



Dianella Centre

Precinct Structure Plan Part Two – Explanatory Report

Prepared for: Greenpool Capital

Acknowledgment of Country



Urbis acknowledges the Traditional Custodians of the lands we operate on.

We recognise that First Nations sovereignty was never ceded and respect First Nations peoples continuing connection to these lands, waterways and ecosystems for over 60,000 years.

We pay our respects to First Nations Elders, past and present.

The river is the symbol of the Dreaming and the journey of life. The circles and lines represent people meeting and connections across time and space. When we are working in different places, we can still be connected and work towards the same goal.

Urbis is committed to incorporating our respect for First Nations cultures, peoples and storytelling in our work across the Country. We are proud to have partnered with Darug Nation artist, **Hayley Pigram**, and to profile her artwork - **Sacred River Dreaming**.

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Project Code	P0063129
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Report Number	Rev 0
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List of Abbreviations

ABS	Australian Bureau of Statistics
AHD	Australian Height Datum
ASS	Acid Sulfate Soils
CBD	Central Business District
CSEP	Community and Stakeholder Engagement Plan
DCP	Development Control Policy
DP	Deposited Plan
DPLH	Department of Planning, Lands and Heritage
DWER	Department of Water and Environmental Regulation
Ha	Hectare
LPP	Local Planning Policy
LPS	Local Planning Scheme
MRS	Metropolitan Region Scheme
NLA	Net Lettable Area
OP	Operational Policy
PLUC	Planning Land Use Category
POS	Public Open Space
PSP	Precinct Structure Plan
R-Codes	Residential Design Codes
SPP	State Planning Policy
WAPC	Western Australian Planning Commission
WSUD	Water Sensitive Urban Design

1

Introduction and Purpose

1 Introduction and Purpose

The Dianella Activity Centre (**Dianella Centre**), anchored by the Dianella Plaza Shopping Centre (**Dianella Plaza**), has evolved gradually since its establishment as a suburban shopping centre in the 1960s. It has long served as an important district-level retail destination, however it remains characterised by a largely single-use shopping centre format that underutilises a strategically located site. While Dianella Plaza remains a valued and well-used destination for everyday shopping, the surrounding precinct does not yet realise its full potential as a contemporary District Centre.

This presents a clear opportunity to reposition Dianella as a more vibrant, accessible and connected place – one that delivers improved amenity, greater convenience and a higher-quality public realm. Through revitalisation, the centre can better support a broader mix of social, lifestyle, education and employment opportunities that respond to the evolving needs of the local community.

In this context, the Precinct Structure Plan (**PSP**) provides a framework to transition the centre into a contemporary mixed-use destination that can accommodate housing growth, additional employment opportunities, improved public realm outcomes and a more diverse range of community services.

The PSP establishes a staged and flexible approach to development, enabling the centre to adapt to changing market conditions and community needs over time. Informed by stakeholder and community engagement, the PSP is supported by detailed technical investigations, including the following:

- **Appendix A** – Landscape Master Plan, prepared by Plan E.
- **Appendix B** – Transport Impact Assessment, prepared by PJA.
- **Appendix C** – Engineering Report, prepared by Colliers.
- **Appendix D** – Precinct Structure Plan Water Management Report, prepared by Avant Hydro Consultants.
- **Appendix E** – Needs and Impact Assessment (including Net Benefit Test), prepared by Urbis.

1.1 Requirement for a Precinct Structure Plan

A PSP is generally required to be prepared and approved prior to subdivision and development of the land where it is identified under a local planning scheme as an Activity Centre under State Planning Policy No.4.2: Activity Centres (**SPP4.2**) and in accordance with the *Planning and Development (Local Planning Schemes) Regulations 2015*.

1.2 Overview

This section of the PSP intends to provide the rationale behind the provisions of Part One. The PSP will be used by the WAPC, DPLH and other State Government agencies, the City, landowners, business owners and developers, to inform more detailed planning and provide certainty of what is envisaged for the Dianella Centre.

The City's Local Planning Strategy reinforces Dianella as a District level centre serving surrounding neighbourhoods, with Dianella Plaza as the primary retail anchor. The intent is to ensure the centre continues to meet day-to-day shopping, services and community needs, and enabling additional housing opportunities in a form which integrates with the centre and surrounding uses.



2

Site and Context Analysis

2 Site Context

2.1 Physical Context

2.1.1 Regional Context

The subject site is located approximately 6.4 kilometres north-east of the Perth Central Business District (CBD), within the Perth Metropolitan Area. It sits within the City of Stirling local government area within an established urban context characterised by a mix of residential neighbourhoods, local commercial centres and community and cultural facilities.

The site benefits from strong regional and local connectivity. Alexander Drive, a major north-south arterial road, provides direct access to the Perth CBD and connects to other key arterial routes including Walcott Street, Morley Drive and Reid Highway. The site also has frontage to Grand Promenade to the south, a major arterial road linking Dianella to Bayswater, with further connections to Morley Drive, Beaufort Street and Whatley Crescent.

The site is located near several other key activity centres. The Morley Strategic Metropolitan Centre is approximately 2.6 kilometres east of the site, while the Mirrabooka Secondary Centre is located around 3.1 kilometres northeast. In addition, a number of District Centres are located within a 4-kilometre radius, including Dog Swamp (Yokine), Inglewood, Noranda and Main Street, Osborne Park.

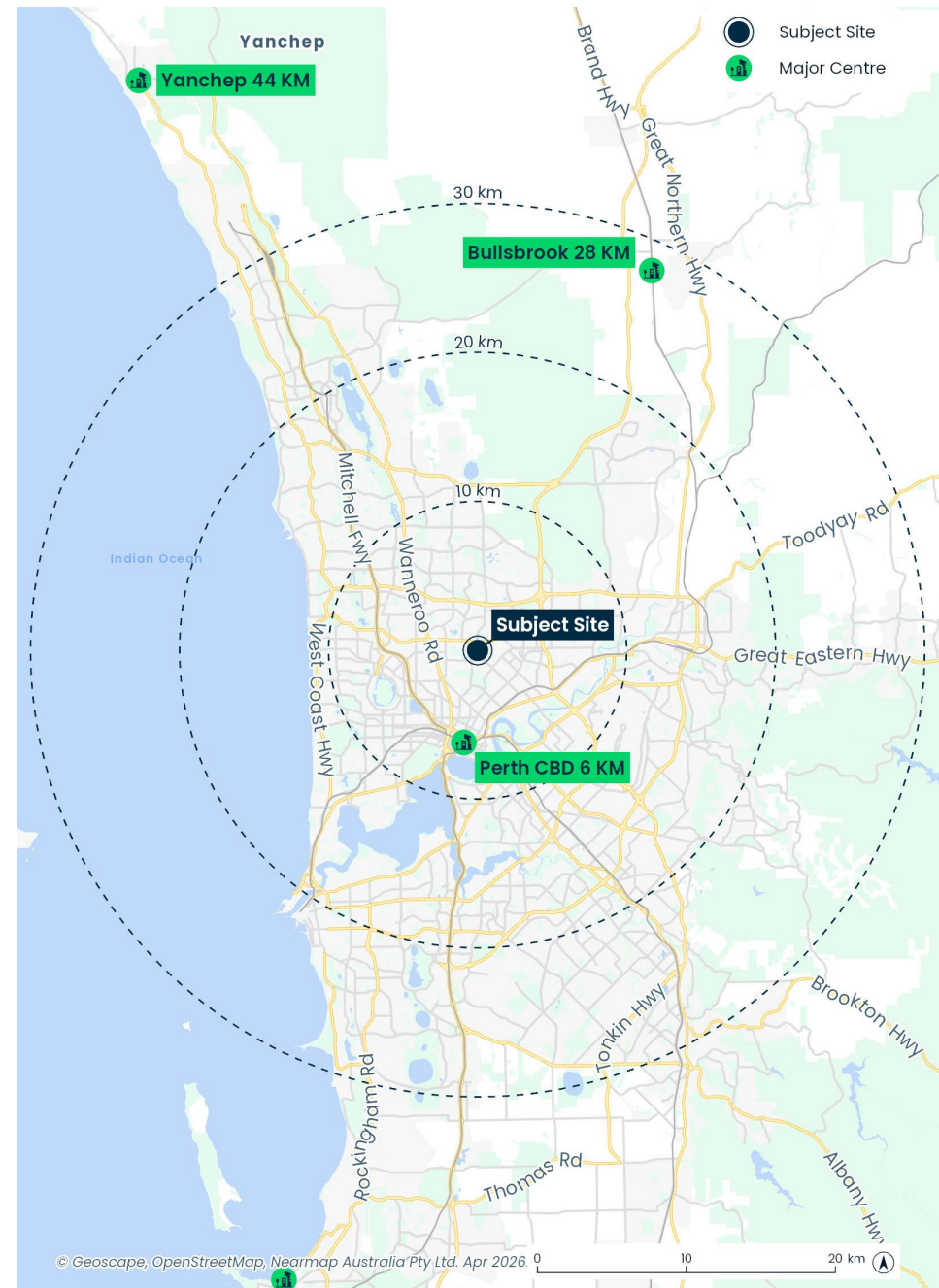


Figure 1 Regional Context Plan

2.1.2 Local Context

The subject site is situated centrally within the suburb of Dianella. It forms a key District Centre of the suburb, providing a range of commercial and retail uses.

The surrounding area primarily consists of residential land uses coded R20-R30. Higher density development is located directly east, comprising the Dianella Apartments. Fronting Waverley Street, the apartments were completed in 2021 and comprises 128 apartments within a four-storey building. The Waverley Pola Reserve is located directly north, which is a neighbourhood park comprising a waterbody that follows the path of the Bayswater Brook.

The site is located within a network of established residential neighbourhoods, primarily consisting of single-detached 1960's post-war residential dwellings. Surrounding suburbs, such as Yokine and Bedford, characterised by a high proportion of single-detached homes with a mix of character homes generally built between 1940-1970, and newer subdivided townhouses.

The site is surrounded by district and regional level facilities, such as the Dianella Regional Open Space to the north-east of the site and Terry Tyzack centre.

The context of the site is illustrated at **Figure 1** and **Figure 2**.

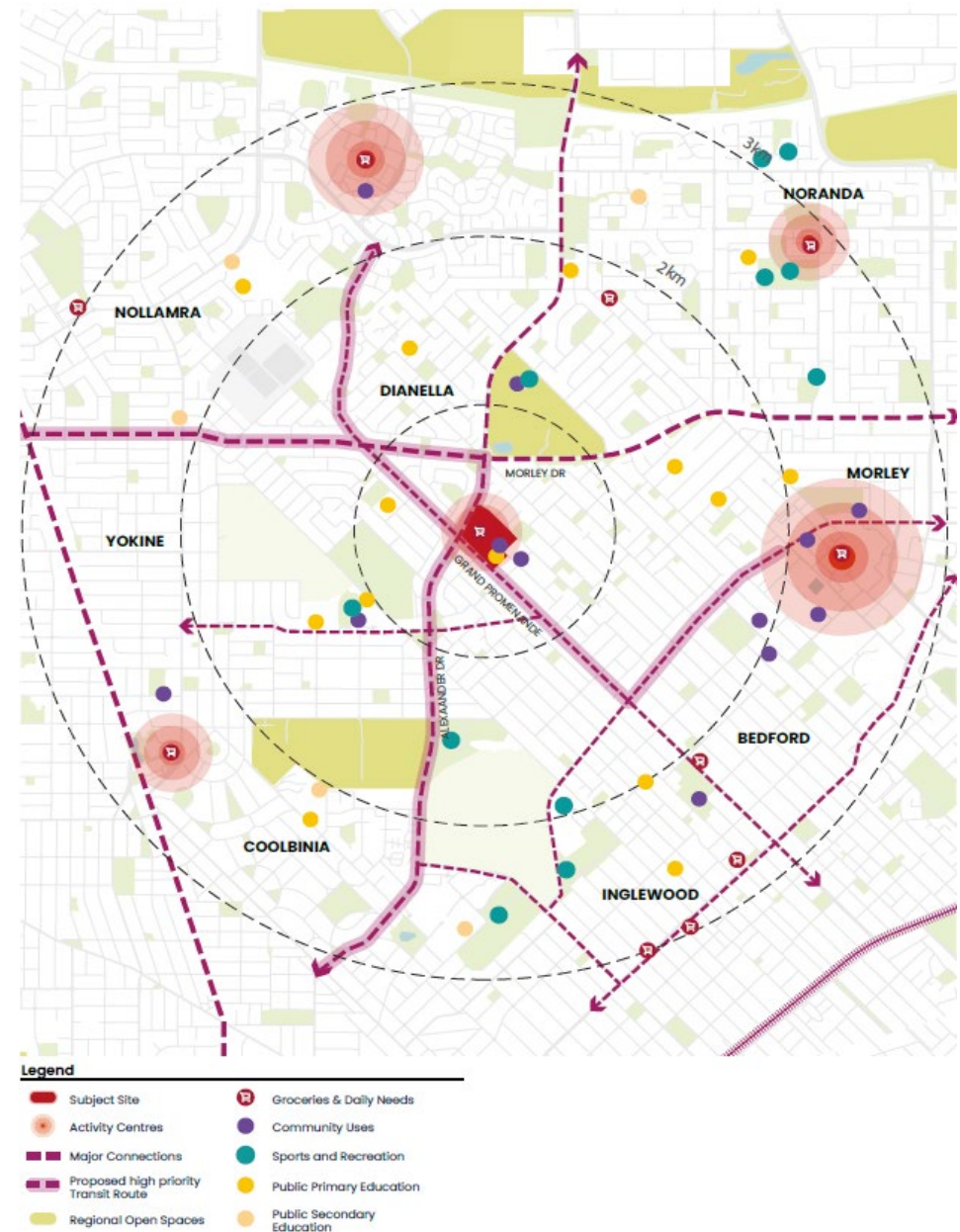


Figure 2 Local Context Map

2.1.3 Subject Site

The subject site has an area of 8.95 hectares and is bounded by Alexander Drive to the north-west, residential uses to the north-east, residential and community uses to the south-east, and Grand Promenade to the south-west. The site is generally flat, with an elevation of approximately 30 metres AHD, reflecting previous levelling works undertaken to accommodate the existing shopping centre development.

The site is dominated by the Dianella Plaza Shopping Centre and its associated car parking. Additional buildings are also located across the site, including the 'Chargrill Masters Dianella' fast food tenancy and the 'EG Ampol Dianella' petrol station to the east.

To the south is the 'Our Lady's Assumption School', the adjoining 'Our Lady's Assumption Catholic Church', and the community facility 'Stirling Libraries – Dianella' with associated parking. The northern portion of the site includes the betting agency use 'TAB Dianella'.

An aerial plan of the site is illustrated at **Figure 3**.



Figure 3 Aerial Plan

2.1.4 Tenure and Land Ownership

The subject site comprises seven lots which are depicted in **Figure 4** and described in **Table 1**

Table 1 Legal Lot Descriptions

Lot No.	Plan/Diagram	Volume	Folio	Area (ha)	Proprietor
59	30517	1884	103	0.1816	WPG COMMERCIAL PTY LTD
70	70832	1747	918	1.7735	DIANELLA PLAZA ASSET CO PTY LTD
71	70832	1747	919	0.0465	RACING AND WAGERING WESTERN AUSTRALIA
78	46369	1396	233	0.3462	DIANELLA PLAZA ASSET CO PTY LTD
79	52546	1505	499	0.1842	CITY OF STIRLING
100	63977	1977	752	1.2441	THE ROMAN CATHOLIC ARCHBISHOP OF PERTH
110	72485	1818	586	5.1753	DIANELLA PLAZA ASSET CO PTY LTD



Figure 4 Cadastral Plan

2.2 Movement

A Transport Impact Assessment (**TIA**) has been prepared by PJA to confirm the capability of the subject site to accommodate future redevelopment from a transport and movement perspective (refer **Appendix B**). A summary of the existing movement context of the site is provided below.

The Dianella Centre benefits from a strong regional movement context, supported by its position at the intersection of Alexander Drive and Grand Promenade. These roads provide high levels of visibility and vehicle accessibility from surrounding suburbs and the broader northern and eastern metropolitan area. Overall, the centre enjoys excellent regional vehicle accessibility and remains one of the most accessible District Centres within the surrounding catchment.

Alexander Drive is classified as both a District Distributor A Road as well as an Other Regional Road under the Metropolitan Region Scheme, while Grand Promenade functions as a District Distributor A Road. Waverley Street provides additional local distributor access, linking the centre with nearby residential neighbourhoods and community facilities.

Key vehicle movement characteristics include:

- Alexander Drive functions as the primary north-south regional corridor, carrying approximately 31,900 vehicles per day in 2026.
- Grand Promenade provides an important east-west connection, carrying approximately 16,200-16,500 vehicles per day.
- The centre is served by multiple access points from Alexander Drive, Grand Promenade and Waverley Street, creating high levels of vehicular permeability.

From a pedestrian and cyclists network perspective, the key movement characteristics are as follows:

- While the centre is accessible by bicycle, cycling infrastructure in the immediate vicinity is limited and lacks direct regional connections. Alexander Drive and Grand Promenade are not considered favourable

cycling environments due to high traffic volumes and the absence of dedicated on-road cycling infrastructure.

- The pedestrian network surrounding the centre is generally well established, with continuous footpath and shared path infrastructure on all primary frontages, with signalised pedestrian crossings at the major intersection of Alexander Drive / Grand Promenade.

Based on this context analysis, the key movement opportunities identified for the Dianella Centre are summarised into three key themes below:

Capitalise on Strong Regional Vehicle Accessibility

- Leverage the site's prominent location at the intersection of Alexander Drive and Grand Promenade, providing excellent visibility and regional access for retail, commercial, medical and mixed-use development.
- Utilise multiple existing access points from Alexander Drive, Grand Promenade and Waverley Street to support future intensification without requiring significant changes to site accessibility.

Create a Walkable Mixed-Use Centre

- Strengthen pedestrian connectivity through new north-south and east-west pedestrian links connecting retail, residential, community facilities and transport infrastructure.
- Develop an active, walkable town centre environment around Lowick Street and the proposed activated shared zone.
- Improve integration between the shopping centre, library, community facilities, school and surrounding residential neighbourhoods.

Improve Connections to Surrounding Community Assets

- Enhance links to Waverley Pola Reserve, nearby schools, the Dianella Library and surrounding community facilities.
- Encourage greater visitation from nearby residential areas through improved walkability and public realm upgrades.

These three key themes have been integrated throughout the PSP planning process, informing both the objectives and development controls within the PSP.

2.3 Physical Infrastructure and Services

An Infrastructure Servicing Report has been prepared by Colliers to identify existing site conditions, current and proposed services, and necessary upgrades to address environmental and geotechnical constraints (refer **Appendix C**). A summary of the existing infrastructure servicing the site and potential upgrades to service the development is provided below.

Electrical Supply

The site is currently supplied by both overhead and underground 415V low-voltage powerlines connected to the Morley substation, which has adequate network capacity, with approximately 15–20 MVA available as at 2025. The estimated site demand is 2 MVA, based on retail, commercial and residential requirements. Final load calculations must be confirmed by an electrical consultant, which will also be responsible for coordinating any required upgrades with Western Power. Undergrounding of the existing overhead lines is recommended to improve safety and visual amenity.

Sewerage Reticulation

Existing sewer infrastructure includes several 150mm vitrified clay lot connections along the northeast and southeast boundaries, as well as a 900mm reinforced concrete gravity transfer main (the Bedford Bypass Sewer Main) located within Waverley Street. The Water Corporation has accepted the proposed increased discharge for the development, with an SDF of 1.71 L/s based on the combined residential and commercial/retail areas. Internal easements and invert levels will need to be confirmed prior to detailed design, and further liaison with the Water Corporation will be required.

Water Supply

The site is currently serviced by a 100RC reticulated water main within Waverley Street; however, this is insufficient to meet the needs of the proposed development, particularly in relation to fire servicing. The Water Corporation requires the construction of a new 150mm main extension, approximately 340 metres in length, from The Strand to provide adequate supply. A redundant 100mm pipe crossing the site is likely to need to be removed or capped as part of the construction works.

Stormwater Drainage

The existing stormwater system comprises 300mm and 600mm reinforced concrete mains, grated pits, and connections to the Waverley Street compensation basin. The City of Stirling allows the continued use of the existing lot connection for Stages 2A and 2B, subject to the condition that the first 15mm of runoff from hardstand areas is treated onsite through bio-retention basins. Roof runoff is considered clean and does not require treatment. The undercroft carpark will require an impervious storage system and mechanical pumping due to the lack of a suitable gravity connection to the stormwater network. For future stages, stormwater must be fully managed onsite, with no new lot connections permitted.

Gas Supply

A 50mm PVC gas distribution pipe with a MAOP of 7kPa is located within Waverley Street but is likely to be insufficient to service the full development. Should gas be required, a 200-metre extension to a 110mm PE main in Alexander Drive may be necessary, subject to further advice from ATCO Gas.

Communications

Telstra, NBN and Optus pit and pipe networks are available within the southwest and northeast verges of Waverley Street and along internal roads. Capacity to service the proposed 619 residential dwellings and commercial premises will need to be confirmed with the relevant service providers. Relocation or protection of existing assets may be required where conflicts with construction activities arise.

3

*Community
Context*

3 Community Context

3.1 Dianella Plaza History

Dianella Plaza Shopping Centre was developed in the late 1960s, during a period of rapid suburban growth in Perth's northern and north-eastern suburbs. The centre's establishment coincided with the residential expansion of Dianella and surrounding areas, responding to demand for a local, car-accessible shopping destination anchored by a full-line supermarket.

From its early years, Dianella Plaza functioned as a neighbourhood-level centre. It was designed to meet day-to-day needs rather than act as a regional destination, providing groceries, basic retail, personal services and casual dining. Its location on Grand Promenade, a key arterial road, helped secure its role as a convenient centre for surrounding catchments including Dianella, Yokine and parts of Morley.

Over time, Dianella Plaza has undergone several refurbishments and incremental upgrades rather than wholesale redevelopment. This pattern reflects its continued function as a stable, local centre serving a largely established population.

3.2 People

Dianella is a well-established middle-ring suburb within the City of Stirling, located around 8 kilometres north-east of the Perth CBD. Dianella contains around 23,000 residents, with its population profile reflecting its long period of development, relatively stable residential base, and gradual change through housing diversification.

ABS Census data shows Dianella has a stable population, with modest growth over recent census periods. Growth has been slower than in greenfield areas, reflecting limited opportunities for large-scale redevelopment and a predominance of established housing. The City of Stirling Local Planning Strategy identifies Dianella as an area where incremental change is expected rather than rapid population increase.

Dianella has an older age profile compared with the Perth metropolitan average. There is a higher proportion of residents aged 50 years and over with median age of 43–44 years old, consistent with long-term home ownership and ageing in place. Children and young adults are present but in smaller proportions than in newer suburbs. The City's Local Planning Strategy notes that this ageing profile will influence future housing and service needs, particularly demand for smaller, accessible dwellings and local services.

Households in Dianella are predominantly family households, including couples with children and couples without children. Lone-person households are also a significant component, reflecting the ageing population. Average household size is slightly lower than the metropolitan average, consistent with fewer large families and more established households.

ABS data indicates Dianella is culturally diverse. While most residents were born in Australia, there are notable communities with origins in Europe, particularly southern and eastern Europe, reflecting earlier waves of migration. More recent census data shows increasing diversity, though at a slower rate than some other parts of Perth. English is the dominant language spoken at home, with a range of other languages present in smaller numbers.

Both ABS data and the City of Stirling Local Planning Strategy point to Dianella continuing to evolve gradually. Key planning considerations include supporting ageing residents, enabling housing choice to attract smaller households and downsizers, and maintaining access to local services, open space, and public transport.

3.3 Housing

Dianella is a predominantly established, low-density residential suburb developed mainly from the 1950s through to the 1980s. Its housing stock reflects this period, with a strong emphasis on detached dwellings on individual lots. The City's Local Planning Strategy identifies Dianella as an area where change is expected to be gradual and largely driven by infill rather than large-scale redevelopment.

ABS data shows that detached houses make up the clear majority of dwellings in Dianella, comprising around 78–80% of all dwellings. Semi-detached dwellings, townhouses and villas form a smaller but growing share at between 16–18%, while low-rise apartments account for a relatively minor proportion of housing. This mix is consistent with the City of Stirling's planning framework, which supports modest increases in medium-density housing in appropriate locations, particularly near activity centres and along key transport routes.

Home ownership is a defining feature of Dianella's housing profile. Between 70–80% of dwellings are owned outright or being purchased with a mortgage, reflecting long-term residency and an ageing population. The proportion of rental housing is approximately 20%, lower than the metropolitan average, and public or social housing forms a very small component of the total stock.

Summary

Both ABS data and the City of Stirling Local Planning Strategy point to Dianella continuing as a stable, predominantly owner-occupied suburb. Future housing change is expected to be incremental, with an emphasis on:

- diversification of dwelling types;
- Infill and redevelopment which does not compromise suburban amenity;
- improved housing choice for older residents and smaller households.

