ELLENBROOK
VILLAGE 7A DEVELOPMENT PLAN
SEPTEMBER 2017

ellenbrook

RD great places

ENDORSEMENT PAGE

This structure plan is prepared under the provisions of the City of Swan
Local Planning Scheme No.17

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

19 JANUARY 2010

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 2030**

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PROJECT:	Ellenbrook
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www.robertsday.com.au

ELLENBROOK - VILLAGE 7A
DEVELOPMENT PLAN

PREPARED FOR
Ellenbrook Management Ltd

CONSULTANCY TEAM
Roberts Day - Town Planning + Design
Cossill and Webley - Engineers
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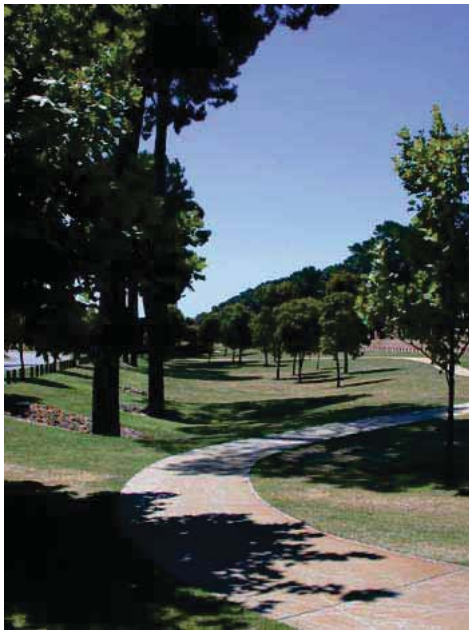
Sinclair Knight Merz - Traffic Engineers
RPS - Environmental

Record of Amendments made to the endorsed Village 7A Development Plan (DP16)

Amendment No.	Description of Amendment	Endorsed by Council	Endorsed by WAPC
Amendment 1.	Amendment to Density Sites Plan	26 April 2012	
Amendment 2.	Amended Design Stage 6 and 8		
Amendment 3. (DP-16/F)	Amended design Stage 9	15 February 2017	15 March 2018

EXECUTIVE SUMMARY



The Development Plan design accommodates a variety of residential lot sizes, ranging from 150m2 through to 3000m2. This is to encourage a diversity of households to be provided in Village 7A, both in design and affordability. This diversity will be further encouraged through design guidelines that will be tailored to achieve a specific character within nominated residential precincts. The inclusion of larger lots on the eastern periphery of Village 7A are proposed to provide a transition of lot sizes from the larger lots located within the adjoining The Vines development.

All future residents will have ready access to the surrounding Villages and their amenities, including commercial, retail and educational facilities, and the parkway system via an interconnected street network and extensive network of footpaths and cycleways.

This Development Plan has been prepared to guide development of the first stage of Ellenbrook's next Village - Village 7, in accordance with the requirements of the City of Swan Local Planning Scheme No. 17.

Village 7A, comprising approximately 44 hectares, is located directly south of a conservation reserve (Lexia Wetlands), west of the original The Vines development, immediately to the north of The Vines Stage 5 area (Woburn Park) and to east of Ellenbrook's Village 6 (Malvern Springs).

The Development Plan for Village 7A has capacity to accommodate approximately 590 dwellings for a community of around 1700 residents.

The design has been guided by a 'healthy living' theme to complement the adjoining Village 6 (Malvern Springs) which was also design based on this theme, which will allow residents the ability to live within a sustainable Village environment that is complemented by a natural parkway setting comprising remnant vegetation and associated fauna. This theme will be further reinforced through a network of footpaths and cycleways, the selection of landscaping, the built form and treatments applied to public spaces.

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1.0 INTRODUCTION

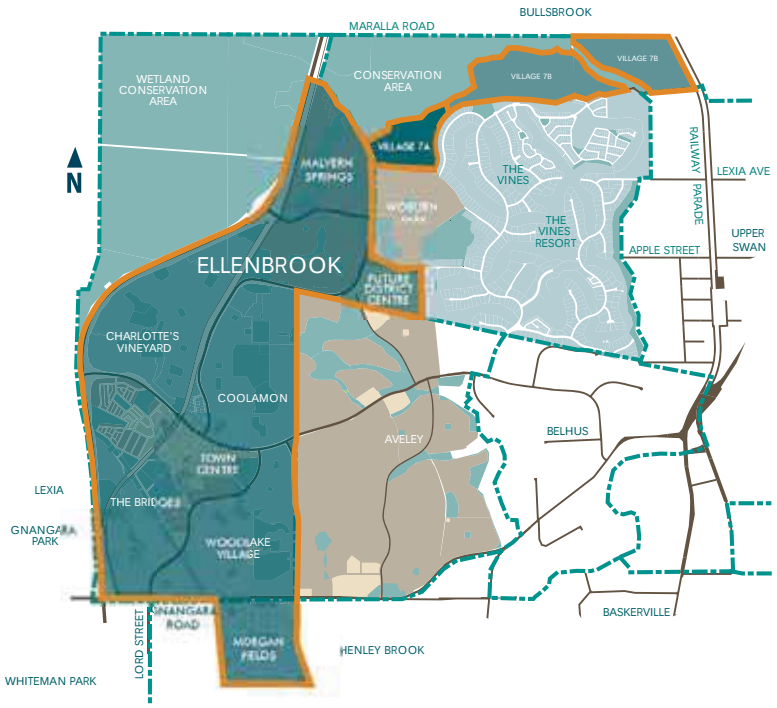


FIGURE 1 - LOCATION

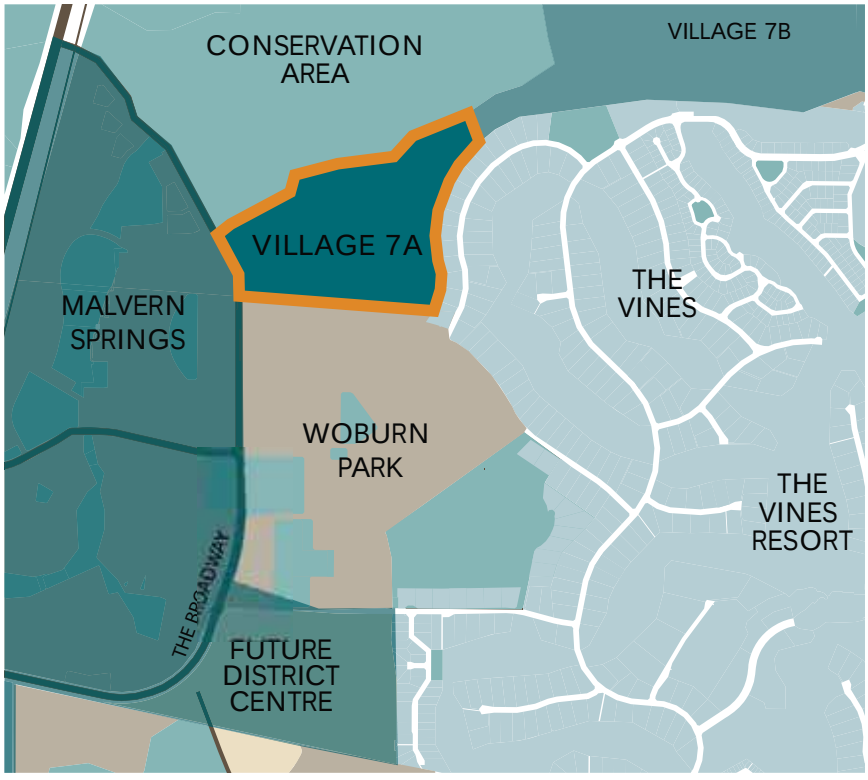


FIGURE 2 - LOCAL CONTEXT

1.1 LOCATION/LOCALCONTEXT

The Ellenbrook project is located within the City of Swan, approximately 20km north-east of the Perth CBD and within 10km of the Midland Town Centre.

Village 7A is located directly south of a conservation reserve, west of the original The Vines development, immediately to the north of The Vines Stage 5 area (Woburn Park) and to east of Ellenbrook's Village 6 (Malvern Springs).

In a local context, Village 7A is located to the north of the existing development and is well connected via road linkages with; Ellenbrook Village 6 (Malvern Springs), Stage 5 The Vines (Woburn Park), and the future second stage of Village 7.

1.2 LAND DESCRIPTION

Village 7A is comprised of three balance title lots being;

Lot 9162 on Deposited Plan 59330 – Volume 2697 Folio 881
Lot 9175 on Deposited Plan 43403 – Volume 2711 Folio 647
Lot 9507 on Deposited Plan 57881 – Volume 2680 Folio 195

1.3 LAND USE/LANDFORM

Village 7A extends over approximately 44 hectares and is predominantly cleared of vegetation. The site has been significantly earth worked as part of bulk earthworks associated with the existing Ellenbrook Villages to the south and west. The site generally lies on gently sloping land falling from west to east. The south western corner abutting The Broadway has a maximum elevation of approximately RL 48.0 metres and falls gradually to about RL 33.0 in the north east corner of the site.

The site is predominately cleared of vegetation with the exception of a remnant stand of native vegetation within the centre of the site and parkland cleared vegetation on the eastern boundary.

1.4 VIEWS

Views are available from within the Village 7A area to the adjacent conservation reserves, including the Lexia Wetlands, and the Darling Range Escarpment. The retention of the elevated terrain, where possible, and careful orientation of streets will enable future residents the ability to enjoy the benefit of these views and assist with orientation.

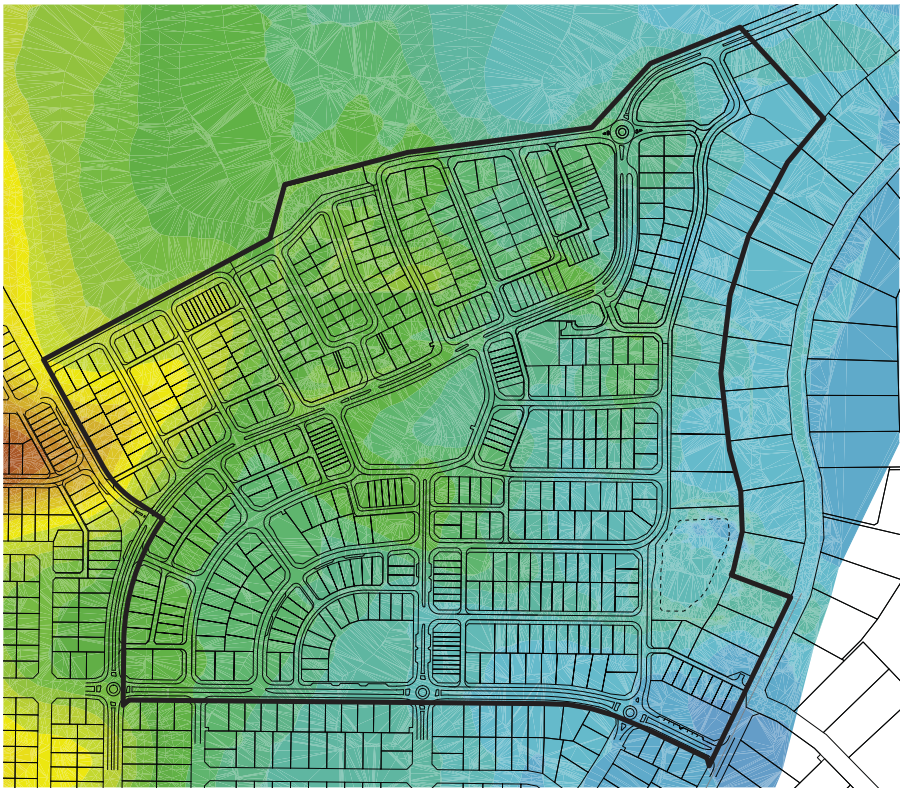


FIGURE 3 - LANDFORM

* Indicative lot layout only

1.5 CONSERVATION RESERVES

Conservation areas, which are protected through Metropolitan Region Scheme Parks and Recreation Reservations, are located adjacent to the northern portion of the Village 7A area. The northern portion of Village 7A abuts the Lexia Wetlands providing an attractive outlook for residents. It will be necessary for a hard edge treatment in the form of a road interface to be provided adjacent to the reservation for fire management purposes and public access.

FIGURE 4 - CONSERVATION AREAS

* Indicative lot layout only

2.0 DESIGN CONCEPT

2.1 THEME

'Health' is the theme for Village 7A

A primary objective in the planning of Ellenbrook is to create Villages with a distinctive character and identity with 'central places' which foster a sense of community belonging.

Village 7A will bring residents the benefits of a sustainable Village within a parkway setting that will embrace the site's natural features. Residential areas will be framed around a north-south linear open space parkway and a wide east-west boulevard (The Broadway), which caters for the retention of native vegetation. This parkway setting will offer a natural sanctuary for future residents and provide varied opportunities for leisure and relaxation. The juxtaposition of residential housing overlooking the conserved wetlands to the north and adjoining the north-south linear parkway and east-west boulevard will allow for the creation of a diversity of landscape and built form.

The ability to live a healthy lifestyle will be the key attribute of Village 7A – a place "where you can take a year round holiday at home". The theme will appeal to a wide cross section of buyers and clearly identify the Village with one of the increasingly important facets of community life. The concept of "creating a healthy community" translates the notion of sustainability into more meaningful terminology for purchasers.

This theme has strongly influenced the major urban design elements for the Village including structure of open spaces, landscaping and housing form.

2.1.1 Open Space Structure / Landscape

Areas of public open space with retained native vegetation, varied road reserves and the adjoining Lexia Wetlands will be linked through a north-south linear green 'belt' running through the middle of the Village. This will offer residents and visitors an extensive and interesting car-free network system with wider links to Ellenbrook as a whole. This greenway network will serve at least four major functions:

- protect and/or enhance conserved native vegetation;
- provide linear open space for compatible human use via the provision of active recreation areas;
- maintain connectivity between conservation lands, communities, parks, schools, other recreational facilities and the greater hike and bike network throughout Ellenbrook; and
- add value to the surrounding properties.

These characteristics will add to the health, well-being, and aesthetic values of the community and are vital to the maintenance of functional native ecosystems.

2.1.2 Housing Form

A 'retreat' atmosphere and resort style of architecture will be encouraged through the detailed design guidelines. These guidelines will work in conjunction with sustainable living standards promoted throughout the Village. Emphasis on comfort and healthy living through use of natural light, shading in summer and breezeways for climate control as opposed to mechanical ventilation will be promoted.

2.1.3 Self Sufficiency

The maturing of the Town Centre, and ultimately, the nearby District Centre will enable the residents of Village 7A to enjoy a relatively sustainable existence within the boundaries of Ellenbrook. Village 7A is the second of Ellenbrook's Villages to be able to offer ready access to the majority of daily needs and employment opportunities during its development phase.

Inspirational design elements will include:

- Enhancing the natural landscape in key 'public domain' locations through formal plantings;
- Density housing adjacent to public open space and environmental features;
- Linear public open space;
- Colour palette (white limestone, red ochre, green, purple lavender, terracotta stone, blue) that complements the natural setting;
- Interconnected street pattern; and
- Gradation of lot sizes adjacent to larger lots of The Vines.

The Village design and built form will promote:

- energy efficiency by promoting walking/ cycling and solar oriented housing; and
- water conservation through selective landscaping and drainage management.

Village 7A will be developed and designed to cater for a return to a simple lifestyle, where neighbours know each other and the landscape is respected. The design will seek to create a pattern of streets, lots and open spaces of varying size to compliment the physical attributes of the site in a sustainable manner.

Theming elements that will define Village 7A include:

- Linear parkways and walking trails;
- Generous verandahs and laneway housing that promote surveillance and community interaction on frontage streets;
- Retained remnant vegetation and landform that contribute to local character; and
- Activity in the public realm, including children at play, walking/cycling and bird life.

2.2 DESIGN PRINCIPLES/OBJECTIVES

In keeping with the Ellenbrook Joint Venture's overall vision statement, the design approach adopted for Village 7A was defined by and framed around a number of key principles and objectives.

