PART TWO – EXPLANATORY SECTION

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1.0 Introduction

MGA Town Planners (MGA) has been commissioned by the Department of Housing and Maddestra Group to progress a Local Structure Plan (LSP) over the Southern River Precinct 3E area, comprising Lots 13, 14, 18, 19 20, 21 and 22 Southern River Road and Matison Street.

The original LSP report was prepared by Urbanplan and Bioscience Pty Ltd.

This section of the report provides information as required under the City of Gosnells (CoG) Town Planning Scheme No. 6 (TPS6) addressing relevant urban design, amenity and environmental issues.

Key aspects of the LSP include:

- Providing a desirable distribution and density of residential development facilitating a variety of housing types, to address the changing demographics and emerging needs of the Perth Metropolitan Region.
- Sustainable environmental outcomes with respect to water use, conservation and transport, while taking advantage of natural features.
- Providing an attractive commercial centre meeting the daily and weekly shopping needs of residents and local employment opportunities; being co-located with local recreation space.
- A high level of linkage within and beyond the edge of the LSP area for pedestrians, cyclists and private vehicles.

The LSP has been prepared in accordance with the City of Gosnells Town Planning Scheme No. 6; Council's local planning policies and the WAPC's Liveable Neighbourhoods policy, being a guide to the assessment and determination of applications for land use and subdivision.

The LSP report contains an Implementation section based on the requirements of the Structure Plan Preparation Guidelines (WAPC, August 2012), and some additional information added to portions of the explanatory section. Not all of the suggested requirements of the Structure Plan Preparation Guidelines have been addressed, given the LSP was recommended for approval by the City of Gosnells during 2011.

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2.0 Preamble

This document should be read in conjunction with:

- The Department of Planning's Southern River Precinct 3 Local Structure Plan 2009.
- The former Department of Planning and Infrastructure's Southern River Forrestdale Brookdale Wungong District Structure Plan 2001.
- Urbanplan's 2007 submission to Council and the WAPC (on behalf of the Departments of Housing and Education) regarding the co-location of primary and high schools and district playing fields for stormwater detention adjacent the Forrestdale Brookdale Wungong District Drain within Precinct 3.
- Taylor Burrell Barnett's Precinct 3 Local Structure Plan report that concurs with Urbanplan's 2007 assessment.
- The Forrestdale Main Drain Arterial Drainage Strategy supplemented by the district water management work undertaken to support the Integrated Land and Water Management Plan.

Southern River is an area with strong development interest, and a range of environmental and development challenges. These include conservation and environmental constraints, urban water management, fragmented land ownership and the need for coordinated integrated urban form of suitable critical mass.

Within Southern River the City of Gosnells has identified a number of precincts. Of interest to this LSP is the Precinct 3 Structure Plan - Southern River Precinct and the surrounding area. Southern River Road, Ranford Road, Matison Road and the Southern River bound Precinct 3.

This area is within the Southern River / Forrestdale / Brookdale / Wungong District Structure Plan approved by the Western Australian Planning Commission in 2001. This District Plan provides a strong regional context and an approved basis for the Department's Local Structure Plan approved by the WAPC.

This proposed LSP follows the City of Gosnells adoption of the Precinct 3 Local Structure Plan (as devised by the Department of Planning – DoP), which provides guidance on the development of the subject land in consideration of surrounding green-field sites.

Enhanced knowledge of the environmental values of the area and changes in water sensitive urban design and drainage requirements has implications for planning in Precinct 3. Equally, creation of an integrated urban form with critical mass highlights the difficulties of achieving mutually inclusive outcomes.

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3.0 Subject Land and Ownership

The subject land is bounded by Southern River Road, Matison Street, Lander Street and the Balannup Lake Drain; and lies within the suburb of Southern River approximately 20kms from the Perth central business district.

Refer to Figure 2 – Location Plan
Refer to Figure 3 – Study Area

Southern River is situated at the edge of the urban development front within the south east corridor; and is characterised by new greenfield urban development and small rural landholdings.

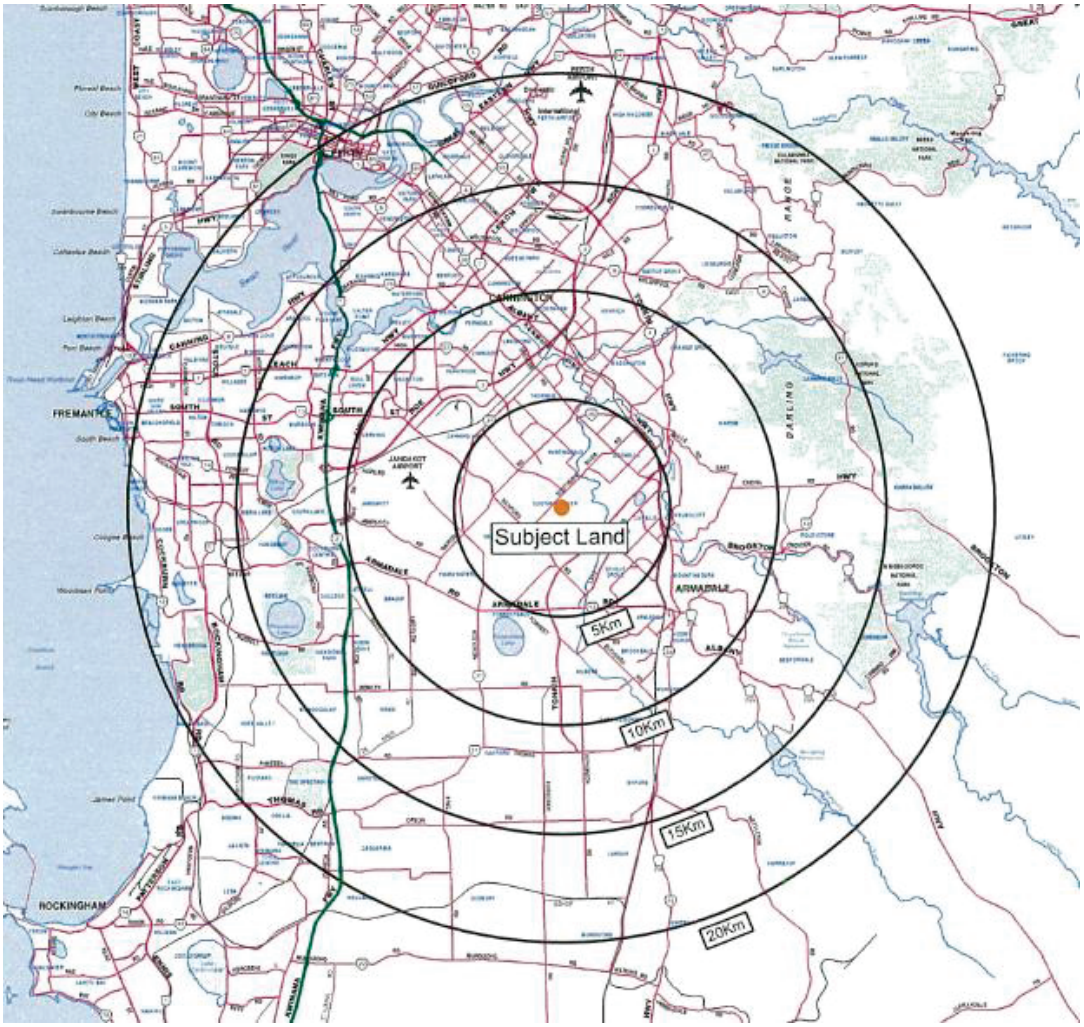


Figure 2 - Location Plan

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The subject land has a combined area of 25.7781ha, comprising seven lots, and may be described legally as:

- Lot 13 Southern River Road, Southern River is described on Certificate of Title Volume 208 Folio 84A Plan 8225. The registered owner is LWP Southern River Pty. Ltd. and Lot 13 has a legal land area of 4.0494ha.
- Lot 14 Southern River Road, Southern River is described on Certificate of Title Volume 27 Folio 389A Plan 8225. The registered owner is LWP Southern River Pty. Ltd. and Lot 14 has a legal land area of 4.0469ha.
- Lot 21 Southern River Road, Southern River is described on Certificate of Title Volume 1813 Folio 671 Diagram 72294. The registered owner is LWP Southern River Pty. Ltd. and Lot 21 has a legal land area of 2.0011ha.
- Lot 22 Southern River Road, Southern River is described on Certificate of Title Volume 1813 Folio 672 Diagram 72294. The registered owner is LWP Southern River Pty. Ltd. and Lot 22 has a legal land area of 2.2199ha.
- Lot 18 Matison Street, Southern River is described on Certificate of Title Volume 358 Folio 11A Diagram 31754. The registered owners are Carmelo Radici and Rosina Radici and Lot 18 has a legal land area of 4.5072ha.
- Lot 19 Matison Street, Southern River is described on Certificate of Title Volume 1342 Folio 833 Diagram 31754. The registered owner is LWP Southern River Pty. Ltd. and Lot 19 has a legal land area of 4.5881ha.
- Lot 20 Matison Street, Southern River is described on Certificate of Title Volume 1311 Folio 770 Diagram 31754. The registered owner is LWP Southern River Pty. Ltd. and Lot 20 has a legal land area of 4.3655ha.

TABLE 3 - LEGAL LAND AREA, OWNERSHIP AND DESCRIPTION

Lot No.	Certificate of Title	Registered Owner	Land Area
13	208/84A	LWP Southern River Pty. Ltd.	4.0494ha
14	27/389A	LWP Southern River Pty. Ltd.	4.0469ha
21	1813/671	LWP Southern River Pty. Ltd.	2.0011ha
22	1813/672	LWP Southern River Pty. Ltd.	2.2199ha
18	358/11A	Carmelo Radici and Rosina Radici	4.5072ha
19	1342/833	LWP Southern River Pty. Ltd.	4.5881ha
20	1311/770	LWP Southern River Pty. Ltd.	4.3655ha
TOTAL			25.7781ha

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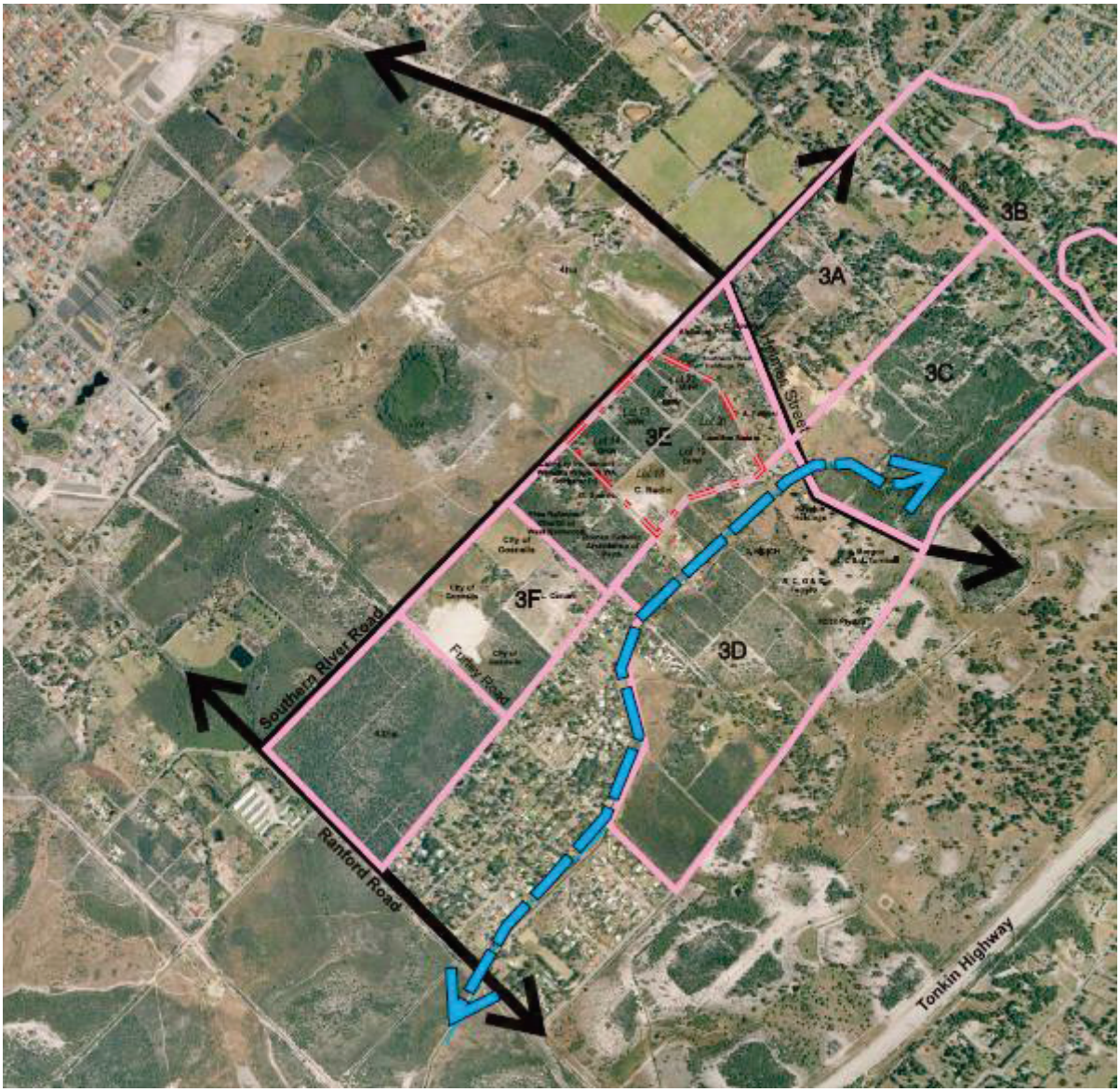


Figure 3 – Study Area

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4.0 Report Structure

The report is essentially structured based on the Liveable Neighbourhoods framework:

- A site analysis including a detailed assessment of hydritic soils, hydrology and wetland vegetation is discussed in Section 5.0.
- Section 6.0 outlines the relevant planning framework that guides development of the subject land.
- The community design philosophy is described in Section 7.0 with details of lot variety and densities.
- The movement network is discussed in Section 8.0.
- Parkland and urban water management are described in Sections 9.0 and 10.0 respectively.
- An overview of utilities is given in Section 13.0.
- Activity centres and employment are considered in Section 14.0.
- Consultation and implementation are discussed in the final sections.

