Forrestfield U7 | Agreement Area 2, 3 and 4

Structure Plan Amendment Report
Lot 12 (256) Sultana Road East, Forrestfield

Prepared for Acott Equities Pty Ltd

23~070

January 2025

Taylor Burrell Barnett

ENDORSEMENT

This outline development plan is prepared under the provisions of the City of Kalamunda Town Planning Scheme No. 3.

IT IS CERTIFIED THAT THIS STRUCTURE PLAN WAS APPROVED ON:

15 June 1998

In accordance with Schedule 2, Part 4, Clause 28 (2) and refer to Part 1, 2. (b) of the Planning and Development (Local Planning Schemes) Regulations 2015.

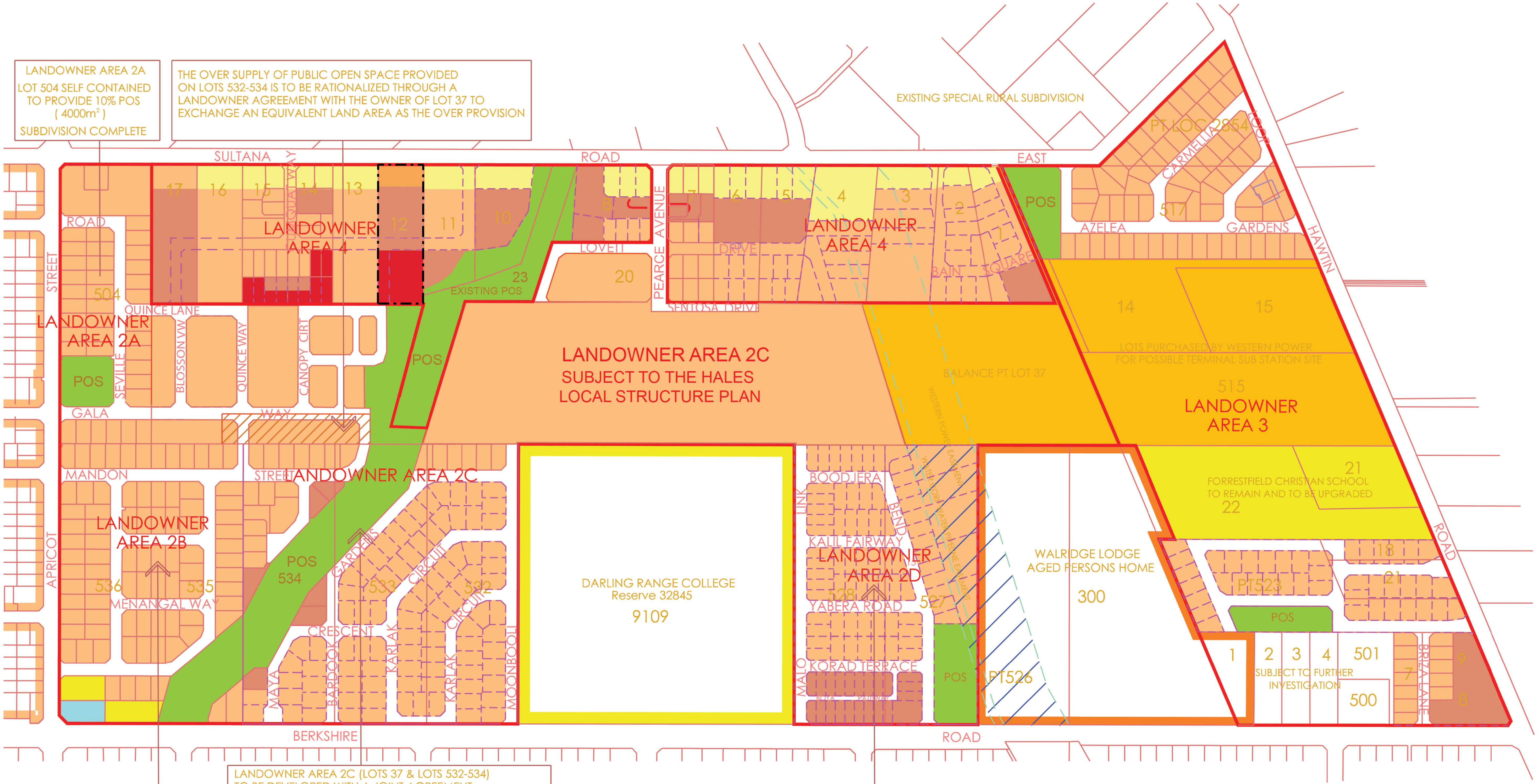
Date of Expiry: 19 October 2028

TABLE OF AMENDMENTS

Amendment No.	Amendment Summary	Council Endorsed Date	WAPC Endorsed Date
N/A	Original outline development plan	15 June 1998	-
N/A	Modified outline development plan	-	08 July 2008
N/A	Unknown	-	13 February 2013
1	Increasing the residential density coding of Lot 16 (228) Sultana Road, deleting a portion of road, and extending Mangosteen Drive.	-	20 November 2020
2	• Rezone Lot 12 No. 256 Sultana Road East from R12.5 and R20 to R25, R30 and R40 lots. • Update the Structure Plan to reflect the changes and incidental configurations • Remove area of Public Open Space on Lot 12 No. 256 Sultana Road East.	-	11 February 2025

LANDOWNER AREA 2A
LOT 504 SELF CONTAINED TO PROVIDE 10% POS (4000m²)
SUBDIVISION COMPLETE

THE OVER SUPPLY OF PUBLIC OPEN SPACE PROVIDED ON LOTS 532-534 IS TO BE RATIONALIZED THROUGH A LANDOWNER AGREEMENT WITH THE OWNER OF LOT 37 TO EXCHANGE AN EQUIVALENT LAND AREA AS THE OVER PROVISION



LANDOWNER AREA 2B (LOTS 535 & 536) DEVELOPED WITH JOINT AGREEMENT IN RESPECT TO POS PROVISION

TOTAL AREA OF 2 LOTS	8.1140ha
LESS COMMERCIAL SITE	0.1638ha
NET DEVELOPABLE AREA	7.9502ha
POS AT 10%	0.7950ha
COMMUNITY PURPOSE SITE CREDITED AS POS	0.2000ha
POS REQUIRED	0.5950ha
POS PROVIDED	0.7750ha
OVERPROVISION OF POS	0.1800ha

SUBDIVISION COMPLETE

LANDOWNER AREA 2C (LOTS 37 & LOTS 532-534) TO BE DEVELOPED WITH A JOINT AGREEMENT IN RESPECT TO POS AND DRAINAGE

LAND AREAS	
LOT 37	21.5700ha
LESS AREA RETAINED FOR TERMINAL SUBSTATION	4.7128ha
	16.8572ha
LOTS 532-534	12.1710ha
NET DEVELOPABLE AREA	29.0282ha
POS REQUIRED AT 10%	2.9028ha
POS PROPOSED	
LOTS 532-534	1.8000ha
	(0.5829ha OVER PROVISION)
LOT 37	1.1028ha
	(0.5829ha UNDER PROVISION)
TOTAL	2.9028ha

SUBDIVISION APPROVED AND UNDER CONSTRUCTION

LANDOWNER AREA 2D - LOTS 527 & 528

TO BE DEVELOPED AS SELF CONTAINED SUB AREA WITH 10% PROVISION OF POS

DRAINAGE SWALE WITHIN POS 100% CREDIT

NOTE :
CALCULATION OF POS BASED UPON 10% OF NET DEVELOPABLE AREA EXCLUDING NON DEVELOPABLE WESTERN POWER EASEMENT

SUBDIVISION APPROVED

OUTLINE DEVELOPMENT PLAN
AGREEMENT AREAS 2, 3 & 4
FORRESTFIELD U7

RESIDENTIAL CODES
- RESIDENTIAL R12.5
- RESIDENTIAL R20
- RESIDENTIAL R30
- RESIDENTIAL R40
- RESIDENTIAL R25 APPLY TO FRONTAGE LOTS

0 100m
SCALE 1:5000 @ A3

DATE: 14 OCTOBER 2020

Document Information

Structure Plan Amendment Report - Kalamunda U7 Outline Development Plan

Lot 12 (256) Sultana Road East, Forrestfield

Acott Equities Pty Ltd

23~070

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Doc ID: 23~070 RPT SP Amendment

Revision	Status	Author	Approved by	Date Issue
1.0	Issued for Advertising	L. Martins	J. Ross	13/06/2024
1.1	Issued for Council Consideration	L. Martins	J. Ross	16/09/2024
2.0	Final issued for WAPC Endorsement	L. Martins	R. Chapman	08/01/2025

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Executive Summary

This report has been prepared as an amendment to the Outline Development Plan for Agreement Areas 2, 3 and 4 (Forrestfield U7) which is implemented in accordance with *Planning and Development (Local Planning Scheme) Regulations 2015* and the City of Kalamunda *Local Planning Scheme No. 3.*

The subject site for the purpose of the amendment is Lot 12 (256) Sultana Road East, Forrestfield, which is currently a 1ha lot consisting of a single dwelling and associated outbuildings which fronts Sultana Road East and is surrounded by similar sized rural living landholdings and a growing suburban residential estate.

This report provides a comprehensive overview of planning controls and considerations to facilitate the future subdivision and development of the site for residential purposes consistent with the over arching vision of the City of Kalamunda and the Western Australian Planning Commission.

Land Use

The structure plan amendment retains the existing 'Residential' zone applicable to the subject site and proposes the land to be subdivided and developed exclusively for residential purposes.

The amendment seeks to modify the residential coding applicable to the site from R12.5 and R20 to more contemporary densities which appropriately transition from R25 for frontage lots to R30 and R40 lots, and provide for the development of a range of high quality dwelling types including but not limited to single detached dwellings, grouped dwellings and terrace home style development.

The final lot design is to be determined at the subdivision application stage in order to provide flexibility to respond to changing market conditions and deliver an optimal outcome for existing and future residents.

Structure Plan Amendment Summary Data

Item	Data	Document Reference
Total Amendment Area	1.001Ha	Part 2, Section 1.2
Area of Land Use Proposed	~0.76Ha (Residential)	Plan 1
Estimated Lot and Dwelling Yield	~15-30 lots/dwellings	Part 2, Section 5.2
Estimated Residential Site and Target Density	25-30 dwellings/ha	Part 2, Section 5.2
Estimated Population	47-70 people	Part 2, Section 5.2

Movement Network

The existing Outline Development Plan provides an indicative road pattern which provides for connections to Mangosteen Drive to the west, Sultana Road East to the north and Canopy Circuit to the south.

Connections to these existing streets have been retained as a component of the amendment, but an alternative indicative road design is proposed across the subject site, along with the adjacent Lots 11 and 13, which provides greater efficiency in subdivision design for all three lots whilst maintaining connectivity to the broader network.

Public Open Space

The original Outline Development Plan identified a small portion of public open space in the southern section of subject site.

In further discussion with the City it was recognised that this additional open space was too small to provide benefit to the existing or future residents of the area, and was not necessary given the extent of open space already available within the local area.

On this basis, it is proposed that the open space area be removed from the subject site as part of the amendment proposal, and the subdivider be required to make a cash-in-lieu payment for their open space contribution as a condition of subdivision approval.

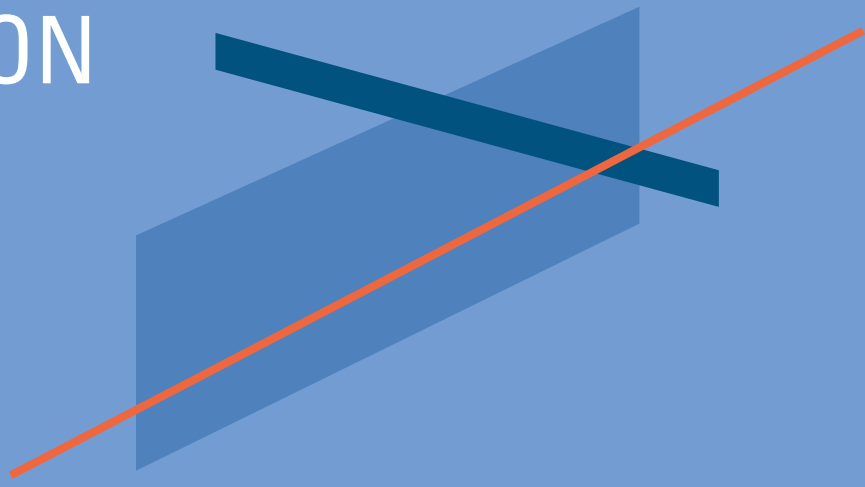
This cash-in-lieu is to be used to fund improvements or expansion of public open space within the immediate locality to ensure that it provides benefit to the local community.

Implementation

The implementation of the subdivision and development is likely to occur as a single stage, with subdivision approval to be progressed following approval of this structure plan amendment, and will include the extension of public infrastructure and connection to services in accordance with the conditions of approval.

1.0

PART ONE: IMPLEMENTATION



1.0 Structure Plan Area & Operation

This Structure Plan Amendment applies to Lot 12 (256) Sultana Road East, Forrestfield, as depicted on **Plan 1**.

The plan is in effect from the date stated on the cover (date decision letter is distributed to the applicant) and for a period of 10 years, or for any other period approved by the Western Australian Planning Commission (WAPC).

The structure plan amendment is informed by the adopted Outline Development Plan and by the City of Kalamunda's *Local Planning Scheme No. 3*.

2.0 Purpose of the Structure Plan

The purpose of this report is to outline an amendment to the approved Forrestfield U7 Outline Development Plan (ODP) with respect to the Structure Plan Amendment Area.

The key objectives of this report are to:

- Apply a more contemporary residential density coding to the subject area which is reflective of modern residential development and aligns with existing and proposed development throughout the surrounding area;
- Clarify arrangements with respect to the provision of public open space within the ODP Area and more specifically with respect to the structure plan amendment area; and
- Outline the anticipated road network modifications across the structure plan amendment area, and the anticipated alignment of these across adjacent development sites to connect with the existing gazetted road network.

3.0 Staging of Implementation

The subdivision of the subject site is likely to be undertaken as a single stage, with development to occur progressively across new residential lots following the creation of new titles.

4.0 Subdivision and Development

The proposed zones and reserves for the structure plan amendment area are outlined in **Plan 1**.

4.1 Land Use Zones and Reserves

4.1.1 Zoning

The subject site is zoned 'Residential' for the purpose of this Structure Plan Amendment, and is to be interpreted consistent with the land use permissibility and development controls applicable to the corresponding 'Residential' zone of the City of Kalamunda's *Local Planning Scheme No. 3* (as amended).

4.1.2 Road Reserves

The indicative road reserve alignments are outlined in **Plan 1**, and will be designated as a component of a submitted Plan of Subdivision for the Structure Plan Area.

It is anticipated that the Plan of Subdivision will outline standard 15.0m wide Road Reserve consistent with the surrounding road network, and designed in accordance with Liveable Neighbourhoods and the applicable standards and requirements of the City of Kalamunda.

4.1.3 Public Open Space

The subject site is not required to provide any land as public open space as outlined in **Plan 1**. The subdivider will instead provide a cash-in-lieu contribution to a value consistent with 10% of the market value of the land in accordance with the WAPC Development Control Policy 2.3 and s.155 of the *Planning and Development Act 2005.*

4.2 Density and Development

4.2.1 Density and R-Codes

Plan 1 designates an R-Codes applicable to subdivision and development in the structure plan area, being:

- **R25**, which is to be applicable to lots directly fronting Sultana Road East, and are intended as a lower density transition to the rural-residential land uses to the north;
- **R30**, which is to be applied to the centre of the site, is intended to accommodate a combination of single lots and a grouped housing site;
- **R40**, which is applicable to the remainder of the Structure Plan Amendment Area, is intended to accommodate terrace style development depending on market demand and compliance with the R-Codes.

4.2.2 Local Development Plan(s)

A Local Development Plan is to be prepared for the Structure Plan Amendment area as a condition of subdivision approval to identify variations to the R-Codes for the delivery of residential development across created lots, and in addition will address (as relevant):

- Primary street setback requirements and open space for lots fronting Sultana Road East in consideration of Bushfire Attack Level (BAL) ratings; contemporary dwelling design and optimal creation of open space; and retention/planting of mature trees within the road verge;
- Primary and secondary street setback requirements, garage locations and open space for lots coded R30 and R40;
- Uniform fencing design for any lots abutting the adjacent public open space; and
- Additional design considerations for narrow and/or laneway lots, inclusive of boundary setback requirements for side boundary walls.

4.3 Other Requirements

4.3.1 Bushfire Protection

A portion of the subject site is identified as 'Bushfire Prone' on the DFES Map of Bush Fire Prone Areas.

A bushfire management plan has been prepared by Martinick Bosch Shell Pty Ltd in support of this structure plan amendment provided in **Appendix B.** The BMP notes that the proposal is capable of being fully compliant with the acceptable solutions and protection criteria.

4.3.2 Infrastructure Arrangements

An approved subdivision application will be subject to conditions requiring connection to all essential services necessary to accommodate residential development of proposed lots. A servicing strategy demonstrating the lack of constraint to utility connections is outlined in **Appendix C**.

4.3.3 Development Contributions

There are no development contribution arrangements applicable to the subdivision or development of the subject site other than the anticipated requirement for a cash-in-lieu contribution for public open space consistent with section 4.1.3 of this report.

4.3.4 Protection or Management of Environmental / Landscape Features

There are no environmental or landscape features of the subject site which warrant protection or management.

4.3.5 Water Resource Management

A draft Urban Water Management Plan (UWMP) has been prepared based on a conceptual subdivision proposal and is included as **Appendix E**. The UWMP outlines local stormwater management is to be consistent with water sensitive design practices and to meet key objectives and criteria.

4.4 Additional Details

4.4.1 Required Application Information

A subdivision application for the subject site may be required to be accompanied by the additional information outlined in **Table 1** below.

Table 1: Additional Information likely to be required as a component of a subdivision application for the subject site.

Additional Information / Purpose	Approval Stage	Responsible Agency
Justification of consistency with Structure Plan Addendum Report Guidance	Subdivision Application	Western Australian Planning Commission
Bushfire Attack Level (BAL) Assessment	Subdivision Application	Western Australian Planning Commission
Transport Impact Assessment	Subdivision Application	Western Australian Planning Commission
Liveable Neighbourhoods Assessment	Subdivision Application	Western Australian Planning Commission

4.4.2 Conditions of Future Approvals

A subdivision approval for the subject site is anticipated to be subject to standard conditions of residential subdivision proposals, and generally in accordance with the WAPC's model subdivision conditions.

Studies or assessments which may be required are anticipated to be limited to those outlined in **Table 2** below.

Table 2: Additional Information likely to be required as a condition of a subdivision approval for the subject site.

Additional Information / Purpose	Approval Stage	Responsible Agency
Urban Water Management Plan	Condition of Subdivision Approval	Western Australian Planning Commission
Geo-technical Analysis	Condition of Subdivision Approval	Western Australian Planning Commission
Local Development Plan	Condition of Subdivision Approval	Local Government

Plan 1: Structure Plan Amendment Plan

2.0

PART TWO: Explanatory Section

1.0 Introduction and Purpose

1.1 Purpose

This amendment to the Outline Development Plan (ODP) for Agreement Areas 2, 3 & 4 Forrestfield U7 (**U7SP)** applies to Lot 12 (No.256) Sultana Road East, Forrestfield (subject site) within the municipality of the City of Kalamunda (City). It forms part of a broader development area that is progressively being developed for residential purposes. Under the *Planning and Development (Local Planning Schemes) Regulations 2015* (LPS Regs) Outline Development Plans (or similar) are now defined as 'Structure Plans'.

The U7SP was originally approved by the Western Australian Planning Commission (WAPC) on 15 June 1998. The most recent amendment to the U7SP was approved by the WAPC on 28 June 2019.

The purpose of the proposed structure plan amendment is intended to facilitate a more contemporary residential density for the site and a more efficient subdivision layout. U7SP will remain in operation for the portions of the Agreement Areas which include existing development.

The report addresses the proposed mix of residential densities, adjustments to the indicative movement network, clarification of public open space provisions with further information provided on the planning background, site conditions and subdivision considerations.

1.2 Land Description

The subject site comprises of a single land parcel (Lot 12), with an area of approximately 1 hectare. The site currently consists of an existing residential dwelling on the north-eastern portion of the site, with the remainder generally cleared with areas of low-level vegetation and some large trees along the lot boundary, refer **Figure 1.**

Development of the surrounding area has occurred progressively since the introduction of the U7SP, with mostly rural residential properties being subdivided on an individual basis according to the existing U7SP.

The property details and ownership of the subject site are detailed in **Table 3** below.

Table 3: Legal Description

Lot No.	Volume/Folio	Plan	Site Area	Registered Proprietor
12 (No. 256) Sultana Road East, Forrestfield	1595/559	P013574	10,001m²	Acott Equities Pty Ltd

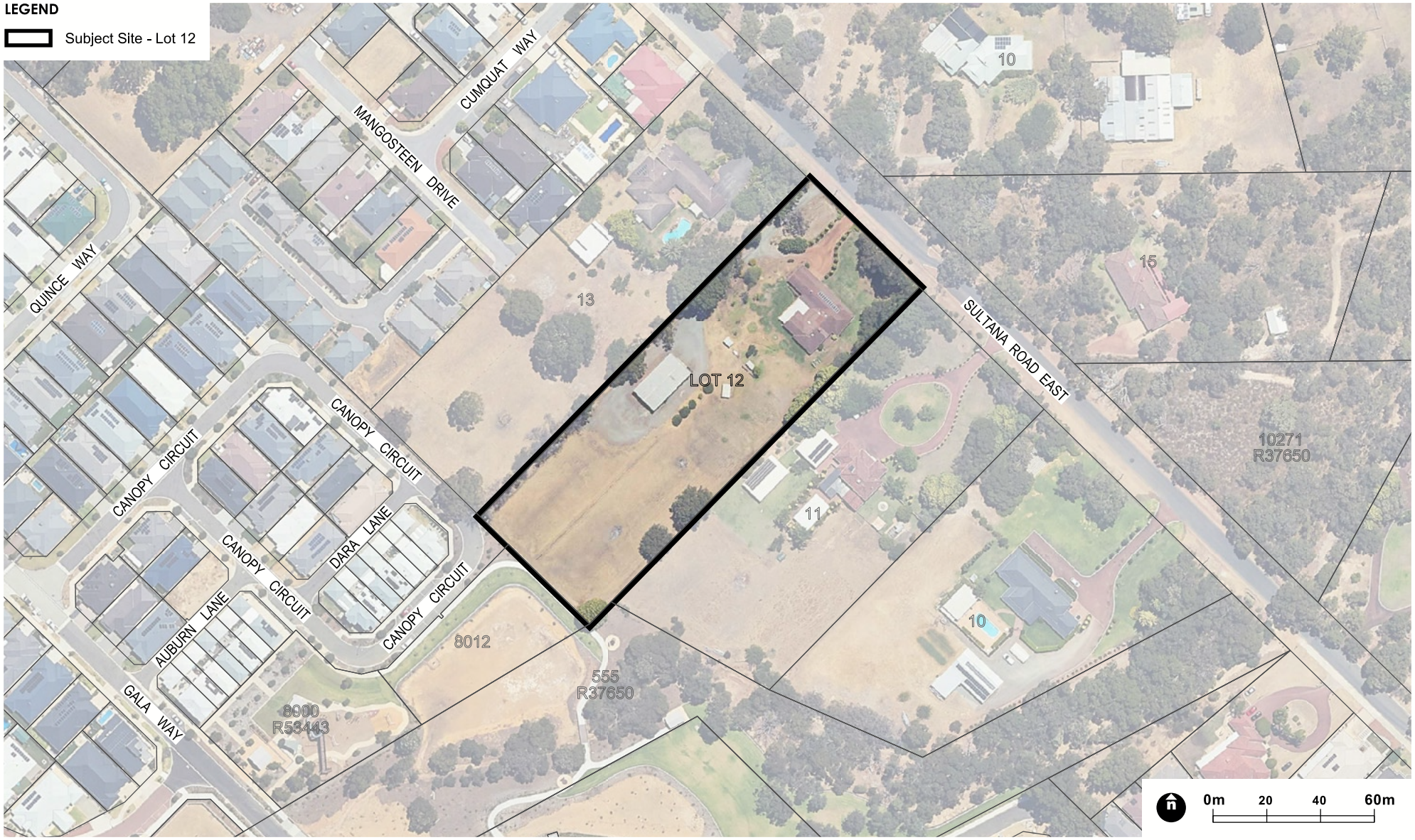


Figure 1: Subject Site (Aerial)

2.0 Site and Context Analysis

2.1 Regional Context

The subject site is located within the suburb of Forrestfield situated within the municipality of the City of Kalamunda. It is situated approximately 14km east of the Perth Central Business District, 8.5km south of the Midland Activity Centre, and 4.km south east of the Perth Airport (**Figure 2**).

Situated in the Darling Range foothills, the site is an extension of the existing Forrestfield residential area.

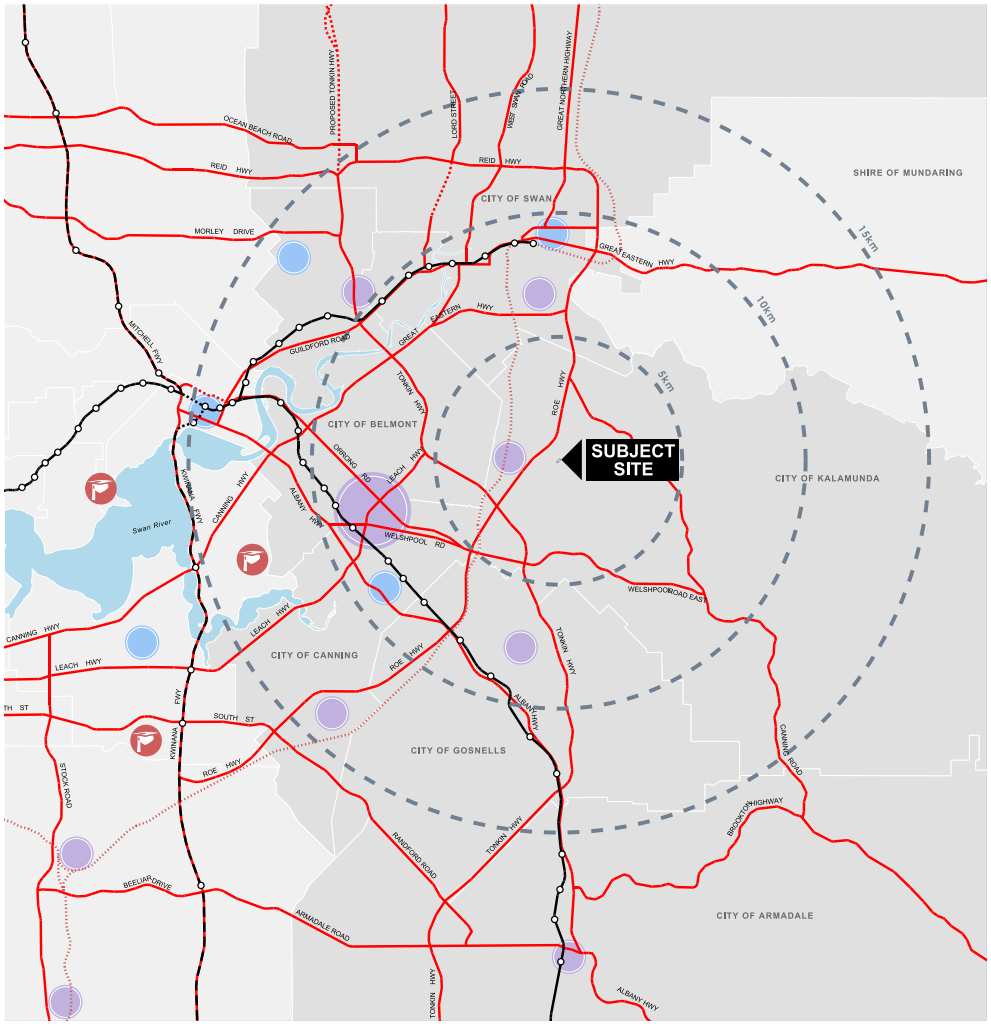


Figure 2: Regional Context Plan

2.2 Local Context

The subject site fronts Sultana Road East to the north, and is generally bound by existing residential development and land identified for future infill housing development.

Land to the north of Sultana Road East primarily consists of large lot rural-residential properties, whilst to the south and west development generally comprises medium density residential development (**Figure 3**).

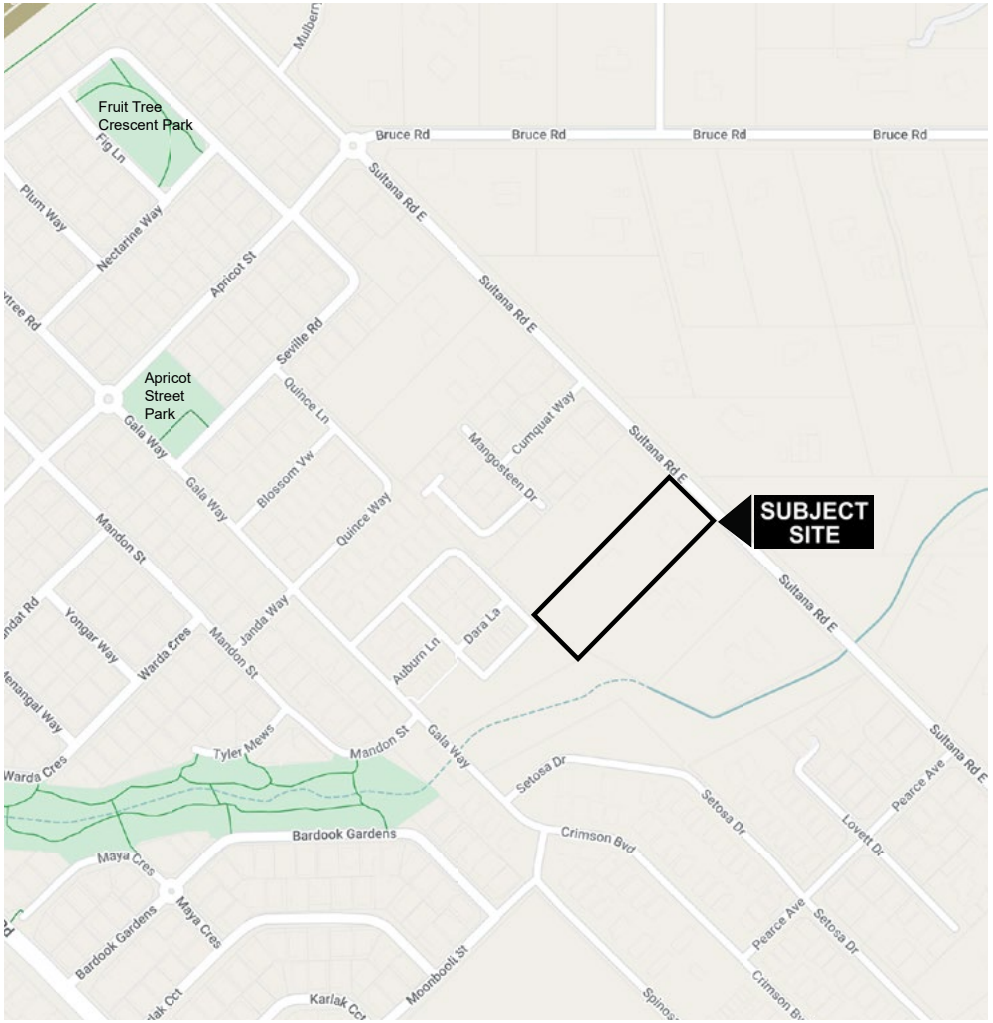


Figure 3: Local Context Plan

2.3 Environmental Considerations

2.3.1 Landform

The subject site is located in the Perth sub-region, broadly characterised by Jarrah and Banksia woodlands on sandy soils.

2.3.2 Geotechnical Analysis

Surface soils across the study area are classified as sand and clay, consistent with the adjacent Hales Estate Stages 2 - 9. The draft UWMP provided in **Appendix E** notes that there was no indicated contaminated sites, risk of Acid Sulphate Soils (ASS) or impacts to groundwater qualities on the subject site (**Figure 4**).

2.3.3 Environmental Features

The subject site currently contains remnant vegetation of a managed rural lot, comprising of lawn areas, landscaped gardens, shrubs, and trees scattered on the sites east, west and northern borders.

The site does not contain any significant vegetation or environmental features, or any wetlands or waterways, with the closest streamline (Crumpet Creek) that flows from the northeast from Sultana Road East to the southwest located approximately 150m to the northeast.

2.3.4 Groundwater

Assessment of the subject site indicates that minimum groundwater levels are around RL24m AHD, with significant separation (approximately 20m) from natural surface levels. The draft UWMP notes that clay soils may present issues with surface water perching, requiring a subsoil network for discharge to the south and stormwater infiltration, which will be addressed in the final UWMP during detailed design following subdivision approval.

2.3.5 Stormwater Management

The stormwater drainage system recommended in draft UWMP has been designed based on the management of small, minor and major events.

- **Initial Rainfall:** First 15mm of rainfall discharges into the road drainage network, directing runoff to roadside swales.
- **Minor Events:** Managed through drains, pipes, kerbs, and gutters for up to 20% AEP.
- **Major Events:** Directed along overland flow paths.

The site falls within two drainage catchments: lots fronting Sultana Road East drain to its stormwater system (Catchment A); with the remainder to be directed to the Hales Estate Detention Storage basin (Catchment B). The draft UWMP notes that based on the concept design, stormwater drainage levels are capable of being sufficiently managed.

Figure 4: Environmental Considerations for subject site

2.4 Transport Considerations

2.4.1 Road Network

Existing access to the subject site is provided via Sultana Road East, with proposed access to be provided via Mangosteen Drive to the north-west and Canopy Circuit to the south. Sultana Road East is classified as an Access Road by Main Roads WA, operating under the default speed limit of 50km/h.

The proposed subdivision will provide access via existing access arrangements from Sultana Road East, combined with modifications to the road network to allow access from the adjacent subdivision to the east, west and south of the site via Canopy Circuit and Mangosteen Drive (**Figure 5**).

The proposed modifications to the road network will improve the local road network and connectivity.

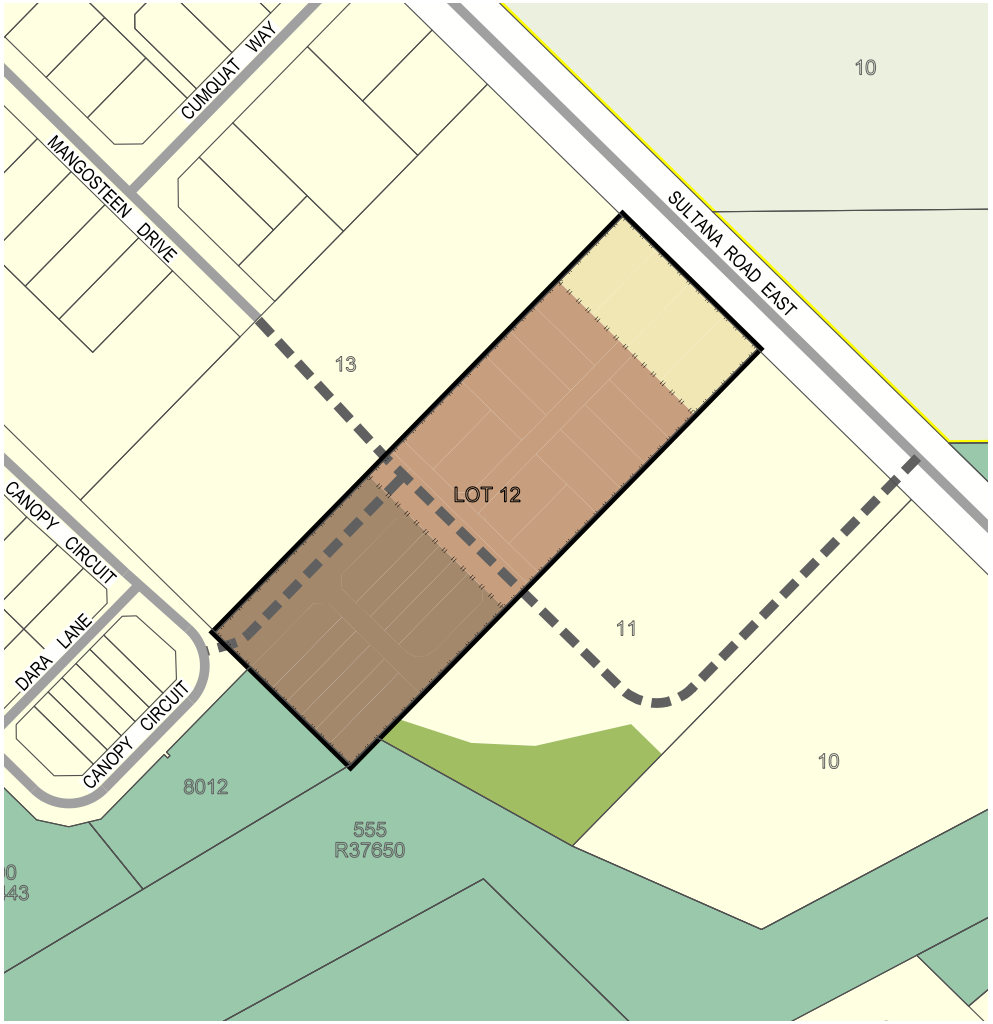


Figure 5: Indicative road alignments across Lots 13, 12 and 11 to provide connections to the existing Mangosteen Drive, Canopy Circuit and Sultana Road East.

2.4.2 Public Transport

Access to public transport services (Bus Service 270) exists on Hawtin Road approximately 1.2km east of the subject site (**Figure 6).** This bus route provides service between High Wycombe Station to Elizabeth Quay Station from Monday to Sunday including Public Holidays.

2.4.3 Cycling / Walking

A 2m shared path exists along portions of the southern side of Sultana Road East. The subject site has direct access to Sultana Road East and will have improved pedestrian and cycle access as the planned movement networks of the surrounding area become fully developed in the future.

Identified on Perth Bike Maps published by the Department of Transport, the cycle network around the subject site and along Sultana Road East is considered 'good riding environment'. The cycling network provides good accessibility east and west through the local area.

2.4.4 Waste Collection

Waste will be collected by the standard arrangement for residential subdivisions throughout the City of Kalamunda. The proposed road network will provide sufficient access in both directions on all streets for rubbish collection on either side of the street, and will be further considered at subdivision design stage.

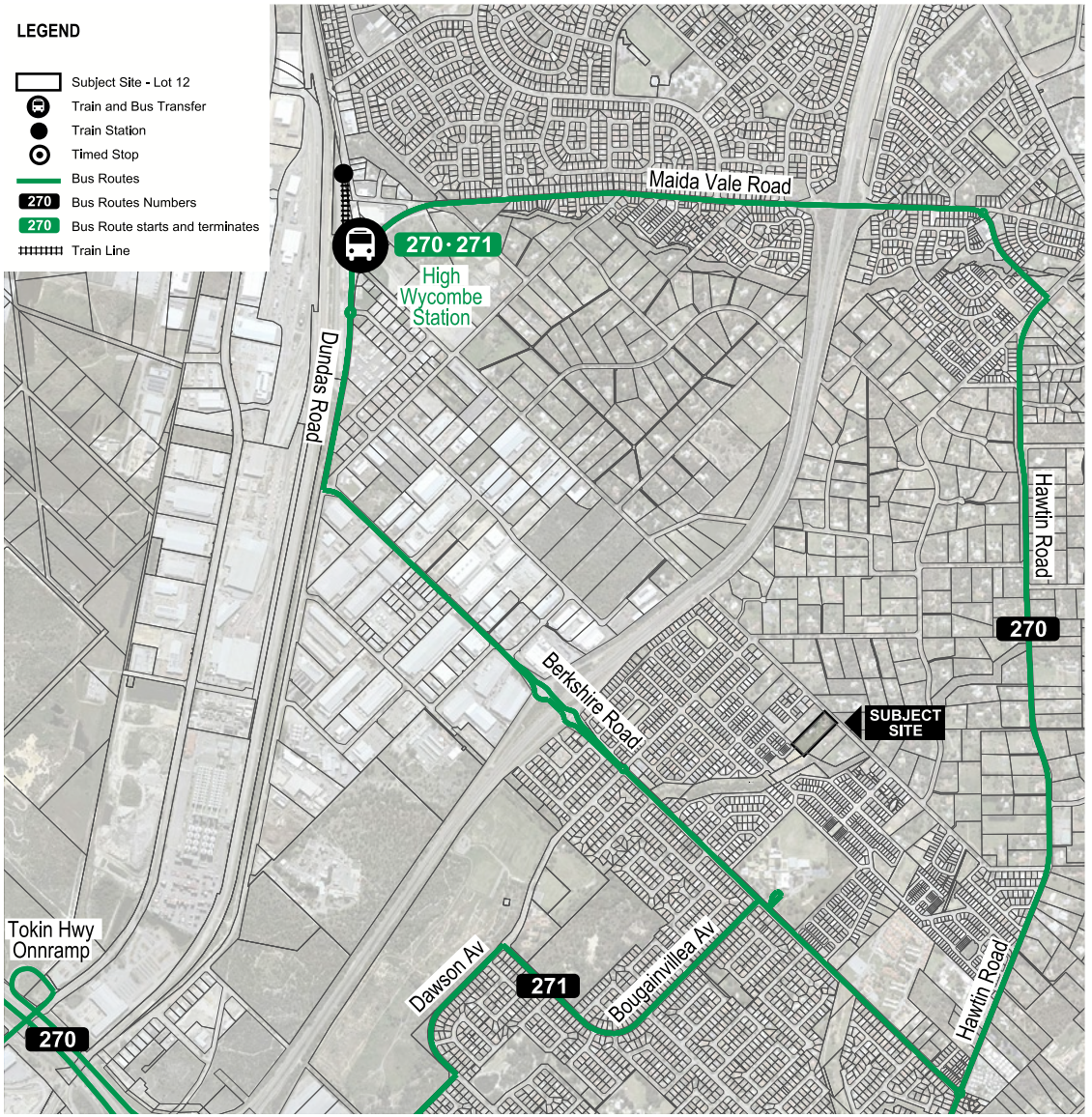


Figure 6: Public Transport Access within surrounding area.

2.5 Planning Framework

2.5.1 Sub-Regional Strategy

The *Perth and Peel @3.5million* strategy was adopted by the WAPC in March 2018, with the framework establishing a long-term, integrated planning framework for land use and infrastructure to guide future growth. The strategy was published together with a number of sub-regional planning frameworks to provide guidance at the local level.

The *North-East Sub-Regional Planning Framework* (Sub-Regional Framework) is the strategic planning document that encompasses the area of Forrestfield and is intended to guide the delivery of the objectives under Directions 2031.

The Sub-Regional Framework identifies the Kalamunda local government area, inclusive of Forrestfield, as an area for urban expansion and expected population increase, suggesting land zoned urban to accommodate increased residential infill development and densities in undeveloped areas (**Figure 7**). The framework provides a minimum urban infill dwelling target of 11,450 dwellings to accommodate 25,190 people by 2050, with a total dwelling target of 21,040.

The proposed structure plan amendment is consistent with the strategy as follows:

- The proposed residential development within this structure plan is in accordance with the Sub-Regional Framework urban development objectives and dwelling targets for the local government area.
- The subject site is identified as 'Urban' under the framework and is therefore identified as suitable location for accommodating increased urban development.
- The proposed increases in densities reflect the Sub-Regional Framework's recommendation on increasing residential densities in greenfield developments.
- Bushfire risk assessment has been conducted as part of this report (refer **Appendix B**), consistent with the Sub-Regional Framework.