2.2.1 Principles

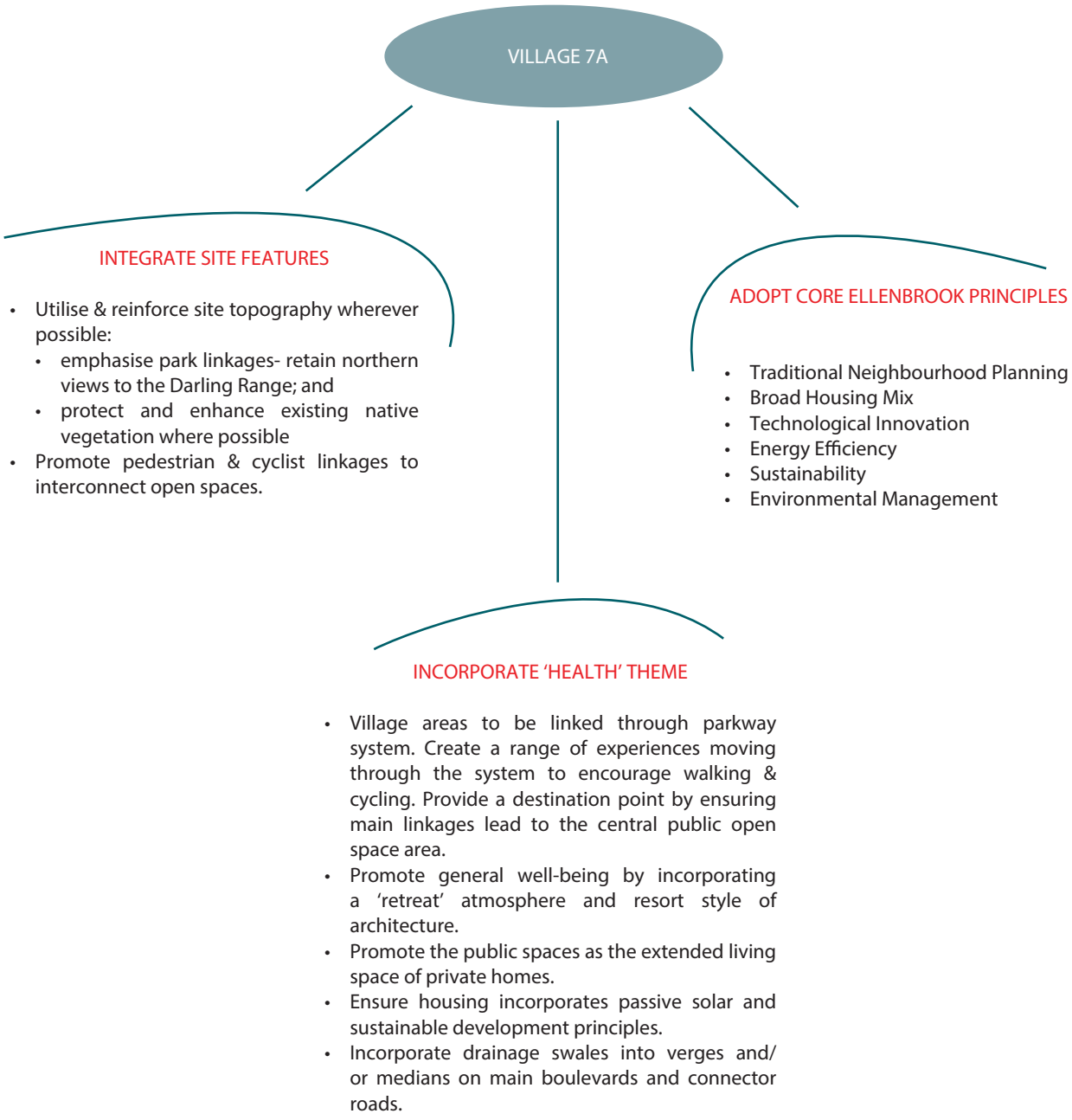
Village 7A will be a modern community designed to provide housing and recreation facilities for approximately 1460 residents. It will offer a wide choice of housing that caters for varied household types and lifestyles in an attractive environment designed to enhance and embrace the natural features of the site.

While signifying a return to the more traditional values of community living, Village 7A will also pursue a leadership role in the more efficient delivery of infrastructure and in the implementation of advanced sustainable environment built form initiatives.

2.2.2 Objectives

- To build a community based upon traditional design principles adapted to the changing demands of our contemporary lifestyles;
- To provide varied housing and services for a range of income groups and household types;
- To achieve integrated community planning and compliance with the City of Swan Community Plan requirements;
- To create an interconnected movement network that minimises total vehicle kilometres travelled and gives priority to pedestrian and cyclist access;
- To employ water sensitive design principles via appropriate stormwater management;
- To reinforce the Village's identity through a unifying landscape, retained natural landforms and unique design elements applied to core buildings (i.e. verandahs, intimate courtyards, awnings etc);
- To promote energy efficiency, water conservation and waste management through sustainable Village and building design;
- To emphasise linear parkway trails and linkages to nature that incorporate the retained remnant vegetation; and
- To create a landscaping theme based upon the concept of 'enhanced natural'.

FIGURE 7 - VILLAGE 7A DESIGN PRINCIPLES/OBJECTIVES



2.3 PROJECT OVERVIEW

Comprising approximately 44 hectares, Village 7A will accommodate approximately 505 dwellings and recreation facilities, both active and passive. It is envisaged the Village will be developed over a three year period from 2009 – 2012.

2.4 DEVELOPMENT PLAN

The Village 7A Development Plan is the product of the convergence of the locational, landform and landscape features of the site with the design objectives of sustainability, walkability and an identifiable built form.
The various components that comprise the Development Plan are set out below.

The existing landform and remnant vegetation within the site and the adjoining land uses, including the Lexia Wetlands, have influenced the Village design. The creation of a north-south linear park network results in the retention and protection of remnant vegetation within the site and allows for connectivity between the proposed development, from Stage 5 The Vines (Woburn Park) to the south through to the conservation reserves to the north. This linear park network also provide a central focus within the site and a focus for 'dress circle' and cottage (density) housing.

The location and design of the east-west orientated Banrock Drive allows for a tree lined boulevard, flanked to the north and south by areas of POS. The meandering nature of the road and generous landscaping will provide a suitable transition into the Avon Valley themed Village 7B.

The movement network is configured to allow convenient and safe pedestrian/cyclist access to the future facilities and services consolidated within the Town Centre.

The design has allowed the provision of a diverse range of lot sizes, which will subsequently facilitate a mix of housing types to cater for a wide range of emerging demographics. The adjoining larger lots of the The Vines development to the east of the site has required the creation of the larger lots on this eastern boundary to ensure a suitable transition of lots sizes. Higher densities are located adjacent to areas of high amenity including the public open space areas and the adjoining conservation reserves.

FIGURE 5 - VILLAGE 7A DEVELOPMENT PLAN

* Indicative lot layout only

3.0 DEVELOPMENT PLAN STRUCTURE

3.1 MOVEMENT NETWORK, ACCESS & CIRCULATION

The internal movement network is based upon interconnected streets which provide direct and shared vehicular, pedestrian and cycle access to the linear parkway. The Broadway, which provides direct access to the Ellenbrook Town Centre, provides the primary access to this Village and will continue through to service the balance of Village 7. The Village is also accessed via an east-west road located on the sites southern boundary. This roads allows for convenient access to Woburn Park, The Vines and the Ellenbrook District Centre.

In accordance with the parkway theme for the Village, the interconnected streets will be tree lined to enhance the streetscape and provide shade for pedestrians.

Rear laneways will be used adjacent to the east-west boulevard (The Broadway), the linear parkway and other POS areas to provide vehicular access to garages at the rear of lots, thereby reducing traffic movements on frontage streets. Coupled with reduced front house setbacks, the incorporation of laneways will encourage greater community interaction on frontage streets and in the linear parkway.

In order to assist in the provision of water sensitive urban design there will be swale drains provided on the northern edge of The Broadway road reserve. These swales will be appropriately landscaped to be both aesthetically pleasing and easily maintained.

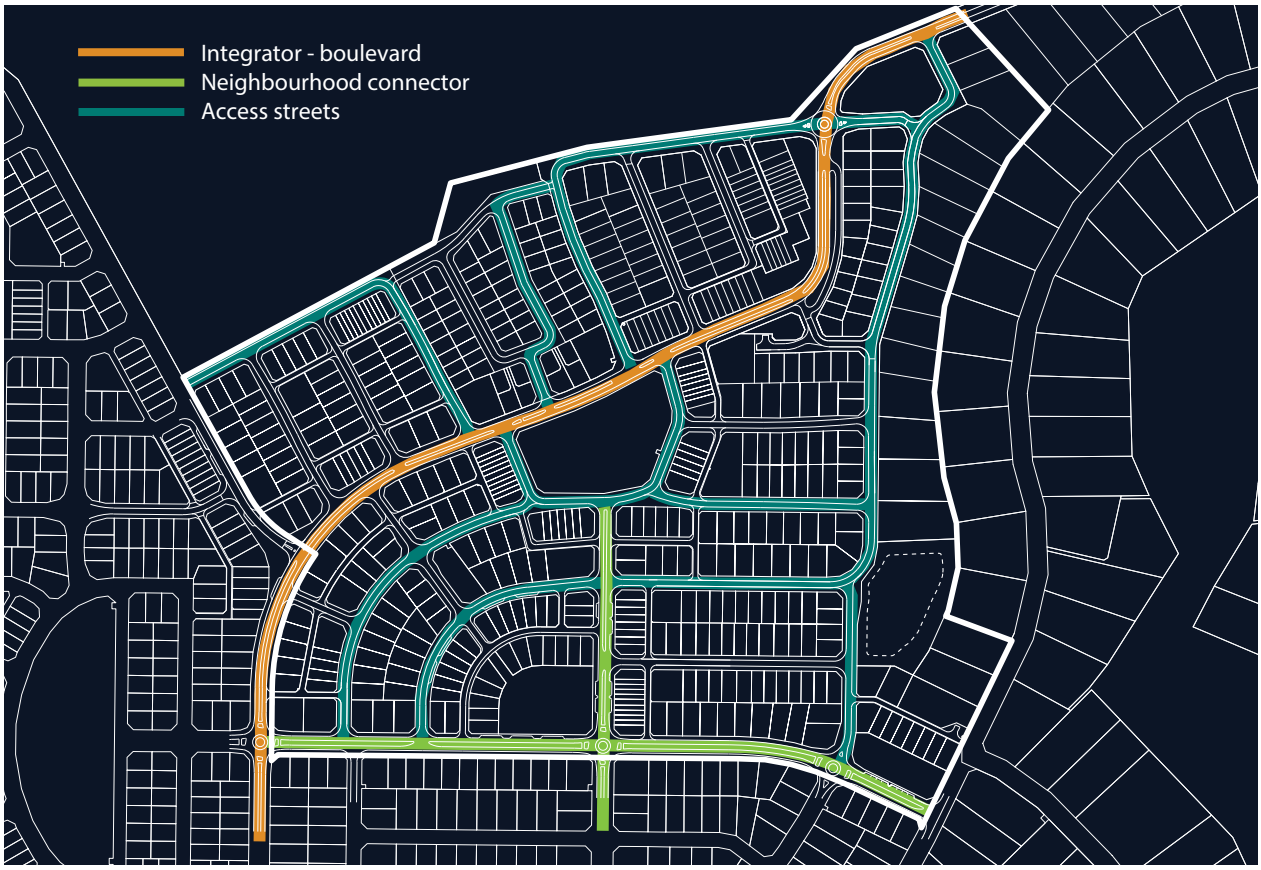


FIGURE 6 - ACCESS/LINKAGES & MOVEMENT NETWORK

* Indicative lot layout only

3.2 PUBLIC OPEN SPACE NETWORK

Remnant vegetation located centrally within the site and the need to provide adequate access to conservation areas to the north, has influenced the design of the open space system.

The central POS area has been positioned to protect and enhance a stand of remnant vegetation. POS areas to the north and south of this central POS create a linear park system connected via wide road reserves. This parkway connection will bind the various elements of Village 7A and be designed to accommodate a range of activities, including both passive and active recreation.

A number of complementary POS areas/ pocket parks will also be strategically sited for ease of access and to provide for informal active recreation opportunities and local amenity for nearby residential lots. A primary design objective is to ensure all residents are within a 5 to 10 minute walk of an open space area. The table adjacent provides an analysis of the public open space to be developed in Village 7A in terms of; recreation use (passive/ active), and whether the space performs a drainage function.

TABLE 1 – PUBLIC OPEN SPACE SCHEDULE

Public Open Space Provision	
1 – Active/Passive	0.2983 ha
2 – Active/Passive	1.2582 ha
3 – Active	0.6475 ha
4 – Passive/Drainage	0.4046 ha
5 – Passive	0.3282 ha
6 – Passive	0.0947 ha
7 – Passive	0.3467 ha
Total	**3.3782 ha**

The intent and function for each of the proposed POS areas in Village 7A is detailed below.

1. A linear park that is intended to be a physical link from the central POS reserve through to the adjacent conservation reserves. This area will contain trees and seating for passive uses with grassed areas being available for more informal active uses. Lots adjoining this reserve will be required to orientate towards the park to enable passive surveillance.

2. This central POS reserve will accommodate remnant vegetation and is the aesthetic and natural heart of the Village. There will be seating and grassed areas on the periphery of this reserve to facilitate active and passive uses by surrounding residents.

3. A POS area which will service the southern portion of the Village and will link with the adjacent development to the south

FIGURE 7 - PUBLIC OPEN SPACE

(Woburn Park). It will contain trees and seating for passive uses with grassed areas being available for more active uses. Lots adjoining this reserve will be required to orientate towards the park to enable passive surveillance.

4. A grassed infiltration area which will accommodate both an active and passive function. The periphery of the reserve will be improved with trees and seating. The swale is designed to accommodate a ten year average rainfall recurrence.

5. A pocket park which will service the surrounding cottage lots. Lots adjoining this reserve will be required to orientate towards the park to enable passive surveillance.

6. A pocket park servicing surround lots and providing a landscaped edge to the east west boulevard.

7. A POS area that will service the surrounding lots and provide additional amenity for adjacent cottage lots. The POS will be generously landscaped, and will simultaneously provide an additional landscaped edge to the entry/exit boulevard of Banrock Drive.

The provision of 3.3782ha of public open space equates to 8% of the Village 7A Development Plan area. Whilst this provision does not meet the prescribed 10%, this minor shortfall will be included in the public open space provision for the second stage of Village 7. Notwithstanding this shortfall being addressed via the second stage of Village 7 it must be noted that two adjoining villages, Malvern Springs and Woburn Park, have provided 11% and 14% of the site for public open space respectively.

The adjoining Lexia Wetlands, which are reserved as 'Regional Open Space' under the Metropolitan Region Scheme, will also provide opportunities for passive recreation (e.g. bushwalking, cycling) for residents of Village 7B.

In light of the above the proposed public open space is considered adequate to service the Development Plan area.