5.0 Site Analysis

5.1 Landform

The landscape of Precinct 3 comprises Bassendean dune landform. It is the oldest of the three Aeolian dune systems on the Swan Coastal Plain, is generally low relief and consists of broad interdunal swales or relatively flat sand sheets between low dunes. In part the Bassendean sands overlay alluvial soils and remnant drainage systems.

Refer Appendix 2 - Bioscience Geotech Report

5.2 Hydritic Soils

Soils throughout the subject site were found to be composed of deep quartz sand of the Bassendean system. The one exception was at bore number DHW1 where ferrunginous induration “coffee rock” was found at depths of 0.35 to 0.7 metre, and under this was a layer of clayey sand before becoming coarse, rounded quartz sand, suggestive of an ancient drainage channel. Details of soil profiles are contained in Appendix 1 of the Bioscience report.

The chemical properties of recovered soil were investigated in Bioscience’s soil laboratory. Redox potential (a measure of soil’s history of inundation) was measured, as was carbon and sulphur content and SPOCAS testing for acid sulphate conditions, which also are hydritic indicators (Refer Bioscience Appendices).

The results presented in the Bioscience Appendices show that:

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- The only soil which displayed a redox potential indicative of hydritic soil (i.e. less than 400 mV) were the samples collected below 150 mm from DHW1. The most electronegative sample corresponded to the ferrunginous layer.
- The amount of carbon was generally low except for the surface soils. The exception was again DHW1 where a spike of carbon occurred at depth. DHW2 had relatively low carbon at the surface.
- The amount of sulphur present was at very low levels. None of the soils would be classified as Acid Sulphate.

Bioscience concluded from the data obtained that soil throughout the profile of DHW1 displays typical hydritic characteristics, whereas none of the other soils are indicative of wetlands.

5.3 Groundwater

Two Department of Water monitoring bores lie equidistant, about 1.6 km north (bore 4880) and south (bore 4879) of the site. These bores were installed as part of the Lake Thompson project and have been monitored for over 30 years. Hydrographs are reproduced in the Bioscience Appendices. The Hydrographs show very similar seasonal trends in terms of the extent and timing of annual variation, with a 2 m difference between minima and maxima, with maxima recorded mostly in October. Unlike many other bores in the Perth area, these show no significant long term trend to water level decline.

The 2 metre difference between maxima and minima is somewhat greater than the typical 1 m variation in Bassendean sand-hosted superficial aquifers as reported by Davidson (1995) suggesting the area has higher hydraulic conductivity, and is in proximity to discharge points (drains) thus recharges and discharges generally faster than similar areas.

Details of the soil profile and the depth to groundwater are contained in the piezometer logs in Annex B of the Bioscience report). By reference to the 30 year records from DoW bores, and considering the fairly average rainfall year and timing in 2008, it is inferred at the time recordings (30 October) groundwater levels would have been declining and be in the order of 0.25 to 0.5 m below maxima.

From the then single recording we can thus make the tentative conclusion that at DHW1, groundwater probably inundates the area in most years, with standing water up to 250 mm deep in heavy rainfall years.

At DHW2, groundwater probably rises to be 150 mm below the surface at its peak, and in very wet winters could be temporarily at the surface.

The remaining locations across the Owners' Collaborative have groundwater significantly deeper, and it is unlikely to ever rise to within 1.5 m from the surface, even in very wet years, thus the vast majority of the land has suitable clearance to groundwater for urban development. Piezometer monitoring is ongoing, and will provide finer detail of groundwater dynamics and water quality for inclusion in a Local Water Management Strategy.

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5.4 Vegetation

The subject land was reviewed by ENV Australia in 2006 as part of a site assessment report commissioned by the City of Gosnells to assist with the planning of the area. Bioscience was commissioned to undertake a review of the current state of vegetation and wetlands. Bioscience's commission involved reviewing previous studies, aerial photography and satellite imagery prior to visiting the site and undertaking parallel transects through the entire area approximately 20 metres apart.

Refer Appendix 3 – Bioscience Wetland Assessment

There are areas of upland bushland, particularly on Lot 14, and wetland fringing vegetation on Lot 19 that have native vegetation in good to very good condition, as judged by the Bush Forever rating system. Bioscience recommends that this bushland area be protected and preserved as Public Open Space, as it has higher biodiversity and conservation significance than the remnant wetland area, and is more likely to be successfully conserved.

Vegetation units within DHW's site were mapped and the condition of vegetation was assessed using a modified Trudgen method noting the approach taken by Keighery as used in the ENV Australia report.

TABLE 4 - VEGETATION CONDITION RATING SYSTEM

Trudgeon	Keighery	Bioscience Score
Excellent	Pristine	0 - 4
Very Good	Excellent	5 – 8
Good	Very Good	9-13
Poor	Good	14 -17
Very Poor	Degraded	18-21
Completely degraded	Completely degraded	22 - 25

The condition of the sectors defined in the vegetation map is colour coded on Figure 2 – Site Specific Wetland Analysis Map for the vegetation condition. Greater detail of vegetation condition analysis is described in Annex B.

The only area with vegetation unequivocally described wetland vegetation is the area surrounding piezometer DHW1 that contains the swamp paperbark Melaleuca raphiophylla. This area had been previously cleared and used for summer grazing, so the vegetation was in degraded condition.

The areas of the other 4 bores contained vegetation that included wetland indicator species such as Melaleuca preissiana, Pericalymma ellipticum and Atsartea affinis, but also contained non-wetland species such as Nuytsia floribunda, Eucalyptus todtiana and E. decipiens. The vegetation surrounding these bores is thus best described as transitional between typical wetland vegetation and typical upland vegetation of the Southern River area.

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No other wetland areas are apparent on Lots 21 and 22, other than an area at the northern tip of Lot 22 contains a stand of Melaleuca ryaphiophylla. However this is in degraded condition with no other native vegetation present.

Soil investigations undertaken in this locality immediately adjacent to a local drain found the distance to groundwater to be greater about 1 metre. The construction of the drain is likely to have altered the local hydrology, reducing groundwater levels. This northern section of Lot 22 is thus a wetland that is likely to decline further.

Lot 20 has a central area of 'Low Open Woodland of Melaleuca rhaphiophylla' ranges from Good to Degraded condition with the understorey replaced by weeds. The area immediately northwest of the existing vacant dwellings is Completely Degraded with insufficient native vegetation cover remaining to provide a starting point for rehabilitation.

Lot 18 has been completely degraded through grazing and infestation of pasture grasses.

The areas that contain remnant vegetation in Good to Very Good condition are planned to be reserved as Public Open Space.

5.5 Wetland

5.5.1 Preamble

The DEC's Geomorphic Wetlands of the Swan Coastal Plain dataset illustrate a Resource Enhancement wetland located across a portion of some of the subject lots.

Resource Enhancement wetlands are defined as:

> *"Priority wetlands that may have been partially modified but still support substantial ecological attributes and functions. The objective is for management, restoration and protection towards improving their conservation value. Such wetlands have the potential to be restored to conservation category wetlands."*

Refer Appendix 3 – Bioscience Wetland Assessment

5.5.2 Context

General site analysis was undertaken by ENV Australia, as commissioned by the City of Gosnells, to provide a high level assessment of wetland vegetation in Precinct 3 using aerial photography. Using Statement 33 as guidance, a number of wetland assets were identified by this study with recommendations for protection of wetland and flora values.

The report reviews the management category of wetlands in the precinct and describes their characteristics, including two Resource Enhancement Wetlands within the subject land. In doing so, the report made a number of recommendations including:

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- the importance of site specific vegetation assessment as part of more detailed planning;
- the categorisation of wetlands within the precinct that may impact on structure planning for the precinct;
- a number of priority species; and
- vegetation linkages and the protection of important species.

Initial site assessment by Urbanplan revealed the extent of the wetland was far less than that purported through aerial photographic interpretation. Accordingly, Bioscience was engaged to substantiate the extent of the wetland vegetation on Lots 13, 14, 19, 21 and 22, and more recently for the Radici Family and Landflow Assets on Lot 18 and Lot 20 respectively, by researching hydritic soils, hydrogeology and wetland vegetation type and condition; a summary follows (refer to the Bioscience report contained at Appendix B). RPS had undertaken a less detailed study on Lot 20, see comments below (refer to the RPS report contained at Appendix C).

Bioscience installed 25 groundwater monitoring piezometers across the subject land to determine the depth to groundwater, water quality and seasonal variations. Refer to Figure 2 - Site Specific Wetland Analysis for the Groundwater Bore Locations.

5.5.3 Bioscience Investigations

Bioscience's fieldwork included a feature survey to precisely determine elevation and investigations of groundwater. Data collected from the site and from other investigations (DoW, JDA, BoM) has been used for hydrological modelling to determine both short term and long term variation in groundwater levels. Combined with survey data, this enabled determination of the area subject to inundation and water logging, and thus the wetland boundaries.

The Geomorphic Wetlands Dataset compiled through aerial photographic interpretation of across the Swan Coastal Plain, initially suggested the vast majority of the subject land is wetlands with about half of the area having high conservation value. Biosciences fieldwork has established the wetland extent is very much smaller than was originally mapped by DEC. The reduction is in part due to local authority drains to the north east and south west, which have lowered groundwater to a minor extent. Further, as recommended by the DEC, detailed site analysis has resulted in refinement of the wetland extent in contrast to the broad nature of DEC's method of aerial photographic determination. The reduced wetland area is not due to a seasonal reduction in rainfall, as existing groundwater levels accord with long term Department of Water groundwater records that do not show a decline in this area.

The conservation value of the remaining wetland area is low, as this area has been cleared in the past for grazing purposes. Although paperbark trees have regenerated, there are few other native species present, whereas pasture species and weeds are abundant.

There are areas of upland bushland, particularly on Lot 14, and wetland fringing vegetation on Lot 19 that have native vegetation in good to very good condition, as judged by the Bush Forever rating system. Bioscience recommends that this bushland area be protected and preserved as Public Open Space, as it has higher biodiversity and conservation significance than the remnant wetland area, and is more likely to be successfully conserved.

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The adjoining wetland area of Lot 18 can also be retained as additional open space and may serve a useful hydrological function. Details of how it is best managed will be elucidated in Bioscience's current work, which is collecting data for an Urban Water Management Strategy (Refer to Annex D).

5.5.4 RPS Environment Investigations

The RPS brief did not seek to investigate wetland boundaries, rather management categories based on vegetation condition assessment. Essentially, the area proposed to be reclassified to Multiple Use Wetland varies in condition from Completely Degraded to Good.

5.5.5 Summary

Environmental investigations of the wetland areas and wetland dependent vegetation have been conducted by Bioscience, where it was concluded that the soil profiles obtained suggest that the central part of Lot 19, demarked as area 6 on the vegetation mapping is wetland which formed on a relic drainage channel, probably in a swale of Holocene origin. It has progressively silted up and acquired a more anaerobic character, with darker soil and iron deposition at depth. It is a typical and characteristic wetland, but is in very degraded condition due to past land use. Because it has lost many of the wetland values and natural attributes, of itself, it is properly classified into the management category of Multiple Use Wetland.

The Bioscience investigations have been submitted to the DEC in support of a request to redefine wetland boundaries and to reclassify a portion of the wetland from Resource Enhancement to Multiple Use Wetland to accurately reflect the site's hydrology and vegetation. Because of the extensive research by Bioscience, a favourable determination of the request to reclassify is anticipated to facilitate the development of the land for residential purposes.
This approach is consistent with the DEC's process to reclassify wetlands and that proposed by the Precinct 3 Local Structure Plan.

Based on the results of the site inspection and vegetation assessment, the current DEC wetland classification for the central portion of Lot 20 does not appear accurate. Degradation through weed colonisation in addition to impacts through uncontrolled public access (and likely influence of nearby Balannup Drainage) has significantly reduced the water table and diminished the biodiversity values of this portion. Therefore, it is recommended that the central portion of Lots 18, 19 and 20 be reclassified to Multiple Use Wetland to better represent its current condition and limited value as more than a wetland function area. The request to reclassify the wetland is currently before the Department of Environment and Conservation for assessment and determination. The DEC has informed that due a change to wetland guidance policy the Multiple Use Wetland is no longer classified as a wetland.

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5.6 Land Use and Development

The diversity of land uses surrounding the site is typical for areas undergoing land use transition from primarily rural to urban activities.

5.6.1 Current Land Use

The subject land is situated within a locality characterised by small rural landholdings, located between the urban development fronts of Southern River / Harrisdale (north - west of Southern River Road) and Champion Lakes/Seville Grove (south east of Tonkin Highway). To the north east the area is bounded by the established residential suburb of Huntingdale. There is a regional reservation for parks and recreation on the corner of Southern River Road and Ranford Road. This reservation protects a Bush Forever site and EPP Wetland. Western Power has constructed a substation off Southern River Road to the west of the subject land.

A kennel area operates within Precinct 3 along Ranford Road and Matison Road. The Kennel area is outside the study area; however the required buffer of 500 metres influences the opportunities for sensitive land uses within this vicinity. Affected areas unable to accommodate residential development and for which no alternatives are identified as yet, have been notated as 'Subject to Further Planning' on the LSP plan. A former liquid waste disposal site operated between 1955 and 1981 adjacent Furley Road. The site is owned by the City and has been remediated to industrial standard.

