreditation Expiry
Zac Cockerill	Level 2	BPAD37803	31/08/2025
Company		**Contact No.**	
JBS&G Australia Pty Ltd		(08) 9792 4797	

I declare that the information provided within this bushfire management plan is to the best of my knowledge true and correct

Signature of Practitioner **Date** 18/06/2025

64008/150,650

M01 Vasse Dawson Stages 6C & D subdivision BMP Addendum (Rev 1)

18 June 2025

Alex Meares

JV of Perron Developments P/L & Stawell P/L

Via email: alex@qprojects.com.au

Bushfire Management Plan Addendum: Vasse Dawson Stages 6C and 6D

1. Introduction, background and purpose

Strategen-JBS&G prepared a comprehensive Bushfire Management Plan (BMP) in June 2020 to support the Joint Venture (JV) of Perron Developments P/L and Stawell P/L in their application for the Vasse Structure Plan (VSP) amendment, located in the City of Busselton. The VSP amendment is approved and the proponent is progressing staged subdivision across the estate. The latest VSP is contained in Appendix A.

The proposed Vasse Dawson Stages 6C and 6D subdivision (hereon referred to as the project area), situated within the overall VSP area, will create 128 residential lots, one education lot (proposed primary school), two POS cells, public road reserves and one balance lot (Lot 9562), as depicted in Figure 1 and Figure 2 (noting Figure 2 incorporates subsequent changes to Stage 6C made under WAPC Ref. 200848).

This BMP has been prepared as an addendum to the VSP amendment BMP (Strategen-JBS&G 2020) and provides an updated, detailed bushfire assessment specific to the proposed Dawson Stages 6C and 6D subdivision area. This BMP addendum should be read in conjunction with the VSP amendment BMP (Strategen-JBS&G 2020). This BMP addendum includes the following information:

1. A revised bushfire assessment including:
    a. an updated Vegetation Classification and Effective Slope map, depicting the expected post-development vegetation classifications/exclusions specific to the Stages 6C and 6D subdivision area and current vegetation conditions (Figure 3)
    b. an updated BAL Contour map specific to the Stages 6C and 6D subdivision area and vegetation conditions mapped from Item 1a above (Figure 4).
2. An updated assessment against the bushfire protection criteria of the Guidelines, including updated statements of compliance against acceptable solutions to demonstrate compliance within the boundary of the subdivision site (Table 3).
3. A works program outlining responsibilities and timing for implementation of the bushfire management actions specific to the proposed subdivision that can be appropriately conditioned as part of model conditions of subdivision approval (Table 4).

This BMP addendum has been prepared to accompany subdivision application for Vasse Dawson Stages 6C and 6D and address requirements under Policy Measure 6.4 of *State Planning Policy 3.7 Planning in Bushfire Prone Areas* (SPP3.7; WAPC 2015) in accordance with *Guidelines for Planning in Bushfire-Prone Areas Version 1.4* (the Guidelines; WAPC 2021).

A portion of the project area is designated bushfire prone on the Map of Bush Fire Prone Areas (DFES 2021; refer to Plate 1); therefore, bushfire risk consideration and BAL assessment are required to inform proposed subdivision planning and design, as per requirements under Policy Measure 6.2 of SPP3.7.

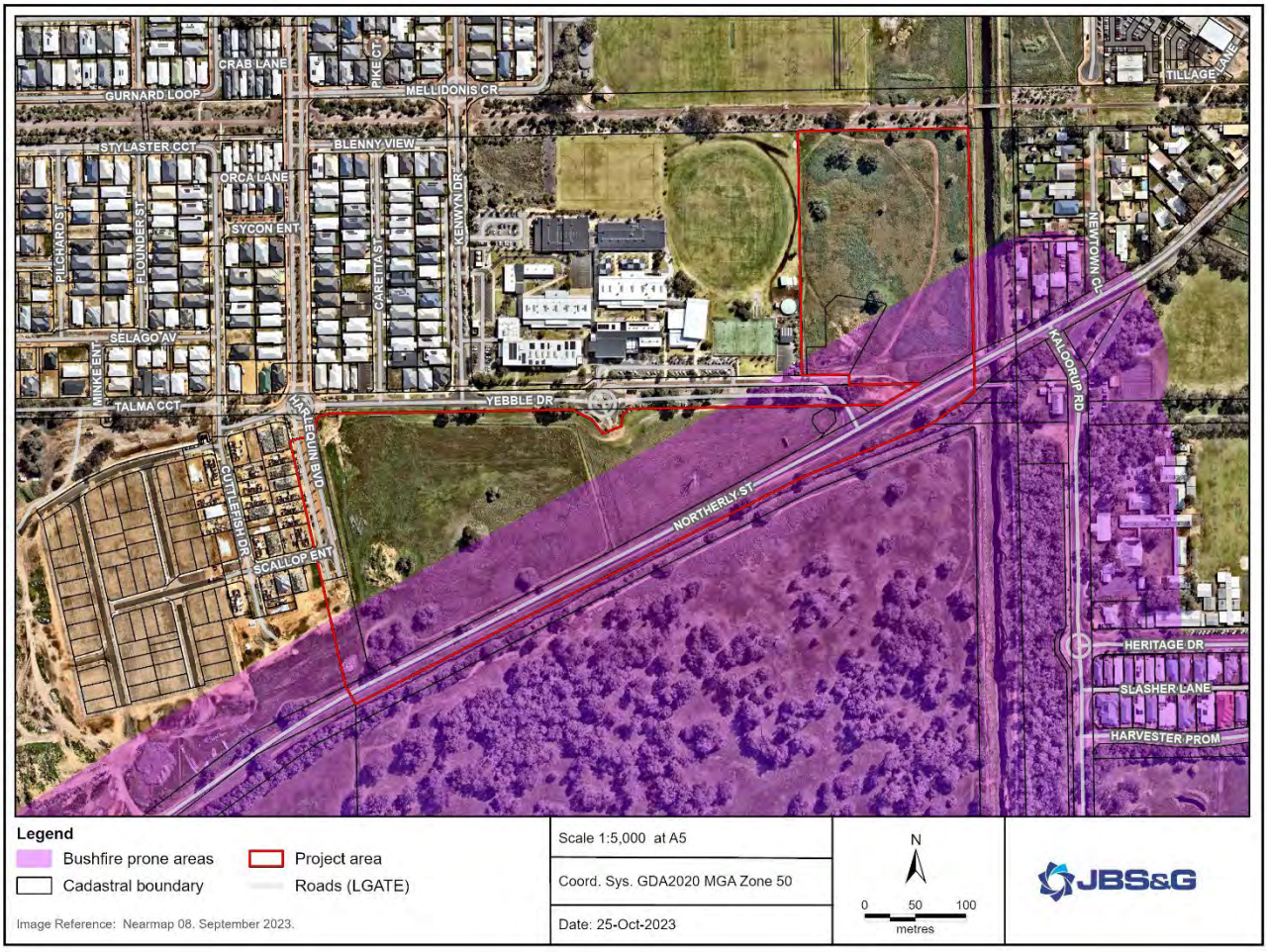
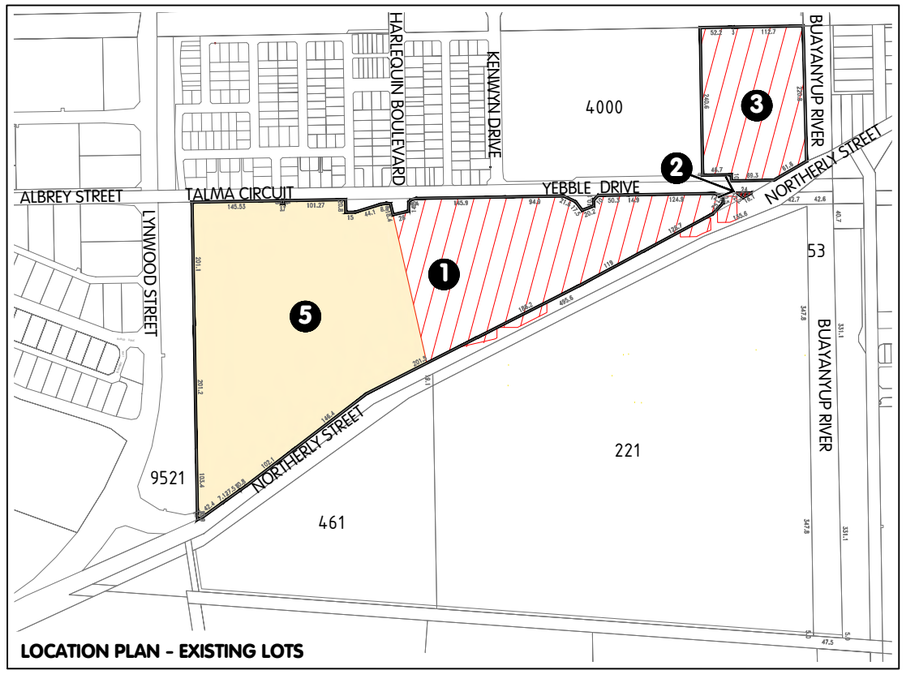


Plate 1: Designated bushfire prone status of the project area (DFES 2021)



LOCATION PLAN - EXISTING LOTS

EXISTING LOT 9562	
1	21.5934ha (21.6023ha)
2	0.0089ha (21.6023ha)
EXISTING LOT 9559	
3	4.1089ha

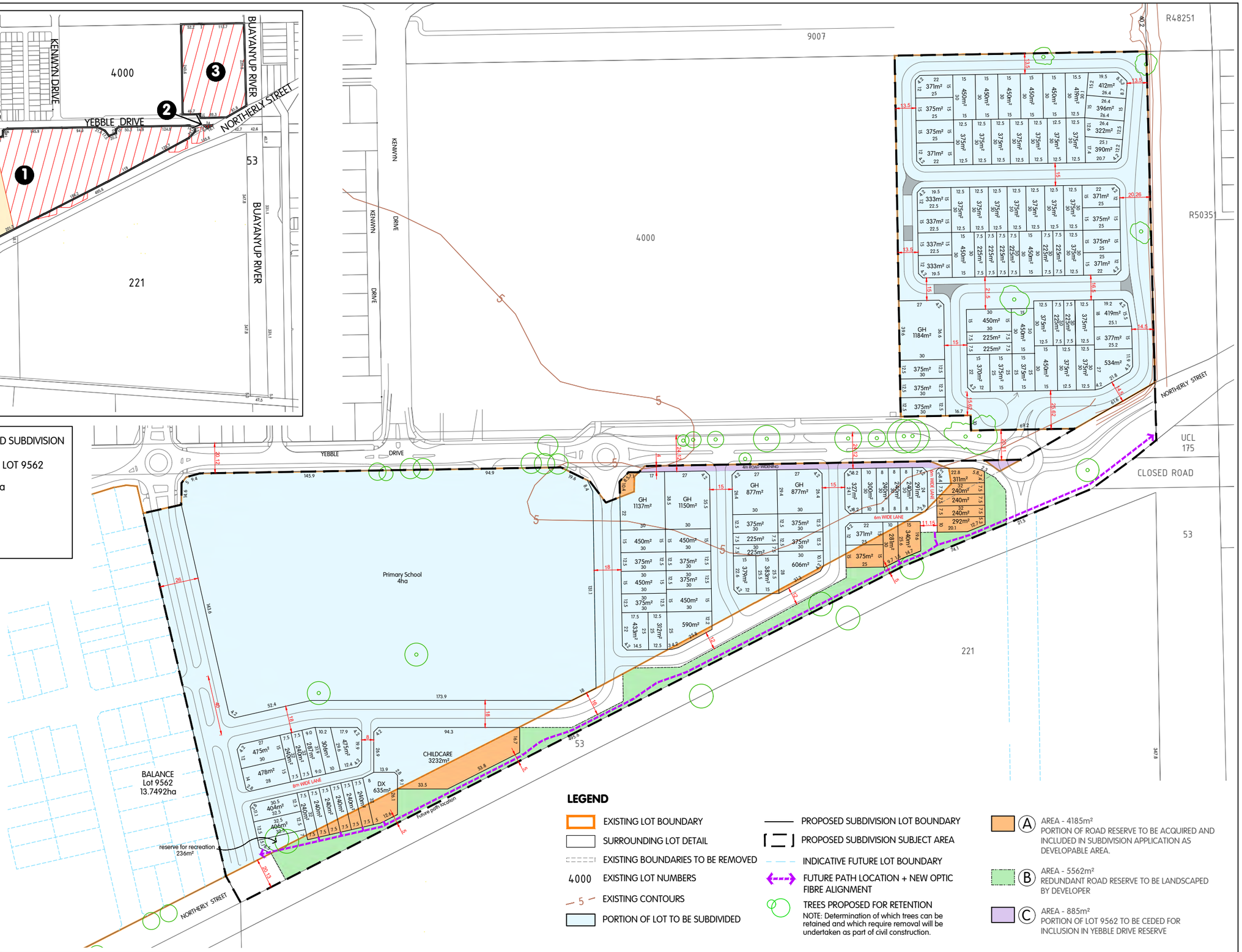
PROPOSED SUBDIVISION	
BALANCE LOT 9562	
5	13.7492ha

PROPOSED LAND USE/DEVELOPMENT

Zone	Lot Size	No. of Lots
Residential	180 - 234m²	12
Residential	235 - 319m²	22
Residential	320 - 449m²	60
Residential	450 - 499m²	17
Residential	500 - 549m²	1
Residential	550 - 599m²	1
Residential	600 - 699m²	2
Residential	800 - 899m²	2
Residential	1000 - 1499m²	3
Commercial	3000 - 3999m²	1
Education	2ha-5ha	1
Other (Balance)	10ha-25ha	1
	TOTAL	**123**

YIELD TABLE

Existing Lots	2
Road Reserve	1
Proposed Lots	
Residential	120
Education	1
Commercial	1
Balance of Title	1
TOTAL	**123**



LEGEND

- EXISTING LOT BOUNDARY
- SURROUNDING LOT DETAIL
- EXISTING BOUNDARIES TO BE REMOVED
- 4000 EXISTING LOT NUMBERS
- 5 EXISTING CONTOURS
- PORTION OF LOT TO BE SUBDIVIDED
- PROPOSED SUBDIVISION LOT BOUNDARY
- PROPOSED SUBDIVISION SUBJECT AREA
- INDICATIVE FUTURE LOT BOUNDARY
- FUTURE PATH LOCATION + NEW OPTIC FIBRE ALIGNMENT
- TREES PROPOSED FOR RETENTION
  NOTE: Determination of which trees can be retained and which require removal will be undertaken as part of civil construction.
- (A) AREA - 4185m²
  PORTION OF ROAD RESERVE TO BE ACQUIRED AND INCLUDED IN SUBDIVISION APPLICATION AS DEVELOPABLE AREA.
- (B) AREA - 5562m²
  REDUNDANT ROAD RESERVE TO BE LANDSCAPED BY DEVELOPER
- (C) AREA - 885m²
  PORTION OF LOT 9562 TO BE CEDED FOR INCLUSION IN YEBBLE DRIVE RESERVE

N

HATCH | RobertsDay

SIZE A3_ 1:2500

0 metres 25 50 75 100 125

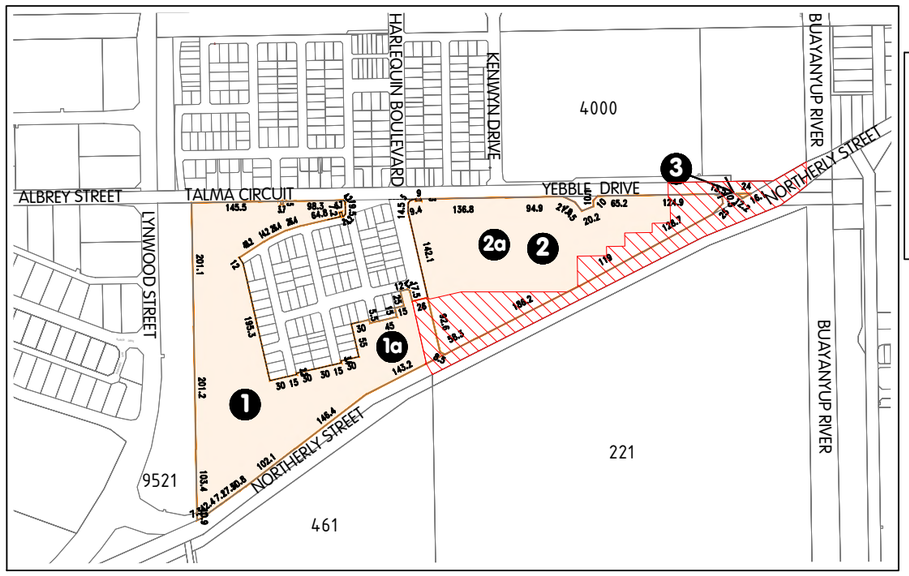
SUBDIVISION PLAN - STAGE 6C and 6D

Lot 53, 9562 and 9559 Northerly Street, Vasse

City of Busselton

REV	DESCRIPTION	YYMMDD	DRAWN	APPR'D
F	LOT MODIFICATION	230621	SB	DP
E	LOT MODIFICATION	230414	SB	DP
D	LOT MODIFICATION	230329	SB	DP
C	ROAD RESERVE INCREASED	221122	SB	DRAFT

REF NO.	DRAW NO.	REV.
PGP DAW	**RD1 160**	**F**



LOCATION PLAN - EXISTING LOTS

PROPOSED SUBDIVISION

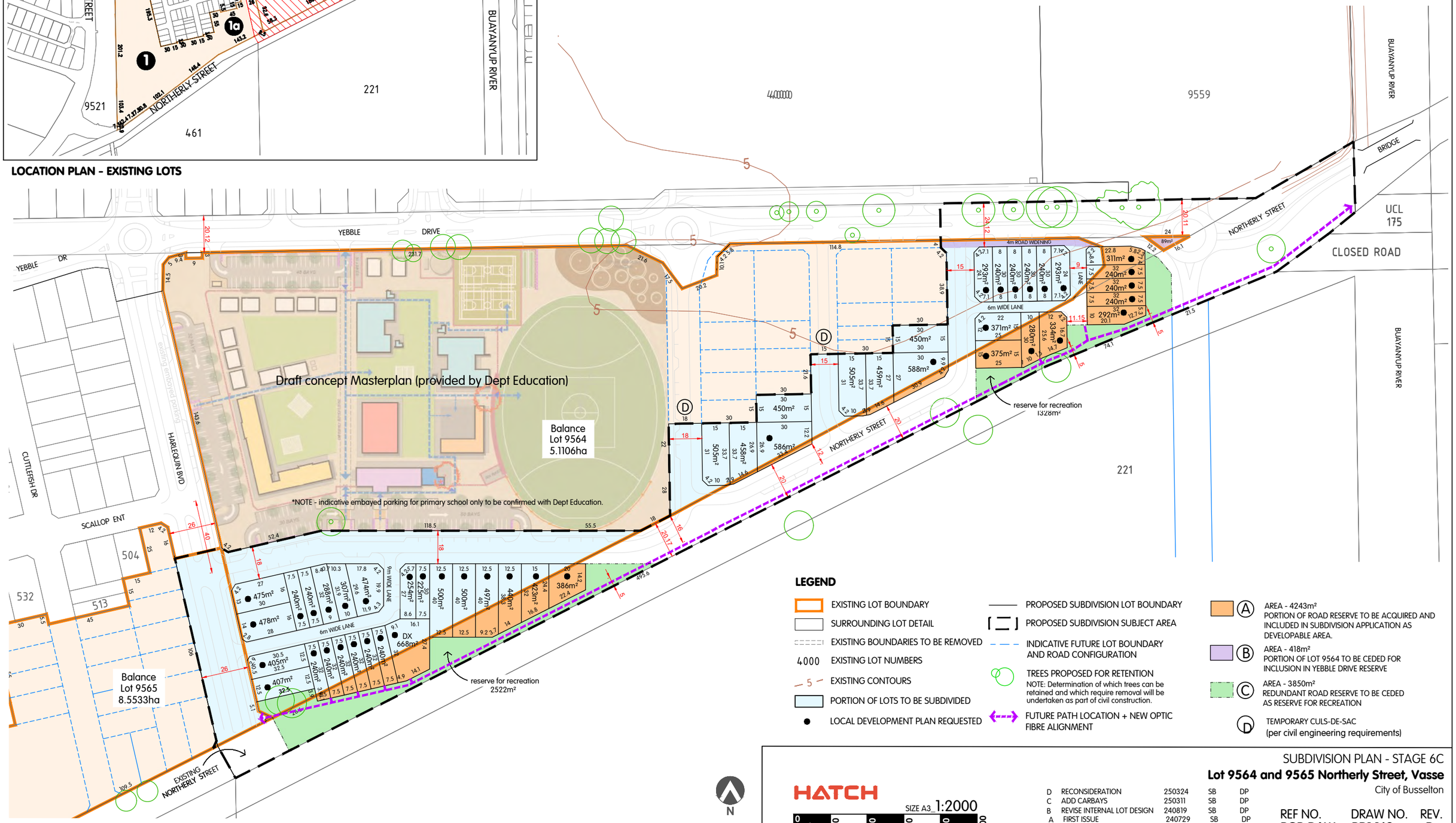
EXISTING LOT 9565	BALANCE LOT 9565
1 8.8233ha	1a 8.5533ha
EXISTING LOT 9564	**BALANCE LOT 9564**
2 7.2002ha (7.2091ha)	2a 5.1106ha
3 0.0089ha (7.2091ha)	

YIELD TABLE

Existing Lots	2
Proposed Lots	
Residential	47
Balance of Title	2
TOTAL	**49**

PROPOSED LAND USE/DEVELOPMENT

Zone	Lot Size	No. of Lots
Residential	235 - 319m²	25
Residential	320 - 449m²	12
Residential	450 - 499m²	5
Residential	550 - 599m²	2
Residential	600 - 699m²	1
Other (Balance)	5ha-10ha	2
	TOTAL	**49**



LEGEND

- EXISTING LOT BOUNDARY
- SURROUNDING LOT DETAIL
- EXISTING BOUNDARIES TO BE REMOVED
- 4000 EXISTING LOT NUMBERS
- 5 EXISTING CONTOURS
- PORTION OF LOTS TO BE SUBDIVIDED
- LOCAL DEVELOPMENT PLAN REQUESTED
- PROPOSED SUBDIVISION LOT BOUNDARY
- PROPOSED SUBDIVISION SUBJECT AREA
- INDICATIVE FUTURE LOT BOUNDARY AND ROAD CONFIGURATION
- TREES PROPOSED FOR RETENTION
  NOTE: Determination of which trees can be retained and which require removal will be undertaken as part of civil construction.
- FUTURE PATH LOCATION + NEW OPTIC FIBRE ALIGNMENT
- (A) AREA - 4243m²
  PORTION OF ROAD RESERVE TO BE ACQUIRED AND INCLUDED IN SUBDIVISION APPLICATION AS DEVELOPABLE AREA.
- (B) AREA - 418m²
  PORTION OF LOT 9564 TO BE CEDED FOR INCLUSION IN YEBBLE DRIVE RESERVE
- (C) AREA - 3850m²
  REDUNDANT ROAD RESERVE TO BE CEDED AS RESERVE FOR RECREATION
- (D) TEMPORARY CULS-DE-SAC
  (per civil engineering requirements)

HATCH

SIZE A3 1:2000

0 metres 20 40 60 80 100

REV	DESCRIPTION	YYMMDD	DRAWN	APPR'D
D	RECONSIDERATION	250324	SB	DP
C	ADD CARBAYS	250311	SB	DP
B	REVISE INTERNAL LOT DESIGN	240819	SB	DP
A	FIRST ISSUE	240729	SB	DP

SUBDIVISION PLAN - STAGE 6C

Lot 9564 and 9565 Northerly Street, Vasse

City of Busselton

REF NO.	DRAW NO.	REV.
PGP DAW	**RD1 168**	**D**

2. Bushfire assessment results

2.1 Assessment inputs

2.1.1 Vegetation classifications and exclusions

JBS&G assessed classified vegetation and exclusions within the 150 m assessment area as part of the original VSP amendment BMP (Strategen-JBS&G 2020) in accordance with *AS 3959-2018 Construction of Buildings in Bushfire-Prone Areas* (AS3959; SA 2018) and the *Visual Guide for Bushfire Risk Assessment in Western Australia* (DoP 2016). Site photos from the original site inspection representative of the vegetation classifications and exclusions can be viewed in Appendix B of the VSP amendment BMP (Strategen-JBS&G 2020).

A review of on-ground conditions via Nearmap imagery (dated 8 September 2023) has determined that aside from new clearing, earthworks and development associated with preceding stages of subdivision within Vasse Dawson Estate, the extent of classified vegetation has not materially changed since the original site inspection conducted by Strategen-JBS&G on 17 July 2019. In this regard, a desktop assessment was deemed to be an appropriate means of re-validating classified vegetation and exclusions against current conditions, which are summarised as follows and depicted in Figure 3:

- Class A forest in the form of a 45 m wide strip of overstorey trees (mixed eucalyptus species), a midstorey and a grassy understorey east of the project area and Buayanup Drain
- Class B woodland in the form of sparse overstorey eucalypts over a grassy understorey south of Northerly Street (i.e. within future development stages of Vasse Armstrong, including proposed tree retention within future POS) and two small pockets east of the project area and Buayanup Drain
- Class G grassland in the form of unmanaged grassland greater than 100 mm in height at maturity beyond the 100 m wide low threat staging buffer to the west and southwest within adjacent Lot 461 and balance Lot 9562
- existing non vegetated areas (e.g. roads, buildings, footpaths, etc) and low threat managed land (e.g. street verges, managed gardens, POS, low threat staging buffers, etc) excluded under Clauses 2.2.3.2 (e) and (f) of AS3959
- a 100 m wide low threat staging buffer, excluded under Clauses 2.2.3.2 (e) and (f), to be established around the project area to the southwest and south to manage temporary bushfire hazards on adjacent stages yet to be developed, particularly within future stages of Vasse Armstrong opposite Northerly Street to the south, consistent with the VSP amendment BMP (Strategen-JBS&G 2020), noting that proposed tree retention within future POS to the south has been catered for and the low threat staging buffer to the south will not result in any tree removal in recognition of proposed habitat protection for Western Ringtail Possums and Black Cockatoos.

It should be noted that the low threat staging buffer south of the current Northerly Street alignment referenced in this BMP addendum is defined as an area established as low threat vegetation in accordance with Clauses 2.2.3.2 (e) and (f) of AS3959 comprising retention of all trees and a managed (slashed or mown) understorey.

2.1.2 Effective Slope

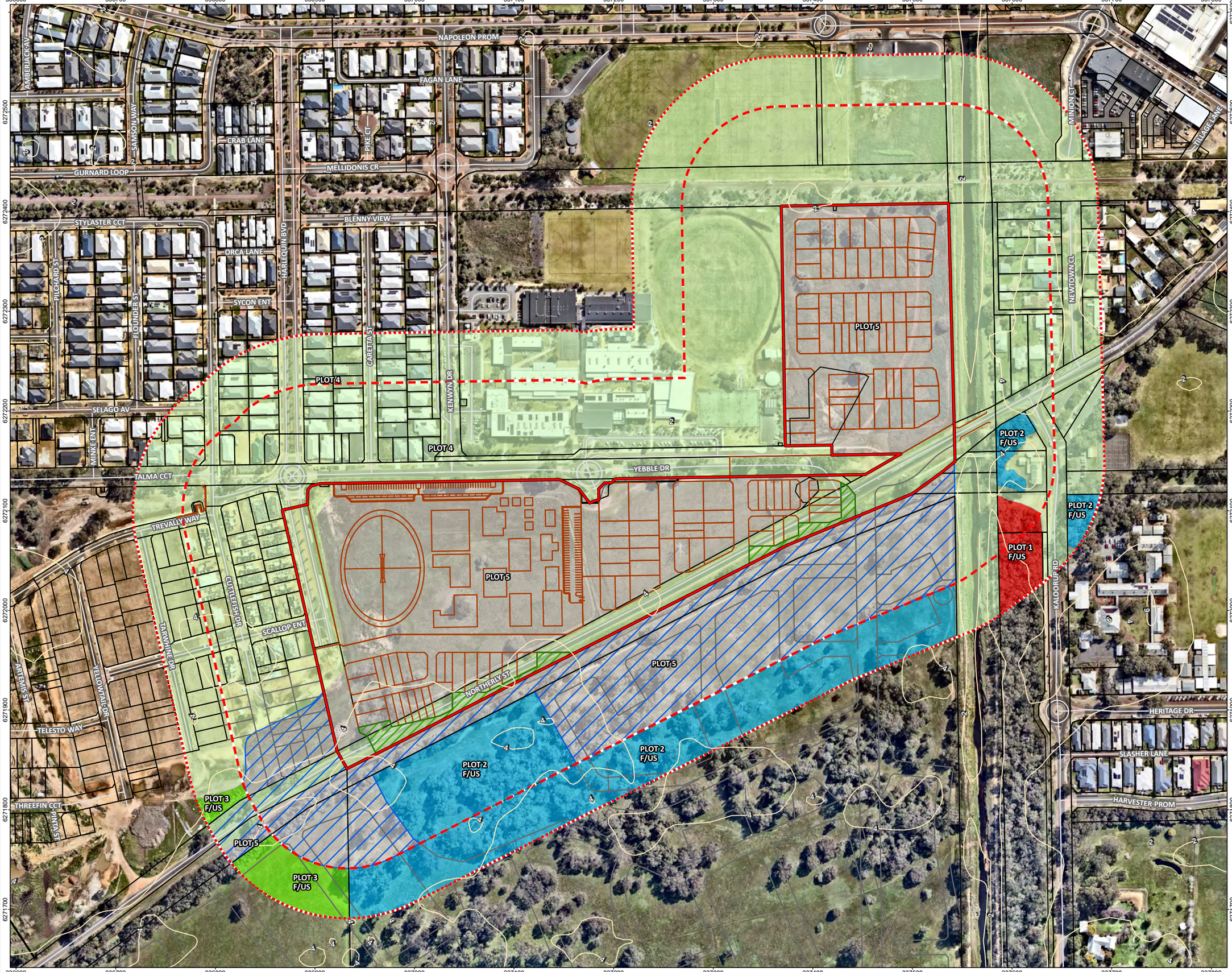
Effective slope under classified vegetation was assessed as part of the VSP amendment BMP (Strategen-JBS&G 2020) through on ground verification in accordance with AS3959. Results were cross referenced with DPIRD 2m contour data and indicate that effective slope is flat/upslope under all areas of classified vegetation.

