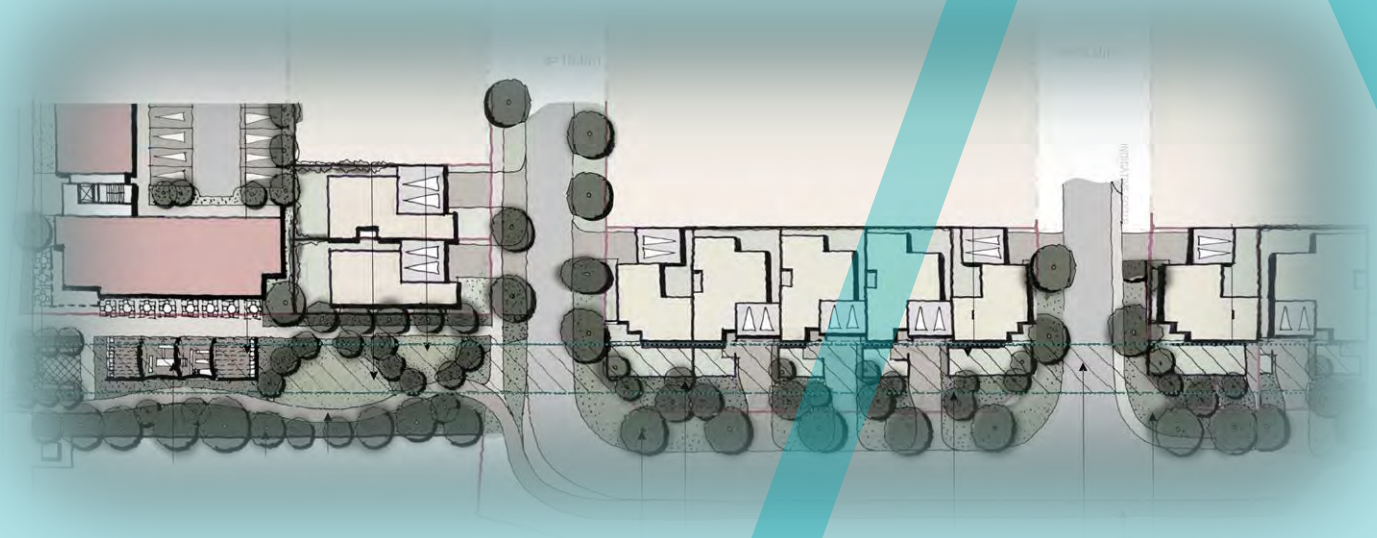
LOT 2 FAWCETT ROAD, LAKE COOGEE

STRUCTURE PLAN



PREPARED BY:

URBANISTA
TOWN PLANNING

This structure plan is prepared under the provisions of the City of Cockburn Town Planning Scheme No. 3.

IT IS CERTIFIED THAT THIS STRUCTURE PLAN WAS APPROVED BY RESOLUTION OF THE WESTERN AUSTRALIAN PLANNING COMMISSION ON: **21 JUNE 2021**

Signed for and on behalf of the Western Australian Planning Commission

_____

an officer of the Commission duly authorised by the Commission pursuant to Section 16 of *the Planning and Development Act 2005* for that purpose, in the presence of:

_____ Witness

22 JUNE 2021 Date

21 JUNE 2031 Date of Expiry

TABLE OF AMENDMENTS

Each time a structure plan is amended, the amendment is to be recorded in the table of amendments at the front of the structure plan, including the amendment type (minor or major).

Amendment Number	Summary of the Amendment	Amendment type (minor / major)	Date approved by Western Australian Planning Commission
—			

TABLE OF DENSITY PLANS

Each time a density plan is approved, the plan is to be recorded in the table of density plans at the front of the structure plan.

Density Plan No.	Location of density plan	Total area of density plan application	Date endorsed by Western Australian Planning Commission

EXECUTIVE SUMMARY

This Structure Plan encompasses Lot 2 Fawcett Road, Lake Coogee (the subject site), which is located in the City of Cockburn. The subject site is situated on the eastern side of Fawcett Road and to the south of Mayor Road and has a total land area of 1.0121 hectares.

The intent of this structure plan is to guide the subdivision and subsequent development of the site for residential and partly commercial purposes, along with ensuring appropriate provision of access via an extension of Kirk Close and the provision of a reserve for local parks and recreation, which provides a linkage to the regional open space wetlands to the east and to the west of the site.

This Structure Plan takes into account the statutory and strategic planning framework applicable to the subject site, outlining development principles and assessments as they relate to environmental, engineering and servicing, transport impact and bushfire risk management issues.

Item	Description	LSP Reference
Total area covered by the structure plan	10,121 sqm	Part 2 – Clause 1.2
Area of each land use & density proposed • **Residential R30** • **Residential R40** • **Residential R30/60**	 3,226 sqm 1,722 sqm 1,403 sqm	Part 1 – Clause 4.1
Estimated dwelling yield	Residential R30 — 10 dwellings Residential R40 — 9 dwellings Residential R30/60 — 4–12 dwellings	Part 2 – Clause 3.4
Estimated population	76 people	
Estimated commercial floor space	400 sqm	Part 2 – Clause 3.5
Estimated public open space	1,016 sqm	Part 2 – Clause 3.3

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Part

1 Implementation Section

1. STRUCTURE PLAN AREA

This Structure Plan applies to the land identified in the Structure Plan map and comprising of the land bounded by Kirk Close, Fawcett Road, Preston Drive, and freehold land to the north and east. The Structure Plan area comprises of Lot 2 on P3562 and 1.0121ha of land.

Refer to Plan 1 — Structure Plan Map.

2. OPERATION

This structure plan commences operation on the date it is approved by the Western Australian Planning Commission.

3. STAGING

No staging is proposed, the Structure Plan area is to be developed in a single stage. Basic essential infrastructure including roads and utilities are to be provided prior to the release of land for residential or other development. Land relating to the temporary cul-de-sacs is to be withheld until 5 Fawcett Road to the north is developed.

4. SUBDIVISION & DEVELOPMENT REQUIREMENTS

4.1 LAND USE ZONING

The land use zoning of the Structure Plan area is shown on the Structure Plan Map (Plan 1).

The Structure Plan Map identifies the following zones and reserves applicable to the structure plan area:

- Residential 6,351sqm
  - *R30* *3,226sqm*
  - *R40* *1,722sqm*
  - *R30/60* *1,403sqm*

- Public Open Space 1,016sqm
- Unzoned (Crown) 2,754sqm

The Commission may consider the R40 lots encroaching into the easement area if a detailed geotechnical investigation has been prepared (as discussed in Section 4.4), which confirms the land that is suitable for development, and the Water Corporation and the City of Cockburn have been consulted and are generally supportive of this approach.

4.2 RESIDENTIAL DENSITY

The residential density applicable is as shown on the associated Structure Plan Map prepared in conjunction with this Structure Plan report.

Split Density Code

Where a split-density code of R30/60 applies to land within this Structure Plan, as indicated on the Structure Plan Map, *the base density code of "R30" shall apply*, except in the following circumstance:

Within the area delineated on the Structure Plan Map as R30/60, *the "R60" density code may be applied where the following conditions are met*:

1. The split coded land is subdivided to no more than one lot, prior to a development application being approved over the site, and the development site or sites comprise of a total land area of no less than 1,400m^2; and
2. The higher density of R60 can only be achieved in a mixed-use development with multiple dwellings and ground floor commercial land use component(s) with a cumulative total gross floor area of at least 100m^2; and
3. The proposed development does not include any single house or grouped dwelling development; and
4. The proposed development consists primarily of two-storey or greater height development (greater height subject to height development standards); and
5. A Local Development Plan is prepared or updated, and approved for the subject land.

4.3 PUBLIC OPEN SPACE

This Structure Plan proposes the provision of approximately 1,032sqm of public open space.

The POS will be managed on an ongoing basis by the City, however the developer of Lot 2 Fawcett Road will be the caretaker of the POS for a standard period of two years.

4.4 WATER CORPORATION SEWERAGE EASEMENT

Further information on the Bibra Lake Section 8 Sewer Main is provided in the Part 2 (Explanatory Section) of this report, please refer to this section of the report. Development is to be consistent with the registered easement document I330227 and the standards and considerations prescribed therein.

Prior to subdivision approval, a geotechnical investigation of the land will be specifically required for all the R40 lots abutting the Water Corporation easement to determine the extent of the zone of influence and its impact on the subdivision and development of the land.

4.5 DEVELOPMENT STANDARDS

Development is to be consistent with TPS No. 3. Notwithstanding the scope of development standards is not limited only to TPS No. 3, and other development standards and considerations apply.

4.6 VEHICLE ACCESS ARRANGEMENT

No more than one vehicle access point (crossover) in total from the Structure Plan area shall be permitted from the Fawcett Road verge. A communal street (or vested public road) may form the primary access means to individual sites if necessary in order to meet this development standard.

Driveways shall be positioned in a suitable location to allow for Access and Manoeuvring in accordance with the relevant Australian Standards — development will be assessable at time of development application approval application to ensure it meets these standards. Further discussion and analysis is provided in the technical report drafted by KCTT, attached as an appendix to this report.

Access to R40 Lots in the Central Cell

Subdivision and development of land in the central cell abutting the easement is to minimise the number of crossovers to Kirk Close. Shared crossovers are to be provided wherever possible. All crossovers and private driveways are to be constructed in a material (e.g. block paving or modular precast units) that allows for the driveway to be removed and reinstated if access to the sewer infrastructure is required by the Water Corporation.

Access to R40 Lots in the Eastern Cell

Subdivision and development of land in the eastern cell abutting the easement is not to derive access from Kirk Close.

Waste Collection

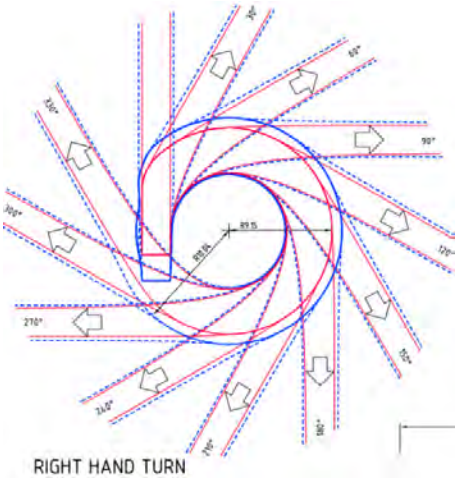
For the purposes of allowing for street-side waste collection by the City of Cockburn it is considered that the installation of 18.0m diameter temporary cul-de-sacs at the terminating ends of the proposed access roads may be required at the discretion of the City.

Following advice from the City and discussion with the traffic consultant, the installation and removal of the cul-de-sacs shall be applied as a condition of subdivisional approval by the WAPC in liaison with the City, with the affected lots being withheld from private development as residential housing until the cul-de-sacs are removed at the expense of the LSP proponent following the development of 5 Fawcett Road (Lot 1 P3562) to the north.

The reinstated road verge should be upgraded to a standard consistent with the surrounding area, including the provision of a continuous footpath network, kerbing, and other landscaping, which is expected to be applied as a condition of subdivisional approval.

It is noted that with the exception of the City's garbage collection trucks, there will be no other large vehicles which will use the proposed access roads. The position of these cul-de-sacs has been illustrated on the structure plan map. Preference is for centre off-set cul-de-sacs to allow reduce the burden of development and site works costs.

Side-loading garbage truck	
Length	9.7m
Front Overhang	1.5m
Rear Overhang	2.9m
Wheelbase (rear wheel turning *r*)	5.2m
Turning circle ø (road surface)	17.9m
Turning circle ø (to obstruction)	20.6m
WALGA Waste Management Plan Guidelines Turning circle ø	19.0m
Proposed turning circle (road surface) ø	18.0m



4.7 TREATMENT OF ROAD RESERVE

The proposed internal access roads shall be developed with dual-use footpaths connected to the existing footpath network to the City's development standards. A footpath width of at least 2.0m is required, with the preferred width being 2.5m. Footpaths are proposed to be positioned near the lot boundary for the Kirk Close extension, consistent with *Liveable Neighbourhoods* and to improve safety and usability outcomes. A kerbside dual-use footpath is proposed on the central access street.

The road reserves shall include the installation of street trees, stormwater retention and infiltration systems, and street lighting to the satisfaction of the City and their adopted policies and planning framework.

The width of and number of crossovers shall be kept to a functional minimum in accordance with the R-Codes and the City's adopted Local Planning Policies, to minimise the extent of hard surface, and reduce vehicle conflict, a parallel driveway and shared crossover design is desirable.

In accordance with and in response to the proposed density, *Liveable Neighbourhoods*, the consultant traffic engineer's report, and the existing road network, a road reserve width of 15.0m has been proposed. This will be made up of a 6.0m wide centrally positioned road surface, a 2.5m wide dual-use footpath, and landscaped road verge area on both sides.

The land that is reserved as road reserve and located over the Water Corporation easement is required to be embellished by the responsible developer to the satisfaction of the City of Cockburn.

Kirk Road Verge Maintenance

The road reserve located over the Water Corporation easement will be maintained in perpetuity by the owners of the future R40 lots. No trees shall be planted unless a previous approval from the Water Corporation has been secured.

4.8 NOTIFICATIONS ON TITLES

In respect of applications to subdivide land within the structure plan area, the City of Cockburn may recommend the following notification be placed on the certificate of title:

> *This land may be affected by midge from nearby lakes and/or wetlands. Enquiries can be made with the City of Cockburn Environmental Services.*

Where an application proposes to create lots with a bushfire attack level of 12.5 or above, the following notification on the certificate(s) of title of the proposed lot(s) may be required:

> *This land is within a bushfire prone area as designated by an order made by the Fire and Emergency Services Commissioner and is/may be subject to a bushfire management plan. Additional planning and building requirements may apply to development on this land.*

5 LOCAL DEVELOPMENT PLANS

Certain lots or parcels within the structure plan area will require the preparation or revision of a site-specific Local Development Plan in accordance with Part 6 of Schedule 2 of the Planning and Development (Local Planning Schemes) Regulations 2015.

LDPs should be prepared to the satisfaction of the City of Cockburn and approved by the City as required. No development subject to this LSP shall be approved where the lot or parcel is subject to the preparation of a LDP, without that LDP having first been approved and adopted by the City.

Notwithstanding, certain development, subject to the planning framework at that time, may be exempt from the requirement for the prior preparation of a LDP.

A Local Development Plan will be required where:

a) Lots are less than 350sqm;
b) Mixed-use development is proposed;
c) Lots are abutting public open space;
d) Lots are abutting the Water Corporation easement for gravity sewer main.

The following matters are to be included in the local development plans:

a) Building envelopes for R40 lots – ground and upper floor setbacks to primary and secondary streets, rear northern boundary setbacks for solar access, nil setbacks to side boundaries.
b) Zone of influence of the Water Corporation gravity sewer main shown as shaded/hatched.
c) Parking - location (mandatory and/or desired), potential additional parking location for duplex-sized lots.
d) Vehicle access points.
e) Fencing – heights, detailing, retaining walls, developer-provided fencing.
f) Services – easements.
g) Private open space – location of strategically important outdoor living areas.
h) Shared crossovers – a notation that such crossovers will be constructed in a non-permanent manner.
i) Mechanisms for expiry or variations of local development plan(s).

6. OTHER REQUIREMENTS

6.1 BUSHFIRE MANAGEMENT

The Department of Fire and Emergency Services (DFES) map of bushfire prone areas indicate that a significant portion of the site is situated within bushfire prone areas. The determined Bushfire Attack Level (highest BAL) is depicted as BAL-29.

In this regard, a Bushfire Management Plan (BMP) has been prepared by Greenstart Consulting in support of this Structure Plan, which identifies the bushfire management measures (Part 5) required to be implemented by the developer/landowner in the initial stages of subdivision and ongoing measures to be implemented by the landowner/occupier to ensure the relevant standards and performance criteria are met.

6.2 DEVELOPMENT CONTRIBUTIONS

The Structure Plan area is located over Development Contribution Areas 6, and 13 (DCA 6, and DCA 13) and Development Area 5.

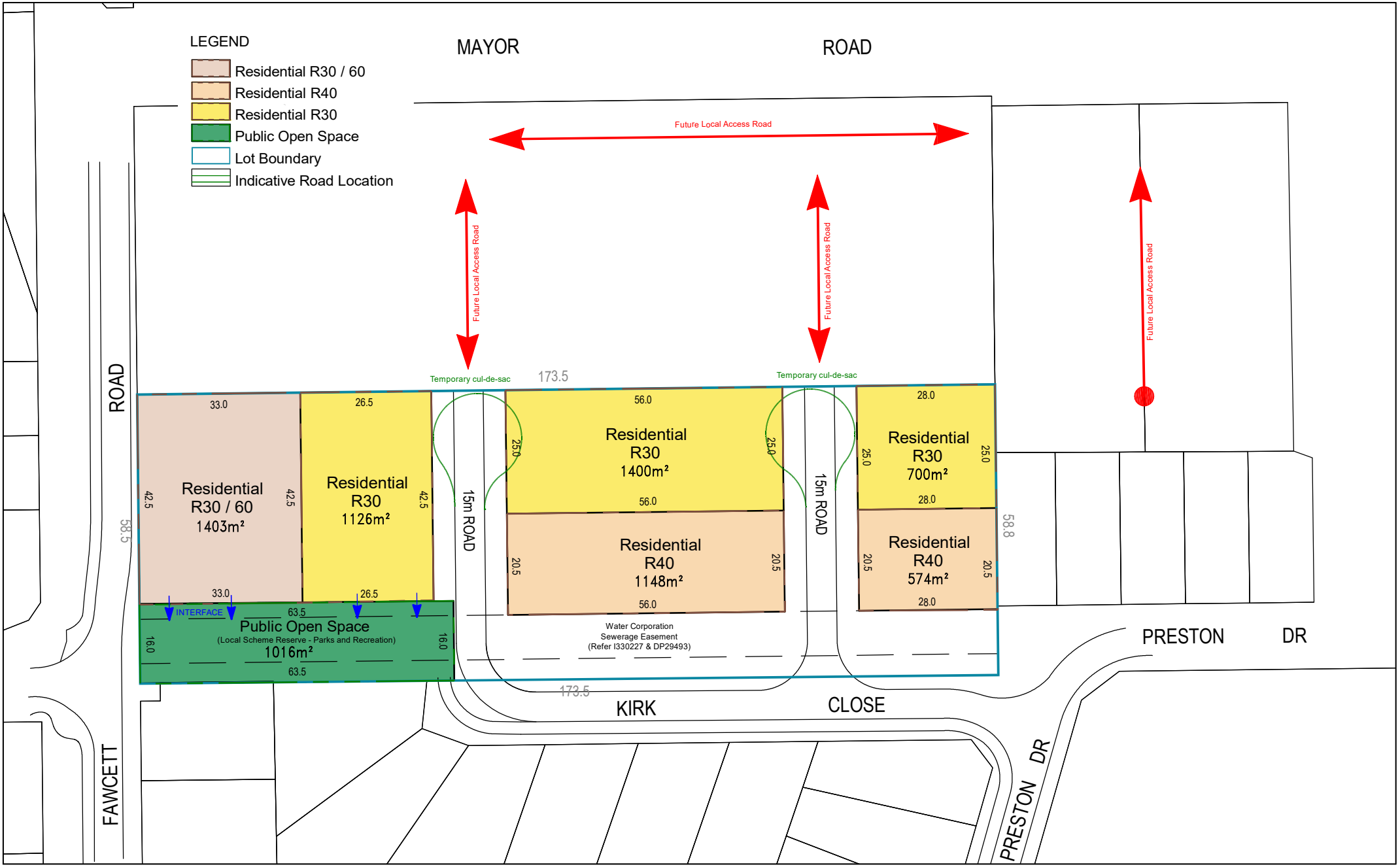
The applicant should arrange with the City of Cockburn to provide proportional contributions as set out in within the City's Town Planning Scheme No. 3, or elsewhere as required. Development Contribution Area details at the time of writing are specified as follows:

DCA 6	DCA 13
Proportional contribution (23.4%) towards widening and upgrading of Beeliar Drive (Mayor Road), between Stock and Cockburn Roads, Lake Coogee.	City of Cockburn wide infrastructure and facilities

Where an application for subdivisional approval is sought, the proponent of that subdivision shall pay proportionate costs for the upgrading and construction of infrastructure and utilities for roads, public open spaces, and servicing.