5.6.2 Future Land Use – Precinct 3

Southern River Precinct 3 is an area that has been identified for urbanisation within the Southern River Forrestdale Brookdale Wungong District Structure Plan (DSP). The approved structure plan provides for:

- urban development focused in the northern portion of the precinct;
- a light industrial area with some mixed business/commercial along Southern River Road;
- a local activity centre adjoining Southern River Road; and
- recreation and Bush Forever reserves and drainage corridors.

More recent Local Structure Planning undertaken by the Department of Planning has refined the framework proposed by the DSP, reaffirmed the future development of the precinct and refined the location of the proposed urban, commercial, community, open space and industrial uses.

The subject land lies within a distinct urban and open space precinct serviced by adjoining neighbourhoods containing local and neighbourhood centres and education facilities. The LSP confirmed the location of a site suitable to co-locate a high school, special education facilities and district playing fields on land fronting Passmore Street. The District Playing fields also assist in flood water retention from the Forrestdale Brookdale Wungong District Drain. Primary school sites have, and will be, developed in adjoining neighbourhoods to the north and east. Under current arrangements, the land immediately west of Lander Street, west of the subject land, is proposed to be developed for light industrial purposes.

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6.0 Planning Framework

Southern River has been the subject of extensive land use and environmental planning at both the State and local levels resulting in a detailed framework to guide the preparation and assessment of applications for land use, subdivision and development.

6.1 State Planning Framework

6.1.1 Directions 2031

Directions 2031provides a spatial planning framework that establishes a vision for the future growth of the Perth and Peel regions; and the detailed planning and delivery of housing, infrastructure and services required to accommodate a forecast population of 556,000 by the year 2031.

The subject land is located within the south-east sub-region, which is forecast to grow to 228,000 by 2031, requiring 35,000 additional dwellings and 31,000 new jobs. Direction 2031 suggests that growth will be accommodated by a combination of infill and green-field development, where green-field development will be expected to achieve a minimum of 15 dwellings per urban zoned hectare (26 dwellings per residential site hectare).

Located within close proximity to the Strategic City Centre of Armadale, the Regional Town Centre of Maddington (as well as a number of other smaller shopping and service centres) and the Regional Industrial Centre located at Forrestdale (as well as a number of areas identified for Industrial Investigation), the area currently has access to the full range of services, facilities and local and sub - regional employment opportunities.

6.1.2 Southern River / Forrestdale / Brookdale / Wungong District Structure Plan

The Southern River / Forrestdale / Brookdale / Wungong District Structure Plan 2001 (DSP), prepared by the Western Australian Planning Commission, provides a broad framework for land use and development including major community facilities, conservation areas, open space and potential areas for development together with the management of key environmental issues for a region facing increasing development pressure.

The Structure Plan identifies the subject land as being Urban (including balance of POS) where a Village Centre is notionally shown at the intersection of Southern River Rd and a proposed subdivisional road crossing the subject land and land to the north west of Southern River road. Areas of Open Space (Including drainage corridors) are located on the southern and western edges of the subject land.

The DSP establishes a framework for the implementation of the preferred land uses, transport networks, conservation areas, cost sharing and coordination of development through various mechanisms such as the Metropolitan Region Scheme, local town planning schemes, Local Structure Plans and Developer Contribution Scheme. Part of the consultation outcome derived from the DSP was a clear expression that landowners be compensated fairly.

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It is understood that this compensation would include Wetland reserves being jointly compensate within the Developer Contribution Scheme.

6.1.3 Metropolitan Region Scheme

The subject land is zoned Urban under the Metropolitan Region Scheme (MRS). The MRS amendment lifting the urban deferred was gazetted on 7 May 2010.

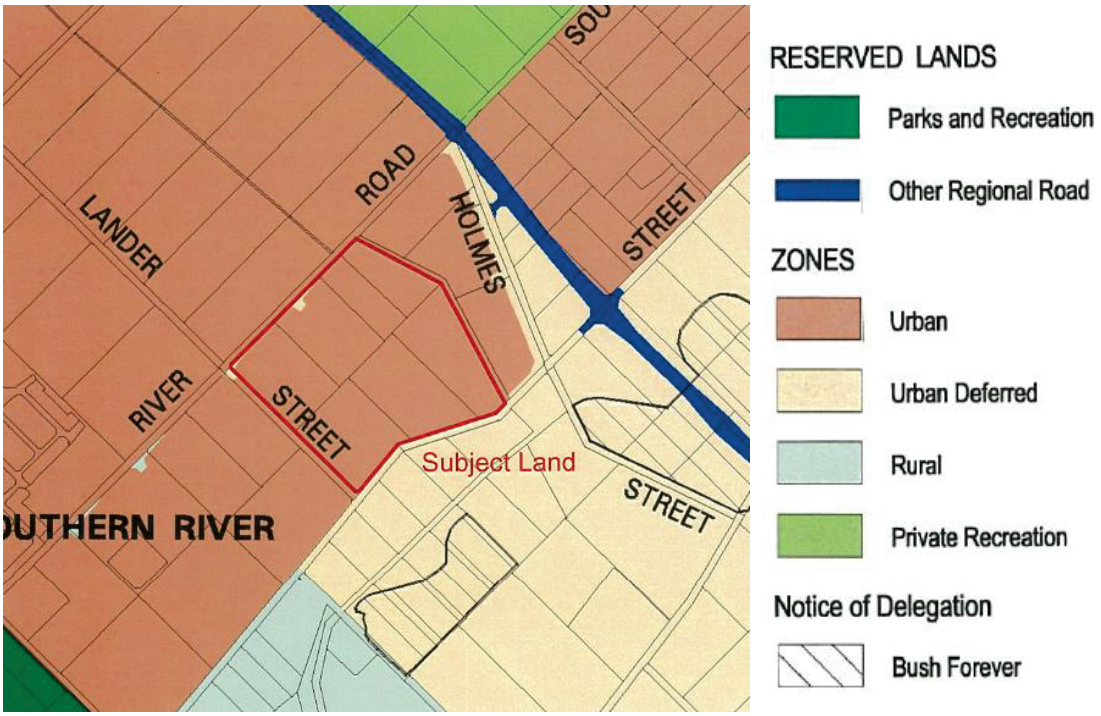


Figure 4 – Metropolitan Region Scheme Zoning

6.1.4 Liveable Neighbourhoods

The proposed LSP has been prepared in accordance with the WAPC's Liveable Neighbourhoods policy, as the current operational policy guiding the design and assessment of structure plans and subdivision applications for greenfield sites and for the redevelopment of large brownfield and urban infill sites.

The LSP is addressed with reference to the requirements of Liveable Neighbourhoods throughout and particularly in Sections 7.0 – 9.0 below.

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6.2 Local Planning Framework

6.2.1 City of Gosnells Town Planning Scheme No. 6

The subject land is zoned 'Residential Development' under the City of Gosnells Town Planning Scheme No. 6 (TPS6).

In accordance with Section 126 (3) of the *Planning and Development Act, 2005*, a request to amend the Town Planning Scheme concurrently with the MRS was made to the City of Gosnells and the WAPC. Once the land transferred into the Urban Zone under the MRS by notice in the Government Gazette, the rezoning of the land from 'General Rural' to 'Residential Development' under TPS6 came into effect.

Those matters to be addressed in the preparation of an LSP identified under Clause 7.3 of TPS6 have been observed.

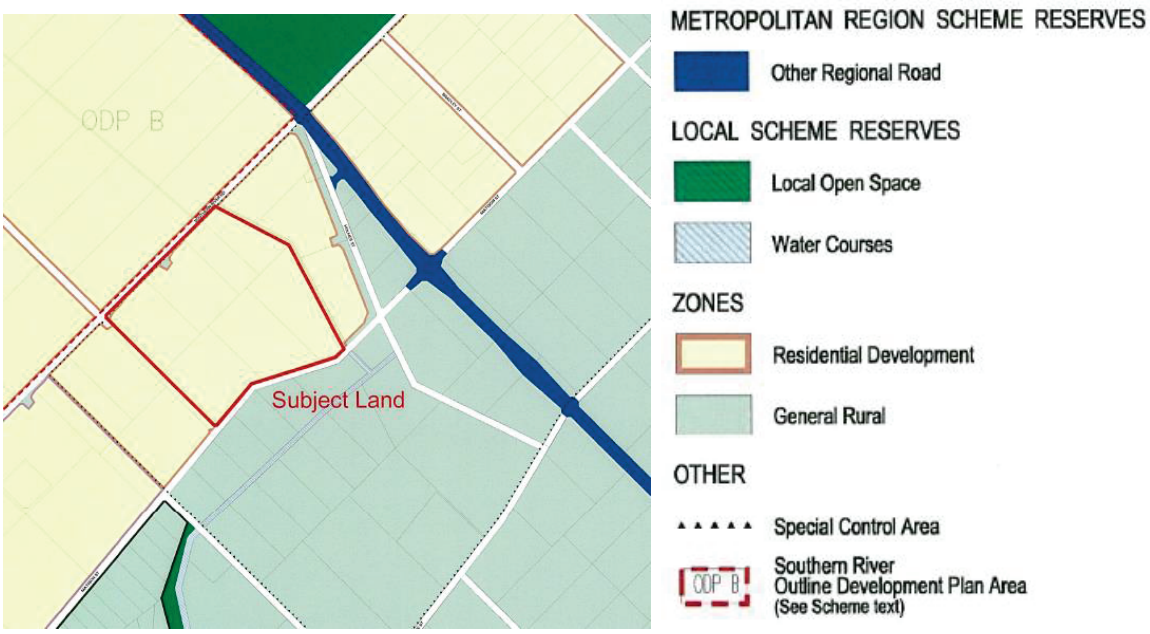


Figure 5 – City of Gosnells Town Planning Scheme No.6 Zoning

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6.2.2 Southern River Precinct 3 Planning Framework (Policy No. 6.3.3.1)

On 28 November 2006 Gosnells Council resolved to adopt a local planning policy that established a planning framework for Precinct 3, the intent being to coordinate planning of disparate landholdings. The Southern River Precinct 3 Planning Framework divides Precinct 3 into six sub-precincts 3A to 3F and outlines a framework to ensure that planning applications (such as region and local scheme amendments) appropriately address the various planning requirements and integration of planning outcomes at the appropriate stage. A key objective of the Policy was for the preparation of a Local Structure Plan, across the whole Precinct to further refine the work of the Southern River / Forrestdale / Brookdale / Wungong District Structure Plan and guide the preparation of sub-precinct level Local Structure Plans and associated arrangements for shared infrastructure provision.

The Precinct 3 LSP is further refined by the work undertaken to prepare this LSP report and plan, which fulfils the intent of the Policy to achieve coordinated planning amongst fragmented land ownership.

6.2.3 Southern River Precinct 3 Local Structure Plan

In accordance with the Planning Framework Policy the Southern River Precinct 3 Local Structure Plan (2009) was prepared by the DoP to further refine the broad urban structure identified in the Southern River / Forrestdale / Brookdale / Wungong District Structure Plan; and provide a framework for the coordinated development of the Precinct 3 sub-precincts.

The Draft Precinct 3 LSP, as advertised for public comment, illustrated the subject land within an Eco Living Zone, where the majority of the land is shown as Conservation. Submissions made during the comment period raised concerns over the extent of the Eco Living Zone and Core Conservation areas across the subject land (and other landholdings south of Matison Street) and questioned the validity of the wetland mapping and appropriateness of development parameters.

On 14 April 2009 in consideration of the submissions, but mindful of the need to provide a framework to facilitate and coordinate the preparation of sub-precinct Local Structure Plans, Council resolved to amend the LSP to require that those areas shown as Conservation be subject to for further environmental assessment and detailed planning and that the Eco Living Zone be removed from the LSP and replaced with a notation requiring further environmental.

On 12 May 2009 Gosnells Council resolved to adopt a Local Structure Plan (LSP) for Southern River Precinct 3 (encompassing the subject land).

On 15 September 2009, following further modifications, the WAPC resolved to identify the Southern River Precinct 3 LSP as a basis to guide land use planning decisions, thereby facilitating the adoption of this LSP.

The adopted LSP identifies the subject land as Residential and Wetland with an annotation that states “Land use and development parameters to be determined through further environmental review and detailed planning”, which is the subject of this LSP and associated process.

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7.0 Community Design – Liveable Neighbourhoods

7.1 Preamble

Liveable Neighbourhoods principles apply to the preparation and review of regional, district and local structure plans for new urban areas, local structure plans for new subdivisions and in planning for the revitalisation or redevelopment of existing areas. Liveable Neighbourhoods currently functions as an operational policy. Relevant principles to be observed during the planning process include:

- *A sense of community, strong local identity and sense of place in neighbourhoods and towns.*
- *Active street frontages with buildings facing streets to improve personal safety through increased surveillance and activity.*
- *New development which supports the efficiency of public transport systems where available and provides safe, direct access to the system for residents.*
- *A variety of lot sizes and housing types to cater for the diverse housing needs of the community at a density that can ultimately support the provision of local services.*
- *The protection of key environmental areas and the incorporation of significant cultural and environmental features of a site into the design of an area with an integrated approach to the design of open space and urban water management.*

Relevant objectives listed under the Elements of the Liveable Neighbourhoods policy are addressed below with reference to the LSP (Figure 1), in addition to other supporting plans referenced. This is intended to demonstrate that the proposal will provide an efficient and desirable future form of development, which may be further refined through the Local Development Planning process.

7.2 Design Philosophy

The Local Structure Plan has been prepared to guide the development of 25.77ha of land currently comprising small rural landholdings for urban purposes. The LSP reflects a site responsive approach that aims to enhance the local context, strengthen local character and identity and promote community creation.