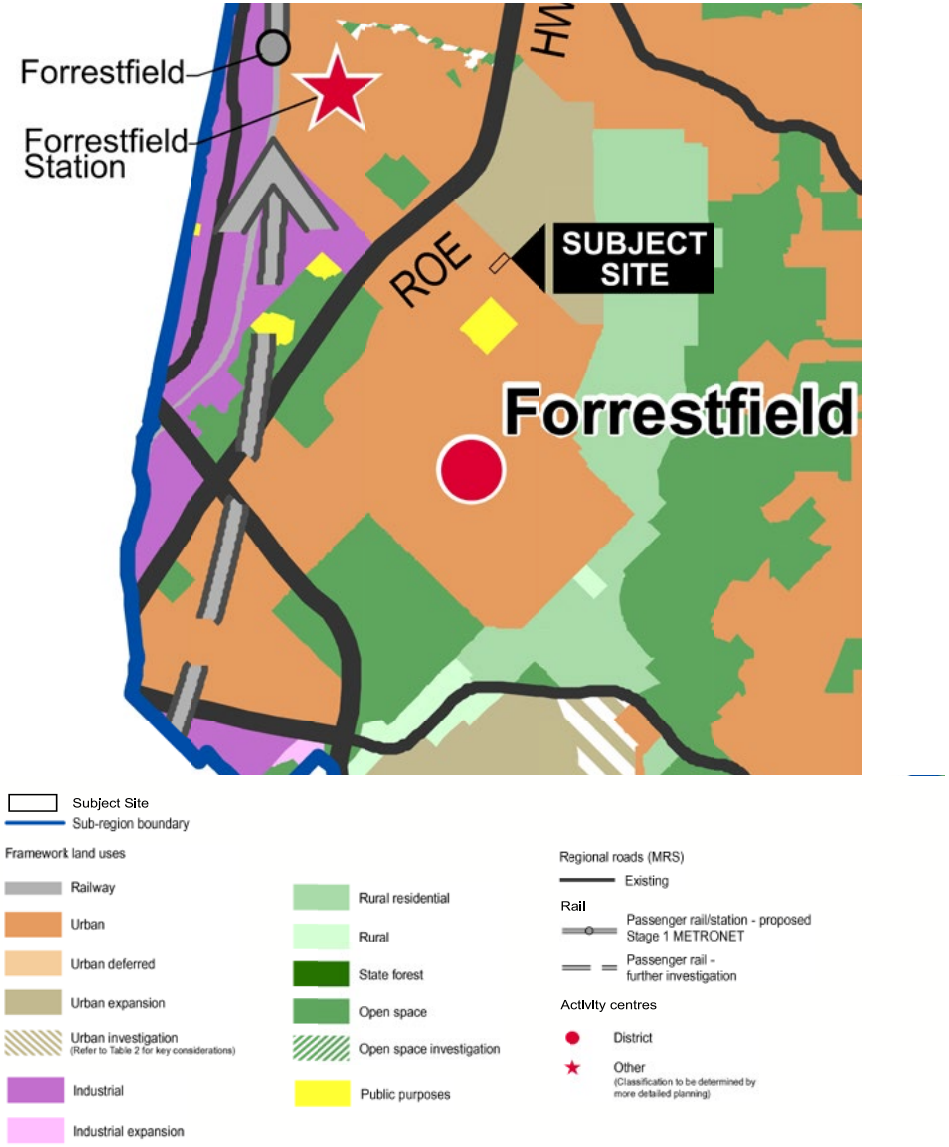


Figure 7: North-East Sub-Regional Planning Framework Map Extract

2.5.2 Local Planning Strategy

The City of Kalamunda *Local Planning Strategy* was endorsed on 5 February 2013 (**Figure 8**). The strategy has been prepared to provide planning and development guidance in conjunction with the City of Kalamunda *Local Planning Scheme No.3*.

The proposed amendment is consistent with the key objectives of the strategy applicable to the subject site as follows:

- The proposed amendment will support employment growth proximate to the Perth Airport, identified as a driving demand for housing in the Forrestfield area.
- The development supports population and dwelling targets by accommodating increasing residential densities.
- The development of new dwellings in Forrestfield area is described as a priority.

2.5.2.1 Local Housing Strategy

Informing the preparation of the endorsed Local Planning Strategy (2013), the City prepared a Local Housing Strategy (LHS) to identify and facilitate housing needs for the area.

The LHS noted the limited housing diversity within the municipality, with half of all housing stock being low density being occupied by one or two persons. Subsequently, the LHS promotes increased densities.

The proposed amendment seeks to modify the coding applicable to the subject site, which under the existing ODP is allocated as R12.5 and R20, to a density coding of R25, R30 and R40, providing for a larger number of dwellings to be created and a more contemporary residential development pattern.

Figure 8: Local Planning Strategy Map Extract

2.5.3 Metropolitan Region Scheme

Under the provisions of the *Metropolitan Region Scheme* (MRS) the subject land is zoned 'Urban'. Land to the north-east of Sultana Road remains within the 'Rural' zone under the MRS (**Figure 9**).

To the south of the subject site is a portion of a land reserved for 'Public Purpose' (High School), and to the north-west of the site is land reserved for 'Primary Regional Road' which accommodates Roe Highway.

The proposed amendment to the structure plan is consistent with the objectives of the Urban zone under the MRS.

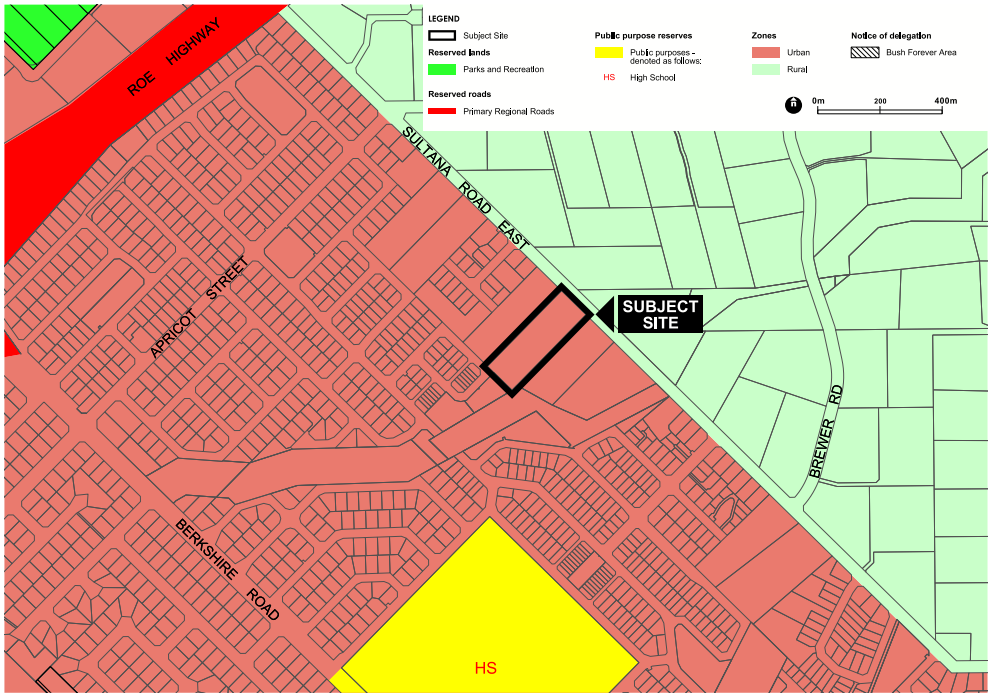


Figure 9: Metropolitan Region Scheme Zoning

2.5.4 Local Planning Scheme No. 3

The subject site is zoned 'Urban Development' under the City of Kalamunda *Local Planning Scheme No.3* (LPS3) (**Figure 10**). Clause 4.2.1 outlines the objectives of the Urban Development zone:

- *To provide orderly and proper planning through the preparation and adoption of a Structure Plan setting the overall design principles for the area.*
- *To permit the development of land for residential purposes and for commercial and other uses normally associated with residential development.*

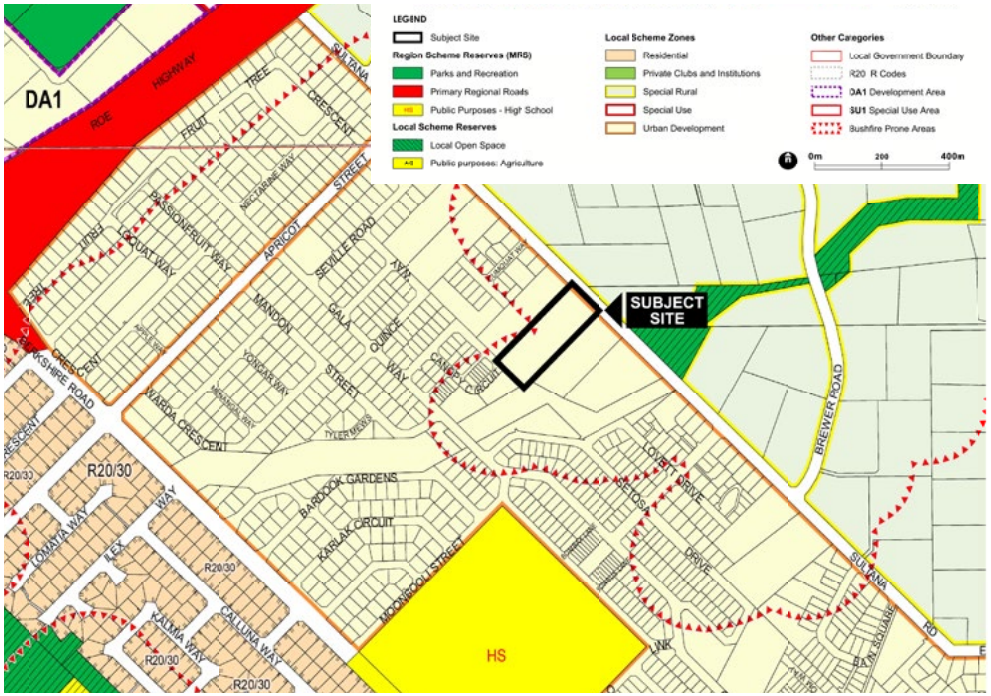


Figure 10: Local Planning Scheme No.3 Zoning

Consistent with the zones objectives, U7SP was adopted for the subject site in accordance with clause 6.2.2.1 of LPS3 and the *Planning and Development (Local Planning Scheme) Regulations 2015*. The Structure Plan has been adopted by the WAPC, and is intended to guide future subdivision and associated residential development.

2.5.4.1 Outline Development Plan Agreement Areas 2,3 & 4 Forrestfield U7

Under the provisions of U7SP the subject site is zoned 'Residential,' with residential density codes of R12.5 on the northern portion of the lot abutting Sultana Road East, and R20 for the remainder of the lot, as outlined in **Figure 11.**

It is also noted that the south-east corner of the subject site is identified as part of the reservation for 'Public Open Space'.

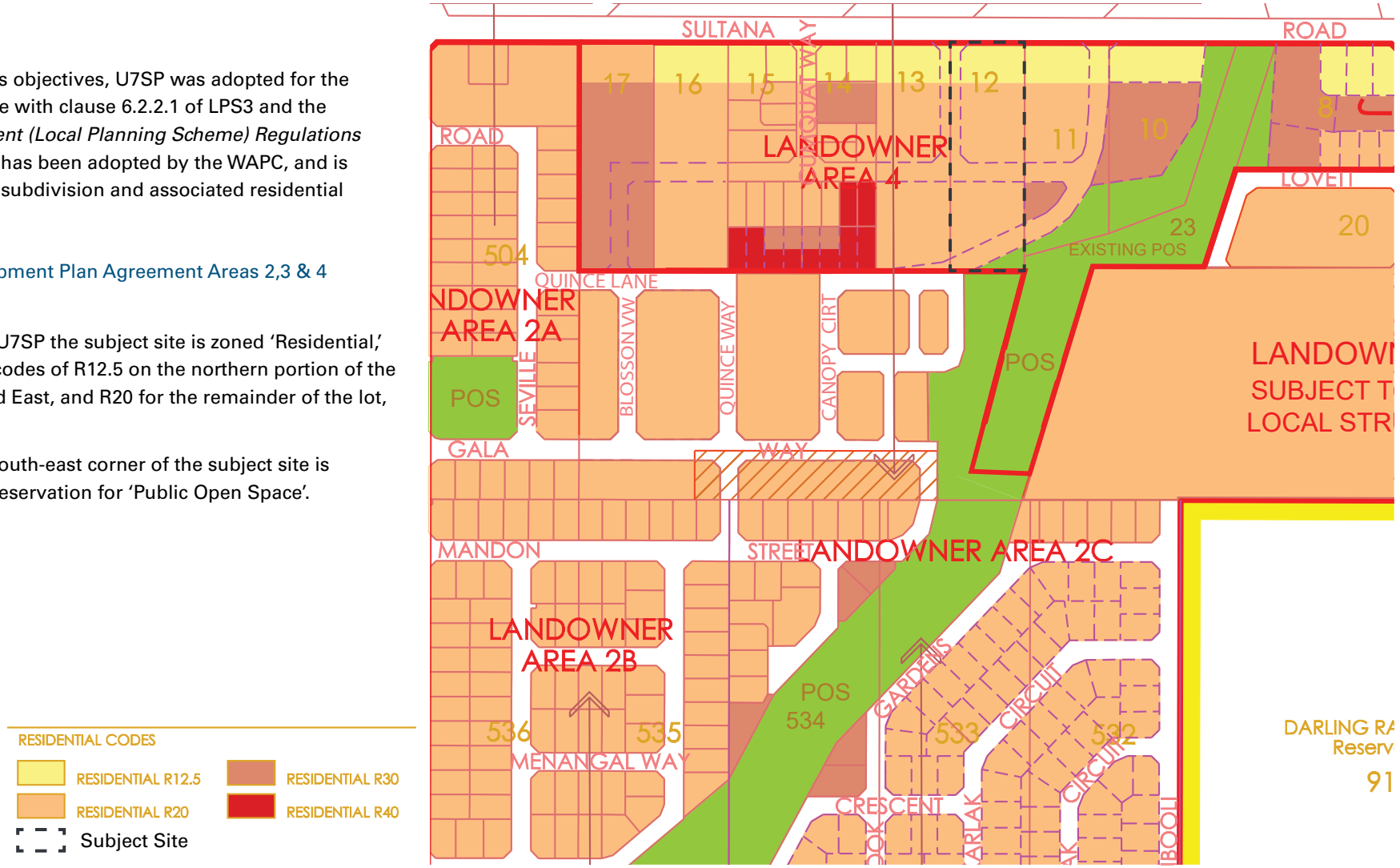


Figure 11: Outline Development Plan Agreement Areas 2, 3 and 4 (Forrestfield U7)

2.5.5 Policy Framework

2.5.5.1 State Government Policies

State Planning Policy No. 3.7 – Planning in Bushfire Prone Areas

State Planning Policy 3.7 Planning in Bushfire Prone Areas (SPP 3.7) outlines measures to reduce risk of bushfire to people, property and infrastructure. The entire project site is identified as being 'Bush Fire Prone' under the Map of Bush Fire Prone Areas.

As such, a Bushfire Management Plan (BMP) has been prepared by Martinick Bosch Sell to address the requirements of SPP3.7 and the associated Guidelines for Planning in Bushfire Prone Areas provided in **Appendix A**.

The BMP determines that the proposed subdivision is in an area where the bushfire hazard level is manageable. A summary of the key findings from the BMP are provided below:

- All proposed lots can achieve a Bushfire Attack Level (BAL) of BAL-29 or lower as shown in **Appendix A**.
- Lots proposed to front Sultana Road East are likely to be rated BAL-29 with the application of a minimum 4m setback for R25 lots from the front lot boundary.
- The anticipated subdivision design widths are suitable to ensure radiant heat does not exceed BAL-29 as measured from any external wall or supporting post or column in all circumstances.

State Planning Policy No. 7.3 – Residential Design Codes (Volume 1)

State Planning Policy 7.3 - Residential Design Codes (R-Codes) applies to residential development in Western Australia. Clause 4.2.2 of LPS3 requires the development of land for residential purposes to conform to the provisions of the R-Codes.

The proposed amendment seeks to amend the two existing residential density codes pertaining to the subject site from R12.5 and R20 to R25, R30 and R40 respectively. Future subdivision and residential development across the subject site are to comply with the requirements of the R-Codes.

Liveable Neighbourhoods

Liveable Neighbourhoods (LN) is a State policy which guides neighbourhood scale development. The proposed amendment has been prepared in accordance with the LN target of 26 dwellings per site hectare.

The proposed amendment would increase the potential density of the subject site from approximately 12 dwellings under the current U7SP, to approximately 25 - 30 dwellings per site hectare.

2.5.5.2 Local Planning Policies

There are no local planning policies which are considered specifically relevant to the subject proposal.

3.0 Opportunities and Constraints Analysis

3.1 Opportunities and Constraints

An opportunities and constraints analysis has been undertaken for the subject site based on the natural features, surrounding development, existing infrastructure and the future vision.

The analysis has been separated into considerations of built form, land use, public realm and movement network, and is outlined as **Figure 13.**

LAND USE | OPPORTUNITIES

Opportunity to provide lower residential density orienting to Sultana East Road to respect adjacent existing development.

Optimise medium residential density within the site and in closer proximity to areas of higher amenity.

Provide diversity of lot size and area as to promote a diverse built form outcome.

LAND USE | CONSTRAINTS

Lower density, wider lots provided to orientate to Sultana East Road to respect adjacent existing development.

Identified Bush Fire Prone area as such, any attenuation requirements would need to be adhered to.

BUILT FORM | OPPORTUNITIES

Opportunity to provide a variety of housing types and density.

Opportunity for residential development oriented to Sultana Road East promoting and improving passive surveillance.

Opportunity for development adjacent the open space to provide a built form outcome that orientates to and promotes passive surveillance of the open space.

Proposed streets to respond to site topography and optimise potential for solar access.

BUILT FORM | CONSTRAINTS

Potential for future homes to need to adhere to Bush fire attenuation requirements (subject to assessment).

PUBLIC REALM | OPPORTUNITIES

All new streets to provide street trees improving amenity, streetscape appeal, shade canopy and improved walkability conditions as well as permeability.

Opportunity to provide a cash-in lieu contribution for Public Open Space (rather than a physical area) to improve utilisation, open space functionality and residential efficiency.

Opportunity to consider existing tree retention within proposed road reserve (subject to further detailed design).

PUBLIC REALM | CONSTRAINTS

Limited opportunity for tree retention within site

MOVEMENT | OPPORTUNITIES

Opportunity to connect new roads to the surrounding existing and proposed roads to complete a number of networks and provide improved legibility and permeability locally.

Integrate proposed footpath/shared path network with the existing network with carefully consideration given to abutting existing open space design.

MOVEMENT | CONSTRAINTS

Proposed ultimate road connection to Sultana Road East provided as a component of adjacent subdivision.

Proposed ultimate road connection to Mangosteen Drive provided as a component of adjacent subdivision.

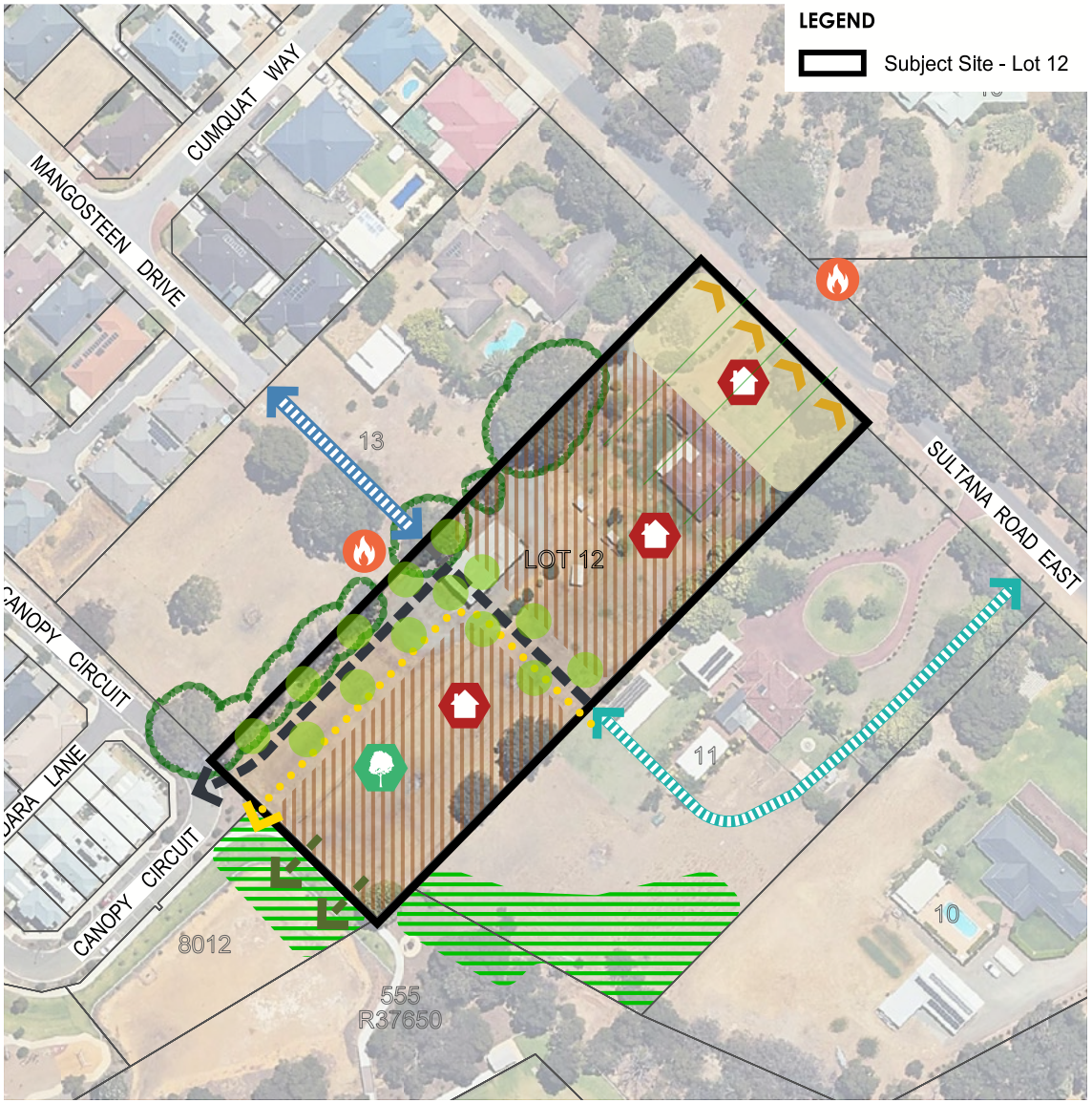


Figure 12: Opportunities and Constraints Analysis Map

4.0 Pre-Lodgement Consultation

Pre-lodgement consultation has been undertaken with the City of Kalamunda with respect to the proposed structure plan amendment, as outlined in **Table 4** below.

Table 4: Pre-Lodgement Summary

Date	Attendees	Summary
21 August 2023	**Taylor Burrell Barnett** • Jarrod Ross **City of Kalamunda** • Andrew Fowler-Tutt • Regan Travers • Anjali Parmar	• Overview of the proposed amendment and the appropriate selection of residential coding. • Discussion on the acceptability of cash-in-lieu payment for open space, noting that Landowner Area 4 already has in excess of 10% of the total land area provided as public open space.
20 November 2023	**JDA Consultant Hydrologists** **City of Kalamunda** • Raktim Barua	• JDA has had ongoing correspondence and site meetings with the City of Kalamunda's Engineering Services regarding resolution of the flood issue at Berkshire Road, and ensuring that the proposed subdivision of the subject site does not exacerbate this issue. • Most recently JDA has provided concept design drawings to the City for the purpose of stormwater drainage management consistent with those included in **Appendix E**, and it is understood that the City are supportive in principle of the management regime proposed.
31 May 2024	**Taylor Burrell Barnett** • Jarrod Ross • Rachel Chapman **City of Kalamunda** • Regan Travers • Cardia Mariani • Raktim Barua • Partha Deb	• Pre-lodgement discussion on the proposed amendment, inclusive of refined position on appropriate residential density codes, adjustment to indicative street alignments and design of drainage within surrounding area. • Confirmation of process requirements for assessment, advertising and recommendation.

5.0 Design Response

5.1 Vision

Following on from the opportunities and constraints analysis the project team prepared the Structure Plan amendment to spatially depict the vision for the precinct.

The Structure Plan focuses on:

- The creation of a diverse range of residential living opportunities through a gradation of density codes across the site. This will provide the opportunity for diverse dwelling typologies and arrangements to encourage families, young couples, down-sizers and retirees into the community.
- The provision of built form and design controls which facilitate the retention of existing mature trees along Sultana Road East, and provide opportunities for further verge planting to maintain the vegetated quality of the existing road reserve.
- The integration of new access roads that connect with the existing street network (i.e. from Canopy Circuit) whilst future proofing new road connections that align to the surrounding existing road network (i.e. Mangosteen Drive and Sultana Road East) and the wider Outline Development Plan.
- Promoting pedestrian and cycling through the area and providing a legible, permeable and safe path that ultimately connects Sultana Road East and Hales Park/Crumpet Creek Reserve as well as the wider surrounds.
- Providing street trees within proposed road reserves that improve amenity, streetscape appeal, shade canopy and improved pedestrian and cycling conditions.
- A development layout and road network that aligns to and takes advantages of the benefits of good passive solar orientation.
- Development which responds to the high quality parkland and open space facilities of adjacent existing Hales Park/Crumpet Creek Reserve and providing the opportunity for development to orient to and promote increased passive surveillance and safety of the existing open space.

5.2 Residential Design

The ultimate subdivision design is to be confirmed at the subdivision application stage in order to provide flexibility and respond to market demand at the time of subdivision, but key parameters of this structure plan amendment will provide for:

- A lower density (R25) interface with Sultana Road East which provides for a minimum 4m setback to the road, allowing a more consistent streetscape design on the southern side of the road and responding to the existing rural lifestyle development to the north of Sultana Road East.
- The key road network connections within the site, and ultimately across adjacent sites, such that the subdivision area will be initially connected to Canopy Circuit to the south, and ultimately be connected to Mangosteen Drive and Sultana Road East once the adjacent Lots 11 and 13 are subdivided and developed.
- The option to create a range of residential dwelling types within the balance of the site at a density coding of R25, R30, and R40, which could be provided as single detached housing, grouped dwellings or terrace style development depending on market demand and compliance with the R-Codes.
- The incorporation of a requirement for the preparation of a Local Development Plan as a condition of subdivision approval to ensure that residential design appropriately responds to the public realm and desired built form outcomes for the precinct.

5.3 Public Open Space

The original Outline Development Plan identified a small portion of public open space in the southern section of Lot 12. In further discussion with the City it was recognised that:

- The portion of open space was too small to meaningfully provide any benefit to the existing or future community, and as such was not seen to be of high value in a subdivision proposal.
- The existing open space provided within 'Landowner Area 4' equates to approximately 12.35%, which indicates the area may already be oversupplied with open space.
- The additional area is not required for the accommodation of further stormwater drainage from the subject site or the surrounding sites.

On this basis it is considered a better outcome to remove the proposed open space from the subject site , and instead apply a cash-in-lieu contribution requirement for the ultimate subdivision of the subject site, as this will provide the City with funds to further embellish existing open space or acquire more strategic parcels of land for future open space within the immediate area.

6.0 Conclusion

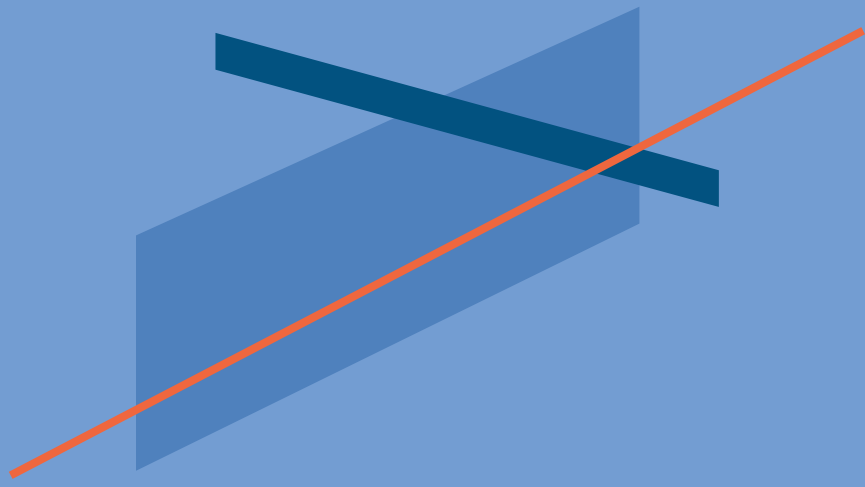
The proposed amendment to Outline Development Plan for Agreement Areas 2, 3 & 4 Forrestfield U7 seeks to facilitate efficient future subdivision for residential purposes.

The proposed modifications will result in improved connectivity of the proposed subdivision with the existing 'The Hales' development and will provide standardised lot types and cell depths that will facilitate the development of high quality residential development and increased housing densities and diversities.

The provisions to apply a more contemporary residential density coding to the subject area is reflective of modern residential development and supports the City's strategic directions to accommodate dwelling targets and increased densities.

The proposed amendment is consistent with the applicable planning frameworks, resulting in a proposal that sufficiently meets the planning intent of the State and Local Government.

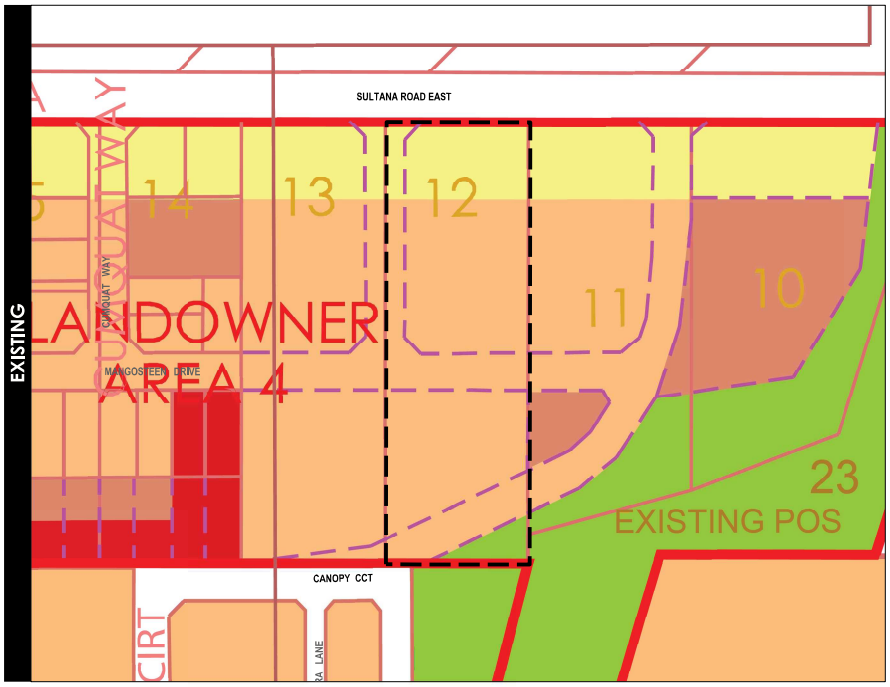
TECHNICAL APPENDICES



Appendix A

ODP Forrestfield U7 Amendment Map

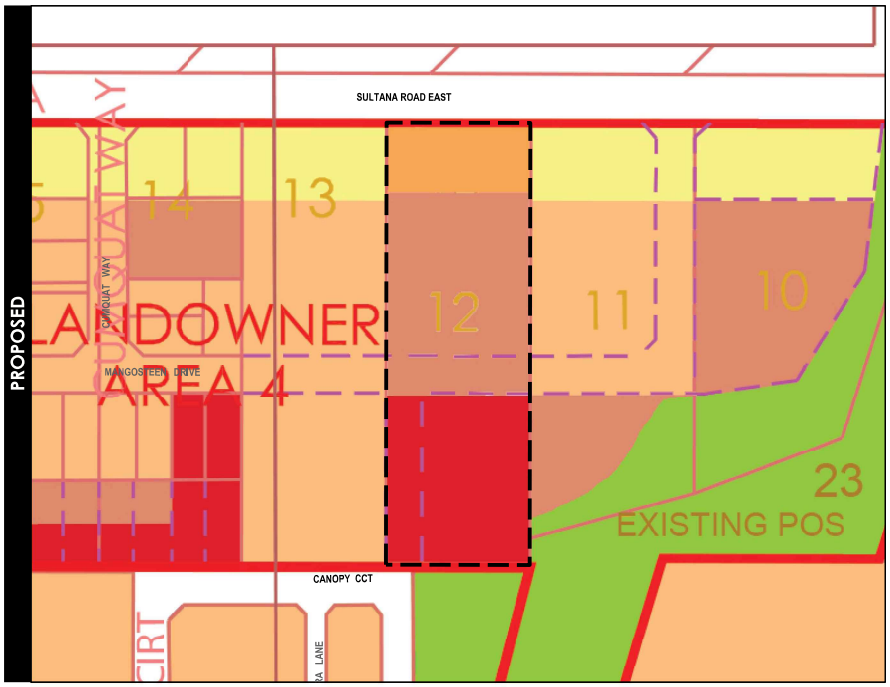
City of Kalamunda
AMENDMENT TO ODP FORRESTFIELD U7
Lot 12 Sultana Road East, Forrestfield



LEGEND

RESIDENTIAL CODES

- RESIDENTIAL R12.5
- RESIDENTIAL R20
- RESIDENTIAL R30
- RESIDENTIAL R40



LEGEND

RESIDENTIAL CODES

- RESIDENTIAL R12.5
- RESIDENTIAL R20
- RESIDENTIAL R25 APPLY TO FRONTAGE LOTS
- RESIDENTIAL R30
- RESIDENTIAL R40

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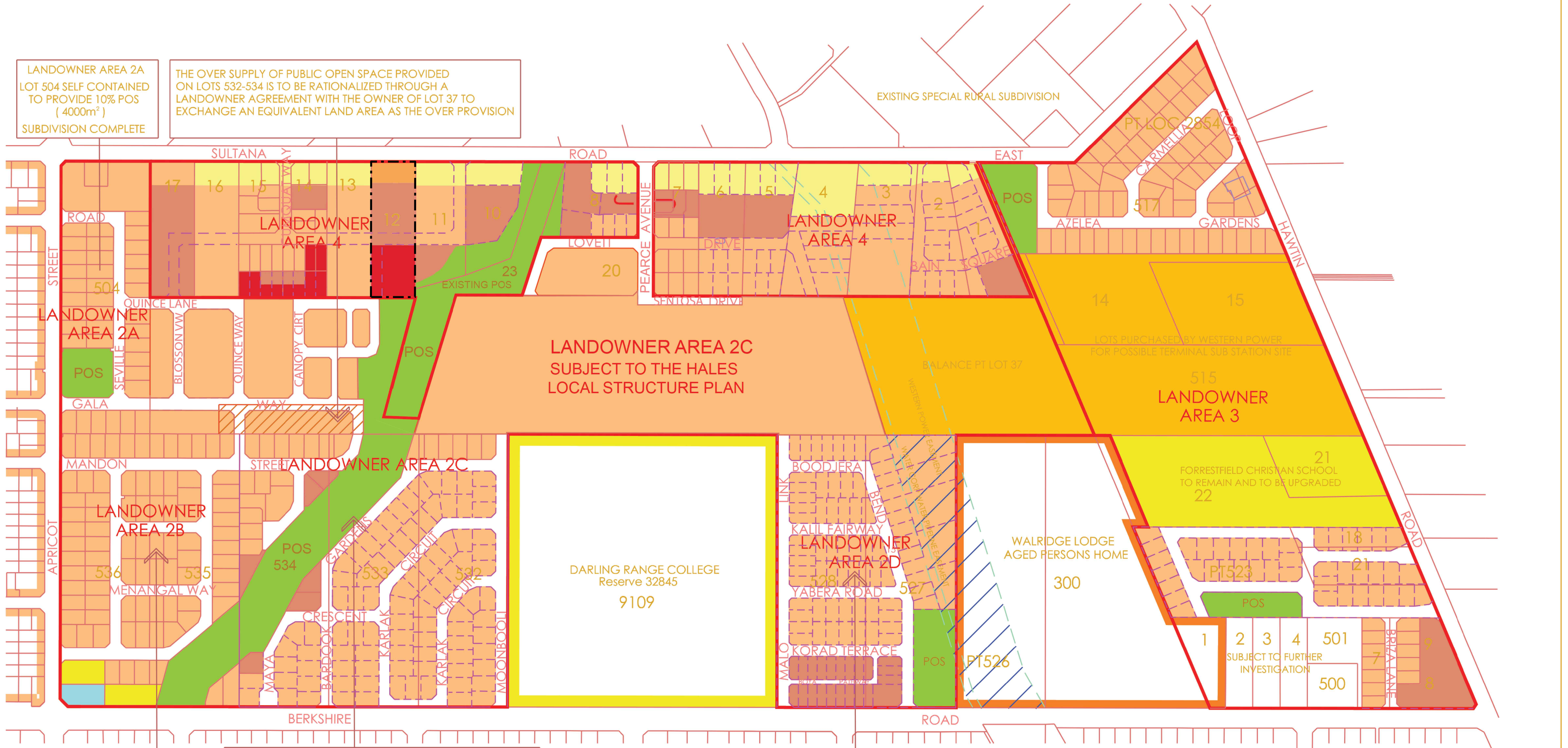
plan: 23/070/019A
date: 11/09/2024



LANDOWNER AREA 2A
LOT 504 SELF CONTAINED TO PROVIDE 10% POS (4000m^2)
SUBDIVISION COMPLETE

THE OVER SUPPLY OF PUBLIC OPEN SPACE PROVIDED ON LOTS 532-534 IS TO BE RATIONALIZED THROUGH A LANDOWNER AGREEMENT WITH THE OWNER OF LOT 37 TO EXCHANGE AN EQUIVALENT LAND AREA AS THE OVER PROVISION

LANDOWNER AREA 2B (LOTS 535 & 536) DEVELOPED WITH JOINT AGREEMENT IN RESPECT TO POS PROVISION

TOTAL AREA OF 2 LOTS	8.1140ha
LESS COMMERCIAL SITE	0.1638ha
NET DEVELOPABLE AREA	7.9502ha
POS AT 10%	0.7950ha
COMMUNITY PURPOSE SITE CREDITED AS POS	0.2000ha
POS REQUIRED	0.5950ha
POS PROVIDED	0.7750ha
OVERPROVISION OF POS	0.1800ha

SUBDIVISION COMPLETE

LANDOWNER AREA 2C (LOTS 37 & LOTS 532-534) TO BE DEVELOPED WITH A JOINT AGREEMENT IN RESPECT TO POS AND DRAINAGE

LAND AREAS	
LOT 37	21.5700ha
LESS AREA RETAINED FOR TERMINAL SUBSTATION	4.7128ha
	16.8572ha
LOTS 532-534	12.1710ha
NET DEVELOPABLE AREA	29.0282ha
POS REQUIRED AT 10%	2.9028ha
POS PROPOSED	
LOTS 532-534	1.8000ha
	(0.5829ha OVER PROVISION)
LOT 37	1.1028ha
	(0.5829ha UNDER PROVISION)
TOTAL	2.9028ha

SUBDIVISION APPROVED AND UNDER CONSTRUCTION

LANDOWNER AREA 2D - LOTS 527 & 528

TO BE DEVELOPED AS SELF CONTAINED SUB AREA WITH 10% PROVISION OF POS

DRAINAGE SWALE WITHIN POS 100% CREDIT

NOTE :
CALCULATION OF POS BASED UPON 10% OF NET DEVELOPABLE AREA EXCLUDING NON DEVELOPABLE WESTERN POWER EASEMENT

SUBDIVISION APPROVED

RESIDENTIAL CODES
- RESIDENTIAL R12.5
- RESIDENTIAL R20
- RESIDENTIAL R30
- RESIDENTIAL R40
- RESIDENTIAL R25 APPLY TO FRONTAGE LOTS

OUTLINE DEVELOPMENT PLAN AGREEMENT AREAS 2, 3 & 4 FORRESTFIELD U7

DATE: 14 OCTOBER 2020

0 100m
SCALE 1:5000 @ A3

Appendix B

Bushfire Management Plan

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:	Lot 12 Sultana Rd East				
Suburb:	Forrestfield	**State:**	WA	**P/code:**	6058
Local government area:	City of Kalamunda				
Description of the planning proposal:	Residential Development				
BMP Plan / Reference Number:		**Version:**	Revision 1.2	**Date of Issue:**	24 Sept 2024
Client / Business Name:	Acott Equities Pty Ltd				

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.)?

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	Sue Brand	**Accreditation Level**	Level 2 BPAD Practitioner	**Accreditation No.**	36638	**Accreditation Expiry**	30 April 2025
Company	MBS Environmental			**Contact No.**	0439 435 110		

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

Signature of Practitioner SBrand **Date** 24 September 2024

BUSHFIRE MANAGEMENT PLAN
LOT 12 SULTANA ROAD EAST, FORRESTFIELD

PREPARED FOR:

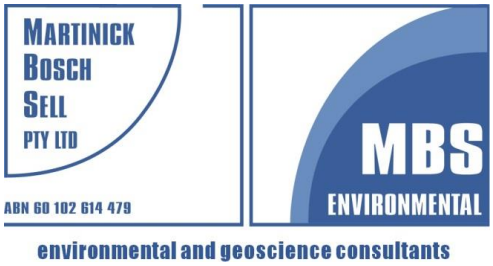
ACOTT EQUITIES PTY LTD

SEPTEMBER 2024

PREPARED BY:

Martinick Bosch Sell Pty Ltd
4 Cook Street
West Perth WA 6005
Ph: (08) 9226 3166
Email: info@mbsenvironmental.com.au
Web: www.mbsenvironmental.com.au

MBS ENVIRONMENTAL



LOT 12 SULTANA ROAD EAST, FORRESTFIELD
BUSHFIRE MANAGEMENT PLAN

Distribution List:

Company	Contact Name	Copies	Date
Acott Equities Pty Ltd	Brendan Acott	[01]	September 2024

Document Control for Job Number: AEGFBMP

Document Status	Prepared By	Authorised By	Date
Final Report	Sue Brand	Matthew Todd	14 November 2023
Revision 1.1	Sue Brand	Matthew Todd	26 April 2024
Revision 1.2	Sue Brand	Matthew Todd	September 2024

Disclaimer, Confidentiality and Copyright Statement

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TABLES

FIGURES

1. BACKGROUND INFORMATION

Acott Equities Pty Ltd (the Developer) are proposing a residential development at Lot 12 Sultana Road East, Forrestfield (the Site, Lot 12), with a Bushfire Management Plan required to support a subdivision application, with this document updating the previous 2023 BMP due to the proposed change to the Lot layout. The broad aim of the assessment process was to identify potential bushfire risks to future properties along with appropriate management actions when the site is developed.

The Site is located within a bushfire prone area as designated by the Fire and Emergency Services Commissioner, Office of Bushfire Risk Management (OBRM), within the Department of Fire and Emergency Services (2021). Accordingly, there is a requirement for landowners to undertake an assessment to determine the risks and identify appropriate management strategies such that the development does not increase the inherent bushfire risk. Portions of the site that are located within 100 m of vegetation designated as being bushfire prone necessitate the need for a bushfire attack level assessment (BAL assessment) and assigning a BAL rating that will determine appropriate construction standards as per *AS 3959:2018 Construction of Buildings in Bushfire Prone Areas*. The BAL assessment component of this document considers current and projected site conditions (i.e. vegetation classification pre- and post-development), along with the provisions of State Planning Policy (SPP) 3.7 *Planning in Bushfire Prone Areas* (DoP and WAPC, 2015), *Guidelines for Planning in Bushfire Prone Areas* (DPLH and WAPC, V1.4, 2021).

1.1 LOCATION

Lot 12 Sultana Road East is located in Forrestfield within the City of Kalamunda (Figure 1), and is:

- Approximately 14.5 km east of the Perth Central Business District (CBD) within the City of Kalamunda.
- Approximately 1.00 ha (total).

The Site is bounded by Sultana Road East and vegetated rural residential properties to the northeast, managed rural residential properties to the southeast and northwest, and POS including retained vegetation and higher density residential Lots to the southwest.