2.1.3 Post-development inputs

Figure 3 illustrates the anticipated post-development vegetation classifications and exclusions following completion of subdivisional works and implementation of low threat staging buffers. The post-development vegetation classifications/exclusions and effective slope are summarised in Table 1.

Table 1: Summary of post-development vegetation classifications, exclusions and effective slope

Vegetation plot	Vegetation classification	Effective slope	Comments
1	Class A Forest	Flat/upslope (0°)	Eucalyptus canopy, a midstorey layer and a grassy understorey
2	Class B Woodland	Flat/upslope (0°)	Sparse eucalyptus canopy with a grassy understorey
3	Class G Grassland	Flat/upslope (0°)	Grassland greater than 100 mm in height at maturity
4	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	Existing non-vegetated and low threat managed areas
5	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	Areas to be modified to a non-vegetated or low threat managed state as part of proposed development (e.g. the project area, low threat staging buffer comprising retention of all trees and a slashed or mown understorey, etc).



Legend

- Project area
- 100m assessment area
- 150m assessment area
- Cadastral boundaary (LGATE-002)
- POS
- 100m wide low threat staging buffer

Vegetation classification

- Class A Forest
- Class B Woodland
- Class G Grassland
- Clause 2.2.3.2 (e) & (f)
- Area to be modified to non-vegetated and low threat state
- Proposed lot layout
- Future indicative lot layout on adjacent stages
- Topographic contours (mAHD)
- Minor road

JBS&G

Job No: 64008	
Client: JV Perron Developments & Stawell	
Version: A	Date: 13-Jun-2025
Drawn By: bsunderland	Checked By: ZC

Scale 1:3,500 at A3

0 50 100
metres

Coord. Sys. GDA2020 MGA Zone 50

Dawson Stages 6C and 6D, Vasse, WA

VEGETATION CLASSIFICATION AND EFFECTIVE SLOPE

FIGURE 3

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Image Reference: www.nearmap.com© - Imagery Date: 08. September 2023.

2.2 Assessment outputs

2.2.1 Bushfire Attack Level (BAL) contour assessment

JBS&G has undertaken a BAL contour assessment in accordance with Method 1 of AS3959 for the project area (Figure 4). The Method 1 procedure incorporates the following factors:

- state adopted FDI 80 rating
- vegetation classification
- effective slope
- distance maintained between proposed development areas and the classified vegetation.

The BAL rating gives an indication of the level of bushfire attack (i.e. the radiant heat flux) that may be received by proposed development and subsequently informs the standard of building construction and/or setbacks required for proposed habitable development to potentially withstand such impacts and deliver compliance with relevant bushfire protection criteria of the Guidelines.

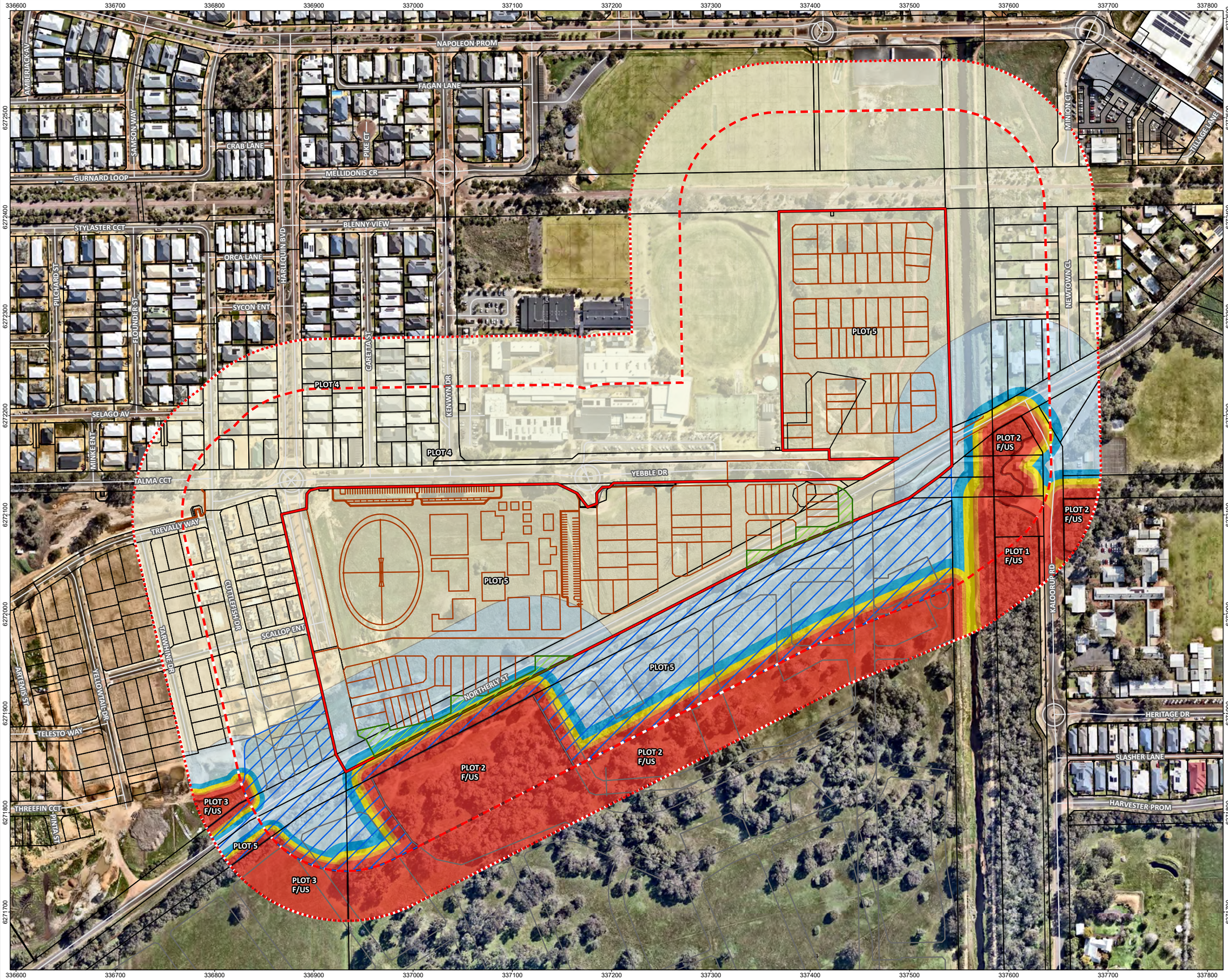
The BAL contours are based on:

- the vegetation classifications and effective slope observed during the original site inspection and updated desktop review of current site conditions
- consideration of the proposed on-site clearing extent, proposed low threat areas and 100 m wide low threat staging buffer (i.e. comprising retention of all trees and a slashed or mown understorey) and the resultant separation distances achieved in line with the subdivision plan.

Results of the BAL contour assessment are detailed in Table 2 and illustrated in Figure 4. The determined worst case BAL impact to proposed habitable development within the project area is BAL–12.5.

Table 2: BAL contour assessment results

Method 1 BAL determination				
Vegetation plot	**Vegetation classification**	**Effective slope**	**Separation distance**	**Highest BAL**
1	Class A Forest	Flat/upslope (0°)	100 m	BAL–Low
2	Class B Woodland	Flat/upslope (0°)	21 m	BAL–19
3	Class G Grassland	Flat/upslope (0°)	>50 m	BAL–Low
4	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	N/A	N/A
5	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	N/A	N/A



Legend

- Project area
- 100m assessment area
- 150m assessment area
- Cadastral boundaary (LGATE-002)
- POS
- 100m wide low threat staging buffer
- Classified vegetation

BAL contours

- BAL FZ
- BAL 40
- BAL 29
- BAL 19
- BAL 12.5
- BAL Low
- Proposed lot layout
- Future indicative lot layout on adjacent stages
- Minor road

JBS&G

Job No: 64008	
Client: JV Perron Developments & Stawell	
Version: A	Date: 13-Jun-2025
Drawn By: bsunderland	Checked By: ZC

Scale 1:3,500 at A3

0 50 100
metres

Coord. Sys. GDA2020 MGA Zone 50

Dawson Stages 6C and 6D, Vasse, WA

BAL CONTOUR MAP

FIGURE 4

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Image Reference: www.nearmap.com© - Imagery Date: 08. September 2023.

3. Assessment against bushfire protection criteria

3.1 Compliance with Elements 1–4

Compliance with Elements 1–4 of the bushfire protection criteria of the Guidelines (Version 1.4) is demonstrated by meeting the acceptable solutions, as detailed in Table 3.

Table 3: Compliance with the bushfire protection criteria of the Guidelines (Elements 1-4)

Bushfire protection criteria	Performance Principle	Method of compliance Acceptable solutions	Statement of development compliance	Compliance achieved
Element 1: Location	**Performance Principle P1** The strategic planning proposal, subdivision and development application is located in an area where the bushfire hazard assessment is or will, on completion, be moderate or low, or a BAL–29 or below, and the risk can be managed. For unavoidable development in areas where BAL–40 or BAL–FZ applies, demonstrating that the risk can be managed to the satisfaction of the decision-maker.	**A1.1 Development location** The strategic planning proposal, subdivision and development application is located in an area that is or will, on completion, be subject to either a moderate or low bushfire hazard level, or BAL–29 or below.	The BAL contour assessment (see Figure 4 and Table 2) demonstrates that all future habitable development will be located in areas of BAL-29 or lower.	✓
Element 2: Siting and design	**Performance Principle P2** The siting and design of the strategic planning proposal, subdivision or development application, including roads, paths and landscaping, is appropriate to the level of bushfire threat that applies to the site. The proposal incorporates a defendable space and significantly reduces the heat intensities at the building surface thereby minimising the bushfire risk to people, property and infrastructure, including compliance with AS 3959 if appropriate.	**A2.1 Asset Protection Zone** Every habitable building is surrounded by, and every proposed lot can achieve, an APZ depicted on submitted plans, which meets the requirements set out in Schedule 1.	No formal Asset Protection Zones (APZs) are required to deliver BAL-29 or lower given the suitable extent of low threat Clause 2.2.3.2 (e) and (f) exclusions proposed between future areas of habitable development and the classified vegetation extent. As part of proposed development, any land to be modified to a low threat state under Clauses 2.2.3.2 (e) and (f) of AS3959 (e.g. on-site development footprint, low threat staging buffers, etc) is to comply with Schedule 1 APZ standards of the Guidelines (refer to Appendix B). It should be noted that the low threat staging buffer is to comprise retention of all trees and a slashed or mown understorey.	✓
	Performance Principle P3i	**A3.1 Public roads**	All public roads will be constructed to the minimum technical requirements of the	✓

Bushfire protection criteria	Performance Principle	Method of compliance Acceptable solutions	Statement of development compliance	Compliance achieved
Element 3: Vehicular access	The design and capacity of vehicular access and egress is to provide for the community to evacuate to a suitable destination before a bushfire arrives at the site, allowing emergency services personnel to attend the site and/or hazard vegetation.	*The minimum requirements under this acceptable solution are applicable to all proposed and existing public roads.* Public roads are to meet the minimum technical requirements in Table 6, Column 1. The trafficable (carriageway/pavement) width is to be in accordance with the relevant class of road in the Local Government Guidelines for Subdivisional Development (IPWEA Subdivision Guidelines), Liveable Neighbourhoods, Austroad standards and/or any applicable standards for the local government area.	Guidelines (see Appendix C) and in accordance with relevant federal, State and local government requirements.	
		A3.2a Multiple access routes Public road access is to be provided in two different directions to at least two different suitable destinations with an all-weather surface (two-way access). If the public road access to the subject site is via a no-through road which cannot be avoided due to demonstrated site constraints, the road access is to be a maximum of 200 metres from the subject lot(s) boundary to an intersection where two-way access is provided. The no-through road may exceed 200 metres if it is demonstrated that an alternative access, including an emergency access way, cannot be provided due to site constraints and the following requirements are met: the no-through road travels towards a suitable destination; and the balance of the no-through road, that is greater than 200 metres from the subject site, is wholly within BAL-LOW, or is within a residential built-out area – Figure 23.	Proposed subdivision design indicates multiple public vehicular access connections to the surrounding public road network, including connections to Harlequin Boulevard to the west, Northerly Street to the southwest and northeast and Yebble Drive to the north. These will provide public vehicular access routes in multiple directions to multiple suitable destinations, including the Vasse and Busselton townsites. The proposed development cell in the northeast of the project area (i.e. north of Yebble Drive) will be serviced by a single point of access and egress off the opposing roundabout to the south at the junction of Yebble Drive and Northerly Street. This no-through road is unavoidable due to site constraints including being landlocked to the north, east and west by the Rails to Trails walk trail corridor, Buayanup Drain and Cape Naturalist College respectively. There is no alternative or scope to deliver a secondary access route (including an emergency access way) to the surrounding public road network for this development cell. The no-through road will be greater than 200 m in length; however, as per Guideline provisions, is	✓

Bushfire protection criteria	Performance Principle	Method of compliance Acceptable solutions	Statement of development compliance	Compliance achieved
			permissible since the no-through road travels towards a suitable destination in Yebble Drive/Northerly Street and Vasse Town Centre and the balance portion of the no-through road that is greater than 200 m is within a residential built-out area.	
		A3.2b Emergency access way *Where it is demonstrated that A3.2a cannot be achieved due to site constraints, or where an alternative design option does not exist, an emergency access way can be considered as an acceptable solution.* An emergency access way is to meet all the following requirements: requirements in Table 6, Column 2; provides a through connection to a public road; be no more than 500 metres in length; and must be signposted and if gated, gates must open the whole trafficable width and remain unlocked.	Emergency Access Ways (EAWs) are not required to provide through access to a public road. Any temporary emergency access ways required as part of internal staging will be constructed to comply with relevant Guidelines requirements, as per Appendix B.	✓
		A3.3 Through-roads All public roads should be through-roads. No-through roads should be avoided and should only be considered as an acceptable solution where: it is demonstrated that no alternative road layout exists due to site constraints; and the no-through road is a maximum length of 200 metres to an intersection providing two-way access, unless it satisfies the exemption provisions in A3.2a of this table. A no-through road is to meet all the following requirements: requirements of a public road (Table 6, Column 1); and	All proposed public roads will be through roads, except for one no-through road servicing the proposed development cell in the northeast of the project area (i.e. north of Yebble Drive), which will be serviced by a single point of access and egress off the opposing roundabout to the south at the junction of Yebble Drive and Northerly Street. Refer to Acceptable Solution A3.2a for justification for this no-through road and the associated compliance.	✓

Bushfire protection criteria	Performance Principle	Method of compliance Acceptable solutions	Statement of development compliance	Compliance achieved
		turn-around area as shown in Figure 24.		
	Performance Principle P3ii The design of vehicular access and egress provides: access and egress for emergency service vehicles while allowing the community to evacuate; a defendable space for emergency services personnel on the interface between classified vegetation and development site; and hazard separation between classified vegetation and the subject site to reduce the potential radiant heat that may impact a lot(s).	**A3.4a Perimeter roads** A perimeter road is a public road and should be provided for greenfield or infill development where 10 or more lots are being proposed (including as part of a staged subdivision) with the aim of: separating areas of classified vegetation under AS3959, which adjoin the subject site, from the proposed lot(s); and removing the need for battle-axe lots that back onto areas of classified vegetation. A perimeter road is to meet the requirements contained in Table 6, Column 1. A perimeter road may not be required where: the adjoining classified vegetation is Class G Grassland; lots are zoned for rural living or equivalent; it is demonstrated that it cannot be provided due to site constraints; or all lots have frontage to an existing public road.	Whilst the project area will not be directly bound by classified vegetation at any interface, perimeter roads are either already provided or proposed at external development interfaces to provide separation between broader bushfire hazard areas and a defendable space for firefighting activities if required.	✓
	Performance Principle P3iii Vehicular access is provided which allows: access and egress for emergency service vehicles; defendable space for emergency services personnel on the interface between classified vegetation and development; and hazard separation between classified vegetation and the site to reduce the potential radiant heat that may impact a lot(s).	**A3.4b Fire service access route** *Where proposed lots adjoin classified vegetation under AS3959, and a perimeter road is not required in accordance with A3.4a, a fire service access route can be considered as an acceptable solution to provide firefighter access, where access is not available, to the classified vegetation.* A fire service access route is to meet all the following requirements: requirements in Table 6, Column 3; be through-routes with no dead-ends;	As discussed above under A3.4a, proposed subdivision design includes perimeter roads at development interfaces with the boundary of the subdivision area. In this regard, fire service access routes (FSARs) are not considered to be required for the proposed development.	N/A

Bushfire protection criteria	Performance Principle	Method of compliance Acceptable solutions	Statement of development compliance	Compliance achieved
		linked to the internal road system at regular intervals, every 500 metres; must be signposted; no further than 500 metres from a public road; if gated, gates must open the required horizontal clearance and can be locked by the local government and/or emergency services, if keys are provided for each gate; and turn-around areas designed to accommodate type 3.4 fire appliances and to enable them to turn around safely every 500 metres.		
	Performance Principle P3iv Vehicular access is provided which allows emergency service vehicles to directly access all habitable buildings and water supplies and exit the lot without entrapment.	**A3.5 Battle-axe access legs** *Where it is demonstrated that a battle-axe cannot be avoided due to site constraints, it can be considered as an acceptable solution.* There are no battle-axe technical requirements where the point the battle-axe access leg joins the effective area of the lot, is less than 50 metres from a public road in a reticulated area. In circumstances where the above condition is not met, or the battle-axe is in a non-reticulated water area, the battle-axe is to meet all the following requirements: requirements in Table 6, Column 4; and passing bays every 200 metres with a minimum length of 20 metres and a minimum additional trafficable width of two metres (i.e. the combined trafficable width of the passing bay and constructed private driveway to be a minimum six metres).	No battle-axe lots are proposed as part of the subdivision and the project area is not serviced by an existing battle-axe.	N/A
		A3.6 Private driveways There are no private driveway technical requirements where the private driveway is: within a lot serviced by reticulated water;	A3.6 is applicable to the Development Application (DA) stage only.	N/A

Bushfire protection criteria	Performance Principle	Method of compliance Acceptable solutions	Statement of development compliance	Compliance achieved
		no greater than 70 metres in length between the most distant external part of the development site and the public road measured as a hose lay; and accessed by a public road where the road speed limit is not greater than 70 km/h. In circumstances where all of the above conditions are not met, or the private driveway is in a non-reticulated water area, the private driveway is to meet all the following requirements: requirements in Table 6, Column 4; passing bays every 200 metres with a minimum length of 20 metres and a minimum additional trafficable width of two metres (i.e. the combined trafficable width of the passing bay and constructed private driveway to be a minimum six metres); and turn-around area as shown in Figure 28 and within 30 metres of the habitable building.		
Element 4: Water	No performance principle applies	**A4.1 Identification of future water supply** Evidence that a reticulated or sufficient non-reticulated water supply for bushfire fighting can be provided at the subdivision and/or development application stage, in accordance with the specifications of the relevant water supply authority or the requirements of Schedule 2. Where the provision of a strategic water tank(s) is required a suitable area within a road reserve or a dedicated lot the location should be identified, should be identified on the structure plan, to the satisfaction of the local government.	A4.1 is applicable to strategic planning applications only.	N/A

Bushfire protection criteria	Performance Principle	Method of compliance Acceptable solutions	Statement of development compliance	Compliance achieved
	Performance Principle P4 Provide a permanent water supply that is: sufficient and available for firefighting purposes; constructed from non-combustible materials (e.g. steel), or able to maintain its integrity throughout a bushfire; and accessible, with legal access for maintenance and re-filling by tankers and emergency service vehicles.	**A4.2 Provision of water for firefighting purposes** Where a reticulated water supply is existing or proposed, hydrant connection(s) should be provided in accordance with the specifications of the relevant water supply authority. Where these specifications cannot be met, then the following applies: The provision of a water tank(s), in accordance with the requirements of Schedule 2; and Where the provision of a strategic water tank(s) is applicable, then the following requirements apply: land to be ceded free of cost to the local government for the placement of the tank(s); the lot or road reserve where the tank is to be located is identified on the plan of subdivision; tank capacity, construction, and fittings, provided in accordance with the requirements of Schedule 2; and a strategic water tank is to be located no more than 10 minutes from the subject site (at legal road speeds). Where a subdivision includes an existing habitable building(s) that is to be retained, a water supply should be provided to this existing habitable building(s), in accordance with the requirements listed above.	The proposed development will be connected to a reticulated water supply via extension of services from adjacent development areas in accordance with Water Corporation Design Standard 63 requirements.	✓

4. Responsibilities for implementation and management of the bushfire measures

Implementation of the BMP addendum applies to the developer and prospective landowners to ensure bushfire management measures are adopted and implemented on an ongoing basis. A bushfire responsibilities table is provided in Table 4 to drive implementation of all relevant bushfire management works associated with this BMP addendum.

Table 4: Responsibilities for implementation and management of the bushfire measures

Implementation/management table	
Developer – prior to issue of titles	
No.	Implementation action
1	Construct (or have works bonded) the public roads and any temporary no-through-roads/emergency access ways (required as part of internal staging) to the standards stated in this BMP addendum.
2	Construct (or have works bonded) the reticulated water supply to the standards stated in this BMP addendum.
3	Establish the project area to a non-vegetated/low threat managed state in accordance with the requirements of this BMP addendum.
4	Establish the 100 m wide low threat staging buffer to a low fuel understorey managed state (i.e. slashed or mown grass) and all trees retained in accordance with the requirements of this BMP addendum.
5	Comply with the relevant requirements of the City of Busselton annual firebreak notice (refer to Appendix D).
6	Prepare a BMP compliance report to demonstrate the relevant bushfire management measures have been implemented to deliver compliance in accordance with this BMP addendum.
Developer – until sale/transfer of lots	
No.	Implementation action
1	Maintain the project area to a non-vegetated/low threat managed state in accordance with the requirements of this BMP addendum.
2	Maintain the 100 m wide low threat staging buffer to a low fuel understorey managed state (i.e. slashed or mown grass) and all trees retained in accordance with the requirements of this BMP addendum.
3	Comply with the relevant requirements of the City of Busselton annual firebreak notice (refer to Appendix D).
Landowner/occupier – prior to building construction and ongoing	
No.	Implementation action
1	Comply with the relevant requirements of the City of Busselton annual firebreak notice (refer to Appendix D), including maintenance of cleared/vacant lots in a low threat state.
2	Comply with AS3959 building constructions standards relevant to the assessed BAL where required.

5. References

Department of Fire and Emergency Services (DFES) 2021, *Map of Bush Fire Prone Areas*, [Online], Government of Western Australia, available from: https://maps.slip.wa.gov.au/landgate/bushfireprone/, [25/10/2023].

Department of Planning (DoP) 2016, *Visual guide for bushfire risk assessment in Western Australia*, Department of Planning, Perth.

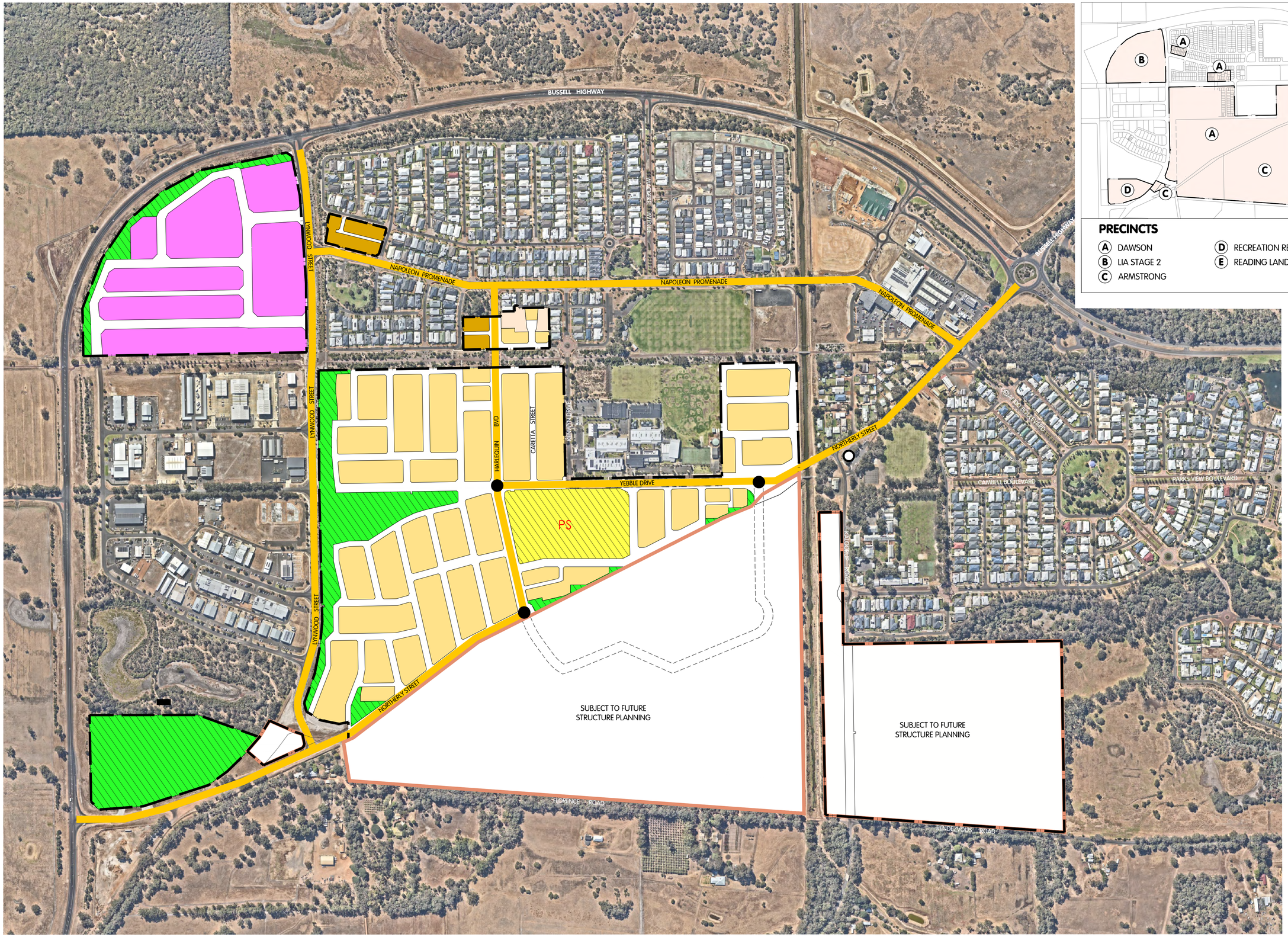
Standards Australia (SA) 2018, *Australian Standard AS 3959–2018 Construction of Buildings in Bushfire-prone Areas*, Standards Australia, Sydney.

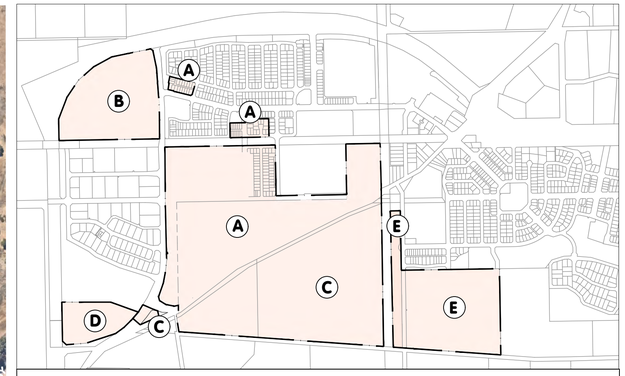
Strategen-JBS&G 2020, *Bushfire Management Plan – Vasse Structure Plan*, report prepared for JV Perron Developments P/L & Stawell P/L, June 2020.

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

Western Australian Planning Commission (WAPC) 2021, *Guidelines for Planning in Bushfire Prone Areas*, Version 1.4 December 2021, Western Australian Planning Commission, Perth.