The LSP will facilitate the development of a high quality, liveable urban precinct offering residents a diversity of lot products with access to the full range of urban services and facilities, including primary and high schools, public open space and local shops. The LSP design is based on the following broad urban design objectives:

- Retain the general landform and significant natural features of the site, as far as practicable, through the designation of appropriate land uses, the design of the road network and consideration of the future built form.

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- Ensure that the urban development of the precinct responds to and integrates with established and future neighbouring residential development.
- Locate land uses and residential densities appropriately, having regard to established and future surrounding land uses and the potential for conflicts.
- Facilitate the orderly and independent subdivision of lots in fragmented ownership.
- Achieve a residential density range exceeding 26 dwellings per residential site hectare.
- Provide a range of lot products and sizes to facilitate the creation of a mix of housing typologies and range of affordability to cater for a varied demographic.
- Locate higher density development in areas within proximity of the future activity centre on adjoining Matison Street, to support viability and accessibility.
- Locate higher density development opposite areas of public open space to capitalise on landscape amenity and sense of place afforded by the established areas of vegetation and the wetland setting.
- Provide an efficient, connected, legible and safe road network appropriate to the residential character of the precinct, whilst minimising connections to Southern River Road.
- Encourage the use of alternative modes of transport by creating safe and efficient connections to primary schools, neighbourhood centres, public transport along Southern River Road, pedestrian and cycle networks and a high standard of walkability.
- Provide sufficient and accessible public open space to meet the recreation needs of the future residents.
- Maximise opportunities for passive surveillance of public open spaces, and pedestrian and cycle routes to enhance the amenity and safety of the public realm.
- Incorporate best practice principles of sustainability through the design in consideration of solar orientation, prevailing winds and stormwater retention and reuse.

The principles for future urban layout for the greater sub-precincts 3E, 3D and 3F provide context for the more detailed design of Sub-precinct 3E and comprise:

- The placement of activity centres around intersections of major transport routes and the placement of medium density residential development adjacent activity centres and open space areas to provide proximate facility provision and amenity.
- The provision of a pedestrian network within the wetland vegetation corridor that interconnects local services and facilities; north south street orientation (within the skewed grid of the locality) to enable creation of east-west single residential allotments and north - south laneway allotments;
- The integration of wetland vegetation corridors with the district drain to assist flood mitigation strategies; and
- The maintenance of vegetation remnants within passive open space areas to complement species protection in vegetation corridors.

Subsequently, the specific principles of the urban layout for the Owners' Collaborative are defined as:

- Enhancement of the north south drain along the east of boundary of Lots 20 and 22 as a re-created intermittent living stream environment;

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- Maintenance of some remnant wetland vegetation corridors in vegetation areas 6 and 7, with wetland buffers in adjoining area 5, within WSUD swales to connect to recreated intermittent living stream environments;
- Placement of medium density Residential (eg R30 - R40) development overlooking open space areas to emphasise amenity; whilst facilitating use of the open space area by the public with pedestrian connections separating lots
- Intended future placement of medium density Residential Code and R40 development within proximity to commercial and retail facility provision along Southern River Road; and R20 and R30 densities elsewhere.
- The resultant LSP provides a consolidated and integrated urban form inclusive of an enhanced wetland vegetation corridor.

7.3 Response to Site and Context Analysis

The outcome of the site analysis and opportunities and constraints mapping highlighted key design drivers that have influenced the proposed road and lot layout. These key drivers are summarised below. Refer to Figure 3 - Opportunities and Directions.

7.3.1 Wetland and Remnant Vegetation

With regard to the vegetation wetland complex, consideration needs to be given to the attributes and management objectives of remnant environments and the potential to achieve connection between remnants.

The extent of wetlands identified as worthy of conservation and retention could impact on the critical mass and integration of future urban form if fully applied. Conversely, future urban development that surrounds remnant vegetation may impact on its survival regardless of the proposed vegetation separation buffer.

The guidance recommends reduced risk of further degradation and pollution of Resource Enhancement Wetlands and management that promotes enhanced condition. Achieving these objectives must be linked to:

- the identification of well connected, functional land parcels for management and the creation of vegetation corridors, and
- minimising the threat of off-site impacts to vegetation and wetland condition such as stormwater flows increased by urban development and surface and groundwater pollutants in order to accomplish survival of wetland vegetation.

Given the above, it is valid to question the retention of Resource Enhancement Wetlands that are not part of broader environmental corridors and those that will be under threat from surrounding urban development, stormwater drainage, pollution and impacts on the hydrological regime. In these circumstances, which are likely to impact the degraded wetland within the subject land, it may be unlikely that the Resource Enhancement objectives to restore and enhance will be met in the long term.

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The options are to:

- endeavour to protect the identified remnant wetlands within proposed WSUD drainage corridors;
- assess and seek reclassification of the Wetland; or
- dispense with the remnant (wetland) vegetation on the basis that survival prospects are limited.

Urbanplan, in conjunction with Bioscience, identified and sought reclassification of the wetland to a Multiple Use Category Wetland. In addition, quality remnant vegetation space has been set aside within the proposed area of public open. The DEC have informed that the request to reclassify the wetland has resulted in a declassification of the wetland due to the newly revised Wetland Policy Guidance. Regardless, it is proposed that an urban water management swale drain will be created to facilitate drainage and create more open space amenity.

7.3.2 Balannup Drain

Balannup Drain, located on the eastern boundary of the subject land, currently provides a stormwater management function for the wider locality. It has been suggested that development of adjoining land will result in its re-contouring and rehabilitated as a living stream drainage swale. As such the LSP acknowledges the future enhanced function and amenity of the drain and provides a road interface to maximise opportunities for passive surveillance, improve residential amenity and aspect, minimise weed invasion and enable passive recreation. The drain reserve is proposed to be widened in two locations, comprising a total additional area of 700m^2.

7.3.3 Access onto Southern River Road

The adopted Precinct 3 LSP reflects the intent to reserve Southern River Road as an Other Regional Road (subject to a future reservation under the MRS) consistent with its proposed function and traffic forecasts.

7.3.4 Integrated Urban Form

Achieving a functional integrated settlement pattern in Precinct 3 and the surrounding area requires planning to address:

- appropriate spatial location of uses and open space;
- critical mass of urban form to ensure the success of urban function; and
- integration of uses through permeable and legible linkages to promote transport accessibility and mobility as a function of urban mass and proposed residential densities.

The ability to deliver integrated functional urban form will depend on achieving development areas that are not fragmented by environment and conservation objectives and can achieve suitable residential densities.

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This LSP proposes:

- refined definition and reclassification of the Multiple Use Wetland;
- rehabilitate the Balannup Drain to endeavour to create a living stream drainage swale;
- potential for higher residential densities overlooking open space areas and areas within walking distance of neighbourhood facilities.

7.4 Land Use and Distribution

In accordance with the Southern River / Forrestdale / Brookdale / Wungong District Structure Plan and the Southern River Precinct 3 Local Structure Plan; the subject site is proposed to be developed for residential and public open space purposes, along with a local activity centre primarily catering to daily / weekly shopping needs. No schools or community purpose sites are identified, as the location of these facilities has been confirmed elsewhere through the LSP.

The location and distribution of public open space proposed was driven primarily in response to the extent of remnant vegetation and the wetland. The LSP reflects the recommendations of the two environmental consultants for the retention of vegetation across Lots 13 and 19 and the retention of the wetland with redefined boundaries located in Lots 18, 19 and 20.

The balance of the land is proposed for residential development at densities of R20, R30 and R40. The rationale for the distribution of densities essentially reinforces the need to create a critical mass immediately adjacent the local centre facilities and take advantage of the amenity from open space areas. A site has also been identified for a place of worship and a local centre. The residential yield is constrained by the extent of public open space to be ceded and the noise buffer at the south western corner of the LSP area.

7.5 Residential Lot Layout

7.5.1 Layout and Climate Responsive Design

The road network comprises a modified grid pattern with skewed orientation to the north east, and south west. The road orientation facilitates the majority of single residential lots to be oriented maximising opportunities for solar passive design response.

Local Development Plans

Local Development Plans (DAP) are generally required under circumstances such as the following:

- Lots having an area below 350m² and an irregular shape (Clause R10).
- Lots where it is important to control vehicle access / egress.
- Lots abutting POS.
- Narrow lots requiring special conditions to be set.

LDP's may be required by the WAPC as a condition of subdivision approval.

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Relationship with Public Open Space

The Landscape Strategy Plan prepared by EPCAD (**Figure 6 and Appendix 4**) depicts the future intended formal access pathway network around the entire perimeter and centrally within the POS area. The Landscape Strategy identified that an appropriate setting may be established complementing the development and facilitating sound public access. A path network would provide the benefit of strong connections between residential cells and the local activity centre through an attractive setting.

The approach to the landscape design of public realm spaces and open space for this project has focused on the protection of conservation quality vegetation and its integration within open space which provides passive recreational areas for the community. Combined with this is the requirement to integrate effective urban water drainage into the landscape.

The objectives of the landscape approach are;

- To create public places that will be valued by the community that will use them.
- To protect and enhance the environmental qualities of the site.
- To accommodate use by the community in a secure manner.
- To create a landscape that meets the maintenance and management requirements of the adopting authority.
- To accommodate drainage infrastructure as best practice water sensitive design in POS.

The design of open space retains all conservation value vegetation associated with wetlands and creates secure managed access areas that the public cannot traverse. At the same time the public is encouraged into other areas and provided with circulating footpaths that link into the streets and other open space areas. It is intended that all areas of POS are planted using predominantly native species with exotics only used in areas away from retained vegetation and used only for accent and shade. The design approach will be to create an informal modified natural landscape.

Those areas of open space that are isolated and utilized for drainage management will be developed using all native species. These locations will incorporate informal seating and paths where practical and will be designed to provide safe passive recreation opportunities within a strongly natural setting.

All parks and open space will be designed to minimise the use of irrigation; through utilizing drainage infrastructure for the passive irrigation of areas.

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Figure 6 – Landscape Strategy Plan (EPCAD)

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7.5.2 Residential Lot Size and Variety

The LSP proposes a road network that results in the creation of street blocks being robust and adaptable to accommodate a variety of lot sizes. Higher density lots are to be concentrated around areas of public open space; and the Precinct 3E local centre. The Local Structure Plan (Figure 1) describes the range of residential densities to be applied. An indication as to the expected lot type and yield is provided in Table 4.

TABLE 5 – INDICATIVE LOT SIZE AND VARIETY	
Density Codes	R25 – R60
Estimated Indicative Minimum / Maximum lot size	170m² – 550m²
Indicative Average lot size	300m²
Estimated Lot Yield	360 Lots
Estimated Dwelling Yield	360 Dwellings

7.5.3 Residential Density Targets and Yield Forecast

Density targets for the development of the site have been pre-determined by regional frameworks and preceding district and local structure plans.

The Southern River / Forrestdale / Brookdale / Wungong District Structure Plan (DSP) estimated lot yields and population projections based on single residential development at 10 dwellings per hectare (2.6 persons per dwelling) and medium density residential at 25 dwellings per hectare (2 persons per dwelling). Medium density residential was forecast to comprise 18.5% of the total study area and approximately 24.8% across Area 1 Southern River, containing the subject land.

The Southern River Precinct 3 Local Structure Plan (LSP) does not suggest a density target for the Precinct but instead recommends a based density of R20 for residential areas. Clearly, the proposed LSP exceeds this target specified in the Precinct 3 LSP.

Liveable Neighbourhoods suggests that in new urban areas urban densities should achieve 15 dwellings per gross hectare and an average of 22 dwellings per site hectare, being distributed as follows:

- 12 to 20 dwellings per site hectare for standard lot layouts; and
- 20 to 30 dwellings per site hectare for areas within 400m of a neighbourhood centre and within 250m from a main bus route.

Directions 2031 and beyond sets a target of 15 dwellings per gross urban zoned hectare which represents a 50 per cent improvement on the current average density achieved in Greenfield development. The equivalent site hectare density target is 26 dwellings per residential site hectare, being applicable to district and local structure plans and Local Structure Plans.

This LSP provides for an average lot size of 300m^2, and an estimated lot yield of 360. Based on the measurements provided in **Table 1**, a calculated density of over 30 dwellings per residential site

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hectare is anticipated, exceeding the recommendations of the DSP, Precinct 3 LSP, Liveable Neighbourhoods and the requirements of Directions 2031.

The LSP design has inherent flexibility to enable composite development and separate or individual development stages. Dependent on future housing market demand, the LSP statutory framework enables flexibility to current intentions, through the density ranges applied to the LSP (Figure 1).

The development of the subdivision is also subject to the requirements and contributions as set by the developer contributions scheme.

8.0 Movement Network

8.1 Preamble

Ranford Road and Holmes Street (the Garden street extension) will provide the district distributor connector function linking the district to the Roe and the Tonkin Highways. Southern River Road is also a significant distributor and will be a key avenue for public transport routing. Southern River Road has been recommended for an elevation in classification to an Other Regional Road in the MRS. Accordingly, this road reserve is proposed for widening.

Cardno Eppel Olsen (Cardno) undertook a traffic study in July 2012, which was updated to account for the addition of the local activity centre and reduced extent of residential development following the EPA and DoP decision to avoid residential development in the 500m kennel buffer area.

To complete the Precinct 3E traffic assessment, information was compiled by Cardno from existing data and the Precinct 3A Transport Assessment. Additional data was generated from first-principles for the Precinct 3 South area, including Precinct 3E.

The final Cardno Traffic Impact Assessment dated March 2013 is attached at **Appendix 5**.

8.2 External Road Network

Traffic volumes associated with Precinct 3E are not anticipated to significantly impact the boundary road network and as such, no modifications are proposed to Southern River Road or Matison Street, outside of the requirements of the broader Precinct 3 Structure Plan.