1.2 AIMS AND OBJECTIVES

The aim of the BMP is to outline the bushfire management methods and requirements that will be implemented within the Lot 12 Sultana Road East subdivision. Accordingly, broad aims include:

- Reduce the occurrence of and minimise the impact of bushfire to the life and property of future residents and the environment.
- Allow easy access of firefighters if a bushfire does occur.
- Protect the landscape within the site as far as is possible.
- Document bushfire prevention requirements of the area to which it relates.

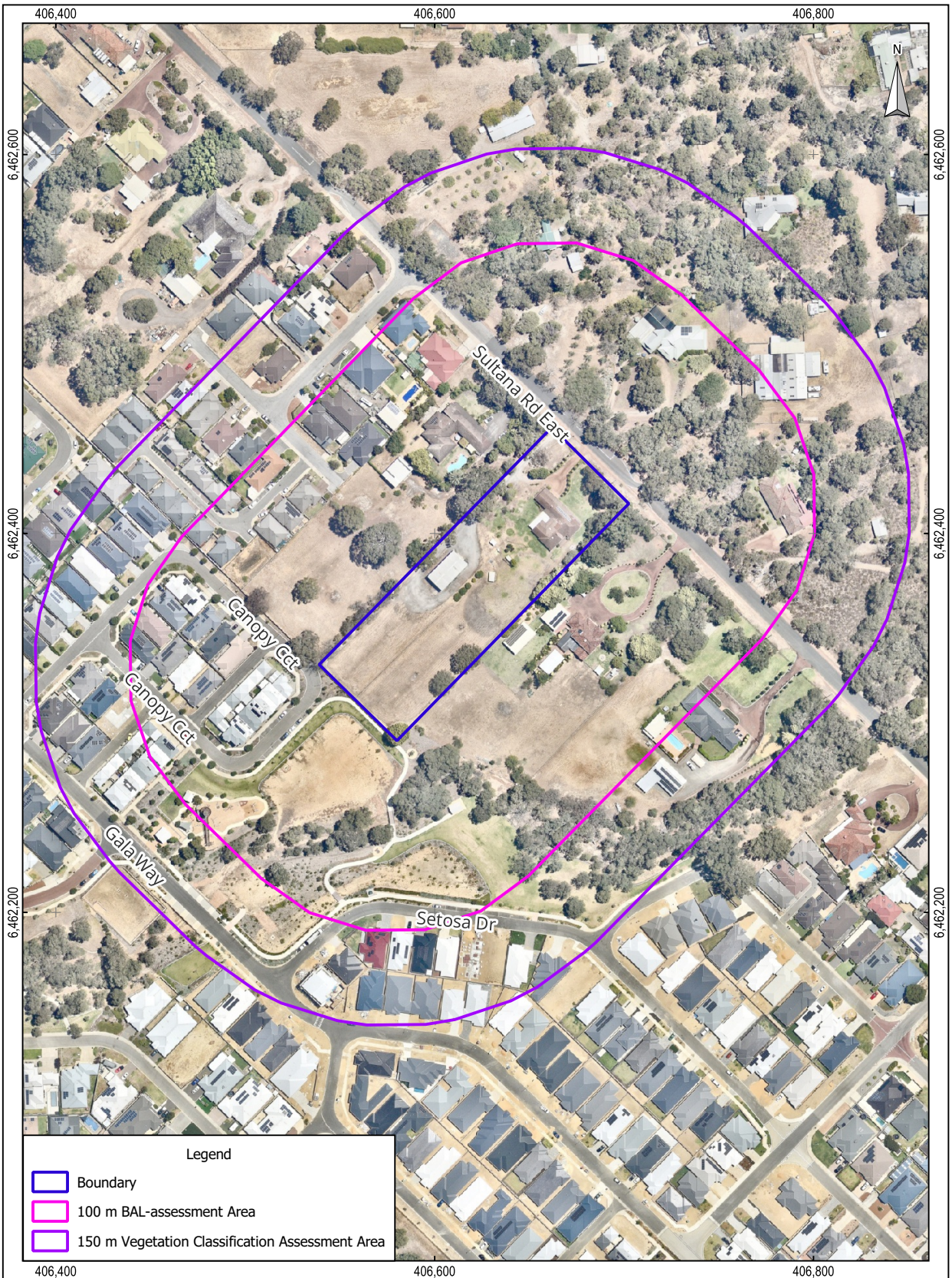
The objectives of this BMP are to:

- Define land use areas and values within the subdivision, with the entire subdivision being developed as urban residential Lots.
- Define and rank bushfire hazard areas according to the vegetation type and fire fuels present.
- Outline the roles and responsibilities of individuals and organisations in relation to fire management within the subdivision.
- Document fire management strategies for the subdivision, taking into consideration:
  - Retained and unmanaged vegetation within properties surrounding the Site as well as POS areas to the southwest (Figure 1).
  - The need for building construction standards where vegetated areas interface with the urban development.
  - Identify access for fire-fighting operations and daily maintenance in and around vegetated areas and stages of development.
  - Define an assessment procedure that will evaluate the effectiveness and impact of existing and proposed fire prevention activities and strategies.
  - Document the performance criteria and acceptable solutions adopted for the site.

1.3 DOCUMENT PREPARATION

This document has been prepared by Sue Brand, an accredited Level 2 Bushfire Planning and Design (BPAD) practitioner with the Fire Protection Association Australia. Activities involved with the plan preparation process included:

- Assessing the vegetation type and class present within and adjacent to the proposed development site using descriptions provided in *AS 3959:2018 Construction of Buildings in Bushfire Prone Areas* (*AS 3959:2018*).
- Assigning hazard ratings based on the vegetation types present on and offsite.
- Determining bushfire attack level (BAL) ratings and suggesting management strategies that could be implemented based on current and projected site considerations.
- Preparing this BMP.



Scale: 1: 2,600
Original Size: A4
Aerial Imagery: NearMap Feb 2024
Grid: GDA94 / MGA zone 50
0 25 50 m

Bushfire Management Plan
Lot 12 Sultana Road,
Forrestfield
Acott Equities Pty Ltd

Figure 1

Location

Martinick Bosch Sell Pty Ltd
4 Cook St
West Perth WA 6005
Australia
t: +61 8 9226 3166
info@mbsenvironmental.com.au
www.mbsenvironmental.com.au

MBS ENVIRONMENTAL

\\mbssvr\working\Acott Equities\GIS\Lot 12 BMP.qgz 03/03/2024 F1 Location

2. CONSIDERATION OF BUSHFIRE THREAT

2.1 SITE CHARACTERISTICS

2.1.1 Regional Context

Perth is located within the Swan Coastal Plain region of the Interim Biogeographical Regionalisation of Australia (IBRA). The Swan Coastal Plain comprises of two major divisions, namely the Swan Coastal Plain 1 – Dandaragan Plateau and Swan Coastal Plain 2 – Perth Coastal Plain. The Site is in the Perth subregion, which is broadly characterised as including areas of Jarrah and Banksia woodlands on sandy soils in a series of sand dunes, along with wetland areas, often within the interdunal swales (Mitchell, Williams, and Desmond, 2002).

2.1.2 Vegetation

The Site currently contains vegetation characteristic of a managed rural residential lot including lawn areas, landscaped gardens, and the occasional tree. The entire Site will be cleared of buildings and vegetation to accommodate the proposed subdivision. Vegetation occurs to the northeast of Sultana Road East within rural residential properties, treed areas, as well as within an area of public open space (POS) to the south of the Site (Figure 1).

2.1.3 Contours and Slope

The Site and vegetation are upslope of flat land, and this is the slope that has been applied for the BAL assessment component of this document.

2.1.4 Land Use

Current land use within the subdivision is a managed rural residential lot including lawn areas and landscaped gardens. The entire Site will be cleared of buildings and vegetation to accommodate the proposed subdivision development (Figure 2).

Figure 2: Current Land Use

2.1.5 Environmental Considerations

There are no patches of vegetation currently retained within the Site. Vegetation to the northeast of Sultana Road East within rural residential properties as well as within a POS area to the south of the Site are expected to be retained in the future.

Within the Site boundary, there are no:

- Bush Forever Sites.
- Wetlands or waterways, with the closest streamline (Crumpet Creek) that flows from the northeast from Sultana Road East to the southwest located approximately 150 m to the northeast.

2.1.6 Landscaping

The proposed development area is approximately 1 ha, which encompasses the entire Site. This area will be developed as residential Lots and roads, with no POS areas and therefore no landscaping will occur.

2.2 VEGETATION CLASSIFICATION

Vegetation on and within 150 m of the Site was assessed during a site visit on 04 October 2023 using descriptions provided in Table 2.3 and Figure 2.4 of *AS 3959:2018*. Each vegetation class is discussed and shown in Figures 3, 4, 5, and 6. The pre-development vegetation classifications for the Site are shown in (Figure 7), with the post-development classifications shown in (Figure 8). Note, some areas were not accessible given private property adjacent, therefore the classification of some of the vegetation classes was inferred from aerial imagery.

2.2.1 Patch 1: Class A Forest

Class A Forest is characterised by trees, commonly eucalypts, to 30 m with a 30–70% canopy over layered vegetation that may include sclerophyllous low trees or shrubs. This vegetation class is present in medium to large patches in several properties across Sultana Road East to the northeast that represents an ongoing bushfire risk into the future (Figure 3). There is a small patch of Class A Forest is associated with the riparian zone of the streamline approximately 150 m to the southeast of the Site. This vegetation will not contribute to BAL ratings given its distance away from the site (Figure 3).

Patch: 1	**Classification or Exclusion Clause:**	Class A Forest

Photo ID 1

Photo ID 2

Photo ID 3

Figure 3: Class A Forest

2.2.2 Patch 2: Class C Shrubland

Class C Shrubland is characterised by shrubs to 2 m with a continuous canopy from ground level. A small patch of this vegetation class with plant height averaging 1 m and grass trees to 2 m is present across Sultana Road East approximately 90 m to the northeast of the Site (Figure 4). This vegetation class will be retained into the future, it will have no influence on BAL ratings as the Class A Forest immediately across Sultana Road East is the vegetation Class that will determine the BAL ratings for proposed Lots.

Patch: 2	Classification or Exclusion Clause:	Class C Shrubland

Photo ID 4

Figure 4: Class C Shrubland

2.2.3 Patch 3: Low-Threat Vegetation

Vegetation may be considered low threat due to characteristics such as poor flammability, high moisture content, or low fuel load, with examples including managed parkland/reserve areas, grassland maintained in a minimal fuel load through cropping to 20 cm or less, nature strips, wind breaks, market gardens, orchards, and playing fields. These locations are subject to exclusion clause 2.2.3.2 (f). Low-threat vegetation subject to exclusion clause 2.2.3.2(f) is present in (Figure 5):

- The landscaped and maintained reserve area that fronts Setosa Dr (Photo ID 5).
- The treed area to the rear of Lot 10 that has been cleared of all understorey and branches under-pruned, with the area being used as bike park (Photo ID 6).
- Maintained lawns and gardens in rural residential Lots along Sultana Road East (Photo ID 7).

Patch: 3	**Classification or Exclusion Clause:**	Exclusion Clause 2.2.3.2 (f)

Photo ID 5

Photo ID 6

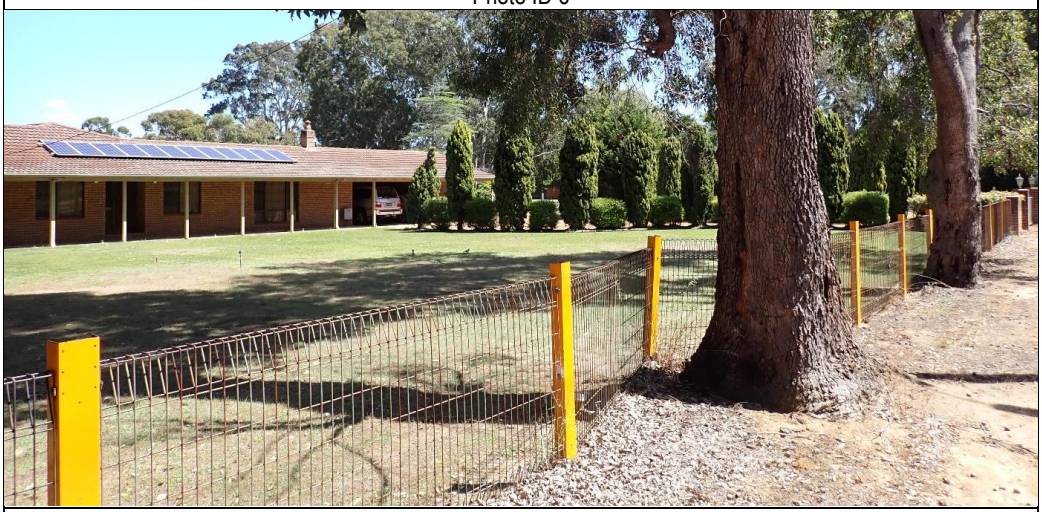


Photo ID 7

Figure 5: Low-Threat Vegetation

2.2.4 Patch 4: Non-vegetated Areas

Non-vegetated areas are subject to exclusion clause 2.2.3.2 (e), with those in proximity to the Site including (Figure 6):

- Roads and footpaths.
- Cleared areas in locations being developed by others.
- Existing buildings in previously developed areas.

Patch: 3	**Classification or Exclusion Clause:**	Exclusion Clause 2.2.3.2 (e)

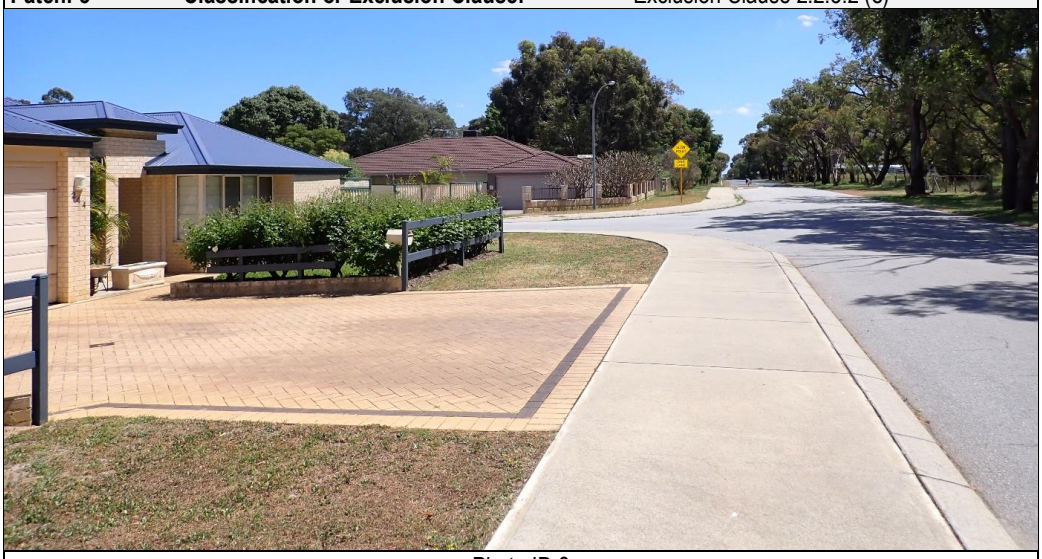
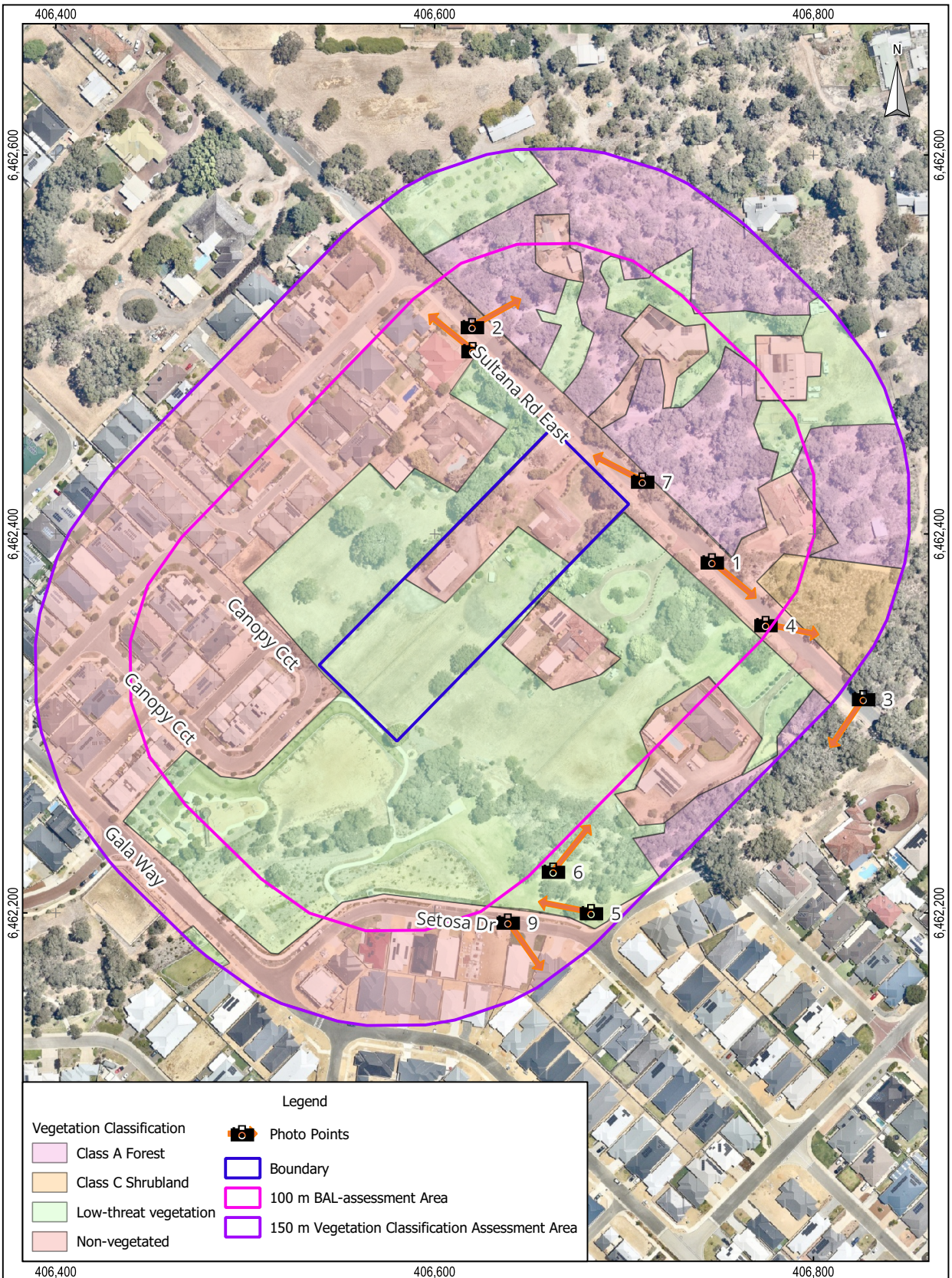


Photo ID 8

Photo ID 9

Figure 6: Non-vegetated Areas



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Lot 12 Sultana Road,
Forrestfield
Acott Equities Pty Ltd

Figure 7

Vegetation Classification as per AS 3959:2018

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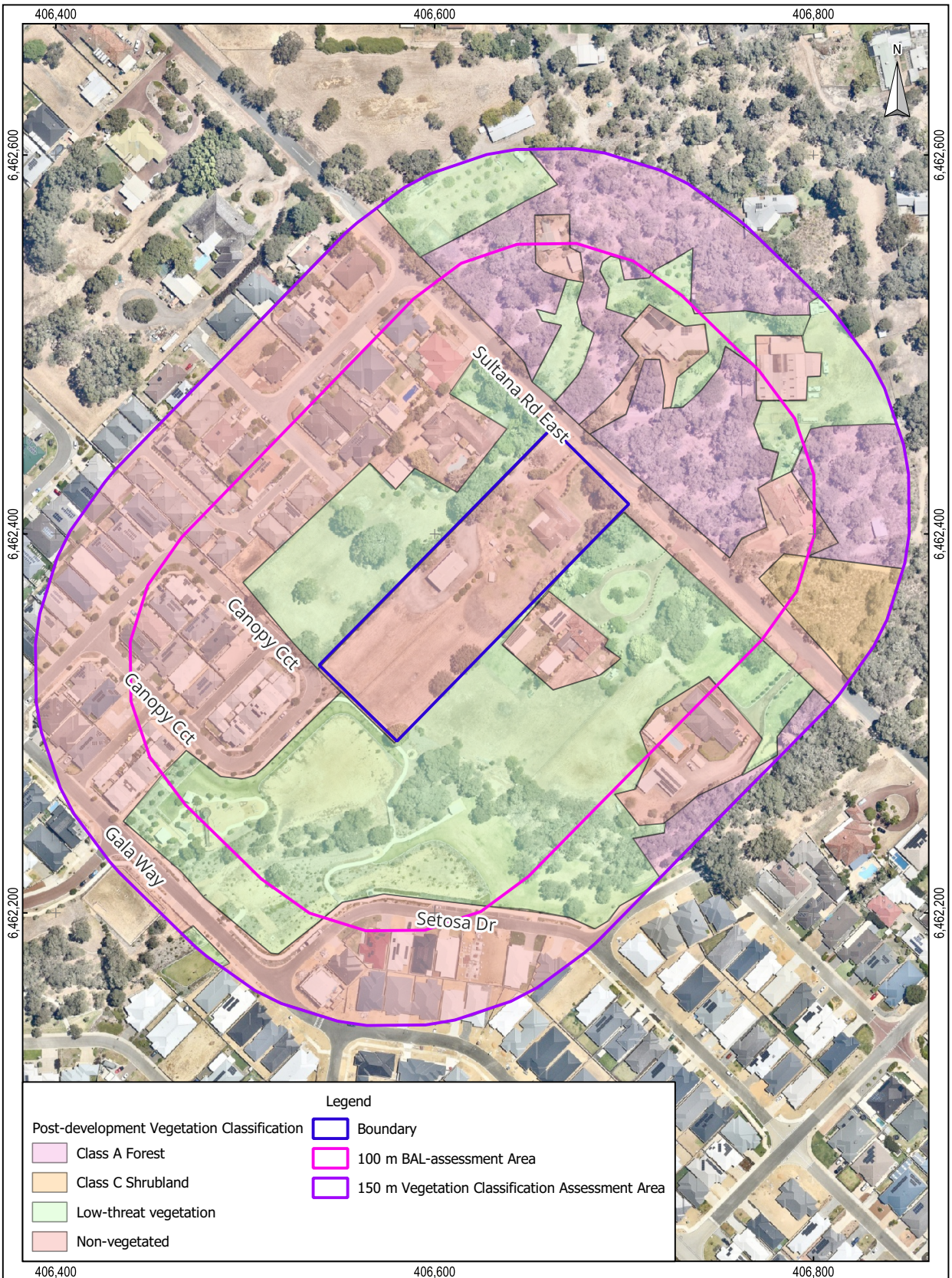

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Aerial Imagery: NearMap Feb 2024
Grid: GDA94 / MGA zone 50
0 25 50 m

Bushfire Management Plan
Lot 12 Sultana Road,
Forrestfield
Acott Equities Pty Ltd

Figure 8

Post-development Vegetation Classification

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2.3 BUSHFIRE HAZARD LEVEL

2.3.1 Bushfire Hazard Assessment

Depending on the vegetation type, a hazard rating of low, moderate, or extreme is assigned. The nature of the vegetation in and around the development area means that the pre-development bushfire hazard rating ranges from Low to Extreme due to the Class A Forest present in proximity to the Site (Figure 9). All locations within 100 m of the Class A Forest are assigned a Moderate hazard rating due to the increased risk in those locations, with remaining areas being assigned a Low hazard rating.

2.3.2 Fire Danger Index

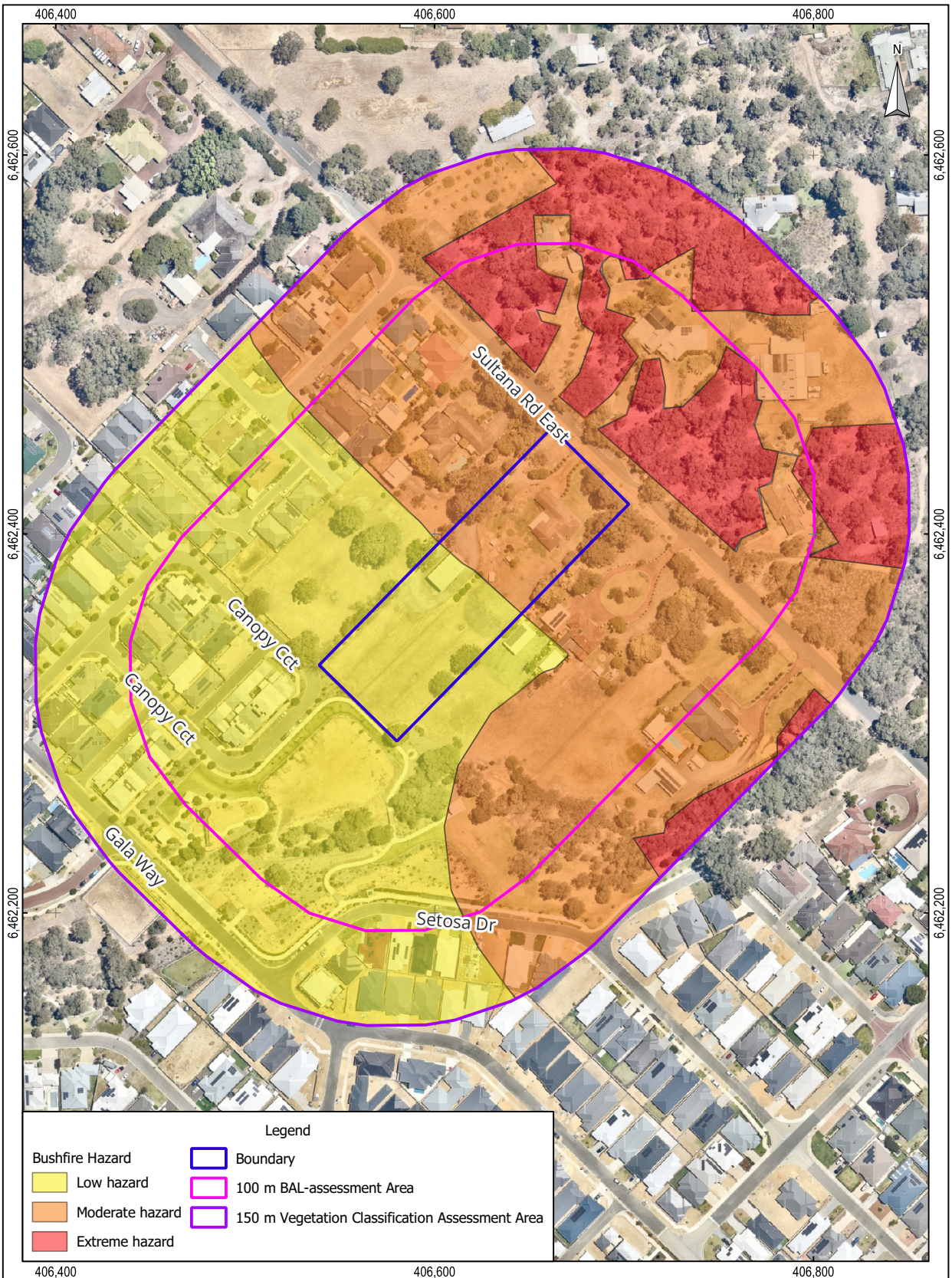
The fire danger index (FDI) for the Site is FDI 80, as documented in Table 2.4.3 of AS 3959:2018, and which is the nominated FDI for Western Australia.

2.3.3 Potential Fire Impacts

Potential fire impacts within the Site include radiant heat, smoke, and ember attack, with the BAL analysis provided in Table 1. The subdivision will create 28 residential Lots, of which eight will be located within the proposed group housing site (GHS) (Figure 10). Note that a minimum building setback of 4 m (in keeping with the R25 designation) will apply to Lots 1 to 4 facing Sultana Road East. This will enable the construction of dwellings outside the BAL-40 zone and a BAL-29 rating to be assigned whilst also providing a mechanism for the required building setback to be enforced.

Table 1: BAL Analysis

Patch	Vegetation Class	Slope	Separation Distance (m)	BAL rating
1	Class A Forest	Upslope	>18	BAL-40
	Class A Forest		>21	BAL-29
	Class A Forest		>42	BAL-12.5
	Class A Forest		>100	BAL-Low
2	Class C Shrubland	Upslope	>80	BAL-12.5
3	Low Threat Vegetation	N/A	N/A	BAL-Low
4	Non-vegetated Areas	N/A	N/A	BAL-Low



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Original Size: A4
Aerial Imagery: NearMap Feb 2024
Grid: GDA94 / MGA zone 50
0 25 50 m

Bushfire Management Plan
Lot 12 Sultana Road,
Forrestfield
Acott Equities Pty Ltd

Figure 9

Pre-development Bushfire Hazard

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\\mbssvr\working\Acott Equities\GIS\Lot 12 BMP.qgz 03/03/2024 F9 BF Hazard

2.4 BAL ASSESSMENT

An indicative Lot layout for the Site is known, so it is possible to provide an indication of BAL ratings for each Lot and these are shown in Figure 10. The following provides a summary of the assigned BAL ratings for the Site based currently available information, noting that Lot numbers are as provided by others:

- Lots 8 to 18 in the southern portion of the Site will be rated BAL-Low.
- Lots 1 to 10 (GHS), along with 6 and 7 that are separate from the GHS will be rated BAL-12.5.
- No Lots will be rated BAL-19.
- Lots 1 to 4 facing Sultana Road East will be rated BAL-29 with the application of a minimum 4-m setback for R25 Lots from the front Lot boundary to avoid building in the BAL-40 zone.
- No Lots will be rated BAL-40 or BAL-FZ.

2.5 ASSET PROTECTION ZONE

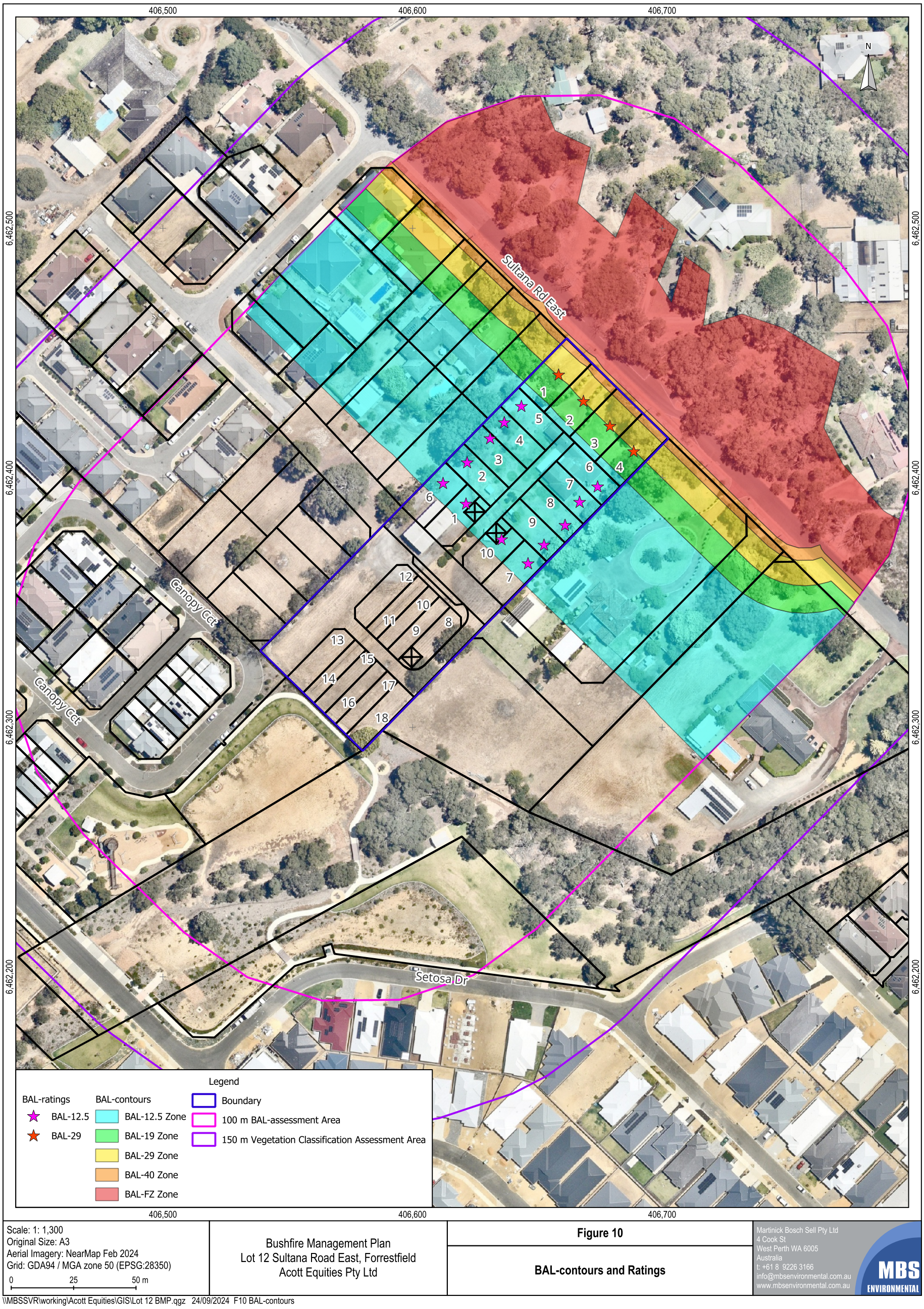
The asset protection zone (APZ) for the Site is that area that provides the separation distance between the classified vegetation and building walls, with a preferred width of 100 m. For locations where a 100-m APZ width cannot be achieved, a reduced APZ can be implemented when a BAL rating is determined for the building, as is the case for some of the Lots that are the subject of this BMP. The reduced APZ commences at the junction of the BAL-40 and BAL-29 zones, or the junction of the orange and yellow zones shown in Figure 10, and will extend to the building walls as that is the point where the potential radiant heat impact of a bushfire does not exceed 29 kW/m^2. As a suitable separation distance can be demonstrated for each of the Lots that will be created, it indicates that the bushfire risk can be managed within the subdivision area.

2.6 SHIELDING

Clause 3.5 of *AS 3959:2018* allows for a reduction in the nominated construction standard for a building in a bushfire prone area where the elevation is not exposed to the source of the bushfire attack, noting that the reduction in building standard cannot reduce below BAL-12.5. For BAL-29-rated Lots, elevations that are not exposed to the source of the bushfire attack may be reduced to BAL-19. This Clause will not apply to Lots rated BAL-12.5 or BAL-Low.

2.7 OTHER BUSHFIRE PROTECTION MEASURES

No other bushfire protection measures are required for the Site other than those documented in this BMP.



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0 25 50 m

Bushfire Management Plan
Lot 12 Sultana Road East, Forrestfield
Acott Equities Pty Ltd

Figure 10

BAL-contours and Ratings

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2.8 IMPLEMENTATION

Implementation of this BMP will commence immediately and the Developer will hold responsibility for both for installation and ongoing maintenance until Lots within the Site are sold. The Developer is also responsible for ensuring the new owner of the site receives a copy of this BMP to support the building process.

When ownership arrangements change over time, the responsibility for the maintenance of fire management measures will devolve to the new owner or managing organisation, noting that landowners or managers are responsible for land under their direct control only. For example, Lot owners will be responsible for ensuring asset protection zones within their property are maintained. Activities that will be involved with the implementation of this plan are described in Table 2, which also includes an indication of maintenance responsibilities associated with particular activities.

2.9 RESPONSIBILITIES

Responsibilities for bushfire preparedness and response within the development area are shared by the Developer, the City of Kalamunda and building owners/occupiers.

2.9.1 Developer Responsibilities

The Developer is responsible for implementing key portions of this BMP including:

- Provide a copy of this BMP to owner to inform future building construction standard and approvals.
- Apply a minimum 4-m building setback from the front Lot boundary of Lots 1 – 4 facing Sultana Rd East as per the R25 designation; this will enable a BAL-29 rating to apply to these Lots.
- Install and maintain firebreak/low fuel/asset protection zones on their land.
- Arranging for a notification on titles to inform that some Lots are located within a designated bushfire prone area and a BAL rating applies.

2.9.2 City of Kalamunda Responsibilities

It should be noted that the City of Kalamunda has the responsibility and powers under the Local Planning Scheme and the *Bush Fires Act 1954* (WA) to ensure that this BMP, annual firebreak notices, any bushfire Information, and any special orders issued under the *Bush Fires Act* 1954 are complied with.

The City will be responsible for:

- Providing appropriate bushfire advice in relation to firebreaks, hazard reduction, and similar.
- Ensuring appropriate information relating to bushfire prone status is included on titles.
- Ensure that buildings are constructed in accordance with the nominated BAL rating.

2.9.3 Owner and/or Occupier Responsibilities

It is the responsibility of individual property owners building near the vegetated areas to:

- Ensure that residences are constructed in accordance with the relevant clauses of *AS 3959:2018* for the confirmed BAL rating.
- Maintain the nominated asset protection zone between the edge of the classified vegetation and building walls.
- If evaporative air conditioners are installed on dwelling(s), install ember shields.
- Respond to/comply with bushfire advice issued by the developer, the City of Kalamunda or DFES.

Table 2: Implementation Schedule

Item	Activity	Responsibility	Maintenance	Responsibility
Developer Responsibilities				
1	Provide a copy of this BMP to Lot owners to inform future building approval and construction process.	Developer	Not required	N/A
2	Apply a minimum 4-m building setback from the front Lot boundary of Lots 1 to 4 as per the R25 designation.	Developer	Not required	N/A
3	Install and maintain firebreak/low fuel/asset protection zones on their land.	Developer	Ongoing, in accordance with City of Kalamunda firebreak notices	Developer or owner/occupier as appropriate
4	Arrange for a notification on titles of Lots with a BAL rating to indicate that they are in a designated bushfire prone area.	Developer	Not required	N/A
City of Kalamunda Responsibilities				
5	Provide appropriate bushfire advice in relation to firebreaks, hazard reduction, and similar.	City of Kalamunda	As required	City of Kalamunda
6	Ensure appropriate information relating to bushfire prone status is included on titles.	City of Kalamunda	Not required	N/A
7	Ensure that buildings are constructed in accordance with the nominated BAL rating.	City of Kalamunda	Not required	N/A
Owner/Occupier Responsibilities				
8	Ensure that buildings constructed in accordance with the relevant clauses of *AS 3959:2018* for the confirmed BAL rating.	Owner/builder	Not required	N/A
9	Maintain the nominated asset protection zone between the edge of the classified vegetation and building walls.	Owner/occupier	Ongoing as required	Owner/occupier
10	If evaporative air conditioners are installed on dwelling(s), install ember shields.	Owner	Regular maintenance in accordance with manufacturer's instructions	Owner
11	Respond to/comply with bushfire advice issued by the developer, the City of Kalamunda or DFES.	Owner/occupier	Ongoing as required	Owner/occupier

3. COMPLIANCE AND JUSTIFICATIONS

3.1 SPP 3.7 OBJECTIVES AND APPLICATION OF POLICY MEASURES

The intent of *State Planning Policy (SPP) 3.7 Planning in Bushfire Prone Areas* (Department of Planning and Western Australian Planning Commission, 2015) is to ensure that bushfire risks are considered in a timely manner and that planning documents demonstrate the appropriate application of the various policy measures. Table 3 summarises the intent and objectives of SPP 3.7 and provides evidence of how the Lot 12 Sultana Road East subdivision complies.

Table 3: SPP 3.7 Compliance Evidence

SPP Reference	Description	Evidence of Compliance
Intent	• Ensure that risks associated with bushfires are planned using a risk-based approach.	• Preparation of a BMP in accordance with SPP 3.7. • Hazard assessment indicates risks associated with bushfire are manageable.
Objective 1	• Avoid any increase in the threat of bushfire to people, property, and infrastructure.	• Hazard assessment indicates risks associated with bushfire are manageable. • Some Lots within the Site will have a BAL-rating, with none higher than BAL-29 with the application of a 4-m building setback for Lots 1 to 4 facing Sultana Rd E (Figure 10).
Objective 2	• Reduce vulnerability to bushfire.	• Hazard assessment indicates risks associated with bushfire are manageable. • Some Lots within the Site will have a BAL-rating, with none higher than BAL-29 with the application of a 4-m building setback for Lots 1 to 4 facing Sultana Rd E (Figure 10).
Objective 3	• Ensure that higher order strategic planning documents and proposals consider bushfire protection requirements at an early stage.	• The planning process has considered the risk of bushfire in an early stage. • The preparation of this document has been completed to inform owners of BAL ratings assigned to Lots ahead of sale and the later building process.
Objective 4	• Achieve an appropriate balance between bushfire risk management and biodiversity conservation.	• There will be no patches of retained vegetation within the Site. Retained vegetation to the northeast of Sultana Road East within rural residential properties and the Crumpet Creek riparian zone are expected to be retained for into the future.

3.2 BUSHFIRE PROTECTION CRITERIA

Appendix 4 of the *Guidelines for Planning in Bushfire Prone Areas* (DPLH and WAPC, v1.4, 2021) provides details of the acceptable bushfire protection solutions that can be used to demonstrate how a location can be developed in bushfire prone areas. Table 4 demonstrates the Site's Compliance with Bushfire Protection Criteria and Figure 10 provides the Lot layout with BAL contours and ratings for the Lots.

Table 4: Compliance with Bushfire Protection Criteria

Intent	Acceptable Solutions	Solution
Element 1: Location		
Ensure that strategic planning proposals, subdivision and development applications are located in areas with the least possible risk of bushfire to facilitate the protection of people, property and infrastructure	**A1.1 Development Location**	
	Bushfire hazard assessment is or will on completion be moderate or low.	• The subdivision is in an area where the bushfire hazard level is manageable. • Some Lots within the Site will have a BAL rating, with none higher than BAL-29 with the application of a 4-m building setback for Lots 1 – 4 facing Sultana Rd East (Figure 10).
	BAL rating is BAL-29 or lower.	• Bushfire hazard assessment indicates manageable bushfire risk. • Some Lots within the Site will have a BAL rating, with none higher than BAL-29 with the application of a 4-m building setback for Lots 1 – 4 facing Sultana Rd East (Figure 10).
Element 2: Siting and Design of Development		
To ensure that the siting and design of development minimises the level of bushfire impact	**A2.1 Asset Protection Zone (APZ)**	
	Every habitable building is surrounded by, and every proposed lot can achieve an APZ depicted on plans that meets the following: • **Width** — bushfire radiant heat does not exceed radiant heat of 29 kW/m^2 (BAL-29) as measured from any external wall or supporting post or column in all circumstances. • **Location** — APZ contained solely within the boundaries of the Lot on which the building is situated, except in instances where the neighbouring lot(s) will be managed in a low-fuel state on an ongoing basis, in perpetuity. • **Management** — the APZ is managed in accordance with the requirements of '*Standards for Asset Protection Zones*' (Schedule 1 on page 71 of the Guidelines).	• The APZ coincides with the boundary between BAL-40 and BAL-29 zones (Figure 10) and includes roads and cleared areas. • Subdivision design ensures width is suitable to ensure radiant heat does not exceed 29 kW/m^2 (BAL-29) as measured from any external wall or supporting post or column in all circumstances. • Some Lots within the Site will have a BAL rating, with none higher than BAL-29 with the application of a 4-m building setback for Lots 1 to 4 facing Sultana Rd East (Figure 10).