7. ADDITIONAL INFORMATION

No additional information is required. Additional information by way of management plans, reports, or strategies may be necessary to facilitate subdivisional approval, planning approval, or development application approval, as determined on a case-by-case basis.



STRUCTURE PLAN

0 5 10 15 20 25m

SCALE 1:1000 @ A4

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Part

2 Explanatory Section

1. PLANNING BACKGROUND

1.1 INTRODUCTION AND PURPOSE

Part Two of this Structure Plan comprises an explanatory report that outlines site details, the applicable planning framework, site conditions and constraints and the design rationale for the structure plan. Part Two should be read in conjunction with the Structure Plan Map (Plan 1) and any figures and appendices that relate to applicable site investigations.

The purpose of the Structure Plan is to guide the subdivision and subsequent development of Lot 2 Fawcett Road, Lake Coogee for residential and partly commercial purposes. This Structure Plan has been prepared in accordance with the requirements for Development Areas under the City's Town Planning Scheme No. 3 (TPS No. 3) the "deemed provisions" of the *Planning and Development (Local Planning Schemes) Regulations 2015*.

1.2 LAND DESCRIPTION

1.2.1 Location

The structure plan area encompasses Lot 2 Fawcett Road, Lake Coogee, and is located within the City of Cockburn, approximately 20km south of the Perth CBD.

The subject site is situated within the suburb of Lake Coogee and is bounded by Fawcett Road to the west, Kirk Close to the south and freehold lots to the east and north of the site. The site is located approximately 70m from the Mayor Road intersection, which is proposed to be widened and upgraded in accordance with Development Contribution Area 6 (DCA6) of the City's Town Planning Scheme. Cockburn Central Train Station is located approximately 7km from the site and several bus routes run along Mayor Road, with a bus stop located approximately 100m from the site.

Fremantle is the closest Strategic Metropolitan Centre (10km north), Cockburn Central the nearest Secondary Centre (7km east), with the Phoenix District Shopping Centre (3km north) and Beeliar Village Shopping Centre. located approximately 2km from the subject site. Two local centres known as Lighthouse Corner Store and Churchill Avenue are also 1km north-west and south-east of the site respectively.

Coogee Primary School is located approximately 700m to the east of the subject site, St Jerome's Primary School approximately 800 metres to the north and South Coogee Primary School approximately 1.6 kilometres to the west. Lakeland Senior High School is located approximately 5km north-east of the subject site and Fremantle College is located approximately 7km north of the subject site.

Refer to Figure 1 – Context Plan

1.2.2 Area and Land Use

The subject site encompasses the whole of Lot 2 Fawcett Road, Lake Coogee and has a total land area of 1.0121 hectares. The subject site is largely vacant, with an existing single dwelling which currently exists on the north-western corner of the site.

Future application/s for subdivisional approval will be submitted to the WAPC in due course, prior to development of individual lots or sites.

The immediate surrounding area is in the process of residential suburban infill and has been largely developed to a residential suburban standard, as illustrated in the Site Aerial Map on the following pages. The Structure Plan area remains as one of the few large areas that have yet to been redeveloped or had a Structure Plan approved for its redevelopment.

Refer to Figure 2 – Site Plan

1.2.3 Ownership

Lot	Plan	Volume / Folio	Area	Registered Proprietor
2	P3562	459 / 997	10,121sqm	Vem Contracting Pty Ltd

1.3 PLANNING FRAMEWORK

1.3.1 Zonings and Reservations

Metropolitan Region Scheme

The Metropolitan Region Scheme is a broad regional planning document which sets out the zoning and use of land in the Perth metropolitan area. The site is located within the Metropolitan Region Scheme area and is zoned "Urban" under the scheme.

City of Cockburn Town Planning Scheme No. 3

The subject site is zoned "Development" in accordance with the City of Cockburn Town Planning Scheme No. 3 (TPS No. 3). The purpose of the Development zone is 'to provide for future residential, industrial or commercial development to be guided by a comprehensive structure plan prepared under the Scheme'. In this regard, a Development Area is designed to:

a) *Identify areas requiring comprehensive planning; and*
b) *Coordinate subdivision and development in areas requiring comprehensive planning.*

The subject site is located within Development Area 5 (DA5) under TPS No. 3; with Table 9 of TPS No. 3 identifying that DA5 is to predominantly provide for new residential development.

TPS No. 3 also states that the subdivision and development of land within a Development Area is generally to accord with any approved structure plan pertinent to the land. Refer to Section 5.2 of TPS No. 3.

The subject site is located over the following Development Contribution Areas:

- Development Contribution Area 13 (DCA 13), which establishes a developer contribution arrangement for the upgrade of local and regional recreational and landscape facilities within the whole of the City of Cockburn; and
- Development Control Area 6 (DCA 6), which establishes a developer contribution for the Munster locality for the widening and upgrades of Mayor Road.

Refer to Figures 3 and 4 – Zoning Maps

1.3.2 Strategic Planning Framework

Perth and Peel@3.5million

Perth and Peel@3.5million is the overarching strategic planning framework for the Perth and Peel metropolitan regions. Perth and Peel@3.5million proposes five strategic themes for a liveable, prosperous, connected, sustainable and collaborative City. The framework aspires to a city that provides '…*a network of connected activity centres which deliver employment, entertainment and high-density lifestyle choices*'. The site is located within the South Metropolitan Peel Sub-Region. The framework further identifies that additional an additional 14,680 dwellings will be required to be accommodated in the City of Cockburn (urban infill) over the 35 years to 2050.

The structure plan responds to the objectives and intent of Perth and Peel@3.5million by achieving the following:

1. The site recognises the priority of public transport over the use of private vehicles, and will take advantage of future public transport options, as urban densification occurs;
2. The site provides for appropriate and responsive urban consolidation;
3. The site provides for higher-density residential development;
4. The site provides a minimal impact of the existing fabric of the surrounding local area; and
5. The site contributes to an increase in density and diversity of beneficial land-uses by allowing for a variety of complementary uses in the Local Centre zone.

The structure plan is considered to achieve the intent and objectives of Perth and Peel@3.5million.

Liveable Neighbourhoods

Liveable Neighbourhoods is an operational policy, adopted by the WAPC, for the design and assessment of new structure plans and subdivisions. There are two versions of Liveable Neighbourhoods — the 2009 approved version and 2015 draft version.

It is acknowledged that the general intent and objectives of Liveable Neighbourhoods are relevant in terms of addressing such elements as connectivity and walkability, provision of public parkland, urban water management and utilities. A detailed description of the design rationale for the Structure Plan has accordingly been provided in Section 3 of this Structure Plan report as a result.

City of Cockburn Local Planning Policies

LPP 1.11 – Residential Rezoning and Subdivision Adjoining Midge Infested Lakes and Wetlands

The City's policy Residential Rezoning and Subdivision Adjoining Midge Infested Lakes and Wetlands outlines the City's approach with respect to new residential development in close proximity to midge infested lakes and wetlands.

The Policy identifies that the subject site is located within 500 metres of Market Garden Swamp 3 (to the southwest) and is therefore potentially subject to midge infestation during the spring and summer seasons. As such and in accordance with Clause 2 of the Policy, a Notification will be placed on all future titles stating that:

> *This land may be affected by midge from nearby lakes and/or wetlands. Enquiries can be made with the City of Cockburn Environmental Services.*

LPP 1.16 – Single House Standards for Medium Density Housing in the Development Zone

The City's policy Single House Standards for Medium Density Housing in the Development Zone replaces the deemed to comply provisions of the R-Codes with respect to certain elements, for single house residential development in R25–R60 density coded areas. Should a single house be proposed, it will need to address this LPP.

1.4 PRE-LODGEMENT CONSULTATION

In formulating this structure plan proposal, the landowner's representative liaised with the City of Cockburn's Strategic Planning Services department in June 2019.

Further discussions and meetings were held in January and February 2020 to further refine the proposal.

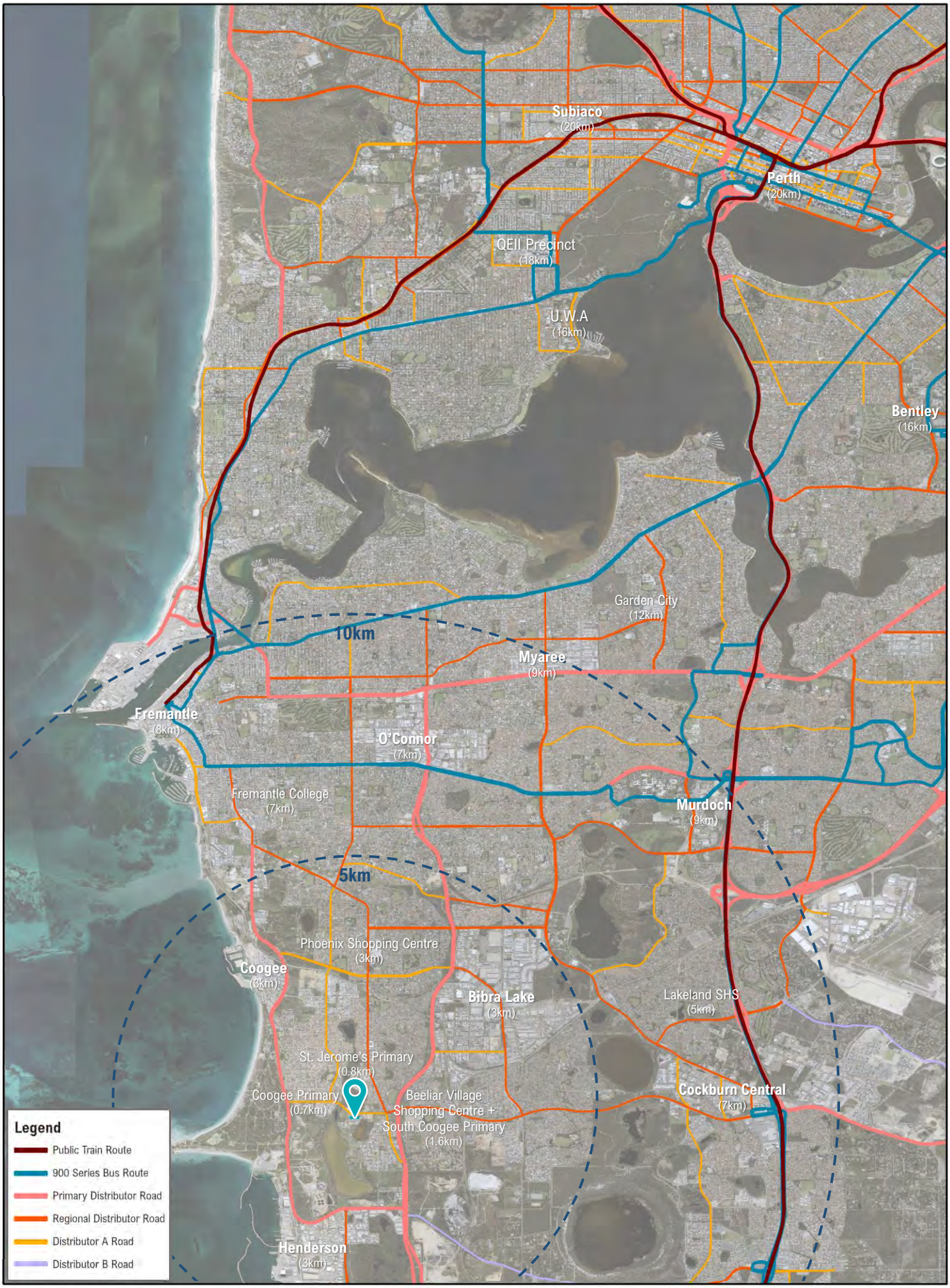

FIGURE 1 — CONTEXT PLAN

0 500 1,000 2,000 3,000 4,000 5,000 m

SCALE 1:100,000 @ A4

LOT 2 FAWCETT ROAD LAKE COOGEE

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GCS WGS
1984 & AHD

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FIGURE 2 — SITE PLAN

0 10 20 40 60 80 100 m

SCALE 1:2,000 @ A4

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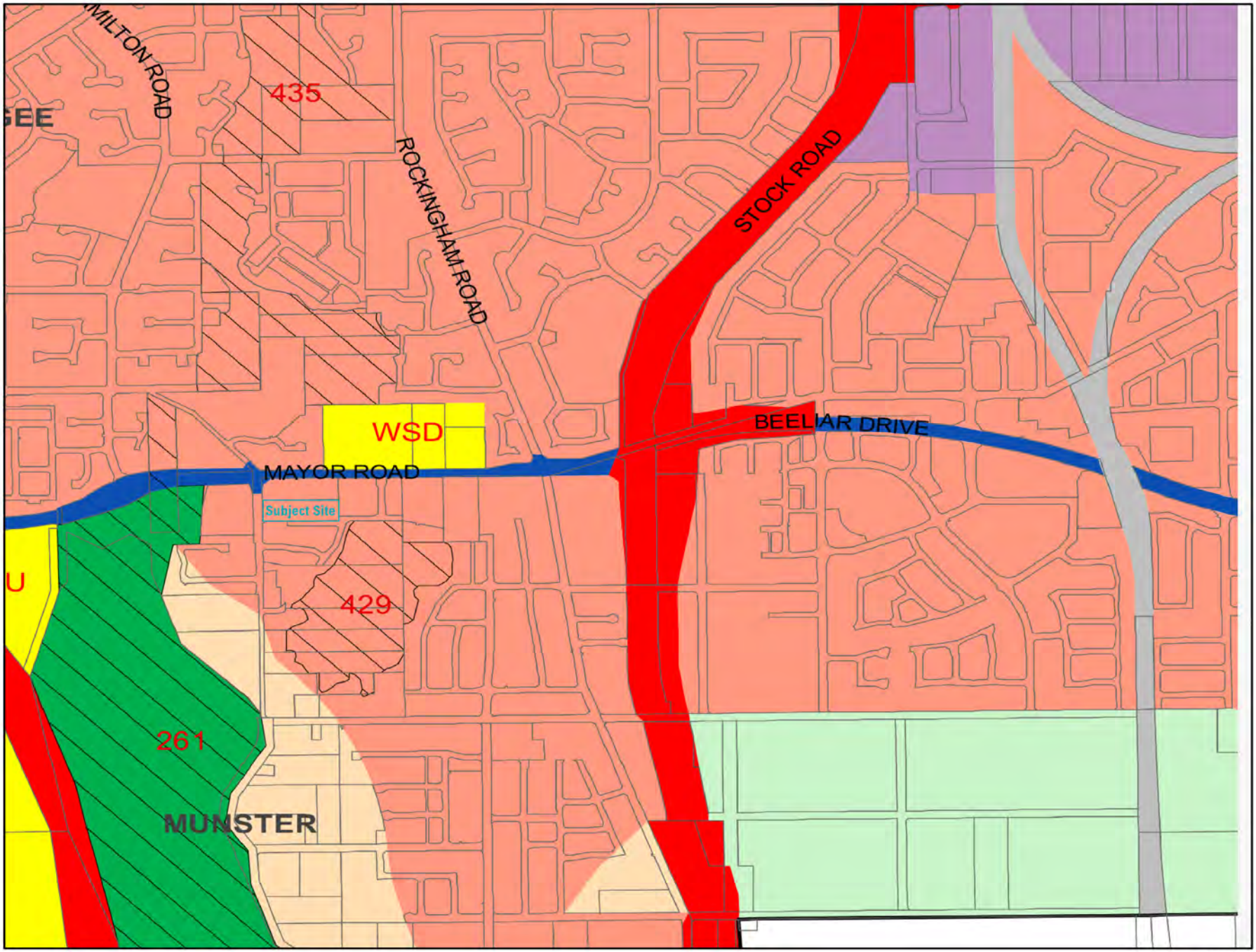

Legend

Scheme boundary

Reserved lands

- Parks and recreation
- Restricted public access
- Railways
- Port installations
- State forests
- Civic and cultural
- Waterways
- Water catchments
- Public purposes - denoted as follows:
  - H Hospital
  - HS High school
  - TS Technical school
  - CP Car park
  - U University
  - CG Commonwealth Government
  - SEC State Energy Commission
  - SU Special uses
  - WSD Water Authority of WA
  - P Prison

Reserved roads

- Primary regional roads
- Other regional roads

Zones

- Urban
- Urban deferred
- Central city area
- Industrial
- Special industrial
- Rural
- Rural - water protection
- Private recreation