Appendix A Vasse Structure Plan





PRECINCTS

- (A) DAWSON
- (B) LIA STAGE 2
- (C) ARMSTRONG
- (D) RECREATION RESERVE
- (E) READING LAND

N

LEGEND

- Structure Plan Boundary
- Existing Cadastre
- Lot Boundaries

LOCAL SCHEME RESERVES

- Recreation
- Public Purposes
- Primary School

ZONES
Residential

- R20
- R30
- R20-R40

- Urban Development (Subject to future structure planning)
- Industrial
- Neighbourhood Connector
- Local Roads
- Future Roundabout
- Potential for a treatment or upgrade at the intersection of Northerly Street and Kaloorup Road, subject to future investigations including the location and alignment of Kaloorup Road

VASSE

CADASTRAL INFORMATION
SOURCE: LANDGATE SLIP
YYMMDD: 160803
DWG REF: dawson
PROJECTION: MGA94

AERIAL PHOTOGRAPHY
SOURCE: NEARMAP
YYMMDD: 240402

HATCH

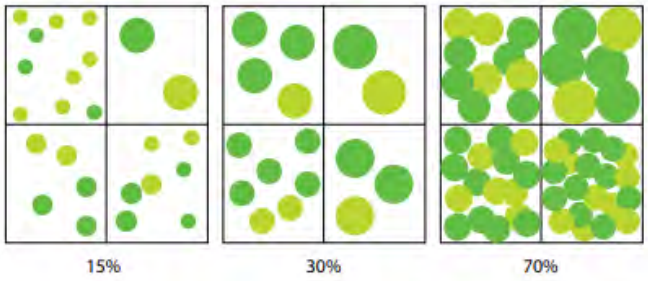
SIZE A1 1:4000
0 metres 40 80 120 160 200

REV	DESCRIPTION	YYMMDD	DRAWN	APPRD
O.2	WAPC MODIFICATIONS	250610	RS	DP
O.1	REVISE LOT BOUNDARIES	240311	SB	DP
O	UPDATED NEIGHBOURHOOD CONNECTOR	240516	SB	DP
N	UPDATED STRUCTURE PLAN DESIGN	240325	RG	RG
M	WAPC MODIFICATIONS FOR ENDORSEMENT	230827	SB	DP
L	UPDATE ZONING	201117	SB	DP
K	UPDATED STRUCTURE PLAN DESIGN	191101	SB	DP

AMENDMENT No.1
Vasse Structure Plan
City of Busselton

REF NO.	DRAW NO.	REV.
PGP VAS	**RD1 200**	**O.2**

Appendix B APZ standards (Schedule 1 of the Guidelines)

Schedule 1: Standards for Asset Protection Zones	
Object	**Requirement**
Fences within the APZ	Should be constructed from non-combustible materials (for example, iron, brick, limestone, metal post and wire, or bushfire-resisting timber referenced in Appendix F of AS 3959).
Fine fuel load (Combustible, dead vegetation matter <6 millimetres in thickness)	Should be managed and removed on a regular basis to maintain a low threat state. Should be maintained at <2 tonnes per hectare (on average). Mulches should be non-combustible such as stone, gravel or crushed mineral earth or wood mulch >6 millimetres in thickness.
Trees* (>6 metres in height)	Trunks at maturity should be a minimum distance of six metres from all elevations of the building. Branches at maturity should not touch or overhang a building or powerline. Lower branches and loose bark should be removed to a height of two metres above the ground and/or surface vegetation. Canopy cover within the APZ should be <15 per cent of the total APZ area. Tree canopies at maturity should be at least five metres apart to avoid forming a continuous canopy. Stands of existing mature trees with interlocking canopies may be treated as an individual canopy provided that the total canopy cover within the APZ will not exceed 15 per cent and are not connected to the tree canopy outside the APZ. **Figure 19:** Tree canopy cover – ranging from 15 to 70 per cent at maturity 
Shrub* and scrub* (0.5 metres to six metres in height). Shrub and scrub >6 metres in height are to be treated as trees.	Should not be located under trees or within three metres of buildings. Should not be planted in clumps >5 square metres in area. Clumps should be separated from each other and any exposed window or door by at least 10 metres.
Ground covers* (<0.5 metres in height. Ground covers >0.5 metres in height are to be treated as shrubs)	Can be planted under trees but must be maintained to remove dead plant material, as prescribed in 'Fine fuel load' above. Can be located within two metres of a structure, but three metres from windows or doors if >100 millimetres in height.
Grass	Grass should be maintained at a height of 100 millimetres or less, at all times. Wherever possible, perennial grasses should be used and well-hydrated with regular application of wetting agents and efficient irrigation.
Defendable space	Within three metres of each wall or supporting post of a habitable building, the area is kept free from vegetation, but can include ground covers, grass and non-combustible mulches as prescribed above.

Schedule 1: Standards for Asset Protection Zones	
LP Gas Cylinders	Should be located on the side of a building furthest from the likely direction of a bushfire or on the side of a building where surrounding classified vegetation is upslope, at least one metre from vulnerable parts of a building. The pressure relief valve should point away from the house. No flammable material within six metres from the front of the valve. Must sit on a firm, level and non-combustible base and be secured to a solid structure.

***** *Plant flammability, landscaping design and maintenance should be considered – refer to explanatory notes*

Source: *Guidelines for Planning in Bushfire Prone Areas (WAPC 2021)*

Element 2 Explanatory Notes

E2 Managing an Asset Protection Zone (APZ) to a low threat state

An APZ is a low fuel area maintained around a habitable building to increase the likelihood that it will survive a bushfire, by providing a defendable space and reducing the potential for direct flame contact, radiant heat exposure and ember attack.

Vegetation management within an APZ should provide defendable space and be maintained to a low threat state, in perpetuity, in accordance with the requirements outlined in Schedule 1.

The width of an APZ varies with slope and vegetation type, however it should only be as wide as needed to ensure the potential radiant heat impact of a bushfire does not exceed 29kW/m² (BAL-29), or 10kW/m² where a building is identified for use as an on-site shelter. An APZ is generally not required where a building or development site achieves 29kW/m² (BAL-29) or lower in its pre-development state (prior to any vegetation clearing or modification).

An APZ should include an area of defendable space immediately adjoining a building, that is kept free from combustible items and obstructions, within which firefighting operations can be undertaken to defend the structure. Where a lot contains a building envelope, it may not be necessary for the entire building envelope to achieve 29kW/m² (BAL-29) as this may result in significant unnecessary clearing. It is recommended that the BMP identifies that a sufficient APZ can be accommodated within the building envelope, with the development site and associated APZ to be determined at the development approval stage.

An APZ should be contained within the boundaries of the lot on which the building is situated, except in instances where it is demonstrated that the vegetation on the adjoining land is managed in a low threat state, as per cl. 2.2.3.2 of AS 3959, such as a road, managed park, rocky outcrop or a water body.

The siting of a habitable building and associated APZ should aim to minimise the clearing of vegetation. The BMP should demonstrate that the proposed APZ has minimised the unnecessary loss of vegetation or potential for conflict with landscape or environmental objectives; and complies with environmental approvals/exemptions (where necessary). A re-design or reduction in lot yield may be necessary to minimise the removal and modification of remnant vegetation.

It is recommended that development be located on flat areas or slopes less than 20 degrees (especially where classified vegetation is located downslope to a building) and away from ridge tops, crests or narrow gullies, as bushfire can spread rapidly in these areas. Circumstances where these locations may be suitable for development to occur include where the land is already cleared, and 29kW/m² (BAL-29) or lower can be achieved for the whole development site without the use of an APZ. To ensure soil stability within an APZ, vegetation removal on slopes exceeding 18 degrees is discouraged.

Fine fuel load should be maintained to less than two tonnes per hectare, however this is often a subjective assessment. Reducing fuel load levels does not necessarily require the removal of existing vegetation. A combination of methods can be utilised to reduce fuel load such as raking, weed removal, pruning, mulching and/or the removal of plant material.

A simple method to estimate fuel load is to roughly equate one tonne of fuel load per hectare as 100 grams per square metre. For example, two tonnes per hectare of leaf litter is roughly 200 grams of leaf litter per square metre and eight tonnes per hectare is roughly 800 grams. Eucalyptus leaf litter is approximately 100 grams per handful, so two handfuls of litter per square metre will roughly equate to two tonnes per hectare. Different types of fine fuel, like mulch or pine needles may be more or less than a handful, however the 100 grams per square metre rule of thumb can still be used.

The landowner or proponent is responsible for maintaining an APZ in accordance with Schedule 1 - Standards for Asset Protection Zones. Ongoing maintenance of an APZ is usually enforced through the local government firebreak notice issued under section 33 of the Bushfires Act 1954, and/or through a condition of a development approval, which requires the implementation of measures identified within a BMP.

Schedule 1: Standards for Asset Protection Zones
A copy of the firebreak notice and Schedule 1 should be included in a BMP specifically as a how-to guide for the landowner, and to demonstrate to decision-makers that the measures outlined in the BMP to achieve the appropriate BAL rating through provision and ongoing management of an APZ, can be implemented.

E2 Landscaping and design of an Asset Protection Zone
Landscaping, design, and maintenance of an APZ in a bushfire prone area can significantly improve the bushfire resilience of a building. An APZ should not be seen as an area entirely cleared of vegetation, but as a strategically designed space that gives holistic consideration to how existing or proposed vegetation or non-combustible features interact with, or affect the building's bushfire resilience. A well designed APZ provides a greater level of vegetation management within the first few metres of a building with, for example, less vegetation or inclusion of non-combustible materials. The vegetation within the remainder of an APZ can increase further away from the building with carefully considered plant selection and landscaping techniques. Strategic landscaping measures can be applied, such as replacing weeds with low flammability vegetation (refer to E2 Plant Flammability) to create horizontal and vertical separations between the retained vegetation. The accumulation of fine fuel load from different plants is an important consideration for ongoing maintenance in accordance with Schedule 1. For example, when planting ground covers under deciduous trees within an APZ, the total fine fuel load prescribed in Schedule 1 will include any dead plant material from ground covers and leaf litter from the trees. Plant density and final structure and form of mature vegetation should be considered in the initial landscaping stages. For example, clumps of sapling shrubs planted at a density without consideration of future growth, may increase the bushfire risk as a clump will quickly grow to exceed $5m^2$. It should be noted that in some cases, a single shrub in a mature state may be so dense as to fill a $5m^2$ clump alone. The location of plants within an APZ is a key design technique. Separation of garden beds with areas of low fuel or non-combustible material, will break up fuel continuity and reduce the likelihood of a bushfire running through an APZ and subjecting a dwelling to radiant heat or direct flame contact. It is important to note, where mature trees are separated from a building by six metres, but the canopy has grown to extend or overhang a building, maintenance and pruning to remove the overhanging branches should be undertaken without the entirety of the tree being removed. Mulches used within the APZ should be non-combustible. The use of stone, gravel, rock and crushed mineral earth is encouraged. Wood mulch >6mm in thickness may be used, however it is recommended that it is used in garden beds or areas where the moisture level is higher by regular irrigation. These materials could be sourced from non-toxic construction and demolition waste giving the added benefit of reducing the environmental impact of any 'hard landscaping' actions. Combustible objects, plants, garden supplies such as mulches, fences made from combustible material, should be avoided within 10 metres of a building. Vines or climbing plants on pergolas, posts or beams, should be located away from vulnerable parts of the building, such as windows and doors. Non-flammable features can be used to provide hazard separation from classified vegetation, such as tennis courts, pools, lawns and driveways or paths that use inorganic mulches (gravel or crushed rock). Consider locating firewood stacks away from trees and habitable buildings. Incorporation of landscaping features, such as masonry feature walls can provide habitable buildings with barriers to wind, radiant heat and embers. These features can include noise walls or wind breaks. Use of Appendix F of AS 3959 for bushfire resistant timber selection within areas of $29kW/m^2$ (BAL-29) or below, or the use of non-combustible fencing materials such as iron, brick, limestone, metal post and wire is encouraged. In addition to regular maintenance of an APZ, further bushfire protection can be provided at any time by: ensuring gutters are free from vegetation; installing gutter guards or plugs; regular cleaning of underfloor spaces, or enclosing them to prevent gaps; trimming and removing dead plants or leaf litter; pruning climbing vegetation (such as vines) on a trellis, to ensure it does not connect to a building, particularly near windows and doors; removing vegetation in close proximity to a water tank to ensure it is not touching the sides of a tank; and/or following the requirements of the relevant local government section 33 fire break notice, which may include additional provisions such as locating wood piles more than 10 metres from a building.

Schedule 1: Standards for Asset Protection Zones
Preparation of a property prior to the bushfire season and/or in anticipation of a bushfire is beneficial even if your plan is to evacuate. As embers can travel up to several kilometres from a bushfire and fall into small spaces and crevices or land against the external walls of a building, best practice recommends that objects within the APZ are moved away from the building prior to any bushfire event. Objects may include, but are not limited to: door mats; outdoor furniture; potted plants; shade sails or umbrellas; plastic garbage bins; firewood stacks; flammable sculptures; and/or playground equipment and children's toys.
E2 Plant flammability
There are certain plant characteristics that are known to influence flammability, such as moisture or oil content and the presence and type of bark. Plants with lower flammability properties may still burn during a bushfire event, but may be more resistant to burning and some may regenerate faster post-bushfire. There are many terms for plant flammability that should not be confused, including: Fire resistant – plant species that survive being burnt and will regrow after a bushfire and therefore may be highly flammable and inappropriate for a garden in areas of high bushfire risk. Fire retardant – plants that may not burn readily or may slow the passage of a bushfire. Fire wise – plants that have been identified and selected based on their flammability properties and linked to maintenance advice and planting location within a garden. Although not a requirement of these Guidelines, local governments may develop their own list of fire wise or fire retardant plant species that suit the environmental characteristics of an area. When developing a recommended plant species list, local governments should consult with ecologists, land care officers or environmental authorities to ensure the plants do not present a risk to endangered ecological communities, threatened, or endangered species or their habitat. When selecting plants, private landholders and developers should aim for plants within the APZ that have the following characteristics: grow in a predicted structure, shape and height; are open and loose branching with leaves that are thinly spread; have a coarse texture and low surface-area-to-volume ratio; will not drop large amounts of leaves or limbs, that require regular maintenance; have wide, flat, and thick or succulent leaves; trees that have bark attached tightly to their trunk or have smooth bark; have low amounts of oils, waxes, and resins (which will often have a strong scent when crushed); do not produce or hold large amounts of fine dead material in their crowns; and/or will not become a weed in the area. Refer to the WAPC Bushfire and Vegetation Fact Sheet for further information on clearing and vegetation management and APZ landscaping, design and plant selection reference material.

Source: *Guidelines for Planning in Bushfire Prone Areas (WAPC 2021)*

Appendix C Vehicular access technical requirements of the Guidelines

Acceptable Solution A3.1 – Public Roads
Explanatory Note E3.1

These Guidelines do not prescribe values for the trafficable (carriageway/pavement) width of public roads as they should be in accordance with the class of road as specified in the IPWEA Subdivision Guidelines, Liveable Neighbourhoods, Austroad Standards and/or any applicable standard in the local government area.

The IPWEA Subdivision Guidelines, Liveable Neighbourhoods, Austroad Standards do not prescribe a horizontal clearance. However, it is recommended that a traversable verge is provided to allow for emergency services vehicles to stop and operate on the side of the public road, specifically where the public road may traverse large areas of classified vegetation.

Where local government roads are proposed to be widened by the proponent, they must obtain approval from the local government.

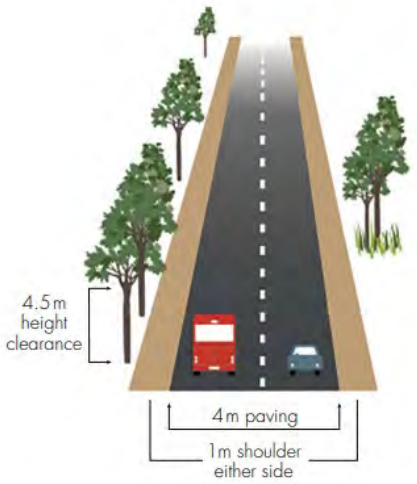


Figure 20: Example of a public road

Source: *Guidelines for Planning in Bushfire Prone Areas (WAPC 2021)*

Acceptable Solution A3.2a – Multiple access routes

Explanatory Note E3.2a

Two-way public road access is public road access from a lot in at least two different directions to two suitable destinations, and provides residents and the community, as well as emergency services, with access and egress from both the subdivision and individual habitable buildings/development in the event of a bushfire emergency. A single road provides no alternative route if the access becomes congested or is unable to be traversed due to smoke and/or fallen trees during a bushfire.

Two-way public road access applies to access/egress routes leading into a subdivision, as well as those within a subdivision. A road that loops back onto itself does not constitute the option of two different directions.

Two-way public road access should always be the first option. Where the site is not able to achieve two-way access within 200 metres of the lot boundary, due to demonstrated site or environmental constraints, the proponent should identify options for an emergency access way from the subject site to a suitable destination. Where an emergency access way cannot be provided, the proponent should demonstrate compliance with the performance principle.

Subject sites or proposed lots greater than 200 metres from an intersection, which provides two-way access, do not satisfy the requirement for two-way access unless they meet the provisions which allow for no-through roads greater than 200 metres in A3.2a.

To demonstrate compliance with the performance principle for two-way access, the bushfire planning practitioner may have regard to:

a. the extent of the bushfire hazard, location and vegetation classification, the likelihood, potential severity and impact of bushfire to the subject site and the road network;
b. time between fire detection and the onset of conditions in comparison to travel time for the community to evacuate to a suitable destination;
c. available access route(s) travelling towards a suitable destination; and
d. turn-around area for a fire appliance for no-through roads.

Figure 21: Example of compliant and non-compliant two-way

Source: *Guidelines for Planning in Bushfire Prone Areas (WAPC 2021)*

Acceptable Solution A3.2b – Emergency access way
Explanatory Note E3.2b
An emergency access way is not a preferred alternative to through public road access and should only be considered acceptable where it has been demonstrated that it will provide the safety and performance needs of emergency services and the community, including consideration for future needs, and that public road access to satisfy A3.2a cannot be achieved due to site constraints, such as an established road network with no opportunity to provide a public road for secondary access. Acceptance of an emergency access way should also consider the ability to accommodate reasonable worst-case vehicle volumes. The principle function of the emergency access way is to provide a contingency (second) community evacuation route and simultaneously provide access for emergency services, in the event of a bushfire emergency. Where an emergency access way traverses classified vegetation, which has the potential to create a bushfire hazard, an emergency access way performs the secondary function of providing access by emergency services to this vegetation. Emergency access ways should connect to a public road to allow alternative two-way through access. An emergency access way should not exceed 500 metres in length as they may not be as safe for road-use due to not being designed or constructed to the full requirements of a public road and may present uncertainties to emergency service personnel and the public as they are not part of the daily road network and not identified on Maps. **Permanent public emergency access way** An emergency access way can be provided as either a public easement in gross or a right-of-way. In both approaches, the management of the emergency access way is by the local government as the grantee of the easement or management body of the right-of-way. The proponent must obtain written consent from the local government that the local government will accept care, control and management of the easement or right-of-way; this must be provided to the decision-maker prior to granting planning approval. The approach taken is at the discretion of the decision-maker and/ or the local government and is also dependent on whether the land is to remain in private ownership or be ceded to the Crown. Consultation with Land Use Management at the Department of Planning, Lands and Heritage should also be considered if the land is to be ceded to the Crown or if the local government is uncertain of which approach to take. If the emergency access way is provided as an easement, it should be provided as a public easement in gross under sections 195 and 196 of the Land Administration Act 1997 in favour of the local government and/or public authority, to ensure accessibility for emergency services and the public at all times. To be provided as a right-of-way the emergency access way should be vested in the Crown under section 152 of the Planning and Development Act 2005 as a right-of-way and such land to be ceded free of cost and without any payment or compensation by the Crown. If gates are used to control traffic flow during non-emergency periods, these will be managed by the local government and must not be locked. Gates should be double gates wide enough to access the full pavement width and accommodate Type 3.4 fire appliances with the design and construction to be approved by the relevant local government. **Temporary public emergency access way** A temporary emergency access way may be proposed to facilitate the staging arrangements of a subdivision. The provision of two public roads may not be possible in the first stage of the subdivision and an emergency access way can be provided as an interim access route until the second public road is developed and gazetted in a subsequent stage of the subdivision (see figure 22). The emergency access way should be provided in the same manner as a permanent emergency access way, but it should be removed from the certificate of title once the public road

Acceptable Solution A3.2b – Emergency access way
Explanatory Note E3.2b
is developed and gazetted. Where an emergency access way is proposed as an alternative to a public road, the Bushfire Management Plan should provide thorough justification for its use. **Restricted public emergency access way** There may be some instances where a restricted emergency access way is proposed as a performance principle based solution where access is only available to the public in the event of a bushfire emergency. This option can only be considered where the local government or Main Roads WA have advised that vehicular access on the emergency access way is not allowed during non-emergency periods, as it provides an additional thoroughfare and entry point on a local or State road. In this scenario, the emergency access way can be provided as an easement under section 195 of the Land Administration Act 1997, as public access in the event of a bushfire emergency or vested in the Crown as a reserve under section 152 of the Planning and Development Act 2005. Such land is to be ceded free of cost without any payment or compensation by the Crown. The proponent must obtain written consent from the local government that the local government will accept care, control and management of the proposed reserve and agree to the terms of the Management Order Conditions (if applicable); this must be provided to the decision-maker prior to granting planning approval. The purpose of the reserve should be for a public purpose specified in the condition related to the subdivision, for example for emergency access only, or for emergency access and recreation. A reserve for emergency access and recreation can optimise the land-use as a dual purpose where it provides vehicular access in the event of a bushfire emergency, but can be accessed by the public (on foot) on a day-to-day basis as a recreation link. Appropriate signage can ensure the general public is aware of the purpose of the reserve. The approach taken is at the discretion of the decision-maker and/or local government. **Right-of-carriageway emergency access way** There may be some instances where a right-of-carriageway easement is proposed as a performance principle-based solution. This may be where particular landowner(s) and emergency services, but not the public, require access over a neighbouring lot(s). A right-of-carriageway easement should be provided under section 195 of the Land Administration Act 1997. The easement is to provide alternative access for the particular landowner(s) in the event of a bushfire emergency and not for use by the public. In this scenario, support will be necessary from the adjoining lot owner(s). The easement is to be granted to the local government and it is to agree with the landowner on the arrangements of the management of the easement area by deed. These management arrangements will be at the discretion of the local government. If gated, the easement area can be locked to restrict day-to-day vehicular access.

Acceptable Solution A3.2b – Emergency access way
Explanatory Note E3.2b

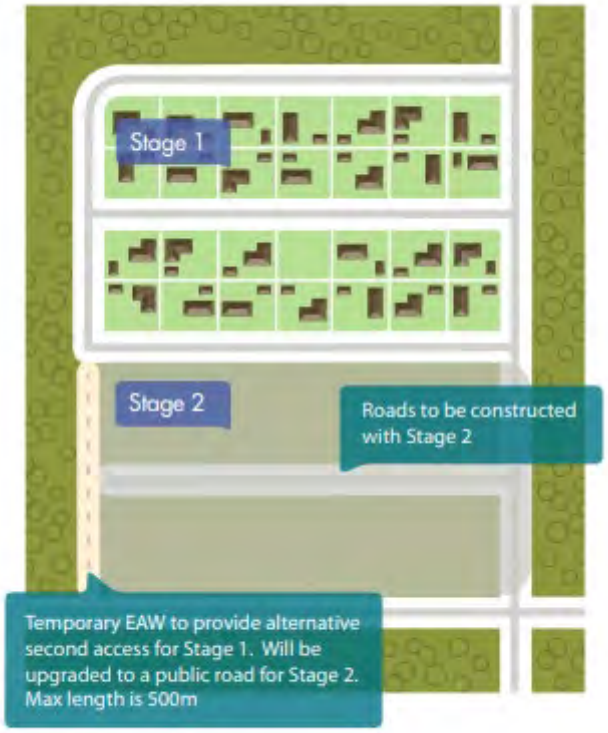


Figure 22: Example of an emergency access way

Source: *Guidelines for Planning in Bushfire Prone Areas (WAPC 2021)*

Acceptable Solution A3.3 – Through roads

Explanatory Note E3.3

In bushfire prone areas, a proposed structure plan or subdivision that incorporates no-through roads should be avoided because they do not provide a connected and legible design that allows for easy access and egress by the community, residents and emergency services in the event of a bushfire. No-through roads also reduce the options available for access and egress in the event of a bushfire emergency.

There will however be situations where a subject site is accessed via an existing or proposed no-through road and alternative access cannot be provided. In these situations, the proponent should demonstrate to the decision-maker, that all efforts have been made with the local government and/or adjoining landowners to secure alternative public road access or an emergency access way and that a redesign has been explored. The bushfire planning practitioner may need to develop a performance principle-based solution or address the non-compliance and demonstrate to the decisionmaker why discretion should be exercised in accordance with section 2.6 of these Guidelines.

No-through roads will only be considered an acceptable solution where it is demonstrated by the proponent, to the satisfaction of the decision maker, that a no through-road cannot be avoided due to site constraints. For example, the internal road design of a structure plan or subdivision where site constraints, such as a water body or Bush Forever, prevent the ability to create a through-road and a no through road may be a more appropriate road layout.

No-through roads should be a maximum of 200 metres from the lot(s) boundary to an intersection where two-way access is provided and may only exceed 200 metres if it meets the provisions which allow for no-through roads greater than 200 metres in A3.2a.

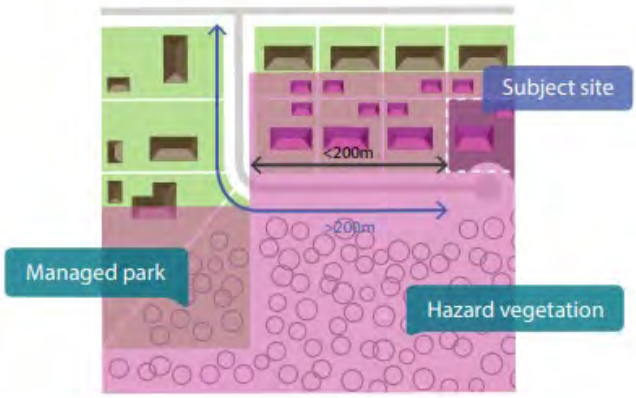


Figure 23: Example of a site on a no-through road greater than 200 metres from the intersection, but within 200 metres of BAL-LOW

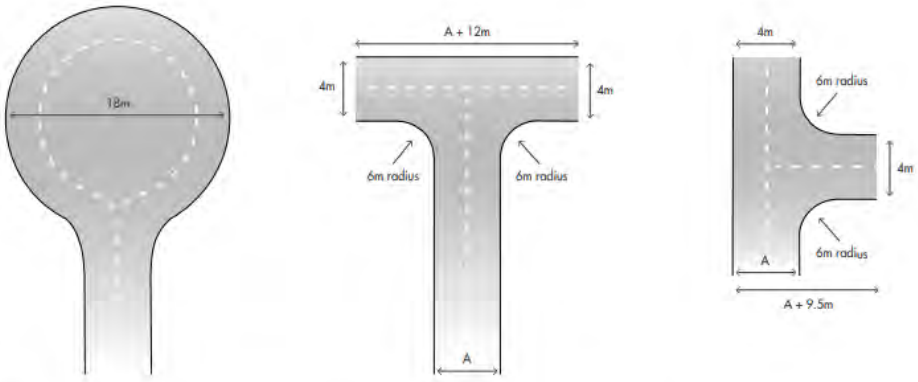


Figure 24: Turn-around area dimensions for a no-through road

Source: *Guidelines for Planning in Bushfire Prone Areas (WAPC 2021)*

Acceptable Solution A3.4a – Perimeter roads

Explanatory Note E3.4a

Where a planning proposal includes the creation of 10 or more lots adjacent to each other, which adjoin classified vegetation under AS 3959 with the exception of Class G Grassland, as part of a greenfield development or large urban infill site, hazard separation and defendable space should be provided in the form of a perimeter road. Greenfield is 'undeveloped or minimally developed areas that have been identified for urban development'; and urban infill is 'the redevelopment of existing urban areas at a higher density than currently exists'. The creation of 10 or more lots includes cumulative subdivision applications where the subdivision application may be part of a staged subdivision.

A perimeter road should be in accordance with the class of road as specified in the IPWEA Subdivision Guidelines, Liveable Neighbourhoods, Austroad Standards and/or any applicable standard in the local government area as per the requirements of a public road in Table 6, Column 1.

As the road is likely to function as a key neighbourhood distributor, or similar, consideration should be given to the provision of additional width to allow for emergency services vehicles to stop and operate on the side of the perimeter road, whilst simultaneously proving for the evacuation of the community (Figure 20).

When designing a strategic planning proposal and/or subdivision, creating a large setback between classified vegetation and proposed lots with a perimeter road, and orientating habitable buildings to front onto (rather than back onto) areas of vegetation has many benefits, including:

- passive surveillance;
- defendable space for firefighting and emergency management purposes;
- reducing the potential radiant heat that may impact a habitable building in a bushfire event;
- reducing the need for battle-axe lots; and
- unconstrained public access/egress for the community in the event of a bushfire.

In developments where no perimeter road exists, property defence in a bushfire event is difficult and can be impossible. Where proposed lots have frontage to an existing public road and abut the hazard at the rear or side, it may be an undesirable planning outcome to create lots which front the existing public road and back onto a perimeter road. In this instance, consideration should be given to a fire service access route. Refer to E3.4b below.

Figure 25: Example of a perimeter road

Source: *Guidelines for Planning in Bushfire Prone Areas (WAPC 2021)*

Technical requirement	1	2	3	4
	Public road	Emergency access way[1]	Fire service access route[1]	Battle-axe and private driveways[2]
Minimum trafficable surface (m)	In accordance with A3.1	6	6	4
Minimum horizontal clearance (m)	N/A	6	6	6
Minimum vertical clearance (m)	4.5	4.5	4.5	4.5
Minimum weight capacity (t)	15	15	15	15
Maximum grade unsealed road[3]	As outlined in the IPWEA Subdivision Guidelines	1:10 (10%, 6°)	1:10 (10%, 6°)	1:10 (10%, 6°)
Maximum grade sealed road[3]		1:7 (14.3%, 8°)	1:7 (14.3%, 8°)	1:7 (14.3%, 8°)
Maximum average grade sealed road		1:10 (10%, 6°)	1:10 (10%, 6°)	1:10 (10%, 6°)
Minimum inner radius of road curves (m)		8.5	8.5	8.5

[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.

Appendix D City of Busselton Annual Firebreak Notice

City of Busselton.

BUSHFIRE RISK REDUCTION NOTICE 2024-2025

BUSH FIRES ACT 1954

The following Notice is hereby given to all owners and/or occupiers of land within the District of the City of Busselton.

The majority of land with the District of the City of Busselton has been designated by the State as Bushfire Prone and has the potential to be subject, or likely to be subject to be impacted by bushfires.

Pursuant to the powers contained in Section 33 of the *Bush Fires Act 1954* notice is hereby given to all owners and occupiers of land within the District of City of Busselton, you are required and therefore ordered by the local government to carry out fire prevention work in accordance with the requirements of this Notice, on or before 15 November 2024, and maintain the requirements up to and including 30 April 2025 or within 14 days of becoming an owner or occupier of land if after that date, to comply with the requirements set out in this notice.