Intent	Acceptable Solutions	Solution
Element 3: Vehicular Access		
Ensure that the vehicular access serving a subdivision/ development is available and safe during a bushfire event. To achieve the intent, all applicable acceptable solutions must be addressed: • **SP** — Strategic planning proposal and structure plan where the lot layout is not known. • **Sb** — Structure plan where the lot layout is known and subdivision application. • **Dd** — Development application for a single dwelling, ancillary dwelling, or minor development. • **Do** — Development application for any other development that is not a single dwelling, ancillary dwelling, or minor development.	**A3.1 Public Roads (SP Sb Do)**	
	Public roads are to meet the minimum technical requirements in Table 6, Column 1 on page 76 of the Guidelines. 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.	Public roads associated with this subdivision will be constructed in accordance with the technical requirements outlined in Column 1 of Table 5 on page 76 of the Guidelines.
	A3.2a Multiple Access Routes (SP Sb Do)	
	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).	• Lots 1 to 4 face Sultana Road East, with access/egress options available to the northeast and northwest (Figure 10). • In the short term, access and egress for the GHS (Lots 1 – 10), Lots 6 and 7, and 8 to 18 will be via the internal road that will connect to Canopy Cct and the existing road network with several egress options provided to the northwest and southwest (Figure 10). • Access and egress for the GHS (Lots 1 to 10) will be via a 6 m wide access/lane way that connects to the planned internal road networks and Canopy Cct and is wide enough to provide for passing (Figure 10). • In time, development of neighbouring rural residential Lots will result in the creation of additional roads that will provide alternative access/egress options (Figure 10).
	If the public road access is via a no-through road that cannot be avoided due to demonstrated site constraints, the road access is to be a maximum of 200 m from the subject lot(s) boundary to an intersection where two-way access is provided.	• At present, the planned internal road is a no-through road that connects to Canopy Cct. • The maximum distance from GHS Lots 1 – 10 to Canopy Cct is approximately 170 m where egress can occur to the northwest and southwest, with the distance for all other Lots being a maximum of 120 m. • These access options will lead away from the probable fire source.

Intent	Acceptable Solutions	Solution
	A no-through road may exceed 200 m if it is demonstrated that an alternative access way cannot be provided due to site constraints and the following requirements are met: • The no-through road travels towards a suitable destination. • The balance of the no-through road that is greater than 200 m from the subject site is wholly within BAL-Low or is in a residential built-out area (Figure 23 on page 81 of the guidelines).	N/A — the length of the no-through road does not exceed 200 m.
	A3.2b Emergency Access Way (SP Sb Do)	
	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 on page 76 of the guidelines. • Provides a through connection to a public road. • Be no more than 500 m. • Must be signposted and if gated, gates must open the whole trafficable width and remain unlocked.	N/A — access will be via the existing and planned road network.
	A3.3 Through-roads (SP Sb)	
	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 m to an intersection providing two-way access, unless it satisfies the exemption provisions in A3.2a.	• As the development is for a single rural residential Lot, the design is constrained by the rural residential Lots either side and which limits the potential location of roads until Lots either side are developed. • The maximum distance from GHS Lots 1 – 10 to Canopy Cct is approximately 170 m where egress can occur to the northwest and southwest, with the distance for all other Lots being a maximum of 120 m.
	A no-through road is to meet all the following requirements: • Requirements of a public road (Table 6, Column 1, Page 76). • Turn-around area as shown in Figure 24 on page 81 of the Guidelines.	• The no-through roads will be constructed in accordance with the requirements for public roads and turn around areas specified in the guidelines. • Engineering design will be approved by the City of Kalamunda.

Intent	Acceptable Solutions	Solution
	A3.4a Perimeter Roads (SP Sb)	
	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 AS 3959 that adjoin the subject site from the proposed lots, and • Removing the need for battle-axe lots that back onto areas of classified vegetation.	Sultana Road East acts as a perimeter road between Lots 1 – 4 and the classified vegetation to the northwest, with no other perimeter roads required.
	A perimeter road is to the meet the requirements contained in Table 6, Column 1 on page 76 of the Guidelines.	N/A – Sultana Road East is a perimeter road, with none required within the proposed subdivision area.
	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. • All lots have frontage to an existing public road.	N/A — Sultana Road East is a perimeter road.
	A3.4b Fire Service Access Route (SP Sb)	
	Where proposed lots adjoin classified vegetation under AS 3959 (excluding Class G Grassland) 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 access route is to meet all the following requirements: • Requirements in Table 6 Column 3 on page 76 of the Guidelines. • Be through-routes with no dead-ends. • Linked to the internal road system at regular intervals, every 500 m. • Must be signposted. • No further than 500 m from a public road. • If gated, gates must open the required trafficable width and be locked by the local government and/or emergency services, if keys are provided for each gate. • Turn-around areas designed to accommodate type 3.4 fire appliances and to enable them to turn around safely every 500 m.	N/A — fire access will be via the existing and planned road network.

Intent	Acceptable Solutions	Solution
	A3.5 Battle-axe Access Legs (Sb)	
	Where it is demonstrated that a battle-axe access leg 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 of the battle-axe access leg joins the effective area of the battle-axe lot is less than 50 m from a public road in a reticulated water area.	N/A — there are no battle-axe Lots planned.
	In circumstances where the above condition is not met, or the battle-axe lot is in a non-reticulated water area, the battle-axe access leg is to meet all the following requirements: • Requirements in Table 6, Column 4 on page 76 of the Guidelines. • Passing bays every 200 m with a minimum length of 20 m and minimum additional trafficable width of 2 m (i.e. the combined trafficable width of the passing bay and constructed driveway to be a minimum 6 m).	N/A — there will be no battle-axe Lots.
	A3.6 Private Driveways (Dd Do)	
	There are no private driveway technical requirements where the private driveway is: • Within a lot serviced by reticulated water. • No greater than 70 m in length between the most distant external part of the development site and the public road as measured as a hose lay. • Accessed by a public road where the road speed limit is not greater than 70 km/h.	N/A — there will be no private driveways.
	In circumstances where all 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 on page 76 of the Guidelines. • Passing bays every 200 m with a minimum length of 20 m and minimum additional trafficable width of 2 m (i.e. the combined trafficable width of the passing bay and constructed driveway to be a minimum 6 m). • Turn around areas as shown in Figure 28 on page 86 of the Guidelines and within 30 m of the habitable building.	N/A — there will be no private driveways.

Intent	Acceptable Solutions	Solution
Element 4: Water		
Ensure that water is available to enable people, property, and infrastructure to be defended from bushfire. To achieve the intent, all applicable acceptable solutions must be addressed: • **SP** — Strategic planning proposal and structure plan where the lot layout is not known. • **Sb** — Structure plan where the lot layout is known and subdivision application. • **Dd** — Development application for a single dwelling, ancillary dwelling, or minor development. • **Do** — Development application for any other development that is not a single dwelling, ancillary dwelling, or minor development.	**A4.1 Identification of Future Water Supply (SP)**	
	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 on Page 90 of the Guidelines.	The Lots are located in an area with a reticulated water supply available for firefighting purposes.
	Where the provision of a strategic water tank(s) is required in a suitable area within a road reserve or a dedicated lot the location should be identified on the structure plan to the satisfaction of the local government.	N/A — subdivision will be connected to a reticulated water supply.
	A4.2 Provision of Water for Firefighting Purposes (Sb Dd Do)	
	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 on page 90 of the guidelines. • 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 on page 90 of the Guidelines. — 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.	Hydrants will be installed in accordance with Water Corporation Design Standard DS 63.

Intent	Acceptable Solutions	Solution
Element 5: Vulnerable Tourism Land Uses		
Provide for bushfire protection for tourism land uses relevant to the characteristics of the occupants and/or the location, to preserve life and reduce the impact of bushfire on property and infrastructure. All applicable acceptable solutions must be addressed.	Every habitable building is surrounded by Asset Protection Zone (APZ) in accordance with Element 2: Siting and Design of Development — A2.1 APZ.	N/A — Residential subdivision
	Habitable buildings are sited and designed to: • Minimise clearing of existing vegetation. • Provide hazard separation between classified vegetation and a development site that is managed in perpetuity to protect life, prevent the spread of, and manage the impacts of fire.	N/A
	Suitable access/egress is provided for users of tourism sites.	N/A
	Adequate water is available for firefighting purposes in the event of a bushfire.	N/A

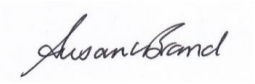
3.3 COMPLIANCE WITH RELEVANT DOCUMENTS

Sections 3.1 and 3.2 document how the Lot 12 Sultana Road East subdivision complies with *State Planning Policy 3.7* (Department of Planning and WA Planning Commission, 2015), *Guidelines for Planning in Bushfire Prone Areas* (Department of Planning, Lands and Heritage (DPLH) and the WA Planning Commission (WAPC), (V1.4, 2021).

Site owners/occupiers must comply with relevant sections of the annual firebreak notice and bushfire information prepared by the City of Kalamunda, such as total fire ban and hazard reduction programs.

3.4 COMPLIANCE STATEMENT

This BMP has been prepared in accordance with the requirements of *State Planning Policy 3.7 Planning in Bushfire Prone Areas* (Department of Planning and Western Australian Planning Commission, 2015) and *Guidelines for Planning in Bushfire Prone Areas* (DPLH and WAPC, V1.4, 2021). The information contained in this document represents current site conditions based on a visit to the site on 04 October 2023 and associated planning.

Signed: 

Date: 24 September 2024

Accreditation Number: BPAD 36638

Accreditation Expiry Date: 30 April 2025

BPAD Bushfire Planning & Design Accredited Practitioner Level 2

4. REFERENCES

Australian Standard AS 3959:2018. *Construction of Buildings in Bushfire-Prone Areas*, Standards Australia, NSW.

Bushfires Act 1954 (WA)

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Appendix C

Engineering Service Report

Cossill & Webley
CONSULTING ENGINEERS

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Forrestfield

May 2024

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Table of Contents

1. INTRODUCTION

The following report has been prepared by Cossill & Webley and summarises the results of a preliminary assessment of the engineering aspects of the proposed urban development over Lot 12 Sultana Road East, Forrestfield, which for the purposes of this report shall be referred to as "the Site".

The area of land is identified by the red boundary presented in **Figure 1** below, on the City of Kalamunda Planning Scheme 3 map.

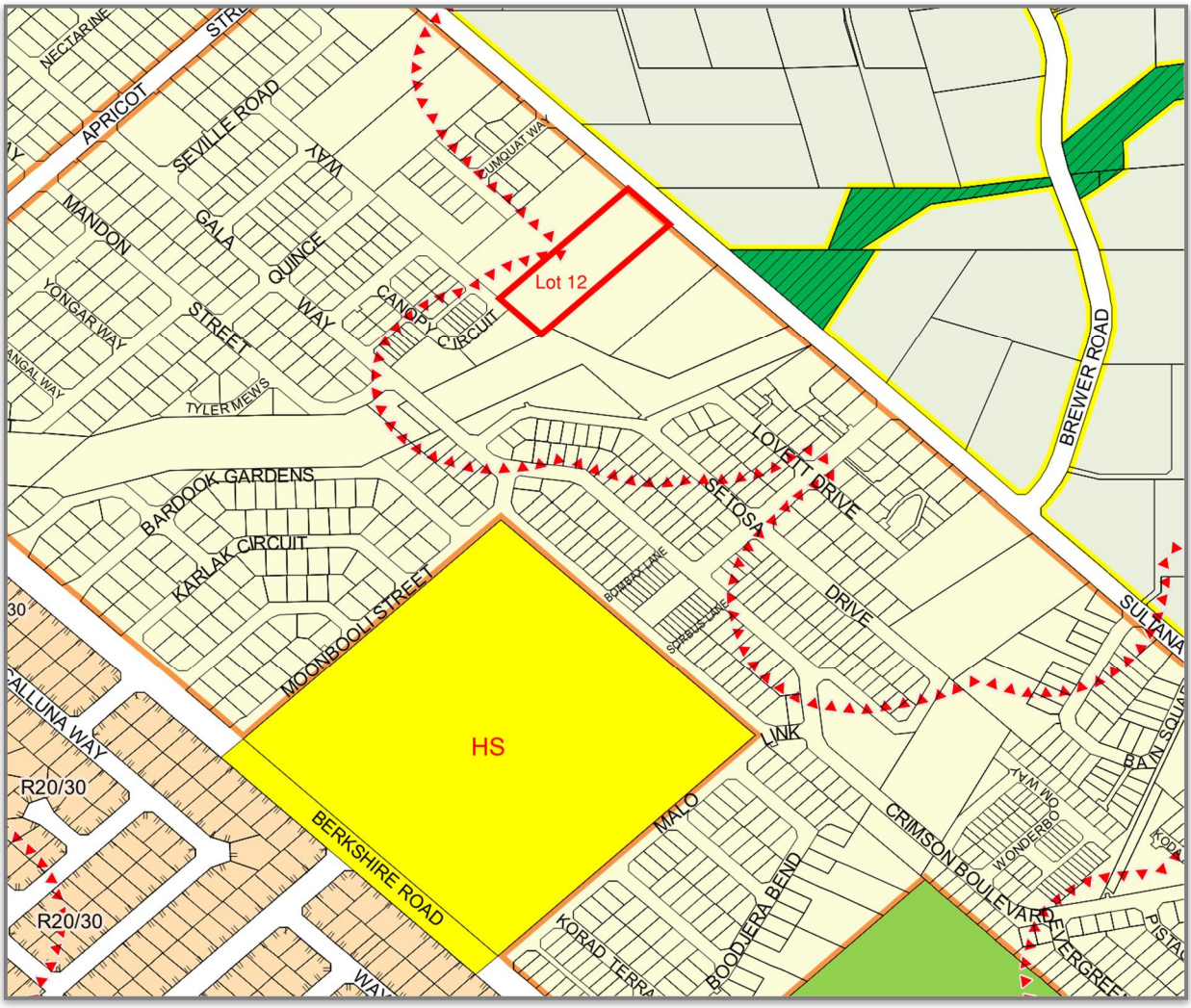


Figure 1 – Town Planning Scheme 3 (City of Kalamunda, 2023)

The Site is bound by an existing mix of residential housing, including a mix of new developments with standard residential lots and existing 1-hectare semi-rural properties.

We understand that the landholding is currently zoned for urban development as shown in **Figure 1**. An Outline Development Plan (ODP) was prepared by Gray & Lewis for the Shire of Kalamunda in 2007, with the most recent update of the ODP occurring in October 2020. No further rezoning is required.

The City of Kalamunda has confirmed that the Site does not fall within a Developer Contribution Scheme.

Figure 2 depicts the existing road network surrouding the Site. Access to the Site is from Sultana Road East and Canopy Circuit from the previous 'The Hales' development in the south-west.

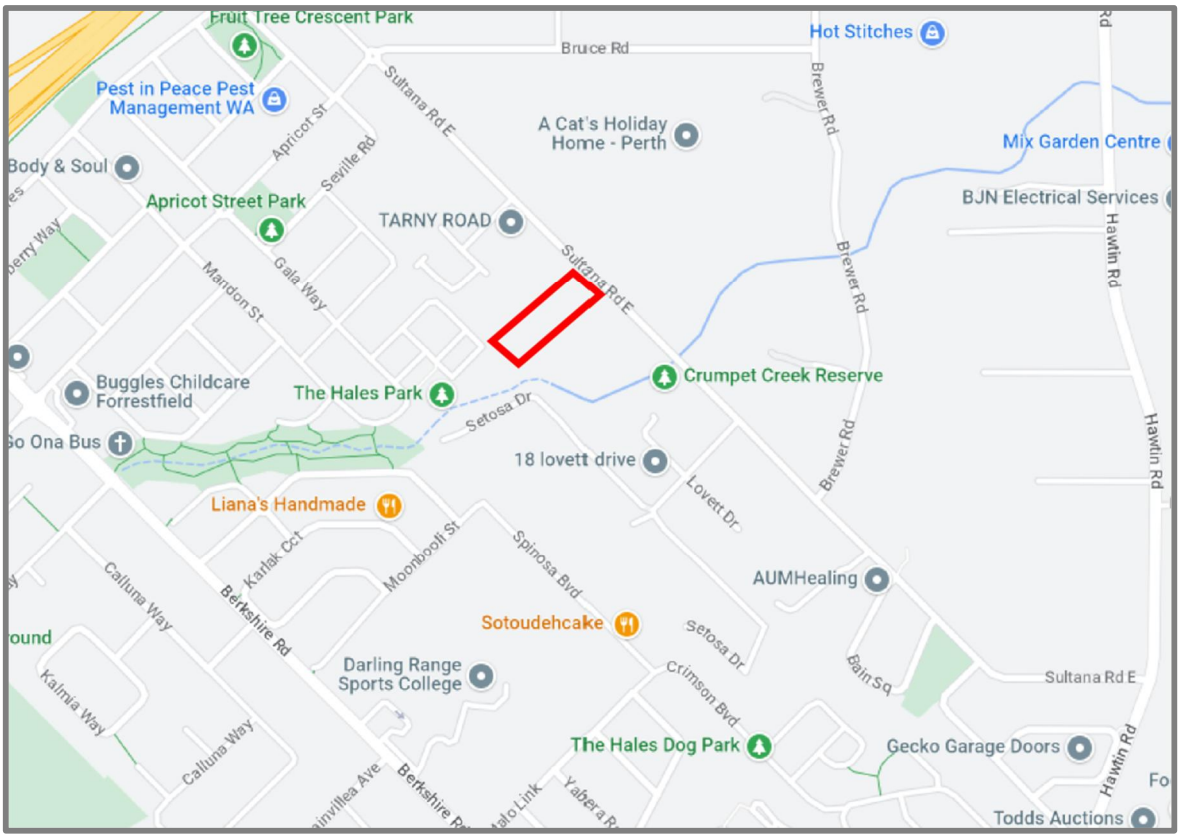


Figure 2 – Existing Road Network (Google Maps, 2023)

2. SITE DESCRIPTION

2.1 SITE VEGETATION

The entire site is approximately 1 hectare in area and is located within the City of Kalamunda, in the suburb of Forrestfield. The land contains residential buildings with several smaller outbuildings with most of the site covered in grass as shown in the recent aerial photography of the site presented in **Figure 3** below.

2.2 EXISTING BUILDINGS

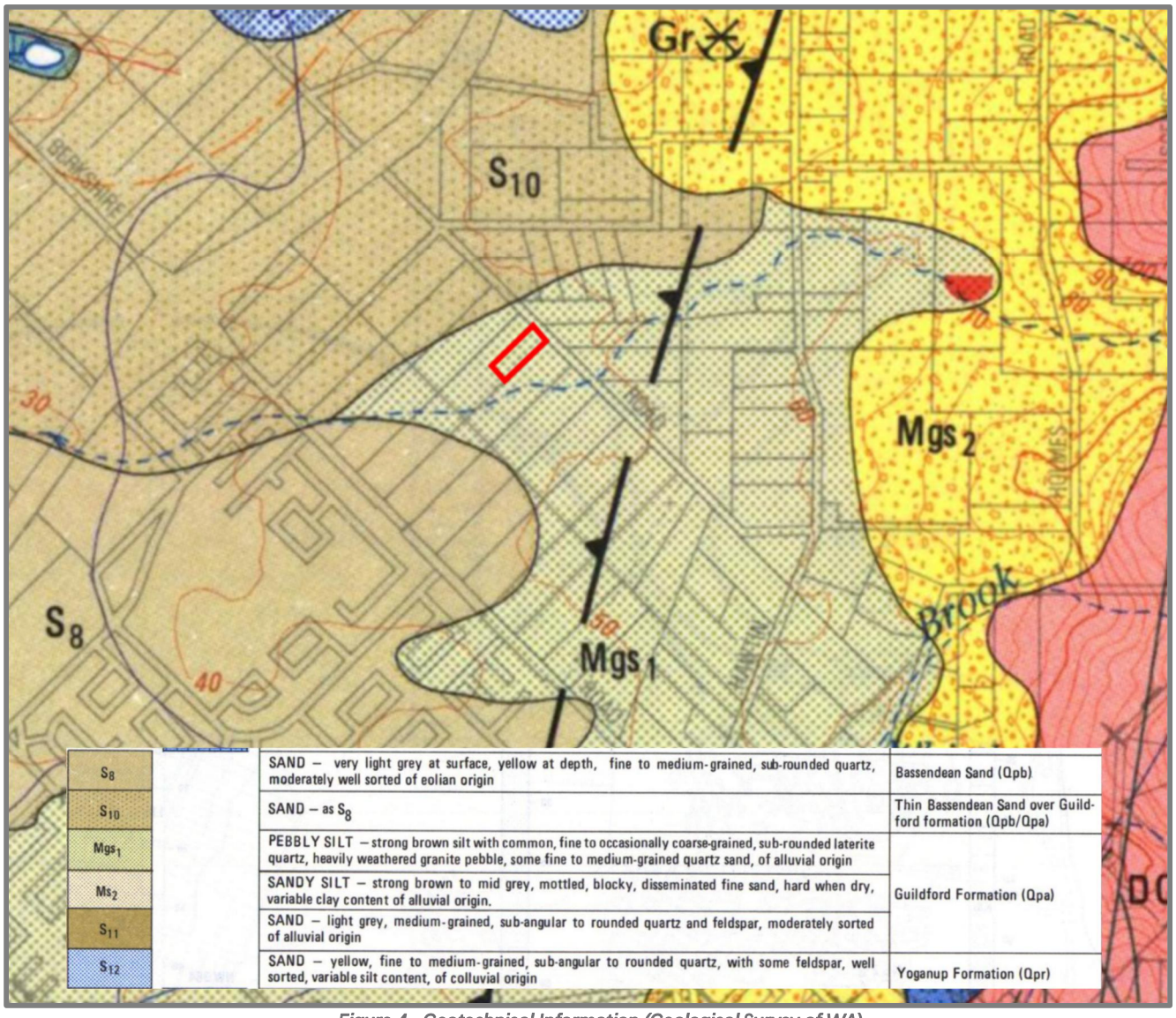
There is a house and sheds on the Site which require demolition, as shown in **Figure 3**. There are a number of existing homes adjacent to the Site which will require additional consideration during construction. Dilapidation surveys and a comprehensive dust management plan will be required prior to the commencement of works.

Figure 3 – Aerial Photography (MNG Access, 2023)

2.3 GEOLOGY

The Geological Survey of Western Australia Perth Metropolitan Region soils map for Perth (part 2034II & 2134III) indicates that the majority of the Site is characterised by Pebbly Silt (refer to **Figure 4**).

This soil type is generally characterised by Guildford Formation clays near the surface. The presence of Guildford Formation is likely to result in low shrink swell potential, which may have an impact on the future site classification of the lots. A geotechnical investigation will be required to better identify the soil make-up of the site and to help determine the site's classification prior to detailed engineering design.



S_8	SAND – very light grey at surface, yellow at depth, fine to medium-grained, sub-rounded quartz, moderately well sorted of eolian origin	Bassendean Sand (Qpb)
S_{10}	SAND – as S_8	Thin Bassendean Sand over Guildford formation (Qpb/Qpa)
Mgs_1	PEBBLY SILT – strong brown silt with common, fine to occasionally coarse-grained, sub-rounded laterite quartz, heavily weathered granite pebble, some fine to medium-grained quartz sand, of alluvial origin	Guildford Formation (Qpa)
Ms_2	SANDY SILT – strong brown to mid grey, mottled, blocky, disseminated fine sand, hard when dry, variable clay content of alluvial origin.	
S_{11}	SAND – light grey, medium-grained, sub-angular to rounded quartz and feldspar, moderately sorted of alluvial origin	
S_{12}	SAND – yellow, fine to medium-grained, sub-angular to rounded quartz, with some feldspar, well sorted, variable silt content, of colluvial origin	Yoganup Formation (Qpr)

Figure 4 - Geotechnical Information (Geological Survey of WA)

2.4 ACID SULPHATE SOILS

A desk top review of the Acid Sulphate Soil Risk Map (MNG Access, 2023) for the Central Metropolitan Region for potential for acid sulphate soils (ASS) indicates the Site is classed as having no known risk of ASS occurring within 3m of the natural soil surface (or deeper) over the Site as depicted in **Figure 5** below.

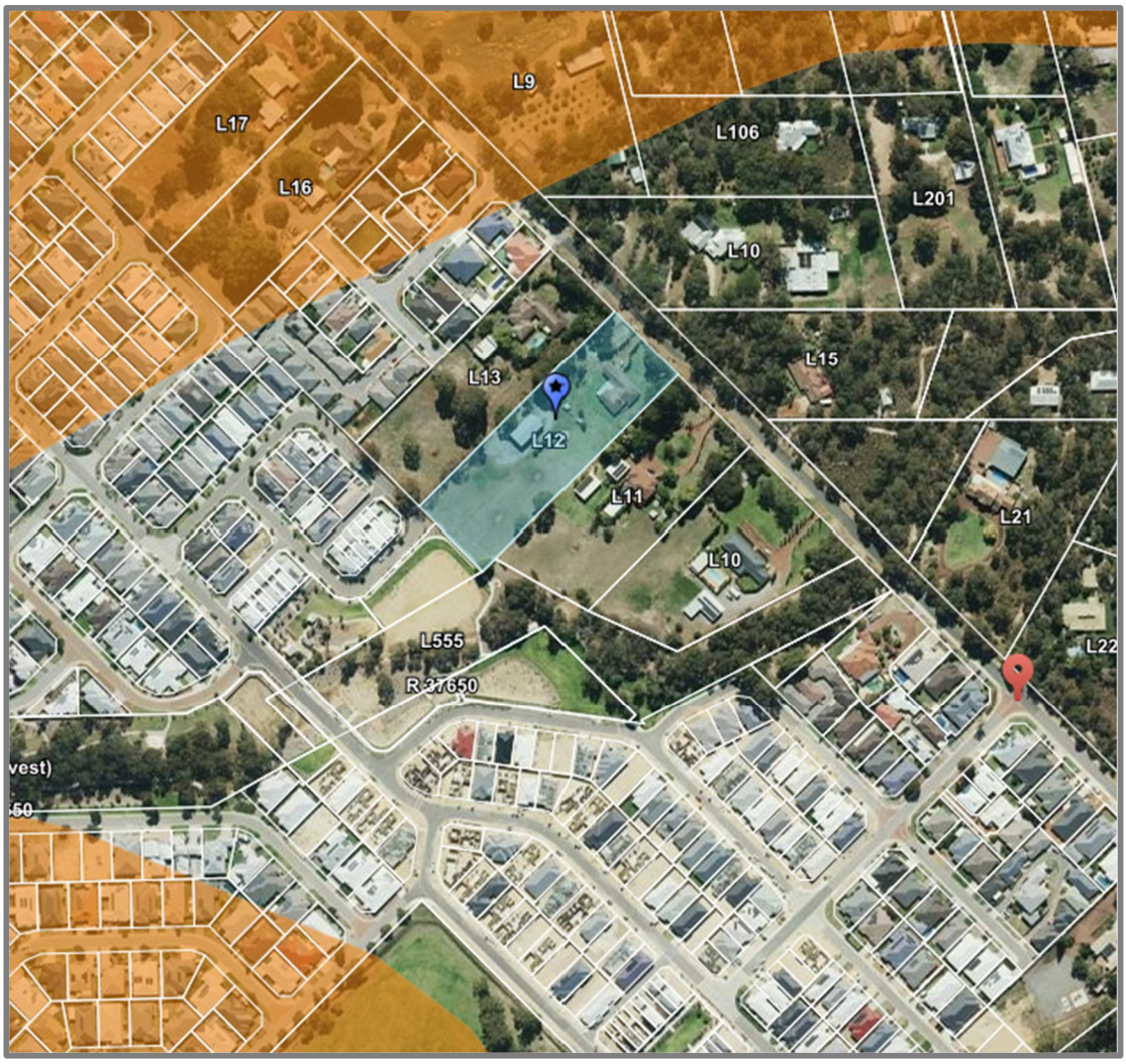


Figure 5 – Acid Sulphate Soils Risk Mapping (MNG Access, 2023)

2.5 SITE CONTOURS

Based on aerial contour information obtained from MNG Access, the Site has minor fall from the North Eastern boundary adjacent to Sultana Road East at a level of approximately RL 48m AHD to a low of approximately RL 46m AHD at Canopy Circuit as depicted below in **Figure 6**. Crumpet Creek is located to the south of the Site, at an elevation between RL45m and RL46m AHD.

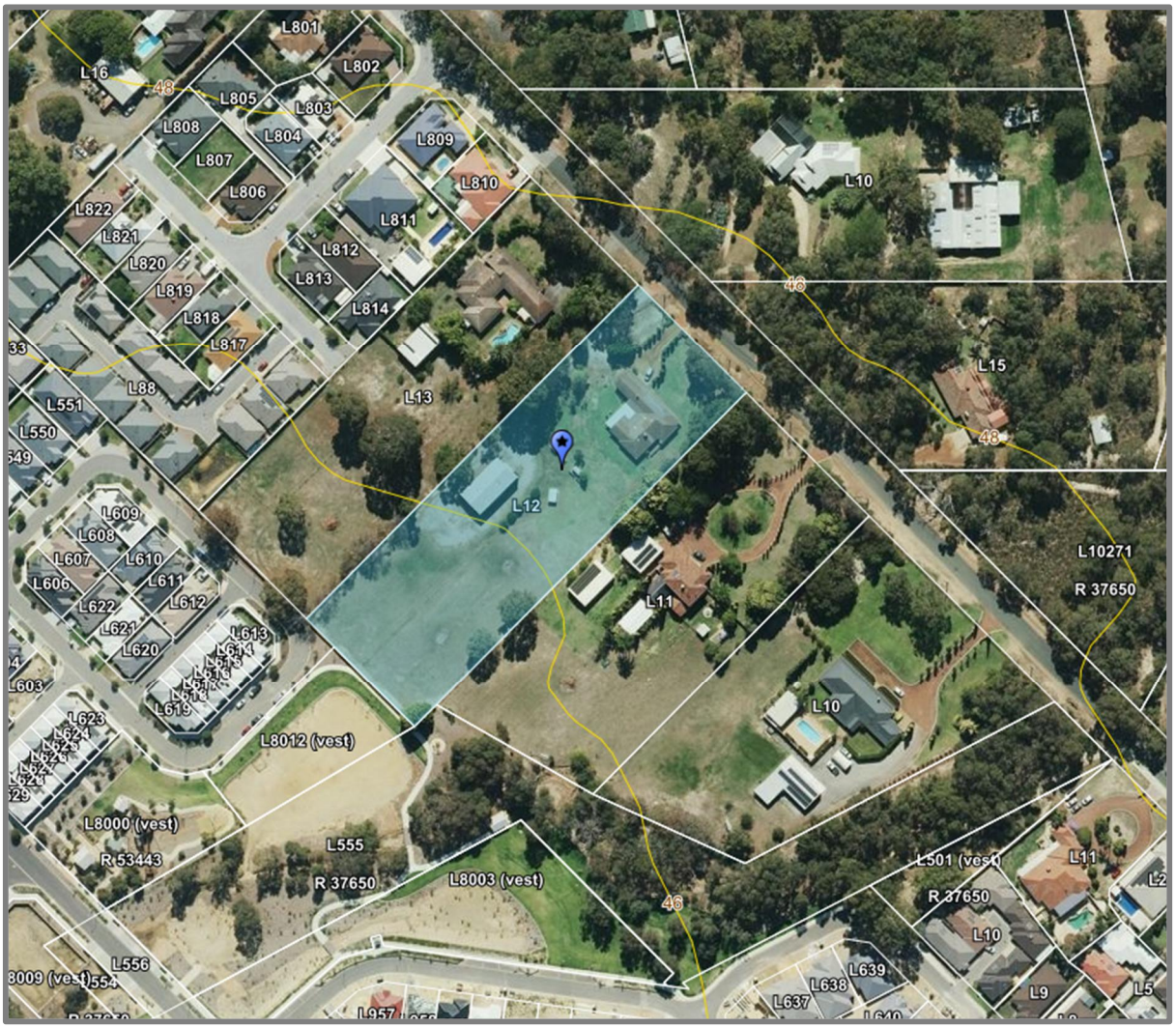


Figure 6 – Existing Ground Contours of The Site (MNG Access, 2023)

2.6 GROUNDWATER

A review of available groundwater contour information from the Department of Water and Environmental Regulations' Groundwater Atlas (September 2023) indicates the minimum groundwater levels are approximately RL24m AHD as depicted below in **Figure 7.** There is significant separation between the prevailing groundwater levels and natural surface levels (approximately 20 metres).

Given the likely presence of Guildford Formation clay soils across the Site, we anticipate there is likely to be issues with water perching on the surface, which will need to be dealt with by the installation of a subsoil network, generally discharging to the south.

The presence of Guildford Formation clay is likely to impact the ability to infiltrate stormwater at source. This will be addressed as part of the Urban Water Management Plan process to inform detailed design.

Figure 7 - Groundwater Levels (Perth Atlas 2023)

3. DRAINAGE AND GROUNDWATER MANAGEMENT

A UWMP has been prepared by JDA Consultant Hydrologists dated May 2024 which has been prepared in accordance with Better Urban Water Management (WAPC, 2008).

The following is a summary of the proposed stormwater drainage design as detailed in the UWMP:

- The first 15mm of rainfall from lots is to discharge into the road drainage network via lot connections. Stormwater runoff from initial events is to be directed to roadside swales.
- Minor events are designed as a system of drains, pipes, kerbs, gutters, etc to convey stormwater flows from the up to 20% AEP.
- Major events are to be directed along overland flow paths.

The Site falls within two drainage catchments. The proposed lots fronting Sultana Road East drains to the Sultana Road East stormwater system. The balance of the site drains to the Hales Estate Detention Storage basin.

Stormwater is to discharge directly into the adjacent Hales Estate Detention Storage area adjacent to Canopy Circuit. The total allowable discharge from Lots 12 and 13 is 19L/s based on the allowance in the hydrology model for the Hales Estate.

All lots will have a 500mm clearance from the 1% AEP top water level of the detention storage area and 300mm from the adjacent road flood level.

Subsoil drainage is proposed to be installed in road reserves to protect infrastructure in the event of any perched groundwater rise.

4. ROADWORKS & FOOTPATHS

Figure 2 depicts the existing road network surrounding the Site. Access to the Site is from Sultana Road East to the northeast and Canopy Circuit to the southwest.

Sultana Road East is an un-kerbed road in good condition with no piped drainage, with a rural style open channel on the south bound traffic lane verge to collect Stormwater runoff.

Canopy Circuit provides connection to the south west of the development and is a kerbed sealed road with a pedestrian footpath. Canopy Circuit also provides a conventional pit and pipe stormwater system.

All newly created roads would need to be designed and constructed to the satisfaction of the City of Kalamunda.

5. WATER RETICULATION

There are a number of reticulation sized mains surrounding the Site which can be extended through the future development to service the Site. The existing water network is shown on **Figure 8.**

Currently Lot 12 is serviced via a private connection from the 205mm Cast Iron water main running within the Sultana Road East verge. Canopy Circuit contains a 100P-12 water reticulation main which currently services properties to the south-west. These networks can be extended to and supply water to the Site.

Based on Water Corporation advice, there is sufficient capacity in the water network to serve the proposed development.

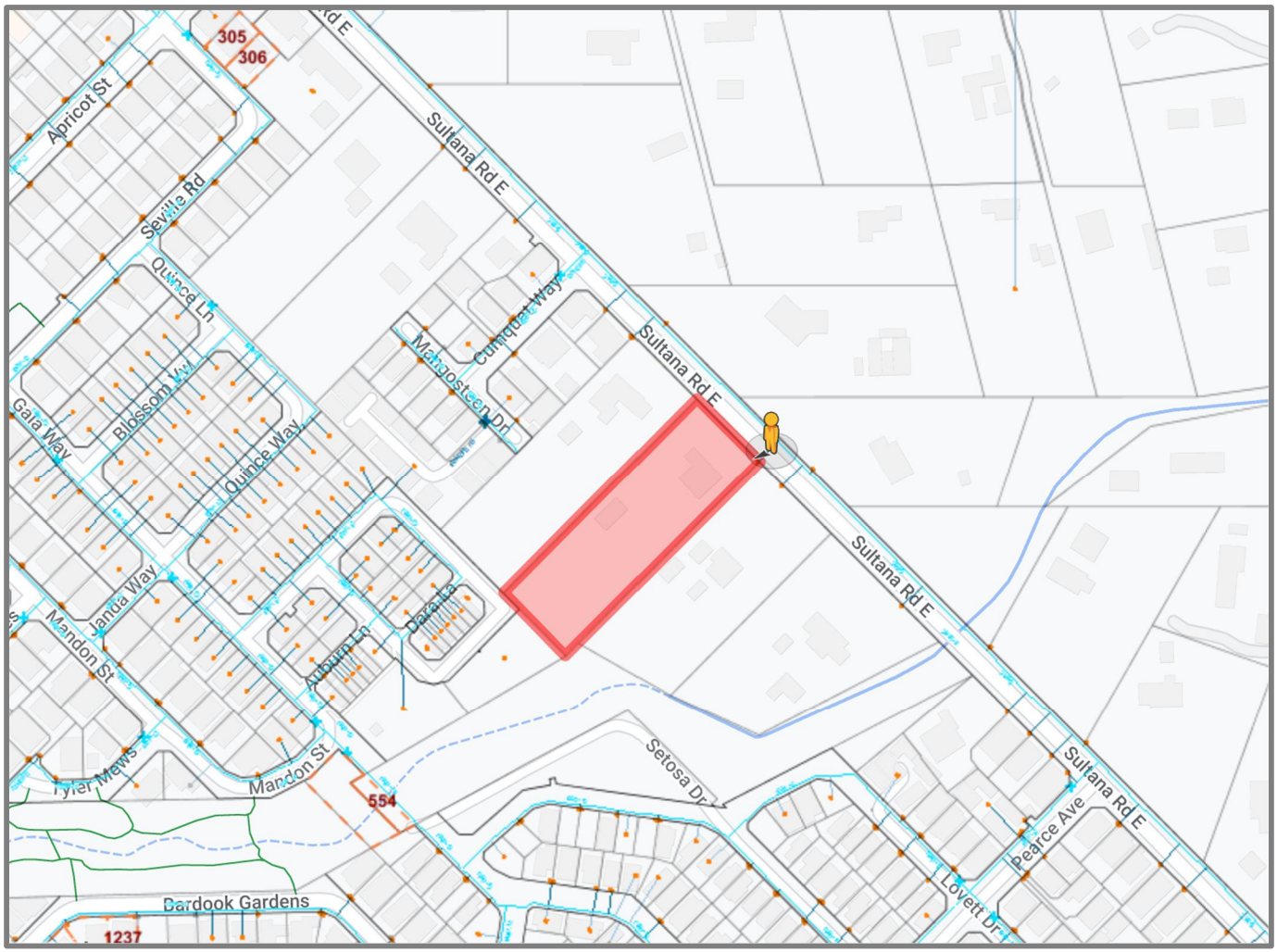


Figure 8 - Existing Water Reticulation (Water Corporation Esinet, 2023)

6. SEWER RETICULATION

The Site falls within the Gooseberry Hill Sewer District. **Figure 9** - Existing Sewer Reticulation (Water Corporation Esinet, 2023) depicts the existing sewerage reticulation within the area.

There are a number of reticulation sized mains surrounding the Site which could be extended through the future development to service the site. Canopy Circuit contains a 150PVC-U sewer network which currently services properties to the south west. This network can be extended to and supply sewer to the internal properties of the Site.

Sultana Road East contains a 150PVC-U which currently services lots to the north-west. However, this sewer main may be too shallow to service lots fronting Sultana Road East. If this is the case, the Sultana Road East lots will need to be serviced from Canopy Circuit which will require easements for any sewer mains located in lots.

The Water Corporation has indicated there is sufficient capacity in the current sewer reticulation system to service the development.

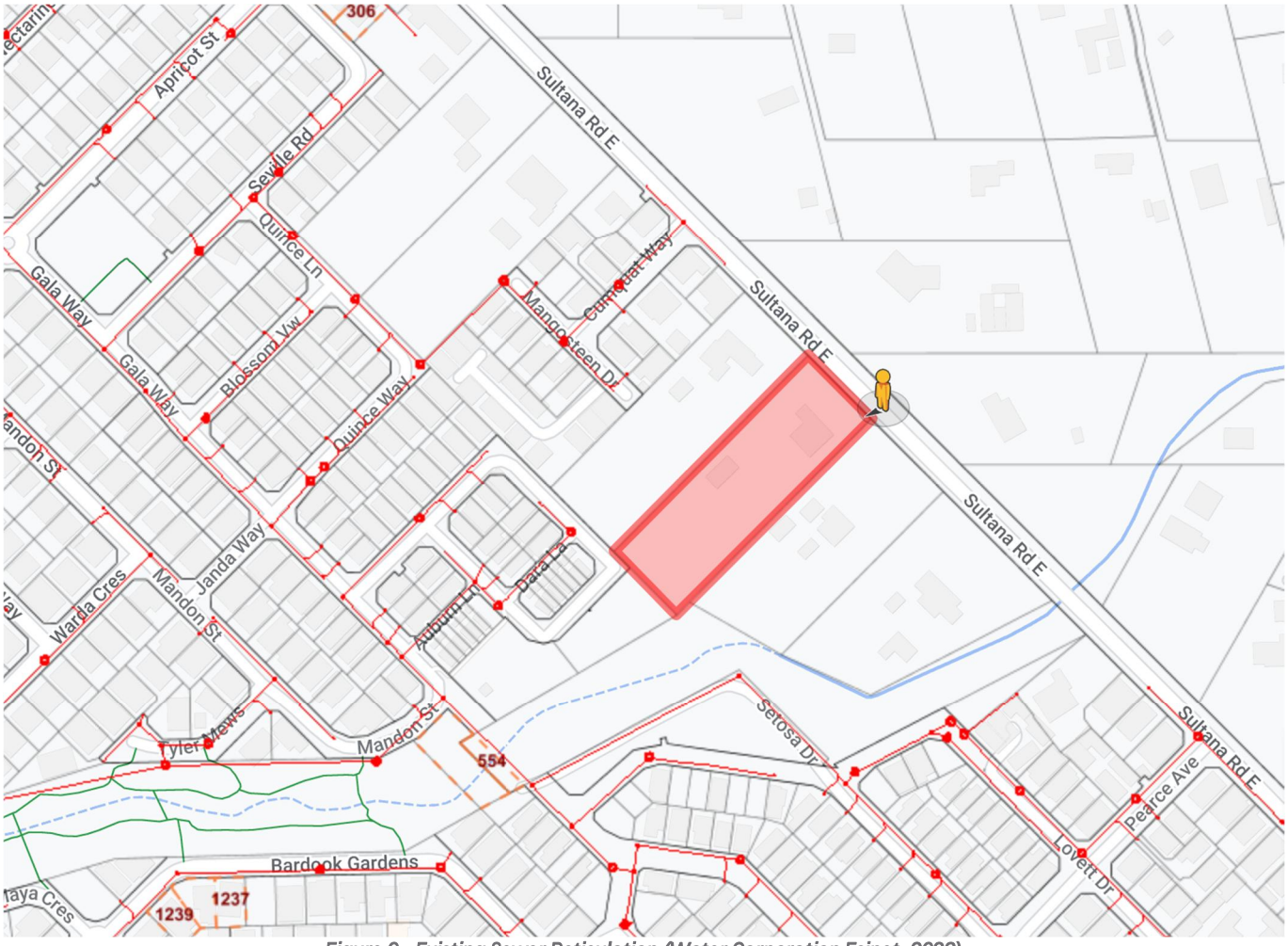


Figure 9 - Existing Sewer Reticulation (Water Corporation Esinet, 2023)

7. POWER

The Western Power Network Capacity Mapping Tool was used to determine future forecast remaining capacity in the electricity network. This indicates that the network will have more than 30MVA remaining capacity from now until 2034. The total power requirement for the proposed residential development is estimated to be in the order of 80kVA, well within the network capacity. This will need to be confirmed formally with Western Power during planning.

The existing overhead power infrastructure is shown in **Figure 10**. There is a High Voltage (11kV-33kV) and Low Voltage (< 1kV) overhead line running along the Sultana Road East Road Reserve, as shown in **Figure 10**. Unless specified under the WAPC conditions the aerial lines can remain, poles may need to be shifted to avoid crossovers.

Figure 10 - Existing Overhead Power Lines (MNG Access Western Power, 2023)

Figure 11 below depicts the existing underground power infrastructure. The underground network surrounding the Site may be extended to service the proposed development, and no further upgrade works are anticipated. If no general capacity is available in the local LV network, a new transformer will be required to be installed.

Figure 11 – Underground Power (MNG Access Western Power 2023)

8. GAS SUPPLY

Figure 12 depicts the existing gas network surrounding the Site. There is an existing gas main in Sultana Road East that is a DN155 PVC main. This main is within the southern verge adjacent to the Site. A smaller DN63 PE main is located within Canaopy Circuit. At the time of writing, a response is still being sought from ATCO Gas about the requirements for gas for this development. However, it is anticipated that there will be sufficient capacity in the surrounding network to service the proposed development, and no gas headwork upgrades will be required.