Notice of delegation

(Site No) Bush forever area

Redevelopment schemes

Redevelopment scheme/act area

FIGURE 3 — MRS EXTRACT

LOT 2 FAWCETT ROAD LAKE COOGEE

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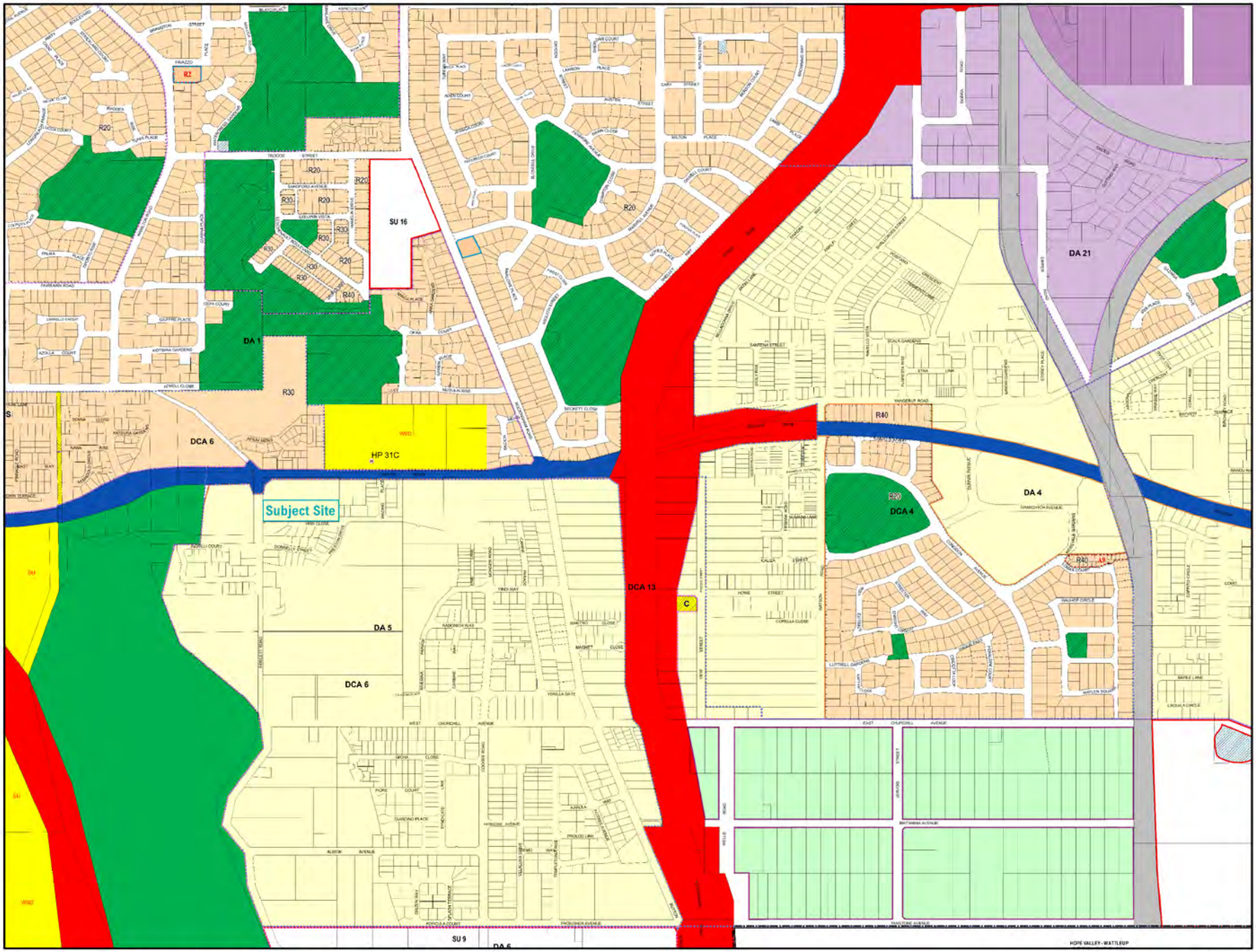

LEGEND

REGION SCHEME RESERVES (MRS)

- Civic and Cultural
- Other Regional Roads
- Parks and Recreation
- Parks and Recreation - restricted
- Port Installations
- Primary Regional Roads
- Railways
- State Forests
- Waterways
- Water Catchments
- Public Purposes

LOCAL SCHEME RESERVES

- Lakes and Drainage
- Local Road
- Parks and Recreation
- Public Purposes

LOCAL SCHEME ZONES

- Development
- District Centre
- Industry
- Lakes and Drainage
- Light and Service Industry
- Local Centre
- Mixed Business
- Mixed Use
- Regional Centre
- Residential
- Resource
- Rural
- Rural Living
- Special Use

OTHER CATEGORIES

(see scheme text for additional information)

- Scheme Area Boundary
- Local Government Boundary
- Hope Valley - Wattleup Redevelopment Area
- R20 R Codes
- A1 Additional Uses
- R1 Restricted Uses
- SU1 Special Use Area
- Peel-Harvey Coastal Plain Catchment Area
- Building Envelope
- DA1 Development Area
- Development Contribution Area
- JA Jandakot Airport
- Heritage Place
- No Zone
- Waterbodies

FIGURE 4 — COCKBURN LPS № 3 EXTRACT

LOT 2 FAWCETT ROAD LAKE COOGEE

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2. SITE CONDITIONS & CONSTRAINTS

2.1 BIODIVERSITY AND NATURAL AREA ASSETS

The subject site is primarily vacant with only open grassland and shrubbery existing on the site.

2.2 LANDFORM AND SOILS

As indicated in the Engineering Servicing Report prepared by McDowall Affleck (Appendix 7), the subject site slopes from approximately 10m AHD to 11m AHD near the north western boundary and slopes down to a level of approximately 8m AHD near the south-eastern boundary of the subject site.

A geotechnical investigation was completed by Galt Geotechnics in October 2019 (Appendix 5). The soil profile identified by Galt is consistent with the Geological Survey Maps of Perth, which indicate the soil conditions of the site to be:

> *S7, LS1 – Limestone, Sand: Pale, yellowish brown, medium to coarse-grained sub-angular quartz, trace of feldspar, moderately sorted, of residual origin, shell debris, variably lithified, surface kankar, of eolian origin.*

Figure 5: Image of the subject site as viewed from Kirk Close.

2.3 GROUNDWATER AND SURFACE WATER

Galt Geotechnics have advised in Section 5.3 of their Geotechnical Report (Appendix 5) the following regarding the groundwater conditions of the site:

> *The Perth Groundwater Atlas (1997) shows the maximum historical groundwater level to be around RL 2m AHD. This is within about 5m to 9m of the current ground surface. Groundwater is not expected to impact on the proposed development.*

2.4 BUSHFIRE HAZARD

In recognition of majority of the site being designated as a bushfire prone on the WA Map of Bush Fire Prone Areas, a Bushfire Management Plan (BMP) has been prepared by Green Start Consulting to accompany the Structure Plan (Appendix 4).

The purpose of the BMP is to minimise the occurrence and impact of bushfires and their devastating effects to life, property and the environment, and to document fire prevention requirements at the Site. By providing acceptable solutions, the BAL level can be managed to an acceptable level.

The objectives of the BMP are to:

- Define areas where values are located;
- Define and rank hazard areas;
- Identify individuals and organizations responsible for fire management and associated works within the area of the plan;
- Develop fire management strategies for all land with regard to life, property and the environment;
- Nominate an assessment procedure that evaluates the effectiveness and impact of proposed and existing fire prevention work and strategies; and
- Identify performance criteria and acceptable solutions for all fire management works, including acceptable solutions for fire breaks, low fuel areas and building construction standards.

This BMP will achieve the objectives by:

- Assessing the bushfire attack level;
- Determining bushfire management requirements; and
- Determining ongoing management responsibilities.

The site itself is almost entirely cleared as shown in the images below. Based upon the Bushfire Assessment Results in Green Start Consulting's report (Appendix 4), the greatest BAL level is BAL-29 which is located in 'Plot 6 and 7'.

Despite this classification, it is considered that No. 5 Fawcett Road is sparsely vegetated and is itself expected to be developed in the near future, following the development of the subject site at No. 7 Fawcett Road — this risk is manageable, and otherwise unavoidable.

To address these matters a requirement for the preparation of a Local Development Plan for affected properties has been included in the structure plan.

2.5 HERITAGE

As illustrated in the wider context plans which have been prepared for this structure plan, the site is not located over or in the immediate vicinity of an Indigenous Australian or Australian site of heritage significance. A desktop search of the Department of Aboriginal Affairs' Aboriginal Heritage Inquiry System has indicated that the subject site has no known European heritage or Indigenous Australian heritage significance.

2.6 SEWERAGE EASEMENT

The site is located over easement I330227, which was prepared in 2002 for the benefit of the Water Corporation in relation to the Bibra Lake Main Sewer (Section 8), also installed that year. The original easement instrument was prepared between the Water Corporation, and the landowners.

A copy of this easement is provided as Appendix 2: Registered Easement I330227 within Part 3 of this structure plan as well as the associated DP29493. This easement provides the ability for the Water Corporation, or anyone duly authorised by the Water Corporation to access the easement land and to maintain, repair or improve the sewer.

The sewer has a dimeter of 2.25m and is made of reinforced concrete with keyed plasticised PVC sheeting. Section 8 of the Sewer Main runs from Wading Place to Fawcett Road (at a length of 291.2m, as shown image below). The Sewer Main falls down by 0.57m and is approximately 3m below natural ground level at the east lot boundary, and 5m below NGL at the west lot boundary and flows to a nearby wastewater pumping station of Cockburn Road.

The Water Corporation have expressed their in principle support to use a portion of the easement space for the purposes of public open space and have also confirmed their support for the construction of play equipment in the easement area. This is further discussed subsequently in section 3.2.

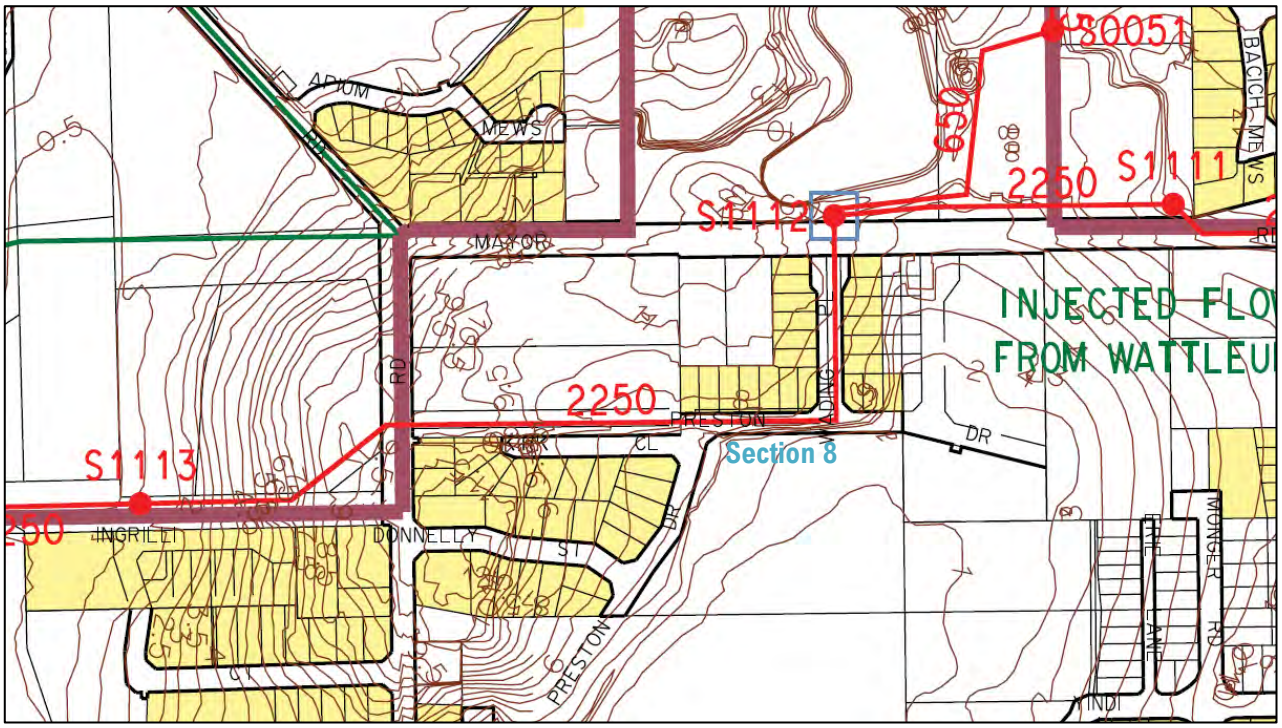


Figure 6: Extract of Spearwood SD66 Sewer District Plan as provided by Water Corporation.

Section Length	Sewer Ø	Down Stream Invert Lvl	Up Stream Invert Lvl
291.2m	2.25m	2.01m	2.52m

	Sewer Depth at West. Bnd'ry	Sewer Depth at East. Bnd'ry
Adjusted Invert Level	2.04m (17m from end)	2.34m (100m from end)
Nearest Depth Measure	10.15m AHD (spot height from site survey)	5.58m AHD(manhole on Preston Drive) 6.37m AHD (spot height from site survey)
Pipe Depth (Top)	~5.86m	~1.78m
Pipe Depth (Invert)	~8.11m	~4.03m

3. LAND USE & SUBDIVISION REQUIREMENTS

3.1 LAND USE

The City of Cockburn Town Planning Scheme No. 3 (TPS No. 3) states that the development and use of land within a "Development Zone" is to be guided by a comprehensive structure plan. The land uses proposed as part of this Structure Plan are as indicated on Plan 1 — Structure Plan Map, with a "Residential" land use zone proposed over the majority of the structure plan area.

3.2 CONCEPT PLAN

A Concept Plan has been prepared to support the Structure Plan and provide a greater degree of certainty on the future pattern of subdivision and development for the subject site and the adjoining northern site. It should be noted that this concept does not constitute a Structure Plan in any way or form, and is provided as an indication only for the land at Lot 1, 5 Fawcett Road. The concept plan provides an indicative layout of the proposed subdivision and development. The concept plan is subject to further detailed refinement at the subdivision stage.

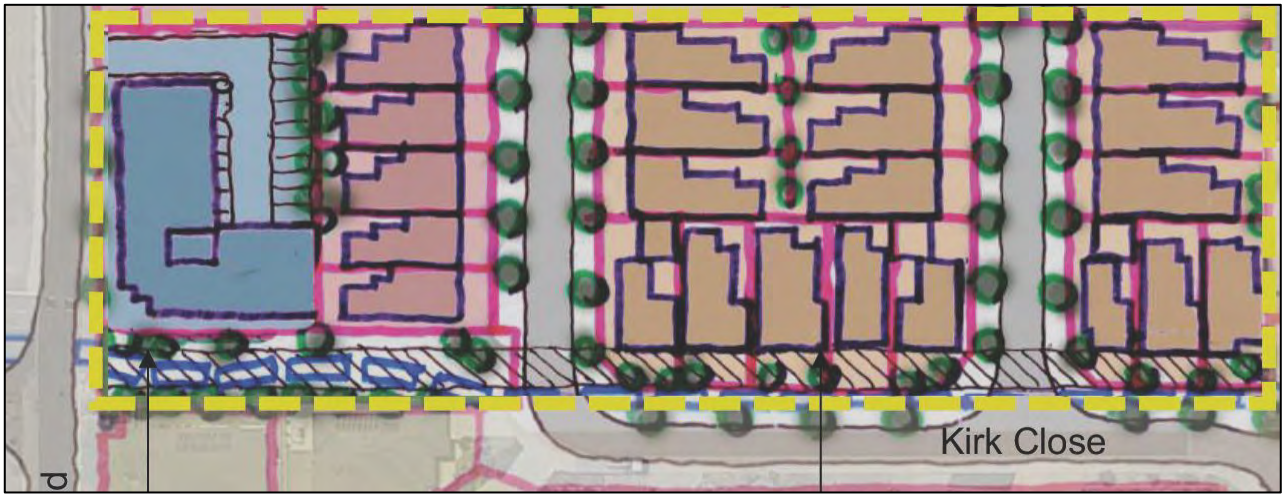
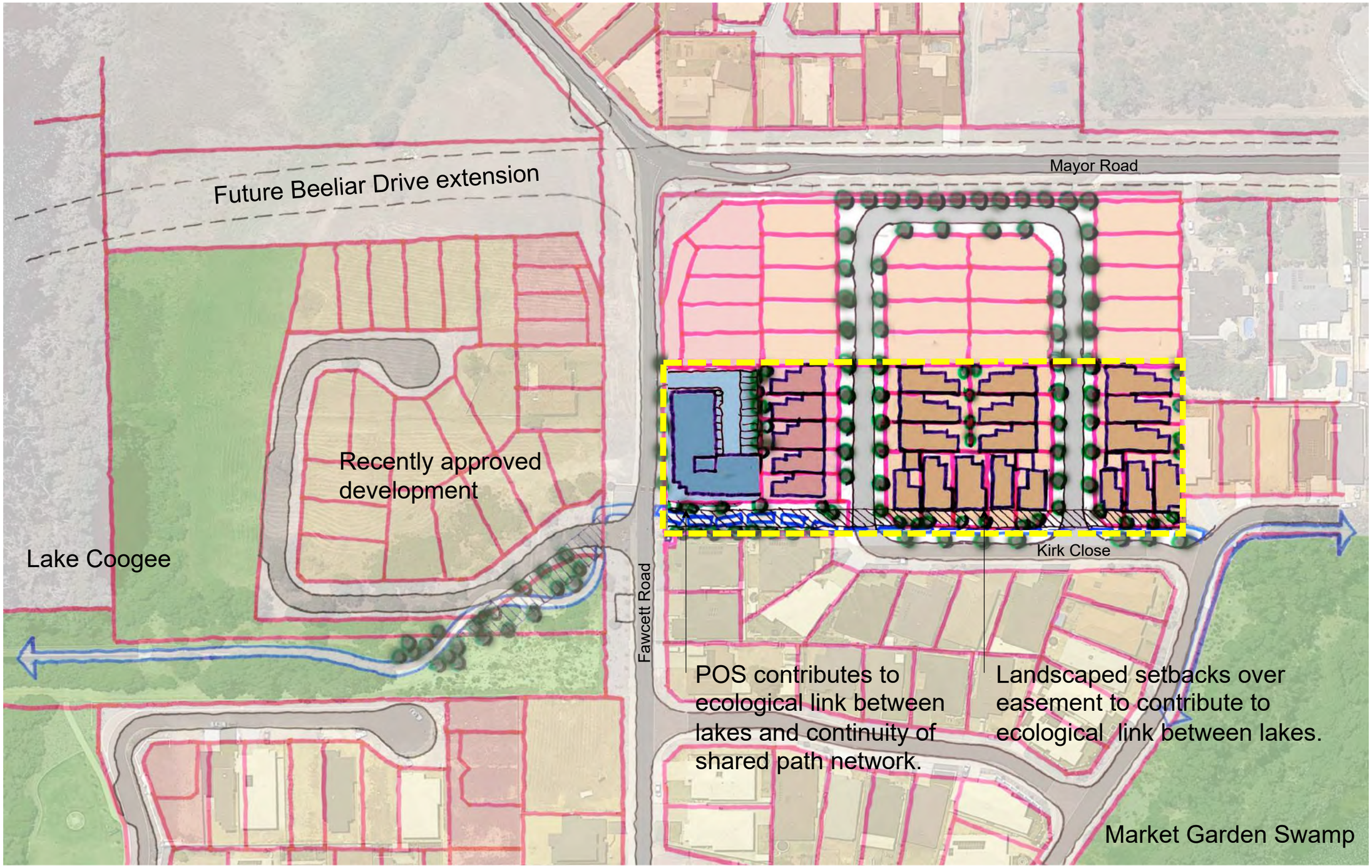


Figure 7: Indicative Subdivision Layout as prepared by Mackay Urban Design.