4

Governance Context

4 Governance Context

4.1 Zoning and Reservations

4.1.1 Metropolitan Region Scheme

The subject site is currently zoned 'Urban' under the Metropolitan Region Scheme (MRS) (refer **Figure 5**). This zone aims to provide for residential development and associated local employment, recreation and open space, shopping, schools, and other community facilities.

More broadly, almost all the land surrounding the subject site is zoned 'Urban', aside from Alexander Drive directly adjacent to the subject site, which is reserved 'Other Regional Road'. Approximately 440m north-east from the centre of the subject site is land reserved for 'Regional Open Space', and is designated Bush Forever Site 280, being the Dianella Regional Open Space.

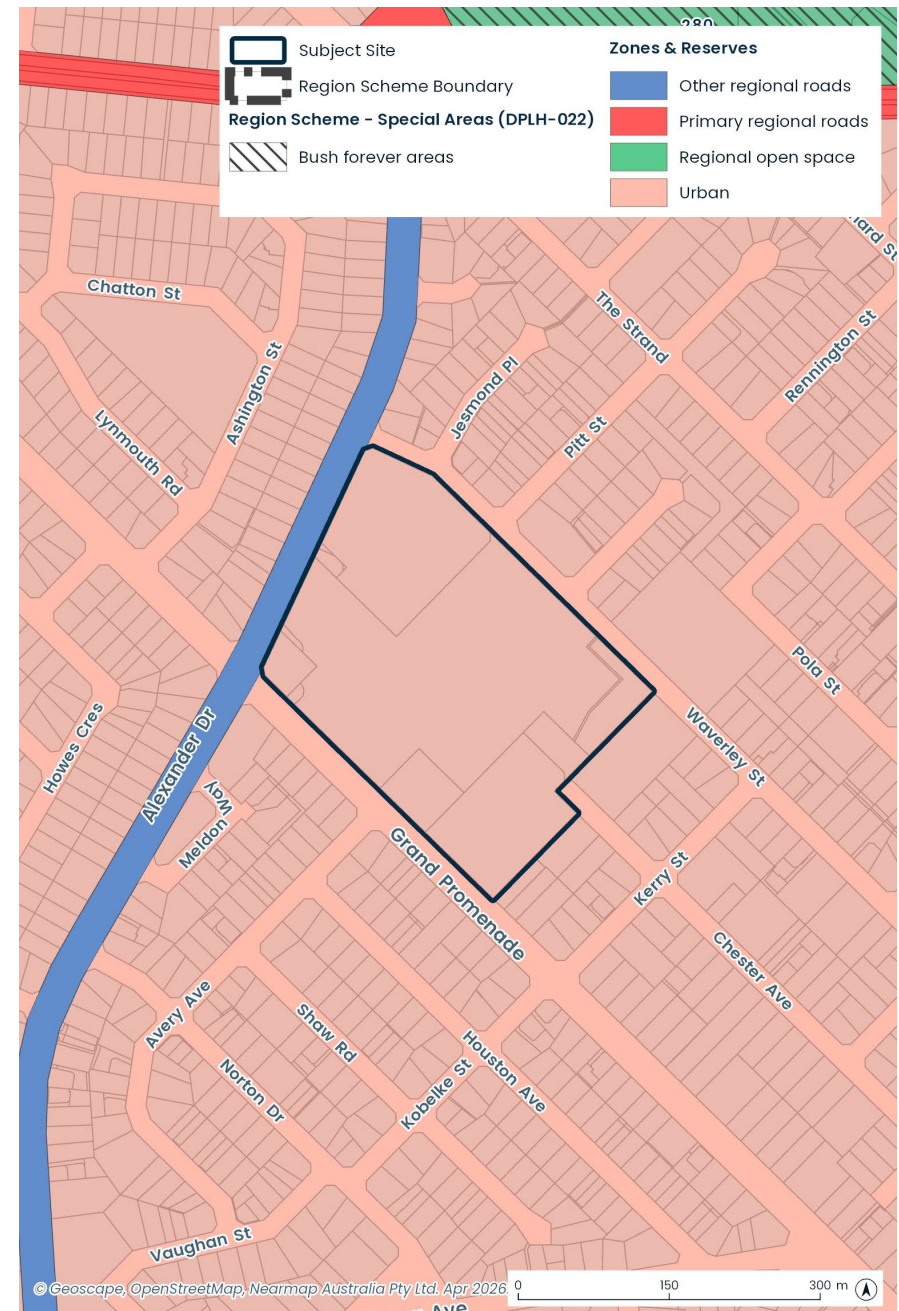


Figure 5 MRS Map

4.1.2 City of Stirling Local Planning Scheme No. 3

The subject site has several zonings under the Local Planning Scheme No.3 (LPS 3), these include:

- **District Centre:** To provide a broad range of shopping, commercial and community services that meet the weekly needs of surrounding neighbourhoods, support local employment, and ensure development is designed and sited to deliver a high standard of safety, amenity and sense of place.
- **Hotel:** To provide a limited range of entertainment and accommodation-related facilities, while ensuring a high standard of development and design that contributes to a strong sense of place and community.
- **Service station:** A premise, excluding transport depots and facilities for panel beating, spray painting, major repairs or wrecking, that are used for the retail sale of petroleum products and incidental goods, and for greasing, tyre repairs and minor mechanical repairs to motor vehicles.

4.1.2.1 Dianella Centre Special Control Area

Six of the seven landholdings that form the PSP are located within the LPS 3 'Dianella Centre Special Control Area' (**DCSCA**) (excluding the Hotel zoned site). The objectives of DCSPCA include:

- To ensure a diversity of uses and services which encourage reduced car travel, shorter trips and better social interaction.
- To ensure the development of multiple functions benefiting the community through appropriate social services and business mix.
- To ensure integration of intensive building form and land uses with public transport infrastructure.
- To ensure building forms provide for a long life span and adaptability for use, changing with time.
- To apply the activity centre standards of the Residential Design Codes, to encourage consolidated housing forms and diversity.

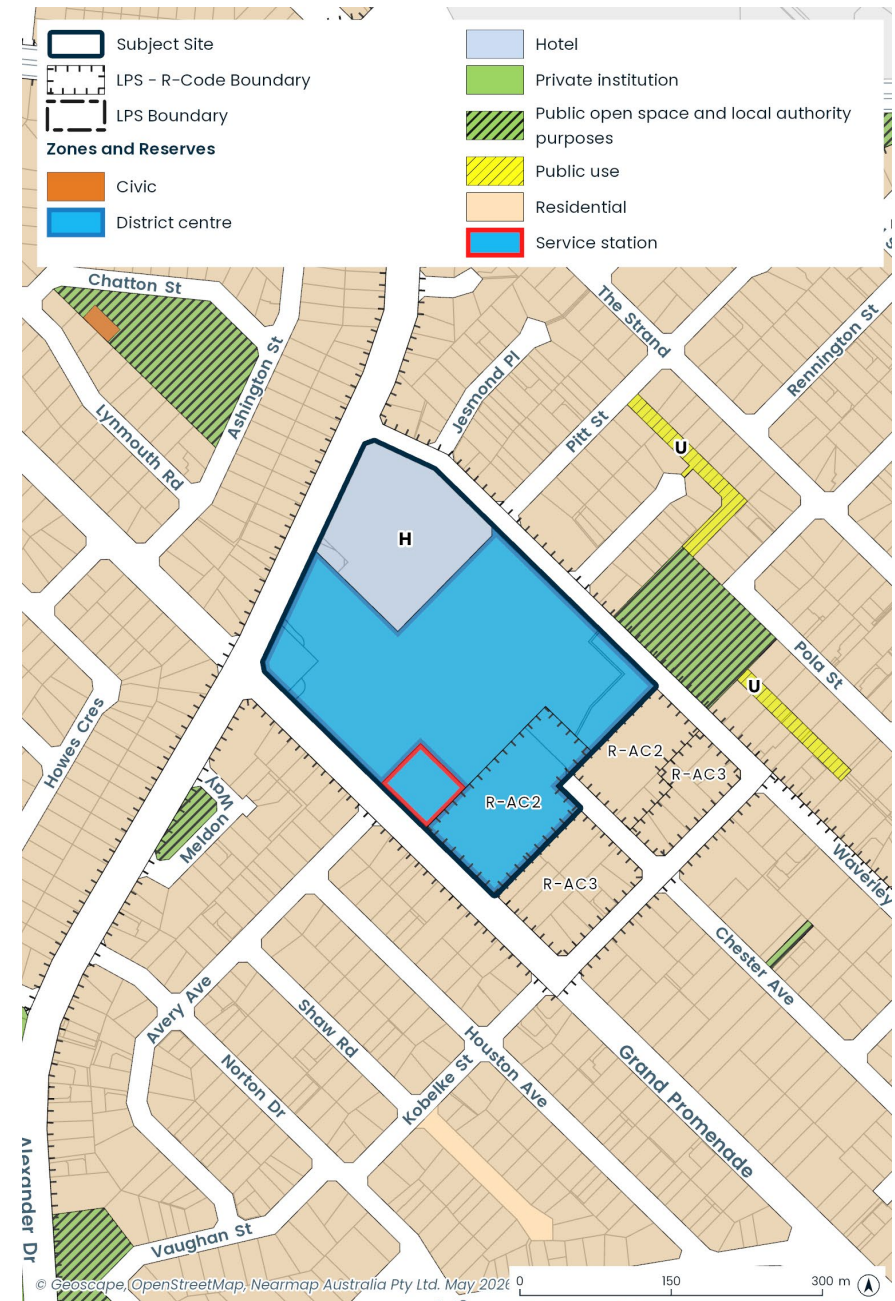


Figure 6 LPS3 Map

- To apply minimum development standards to achieve the desired intensive building form and land use mix.

The DCSCA provides specific provisions for development regarding Building Height, along with superseding specific provisions of the R-codes, such as minimum open space, setback, and maximum height, the R-Codes for land zoned R-C2 and R-AC3 within the DCSPCA.

PSP Response

The redevelopment of the Dianella Centre to accommodate a mix of retail, residential, community and ancillary uses is strongly aligned with the District Centre zoning and the objectives of the DCSCA. The PSP provides a clear and coordinated framework to guide this transformation, ensuring development outcomes that support the centre's role as a key activity node within the district.

In particular, the PSP seeks to deliver a more attractive and diverse centre by encouraging a broad mix of uses and active built form. Ground-level retail and community uses, combined with residential and other compatible uses above, are intended to generate activity throughout the day and evening. This approach supports casual social interaction, improves passive surveillance, and strengthens the centre's function as a community focal point.

The PSP also promotes higher density residential development and more intensive land uses focused around a defined main street node. Concentrating density and activity in this location reinforces the centre's hierarchy, supports local businesses, and improves access to services within walking distance.

To support these outcomes, the PSP includes suitable development standards within Part One that establish clear expectations for built form and land use. These standards guide building height, scale, interface, and land use mix to ensure new development contributes positively to the character and function of the centre. Collectively, they provide certainty for development while ensuring that individual projects work together to deliver the intended district centre outcomes envisaged by the DCSCA.

The redevelopment of the Dianella Centre to accommodate a mix of retail, residential, community, education and ancillary uses is strongly aligned with the District Centre zoning and the objectives of the DCSCA. The PSP provides a clear and coordinated framework to guide this transformation, ensuring development outcomes that support the centre's role as a key activity node within the District.

4.1.3 City of Stirling Draft Local Planning Scheme No. 4

The City of Stirling is currently progressing

a new Local Planning Scheme to replace LPS 3. Draft Local Planning Scheme No. 4 (**Draft LPS 4**) was formally advertised in late-2024, early-2025, and is now a seriously entertained document. At the time of writing this report, Draft LPS4 was presented to the May 2026 Statutory Planning Committee for recommendation to the Minister for final approval.

Draft LPS 4, as advertised, will rezone the subject site, which currently comprises 'District Centre', 'Service Station', 'Hotel' zonings, to a holistic 'Centre' zone, as illustrated in **Figure 7**.

The draft objectives for the 'Centre' zone are as follows:

- To provide a focal point for a broad range of land uses to meet the community's district and/or sub-regional needs, consistent with the centre's level in the activity centre hierarchy.
- To facilitate a range of employment to contribute towards the sub-region's employment self-sufficiency.
- To provide a basis for future detailed planning in accordance with the structure planning provisions of this Scheme or the Activity Centres State Planning Policy.

PSP Response

The Centre zone within Draft LPS 4 designates the subject land as an activity centre and requires the preparation of a PSP, in accordance with State Planning Policy No.7.2: Precinct Design and State Planning Policy No.4.2: Activity Centres for Perth and Peel. The PSP is entirely consistent with this requirement and the broader State and Regional Planning Framework which is expanded upon in **Section 4.2**.



Figure 7 Draft LPS 4 Map

4.2 State and Regional Planning Framework

4.2.1 Perth and Peel @3.5million and Central Sub-Regional Framework

Perth and Peel @ 3.5 million is the State's long-term spatial strategy for managing population growth to around 3.5 million people. The strategy seeks to deliver a more compact, connected and resilient metropolitan area by focusing growth in existing urban areas, strengthening activity centres, improving public transport access, and supporting a diverse housing mix close to jobs and services.

Within this framework, the Central Sub-regional Planning Framework provides more detailed direction for inner and middle-ring suburbs, including Dianella. It identifies the need to accommodate a significant share of future population growth through infill development and urban renewal, particularly around activity centres and along key transport corridors.

As a designated District Centre, the Dianella District Centre is expected to play a stronger role in meeting day-to-day retail, service, community and employment needs for surrounding neighbourhoods. The framework supports moderate increases in residential density around District Centres, improved built form outcomes, and a broader mix of land uses, provided development is well designed and sensitive to adjoining residential areas.

The Central Sub-regional Framework also emphasises improving walkability, cycling and public transport access, especially along strategic roads such as Alexander Drive and Grand Promenade. For Dianella, this reinforces opportunities to enhance connections to surrounding neighbourhoods, improve the public realm, and create a more legible and accessible centre.

PSP Response

Perth and Peel @ 3.5 million and the Central Sub-regional Framework position the Dianella District Centre as a key location for incremental infill, renewal and local job creation.

The PSP response is entirely consistent with this objective, noting that with appropriate planning and design, the centre can evolve beyond a traditional shopping destination to become a more vibrant, mixed-use hub that supports housing choice, community activity and sustainable urban growth in line with metropolitan objectives.

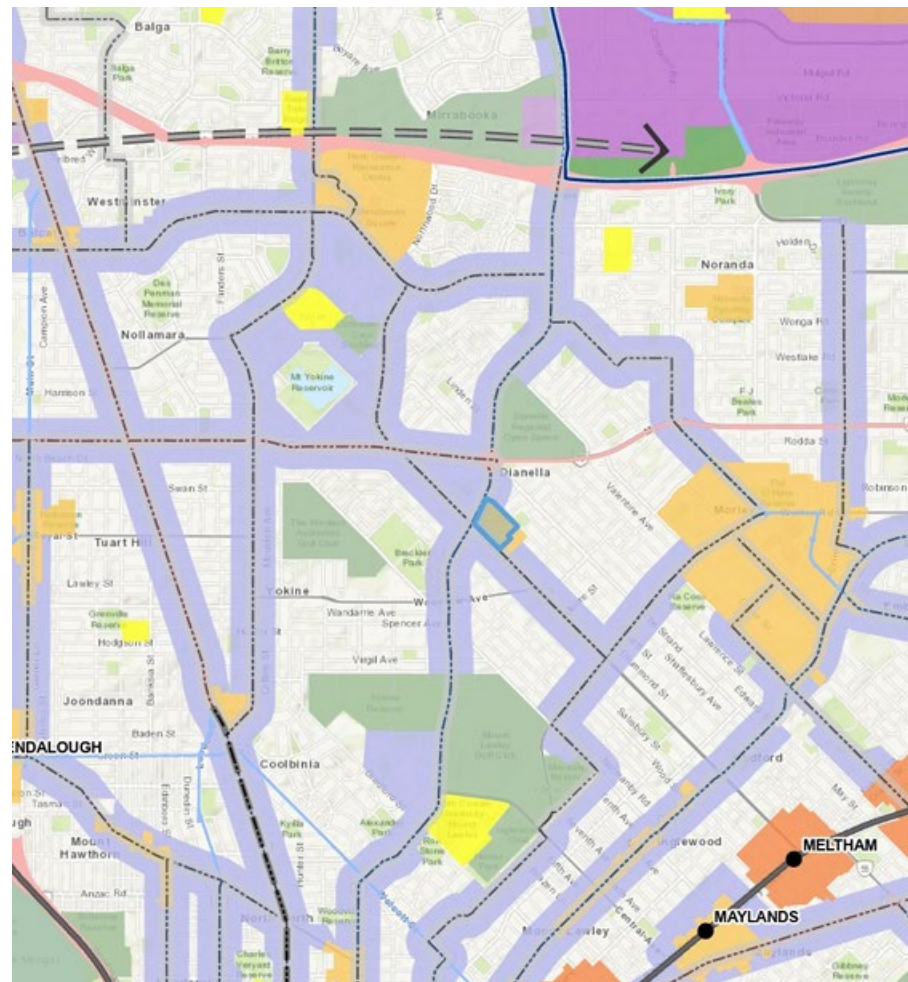


Figure 8 Perth and Peel @3.5million Map

4.2.2 State Planning Policies

The State Planning Policies (SPPs) applicable to the PSP area and the manner in which they have been addressed through the PSP are outlined in **Table 2** below.

Table 2 Response to State Planning Policies

SPP	Intent	PSP Response
SPP 2.9 – Planning for Water	SPP 2.9 – Planning for Water and Guidelines seek to deliver greater clarity around how water-related provisions are implemented (and supersede a range of other water-related policies). SPP 2.9 and Guidelines incorporate improvements that will lead to better planning decision-making through consideration of appropriate management measures to achieve optimal water resource and development outcomes.	Appendix D contains the Water Management Report (WMR), prepared by Avant Hydro Consultants. The WMR is based on Water Sensitive Urban Design principles and aligns with State Planning Policy 2.9 – Water, the Stormwater Management Manual for Western Australia, the City of Stirling on Site Stormwater Drainage Criteria, and related guidance. The report's guiding objectives include maintaining the total water cycle, protecting people and property from flooding, supporting water conservation, and improving water quality, consistent with SPP2.9. The report identifies the need for a subdivision and development Water Management Report for subsequent stages of development, which has been identified as a deliverable required for development or subdivision under Part One of the PSP.
SPP 4.2 – Activity Centres	SPP 4.2 – Activity Centres guides the planning and development of activity centres throughout Western Australia. The main purpose of SPP 4.2 is to ensure planning, development and decision making adequately considers the distribution, function, broad land use, access and urban form considerations for activity centres. It also provides guidance for commercial and other activity-based development outside of designated activity centres to ensure identified activity centre are protected by limiting inappropriate 'out of centre' development. The subject site is currently identified as a District Centre under SPP 4.2. The objectives of a District Centre is to provide daily and weekly needs for residents. They possess a relatively smaller scale and catchment which enables them to have a greater local community focus and provide services, facilities and job opportunities that reflect the needs of their catchments.	The PSP has been informed by a Retail Needs Assessment and Net Benefit Test, prepared by Urbis (Appendix E). The assessment concludes that the expanded centre is needed because trade area population and retail spending are forecast to grow, and the centre is currently below benchmark market share for a district-centre anchor. The Retail Net Benefit Test concludes that the proposal would create only low trading impacts on nearby centres, and that these impacts would not threaten the sustainability of any individual centre. Overall, this demonstrates the proposed retail outcomes within the Dianella PSP align with SPP4.2.

SPP 5.4 – Road and Rail Noise

SPP 5.4 applies to residential or other noise sensitive premises which are in proximity to primary freight roads and rail routes. The purpose of SPP 5.4 is to minimise the adverse impact of road and rail noise on noise-sensitive land use and/or development within the specified trigger distance of major transport corridors. It also seeks to protect the functionality of the State's transport corridors by protecting them from encroaching incompatible development.

The subject site is adjacent to Alexander Drive and Grand Promenade, which are both identified as a 'Other significant freight/traffic route' under SPP 5.4 and has a trigger distance of 200m for noise impacts. Future residential and other noise sensitive development within this trigger distance will require the employment of noise attenuation methods. Where noise levels are likely determined to be in excess of the noise target set out in SPP 5.4, a Noise Management Plan is required to detail any amelioration requirements.

The PSP identifies the land fronting Alexander Drive and Grand Promenade within the Daily Needs precinct, which will form the 'Centre' zone, with a focus on maintaining this area as the key retail and commercial zone for the site. Noise sensitive uses such as residential development are encouraged in the Living and Lifestyle precinct, within the 'Mixed Use' zone.

This approach is entirely consistent with the principles of SPP5.4 and sets the foundations to minimise transport noise conflicts. As outlined in Part One, a Noise Management Plan will still be required at the development application or subdivision stage, for any noise sensitive uses proposed within the SPP5.4 trigger distance.

Residential Design Codes (Volume 2)

The Residential Design Codes (R-Codes) provide planning and design provisions for residential development across the State. The R-Codes aim to facilitate an appropriate standard of housing, encourage more diverse types of housing, promote sustainability and outline assessment pathways to facilitate better residential outcomes for occupants.

The proposal is consistent with the R-Codes and seeks to vary the following provisions within Volume 2:

- Acceptable Outcome A2.2.1 – Building Height
- Acceptable Outcome A2.3.1 – Street Setback
- Acceptable Outcome A2.4.1 – Side and Rear Setback
- Acceptable Outcome A2.5.1 – Plot Ratio
- Acceptable Outcome A3.3.4 – Deep Soil Area

All other requirements of the Residential Design Codes will continue to be applied at the development application and/or subdivision stage.

4.2.3 Development Control Policies

A summary of the Development Control Policies (DCPs) and Operational Policies (OPs) and Position Statements (PS) applicable to the PSP and the manner in which they have been addressed through the PSP is outlined in **Table 3** below.

Table 3 Response to Development Control Policies

DCP / OP	Intent	PSP Response
DCP 1.6 – Planning to Support Transit Use and Development	The intent of Development Control Policy DCP 1.6 is to facilitate development, subdivision and all planning frameworks to support of transit-oriented design principles and to support these precincts to transition into areas that benefit more directly from transit exposure. These include walkability, density, and a mixture of land uses. The subject site directly abuts existing bus stops that service a High Frequency Bus Route, as defined by Transperth. In accordance with this policy, this level of proximity to a High Frequency Bus Route results in an area being defined as a 'Transit Orientated Precinct'. These bus routes include the 960 and the 980 services, connecting the site to the Perth CBD and Elizabeth Quay, Curtin University, Dianella Plaza, and Morley Galleria.	The PSP capitalises on this existing transport infrastructure and is entirely consistent with the principles of DCP1.6, noting the following: - Stage 1 (which includes relocation of the Coles supermarket and delivery of the pad sites on Alexander Drive) seeks to improve the wayfinding and pedestrian permeability through the existing Dianella Plaza shopping centre. This is achieved through restructuring the layout of the site to create direct and clearly marked pedestrian pathways through the site. Stage 1 includes key enabling projects and works to form up the precinct opportunities delivered in subsequent stages. - Stage 2-3 seeks to deliver further retail expansion closer to Waverley Street as well as an internal main street (Lowick Street) and approximately 600 residential dwellings within the PSP area. These dwellings will all be located within 300m of a bus stop, entirely consistent with TOD principles.
Position Statement: Public Open Space	The intent of the Position Statement is to ensure public open space (POS) is considered and delivered consistently within planning frameworks. For structure plans, it requires the framework to consider any existing POS and assess the need for new POS to meet current and anticipated future community needs. This includes the need to reference the anticipated POS contributions (land or cash-in-lieu) to be provided at subdivision stage. The Position Statement also provides guidance on delivering POS for infill development within established suburbs. It acknowledges that a reduced POS contribution is suitable in these scenarios. Infill is defined as the redevelopment of an existing urban area at a higher density, which by definition would include the Dianella PSP area.	Dwellings being delivered under the PSP are likely to comprise multiple dwellings, and therefore subject to a strata subdivision. Under the Position Statement, this does not currently trigger a requirement for a public open space contribution, <u>assuming the requirements of Table 1 of the Position Statement are met</u>. As outlined in Part One of the PSP, the PSP plan does not designate any additional <i>public</i> open space within the site. But the redevelopment does propose a number of open space areas throughout the site, including an outdoor town square as a central meeting space, area and pocket parks in key locations. The only factor which excludes these areas from being defined as public open space is the ownership

	Table 1 of the Position Statement states that POS contributions for infill areas should be delivered as follows: • Up to December 2027, infill subdivisions may reduce the POS contribution to a default 0% of gross subdivisible area, unless already required under the local planning scheme; and • From 2027 onwards, built strata subdivisions of 6 or more lots, constructed in accordance with development approval, issued before December 2029, are not required to contribute to POS where the subdivision is approved on or before December 2033.	structure, where the open space will remain under ownership of the main centre. The external open space areas will still be open for public use, including by residents of the future development stages. A key benefit of this approach is that the design and maintenance will be delivered by the landowner, reducing maintenance obligations on the City of Stirling. Section 4.3 provides an overview of the City's open space strategy, which identifies that Dianella currently achieves 10% of area as public open space. This also identifies the need to diversity the range of open space areas within Dianella, including delivering more opportunities for open space which provides opportunities for informal social interactions. The landscape strategy for the PSP is entirely consistent with this approach, noting the following: ▪ The Lowick Street town centre space is located within a highly activated section of the mixed-use precinct and co-located with the adjoining Library. ▪ The pocket parks are located adjacent to key entries of Dianella Plaza, providing casual spaces for staff and customers. Overall, the PSP is entirely consistent with the Position Statement, as despite not requiring a public open space contribution, the PSP still delivers open space to support the community, and the City's framework does not identify the need for additional public open space within the Dianella area.
OP 2.4 – Planning for School Sites (2022)	OP 2.4 outlines the general requirements for school sites in residential areas, generally corresponding to the requirements of Liveable Neighbourhoods. OP 2.4 also sets out physical site servicing and access requirements, as well as guidelines for the identification and establishment of other complementary facilities on school sites such as educational support facilities, childcare facilities and community purpose buildings.	The WAPC has confirmed that the OP2.4 contribution regime is unable to capture built-strata dwellings, such as apartments, as they do not follow the same planning assessment and approval process as survey-strata and freehold subdivisions. Until this position changes, the multiple dwellings proposed under the PSP will not trigger the requirement for a contribution for school sites.