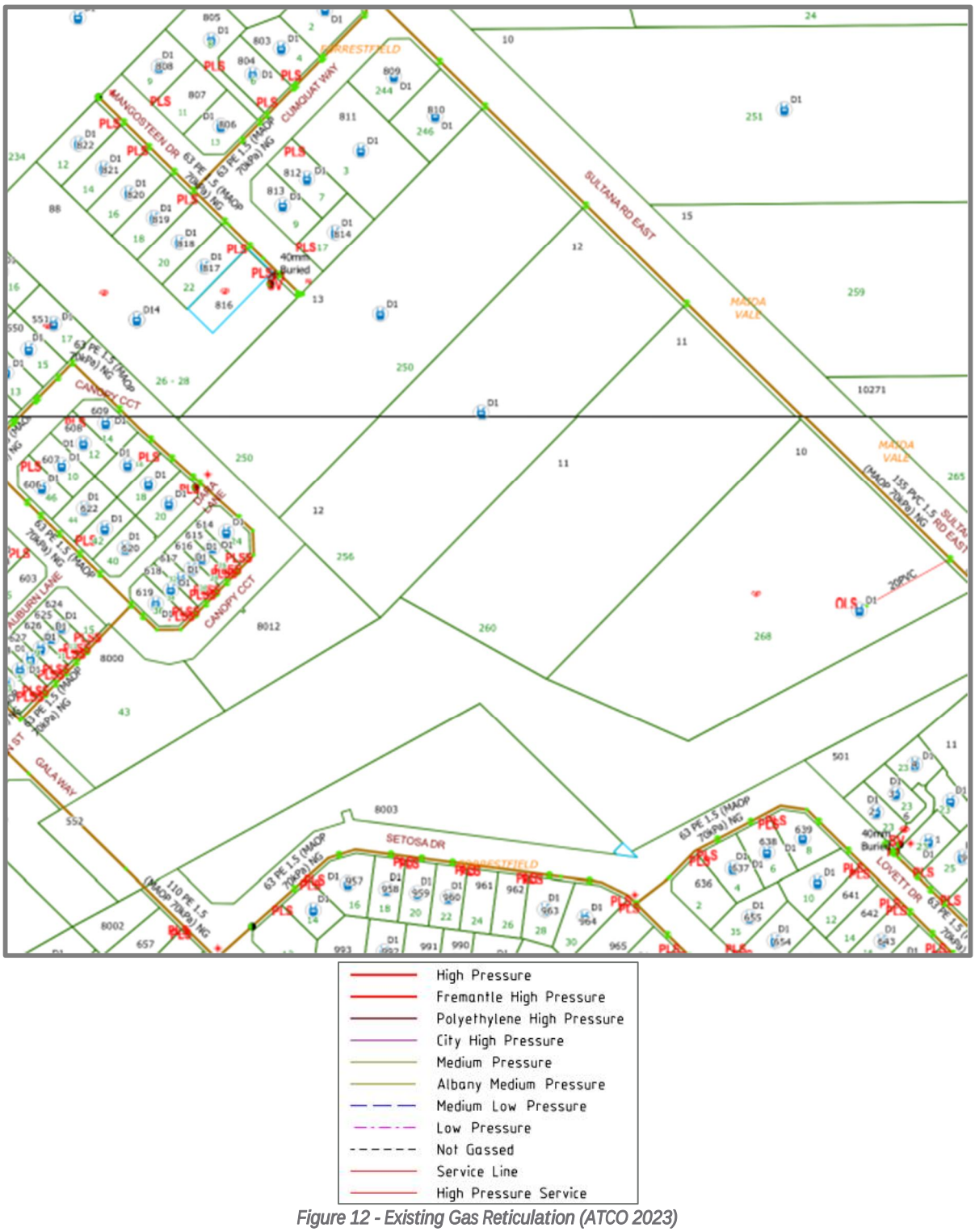


Figure 12 - Existing Gas Reticulation (ATCO 2023)

9. TELECOMMUNICATIONS

The only existing Telstra underground cables in the site run along Sultana Road North-east verge. Lot 12 is provided with a P20 property connection, as shown in **Figure 13**. This will need to be removed as part of any subdivision works prior to the commencement of development.

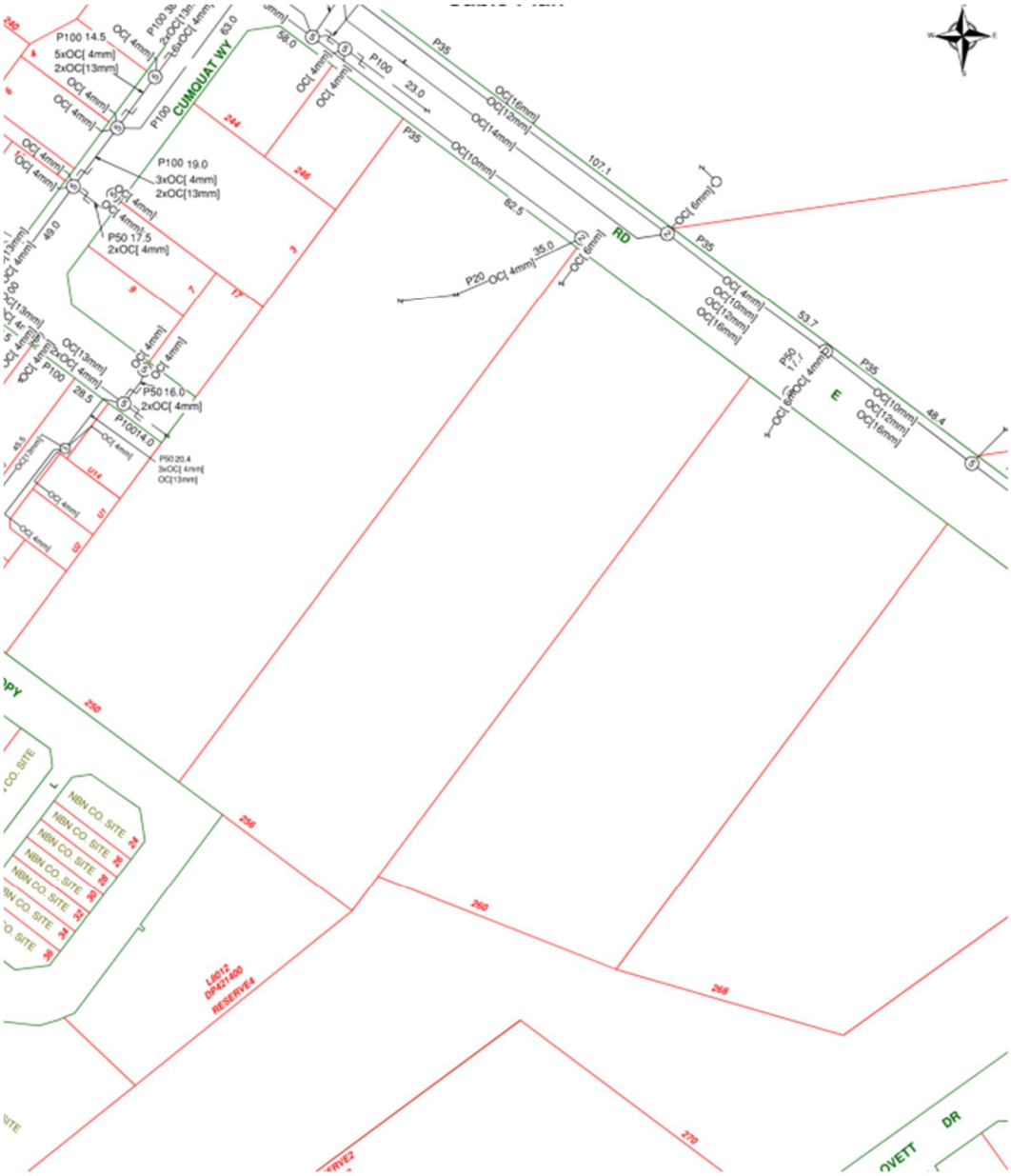


Figure 13: Existing Telstra Network (Telstra 2023)

Figure 14 shows the Site is within an existing NBN Co footprint and there is existing NBN infrastructure within the area. It is not anticipated any headworks upgrades or backhaul will be required to service this development.

Figure 14: NBN Co Rollout Planning (NBN Co 2015)

10. CONCLUSION

The Site is expected to be readily serviced with extensions of existing infrastructure from the surrounding area, including infrastructure extensions from Sultana Road East and Canopy Circuit. Water supply, sewerage and other public utility services are available or can be extended to service the proposed urban area.

Appendix D

Transport Impact Statement

Engineering a better future for over 20 years!

Proposed Subdivision

Lot 12 Sultana Road East, Forrestfield

Transport Impact Statement

PREPARED FOR:
Acott Equities Pty Ltd

September 2024

Document history and status

Author	Revision	Approved by	Date approved	Revision type
A Navarro	r01	R White	31/08/2023	Draft
A Navarro	r01a	B Bordbar	01/09/2023	Final
A Navarro	r01b	B Bordbar	01/09/2023	Revised Final
A Navarro	r02	B Bordbar	12/02/2024	2nd Revision
A Navarro	r02a	B Bordbar	10/04/2024	3rd Revision
Roger Bajwa	r02b	B Bordbar	12/09/2024	4th Revision

File name: t23.172.rb.r02b

Author: Roger Bajwa

Project manager: Behnam Bordbar

Client: Acott Equities Pty Ltd

Project: Lot 12 Sultana Road East, Forrestfield

Document revision: r02b

Project number: t23.172

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REPORT FIGURES

1 Introduction

This Transport Impact Statement (TIS) has been prepared by Transcore on behalf of Acott Equities Pty Ltd with regard to the proposed subdivision application for Lot 12 Sultana Road East, Forrestfield, in the City of Kalamunda.

The subject site is located southwest of Sultana Road East and northeast of Canopy Circuit, as shown in **Figure 1**.

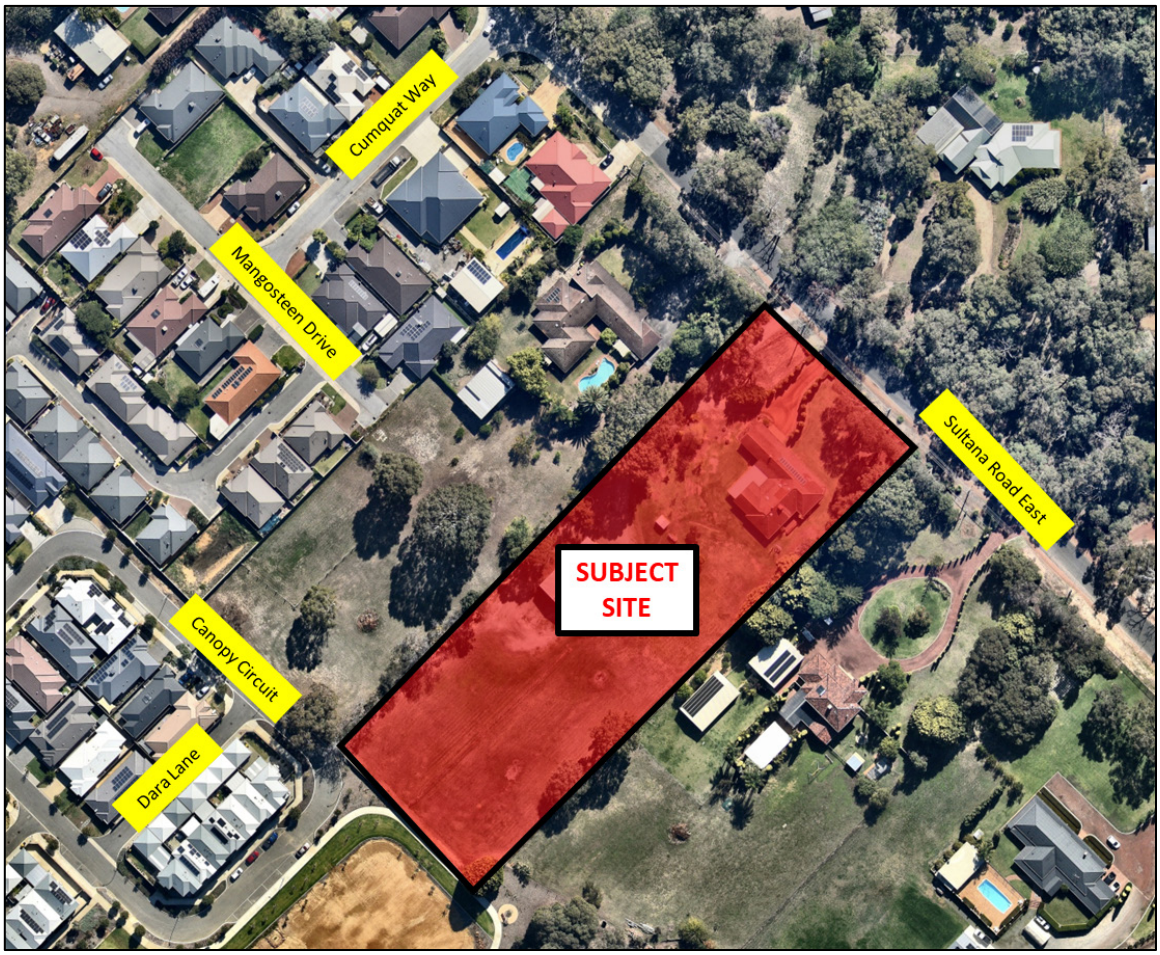

Figure 1: Location of the subject site

The Transport Impact Assessment Guidelines (WAPC, Vol 3 – Subdivisions, August 2016) states *"A Transport Impact Statement is required for those subdivisions that would be likely to generate moderate volumes of traffic*[1] *and therefore would have a moderate overall impact on the surrounding land uses and transport networks"* and Table 1 of Volume 3 indicates for residential subdivisions a Transport Impact Statement is required for subdivisions that will yield 10 – 100 dwellings.

[1] *Between 10 and 100 vehicular trips per hour*

The proposed subdivision of the subject site will accommodate 18 residential lots, so a Transport Impact Statement is the appropriate level of assessment for this proposed subdivision.

However, as part of the proposal, there will also be a structure plan amendment over the abovementioned site. The purpose of the amendment is to improve the road network in this area and improve lot yield and lot shapes. This TIS will also be used for the structure plan amendment.

2 Proposed Subdivision

The subject site currently has one dwelling on the Sultana Road East frontage and the remainder of the site is currently undeveloped.

The proposed subdivision will yield 18 residential lots (including one grouped housing lot) with areas of 180m^2 (smallest residential lot) – 3,194m^2(grouped housing lot). The existing dwelling on site will be removed. The proposed subdivision plan is shown in **Appendix A**.

Other residential subdivision development has progressed to the south of the subject site with Setosa Drive and Gala Way connecting to Canopy Circuit which would eventually connect to the proposed subdivision.

3 Proposed Amendment to Outline Development Plan

The subject site is currently within the Urban Cell 7 (Landowner Area 4) of the Forrestfield Outline Development Plan. The existing approved Outline Development Plan is included in **Appendix B** for reference.

This amendment proposes modifications to the existing Outline Development Plan as it applies to the subject site within Landowner Area 4. The modifications involve changes to the road network through the subject site. This modification will result in better connectivity of the proposed subdivision with the existing 'The Hales' development and will provide regularised lot types and cell depths that will facilitate the development of affordable houses and land. Refer to **Figure 2** for the proposed road network modification.

This modification of the subdivision road network would include the change of residential density of R12.5 coded land to R25 and most of the R20 coded land to R30 and R40. This change would allow the subdivision to yield 18 lots ranging from 180m^2 to 3,194m^2. Based on the existing R-Code densities it is estimated Lot 12 would yield approximately 13 lots under the current ODP.

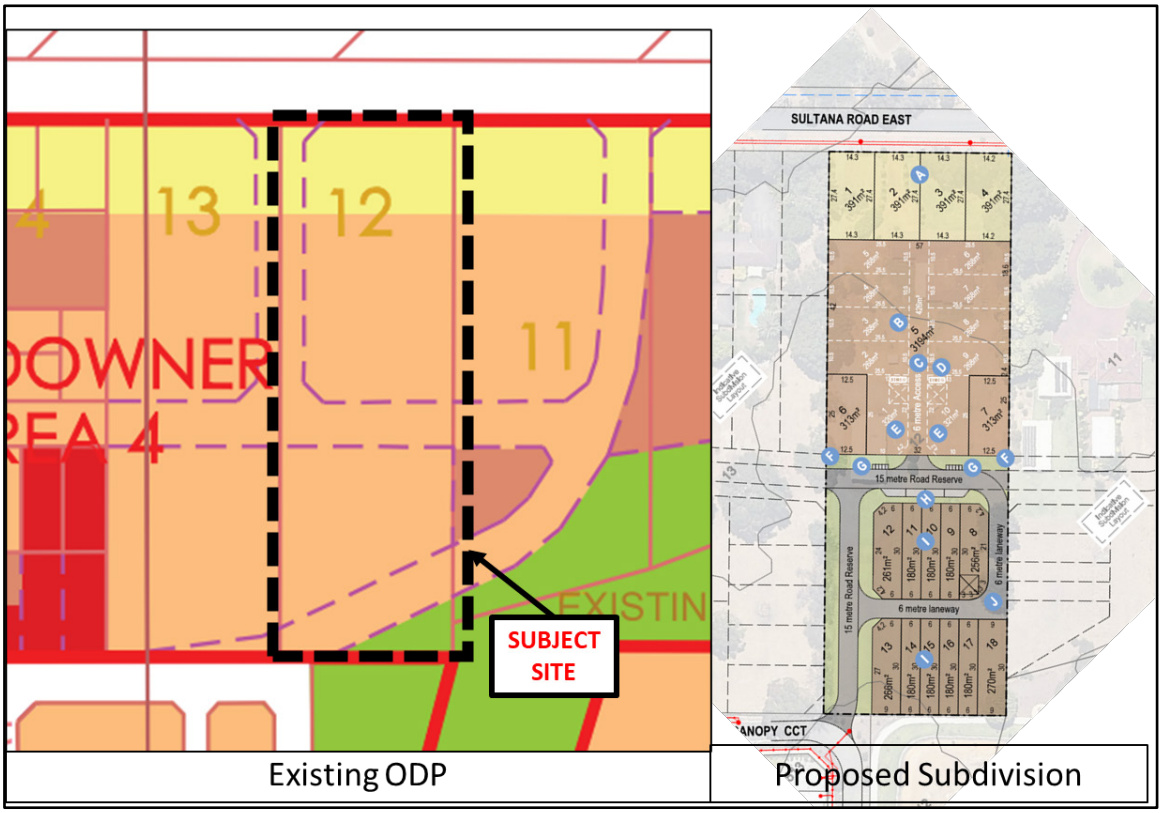

Figure 2: Proposed road network modification

4 Vehicle Access

Access to the subdivision will be provided via the proposed subdivision road network connecting the proposed subdivision to Sultana Road East and the adjacent subdivision to the east, west and south of the site via Canopy Circuit and Mangosteen Drive. Refer to **Figure 3** for more details.

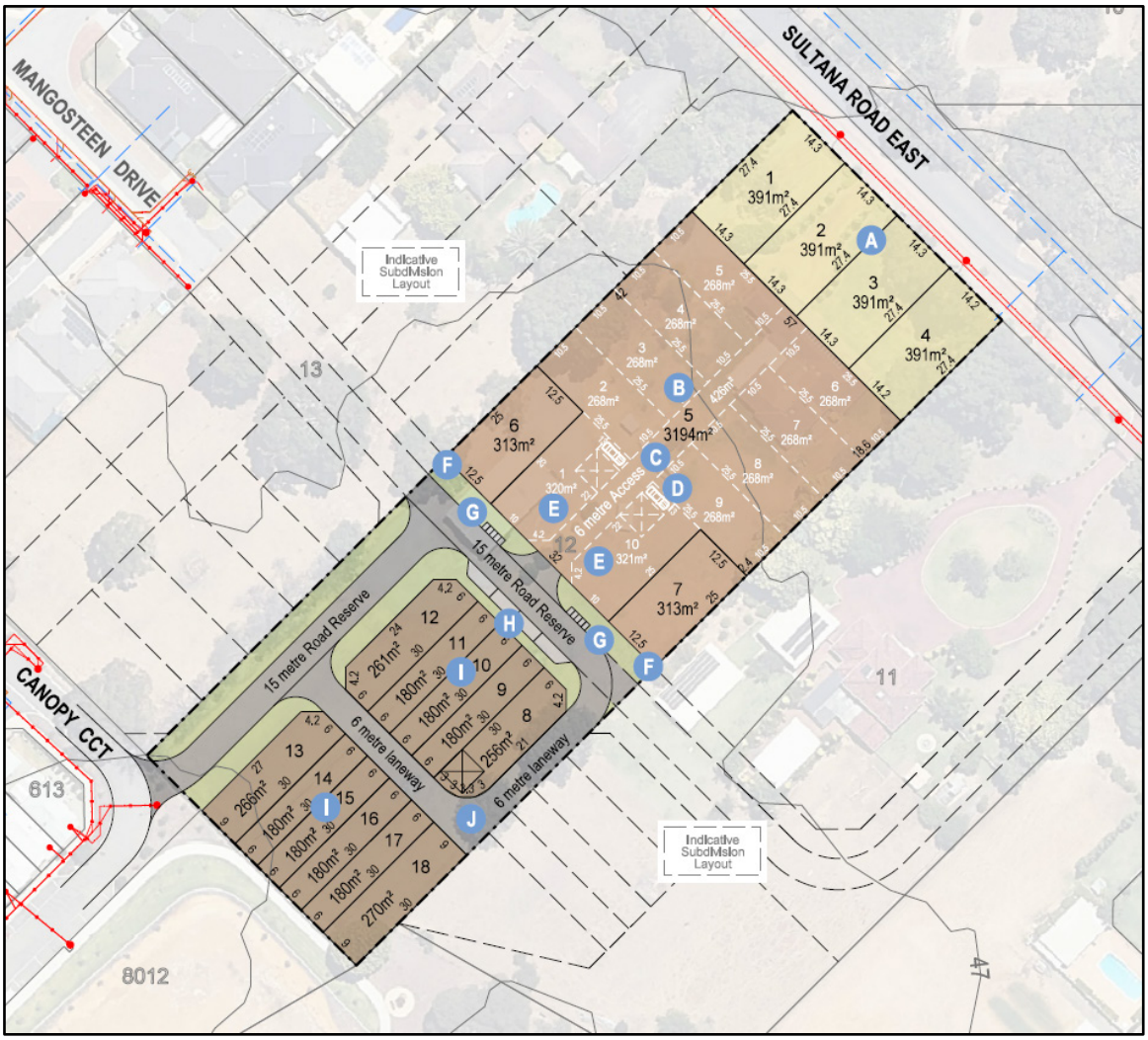

Figure 3: Proposed subdivision road network

5 Provision for Service Vehicles

The waste collection for the proposed subdivision will be the standard arrangement for residential subdivisions throughout the City of Kalamunda. This consists of rubbish bins wheeled out by the residents for verge collection on the designated collection day. The subdivision road network allows rubbish trucks access in both directions on all streets for rubbish collection on both sides of the street.

As part of the proposed subdivision, concrete crossovers will be constructed on Lots 7, 8 and 18 to enable rubbish collection vehicles to turn around whilst the balance of the structure plan road network is not constructed. Refer to **Figure 4** for the location of the aforementioned lots. This will enable these lots to be developed without being held off from the development of the adjacent subdivision due to the connected road network through the two sites.

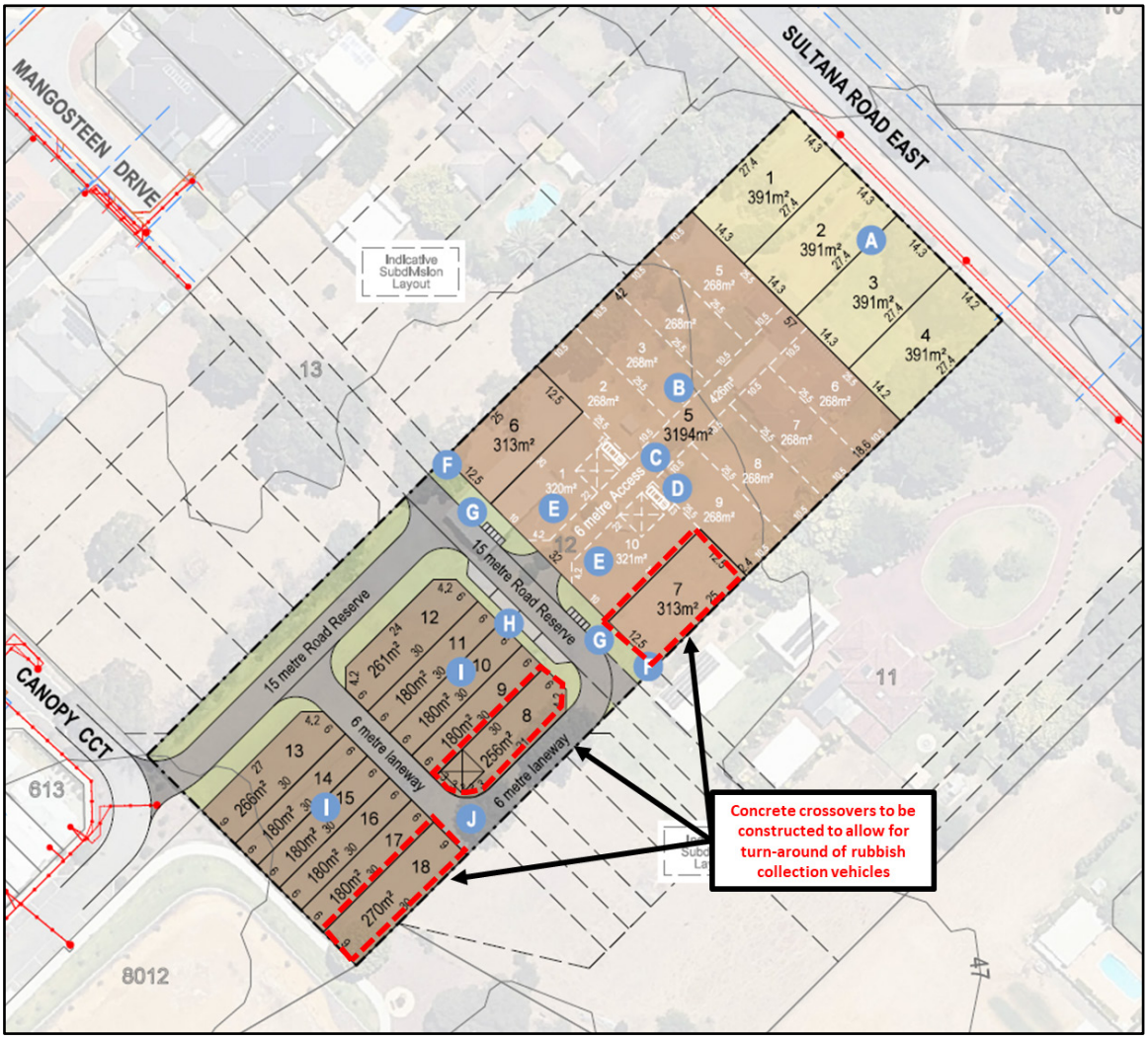

Figure 4: Location of Lots 7, 8 and 18 of proposed subdivision

6 Daily Traffic Volumes and Vehicle Types

6.1 Future Traffic on the Surrounding Road Network

The proposed subdivision is located within Urban Cell 7 – Landowner Area 4 of the Forrestfield Outline Development Plan (ODP). The recent Traffic Engineering Letter (KC00910.000) prepared by KCTT in January 2019 in relation to Lot 17 Sultana Road stated as follows:

"Based on traffic modelling performed by KCTT for KC00332.000 Maida Vale and KC00604.000 Forrestfield North, it is not expected that Sultana Road East would carry more than 3,000 vehicles per day. Based on anticipated traffic volumes, Sultana Road East can be deemed equivalent to a Liveable Neighbourhoods classification of Access Street "B". Therefore, there is no obstacle for lots having vehicular access directly from Sultana Road East."

6.2 Trip Generation

The proposed subdivision will yield 28 dwellings. The traffic generation rate used for the proposed subdivision is 8 vehicular trips per day (vpd) per dwelling, which corresponds to peak hour trip generation rates of 0.8 vehicular trips per hour per dwelling as recommended in the Western Australian Planning Commission (WAPC) *Transport Impact Assessment Guidelines (2016).*

Accordingly, it is calculated that the daily and peak hour traffic generation for the proposed subdivision is:

- Daily vehicle trips: 224vpd; and,
- Weekday peak hour trips: 23vph.

Therefore, it is estimated that the proposed subdivision would generate about **224** vehicular trips per day with approximately **23** trips during the typical weekday peak hour. These figures include both inbound and outbound vehicle movements.

In comparison, the estimated yield of 13 residential lots from Lot 12 under the approved ODP would yield 104vpd (daily) and 10vph (peak hour).

The increase in the residential density due to the modification of the road network will result in an increase in traffic volume that will be travelling on the surrounding road network. However, the increase is only minimal and there is no significant impact on the surrounding road network.

The traffic generation of other precincts relevant to this analysis is as follows:

- Lot 10: approximately 17 lots @ 8vpd = 136vpd;

- Lot 11: approximately 9 lots @ 8vpd = 72vpd (approved ODP) & approximately 12 lots @ 8vpd = 104vpd (indicative subdivision layout as shown in **Appendix A**);
- Lot 13: approximately 15 lots @ 8vpd = 120vpd (approved ODP) & approximately 17 lots @ 8vpd = 136vpd (indicative subdivision layout as shown in **Appendix A**);
- Lot 14 and 15: 51 lots @ 8vpd = 408vpd; and,
- Canopy Circuit subdivision: 45 lots @ 8vpd = 360vpd.

6.3 Traffic Distribution

For this assessment it is estimated that trip distribution from this area would be as follows:

- 60% to and from the west via Berkshire Road;
- 20% to and from the northeast via Sultana Road East; and
- 20% to and from the southeast via Gala Way or Sultana Road East.

The subdivision road through Lot 12 between Canopy Circuit and Sultana Road East (in both the existing ODP and the proposed subdivision pan) will provide a convenient through route for some trips from the existing Canopy Circuit subdivision area to the southwest and future Mangosteen Drive subdivision to the northwest (Lots 13 and 14) and Lots 10 and 11 to the east but is not expected to attract through traffic from other surrounding areas.

6.4 Traffic Changes on the Surrounding Road Network

Figure 5 and **Figure 6** show the future daily traffic flows generated by the Lot 12 subdivision, the existing Canopy Circuit subdivision and Lots 14 & 15, and the future subdivision of adjacent Lots 10, 11 and 13 in the existing approved ODP (**Figure 5**) and in the proposed subdivision concept plan (**Figure 6**). The traffic that will be generated by Lot 12 is included in those total traffic flows and is also shown separately in brackets.

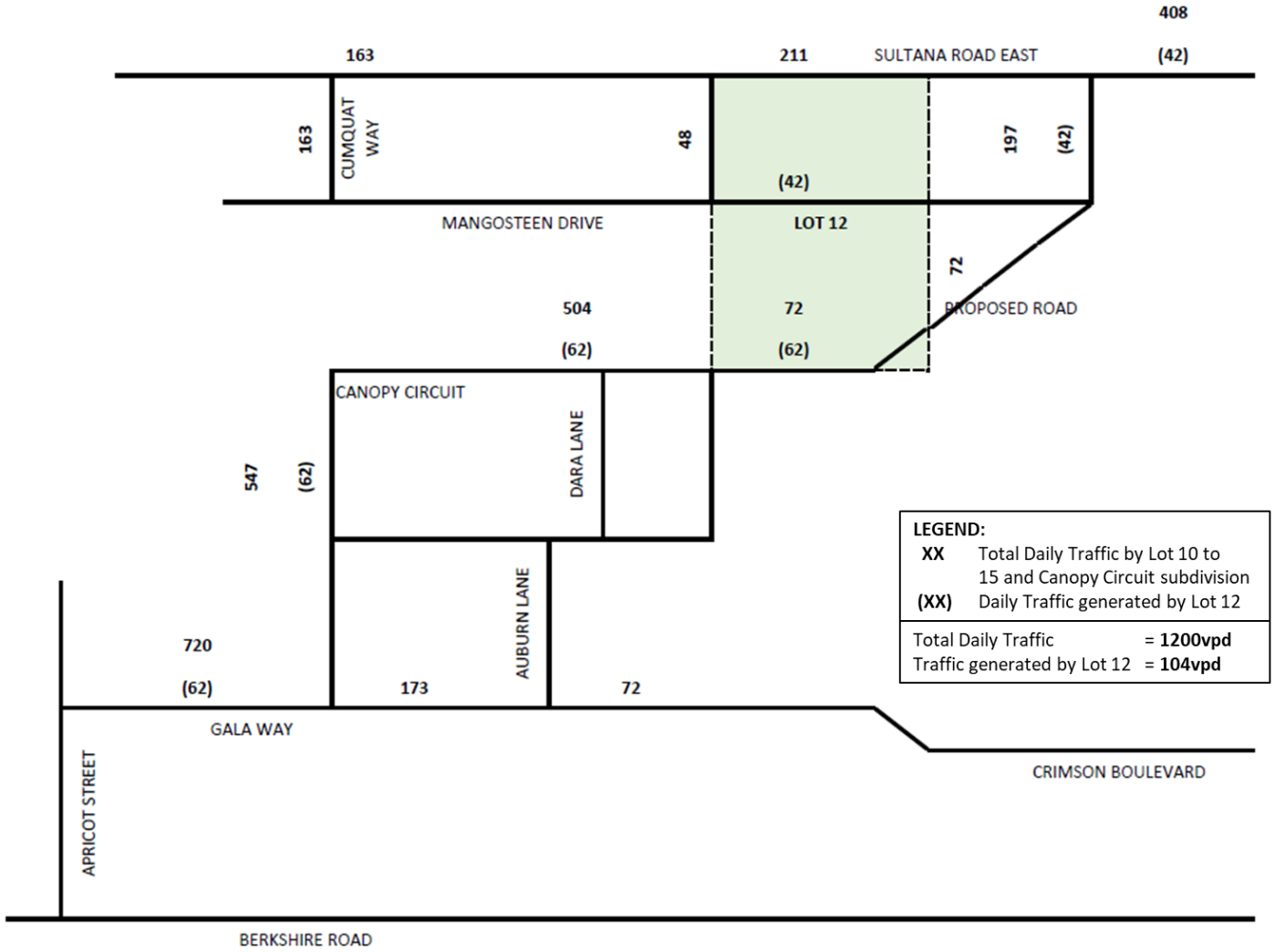

Figure 5: Traffic flows based on the approved ODP

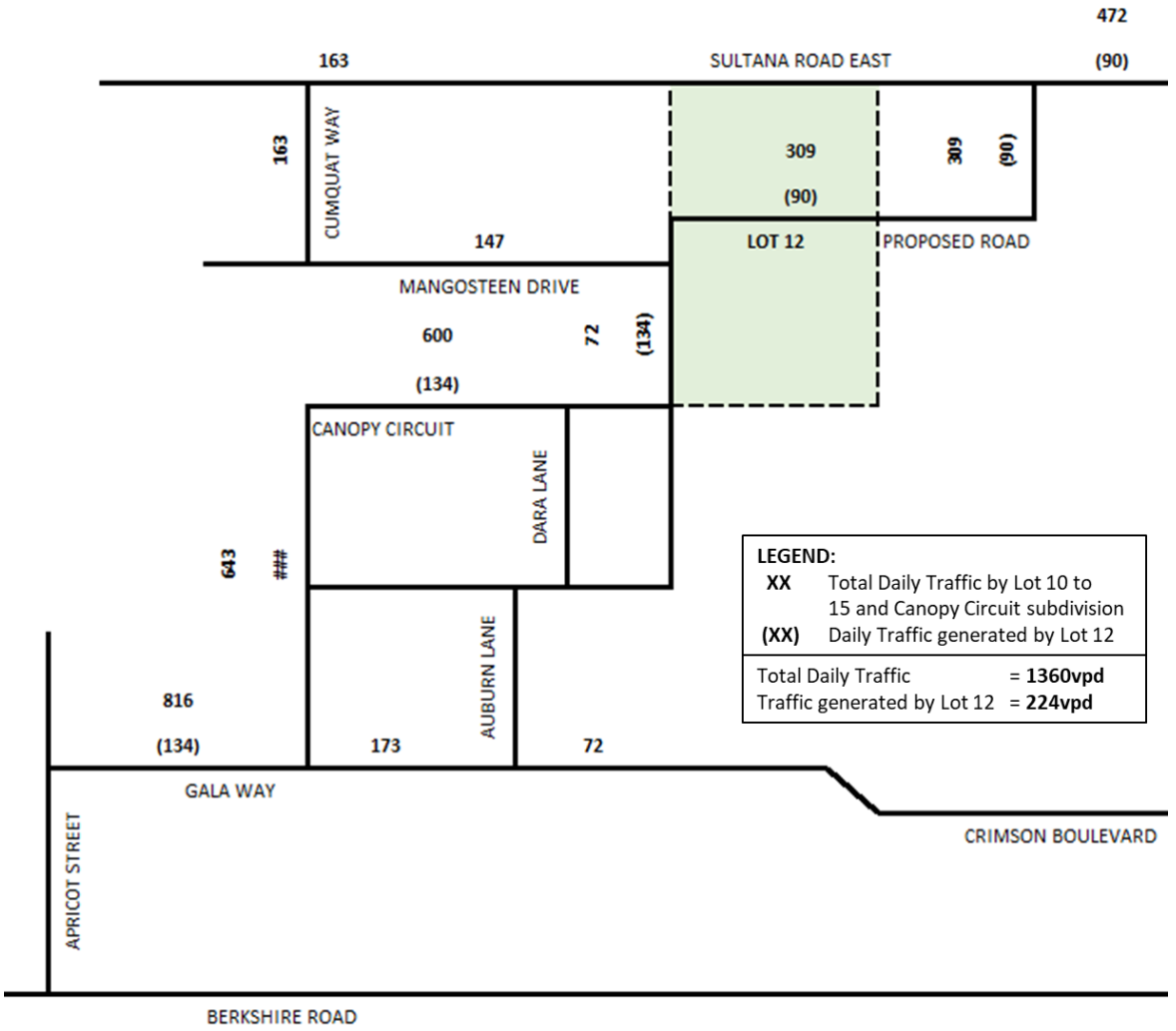

Figure 6: Traffic flows based on the proposed subdivision

6.5 Impact on Surrounding Roads

The WAPC *Transport Impact Assessment Guidelines* (2016) provides the following guidance on the assessment of traffic impacts:

"As a general guide, an increase in traffic of less than 10 percent of capacity would not normally be likely to have a material impact on any particular section of road, but increases over 10 percent may. All sections of road with an increase greater than 10 percent of capacity should therefore be included in the analysis. For ease of assessment, an increase of 100 vehicles per hour for any lane can be considered as equating to around 10 percent of capacity. Therefore, any section of road where development traffic would increase flows by more than 100 vehicles per hour for any lane should be included in the analysis."

The proposed changes to the ODP only result in net increases of 96vpd (10vph) on Canopy Circuit and 64vpd (7vph) on Sultana Road East.

The proposed subdivision will not increase traffic flows on any roads adjacent to the site by the quoted WAPC threshold of +100vph to warrant further analysis. Therefore, the impact of development traffic on the surrounding road network will not be significant.

7 Traffic Management on the Frontage Streets

Sultana Road East, northeast of the subject site, is constructed as a 7.4m-wide single-carriageway, two-lane undivided road with unsealed shoulders. Within close proximity to the site is a slow point/horizontal deflection device.

Sultana Road East is classified as an *Access Road* in the Main Roads WA *Metropolitan Functional Road Hierarchy* and operates under the default, built-up speed limit of 50km/h. Refer **Figure 7** and **Figure 8** for more details.

According to the traffic count obtained from the City of Kalamunda, Sultana Road East, southeast of Brewer Road, carried 772 vehicles per day (vpd) in February 2018.

Figure 7: North-westbound view of Sultana Road East

Figure 8: South-eastbound view of Sultana Road East

The proposed subdivision road network is proposed to be connected to Sultana Road East, Mangosteen Drive and Canopy Circuit.

8 Public Transport Access

Public transport services in the vicinity of the subject site are shown in **Figure 9**. The closest existing bus service to the subject site is Bus Service 270 on Hawtin Road to the east of the site (approximately 1.2km east of the subject site). This bus route provides services between High Wycombe Station to Elizabeth Quay Station from Monday to Sunday including Public Holidays.

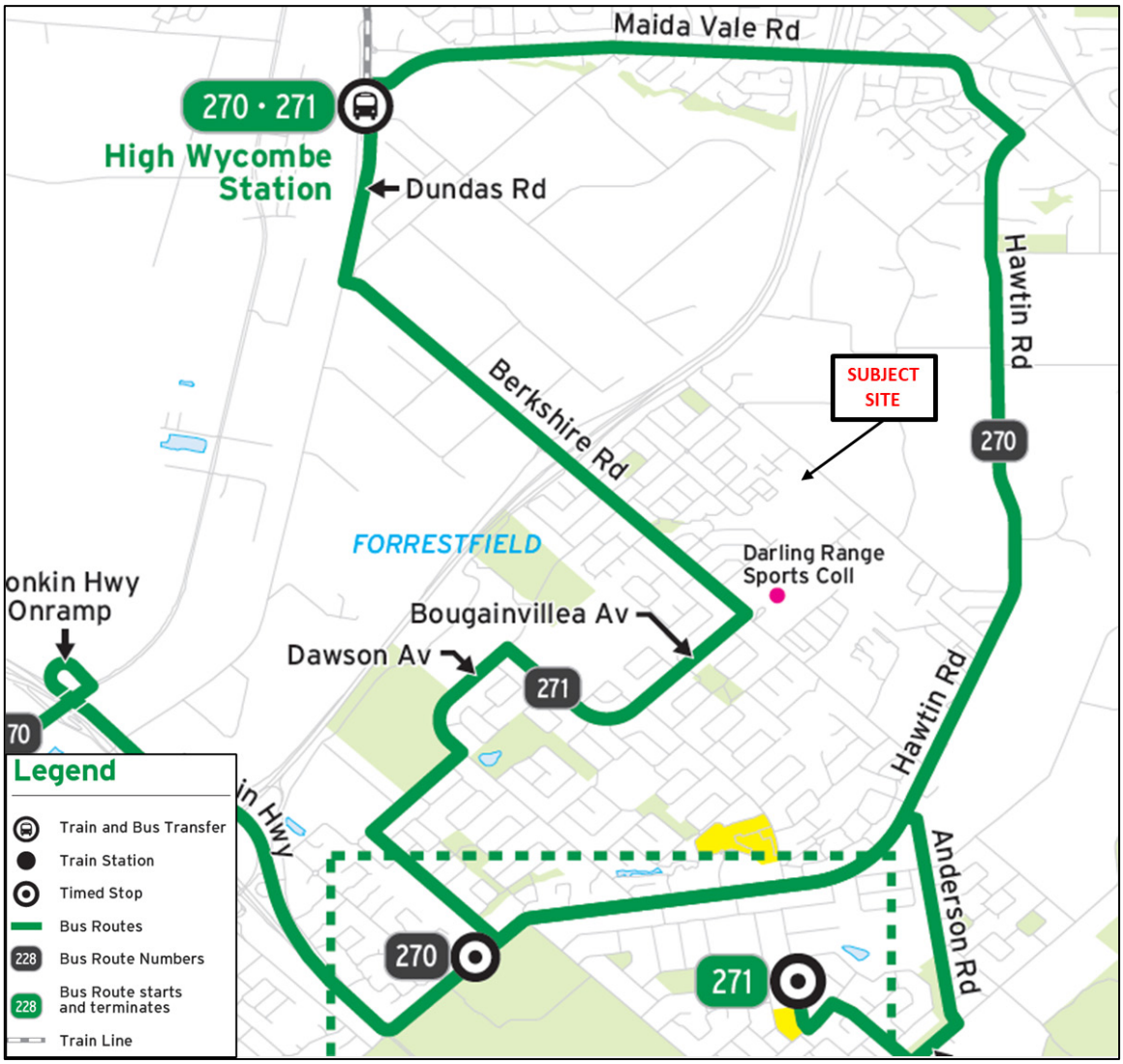

Figure 9: Existing public transport services (Source: Transperth)

9 Pedestrian and Cycle Access

There are no existing pedestrian facilities in the immediate frontage of the subject site along Sultana Road East, however, there is an existing 2m shared path on the south side of Sultana Road adjacent to the existing developments further west and east of the subject site.