The current Southern River Developer Contributions Scheme (DCP) provides for significant improvements to the function and operation of Holmes Street. These improvements include road widening and signalisation of the intersections of Holmes Street with Southern River Road and Holmes Street.

Based on the analysis included in this report, which includes the traffic impact for all of Precinct 3 against the existing background traffic, these upgrades are not considered necessary in the near term. The strategic network improvements proposed for the 2021 and 2031 scenarios, including the Holmes Street realignment (to connect Garden Street / Nicholson Road to Tonkin Highway) are likely to require mitigation measures required, including signalisation. However, the need for any

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modifications would result from changes to the strategic road network and are not triggered or required by development of Precinct 3.

8.3 Connectivity

The movement network has been designed to provide a low-key connected street network that clearly distinguished between connecting routes and local access places. This establishes good internal and external access for residents, maximises safety, encourages walking and cycling and supports the use of public transport. As shown previously in **Figure 7,** the landscaping strategy delivers connectivity through the central POS areas.

8.4 Street Network and Road Reserve Width

The internal road network is affected by the wetland topography and proposals to conserve remnant vegetation as open space. Accordingly, the main site access meanders through the site connecting Southern River Road and Matison Street. Internal roads provide an edge to the Wetlands and remnant vegetation open space.

The road network has been designed to facilitate the creation of regular shaped lots, capable of accommodating standard residential dwellings and smaller housing types, with access via a rear laneway or with frontage to an access place.

The proposed central north - south road reserve features a width of ~23m falling to 18m, being consistent with an access street type 'A' reserve; and subsequently an access street type 'B' reserve width (16.5 - 18.0m). The verge width available is sufficient to accommodate a wide reserve path enabling sound pedestrian and cycle access centrally through the LSP area.

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8.5 Public Transport

8.5.1 Existing Services

The nearest train station is the Gosnells Station (Armadale line) located approximately 4.8 kilometres away from the corner of Southern River Road/Lander Street intersection. The Murdoch Station (Mandurah line) is located approximately 13 kilometres away from the corner of Southern River Road/Lander Street intersection. The network of bus routes serving the Southern River area is summarised in Table 5 and illustrated in Figure 3 below.

TABLE 6 – BUS ROUTES			
Route	No. Service Type	Destinations	Nearest Bus Stop
231	Full Time, Monday to Sunday including Public	Gosnells Train Station – King St/Eudoria St–Chamberlain St/ Southern River Rd – Harry St/Corfield St – Gosnells Train Station(Anti-Clockwise Circular Route)	2.6 km
232	Full Time, Monday to Sunday including Public Holidays	Gosnells Train Station – Harry St/Corfield St – Southern River Rd/Chamberlain St – King St/Eudoria St – Gosnells Train Station (Clockwise Circular Route)	2.5 km
517	Full Time, Monday to Sunday including Public Holidays	Murdoch Station – Livingston Shopping Centre – Castlewood Parkway/Edencourt Drive (Southern River)	1.5 km
518	Full Time, Monday to Saturday only	Murdoch Station – Livingston Shopping Centre – Wright Road/Lauraine Drive – Wright Road/Bordeaux Parade (Piara Waters)	3.3 km

The 517 route passes a number of local employment, commercial and retail nodes including Livingston Marketplace Shopping Centre and surrounding bulky goods retail/showrooms, Market Square, Canning Vale industrial area and the Bull Creek Shopping Centre. Murdoch Stations is within close proximity to St John of God Hospital Murdoch, Murdoch University and the Fiona Stanley Hospital, currently under construction.

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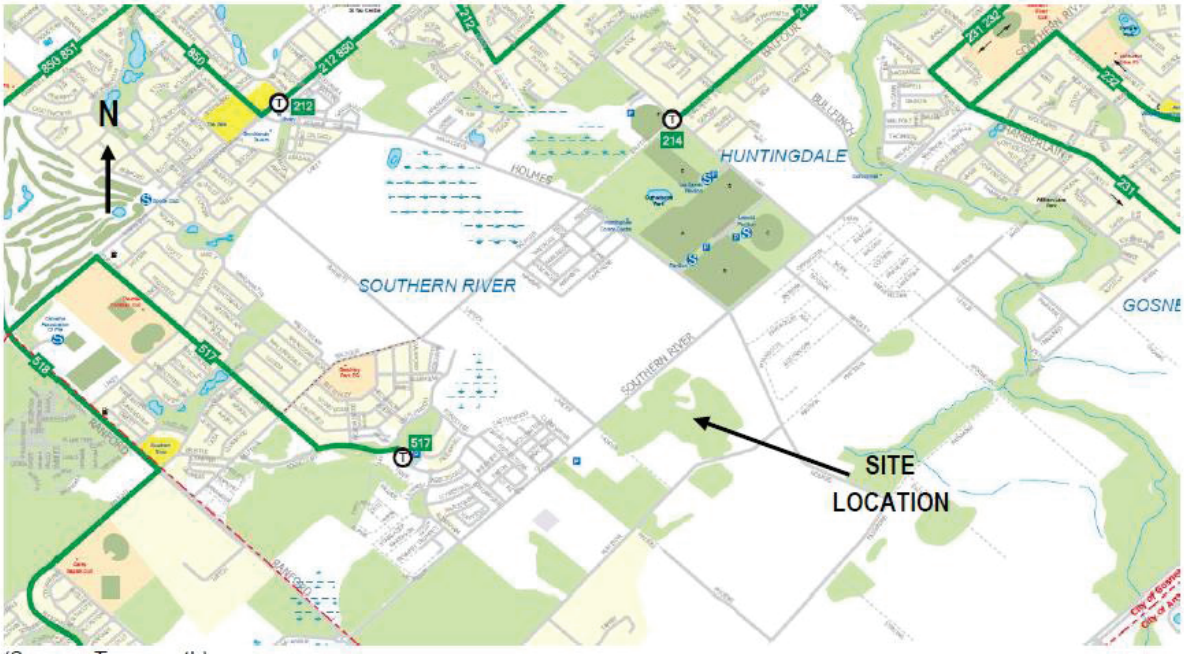


Figure 7 – Current Bus Route Network (TransPerth)

8.5.2 Future Public Transport Services

As Southern River Precinct 2 and 3 are progressively developed into residential neighbourhoods it is anticipated that Transperth's bus services will be expanded to provide bus stops and routes within walking distance to a greater proportion of the future residents.

The adopted Precinct 3 LSP illustrates bus services traversing Southern River Road, Holmes Street and Matison Street (to the east of Holmes Street).

The viability of Transperth' services will be improved through the application of a higher density of dwellings per residential site hectare than is currently established on average throughout the Perth Metropolitan Region.

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8.6 Pedestrian and Cycle Access

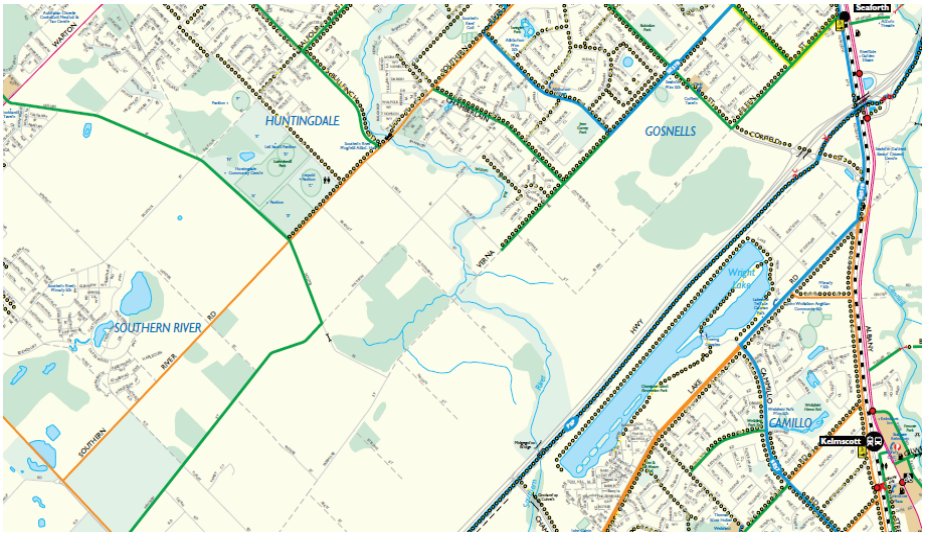
8.6.1 Existing Networks

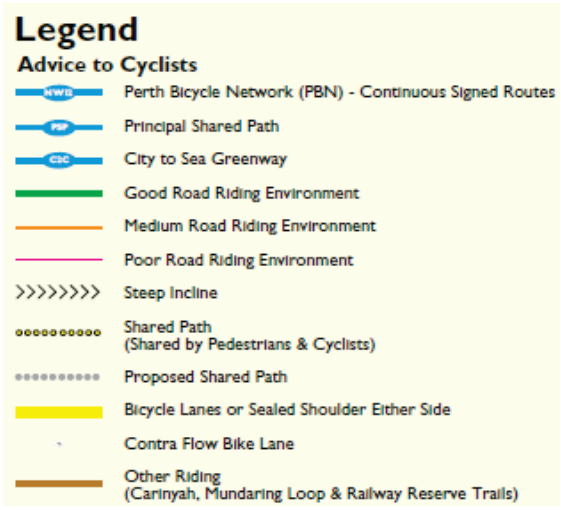
Pedestrian

The pedestrian network in Southern River is disjointed as a result of the historical land use of the area for small rural landholdings and its progressive development for residential purposes. Surrounding residential neighbourhoods are well served and connected with a network of shared paths and footpaths.

Cycling

The Department of Transport's (DoT) Perth Bike Maps illustrates the extent of existing cycle networks in and surrounding Southern River. The network, comprising dedicated cycle paths, shared paths and on street cycling, caters for destination trips (i.e. to work or school) and recreational cycling.





Source: Department for Transport

Figure 8 – Bicycle Route Map

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Future Networks

As Southern River Precinct 2 and 3 are progressively developed into residential neighbourhoods the pedestrian and cycle network will be expanded to provide additional dedicated/shared paths and on-street cycling lanes to provide greater pedestrian and cyclist opportunities to service the development and connect to the established network and surrounding neighbourhoods.

8.7 Walkable Catchments

The subject land's situation and siting provides accessibility to a number of community facilities, including the following:

- The LSP design shrouds open space and wetlands to take advantage of the amenity and aspect. The most distant lot is 250 metres to this centrally located park.

- The subject land falls within 400 to 800 metres from the activity centre proposed for the intersection of Southern River Road and Holmes Street.

- Future bus routes will run along Southern River Road and it is anticipated the nearest Bus stop will adjoin the proposed development.

- The proposed local activity centre in the Precinct 3E LSP area.

- The closest proposed Primary schools are 800 metres to the north east and north of the subject land. Alternatively, the development of the proposed independent primary school, understood to be planned for adjacent Lot 17.

- The Gosnells, Seaforth and Kelmscott Train Stations, on the Armadale to Perth railway line, are located approximately 4.75km of the subject land and are all connected to the local and regional cycle network.

Consequently, the LSP facilitates the application of residential R-Code ranges that will serve to deliver an acceptable level of residential density within the walkable catchments of the abovementioned services and attractions.

8.8 Balannup Drain Crossing

A crossing of the Balannup Drain is proposed between the Precinct 3E LSP area and the adjacent Precinct 3A lands to the east.

Through discussions with the adjoining landowners, a copy the draft LSP for Precinct 3A had been obtained. Three alternative options were investigated to determine if an alternative design could yield better results, which are described in detail within **Section 5.6** of the Cardno Traffic Impact Assessment at **Appendix 5**.

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Alternative 1 involved investigating the establishment of a staggered T – intersection and relocating the crossing further to the east. This reduces the viability of a roundabout form and suggests a staggered-tee arrangement. Traffic demand analysis showed a much higher split of traffic along the Balannup Drain reserve, potentially impacting on the amenity of this system.

Alternative 2 involved realigning the crossing to create an angled bridge over the drain, as shown in Figure 16. This arrangement retained the detrimental features of Alternative 1 including a staggered-tee intersection form, and also created a streamlined connection through Precinct 3A to Matison Street (a non-preferred distributor road) which would require additional traffic calming measures. The cost of an angled crossing would also likely to be significantly higher than the perpendicular bridge as a result of the additional engineering requirements, longer crossing length and non - symmetrical loading.

Alternative 3 retains the original crossing location, but does not include a roundabout, but a staggered tee as an alternative. The proposed alignment is preferred to the alternatives; as it reduces the priority of the connection to Matison Street. The intersection configuration within Precinct 3E supports the distribution of traffic throughout this north-eastern cell, while retaining amenity for active modes (walking and cycling etc.), particularly along the drain frontage. The proposed staggered-T arrangement is also considered a viable alternative due to the short lengths associated with the major roadway and lack of expected cross traffic over the stagger, between the residential cells. The proposed crossing location and the staggered-tee intersection are therefore the preferred option, and is not expected to result in appreciable volumes of crossing traffic.

8.9 Assessment of Future Traffic Impacts

8.9.1 Preamble

Cardno have undertaken an assessment of future traffic conditions, originally incorporating the provision of housing in the area now identified as being Subject to Further Planning on the LSP.

The modelling undertaken by Cardno was based on 420 residential units, which has now decreased to an anticipated 337. The resulting traffic generation quoted in the Cardno report may therefore be viewed as a very conservative estimate, as stated in the most recent update to the report (Appendix 5).

8.9.2 Future Traffic - SIDRA Analysis 2021

The Cardno traffic impact assessment provides the outcomes of modelled SIDRA analysis scenarios undertaken for the year 2021.