Indicative site and context plan

FIGURE 8 — INDICATIVE SITE & CONTEXT PLAN

LOT 2 FAWCETT ROAD LAKE COOGEE

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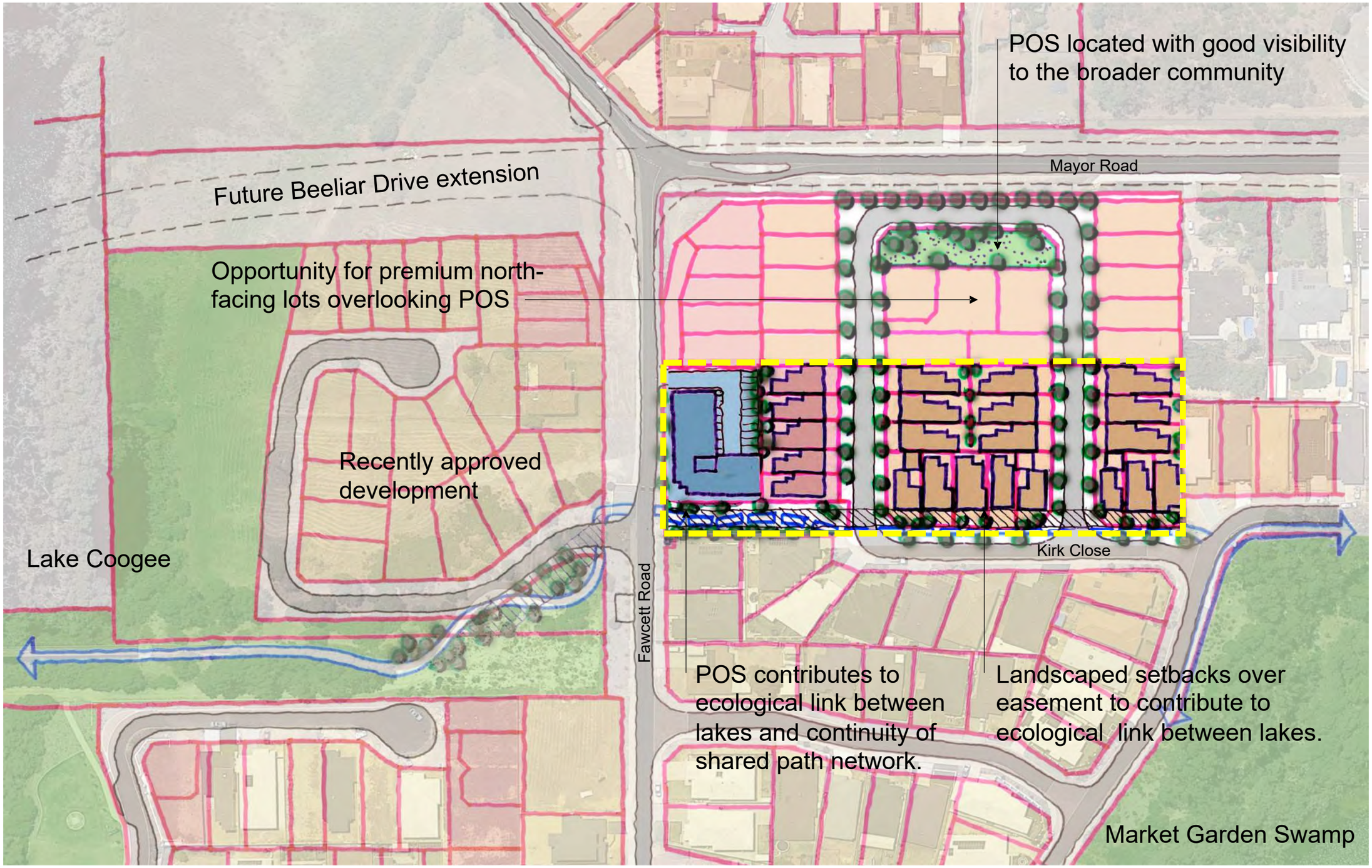

Indicative site and context plan

FIGURE 9 — ALTERNATE SCENARIO (POS PROVIDED @ 5 FAWCETT ROAD)

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3.3 PUBLIC OPEN SPACE

The provision of Public Open Space (POS) within new residential areas is a key factor in the consideration of structure plans, particularly in terms of the dimensions and functions of the POS areas provided. There are several City policies that are relevant in terms of assessing the location and layout of POS areas, however it is ultimately the Western Australian Planning Commission that determines the required POS provision, having regard to Liveable Neighbourhoods and Development Control Policy 2.3 – Public Open Space in Residential Areas (DCP 2.3).

Liveable Neighbourhoods sets out a requirement for a contribution of a least 10% of the gross subdividable area to be given up for POS. A total of 1,016sqm of the subject site is proposed as POS which will be complemented by green linkages in the road reserve (namely east-west along the northern side of Kirk Close).

3.3.1 Public Open Space Location and Function

This Structure Plan proposes a 1,032sqm (10.04%) public open space area in the south-western corner of the structure plan area. The dimensions of the POS are approximately 16m by 63.5m with direct frontage to both Fawcett Road and Kirk Close, providing a pedestrian / cyclist connection between these two streets.

The proposed POS fits into the surrounding open space network, which includes a small park proposed for the south-eastern corner of the adjacent site at No. 8 Fawcett Road and an existing shared path which currently terminates opposite the proposed POS on the other side of Fawcett Road. The provision of a linear park in this location will allow the continuance of the pedestrian and cycle path and a much-needed connection between these areas.

The proposed POS is to be cognisant and responsive to the City's POS needs assessment which has identified that there is a lack of POS which caters to young children below 8 years of age (and their parents) in the immediate locality. Detail on potential POS embellishments is provided in section 3.3.3 for POS Design below.

The proposed POS location is suitable and appropriate given the context of the site in relation to the two regional reserves on the west and east of the site. The proposed development will create a high-quality usable public open space area providing a critical pedestrian and cyclist connection between Bindjar Reserve (Kirk Close) to the east, the future POS of the Lots 811 & 812 (#8) Fawcett Road Lake Coogee Structure Plan, and Lake Coogee to the west. This linear POS is capable of include playground features, a shared path link and active interface design features which may include alfresco dining options as a spillover from the R30/60 site.

The proposed POS in relation to its location and function contributes to the landscape character and quality of the neighbourhood and will make walking through the Lake Coogee area more enjoyable and appealing to residents. The function of the proposed POS is as part of a hierarchy of POS, to be used as a linkage and intermediary space in a broader network of regional open space serving different functions and purposes, and improving the ease of access between these spaces.

Figure 9: POS links with adjacent sites.

As illustrated in Figure 10, the current Cockburn West Walk and Cycle Map is missing the “link” between the shared pedestrian and cyclists path between the path on the western side of Fawcett Avenue and the path along Kirk Close.

In terms of the subdivision layout and POS location of the adjoining northern lot, consideration has been made for the concept planning for this site. The location and function of the POS on the subject site allows diverse options for POS or a cash-in-lieu contribution for No. 5 Fawcett Road.

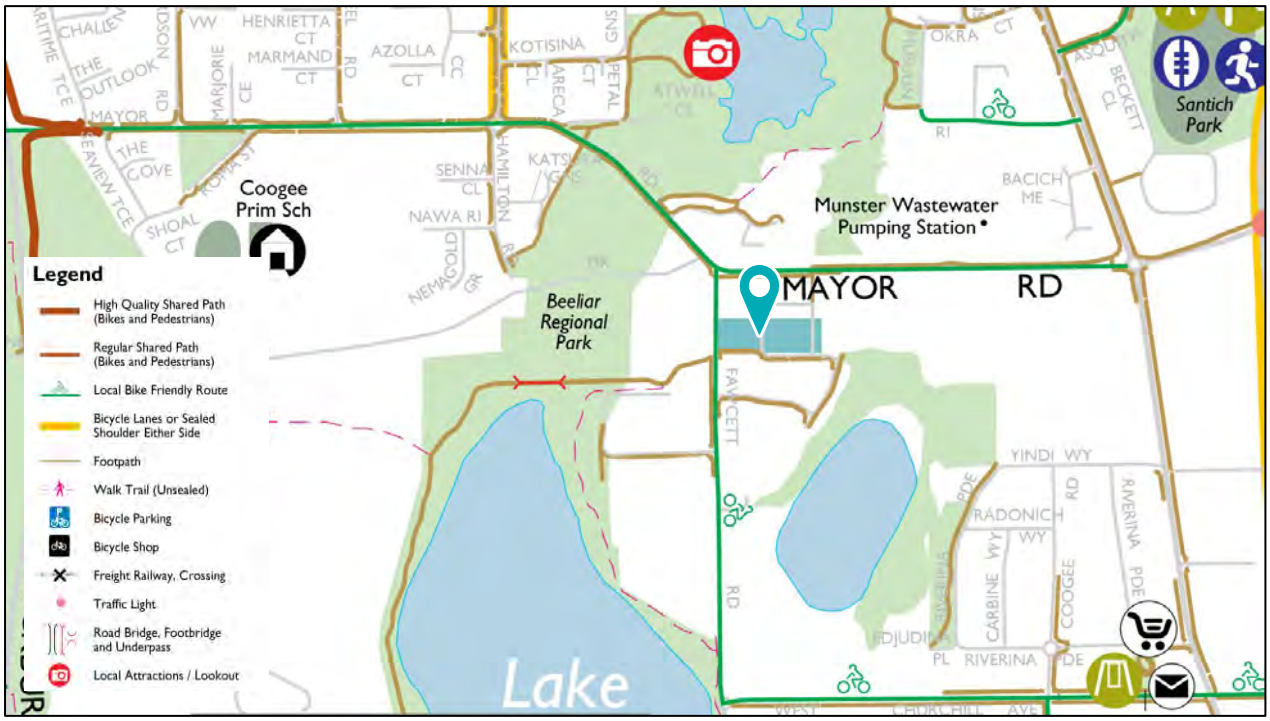


Figure 10: Bicycle Network Map, showing indicative future bicycle network for the subject site.

Liveable Neighbourhoods sets out a hierarchy of POS as part of a high-level strategic planning framework document, from district, to neighbourhood, and local (with various flavours of each). The City expressed concerns regarding the availability of active open space for recreation pursuits. The nearest large ovals (district parks) include Santich Park (650m away) and the oval at Coogee Primary School (800m)—both within the walking 600m to 1,000m "ped-shed" for district parks. Large grassed open areas are also proposed as part of the Lots 811 & 812 (#8) Fawcett Road Lake Coogee Structure Plan (opposite the subject site to the west of Fawcett Road) and further south of that area, which will serve a similar function as part of a hierarchy of public open space. All public open spaces do not necessarily need to serve every function or purpose of how a community interacts with POS—there is need for diversity in the type and style of POS within a community.

Liveable Neighbourhoods (2009) details the desired separation between different levels of POS. For a neighbourhood park, which is desired to be approximately 3,000sqm to 5,000sqm in size, a "ped-shed" of approximately 400m is considered to be optimal (refer to figure 13 below). The proposed POS contribution for the subdivision of Lots 811 & 812 (#8) Fawcett Road, and surrounds, provide contiguous open usable areas exceeding 3,000sqm, and overall areas well over 5,000sqm in size (not taking into account the areas restricted by wetland purposes) (refer to figure 13 insert). These parks are directly opposite the Structure Plan area over Fawcett Road, with the bulk of the POS being less than 150m walking distance away. These parks also link through to the wider open space network forming part of a network of nature based open space interconnected with paths and trails for pedestrians and cyclists alike. It is considered that the POS associated with these areas directly west of the site constitute a "neighbourhood park" and satisfy the 400m "ped-shed" consideration of Liveable Neighbourhoods in providing ample POS which achieves the criteria and intentions of Liveable Neighbourhoods.

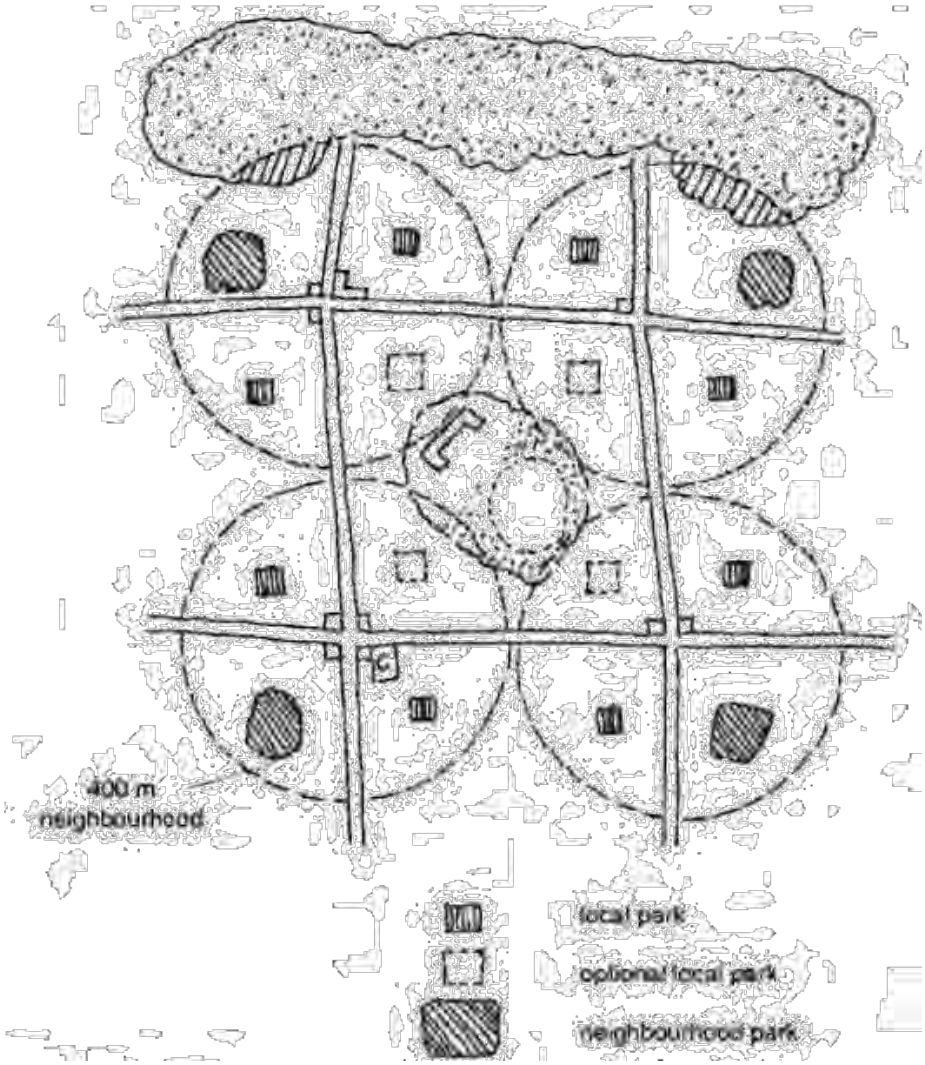
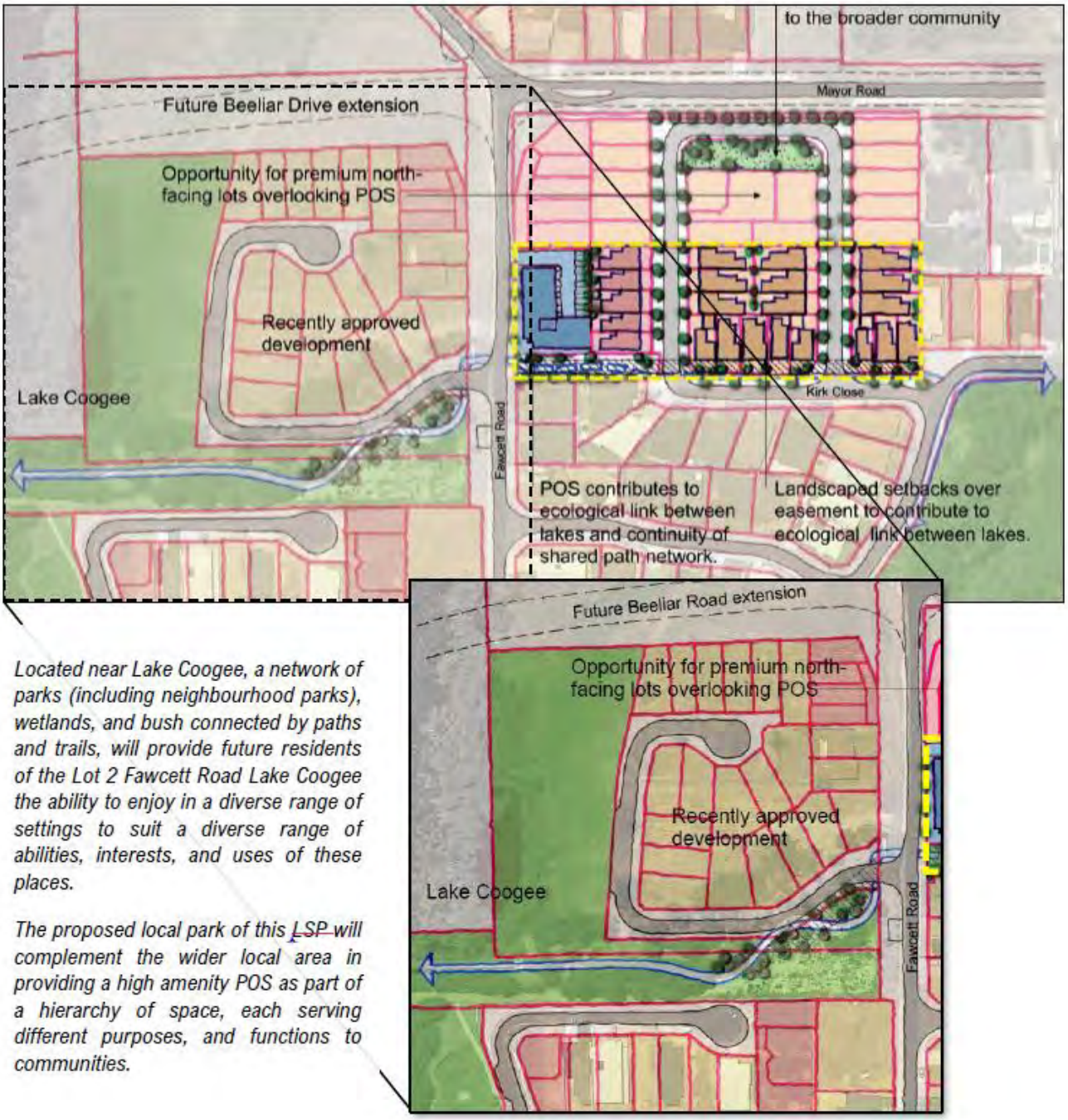


Figure 11: Figure 52 of Liveable Neighbourhoods illustrating a public open space model.

It is noted that the original Munster Phase 3 Structure Plan put forward by the City did not extend to the subject land to coordinate development and the location of POS over the subject land at that time, and that at this stage it is not practicable for this Structure Plan to include the adjoining Lot 1, 5 Fawcett Road to the north, given the incumbency which would be placed on that land and its owner as a result of this proponent led Structure Plan. The POS concept provided below is in no form binding or guiding to the built form outcome of the property to the north, and has been provided to show a potential indicative built form, which is to be determined through a separate Structure Plan and associated Local Development Plans.



Located near Lake Coogee, a network of parks (including neighbourhood parks), wetlands, and bush connected by paths and trails, will provide future residents of the Lot 2 Fawcett Road Lake Coogee the ability to enjoy in a diverse range of settings to suit a diverse range of abilities, interests, and uses of these places.

The proposed local park of this LSP will complement the wider local area in providing a high amenity POS as part of a hierarchy of space, each serving different purposes, and functions to communities.

Figure 12: Option 1 – POS Contribution.