In terms of cycling, Sultana Road East is considered a "good road riding environment" as shown in **Figure 10**, an extract of the Perth Bike Maps published by the Department of Transport. This provides further links to other bicycle lanes.

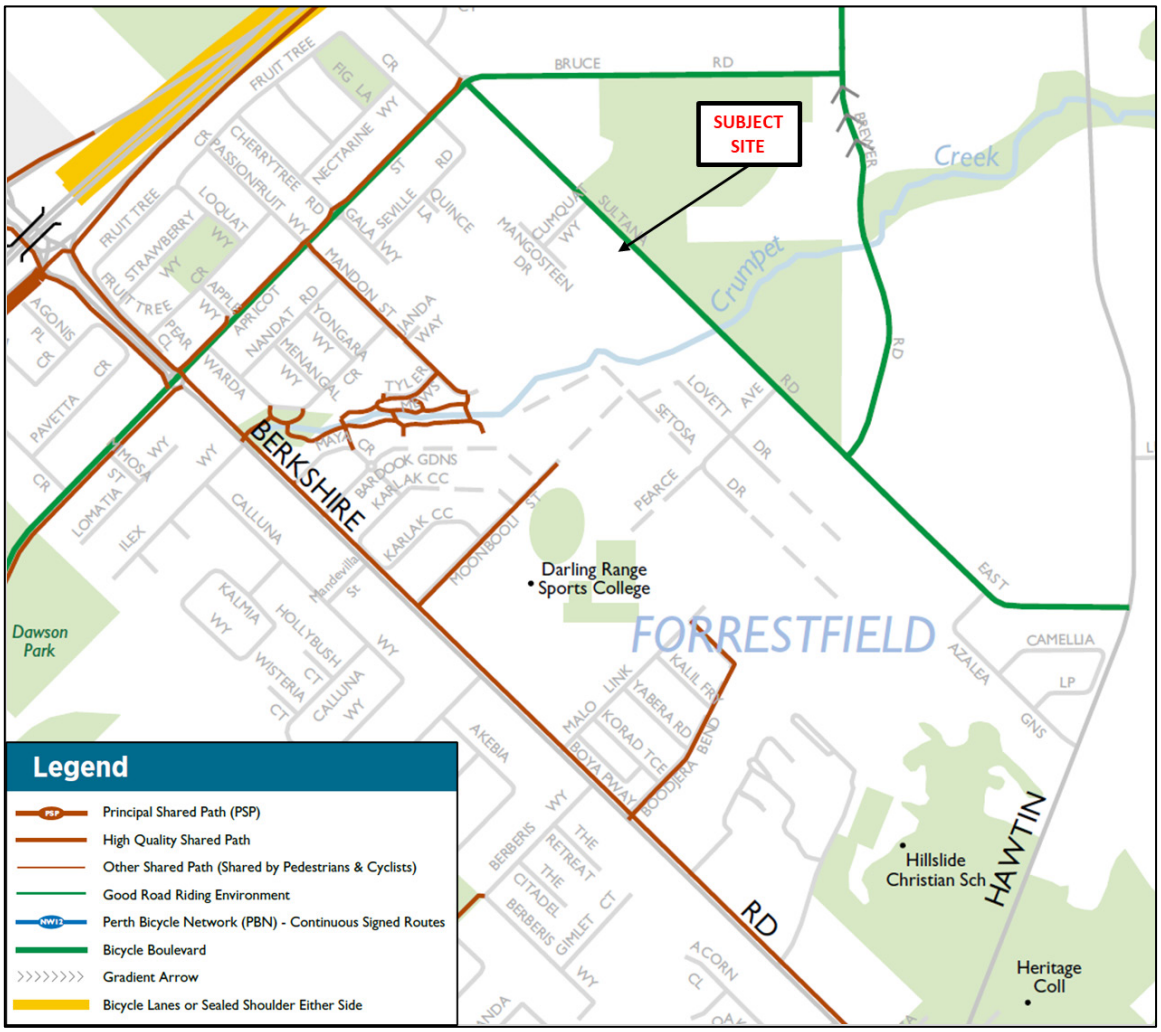

Figure 10: Extract of Perth Bike Map (Source: Department of Transport)

10 Site Specific Issues

The proposed subdivision entails the modification of the approved road network going through Lot 12.

- The proposed change of the road network will still connect Lot 12 to Canopy Circuit on the south and Mangosteen Drive on the west as shown in **Appendix A**;
- The modification to the road network allows for regularised lot types and cell depths that will facilitate the development of affordable houses and land for Lot 12 and the adjacent Lots 11 and 13;
- The modification to the road network allows seamless connectivity to the existing 'The Hales' development;
- The modification to the road network allows the proposed subdivision to progress independently without being dependent upon other parcels of land to be developed first; and,
- The modification to the road network improves road network and connectivity.

No other site-specific issues were identified within the scope of this assessment.

11 Safety Issues

No safety issues were identified within the scope of this assessment.

12 Conclusions

This Transport Impact Statement (TIS) has been prepared by Transcore on behalf of Acott Equities Pty Ltd with regard to the proposed subdivision application for Lot 12 Sultana Road East, Forrestfield in the City of Kalamunda.

The proposed subdivision of the subject site will yield 18 residential lots (including one grouped housing lot) with areas of 180m^2 – 3,194m^2.

The proposal includes the amendment of the existing Urban Cell 7 (Landowner Area 4) of the Forrestfield Outline Development Plan as it applies to the subject lot. This includes the modification of the proposed road network through the site to allow for seamless connectivity to the existing "The Hales" development and to provide regularised lot types and cell depths that will facilitate the development of affordable houses and land.

Access to the subdivision will initially be provided via the proposed 15m wide internal subdivision road connecting to the existing Canopy Circuit on the southwest side of the subject site. The proposed 15m wide subdivision access road is proposed to also connect to the adjacent lot on the southeast side of the subject site in the future that will connect onto Sultana Road East.

The modification of the road network and the changes in the r-coding of the lots have increased the residential density of the subject site, as such, it has resulted in an increase in traffic generation. However, the increase in traffic generation is only minimal, as such, there is no significant impact on the surrounding road network.

The traffic analysis undertaken in this report shows that the traffic generation of the proposed subdivision is relatively low and would not have any significant impact on the surrounding road network.

The subject site currently has direct access to Sultana Road East and will have good pedestrian, bicycle and public transport access as the planned movement networks of the surrounding area become more fully developed in future.

It is therefore concluded that traffic-related issues should not form an impediment to the approval of the proposed subdivision and amendment to the Outline Development Plan.

Appendix A

PROPOSED SUBDIVISION CONCEPT PLAN

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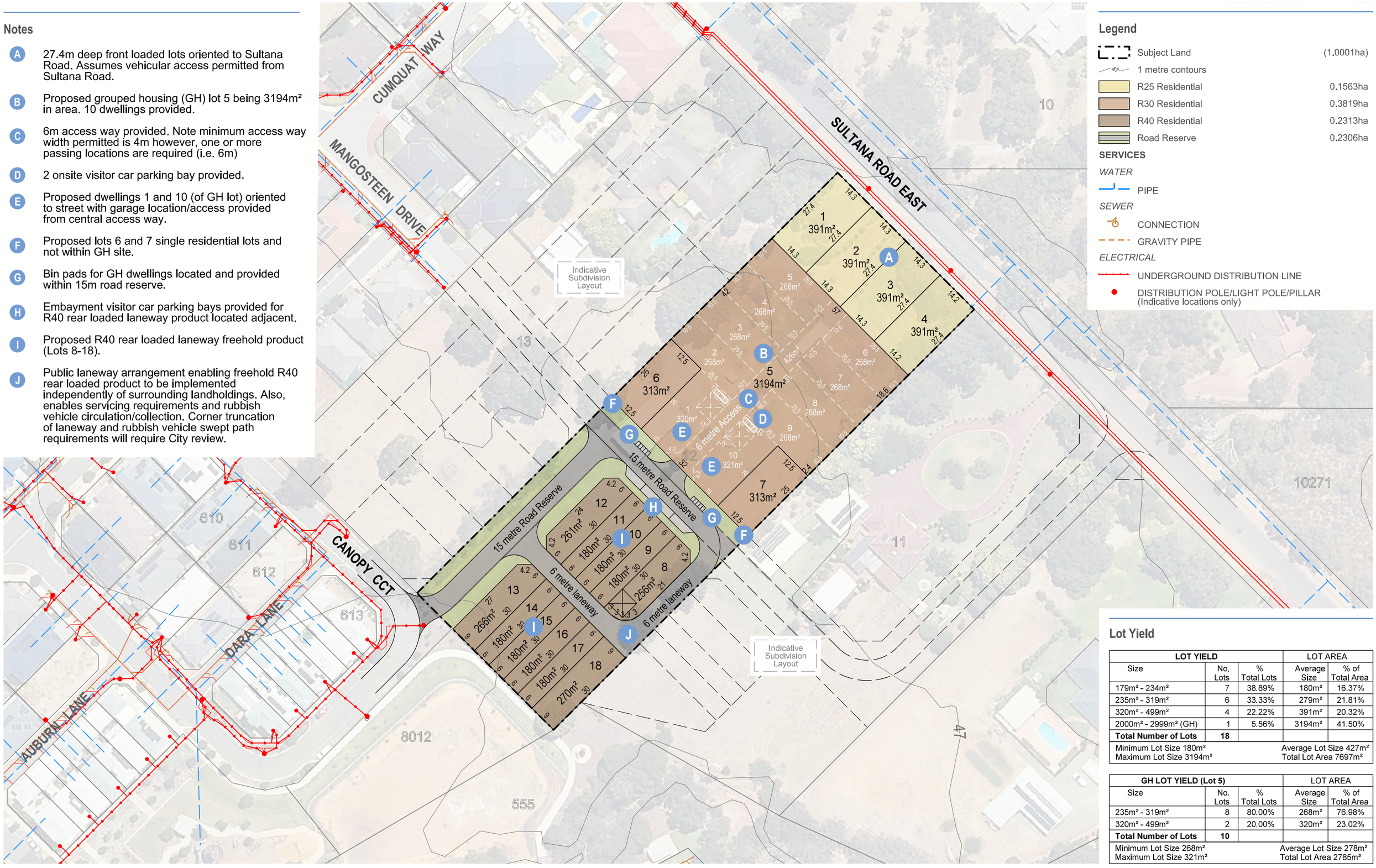
Notes

- **A** 27.4m deep front loaded lots oriented to Sultana Road. Assumes vehicular access permitted from Sultana Road.
- **B** Proposed grouped housing (GH) lot 5 being 3194m² in area. 10 dwellings provided.
- **C** 6m access way provided. Note minimum access way width permitted is 4m however, one or more passing locations are required (i.e. 6m)
- **D** 2 onsite visitor car parking bay provided.
- **E** Proposed dwellings 1 and 10 (of GH lot) oriented to street with garage location/access provided from central access way.
- **F** Proposed lots 6 and 7 single residential lots and not within GH site.
- **G** Bin pads for GH dwellings located and provided within 15m road reserve.
- **H** Embayment visitor car parking bays provided for R40 rear loaded laneway product located adjacent.
- **I** Proposed R40 rear loaded laneway freehold product (Lots 8-18).
- **J** Public laneway arrangement enabling freehold R40 rear loaded product to be implemented independently of surrounding landholdings. Also, enables servicing requirements and rubbish vehicle circulation/collection. Corner truncation of laneway and rubbish vehicle swept path requirements will require City review.



Legend

- Subject Land (1.0001ha)
- 1 metre contours
- R25 Residential 0.1563ha
- R30 Residential 0.3819ha
- R40 Residential 0.2313ha
- Road Reserve 0.2306ha

SERVICES

WATER
- PIPE

SEWER
- CONNECTION
- GRAVITY PIPE

ELECTRICAL
- UNDERGROUND DISTRIBUTION LINE
- DISTRIBUTION POLE/LIGHT POLE/PILLAR (Indicative locations only)

Lot Yield

LOT YIELD			LOT AREA	
Size	No. Lots	% Total Lots	Average Size	% of Total Area
179m² - 234m²	7	38.89%	180m²	16.37%
235m² - 319m²	6	33.33%	279m²	21.81%
320m² - 499m²	4	22.22%	391m²	20.32%
2000m² - 2999m² (GH)	1	5.56%	3194m²	41.50%
Total Number of Lots	**18**			
Minimum Lot Size 180m²			Average Lot Size 427m²	
Maximum Lot Size 3194m²			Total Lot Area 7697m²	

GH LOT YIELD (Lot 5)			LOT AREA	
Size	No. Lots	% Total Lots	Average Size	% of Total Area
235m² - 319m²	8	80.00%	268m²	76.98%
320m² - 499m²	2	20.00%	320m²	23.02%
Total Number of Lots	**10**			
Minimum Lot Size 268m²			Average Lot Size 278m²	
Maximum Lot Size 321m²			Total Lot Area 2785m²	

Subdivision Concept Plan

LOT 12 SULTANA ROAD EAST, FORRESTFIELD

DRAFT

scale: 1:1000@A3 | 1:500@A1
0 10 20m
plan: 23/070/018B
date: 23/08/2024
aerial: Feb 2023

Taylor Burrell Barnett Town Planning & Design
Level 7, 160 St Georges Terrace, Perth WA 6000
e: admin@tbbplanning.com.au
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Taylor Burrell Barnett

Appendix B

OUTLINE DEVELOPMENT PLAN AGREEMENT AREAS 2, 3 & 4 FORRESTFIELD U7

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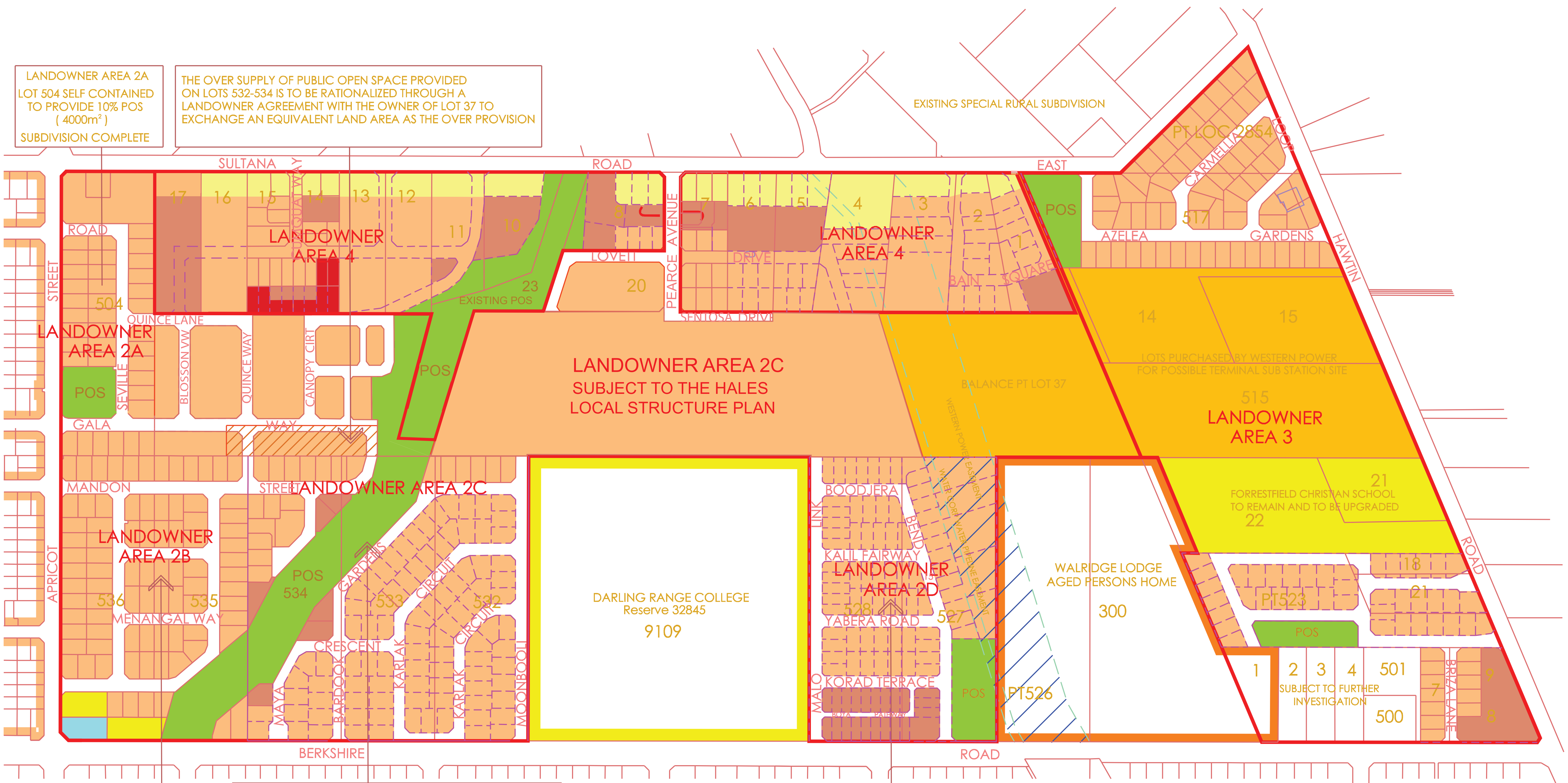

LANDOWNER AREA 2B (LOTS 535 & 536) DEVELOPED WITH JOINT AGREEMENT IN RESPECT TO POS PROVISION

TOTAL AREA OF 2 LOTS	8.1140ha
LESS COMMERCIAL SITE	0.1638ha
NET DEVELOPABLE AREA	7.9502ha
POS AT 10%	0.7950ha
COMMUNITY PURPOSE SITE CREDITED AS POS	0.2000ha
POS REQUIRED	0.5950ha
POS PROVIDED	0.7750ha
OVERPROVISION OF POS	0.1800ha

SUBDIVISION COMPLETE

LANDOWNER AREA 2C (LOTS 37 & LOTS 532-534) TO BE DEVELOPED WITH A JOINT AGREEMENT IN RESPECT TO POS AND DRAINAGE

LAND AREAS	
LOT 37	21.5700ha
LESS AREA RETAINED FOR TERMINAL SUBSTATION	4.7128ha
	16.8572ha
LOTS 532-534	12.1710ha
NET DEVELOPABLE AREA	29.0282ha
POS REQUIRED AT 10%	2.9028ha
POS PROPOSED	
LOTS 532-534	1.8000ha (0.5829ha OVER PROVISION)
LOT 37	1.1028ha (0.5829ha UNDER PROVISION)
TOTAL	2.9028ha

SUBDIVISION APPROVED AND UNDER CONSTRUCTION

LANDOWNER AREA 2D - LOTS 527 & 528

TO BE DEVELOPED AS SELF CONTAINED SUB AREA WITH 10% PROVISION OF POS

DRAINAGE SWALE WTHIN POS 100% CREDIT

NOTE :
CALCULATION OF POS BASED UPON 10% OF NET DEVELOPABLE AREA EXCLUDING NON DEVELOPABLE WESTERN POWER EASEMENT

SUBDIVISION APPROVED

Amendment to Structure Plan Forrestfield Outline Development Plan - Cell 7 has been approved by the Western Australian Planning Commission on 27-Nov-2020.

[signature]

Rosa Rigali
Signed by an officer duly authorised by the Western Australian Planning Commission pursuant to Section 16 of the Planning and Development Act 2005

OUTLINE DEVELOPMENT PLAN AGREEMENT AREAS 2, 3 & 4 FORRESTFIELD U7

RESIDENTIAL CODES

- RESIDENTIAL R12.5
- RESIDENTIAL R20
- RESIDENTIAL R30
- RESIDENTIAL R40

0 100m
SCALE 1:5000 @ A3

DATE: 14 OCTOBER 2020

Appendix E

Urban Water Management Plan

Prepared for:

ACOTT EQUITIES PTY LTD

Lot 12 Sultana Road East, Forrestfield

Urban Water Management Plan

September 2024

Suite 1/27 York St, Subiaco WA 6008 | PO Box 117, Subiaco WA 6904

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DISCLAIMER

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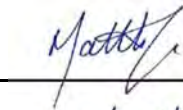
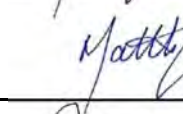
QUALITY ASSURANCE

The JDA quality control system has been in place since 1997 and meets the requirements of AS/NZS ISO 9001:2008. JDA is committed to maintaining and improving the quality management system.

Document Version	Issue Date
J7456a	23 May 2024
J7456b	18 September 2024

	Name	Signature	Date
Author	Matthew Yan		18 September 2024
Checked by	Matthew Yan		18 September 2024
Approved by	Jim Davies		18 September 2024

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APPENDICES

1. EXECUTIVE SUMMARY

This Urban Water Management Plan (UWMP) has been prepared by JDA Consultant Hydrologists on behalf of Acott Equities Pty Ltd for urban development of Lot 12 Sultana Road East, Forrestfield. This document has been prepared to support subdivision and has been prepared in accordance with Better Urban Water Management (WAPC, 2008).

A summary of the development design and compliance to objectives for UWMP is provided in Table 1.

TABLE 1: SUMMARY OF UWMP DESIGN PRINCIPLES AND CRITERIA

Key Guiding Principles		
• Facilitate implementation of sustainable best practice in urban water management. • Encourage environmentally responsible development. • Provide integration with planning processes and clarity for agencies involved with implementation. • To minimise public risk, including risk of injury or loss of life. • Protection of infrastructure and assets from flooding and inundation. • To maintain the total water cycle.		
Category	**UWMP Objective**	**Design and Compliance to Objective**
Water Conservation and Sustainability	• Consider alternative fit for purpose water sources where appropriate and cost-effective. • Aim to achieve the State Water Plan target for water use of 100 kL/person/yr. • Streetscape areas to be at least 50% native plants. • Buildings are to comply with water efficiency standards introduced into the building code.	• All houses built to current NCC guidelines including include water efficient fixtures and fittings. • Local native plants will constitute a minimum of 50% of landscape and streetscape treatment.
Stormwater Management	• Runoff from the 'small' event or first 15 mm of rainfall from roads to be treated and infiltrated at-source where possible. • Runoff for events up to the 1% AEP to be managed and conveyed to a suitable flood detention area. • Manage surface water flows from major events to protect infrastructure from flooding and inundation. • Use of subsoil beneath drainage areas to facilitate adequate drainage of stormwater runoff.	• All Lots connected to the road drainage network to convey the first 15 mm of rainfall. • Roadside swales treat internal road runoff for the first 15 mm of rainfall. • Stormwater runoff from internal roads for the minor and major events discharge to the Hales Estate detention storage in Crumpet Creek. • Finished floor levels minimum 0.5 m above the 1% AEP top water level of the Hales Estate detention storage and 0.3 m from the adjacent road network.
Groundwater Management	• Protection of infrastructure and assets from flooding and inundation by high seasonal groundwater levels, perching and/or soil moisture. • Managing and minimising changes in groundwater levels and groundwater quality following development. • Installed subsoil drainage where intercepting and capturing groundwater is to be treated prior to discharge to the downstream system.	• Residential lots have a minimum separation of 1.5 m from the design groundwater level. • Subsoil drainage proposed in road reserve to protect against any potential rise in perched water table and capture infiltrated water from roadside swales.
Water Quality	• Establishment of 'small' event vegetated treatment areas to treat a minimum of 2% of connected impervious areas of road catchments. • Non-structural controls to reduce applied nutrient loads.	• Structural and non-structural controls used to form a treatment train approach for water quality management. • Use of local native plants in streetscape treatments and street sweeping to manage sediment and nutrients in road runoff. • The 'small event' storage treated in vegetated roadside swales. It is underlain with minimum 300 mm of amended soil material with PRI ≥ 10 and minimum saturated hydraulic conductivity of 5 m/day.

A number of assumptions have been made in the preparation of this report, with the relevant sections of this report highlighted in Table 2. Other assumptions and parameters are more comprehensively documented in this report.

TABLE 2: KEY HYDROLOGICAL PARAMETER VALUES USED IN THIS REPORT

Parameters	Section	Value or Source
Design Rainfalls	5	Bureau of Meteorology (2016)
Rainfall temporal patterns	5	Australian Rainfall & Runoff (Ball et al., 2019)
Hydraulic conductivity of imported fill	6	minimum 5 m/day

2. PROPOSED SUBDIVISION

Lot 12 Sultana Road East, Forrestfield is a proposed residential development located within the south-east corridor of the Perth Metropolitan Region in the City of Kalamunda, approximately 12 km east of the Perth CBD, Figure 1. The Study Area is bound by Sultana Road East to the northeast, Hales Estate to the southwest and future residential development to the northwest and southeast, Figure 1.

The proposed subdivision will create 18 Residential Lots with size ranging from 180 m^2 to 391 m^2 and a Group Housing site with 10 Lots of average size of 278 m^2, Figure 1.

Table 3 provides a breakdown of the proposed land use areas within the Study Area.

TABLE 3: LAND USE BREAKDOWN

Land Use Description	Area (ha)
R25 Residential Lots	0.16
R30 Residential Lots	0.38
R40 Residential Lots	0.23
Road Reserve	0.23
Total	**1.00**

3. PLANNING APPROVALS

3.1 Regional Planning

The Study Area is currently zoned *Urban* in the Metropolitan Region Scheme (WAPC, 2015) and *Urban Development* in the City of Kalamunda Local Planning Scheme No. 3 (City of Kalamunda, gazetted 22 March 2007).

3.2 Local Structure Plan

The Study Area falls within the Forrestfield U7 Outline Development Plan (ODP) which was adopted in February 2013 and provides strategic direction to coordinate the land use and development of the area.

A Local Structure Plan (LSP) was prepared for Lots 14, 15, 515, 3000 and 9502 Hawtin Rd, Forrestfield that provided an updated development layout from that shown in the ODP (Rowe Group, 2016). From a water management perspective, the LSP was supported by the *Local Structure Plan – The Hales, Lots 14, 15, 515, 3000 and 9502 Hawtin Rd, Forrestfield, WA - Local Water Management Strategy* (JDA, 2016b) that outlined peak flows in Crumpet Creek, detention basin design and minor creek modifications.

3.3 Subdivision

This UWMP has been prepared to support the *Lot 12 Sultana Rd, Forrestfield - Subdivision Concept Plan* (Taylor Burrell Barnett, 2024) (Appendix A) in accordance with the water management reporting process outlined in Better Urban Water Management (WAPC, 2008).

4. EXISTING SITE CHARACTERISTICS

4.1 Climate

The Forrestfield area is characterised by a Mediterranean climate with hot dry summers and cool wet winters.

Rainfall data has been obtained from the Bureau of Meteorology for the nearby *Perth Airport* rain gauge (Site ID. 009021) located 5.5 km north-west of the Study Area, Figure 2.

The average annual rainfall, 1945 to 2022, for Jandakot Aero was 760 mm, with 30-year and 10-year averages of 686 mm and 668 mm, respectively. This represents a 9.7% (30-year average) and 12.1% (10-year average) decrease from the average annual rainfall for Jandakot Aero. The general decline in rainfall observed across Perth Airport rain gauge is consistent with the decreasing rainfall trend across south-west Western Australia (DoW, 2015). The seasonal rainfall distribution has also altered since 1990, with a reduction of average monthly totals in the winter months, but no reduction or increase in the summer months.

Average annual pan evaporation is estimated at 1,770 mm for the Study Area from pan evaporation data (2002 to 2022) from the Department of Primary Industries and Regional Development (DPIRD) South Perth weather station. This is slightly lower than the estimate of 2,080 mm from Luke *et al.* (1987).

4.2 Topography

The topography of the Study Area generally grades from the north-east boundary at 47.60 mAHD to southwest boundary at 46.00 mAHD, Figure 3.

4.3 Geology and Soils

Surface geology mapping by Jordan (1986) is shown on Figure 4.

Surface soils across the Study Area are classified by Jordan (1986) as Mgs1 Pebbly Silt across the Study Area. The soils are strong brown silt with common, fine to occasionally coarse-grained, sub-rounded laterite quartz, heavily weathered granite pebble, some fine to medium-grained quartz sand, of alluvial origin.

This is the same mapping classification for the adjacent Hales Estate Stages 2 to 9. Therefore, the geotechnical investigation performed for the adjacent Hales Estate Stages 2 to 9 is also considered representative of the Study Area as described further below.

Geotechnical investigation conducted by CMW Geosciences in May 2015, and Golder Associates in January and February 2016 incorporated excavation of 99 test pits across the Hales Estate Stages 2 to 9. The surface geology results from the geotechnical investigation are generally consistent with the mapping by Jordan (1986).

The subsurface profile was summarised by Golder Associates (2016) as follows:

> *Topsoil: SAND/Silty Sand – fine to medium grained, grey-brown, with approximately 10% to 15% low plasticity silt, trace roots and vegetation, loose to medium dense, extending to depths of between about 0.1 m to 0.3 m, overlying.*
>
> *Non-Reactive Soils: Sand, Silty/Clayey Sand, Sandy Gravel – fine to coarse grained, yellow to yellow-brown, with approximately 10% to 20% low plasticity fines, fine to medium grained, sub rounded to sub-angular gravel, loose to dense, extending to depths of between about 0.3 m and the maximum depth investigated of 2.5 m where present, overlying.*

Reactive Soils: Clayey Sand, Sandy Clayey Gravel, Sandy Clay – *fine to coarse grained, yellow to yellow-brown, approximately 20% to 60% low plasticity clay, fine to medium grained, sub rounded to sub-angular gravel, occasionally weakly cemented, loose to very dense/very stiff to hard, extending to the maximum depth investigated of 3.0 m where present.*

The geotechnical investigation report concludes that due to the relatively low permeability of the sand and the relatively shallow depth to clayey soil across the site, soakwells are not suitable for the site and lot connection pits are required.

4.4 Acid Sulphate Soils

The Swan Coastal Plain Acid Sulphate Soils (A.S.S) risk mapping (DWER, 2018) indicates that within the Study Area there is no known risk of A.S.S at up to 3 m depth, Figure 4.

4.5 Groundwater

4.5.1 Groundwater Levels

There is no regional groundwater mapping for the Study Area with groundwater contours shown in Perth Groundwater Atlas (DoE, 2004) terminating west of the site near Roe Hwy. Regional groundwater contours (JDA, 2016) for the Hales Estate indicates groundwater is generally 20 m below the natural surface.

There are no monitoring bores installed within the Study Area. A monitoring bore MB4 installed by Strategen (2016) for the Hales Estate is located near the southern corner of the Study Area. The water level recorded (Table 4) indicates a perched water table on clayey sand. For design of the stormwater management system, a design groundwater level (DGL) is set to be at the interface of the clayey soils, which is around 2.5 m below natural surface at approximately 44.5 mAHD.

TABLE 4: DETAILS OF GROUNDWATER MONITORING BORE, MB4

Bore ID	GDA 1994 Coordinates		Natural Surface (mAHD)	Total Depth	Installation Date	Water Level Recorded	
	Easting	Northing				15/12/15	31/10/16 (Maximum)
MB4	406587	6462278	46.27	3.75	17/11/15	Dry	43.68

4.5.2 Groundwater Quality

There is no groundwater quality data available within the Study Area as the regional groundwater is generally 20 m below the natural surface.

4.5.3 Groundwater Resources for Irrigation

The Department of Water and Environmental Regulation manages the groundwater of the State under the Rights in Water and Irrigation Act 1914 (RIWI Act). The Study Area is located within the Shire of Kalamunda Groundwater Sub-Area of the Perth Groundwater Management Area.

The Superficial Aquifer is generally considered the most feasible irrigation water supply source for the Study Area.

The DWER groundwater allocation limit and water allocations from the Superficial Aquifer are shown in Table 5 and are based on a Resource Allocation Report from DWER as at 01 November 2023.

TABLE 5: DWER GROUNDWATER RESOURCE ALLOCATION AND LIMIT, 01 NOVEMBER 2023

GW Sub-Area	Aquifer	Allocation Limit (kL/yr)	Allocated Volume (kL/yr)	% Allocated & Committed
Shire of Kalamunda	Perth - Superficial Swan	3,000,000	2,618,865	87.3

As of 01 November 2023, the Resource Allocation Report indicates the superficial aquifer was allocated (87.3%) with 2,618,865 kL/year allocated.

The superficial aquifer may be a potential water source for the temporary irrigation of vegetated swales and any tree pits during the establishment phase of the development.

4.6 Surface Water Hydrology

The Study Area is located within the Swan Avon Lower Swan Catchment (DoW, 2013) of the Swan River and Tributaries system.

There are no existing watercourses within the Study Area. Crumpet Creek is located near the southern edge of the Study Area and flows west into Water Corporation's Main Drain at the boundary of the Perth Airport. The Crumpet Creek Catchment upstream of the Study Area is approximately 420 ha, extending east into the Darling Scarp.

Crumpet Creek flows between August to October annually. Estimated 1% AEP flow rate in Crumpet Creek at Berkshire Rd is 7.1 m^3/s and the 10% AEP flow rate is 4.8 m^3/s as reported by Water Corporation (1998).

4.7 Wetlands

Geomorphic Wetland mapping of the Swan Coastal Plain (DBCA, 2018) shows no wetland mapped within the Study Area. There are no Bush Forever sites located within the Study Area.

4.8 Contaminated Sites

A search of DWER's publicly available Contaminated Site Database (accessed 1 November 2023) indicated no contaminated sites within the Study Area.

5. STORMWATER MANAGEMENT

5.1 Design Overview

Local stormwater management is proposed to be consistent with water sensitive design practices and to meet key objectives and criteria as summarised in Table 1.

The stormwater drainage system has been designed based on management of the 'small', minor and major events.

'Small' event management concentrates on the first 15 mm of rainfall (approximately the 1 EY 1 hour event). The first 15 mm of stormwater runoff from impervious surfaces within a Lot discharges into the road drainage network, via a Lot connection pit due to the inability to infiltrate on-site. Stormwater runoff from road reserve areas are retained and infiltrated in vegetated roadside swales, which also provide water quality treatment. Swales are underlain with a Ø150 subsoil drainage pipe to prevent prolonged ponding and waterlogging and discharge into the road drainage network.

The minor drainage system is designed as a system of drains, pipes, culverts, kerbs, gutters, etc. and has the capacity to convey stormwater runoff generated by low frequency storms, typically less than the 20% AEP for residential areas.

The major drainage system is defined as the overland flow path arrangement of roads and attenuation areas planned to provide safe passage of stormwater runoff from extreme rainfall events (up to the 1% AEP).

Stormwater runoff from the Study Area (and adjacent Lot 13) discharge directly into the adjacent Hales Estate Stage 1 Detention Storage area, as outlined in the Hales Estate Stage 1 UWMP (JDA, 2016).

Stormwater runoff from Lots adjacent to Sultana Rd East discharge into the local pipe drainage system.

The stormwater management plan for the Study Area is shown on Figure 5 with engineering details presented in Appendix B.

5.2 The Hales Estate Stormwater Management Design

Previous water management design and reporting has been performed for the adjacent Hales Estate to support local structure planning and detailed subdivision design. These include:

- *Local Structure Plan – The Hales, Lots 14 ,15, 515, 3000 and 9502 Hawtin Road, Forrestfield WA: Local Water Management Strategy*. (JDA, 2016b)
- *The Hales Estate, Lot 9502 Lovett Drive, Forrestfield – Stage 1 Urban Water Management Plan*. (JDA, 2016)
- *The Hales: Stages 2-9, Lots 14 ,15 & 515 Hawtin Road and 9002 Lovett Drive, Forrestfield, Urban Water Management Plan (JDA, 2017)*
- *The Hales: Stages 2-9 – Addendum 1 (JDA, 2021)*

Lot 12 (Study Area) and Lot 13 were identified in these reports as an External Catchment contributing to the Hales Estate Stage 1 Detention Storage (JDA, 2016).

In 2021, the design of the stormwater management system was refined in the area adjacent to and within Crumpet Creek in consultation with the City of Kalamunda. It included two online detention storage areas designed as a widening of Crumpet Creek that are offset and above the low flow channel of the creek. Details of the hydraulic modelling performed is summarised in *The Hales: Stages 2-9 Addendum 1* (JDA, 2021) which is presented in Appendix C.

5.3 Crumpet Creek Design Discharge Criteria

Lot 12 (Study Area) and Lot 13 are shown as a 1.29 ha External Catchment in the approved Hales Estate Stage 1 UWMP (JDA, 2016). This external catchment discharges into the Hales Estate Stage 1 detention storage abutting Crumpet Creek. Peak 1% AEP allowable discharge from this catchment is based on the pre-development flow rate of 14.5 L/s/ha (JDA, 2016). With Lot 12 and Lot 13 both comprising 0.645 ha catchment area each, total allowable discharge from this External Catchment to the Hales Estate is calculated as 19 L/s for the 1% AEP.

5.4 Stormwater Model Parameters

The stormwater management system was modelled using the hydraulic XP-Storm to determine peak flow rates, volumes and levels based on the methodology in *Australian Rainfall and Runoff* (Ball et al., 2019). The rainfall temporal pattern was assumed spatially uniform across the catchment with storms modelled ranging from 30 minutes to 72 hours. Catchment slopes were calculated from road earthwork levels.

The hydraulic XP-Storm model used in *The Hales Stages 2-9 Addendum 1* (JDA, 2021) is the latest model version for the Hales Estate. It has been updated to include Study Area subdivision design as outlined in the following sections.

5.4.1 Post Development Drainage Catchments

There are three post-development stormwater catchments for the Study Area as shown in Figure 5.

- *Catchment A: Northern portion of the Study Area that drains to the Sultana Road East stormwater system through lot connection pits.*
- *Catchment B: Portion of the Study Area that drains to the Hales Estate Stage 1 detention storage.*
- *Catchment C: Portion of Lot 13 that drains to the Hales Estate Stage 1 detention storage through Catchment B.*

Land use areas for each catchment are presented in Table 6.

TABLE 6: CATCHMENT AREAS

Catchment	Road Reserve (ha)	Residential Lots (ha)	Total (ha)
Catchment A	-	0.156	0.156
Catchment B	0.230	0.613	0.843
Catchment C	0.086	0.559	0.645
Total	0.316	1.328	1.664

5.4.2 Loss Model

Rainfall-runoff loss model parameters adopted for each land use is presented in Table 7. This loss model is the same as that adopted in the Hales Stage 1 and Stages 2-9 UWMP's (JDA, 2016 & 2017) for consistency.

TABLE 7: CATCHMENT RAINFALL-RUNOFF LOSS MODEL

Land Use	Initial Loss (mm)	Proportional Loss (%)
Residential Lots (R20)	0	30
Residential Lots (R30 & R40)	0	20
Group Housing (R30)	0	20
Road Reserve	1.5	20

5.5 Small Event Drainage

The following design is adopted for management of the first 15 mm of rainfall ('small' event) for all catchments:

- Residential Lots & Group Housing: All Lots connect directly into the local drainage network through standard lot connection pits to convey the first 15 mm of rainfall.
- Roads: Stormwater runoff from roads is captured and infiltrated in roadside swales in the road reserve.
- Roadside swales (bio-retention area) are underlain with amended soils and planted with suitable plant species, consistent with the *Vegetation Guidelines for Biofilters in South-West Western Australia* (Monash University, 2014). Swales are underlain with subsoil drainage to control groundwater levels and prevent waterlogging.

Table 8 shows the runoff volume from the Study Area that is required to be treated. The vegetated treatment base area provided of 88 m^2 meets the FAWB (2009) criterion for a minimum treatment area of 2% of the connected impervious area (39 m^2). The total provided storage treatment volume of 29 m^3 also meets the 15 mm runoff volume of 29 m^3.

TABLE 8: SMALL EVENT MANAGEMENT

Small Event (15 mm)	Catchment Details	
Impervious Road Catchment Area (m^2)	1,836	
2% of Impervious Catchment Area (m^2)	36.7	
Rainfall (mm)	15	
Runoff Volume (m^3)	27.5	
Roadside Swale Details	**Swale 1**	**Swale 2**
Base Area (m^2)	38	50
Top Area (m^2)	48	60
Maximum Allowable Water Depth (m)	0.30	0.30
Side Slope (v:h)	1:4	1:4
Storage Volume (m^3)	12.9	16.1

Lot 13 will need to provide sufficient roadside swale storage for management of the first 15 mm runoff generated from within the Lot 13 road areas.

The 'Small' Flood Event Plan including location of roadside swales is shown on Figure 6.

5.6 Minor Drainage System

The following design is adopted for management of the minor event (for events up to the 20% AEP event):

Catchment A:

- All Lots connect directly into the Sultana Road drainage network through standard lot connection pits.

Catchments B & C:

- Runoff generated in Lots connect directly into the local drainage network through a standard lot connection pit.
- Stormwater runoff from roads flow into roadside swales. When the capacity of the roadside swales is exceeded, stormwater overflows into the underground pipe road drainage network that discharges to the Hales Estate

detention storage downstream of the Study Area. The pit and pipe road drainage network will be sized to manage events up to the 20% AEP.

Modelling results of the Hales Stage 1 detention storage for the minor event including storage volumes and peak water levels are summarised in Table 9. Results for three development stages are presented which include:

- Existing: Current Hales Estate Storage Detention design (JDA, 2017).
- Interim: Existing design with the addition of discharge from the Study Area (Lot 12).
- Ultimate: Existing design with the addition of discharge from the Study Area (Lot 12) and Lot 13.

The Minor (20% AEP) Flood Event Plan is shown on Figure 7 for the Ultimate development stage.

5.7 Major Drainage System

The major drainage system is designed to manage rainfall events greater than the 20% AEP event up to the 1% AEP event. Key points of the major drainage system design adopted are as follows:

Catchment A:

- When the minor drainage system on Lots through the lot connection pit is full, excess stormwater will flow overland into the Sultana Road drainage network.

Catchment B & C:

- When the minor drainage system on Lots through the lot connection pit is full, excess stormwater will flow overland into the local drainage network.
- When the minor drainage pit and pipe system for road runoff is full, excess stormwater will bypass minor drainage structures and flow overland within the road carriageway towards the Hales Stage 1 detention storage.
- Minimum habitable building floor levels will have a 500 mm (0.5 m) clearance from the 1% AEP top water level of the detention storage and 300 mm (0.3 m) from the adjacent road flood level.

Modelling results of the Hales Stage 1 detention storage for the major event including storage volumes and peak water levels under the 3 different development stages are summarised in Table 9. Peak outflow is within the allowable criteria of 19 L/s. The Major (1% AEP) Flood Event Plan is shown on Figure 7 for the Ultimate development stage.

The results demonstrate the Hales Estate detention storage can adequately manage the stormwater runoff from the Study Area up to the 1% AEP event with minimal impact on the existing Hales Estate stormwater design.

TABLE 9: STORMWATER MODELLING RESULTS - MINOR AND MAJOR EVENTS

The Hales Estate Detention Storage Details	Parameter	Existing Development	Interim Development	Ultimate Development
Catchment Areas	Residential Lots (ha)	2.52	3.13	3.69
	Road Reserve (ha)	1.36	1.59	1.68
	Public Open Space (ha)	0.57	0.57	0.57
Detention Storage Details	Invert Level (mAHD)	44.32	44.32	44.32
	Side Slope (v in h)	1 in 6	1 in 6	1 in 6
	Creek Invert (mAHD)	44	44	44
	Basin Outlet Invert (mAHD)	44.32	44.32	44.32
	Base Area (m^2)	3,110	3,110	3,110
Minor Event (20% AEP)	Critical Storm Duration (hrs)	6	6	6
	Storm Rainfall (mm)	49	49	49
	Peak Water Level (mAHD)	44.91	44.91	44.91
	Maximum Depth (m)	0.59	0.59	0.59
	Peak Water Level Area (m^2)	4,300	4,340	4,390
	Peak Water Storage Volume (m^3)	2,200	2,200	2,210
Major Event (1% AEP)	Critical Storm Duration (hrs)	6	3	3
	Storm Rainfall (mm)	83	67	67
	Peak Water Level (mAHD)	45.31	45.31	45.32
	Maximum Depth (m)	0.99	0.99	1
	Peak Water Level Area (m^2)	5,300	5,330	5,400
	Peak Water Storage Volume (m^3)	4,100	4,160	4,224

5.8 Lot Finished Levels Relative to Stormwater

The drainage management criteria for determination of building floor levels shall be a minimum 500 mm above the 1% AEP top water level of the downstream Hales Estate detention storage as per the recommendations in DWER (2017a).