4.3 Local Planning Framework

4.3.1 City of Stirling Local Planning Strategy

The City of Stirling Local Planning Strategy (**Strategy**) was prepared in 2019 to guide the long-term planning and land use direction. The Dianella Centre is identified as a 'District Centre' under the Strategy which relates directly to the existing use of the land for a Shopping Centre. The objectives for District Centres are to service the daily and weekly needs of local residents.

The Strategy identifies key population, land use, employment and development trends for the Dianella area, including the District Centre. Key findings of the Strategy as it applies to the Dianella centre include the following:

- Dianella District Centre currently lacks land use diversification, with 71% of the commercial floorspace forming solely 'Shop/Retail' uses, and 11% being 'Other Retail' uses. The target commercial diversification target for Dianella identified in Table 37 of the Strategy is 29%, indicating that there is a significant opportunity for the Dianella Centre to develop other non-residential categories such as office, entertainment and health / welfare.
- The forecast population and dwelling growth identified for Dianella is between 1-2% growth, creating the need for approximately 2,400 new dwellings across the suburb by 2036. Of these dwellings, the Strategy intends for 75% of dwellings (approx. 1800 dwellings) to be delivered in centres and corridor areas by 2036. Dianella Plaza being a key centre within Dianella would therefore need to make a significant contribution to these dwelling targets.

Key land use, density and urban structure initiatives which the Strategy identifies as priorities for the Dianella District Centre include:

- **Centre consolidation and renewal:** Encouraging reinvestment and renewal within established centres to improve amenity, built form quality and functionality, rather than dispersing retail and services.
- **Mixed-use outcomes:** Supporting a broader mix of uses over time, including higher-density housing, commercial uses and community facilities, where appropriate and well designed.
- **Housing diversity:** Promoting increased housing choice and moderate density in and around activity centres to support ageing in place, smaller households and affordability, while managing interfaces with surrounding neighbourhoods.
- **Movement and access:** Improving walkability, cycling and public transport access, with particular emphasis on safer pedestrian connections, legible centre layouts and reduced reliance on private vehicles.
- **Public realm and place quality:** Enhancing streetscapes, open spaces and civic areas to create a more attractive, comfortable and safe centre for everyday use.

Overall, the Local Planning Strategy positions the Dianella District Centre for incremental change rather than wholesale redevelopment. It supports a transition from a predominantly single-use shopping centre to a more integrated, diversified and consolidated district centre that better contributes to local liveability and employment, while respecting its established suburban context.

4.3.2 City of Stirling Public Open Space Strategy 2021–2031

The City of Stirling Public Open Space Strategy provides a long-term framework to guide the provision, enhancement and management of public open space across the local government area. It responds to changing community needs, increasing urban density, climate pressures and evolving expectations around accessibility, inclusion and environmental sustainability.

With specific reference to the Dianella area, the Strategy identifies the following:

- Dianella has 92 hectares of local and regional POS areas, representing the highest total amount of POS across the City of Stirling area.
- Of this 92 hectares, 70 hectares is public open space designated under the local planning scheme. In total, this represents 12% of the total gross subdivisible area of Dianella.
- The majority of these areas being dedicated for local, regional and district open space. Community open space forms the lowest form of open space by area, indicating the need for increased focus on open space which delivers informal recreational and social activity spaces.

The Strategy identifies that Dianella is well serviced by local open spaces, with high numbers of local open spaces within walkable distances of residential areas. The focus for Dianella is ensuring a diversity of functions and quality of spaces to meet needs.

4.3.3 Dianella Centre Plan 2012

The Dianella Centre Plan was initially prepared as a broad framework to guide the future development of the Dianella District Centre. The overarching intent was to provide a framework which enhances the operation of the shopping centre, improve amenity and increase the range of activities and services available to the community.

While the Plan has technically expired due to the statutory 10-year timeframe for structure plans, the principles underpinning the redevelopment of the centre still provide useful context for the PSP. Section of the Dianella Centre Plan

identifies the following key opportunities for transforming the urban structure of the Dianella centre:

- **A more legible centre structure**, including improving the amenity of 'Lowick Street' and promote north-west axis around which the main activities are arranged. Rationalise vehicle routes to be more direct and legible and enhance pedestrian access and safety through provision of quality paths.
- **A defined centre core**, with Dianella Plaza reinforced as the heart of the District Centre, with opportunities for complementary uses and activity clustered around it to create a strong and more identifiable centre.
- **Public realm and open space enhancements**, including enhancing opportunities for small community events through introduction of a small 'town square' as part of shopping centre redevelopment.
- **Housing diversity**, by introducing high density residential opportunities within the centre.
- **Street activation and edges**, by introducing activated street frontages to the perimeter of the existing shopping centre, concentrated around key pedestrian areas.
- **Improved pedestrian priority**, including establishing an east-west pedestrian link through the centre, connecting to Alexander Drive.
- **Land use diversity over time**, by introducing mixed use development to the site, with frontage to the street and internal car park.

Whilst the urban structure of the PSP has evolved since this framework was prepared, many of these opportunities remain applicable and continue to be applied through the PSP.

4.3.4 Local Planning Policies

The City of Stirling Local Planning Policies (LPPs) applicable to the PSP area and the manner in which they have been addressed through the PSP are outlined in **Table 4** below.

Table 4 Response to Local Planning Policies

LPP	Intent	PSP Response
LPP 4.2 – Mixed Use Design Guidelines	LPP 4.2 seeks to promote high-quality built form and attractive streetscape for non-residential and mixed-use development within the City's Activity Centres and other commercial sites. It also supplements the requirements of the Residential Design Codes (R-Codes) for residential components of mixed-use development. LPP 4.2 is applicable to land zoned mixed-use and is therefore relevant to the PSP area.	The PSP seeks to replace the building height, setback, vehicle access and movement areas (including crossovers) with bespoke site-specific controls, as outlined in Part One of the PSP. The principles underpinning the design of buildings and their relationship to the street may continue to apply to the PSP area at the development application stage.
LPP 6.6 – Trees and Landscaping (Non-Residential)	LPP 6.6 sets out requirements for trees and landscaping in developments across the City, aiming to enhance local area quality, liveability, identity, and biodiversity. It specifies minimum landscaped areas, tree numbers and sizes, deep soil zones, and landscaping standards for car park areas, applying these provisions to all relevant non-residential development proposals.	Landscaping, tree retention and open space areas within the PSP are to be delivered in accordance with the Landscape Masterplan, as provided at Appendix A. This will replace the 'landscape area', 'tree and deep soil area', 'car parking area' and 'landscaping along lot boundary' requirements of LPP6.6 with more site responsive requirements. The specific tree size requirements and landscaping area principles of LPP6.6 will may continue to be considered for any development application within the PSP area.
LPP 6.7 – Parking and Access	LPP 6.7 aims to ensure developments provide an appropriate level of car parking, while also encouraging alternative transport options such as walking, cycling, rideshares, and public transport. This approach supports behavioural change to reduce the reliance on cars and the impact of parking on an area. LPP 6.7 sets out car parking ratios for non-residential uses, along with site-specific requirements for school developments. It also includes provisions for commercial developments, such as loading and service bays.	As outlined in Part One of the PSP, carparking ratios for non-residential uses shall be in accordance with the minimum and maximum rates outlined in the <i>WA Planning Manual – Non-Residential Car Parking Rates in Perth and Peel 2024</i>. The PSP continues to apply the parking rates under LPP6.7 as it applies to: ▪ Specific purpose bays ▪ Electric vehicle charging bays ▪ Motorcycle parking ratios ▪ Non-residential parking design

▪ Parking management

**LPP 6.12 –
Public Art on
Private Land**

LPP 6.12 guides the provision of public art as a means of complementing the impacts of urban intensification by improving the appearance and amenity of places.

The proposed location of the public art is to be provided at the time of submission of the application for development approval, along with a brief report showing how the public art requirements have been integrated into the development

Part One of the PSP identifies a Public Art Plan as a deliverable to be provided (where required by LPP 6.12) as a condition of development approval, consistent with LPP6.12.

5

Opportunities and Constraints

5 Opportunities and Constraints

5.1 Site Analysis

The PSP has been informed by considerable site analysis undertaken by the Project Team. The overarching design considerations, including key opportunities and constraints, that have informed the PSP are detailed below.

5.1.1 Site Features

Analysis of the existing site features identifies the following key themes:

- **Established Centre:** Dianella Plaza is an established and well used centre offering daily retail needs. The PSP should seek to maintain and respect the successful elements of the existing centre and avoid disruption through planned improvements. This should include retaining established movement patterns through any redevelopment to retain the sense of familiarity and attachment.
- **Underutilised Land:** Underutilised land within the precinct presents clear opportunities for renewal and intensification. This underutilised land is provided at the periphery of the site, presenting the opportunity to better integrate future development with the public realm.
- **Community Assets:** The existing School and Library are key community assets but are currently weakly integrated with the centre.
- **Surrounding Character -** The Dianella PSP area interfaces with some medium and high-density development. As noted, the wider Dianella area is an established suburb with largely development at a low-to-medium density, with suburban character.

Overall the site analysis demonstrates the PSP area is a well-established community hub where underutilised land and institutions will evolve into a more integrated and contemporary centre. Existing site features are illustrated at **Figure 9**.



Figure 9 Existing Site Features

5.1.1 Connectivity

Analysis of the existing site connectivity identifies the following key themes:

- **Site Exposure** – Frontage to major roads presents a challenge for streetscape interface, but an opportunity for commercial exposure.
- **Direct Public Networks** – The site configuration provides an opportunity to create an activated entry along Lowick Street, strengthening connections between the centre, future uses and the Library. Currently inactive interfaces at the northern corner Lowick Street offers scope for improvement, with the potential to deliver a continuous pedestrian path and clearer, safer access to the centre.
- **Access and Arrival Experience** – The site has good vehicle access, but lacks legibility and priority between vehicles and pedestrian arrival experiences.
- **Multiple Access Points** – The multiple existing access points provide flexibility for future subdivision and staged development.
- **Public Transport Corridor** – Key high priority public transport corridors on Alexander Drive and Grand Promenade provide for transit to the city and Morley/Mt Lawley support increased residential density and centre diversification.

Overall this demonstrates that strong existing movement networks exist to position the precinct to maintain and improve its position as a highly accessible, transit-supported destination over time. Existing connectivity is illustrated at **Figure 10**.

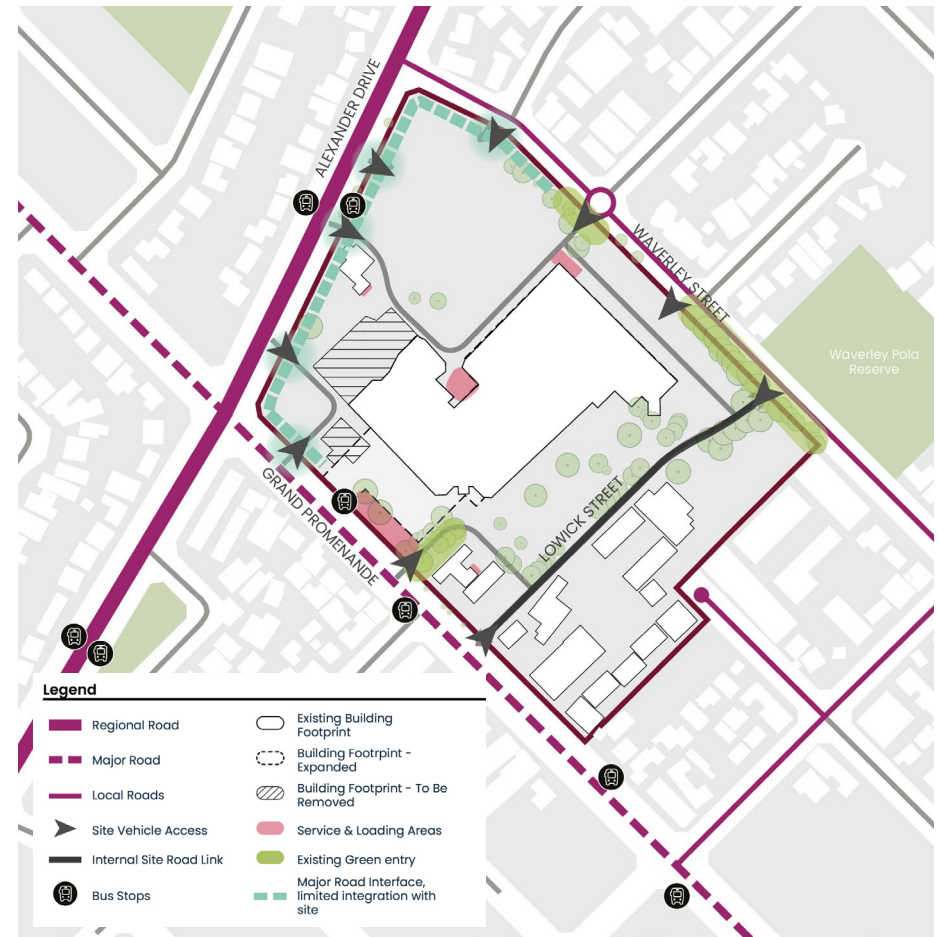


Figure 10 Existing Site Connectivity

5.1.2 Public Realm and Activity

Analysis of the existing public realm and activity identifies the following key themes:

- **Tree Retention and Green Links** – Existing mature trees and nearby public open space provides the opportunity to deliver planned green links through the site.
- **Edges and Interfaces** – The site has distinctly different character in public realm interfaces, with Alexander Drive and Grand Promenade delivering a regional vehicle connector purpose, whilst Waverley Street and Lowick Street delivering lower order, lower speed interfaces.
- **Enhance Pedestrian Network** – Opportunity to enhance pedestrian network from activity areas to the surrounding site, considering integration with future development areas.
- **Inactive interfaces** – the northern corner and Waverley Street provide significant development and enhancement opportunity for activation.
- **Pedestrian Movement** – Lowick Street currently provides low amenity for pedestrian movement, with no continuous path or clear access to the centre, despite being an important link to the library and school.

Overall this demonstrates that re-shaping edges and movement paths can transform the centre into a more walkable, lively and outward-facing place. The existing public realm and activity features of the site are illustrated at **Figure 11**.

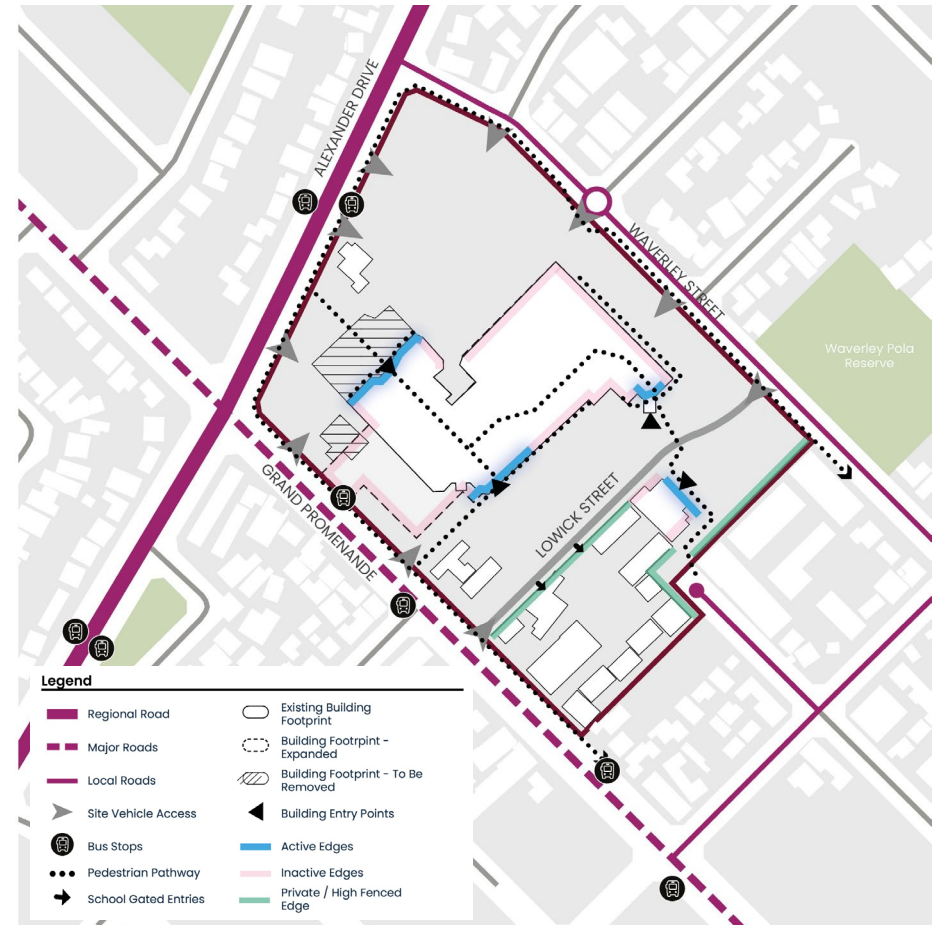


Figure 11 Existing Public Realm and Activity

5.1.3 Development Opportunities

Figure 12 consolidates the above analysis into a map detailing the future development opportunities for the site. These opportunities are summarised as follows:

- **Undeveloped North West Corner** - North-west corner of the site provides a high traffic, high exposure environment, which delivers potential for subdivision for a variety of commercial uses.
- **Alexander Drive** - interface and access supports extended vehicle oriented commercial uses.
- **Waverley Street** - opportunity to sleeve existing centre with mixed use development, extend development to the street edge and increase height with limited impact to neighbouring residential area.
- **Lowick Street** - potential to create activated entry connecting the centre and future uses with the Library.
- **Neighbouring properties** - Consider neighbouring apartment frontage overlooking the site through building orientation or access design.

This demonstrates the underutilised land and prominent interfaces provide a foundation for staged mixed-use growth and centre renewal. An illustrative plan showing key future development opportunities is provided at **Figure 12**.

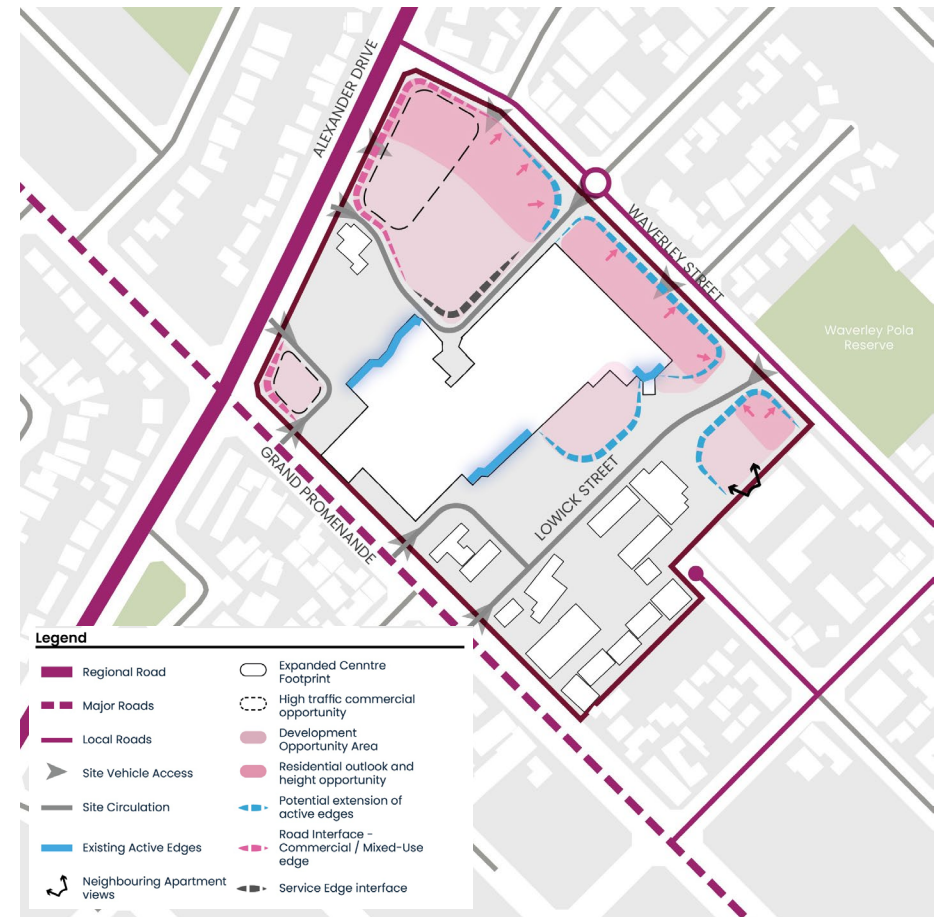


Figure 12 Opportunity and Constraint Summary – Development

5.1.1 Public Realm Opportunities

Figure 13 consolidates the above analysis detailing the public realm opportunities for the site. These opportunities are summarised as follows:

- **Legibility** - Enhance existing activity nodes and centre entries to improve legibility and arrival experiences.
- **Pedestrian Spine** - Upgrade Lowick Street as a key pedestrian spine with active frontages and improved amenity.
- **Green Link** - Connect existing trees with new activation and strengthen links to Waverley Reserve.
- **Major Road Interface** - Improve the Alexander Drive interface to create a more legible, comfortable and attractive environment.
- **Public Transport Connections** - Strengthen safe, direct and comfortable pedestrian connections to bus stops.

This demonstrates the opportunity to deliver a connected, activated public realm to unify the precinct, enhance daily experience and strengthen links to the wider neighbourhood. An illustrative plan showing key future public realm opportunities is provided at **Figure 13**.

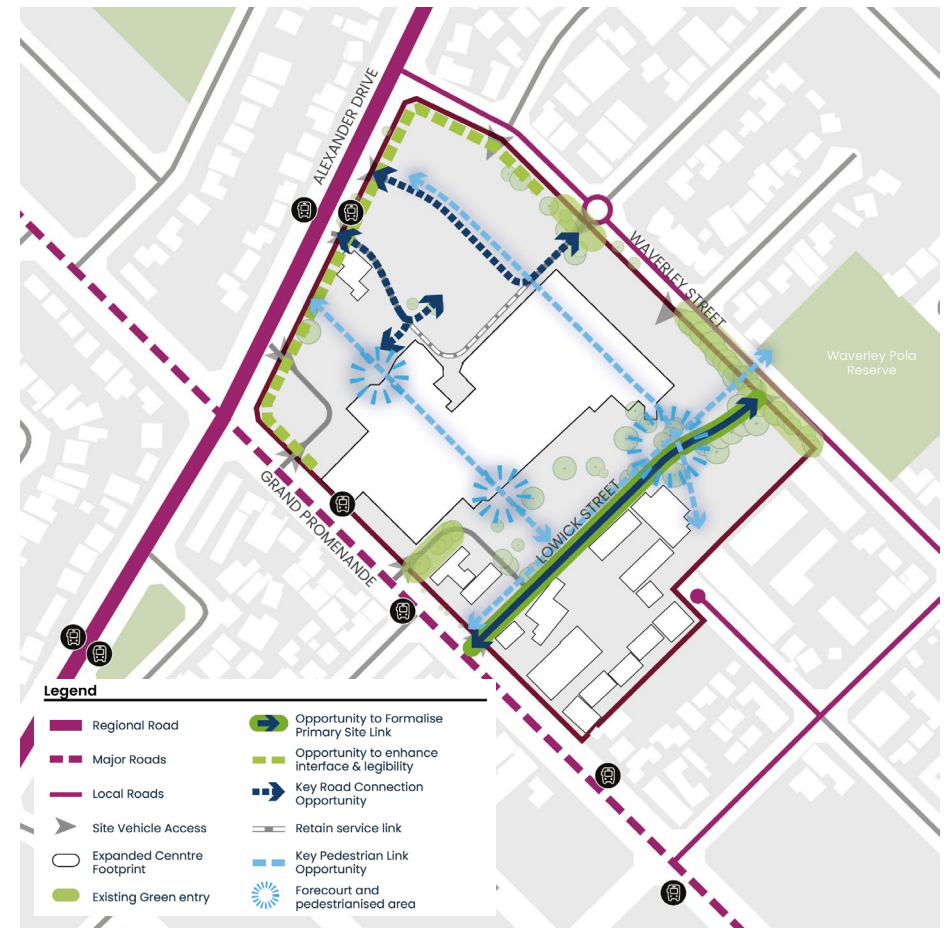


Figure 13 Opportunity and Constraint Summary – Public Realm

6

Stakeholder and Community Engagement

6 Stakeholder and Community Engagement

6.1 Community Engagement

The PSP has been underpinned by a Community and Stakeholder Engagement Plan (**CSEP**) prepared and implemented by Shape Urban, to guide preliminary engagement with the Dianella community regarding the PSP vision and aspiration.