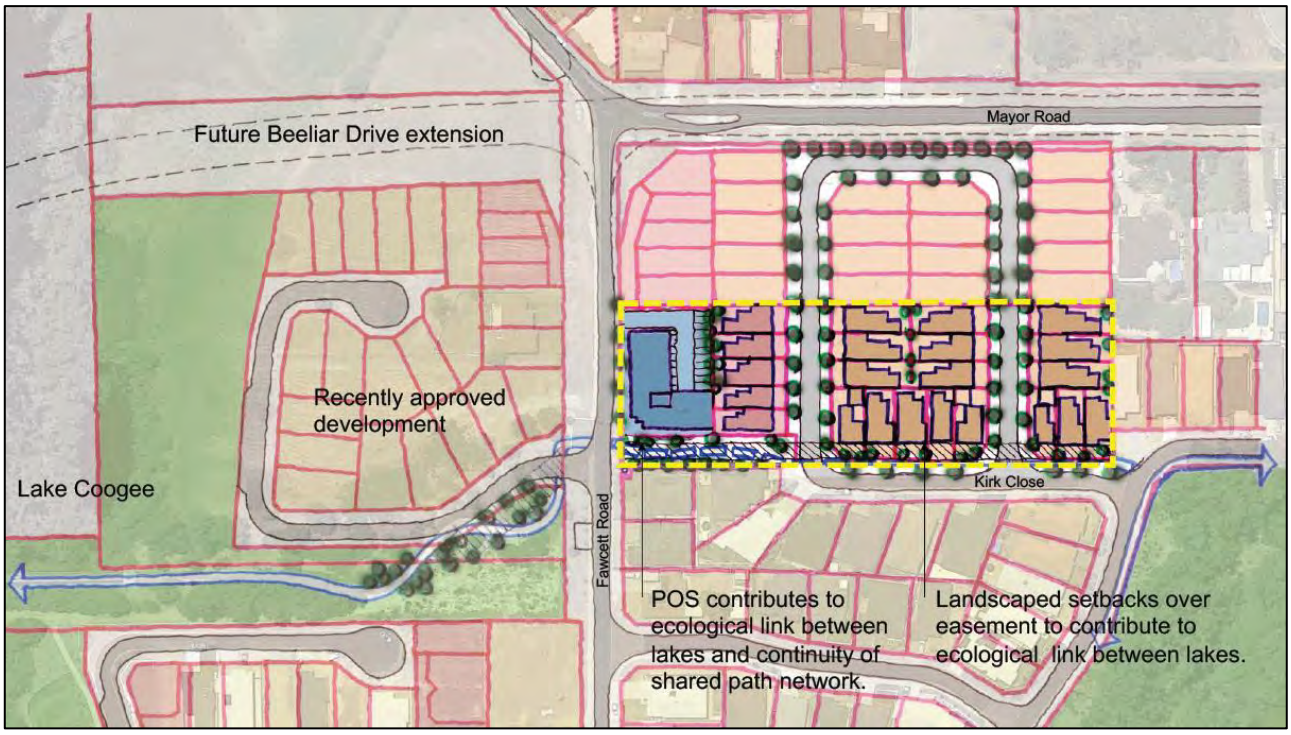


Figure 13: Indicative alternative cash-in-lieu contribution

3.3.2 Ecological Links

The natural topography of the area has resulted in two wetland systems in close proximity; Lake Coogee to the west of the site and a smaller lake, Market Garden Swamp, to the south-east of the site.

Best practice planning and urban design necessitates a careful balancing of both the urban ecological system and the natural ecological system, which in some cases means prioritising the creation of green links, but often means using attributes of the urban structure such as street reserves parks and lower density lots to achieve de-facto ecological linkages. This green linkage will improve the amenity and character of the area as well as urban heat island outcomes, and place attachment, while also serving the function of providing a seamless connection between the natural wetland spaces east and west of the site.

The subject site is ideally placed to provide such an green linkage by virtue of the sewer easement that traverses the site. Use of the easement as a de-facto ecological linkage enables a landscape connection directly from Market Garden Swamp to the public open space finger created as part of the LDP (19/30) for the land immediately to the west of Fawcett Road and, hence to the Lake Coogee reserve.

This linkage was anticipated in the original structure plan for the area back in 2006 / 2010, which identifies an “open space link” and a strategic “pedestrian / cycle link” to facilitate recreational movement traversing the site along the alignment of the sewer easement between Fawcett Road and Preston Drive, which fringes Market Garden Swamp.

Figure 14: Site location and adjacent environmental assets

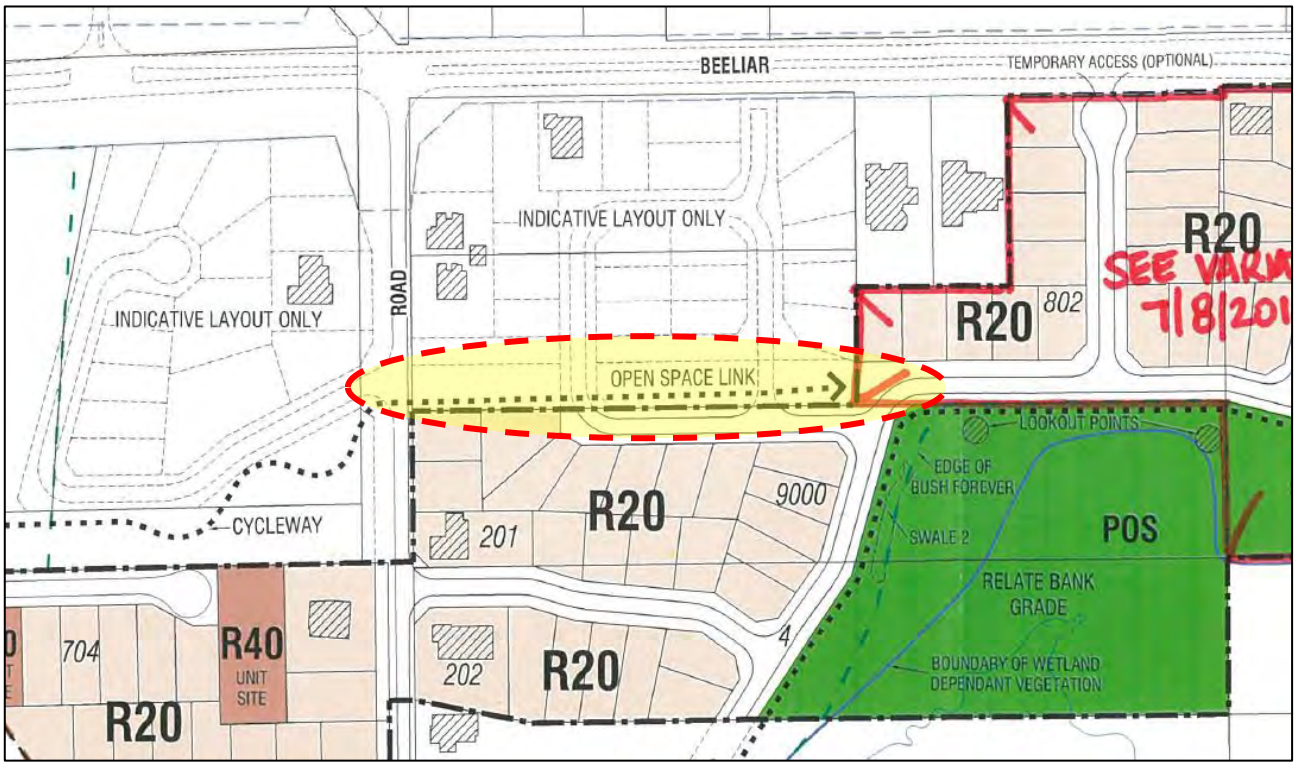
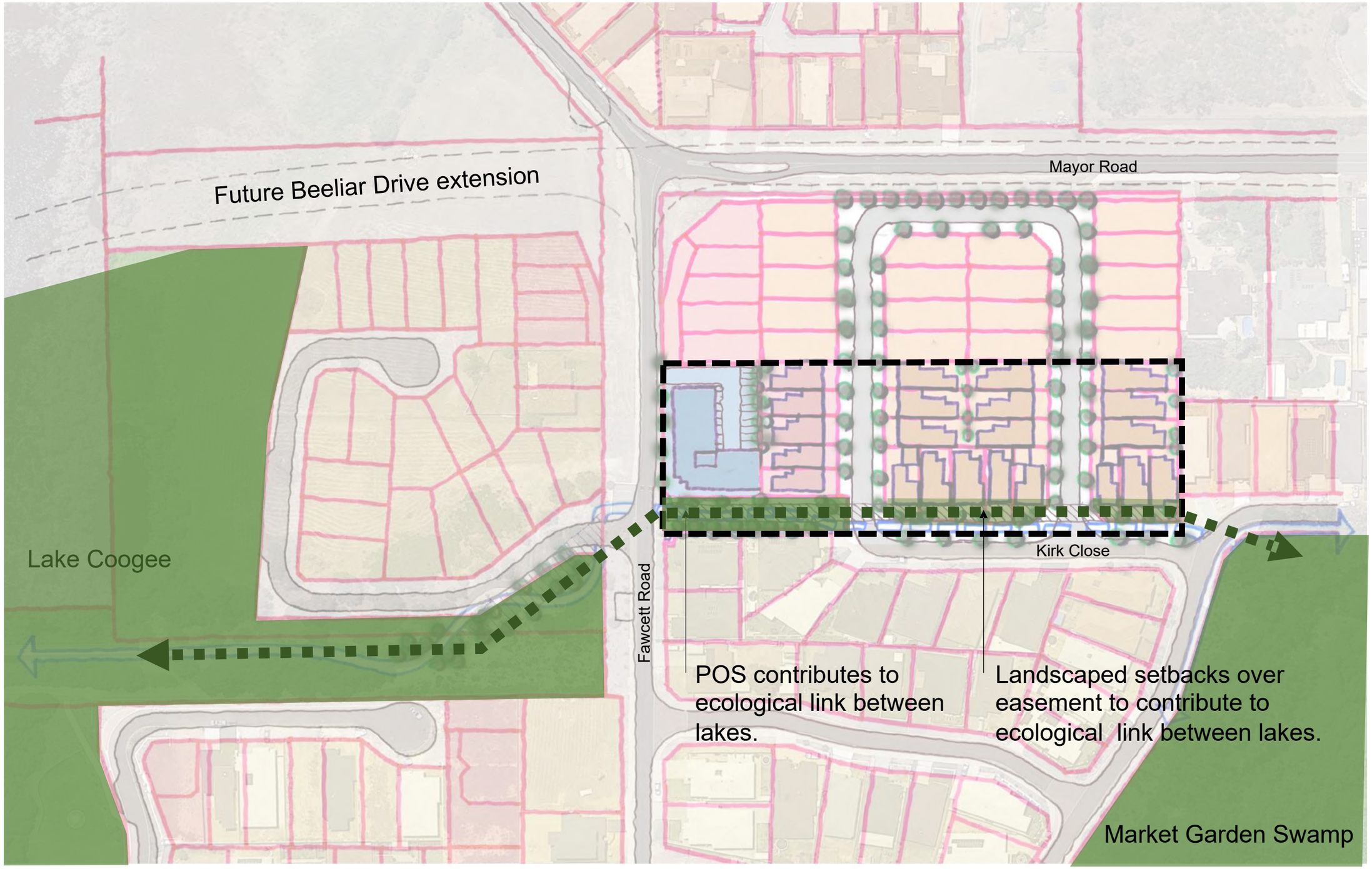


Figure 15: Amended Local Structure Plan Munster — Phase 3 showing open space link and cycleway.



Supporting Ecological Linkages

FIGURE 17 — SUPPORTING ECOLOGICAL LINKAGES

LOT 2 FAWCETT ROAD LAKE COOGEE

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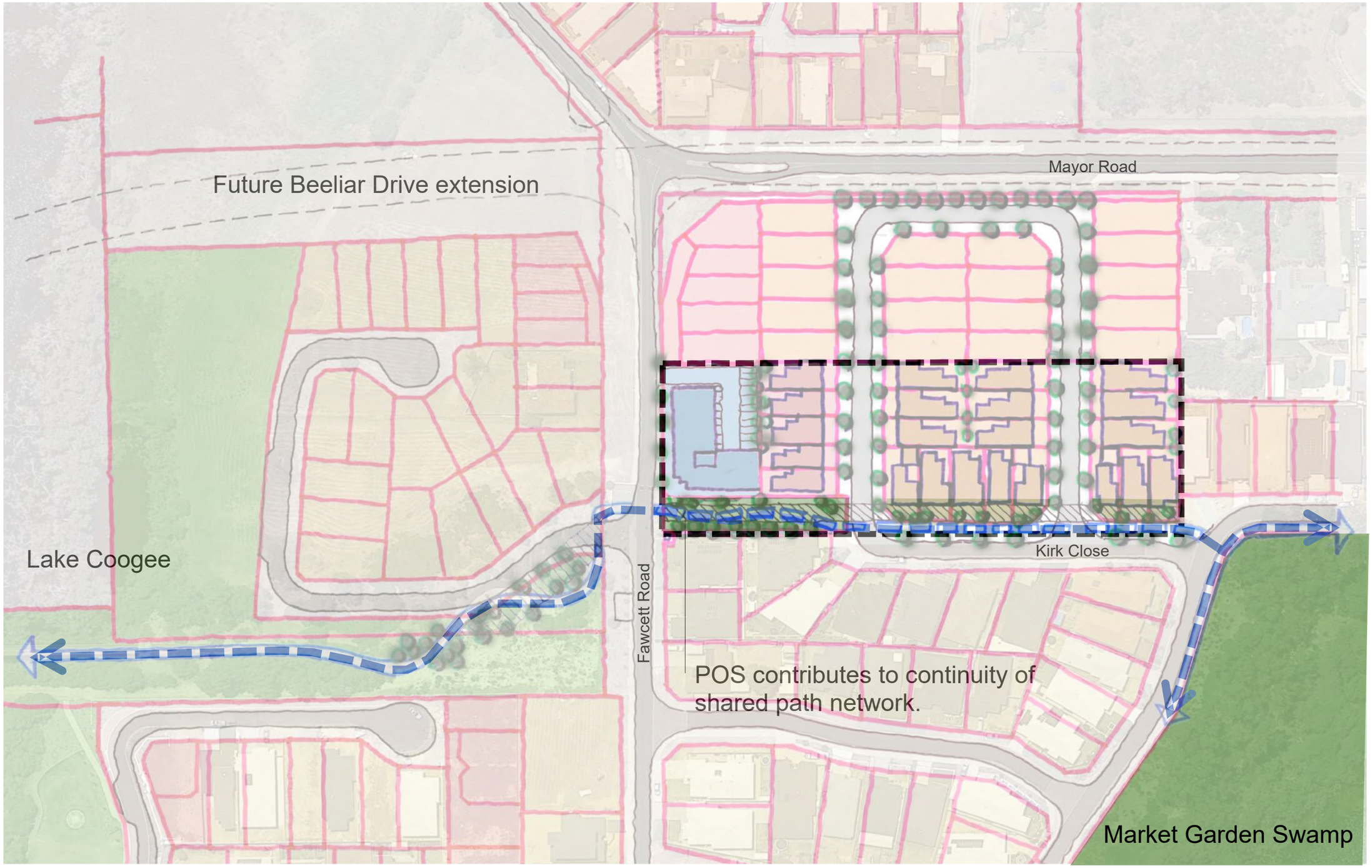

Supporting Recreational Linkages

FIGURE 18 — SUPPORTING RECREATIONAL LINKAGES

LOT 2 FAWCETT ROAD LAKE COOGEE

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3.3.3 Public Open Space Design

Mackay Urban Designs prepared a detailed concept plan illustrating a potential urban park layout for the proposed public open space. The theme behind the linear park will focus on:

- Community gathering;
- Wellness and mindfulness; and
- Whole of family fitness.

The POS will act has a gathering area for local residents given its proximity to the two adjacent regional spaces and the mixed-use lot to the north. It is envisaged that the POS will be formed around a pathway that connects Fawcett Road and Kirk Close and includes the planting of several trees and hedging that, all of which would be native waterwise species, and not impact on the sewer land.

In order to cater to younger children and their parents, the POS is to include embellishments (appropriate to the scale and context of the park) which address and cater to these younger children. This can be achieved through safe active play design and is not necessarily limited in scope to playground equipment. As illustrated in the detailed concepts, the proposed urban pocket park will provide a children's' play area and informal seating that provides an open connection with the neighbouring mixed-use lot to the north. As such, the urban pocket park becomes a local recreational destination along the route between the two lakes.

Additionally, a Local Development Plans will be required for lots with direct boundary frontage to the POS, so as to manage this interface and establish the requirement for future development to address and achieve passive surveillance of the POS. The interface between the public park and the Mixed-Use zone may include alfresco dining options for example which would provide activation of the public open space.

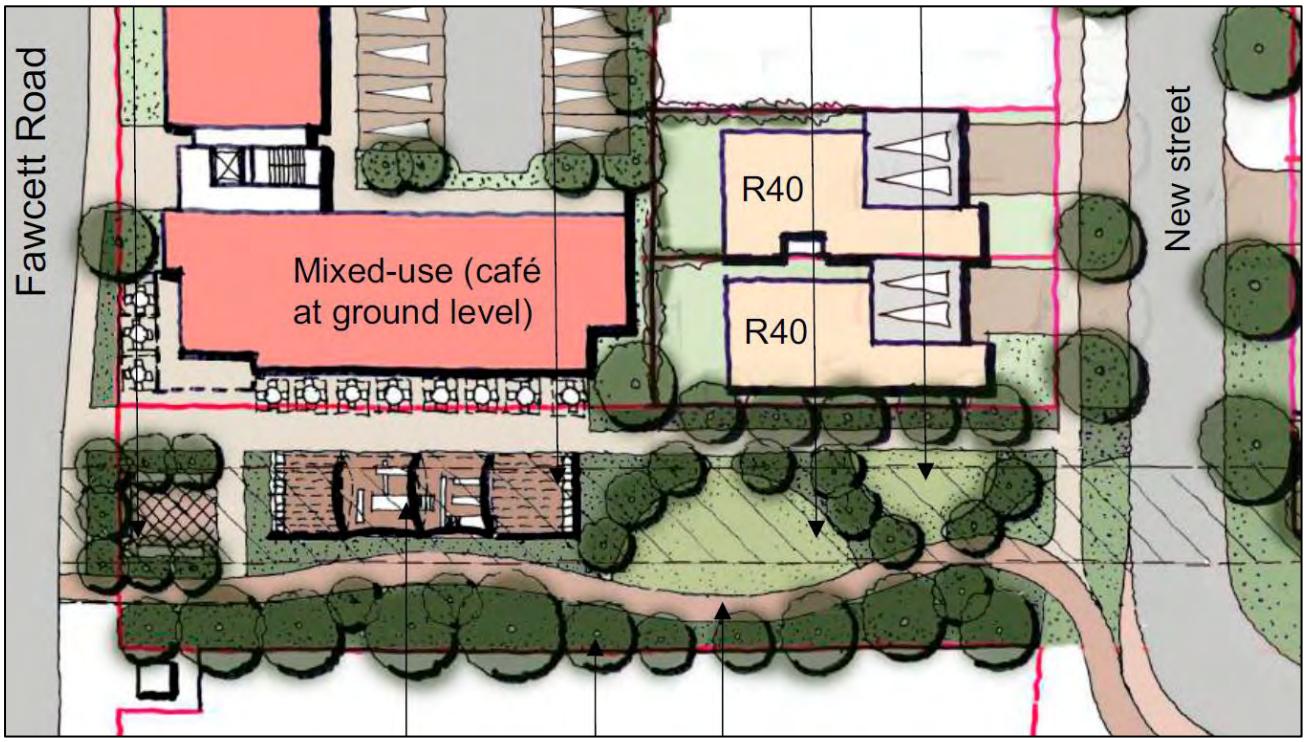

Figure 18: Indicative Public Open Space Layout as prepared by Mackay Urban Design.