Definitions of terms referred to this Notice:

Authorised officer means a person appointed by the City as a Bush Fire Control Officer pursuant to the powers conferred in s38 of the *Bush fires Act 1954*

Bushfire Prone Area (BPA) means all land designated within the Map of Bushfire Prone areas as identified by the Fire and Emergency Services Commissioner under s18P of the *Fire and Emergency Services Act 1998.*

Current Bushfire Management Plan a plan prepared specifically for a property or subdivision as a condition of subdivision or development approval and endorsed by the Western Australian Planning Commission or the City after 7 December 2015.

Driveway/access way means the access route from a public or private road to a habitable building. With:

- a 3-metre-wide trafficable surface.
- vegetation maintained to provide a 0.5m clearance each side of the trafficable surface; however isolated trees and significant plants need not be removed.
- a 4-metre vertical clearance is to be installed and maintained.

Firebreak means a 3m wide area of land cleared and maintained totally clear of all vegetation material (living or dead), with a trafficable surface over which any overhanging vegetation is no less than 4m above ground level, for the primary purpose of access for firefighting appliances.

Flammable material means accumulated fuel such as dry grass, leaf litter, twigs, branches, trash, bush, dead trees, firewood, stored fuels and scrub that can be easily ignited or is likely to catch fire and burn. It includes any other thing deemed by an Authorised Officer to be likely to catch fire but excludes living standing trees, growing bushes and plants in gardens and/or lawn areas under cultivation.

Habitable building means any single or two-family residence, garage, building, structure, trailer, vehicle or portion thereof where persons dwell, reside, are employed, or congregate and which is occupied in part or whole on a permanent or temporary basis.

Land means freehold land or leasehold Crown land.

Lot means an allotment of freehold land or leasehold Crown land and includes contiguous land parcels in common ownership.

Managed Fuel Area means an area of land within 20 metres of a habitable dwelling from the outermost point of the building wall or to the lot boundary (whichever is smaller). Within the Managed Fuel area:

- Trees must be pruned 2m away from buildings with vertical clearance of 5 metres above the top of the external roof.
- Gutters to be kept free of dead suspended matters such as twigs, leaves, and bark.
- Vegetation must be reticulated and/or maintained or there must be a low fuel understory with no Flammable Material present.
- Flammable material to be managed or moved 5 metres away from buildings.
- Unless Managed Vegetation, available Surface Fine Fuel loads must be reduced and maintained at an average compressed depth of 15mm, by Passive Fuel Reduction methods that do not permanently remove or reduce the quantity or occurrence of the native plants, shrubs, and trees within the subject area.

Managed Vegetation includes actively managed and maintained and/or reticulated low-threat vegetation gardens, orchards, vegetable gardens, living standing trees, growing bushes and plants in gardens and/or lawn areas under cultivation.
Passive Fuel Reduction means lowering the amount of available fuel that will burn under prevailing conditions by means that will not permanently reduce or modify the structure or life cycle of plant, shrub, scrub, or tree communities within a treated area. This may be achieved by undertaking a cool, controlled burn of an area during cooler, damper months, or by physical removal through raking, pruning, weed management, or by any other method, of built-up leaf litter, dead materials, weeds and slashing long dry grasses without damaging live native plants within the area.
Special Work Order means a property specific notice served by the City on an owner pursuant to Section 33 of the *Bush Fires Act 1954,* to act as and when specified in the notice with respect to anything which is upon the land, and which in the opinion of the local government or its duly authorised officer, is or is likely to be conducive to the outbreak of a bush fire or the spread or extension of a bush fire.
Surface Fine Fuel means the leaf litter on the ground, including leaves, twigs (up to 6mm in diameter) and bark which is easily scratched away and not starting to decompose.
Trafficable surface a firm and stable surface, unhindered and without any obstruction suitable to support a 4x4 fire appliance.
Turnaround area means an area of trafficable surface that allows a large fire appliance vehicle to turn around. The turnaround area must:

- be kept clear of encroaching vegetation and overhanging branches to a height of 4 metres.
- Be within 30 metre proximity to the habitable building.
- Turn around can be a loop with a minimum 10 metre radius or a trafficable bay sufficient to support a three-point turn by an 8.3m fire appliance.

Variation means an individual specific Firebreak Notice served by the City on an owner under s33(2) of the *Bush Fires Act 1954*

Category 1 – All Lots 1,100m2 or less:

a) **Grasses to be maintained –** slashed/mowed to less than 10cm in height and removed from the land and disposed of in an appropriate manner;
b) **Flammable material** to be managed or moved 5 metres away from buildings;
c) **Gutters** to be kept free of dead suspended matters such as twigs, leaves and bark.

Category 2 –All lots greater than 1,100m2 but less than 5ha:

a) **Grasses to be maintained –** slashed/mowed/grazed to less than 10cm in height unless actively grazed. If land is actively grazed, grasses shall be maintained to less than 20cm in height.
b) **Category 2 properties with a habitable building:**
  i. **Establish and maintain a Managed Fuel Area;**
  ii. **Driveway/access way –** If the habitable building is, at its closest point, more than 20 metres from the carriageway of a public or private road, the driveway/accessway must be installed and maintained as defined in this Notice;
  iii. **Turnaround area -** If the habitable building is, at its closest point, more than 50 metres from the point of access from the carriageway of a public or private road, a turnaround area is to be installed and maintained.

Category 3 – All lots 5ha or greater:

a) **Grasses to be maintained –** slashed/mowed to less than 10cm in height unless actively grazed or farmed;
b) **Firebreak –** A 3-metre-wide firebreak shall be maintained as close as practicable within 100m of all property boundaries. Where land is actively grazed, or maintained to less than 10cm in height the firebreak may be reduced to 2 metres width. Where the land area exceeds 120 hectares, an additional firebreak must divide land into areas of not more than 120 hectares with each part completely surrounded by a firebreak within 100m of the boundary of that part;
c) **Category 3 properties with a habitable building:**
  i. **Establish and maintain a Managed Fuel Area;**

ii. **Driveway/access way –** If the habitable building is, at its closest point, more than 20 metres from the carriageway of a public or private road, the driveway/accessway must be installed and maintained as defined in this Notice;

iii. **Turnaround area -** If the habitable building is, at its closest point, more than 50 metres from the point of access from the carriageway of a public or private road, a turnaround area is to be installed and maintained.

Current Bushfire Management Plan – Properties subject to a Current Bushfire Management Plan must comply with the requirements of their Current Bushfire Management Plan in addition to the requirements of this Notice.

Variations to the requirements of this Notice: To request a Variation to the requirements of this Notice, you may apply in writing to the City of Busselton for a Variation to the Notice. Variations will be considered where compliance is not practicable due to site-specific constraints such as topography, gradients, or waterways or due to environmental constraints. A submission for a variation is required annually.

Applications for Variations must be completed on the approved form, available from the City's website and must provide alternative means of meeting the objectives of the notice.

Take notice if permission is not granted in writing you must comply with the requirements of this notice.

Additional works: The City retains the ability to issue Special Work Orders pursuant to Section 33 of the Bush Fires Act 1954, to individual landowners should additional works be necessary for a potential fire hazard that may exist on a property. These can be issued at any time during the year.

Inspections, appointments, education and compliance: Landowners/occupiers who would like an early inspection by appointment, for reasons, including dangerous animals, biosecurity, locked gates, or for an explanation on the requirements of this Notice, should contact Rangers by **1 October 2024.** Where inspections by appointment are not requested, **Authorised officers** will be inspecting properties for compliance, without further notice from **15 November 2024.**

Clearing permits and exemptions: Owners/Occupiers must attempt to minimise environmental impacts as much as possible and should contact the City prior to undertaking works if clearing is likely to impact any protected flora, fauna or fauna habitat, or their property is within an Environmentally Sensitive Area. In most circumstances, Owners/Occupiers that clear vegetation in compliance with this Notice will be exempt from the requirement to seek approvals or permits under State law.

Federal environmental approval may be required, if the requirements of this Notice are likely to have a significant impact on a nationally protected matter. Western Ringtail Possums or black cockatoos may be disturbed through the clearing of vegetation need, licenced wildlife handlers must be present when the clearing takes place.
Owners/Occupiers who clear beyond the requirements of this Notice without approvals may be subject to prosecution.

Landowners/occupiers who do not comply with this Notice or a Variation to this Notice may be issued with an infringement notice ($250) or prosecuted with a penalty up to $5,000. A person in default is also liable, whether prosecuted or not, to pay the costs of performing the work directed by this Notice if it is not carried out by the owner and/or occupier by the date required by this Notice.

Right of appeal: Where the City has issued a person with an Infringement Notice, there is a right of appeal. If a person genuinely believes that there are grounds as to why the Infringement should be withdrawn, then they are encouraged to detail those reasons in writing to the CEO of the City of Busselton seeking a review of the matter within 14 days of the date of issue.

APPENDIX 3

TRANSPORT IMPACT ASSESSMENT

(Uloth & Associates, May 2024)

Vasse Structure Plan
Transport Impact Assessment

INCLUDING UPDATED TRAFFIC MODEL

Uloth & ASSOCIATES

Updated 23 June 2025

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1. INTRODUCTION

The overall Vasse development area is located to the south of Busselton Bypass, and to the south and east of Bussell Highway, as shown in the overall Locality Plan in Figure 1. The remaining Vasse Structure Plan areas are also identified, including small pockets within the Dawson North Precinct, Dawson South, Armstrong, parts of the Industrial Precinct, and Reading (as also shown in Figure A.2 in Technical Appendix A).

In order to progress proposed subdivisions within the remaining development areas, Hatch Roberts Day is preparing a proposed modification to the overall Vasse Structure Plan, including the closure of a central portion of Northerly Street, to remove the diagonal traffic route slicing through between Dawson South and the adjacent Armstrong precinct.

Uloth and Associates has therefore been appointed to prepare a Transport Impact Assessment for the overall Vasse Structure Plan areas, including the preparation of an updated traffic model for the overall Vasse development area. The initial report has now also been updated to reflect the latest design plans for Armstrong, while also responding (where required) to comments provided from the Peer Review carried out for City of Busselton.

1.1 BACKGROUND INFORMATION AND PREVIOUS STUDIES

The Development Guide Plan for the overall structure plan area was initially approved in 2007, including initial assumptions for the proposed land use together with traffic modelling to determine future traffic flows plus road and access requirements within the overall Vasse development. The plan was then updated in 2009 and after the lodgement of a number of subdivision applications for the Vasse Village Centre in 2013 a Transport Assessment Report was prepared (July 2013) to include the current staging for the proposed land use and recommended road layout on Bussell Highway adjacent to the proposed Vasse Village Centre.

After a series of negotiations between Main Roads WA and the developer, agreement was reached regarding the construction of the Vasse Bypass component of Bussell Highway, which is planned (subject to funding) to also connect with the future Vasse-Dunsborough extension of Busselton Bypass. This included a decision to construct Stage 1 of the Bypass on its current alignment, rather than utilise a temporary alignment along Lynwood Street adjacent to the industrial area. Additional work was therefore carried out in June 2014 to determine future traffic flows along the Vasse Bypass, and along Northerly Street to Napoleon Promenade, in order to confirm that the proposed intersection designs could accommodate the full development of the overall Development Guide Plan. The future traffic forecasts were then also extended to include Lynwood Street, as well as Northerly Street up to Kaloorup Road.

As a result of the various changes to the overall road network, Roberts Day prepared a further update to the Development Guide Plan in 2015, together with a new Detailed Area Plan for the proposed Dawson Village. A new Transport Assessment Report was therefore prepared (August 2015) to update the future traffic flows on the surrounding road network, and to confirm the road network modifications and resulting road hierarchy for the proposed Dawson Village. Various supplementary studies were also carried out, for additional developments within Vasse Village Centre, and to further investigate future intersection requirements at Northerly Street - Kaloorup Road.

The Vasse Structure Plan was then prepared (in October 2021) to respond to amendments within the local planning scheme and focus on the remaining undeveloped areas that were previously included in the original Development Guide Plan.

A new traffic model was then also developed (in October 2022) as part of the Transport Impact Assessment report prepared for the proposed Dawson South (Stage 6C and 6D) subdivision, to investigate the traffic impact of the proposed closure of Northerly Street and to identify the resulting road hierarchy and road reserve requirements for the overall Vasse Structure Plan area in the vicinity of Dawson South and Armstrong.

1.2 STUDY OBJECTIVES

The overall objective for this study is to prepare a Transport Impact Assessment for the proposed Vasse Structure Plan, including an update of the future traffic modelling for the overall Vasse development area (to confirm the suitability of the proposed overall road network), taking into account the new design plans for Armstrong.

The specific study objectives are therefore as follows:

- Identify and document the existing situation in the vicinity of the overall Vasse Structure Plan areas.
- Identify the future land use data (and hence traffic generation) for the existing and approved development areas, together with the proposed future development within the remaining areas.
- Update the future traffic model (including the proposed road closures in Northerly Street) to identify future traffic flows, and resulting road and intersection modifications.
- Make recommendations regarding the required road network for the proposed subdivision areas within the Vasse Structure Plan, including recommended road layouts, intersection treatments, pedestrian/cyclist facilities, road hierarchy and resulting road reserves.
- Include an assessment of public transport access and pedestrian/cyclist networks to provide safe and accessible routes to the nearby schools within Dawson South and Birchfield for all non-vehicle traffic modes.

0 400 800
METRES
SCALE 1 : 20,000

N

SOURCE: NEARMAP PTY LTD

Overall Vasse Development

Vasse Structure Plan Areas

Overall Locality Plan
VASSE STRUCTURE PLAN AREAS

FIG. 1

2. STUDY FINDINGS AND CONCLUSIONS

The study findings and conclusions regarding the existing situation, future land use data, resulting future traffic flows and the corresponding future road hierarchy are presented in this chapter. Additional information is provided within the Technical Appendices.

2.1 EXISTING SITUATION

Details regarding the existing situation are summarised in this Section, with reference to background information provided in Technical Appendix A.

- The existing situation for the overall Vasse development area is shown in an aerial photograph in Figure A.1 in Chapter A.1 in Technical Appendix A, identifying both the overall Development Area boundary and the various internal development precincts.

- It can be seen in Figure A.1 that the Armstrong precinct is located west of Buayanup Drain and south of Northerly Street. It can also be seen that the residential areas of Birchfield and Dawson North have been constructed, together with some of Industrial area at the western end (west of Lynwood Street) and some of Vasse Village Centre (at the south west corner of the Bussell Highway-Busselton Bypass roundabout). Subdivision of some of the land in Dawson South (east of Lynwood) has also commenced.

- Figure A.2 in Chapter A.1 then shows a slightly more detailed view of the existing situation, together with the various Development Areas within the proposed Vasse Structure Plan, while Figures A.3 and A.4 provide diagrammatic representations of the corresponding existing road network.

- It is important to note that Northerly Street (which runs diagonally through the overall development area) is the remnant portion of the original Bussell Highway alignment, prior to the construction of the Vasse Bypass section of the Highway (which now defines the northern and western boundaries of the overall area). However, it is also important to note that Northerly Street still operates as a spine road cutting diagonally through the proposed Structure Plan area, providing the shortest route to/from the north-east. It also provides important connections to Yebble Drive (and Cape Naturaliste College) and Kaloorup Road (including Vasse Primary School).

- Public transport services and pedestrian/cyclist facilities in the vicinity of the proposed Structure Plan area are identified in Chapter A.2 in Technical Appendix A. TransBusselton Bus services are identified in Figures A.5 and A.6, noting that there is currently only 1 regular Bus service (Route 816) in the area, running to/from Napoleon Promenade near Mackeral Avenue, but extending to and from Vasse Primary School during the AM and PM peak periods, respectively. An additional 8 School Buses also operate in the area (servicing Cape Naturaliste College and Vasse Primary School), with Figure A.5 showing bus services during the AM drop-off period and Figure A.6 showing services during the PM pick-up period.

- It can be seen in Figures A.5 and A.6 that there are 2 School Bus routes operating via Kaloorup Road and Rendezvous Road (to/from the east), plus 6 routes via Northerly Street to/from Bussell Highway (north) and Busselton Bypass (east). Each School Bus route provides one Bus service arriving into Vasse at the start of each school day plus one Bus out of Vasse at the end of each school day, with arriving Buses generally stopping first at Vasse Primary School (in Kaloorup Road) before continuing on to Cape Naturaliste College (in Yebble Drive), and departing Buses also commencing at Vasse Primary School on their way to Cape Naturaliste College before leaving the area.

- It is also understood that 'School Bus Services' provides "Orange School Bus" services for eligible students that reside outside the designated public transport area and live more than 4.5 kilometres from their school. Noting that the catchment area for Cape Naturaliste College extends a significant distance west and south of Vasse, it is assumed that "Orange School Buses" are likely to travel to/from

both Bussell Highway (south) and Vasse-Yallingup Siding Road (west), with these possible bus routes also indicated in Figures A.5 and A.6.

- Existing pedestrian/cyclist facilities in the vicinity of the proposed structure plan are then shown in Figure A.7 in Chapter A.2, including shared paths, on-road cycle lanes, and roads with adjacent footpaths. It can be seen in Figure A.7 that most local roads provide a footpath on one side of the carriageway, while higher order roads provide footpaths on both sides together with on-road cycle lanes in most situations. It can also be seen that there is a primary shared path running east-west through the overall structure plan area, linking to additional shared paths along the Buayanup Drain, Bussell Highway (north) and Busselton Bypass (east), together with a number of local shared paths, providing key cycling routes identified within the Leeuwin-Naturaliste 2050 Cycling Strategy.

- Figure A.8 then shows the resulting 'Safe Routes to School' that would currently apply within the vicinity of both Vasse Primary School and Cape Naturaliste College, as required under Section 10.10.9 of the WAPC Transport Impact Assessment Guidelines (Volume 2).

- Figure A.9 in Chapter A.3 in Technical Appendix A shows the Main Roads WA Functional Road Hierarchy for the overall Vasse Structure Plan area, while Figure A.10 shows the existing Liveable Neighbourhoods road hierarchy, reflecting both the existing daily traffic flows (identified in Figures A.12 to A.14 in Chapter A.4) as well as the as-constructed road cross-sections and layouts.

- It can be seen in Figure A.9 that Bussell Highway and Busselton Bypass are both classified as Primary Distributor roads, while Northerly Street, Yebble Drive, Kaloorup Road, Rendezvous Drive and Vasse-Yallingup Siding Road are all classified by Main Roads WA as Local Distributors. However, when taking into account the additional details provided under Liveable Neighbourhoods, it is clear that Lynwood Street, Napoleon Promenade, Mackerel Avenue, Harlequin Boulevard, and Northerly Street between Kaloorup Road and Napoleon Promenade would all be classified as Neighbourhood Connector A roads, as shown in Figure A.10.

- It can also be seen in Figure A.10 that the remaining parts of Northerly Street would be classified as an Integrator B (north of Napoleon Promenade) and Neighbourhood Connector B (west of Kaloorup Road to Bussell Highway), while Yebble Drive would currently be classified as Access Street C.

- Figure A.11 then shows the current posted speed limits within the overall Vasse development area, identifying that while Northerly Street west of Yebble Drive has a posted speed limit of 70 kilometres per hour, all other roads within the overall area have the default urban speed limit of 50 kilometres per hour (together with 40 kilometres per hour school speed zones adjacent to the two schools).

- It can also be seen in Figure A.11 that the Bussell Highway speed limit reduces from 110 kilometres per hour south of Vasse to 90 kilometres per hour between Northerly Street and Coomidup Boulevard. It then reduces further to 60 kilometres per hour adjacent to Vasse Village Centre and for several hundred metres north of Northerly Street and Busselton Bypass, before increasing again to 80 kilometres per hour. Busselton Bypass is also 60 kilometres per hour for approximately 400 metres east of Northerly Street and Bussell Highway, before increasing to 80 kilometres per hour (for approximately 600 metres) and then to 110 kilometres per hour.

- Existing traffic flows within and adjacent to the overall Vasse Structure Plan are shown in Figures A.12 to A.16 in Chapter A.4 in Technical Appendix A, based on data available from the Main Roads WA TrafficMap website plus additional traffic surveys carried out by Uloth and Associates.

- Figure A.12 shows existing Average Weekday daily traffic flows for the overall Vasse development area, while Figures A.13 and A.14 show more-detailed daily flows for the critical Friday (in the vicinity of the Vasse Structure Plan area, and at Vasse Village respectively), with Figures A.15 and A.16 then showing the corresponding Friday PM peak hour traffic flows.

- It can be seen in Figure A.12 that traffic flows on Bussell Highway vary from approximately 6,000 to 8,000 vehicles per average weekday from south of Northerly Street to west of Busselton Bypass, before increasing to between 9,000 and 11,000 vehicles per day north of Busselton Bypass, while Busselton Bypass carries approximately 13,000 vehicles per average weekday east of Northerly Street and approximately 17,000 vehicles per day east of Lakeview Boulevard.

- Northerly Street increases from 2,300 vehicles per day at its western end (east of Bussell Highway) to 3,500 vehicles per day east of Yebble Drive and 4,700 vehicles per day east of Kaloorup Road. It then increases further to 6,300 vehicles per day north of Napoleon Promenade - Orlando Boulevard and to 7,800 vehicles per day south of Busselton Bypass.

- It can also be seen in Figure A.12 that Napoleon Promenade increases from 1,000 vehicles per average weekday east of Lynwood Street to 2,500 vehicles per day crossing Buayanup Drain, and to 5,300 vehicles per day west of Northerly Street.

- The next most-trafficked local roads are then Kaloorup Road (2,400 vehicles per day), Orlando Boulevard (2,100 vehicles per day) and Coomidup Boulevard (1,800 vehicles per day).

- The slightly more-detailed traffic diagrams in Figures A.13 and A.14 then show that Friday daily traffic flows are all slightly higher than the average weekday flows in Figure A.12, with triangles (or diamonds) at intersections to indicate the direction of travel at key locations.

- Figures A.15 and A.16 show Friday PM peak hour traffic flows at the same locations, noting that the overall Friday peak hour occurs from 3pm to 4pm.

- Historical crash data was also obtained from Main Roads WA, indicating that there were 6 reported crashes along Northerly Street, in the vicinity of Dawson and Armstrong and 2 reported crashes along Lynwood Street in the vicinity of the Industrial Area over the past 5 years to December 2023.

- The crashes along Northerly Street included 3 crashes at the Napoleon Promenade - Orlando Boulevard roundabout, 2 crashes at the Kaloorup Road junction (with 1 of these 2 a rear-end collision classified as 'Medical' in severity), and 1 crash west of Lynwood Street (which involved a vehicle hitting an object to avoid an animal). Along Lynwood Street, 2 crashes involved right-angle collisions, with one occurring at Albrey Street and one at Napoleon Promenade.

2.2 EXISTING AND PROPOSED DEVELOPMENT

The existing and proposed developments within the overall Vasse development area are detailed in Chapters B.1 to B.3 in Technical Appendix B, as input to the future traffic modelling for the overall development.

- Figure B.1 in Chapter B.1 shows the 6 key land use precincts within the overall development area, including the Industrial Area (west of Lynwood Street), the residential precincts of Dawson North, Dawson South and Armstrong (between Lynwood Street and the Buayanup Drain) plus Birchfield and Reading (south of Northerly Street and Busselton Bypass, east of the Buayanup Drain), and the Vasse Village Centre (adjacent to the Bussell Highway - Busselton Bypass - Northerly Street roundabout).

- It can be seen in Figure B.1 that the Birchfield residential precinct at the easternmost end is essentially fully developed, as is Dawson North (north of the Wadandi Track). It can also be seen that the Industrial Area and Dawson South are partially developed, while the Armstrong and Reading precincts are still vacant.

- Figure B.2 shows the existing aerial photograph overlaid with existing and approved subdivisions within both the Industrial Area and Dawson South.

- The current Vasse Structure Plan is shown in Figure B.3 in Technical Appendix B, including the current road layout for the proposed Armstrong subdivision, which has an estimated residential yield of 513 dwellings.

- Figure B.4 in Chapter B.3 then shows the breakdown of the overall Vasse development area into traffic zones, for the purpose of identifying the proposed future land use and resulting trip generation for input to the overall future traffic model. The land use data and trip generation is then summarised by precinct in Table B.1, including AM peak hour, PM peak hour and Daily trip generation, based on trip generation rates from the NSW RMS *'Guide to Trip Generating* Developments' publication and the Institute of Transportation Engineers (ITE) *'Trip Generation Manual'*. It can be seen in Table B.1 that a total of 60,330 vehicle trips per day are estimated for the overall structure plan, including 6,906 vehicle trips during the critical PM peak hour.

2.3 FUTURE AIMSUN TRAFFIC MODEL

In order to identify future traffic flows (and hence the recommended future road hierarchy) for the proposed Vasse Structure Plan area, the AIMSUN traffic model that was developed for the previous Dawson South Study has been updated (with Northerly Street closed between Yebble Drive and Harlequin Boulevard).

2.3.1 Traffic Model Development

- The development of the traffic model is documented in detail in Technical Appendix C, including key assumptions and parameters, as well as output traffic flows and intersection operational characteristics.

- The resulting AIMSUN traffic model represents the critical Friday PM peak hour, together with a built-in 30 minute warm-up period.

- The study area for the future traffic model includes the whole of the Vasse development area, as shown in Figure B.1 in Technical Appendix B, together with the adjacent external roads (including Bussell Highway, Busselton Bypass and Vasse-Yallingup Siding Road). The traffic model also includes the proposed future development areas, as indicated in Figures B.2 and B.3 in Technical Appendix B, based on existing and future traffic zones as shown in Figure B.4, and with future roads and intersections as indicated in Figure C.1 in Technical Appendix C.

- In order to set-up the initial traffic model, it was first necessary to compile a collection of existing and future data, as briefly noted in the following with reference to additional information provided within the Technical Appendices:
  - Existing School Bus routes and timetables for the 2 existing schools were identified, as detailed in Figures A.5 and A.6 in Chapter A.2 in Technical Appendix A.
  - Existing road hierarchy and speed limits throughout the study area were obtained from the Main Roads WA GIS Mapping Information Systems, as shown previously in Figures A.9 and A.10 in Chapter A.3 in Technical Appendix A.
  - Existing Friday PM peak period and daily traffic counts were carried out by Uloth and Associates, as documented in Chapter A.4 in Technical Appendix A, identifying the Friday PM peak hour as 3pm to 4pm.
  - 'Development' traffic flows and 'Background' traffic flows were then identified, as described below in Sections 2.3.2 and 2.3.3, and these were converted to trip matrices for inclusion within the models. The 15-minute traffic flow profile during the PM peak hour was also determined for each separate trip type.
  - Heavy Vehicle percentages were also identified, as described in Chapter C.2 in Technical Appendix C.

- The overall traffic model was then constructed, as described in Chapters C.1 to C.5 in Technical Appendix C. This includes the overall road network and zoning structure (in Chapter C.1), various trip matrices and vehicle types (in Chapter C.2), and model parameters and settings (in Chapter C.3), together with development traffic flows and trip distribution (in Chapter C.4) and background traffic flows (in Chapter C.5).

- Required road network upgrades were also identified, as described below in Section 2.3.4.

2.3.2 Development Traffic Flows

- The future trip generation for the overall development study area is summarised in Table B.1 in Chapter B.3 in Technical Appendix B, identifying a total of 60,330 vehicle trips per day, with 6,906 trips during the Friday PM peak hour. For modelling purposes, these future traffic flows were then broken down into 4 trip types, comprising 'Industrial' trips, 'School' trips, 'Village Centre' trips, and 'Residential' trips. However, it is also necessary to identify the number of trips expected to remain within the overall study area, including (for example) residential trips travelling to/from the local schools, or trips to/from the Village Centre and/or the Industrial Area.

- Table C.3 (in Chapter C.4 in Technical Appendix C) therefore shows the calculation of internal and external traffic flows for the overall structure plan area, based on the various assumptions also identified within the Table.

- It can be seen in Table C.3 that the overall Structure Pan area is estimated to generate a total of 41,270 vehicle trips per day of external traffic flows (with 4,558 trips during the PM peak hour), in addition to 19,060 vehicle trips per day (2,348 trips per PM peak hour) of internal traffic flows remaining within the study area.

- External traffic flows were then assigned to the overall road network in accordance with the percentages identified in Chapter C.4, with 15-minute traffic profiles as shown in Table C.4, and Heavy Vehicle proportions as detailed in Chapter C.2.

2.3.3 Background Traffic Flows

- The calculation of existing 'background' traffic flows is described in Chapter C.5 in Technical Appendix C.

- 'Background' traffic flows were identified by initially calculating the distribution of 'Local' traffic flows to/from the west and south at the key intersections along both Bussell Highway and Northerly Street (from the existing Friday traffic flows in Figures A.13 and A.14 in Technical Appendix A), and by then subtracting these local flows from the existing total traffic flows at Bussell Highway (south) and Vasse - Yallingup Siding Road. The remaining 'Background' traffic was then pro-rated to travel to/from Bussell Highway (north) and Busselton Bypass (east) based on the existing traffic patterns at the Bussell Highway - Busselton Bypass - Northerly Street intersection, and then combined with the existing surveyed traffic flows travelling north-to-east and east-to-north at the same location.

- The existing background traffic flows were then increased by 20 percent (reflecting a growth rate of just less than 1 percent per annum for 20 years, or just less than 2 percent per annum for 10 years), noting that any increased growth rate would only affect the timing of improvements along the regional roads, without any impact on the proposed structure plan itself.

2.3.4 Road Network Upgrades

- The modelled road network for the future AIMSUN traffic model is shown in Figure C.2 in Chapter C.1 in Technical Appendix C. However, it is important to note that in order to accommodate the increased future traffic flows, it has been assumed that the regional road network will continue to be upgraded, including the widening of Bussell Highway to 4 lanes divided (both north of Busselton Bypass and west of Coomidup Boulevard).