SIDRA analysis of the network has been undertaken for the boundary road network under the Ultimate (existing plus full development of Precinct 3) for AM and PM peak hours, using 2021 ROM outputs to determine background traffic flows. The following intersections were modelled:

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- Southern River Road / Ranford Road.
- Southern River Road / Holmes Street.
- Matison Street / Ranford Road.

For the purpose of the assessment, traffic volumes along Holmes Street were not projected to substantially increase, as no additional regional connection is proposed prior to the 2021 horizon. On this basis, a reassessment of the Holmes Street / Access Road intersection was conducted for the year 2031.

Southern River Road / Ranford Road

The Southern River Road/Ranford Road intersection has been analysed in its current roundabout form. The results above show that the roundabout is insufficient to accommodate the regional traffic growth along these two major regional connections and an alternative arrangement will be required by 2021. A potential signalised intersection arrangement is described in the Cardno report and further modelling of the proposed signalised intersection was undertaken by Cardno, demonstrating that a signalised intersection at Southern River Road / Ranford Road is an orderly proposition beyond 2021.

Southern River Road / Holmes Street

The significant increase in traffic volumes resulting from the Garden Street extension to Southern River Road suggest that the existing intersection geometry will be unable to accommodate the Southern River Road/Holmes Street intersection as a priority controlled 4-way intersection. An alternative layout and phasing diagram is proposed by Cardno. The proposed intersection geometry has been modelled in SIDRA and designed to provide an acceptable level of service for the 2021 PM peak.

Matison Street / Ranford Road

The existing Matison Street/Ranford Road intersection is a priority controlled T- intersection. A revised intersection form was modelled for the 2021 scenario, including a wider central median allowing for staged crossing for right-turning egress from Matison Street and sufficient storage for a single vehicle. The results above show that the operational performance of all approaches is generally acceptable, though the right turning egress into Ranford Road from the central median is constrained by the volume of traffic. It should be noted that this analysis does not include the impact of upstream signals likely to be required at Ranford Road / Southern River Road, which would improve the intersection operation.

Summary of 2021 Scenarios

Modifications to the strategic road network will be required as a result of regional traffic growth. Intersection analysis undertaken for the future 2021 scenario indicates that:

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- The form of Southern River Road / Ranford Road and Southern River Road / Holmes Street intersections will be insufficient to accommodate expected traffic and will require signalisation by 2021.

- The intersection of Ranford Road / Matison Street will continue to operate acceptably under the existing priority control arrangement, provided a central median allowing staged crossing is constructed.

8.9.3 Future Traffic - SIDRA Analysis 2031

Additional modifications to the strategic road network will be required as a result of changes to regional traffic flows resulting from the proposed Holmes Street (Garden Street) extension to Tonkin Highway and further regional growth.

Further intersection analysis undertaken in another scenario for the year 2031, indicating that:

- The form of the Southern River Road / Holmes Street intersection will need to be modified to support additional traffic travelling to and from the Tonkin Highway, including minor increases in turning pocket length to ensure sufficient queuing space.

- The Southern River Road / Ranford Road intersection will continue to operate effectively in its 2021 form with only minor changes to turning pocket length.

- Upgrade of Holmes Street (Garden Street) will impact the Holmes Street / E-W Access Street intersection, requiring provision of a central median to facilitate staged crossing.

- The intersection of Ranford Road / Matison Street will continue to operate acceptably under the existing priority control arrangement, provided a central median sufficient to allow staged crossing is constructed.

The results of the SIDRA analysis show that the operational performances of all approaches for each of the intersections modelled are generally acceptable, and that signalisation of intersections along Holmes Street is not required as a result of the Precinct 3 development in the short term up to 2021.

Further operational analysis based on the 2021 and 2031 scenarios supports the findings of previous studies which suggest a requirement for signalisation at Southern River Road / Ranford Road and Southern River Road / Holmes Street.

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9.0 Public Parkland

9.1 Distribution

The POS provision will provide space for passive recreation and conservation pursuits. Recreation opportunities within the central open space area will be supplemented by areas abutting the wetland and drainage swale accommodating passive recreation, and affording high landscape amenity for the benefit of adjoining residents and the wider locality.

The public open space contribution comprises both unrestricted and restricted open space. The total restricted open space contribution component is 0.365ha in area (maximum allowable area). The WAPC may agree to such features as landscaped compensating basins being included and credited either in whole or in part as a portion of a public open space contribution. Two local parks are proposed, having a combined total area of 0.4692ha, which will not have a drainage function under the urban water management plan.

Active recreation opportunities will be supplemented by Sutherlands Park (containing playing fields, facilities and car parking) and the district playing fields proposed in the Precinct 3 LSP, located south of the subject land.

9.2 District Facilities

The adopted Precinct 3 LSP identifies the provision of district open space to be co – located with the proposed government high school site, situated approximately 400 to 500m south of the subject land.

9.3 Ongoing Management Arrangements and Responsibilities

The public open space, wetland and additional land for drainage associated with the Balannup Lake Drain would be ceded to the City of Gosnells as a condition of subdivision approval.

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9.4 POS Schedule

The POS Schedule is provided in Part One Section 5.5, based on the RPS Landscape Masterplan approved by the City of Gosnells at **Appendix 4.**

***Refer Figure 9 – Public Open Space*.**

The Department of Environment and Conservation previously considered the proposed LSP plan and agreed to the clearing of two areas of vegetation for the establishment of unrestricted public open space. The proposed LSP plan maintains the same location and size for these areas as per the LSP plan approved by the City.

With reference to **Figure 9** (Public Open Space plan) the first local park (POS 1) on Lot 21 measures 0.1786ha in area. The second local park (POS 2), on Lot 18, measures 0.2906ha in area and is located immediately north of the local centre. Neither of the two local parks are planned to accommodate any drainage function, consistent with the requirements of the City of Gosnells.

The maximum POS credit provided for restricted use areas, combined with the unrestricted POS areas does not meet the minimum 10% requirement for POS specified under Liveable Neighbourhoods. The Council previously identified the need to consider POS in a broader context, given the history of the site and nature of the POS area as a wetland and vegetation conservation area. Further, it was identified the overall POS area far exceeded the 10% to be provided as POS and that Precinct 3E is located within 400m from Sutherland Park, providing future residents a large area of unrestricted POS for active recreational use. Also, district playing fields are proposed in the Precinct 3 LSP south of the subject land.

The City has indicated the POS arrangements proposed are satisfactory with reference to the broader development context of the Precinct 3 area, as identified during consideration of the original LSP by Council.

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KEY

- Residential R25-R40
- Residental R30-R60
- Conservation POS
- Traditional POS
- Urban Water Management POS Swale Drainage
- Swale Drainage
- Subject to Further Planning
- Local Centre
- Road Reserve

500m Buffer to the outer boundary of all kennels zone properties

ROAD A = Access Street B
ROAD B = Access Street C

Structure Plan Extent

1. Endemic native vegetated Drainage Swales with engineered slopes of 1:6 (no irrigation) - 0.0707ha
2. Endemic native vegetated Drainage Swale with engineered slopes of 1:6 (no irrigation) - 0.1128ha
3. Endemic native vegetated Drainage Swale with engineered slopes of 1:6 (no irrigation) - 0.0645ha
4. Irrigated turf active space - 0.1786ha
5. Irrigated turf active space - 0.2906ha
6. Area of open space comprising of conservation and drainage areas. Open space comprises of the following
   - Higher quality conservation value bush land - 1.4852ha
   - Remnant vegetation and drainage - 1.9913ha

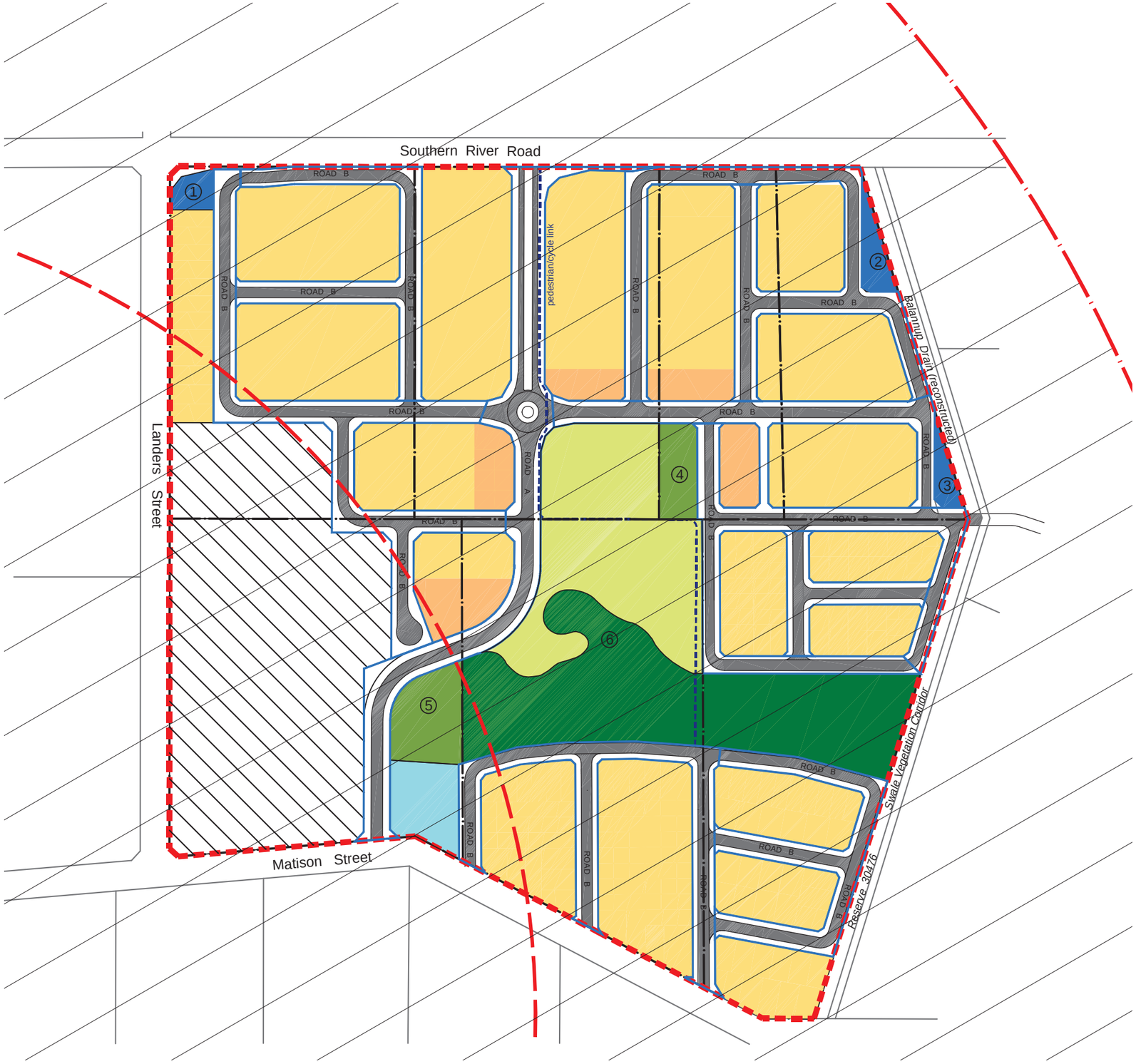


FIGURE 9

PUBLIC OPEN SPACE PLAN *(indicative plan subject to change and detailed design)*

Lots 12, 14, 18, 19, 20, 21 and 22 Southern River Road and Matison Street

M G A
Town Planners
Scale 1:3000 at A3

April 2017 2676/Design25 revised ODP

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10.0 Urban Water Management

10.1 District Urban Water Management Framework

The Southern River Integrated Land and Water Management Plan (ILWMP) was released in January 2009.

The ILWMP was prepared to provide guidance on the range of water management issues to be addressed as part of zoning, structure planning, subdivision and development processes with the intent of managing post-development district run off.

The ILWMP sets out management requirements for water at the regional, local and lot scale, including targets (design objectives) for the management of surface and groundwater quality and quantity and for potable water use and contains requirements for monitoring, auditing and reporting.

The Forrestdale Main Drain Arterial Drainage Strategy (ADS) supplements the district water management work undertaken to support the ILWMP and district and local structure plans. It is considered that the ADS was prepared in lieu of the District Water Management Strategy and has sufficient information and guidance to fulfil this function.

The ILWMP and the ADS outlines that at the Town Planning Scheme Amendment/Local Structure Plan stage a proponent is required to prepare a Local Water Management Strategy to the satisfaction of the City of Gosnells, Department of Water and the Water Corporation. This is being achieved as a part of the LSP.

10.2 Local Water Management Strategy

10.2.1 Water Demand and Conservation Strategies

According to Rockwall (2005) the total annual water use expected for a water wise house without restrictions is 304kL/house/year, of which 149kL/house/year is used internally and 155kL/house/year is used externally.

See Bioscience Local Water Management Strategy and Addendum at Appendix 6.

A residential consumption target for potable scheme water usage of 100kL/person/year has been recommended by State Water Plan (2007), however the more recent Better Urban Water Management (WAPC, 2008) recommend a target for potable scheme water usage of between 40-60kL/person/yr. Considering the average occupancy rate per house is 2.4 people (Australian Bureau of Statistics website, accessed 08/01/2010), this represents a target of 96 to 144kl/house/year and a reduction from current levels in the order 68 to 47%, which is somewhat ambitious.

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Consequently, methods for sustainable water use, conservation and reuse of water should be implemented within the development where possible. As 51% of potable scheme water is used externally on gardens, possibly the greatest opportunity to reduce potable water usage involves reducing this external use whilst encouraging owners to become waterwise internally.