The purpose of the preliminary engagement was to raise awareness of the project and provide an avenue for community to ask the Project Team questions and to share their initial feedback about what they would like to see in the centre. The local community was advised of the opportunity to get involved via a direct mail out, with posters displayed in the shopping centre with details of engagement activities, including community drop-in sessions. The engagement was undertaken in June and July 2026, prior to lodgement of the PSP. A summary of the key engagement activities and preliminary feedback is provided below:

- **Registration of interest** – community members were provided with the opportunity to register for project updates. There were 100 registrations of interest, highlighting significant interest in the project. Twenty comments had been shared via the registration survey. The general sentiment from the comments indicates a desire to update the centre and include cafes, restaurants and green spaces that cater for all generations.
- **Meeting with Neighbours** – immediate neighbours were offered the opportunity to meet individually with the team. A group meeting was offered to the residents of Dianella Apartments which abuts the site to the east. One community member attended the meeting held on 21 July 2026 at the Dianella Library. No community members requested to attend the online meeting offered for 21 July 2026.

- **Community Drop-in Sessions** – two community drop-in sessions were held at the Dianella Library on Wednesday 15 July 2026, between 3:30–6:30pm and Thursday 23 July 2026, between 3:30–6:30pm. Approximately 65 community members participated across the two sessions.

Posters were displayed providing the community with a snapshot of the Draft PSP concept plan, as well as a series of posters where community could indicate the types of shops, services and public realm spaces they thought would be desirable in the centre. Community members were able to speak to members of the Project Team to understand what is being proposed in the draft PSP and share their ideas and aspirations for the centre.

Overall community feedback strongly supports revitalisation of Dianella Centre through additional dining, retail, green spaces, community event areas and family-oriented amenities, with a particular emphasis on landscaping and outdoor activation.

An exercise was also conducted to gauge an understanding of the types of activities the community would like to see in the centre. This was undertaken by placing sticky dots against an image and description to indicate whether it was desirable, unsure or undesirable for this centre. This exercise indicated:

- A strong desire for outdoor activity areas, in particular alfresco dining areas and small outdoor event spaces.
- More outdoor green or passive spaces and small outdoor play spaces incorporating greenery.
- A strong desire for general services, such as a bank and pos office.
- A desire for additional retail options including grocery stores and speciality stores.

6.2 Stakeholder Engagement

Table 5 below provides a summary of key stakeholder meetings which have informed the preparation of the PSP through pre-lodgement discussions.

Table 5 Summary of Stakeholder Engagement

Meeting	Summary of Outcomes
January 2026 Initial briefing to Department of Planning, Lands and Heritage	Introduction to the PSP vision and objectives, and initial opportunities and constraints assessment.
April 2026 Initial briefing of City of Stirling Planning	Initial overview of PSP vision and principles, and high-level overview of the overall urban structure for redevelopment of the Centre.
April 2026 Briefing to City of Stirling Elected Members	Briefing to Mayor and Ward Councillors on PSP vision and objective
April 2026 City of Stirling – Technical Discussion	Meeting with City of Stirling Planning and Engineering Departments to providing an initial overview on transport and engineering matters.
25 June 2026 City of Stirling – Briefing on Proposed Built Form Controls – Planning	Briefing to City of Stirling Planning team on Part One development controls.
6 July 2026 City of Stirling – Transport and Engineering Discussion	Briefing to City of Stirling Technical Departments, with key discussion focussed on transport and access arrangements.



Figure 14 Photograph of Interactive Engagement Exercise

7

Design Response

7 Design Response

7.1 Vision

The vision for the Dianella Centre PSP is to retain the centre's focus on meeting daily retail needs, while capitalising on opportunities to introduce greater diversity. This intent is articulated in the vision outlined below.

To create a vibrant, amenity-oriented mixed-use precinct in Dianella that brings together contemporary living, accessible retail and community spaces, and the area's natural vegetation.

Through sustainable design, the precinct will reflect local identity, foster a strong sense of belonging, and deliver a reimagined retail and lifestyle experience that meets the needs of young professionals, families and older generations alike.



7.2 Precinct Objectives

The Dianella PSP includes three precincts, each their own objectives and desired built form outcomes. The rationale for these precincts including planning objectives is summarised below, with an illustrative concept plan of the entire PSP area included at **Figure 15**.

Daily Needs

The 'Daily Needs' precinct is intended to function as the primary focus of commercial activity and development intensity within the PSP. It will support local employment and daily needs by providing a mix of shops, services and amenities. This precinct is located with interfaces to higher order roads (Alexander Drive and Grand Promenade) to capitalise on high exposure opportunities, whilst also forming a buffer to surrounding precincts.

Accessibility is also a core objective of this precinct, with an emphasis on efficient vehicle movements and walkable design. This includes strong pedestrian connections and convenient access to public transport. Together, these objectives aim to create lively, inclusive and well-connected centres that support sustainable growth and community wellbeing.

Development controls within this precinct are intended to support intensification of use, including residential development where complementary to the core commercial uses, but delivered in a manner that continues to respect context.

Lifestyle and Living

The purpose of the 'Lifestyle and Living' precinct is to integrate a complementary range of land uses, such as housing, employment, retail, services and community facilities, within a single, well-planned area. This integration supports more efficient use of land and infrastructure while creating places that are active and functional throughout the day and evening. Key objectives include supporting housing choice, reducing the need for longer trips by enabling people to live closer to jobs and services, and encouraging walking, cycling and public transport use. This precinct is designed to be highly accessible, with strong pedestrian connections and good public transport access.

This precinct located with frontage to Waverley Street and Lowick Street, interfaces with existing multiple dwelling development to the east of the site. The built form controls for this precinct seek to address the existing residential interface and character, whilst also transforming Lowick Street north into a community meeting space with main street principles.

Education

The primary focus of the 'Education' precinct is to support the ongoing operation of the Our Lady's Assumption School within the precinct and provide a framework for any planned development. The boundary of this precinct is defined by the existing lot boundary of the school. Recognising that the existing school forms a major community destination generating daily movements by students and staff, the PSP seeks to better manage traffic, support safe walking and cycling connections, and provide clear and legible access points to tie in with the school.



Figure 15 Dianella Centre Illustrative Concept Plan

7.3 Urban Ecology

Design Element 1 of the SPP 7.2 Precinct Design Guidelines requires consideration of 'Urban Ecology', specifically in developing a holistic understanding of the built and natural environment of the site and its wider context. The SPP 7.2 Design Element Objectives and Design Responses are summarised in **Table 6** and **Figure 16** below, with key considerations outlined in further detail in subsequent sections.

Table 6 Urban Ecology – Element Design Response

No.	Design Element	Design Element Response
O1.1	To protect, enhance and response to the ecological systems of the precinct	- The PSP retains and protects significant mature trees within tree protection areas and explores opportunities to integrate them within both the 'town square' area adjacent to the public realm, together with new planting. - The PSP introduces pocket parks throughout to the centre to provide informal gathering spaces for workers, shoppers and residents, contributing to the centre's social life without requiring large civic spaces. - The PSP introduces new planting throughout the car parking areas to soften the appearance of the parking, outlined in the Landscape Master Plan. - The PSP seeks to enhance connections to the Waverley Pola Reserve to the north, through location of the active town centre space to the north on Lowick Street and proposing potential improvements to pedestrian connections across Waverley Street (ie, raised pedestrian crossing).
O1.2	To enhance sense of place by recognising and responding to Aboriginal, cultural and built heritage	- The PSP supports the development of a flexible town centre space on Lowick Street that will evolve into a focal point for community gathering and activity, as well as artistic and cultural practice. - The built form responses are encouraged to draw on the social history and evolving character of the area through the design of public spaces and building interfaces, including through the delivery of public art.
O1.3	To reduce the environmental and climate change impacts of the precinct development	- The PSP seeks to deliver development in underutilised sections of the site, delivering a more efficient use of land and infrastructure. This makes better use of serviced land, reducing pressure for outward growth and associated environmental impacts. - The PSP adopts sustainable water conservation, water management and groundwater management principles as outlined in the Water Management Report (Appendix D).

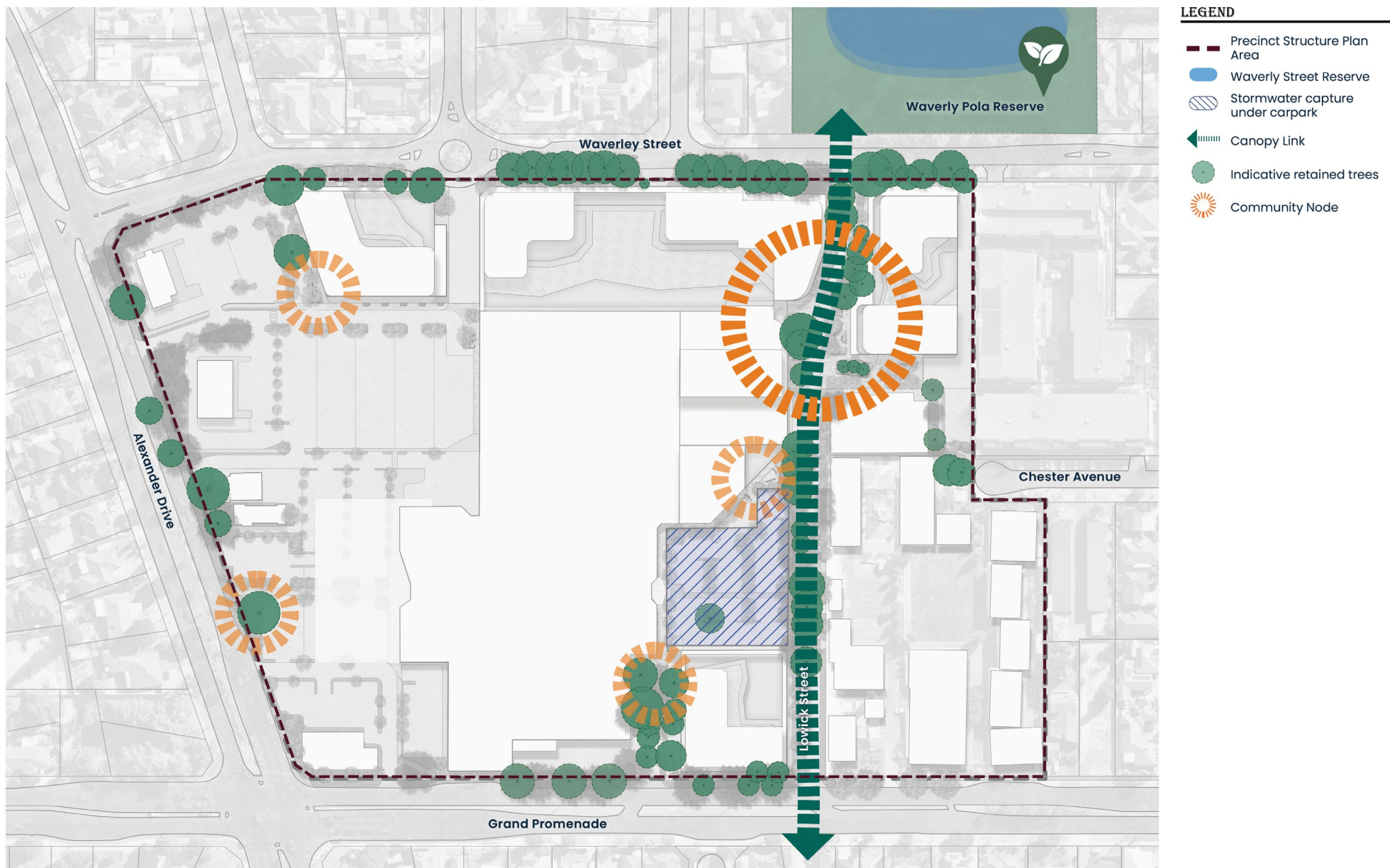


Figure 16 Urban Ecology

The PSP is informed by detailed environmental and water management investigations, ensuring it responds to the site's ground conditions with safe, compliant, and sustainable measures. These measures are detailed in the EAMS at **Appendix C** and WMR at **Appendix D**, with a summary of key urban ecology strategies provided below.

7.3.1 Existing Trees and Green Network

The PSP has been designed to retain and protect existing mature trees by establishing clear tree protection zones within the Waverley Street frontage.

These zones are integrated into the overall layout and construction approach, ensuring that key trees are safeguarded during both future development and ongoing operation. Where possible, built form, services and access arrangements are set back from tree protection zones to minimise impacts on root systems and canopy health, supporting the long-term viability of existing vegetation.

In addition to the protection of mature trees, the Waverley Street tree protection zone also serves the function of creating a green network connecting Waverley Pola Reserve to the future town square within Dianella Plaza. New landscaped areas, planted pedestrian routes and shaded gathering spaces are arranged to strengthen these connections, improving walkability and ecological continuity. This approach supports urban cooling, enhances biodiversity and provides a more pleasant experience for shoppers, students of the school and the wider community, while reinforcing the shopping centre's role as an integrated part of the local open space network.

7.3.1 Stormwater Management Strategy

The stormwater management strategy for the site proposes a Water Sensitive Urban Design (WSUD) based stormwater strategy that separates small, minor, and major events.

The minor drainage system is to handle low-frequency events, and for this site the report treats the 5% AEP (20 year ARI) event as the minor design event, consistent with City of Stirling criteria. All stormwater runoff up to the 1% AEP event is retained within the study area, either via WSUD structures, underground storage, or above-ground depressions in car park areas.

Existing private stormwater connections to the City of Stirling drainage system occur in the north-west (3 outlets) and south-west (1 outlet), and the existing pipe network serving Stirling Libraries – Dianella will need to be maintained post-development, likely relocated further west through the future Activity Shared Zone.

7.3.2 Site Contamination

The service station areas in the south-east and south-west are classified as 'Remediated for Restricted Use' due to hydrocarbons in soil and groundwater. The former dry cleaner tenancy in Dianella Plaza is similarly classified due to chlorinated solvents (tetrachloroethylene), but with the Department of Health identifying the tenancy was suitable for commercial use.

The former Dianella Hotel area contained some suspected asbestos-containing fragments in surface soils. Further hazardous materials investigation is recommended prior to refurbishment or demolition works in this area.

7.4 Urban Structure

Design Element 2 of the SPP 7.2 Precinct Design Guidelines requires consideration of 'Urban Structure' with the intent that it should be robust, flexible and legible, and designed to support the intended function and built form of the precinct. The SPP 7.2 Design Element Objectives and Design Responses are summarised **Table 7** and **Figure 17** below.

Table 7 Urban Structure – Element Design Response

No.	Design Element	Design Element Response
O2.1	To ensure the pattern of blocks, streets, buildings and open space responds and contributes to a distinct, legible precinct character	- The PSP encourages the transformation of the existing inward-facing layout of the centre into a centre which addresses the public realm, improves legibility and provides clear edges to public streets. As demonstrated in Figure 17 below, this is achieved by identifying areas of built form and activity emphasis, which provide a clear entry statement from the public streets. - The massing strategy contributes to a recognisable precinct identity. Building heights, massing and transitions responds to adjacent residential areas while allowing a more prominent presence at key corners or nodes. - Public spaces and pedestrian links are integrated as part of the overall precinct structure, not treated as leftover areas. Public spaces have been located to support movement patterns, visibility and community assets, and are connected to surrounding streets. As demonstrated in Figure 17, this includes clearly designated pedestrian and shared vehicle movement links. - A key factor in the urban structure is also the need to maintain the core retail functions through the transformation of the centre. Dianella Plaza will continue its core retail function of delivering daily needs to the community, whilst also maintain place identity. The intent of the PSP is to enable evolution of the centre, not disruption or displacement of the existing operations. The retention of existing vehicle crossovers is a component of this approach, but with improvements to the structure of the internal movement networks from the crossovers.
O2.2	To promote an urban structure that supports accessibility and connectivity within and outside the precinct.	- The urban structure responds to the surrounding streetscape character. The PSP area is framed by three road frontages (Alexander Drive, Grand Promenade and Waverley Street), each with a distinctly different character, interface and desire lines. - This varies from a major road frontage to residential and main street characters. This PSP response to this context by providing the opportunity for the urban structure to

		transition from a vehicle focussed activity, to retail activity into a pedestrian focussed area with main street principles.
O2.3	To ensure the urban structure supports the built form, public realm and activity intended for the precinct.	▪ The PSP establishes three precinct areas, each with a distinct objective and urban structure outcomes, intended use and built form controls to respond to site context and desired outcomes. This is further refined with streetscape interface objectives for development fronting public streetscape. ▪ The PSP proposes enhanced arrival experiences from key interfaces will reflect each character area and improve integration between the broader precinct and the surrounding community.
O2.4	To ensure an adaptable urban structure that can respond to and facilitate change within a precinct.	▪ The PSP is based on a clear character areas and interface structures, which create a clear block and street structure to maintain the integrity of the precinct. Beyond these elements, the framework is flexible to land uses and built form responses, enabling the precinct to evolve in response to changing economic, social and community needs. ▪ By focussing massing on underutilised sections of the site, the PSP supports staged and incremental development, enabling redevelopment to occur over time while maintaining an active centre. This approach reduces disruption, improves feasibility and allows the precinct to respond to market conditions and community needs as they evolve.

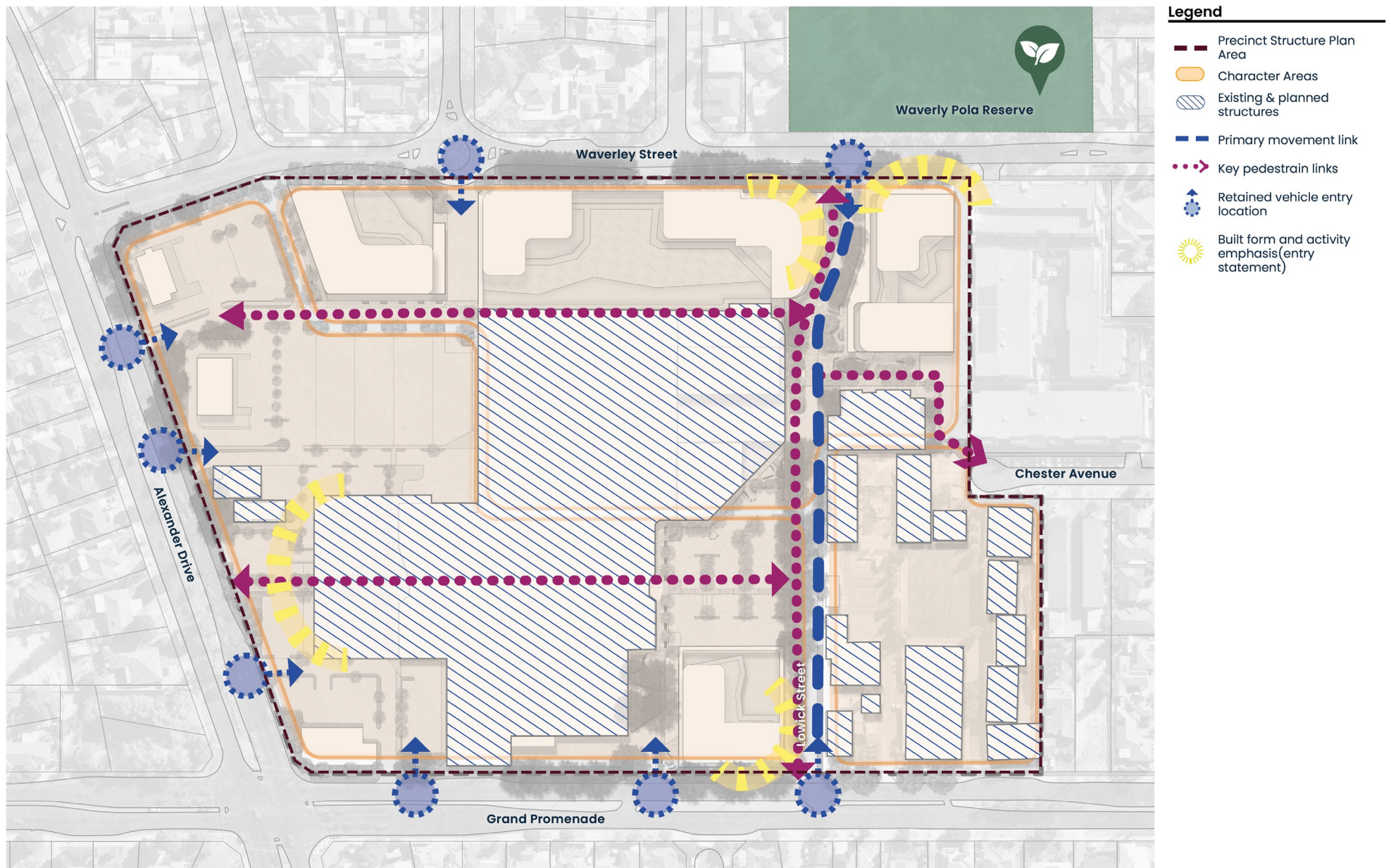


Figure 17 Urban Structure Plan

7.4.1 Structural Layout

The redevelopment of the shopping centre site provides an opportunity to transform an established retail destination into a more integrated, accessible and vibrant mixed-use precinct. The proposed structure supports a broader range of retail, commercial, residential, community and public realm uses, strengthening the site's role as a daily destination and improving its connection with the surrounding neighbourhood.

The urban structure is focused on creating a clear and legible framework of streets, pedestrian links, public spaces and active frontages that improve movement through the site and support a more engaging centre experience. Key internal connections will enhance permeability across the site, while improved access points and identifiable gateways will strengthen the centre's relationship with the surrounding street network.

A connected network of north-south and east-west linkages will support safer and more convenient movement for pedestrians, cyclists, public transport users and vehicles. These connections will improve access to existing and future retail services, community facilities, public transport stops, nearby recreation areas and surrounding residential neighbourhoods.

The redevelopment will also provide opportunities to enhance the site's presentation to key street frontages, improve wayfinding, and create a more active and attractive public realm. A clear and adaptable urban structure will support staged redevelopment over time, while allowing the centre to respond to changing retail, residential and community needs. The structure will also enable improved integration between built form, movement networks, landscape areas and public spaces, supporting the long-term renewal of the shopping centre site.

7.5 Public Realm

Design Element 3 of the SPP 7.2 Precinct Design Guidelines requires consideration of ‘Public Realm’ with a view to providing a range of well-connected, functional and enriching places, appropriate to the function, scale and character of the precinct. For the purpose of the PSP, the public realm is interpreted as both the interfaces to public streets, as well as the use of external spaces surrounding the Dianella Plaza buildings, noting that these effectively function as public spaces.

The SPP 7.2 Design Element Objectives and Design Responses are summarised in **Table 8** and **Figure 18** below, with key considerations outlined in further detail, in subsequent sections.

Table 8 Public Realm – Element Design Response

No.	Design Element	Design Element Response
03.1	To ensure the public realm is designed to promote community health and wellbeing.	- The ‘shared zone and plaza link’ is designed to support social connection and everyday use, including areas that provide opportunities to sit, meet and spend time. These spaces are well located within the mixed use precinct, visible and integrated with active ground-floor and the existing library to encourage regular use and passive surveillance. - The PSP also identifies more intimate ‘community landscape nodes’ throughout the precinct, located within the ‘daily needs’ precinct. These spaces are designed to provide small but conveniently located at key locations outside the centre, for employees and customers to use as casual dining and waiting spaces.
03.2	To enable local character and identity to be expressed in public realm design to enhance sense of place.	- The PSP presents an opportunity for the public realm to reflect the distinctive qualities of Dianella through thoughtful, place-based design. This includes high-quality landscaping that responds to the local climate, incorporation of the local ‘Dianella’ plant and references to the use of materials, colours and forms that complement the surrounding neighbourhood. - The PSP includes well-designed gathering spaces, shaded areas and pedestrian connections proposed in the PSP also ensures the local character of the site will evolve from a box-style shopping centre to a centre with a distinct structure and character. - By embedding these elements into the public realm, the redevelopment can strengthen sense of place, support community pride and create a centre that feels authentically connected to its local setting while meeting contemporary needs
03.3	To ensure that key environmental attributes are protected and enhanced within the public realm.	Public realm areas aim to retain and incorporate existing mature vegetation where feasible and maximise overall tree canopy through a combination of retained trees and new planting, balancing site constraints where required.