- It is also important to note that the future traffic model provides both left-turn and right-turn auxiliary lanes within Northerly Street at Kaloorup Road, but with the design of the right-turn lane based on Austroads EDD (Extended Design Domain) requirements due to the short separation between the intersection and the existing bridge at Buayanup Drain.

- It is acknowledged that the intersection was previously identified as a 4-way roundabout, with Kaloorup Road realigned to connect at Newtown Close. However, since City of Busselton constructed a public car park within the area that would have been used for the proposed realignment, it is assumed that Kaloorup Road will now remain on its current alignment. Nevertheless, the potential for an alternative intersection treatment or upgrade remains, subject to further investigation, as there is nothing within the proposed Structure Plan to prevent City of Busselton from removing the existing car park and realigning Kaloorup Road in the future, if required.

- It is also important to note that the construction of the new Vasse West Primary School, in Harlequin Boulevard, together with the downgrading of Northerly Street east of Harlequin Boulevard, will change the distribution of traffic to/from the existing Vasse Primary School in Kaloorup Road, which will remove some of the existing congestion that currently occurs within Kaloorup Road.

- Alternative possible alignments were also considered for the Northerly Street - Yebble Drive intersection (with the closure of Northerly Street between Yebble Drive and Harlequin Boulevard), however, the proposed alignment (with Northerly Street extending into Yebble Drive as the continuing route) was selected as it provides a more-balanced overall solution that also works well during the staging of the overall development.

- Further upgrades were also identified (through a trial and error process) to achieve acceptable overall operation, including the provision of a left-turn auxiliary lane in Busselton Bypass east of Northerly Street, and the widening of Northerly Street to 2 lanes southbound from Busselton Bypass to Napoleon Promenade (with the inclusion of a separate right-turn lane from Northerly Street into Napoleon Promenade by upgrading the existing roundabout).

- The recommended roads and intersections for the proposed Vasse Structure Plan are therefore as shown in Figure 3 in Chapter 3 Recommendations.

2.4 TRAFFIC MODEL OUTPUTS AND RESULTING FUTURE ROAD HIERARCHY

The traffic model outputs, including future Friday traffic flows and resulting intersection operations, are documented in Chapters C.6 to C.8 in Technical Appendix C.

- The modelled road network for the proposed Vasse Structure Plan is shown in Figure C.2 in Chapter C.1, and the resulting future Friday PM peak hour traffic flows are shown in Figures C.3 and C.4 in Chapter C.7 (including intersection turning movements at key locations). Corresponding Friday daily traffic flows are then shown in Figures C.5 and C.6, calculated using factors applied to each individual trip type (based on trip generation data in Table B.1).

- It can be seen in Figure C.5 that traffic flows on Bussell Highway are expected to increase to 16,700 vehicles per day south of Northerly Street (at the western end), and to between 17,300 and 21,600 vehicles per day between Vasse-Yallingup Siding Road and Coomidup Boulevard, with 19,300 vehicles per day north of Busselton Bypass, while Busselton Bypass will increase to 27,200 vehicles per day east of Northerly Street.

- It can also be seen that with the closure of Northerly Street between Yebble Drive and Harlequin Boulevard, traffic flows on Northerly Street west of Napoleon Promenade will reach approximately 10,300 vehicles per day, while Yebble Drive (west of Northerly Street) and Road A (to the south of Yebble Drive into Armstrong) will carry 4,900 vehicles per day and 3,900 vehicles per day, respectively.

- Figure 2 therefore shows the initial road hierarchy that would apply based solely on the anticipated future traffic flows in the vicinity of the proposed Vasse Structure Plan, as follows:
  - The eastern end of Northerly Street would logically be classified as an Integrator A road immediately west of Busselton Bypass, reducing to an Integrator B road between Napoleon Promenade and Yebble Drive.
  - The western end of Northerly Street would be a neighbourhood Connector A road from Bussell Highway to Lynwood Street, and then Neighbourhood Connector B from Lynwood Street to Harlequin Boulevard.
  - Yebble Drive would be classified as Neighbourhood Connector A between Northerly Street and the roundabout at Cape Naturaliste College, before reducing slightly to Neighbourhood Connector B along the frontage of the new Primary School, while Road A (south of Yebble Drive into Armstrong) would also be classified as a Neighbourhood Connector A.
  - Napoleon Promenade would be classified as Integrator B, from Northerly Street to Coomidup Boulevard, before reducing to Neighbourhood Connector A from Coomidup Boulevard to Mackeral Avenue and then to Neighbourhood Connector B through to Lynwood Street. Lynwood Street north of Napoleon Promenade would also be a Neighbourhood Connector A, while the remaining section of Lynwood Street, together with Mackerel Avenue and Harlequin Boulevard would be classified as Neighbourhood Connector B roads.

- The network-wide traffic model outputs are shown in Table C.5 in Chapter C.6, while the intersection operational characteristics for the critical intersections along Bussell Highway and Northerly Street are then shown in Tables C.6 to C.13 in Chapter C.8, confirming that acceptable operating conditions are achieved throughout the overall traffic model area.

- It is important to note, however, that the final recommended road hierarchy (and road reserves) must also take into account the significance of each road within the overall network and the existing (as-constructed) road cross-sections, as well as future public transport routes and pedestrian/cyclist facilities.

0 100 200
METRES
SCALE 1 : 7,500

N

SOURCE: ULOTH & ASSOCIATES

BUSSELL HIGHWAY

MACKEREL AVENUE

Dawson North

NAPOLEON

PROMENADE

Vasse Village Centre

BUSSELL HIGHWAY

BUSSELTON BYPASS

HIGHWAY

STREET

LYNWOOD

Industrial Area

DRIVE

HARLEQUIN BOULEVARD

KENWYN

Cape Naturaliste College

STREET

ORLANDO BOULEVARD

Birchfield

LAKEVIEW BOULEVARD

Dawson South

YEBBLE

DRIVE

Vasse West Primary School

ROAD A

Armstrong

Vasse Primary School

ROAD

HERITAGE

DRIVE

VASSE-YALLINGUP SIDING ROAD

BUSSELL HIGHWAY

NORTHERLY

KALOORUP ROAD

Reading
(Subject to Future Planning)

RENDEZVOUS ROAD

LEGEND

- Primary Distributor
- Integrator A
- Integrator B
- Neighborhood Connector A
- Neighborhood Connector B
- Access Street

Initial Future Road Hierarchy

BASED ON FORECAST TRAFFIC FLOWS

FIG. 2

2.5 PUBLIC TRANSPORT AND PEDESTRIAN/CYCLIST FACILITIES

With the recommended roads and intersections as shown in Figure 3 in Chapter 3 Recommendations, it is now also necessary to identify the modifications and additions to the overall Bus services and pedestrian/cyclist facilities within and adjacent to the proposed Vasse Structure Plan area.

- Existing school bus services will be able to continue on their current routes, except that they will be extended to now also include the new Vasse West Primary School, travelling anti-clockwise around the new school before accessing Cape Naturaliste College, as now shown in Figure 4 in Chapter 3.

- "Orange Bus" services will also be able to continue accessing the school via Northerly Street west, by now travelling via Harlequin Boulevard (and then Yebble Drive), as also indicated in Figure 4.

- It is also important to identify possible future public bus routes to service the general population within the overall Vasse Structure Plan area, as shown in Figure 5 in Chapter 3, including the extension of existing Bus Route 816 into the Industrial area, and a possible second route utilising Napoleon Promenade and Harlequin Boulevard to service the Dawson South and Armstrong residential areas.

- Figure 6 in Chapter 3 then shows the recommended pedestrian/cyclist facilities for inclusion within the proposed Vasse Structure Plan, identifying Yebble Drive, Harlequin Boulevard and Road A to all provide both on-road cycle lanes and footpaths on both sides. The Access Streets adjacent to the new Primary School should also provide footpaths on both sides, as indicated in Figure 6, as should the extension of Harlequin Boulevard into Armstrong. All other Access Streets should provide paths on one side only, in accordance with Liveable Neighbourhoods requirements, as also shown.

- It is also recommended to provide a new shared path parallel to the portion of Northerly Street to be removed, linking to the existing 'local cycle route' along the southern side of Northerly Street (east of Yebble Drive) and then crossing Buayanup Drain towards Kaloorup Road.

2.6 ACCESS TO/FROM VASSE WEST PRIMARY SCHOOL

It is important to note that the catchment area for the new Primary School (Vasse West), located on the southern side of Yebble Drive (adjacent to Harlequin Boulevard) is assumed to include both the Dawson and Armstrong residential areas.

- The school site is bounded by local roads on all 4 sides, with Yebble Drive and Harlequin Boulevard to both be classified as Neighbourhood Connector Roads, and the other two roads to be classified as Access Streets.

- It is expected that on-street parking embayments will be provided on each of the west, south and east road frontages to provide for easy pick-up and drop-off, with vehicles able to access the school from any direction and circulate anti-clockwise around the entire site.

- School buses will also circulate anti-clockwise around the site, with bus stops expected to be located along the new road frontage on the southern side of the School.

- Taking into account the proposed road network and recommended pedestrian/cyclist facilities discussed above in Section 2.5. Figure 7 in Chapter 3 identifies the resulting 'Safe Routes to school' for the proposed new Primary School, together with the existing Vasse Primary School and Cape Naturaliste College, confirming that good (safe) access will be provided for students walking or cycling to/from the schools from all surrounding areas.

3. RECOMMENDATIONS

The overall recommendations regarding the proposed Vasse Structure Plan are based on the study findings and conclusions documented above in Chapter 2, as follows:

Proposed Road Network and Future Bus Services

- An indicative plan showing the recommended roads and intersections for the proposed Vasse Structure Plan is shown in Figure 3, including the proposed closure of Northerly Street between Harlequin Boulevard and Yebble Drive, with a new roundabout at the resulting 4-way intersection of Northerly Street, Yebble Drive and the new Road A. The plan also shows the existing and proposed roads within the northern part of the Industrial Area and the small pockets of Dawson North, as well as the Dawson South, Armstrong and Reading precincts. It is also noted that there is potential for alternative intersection treatments or upgrades at the Northerly Street - Kaloorup Road junction, subject to further investigation, including the possible realignment of Kaloorup Road.

- Figure 4 shows the recommended future school bus routes following the proposed development, with existing bus routes accessing Yebble Drive from the east but then extending to circulate anticlockwise around the new Vasse West Primary School before accessing Cape Naturaliste College.

- Figure 5 then shows the possible future public bus routes in the vicinity, including the extension of Bus Route 816 into the Industrial area, while a second bus route could use Napoleon Promenade and Harlequin Boulevard to service the Dawson North, Dawson South and Armstrong Precincts.

Pedestrian/Cyclist Facilities and Safe Routes to School

- Figure 6 shows the recommended pedestrian/cyclist facilities for inclusion within the Structure Plan, including the Neighbourhood Connector roads with on-road cycle lanes plus paths on both sides, as well as significant Access Streets with no on-road cycle lanes but paths on both sides, and lower-order Access Streets with paths on one side only.

- The recommended 'Safe Routes to School' are then shown in Figure 7, confirming that direct, convenient and safe access routes will be available for pedestrians and cyclists accessing the new Vasse West Primary School and the existing school sites to/from all of the surrounding areas.

Road Hierarchy and Road Reserves

- Figure 8 shows the recommended overall road hierarchy in the vicinity of the proposed Vasse Structure Plan, taking into account both the already-constructed road cross-sections (for Napoleon Promenade, Lynwood Street, Mackerel Avenue and Harlequin Boulevard), together with the additional requirements based on anticipated future traffic flows, pedestrian/cyclist facilities and possible future bus routes. Figures 9 and 10 then show the more-detailed road hierarchy and recommended road reserves for the northern and southern parts of the Structure Plan, including a further breakdown of both residential and industrial access streets.

- It can be seen in Figures 8 and 10 that Yebble Drive west of Northerly Street is recommended to be upgraded to a Neighbourhood Connector A, with a 24 metre road reserve (to provide a 2-way divided roadway with on-road cycle lanes and footpaths on both sides, as defined under Liveable Neighbourhoods), suitable for traffic flows in excess of 3,000 vehicles per day. However, west of the existing roundabout that provides access to Cape Naturaliste College, it can reduce down to a Neighbourhood Connector B (within its existing 20 metre road reserve), with no need for a central median.

- Road A, south of Yebble Drive, is also recommended to be constructed as a Neighbourhood Connector A within a 24 metre road reserve (as also indicated in Figure 10), in order to accommodate traffic flows in excess of 3,000 vehicles per day, while the extension of Harlequin Boulevard south of Northerly Street should be classified as Neighbourhood Connector B (within an 18 metre road reserve).

- It can also be seen (in Figure 9) that the 2 proposed industrial access streets off Lynwood Street (at the northern end) are classified as Industrial Access A, with 25 metre road reserves, while the internal roads are shown as Industrial Access B (with 20 metre road reserves).

- Taking into account the recommended road hierarchy in Figures 8 to 10, Figure 11 shows the overall resulting future road network for the proposed Vasse Structure Plan, identifying the roads to be constructed as dual-carriageway roadways with a central median, together with proposed roundabouts at 4-way intersections.

SOURCE: ULOTH & ASSOCIATES

0 100 200
METRES
SCALE 1 : 7,500

N

BUSSELL HIGHWAY

MACKEREL AVENUE

Dawson North

NAPOLEON STREET

PROMENADE

Vasse Village Centre

BUSSELL HIGHWAY

BUSSELTON BYPASS

Industrial Area

HIGHWAY

LYNWOOD STREET

HARLEQUIN BOULEVARD

Cape Naturaliste College

STREET

ORLANDO BOULEVARD

Birchfield

LAKEVIEW BOULEVARD

YEBBLE DRIVE

*

Dawson South

Vasse West Primary School

ROAD A

Vasse Primary School

ROAD

HERITAGE DRIVE

VASSE-YALLINGUP SIDING ROAD

BUSSELL HIGHWAY

Armstrong

KALOORUP ROAD

Reading
(Subject to Future Planning)

NORTHERLY

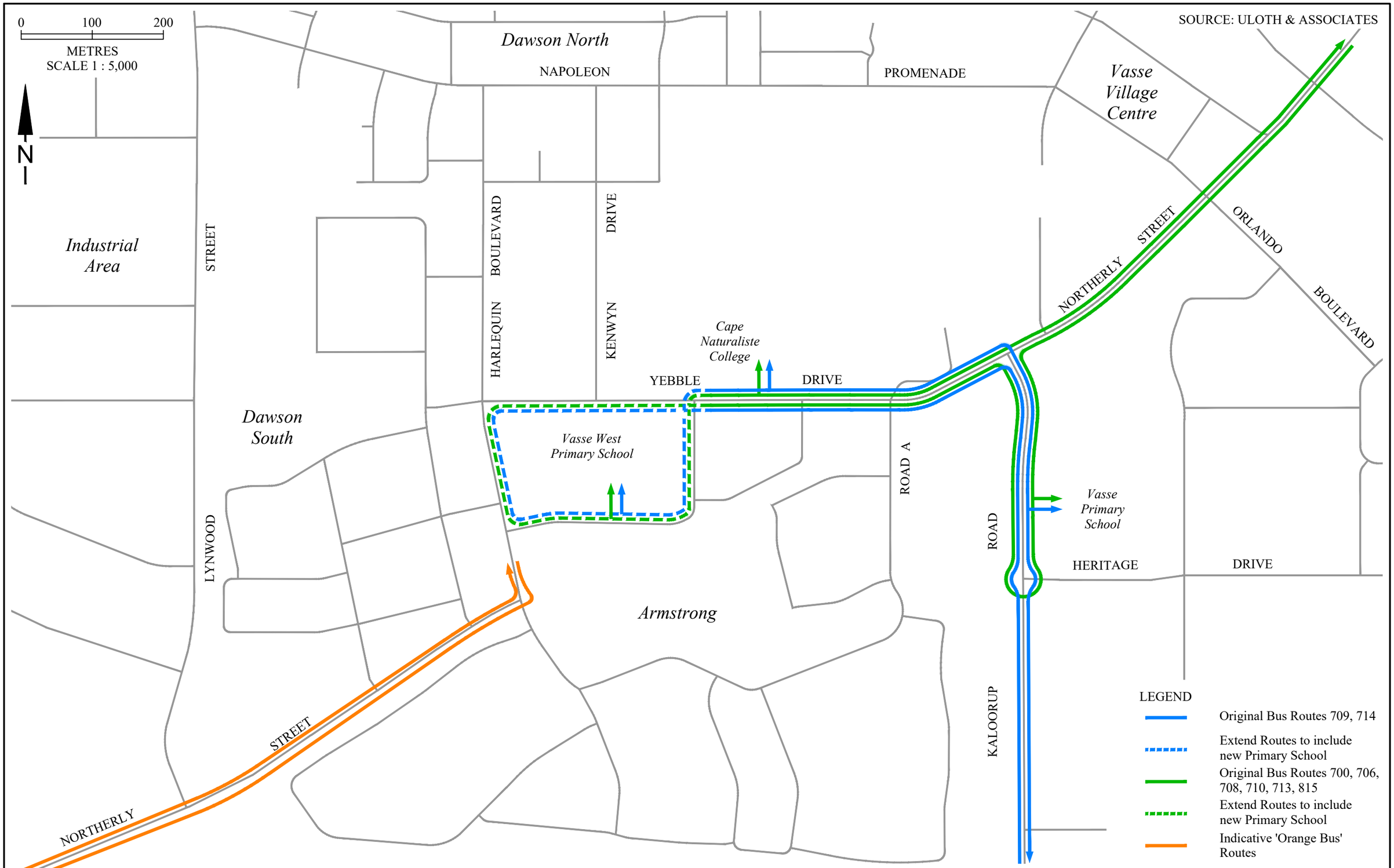
RENDEZVOUS ROAD

* *Possible intersection treatment or upgrade at Northerly Street - Kaloorup Road, subject to future investigations including the location and alignment of Kaloorup Road.*

Recommended Roads and Intersections

FOR PROPOSED VASSE STRUCTURE PLAN

FIG. 3



Recommended School Bus Routes

FOR PROPOSED VASSE STRUCTURE PLAN

FIG. 4

0 100 200
METRES
SCALE 1 : 7,500

N

SOURCE: ULOTH & ASSOCIATES

BUSSELL HIGHWAY

Dawson North

MACKEREL AVENUE

NAPOLEON

PROMENADE

Vasse Village Centre

BUSSELL HIGHWAY

BUSSELTON BYPASS

LYNWOOD STREET

HARLEQUIN BOULEVARD

Industrial Area

HIGHWAY

Cape Naturaliste College

STREET ORLANDO BOULEVARD

Birchfield

LAKEVIEW BOULEVARD

YEBBLE DRIVE

Dawson South

Vasse West Primary School

ROAD A

Vasse Primary School

ROAD

HERITAGE DRIVE

VASSE-YALLINGUP SIDING ROAD

Armstrong

Reading
(Subject to Future Planning)

BUSSELL

NORTHERLY

KALOORUP ROAD

RENDEZVOUS ROAD

LEGEND

Bus Route 816 extended to service Birchfields, Dawson North and Industrial Area.

Possible new Bus Route servicing Dawson North, Dawson South and Armstrong.

T Terminus

Possible Future Bus Routes

IN THE VICINITY OF PROPOSED VASSE STRUCTURE PLAN

FIG. 5

0 100 200
METRES
SCALE 1 : 7,500

N

SOURCE: ULOTH & ASSOCIATES

BUSSELL HIGHWAY
MACKEREL AVENUE
NAPOLEON STREET
PROMENADE
BUSSELTON BYPASS
LAKEVIEW BOULEVARD
YEBBLE DRIVE
LYNWOOD
ROAD A
ROAD
HIGHWAY
STREET
Track
Wadandi
VASSE-YALLINGUP SIDING ROAD
BUSSELL
NORTHERLY
KALOORUP

Dawson North
Vasse Village Centre
Industrial Area
Cape Naturaliste College
Birchfield
Vasse West Primary School
Dawson South
Armstrong
Vasse Primary School
Reading
(Subject to Future Planning)

LEGEND

Separate Shared Paths:
- Primary Cycle Routes
- Local Cycle Routes

Roads with On-Road Cycle Lanes:
- Plus paths on both sides
- Plus path on one side
- With no paths

Roads with No On-Road Cycle Lanes:
- With paths on both sides
- With path on one side

Recommended Pedestrian/Cyclist Facilities
IN THE VICINITY OF PROPOSED VASSE STRUCTURE PLAN

FIG. 6

SOURCE: ULOTH & ASSOCIATES

0 100 200
METRES
SCALE 1 : 7,500

N

BUSSELL HIGHWAY

Dawson North

MACKEREL AVENUE

NAPOLEON STREET

PROMENADE

Vasse Village Centre

BUSSELL HIGHWAY

BUSSELTON BYPASS

Wadandi

Industrial Area

HIGHWAY

Track

STREET

Existing Cape Naturaliste College

Birchfield

LAKEVIEW BOULEVARD

Dawson South

YEBBLE DRIVE

Vasse West Primary School

Existing Vasse Primary School

LYNWOOD ROAD

VASSE-YALLINGUP SIDING ROAD

Armstrong

Reading
(Subject to Future Planning)

KALOORUP ROAD

RENDEZVOUS ROAD

BUSSELL HIGHWAY

NORTHERLY

LEGEND

Safe Routes to/from Schools

Note: Refer to Figure 6 for Recommended Pedestrian/Cyclist Facilities

Recommended Safe Routes to School

FOR PROPOSED VASSE STRUCTURE PLAN

FIG. 7

0 100 200
METRES
SCALE 1 : 7,500

N

SOURCE: ULOTH & ASSOCIATES

BUSSELL HIGHWAY
BUSSELL HIGHWAY
BUSSELTON BYPASS
HIGHWAY
STREET
LYNWOOD STREET
MACKEREL AVENUE
HARLEQUIN BOULEVARD
NAPOLEON
PROMENADE
STREET
ORLANDO BOULEVARD
LAKEVIEW BOULEVARD
YEBBLE DRIVE
ROAD A
ROAD
HERITAGE DRIVE
KALOORUP ROAD
RENDEZVOUS ROAD
VASSE-YALLINGUP SIDING ROAD
BUSSELL HIGHWAY
NORTHERLY

Dawson North
Industrial Area
Dawson South
Cape Naturaliste College
Vasse West Primary School
Armstrong
Vasse Village Centre
Birchfield
Vasse Primary School
Reading
(Subject to Future Planning)

LEGEND
- Primary Distributor
- Integrator B
- Neighborhood Connector A
- Neighborhood Connector B
- Significant Access Street (See Figures 9 & 10 for more detail)

Recommended Overall Road Hierarchy
IN THE VICINITY OF PROPOSED VASSE STRUCTURE PLAN

FIG. 8

SOURCE: ULOTH & ASSOCIATES

0 100 200
METRES
SCALE 1 : 5,000

N

BUSSELL

HIGHWAY

AVENUE

MACKEREL

Dawson North

NAPOLEON

PROMENADE

STREET

Industrial Area

BOULEVARD

HARLEQUIN

Cape Naturaliste College

YEBBLE

DRIVE

LYNWOOD

Dawson South

Vasse West Primary School

Armstrong

HIGHWAY

VASSE-YALLINGUP SIDING ROAD

BUSSELL

LEGEND

- Primary Distributor
- Integrator B
- Neighbourhood Connector A (24m)
- Neighbourhood Connector B (20m)

Residential Access Streets:

- Access Street A (18m)
- Access Street B (18m)
- Access Street C (15 - 16m)
- Access Street D (14m)
- Laneway (6 - 9m)

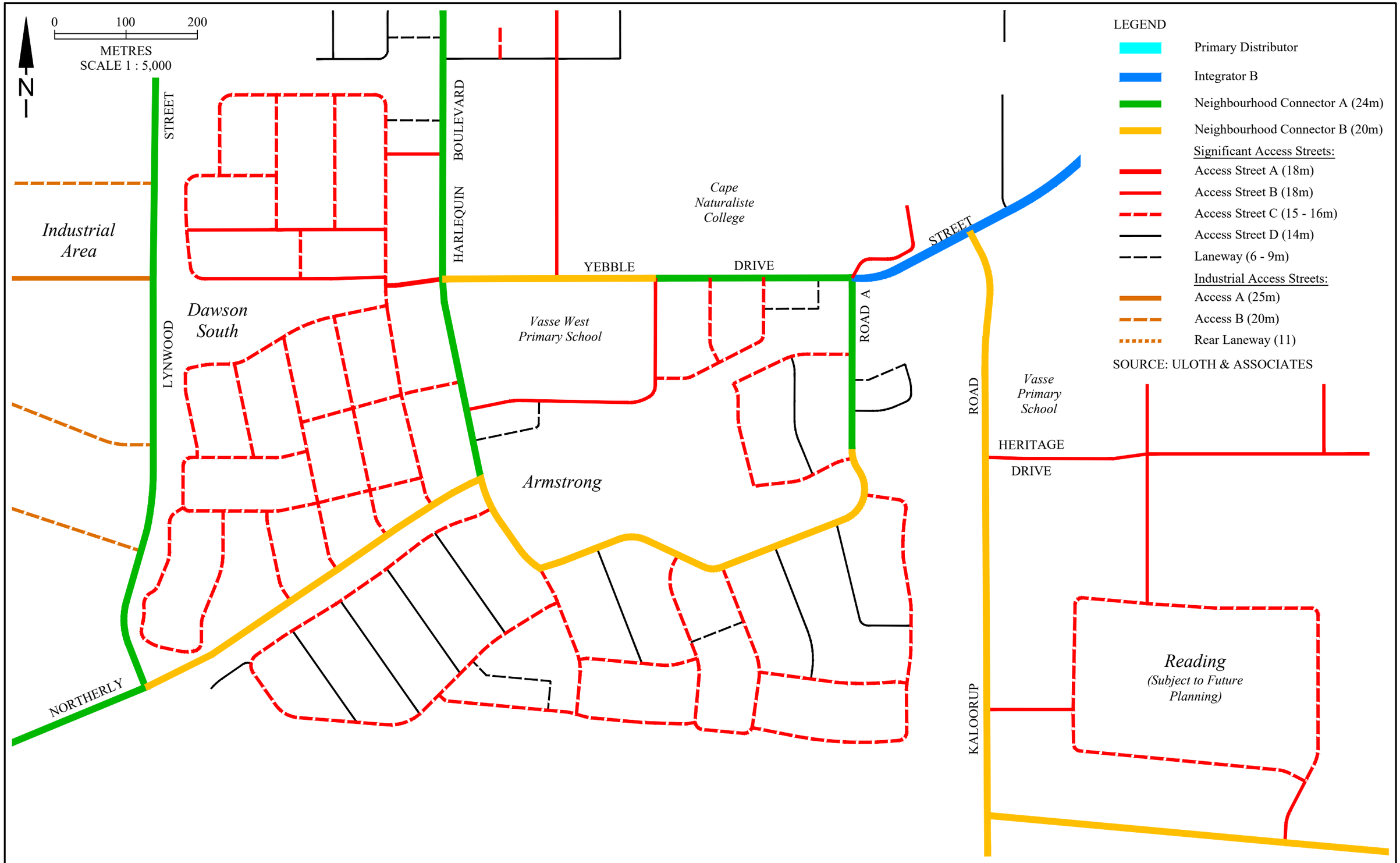
Industrial Access Streets:

- Access A (25m)
- Access B (20m)
- Rear Laneway (11m)

Recommended Road Hierarchy and Road Reserves

FOR NORTHERN PARTS OF PROPOSED VASSE STRUCTURE PLAN

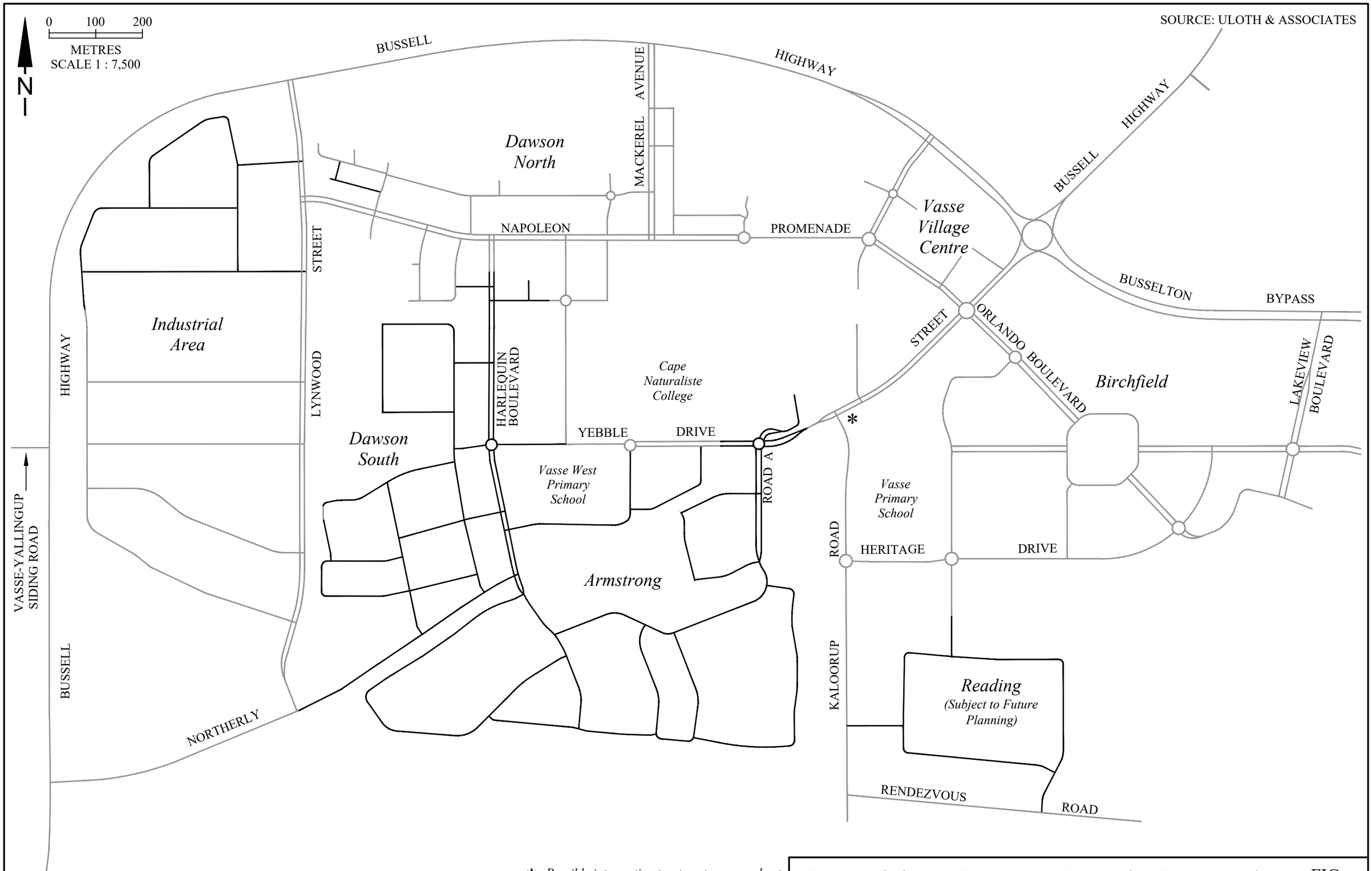
FIG. 9



Recommended Road Hierarchy and Road Reserves

FOR SOUTHERN PARTS OF PROPOSED VASSE STRUCTURE PLAN

FIG. 10



Note: Only the more significant roads are shown, to indicate key components of the overall road network.