Finished lot levels in the Study Area range from 46.56 mAHD to 48.17 mAHD (Appendix A). Lots adjacent to the Hales Estate Detention Storage range from 46.56 mAHD to 46.76 mAHD, satisfying the minimum 500 mm separation required to the detention storage 1% AEP top water level of 45.32 m AHD (for Scenario 3).

5.9 Water Quality Management

5.9.1 Non-Structural Controls

Non-structural source controls to reduce nutrient export from the site focus on reducing the need for nutrient inputs into the landscape. The following strategies are adopted:

- Local native plants make up a minimum 50% of the planted areas and streetscape treatments. Any non-local species will be selected for drought tolerance and low fertiliser requirements;
- Maintenance practices such as street sweeping to remove sediment build-up, particularly during the development and construction phase (to be coordinated with the City of Kalamunda).

5.9.2 Structural Controls

Structural source controls are proposed to complement the non-structural source controls and provide a complete stormwater treatment train.

The *Stormwater Management Manual for Western Australia* (DWER, 2022b) outlines expected pollutant removal efficiencies for detention/retention systems. While DWER (2022b) does not provide expected pollutant removal efficiencies for all BMPs, application of a treatment train approach such as in this UWMP by using a combination of non-structural and structural measures will achieve BMP outcomes for water quality (Table 10).

TABLE 10: BMP WATER QUALITY PERFORMANCE

Parameter	Structural Controls Nutrient Output Reduction[1]	
	Roadside Swale[2]	Detention/Retention Measures
Total Suspended Solids	80%	65-99%
Total Phosphorus	60%	40-80%
Total Nitrogen	50%	50-70%
Gross Pollutants	-	> 90%

1. Typical Performance Efficiencies via DWER (2022b)
2. Mean % Removal via DWER (2022b)

The following structural control is therefore considered appropriate for the Study Area:

- Roadside swales (bio-retention area) planted with suitable plant species to assist in water quality improvement. Planting will be consistent with *Vegetation Guidelines for Stormwater Biofilters in the south-west of Western Australia* (Monash University, 2014).
- The use of amended soils beneath the roadside swales to treat infiltrated stormwater runoff.

5.9.3 Water Quality Treatment Areas

Guidance for design of the roadside swales is provided in the following guidelines:

- DWER (2017a) *Decision Process for Stormwater Management in Western Australia* – the criteria to capture and treat the first 15 mm of rainfall;
- Payne et al. (2015) *The Adoption Guidelines for Stormwater Biofiltration Systems*;
- *FAWB (2009) Stormwater Biofiltration Systems – Adoption Guidelines;*
- *DoW (2011) Water Sensitive Urban Design – Biofilters; and*
- *Monash University (2014) Vegetation Guidelines for Stormwater Biofilters in the South-West of Western Australia* – for plant selection, density and distribution as appropriate.

Guidelines typically indicate a minimum 300 mm of amended soil media is required in all treatment areas, to support vegetation and treat nutrients. Treatment area should also be minimum of 2% of the connected impervious areas to provide sufficient treatment capacity. The proposed treatment area for the Study Area meets this minimum treatment area requirement.

The minimum specifications for the roadside swales are presented in Table 11.

TABLE 11: MINIMUM SPECIFICATIONS FOR TREATMENT AREA

Item	Specification
Amended soil media	• Minimum 300 mm thick. • Minimum hydraulic conductivity of 5 m/day. • PRI >10. • Light compaction only. • Total clay and silt fraction <3% in total (w/w). • Organic matter content <5% (w/w). • Phosphorus content <80 mg/kg.
Maintenance	• 12 months following initial planting.

5.9.4 Disease Vector and Nuisance Insect Management

Structural stormwater management systems are designed to minimise the risk of chironomid midge and mosquito breeding. Infiltration, evapotranspiration and drawing down of water via subsoil drainage underlying the roadside swale to prevent pooling for longer than three days (72 hours) in late spring to early autumn will prevent completion of the larval stages of the mosquito life cycle (DWER, 2022b), as per requirement of the Department of Health and City of Kalamunda.

6. GROUNDWATER MANAGEMENT

6.1 Groundwater Levels and Management

Groundwater management for the Study Area has been prepared in line with the design criteria presented in the Stormwater Management Manual for Western Australia (DWER, 2022b).

Groundwater management is generally required to ensure minimum separation of 1.5 m between finished lot level and a controlled groundwater level (CGL). This is generally achieved through the use of a combination of imported fill and/or subsoil drainage to limit perched water table rise.

For the Study Area, clean free-draining sand fill, where required, will be used to provide sufficient separation between finished lot levels and CGL. JDA recommends the sand fill is to have a minimum hydraulic conductivity of 5 m/day to achieve the required separation to groundwater. If lower hydraulic conductivity fill is used, there is risk of saturation of soil profile.

Subsoil drainage is proposed within road reserves and beneath roadside swales pits to promote infiltration and prevent waterlogging, and is also a contingency measure to protect infrastructure in the event of any perched water table rise. Figure 8 shows an indicative subsoil drainage layout that discharges to the neighbouring Hales Estate Detention storage.

6.2 Lot Finished Levels Relative to Groundwater

Lot finished levels should be a minimum 1.5 m above the design groundwater level (DGL) which is around 2.5 m below the pre-development surface. Finished lot levels in the Study Area range from 46.56 mAHD to 48.17 mAHD, Appendix A, and indicate all lots have in excess of 1.5 m separation between finished lot levels and DGL.

6.3 Groundwater Quality Management

Small event runoff from roads will discharge into the tree pit treatment areas and be treated within planted vegetation (Nitrogen removal) and amended soils (Phosphorus removal).

No groundwater quality management practices are proposed as Hales Estate indicates that groundwater levels are generally 20 m below the natural surface.

7. WATER EFFICIENCY MEASURES

7.1 Residential Lots

To achieve water efficiency targets, households are to be built consistent with current National Construction Code water efficiency standards.

The State Planning Policy 2.9 regarding water resources (WAPC, 2006) requires new developments to employ a total water cycle approach to the consideration of water resources. This section addresses water conservation measures, fit for purpose non-potable supply, and refers to the potable supply strategy and wastewater strategy. JDA notes that a draft State Planning Policy (SPP) 2.9 was released for public comment in September 2021 which amalgamates and synthesises various SPPs into a single planning document including SPP 2.9. The revised SPP 2.9, once published as final, should be used to further inform appropriate water management measures.

Water Conservation initiatives are vital in reducing water demand and can reduce strain or delay timing of potable water supply infrastructure.

The Water Conservation Strategy for the development includes:

- Residential zoning with smaller lots to reduce garden (ex-house) use of water;
- Use of water-wise practices at the lot scale, including water efficient fixtures and fittings (WELD rated taps, showerheads, toilets, appliances, rainwater tanks) and water-wise landscaping including native plant species; and
- All dwellings are to be built to 6-star building standards as per the current National Construction Code [NCC]. Note the NCC 2022 was published on 01 October 2022 and incorporates a minimum 7-star energy efficient rating for new dwellings. NCC 2022 will be adopted on 01 May 2023 by the WA Government but there will be transitional period in implementation of the new code with the residential energy efficiency provisions mandatory from 01 May 2025 after which all new dwellings are to be 7-star rated.

Conservation measures aim to reduce scheme water consumption using water efficient appliances and utilising 6-star building and appliance rating schemes towards minimising potable water consumption in the development area within the constraints of the site.

7.2 Roadside Swales

Temporary irrigation of vegetated areas within roadside swales and any tree pits is required during establishment phase. Use of mobile water carts is the most feasible water source for the temporary irrigation.

8. UWMP IMPLEMENTATION PLAN

8.1 Construction Management

8.1.1 Dewatering

Dewatering is required for some elements of subdivision construction including sewer installation. Given the depth of construction, dewatering will only be in the Superficial Aquifer.

Prior to commencement of any dewatering, the construction contractor will need to apply for and obtain from DWER a "Licence to Take Water". A licence is not required for dewatering if the pump rate does not exceed 10 L/s over a period of less than 30 days and the volume of water taken over the period does not exceed 25,000 kL. At the time of this reporting, an application has been submitted to DWER and is being processed.

Dewatering will be carried out in accordance with any licence conditions. Where possible, construction will be timed to minimise impacts on groundwater and dewatering requirement.

It is envisioned that residential lots will be connected to sewerage at the earliest opportunity. Canopy Circuit sewer network to the south west of the Study Area can be extended to and supply sewer to the internal properties of the site, while Sultana Rd East sewer network to the north west of the site can be extended to and supply sewer to the properties of the site facing Sultana Rd East.

8.1.2 Acid Sulphate Soils

Figure 4 generally shows there is no known risk of A.S.S at up to 3 m depth within the Study Area.

If A.S.S is encountered it will be investigated and managed in accordance with the applicable DWER Acid Sulphate Guidelines for Identification and Investigation and Treatment and Management of Disturbed Acid Sulphate Soils (DER, 2015). Specific methods for treatment and holding times for A.S.S are specified in these guidelines.

8.1.3 Sediment Control and Dust Suppression

Construction will occur in a manner consistent with an Erosion and Sediment Management Plan to be prepared by the Civil Contractor.

A Licence to Take Water for dust suppression activities may be required. These types of licences are considered temporary, generally up to 2 years in duration, and may be approved by DWER if the groundwater aquifer is over-allocated.

Alternatively, scheme water or water tanking may be required to facilitate dust suppression should an application for a licence to construct a bore not be approved prior to commencement of earthworks or there is insufficient yield due to the clayey nature of the aquifer.

8.1.4 Lot 13 Drainage Connection

A stormwater drainage connection stub has been provided in the road reserve for Lot 13 to connect their stormwater drainage system into at a future date. Lot 13 need to provide sufficient onsite storage and treatment for the small event (15 mm) prior to discharge into the stormwater system.

8.2 Maintenance

Construction and initial maintenance of the drainage system will initially be the responsibility of the developer but will ultimately by the City of Kalamunda at the end of the 12-month defects liability period. Table 12 presents the proposed maintenance schedule. During the builder's construction phase, the developer will conduct more frequent

maintenance of the street drainage, with quarterly street sweeping, inspection of pits, eduction of sediment and rubbish in manholes and removal of debris to prevent blockages.

TABLE 12: MAINTENANCE SCHEDULE FOR DRAINAGE INFRASTRUCTURE

Item	Maintenance Interval		
	Quarterly	Bi-annually	As required
Street Drainage			
Street sweeping to reduce particulate build-up	✓		✓
Removal of debris to prevent blockages	✓		
Eduction of sediment and rubbish in manholes/GPTs	✓		
Roadside Swales			
Inspect for erosion + sediment accumulation		✓	
Assess health of vegetation. Remove dead plants and replace where necessary.		✓	
Inspect for standing water 1 day after rainfall events			✓
Removal of sediment and leaf litter layer build up.			✓

8.3 Monitoring Program

A groundwater and surface water monitoring program is not required given that the presence of shallow clays and no surface water feature.

8.4 Responsibilities and Funding

The key roles and responsibilities for the implementation of this UWMP are presented in Table 13 below, with details on the maintenance of the surface water treatment structures previously outlined in Section 8.2.

TABLE 13: ROLES AND RESPONSIBILITIES FOR IMPLEMENTATION OF UWMP

Management Issue	Responsibility and Funding		
	Developer	City of Kalamunda	Lot Owner
Street Drainage Construction	✓		
Maintenance • Street sweeping and drainage cleaning (eduction of sediment) to be undertaken quarterly and as required until the end of the 12 month defect liability period inspection.	✓		
• Ongoing (from notification of City acceptance).		✓	
Vegetated Treatment Area Construction	✓		
Maintenance • Two years, including two winters (period between a successful Practical Completion Inspection and a defects inspection with a written confirmation of City acceptance).	✓		
• Ongoing (from notification of City acceptance).		✓	

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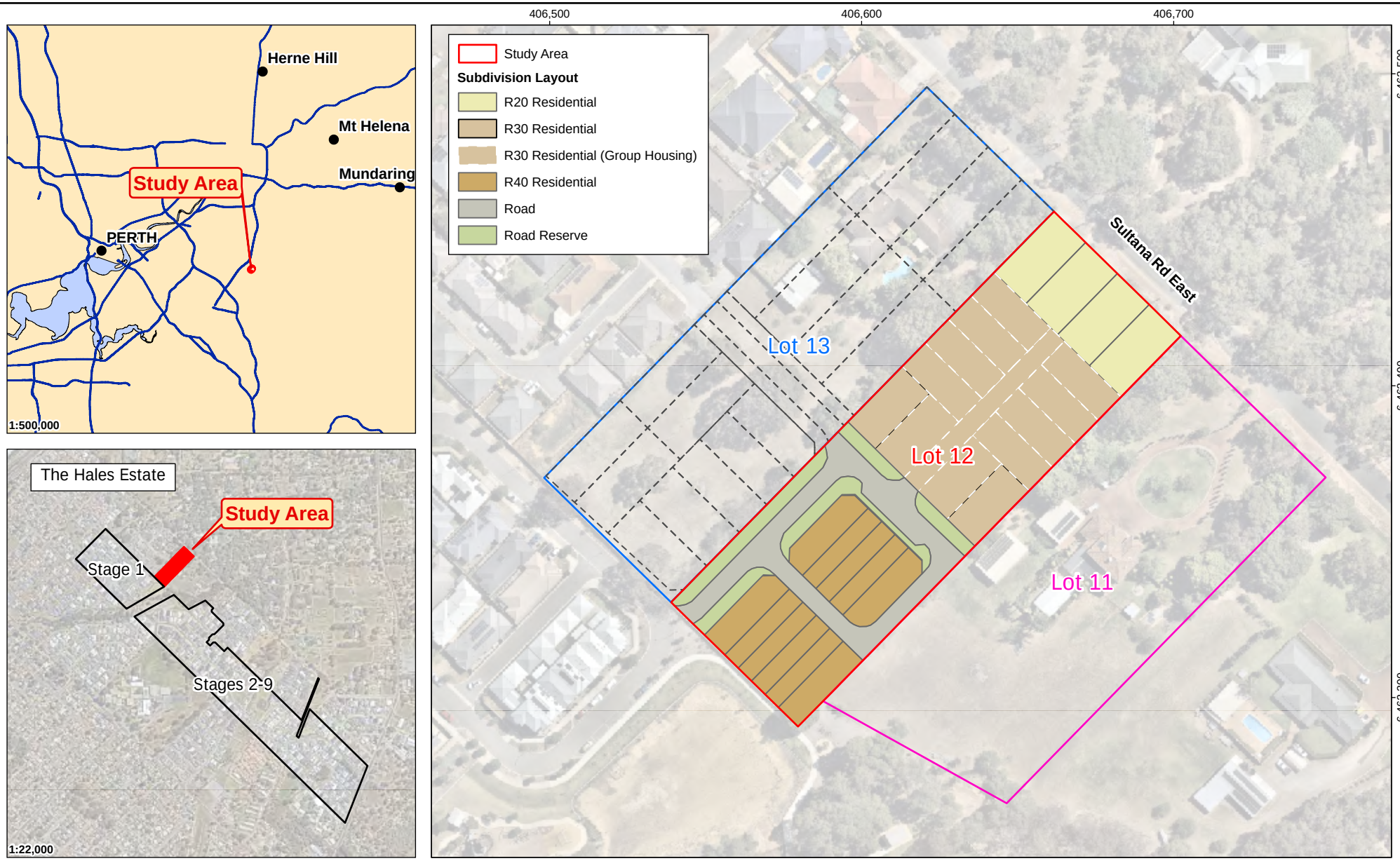
FIGURES



Data Source: Taylor Burrell Barnett Town Planning & Design (2023); Nearmap Digital Imagery (2023), 14 October 2023.

Coordinate System: GDA 94, Zone 50

JDA

Job No. J7456
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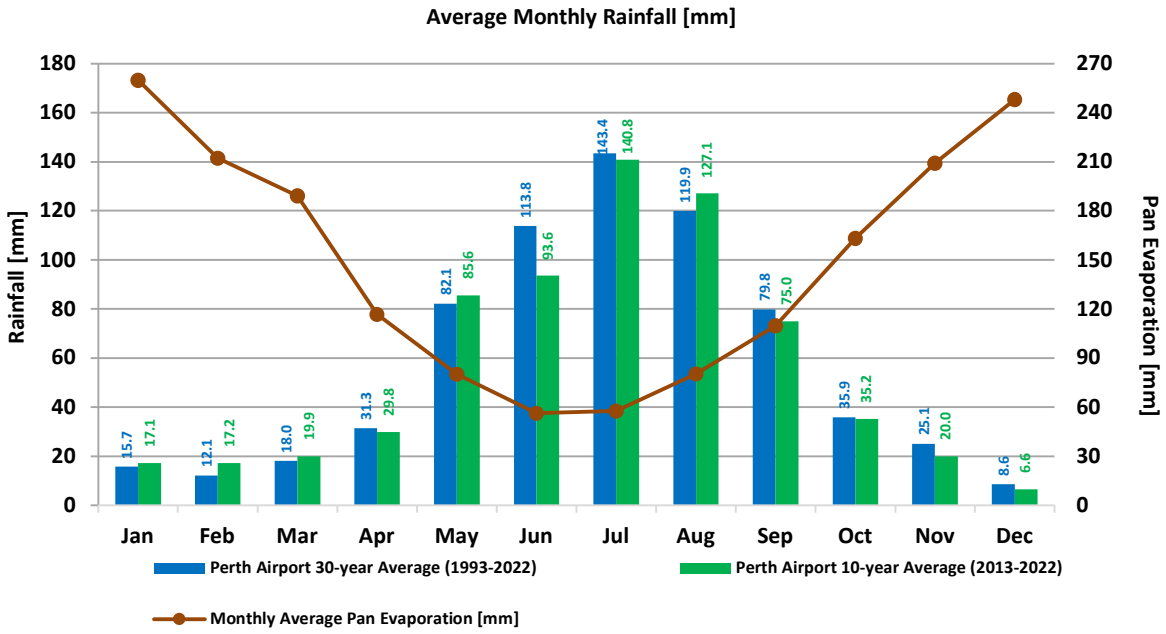
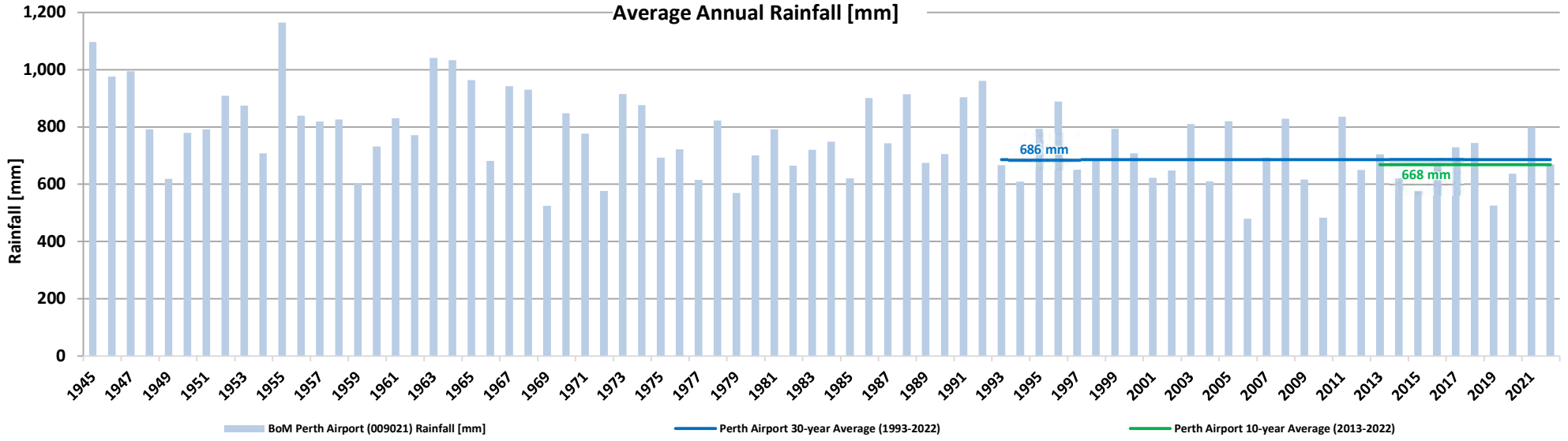
Lot 12 Sultana Road East, Forrestfield: Urban Water Management Plan
Figure 1: Location and Subdivision Plan





Data Source: Bureau of Meteorology (2023) Perth Airport *(009021)* ; DPIRD (2023) *South Perth Weather Station - Pan Evaporation*

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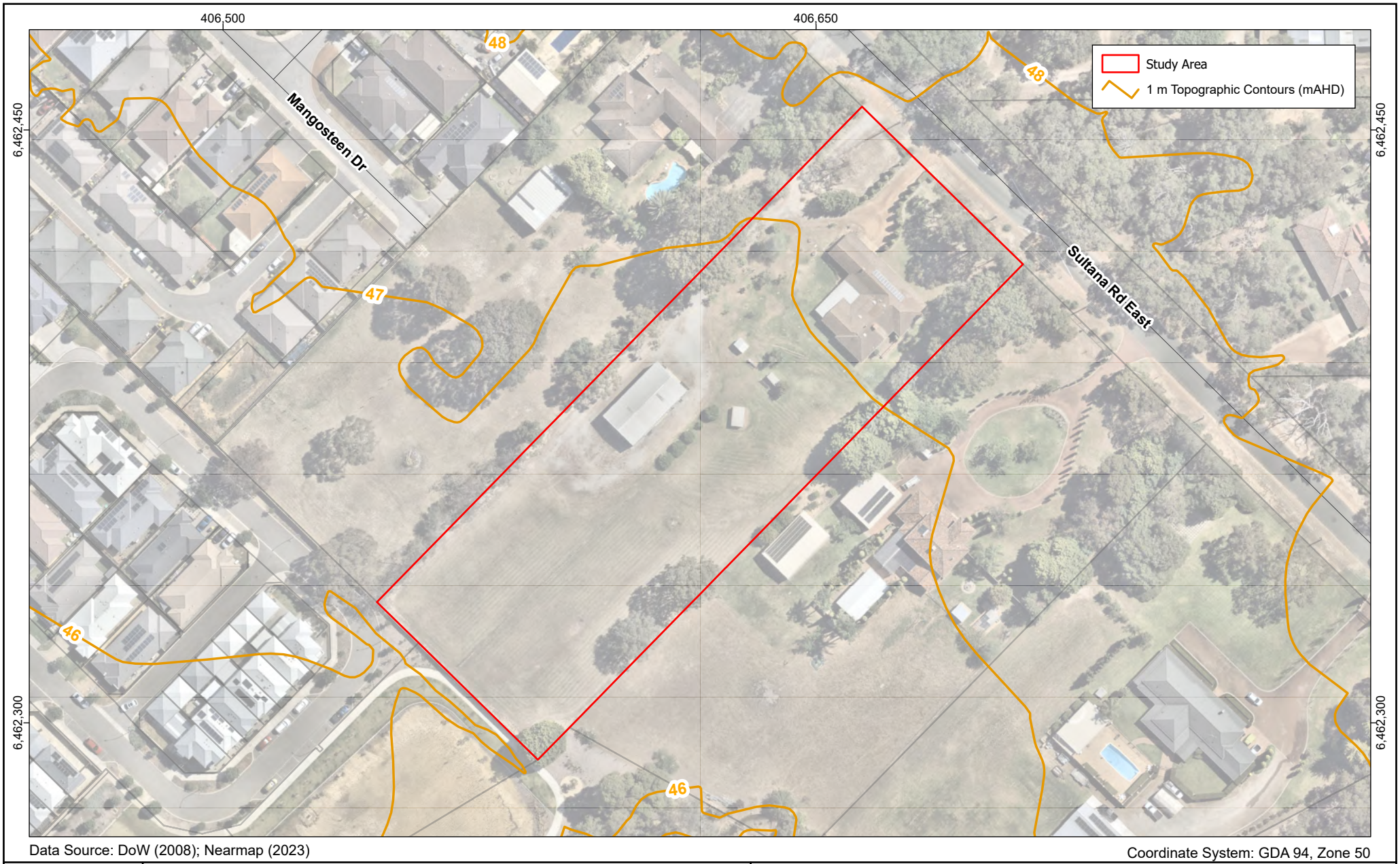
Lot 12 Sultana Road East, Forrestfield: Urban Water Management Plan

Figure 2: Rainfall and Evapoation



Data Source: DoW (2008); Nearmap (2023)

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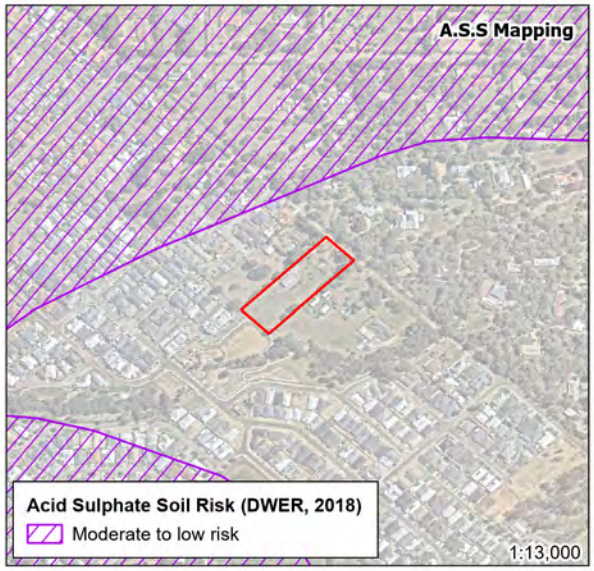
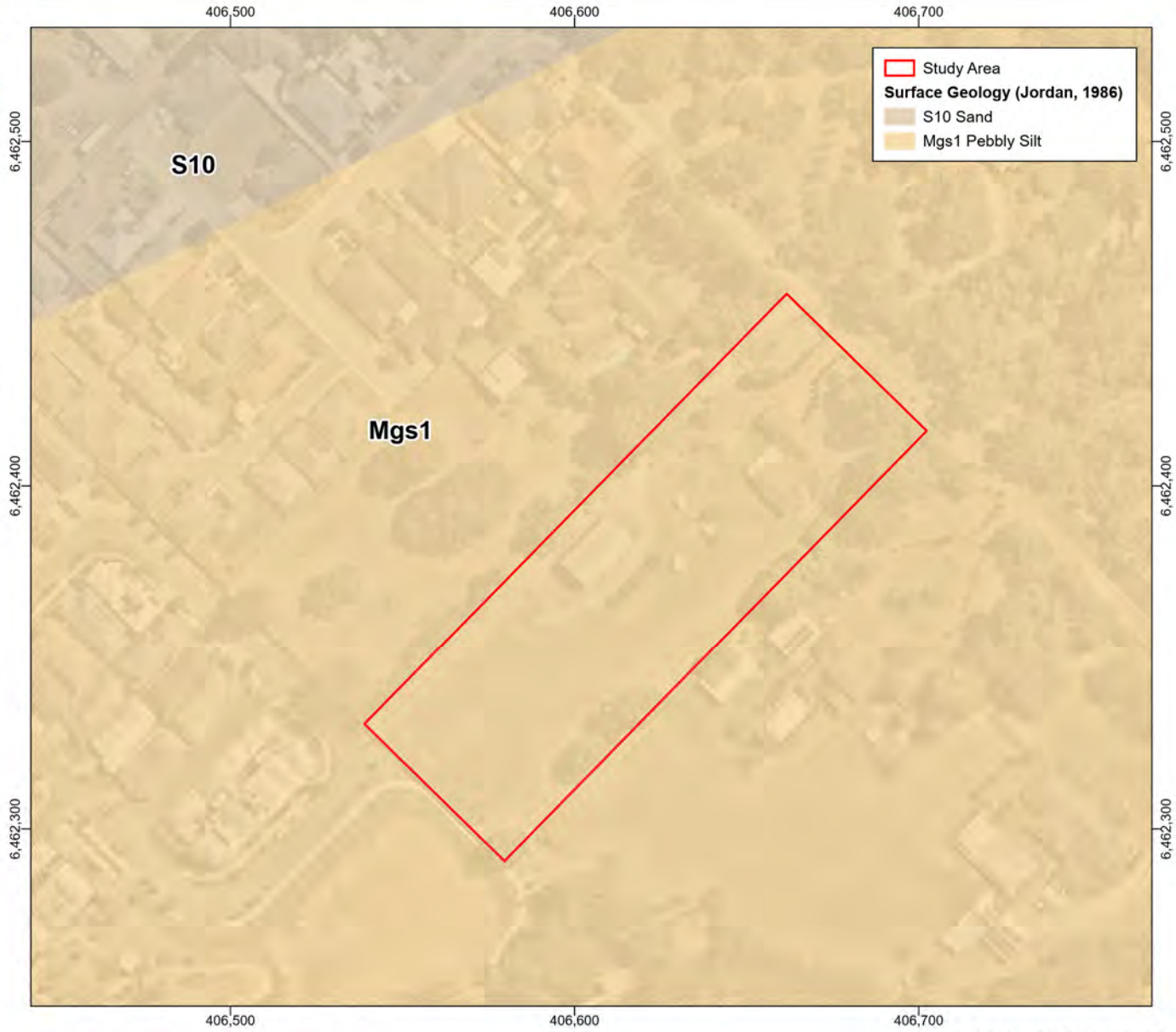
Lot 12 Sultana Road East, Forrestfield: Urban Water Management Plan
Figure 3: Topography



Lithological Classification

S10 - sand, as S8 over sandy clay to clayey sand of the Guildford Formation, of eolian origin.

Mgs1 - pebbly silt, strong brown silt with common, fine to occasionally coarse-grained, sub-rounded laterite quartz, heavily weathered granite pebble, some fine to medium-grained quartz sand, of alluvial origin.



Data Source: Jordan (1986) Environmental Geology Series *Perth*; A.S.S Risk Mapping (DWER, 2018); Nearmap (2023).

Coordinate System: GDA 94, Zone 50

Job No. J7456
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Lot 12 Sultana Road East, Forrestfield: Urban Water Management Plan
Figure 4: Surface Geology, Geotechnical and A.S.S. Mapping

Data Source: Taylor Burrell Barnett Town Planning & Design (2023); Nearmap (2023); C&W (2024)

Coordinate System: GDA 94, Zone 50

JDA Consultant Hydrologists

Job No. J7456
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0 50 100 Meters

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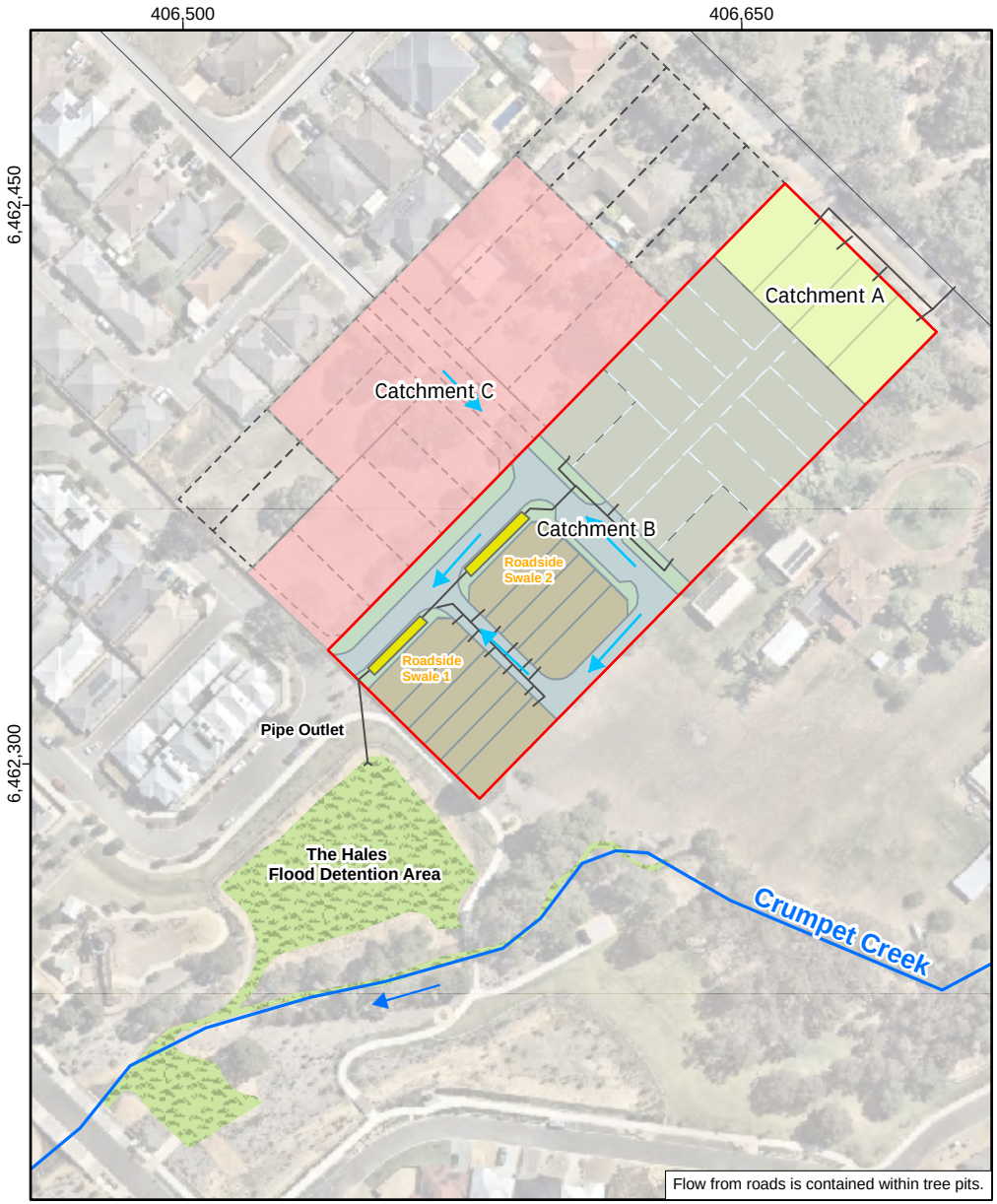
Lot 12 Sultana Road East, Forrestfield: Urban Water Management Plan
Figure 5: Stormwater Management Plan



Data Source: Taylor Burrell Barnett Town Planning & Design (2023); Nearmap (2023); C&W (2024)

Study Area
Catchment A
Catchment B
Catchment C
Drainage Pipe
Surface Flow Direction
Basin Base Area
Roadside Swale

Small Event (15 mm)	Catchment Details	
Impervious Road Catchment Area (m^2)	1,836	
2% of Impervious Catchment Area (m^2)	36.7	
Rainfall (mm)	15	
Runoff Volume (m^3)	27.5	
Roadside Swale Details	**Swale 1**	**Swale 2**
Base Area (m^2)	38	50
Top Area (m^2)	48	60
Maximum Allowable Water Depth (m)	0.3	0.3
Side Slope (v:h)	1:04	1:04
Storage Volume (m^3)	12.9	16.1

Item	Specification
Amended soil media	• Minimum 300 mm thick. • Hydraulic conductivity between 5 and 7.2 m/day. • PRI >10 • Light compaction only. • Total clay and silt fraction <3% in total (w/w). • Organic matter content <5% (w/w). • Phosphorus content <80 mg/kg.
Plant selection, planting density and distribution.	• Tolerant of periodic inundation and extended dry periods. • Preferential selection of endemic and local native species (Monash, 2014). • As per Vegetation Guidelines for Stormwater Biofilters in the South-west of Western Australia (Monash, 2014).
Maintenance	• 24 months following initial planting.

Coordinate System: GDA 94, Zone 50

JDA

Job No. J7456
Scale: 1:2,000 @A4

0 50 100 Metres

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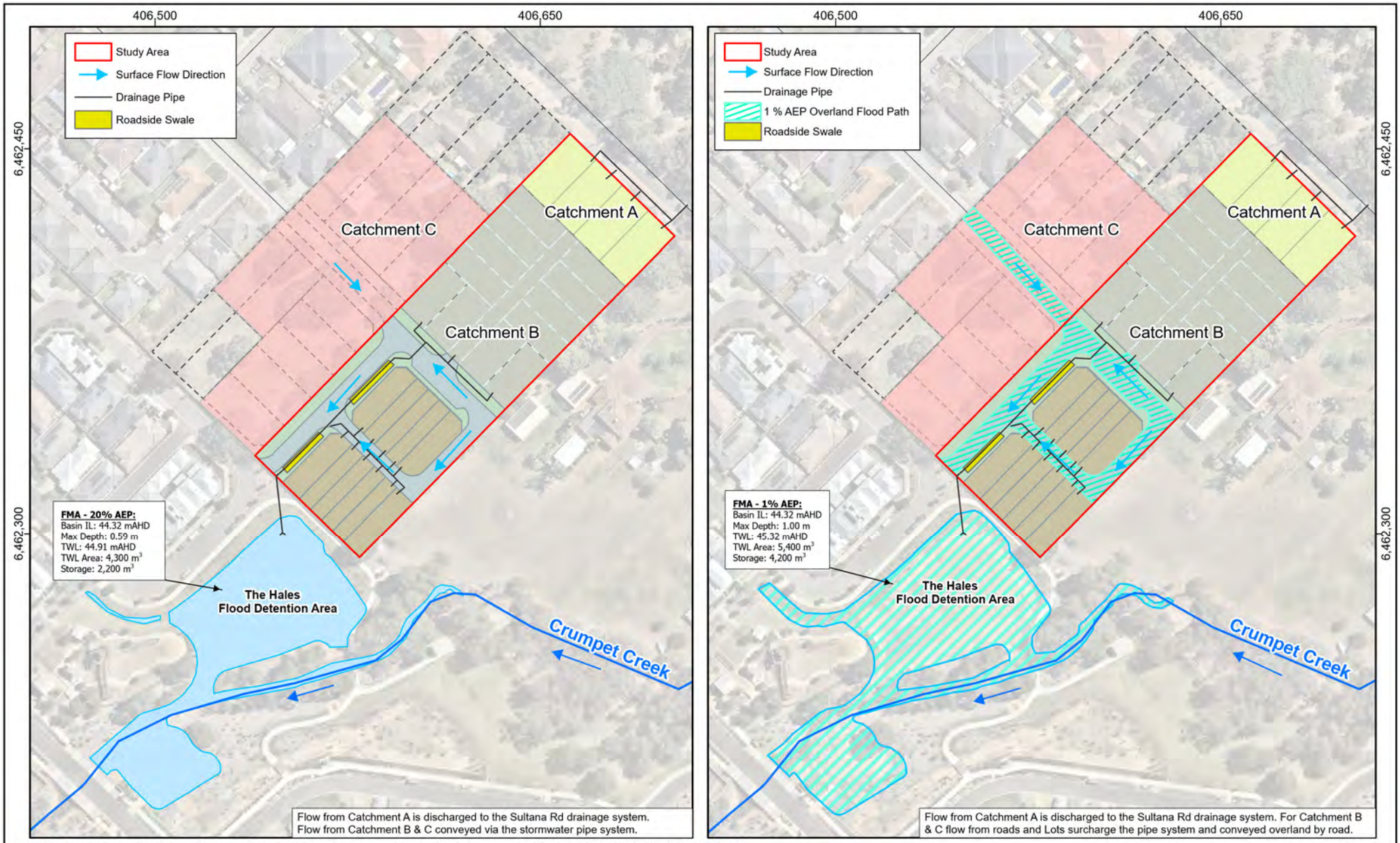
Lot 12 Sultana Road East, Forrestfield: Urban Water Management Plan
Figure 6: Stormwater Event Plan - Small Event



Data Source: Taylor Burrell Barnett Town Planning & Design (2023); Nearmap (2023); JDA (2021); C&W (2024).

Coordinate System: GDA 94, Zone 50

JDA Consultant Hydrologists

Job No. J7456

Scale: 1:2,000 @A4

0 50 100 Metres

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Acott Equities Pty Ltd

Lot 12 Sultana Road East, Forrestfield: Urban Water Management Plan

Figure 7: Stormwater Event Plans - Minor & Major Event

Data Source: Taylor Burrell Barnett Town Planning & Design (2023); Nearmap (2023); C&W (2024).

Coordinate System: GDA 94, Zone 50

JDA

Job No. J7456

Scale: 1:1,800 @A4

0 50 100 Meters

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Acott Equities Pty Ltd

Lot 12 Sultana Road East, Forrestfield: Urban Water Management Plan

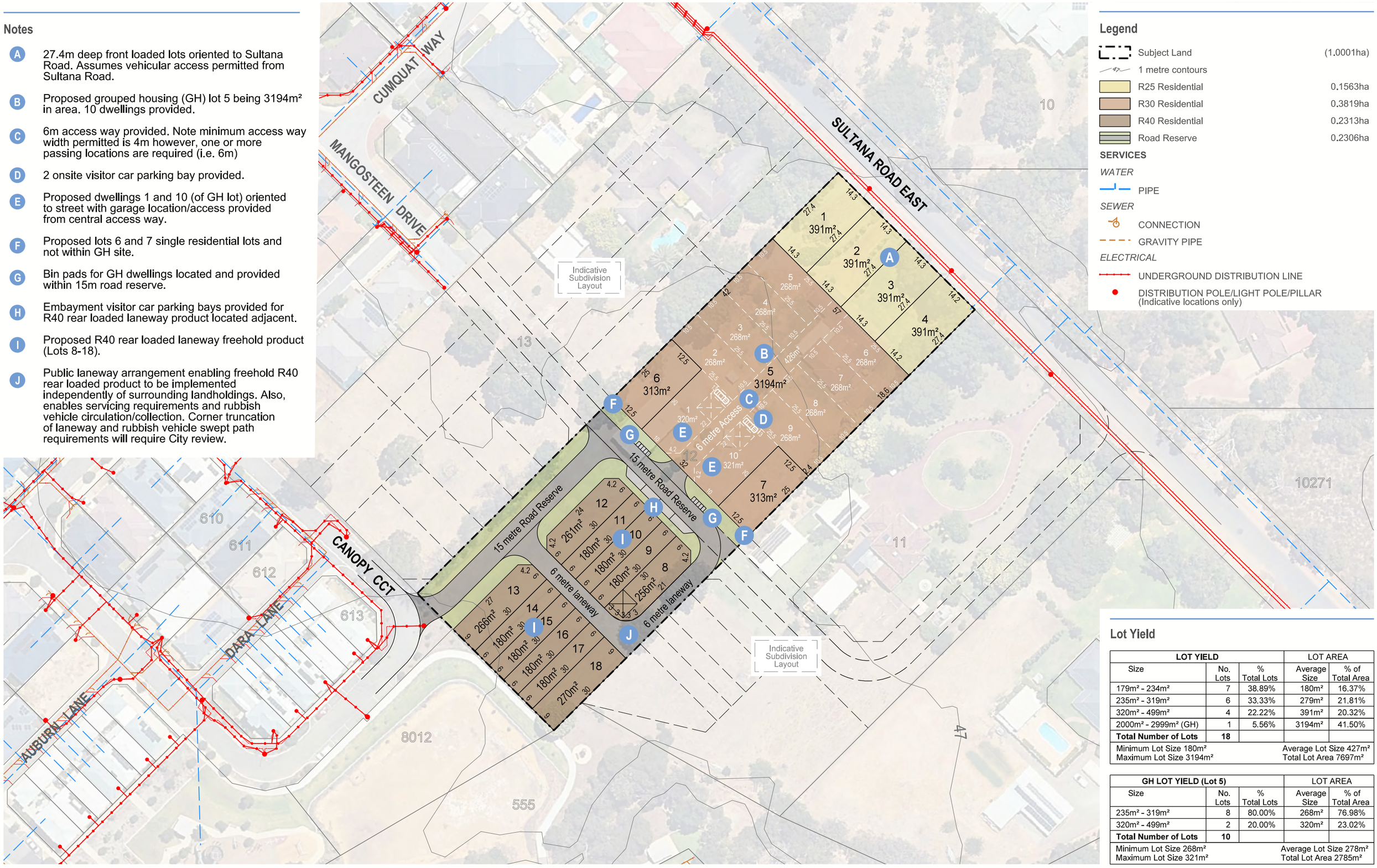
Figure 8: Groundwater Management

APPENDIX A

Subdivision Concept Plan – Lot 12 Sultana Rd, Forrestfield (Taylor Burrell Barnett, 2024)

Notes

- **A** 27.4m deep front loaded lots oriented to Sultana Road. Assumes vehicular access permitted from Sultana Road.
- **B** Proposed grouped housing (GH) lot 5 being 3194m² in area. 10 dwellings provided.
- **C** 6m access way provided. Note minimum access way width permitted is 4m however, one or more passing locations are required (i.e. 6m)
- **D** 2 onsite visitor car parking bay provided.
- **E** Proposed dwellings 1 and 10 (of GH lot) oriented to street with garage location/access provided from central access way.
- **F** Proposed lots 6 and 7 single residential lots and not within GH site.
- **G** Bin pads for GH dwellings located and provided within 15m road reserve.
- **H** Embayment visitor car parking bays provided for R40 rear loaded laneway product located adjacent.
- **I** Proposed R40 rear loaded laneway freehold product (Lots 8-18).
- **J** Public laneway arrangement enabling freehold R40 rear loaded product to be implemented independently of surrounding landholdings. Also, enables servicing requirements and rubbish vehicle circulation/collection. Corner truncation of laneway and rubbish vehicle swept path requirements will require City review.