TABLE 2 – PUBLIC OPEN SPACE SCHEDULE

Structure Plan Area (Site Area)			**44.0338ha**
Deductions			
Dedicated Drainage Reserve (POS 4)	0.5691ha		0.5691ha
Total Deductions			0.5691ha
Gross Subdivisable Area (GSA)			**43.4647ha**
Public Open Space requirement @ 10% of GSA			4.3465ha
Public Open Space Contribution			
May comprise:			
Minimum 80% Unrestricted Public Open Space			**3.4772ha**
Maximum 20% Restricted Public Open Space (based on overall 4.3465ha of POS)			**0.8693ha**
Unrestricted Public Open Space Sites			
POS 1 0.2983ha			0.2983ha
POS 2 1.2582ha			1.2582ha
POS 3 0.6475ha			0.6475ha
POS 4 0.4046ha (balance area not affected by drainage)			0.4155ha
POS 5 0.3335ha			0.3335ha
POS 6 0.0958ha			0.0958ha
POS 7 0.3509ha			0.3509ha
Total Unrestricted Public Open Space			3.3782ha
Restricted Public Open Space Sites			
Total restricted use public open space contribution (less than 20% of total POS)			
Drainage area in POS (subject to inundation greater than 1 year ARI rainfall interval but more frequently than 5 year ARI rainfall event i.e. between 1 and 5 year rainfall event)			
POS 4			0. 0795ha
Total Unrestricted Public Open Space			**0. 0795ha**
Total Public Open Space Provision			**3.4577ha (8.0%)**
POS Undersupply			0.8888ha

TABLE 3 – VILLAGE 7A & 7B COMBINED POS SCHEDULE

	SITE AREA	**10% POS REQUIRED**	**POS PROVIDED**	**PERCENTAGE POS**
VILLAGE 7A	43.4647ha	4.3465ha	3.44577ha	8.0%
VILLAGE 7B	111.43ha	11.1430ha	16.71ha	15.0%
TOTAL	154.8947ha	15.4895ha	20.1677ha	13.0%
POS OVERSUPPLY			4.6782ha	

It is noted that Village 7A, when viewed in isolation, does not achieve the 10% POS contribution requirement. However, it is noted that the 10% POS contribution was originally intended to be calculated as a shared contribution across the two stages of the final Ellenbrook Village, being Village 7A and Village 7B.

The consideration of two stages of the final Village as a single development with a combined POS provision is acceptable, as these two developments were originally intended as two stages of the one Village. Table 3 summarises to POS oversupply that exists for the combined POS contribution for Villages 7A and 7B.

3.3 PEDESTRIAN/CYCLE NETWORK

The pedestrian/cycle network for Village 7A is shown on the plan below. The network is designed to provide direct and safe access as one moves through the Village to access the POS areas and the adjoining Villages and town centre.

As a minimum, a pedestrian footpath will be provided on one side of most streets to provide safe pedestrian movement and encourage community interaction.

The provision of dual use paths coincides with roads that would contain traffic volumes high enough to warrant separation of cyclist movement from vehicular traffic and in accordance with WA Planning Commission policy requirements. The remaining component of the cycle network constitutes local subdivisional roads carrying low traffic volumes that are appropriate for shared use by motorists and cyclists.

* Indicative lot layout only

FIGURE 8 - PEDESTRIAN/CYCLE NETWORK

3.4 HOUSING THEME/PRECINCT GUIDELINES

A diverse range of lot and housing types will be promoted within Village 7A. The general theme for the Village will be Resort Bungalow. This theme is characterised by the re-enforcement of the horizontal plane through simple roof forms, continuous eaves, solid piers, porches and feature materials such as stone and timber cladding.

Historically the term Bungalow is derived from the word Bengala describing the thatched huts of Bengal, India where English colonial officers were stationed during their imperial rule. This design was predominately one or one and a half storey in height and easily manipulated by builders to satisfy the increasing demands for the detached housing in the "new world". Increasing globalization soon led this style to the shores of Australia. Its popularity as a housing style is still evident in suburbs of Perth today such as Wembley, Mt Lawley, Inglewood, Mt Hawthorn, Claremont and Nedlands.

The style has endured throughout the previous century and been adapted into many contemporary forms we see today. The current trend for Indonesian architecture is one example of how this style has been easily adapted from the original Bungalow style.

All housing will incorporate the following elements:

- Continuous eaves;
- Minimum roof pitch of 24 degrees;
- Double garage for lots with frontages of 18m or greater;
- Corner lot housing addressing both frontages; and
- Compliance with sustainability/passive solar design principles.

3.4.1 Housing Innovation – 5m Product

In order to build on Ellenbrook's previous built form and lot design innovations, including pioneering the provision of 8 metre wide lots, it now proposes the creation of 5 metre wide terrace lots within Village 6 – Malvern Springs.

The 5 metre wide lots allows for the construction of a one to two bedroom single storey terrace homes which offer apartment style living on a green title lot. Due to the size and design of the dwelling it is suitable to meet a variety of demographics including singles, young couples, young families and retirees.

The small land area and simple but contemporary dwelling provide for excellent housing affordability and allows for young people to enter the property market and also provides the opportunity for older people to downsize to a more manageable sized property.

The lots are to be located in areas which are in close proximity to services and facilities including schools, public open space, public transport, cycle ways and commercial facilities. The strategic location of these lots will contribute to a vibrant and active neighbourhood whilst promoting walking and cycling rather than travel by car.

As with the 8 metre product in the previous Ellenbrook Villages the lots will be developed as a house and land package.

3.5 RESIDENTIAL LOT YIELD & MIX

Australians have become more discerning and selective in their preferred choice of urban environment for living, working, learning and recreating. The role and function of the home is now more varied than at any time in Australian history. Accordingly, Village 7A has been designed to offer a range of lots and facilities to satisfy a diversity of lifestyles and associated demands.

A diverse range of lot and housing types will be provided within Village 7A. While catering for first homebuyers with an affordable cottage and traditional lot product, Village 7A will also be well suited to the second and third homebuyer given its parkway setting and proximity to the Town Centre and District Centre.

Provided adjacent is a summary of land use, projected dwelling yield and population forecasts for Village 7A.

FIGURE 9 - DENSITY SITES PLAN

* Indicative lot layout only

** Minimum lot size is 150m². Development is to be in accordance with the R60 provisions of the Residential Design Codes unless otherwise varied by a Council approved Detailed Area Plan.*

TABLE 4 – DENSITY & DWELLING CALCULATIONS

R-Code	No. Lots	%	Dwellings	%
R5	11	2.11	11	1.89
R10	8	1.54	8	1.37
R17.5	16	3.07	16	2.74
R20	71	13.63	71	12.18
R25	245	47.02	252	43.22
R30	57	10.94	94	16.12
R40	69	13.24	87	14.93
R60 (incl. Narrow Lot Innovation Precinct)	44	8.44	44	7.55
Total	**521**		**583**	

Section 3.3.2(c) of the City of Swan's 'Neighbourhood Planning Policy' requires an average net density of 22 dwelling units/ hectare over the entire Structure Plan (Development Plan) areas in new urban areas. This Village 7A Development Plan provides for 22 dwelling units/hectare. This density adheres to City policy.

In respect to the density coding for the 5 metre products, which are 150m2 in area, there are no R-Codes which are applicable to single dwelling lots less than 160m2 in area. Following discussions with the WAPC it was concluded that the most appropriate method of dealing with these lots was to designate them as a specific area referred to as the '5 Metre Innovation Precinct'. The Density Sites Plan is to be annotated with the following to assist the City in assessing subdivision and development applications for this Precinct:

** Minimum lot size is 150m^2. Development is to be in accordance with the R60 provisions of the Residential Design Codes unless otherwise varied by a Council approved Detailed Area Plan.*

3.6 ACTIVITY CENTRES & EMPLOYMENT

The subject Development Plan does not propose the provision of any commercial or retail facilities. The City of Swan's Commercial Centres Strategy allocates the provision of one Medium Neighbourhood Centre (3,500m2 – 4,500m2) within Village 7. It is proposed to provide this Neighbourhood Centre within the second stage of Village 7, where the concentration of population and services (e.g. primary school, retirement village) will be co-located. The Village 7A area is considered to be sufficiently serviced by commercial and retail facilities located within Village 6 (Small Neighbourhood Centre) and the District Centre (Large Neighbourhood Centre). These commercial areas are located within 1 to 1.5 kilometres of the centre of Village 7A and will include retail and convenience shopping, child care, service industries and office uses.

In respect to employment generation a primary objective for Ellenbrook is to address the spatial imbalance between jobs and population that currently exists within the Perth metropolitan area by making adequate provision for the employment needs of its residents. A high level of workforce retention will assist in reducing the need for residents to travel long distances to access employment, as well as generate local wealth creation and encourage local residents to participate fully and remain part of the community fabric of Ellenbrook. Employment is projected to be primarily focussed within the Town Centre, however, opportunities for local employment will also be available within the District Centre, Village Centres, local schools and other community services.

The North-East Corridor Extension Strategy (WAPC 2003) sets out a strategic planning framework for land contained within the Ellen Brook catchment to the north of Ellenbrook development. This Strategy sets an employment retention ratio of 50% by 2029. The employment retention rate is the proportion of the total labour force to be employed in locally provided jobs. It is projected that Ellenbrook will ultimately have the capacity to accommodate between 7,104 (47% employment retention) and 8,754 (58% employment retention) jobs for its labour force of 15,000 persons. Notwithstanding this potential, the Ellenbrook Joint Venture accepts that this figure is derived from the capacity of Ellenbrook to accommodate jobs based on current planning and is independent of commercial investment decisions. It is therefore accepted that this figure may be deemed too high and that a percentage of between 45% and 50% is likely to be more realistic.

3.7 SCHOOLS

The subject Development Plan does not propose the provision of any education facilities. One primary school is proposed to be allocated within the second stage of Village 7. There is considered to be adequate educational facilities within proximity to the Village 7A area including three primary schools and a high school located within 1.5 kilometres of the centre of Village 7A.

FIGURE 10 - COMMERCIAL & EDUCATION FACILITIES DISTRIBUTION

* Indicative lot layout only

4.0 STATUTORY PLANNING

4.1 ZONING/PLANNING APPROVAL PROCESS

The Ellenbrook project and specifically Village 7A are zoned 'Urban' under the Metropolitan Region Scheme (MRS). In this context the Urban zone is a generalised zoning category which may include residential, retail, community services, local open space and related activities. The planning process undertaken to facilitate development of land for urban purposes is described below.

Following the rezoning of the Ellenbrook project to 'Urban' under the MRS, the City of Swan Town TPS No. 9 was amended to rezone the Ellenbrook landholdings, including Village 7A, to 'Special Purpose – Ellenbrook'. The recently gazetted Local Planning Scheme No. 17 (LPS No. 17) amended Ellenbrook's zoning to 'Special Use Zone – Ellenbrook'. This zoning establishes a two tiered strategic planning framework for the implementation of urban development. Subdivision and development at Ellenbrook is proceeding in accordance with this staged approval process, which embodies the following:

- Structure Plan; and
- Development Plan.

A Structure Plan has been prepared and approved for Ellenbrook which provides the broad structure for future development at Ellenbrook. This Development Plan represents the next step in the strategic planning process with the objective to refine proposals in the Structure Plan affecting the subject land and to guide development. LPS No. 17 also accommodates the preparation, approval and enforcement of site specific Detailed Area Plans. The Detailed Area Plans are prepared on a per lot basis, where warranted, to enhance and expand upon the planning proposals or the provisions contained within a Structure Plan or Development Plan.

4.2 DEVELOPMENT CONTROL

In accordance with Clause 4 of the 'Special Use Zone – Ellenbrook' development control and land use permissibility for Village 7A will be based upon the Zoning Table of the City of Swan LPS No. 17 in conjunction with the Zoning Classification Plan as contained in this Development Plan.

The Zoning Classification Plan depicts the location of the various land use activities within Village 7A. As noted on the plan, no further fragmentation of lots for development in excess of the R20 standards will be permitted except where nominated on Detailed Area Plans or the Density Sites Plan as adopted by Council.

FIGURE 11 - ZONING CLASSIFICATION PLAN

* Indicative lot layout only

5.0 TRAFFIC/ROAD PLANNING

The traffic model for the Ellenbrook and surrounding developments has been updated to include Village 6, District Centre, Village 7A and Village 7B. This model provides traffic volume estimations and has been used to guide road design and location.

A traffic report for Village 7A has been prepared by Sinclair Knight Merz – Traffic Engineers and appears at Appendix A. The projected traffic volumes in the Village are shown in the report and incorporate both internal and external vehicle movements. The resultant volumes are considered acceptable for the proposed residential development. The proposed road network will adequately accommodate the projected volumes of traffic and provide good accessibility and permeability throughout the Village. The report also provides details on; traffic management, road design, public transport routes and the pedestrian/cycle network.

6.0 SUSTAINABILITY

6.1 INTRODUCTION

The Western Australian State Sustainability Strategy (SSS) was released in September 2003. The purpose of the Strategy is to establish a framework for the development and implementation of initiatives that reflect the principles of sustainability. The primary goal of the Strategy for the creation of new communities is to "... plan and provide settlements that reduce the ecological footprint and enhance quality of life at the same time."

The Strategy outlines objectives and strategies to ensure new communities embrace sustainability including:

- the integration of land use and balancing transport;
- the reduction and management of waste; and
- sustainable energy, built form and natural resources.

The existing statutory and policy planning framework operating under this overarching strategy, including in particular Liveable Neighbourhoods, gives guidance for Village 7A in regard to appropriate land use, transport and infrastructure, and the protection of natural resources.

The project team in conjunction with Ellenbrook Management are currently researching and preparing reports that will allow for the implementation of the following sustainability initiatives in the Village 7A development;

- Housing Design Guidelines;
- Sustainable Housing Report and Recommendations;
- Water Conservation Strategy for POS landscaping/front yards of dwellings; and
- Water Management Strategy - stormwater disposal/swales etc.

6.2 SUSTAINABILITY PRINCIPLES

The Development Plan promotes an urban settlement focussed on an enhanced natural landscape with good access to recreation opportunities, community facilities and services and the Town Centre. Described below are the sustainability principles inherent in the Development Plan design.

6.2.1 Urban Structure

The urban structure expressed in the Development Plan embraces many of the principles set out in Western Australia's leading urban planning initiative - Liveable Neighbourhoods (WAPC 2007). This document is aimed at fostering sustainable community development through eight key elements of community design and development.

Key initiatives proposed for Village 7A, that are consistent with Liveable Neighbourhoods, include: mixed use development; a choice of quality density housing; a walkable movement network; accessible parks; appropriate lot layout and orientation; and stormwater management.

6.2.2 Transport Alternatives

The range of lot sizes and building form, together with the permeable and legible movement system whereby all elements of the Village are within approximately a 5 to10 minute walk (400m – 800m), will contribute to an environment that is highly conducive to walking and cycling.

To entrench walking and cycling as an integral part of the culture and lifestyle a dual use path and/or footpath will be provided on every street and all streets will have good surveillance, shady trees and offer stimulating local character.

Furthermore, regular public transport services and a planned future transit connection to the Town Centre will promote access using public transport.

The availability of viable alternatives to private motorised transport, will translate to reduced total kilometres travelled and significant annual reductions in carbon gas emissions and cost savings per household.
Access for all people, including people with disabilities and those without access to a motor vehicle, will foster an inclusive community. Reducing car dependency through urban design and community infrastructure will also enable people to be more physically active and healthier.

6.2.3 Affordable Housing

Housing affordability has declined in Perth in recent years with increasing land and building costs. Village 7A, like the other Villages at Ellenbrook, will incorporate a proportion of public housing (1 in 12 dwellings) and privately owned affordable housing.

The creation of a diverse range of lot sizes will enable home builders to provide alternative forms of housing which will be affordable in nature. This housing will provide the opportunity for first home buyers to enter the property market.

Low income households will be able to live in an environment supported by essential infrastructure, public transport and local employment opportunities in the expanding Town Centre. The cumulative effect will be a socially inclusive and diverse community.

6.2.4 Building Design

Design Guidelines and Detailed Area Plans will be used for defined housing precincts to control the quality of the built form and promote sustainable practices, including buildings oriented and designed for passive solar access, recycled materials, breezeways and surveillance of public areas.

6.2.5 Safety

Open spaces will have surveillance, lighting and appropriate landscaping to enable safe community access and use.

A comprehensive network of pathways will be provided to ensure safe access for pedestrians and cyclists and streets will be designed to incite a slow speed environment.

6.2.6 Landscape & Open Space Systems

The public realm will be a central focus of Village 7A and contribute to its distinctive character and identity. It will feature a linear park system incorporating highly accessible spaces that will comprise of remnant vegetation and a low maintenance landscape with water sensitive design principles.

The opportunity also exists to incorporate alternative stormwater drainage design (i.e. swale drains) into the streetscape with linkages to the open space network.