* *Possible intersection treatment or upgrade at Northerly Street - Kaloorup Road, subject to future investigations including the location and alignment of Kaloorup Road.*

Resulting Future Road Network

FOR PROPOSED VASSE STRUCTURE PLAN

FIG. 11

TECHNICAL APPENDIX A – EXISTING SITUATION

Technical Appendix A documents the existing roads and traffic flows in the vicinity of the proposed Structure Plan.

A.1 EXISTING ROADS AND INTERSECTIONS

Figure A.1 provides an aerial photograph showing the overall Vasse development area, while Figure A.2 provides a slightly more-detailed view of the areas within the proposed Vasse Structure Plan.

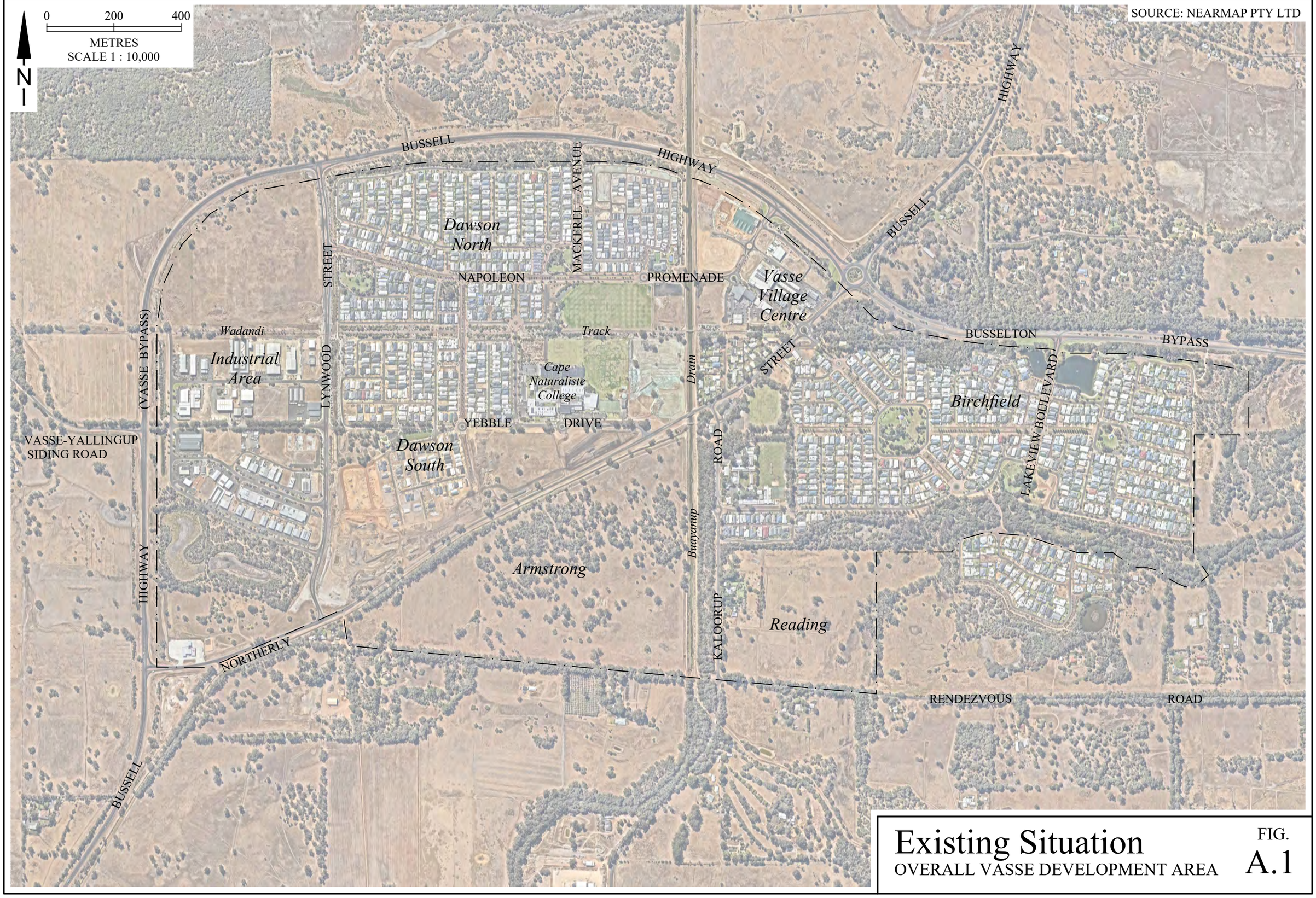
Figures A.3 shows a diagrammatic representation of the existing roads and intersections in the vicinity of the proposed Vasse Structure Plan, while Figure A.4 shows an alternative view identifying the more-detailed road network, including an indication of those roads constructed as dual-carriageway (divided) roads.

A.2 EXISTING PUBLIC TRANSPORT AND PEDESTRIAN/CYCLIST FACILITIES

Figures A.5 and A.6 show the existing Bus Services within the overall Vasse Structure Plan area, including regular Bus Route 816 (which extends to/from Vasse Primary School for the AM and PM drop-off and pick-up periods, respectively), plus a number of specific School Bus routes servicing Vasse Primary School (in Kaloorup Road) and Cape Naturaliste College (in Yebble Drive). Figure A.5 showing the Bus routes during the AM drop-off period, while Figure A.6 shows the PM pick-up period.

Figure A.7 shows the existing pedestrian/cyclist facilities in the vicinity of the proposed Vasse Structure Plan, including shared paths, on-road cycle lanes and roads with adjacent footpaths.

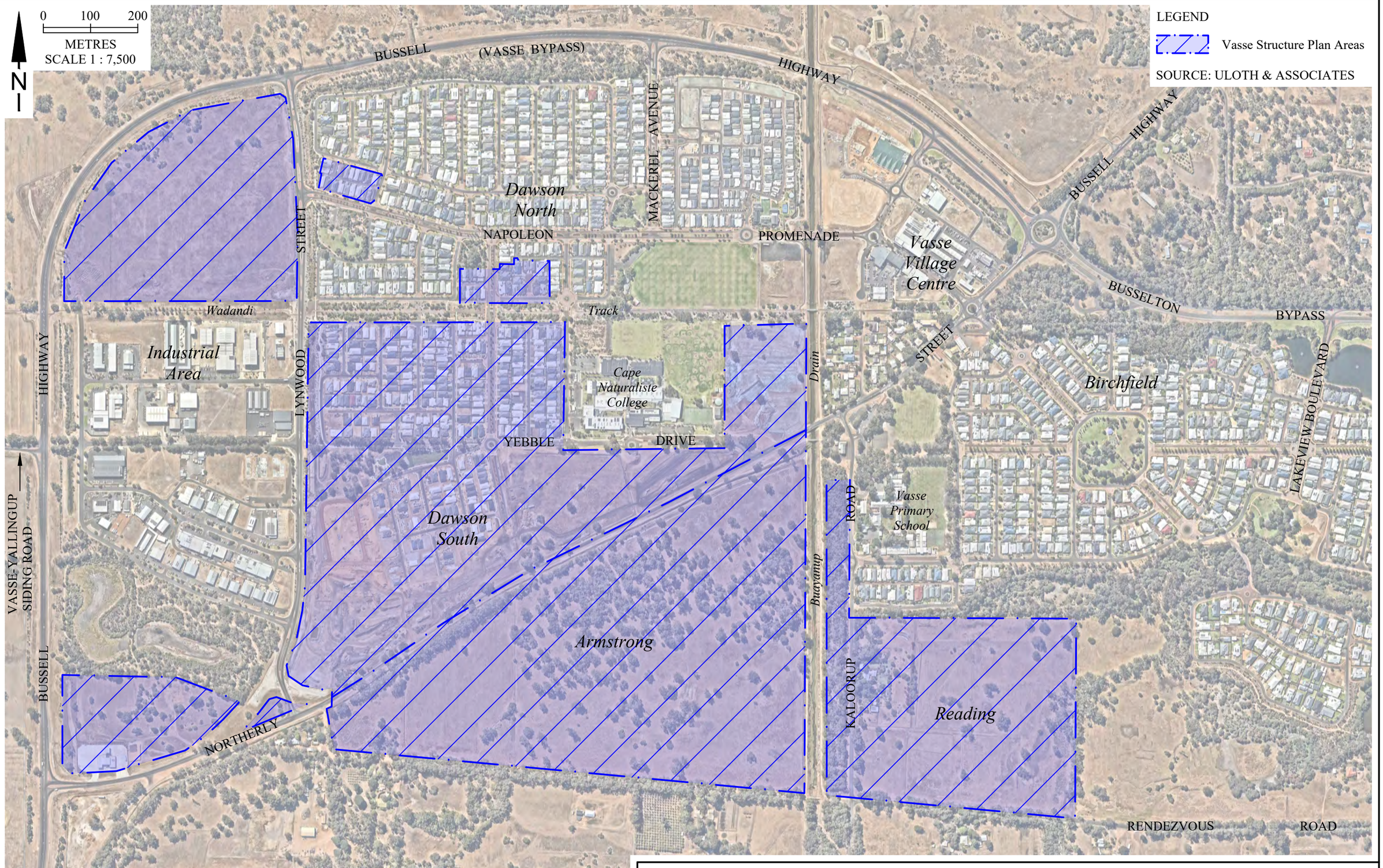
Figure A.8 then shows the resulting 'Safe Routes to School' for both Vasse Primary School and Cape Naturaliste College.



Existing Situation

OVERALL VASSE DEVELOPMENT AREA

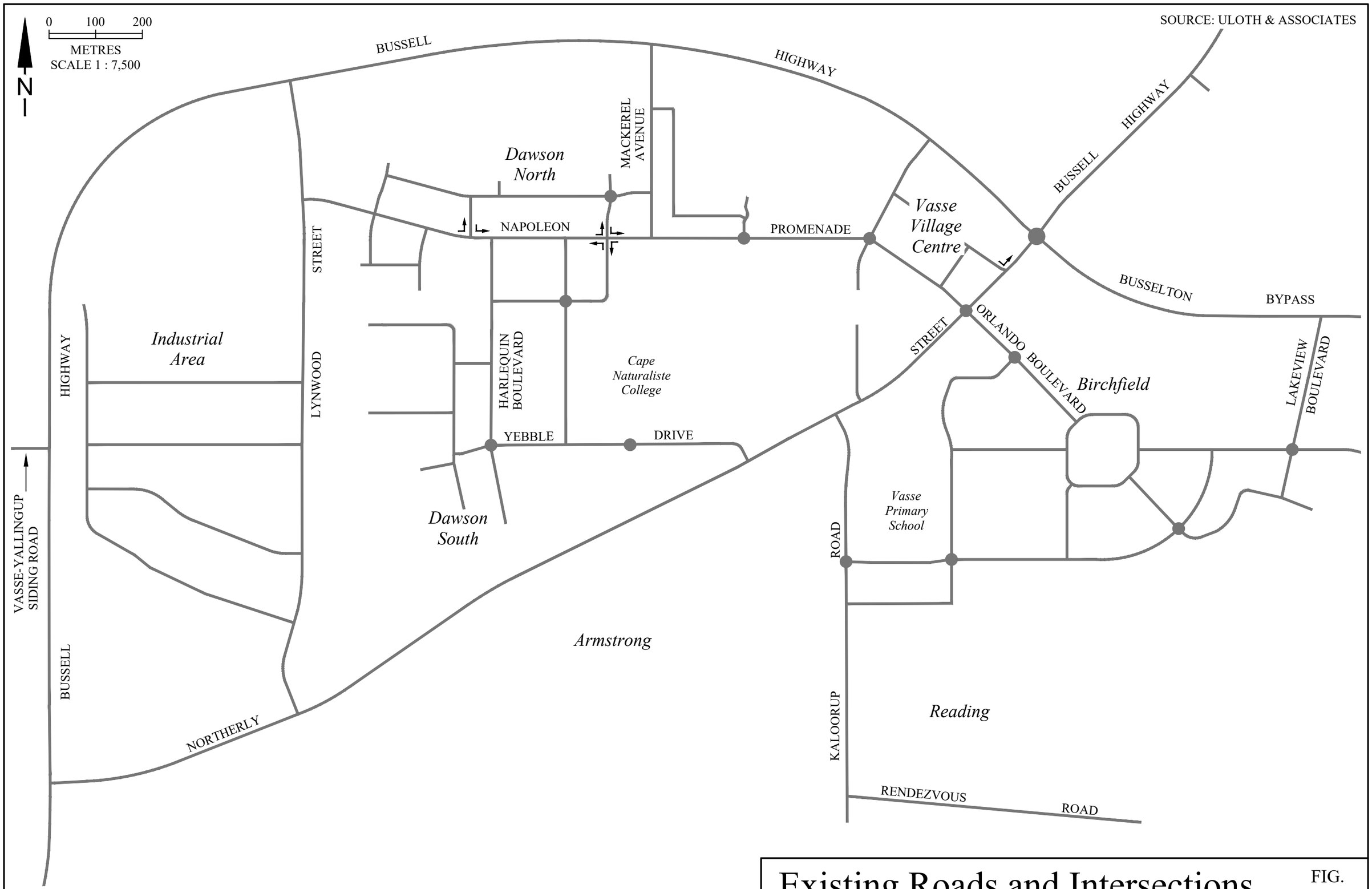
FIG. A.1



Existing Situation and Development Areas

PROPOSED VASSE STRUCTURE PLAN

FIG. A.2



Note: Only the more significant roads are shown, to indicate key components of the overall road network.

Existing Roads and Intersections

IN THE VICINITY OF PROPOSED VASSE STRUCTURE PLAN

FIG. A.3

0 100 200
METRES
SCALE 1 : 7,500

N

SOURCE: ULOTH & ASSOCIATES

BUSSELL HIGHWAY

MACKEREL AVENUE

Dawson North

NAPOLEON

PROMENADE

Vasse Village Centre

HIGHWAY

BUSSELL

BUSSELTON BYPASS

STREET

ORLANDO BOULEVARD

Birchfield

LAKEVIEW BOULEVARD

HIGHWAY

Industrial Area

LYNWOOD STREET

HARLEQUIN BOULEVARD

Cape Naturaliste College

YEBBLE DRIVE

Dawson South

VASSE-YALLINGUP SIDING ROAD

BUSSELL HIGHWAY

Armstrong

NORTHERLY

ROAD

Vasse Primary School

KALOORUP ROAD

Reading

RENDEZVOUS ROAD

Note: Only the more significant roads are shown, to indicate key components of the overall road network.

Existing Road Network

IN THE VICINITY OF PROPOSED VASSE STRUCTURE PLAN

FIG. A.4

SOURCE: ULOTH & ASSOCIATES

0 100 200
METRES
SCALE 1 : 7,500

N

BUSSELL HIGHWAY

MACKEREL AVENUE

Dawson North

NAPOLEON

816

PROMENADE

Vasse Village Centre

BUSSELL 816 815
HIGHWAY 816 710 700 713 706 815 708

BUSSELTON BYPASS 708 706 700

STREET

ORLANDO BOULEVARD

LAKEVIEW BOULEVARD

Birchfield

STREET

LYNWOOD

HARLEQUIN BOULEVARD

Industrial Area

HIGHWAY

Cape Naturaliste College

714

709 714

816

YEBBLE DRIVE

Vasse Primary School

ROAD

Dawson South

Armstrong

VASSE-YALLINGUP SIDING ROAD

BUSSELL

NORTHERLY

KALOORUP ROAD

Reading

RENDEZVOUS ROAD

709 714

LEGEND

Terminating at CNC:

- Routes 710, 713
- Route 709

Continuing En Route after CNC:

- Routes 700, 706, 708, 815
- Possible ' Orange Bus ' Route

Terminating at VPS:

- Route 714

Regular Bus Service extending to VPS in AM Peak:

- Route 816

Existing Bus Routes - AM Peak

IN THE VICINITY OF PROPOSED VASSE STRUCTURE PLAN

FIG. A.5

SOURCE: ULOTH & ASSOCIATES

0 100 200
METRES
SCALE 1 : 7,500

N

BUSSELL HIGHWAY

MACKEREL AVENUE

Dawson North

NAPOLEON STREET

816

PROMENADE

Vasse Village Centre

710 700 706 713 815 708

BUSSELL HIGHWAY 816

815

BUSSELTON BYPASS

STREET

ORLANDO BOULEVARD

LAKEVIEW BOULEVARD

Birchfield

VASSE-YALLINGUP SIDING ROAD

HIGHWAY

Industrial Area

LYNWOOD STREET

HARLEQUIN BOULEVARD

Cape Naturaliste College

714 709

DRIVE

714

YEBBLE

816

ROAD

Vasse Primary School

Dawson South

Armstrong

Reading

KALOORUP ROAD

714 709

RENDEZVOUS ROAD

BUSSELL HIGHWAY

NORTHERLY

LEGEND

Commencing at CNC:

- Route 709
- Route 714

En Route before arrival at VPS:

- Route 815
- Routes 700, 710, 706, 713, 708

Regular Bus Service commencing from VPS in PM Peak:

- Route 816

Possible 'Orange Bus' Route

Existing Bus Routes - PM Peak

IN THE VICINITY OF DAWSON SOUTH AND ARMSTRONG

FIG. A.6

SOURCE: ULOTH & ASSOCIATES

0 100 200
METRES
SCALE 1 : 7,500

N

BUSSELL HIGHWAY

MACKEREL AVENUE

Dawson North

NAPOLEON STREET

PROMENADE

Vasse Village Centre

BUSSELL HIGHWAY

BUSSELTON BYPASS

Wadandi Track

Industrial Area

HIGHWAY

STREET

Cape Naturaliste College

Birchfield

LAKEVIEW BOULEVARD

YEBBLE DRIVE

LYNWOOD

Dawson South

Vasse Primary School

VASSE-YALLINGUP SIDING ROAD

BUSSELL HIGHWAY

NORTHERLY

KALOORUP ROAD

Reading

RENDEZVOUS ROAD

LEGEND

Separate Shared Paths:
- Primary Cycle Routes
- Local Cycle Routes

Roads with On-Road Cycle Lanes:
- Plus paths on both sides
- Plus path on one side
- With no paths

Roads with No On-Road Cycle Lanes:
- With paths on both sides
- With path on one side

Existing Pedestrian/Cyclist Facilities
IN THE VICINITY OF PROPOSED VASSE STRUCTURE PLAN

FIG. A.7

SOURCE: ULOTH & ASSOCIATES

0 100 200
METRES
SCALE 1 : 7,500

N

BUSSELL HIGHWAY

MACKEREL AVENUE

Dawson North

NAPOLEON STREET

PROMENADE

Vasse Village Centre

BUSSELL HIGHWAY

BUSSELTON BYPASS

Wadandi Industrial Area

HIGHWAY

Track

STREET

Cape Naturaliste College

Birchfield

LAKEVIEW BOULEVARD

YEBBLE DRIVE

LYNWOOD

Dawson South

Vasse Primary School

ROAD

VASSE-YALLINGUP SIDING ROAD

BUSSELL

NORTHERLY

Reading

KALOORUP ROAD

RENDEZVOUS ROAD

LEGEND

Safe Routes to/from Schools

Note: Refer to Figure A.7 for Existing Pedestrian/Cyclist Facilities

Existing Safe Routes to School
IN THE VICINITY OF PROPOSED STRUCTURE PLAN

FIG. A.8

A.3 EXISTING ROAD HIERARCHY AND SPEED ZONES

Figure A.9 shows the existing functional road hierarchy for the overall Vasse development area, as defined by Main Roads WA, while Figure A.10 shows the corresponding road hierarchy in the vicinity of the proposed Vasse Structure Plan, as defined under Liveable Neighbourhoods.

Figure A.11 shows the existing posted speed limits for the broader area, as also identified by Main Roads WA.

A.4 EXISTING TRAFFIC FLOWS

Figure A.12 shows the existing Average Weekday traffic flows within and adjacent to the overall Vasse development area, based on data available on the Main Roads WA TrafficMap website plus additional traffic surveys carried out by Uloth and Associates during November 2020, October 2021 and August 2022 (as indicated).

Figures A.13 and A.14 show the corresponding 2022 Friday Daily traffic flows (including an indication of turning movement directions at key intersections), in the vicinity of the proposed Vasse Structure Plan and at Vasse Village Centre. Comparisons were then made between individual peak hours at each location, and the overall Friday PM peak hour was identified to occur from 3pm to 4pm. Figures A.15 and A.16 therefore show the resulting overall Friday PM peak hour traffic flows for the same locations.

0 200 400
METRES
SCALE 1 : 10,000

N

LEGEND
Primary Distributor
Local Distributor
Significant Access Roads
SOURCE: MAIN ROADS WA

BUSSELL HIGHWAY
MACKEREL AVENUE
STREET
NAPOLEON
PROMENADE
BUSSELL HIGHWAY
BUSSELTON BYPASS
ORLANDO BOULEVARD
STREET
HARLEQUIN BOULEVARD
YEBBLE DRIVE
ROAD
LYNWOOD
HIGHWAY
KALOORUP
RENDEZVOUS ROAD
NORTHERLY
BUSSELL HIGHWAY
VASSE-YALLINGUP SIDING RD

Dawson North
Vasse Village Centre
Industrial Area
Cape Naturaliste College
Birchfield
Vasse Primary School
Dawson South
Armstrong
Reading

Main Roads WA Functional Road Hierarchy

OVERALL VASSE DEVELOPMENT AREA

FIG. A.9

0 100 200
METRES
SCALE 1 : 7,500

N

SOURCE: ULOTH & ASSOCIATES

BUSSELL HIGHWAY

MACKEREL AVENUE

Dawson North

NAPOLEON

PROMENADE

Vasse Village Centre

BUSSELL HIGHWAY

BUSSELTON BYPASS

HIGHWAY

STREET

LYNWOOD

Industrial Area

HARLEQUIN BOULEVARD

Cape Naturaliste College

YEBBLE

DRIVE

STREET

ORLANDO BOULEVARD

Birchfield

Vasse Primary School

ROAD

Dawson South

Armstrong

KALOORUP

Reading

BUSSELL

NORTHERLY

LEGEND

- Primary Distributor
- Integrator B
- Neighbourhood Connector A
- Neighbourhood Connector B

Significant Access Streets:

- Access Street A
- Access Street B
- Access Street C

Existing Liveable Neighbourhoods Road Hierarchy

IN THE VICINITY OF PROPOSED VASSE STRUCTURE PLAN

FIG. A.10

0 200 400
METRES
SCALE 1 : 10,000

N

LEGEND
- 110 km/hour
- 100 km/hour
- 90 km/hour
- 80 km/hour
- 70 km/hour
- 60 km/hour
- 50 km/hour
- 40 km/hour School Zones

SOURCE: MAIN ROADS WA

BUSSELL HIGHWAY
HIGHWAY
MACKEREL AVENUE
COOMIDUP BOULEVARD
BUSSELL
BUSSELTON BYPASS
Dawson North
NAPOLEON
PROMENADE
Vasse Village Centre
Industrial Area
STREET
HARLEQUIN BOULEVARD
Cape Naturaliste College
YEBBLE DRIVE
STREET
ORLANDO BOULEVARD
Birchfield
LAKEVIEW BOULEVARD
VASSE-YALLINGUP SIDING RD
LYNWOOD
Dawson South
ROAD
Vasse Primary School
HIGHWAY
Armstrong
KALOORUP
Reading
NORTHERLY
RENDEZVOUS ROAD
BUSSELL

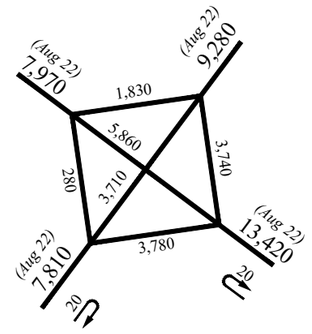
Existing Speed Limits
OVERALL VASSE DEVELOPMENT AREA

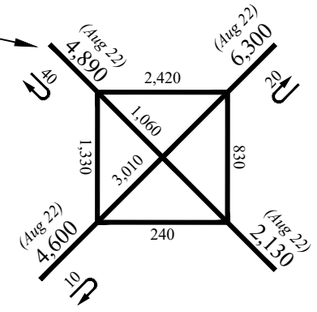
FIG. A.11

0 200 400
METRES
SCALE 1 : 10,000

N

BUSSELL HIGHWAY
(Oct 21) 7,320
(Oct 21) 8,010
(Oct 21) 1,490
(Aug 22) 1,020
(Aug 22) 1,010
MACKEREL AVENUE
Dawson North
NAPOLEON PROMENADE
(Aug 22) 460
(Aug 22) 610
2,450 (Aug 22)
(Mar22) 1,810
COOMIDUP BOULEVARD
(Aug 22) 7,970
(Aug 22) 9,280
(22/23) 11,040
HIGHWAY
BUSSELL
Vasse Village Centre
(Aug 22) 13,420
BUSSELTON BYPASS
(21/22) 15,390
(Mar 22) 5,330
(Aug 22) 2,130
ORLANDO BOULEVARD
STREET
4,600 (Aug 22)
(Nov 20) 4,670
(Nov20) 3,540
(Nov 20) 2,420
(Aug 22) 1,190
YEBBLE DRIVE
Cape Naturaliste College
Industrial Area
STREET
LYNWOOD
Birchfield
Vasse Primary School
ROAD
Dawson South
Armstrong
(17/18) 1,780
VASSE-YALLINGUP SIDING RD
(21/22) 5,890
HIGHWAY
(Aug 22) 1,340
(Aug 22) 2,350
NORTHERLY
BUSSELL (22/23) 7,150
KALOORUP ROAD
Reading
RENDEZVOUS ROAD





LEGEND
- below 1,500 vehicles per day
- 1,500 - 3,000 vehicles per day
- 3,000 - 6,000 vehicles per day
- 6,000 - 12,000 vehicles per day
- 12,000 - 18,000 vehicles per day
- 18,000 - 24,000 vehicles per day
- above 24,000 vehicles per day
- Traffic not counted

SOURCE: ULOTH & ASSOCIATES

Existing Average Weekday Traffic Flows

OVERALL VASSE DEVELOPMENT AREA

FIG. A.12

0 100 200
METRES
SCALE 1 : 7,500

N

BUSSELL HIGHWAY
HIGHWAY
BUSSELL HIGHWAY
BUSSELTON BYPASS
MACKEREL AVENUE
STREET
PROMENADE
NAPOLEON
HARLEQUIN BOULEVARD
YEBBLE DRIVE
LYNWOOD STREET
ORLANDO BOULEVARD
ROAD
BUSSELL HIGHWAY
NORTHERLY
KALOORUP ROAD
RENDEZVOUS ROAD

Dawson North
Vasse Village Centre
Industrial Area
Cape Naturaliste College
Birchfield
Vasse Primary School
Dawson South
Armstrong
Reading

See Figure A.14

LEGEND
- below 1,500 vehicles per day
- 1,500 - 3,000 vehicles per day
- 3,000 - 6,000 vehicles per day
- 6,000 - 12,000 vehicles per day
- 12,000 - 18,000 vehicles per day
- 18,000 - 24,000 vehicles per day
- above 24,000 vehicles per day
- Traffic not counted

SOURCE: ULOTH & ASSOCIATES

Existing (2022) Friday Daily Traffic Flows
IN THE VICINITY OF PROPOSED VASSE STRUCTURE PLAN

FIG. A.13

0 40 80
METRES
SCALE 1 : 2,500

N

LEGEND
- below 1,500 vehicles per day
- 1,500 - 3,000 vehicles per day
- 3,000 - 6,000 vehicles per day
- 6,000 - 12,000 vehicles per day
- 12,000 - 18,000 vehicles per day
- 18,000 - 24,000 vehicles per day
- above 24,000 vehicles per day
- Traffic not counted

SOURCE: ULOTH & ASSOCIATES

BUSSELL HIGHWAY
9,160
8,190
970
930
9,120
1,900
BOULEVARD
COOMIDUP
GANGES
HIGHWAY
9,120
2,100
10,620
BUSSELL HIGHWAY
6,700
320
4,280
4,240
4,320
15,340
NAPOLEON
2,450
Vasse Village Centre
LANE
8,940
30
20
PROMENADE
STREET
BUSSELTON
5,620
50
2,780
7,240
20
1,220
1,520
3,460
960
280
5,280
10
2,460
ORLANDO BOULEVARD
BYPASS
NORTHERLY