O3.4	To ensure the public realm is designed to be inclusive, safe and accessible for different users and people of all ages and abilities.	▪ The PSP presents a strong opportunity to apply universal design principles so spaces are intuitive, comfortable and usable for people of all ages and abilities. This includes clear and legible pathways, step-free access, appropriate gradients, generous seating options, shade, lighting and clear wayfinding. ▪ By prioritising inclusive and accessible design from the outset, the public realm can better support diverse users, encourage longer stays and ensure the centre functions as a welcoming place for the whole community.
O3.5	To ensure public realm design is integrated with the built form, movement network and landscape of the precinct.	▪ The public realm, massing strategy and movement network have all been considered holistically throughout the PSP. At a whole-of-site level, the urban structure and built form ensures the public form is well enclosed with active uses and separated from the vehicle focussed retail and commercial uses within the centre precinct.

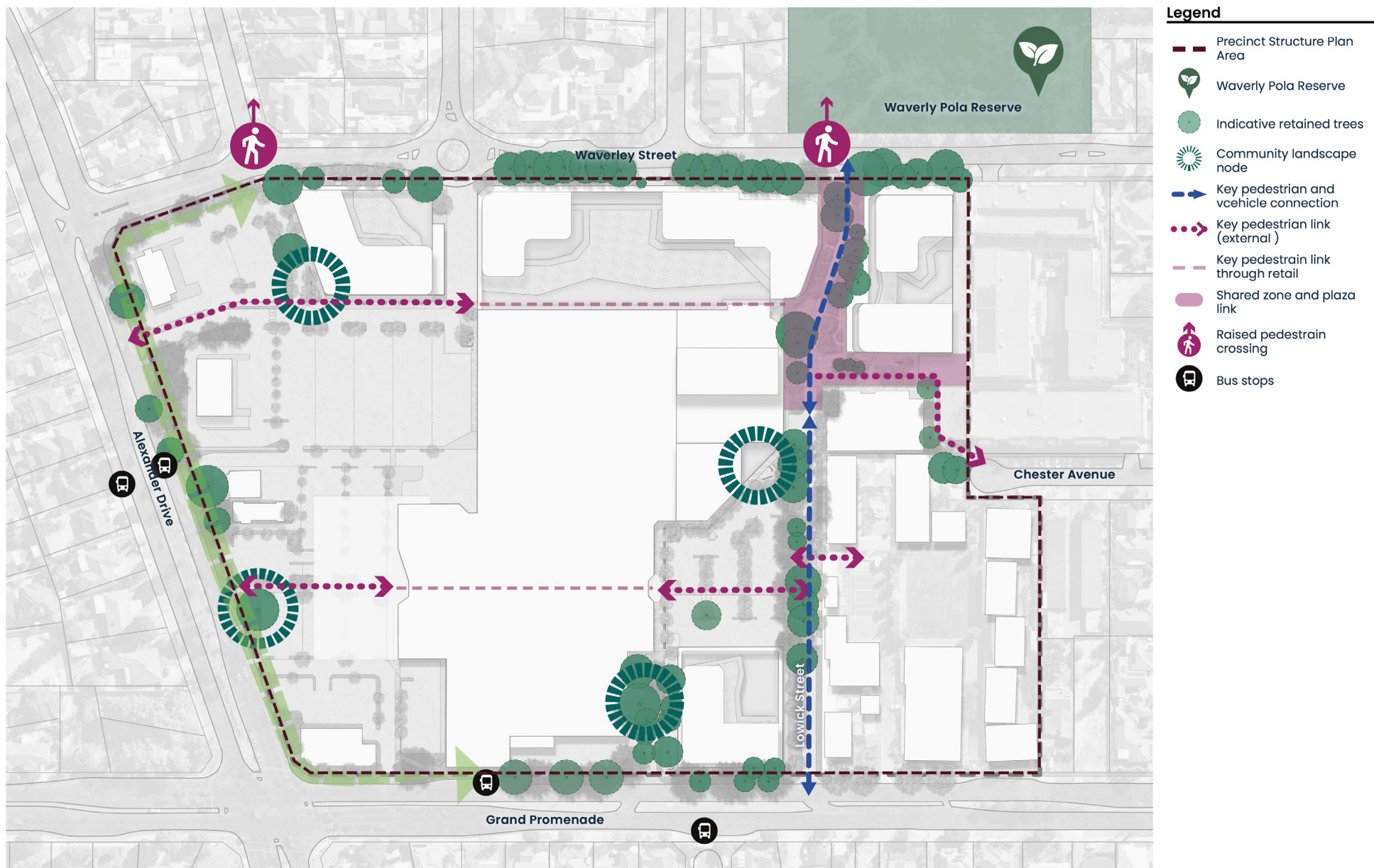


Figure 18 Public Realm Plan

7.5.1 Landscape Master Plan

This PSP is supported by a Landscape Master Plan prepared by Plan E which identifies the landscape vision, objectives, and design responses for the future development of the PSP (refer **Appendix A**).

The landscape vision for the PSP is:

'To design vibrant green space that supports inclusive community use, responds to the unique site character and context, and supports everyday use by encouraging community interaction across all ages.'

The landscape design response for the PSP has been prepared as part of the planning of the site - to create a lively and accessible public realm that connects residents, patrons and the surrounding community within a series of urban parklet landscape spaces.

The designs ensure that what is proposed is resilient, highly durable and will serve the local community for many years to come'.

Guided by this vision, the Landscape Master Plan sets out how the Lowick Street North 'Shared Zone and Plaza Link', 'Community Landscape Nodes' tree retention areas and movement networks come together to deliver a functional, connected and consistent design across the precinct. These areas are described in the following sections.

Lowick North Precinct (High Street and Civic Square)

The Lowick High Street Precinct forms the entry statement to the Mixed Use precinct of the PSP. This area will transform Lowick Street into an area with active and continuous built form, generous pedestrian pathways, parallel parking and nature strips capable of supporting mature trees.

The area culminates in a 15m wide civic space, located north of the existing Dianella library. This space will be a pedestrian only space, designed with casual seating areas and shade canopy.

The landscape design establishes a strong and legible entry to the precinct, creating a welcoming and memorable sense of arrival. Conceived as a highly activated public space throughout the day and evening, the civic heart supports a vibrant mix of movement, gathering and activity. A coordinated

palette of street trees provides shade, contributes to a cooler microclimate and softens the built form, while retained mature trees frame a refined urban setting. Pedestrian movement is prioritised over vehicles, enabling a lively, comfortable and people-focused public realm.

Existing mature native vegetation frames the entry from Waverley Street and is protected by the 5m setback of the Tree Protection Zone. This mature vegetation complements the build and active uses at the corner to create a natural landmark statement for the site.



Figure 19 Lowick North Precinct

Lowick Central Precinct

The landscape design for the Lowick Central precinct focuses on improving public realm amenity through attractive, resilient and community-oriented streetscapes. Whilst this area will continue to contain at-grade parking adjacent to the main shopping centre entrance, the retention of trees, planting of new vegetation and delivery of high-quality pedestrian pathways provide a suitable balance of vehicle movement and pedestrian priority. The 'green network' within Lowick Street continues through this area through the native verge areas and planting adjacent to the school site.

Significant existing trees are retained to provide shade and canopy cover, while clear sightlines and legible site entries are maintained. A native shade tree palette supports comfort, a cooler microclimate, and a strong landscape character.



Figure 20 Lowick Central Precinct

Lowick South Precinct

The landscape and seating areas in the Lowick South precinct are designed to provide a safe and legible environment, guided by CPTED principles and clear transitions between public and private spaces. Shaded paths, seating and small gathering areas support rest, social interaction and passive recreation. Native planting strengthens local character, supports biodiversity, and creates an inviting landscape that encourages movement and community use.



Figure 21 Lowick South Precinct

Waverley Street Precinct

The Waverley Street Precinct promotes high-quality vegetated streetscapes with well-designed outdoor spaces that support a wide range of users. Coordinated street tree planting provides shade, contributes to a cooler microclimate, softens the built form, and creates natural wayfinding cues to key building entrances.

The Waverley Street Precinct also includes pocket park adjacent to one of the main retail entries. In addition to providing a convenient seating area for the shopping centre, this pocket park will also provide an external recreational or informal meeting space for future occupants of the adjacent development.



Figure 22 Waverly Street Precinct

7.6 Movement

Design Element 4 of the SPP 7.2 Precinct Design Guidelines requires consideration of 'Movement', noting that the movement network should respond to the identified movement and place function of the precinct and provide for a range of transport modes. The SPP 7.2 Design Element Objectives and Design Responses are summarised in **Table 9** and **Figure 23** below, with key considerations outlined in further detail.

Table 9 Movement Element Design Response

No.	Design Element	Design Element Response
04.1	To ensure the movement network supports the function and ongoing development of the precinct. distinct, legible precinct character	The proposed character areas leverage Dianella Plaza's strategic location on Alexander Drive and Grand Promenade to support continued commercial and retail requirements without compromising on delivering a pedestrian focussed mixed use precinct.
04.2	To ensure a resilient movement network that prioritises affordable, efficient, sustainable and healthy modes of transport.	- The PSP identifies opportunities to improve active transport by strengthening pedestrian connectivity throughout the precinct, including new north-south pedestrian links, wider footpaths on Waverley Street, improved access to bus stops and new crossing facilities connecting the centre to surrounding community assets and public open space. - The PSP supports greater use of cycling and public transport by leveraging high-frequency bus services on Alexander Drive and Grand Promenade and aligning redevelopment with the Department of Transport's Long Term Cycle Network, which proposes future primary and secondary cycling routes serving the centre
04.3	To enable a range of transport choices that meet the needs of residents, workers and visitors.	The PSP improves the functional movement of all transport modes, including creating efficient vehicle movements, direct and prioritised pedestrian and cyclist movements, and increasing accessibility to public transport. Importantly, the PSP creates spaces within the mixed use precinct where pedestrians and cyclists are prioritised over vehicles.
04.4	To ensure the quantity, location, management and design of parking supports the vision of the precinct.	The vision of the precinct is to deliver enough parking for the site, but not oversupply the site to avoid inefficient use of land for parking. This has been achieved by assessing the existing peak parking demand, and utilising this to critically analyse the default policy parking requirements. The outcome of this has identified that the City's parking standards would likely result in oversupply of parking on site, and the adoption of the rates within <i>WA Planning Manual - Non-Residential Car Parking Rates in Perth and Peel</i> is more in line with the actual parking demand for the site.

This section presents the proposed movement strategy for the PSP, highlighting the planned connectivity between key destinations with the external street environment. A detailed Transport Impact Assessment (**TIA**) has been prepared to accompany the PSP at **Appendix B**. A summary of the key movement strategies is provided in the sections below.

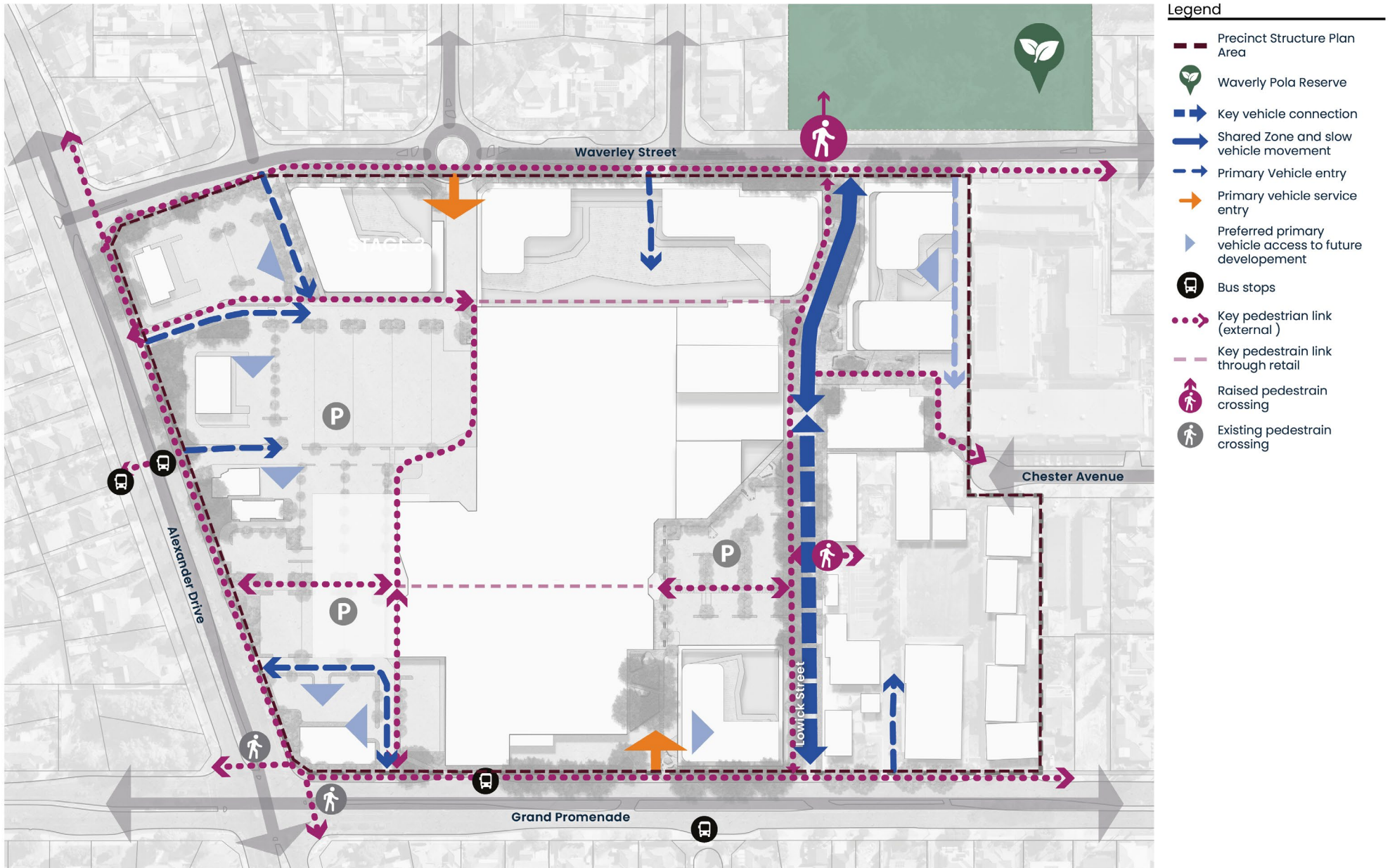


Figure 23 Movement Plan

7.6.1 Proposed Vehicle Access

The precinct will retain its existing access points from Alexander Drive, Waverley Street and Grand Promenade, with several access points repurposed to support the revised land use layout and improve traffic distribution throughout the site. A new internal road network centred around Lowick Street will provide improved connectivity between the retail, mixed-use and community precincts.

Service vehicle access will be rationalised, with the relocated Coles loading dock accessed from Grand Promenade via a dedicated service vehicle entrance, while Woolworths servicing will continue via the existing Pitt Street/Waverley Street roundabout access. Swept path assessments confirms there is sufficient spaces for the service vehicle movements without conflict.

A new full-movement priority-controlled T-junction will be established between the EG Ampol and Our Lady's Catholic Church, replacing the existing restricted access arrangement and accommodating right-turn movements via a two-stage right-turn configuration.

Lowick Street will become the primary north-south movement corridor through the precinct, linking Waverley Street and Grand Promenade and supporting access to the mixed-use development, service station, retail centre and residential elements of the PSP.

The redevelopment retains multiple access points from Alexander Drive, Grand Promenade and Waverley Street, while introducing an enhanced internal road network centred on Lowick Street to improve connectivity and distribute traffic across the precinct.

7.6.1 Movement Upgrades

Based on the Transport Impact Assessment, the redevelopment of Dianella Plaza will require a combination of intersection upgrades, access modifications and local road improvements to accommodate future traffic demand generated by the PSP. A summary of these modifications is provided as follows:

- Signalisation of the Grand Promenade / Waverley Street intersection to provide additional capacity and maintain acceptable operating conditions under future traffic demand scenarios.
- Construction of a new internal movement network, including redefinition of Lowick Street and new east-west pedestrian connections, to improve permeability and create clear movement definition.
- Creation of an activated shared zone along Lowick Street, prioritising pedestrian movement while still maintaining access for vehicles and servicing requirements.
- Pedestrian crossing upgrades at key intersections, including the Lowick Street/Waverley Street intersection, to improve safety and connectivity between different parts of the precinct and surrounding community facilities.

7.6.2 Carparking

For private parking provision (both residential and non-residential), existing guidelines and requirements set out within the State and Local planning framework context will be applied. These guidelines and policies include:

- SPP 7.3 Residential Design Codes Volume 2 – Apartments
- WA Planning Manual – Non-Residential Car Parking Rates in Perth and Peel 2024
- City of Stirling Policy Manual 6.7 Parking and Access, only as it relates to:
 - Delivery bay ratios
 - Specific purpose bays
 - Electric vehicle charging bays
 - Bicycle parking facilities
 - Residential parking design
 - Non-residential parking design
 - Parking management

Non-residential parking supply will be primarily guided by the *WA Planning Manual – Non-Residential Car Parking Rates in Perth and Peel 2024 (Manual)*. This Manual defines consistent carparking rates for non-residential land uses in precincts, with minimum and maximum rates. Given the diverse precinct proposed and mixed use form of development proposed, the provisions of the Manual are considered appropriate, and this is reflected in the Part One provisions.

The WA Planning Manual – Non-Residential Car Parking Rates in Perth and Peel. This stipulates the following parking rates for a Shop:

- Minimum: 1 space per 50m² floor area; and
- Maximum: 1 space per 20sq.m floor area.

The proposed redevelopment provides approximately 1,035 commercial spaces, which is approximately 1 space per 30 m² GFA. This is entirely consistent with the rate required under the WAPC Planning Manual.

The Transport Impact Assessment at **Appendix B** has also considered the existing parking demand at Dianella Plaza during the peak periods. This analysis demonstrated that the existing centre has a surplus of parking bays available.

7.6.3 Streetscape Design and Interfaces

Lowick Street – North Road

Lowick Street – North adopts main street principles which is designed to balance movement with place, supporting local activity, pedestrian safety and comfort.

The road section for this area continues to provide through traffic, but in narrow lanes to calm vehicle speeds and reinforce a pedestrian-priority environment, while still accommodating service vehicles where required.

The Lowick Street north area is designed in three key sections, each with a separate focus and function within the main street hierarchy.

- **Section A (Lowick / Waverley Entry)** – the focus of this space is tree retention and mature vegetation, tying in with the Waverley Street tree protection area. Mature trees and landscape elements are incorporated within nature strips to provide shade, improve comfort and visually narrow the carriageway.
- **Section B (Retail Main Street)** – this area directly interfaces with ground floor active retail uses. On-street parking is provided to support local businesses and act as a buffer between moving traffic and the footpaths. Wide nature strips provide further separation between the traffic areas and shop front footpaths.
- **Section C (Civic Space)**– this section transitions the main street to the civic space and is designed to enable the concentration of activity around the retail main entrance. Generous footpaths are a defining element, allowing for high pedestrian volumes, outdoor dining, street trees, lighting and seating. This space supports social activity and

contribute to a lively public realm. Footpaths are directly fronted by active uses such as shops, cafés and community facilities to encourage passive surveillance and street life.

Overall, the common element across Lowick Street North is to support accessibility, economic activity and a strong sense of place by prioritising people, encouraging slower traffic speeds and creating a comfortable, attractive street environment.