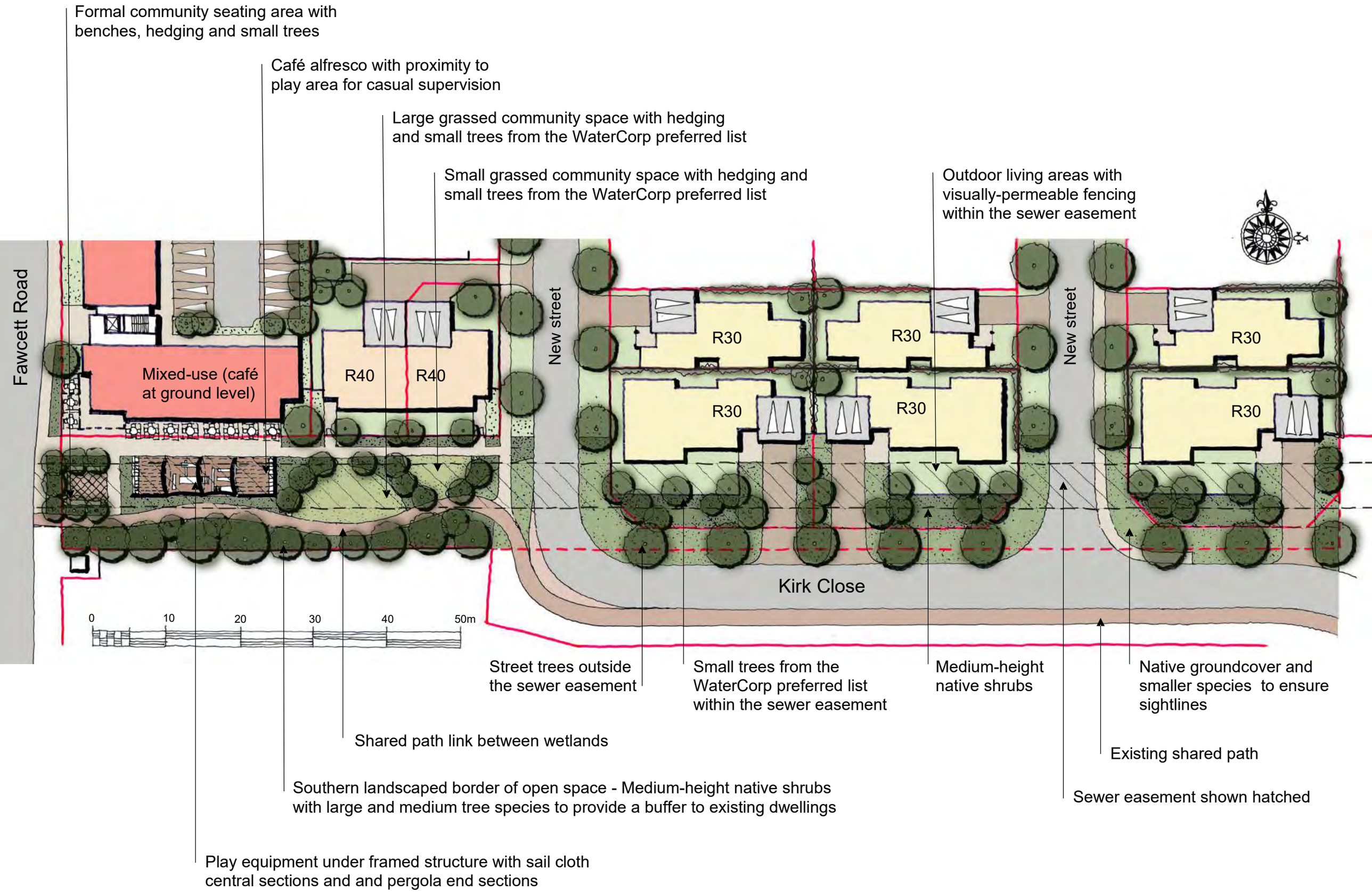

FIGURE 20 — PROPOSED RECREATIONAL & ECOLOGICAL LINK (ALTERNATE LOT LAYOUT)
LOT 2 FAWCETT ROAD LAKE COOGEE

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FIGURE 21 — PROPOSED RECREATIONAL & ECOLOGICAL LINK
LOT 2 FAWCETT ROAD LAKE COOGEE

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3.3.4 POS on Sewer Easement

The proposed POS is located partly over a sewerage easement as detailed in the attached appendices, and on the Structure Plan Map.

The 2009 Liveable Neighbourhoods (Update 02) is the endorsed version of Liveable Neighbourhoods. *Liveable Neighbourhoods* (2009) does not detail "easement land" or anything similar as a type of "restricted POS" under R5 of element 4 of the policy. Examples given in Liveable Neighbourhoods include bushland, wetland, or other POS of environmental value which is not accessible to the public for practical environmental protection reasons, as well as land allocated to a specific public purpose (such as a school or club's POS) which has access or availability restrictions limiting the ability of the general public to use the land.

Simply put, Liveable Neighbourhood defines restricted POS as a specific site constraint which would limit the ability of that land to be accessible to and used by the general public for "public open space" purposes. There are no such restrictions on the proposed linear park, which can still be used and developed to the full capacity and standard expected of such a park, and therefore the proposed POS is not considered to be restricted POS as a result.

The draft 2015 version of Liveable Neighbourhoods does include additional restrictions for the types of POS classed as "restricted POS", however also includes additional deductions for the purposes of calculation, such as road reserves. The draft version is not endorsed by the WAPC in the more than five years since it was first made publicly available, and not used or applied for that reason.

The applicant has sought comment from the Water Corporation in relation to structures over the sewer easement. The Water Corporation were provided with the proposed Structure Plan Map and concept POS design and were questioned if they *'…would have any objections to the POS located in this position'*; and '…*to provide some feedback on whether these types of structures could be installed over the easement'*. In response, the Water Corporation expressed their written support and stated the following in correspondence:

> *As long as there will be no permanent mass structures that cannot easily be removed here, Building Services have no objections to the proposed location of the POS (Ms. Connop, Supervising Building Services Officer).*

and

> *Seating, paving and garden walls are considered as exempt structures and are acceptable over the sewer easement, they can be dismantled and removed in the event access maintenance and repair to the sewer main is required (Mr. Elias, Building Services Officer).*

Section 8 (namely 8.3 and 8.4) of the *Water Corporation Technical Guidelines for safely working near Water Corporation assets* support the written advice of the Water Corporation Building Services team, and outline the ability for fences and other removable lightweight structures to be constructed within an easement or zone of influence area. Based on the fact that Liveable Neighbourhoods does not specify easement areas as restricted POS and that the Water Corporation have advised that a reasonable degree of structures can be provided over the sewer easement area, it is considered that the sewer easement does not restrict the development and access of the POS.

With regard to plants (including trees) the Water Corporation has prepared and provided a comprehensive list available on their website (watercorporation.com.au/Help-and-advice/Designing-a-waterwise-garden/Selecting-

the-right-tree/Selecting-the-right-tree) which details the separation between sewer infrastructure Water Corporation apply when considering approval for the planting of trees with a mature height of 5m or more. Numerous species of tree, and well as most plants are capable of being easily accommodated within the 16m wide POS.

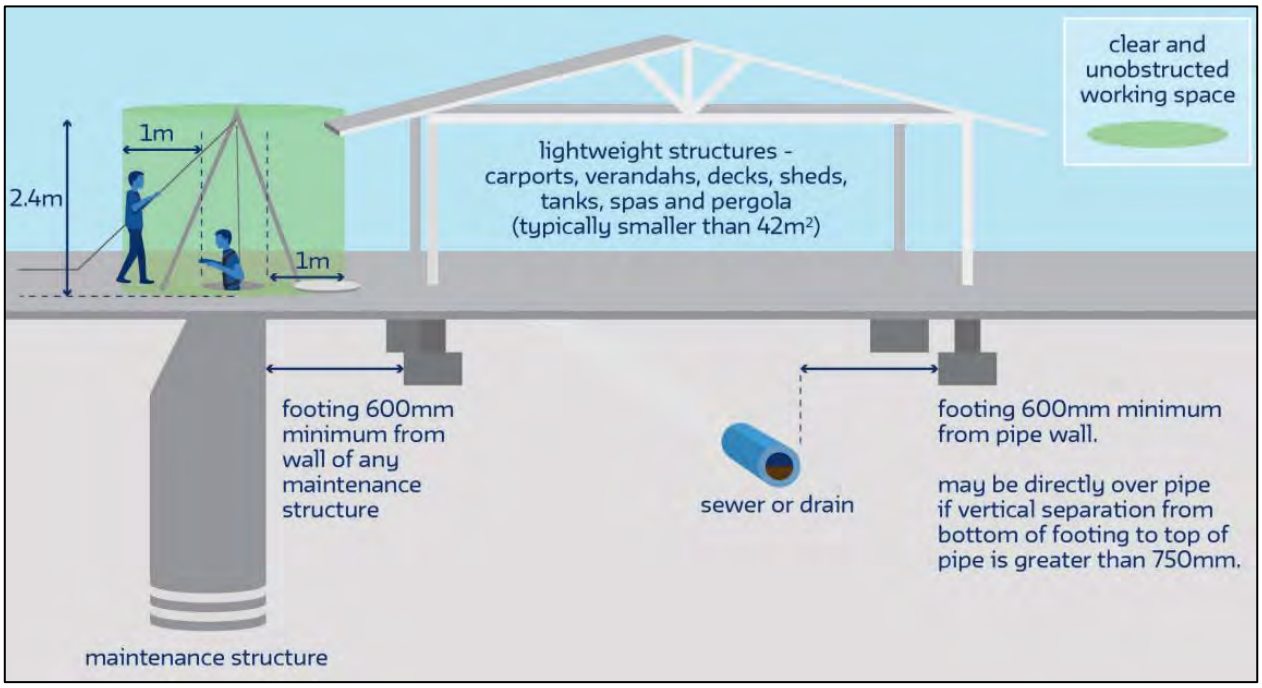

Figure 21: Illustration showing example of lightweight structures permissible over sewer as taken from the Water Corporation Technical Guidelines for safely working near Water Corporation assets.

Figure 22: Examples of Linear Parks within an Urban/Suburban setting.
Source: segd.org/30-urban-linear-parks-projects-2000

3.4 RESIDENTIAL DENSITY

The proposed residential density is to be given “due regard”, as discussed in Part 1 of this report.

The substantive reason for the increase in density and diversity of housing options consistent with State and City targets and objectives, including Perth and Peel@3.5million. In this regard, the Structure Plan proposes a “medium” density coding comprising of R30, R40, and split-coded R30/60 land.

3.4.1 R30 Residential Density

The R30 density provides a continuation of the coding from the lots to the east of the Structure Plan area and are considered to be appropriate given the surrounding context.

Figure 23: Typical housing types for R30 density

3.4.2 R40 Residential Density

The R40 density coding provides a transition to Fawcett Road where somewhat higher density and housing diversity can be accommodated. The R40 coded lots will accompany and interface with the proposed POS and provide for an improved development outcome.

Figure 24: Typical housing types for R40 density

3.4.3 R30/60 Residential Density

With consideration of the Local Development Plan and the split coding R60 standards of this Structure Plan, the proposed split coded R30/60 area will provide an active, open and friendly interface with the POS, while allowing for passive surveillance opportunity in a high amenity setting. The proposed R60 density is only able to be contemplated under this Structure Plan where multiple dwellings with a commercial component is proposed.

Figure 25: Typical development types for R60 mixed use development

The R60 density (split coded land) will assist in generating much needed housing diversity and density in the locality. As part of a mixed-use development, the R60 design will also help create a sense of community, improve the interface, interaction, and activity of the street, and form a local community gathering spot reminiscent of corner shops, noticeably absent in the monotonous curvilinear residential developments of the 1980s to 2000s.

Notwithstanding a proposed mixed-use development recognises its space as part of a hierarchy of places, and does not overdevelop or overstep the mark in providing a development scale and typology highly appropriate and needed in this location, as it evolves into the future.

The split coding of the site fronting Fawcett Road allows for flexibility depending on market conditions. An option to develop the site with single houses or grouped dwellings can be applied at an R30 density and the figures below show subdivision concepts/layouts for this site.

Concept 1 illustrates the creation of a laneway (if green title) or common property area (if survey strata) in front of 5 lots which front Fawcett Road. The creation of the slip road or common property will allow for one vehicular access point to all lots from Fawcett Road.

Concept 2 illustrates a central common driveway, which provides access to 6 survey strata lots. This design will also allow for one vehicular access point to all lots.

Figure 26: Subdivision Concept 1 for R30/60 lot

Figure 27: Subdivision Concept 2 for R30/60 lot

Based on dwelling estimates, the anticipated future density may comprise of approximately 20 new dwellings in the areas coded R30 and R40 on the Structure Plan Map, and up to about 5 dwellings (at R30) or 10–14 apartments (at R60) in the split-coded R30/60 area. Based on the above and the average household size of 2.55 people (Census, 2016), the estimated population for the Structure Plan area is roughly 76 people over 30 dwellings.

The split-coded residential density allows for flexibility in the design to reflect market demand and future changes in the built form, while respecting the feedback from the City. Further discussion is provided in section 3.5 below.

3.5 ACTIVITY CENTRES & EMPLOYMENT

Bibra Lake industrial area is the nearest large employment centre, with several smaller local centres scattered throughout the surrounding suburbs as illustrated in the activity centres map in figure 31.

The site is not located within walking distance of any existing or proposed Activity Centre or Local Centre. The nearest commercial / retail opportunities (of any scale) are all more than 800m from the Structure Plan area. The split coded R30/60 area provides opportunity for small scale commercial enterprises such as a café, convenience store, consulting rooms, lunch bar or restaurant which will provide the opportunity to link the fragmented housing pockets, as a community focal point (as part of a hierarchy of space) and dramatically improve the walkability and pedestrian friendliness of the area.

In the event a mixed-use development is developed on the R30/60 lot, the Structure Plan report estimates a net lettable commercial floor space of 400sqm. This is based on a basic principle which suggests that for a development with 'at-grade' parking, two thirds of the site area is required for parking. This then leave approximately 500sqm for built form, with approximately 100sqm of this area to be communal facilities such as toilets and waste areas.

The local pedestrian access network focuses and orients itself toward this site, including from the proposed park within the Structure Plan area, and the park opposite in the recently approved structure plan of the Lots 811 & 812 (#8) Fawcett Road Lake Coogee Structure Plan. The higher density housing and potential mixed-use development are considered to complement the amenity of the parks and help in creating a feeling of a highly walkable, safe neighbourhood.

The public open space, and pedestrian access network, as well as the proposed split coded area contribute to a clear hierarchy of development, to link through to the future Beeliar Drive extension and public transport options.

Figure 28: Potential development option for R30 / 60 area.

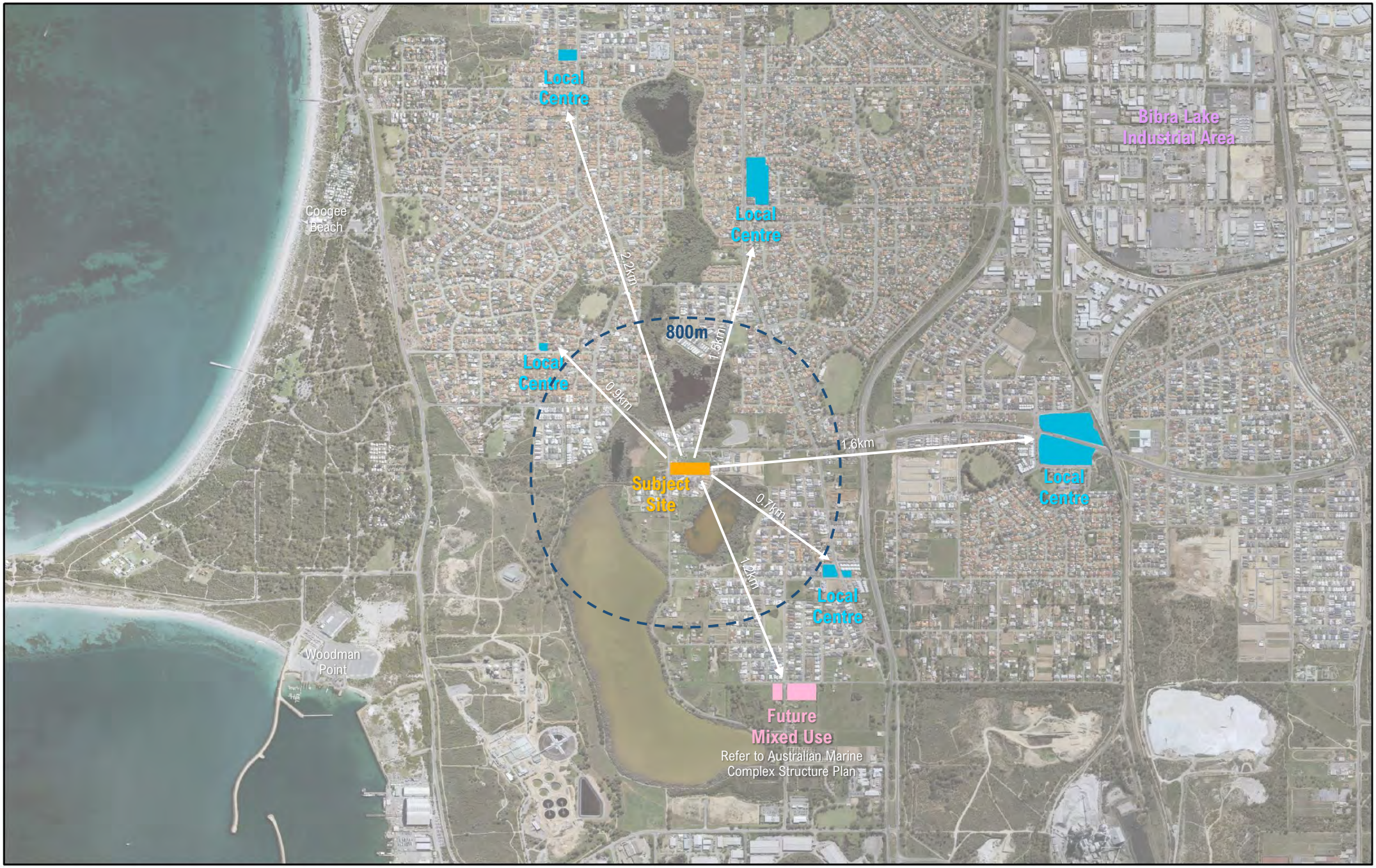

FIGURE 31 — ACTIVITY CENTRE MAP

0 100 200 400 600 800 1,000 m

SCALE 1:25,000 @ A4

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3.6 MOVEMENT NETWORKS

Access to the subject site will be taken from Kirk Close, and Fawcett Road. The proposed 6.0m wide internal roads will be residential access roads with estimated volumes of traffic of less than 1,000 vehicles per day. These roads will be "Access Street D" roads in accordance with the road hierarchy of Liveable Neighbourhoods.