Existing (2022) Friday Daily Traffic Flows
AT VASSE VILLAGE CENTRE

FIG. A.14

SOURCE: ULOTH & ASSOCIATES

0 100 200
METRES
SCALE 1 : 7,500

N

BUSSELL
HIGHWAY
MACKEREL AVENUE
NAPOLEON STREET
PROMENADE
BUSSELTON BYPASS
HIGHWAY
BUSSELL
ORLANDO BOULEVARD STREET
HARLEQUIN BOULEVARD
LYNWOOD
YEBBLE DRIVE
ROAD
BUSSELL
NORTHERLY
KALOORUP ROAD
RENDEZVOUS ROAD

336 517 362 518 62 41 52 49 35 41 37 16 77 37 151 131 285 276 247 236 172 138 165 165 90 139 50 38

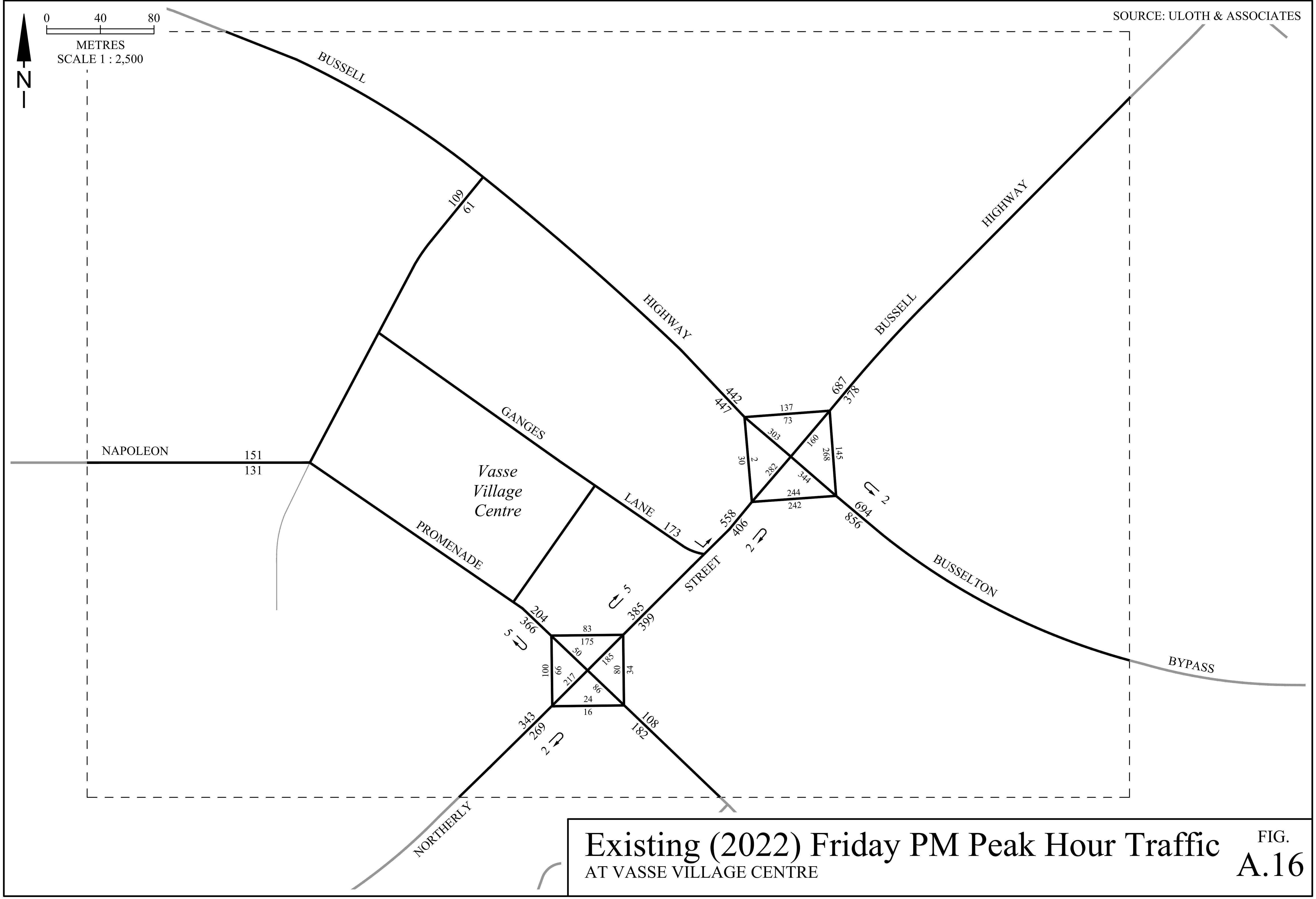
Dawson North
Vasse Village Centre
Industrial Area
Cape Naturaliste College
Birchfield
Vasse Primary School
Dawson South
Armstrong
Reading

See Figure A.16

Existing (2022) Friday PM Peak Hour Traffic

IN THE VICINITY OF PROPOSED VASSE STRUCTURE PLAN

FIG. A.15



Existing (2022) Friday PM Peak Hour Traffic
AT VASSE VILLAGE CENTRE

FIG.
A.16

TECHNICAL APPENDIX B - PROPOSED OVERALL DEVELOPMENT

Technical Appendix B documents the future land use and trip generation for the overall Vasse development area.

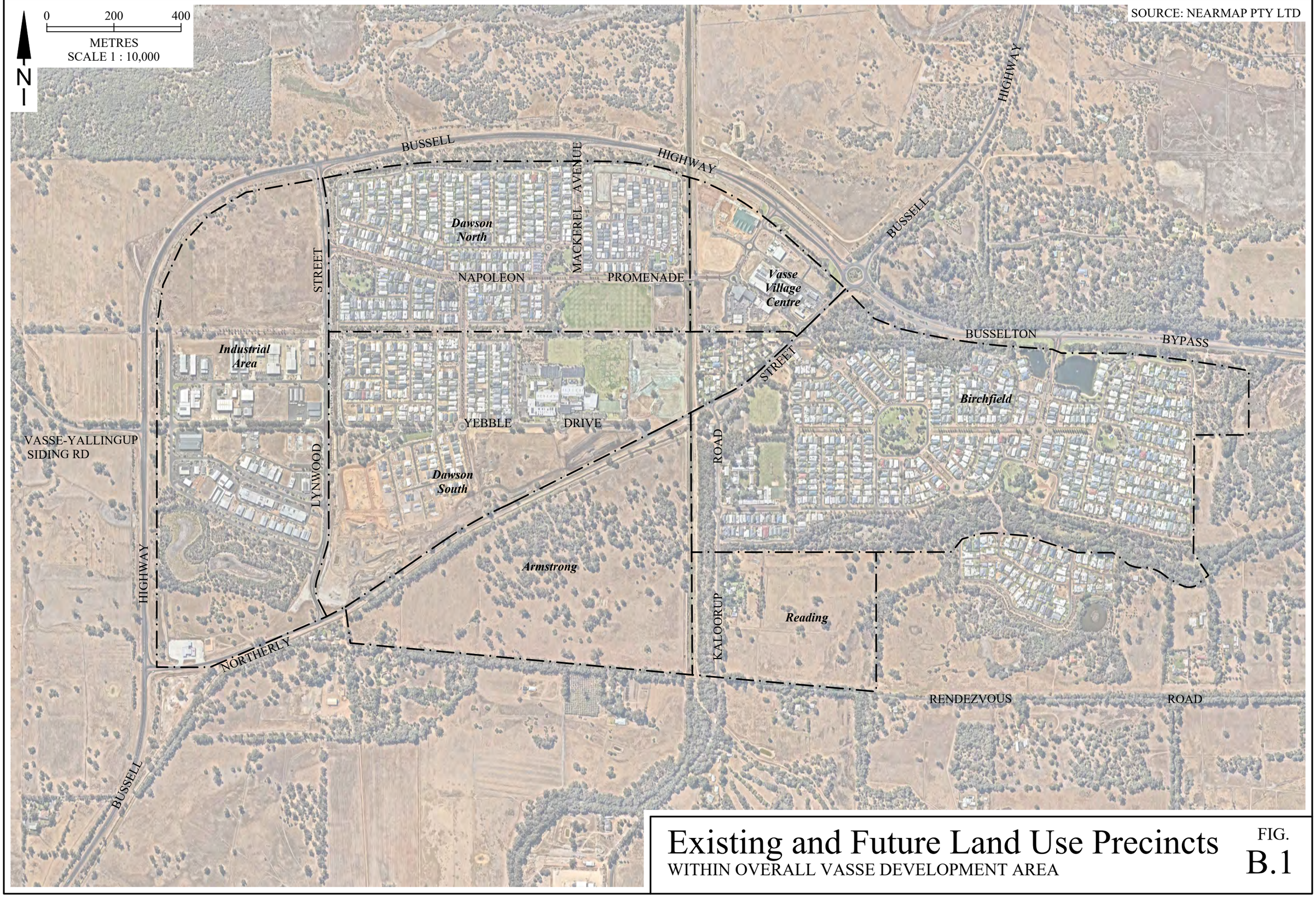
B.1 EXISTING AND APPROVED DEVELOPMENT PLANS

Figure B.1 identifies the 6 land use precincts within the overall Vasse development area, and shows the extent of existing development (particularly within the Birchfield and Dawson North precincts).

Figure B.2 then shows an overlay of approved subdivisions and development plans within the Industrial precinct, Dawson South and the Vasse Village Centre.

B.2 PROPOSED ARMSTRONG STRUCTURE PLAN DESIGN

Figure B.3 shows the currently proposed Vasse Structure Plan, which includes the current concept plan for the Armstong Precinct, as prepared by Hatch Roberts Day. The plan identifies the proposed removal of Northerly Street between Yebble Drive and Harlequin Boulevard, the extension of Harlequin Boulevard south of Northerly Street into Armstrong, and the creation of a new 4-way intersection at Northerly Street - Yebble Drive, with a new access (Road A) to the south, also into Armstrong. It also notes the potential for upgrades or an alternative treatment at the intersection of Northerly Street and Kaloorup Road, subject to further investigations.



Existing and Future Land Use Precincts

WITHIN OVERALL VASSE DEVELOPMENT AREA

FIG. B.1

SOURCE: ULOTH & ASSOCIATES

0 200 400
METRES
SCALE 1 : 10,000

N

BUSSELL HIGHWAY
HIGHWAY
BUSSELL
MACKEREL AVENUE
STREET
(VASSE BYPASS)
LYNWOOD
NAPOLEON
PROMENADE
Dawson North
Vasse Village Centre
Wadandi Industrial Area
Track
Cape Naturaliste College
Drain
STREET
BUSSELTON BYPASS
Birchfield
LAKEVIEW BOULEVARD
YEBBLE DRIVE
VASSE-YALLINGUP SIDING ROAD
Dawson South
ROAD
LAKEVIEW BOULEVARD
Armstrong
Busyanup
HIGHWAY
KALOORUP
Reading
NORTHERLY
RENDEZVOUS ROAD

Existing and Approved Subdivisions

WITHIN OVERALL VASSE DEVELOPMENT AREA

FIG. B.2

PRECINCTS

- (A) DAWSON
- (B) LIA STAGE 2
- (C) ARMSTRONG
- (D) RECREATION RESERVE
- (E) READING LAND

N

BUSSELL HIGHWAY
LYNWOOD STREET
NAPOLEON PROMENADE
NAPOLEON PROMENADE
NAPOLEON PROMENADE
HARLEQUIN BVD
CARETTA STREET
YEBBLE DRIVE
NORTHERLY STREET
PS
LYNWOOD STREET
NORTHERLY STREET
SUBJECT TO FUTURE STRUCTURE PLANNING
SUBJECT TO FUTURE STRUCTURE PLANNING
FLORENCE ROAD
RENDEZVOUS ROAD
CAMBELL BOULEVARD
PARKS VIEW BOULEVARD

LEGEND

- Structure Plan Boundary
- Existing Cadastre
- Lot Boundaries

LOCAL SCHEME RESERVES

- Recreation
- Public Purposes
- PS Primary School

ZONES
Residential

- R20
- R30
- R20-R40

- Urban Development (Subject to future structure planning)
- Industrial
- Neighbourhood Connector
- Local Roads
- Future Roundabout
- Potential for a treatment or upgrade at the intersection of Northerly Street and Kaloorup Road, subject to future investigations including the location and alignment of Kaloorup Road

FIG. B.3

VASSE

CADASTRAL INFORMATION
SOURCE: LANDGATE-SLIP
YIWMDD: 160803
DWG REF: dawson
PROJECTION: MGA94

AERIAL PHOTOGRAPHY
SOURCE: NEARMAP
YIWMDD: 240402

HATCH

SIZE A3, 1:4000
0 metres 50 100 150 200

REV	DESCRIPTION	YIWMDD	DRAWN	APPR'D
O.2	WAPC MODIFICATIONS	250610	RS	DP
O.1	REVISE LOT BOUNDARIES	240911	SB	DP
O	UPDATED NEIGHBOURHOOD CONNECTOR	240516	SB	DP
N	UPDATED STRUCTURE PLAN DESIGN	240325	RO	RO
M	WAPC MODIFICATIONS FOR ENDORSEMENT	210827	SB	DP
L	UPDATE ZONING	201117	SB	DP
K	UPDATED STRUCTURE PLAN DESIGN	191101	SB	DP

AMENDMENT No.1
Vasse Structure Plan
City of Busselton

REF NO.	DRAW NO.	REV.
PGP VAS	RD1 200	0.2

B.3 OVERALL FUTURE LAND USE AND ESTIMATED TRIP GENERATION

Table B.1 shows the summarised future land use data and estimated trip generation for the overall Vasse development area, including the proposed Vasse Structure Plan, based initially on the existing and future traffic zones in Figure B.4, but summarised by precinct.

TABLE B.1
FUTURE LAND USE AND ESTIMATED TRIP GENERATION
FOR OVERALL VASSE DEVELOPMENT AREA

LAND USE DATA BY PRECINCT [1]	TRIP GENERATION [2] AM Peak Hour (vph)	PM Peak Hour (vph)	Weekday (vpd)
• Dawson North & South Precincts (Zones 4 to 14 plus 29) [2]			
- Single-Family Housing (1,024 dwellings)	716	962	9,660
- Attached Housing (5 dwellings)	3	2	40
- Senior Adult Housing (150 dwellings)	36	46	640
- Primary School (640 students)	563	454	2,300
- Child Care (120 children)	83	91	480
- College (1,023 students)	481	277	1,600
• Armstrong/Reading Precinct (Zones 15 to 17 plus 25) [2] [3]			
- Single-Family Housing (779 dwellings)	545	733	7,340
• Birchfield Precinct (Zones 18 to 24) [2]			
- Single-Family Housing (661 dwellings)	462	621	6,240
- Primary School (810 students)	713	575	2,900
• Vasse Village Centre (Zones 26 to 28) [2]			
- Shopping Centre (7,687m^2) [4]	347	960	9,300
- Speciality Shops (3,480m^2)	72	196	1,940
- Petrol Station (8 pumps)	128	148	2,120
- Fast Food (900m^2) [2]	432	320	4,520
- Office (1,714m^2)	34	35	180
- Medical (5,488m^2)	163	218	2,220
- Tavern (785m^2)	0	96	960
- Child Care (70 children)	49	54	280
- Showrooms (5,970m^2)	59	191	520
- Residential Apartments (48 units)	20	24	320
• Industrial Area (Zones 1 to 3) [2]			
- General Light Industrial (129,000m^2)	1,028	903	6,770
• TOTAL	5,934	6,906	60,330

Note: 1) Land Use Precincts as shown in Figure B.1.
2) Traffic Zones as shown in Figure B.4.
3) Land use for Reading is notional only.
4) Includes approved Farmers Market at 3,400m^2.

Source: Land Use Data - Hatch Roberts Day
Trip Generation - Uloth and Associates

SOURCE: ULOTH & ASSOCIATES

0 200 400
METRES
SCALE 1 : 10,000

N

BUSSELL HIGHWAY
BUSSELL HIGHWAY
BUSSELTON BYPASS
MACKEREL AVENUE
NAPOLEON STREET
PROMENADE
LYNWOOD STREET
YEBBLE DRIVE
KALOORUP ROAD
RENDEZVOUS ROAD
VASSE-YALLINGUP SIDING RD
HIGHWAY
NORTHERLY
BUSSELL

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29

Dawson North
Dawson South
Industrial Area
Vasse Village Centre
Birchfield
Armstrong

Existing and Future Traffic Zones
WITHIN OVERALL VASSE DEVELOPMENT AREA

FIG. B.4

TECHNICAL APPENDIX C - FUTURE TRAFFIC MODEL

Technical Appendix C describes the development of the future AIMSUN traffic model, including output traffic flows and resulting intersection operations for the overall Vasse development area.

C.1 MODELLED ROAD NETWORK

Figure C.1 shows the future roads and intersections in the vicinity of the proposed Vasse Structure Plan, as utilised for the development of the traffic model. The overall road network is based on the existing and proposed developments identified in Figure B.1 to B.3 in Technical Appendix B, with Northerly Street closed between Yebble Drive and Harlequin Boulevard (so that Northerly Street deviates into Yebble Drive as the continuing route).

Figure C.2 shows a corresponding screenshot of the modelled road network within the AIMSUN Traffic Model. Detailed coding of the road network was developed using aerial photographs of the existing roads and intersections, expanded to incorporate the proposed future development areas. Speed limits on the existing roads were specified to match existing speed limits, as identified in Figure A.11 in Chapter A.3 in Technical Appendix A, while future roads within the proposed structure plan area are assumed to operate at the default urban area speed limit of 50 kilometres per hour. Permitted turning movements and intersection controls were also identified at each location.

School Bus movements were also coded into the model, based initially on existing bus routes identified in Figures A.5 and A.6 in Technical Appendix A, but updated to also include a stop at the proposed Vasse West Primary School in Dawson South (with buses assumed to travel an anti-clockwise circuit around the Primary School, prior to accessing Cape Naturaliste College).

The overall traffic model comprises a total of 65 centroids, as shown in Figure C.2, including 57 internal centroids representing the 29 traffic zones in Figure B.4 (in Technical Appendix B) plus 8 external centroids representing connections to the broader surrounding road network. The various road network upgrades described above in Section 2.3.4 are also included.

C.2 TRIP MATRICES AND VEHICLE TYPES

Development traffic flows were broken down into 4 ‘trip purposes’, with the creation of separate trip matrices to represent ‘Industrial’ trips, ‘School’ trips, ‘Vasse Village’ trips and ‘Residential’ trips, based on the future land use and trip generation calculations in Table B.1 in Technical Appendix B. A ‘Background’ trip matrix was then prepared to reflect the background traffic flows described above in Section 2.3.3 (with further detail in Chapter C.5).

Heavy vehicle proportions were also defined, based on a combination of existing turning movement surveys and tube counts at key locations, as follows, noting that Heavy Vehicles for ‘Background’ trips were further broken down to ‘Minor’ (Classes 2 to 5), ‘Major 1’ (Classes 6 to 9) and ‘Major 2’ (Class 10):

- ‘School’ trips and ‘Vasse Village’ trips (incl. linked ‘Residential’ trips): 5 percent
- ‘Industrial’ trips (external only): 20 percent
- ‘Industrial’ trips (linked with ‘Residential’): 5 percent
- Remaining ‘Residential’ trips: 2 percent
- ‘Background’ trips: 10 percent

0 100 200
METRES
SCALE 1 : 7,500

N

SOURCE: ULOTH & ASSOCIATES

BUSSELL HIGHWAY

MACKEREL AVENUE

Dawson North

NAPOLEON

PROMENADE

BUSSELL HIGHWAY

Vasse Village Centre

BUSSELTON BYPASS

STREET

HIGHWAY

Industrial Area

LYNWOOD STREET

HARLEQUIN BOULEVARD

ORLANDO BOULEVARD

Birchfield

YEBBLE DRIVE

*

ROAD A

ROAD

Dawson South

ROAD B

Armstrong

BUSSELL HIGHWAY

NORTHERLY

KALOORUP ROAD

* *Possible intersection treatment or upgrade at Northerly Street - Kaloorup Road, subject to future investigations including the location and alignment of Kaloorup Road.*

Future Roads and Intersections

IN THE VICINITY OF PROPOSED VASSE STRUCTURE PLAN

FIG. C.1

SOURCE: ULOTH & ASSOCIATES

0 100 200
METRES
SCALE 1 : 7,500

N

BUSSELL HIGHWAY

HIGHWAY

VASSE-YALLINGUP SIDING ROAD

BUSSELL

NORTHERLY

STREET

LYNWOOD

HARLEQUIN BLVD

NAPOLEON

PROMENADE

YEBBLE

DRIVE

ROAD A

ROAD B

STREET

ORLANDO BOULEVARD

BUSSELTON BYPASS

LAKEVIEW BOULEVARD

ROAD

KALOORUP

RENDEZVOUS ROAD

1-1 1-2 2-1 2-2 3-1 3-2 4-1 4-2 4-3 5-1 5-2 5-3 6-1 7-1 7-2 8-1 8-2 9-1 9-2 9-3 9-4 10-1 10-2 11-1 12-1 12-2 12-3 13-1 13-2 14-1 14-2 15-1 15-2 15-3 16-1 17-1 17-2 18-1 18-2 19-1 20-1 21-1 22-1 22-2 23-3 24-1 25-1 26-1 26-2 26-3 27-1 27-2 28-1 28-2 29-1 103 105 107

* *Possible intersection treatment or upgrade at Northerly Street - Kaloorup Road, subject to future investigations including the location and alignment of Kaloorup Road.*

Future AIMSUN Road Network

FOR PROPOSED VASSE STURCTURE PLAN

FIG. C.2

C.3 MODEL PARAMETERS AND SETTINGS

C.3.1 TRAFFIC ASSIGNMENT PARAMETERS

AIMSUN's Dynamic Traffic Assignment model was used to determine the assignment of traffic within the modelled road network. There are three main parameters that can be applied in dynamic traffic assignment, to inform the traffic assignment process, as follows:

1) Fixed O-D Routes: A fixed origin-destination route ensures that vehicles will use the specified path. If a fixed O-D route is set to 100 percent, all traffic with that O-D will only use that route. If an O-D route is not defined, the O-D path options refer to the Path Assignment described below.
2) Path Assignment: A Path Assignment contains the information about the generated paths in a traffic assignment (either dynamic or static) after a model run. It is stored as a binary file with an AIMSUN specific format (.apa). The information in a Path Assignment can be explored as an output of Static Assignments (Path Assignment folder) and of Dynamic Assignments. If the Path Assignment is set to 100 percent then all traffic (or any remaining traffic after any fixed O-D routes) will use the O-D paths defined within the Path Assignment. If a percentage is not specified, then the O-D path is defined by Dynamic Route Choice, as discussed below.
3) Dynamic Route Choice: Dynamic route choice assignment uses dynamic travel time information, for both past and current points of time in the simulation, to determine the routing for each vehicle. Vehicles react to the prevailing traffic conditions, selecting the optimal route prior to loading onto the network and in some cases, dynamically changing this route to a lower cost route if available. If traffic has not been set to follow a fixed O-D route or the Path Assignment file route, then the traffic will choose a route the model has calculated as the best route at that time in the simulation.

Since multiple route choices are available for both development traffic and background traffic within the traffic model, an incremental assignment was initially carried out as Dynamic User Equilibrium (DUE) experiment, in order to generate path assignment results, with improved overall convergence. The path assignment file generated was then used as an input to a Stochastic Route Choice experiment, which allows route choices to be investigated as part of the modelling process. This, in turn, allows fixed O-D routes to be specified, if necessary, to ensure that realistic route choices are achieved within the final model.

However, with no fixed O-D routes specified, all traffic flows within the model follow the path file generated by the DUE run, with an Enroute percentage calculated as per Main Roads WA guidelines to ensure that at least 50 percent of routes follow the initial path assignment result.

The overall parameters and settings used for the dynamic assignment process are as follows:

Route Choice:

- Simulation Step	0:00:45
- Interval:	0:15:00
- Number of Intervals:	1
- Attractiveness Weighting:	2
- User Defined Cost Weight:	0

Following O-D Routes:

- All Trip Types:	100%

Following Path Assignment Results:

- All Trip Types:	100%

Stochastic Route Choice Model:

- Model:	C-Logit
- Enroute:	Enabled
- Initial K-SPs:	1
- Initial Paths:	3
- Max Number to Keep:	All
- Max Number of Paths:	3

Parameters:

- Scale:	1
- Beta:	0.15
- Gamma:	1

C.3.2 VEHICLE PARAMETER SETTINGS

Five different vehicle types (including buses) have been modelled, as noted above in Chapter C.2. Tables C.1 and C.2 show the modelled vehicle parameter settings for each vehicle type, noting that AIMSUN default parameters were used as the starting point, but these were then adjusted (where required) to fit within the Main Roads Operational Modelling Guidelines prescribed range.

Vehicle reaction time settings were also adjusted in accordance with the Main Roads WA Operational Modelling Guidelines, to reflect WA traffic behaviour.

TABLE C.1
MODELLED VEHICLE PARAMETER SETTINGS FOR CARS AND BUSES
OVERALL VASSE DEVELOPMENT AREA TRAFFIC MODEL

	CAR				BUS			
	Mean	Dev.	Min.	Max.	Mean	Dev.	Min.	Max.
Length (m)	4.30	0.48	3.18	5.18	12	2	12	15
Width (m)	2	0	2	2	2.4	0	2.4	2.5
Max. desired Speed (km/h)	110	10	80	120	90	10	80	100
Speed Acceptance	1.05	0.09	0.9	1.16	1	0.1	0.9	1.1
Clearance (m)	2.43	0.53	1.50	3.35	2.25	0.33	1.85	3
Max. give way time (sec)	15	3	5	30	35	10	20	60
Guidance Acceptance (%)	100	0	100	100	100	0	100	100
Max. Acceleration (m/s2)	2.8	0.2	2.2	3.5	1	0.3	0.8	1.8
Normal deceleration (m/s2)	4	0.25	3.2	4.5	2	1	1.5	4.5
Max. deceleration (m/s2)	6	0.5	5	7	5	1	4	6
Sensitivity factor	1	0	1	1	1	0	1	1
Gap (s)	1.1	0.2	0.5	2	1.1	0.2	0.5	2
Margin for overtaking (s)	5	3	1	10	5	3	1	10

Notes: AIMSUN default parameters were initially adopted, but then varied to comply with the specified ranges within the Main Roads WA Guidelines.

Source: Uloth and Associates

TABLE C.2
MODELLED VEHICLE PARAMETER SETTINGS FOR HEAVY VEHICLES
OVERALL VASSE DEVELOPMENT AREA TRAFFIC MODEL

	TRUCKS ('MINOR')				SEMI-TRAILERS ('MAJOR 1')				B-DOUBLES ('MAJOR 2')			
	Mean	Dev.	Min.	Max.	Mean	Dev.	Min.	Max.	Mean	Dev.	Min.	Max.
Length (m)	8.65	1.9	6	12.5	17	2	11.5	19	25	0	17.5	27.5
Width (m)	2.4	0	2.4	2.5	2.4	0	2.4	2.5	2.5	0	2.4	2.5
Max. desired Speed (km/h)	100	5.5	80	110	100	5.5	80	110	100	11	80	110
Speed Acceptance	1	0.1	0.9	1.1	1	0.1	0.9	1.1	1	0.1	0.9	1.09
Clearance (m)	2.5	0.73	1.6	3.55	3	0.78	1.75	4.4	3	0.75	2.05	4.1
Max. give way time (sec)	30	5	20	36	30	5	20	36	35	6	20	60
Guidance Acceptance (%)	100	0	100	100	100	0	100	100	100	0	100	100
Max. Acceleration (m/s2)	1.5	0.5	0.8	1.8	1	0.5	0.6	1.5	0.8	0.5	0.6	2.4
Normal deceleration (m/s2)	3	0.3	2	3.5	3	0.3	2	3.5	3	0.3	2	3.5
Max. deceleration (m/s2)	5	0.5	4	6	5	0.5	4	6	5	0.5	4	6
Sensitivity factor	1	0	1	1	1	0	1	1	1	0	1	1
Gap (s)	1.3	0.2	0.5	2.5	1.3	0.2	0.5	2.5	1.3	0.2	0.5	2.5
Margin for overtaking (s)	5	3	1	10	5	3	1	10	5	3	1	10

Notes: AIMSUN default parameters were initially adopted, but then varied to comply with the specified ranges within the Main Roads WA Guidelines.

Source: Uloth and Associates

C.4 DEVELOPMENT TRAFFIC FLOWS AND TRAFFIC DISTRIBUTION

In order to calculate trip matrices for each of the specified trip types for the overall development, it was first necessary to identify the proportion of overall trip generation that would operate as 'Internal' or 'Linked' trips within their own precinct, or with other precincts within the overall development area.

It was therefore estimated that 20 percent of 'Industrial' trip generation and 30 percent of 'School' trip generation will be linked with 'Residential' trips across the 4 residential precincts, with the remaining trips to travel to/from the external zones. It was then also estimated that a further 20 percent of 'Residential' trips will be linked with 'Vasse Village' trips, while 30 percent of 'Fast Food' and 'Fuel Station' trips plus 10 percent of 'Other Uses' trips will be linked trips within Vasse Village (accessing either the 'Shopping Centre' or 'Speciality Retail').

Table C.3 therefore shows the resulting calculation of 'internal' and 'external' traffic flows for the overall traffic model, identifying total external traffic flows of 41,270 vehicles per day (with 4,558 vehicles per hour during the Friday PM peak hour).

External 'Vasse Village' trips were also broken down into 'passing' and '2-way' trips, with 30 percent of external trips assumed to be 'passing'. It is important to note that 'passing' trips in this context are simply identified as trips that enter the Village Centre from one direction but exit in a different direction, as part of a trip that would already have been passing the site (such as a trip from home to work). The alternative '2-way' trips are those that arrive and depart to and from the same direction, and are therefore assumed to be distinct trips to and from the Centre.