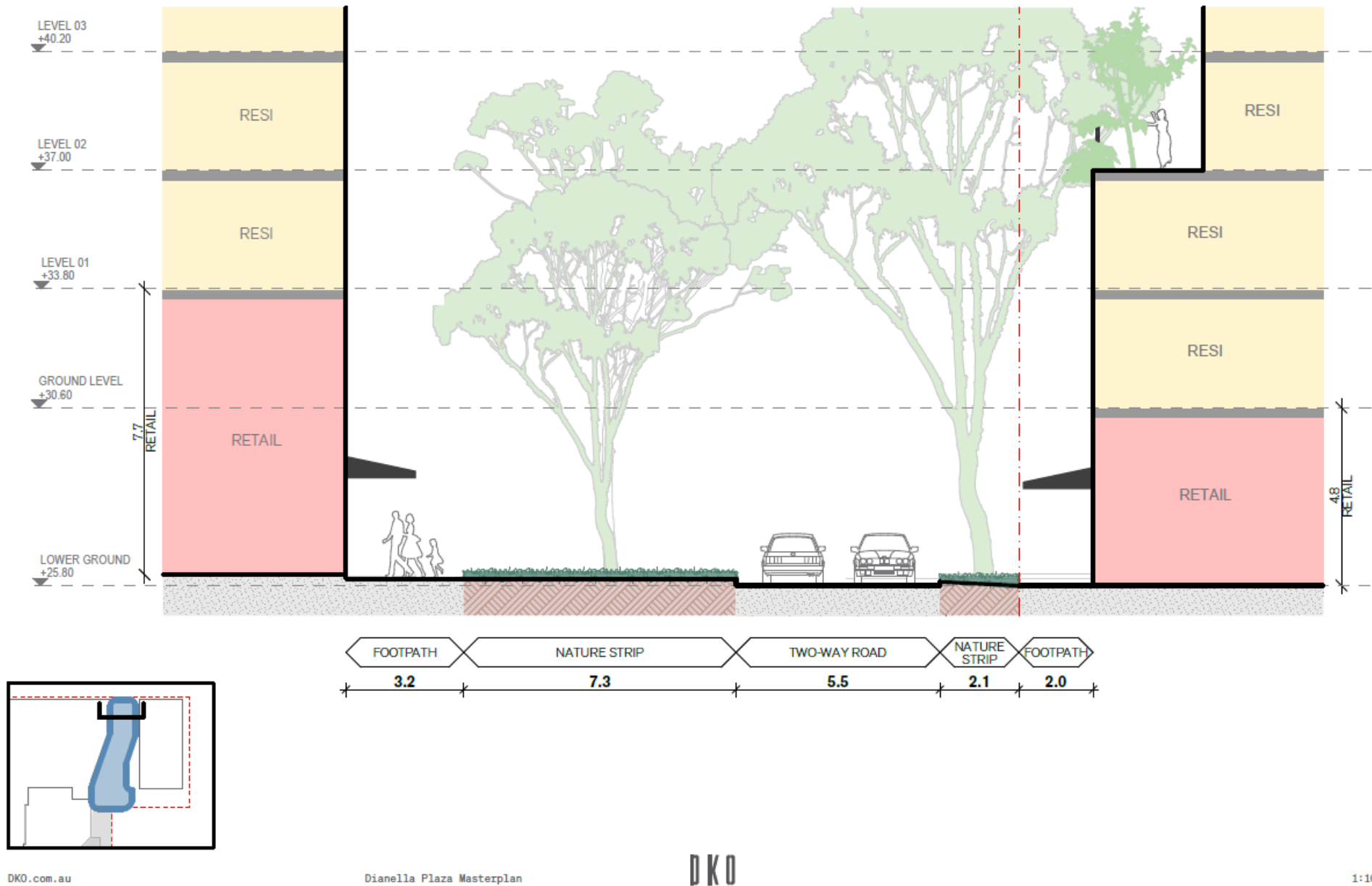


Figure 25 Detailed Section A

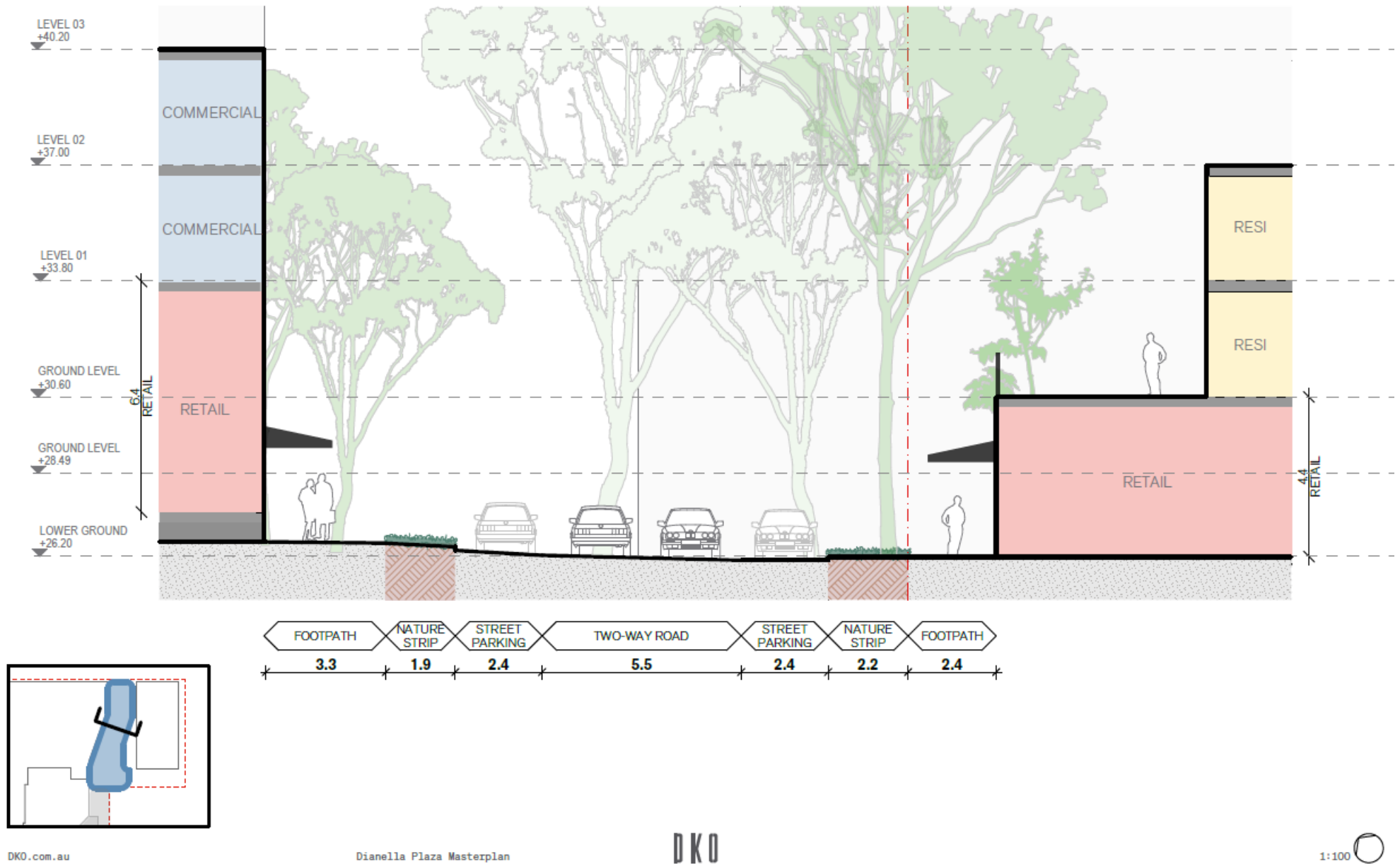


Figure 26 Detailed Section B

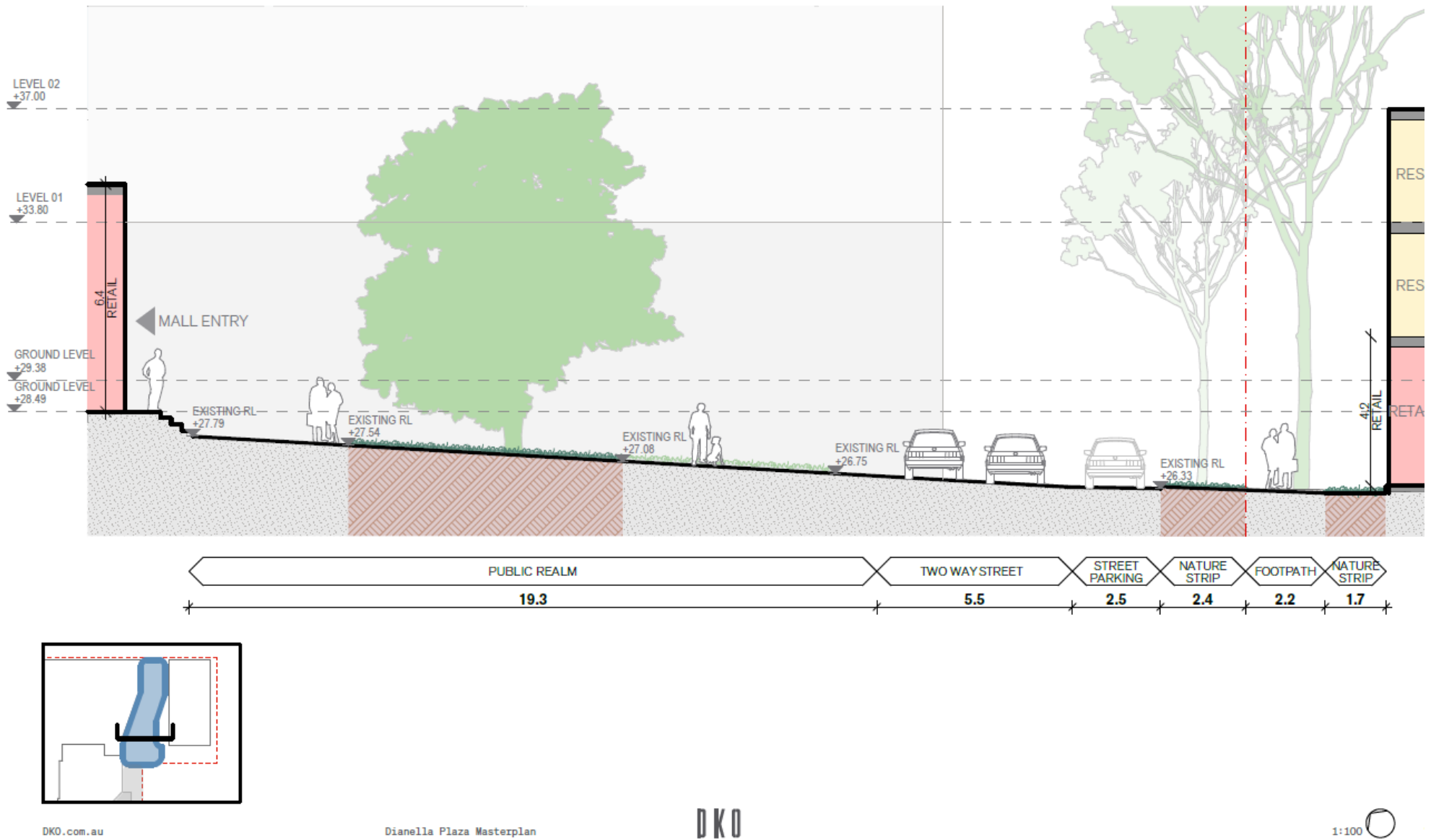


Figure 27 Detailed Section C

Lowick Street – South

Lowick Street South is broadly defined as the area of the Dianella Plaza lot which interfaces with the existing school site and future development site. The focus of this area is maintaining functional vehicle movements, whilst also delivering a comfortable and safe pedestrian environment.

Lowick Street South will continue to be the main vehicle entrance to the shopping centre eastern parking area. This area is therefore expected to experience moderate traffic movement, providing a slightly wider 7m vehicle movement area to provide for two-way traffic.

Lowick Street South continues to deliver clear delineation between pedestrian and vehicle spaces, to ensure clear legibility and entry experience into the precinct. Pedestrian spaces are further separated with generous nature strips to accommodate large trees and tree retention. Landscaping is also provided between the pedestrian pathway and future built form to softer this interface.

Detailed Section F provides an overview of the typical section for Lowick Street South.

Waverley Street

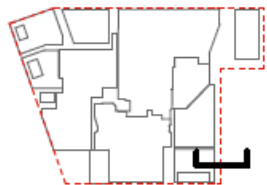
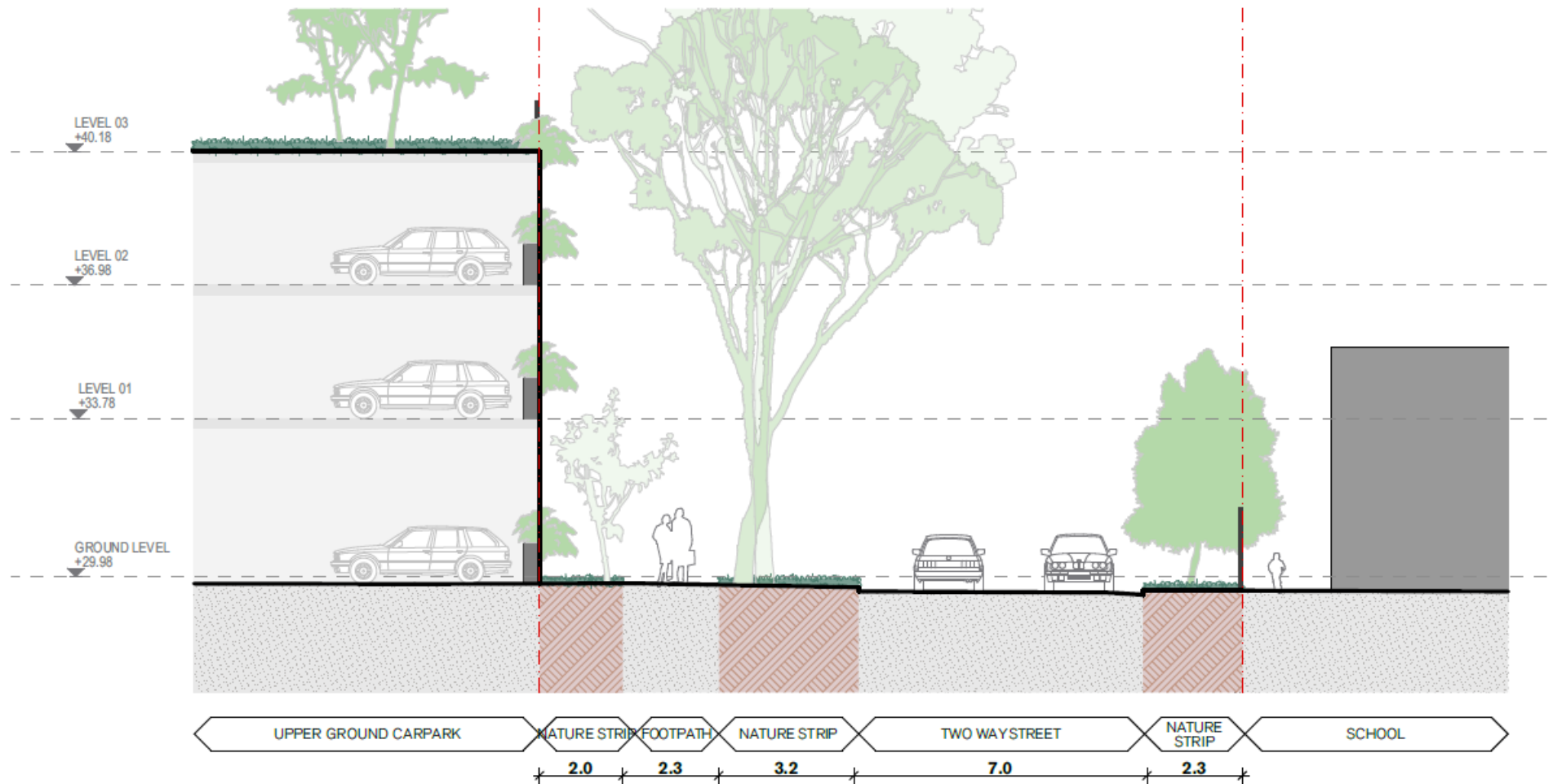
Waverley Street provides a high-quality streetscape interface for where the mixed-use precinct interfaces with the adjoining residential area to the north/east. This is designed to provide a respectful transition in scale, character and amenity, while still contributing to a cohesive public realm. The interface presents a calm, green and residential-scaled edge rather than an intensely commercial frontage.

Wide landscaped setback areas are a key element of the streetscape. These landscaped zones provide visual separation between buildings and the street, soften built form, and create a buffer that supports privacy and acoustic comfort for nearby dwellings. Planting is layered, incorporating groundcovers, shrubs and canopy trees to create depth and seasonal interest while maintaining passive surveillance and safety.

Existing mature trees are retained within a designated tree retention zone, forming a defining feature of the streetscape. Tree retention is integrated into the overall design, with buildings, driveways and services carefully located to protect root zones and allow for long-term tree health. Retained trees are supplemented with new canopy planting to reinforce a continuous green corridor along the street, and providing shading for pedestrian pathways from day one.

Overall, the streetscape interface creates a landscaped, low-impact edge that respects the adjoining residential area, enhances local amenity and contributes to a high-quality, green and walkable street environment.

Detailed Section I provides an overview of the typical section for Waverley Street.



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Dianella Plaza Masterplan

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Figure 28 Detailed Section F

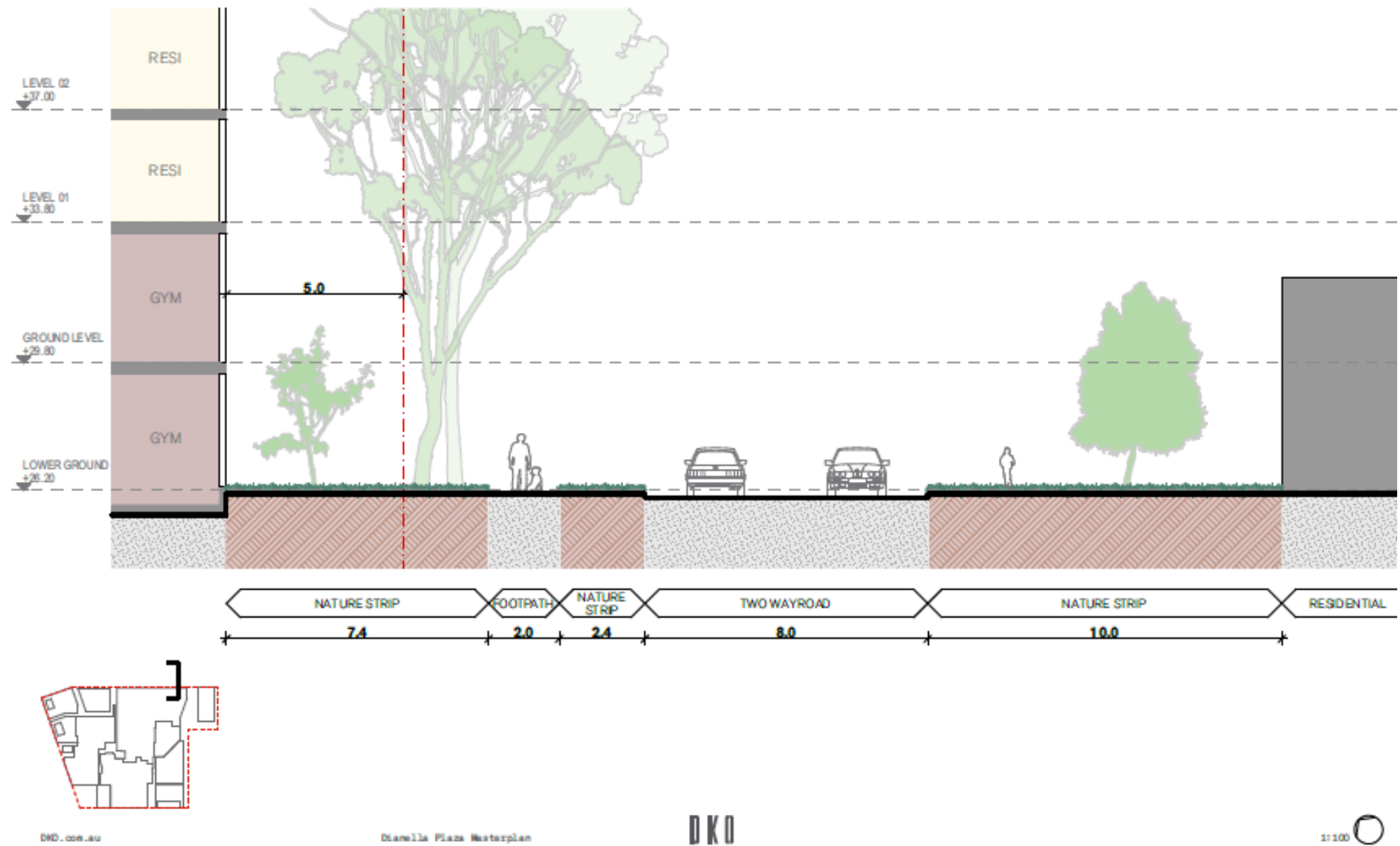


Figure 29 Detailed Section I

Daily Needs and Lifestyle and Living Interface– Internal Road Network

The road network for the Daily Needs precinct is designed to support clear, safe and convenient pedestrian movement to main entrances while accommodating necessary vehicle access and servicing. The overall layout prioritises direct and legible pedestrian routes from surrounding streets, public transport stops and parking areas to primary building entries.

Vehicle access is structured around a limited number of clearly defined entry points, reducing unnecessary traffic circulation within the site. Internal roads are designed as low-speed environments, with narrow lane widths, short block lengths and frequent intersections to calm traffic and improve safety for pedestrians.

Pedestrian routes are aligned with desire lines and are highly visible within the road network. Key pedestrian crossings are provided at strategic locations, particularly where vehicle routes intersect with paths leading to main entrances.

Main entrances are fronted by shared or pedestrian-priority spaces rather than traffic-dominated roads. Landscaping and street trees are integrated along internal roads to define pedestrian spaces, improve comfort and visually narrow carriageways, reinforcing slower vehicle speeds. Service and loading routes are separated where possible and located away from primary pedestrian corridors.

Overall, the road network creates a balanced environment where pedestrian movement to key destinations is prioritised, vehicle access is efficient and legible, and conflicts between modes are minimised through careful layout, design and traffic-calming measures.

Detailed Section G provides an overview of the typical section for the Daily Needs precinct, where it interfaces with the Lifestyle and Living precinct.

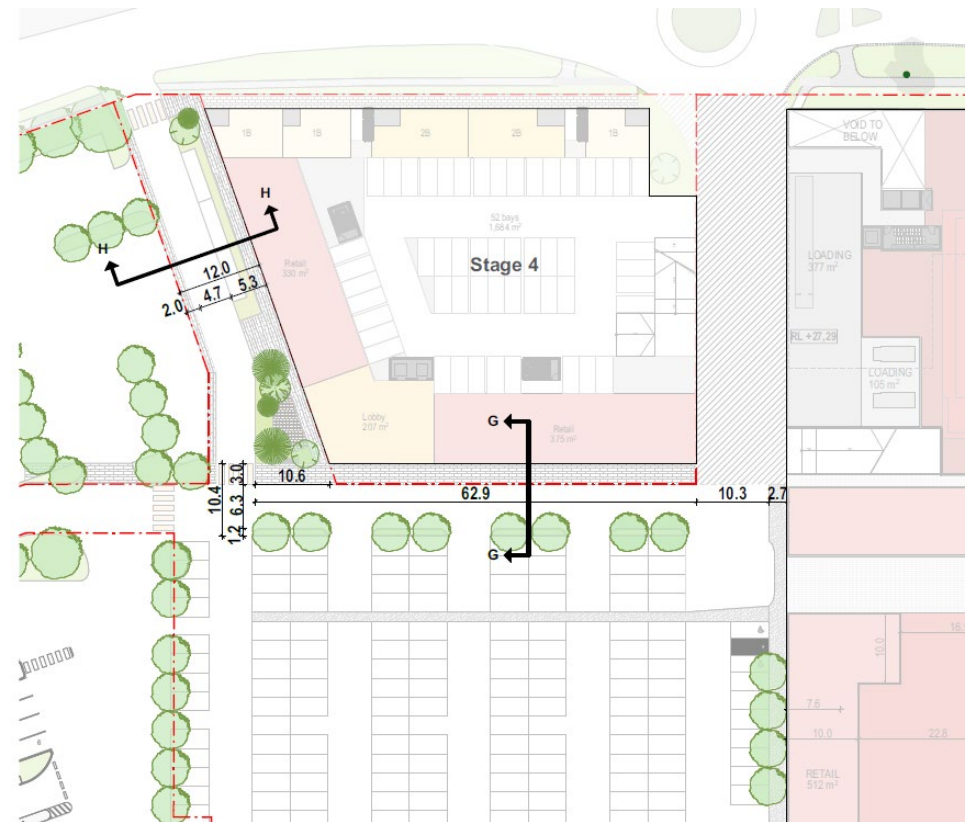
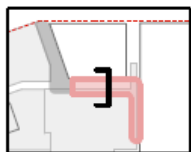
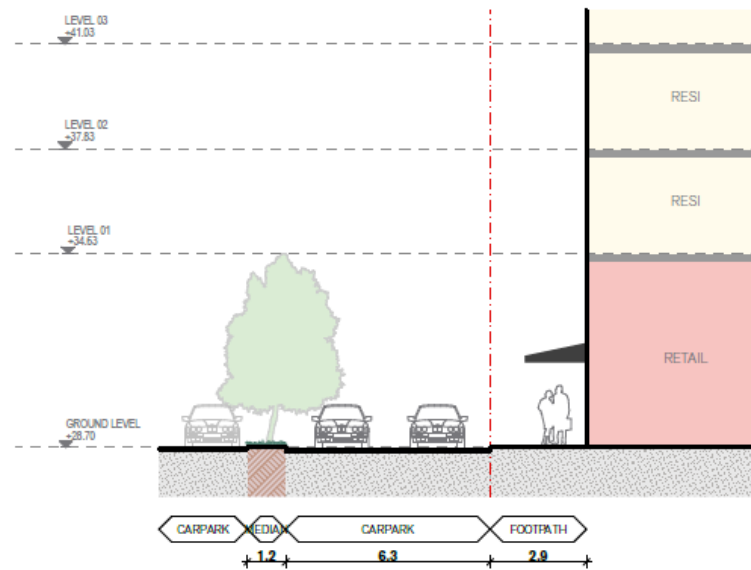


Figure 30 Internal Road Network Section Lines

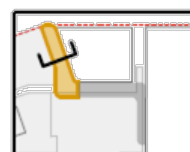
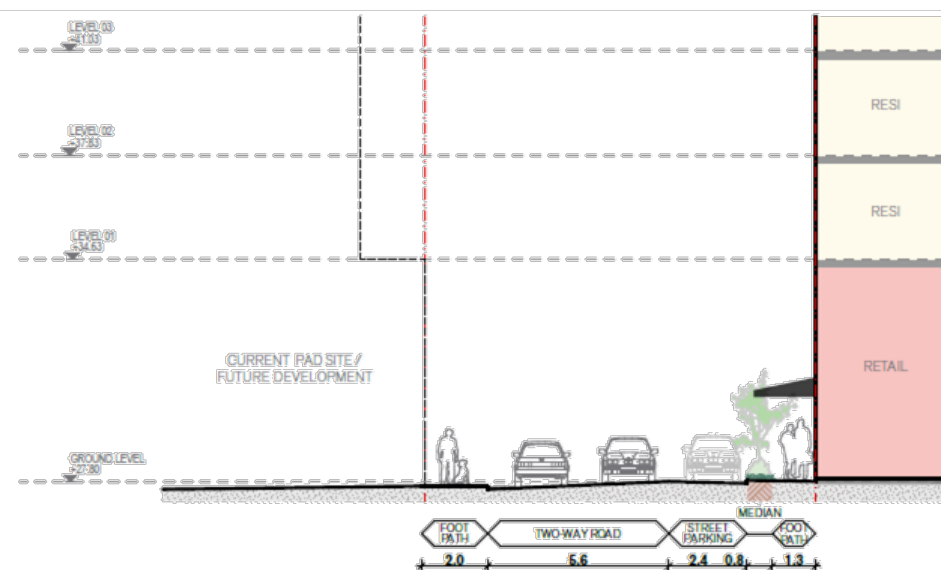


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Dianella Plaza Masterplan

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Figure 31 Detailed Section G



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Dianella Plaza Masterplan

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Figure 32 Detailed Section H

7.7 Land Use

Design Element 5 of the SPP 7.2 Precinct Design Guidelines requires consideration of 'Land Use', noting that land use planning should reflect the role of the precinct in its wider context and respond to community needs, current and intended future activities and functions, alongside broader trends. The SPP 7.2 Design Element Objectives and Design Responses are summarised in **Table 10** and **Figure 33** below, with key considerations outlined in further detail, in subsequent sections.

Table 10 Land Use – Design Element Response

No.	Design Element	Design Element Response
05.1	To ensure current and planned land uses respond to the needs and expectations of the community.	- Retail is envisioned to remain the core function of the Dianella District Centre. As outlined in the Retail Needs Assessment at Appendix E, the scale of retail being delivered in the precinct aligns with the actual need for the catchment area and would not undermine surrounding centres. - The PSP supplements this core function with the delivery of approximately 600 new dwellings. All dwellings will be multiple dwellings, which are under - These dwellings will support the long-term vitality and resilience of the Dianella District Centre. A resident population provides consistent, everyday activity that helps sustain shops, services and hospitality beyond traditional trading hours. Residential uses also add passive surveillance and a sense of safety, especially in the evenings. They contribute to a more diverse and balanced centre, where retail, employment and living coexist rather than compete.
05.2	To ensure the planned land use types contribute positively to the precinct character and amenity.	The land use design response is detailed in Figure 33 below, with the following driving principles: - Higher trip generating uses such as retail and commercial are located within the 'Centre' zone fronting Alexander Drive and Grand Promenade. This approach capitalises on the high exposure location but also protects the Living and Lifestyle precinct from these high volumes of traffic. - The Living and Lifestyle precinct is designed to accommodate a wide range of uses which are suitable for a mixed use zone. This is concentrated along Waverley Street and Lowick Street. The use of frontage types and associated development controls ensures that these uses respect the residential interface but also improve the quality and safety of connections to community uses.
05.3	To achieve a mix of land uses and activity that supports the precinct vision.	A broad range of uses can be contemplated within the Centre, provided they are capable of satisfying the PSP's preferred built form, interface and design outcomes. This approach maintains land use flexibility while ensuring future development contributes to the intended character, scale and function of the Dianella Centre.