6.2.7 Local Identity

The Development Plan is configured to allow the defining qualities of the former landscape of the site to permeate the design.

Landscaping treatments, public art and building design will all contribute to identity and place association.

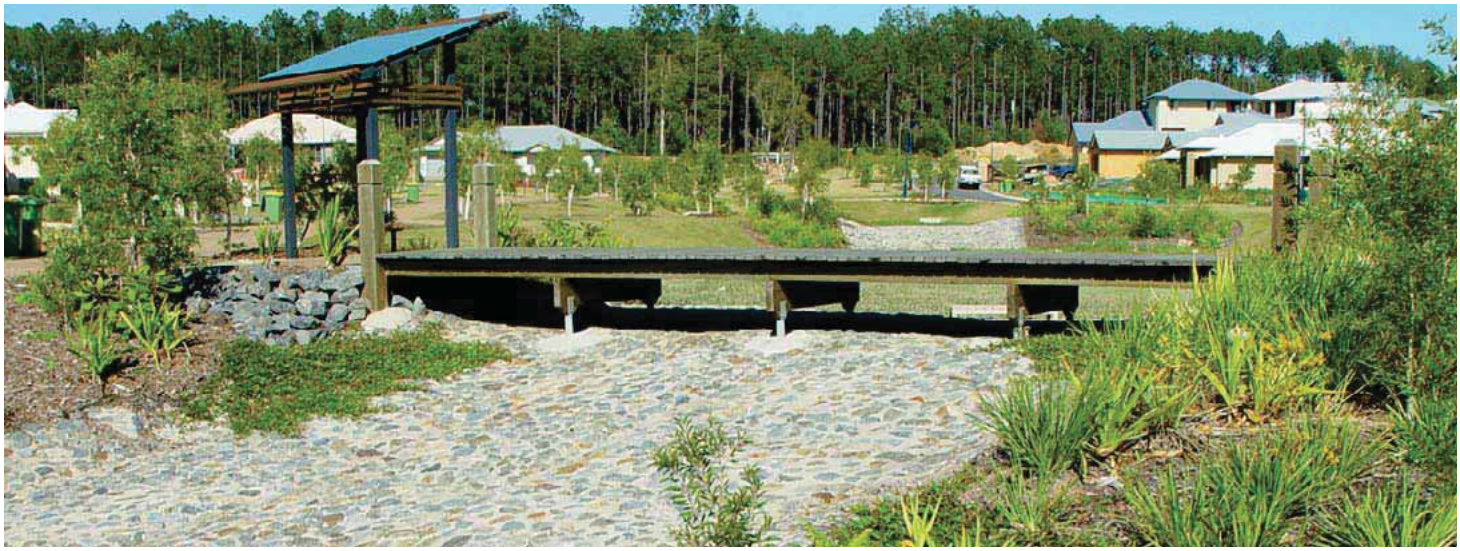
The residents will be provided with a rich assortment of experiences, originating with the open spaces of the adjoining Lexia Wetlands through to intense urban spaces focussed along the linear park system.

6.2.8 Inclusive Community

The Village will be built in accordance with sustainable practices and incorporate a flexible design that is capable of accommodating the needs of all members of the community, including parent groups, young people and the elderly.

The walkability of Village 7A and emphasis on the public realm will be imperative to creating opportunities for planned and unplanned interaction and promoting social cohesion.

7.0 ENVIRONMENT



7.1 ENVIRONMENTAL STUDIES

A number of detailed environmental studies have been conducted over the Ellenbrook project area including the Public Environmental Review (PER) assessed by the Environmental Authority in 1992. As a result of this assessment a major conservation area of approximately 600ha was established and reserved to the north of Village 7A. On the basis of the conservation outcomes achieved within the reserved area, the balance of the land (i.e. Village 7A) has been approved for urban development subject to the management of groundwater, drainage and nutrient export. Ongoing environmental studies include protection of the Lexia Wetlands and associated conservation areas, and involve the follwoing:

- Routine monitoring of shallow groundwater levels in the vicinity of the wetlands, and water levels in the wetlands, predominantly during the winter – spring period of groundwater recharge; and
- Evaluation of the monitoring data, including comparative evaluation of data from nearby Water Authority bores, in order to revise and update the interim water level criteria for the Lexia Wetlands (established as condition of environmental approval for the Ellenbrook project).

7.2 DRAINAGE & NUTRIENT MANAGEMENT PROGRAM

Following approval of the PER, a number of conditions were set by the Environmental Protection Authority. One condition required more detailed drainage and nutrient management work to be undertaken. A Drainage and Nutrient Management Program was prepared for the northern catchment of Ellenbrook and is being implemented.

7.3 ENVIRONMENTAL MANAGEMENT

An environmental management report has been prepared by RPS – Environmental Management Consultants and appears at Appendix B. The report provides details on the physical and biological environment within Village 7A and confirms the implementation of the Development Plan, as proposed, accords with the environmental assessment of the overall Ellenbrook project and approvals issued by the Minister for the Environment. The environmental issues addressed in this report include:

- Topography, landform and soils;
- Groundwater;
- Wetlands;
- Vegetation and flora;
- Fauna
- Aboriginal heritage;
- Surrounding land use;
- Drainage and nutrient management;
- Acid sulphate soils;
- Construction impacts; and
- Compliance with existing statutory environmental approvals.

8.0 LANDSCAPE

8.1 LANDSCAPE APPROACH

Village 7A will be a community living adjacent a rich natural setting. The "enhanced natural" character of the site will have distinctive landscape character sub precincts related to the topography and retained natural features of the area.

The core of all the areas will be a linear park system that incorporates the remnant vegetation and links to the adjoining Lexia Wetlands.

The objectives of the landscape are:

- To create an environmentally appropriate landscape;
- To bring a 'Village' atmosphere to urban life;
- To retain and enhance the remnant; and
- To integrate the landscape within water sensitive design principles.

The landscape of Village 7A falls into two broad categories, Open Space and Streetscapes.
The open spaces will form the dominant feature of the community with a central area of mature retained vegetation.

The streetscapes will present a different character and will include some drought tolerant exotic tree planting. The streets of the urban cells will be designed to have trees planting selected and located for solar access to the buildings, wind reduction and aesthetics.

8.2 PUBLIC OPEN SPACE

The Public Open Spaces are arranged to ensure all of the community has easy and direct access to a linear park system. The linear park system accommodates a series of walks and cycle routes that link to provide diverse recreational routes and circuit walks throughout the community.

The landscape design for the open spaces will adopt a landscape strategy of "Strings, Beads and Settings".

- Strings being maintained movement routes.
- Beads, the intensively developed sites within the POS areas.
- Setting, the structural bushland and retained vegetation.

This strategy will deliver a maintainable, manageable, quality landscape that focuses maintenance and water requirements to key areas, creating an environmentally responsible landscape.

8.2.1 Strings

The maintained corridors will be paths and trails that ensure that residents have a safe series of recreational and destination routes. The linking natural parkland will be well observed from adjacent housing that will afford a high level of natural surveillance. The strings will create "cool corridors" – shade walks with glades around the community. The character of these linear spaces will draw on the native bushland but will be presented with contemporary detailing of incidental seating areas and structures and the presentation of native vegetation in bold and dramatic way. Linear features, such as ephemeral streams, will lead linear park users from one area to the next. Such features accepting and celebrating the seasonal landscape changes.

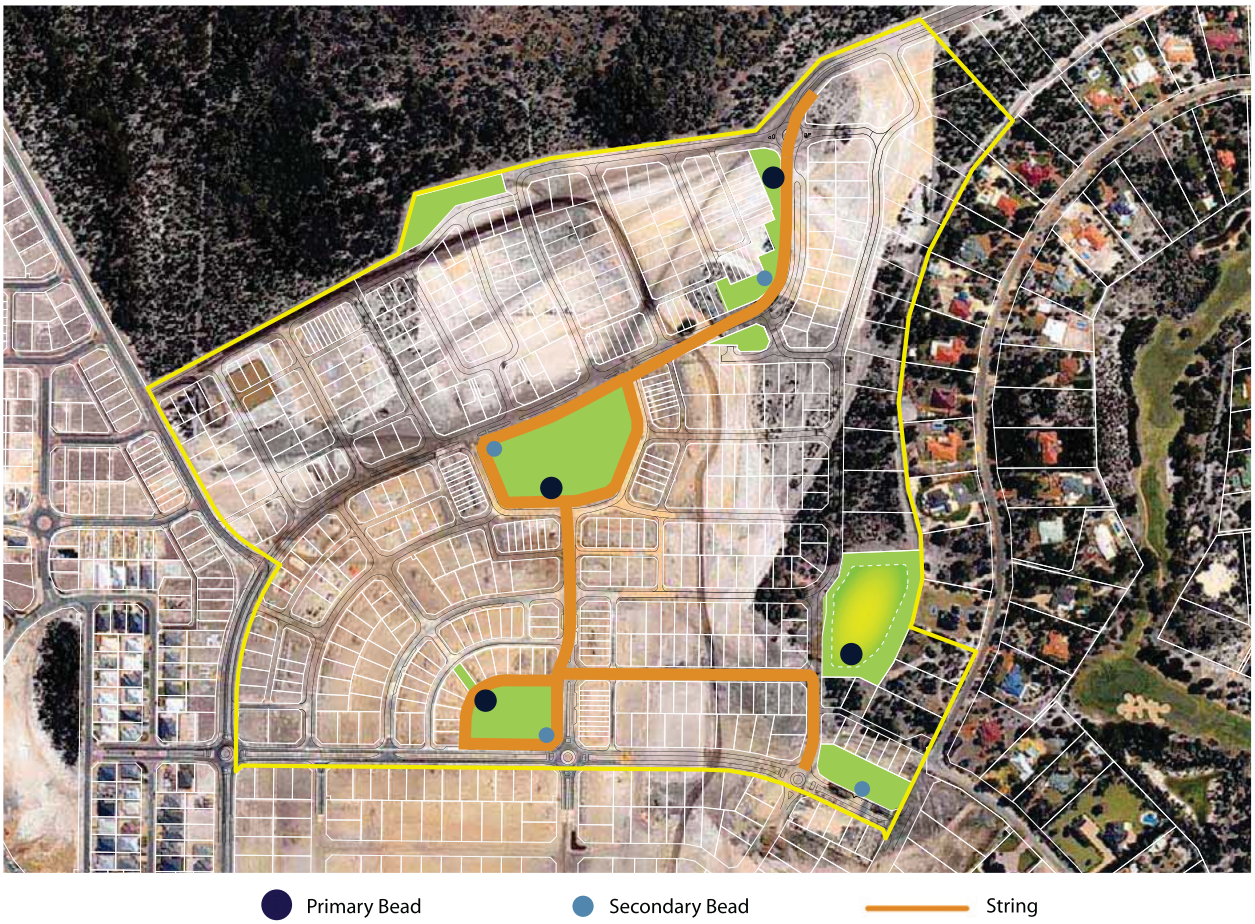


FIGURE 12 - LANDSCAPE DESIGN

* Indicative lot layout only

8.2.2 Beads

The beads are nodes of highly maintained and developed parkland, providing destinations and local facilities. They will range from local play areas and picnic spots to more active open kick-a-bout areas and an interpretive centre. The bead areas will be located to enable easy community accessibility and to maximise marketing exposure.

8.2.3 Setting

The major component of the open space network will be the setting, which will also create the dominant landscape of the community. The setting will include the retained vegetation but will also comprise new areas of recreated native landscapes that are planned and designed to provide a quality aesthetic.

The setting will be a low maintenance, with the more intensive maintenance and irrigation being focused on the strings and beads. The landscape will create a strong visual and physical indigenous landscape that uses native plants and local materials. This will be counterbalanced with contemporary design and a bold use of colours drawn from the inherent colour palette of the local environment. Wherever practical drainage will be integrated within the broader landscape to provide passive irrigation and created damplands.

The plan provides a series of linking linear spaces consisting of POS areas and wide road reserves. They will create shady corridors that carry informal walking and cycling routes around the community linking other park activity spaces.

The landscape approach recognises the importance of the native vegetation and the value that a strong "enhanced natural" landscape structure creates as a recreational, aesthetic and functional local environment.

The dominant open space network will create the character of Village 7A. The "enhanced natural" approach is characteristic of areas of bushland that have become valued parklands incorporating limited areas of managed lawns and introducing some species that accept the conditions but are not locally native.

8.3 STREETSCAPE

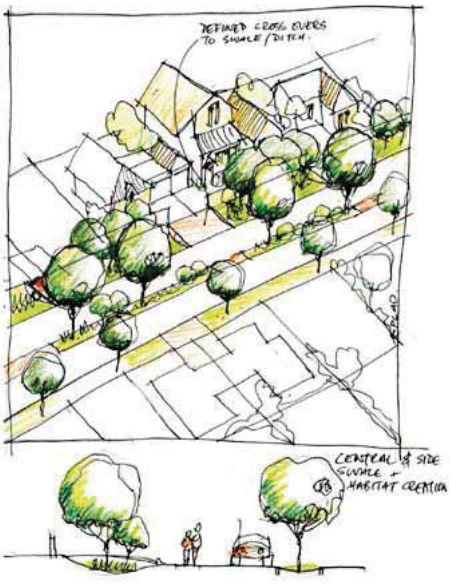
In addition to the open space landscape, the streetscape of the development areas will play a critical role in defining the Village identity. The streetscape will also utilise indigenous species augmented with Australian natives and selected exotics as highlights and where solar access to development is appropriate.
The exotic range will be drawn from species that are tolerant of the local site conditions, low water users and have references to the species traditionally established by early settlers in the area (species established at the nearby heritage dam, mill and church).

A diverse streetscape hierarchy is proposed that creates distinctive places ranging from informal street planting to formal avenues of large trees with monocultures of native ground covers. The need to facilitate solar access to selected streets and spaces will dictate species selection. It is intended that each sub neighbourhood within Village 7A has a distinctive character that is created from the topography, relationship to open space and street tree planting.

The landscape treatment of the streets will reinforce the hierarchy of roads. Species, planting types and verge treatments will create a diverse range of experiences and integrate drainage within the landscape. Verge and median swales will manage surface drainage while providing opportunities for passive irrigation to the landscape.

8.4 MAINTENANCE

The landscaping provided with the public open space reserves will be maintained by Ellenbrook Management Ltd for a period of 2 years, unless otherwise negotiated with the City of Swan. Responsibility for maintenance will be handed to the City of Swan after this period.



9.0 ENGINEERING SERVICES & INFRASTRUCTURE

A comprehensive Engineering Services Report has been prepared by Cossill & Webley – Consulting Engineers and appears at Appendix C. This report provides details on the following engineering components relating to the Development Plan and provision of services:

- The provision of a reticulated water supply and sewerage disposal.
- The provision of public utility services i.e. underground reticulated electricity supply, telephone and natural gas supplies.
- Drainage strategy, based upon the approved Drainage and Nutrient Management Programme.
- The required road network to service the development.

9.1 TELECOMMUNICATIONS

The proposed lots are to be serviced by the Telstra Smart Community initiative via the Telstra Velocity suite. The suite includes:

- High-speed broadband;
- Fixed line services;
- FOXTEL from Telstra; and
- Digital Free-to-Air TV services.

APPENDIX A TRAFFIC REPORT

JACOBS

Memorandum

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Date 20 October 2016

Attention Emma Jeans

From Mina Bayat Mokhtari

Subject **Village 7A Technical Note - Traffic**

1. Introduction

Robert Day has requested Jacobs to review the impacts of the proposed modification to Development Plan No.16, which covers Village 7A (also known as Lexia).

Village 7A is the first stage of the final village at Ellenbrook and comprising approximately 44 hectares. The original Village 7A Development Plan was approved by the City of Swan on 31 August 2012 and was endorsed by the WAPC on 12 September 2013. The comparison between the original approved Development Plan and proposed modification is summarised in **Table 1.1** below.