'Passing' trips for Vasse Village are therefore assigned to the road network based on a weighted distribution of traffic flows at the adjacent Bussell Highway - Busselton Bypass - Northerly Street intersection.

The external trip distribution for '2-way' trips to/from Vasse Village, and for all other external trips was then derived from existing turning movement counts at key locations relevant to each individual trip type. For example, the distribution for 'Industrial' trips was initially determined from traffic counts at the Lynwood Street intersections with both Bussell Highway and Northerly Street, with further refinements based on additional counts at Bussell Highway - Busselton Bypass - Northerly Street, while the distribution of 'Residential' trips was based on counts at Bussell Highway - Mackeral Avenue plus Northerly Street - Kaloorup Road.

The assumed distribution for external trips to/from the overall Vasse Structure Plan area was therefore estimated as follows:

	'Industrial', 'School' and 'Residential' Trips	'Vasse Village' Trips
- Bussell Highway, north:	30 percent	35 percent
- Busselton Bypass, east:	45 percent	35 percent
- Bussell Highway, south:	20 percent	25 percent
- Vasse-Yallingup Siding Road:	5 percent	5 percent

Existing traffic count data was also used to calculate the traffic profile (in 15-minute intervals) for each trip type, with results as shown below in Table C.4.

TABLE C.3
CALCULATION OF INTERNAL AND EXTERNAL TRAFFIC FLOWS
OVERALL VASSE DEVELOPMENT AREA TRAFFIC MODEL

PROPOSED LAND USE	TRIP GENERATION [1)]	
	PM Peak (vph)	Daily (vpd)
Dawson North & South		
- Total Trip Productions	1,010	10,340
- Total Trip Attractions	822	4,380
- Less Internal Trips within Dawson	210	1,140
- Dawson External Trips onto Adjacent Roads	1,622	13,580
- Less Internal Trips Within Remainder of Structure Plan	495	3,780
- Total External Trips	1,127	9,800
Armstrong/Reading		
- Total Trip Productions	733	7,340
- Total Trip Attractions	0	0
- Less Internal Trips within Armstrong	0	0
- Armstrong External Trips onto Adjacent Roads	733	7,340
- Less Internal Trips Within Remainder of Structure Plan	333	2,550
- Total External Trips	400	4,790
Birchfield		
- Total Trip Productions	621	6,240
- Total Trip Attractions	575	2,900
- Less Internal Trips within Birchfield	90	440
- Birchfield External Trips onto Adjacent Roads	1,106	8,700
- Less Internal Trips Within Remainder of Structure Plan	364	2,580
- Total External Trips	742	6,120
Village Centre		
- Total Trip Productions	24	320
- Total Trip Attractions	2,218	22,040
- Less Linked Trips within Village Centre	202	2,440
- Village Centre External Trips onto Adjacent Roads	2,040	19,920
- Less Internal Trips Within Remainder of Structure Plan	473	4,780
- Total External Trips	1,567	15,140
Industrial Area		
- Total Trip Productions	0	0
- Total Trip Attractions	903	6,770
- Less Internal Trips within Industrial Area	0	0
- Industrial Area External Trips onto Adjacent Roads	903	6,770
- Less Internal Trips Within Remainder of Structure Plan	181	460
- Total External Trips	722	1,840
• Grand Total External Trips (Overall Structure Plan)	4,558	41,270

Notes: 1) Initial trip generation figures from Table B.1

Source: Uloth and Associates

TABLE C.4
TRIP GENERATION PROFILE BY TRIP TYPE
OVERALL VASSE DEVELOPMENT AREA TRAFFIC MODEL

TRIP TYPE	PM PEAK HOUR TRIP GENERATION	15-MIN TRIP GENERATION PROFILE					
		Warmup Period		PM Peak Hour			
		2^{30}pm	2^{45}pm	3^{00}pm	3^{15}pm	3^{30}pm	3^{45}pm
• Residential [1) 2)]	1,291	245 (19%)	271 (21%)	362 (28%)	452 (35%)	271 (21%)	206 (16%)
• Industrial [3)]	903	288 (32%)	252 (28%)	217 (24%)	235 (26%)	207 (23%)	244 (27%)
• Vasse Village [4)]	2,242	516 (23%)	516 (23%)	516 (23%)	627 (28%)	583 (26%)	516 (23%)
• School [5)]	1,397	112 (8%)	251 (18%)	475 (34%)	489 (35%)	251 (18%)	182 (13%)
• Background [6)]	1,262	316 (25%)	366 (29%)	328 (26%)	303 (24%)	316 (25%)	315 (25%)
• Total	7,095	1,477 (20%)	1,656 (23%)	1,898 (27%)	2,106 (30%)	1,628 (23%)	1,463 (20%)

Notes:
1) Excludes trips linked with Industrial, Vasse Village or Schools, which are included within each specific trip type.
2) Based on existing 15-minute flows on Mackerel Avenue, Napoleon Promenade (east of Lynwood Street and at the bridge over Buayanup Drain), Kenwyn Drive and Harlequin Boulevard.
3) Based on existing 15-minute traffic flows on Lynwood Street (both south of Bussell Highway and north of Northerly Street).
4) Based on existing 15-minute traffic flows at Napoleon Promenade west of Northerly Street.
5) Based on existing 15-minute traffic flows at Yebble Drive north of Northerly Street and Kaloorup Road south of Northerly Street.
6) Based on existing 15-minute traffic flows at Bussell Highway west of Lynwood Street.

Source: Uloth and Associates

C.5 BACKGROUND TRAFFIC

On the basis of the existing Friday traffic flows in Figures A.13 and A.14 in Chapter A.4 in Technical Appendix A, it is estimated that a total of 4,100 vehicles per day of 'local' or 'development' traffic travels from within the overall Vasse development area to/from the west and south.

With a combined total of 10,400 vehicles per day on Bussell Highway south of Northerly Street and Vasse-Yallingup Siding Road west of Bussell Highway, it is therefore estimated that there is a total of 6,300 vehicles per day of 'Background' traffic travelling to/from the west and south (from either the north or east), with almost all of these trips using the Vasse Bypass portion of Bussell Highway.

Based on the Friday daily turning movements in Figure A.14 at the Bussell Highway - Busselton Bypass - Northerly Street intersection, it is therefore also estimated that 4,720 vehicles per day (75 percent) of these background traffic flows currently travel to/from Busselton Bypass east, leaving 1,580 vehicles per day (25 percent) to/from Bussell Highway north.

A peak hour factor and directional split percentage for the 'Background' traffic flows to/from the west and south was then identified based on existing Main Roads WA traffic count data at Bussell Highway north of Marbellup Road (which is located not far south of Northerly Street).

It can also be seen in Figure A.14 that there are a further 4,280 vehicles per day of background traffic travelling north-to-east or east-to-north at the Bussell Highway - Busselton Bypass - Northerly Street intersection (with a peak hour factor and directional split as also surveyed).

Existing background traffic was then increased by 20 percent for the future traffic model, reflecting a growth rate of just less than 1 percent per annum for 20 years. However, when combined with the anticipated growth of local traffic, the overall traffic growth translates to an annual rate of approximately 2.6 percent per annum over 20 years.

C.6 NETWORK-WIDE RESULTS

After identifying the overall development traffic flows and 'Background' traffic for the future traffic model, initial runs were carried out to determine necessary upgrades for the overall road network (as noted above in Section 2.3.4), and checks were carried out to confirm that modelled traffic flow outputs correspond to the traffic flow inputs for each 'trip purpose' and vehicle type. Traffic model runs were then carried out for 5 separate random seeds (as recommended within the Main Roads WA Operational Modelling Guidelines), to check the overall stability of the model.

Table C.5 shows the network-wide modelling results from 5 separate random-seed runs of the overall Vasse development area future traffic model. The table confirms that all input traffic flows have been released into the model, and that the maximum Coefficient of Variance for any of the 7 identified outputs is 15 percent.

TABLE C.5
NETWORK-WIDE MODEL OUTPUTS FOR FIVE RANDOM SEED RUNS
OVERALL VASSE DEVELOPMENT ARE TRAFFIC MODEL

ITEM	MODEL OUTPUTS [1]					AVERAGE OF 5 RUNS		
	Run 1	Run 2	Run 3	Run 4	Run 5	Mean	SD	CoV[2]
• Delay (sec/km)	21.3	15.4	17.8	15.9	14.8	17.0	2.65	15.6%
• Speed (km/hr)	49.9	51.6	50.9	51.4	52.0	51.2	0.84	1.6%
• Total Travel Time (hr)	356.8	341.1	334.2	340.1	331.7	340.8	9.79	2.9%
• Total Traffic (veh)	7,155	7,218	6,989	7,149	7,063	7,115	89.37	1.3%
• Total Travel Distance (km)	17,793	18,008	17,353	17,931	17,730	17,763	254.23	1.4%
• Total Delay (hr)	105.4	76.8	85.7	79.2	72.8	84.0	12.86	15.3%
• Average Delay per Vehicle (sec)	53.0	38.3	44.1	39.9	37.1	42.5	6.46	15.2%

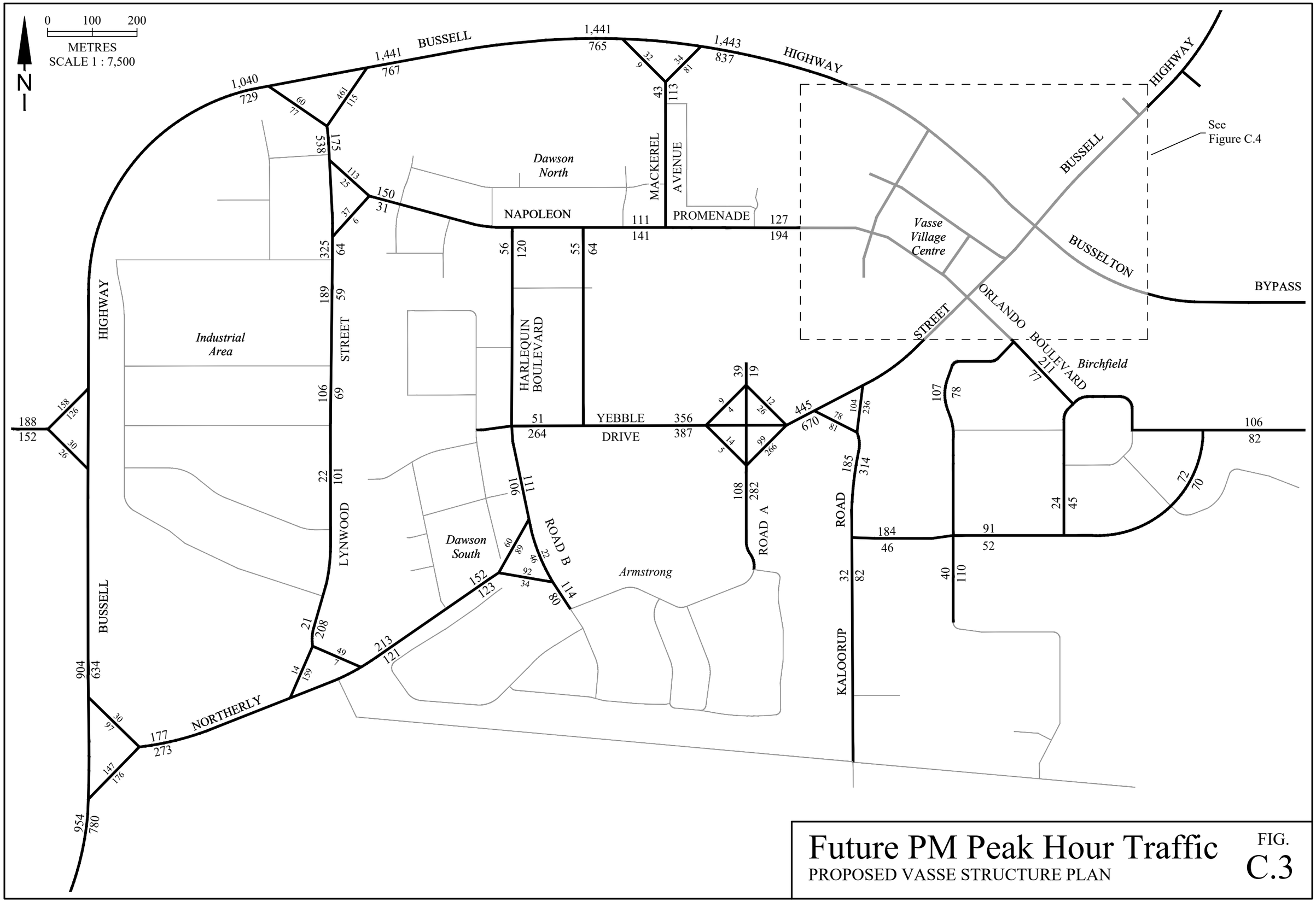
Notes: 1) Random Seeds for Runs 1 to 5 = 560, 28, 7771, 86525 and 2850
2) CoV = Coefficient of Variance, defined as the standard deviation divided by the mean. The lower the variance the more stable the model.

Source: Uloth and Associates

C.7 MODELLED FUTURE TRAFFIC FLOWS

Figure C.3 shows the modelled future PM peak hour flows in the vicinity of the proposed Vasse Structure Plan, while Figure C.4 shows additional detail at Vasse Village Centre.

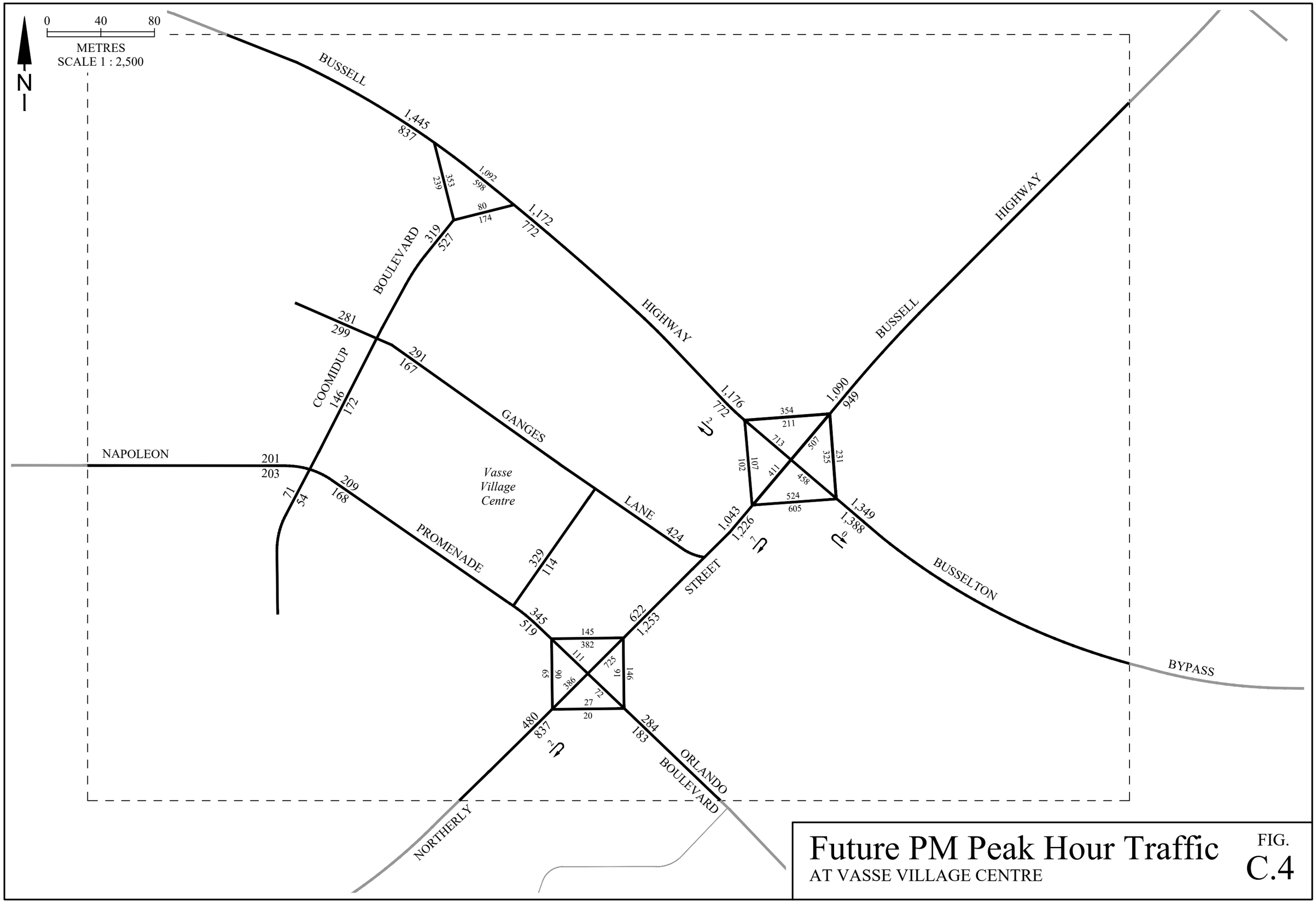
Figures C.5 and C.6 then show the corresponding future Daily traffic flows, calculated as described above in Section 2.4.



Future PM Peak Hour Traffic

PROPOSED VASSE STRUCTURE PLAN

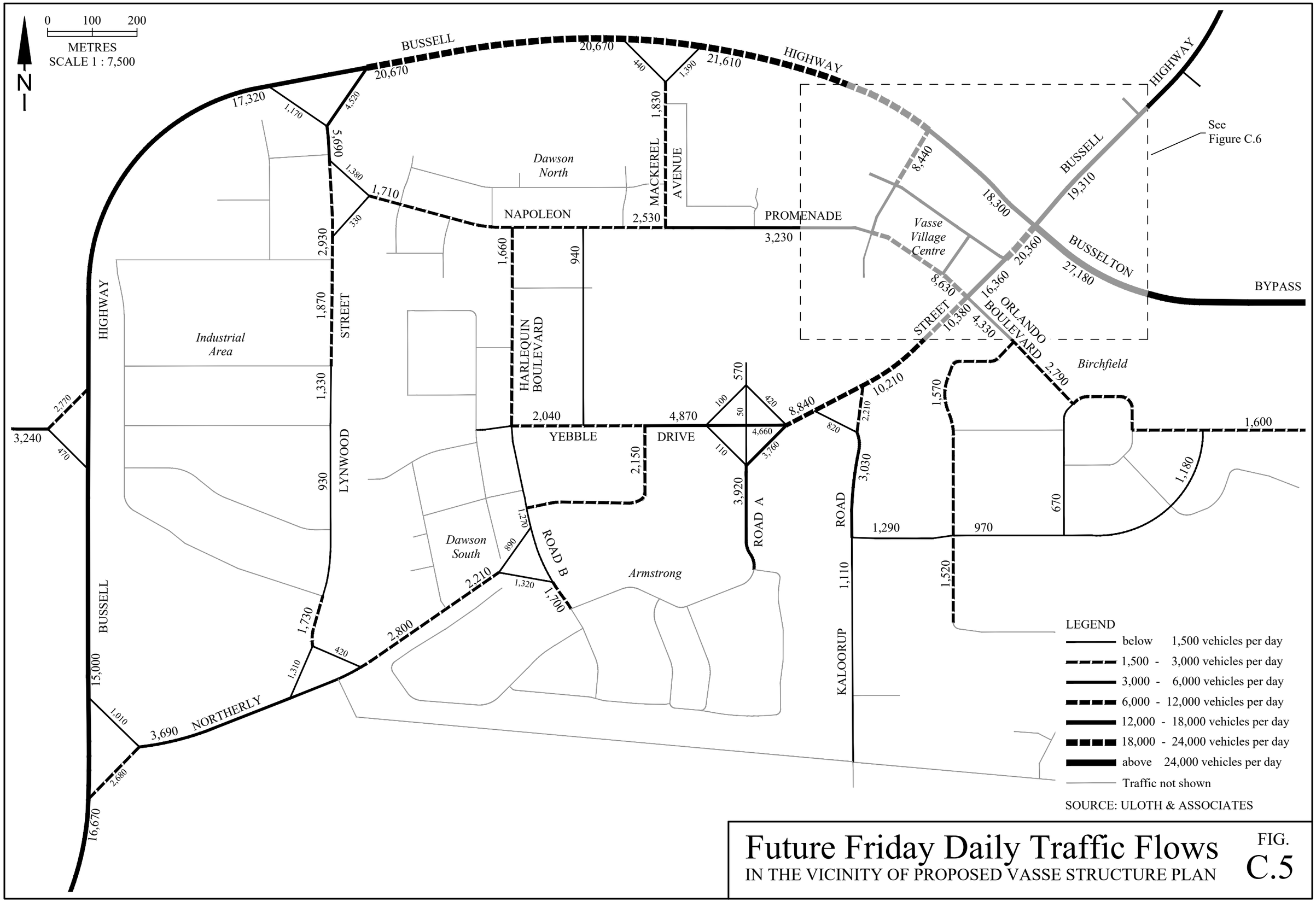
FIG. C.3



Future PM Peak Hour Traffic

AT VASSE VILLAGE CENTRE

FIG. C.4



Future Friday Daily Traffic Flows

IN THE VICINITY OF PROPOSED VASSE STRUCTURE PLAN

FIG. C.5

0 40 80
METRES
SCALE 1 : 2,500

N

LEGEND
below 1,500 vehicles per day
1,500 - 3,000 vehicles per day
3,000 - 6,000 vehicles per day
6,000 - 12,000 vehicles per day
12,000 - 18,000 vehicles per day
18,000 - 24,000 vehicles per day
above 24,000 vehicles per day
Traffic not shown
SOURCE: ULOTH & ASSOCIATES

BUSSELL HIGHWAY
21,620
5,910
8,440
2,530
18,240
BOULEVARD
HIGHWAY
5,780
4,560
COOMIDUP
3,190
GANGES
18,300
5,260
19,310
BUSSELL HIGHWAY
11,250
1,750
8,290
5,750
NAPOLEON
4,050
1,250
3,770
Vasse
Village
Centre
LANE
4,230
20,360
10,180
27,180
PROMENADE
4,420
STREET
BUSSELTON
8,630
5,420
16,360
1,750
1,460
8,620
2,320
260
BYPASS
10,380
4,330
ORLANDO
BOULEVARD
NORTHERLY

Future Friday Daily Traffic Flows
IN THE VICINITY OF ARMSTRONG

FIG.
C.6

C.8 INTERSECTION OPERATIONAL ANALYSIS

Tables C.6 to C.13 show the future Friday PM peak hour intersection operational characteristics for key intersections along both Bussell Highway and Northerly Street, in the vicinity of the proposed Vasse Structure Plan area, as generated within the AIMSUN traffic model.

Tables C.6 to C.8 show the Friday PM peak hour results (on a turning movement basis) for the Bussell Highway intersections with Coomidup Boulevard, Mackerel Avenue and Lynwood Avenue, respectively.

Table C.9 then shows the results for the Bussell Highway - Busselton Bypass - Northerly Street intersection, while Tables C.10 to C.13 show the Northerly Street intersections at Napoleon Promenade - Orlando Boulevard, Kaloorup Road, Yebble Drive - Road A and Road B.

It is important to note in Table C.9 that while the Bussell Highway - Busselton Bypass - Northerly Street roundabout shows an overall Level of Service C, there are individual movements from the north and west with Levels of Service D and E. However, it is also important to note that traffic patterns at this roundabout will change when the Vasse - Dunsborough Link bypass is constructed, resulting in reduced traffic flows to/from the north and east.

It can also be seen in Table C.11 that both the left- and right-turn movements out of Kaloorup Road are shown to operate at Level of Service E with average delays slightly higher than the maximum delay of 45 seconds identified under the WAPC Transport Assessment Guidelines. However this intersection has also been reviewed in SIDRA, using the same peak hour traffic flows, with results confirming that these critical movements will operate at an acceptable Level of Service D.

TABLE C.6
AIMSUN OPERATIONAL CHARACTERISTICS FOR BUSSELL HIGHWAY - COOMIDUP BOULEVARD UNSIGNALISED JUNCTION
FUTURE FRIDAY PM PEAK HOUR

ITEMS	OPERATIONAL CHARACTERISTICS Friday PM Peak Hour		
No. of Approach Lanes: N E S W	- 3 2 3		
Approach	Movement	Average Delay	Level of Service
Bussell Hwy - east	L	4	A
	T	0	A
Coomidup Blvd - south	L	6	A
	R	20	C
Bussell Hwy - west	T	0	A
	R	10	A

Notes: Results are presented on a turning movement basis, rather than lane-by-lane.
Level of Service calculations are based on Average Delay.

Source: Uloth and Associates

TABLE C.7
AIMSUN OPERATIONAL CHARACTERISTICS FOR BUSSELL HIGHWAY - MACKEREL AVENUE UNSIGNALISED JUNCTION
FUTURE FRIDAY PM PEAK HOUR

ITEMS	OPERATIONAL CHARACTERISTICS Friday PM Peak Hour		
No. of Approach Lanes: N E S W	- 3 1 3		
Approach	Movement	Average Delay	Level of Service
Bussell Hwy - east	L T	1 0	A A
Mackerel Avenue - south	L R	14 20	B C
Bussell Hwy - west	T R	1 8	A A

Notes: Results are presented on a turning movement basis, rather than lane-by-lane.
Level of Service calculations are based on Average Delay.

Source: Uloth and Associates

TABLE C.8
AIMSUN OPERATIONAL CHARACTERISTICS FOR BUSSELL HIGHWAY - LYNWOOD STREET UNSIGNALISED JUNCTION
FUTURE FRIDAY PM PEAK HOUR

ITEMS	OPERATIONAL CHARACTERISTICS Friday PM Peak Hour		
No. of Approach Lanes: N E S W	- 3 1 3		
Approach	Movement	Average Delay	Level of Service
Bussell Hwy - east	L T	0 0	A A
Lynwood Street - south	L R	4 12	A B
Bussell Hwy - west	T R	0 4	A A

Notes: Results are presented on a turning movement basis, rather than lane-by-lane.
Level of Service calculations are based on Average Delay.

Source: Uloth and Associates

TABLE C.9
AIMSUN OPERATIONAL CHARACTERISTICS FOR BUSSELL HIGHWAY - BUSSELTON BYPASS - NORTHERLY STREET ROUNDABOUT
FUTURE FRIDAY PM PEAK HOUR

ITEMS	OPERATIONAL CHARACTERISTICS Friday PM Peak Hour		
No. of Approach Lanes: N E S W Avrge Delay (sec) Level of Service	2 3 2 2 21 C		
Approach	Movement	Average Delay	Level of Service
Bussell Hwy - north	L T R	38 45 54	D D E
Busselton Bypass - east	L T R	7 9 13	A A B
Northerly Street - south	L T R	12 10 25	B A C
Bussell Hwy -west	L T R	5 24 38	A C D

Notes: Results are presented on a turning movement basis, rather than lane-by-lane.
Level of Service calculations are based on Average Delay.

Source: Uloth and Associates

TABLE C.10
AIMSUN OPERATIONAL CHARACTERISTICS FOR NORTHERLY STREET - NAPOLEON PROMENADE - ORLANDO BOULEVARD ROUNDABOUT
FUTURE FRIDAY PM PEAK HOUR

ITEMS	OPERATIONAL CHARACTERISTICS Friday PM Peak Hour		
No. of Approach Lanes: N E S W Avrge Delay (sec) Level of Service	2 1 1 1 9 A		
Approach	Movement	Average Delay	Level of Service
Northerly Street - north	L T R	5 5 7	A A A
Orlando Boulevard - east	L T R	17 18 19	B B B
Northerly Street - south	L T R	17 16 19	B B B
Napoleon Prom -west	L T R	7 9 8	A A A

Notes: Results are presented on a turning movement basis, rather than lane-by-lane.
Level of Service calculations are based on Average Delay.

Source: Uloth and Associates

TABLE C.11
AIMSUN OPERATIONAL CHARACTERISTICS FOR NORTHERLY STREET - KALOORUP ROAD UNSIGNALISED JUNCTION
FUTURE FRIDAY PM PEAK HOUR

ITEMS	OPERATIONAL CHARACTERISTICS Friday PM Peak Hour		
No. of Approach Lanes: N E S W	- 2 1 2		
Approach	Movement	Average Delay	Level of Service
Northerly Street - east	L T	1 0	A A
Kaloorup Road - south	L R	47 46	E E
Northerly Street - west	T R	0 8	A A

Notes: Results are presented on a turning movement basis, rather than lane-by-lane.
Level of Service calculations are based on Average Delay.

Source: Uloth and Associates

TABLE C.12
AIMSUN OPERATIONAL CHARACTERISTICS FOR NORTHERLY STREET - YEBBLE DRIVE - ROAD A ROUNDABOUT
FUTURE FRIDAY PM PEAK HOUR

ITEMS	OPERATIONAL CHARACTERISTICS Friday PM Peak Hour		
No. of Approach Lanes: N E S W Avrge Delay (sec) Level of Service	1 1 1 1 4 A		
Approach	Movement	Average Delay	Level of Service
Yebble Drive - north	L T R	7 7 4	A A A
Northerly Street - east	L T R	4 4 4	A A A
Road A - south	L T R	6 8 7	A A A
Northerly Street - west	L T R	3 4 4	A A A

Notes: Results are presented on a turning movement basis, rather than lane-by-lane.
Level of Service calculations are based on Average Delay.

Source: Uloth and Associates

TABLE C.13
AIMSUN OPERATIONAL CHARACTERISTICS FOR NORTHERLY STREET - ROAD B UNSIGNALISED JUNCTION
FUTURE FRIDAY PM PEAK HOUR

ITEMS	OPERATIONAL CHARACTERISTICS Friday PM Peak Hour		
No. of Approach Lanes: N E S W	1 - 2 2		
Approach	Movement	Average Delay	Level of Service
Northerly Street - north	T R	0 1	A A
Road B - south	L T	0 0	A A
Northerly Street - west	L T	1 2	A A

Notes: Results are presented on a turning movement basis, rather than lane-by-lane.
Level of Service calculations are based on Average Delay.

Source: Uloth and Associates

HATCH