The roads are proposed to be terminal (no through roads), with a pedestrian link across the proposed public open space between Fawcett Road and Kirk Close, and a future pedestrian link to Mayor Road. All proposed internal roads will contain 2.5m wide footpaths. The proposed vehicular and pedestrian access network is considered to be clear, legible, and highly functional.

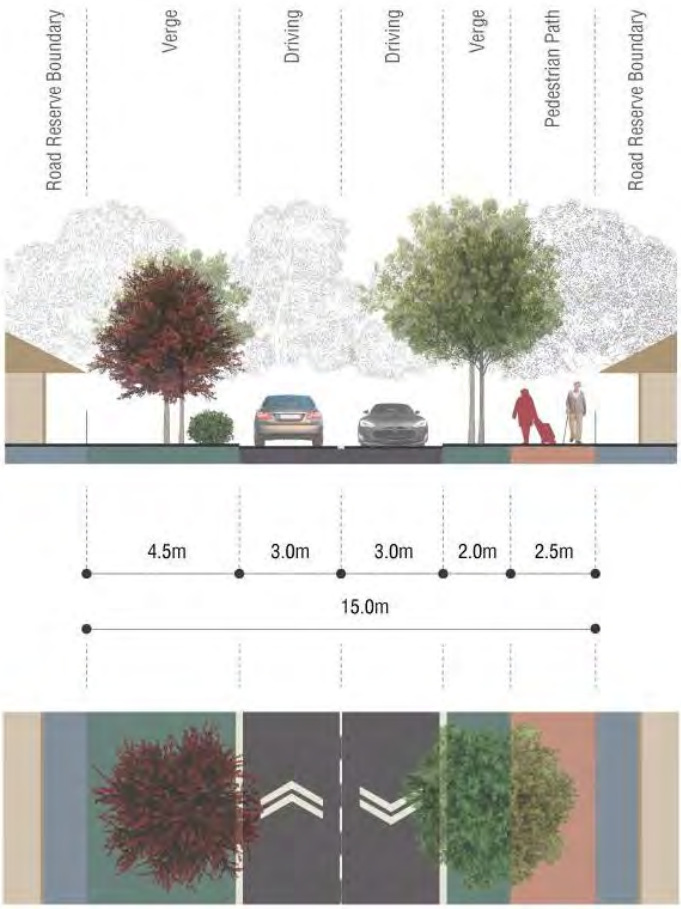


Figure 30: Proposed internal road cross section

A detailed Transport Impact Statement (TIS) has been prepared for the structure plan area by KCTT in support of the Structure Plan proposal and has been included as Appendix C to this report. The TIS provides detailed commentary and analysis on the potential traffic and transport impacts associated with the proposed subdivision and subsequent development of the subject site for residential purposes. The TIS addresses the following matters:

- Existing traffic flow information;
- Local crash information;
- Parking, bicycle, ACROD, and pedestrian usage, generation, and demand forecasts;
- Forecasted trip models and traffic flows;
- Existing traffic flows and vehicular volumes on roads that front the subject site, including Mayor Road, Rockingham Road and Coogee Road;
- Collation of existing crash data on roads that front the subject site, including Mayor Road and Rockingham Road and review of accidents at the intersection of Rockingham Road and Mayor Road;
- Confirmation of trip attraction rates and requirements for cars, bicycles and pedestrians;
- Provision of a Transport Impact Statement in accordance with WAPC Guidelines; and
- Trip Models for 2016 and 2026.

Based on the findings of KCTT, the estimated traffic volume is 269 vehilce movements per day for the residential component of the Structure Plan, and up to 454 vehicles per day if a retail with food component (with 500sqm GFA) was proposed for the proposed Mixed Use site. It is noted that the Mixed Use zoned site fronts and will gain access from Fawcett Road and the existing road network is capable of accommodating the land use densities proposed in the Structure Plan.

3.7 EDUCATION FACILITIES

Coogee Primary School is located approximately 700m to the east of the subject site, St Jerome's Primary School approximately 800 metres to the north and South Coogee Primary School approximately 1.6 kilometres to the west. Lakeland Senior High School is located approximately 5km north-east of the subject site and Fremantle College is located approximately 7km north of the subject site.

The subject site is well serviced by existing education facilities, with South Coogee Primary School located approximately one 1.6km to the east, St Jerome's Primary School approximately 800 metres to the north and Coogee Primary School approximately 700m to the west of the subject site. A further six public primary schools are available within a 5km radius of the subject site.

Lakelands Senior High School is located approximately 5km northeast from the subject site. The new Fremantle College is located on the site of the former South Fremantle Senior High School, approximately 7km north of the subject site.

Challenger Institute of Technology is located approximately one kilometre to the south of the subject site, with

Murdoch University located approximately 7km to the northeast. The University of Notre Dame is also located approximately 9km north of the subject site within the Fremantle Strategic Metropolitan Centre.

3.8 INFRASTRUCTURE SERVICING

A Civil Engineering Servicing Report has been prepared by McDowall Affleck and has been attached as appendix 7 to this report. The report provides advice regarding earthworks, road works, stormwater drainage, sewer reticulation, water reticulation, underground power, communications and natural gas reticulation to service the proposed lots.

3.8.1 Preliminary Earthworks

Preliminary earthworks are proposed which will include the removal of vegetation, screening of topsoil, fill with additional structural fill topsoil, and the compaction of topsoil and structural fill. The ground geology is predominantly sand and loose to well cemented limestone, which is well drained. There are no critical considerations in relation to soil or geology conditions which would affect the suitability of the site to be developed to a residential standard. The site is not located in an area of Acid Sulphate Soils.

3.8.2 Road Works

The existing road network will be extended as illustrated on the structure plan, and fitted with temporary 18m diameter cul-de-sacs at the terminating end of each of the proposed roads, until such a time as the property at Lot 1, 5 Fawcett Road (to the north) is developed. The cul-de-sacs will be removed after this time, as detailed in detailed in section 4.6 in Part 1 of this report.

No issues in relation to traffic management are expected to arise as a result of the proposed development and structure plan. The road network should be developed prior to the development of individual lots. The road widths of the proposed roads will each be approximately 6.0m wide with a 2.5m wide footpath in a 15m wide road reserve.

3.8.3 Stormwater Drainage

A Stormwater Management Plan has been prepared by McDowall Affleck for the subject land (Appendix 6). The Stormwater Management Plan details that the site is capable of managing, through infiltration or disposal, all of the stormwater which falls onto the Structure Plan area, inclusive of POS.

The site is not located within a 1 in 100 year Average Recurrence Interval flood risk area, nor is it located near to wetlands and mosquito breeding areas associated with such wetlands. The site proposes to connect through to the existing stormwater system located beneath Kirk Close for disposal and infiltration of stormwater to the wetland on Preston Road within Bindjar Reserve. Most water is capable of being infiltrated into the sandy soils and any excess, toward the nearby wetlands.

A 2.25m diameter mains sewer runs east-west at the south of the subject site, as illustrated below. This sewer will remain unaffected by the proposed development. Sewerage and effluent disposal from the proposed dwellings will occur by a gravity-fed sewerage system, which will be extended from Kirk Close to the subject site.

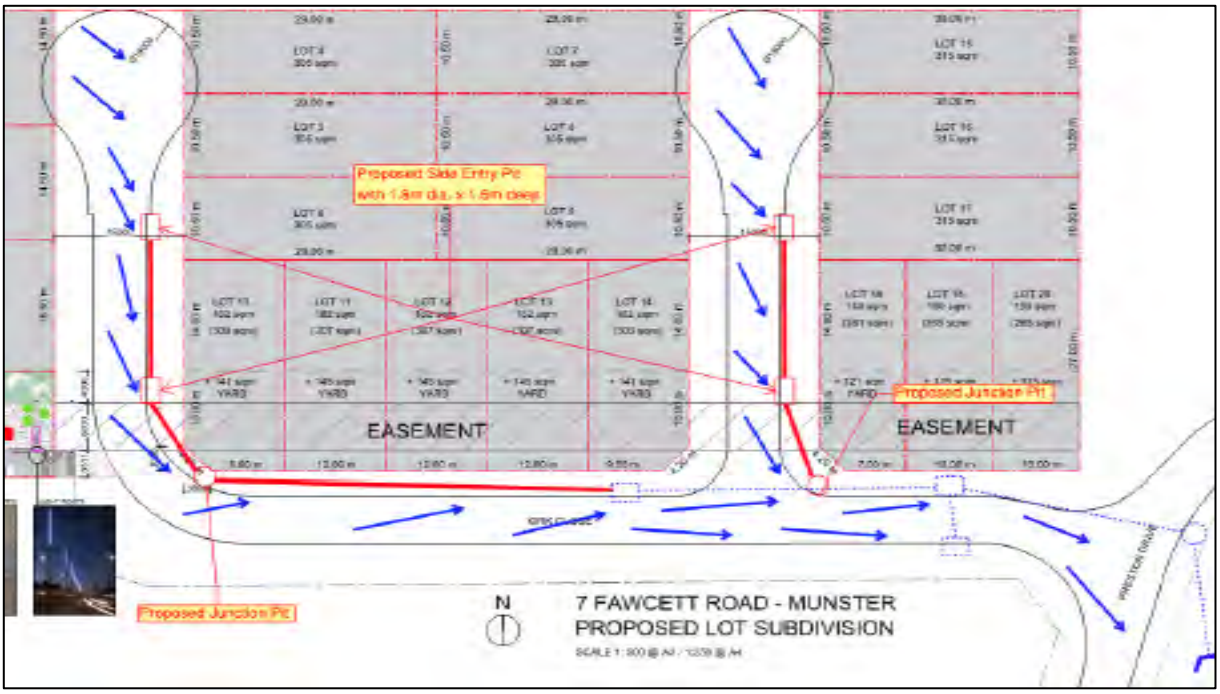


Figure 31: Proposed Drainage Strategy by McDowall Affleck

3.8.4 Communications

All lots will be serviced with nbn and VOIP telephony service which will be extended from Kirk Close. Currently the site receives access and service from nbn Co. and Telstra, no other private providers service the area. Telephony service to the site will occur using the nbn network.

3.8.5 Reticulated Water and Sewerage

All lots should be serviced with reticulated potable mains water. Kirk Close includes a 100mm diameter reticulation main, which can be extended into the subject site and connected through to the Mayor Road road reserve. The proposed reticulation main will consist of a 100mm diameter pipe. Water Corporation have advised that the subject site is capable of being serviced with reticulated water supply with a possible connection at Kirk Close, depending on clearance to Bibra Lake Main Sewer.

In relation to sewerage, the site falls within Water Corporation sewer catchment SD66. Potential sewer connections can include an extension from the existing sewer in Kirk Close or toward Lot 812 on the opposite site of Fawcett Road. There are no issues noted with the provision of reticulated sewerage service, and the site will be capable of being serviced by reticulated sewer. A 2.25m diameter sewer main (the subject of an easement in the south of the subject site) will remain unaffected by the proposed development. The sewer main is made of reinforced concrete pipe, lined with keyed plasticised PVC sheeting.

Figure 32: Water Corporation water pipeline map. Source: Water Corporation 2019.

3.8.6 Underground Power

All proposed residential lots and development will be serviced with underground power in accordance with State and Western Power requirements. Existing underground power supply is located beneath Kirk Close and Fawcett Road. This power supply is capable of being used to service the subject site. If any upgrades are required, these will be borne by the subdivider prior to subdivision. Power is serviceable by the existing Cockburn Cement Substation which has a forecasted remaining capacity of 25 to 30MVA. An image of the existing underground Western Power assets is shown in the image below.

Figure 33: Western Power Underground Assets Map. Source: Western Power 2019.

3.8.7 Natural Gas Reticulation

An existing Natural Gas service pipeline with 70kPa pressure is located beneath Fawcett Road and Kirk Close and is capable of being extended into the subject site to provide future dwellings with natural gas service. ATCO have confirmed that the existing gas pipelines are capable of serving the subject site.

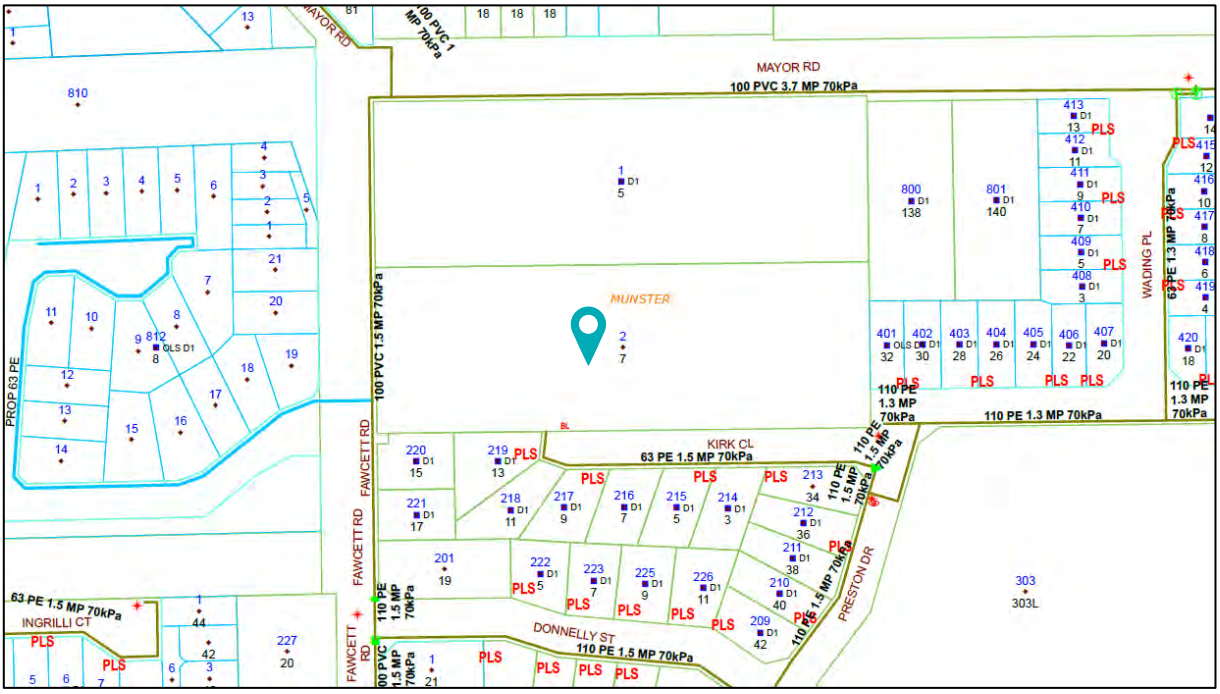
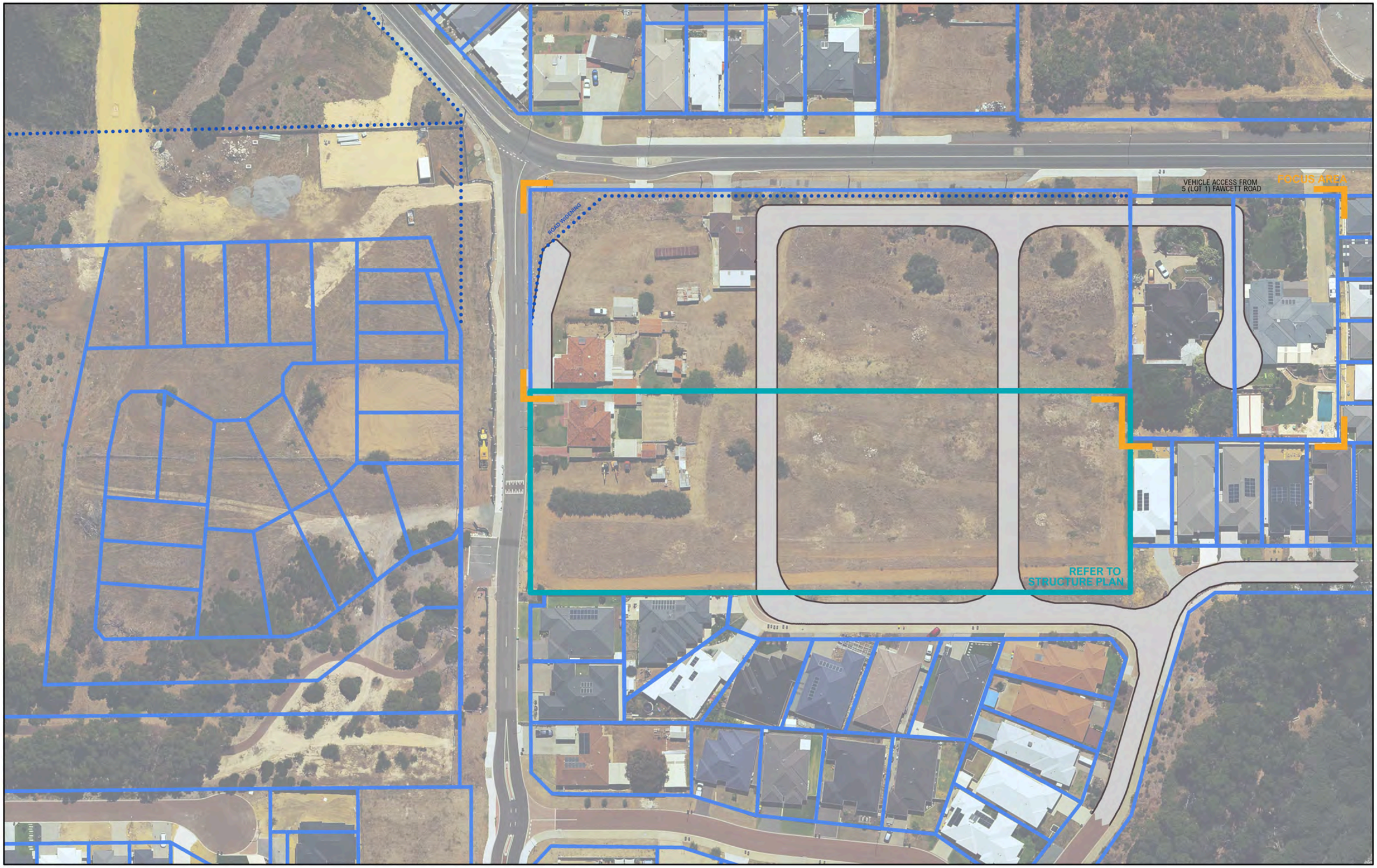


Figure 34: ATCO Gas network map. Source: ATCO Gas Australia 2019.