Legend

- Subject Land (1.0001ha)
- 1 metre contours
- R25 Residential 0.1563ha
- R30 Residential 0.3819ha
- R40 Residential 0.2313ha
- Road Reserve 0.2306ha

SERVICES

WATER
- PIPE

SEWER
- CONNECTION
- GRAVITY PIPE

ELECTRICAL
- UNDERGROUND DISTRIBUTION LINE
- DISTRIBUTION POLE/LIGHT POLE/PILLAR (Indicative locations only)

Lot Yield

LOT YIELD			LOT AREA	
Size	No. Lots	% Total Lots	Average Size	% of Total Area
179m² - 234m²	7	38.89%	180m²	16.37%
235m² - 319m²	6	33.33%	279m²	21.81%
320m² - 499m²	4	22.22%	391m²	20.32%
2000m² - 2999m² (GH)	1	5.56%	3194m²	41.50%
Total Number of Lots	**18**			
Minimum Lot Size 180m²			Average Lot Size 427m²	
Maximum Lot Size 3194m²			Total Lot Area 7697m²	

GH LOT YIELD (Lot 5)			LOT AREA	
Size	No. Lots	% Total Lots	Average Size	% of Total Area
235m² - 319m²	8	80.00%	268m²	76.98%
320m² - 499m²	2	20.00%	320m²	23.02%
Total Number of Lots	**10**			
Minimum Lot Size 268m²			Average Lot Size 278m²	
Maximum Lot Size 321m²			Total Lot Area 2785m²	

Subdivision Concept Plan

LOT 12 SULTANA ROAD EAST, FORRESTFIELD

DRAFT

scale: 1:1000@A3 | 1:500@A1

0 10 20m

plan: 23/070/018B

date: 23/08/2024

aerial: Feb 2023

Taylor Burrell Barnett Town Planning & Design
Level 7, 160 St Georges Terrace, Perth WA 6000
e: admin@tbbplanning.com.au
p: (08) 9226 4276

Taylor Burrell Barnett

APPENDIX B

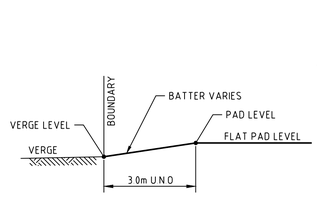
Engineering Drawings
(Cossill & Webley, 2024)

LEGEND

DESCRIPTION	SYMBOL
LIMIT OF WORKS BOUNDARY	
FINISHED SURFACE CONTOUR MAJOR	25.0
FINISHED SURFACE CONTOUR MINOR	24.5
EXISTING SURFACE CONTOUR	25.0
FINISHED LOT PAD LEVEL	25.00
VERGE SPOT LEVEL	25.00

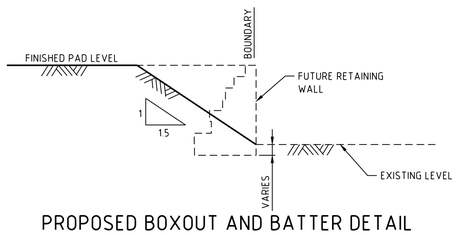
NOTES

1. ALL LEVELS IN METRES TO AHD. SURVEY BY MNG.
2. BATTERS TO EXISTING SURFACE AT 1:3 (CUT) 1:4 (FILL) UNLESS NOTED OTHERWISE.
3. BATTER POSITION FOR FUTURE WALLS TO ENSURE CUT TO FILL EARTHWORKS BALANCE.
4. ALL UNSUITABLE MATERIAL TO BE REMOVED BY THE CONTRACTOR TO APPROVED TIPPING SITE PRIOR TO COMMENCEMENT OF CONSTRUCTION. ALL FEES TO BE PAID BY CONTRACTOR.
5. EXTENT OF CLEARING AND EARTHWORKS TO BE LIMITED TO THE STAGE CLEARING BOUNDARY UNLESS AGREED WITH THE SUPERINTENDENT.
6. ALL CLEARED MATERIAL TO BE MULCHED AND STOCKPILED ON SITE AS DIRECTED BY THE SUPERINTENDENT.
7. CONTRACTOR TO LOCATE ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORKS ON SITE.
8. CONTRACTOR TO GRADE EVENLY BETWEEN DESIGN CONTOURS AND MATCH INTO EXISTING SURFACE AT LIMIT OF EARTHWORKS BOUNDARY WHERE APPROPRIATE.
9. EXCESS CUT FROM EARTHWORKS SHALL BE PLACED ON SITE AS DIRECTED BY THE SUPERINTENDENT.
10. DESIGN LEVELS SHOWN SHALL BE ON THE FINISHED SURFACE INCLUDING TOPSOIL WHERE SPECIFIED.
11. THE CONTRACTOR SHALL LIMIT THE MOVEMENT OF EQUIPMENT AND MANPOWER TO THE MINIMUM AREA NECESSARY AND PROTECT ALL VEGETATION AND EXISTING SERVICES ON SITE.
12. ADJACENT RESIDENTS TO BE NOTIFIED OF THE WORKS AT LEAST TWO WEEKS IN ADVANCE. CONTRACTOR TO PROVIDE MOBILE NUMBER FOR SUPERVISOR AS PART OF NOTIFICATION.



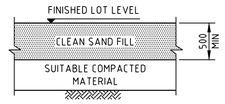
TYPICAL BATTER TO FRONT OF TRADITIONAL LOTS

SCALE: N.T.S



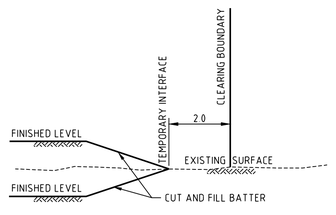
PROPOSED BOXOUT AND BATTER DETAIL FOR FUTURE RETAINING WALLS

SCALE: N.T.S



TYPICAL FILL SECTION FOR LOTS IN SAND AREAS

SCALE: N.T.S



TEMPORARY EARTHWORKS INTERFACE

SCALE: N.T.S

NOTICE TO CONTRACTOR

IT IS THE CONTRACTOR'S RESPONSIBILITY TO INVESTIGATE THE NATURE AND LOCATION OF ALL SERVICES WHICH MAY BE ENCOUNTERED AND TO CONSULT WITH THE RELEVANT SERVICE AUTHORITIES PRIOR TO COMMENCEMENT OF EXCAVATIONS. FAILURE TO DO SO OR TO TAKE DUE CARE SHALL NOT LIMIT THE CONTRACTOR'S LIABILITY FOR REPAIR OF ALL SERVICES DAMAGED BY HIM DURING CONSTRUCTION WORKS THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY FOR THE PROTECTION OF ALL EXISTING SERVICES.

REV	DATE	DRN	CKD	APP	AMENDMENT
B	18.09.24	BVS	NJB		RE-ISSUED FOR APPROVAL
A	02.05.24	RJW	NB	N. BUTSON	ISSUED FOR APPROVAL

N

BEFORE YOU DIG www.byda.com.au

0m 10 20 30

1:500

Cossill & Webley CONSULTING ENGINEERS

Mailing Address
PO Box 680
Subiaco WA 6904

Street Address
B12 (Level 2) 431 Roberts Road
Subiaco WA 6008

T (08) 9422 5800 F (08) 9422 5801 E admin@cosweb.com.au

CLIENT: ACOTT EQUITIES PTY LTD

APPROVED: 02.05.24 NATHAN BUTSON

DESIGNED: RJW

SCALE: 1:500

PROJECT: LOT 12 SULTANA RD FORRESTFIELD

TITLE: EARTHWORKS PLAN CONCEPT

WAPC No.: ×××WAPC NUMBER×××

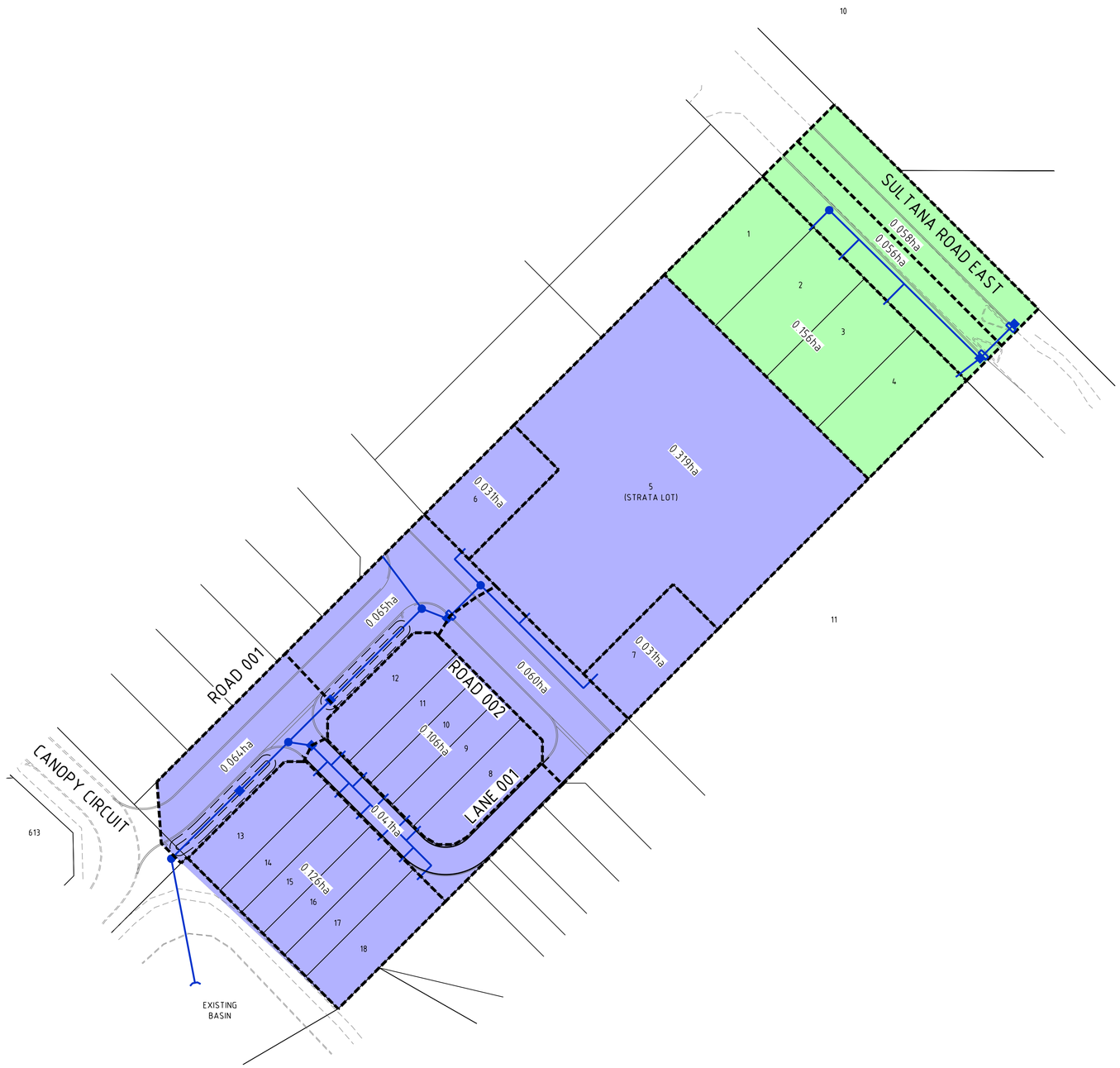
DRAWING No.: 6518-00-202

REVISION: B

ORIGINAL SIZE: A1

LEGEND

DESCRIPTION	SYMBOL
PROPOSED DRAINAGE PIPE	
EXISTING DRAINAGE PIPE	
PROPOSED DRAINAGE PIPE WITH JUNCTION PIT (JP), SIDE ENTRY PIT (SEP), GRATED PIT (GP) AND CIRCULAR GRATED PIT (CGP)	
PROPOSED ROAD	
EXISTING ROAD	
CATCHMENT AREA (Ha)	0.100
DRAINAGE CATCHMENT BOUNDARY	
CATCHMENT A	
CATCHMENT B	



NOTICE TO CONTRACTOR

IT IS THE CONTRACTOR'S RESPONSIBILITY TO INVESTIGATE THE NATURE AND LOCATION OF ALL SERVICES WHICH MAY BE ENCOUNTERED AND TO CONSULT WITH THE RELEVANT SERVICE AUTHORITIES PRIOR TO COMMENCEMENT OF EXCAVATIONS. FAILURE TO DO SO OR TO TAKE DUE CARE SHALL NOT LIMIT THE CONTRACTOR'S LIABILITY FOR REPAIR OF ALL SERVICES DAMAGED BY HIM DURING CONSTRUCTION WORKS THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY FOR THE PROTECTION OF ALL EXISTING SERVICES.

REV	DATE	DRN	CKD	APP	AMENDMENT
B	18.09.24	BVS	NB		RE-ISSUED FOR APPROVAL
A	02.05.24	RJW	NB	N. BUTSON	ISSUED FOR APPROVAL

N

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1:500

Cossill & Webley CONSULTING ENGINEERS

Mailing Address
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Subiaco WA 6904

Street Address
B12 (Level 2) 431 Roberts Road
Subiaco WA 6008

T (08) 9422 5800 F (08) 9422 5801 E admin@cosweb.com.au

CLIENT: ACOTT EQUITIES PTY LTD

APPROVED: 02.05.24 NATHAN BUTSON

DESIGNED: RJW

SCALE: 1:500

PROJECT: LOT 12 SULTANA RD FORRESTFIELD

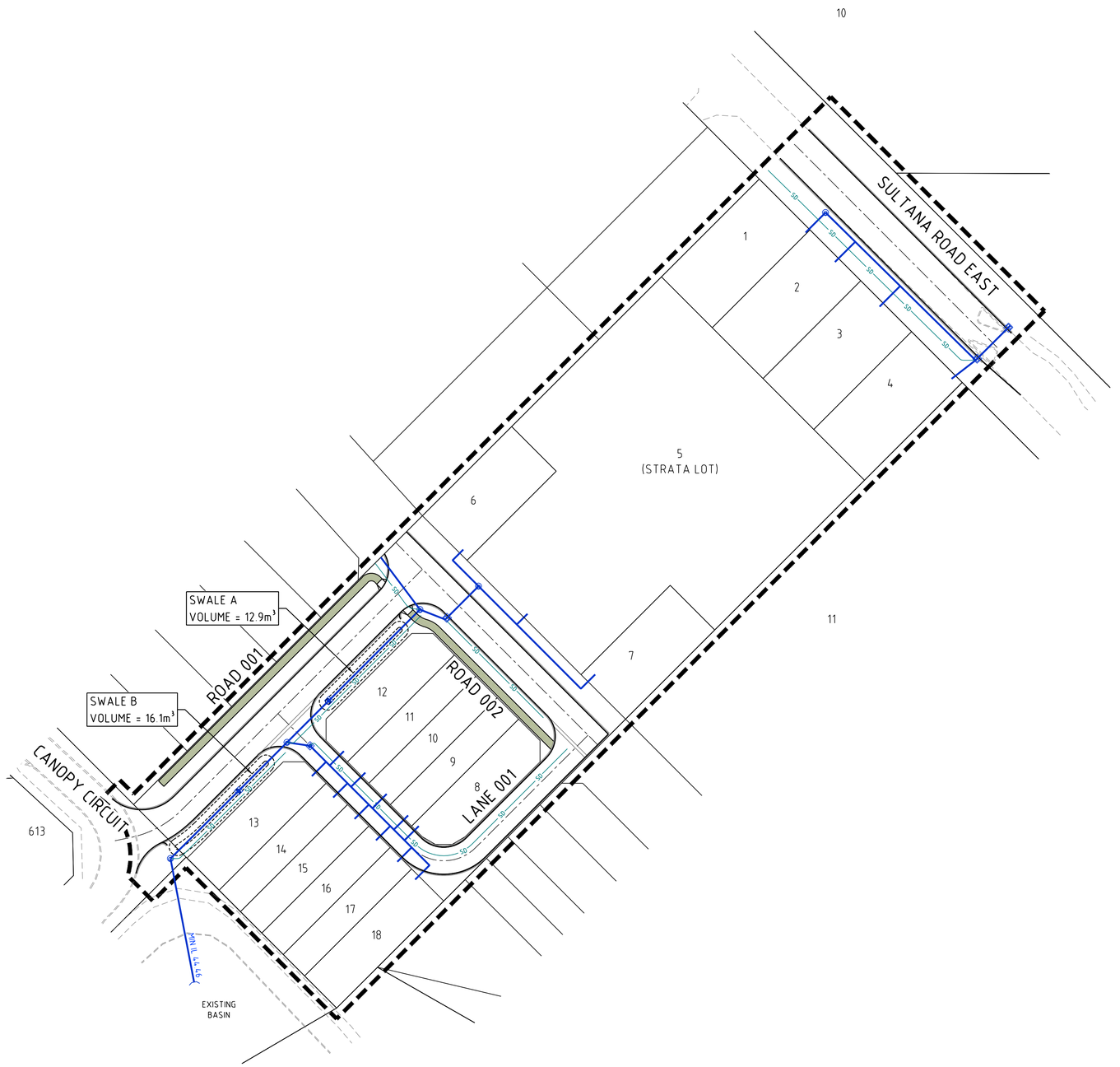
TITLE: STORMWATER DRAINAGE CATCHMENT PLAN CONCEPT

WAPC No. ×××WAPC NUMBER×××

DRAWING No. 6518-00-702

REVISION: B

ORIGINAL SIZE: A1



LEGEND

DESCRIPTION	SYMBOL
LIMIT OF WORKS BOUNDARY	
PROPOSED ROAD	
EXISTING ROAD	
PROPOSED CONCRETE PATH AND PRAM RAMP	
PROPOSED DRAINAGE PIPE	
EXISTING DRAINAGE PIPE	
PROPOSED DRAINAGE PIPE WITH JUNCTION PIT (JP), SIDE ENTRY PIT (SEP), GRATED PIT (GP) AND CIRCULAR GRATED PIT (CGP)	
PROPOSED SUBSOIL DRAINAGE PIPE	50

NOTICE TO CONTRACTOR

IT IS THE CONTRACTOR'S RESPONSIBILITY TO INVESTIGATE THE NATURE AND LOCATION OF ALL SERVICES WHICH MAY BE ENCOUNTERED AND TO CONSULT WITH THE RELEVANT SERVICE AUTHORITIES PRIOR TO COMMENCEMENT OF EXCAVATIONS. FAILURE TO DO SO OR TO TAKE DUE CARE SHALL NOT LIMIT THE CONTRACTOR'S LIABILITY FOR REPAIR OF ALL SERVICES DAMAGED BY HIM DURING CONSTRUCTION WORKS THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY FOR THE PROTECTION OF ALL EXISTING SERVICES.

REV	DATE	DRN	CKD	APP	AMENDMENT
C	18.09.24	BVS	NB		RE-ISSUED FOR APPROVAL
B	22.05.24	RJW	NB	N. BUTSON	DRAINAGE ALIGNMENT AMENDED
A	02.05.24	RJW	NB	N. BUTSON	ISSUED FOR APPROVAL

N

BEFORE YOU DIG www.byda.com.au

1:500 0m 10 20 30

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Subiaco WA 6904

Street Address
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Subiaco WA 6008

T (08) 9422 5800 F (08) 9422 5801 E admin@cosweb.com.au

CLIENT: ACOTT EQUITIES PTY LTD

APPROVED: 02.05.24 NATHAN BUTSON

DESIGNED: RJW

SCALE: 1:500

PROJECT: LOT 12 SULTANA RD FORRESTFIELD

TITLE: ROADWORKS AND STORMWATER DRAINAGE CONCEPT

WAPC No. ×××WAPC NUMBER×××

DRAWING No. 6518-00-602

REVISION C

ORIGINAL SIZE A1

P:\6518\Lot 12 Sultana Rd Forrestfield\6518-00Acad\6518-00-602.dwg, 18/09/2024 8:51:17 AM, ben.s, Digital Signing PDF.pc3, 1:1, - CW Reference

APPENDIX C

The Hales: Stages 2-9 UWMP – Addendum 1
(JDA, 2021)

THE HALES: STAGES 2 TO 9

"Lots 14, 15 & 515 Hawtin Road and 9002 Lovett Drive, Forrestfield: URBAN WATER MANAGEMENT PLAN – WAPC NO.154808 & 155243"

(Report for Satterley Property Group, report reference J6159ab, dated 20/11/2017)

ADDENDUM 1

Date: 3 March 2021
Reference: J6159af

This Addendum has been prepared to provide an update to the stormwater management for Catchment 1 of the *"LOTS 14, 15 & 515 HAWTIN ROAD AND 9002 LOVETT DRIVE, FORRESTFIELD: URBAN WATER MANAGEMENT PLAN – WAPC NO.154808 & 155243" (UWMP) (J6159AF DATED 20/11/2017).*

Since approval of the UWMP, design of the stormwater management area adjacent to and within Crumpet Creek has been refined in consultation with the City of Kalamunda. Whilst the main principles and objectives and general design guidelines outlined in the UWMP still apply, the detention storage details for Crumpet Creek have been updated.

In summary, the 1 year ARI detention storage (bio-retention) area is now designed to provide stormwater quality treatment and improvement for the road catchment area. Runoff from lots will still be managed in this detention storage with overflow to Crumpet Creek when the storage capacity is exceeded.

Design of the flood storage in Crumpet Creek now maintains the existing creek bed and low flow channel, with storage in two widened areas offset and above the low flow channel. The proposed design is shown in the attached drawing "Crumpet Creek Design" (Cossill & Webley dwg no. 6211-08-203 RevA).

Presented below is additional information to supplement the UWMP for Catchment 1 only.

1) Section 5.5 Minor Drainage System

Additional key points of the design of the minor drainage system for Catchment 1 are as follows:

- All lots connect directly into the road drainage network, via standard lot connection pit.
- 1 Year ARI bio-retention storage has capacity to manage and treat 15 mm of rainfall from road and lot catchment. Discharge to Crumpet Creek occurs via subsoil drainage and overflow spillway.
- 5 Year ARI storage in Crumpet Creek occurs in two areas above and adjacent to the low flow channel. The storage also includes runoff volume from Stage 1B (west of Crumpet Creek).
- Downstream discharge, and upstream levels of Crumpet Creek maintained at pre-development condition.

Tables 8A and 9A and Figure 7A attached present revised details of the bio-retention and detention storage designs.

TABLE 1A: BIO-RETENTION STORAGE DETAILS IN POS

	Catchment 1		
Storage Details			
Catchment Area (ha)	10.23[1]		
Impervious Catchment Area (ha)	7.18[1]		
Basin Invert (mAHD)	44.62		
Base Area (m^2)	677		
Side Slopes	1 in 6		
Spillway Invert (mAHD)	45.12		
Subsoil U/S Invert (mAHD)	44.3		
Subsoil D/S Invert (mAHD)	44.2		
Basin Results	***1 yr 1 hr ARI***	***5 yr ARI***	***100 yr ARI***
Critical Duration (hrs)	1	6	6
Storm Rainfall (mm)	15	49	83
Runoff Volume into Basin (m^3)	1,077	3,518	5,959
Basin Water Level Rise (m)	0.5	0.54	0.68
Basin Top Water Level, TWL (mAHD)	45.12	45.16	45.30
Basin Area at TWL (m^2)	1,340	1,410	1,640
Basin Stored Volume (m^3)	501	550	770
% Stored/Runoff Volume	47	16	13
Spillway Outflow (m^3/s)	0.067	0.21	1.8
Subsoil Outflow (m^3/s)	0.029	0.029	0.029
Emptying Time (days)	0.5	0.5	0.5

1. Includes external catchments contributing to basins.

TABLE 2A: DETENTION STORAGE DETAILS FOR 5 YR ARI IN CRUMPET CREEK

	Catchment 1
Storage Details	
Catchment Area (ha)	10.23[1]
Impervious Catchment Area (ha)	7.18[1]
Basin Invert (mAHD)	44.32
Base Area (m^2)	3,110
Side Slopes	1 in 6
Crumpet Creek Invert	44.00
Basin Outlet Invert (mAHD)	44.32
Basin Results[2]	***5 yr ARI***
Critical Duration (hrs)	6
Storm Rainfall (mm)	49
Runoff Volume into Basin (m^3)	3,518
Basin Water Level Rise (m)	0.59
Basin Top Water Level, TWL (mAHD)	44.91
Basin Area at TWL (m^2)	4,300
Basin Stored Volume (m^3)	2,200
% Stored/Runoff Volume	63
Peak Outflow[3] (m^3/s)	3.71
Emptying Time (days)	0.5

1. Includes external catchments contributing to basins.
2. Includes runoff from Stage 1B catchment west of Crumpet Creek.
3. Outflow includes Crumpet Creek flow from upstream catchments.

2) Section 5.6 Major Drainage System

Additional key points of the design of the major drainage system for Catchment 1 are as follows:

- Design of the flood storage in Crumpet Creek now maintains the existing creek bed and low flow channel, with storage in two widened areas offset and above the low flow channel.
- Downstream discharge and upstream levels maintained at pre-development condition.

Table 10A and Figure 7A attached presents revised details of the detention storage design. Long section of Crumpet Creek through the Study Area is presented in Figure 9A.

TABLE 3A: DETENTION STORAGE DETAILS FOR 100 YR ARI IN CRUMPET CREEK

	Catchment 1
Storage Details	
Catchment Area (ha)	10.23[1]
Impervious Catchment Area (ha)	7.18[1]
Basin Invert (mAHD)	44.32
Base Area (m^2)	3,110
Side Slopes	1 in 6
Crumpet Creek Invert	44.00
Basin Outlet Invert (mAHD)	44.32
Basin Results[2]	***100 yr ARI***
Critical Duration (hrs)	6
Storm Rainfall (mm)	83
Runoff Volume into Basin (m^3)	5,959
Basin Water Level Rise (m)	0.99
Basin Top Water Level, TWL (mAHD)	45.31
Basin Area at TWL (m^2)	5,300
Basin Stored Volume (m^3)	4,100
% Stored/Runoff Volume	69
Peak Outflow[3] (m^3/s)	6.72
Emptying Time (days)	0.5

1. Includes external catchments contributing to basins
2. Includes runoff from Stage 1B catchment west of Crumpet Creek.
3. Outflow includes Crumpet Creek flow from upstream catchments.

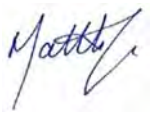
3) Section 5.9.2 Structural Controls

Additional key points of the structural source controls for Catchment 1 are as follows:

- The 1 Year ARI detention storage is designed to provide stormwater quality treatment and improvement for the road catchment area.
- Detention storage base area satisfies being at least 2% of the total connected impervious area (660 m^2 for 3.03 ha contributing road catchment).

Further detail on the detention storage will be presented to the City as part of the separate engineering design approvals process. If you have any queries, please do not hesitate to contact Matthew Yan on 9388 2436 or at matt@jdahydro.com.au.

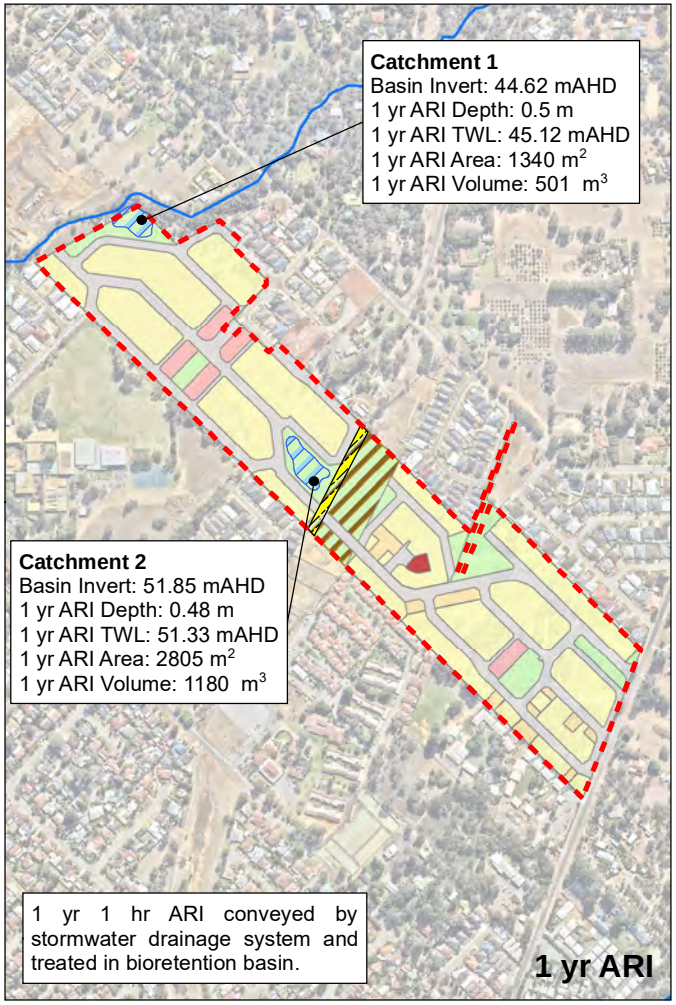
Yours sincerely,

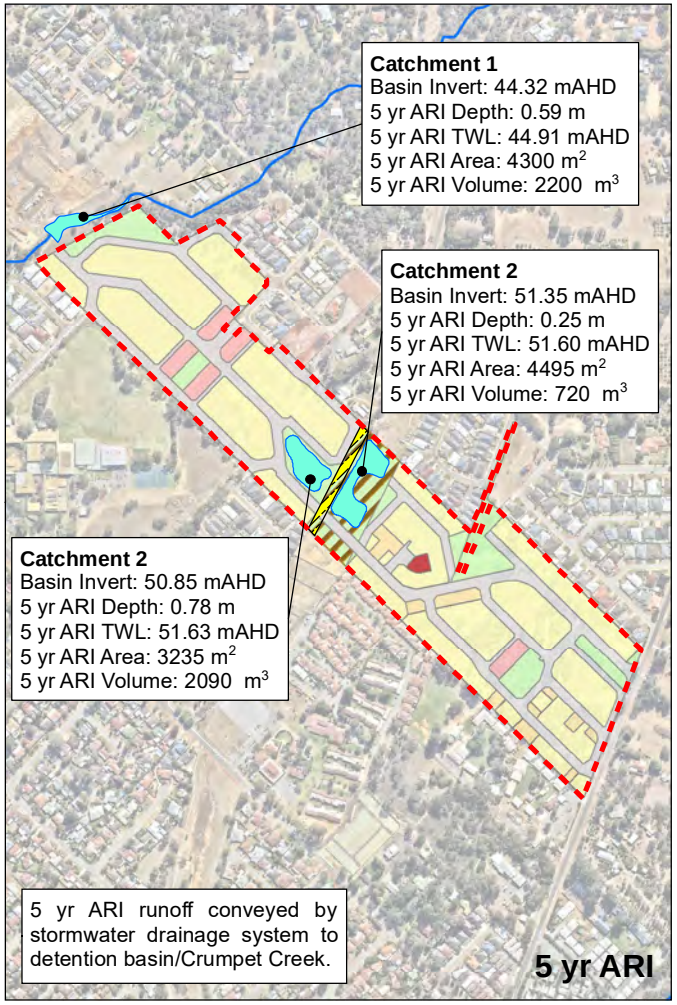


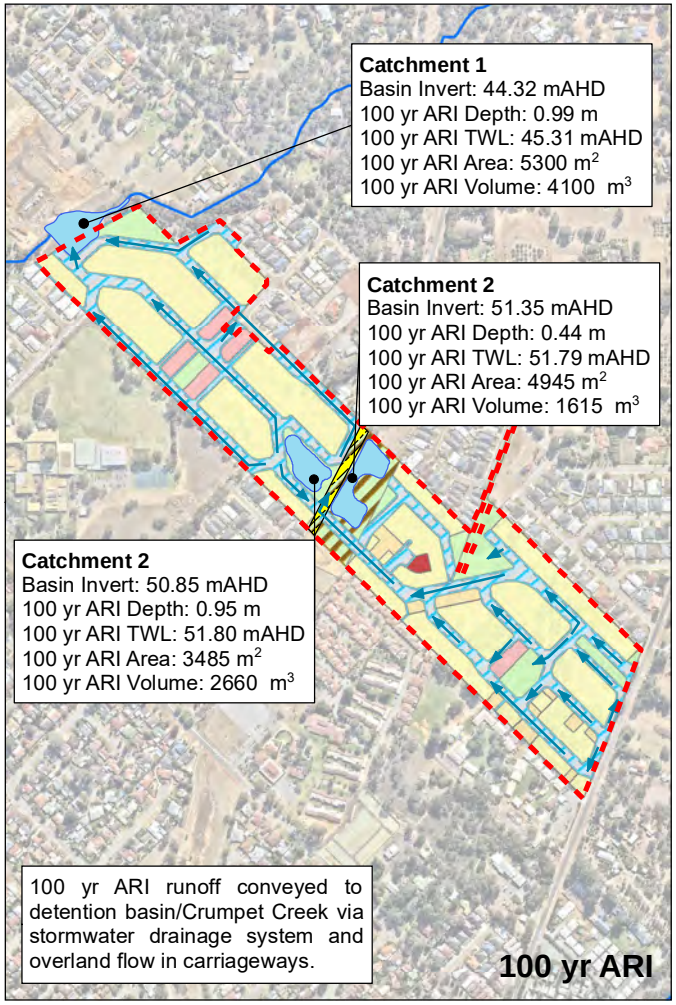
JDA Consultant Hydrologists

Encl.
Cossill & Webley dwg no. 6211-08-203 Rev A dated 2/3/2021 "Crumpet Creek Design"
Figure 7A – Stormwater Event Plans
Figure 9A – Crumpet Creek Long Section

J6159af







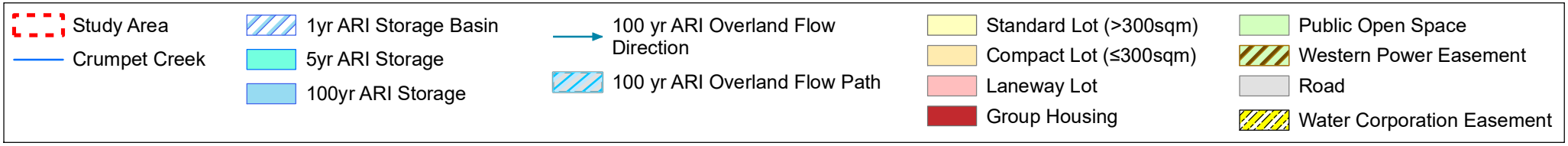
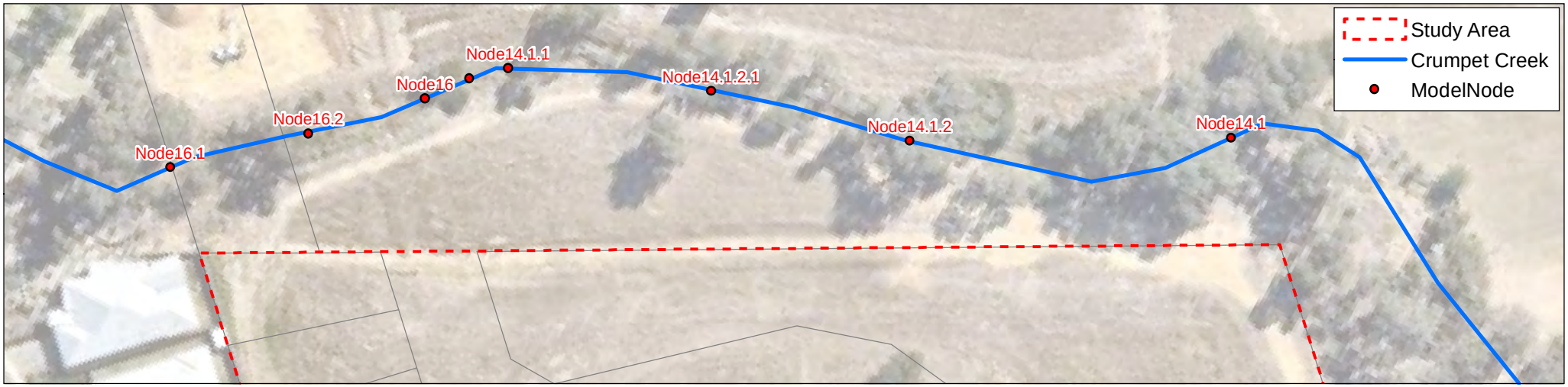


Figure 7A

Stormwater Event Plans



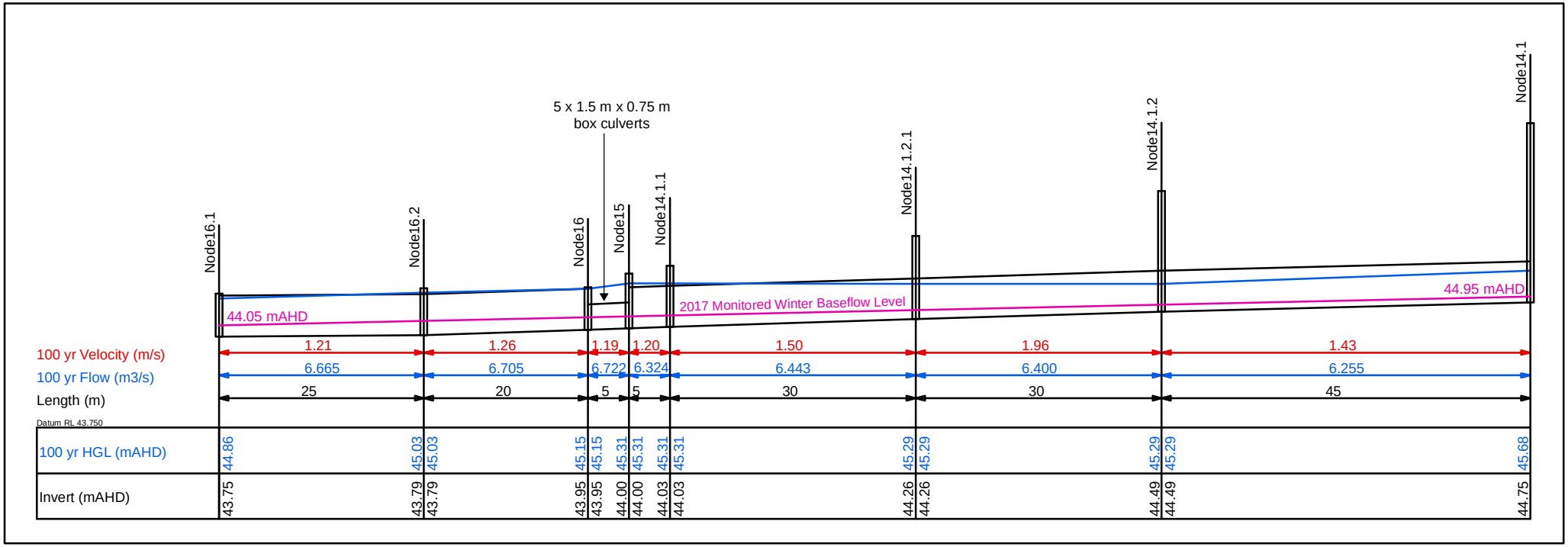
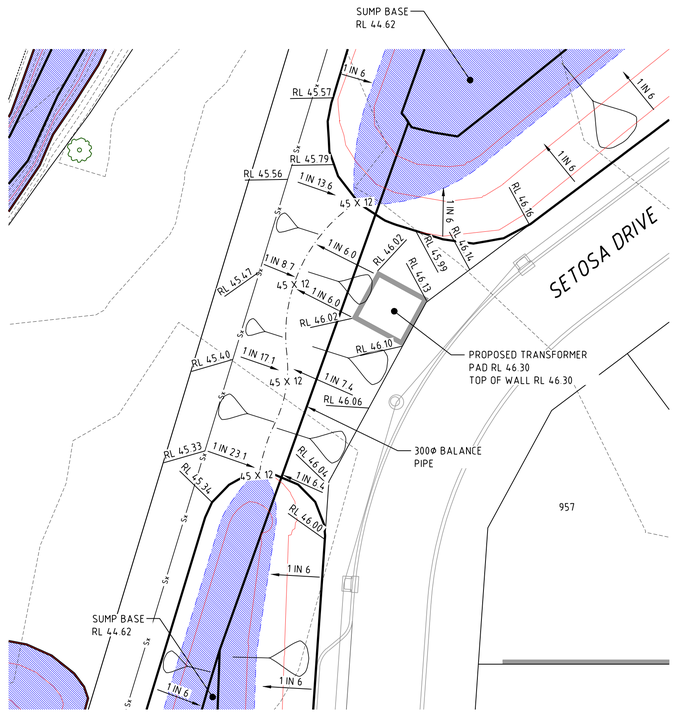


Figure 9A

Crumpet Creek Long Section

PLAN
SCALE 1:500



ENLARGEMENT A
SCALE 1:250

	DESIGN STORM EVENT	TWL (m AHD)	VOLUME (m3)	WETTED AREA (m2)
SWALE A	1:1	45.12	374	944
SWALE B	1:1	45.12	127	399
SWALE C	1:100	45.30	4,114	5,323

TRANSFORMER PAD RL 46.30

1:100 TWL 45.30

FREEBOARD = 1000mm

REV	DATE	DRN	CKD	APP	AMENDMENT
A	02.03.21	WBR	-	-	ISSUED FOR APPROVAL

1:250 0m 5 10 15

1:500 0m 10 20 30

Cossill & Webley CONSULTING ENGINEERS
Mailing Address PO Box 680 Subiaco WA 6904
Street Address B12 (Level 2) 431 Roberts Road Subiaco WA 6008
T (08) 9422 5800 F (08) 9422 5801 E admin@cosweb.com.au

CLIENT: SATTERLEY PROPERTY GROUP

PROJECT: THE HALES ESTATE, FORRESTFIELD - STAGE 08

TITLE: CRUMPET CREEK DESIGN

APPROVED: CHECK PRINT

DESIGNED: WBR

SCALE: 1:250 1:500

WAPC No. 155243

DRAWING No. 6211-08-203

REVISION A

ORIGINAL SIZE A1

Suite 1, 27 York St, Subiaco WA 6008
PO Box 117, Subiaco WA 6904
Ph: +61 8 9388 2436

www.jdahydro.com.au

info@jdahydro.com.au