Table 1.1: Comparison Table

	Original Approved Development Plan	Proposed Modification
No.Lots	458	521
No.Dwellings	624	583

According to the information obtained from the client, this increase in number of lots and reduction in the number of dwellings is as a result of changing the housing density of two large portions of lands from R40 to predominantly single residential lots coded R20, R25 and R30, with no further subdivision potential.

There is an existing constructed central median along Banrock Drive that extends for the length of the southern boundary of the modification area. As a result, the intersection with Banrock Drive and the proposed Access Road at the location shown in **Figure 1.1** will be restricted to left-in/left-out movements only.

Figure 1.1 : Study Area Location

2. Traffic Review

A total reduction of 41 dwellings has been proposed compared to the previously approved plan. Assuming that the previously planned lots and the newly introduced lots have the same trip generation rates, the proposed modification would reduce the total number of trips generated by the whole structure plan by 7%, which can be up to 250 fewer car trips per day.

Movements that are restricted by the provision of the left-in left-out intersection at the proposed location can be accommodated by the alternative intersections that are shown in **Figure 1.1.**

Overall, as it is expected that the trips to and from the modification area would be distributed to a number of different streets in the area and there will be a reduction in the number of lots,the left-in left-out intersection would not have significant impacts on the types of roads and intersections that were previously determined based on the required capacity and the number of trips generated by the residential dwellings. Therefore the proposed changes would not require any modification to the previously proposed type of roads and intersection.

It is also noted that vehicles can also undertake a u-turn movement at the intersection to the south-east corner of the modification area, if it is not restricted and it can be undertaken safely and without interfering with the movement of opposing traffic.

Prepared by:

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Village 7A - Ellenbrook

TRANSPORT AND ACCESS REPORT

- Draft
- 9 December 2010

Village 7A - Ellenbrook

TRANSPORT AND ACCESS REPORT

- Draft
- 9 December 2010

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Contents

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Project number:	PB50063.10

1. Introduction

1.1. Project description

Sinclair Knight Merz (SKM) has been commissioned to prepare a transport and access report for Ellenbrook Village 7A in support of the Development Plan prepared by Roberts Day Group Pty Ltd. This assessment updates the previous transport and access report issued on 19 May 2009.

1.2. Purpose of the report

The purpose of this transport and access report is to demonstrate that the potential traffic impacts of the proposed development plan have been identified.

The number of anticipated households in Village 7A has increased and as a result, the predicted levels of traffic to be generated by the proposed development have increased from the previous report. A revised traffic assessment has been undertaken to reassess the development's impact on the local road network.

1.3. Previous report

SKM previously undertook EMME traffic modelling for Ellenbrook. The aim of this modelling was to forecast the range of traffic volumes on streets within the structure plan area for the year 2030. Two scenarios were developed and analysed:

a) A District Structure Plan with a connection to the Perth-Darwin Highway (PDH);

b) A District Structure Plan without the connection.

The modelling has been updated to include revised land use yields for the Village 7A. This also includes the previously modelled minor modifications to the road network which includes two connections to Maralla Road north of Village 7B. The traffic generation and distribution assumptions in this report reflect the revised model output.

1.4. Report structure

The remainder of this report comprises of the following chapters:

Chapter 2 – Proposed development
Chapter 3 – Trip generation
Chapter 4 – Trip distribution
Chapter 5 – Transport network modelling
Chapter 6 – Traffic impacts
Chapter 7 – Pedestrian and cycle provisions

Chapter 8 – Public transport

2. Proposed development

Ellenbrook Village 7A is located northeast of the Ellenbrook Town Centre and to the west of the Vines Village as shown in Figure 2-1. The developable site will comprise 590 residential dwellings.

- **Figure 2-1: Sub regional network connections at ultimate development**

2.1. Proposed site access

It is proposed that there will be four main access points to/ from Village 7A as shown in Figure 2-2.

- **Figure 2-2: Entry points and road names**

Entry 1 is located to the southwest of the development area and will provide access to Ellenbrook Town Centre, Ellenbrook District Centre, the future Woburn Park and Ellenbrook Village 6 and a possible connection to the Great Northern Highway.

Entry 2 lies upon the southern Village 7A boundary line and will provide direct access to the proposed Woburn Park.

Entry 3 is situated to the south-east corner of the Village 7A proposals. This entry will provide access to the northern section of The Vines.

Entry 4 is a proposed access located to the north east of Village 7A. This access will be fully utilised at ultimate development stage where access will be provided to the northern part of the Vines, the proposed Village 7B and Lot 4 on completion of their development.

3. Trip generation

3.1. Trip generation assumptions

SKM's EMME[1] model of Ellenbrook has been used to model the traffic impacts of Village 7A.

In the SKM EMME model, only vehicle trips are generated. Effectively, this means that trip generation is done simultaneously with mode split. The model contains three trip purposes: home-based work, home-based education and home-based other/ non-home based.

Table 1 shows the assumed motorised trip production rates per person for the study area.

Table 1: Daily vehicle trip production rates by trip purpose

Trip Purpose	Average vehicular trips/ person per day
Work	0.52
Education	0.23
Other	1.33
Total	2.08

Trip Attraction equations for each zone are based on the following relationships:

Work Attractions: 1.365 X Total Employment

Education Attractions: 0.8 X (Primary & Secondary Enrolments) + 0.897 X (Tertiary)

Other Attractions: 0.5 X Dwellings + 0.7 X (Retail Floor Area) + 1 X (Primary/Secondary + Tertiary enrolments) + 1.2 X Total Employment

Based on these relationships, Village 7A generates 3,540 all day vehicle trips in the ultimate development scenario.

[1] EMME provides a uniquely flexible approach to modelling that allows users the freedom to leverage established techniques or create new methods to address local needs. It offers a complete and comprehensive set of tools for demand modelling, multimodal network modelling and analysis and for the implementation of evaluation procedures.

Assuming 2.88 persons per household, 2.08 vehicle trips per person, 6 vehicle trips per household per day and 590 dwellings, the development of Village 7A will generate about 3,540 vehicular trips per day at ultimate development. Of these, 8% of daily trips are assumed to occur in the AM peak hour and 10% of trips in the PM peak hour. During the morning peak hour, 90% of trips are assumed to be outbound and 10% inbound. During the afternoon peak hour, 80% of trips are assumed to be inbound and 20% outbound. These assumptions are detailed in Table 2 and Table 3.

- **Table 2: Directional movements of peak hour traffic**

	In	Out
AM peak (8% of daily trips)	10%	90%
PM peak (10% of daily trips)	80%	20%

- **Table 3: Inbound and outbound trips occurring during the morning and afternoon peak hours**

	In	Out
AM peak (283 trips)	28	255
PM peak (354 trips)	283	21

3.2. Forecast traffic at ultimate development

In order to estimate the total traffic in Village 7A, anticipated development yields for Village 7B and Lot 4 were included as well as existing yields for The Vines. A summary of the yields are detailed below:

- Village 7B: Dwellings - 1,100 residential lots
- Village 7B: Retail – 4,500m^2 gross floor area
- Village 7B: Primary school – 400 enrolments
- Lot 4: Dwellings – 204 residential lots

4. Trip distribution

The trip distribution model in the Ellenbrook EMME model was broken down into three different components, reflecting the three different types of trips, namely:

- Internal-internal trips
- Internal-external and external-internal trips
- External-external trips.

For internal-internal trips, a gravity type model formulation was used whereby the closer the origin and the destination zones, the more trip making activity resulted between the two zones.

For internal-external and external-internal trips, the distribution was based on the assumed distribution in Table 4 which was derived from matrices received from Main Roads WA when the EMME model was created.

- **Table 4: Assumed Distribution of Internal-External and External-Internal Trips**

Zone (Gateway)	**Percentage**
20 (Gnangara Rd W)	32.6%
21 (Reid Hwy W)	9.7%
22 (Lord St)	8.8%
23 (Great Northern Hwy S)	4.9%
24 (Roe Hwy E)	9.3%
25 (Great Northern Hwy N)	4.0%
26 (Railway Pde N)	2.1%
27 (Perth-Darwin Hwy N)	2.5%
28 (West Swan Rd S)	5.9%
49 (West Swan)	3.9%
175 (Henley Brook)	0.3%
176 (Belhus)	4.0%
177 (Cathedral Ave E)	7.9%
178 (Whiteman Park)	2.1%
179 (Middle Swan)	1.9%

External-external trips were taken from a matrix of through trips provided by Main Roads WA.

5. Transport network modelling

5.1. Trip generation network modelling

For the purpose of EMME modelling, Village 7A was divided into three zones. These are indicated below in Figure 5-1. A total of 590 dwellings has been assessed for this report and the numbers of dwellings per zone are highlighted in orange.

- **Figure 5-1: Zones used for modelling**

5.2. Village 7A – Ultimate development modelling

The proposed yields and the road network of Village 7A were included in the existing transport network model to forecast development traffic during the ultimate development stage. To assess the impact of the proposed Perth-Darwin Highway connection (PDHC) on Village 7A, two scenarios were analysed:

- Scenario 1: connection to the PDH at the western end of the Village 6 development
- Scenario 2: no PDHC assumed

5.3. Forecast traffic during the ultimate development phase

It has been assumed that AM peak hour traffic would be eight percent and PM peak hour traffic ten percent of daily traffic. Figure 5-2 shows the forecast traffic volumes on the key streets within Village 7A (i.e. Banrock Drive, Delapre Drive and Adlington Pass), during the ultimate development phase with the PDHC.

- **Figure 5-2: Scenario 1: Ultimate development phase with PDHC – forecast traffic on key internal streets**

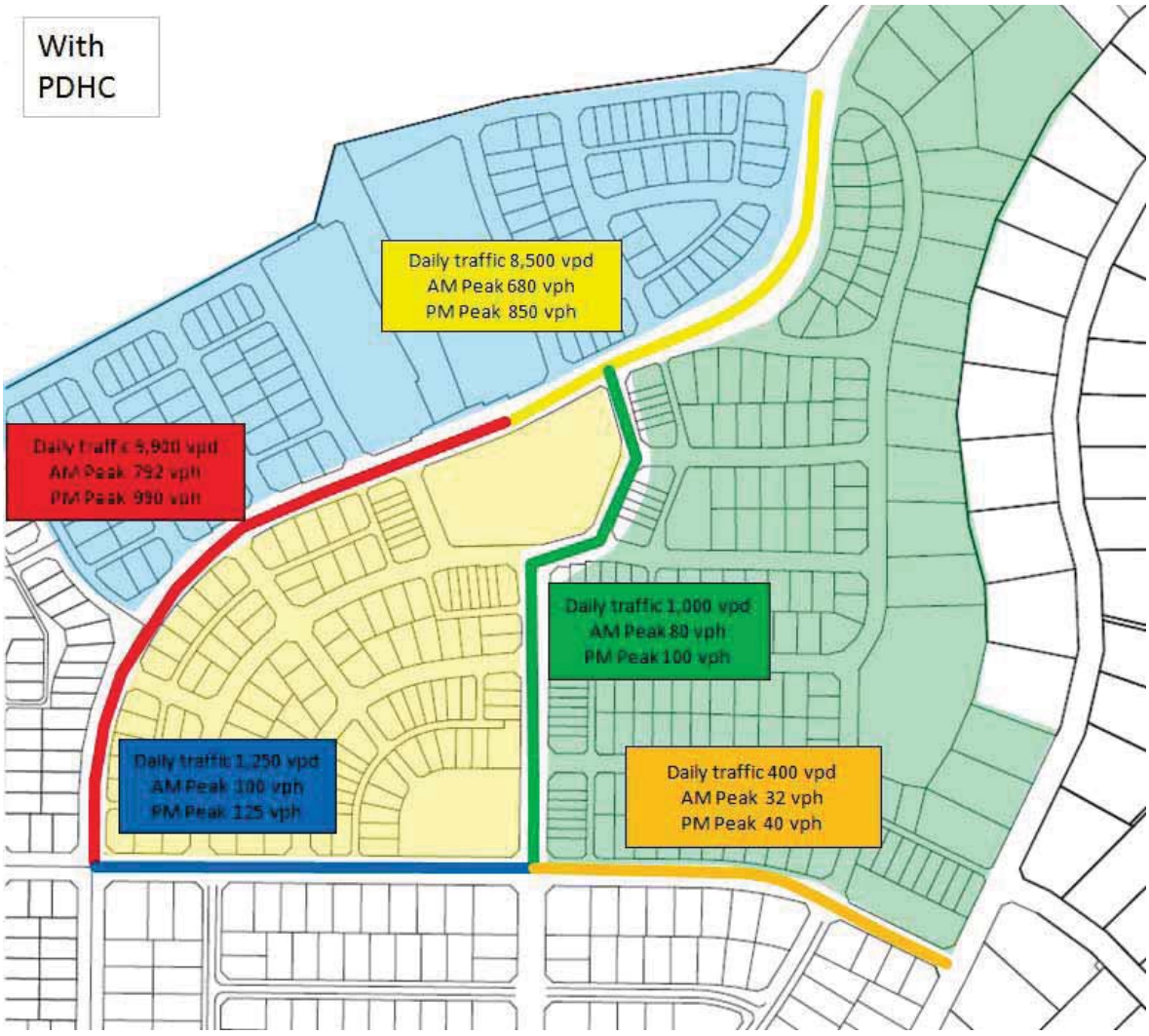
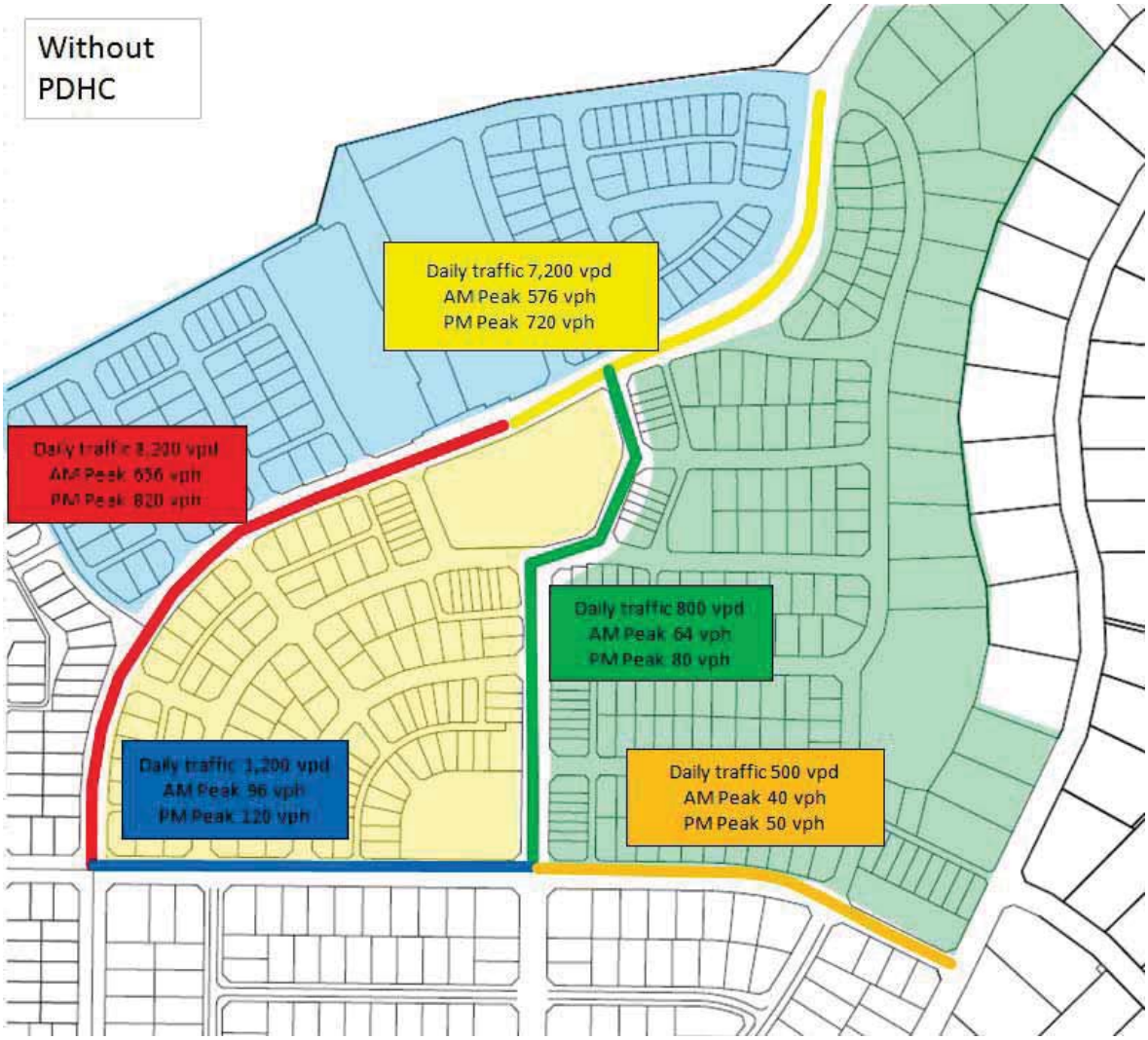


Figure 5-3 shows the forecast traffic volumes on the key streets within Village 7A (i.e. Banrock Drive, Delapre Drive and Adlington Pass), during the ultimate development phase without the PDHC. The same AM and PM peak hour assumptions as detailed in Section 3.1 were also applied to the ultimate development traffic.