10.2.2 Rainwater Tanks & Stormwater Harvesting

Rainwater from roofs and other hardstand areas can be collected in rainwater tanks, and used in gardens (51% total residential water usage) and internally for toilets (9% internal water usage) and washing machines (11% internal water usage). Due to the seasonal nature of Perth rainfall (i.e. 85% occurring during the months of May to October) very large storage tanks of approximately 100m3 would be required to irrigate over the summer months, however tanks of this size are not feasible in urban residential areas. Notwithstanding smaller tanks can still have a significant impact on reducing the use of scheme water.

10.2.3 Groundwater Use

Approximately one third of all households in Perth use groundwater for irrigation purposes. The shallow depth to groundwater in the Southern River area makes this a cost effective option, particularly as there currently are government rebates available.

Currently the DoW considers the City of Gosnells groundwater supplies to be fully allocated, at least in regards to properties over 2000m2 as lots less than this do not require a groundwater license. Consequently, areas larger than 2000m2 such as POS are unlikely to receive a groundwater license. As land use in the area changes for rural to urban, there is in all likelihood that water allocations will become available.

As the majority of the POS with the proposed development is comprised of native vegetation, perceivably there is little requirement for this area to be irrigated (possible during re-vegetation and or during extreme drought).

10.2.4 Waterwise Landscaping

Reducing the amount of water used for irrigation can be achieved via planting drought tolerant species, reducing the area of lawn, improving soil water holding capacity and via the installation of water efficient irrigation.

Another method of water conservation is through the establishment of native vegetation that has minimal or no irrigation requirements. Such plants also help to promote a more natural environment and minimise the introduction of alien species. A substantial proportion of the proposed POS areas has been strategically located to maximise the conservation of native vegetation. As previously motioned it is anticipated that this POS will not require any irrigation.

Where landscaping requirements may exist such as within swales and buffer strips, suitable native species should be selected. Where irrigation of vegetated areas cannot be avoided, it should be restricted during the day as this is when evaporation rates are at their greatest.

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10.2.5 Domestic Greywater

Whilst greywater use is technically feasible (excluding the possible concern of nutrient loading to groundwater) the large scale use within the development is not advised.

10.2.6 Water Efficient Fittings & Appliances

The use of waterwise fixtures such as showerheads, taps, toilets and washing machines is recommended where possible. According to Rockwater (2005) a 12% reduction in internal potable scheme water can be achieve via the installation of waterwise fitting and appliances.

10.2.7 Water Balance

Rockwater (2005) estimated the evopo-transpiration of the area to have accounted for 75% of total annual rainfall. Thus 25% of annual rainfall would recharged surface and groundwater systems. As the total area of the site is 25.778Ha and the average annual rainfall is 837mm/yr, the total volume of annual rainfall for the site is estimated to be 215.76ML/yr, of which 53.94L/yr would actively recharge surface and groundwater systems.

Post-development water balance is considerable more complex that pre-development as it must take into account changes to runoff characteristics from impermeable surfaces such as rooves and roads. It must also take into account importation of potable water and its use externally. More information regarding post-development water balance will be undertaken during the development of an UWMP.

10.2.8 Surface and Stormwater Management

Drain Design and Flood Management

A series of pipes, drains, swales, living streams, bio-retention systems, roadways and attenuation/infiltration POS areas are to be used to transfer and/or store extreme stormwater flows (i.e. a 1 in 100 year ARI event) and provide water quality treatment prior to discharge into the Southern River via the Forrestdale Main Drain.

Drainage will be designed using a major minor approach, more specifically the minor drainage will integrate underground pipes, swales, kerbs and gutters to carry runoff generated by low frequency ARI events (i.e less than an 1 in 5 year ARI event); whereas the major drainage will integrate roadways, living streams, drainage reserves attenuation/infiltration POS areas to provide safe passage of water during extreme runoff events (i.e up to a 1 in 100 year ARI event).

Whilst the use of swales is proposed the specific locations and design will not be determined until the Urban Water Management Plan (UWMP). Dry drainage reserves will be used in POS proposed for lots 18, 19 and 20. This area will remain dry for the majority of the year except following moderate ARI events (i.e. 1 in 6 month ARI event) and will have a elevation above AAMGL.

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The drainage system proposed for the site is a mixture of swales, bioretention systems and drainage basins in POS; however the actual design is yet to be confirmed by the CoG. Bioscience recommends the following point regarding drainage design and maintenance.

Swales to be grassed and irrigated (Note: Not expected to require much irrigation) and managed by the CoG to avoid land owners fertilising and/or filling in swales. Areas of POS that are inundated in a 1 in 1 year event will be planted with native reeds and rushes. Subsoil drainage shall be provided in these areas to avoid water ponding in parks.

Post - Development Flow

As yet the structure plan is not available; hence more detail analysis of post development flow will be undertaken during the development of an UWMP.

Living Streams

This LWMS seeks to maintain existing drainage catchments, flow paths, and maintain post-development flows at pre-development conditions. To achieve this, the existing local authority drains and natural landscape depression are proposed to be established as living streams within a POS corridor.

The Local Structure Plan (LSP) currently being prepared by Urban Plan has assigned higher density housing adjacent to proposed living streams (yet to be approved), thereby reducing the ability for high nutrient application via domestic gardens to leach into the living stream. More detail design and analysis of site conditions will be undertaken during the development of an UWMP, including preparation of landscape plans, design drawing, determining the extent of any catchment areas feeding directly into the living streams and addressing specific water quality treatment measures to be implemented for these catchments prior to discharge to these streams.

10.2.9 Groundwater Management

There are three primary objectives for groundwater protection and management for the proposed development, these include:

- Protection of infrastructure and asserts from flooding and inundation which may be brought about by high groundwater levels.
- Protection of groundwater dependent ecosystems from modified run-off following development.
- Maintaining and managing groundwater levels and quality following development.

Protection of Infrastructure and Assets

The shallow depth to groundwater (less than 1m BGL in many areas, see Figure 9 and 10) and relative flatness of the site increases the potential risk of damage to infrastructure to flooding. The implementation of controlled groundwater levels (CGL) within a development area is dependent on a range of local and site conditions including the soil type and its relationship to groundwater levels

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(regional and/or perched), the presence of ASS, the existence of pollutants or nutrients within groundwater, and the need to protect wetlands and groundwater dependant ecosystems.

According to the LWMP there is a requirement to determine the controlled groundwater levels for the development area, to enable the setting of minimum drainage invert levels and to calculate the extent of land filling requirements. We propose establishing a CGL at pre-development AAMGL within the development area; however this will continue to be updated and refined throughout the UWMP process.

Despite the control of groundwater levels, flooding still remains a considerable risk to infrastructure. The primary method of protecting buildings/infrastructure from flooding and inundation is through the implementation of a minimum separation distance of 1.2m between the AAMGL and the base of the building foundations and infrastructure. This separation distance of 1.2m is recommended to maintain free-draining soils, to allow for the installation of underground services, avoid water-logging and encourage soil filtration/aerobic microbial action to attenuate leached contaminants. In areas where insufficient separation exists between AAMGL and natural surface levels, engineering fill will be required.

Groundwater-Dependent Ecosystems

While it is acknowledged that development in the district structure plan area will require some degree of groundwater management to protect infrastructure and assets, care should be taken to maintain the requirements of groundwater dependent ecosystems.

An increase in groundwater levels may result in upland vegetation being unable to tolerate wetland like conditions; likewise a decrease to groundwater levels may result in wetland vegetation being unable to tolerate dryer conditions. It is likely that the majority of remnant vegetation within the proposed POS located on Lot 19 is to some extent dependent on shallow groundwater, whereas the remnant vegetation within the proposed POS located on lot 13 at its maximum is approximately 2m BGL and dependent on upland conditions.

Post-development alterations to groundwater levels may decrease due to an increase in abstraction of groundwater for residential irrigation (particularly during summer), or due to the control of groundwater levels thought subsurface drainage (during winter) and increase due to greater stormwater infiltration.

Several considerations have been proposed to minimise the impacts of development on groundwater levels. To protect upland and wetland vegetation alike by not constructing subsurface drains above or below 0.3m AAMGL; and secondly, to only permit residential use of superficial groundwater for irrigation if models can conclusively demonstrate sufficient water is available.

Groundwater Quantity

Post-development annual discharge volume and peak flow be maintained relative to pre-development conditions, unless otherwise established through determination of ecological water requirements for sensitive environments (DoW, 2008).

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10.2.10 Wetland and Environmental Water Management

There are no Conservation Category Wetlands (CCW) or Environmental Protection Policy lakes (EPP) within the development area. There is however a CCW located approximately 200m east of Lot 20.

A rehabilitation wetland (RW) is located on the proposed development site. Surveys undertaken for the Department of Housing by Bioscience (2009) indicate that this RW is in poor condition. Consequently this area is proposed to become an living streams within a POS corridor.

Directly north of the site is a Local Authority drain with an approximate depth of 19.6m ADH or 0.9m below AAMGL. The purpose of this drain is to remove surface water from the surrounding area and direct it towards the Forrestdale drain, where it is redirected into the Southern River. A recent Urban Water Management Strategy report from the Southern River/Forrestdale/Brookdale/Wungong, Structure Plan titled "Impact of Existing Drains and Proposed Living Streams on Groundwater Table and Nutrient Export" (JDA, 2002) specifies the drawdown influence of drains of varying depths within this region. Their results can be used to estimate desirable drain depth and distances from significant environmental features such as CCW to provide protection from groundwater lowering (Table 2). Consequently, it can be used in the reverse manner to deduce the impact a drain has on a wetland given its invert below AAMGL and distance are known.

In relation to the site, the drain invert is approximately 0.9 m below AAMGL, consequently, groundwater levels within 1km of this drain will be reduced logarithmically from between 0.57m to 0.08m, and thus has a significant drying effect of the RW located on the site.

10.2.11 Water Quality Management

Designs for infrastructure and management measures to achieve water quality outcomes are based on the methodologies established in the Stormwater management manual for Western Australia (Department of Water 2004–07). The aim in regards to water quality is to maintain pre-development quality and where possible to improve water quality. Assessment of compliance with targets will be through post development monitoring. To achieve this emphasis on nutrient input control, and maintaining 1 in 1 year ARI post-development discharge volumes and peak flow rates at pre-development levels. The proposed water quality management approach for the proposed development area includes:

<u>Non Structural Controls</u>

- Planning practices (POS locations and configuration).
- Construction practices (construction management, soil amendment, use of native plantings).
- Maintenance practices (street sweeping, stormwater system, POS areas).
- Educational and participatory practices (capacity building programs, community education).

<u>Structural Controls</u>

- Retention and infiltration of frequent events where possible (soakwells, and swales).
- Conversion of existing open drains to living streams.
- Creation of ephemeral retention/detention areas within POS areas.
- Gross Pollutant Traps (GPT) at outlets to sensitive environments.

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Monitoring

- Establishment of pre and post development monitoring network.
- Annual reporting, including ongoing assessment of BMP's performance and suitability to provide ongoing guidance and review for future WSUD planning within the Study Area.
- As compared with a development that does not actively managed water quality, developments should achieve.
    - at least 80 per cent reduction of total suspended solids.
    - at least 60 per cent reduction of total phosphorus.
    - at least 45 per cent reduction of total nitrogen.
    - at least 70 per cent reduction of gross pollutants.

Best Management Practices

Water sensitive urban design and best management practices should not only promote infiltration to aid in prevention of possible local flooding from increased runoff due to urbanisation, but should also treat the water prior to its discharge to waterways, wetlands and to groundwater (JDA, 2002). The primary method of maintaining water quality is to avoid nutrients from entering the groundwater and/or surface water from fertilisers, via direst infiltration or thought stormwater.

Reducing the amount of fertilisers used by educating residents and by providing landscaping packages in which minimal fertilisers are required. More specifically the landscaping package should minimise the amount of lawn and make soil amendments that increase the phosphorus retention index. For example the application of Bauxite residue to soil has the potential to reduce eutrophication of rivers, waterways and groundwater by retaining nutrients on infertile sandy soils. The best application rates of red mud which will reduce phosphorus leaching are 10–20 t/ha (Summers et al 1996). As fill is required on site to increase the separation of building foundations and infrastructure from AAMGL, this could be included in the composition of the imported fill. However at this stage it is uncertain whether this would constitute clean fill.

Bio-retention is a best management practice (BMP) to prevent groundwater quality deterioration. It can be incorporated to where subsurface drainage is installed for groundwater level control. A bioretention treatment system generally utilizes soils and both woody and herbaceous plants to remove pollutants from storm water runoff generally within a swale or basin. Water passes first over or through a sand bed, which slows the runoff's velocity and distributes it evenly along the length of the swale or basin, which consists of a surface organic layer and/or ground cover and the underlying planting soil. Water is ponded to a depth of 15 centimetres and gradually infiltrates the bioretention area or is evapo-transpired.

10.2.12 Construction Management

Imported Fill Material and Compaction

The permeability of imported soil is an important consideration, particularly where there is a shallow depth to groundwater. The permeability of a soil is proportional to the amount of fine particles (i.e. <0.075mm) within a soil. Bioscience considers most sandy soils suitable fill material provided it that

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it contains less than 5% fines, has a maximum particle size of 40mm and is free of any organic or deleterious material. Several upland area on site have been identified as being suitable for fill excavation, as they have natural sand cover over AAMGL of greater than 1.5m (Figure 9).

Fill materials, placement and compaction methods and quality control should apply with relevant structure fill requirements according to standard industry practice and AS 3798 "Guidelines on Earthworks for Commercial and Residential Developments".

The fill should generally be placed in loose layers not exceeding 300mm thickness and each layer should be compacted with suitable equipment to a minimum of 95% modified maximum density or 70% density index as appropriate.

Dewatering

Throughout the construction phase of the development dewatering may be required.

Prior to the commencement of any dewatering a licence to take water, will be required to apply for and obtain from DoW. If possible, site preparation should occur during dry periods to reduce or eliminate dewatering requirements. Should dewatering be required, care must be taken to ensure neighbouring wetlands or groundwater dependent ecosystems are not adversely affected.