STRUCTURE PLAN INDICATIVE ROAD LAYOUT FOR NEIGHBOURING SITES

SCALE NOT TO SCALE

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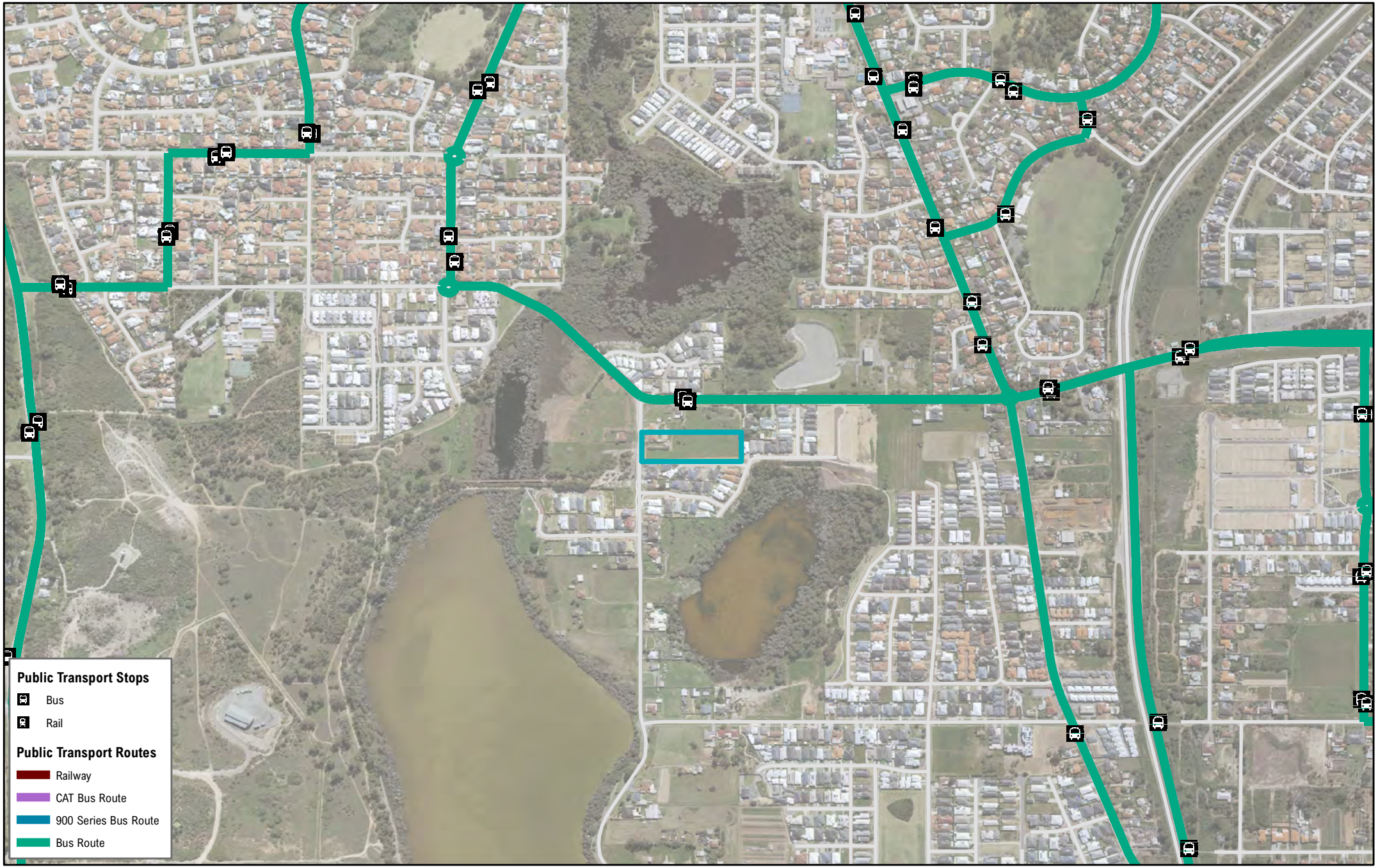

WIDER CONTEXT PLAN PUBLIC TRANSPORT

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SCALE 1:10,000 @ A4

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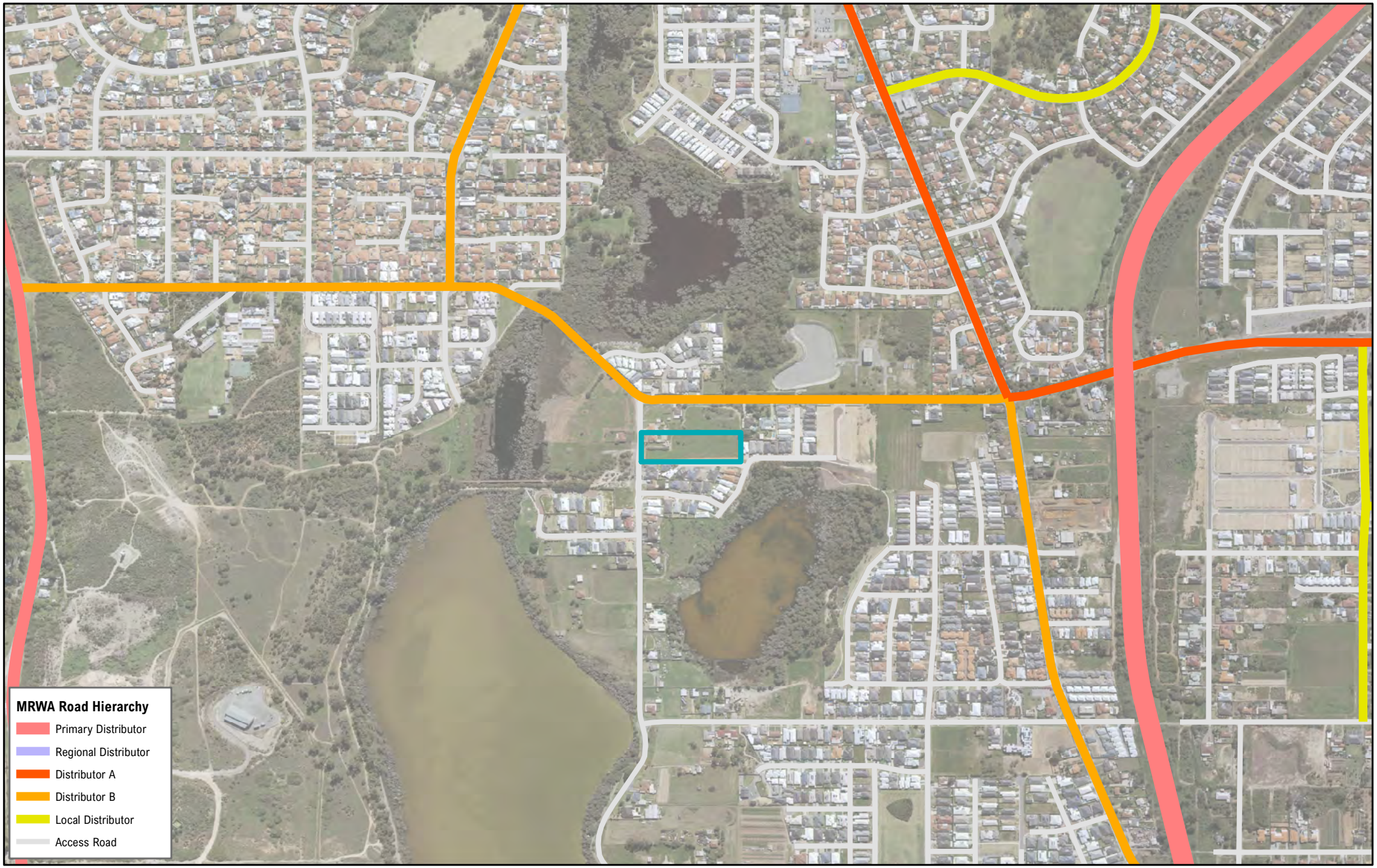

WIDER CONTEXT PLAN ROADS

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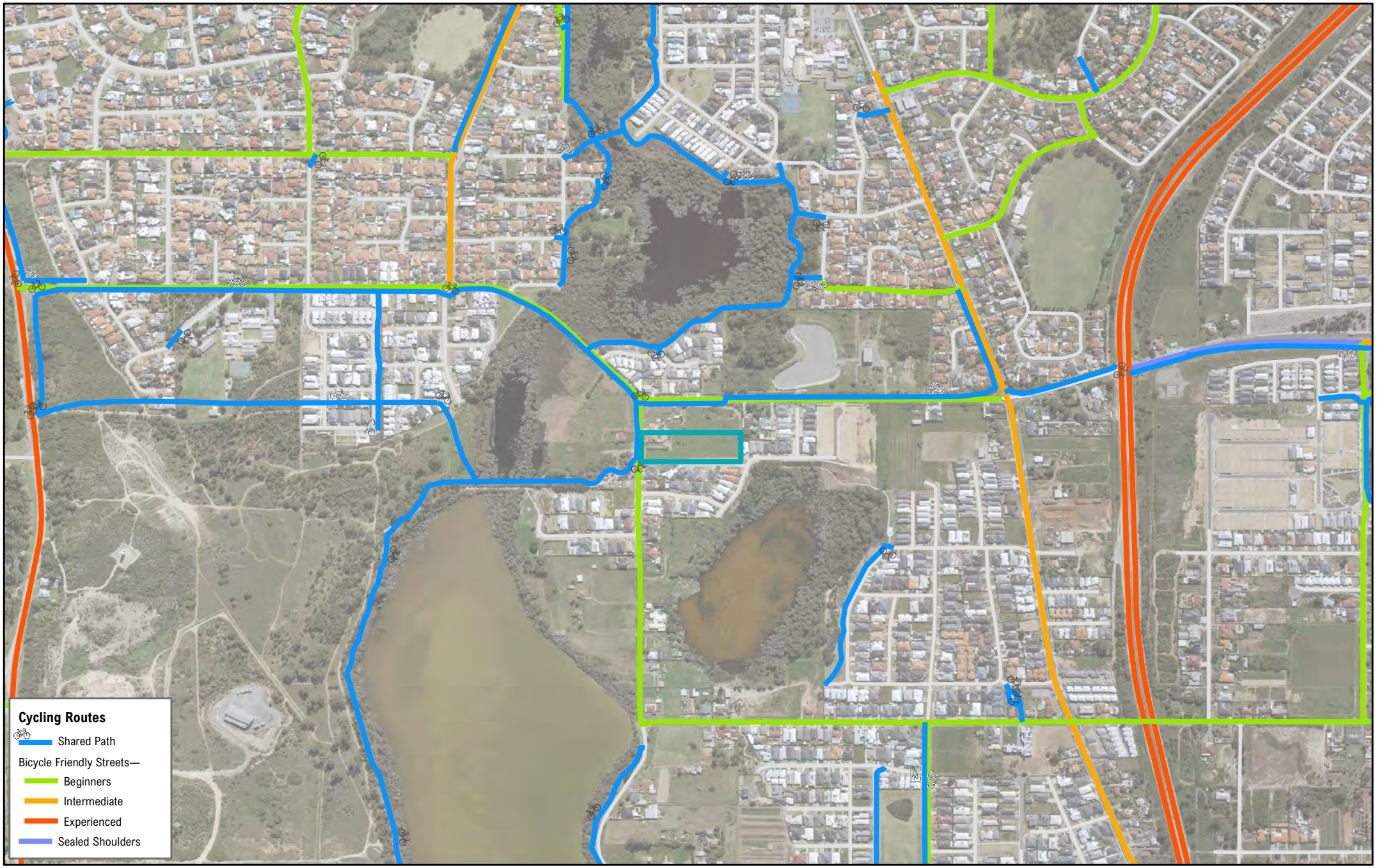

WIDER CONTEXT PLAN CYCLING NETWORK

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WIDER CONTEXT PLAN HERITAGE

0 50 100 200 300 400 500 m

SCALE 1:10,000 @ A4

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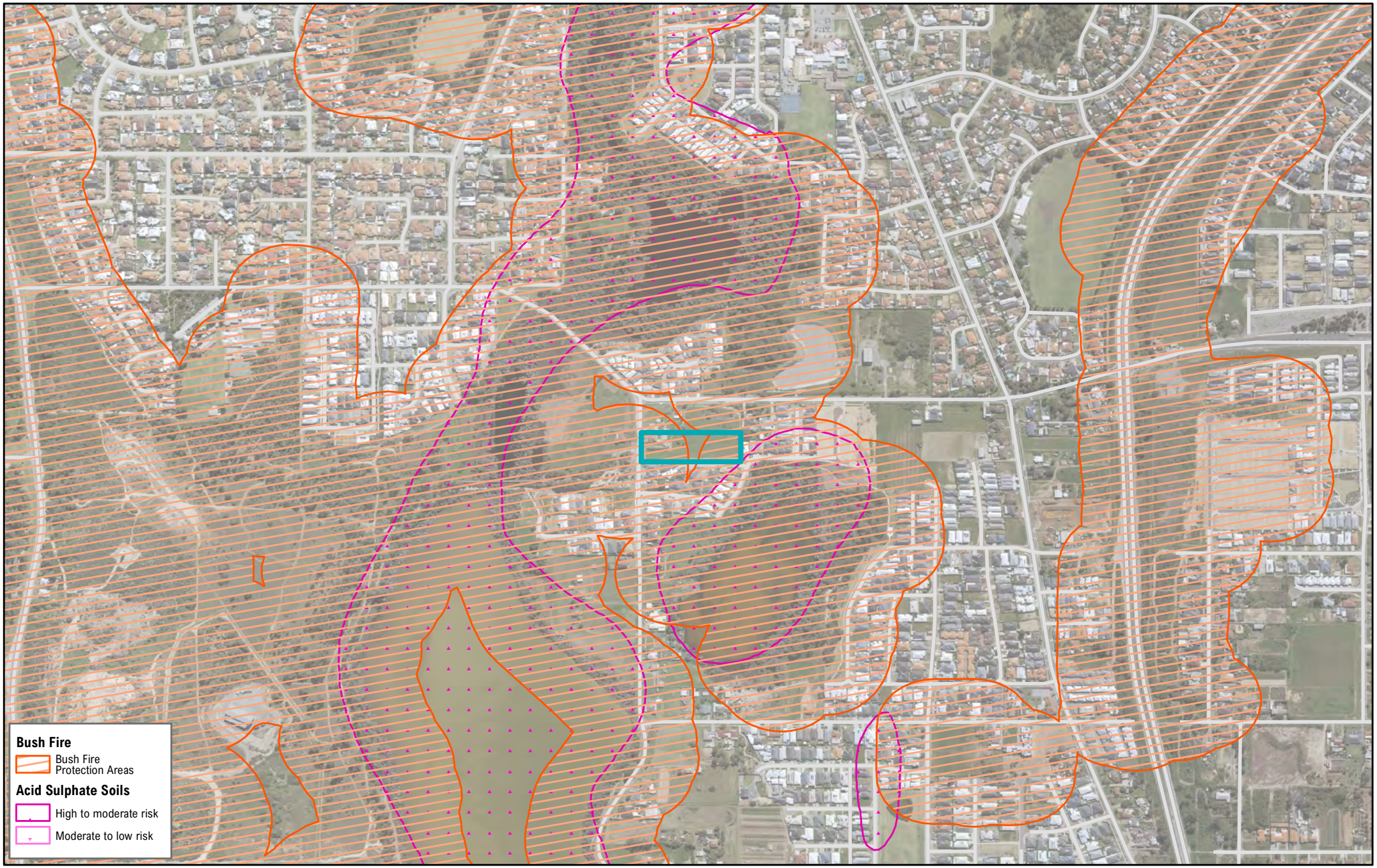

WIDER CONTEXT PLAN BUSH FIRE + SOILS

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SCALE 1:10,000 @ A4

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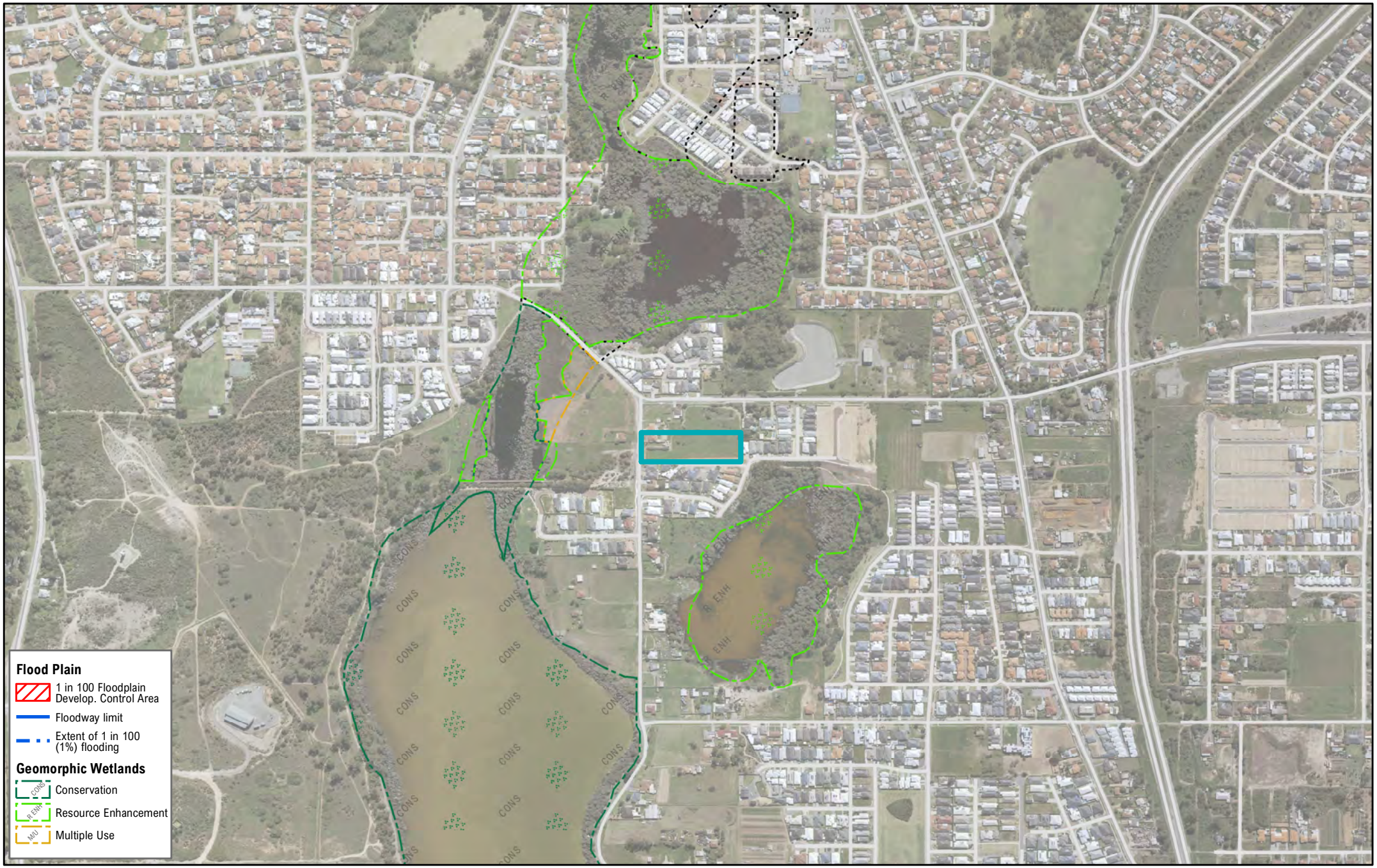

WIDER CONTEXT PLAN FLOODING + WETLANDS

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SCALE 1:10,000 @ A4

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