- **Figure 5-3: Scenario 2: Ultimate development phase without PDHC – forecast traffic on key internal streets**



Banrock Drive will function as the key link from Village 7A to Village 7B. Approximately 8,500 vehicles per day are forecast to use Banrock Drive through Village 7A, assuming a connection to the PDH.

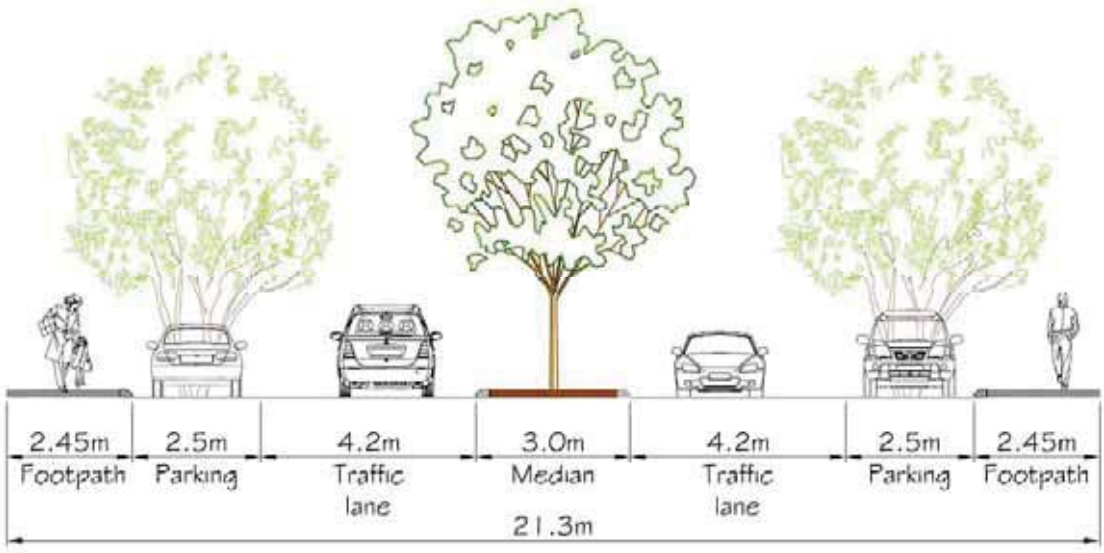
6. Traffic impacts

6.1. Overview of Transport Network

The Western Australia Planning Commission's (WAPC's) Liveable Neighbourhoods (2004)[2] guidelines outline a functional road hierarchy, which can be applied to the proposed street network. The classification of streets should be based on character, function and land use integration (refer to Table 1, Appendix A). Accordingly, streets should be classified as either arterial routes or local streets. Arterial routes are intended to provide safe and efficient regional and local traffic movement. Local Streets are compatible with residential land uses and low volume local traffic movements. They are intended to provide a safe environment for pedestrians and cyclists. Both arterials and local Streets are further distinguished by form, function, and volume range.

Entry 1 is the principal point of access to/egress from Village 7A with forecast traffic volumes ranging up to a maximum of 8,500 vehicles per day at ultimate development. Thus, it is recommended that this principal route (Banrock Drive) through the precinct (see Figure 6-1) be classified as a Neighbourhood Connector (A) with a minimum street reserve width of 22 metres and road pavement width (including car parking) of 17.4 metres. Figure 6-1 shows an indicative layout for Banrock Drive.

- **Figure 6-1: Indicative layout of Banrock Drive**

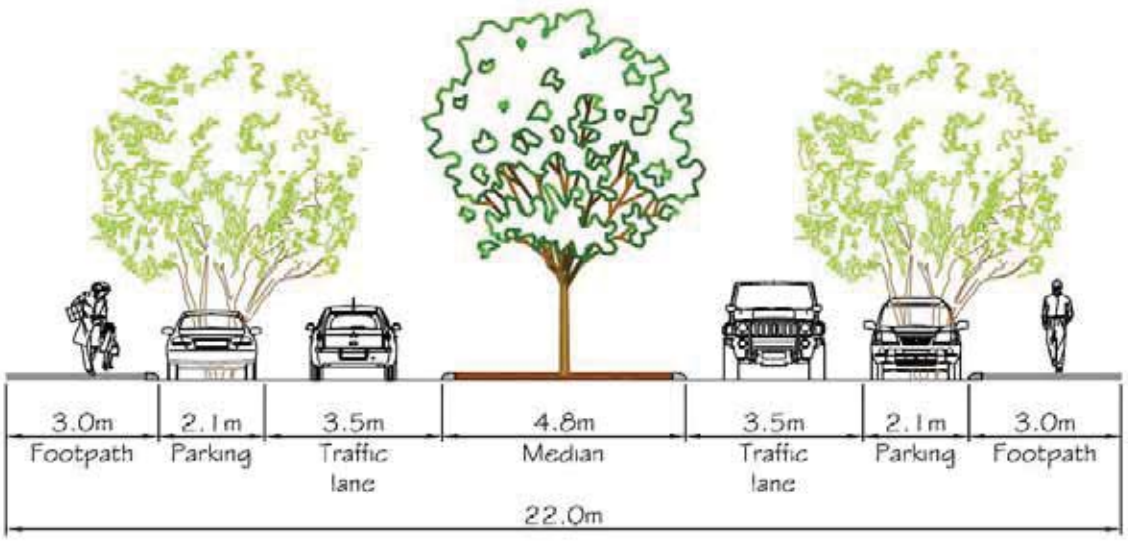


[2] WAPC Liveable Neighbourhoods (draft version, 2004) is an operational policy for the design and assessment of structure plans and subdivisions, and development for new urban and country centres. Liveable Neighbourhoods has been prepared to implement the objectives of the State Planning Strategy which aims to guide the sustainable development Western Australia to 2029.

Entry 2 is a secondary access to Village 7A from the south. Delapre Drive is anticipated to carry up to 1,000 vehicles per day at ultimate development. This street will predominantly be used by vehicles entering/ exiting from the southern area of Village 7A and the future Woburn Park. The recommended classification of this street is Access Street (A) with an indicative street reserve width of 22 metres.

Entry 3 will provide access to Village 7A from the east. Adlington Pass is anticipated to carry approximately 500 vehicles per day at ultimate development. An Access Street (A) classification has been proposed for this street with an indicative street reserve width of 22 metres. Although Adlington Pass is anticipated to carry low volumes of traffic it will still function as a through street. Traffic Lane widths of 3.5 metres are the maximum recommended, as they provide future proofing for a bus linkage with The Vines. Figure 6-2 shows an indicative layout for both Delapre Drive and Adlington Pass.

- **Figure 6-2: Indicative layout of Delapre Drive and Adlington Pass**



It is recommended that all other streets within Village 7A are classified as Access Streets (C). These streets should have a road reserve width of 15-16 metres, providing opportunity for on-street parking, if required. Laneways/ rear access lanes are required to have a minimum total width of six metres in order to provide access for service vehicles. Footpaths may also be positioned on one side of the street only. Figure 6-3 shows an indicative layout of an Access Street (C).

- **Figure 6-3: Indicative layout of an Access Street (C)**

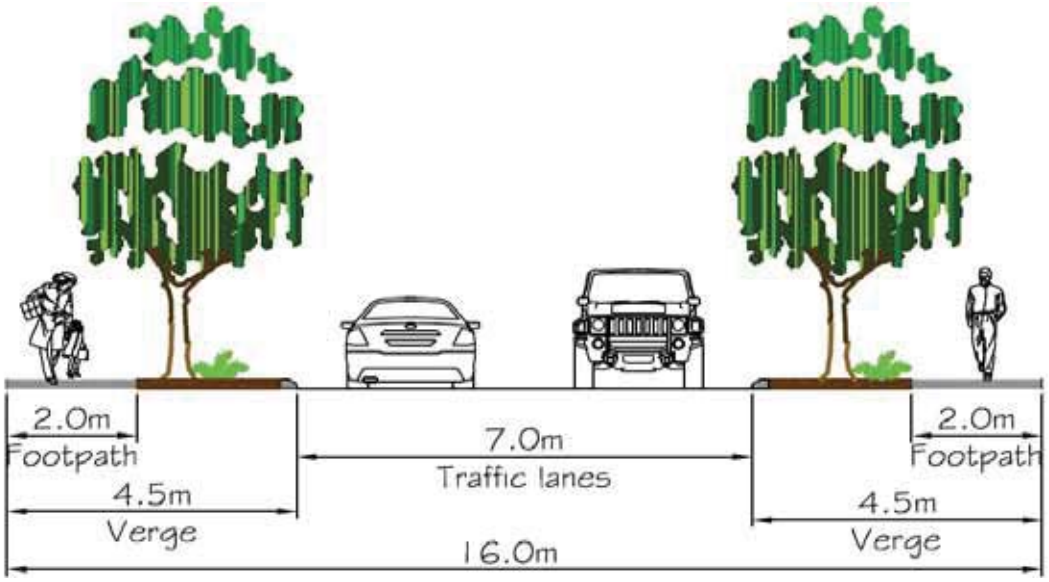
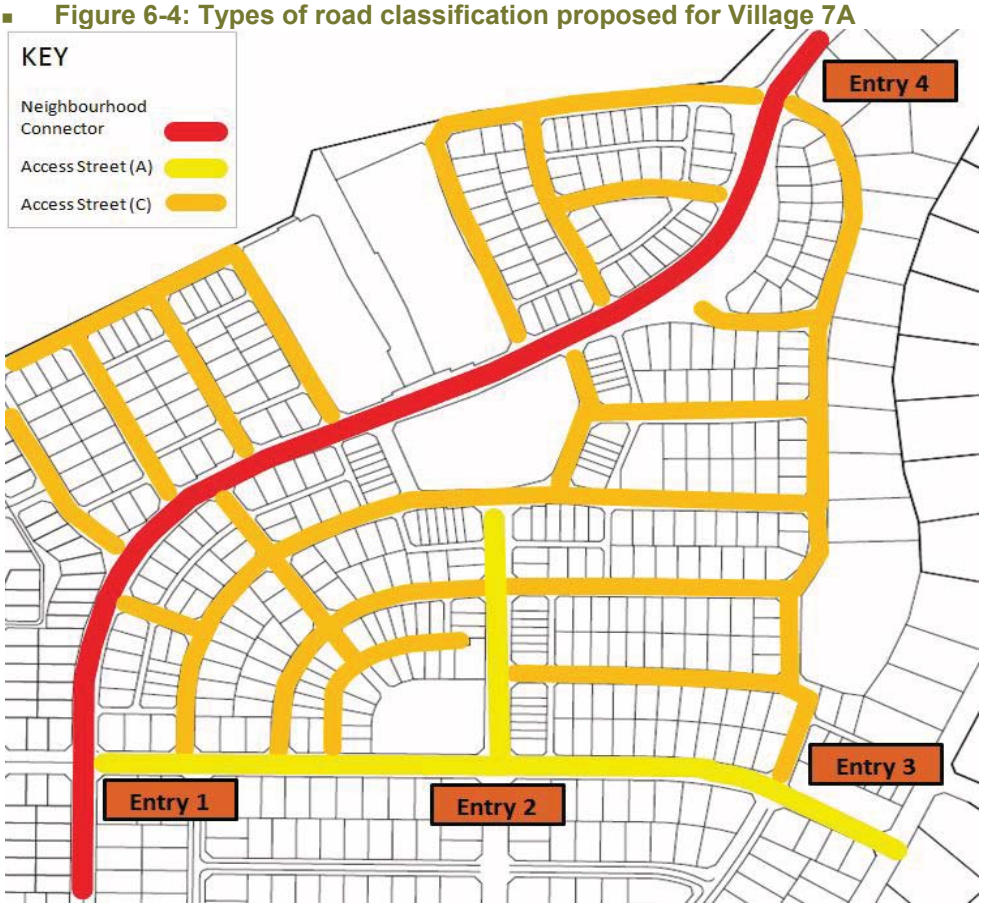


Figure 6-4 indicates the varied type of road classifications proposed for Village 7A development.

- **Figure 6-4: Types of road classification proposed for Village 7A**



6.2. Intersection treatments

6.2.1. External intersections of Village 7A

The proposed treatments for key external intersections (Entry 1, Entry 2, Entry 3, and Entry 4), are shown in Figure 6-5. Roundabouts are proposed at Entry 1, Entry 2 and Entry 4 because of the traffic volumes expected on the cross streets at these locations. Entry 3 is proposed to be a T-intersection with give way/ stop control on the minor leg.

- **Figure 6-5: Key external intersection treatments**

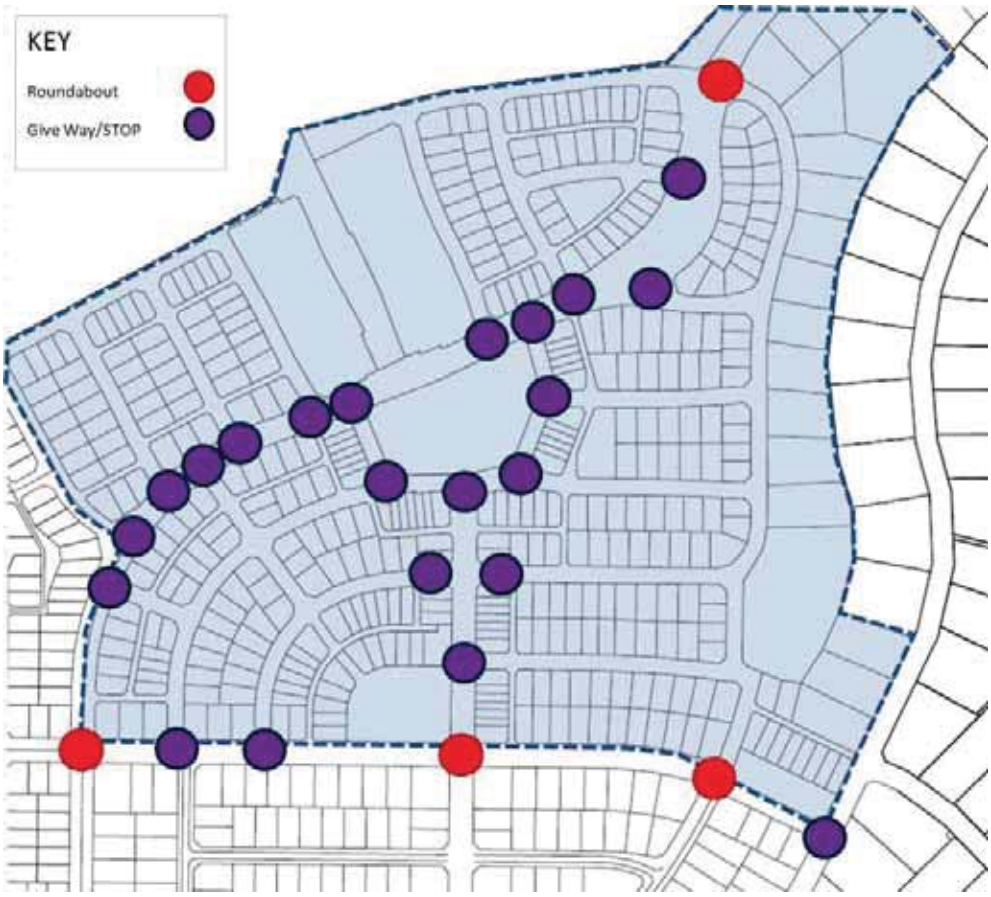
6.2.2. Internal intersections of Village 7A

A number of T-intersections are proposed within Village 7A. Appropriate intersection controls depend on:

- The traffic volume range and traffic turning movements
- Forecast pedestrian crossing demands within the vicinity
- Sight distances
- Proposed urban design and landscaping

Figure 6-6 shows the proposed intersection treatments within Village 7A. Giveway/ stop controls are considered appropriate for the majority of intersections within the precinct. However, one roundabout control should be installed near the proposed Public Open Space (POS) at the centre of Village 7A.