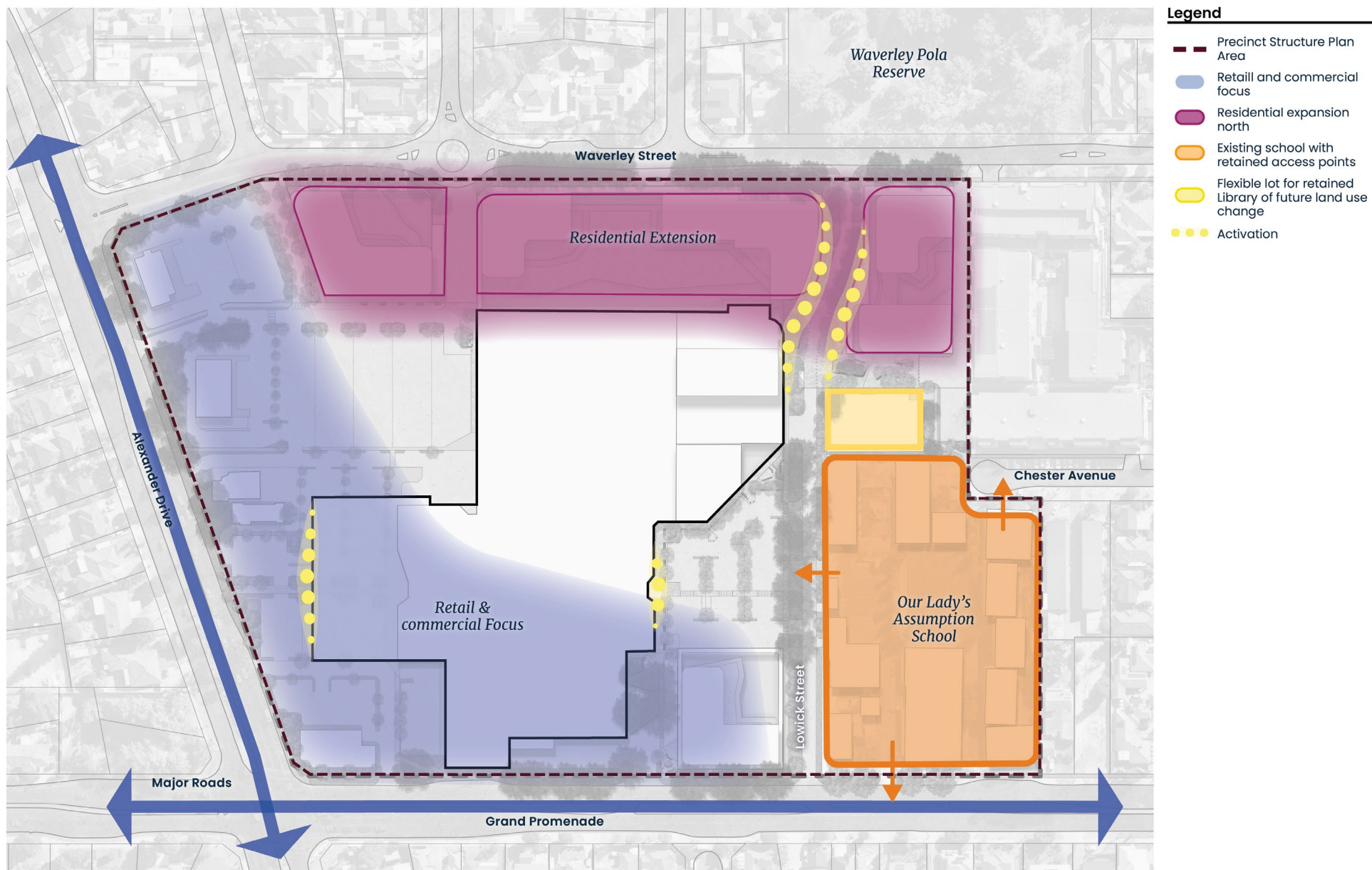


Figure 33 Land Use Design Response Plan

7.7.1 Proposed Zoning and Density Coding

Density Coding

The applicable density codings for the PSP are illustrated on **Plan 1** and described below:

- **Mixed Use – R-AC0** applies to the majority of the ‘Living and Lifestyle’ precinct, to enable the delivery of context specific development controls. From a land use perspective, the Mixed Use zone provides the flexibility to consider a wide range of retail, residential and commercial uses, but discourages vehicle intensive land uses.
- **Mixed Use – R-80** applies to the currently library site. This zoning and enables the ongoing operation of the library, but also provides for potential redevelopment of the site in the future. The lower R-80 density ensures an appropriate interface with the school to the south, and existing four storey ‘Dianella Apartments’ residential development to the east.
- **Centre Zone – R-AC1** applies to Lot 78, which currently contains a service station development. This site is identified for future redevelopment opportunities in later stages, but will likely contain commercial operations in the interim. The R-AC1 density code enables the development to target a high-density urban centre outcome on the site, to create a landmark development at the southern precinct century from Grand Promenade.
- The remainder of the Centre zone will remain as a retail operation and is not envisioned to accommodate residential development within the lifetime of this PSP.

Retail

The PSP proposes an increase of approximately 13,000m² of additional commercial floorspace (beyond the current Stage 1 Coles relocation proposal), including 6,230m² of additional retail floorspace and 9,500m² of ancillary uses.

The expansion of retail development as part of the PSP has been supported by a Retail Needs Impact Assessment and Net Benefit Test, prepared by Urbis, attached at **Appendix E**. The report assesses the economic need, market demand and community impacts of the proposed PSP and concludes that the redevelopment is justified by forecast population growth, increasing retail demand, identified supply gaps in services and housing, and that the proposal will deliver net community benefits without undermining the surrounding activity centre hierarchy.

A detailed breakdown of these findings is as follows:

- Dianella Centre is currently underperforming its intended District Centre role, which is largely attributed to the lack on investment in centre redevelopment over the years. The PSP and associated redevelopment will support the centre in achieving its potential, with an expected increase in market share to approximately 9.8%.
- The trade area population is forecast to increase from approximately 83,100 people in 2026 to 92,560 people by 2036. Retail expenditure is forecast to grow by approximately \$351 million (+25%) over the next decade. This growth is expected to support demand for an additional 29,000-32,000m² of retail floorspace across the broader catchment, and supports the proposed PSP.
- The report identifies gaps in the area of food and beverage offerings, childcare provision, medical and allied health services, profession office and business services and fitness and wellness facilities.
- Trading impacts on surrounding centres are forecast to range between approximately 0.5% and 3.8%, which are considered minor and would not threaten the viability or sustainability of nearby centres.

Overall the redevelopment is considered to strengthen Dianella's role within the activity centre hierarchy, rather than exceeding it. The report concludes that the Dianella Centre PSP demonstrates a clear need for additional retail floorspace, residential apartments, medical services, childcare, office space and community amenities.

The redevelopment is expected to strengthen the role of Dianella as a District Centre, support forecast population growth, improve consumer choice and community services, create significant employment opportunities and deliver net community benefits while maintaining the sustainability of the wider activity centre network

7.8 Built Form

Design Element 6 of the SPP 7.2 Precinct Design Guidelines requires consideration of 'Built Form', outlining that built form should support a precinct environment that is place and functionally appropriate in character, intensity, bulk and scale. The SPP 7.2 Design Element Objectives and Design Responses are summarised below, in **Table 11** with key considerations outlined in further detail.

Table 11 Built Form – Element Design Response

No.	Design Element	Design Element Response
06.1	To ensure that the built form is responsive to the purpose, context and intended character of the precinct.	- The PSP built form supports the Centre's role as a mixed-use destination that extends beyond retail. This includes framing active streets and public spaces, accommodating community and commercial uses, and enabling flexible floorplates that can adapt over time. The built form prioritises pedestrian movement where appropriate, enhances visibility and comfort, and reinforcing the centre as a place to meet, linger and move through. - Sensitive transitions in height and bulk are provided to adjoining areas. Permeable edges, multiple access points and clear connections to surrounding streets help integrate the centre with the broader neighbourhood. - Building design reinforce a human scale at street level, even where larger floorplates or taller elements are required above.
06.2	To ensure building placement, scale and massing is appropriate for the intended precinct and streetscape character.	- The building placement approach for the Dianella PSP ensures location, scale and massing are appropriate to the intended precinct and streetscape character but also support the ongoing operation of the centre throughout staged delivery. - Building placement is planned to allow redevelopment to occur in logical stages without disrupting core retail activity. Locating new buildings and extensions where they can be constructed independently helps maintain continuous trading, safe customer access and clear sightlines to key entries. This supports retailer confidence and preserves the centre's role as an active destination during redevelopment. - Managing height, bulk and construction interfaces will assist in reducing overshadowing of active areas, maintain visibility to shops and avoid creating inactive edges during interim stages. - Overall, carefully considered placement, scale and massing enable a shopping centre to evolve while remaining operational, ensuring that the centre continues to function as a

		vibrant, accessible and economically viable part of the precinct during and after redevelopment.
06.3	To ensure that built form design reduces energy demand across the precinct by facilitating climate-responsive design.	▪ The PSP massing strategy places the majority of new dwellings with frontage to Waverley Street. As Waverley Street runs on a north-east axis, this approach maximises opportunities for future dwellings to achieve access to a northern aspect, which is a key principle of climate-responsive design in Perth. ▪ Prioritising a northern orientation allows dwellings to capture winter sunlight, improving thermal comfort and reducing reliance on artificial heating during cooler months. At the same time, northern façades are easier to shade in summer due to the high sun angle, enabling simple design responses such as eaves and balconies to limit heat gain while still allowing good daylight access. ▪ Locating dwellings along Waverley Street also supports consistent daylight penetration into living areas and private open spaces, contributing to healthier and more comfortable indoor environments. This approach reduces the need for artificial lighting and supports better energy performance across the development.
06.4	To ensure that built form design is responsive to the streetscape and contributes to a safe and comfortable public realm.	▪ The PSP adopts a series of streetscape frontage controls to ensure streetscape objectives are delivered in future development. ▪ These controls include articulation, weather protection and controls to ensure well defined edges to streets and public spaces. This clear guidance on the streetscape edges will help create a safe, legible and comfortable public realm. But in the context of the existing Dianella Plaza shopping centre, creating a well-defined edge helps shift the centre from an inward-focused format to one that actively contributes to the surrounding street network.

7.8.1 Massing Strategy

The overarching massing principle for the Dianella PSP is to introduce high density residential opportunities to the centre in a form which minimises disruption to the core retail and daily needs function of Dianella Plaza. This principle is delivered by identifying underutilised land within the site as redevelopment sites.

In applying this to the Dianella Plaza site, given the existing urban structure locates the main shopping centre building central to the lot, the massing strategy concentrates the majority of development sites occurring at the perimeter of the lot. This approach therefore also serves a secondary benefit of activating and introducing surveillance to the public streetscapes.

Further contextual analysis has identified Waverley Street as the optimal frontage for delivering dwellings with the PSP area. Concentrating massing along Waverley Street ensures overshadowing is maintained within the site boundaries, and future dwelling can maximise orientation to the north and east.

The existing Waverley Reserve immediately north-east of the Dianella PSP area also provides the opportunity to deliver a green connection and provide a tree canopy outlook from future residential dwellings. The massing strategy therefore uses this Waverley Street / Limosa Close section to function as the main entry to the 'lifestyle and living' precinct for the site. The massing strategy enables additional height in this location to ensure the built form achieves a landmark statement, and forms a natural wayfinding cue for entry into the town square.

Height transitions down from this landmark location, with adjacent development sites seeking heights of between 9 and 7 storeys for the remainder of the mixed use precinct. These heights will enable a critical mass of people to be delivered in the mixed use precinct, helping to create lively, safer environments with consistent foot traffic in the town centre.

The majority of the Centre zone will maintain a maximum height limit of 4 storeys. The only exception to this is the south-east development site at the corner of Grand Promenade and Lowick Street, which is able to accommodate height up to 9 storeys, to ensure this entry to the precinct remains inviting.

Four storeys is also permitted within the school and existing library site, to enable some flexibility for redevelopment opportunities over this land.

7.8.2 Dwelling Yields

With the proposed massing strategy, the Dianella PSP is estimated to deliver approximately 600 dwellings across all stages of the PSP, staged as follows:

- Approximately 300 – 400 dwellings during Stage 2; and
- Approximately 100-200 dwellings during Stage 3 onwards.

As a District Centre which is not underpinned by a train station, the average residential density required for the 400m radius is *minimum 25 dwellings per gross hectare*. With a total site area of 8.95ha, this would require a minimum of 223 dwellings to be planned within the Dianella PSP area.

As outlined in **Section 4.3**, the City's Local Planning Strategy has calculated the need for an additional 2,400 new dwellings across the suburb of Dianella by 2036, with 1,800 of these dwellings to be delivered in centres and corridor areas.

The dwelling yields proposed under the PSP, representing a residential site density of 69 dwellings per hectare, will provide a significant contribution to these dwelling targets for Dianella, delivering approximately 33% of this target (accommodating approximately 1114 persons, based on an average occupancy of 1.8 persons per dwelling).

This demonstrates that the dwelling yields of the PSP align with the guidance of the State planning framework, whilst also making a significant contribution towards the City's dwelling targets for Dianella.



Disclaimer

This report is dated 17 August 2026 and incorporates information and events up to that date only and excludes any information arising, or event occurring, after that date which may affect the validity of Urbis Ltd (**Urbis**) opinion in this report. Urbis prepared this report on the instructions, and for the benefit only, of Greenpool Capital (**Instructing Party**) for the purpose of Precinct Structure Plan (**Purpose**) and not for any other purpose or use. To the extent permitted by applicable law, Urbis expressly disclaims all liability, whether direct or indirect, to the Instructing Party which relies or purports to rely on this report for any purpose other than the Purpose, and to any other person which relies or purports to rely on this report for any purpose whatsoever (including the Purpose).

In preparing this report, Urbis was required to make judgements which may be affected by unforeseen future events, the likelihood and effects of which are not capable of precise assessment.

All surveys, forecasts, projections and recommendations contained in or associated with this report are made in good faith and on the basis of information supplied to Urbis at the date of this report, and upon which Urbis relied. Achievement of the projections and budgets set out in this report will depend, among other things, on the actions of others over which Urbis has no control.

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Whilst Urbis has made all reasonable inquiries it believes necessary in preparing this report, it is not responsible for determining the completeness or accuracy of information provided to it. Urbis (including its officers and personnel) is not liable for any errors or omissions, including in information provided by the Instructing Party or another person or upon which Urbis relies, provided that such errors or omissions are not made by Urbis recklessly or in bad faith.

This report has been prepared with due care and diligence by Urbis and the statements and opinions given by Urbis in this report are given in good faith and in the reasonable belief that they are correct and not misleading, subject to the limitations.

Appendix **A**

Landscape Master Plan

DIANELLA CENTRE

Precinct Structure Plan | July 2026 [C]





LEGEND

- PRECINCT STRUCTURE PLAN BOUNDARY
- STAGE 1 WORKS BOUNDARY
- SIGNIFICANT TREES TO BE RETAINED WHERE POSSIBLE
- 01 WAVERLEY / JESMOND ENTRY PEDESTRIAN AND VEHICULAR CONNECTING INTO STAGE 1
- 02 WAVERLEY / PITT STREET ENTRY VEHICULAR ONLY
- 03 WAVERLEY / LOWICK STREET ENTRY - CIVIC 'HIGH STREET' CHARACTER WITH EXISTING RETAINED TREES
- 04 CIVIC PLAZA MAIN COMMUNITY GATHERING SPACE TO ENHANCE CONNECTION TO LIBRARY
- 05 LOWICK STREET WITH EXISTING SIGNIFICANT TREES RETAINED
- 06 PEDESTRIAN CONNECTIONS TO STRENGTHEN RELATIONSHIP WITH SCHOOL COMMUNITY
- 07 LOWICK / GRAND PROMENADE ENTRY VEHICULAR AND PEDESTRIAN
- 08 GRAND PROMENADE ENTRY VEHICULAR ONLY
- 09 GRAND PROMENADE ENTRY VEHICULAR AND PEDESTRIAN CONNECTION TO PUBLIC TRANSPORT
- 10 ALEXANDER DRIVE PEDESTRIAN CONNECTION FROM PUBLIC TRANSPORT INTO STAGE 1 MAIN RETAIL ENTRY

VISION

To design vibrant green space that supports inclusive community use, responds to the unique site character and context, and supports everyday use by encouraging community interaction across all ages.

The landscape design response for the Dianella Centre Precinct Structure Plan has been prepared as part of the planning of the site - to create a lively and accessible public realm that connects residents, patrons and the surrounding community within a series of urban parklet landscape spaces.

The designs ensure that what is proposed is resilient, highly durable and will serve the local community for many years to come.



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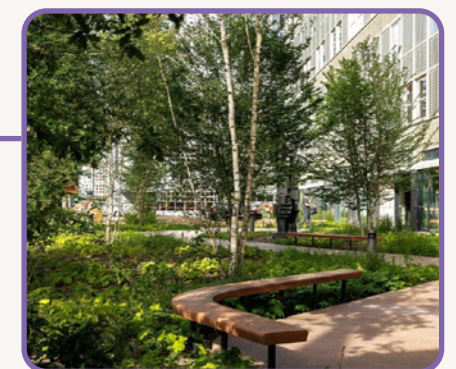
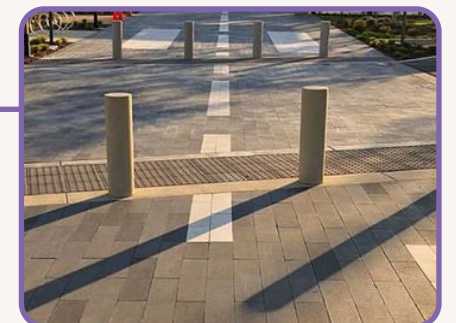
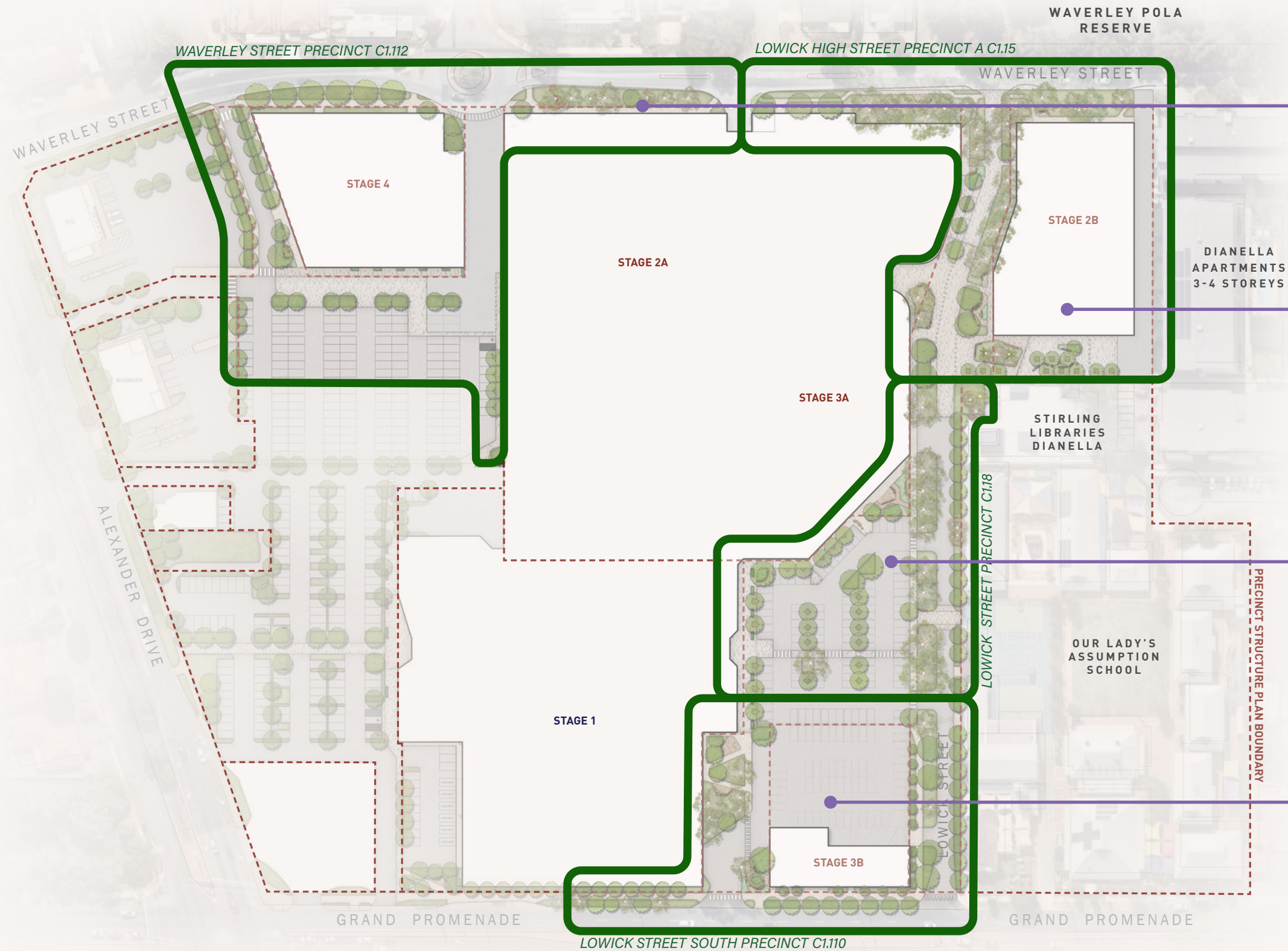
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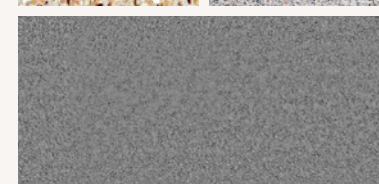
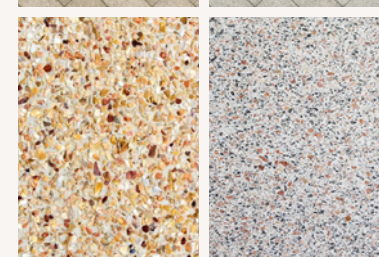
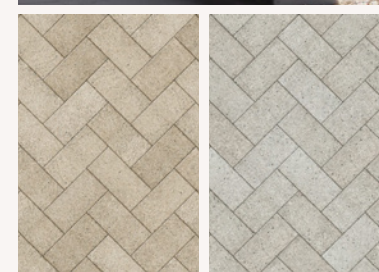
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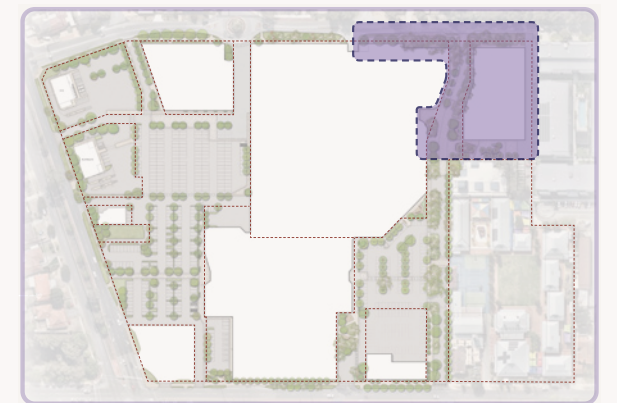




VISION

The landscape design of the 'High Street' Civic Heart of the Precinct Structure Plan aims to create a welcoming and comfortable public realm. A coordinated selection of street trees provides shade, supports a cooler microclimate, and softens the built form.

Access to a variety of outdoor spaces is captured in a sophisticated urban setting beneath existing retained trees, where pedestrian access is prioritised over vehicles.