10.2.13 LWMS Modifications - Post Original LSP

The final version of the LWMS includes minor amendments requested by the City of Gosnells (requested modifications are provided as an addendum to the LWMS at **Appendix 5**).

The City of Gosnells requested two further changes, including lifting the discharge invert of subsoil drains and achieving a minimum clearance of finished lot levels to groundwater of 2 m.

Following further discussion between the property owners, MGA Town Planners, JDSi Engineers and the City's engineering staff, consideration of these requested modifications were delayed by the City, given the final detailed design and finished lot levels are not yet able to be completed.

The City of Gosnells and Department of Planning agreed to delay the requirement for an Urban Water Management Plan (UWMP) to be presented in conjunction with a subdivision application, as required under Clause 6.4.3 (b) of TPS6. The UWMP will be required and delivered as a condition of subdivision approval.

It was agreed that the extent of fill and level of subsoil drainage will be addressed during preparation of the UWMP, at which time further supporting information from detailed engineering designs will be available.

10.3 Ongoing Management Arrangements and Responsibilities

The ongoing management and responsibilities associated with urban water management are outlined in the Local Water Management Strategy.

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11.0 Environmental Noise Assessment

11.1 Preamble

Lloyd George Acoustics was commissioned to assess the noise resulting from the Southern River Kennel Zone, located within 500 metres from the western boundary of the LSP area. Noise measurements were made on two occasions over a period of 10 days from 4 to 13 February 2012, at Location 1, and from the 28 June to 8 July 2012, at Location 2. The noise measurement locations are shown in Figure 11 below.

The Environmental Noise Assessment is attached at **Appendix 7**.



Figure 10 – Noise Logger Locations

11.2 Measurements

Location 1

For Location 1, the time period chosen was between 3.00 am and 7.00 am on Sunday 12 February 2012. From analysis of the recorded noise during this period, Figure 4.3 shows a "snap-shot" of the instantaneous noise levels when background noise level, resulting mainly from insects (crickets) and birds, was at least 10 dB lower than the noise from dogs barking and therefore not influencing the levels. It should be noted that, although the overall noise levels were influenced by the background noise, the barking was audible throughout this entire time period. From this analysis, it has been determined that the LA10 noise level, which is the level considered by the Department of Environment and Conservation to be relevant to dog barking, is LA10 42dB.

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Location 2

For Location 2, the time period chosen was between 11.00 pm and Midnight on Saturday 7 July 2012. From analysis of the recorded noise during this period, Figure 4.4 shows a "snap-shot" of the instantaneous noise levels when background noise level, was at least 10 dB lower than the noise from dogs barking and therefore not influencing the levels. From this analysis, it has been determined that the LA10 noise level is LA10 38dB.

11.3 Noise Contours and Noise Assessment Conclusion

Figure 11 below describes the results of the analysis through noise contour levels.



Figure 11 – Noise Contours (from Lloyd George Acoustic Assessment Appendix 7)

The conclusion drawn by Lloyd George Acoustics is summarised as follows:

The results of the assessment show that assuming buildings are constructed on the industrial land to the south and houses are constructed on proposed lots, the predicted noise levels exceed the assigned levels under the *Environmental Protection (Noise) Regulations 1997* by 2dB and 3dB in the southern section of the proposed development.

Although the assigned levels are exceeded, a good level of amenity could be achieved within a house by the use of facade protection, similar to that specified in State Planning Policy 5.4 (which addresses transportation noise impacts). In addition, outdoor entertainment areas should be positioned behind the house, so that the house acts as a barrier to shield noise from the kennel zone.

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11.4 Outcome

The Environmental Noise Assessment was reviewed by the Department of Environment Regulation (DER) which recommended that a 500 metre buffer distance from the kennel zone be maintained.

DER noted that the construction of noise barriers and future non – noise sensitive development had the potential to screen residential development. However, in the absence of any certainty over the ultimate form of development south of Lander Street, it was concluded that the assumptions made in relation to barrier effects could not be supported as a means to reduce the buffer at the present time. Concerns were also raised in respect of the modelling which did not factor in assumptions relating to the full build out of properties in the kennel zone.

The Structure Plan shows the required 500 metre buffer from the nearest property boundary within the kennel zone to accord with the Southern River/Forrestdale/Brookdale/Wungong District Structure Plan. To address constraints associated with noise sensitive development within the buffer a Local Centre and area nominated as 'Subject to Further Planning' are proposed.

12.0 Acid Sulphate Soils

Subject to the findings of the preliminary soil investigations an Acid Sulphate Soils Preliminary Investigation and/or Management Plan may possibly be required as a condition of subdivision approval.

13.0 Bushfire Management Plan

A Bushfire Management Plan has been prepared by Strategen, providing an assessment against the requirements of State Planning Policy 3.7 – *Planning in Bushfire Prone Areas*. Bushfire management measures have been devised to meet with applicable bushfire protection criteria.

See Appendix 8 – Bushfire Management Plan

14.0 Utilities

Refer to Section 3.9 of the Southern River Precinct 3 Local Structure Plan report produced by Taylor Burrell Barnett.

14.1 Western Power

Western Power advises that the existing power services located within the Southern River Road reserve and the subdivision to the north (of Southern River Road) can be extended to service the development of Precinct 3.A Western Power substation is located on the southern side of Southern River Road west of the subject land.

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14.2 Water Corporation

14.2.1 Reticulated Water

The Water Corporation advise that the Precinct 3 can be serviced with reticulated water by an extension of the existing 400mm diameter water distribution main at Chamberlain Street, along Southern River Road through a pre-funding agreement.

14.2.2 Reticulated Sewer

The Water Corporation has advised that sewer planning for this area has been completed and that Precinct 3 will be served by a reticulated gravity system draining to main sewer lines and/or the permanent wastewater pump stations. The system will then connect to a proposed Type 180 permanent pump station within Bletchley Park Estate (north of Southern River Road) and ultimately will connect to the major wastewater transfer station.

14.3 Telecommunications

Telstra has confirmed that existing services within the area can be extended to connect to and service the development of Precinct 3.

14.4 Gas Supply

Alinta Gas has confirmed that existing services within the area can be extended to connect to and service the development of Precinct 3.

15.0 Activity Centres and Employment

15.1 Activity Centres

The Southern River / Forrestdale / Brookdale / Wungong District Structure Plan (DSP) proposed a hierarchy of retail, commercial and industrial centres to meet the shopping, commercial and employment needs of the future population.

The DSP illustrated a Village Centre, three Neighbourhood Centres and a Mixed Business/Commercial and Light Industrial area within Precinct 3 to service the local and wider population. The Village Centre was notionally located across Precinct 2 and Sub-precinct 3E within the immediate vicinity of the subject land.

The initially adopted Precinct 2 Local Structure Plan, for the area of land abutting the northern side of Southern River Road (directly opposite Lots 21 and 22), identifies a Local Centre with a maximum floor space of 1250m^2 NLA.

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The City has recently completed its Local Activity Centres Strategy 2012, which identifies potential for the implementation of an additional 1,200m² of PLUC 5 shop/retail floor space in the vicinity of the Precinct 3E LSP area.

Discussions with the City have confirmed that the City is willing to entertain the incorporation of a local centre in the LSP area, to service the daily convenience needs of local residents, consistent with the above specified limit of 1,200m² PLUC 5 shop/retail floor space.

MGA Town Planners met with supermarket operators to confirm that the identification and location of the local centre on the LSP was an attractive proposition. To date, the Department of Housing have received a written expression of interest for the establishment of a supermarket on the local centre site; following endorsement of the LSP.

15.2 Employment

The Southern River / Forrestdale / Brookdale / Wungong District Structure Plan (DSP) proposes significant areas being allocated for commercial land use at the centre of neighbourhoods and suggests that provisions be made for home based business in order to achieve a target for local employment the equivalent of 15% of the resident population for the entire DSP area. This workforce is based on employment in local shops and other small local neighbourhood employment activities.

Assuming 50 employees per 1000m² of shop/retail floorspace alone, the proposed local centre could generate in the order of 60 full and part time employment positions. Further, the subject land is located in proximity to nearby planned activity centres, including:

- The proposed local centre adjacent to the subject land on opposite side of Southern River Road;
- Three proposed north east of the subject land on south eastern side of Southern River Road);
- The proposed mixed business/light industrial area (south east of the subject land);
- Larger retail facilities such as the Amherst Road Warton Road retail and commercial centre; and
- The boardwalk shopping centre.

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16.0 Schools

16.1 School Site Planning

The LSP does not set land aside for the provision of government or private primary or high schools. The site will be serviced by established and future schools in adjoining precincts and sub-precincts, in accordance with the established district and local structure plans.

The Southern River / Forrestdale / Brookdale / Wungong District Structure Plan (DSP) identified the need for 3 to 4 primary school sites and 1 high school site within Area 1, encompassing Southern River and the subject land, based on the estimated lot yield and subsequent population projections. Originally, the DSP did not propose a government primary school site within Sub-precinct 3E (containing the subject land), suggesting that the sub-precinct be served by government primary schools located in the adjoining precincts of Precinct 2 (north west / existing school), Sub-precinct 3A (north east) and Precinct 4 (south). The adopted Precinct 3 LSP illustrates a 4 hectares government primary school site within Sub-precinct 3A, approximately 300m east of the subject land, and an 11ha government high school site located approximately 400m south of the subject site.

16.2 Catchment Requirements

As outlined in Section 4.4.3, the LSP will yield an estimated 337 lots equating to an estimated 343 dwellings.

Liveable Neighbourhoods outlines that government primary school sites are to be provided on a ratio of one school site per 1,500 housing units. On the basis that the development of the subject land is anticipated to equate to 22.8% of a whole catchment, it is reasonable that the development be served by the established and future schools located in Precinct 2, Sub-precinct 3A and Precinct 4.

17.0 Consultation

Consultation with surrounding landowners and wider community was undertaken previously through the broad, district-scale planning framework established for Southern River by the Western Australian Planning Commission in 2001 through a District Structure Plan (DSP) prepared to guide development. The DSP identified potential development areas, road networks, major community facilities and land for public open space, drainage and conservation.

Following the district scale planning undertaken by the WAPC, Taylor Burrell Barnett, on behalf of Viento Property Pty Ltd, submitted a proposed Structure Plan for Precinct 3 (covering the subject land) and a proposed Local Structure Plan for Precinct 3A (abutting the subject land). The proposals were advertised for public comment during October and November 2008, the submissions were considered by Council at its meeting of 12 May 2009, where it resolved to adopt a revised Structure Plan and forward it to the Western Australian Planning Commission for its consideration.

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18.0 Developer Contributions

The Precinct 3 LSP outlines an initial framework for the acquisition of developer contributions and identifies common infrastructure and land requirements considered appropriate for cost sharing by landowners within Precinct 3.

Amendment 110 to TPS6 provides a framework for POS contributions based over the entire Precinct 3 area. Council, on 22 March 2011, resolved to initiate Amendment No. 110 and forward it to the Environment Protection Authority (EPA) for review and the Western Australian Planning Commission (WAPC) for consent to be advertised for public comment.

On 20 October 2011, the WAPC advised of its consent to advertise the amendment, subject to several modifications being made to the amendment text, mainly to bring the proposal into line with State Planning Policy 3.6. The Developer Contribution Report informing the calculation of POS and WIC contributions is yet to be completed. Ultimately, each landowner will be responsible for contribution costs that apply to the entire Precinct 3 area, in addition to those that may apply specifically to each of the six sub-precincts that comprise the area.

19.0 Conclusion

This LSP has been prepared and modified by MGA Town Planners, providing additional information and modifications to the LSP plan and report initially prepared by Urbanplan and approved by the City of Gosnells at its ordinary meeting on 9 August 2011, subject to modifications.

Following consideration by the Department of Planning and Environmental Protection Authority, various matters were raised necessitating further investigations and modifications addressing the LSP design, lot yield and arrangement, the progression of an environmental noise assessment, traffic impact assessment, and statutory framework guiding operation of the LSP. These subsequent modifications have been undertaken as required in order to progress the LSP.

The Department of Housing has progressively acquired Lots 13, 14, 19, 21, and 22 as a consolidated holding to achieve housing development in the locality. The proposal stems from the need to provide affordable housing opportunities through maintaining continuity of land supply to satisfy the Department's objectives in the provision of housing. During the planning process, the Department of Housing has collaborated with the owners of Lots 18 and 20 to deliver a coordinated outcome wherever possible; and integrate with surrounds.

Detailed environmental research and documentation conducted by Bioscience for the subject land distinguishes between the land that is to be set aside for wetlands and open space and land available for the development. Based on the environmental investigations undertaken, a formal request was lodged with the DEC Wetland Office to modify the geomorphic wetlands dataset for Lots 13, 14, 18, 19, 20, 21 and 22. The thoroughness of these investigations is ample to inform the creation of a Local Water Management Strategy. Matters raised by the City in relation to the Local Water Management Strategy in 2011, were resolved during 2012 by JDSi Engineers and Bioscience.

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The LSP meets with the intent of Liveable Neighbourhoods, with respect to community design, road configuration, distribution of residential density and ensuring appropriate residential amenity and safety. Based on the retail potential identified in the City's Local Activity Centres Strategy 2012, the LSP now also identifies a local centre to improve access to facilities meeting the daily and weekly needs of future residents. Positive feedback from supermarket operators has verified the orderliness and viability of this proposition.

The LSP has been refined and further informed following the completion of further technical studies, including the assessment of alternative traffic and development scenarios; and the identification of alternative land uses where possible in response to noise impact constraints affecting the LSP area. The modified LSP plan, report and applicable statutory provisions provide a framework guiding subdivision, development and future planning throughout Precinct 3E that may also accommodate changing market demands.

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