- **Figure 6-6: Intersection treatments within Village 7A**



7. Pedestrian and cycle provision

7.1. Overview

The objectives of Liveable Neighbourhoods in relation to walking and cycling within the development area include:

- Provision of a safe, convenient and legible movement network including on-road and off-road routes for walking and cycling, particularly for people with disabilities.
- Designing major routes as integrator arterials with frequent opportunities for pedestrians to move safely along and across them.
- Designing street networks to optimise walking and cycling access to neighbourhood and town centres, schools, public transport stops and stations, and other destinations.
- Provision of pedestrian and cycle paths through parks for recreation purposes wherever practicable.

7.2. Pedestrian facilities

According to Liveable Neighbourhoods, Access Streets must have a footpath on at least one side of the road. Dual footpaths are preferable in all cases however they may be required where higher pedestrian demand is expected (i.e. along routes to schools, shops and bus stops). Footpaths should have a minimum width of 1.5 metres and should be 2 metres near and within areas where there is significant pedestrian activity.

Neighbourhood Connectors (A) must have a shared path (2.5 metres) on one side and a 1.5 metre wide footpath on the other side as a minimum. Provision of shared paths can increase safety for young pedestrians and less experienced cyclists who would otherwise have to cycle on the street. These paths should be characterised by good passive surveillance. This can be facilitated by ensuring housing has limited setbacks and garages do not restrict views from living areas. Adequate street lighting will also increase surveillance.

7.3. Cycling facilities

Under normal circumstances, on road cycle lanes should be provided on Neighbourhood Connectors (A). However, given that Ellenbrook Village has no definitive on-road cycle lanes throughout its entirety and in order to maintain consistency, it is proposed that less experienced cyclists will cycle on dual use footpaths and experienced cyclists will be able to utilise the space available on the 4.5m wide traffic lanes.

Low traffic volumes (less than 3,000 vehicles per day), are anticipated on Access Streets. Access Streets are also intended to be slow speed environments. Therefore, these roads are typically safe enough for cars and cyclists to share. Lane widths should generally not exceed three metres.

To support walking and cycling, the movement network should also be designed to include street furniture and clear signage. Moreover, footpaths and street crossing points should include ramped kerbs and tactile paving to facilitate universal access.

8. Public transport

The Village 7A will be served by a provisional bus route which will serve the development via Entry 1 and Entry 4 along Banrock Drive. This is detailed within Figure 8-1 below. The provisional bus route is recommended to provide access to Ellenbrook town centre, Ellenbrook district Centre, Village 7B and Woburn Park (when developed). The majority of trips generated by Village 7A are expected to access these areas.

- **Figure 8-1: Proposed bus route**

The intersection and carriageway along this road will be designed to provide an efficient future bus service. It is recommended that bus stops be provided at a spacing of approximately 300 to 400 metres, to provide an accessible service to Village 7A. It is imperative that pedestrian crossing facilities to and from the bus stops should be provided to maintain pedestrian safety and passive surveillance of stops should be maximised with nearby streets being fronted by development, in order to minimise breaks in surveillance.

Appendix A

Table 1: Liveable Neighbourhoods – functional road classifications

Street Type	Characteristics	Target Operating Speed (km/h)	Indicative Maximum Volume (vehicles per day)	Pedestrian/ Cyclist Facilities
Neighbourhood Connector **A** (Median)	2-lane divided street, cycle lanes and parking	50	7,000	A minimum of one shared path, with a foot path on the other side of the street; on-street cycle lane only where volumes exceed 3,000 vehicles per day
Neighbourhood Connector **B** (Minor)	2-lane undivided street, typically can accommodate buses, shared path and on-street like lanes	50	3,000	Shared path on one side, foot path on other side; no dedicated on-street cycling provision
Access Street **A** (Avenue)	2-lane with central median, intended parking	40 - 50	3,000	Footpath on at least one side; no dedicated on-street cycling provision
Access Street **B** (Wider Street)	Wider undivided street with increased parking and/ or traffic demand	40 - 50	3,000	Footpath on at least on one side; no dedicated on-street cycling provision
Access Street **C** (Yield or give way street)	Typical and most common undivided residential street	40 - 50	3,000	Footpath on at least on one side; no dedicated on-street cycling provision
Access Street **D** (Narrow yield or give way street)	Narrow undivided street for low parking demand over short lengths	30 - 50	1,000	Footpath on at least on one side; no dedicated on-street cycling provision

APPENDIX B ENVIRONMENTAL ASSESSMENT

ENVIRONMENTAL SUMMARY REPORT

Ellenbrook Village 7A

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APPENDICES

1.0 INTRODUCTION

1.1 Proposed Development

Ellenbrook Village Site 7A is located (Figure 1) in the northern catchment of the Ellenbrook development area, adjacent to The Vines and Malvern Springs North. The site extends over approximately forty-four hectares and is comprised predominately of cleared land with pockets of remnant bushland.

Site 7A is surrounded by The Vines estate to the east, Woburn Park to the south and Ellenbrook Village 6 'Malvern Springs' to the west.

1.2 Statutory Approvals

The Ellenbrook Project in its entirety, including Woodlake Village, Morgan Fields, The Bridges, Coolamon and Charlottes Vineyard which are already constructed, together with Village 6 'Malvern Springs' and Village 7, was assessed by the Environmental Protection Authority (Assessment No. 551) and approved by the Minister for the Environment subject to conditions set out in Statement 288 dated 13 October 1992 and Statement 345 dated 3 March 1994.

Ellenbrook Management Pty Ltd has reported its compliance with conditions to the Department of Environment and Conservation (DEC) in a Performance and Compliance Report submitted to the DEC Audit Branch in 2002, and is continuing with this reporting process as appropriate.

The Development Plan for Village 7A is submitted as the latest stage of development at Ellenbrook where establishment of new urban development has been proceeding in accordance with approvals issued by the Minister for the Environment in 1992 and 1994 and in compliance with environmental management plans prepared to meet the conditions set in the Minister's approvals.

The EPA has advised, in a letter dated 27 October 2004 (Appendix A), that the project continues to be covered by the Minister's approval and that subsequent stages of subdivision within the approval project do not require any further referral to the EPA.

The relevant conditions and reporting requirements of the Minister's approval continue to apply to the project and will be complied with.

2.0 EXISTING ENVIRONMENT

2.1 Physical Environment

2.1.1 Topography, Landform and Soils

A dune ridge runs north/south through the eastern boundary of Village 7A at a maximum elevation of forty-six metres Australian Height Datum - AHD (Figure 2). The site generally slopes gently away from this high point to a low point in the Sawpit Gully at approximately eighteen metres AHD.

Soils at the proposed residential subdivision are predominately mapped as *Thin Bassendean Sand over Guildford Formation* characterised by fine to medium grained, moderately well sorted, white to pale grey sands of aeolian origin at the surface, grading to yellow sands at depth. These aeolian sands overlie well consolidated brown to green sandy clays and clayey sands of high plasticity.

Soils within the wetland areas at the site are mapped as *Peaty Clay* characterised by dark grey and black with variable sand content of lacustrine origin (Gozzard, 1986).

The peaty clay soil unit is identified in Western Australian Planning Commission (2003) *Planning Bulletin 64* as having a 'high risk of AASS and PASS at depths less than three metres from the soil surface'. The sand unit is mapped as moderate to low risk of ASS occurring at depths generally greater than three metres.

The most recent DEC guidance advises consideration of ASS issues in a 500 metre buffer area, extending out from all high risk ASS mapped features, wetlands and/or surface water bodies.

2.1.2 Groundwater

The northern catchment of Ellenbrook, including Village 7A, drains eastwards towards Sawpit Gully and Ellen Brook. Both brooks ultimately discharge to the Swan River.

Groundwater modelling for the entire Village 7 site has been undertaken by JDA Consultant Hydrologists. Average annual maximum groundwater contours modelled in 2004 are presented on Figure 3.

A Drainage and Nutrient Management Programme has been prepared for the Ellenbrook Northern Catchment (JDA, 2004) to guide development so that it meets the criteria and objectives set by the Minister for the Environment in January 1994. The DNMP for the northern catchment was approved by the DEC in June 2004.

2.1.3 Wetlands

The DEC has identified a Conservation Category Wetland bordering the southern edge of Village 7A (Figure 4). The southern wetland (UFI 8928) was not identified in the Environmental Review as an area requiring conservation and has been cleared as part of the Village 6 'Malvern Springs' development.

Analysis of water level data for the site has found the wetland areas no longer appear to be connected to the underlying groundwater (JDA, 2004). This may be a result of the declining water levels of the Gnangara Mound caused by a variety of factors such as increased abstraction for public water supply and utilisation by pine plantations. Any seasonal surface water is therefore likely to be a result of short-term perching caused by the peaty clay soil profiles beneath the wetland areas.

2.2 Biological Environment

2.2.1 Vegetation and Flora

The majority of the original native vegetation at the site has previously been cleared in accordance with Ministerial approvals. The central remnant vegetation consists of Southern River Complex vegetation with pockets of Bassendean-North vegetation complex and along the north-eastern boundary (Heddle *et al*., 1980). These complexes are described as follows:

Bassendean Complex - North
This complex consists of a range of vegetation from low open forest and low woodland of banksia - pricklybark to low woodland of Melaleuca spp., and sedgelands which occupy the moister sites.

Southern River Complex
The Southern River Complex consists of open woodland of marri – jarrah - banksia on the elevated areas and fringing woodland of Eucalyptus rudis - Melaleuca rhaphiophylla along the streams.

2.2.2 Fauna

As the site has been predominantly cleared it is unlikely that native fauna would regularly utilise Village 7A site. However, Site 7A borders the regional bush reservation therefore within the broader Ellenbrook area inclusive of the regional reserve may be utilised by potential species of significance as listed on Table 1.

Of these species the Black-striped Minnow and Western Swamp Tortoise require open water and therefore cannot occur within the site. The remaining species are all mobile and will be able to relocate to surrounding reserves and bushland areas. The site does not contain any habitat areas that fauna species would exclusively depend upon.

Table 1: Threatened and Priority Fauna that may occur in the Ellenbrook Area.

Species	Level	Comments
Chuditch (*Dasyurus geoffroii*)	Schedule 1	Highly mobile and may utilise bush remnants and corridors. One specimen trapped in Ellenbrook Village 5 area in 2002.
Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*)	Schedule 1	Feeds in proteaceous scrubs and heaths and eucalypt woodlands as well as pine plantations. Breeds mainly in wheatbelt forests. Is likely to occur in the area in question.
Western Swamp Tortoise (*Pseudemydura umbrina*)	Schedule 1	Restricted habitat requirements and is restricted in distribution. Caught/trapped in Whiteman Park in 1956. No suitable habitat in Village 7A.
Graceful Sunmoth (*Synemon gratiosa*)	Schedule 1	Has been recorded in a few locations form Wanneroo to Mandurah. Caught/trapped in Whiteman Park in 1997.
Peregrine Falcon (*Falco peregrinus*)	Schedule 4	Species is uncommon and prefers areas with rocky ledges, cliffs, watercourses, open woodland or margins with cleared land. It may occur in the area in question.
Black-striped Minnow (*Galaxiella nigrostriata*)	Priority 3	Typically occurs in shallow isolated pools in peat flats surrounding forested areas. No suitable habitat in Village 7A.
Quenda (*Isoodon obesulus fusciventer*)	Priority 4	Prefers areas with dense understorey vegetation, particularly around swamps and along watercourses. Caught/trapped in Ellenbrook in 1989 and Whiteman Park in 1997.
Western Brush Wallaby (*Macropus irma*)	Priority 4	Occurs in areas of forest and woodland supporting a dense shrub layer. Night sighting in Ellenbrook in 1996.

2.3 Social Environment

2.3.1 Aboriginal Heritage

A search of the Department of Indigenous Affairs' heritage sites database did not identify any heritage areas within Village 7 site. However, given the known occurrence of sites in the general vicinity, the possibility exists that undiscovered artefacts may be present on the site. All contractors working on the development will be made aware of their responsibilities under the Aboriginal Heritage Act with regards to the discovery of Aboriginal heritage sites.

2.3.2 Surrounding Land Use

Village 7A is surrounded by The Vines estate to the east, previous Ellenbrook stages to the south, the Sawpit Gully conservation area to the north-east. None of these land uses require buffering or impinge upon the planned development of Village 7A.

3.0 IMPACTS AND MANAGEMENT

3.1 Vegetation and Flora

3.1.1 Vegetation Complexes

The proposed Village 7A development extends over approximately forty-four hectares of predominately cleared land. The remnant pockets of vegetation included representation from the Bassendean Complex – North and the Southern River Complex. The conservation status of these vegetation complexes is reported in Bush Forever (WAPC, 2000) and outlined in Table 2.

Table 2: Conservation Status of Vegetation Complexes in the Swan Coastal Plain portion of the Perth Metropolitan Region

Vegetation Complex	Original Extent	Area Remaining (% original extent)	Area Currently Reserved (% original extent)	Area Reserved or Proposed for Reservation (% original extent)
Bassendean Complex – North	22,933ha	12,390ha (54.0%)	6,842ha (29.8%)	10,744ha (46.8%)
Southern River Complex	31,148ha	5,370ha (17.2%)	1,775ha (5.7%)	3,147ha (10.1%)

The current reservation extent of the Bassendean Complex – North and the Southern River Complex is the final outcome of the Bush Forever process and reflects the government's decision as to what is acceptable based on review of all relevant issues.

It is relevant to note that approximately 450 hectares has been set aside for reservation in the Ellenbrook Northern Conservation area. Vegetation representation within the local area was an issue addressed during the Public Environmental Review process and assessment by the EPA when conservation areas were defined and ongoing management responsibilities for the regional (bushland) reservation was established.

Remnant vegetation will be retained in a central POS area. The estimated extent of vegetation to be retained is approximately 1.25 hectares. The removal of the remaining vegetation is consistent with the Minister for Environment's approval of the project in Statements 288 and subsequent clearance (through Statement 345) of Condition 4.1. Figure 5 defines the Ellenbrook project boundary and the regional conservation areas.

No Declared Rare Flora has been identified within the Village 7A area.

3.2 Fauna

As the majority of Village 7A has been previously cleared it is unlikely that any Threatened and Priority fauna species as listed in Table 1, would be present in the Village 7A development area.

The fauna species (as listed in Table 1) are mobile and unlikely to depend entirely on the Village 7A development area. Given the clearing of the Village 7A development area, individual animals present are likely to have moved to other areas of bushland in the Lexia Wetlands conservation area to the immediate north, the Sawpit Gully conservation area or The Vines estate to the east.

3.3 Drainage and Nutrient Management

Due to the shallow depth to groundwater at the site, drainage controls will need to be put in place. Fill may also be required in some areas to ensure a minimum separation distance of 1.2 metres from the AAMGL to ground level.

Drainage for the proposed development will be designed in accordance with the Ellenbrook Development Northern Catchment Drainage and Nutrient Management Programme (JDA, 2004). Where appropriate the drainage strategy will optimise the amount of storm water which is locally managed by infiltration to the superficial aquifer, in accordance with DEC urban water management objectives.

The storm water drainage system will include direction of storm water into a pipe network with flow towards infiltration swales and basins. Consideration will be given to utilising open based side entry pits and manholes within the drainage system to promote infiltration. The infiltration swales and basins, which will be located within POS areas, will be designed to accommodate flows from storm events up to 1 to 2 year ARI. Overflow from the infiltration swales/basins will be overland through vegetated areas into the wetlands. In addition, flush kerbing will be installed on roads adjacent to the POS areas.

Finalisation of the drainage system design will be subject to the Shire of Swan requirements and groundwater levels.

3.4 Acid Sulphate Soils

The site is mapped as containing soils with high and moderate-low Acid Sulphate Soil (ASS) Risk.

ASS testing will be conducted following detailed drainage design when possible impacts on the water table can be assessed. These impacts are most likely to occur where dewatering is required for installation of services such as pumping stations.

Testing will be conducted in accordance with DEC guidelines and the results will be submitted to the DEC for review and comment.

3.5 Construction Impacts

The short-term impacts of construction, including noise and dust, will be managed according to industry best practice and in accordance with all applicable government regulations.

All static and mobile machinery employed during construction will be fitted with appropriate noise attenuation equipment and will comply with occupational noise regulations. Construction activities will be managed so as to comply with the Environmental Protection (Noise) Regulations 1997.

Dust arising from construction works and bare ground will be controlled so as to comply with requirements within the EPA's *EIA Guidance No. 18: Prevention of Air Quality Impacts from Land Development Sites*. In particular:

- All cleared areas will be stabilised by watering, mulching or equivalent means.
- No vegetation or other debris will be burned on the development site.
- Where necessary, watering will be employed to minimise dust generation while earth works are in progress.
- The developer will ensure that provisions are made, and responsibility accepted, for dust control in all contracts issued for site works.

4.0 COMPLIANCE WITH EXISTING STATUTORY ENVIRONMENTAL APPROVALS

The development of Village 7A in accordance with the Development Plan presented in this report has been assessed and approved by the Minister for Environment's Statements 288 and 345 and the Minister's clearances of conditions of approval that have since been issued.

The Minister's approval of the Ellenbrook proposal, as described in the Ellenbrook Public Environmental Review (Feilman Planning Consultants, 1992) and subsequently modified in accordance with the proponent's response to Condition 4.1 of Statement 288, created a major conservation area of approximately 450 hectares in the north of the project area.

Figure 5 depicts the location and extent of this conservation area, in relation to the location of Village 7A and the overall Ellenbrook project area.

This area includes wetlands, vegetation, flora and fauna habitat focussed on the Lexia Wetlands and the Sawpit Conservation Area in the north of the original Ellenbrook project area. This area has now been reserved for Regional Open Space in the Metropolitan Region Scheme, as required by the Minister for Environment.

On the basis of the conservation outcomes achieved within this reserved area, the balance of the land within the project area has been approved for urban development subject to management of groundwater, drainage and nutrient export in accordance with conditions set in the Minister's Statement and management plans subsequently compiled by the proponent and cleared by the Minister for Environment.

The Minister's Statement reflected the balance of conservation and residential development objectives required by the State Government for the project area, recognising the need to facilitate the supply of affordable housing land by allowing for complete urban development of the southern portion of the original proposal area, and balancing the impacts of this development by the establishment of a large conservation area for wetlands, damplands, vegetation, flora and fauna in the north of the proposal area.

In the time since the Minister's Statements approving development of the Ellenbrook area were published, the State Government has published *Bush Forever*, the strategic plan for conservation of bushland on the Swan Coastal Plain portion of the Perth Metropolitan Region.

The Bush Forever document and accompanying maps ratify the Minister's Statements 288 and 345 by identifying for conservation only those parts in the north of the original Ellenbrook project that have been reserved for Parks and Recreation in the Metropolitan Region Scheme.

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FIGURES

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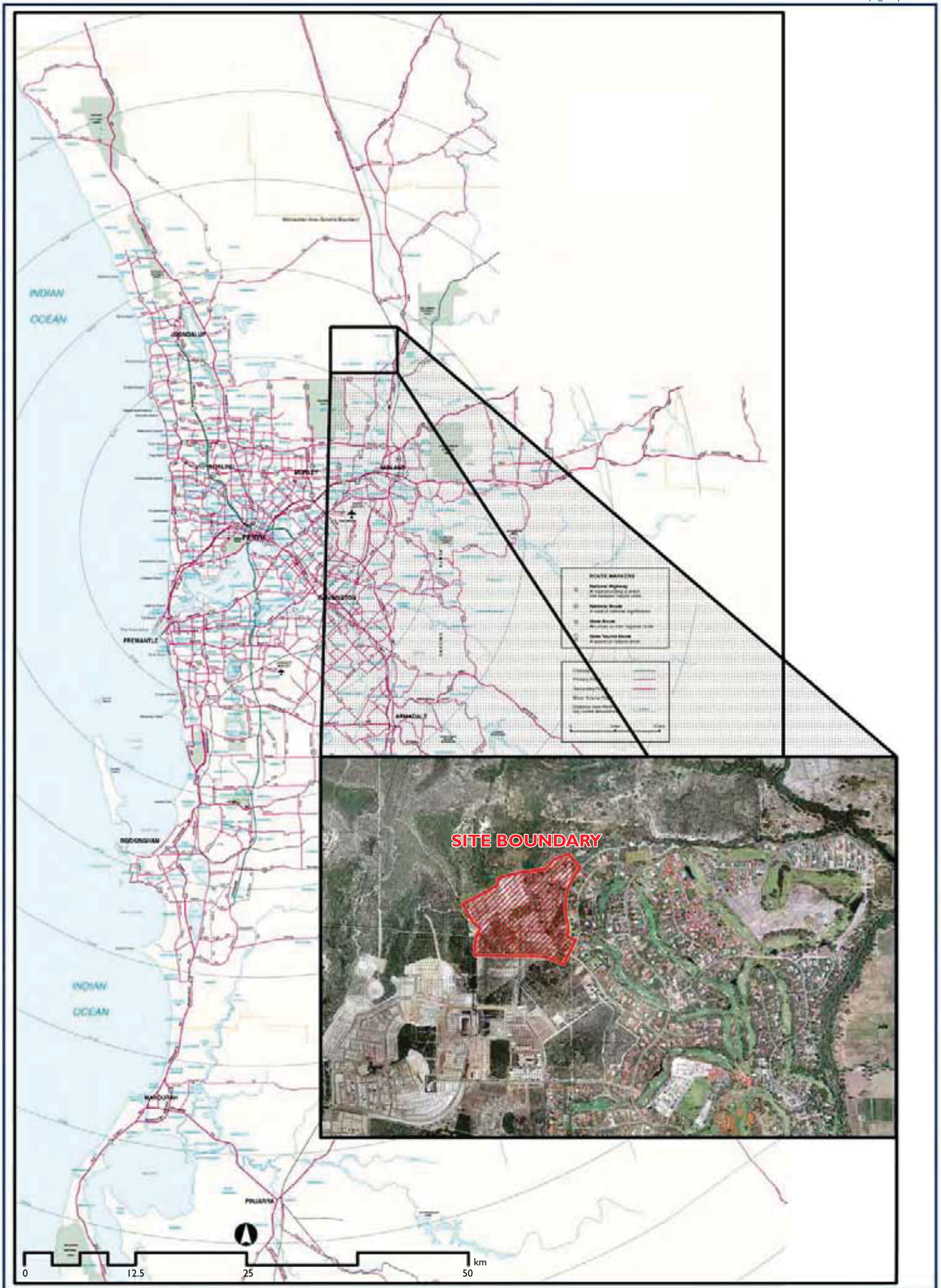

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Figure 1

Site Location

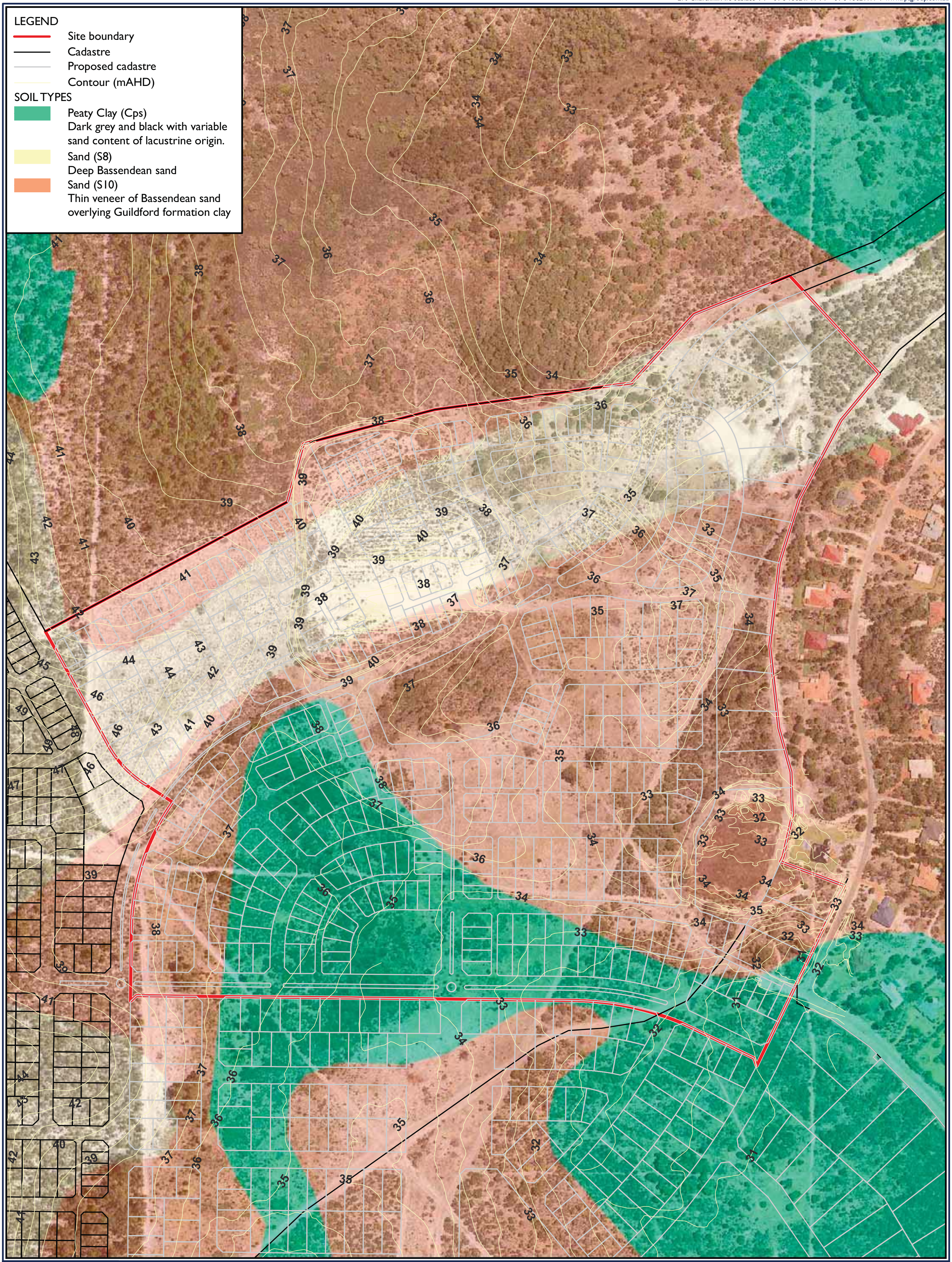

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Figure 2

Topography and Soils

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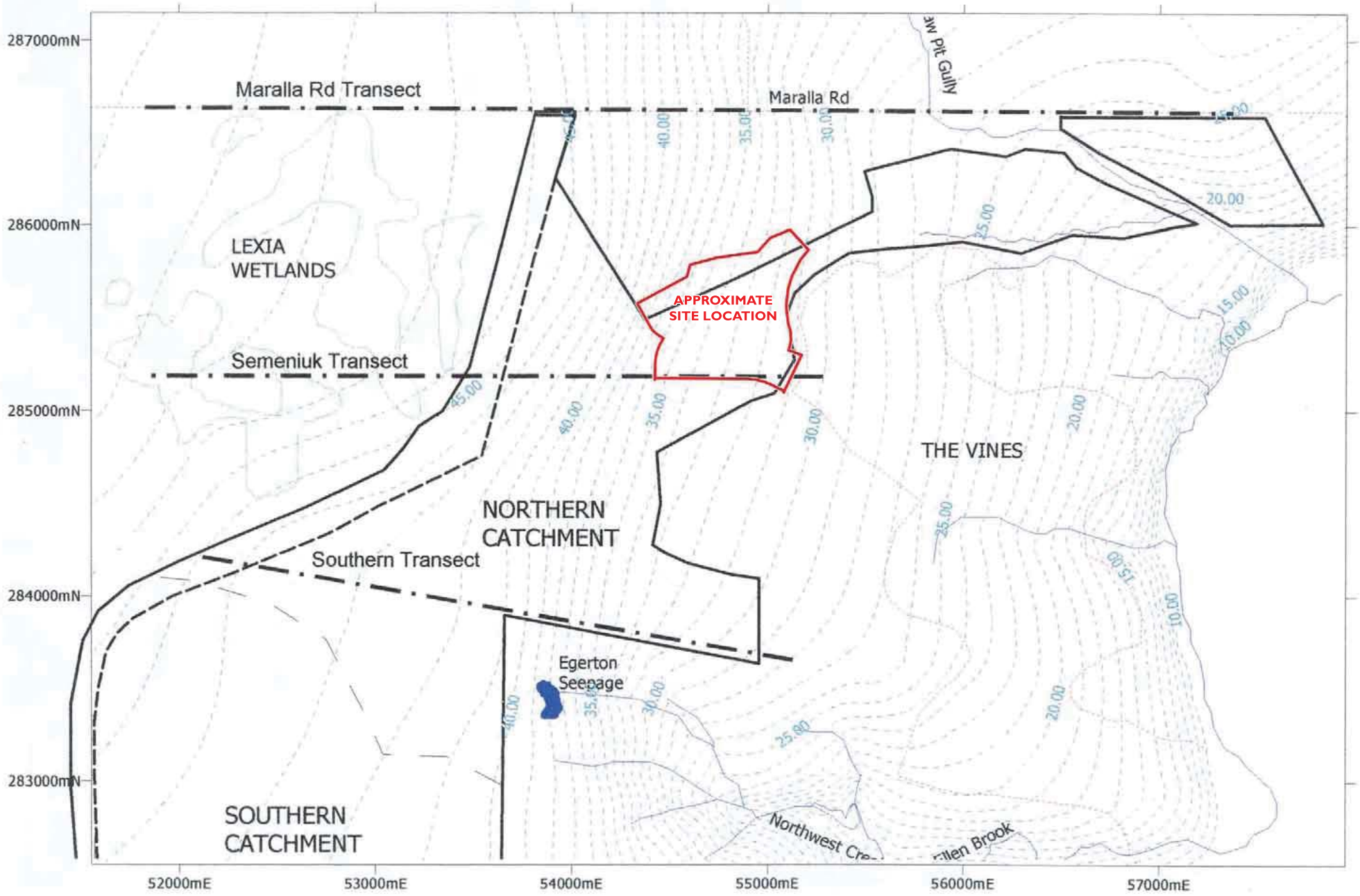

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0 125 250 500 750 1000 metres

Figure 3

Modelled Groundwater Contours (AAMGL)

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0 100 250 375 500 metres

Figure 4

Conservation Category Wetlands