KEY PLAN / NTS



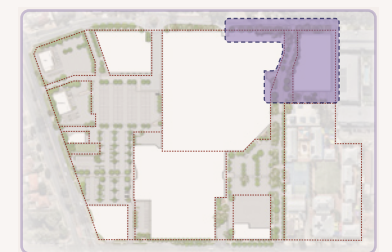


LEGEND

- PRECINCT STRUCTURE PLAN BOUNDARY
-  SIGNIFICANT TREES TO BE RETAINED WHERE POSSIBLE
- 01 TREE RETENTION SETBACK TO PROVIDE OPPORTUNITY FOR EXISTING SIGNIFICANT TREE RETENTION
- 02 WELL DEFINED PATH CONNECTION TO SURROUNDING RESIDENTIAL FACILITIES E.G. WAVERLEY POLA RESERVE
- 03 NATIVE IRRIGATED TREE AND GROUNDCOVER PLANTING TO PROMOTE PARKLAND OUTLOOK
- 04 TRAFFICABLE UNIT PAVING AND HIGH QUALITY PAVING / SEATING OPPORTUNITIES WITH NEW IRRIGATED TREE PLANTING
- 05 EXISTING SIGNIFICANT TREES RETAINED WITHIN NATIVE GARDEN LANDSCAPING
- 06 FLEXIBLE OPEN COMMUNITY SPACE TO MAIN ENTRY WITH BOLLARDS, FLUSH KERBS AND LEGIBLE PEDESTRIAN MOVEMENT
- 07 RAISED SEATING, GARDEN BED AND TREE CANOPY OPPORTUNITIES WITHIN THE "HIGH STREET" WITH COMMUNITY EVENTS E.G. FOOD TRUCKS, NIGHT MARKETS ENABLED BY RESTRICTED VEHICLE ACCESS
- 08 PUBLIC REALM FORECOURT TO LIBRARY WITH HIGH QUALITY PAVING, SEATING AND LANDSCAPING TO FACILITATE COMMUNITY / CIVIC EVENTS
- 09 PAVED PEDESTRIAN CONNECTION TO LIBRARY AND SCHOOL PARKING
- 10 VEHICLE ONLY ACCESSWAY FROM WAVERLEY STREET
- * EXISTING SUNDIAL TO BE RELOCATED IN MAIN ENTRY COMMUNITY SPACE

TOTAL LANDSCAPE OPPORTUNITY 1126m²

- IRRIGATED GARDEN BED / MULCH ONLY AREA WITH ORGANIC MULCH AND AMENDED SOIL, WITHIN THE PSP BOUNDARY (EXCLUDING TREE WELLS)



KEY PLAN



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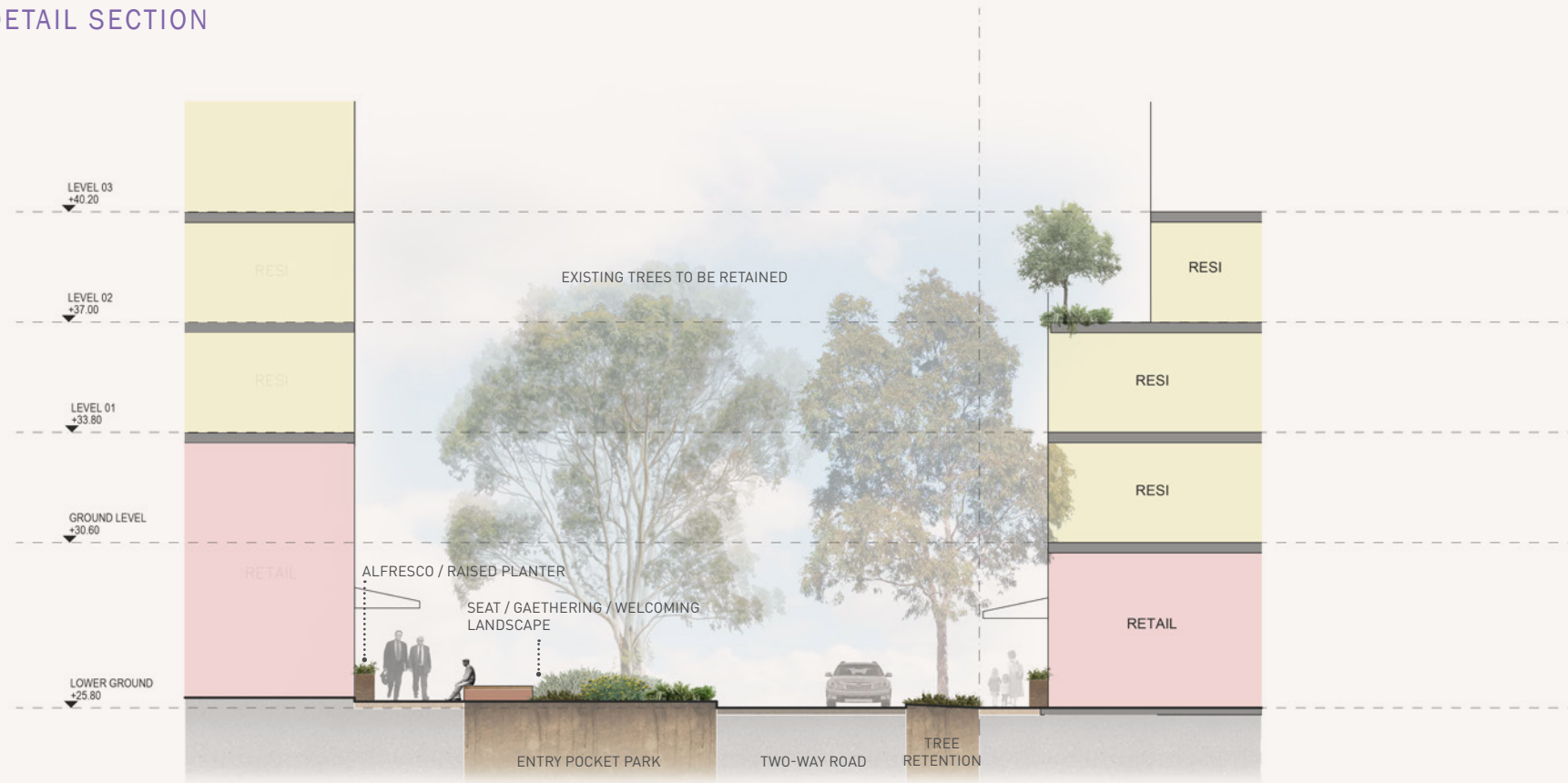
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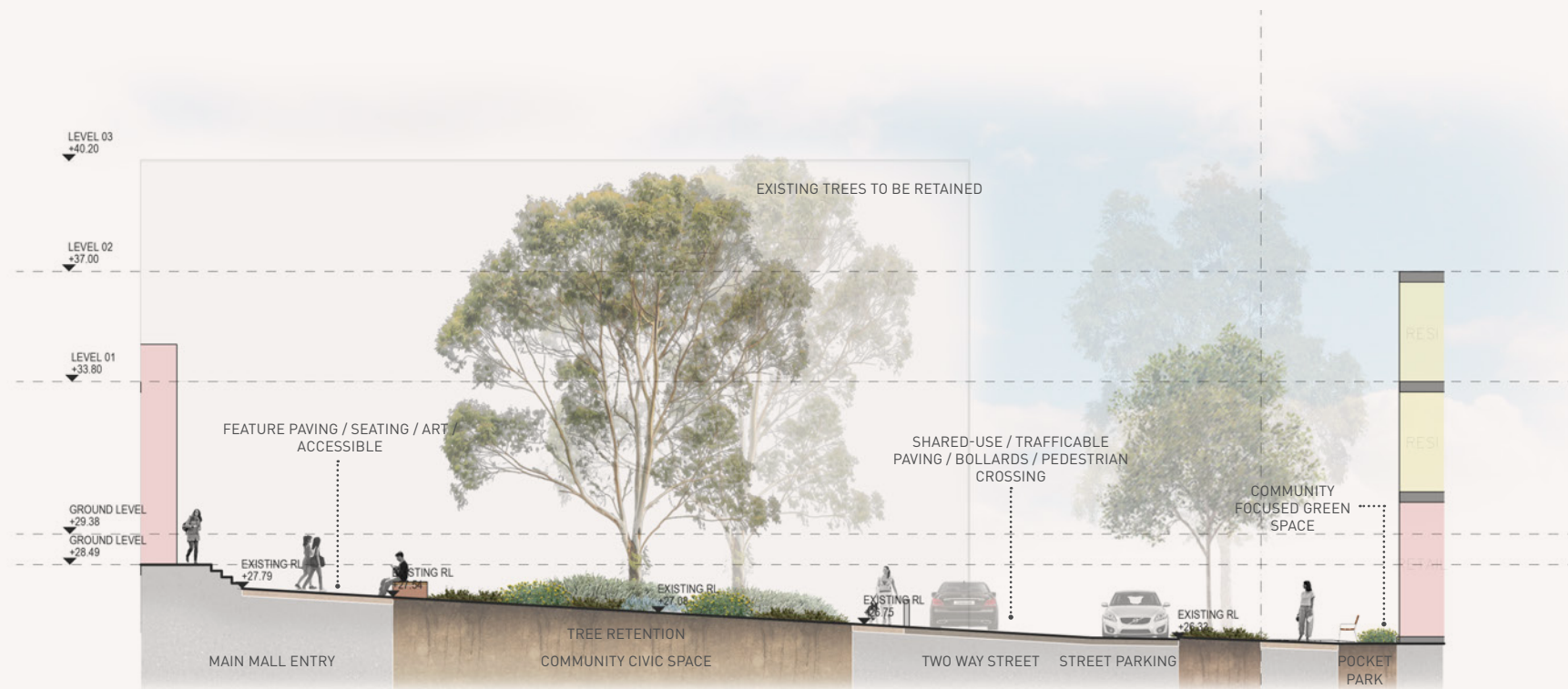
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SECTION AA



SECTION BB



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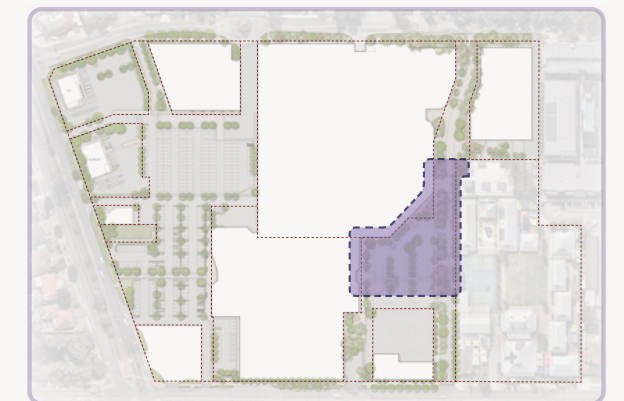
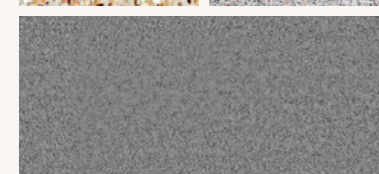
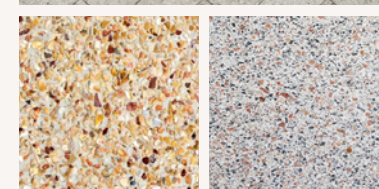
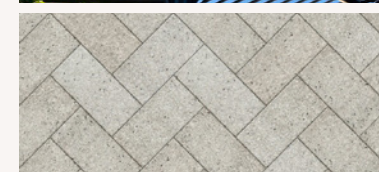
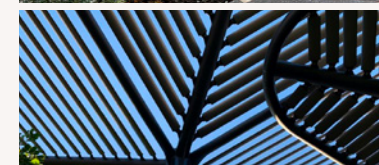




VISION

For the Lowick Street precinct of the Dianella Centre Precinct Structure Plan, the landscape design aims to enhance public realm amenity through the creation of attractive, resilient and community focused streetscapes.

The retention of existing significant trees for much-needed shade and canopy cover with the landscape designed to maintain sightlines and define clear, legible points of entry into the site. A native tree palette of shade trees is proposed to enhance comfort, contribute to a cooler microclimate, and strengthen the landscape character of the site.



KEY PLAN / NTS



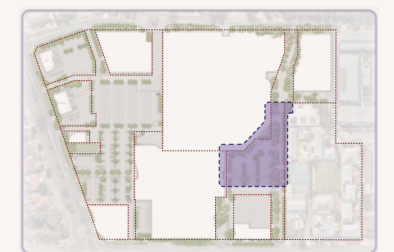


LEGEND

- PRECINCT STRUCTURE PLAN BOUNDARY
-  SIGNIFICANT TREES TO BE RETAINED WHERE POSSIBLE
- 01 EXISTING SIGNIFICANT TREES RETAINED WITHIN NATIVE GARDEN LANDSCAPING
- 02 NATIVE IRRIGATED TREE AND GROUNDCOVER PLANTING TO PROMOTE 'GREEN CONNECTION' WITH ADJACENT SCHOOL COMMUNITY
- 03 PAVED WELL DEFINED PEDESTRIAN CROSSING FLANKED BY EXISTING RETAINED TREES AND SEATING RESPITE OPPORTUNITIES
- 04 CONTINUOUS FOOTPATHS TO ENCOURAGE WALKABILITY
- 05 HABITAT AND CANOPY CREATION OPPORTUNITY WITHIN CARPARK WITH NEW TREE PLANTING
- 06 ENHANCED RETAIL ENTRY WITH HIGH QUALITY PAVING, SEATING AND LANDSCAPING TO OFFER RESPITE AND AMENITY
- 07 OUTDOOR WAITING ROOM - PASSIVE PARKLAND AND TEXTURAL SPACE WITH SEATING AND CLIMBING
- 08 LEGIBLE NORTHERN PATH CONNECTION TO LIBRARY, HIGH STREET AND ASSOCIATED CIVIC SPACE

TOTAL LANDSCAPE OPPORTUNITY 1003m²

- IRRIGATED GARDEN BED / MULCH ONLY AREA WITH ORGANIC MULCH AND AMENDED SOIL, WITHIN THE PSP BOUNDARY (EXCLUDING TREE WELLS)



KEY PLAN



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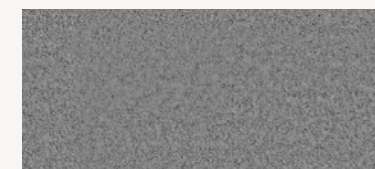
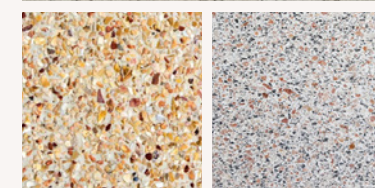
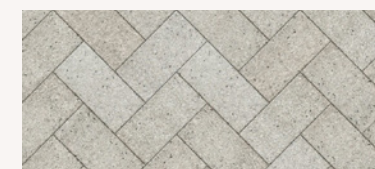
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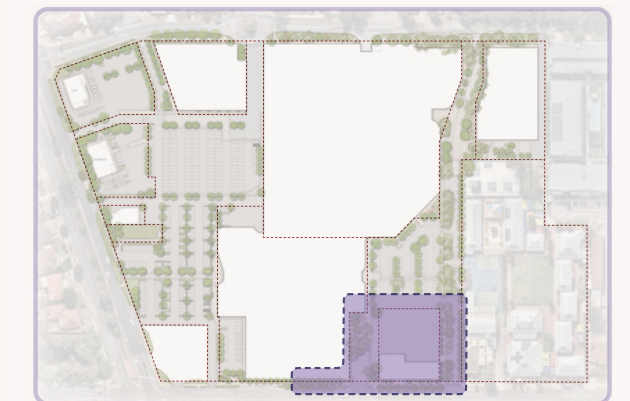




VISION

The landscape and seating areas within the 'Lowick Street South' precinct are designed to create a safe, legible environment in accordance with CPTED principles - with clear delineation between private, semi-private and public realm areas.

Shaded pathways, seating opportunities and small gathering nodes to support rest, social interaction and passive recreation. Native planting reinforces local character, improves biodiversity and creates an inviting landscape experience that encourages active movement and community engagement.



KEY PLAN / NTS

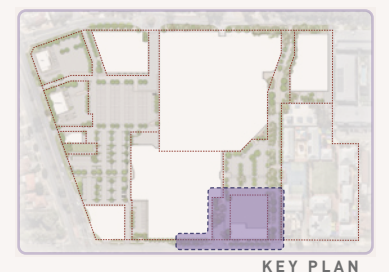


LEGEND

- PRECINCT STRUCTURE PLAN BOUNDARY
-  SIGNIFICANT TREES TO BE RETAINED WHERE POSSIBLE
- 01 PAVED WELL DEFINED PEDESTRIAN CROSSING FLANKED BY EXISTING RETAINED TREES AND SEATING RESPITE OPPORTUNITIES
- 02 EXISTING SIGNIFICANT TREES RETAINED WITHIN NATIVE GARDEN LANDSCAPING
- 03 NATIVE IRRIGATED TREE AND GROUND COVER PLANTING TO PROMOTE 'GREEN CONNECTION' WITH ADJACENT SCHOOL COMMUNITY
- 04 PASSIVE PARKLET AND RESPITE SPACE TO DEFINE DEVELOPMENT CORNER AND PROVIDE 'COOLING' OPPORTUNITY WITH NATIVE LANDSCAPING.
- 05 WELL DEFINED CONTINUOUS FOOTPATHS TO ENCOURAGE WALKABILITY
- 06 LANDSCAPE PARKLET WITH NATIVE PLANTING GARDEN BEDS TO REINFORCE LOCAL DIANELLA CHARACTER
- 07 ENHANCED RETAIL ENTRY WITH HIGH QUALITY PAVING, SEATING AND LANDSCAPING TO OFFER RESPITE AND AMENITY
- 08 HABITAT AND CANOPY CREATION OPPORTUNITY WITHIN CARPARK WITH NEW TREE PLANTING
- 09 PRIORITISE PEDESTRIAN MOVEMENT WITH DEFINED WALKWAYS

TOTAL LANDSCAPE OPPORTUNITY 624m²

- IRRIGATED GARDEN BED / MULCH ONLY AREA WITH ORGANIC MULCH AND AMENDED SOIL, WITHIN THE PSP BOUNDARY (EXCLUDING TREE WELLS)



KEY PLAN



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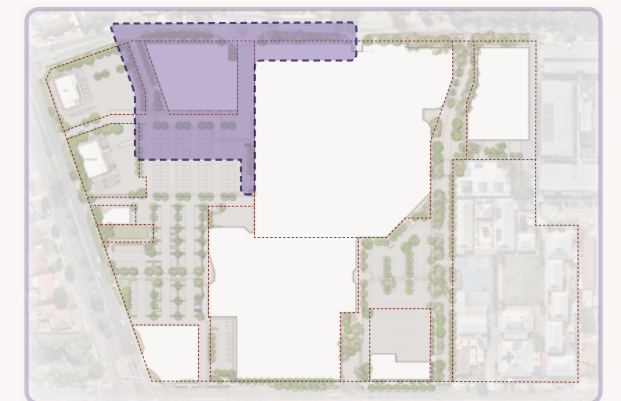




VISION

The streetscape and public realm opportunities within the Dianella Centre Precinct Structure Plan include well designed and considered outdoor space to maximise opportunities for all user groups.

A coordinated selection of street trees provides shade, supports a cooler microclimate, and softens the built form. Raised feature garden beds showcase waterwise and robust native planting to support local flora, fauna and define pedestrian movement towards built form entries.



KEY PLAN / NTS

WAVERLEY STREET

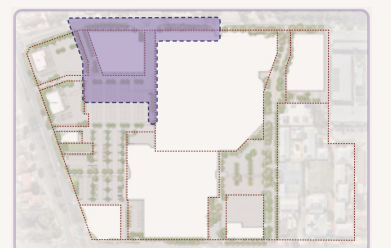


LEGEND

- PRECINCT STRUCTURE PLAN BOUNDARY
- SIGNIFICANT TREES TO BE RETAINED WHERE POSSIBLE
- 01 WAVERLEY / JESMOND ENTRY PEDESTRIAN AND VEHICULAR LINED WITH NEW TREE PLANTING (CANOPY CREATION)
- 02 NEW CONTINUOUS FOOTPATHS TO ENCOURAGE WALKABILITY AND STRENGTHEN CONNECTION TO EXISTING RESIDENTIAL
- 03 WAVERLEY / PITT STREET ENTRY VEHICULAR ONLY
- 04 EXISTING SIGNIFICANT TREES RETAINED WITHIN NATIVE GARDEN LANDSCAPING TO REINFORCE THE EXISTING SITE CHARACTER
- 05 ENHANCED RETAIL ENTRY WITH HIGH QUALITY PAVING
- 06 WELL DEFINED PEDESTRIAN MOVEMENT BETWEEN ALEXANDER DRIVE AND RETAIL ENTRY
- 07 TREE AND HABITAT CREATION OPPORTUNITY WITHIN OPEN PARKING
- 08 FLEXIBLE OPEN COMMUNITY SPACE FRONTING FOOD TENANCIES WITH TRAFFICABLE UNIT PAVING, BOLLARDS, FLUSH KERBS AND LEGIBLE PEDESTRIAN MOVEMENT
- 09 PUBLIC REALM PARKLET TO LOBBY ENTRY HIGH QUALITY PAVING, SEATING AND LANDSCAPING TO ENCOURAGE COMMUNITY INTERACTION

TOTAL LANDSCAPE OPPORTUNITY 657m²

- IRRIGATED GARDEN BED / MULCH ONLY AREA WITH ORGANIC MULCH AND AMENDED SOIL, WITHIN THE PSP BOUNDARY (EXCLUDING TREE WELLS)



KEY PLAN



LANDSCAPE ARCHITECTS

LEVEL 1 278 RAILWAY PDE WEST LEEDERVILLE WA 6007
T: (08) 9388 9566 E: mail@plane.com.au

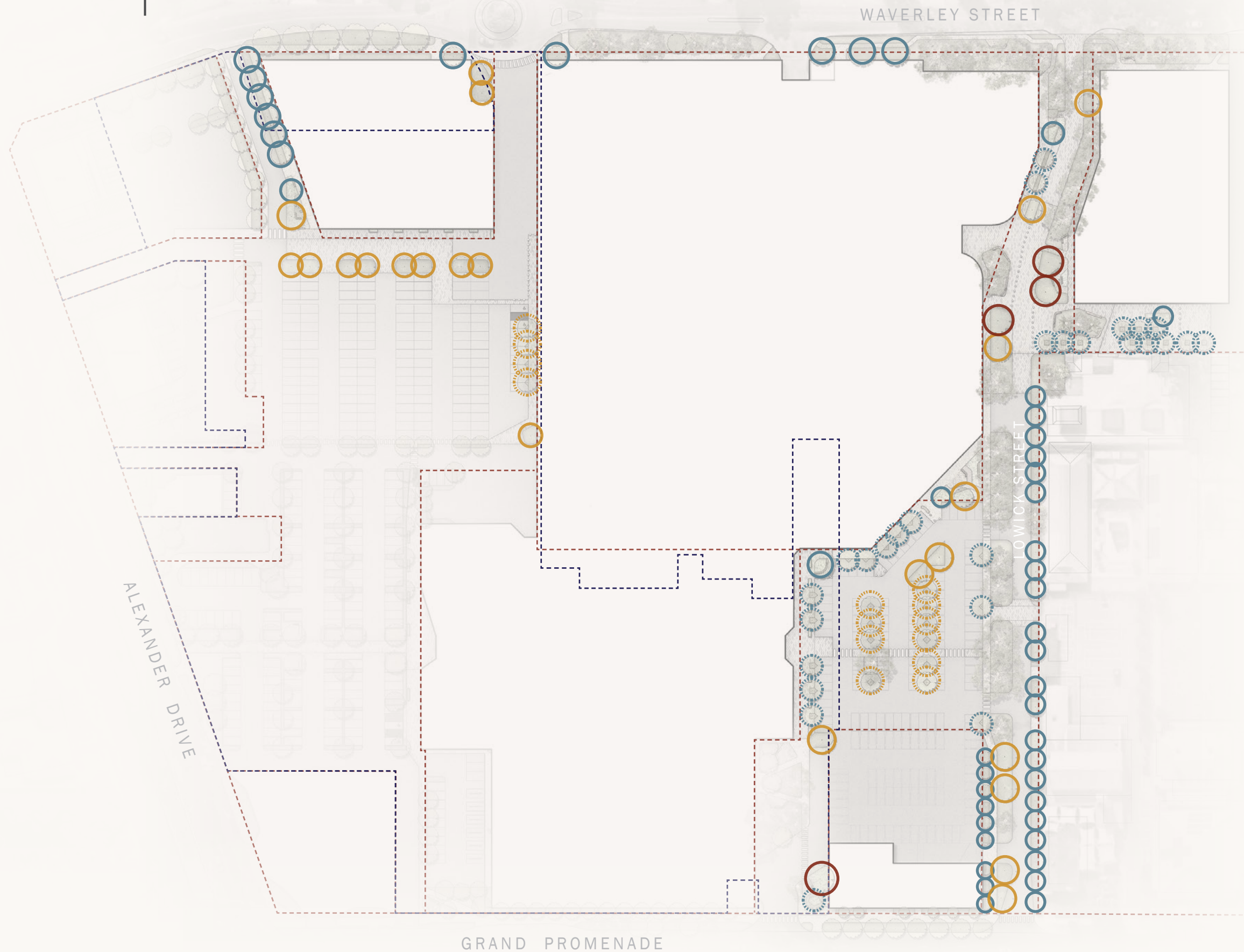
DIANELLA CENTRE / PRECINCT STRUCTURE PLAN

PREPARED FOR GREENPOOL CAPITAL
JULY 2026

C1.112

REV C
1:500 @ A3





LEGEND

- PRECINCT STRUCTURE PLAN BOUNDARY
- STAGE 1
- POTENTIAL LARGE TREE LOCATIONS (MIN 5.0 M DIAMETER AT MATURITY) 4 NO.
- POTENTIAL MEDIUM TREE LOCATIONS (MIN 3.0 M DIAMETER AT MATURITY) 23 NO.
- MEDIUM TREE OPPORTUNITY (RESTRICTED) 14 NO.
- POTENTIAL SMALL TREE LOCATIONS (MIN 2.0 M DIAMETER AT MATURITY) 47 NO.
- SMALL TREE OPPORTUNITY (RESTRICTED) 27 NO.

NOTE

Restricted Tree Opportunities are proposed tree locations where the area of Deep Soil includes structural and/or amended soil profiles beneath the surface.

DSA & TREE PROVISION

LARGE TREE	4 NO. x 36m ²
MEDIUM TREE	23 NO. x 16m ²
SMALL TREE	47 NO. x 9m ²
	935m ²

DEEP SOIL AREA (Large) : In-ground garden bed, soft landscape area, which supports the growth of large canopy trees and meets the minimum City dimension of 5.0 metre length / 36 m² area

DEEP SOIL AREA (Medium) : In-ground garden bed, soft landscape area, which supports the growth of medium canopy trees and meets the minimum City dimension of 3.0 metre length / 16 m² area

DEEP SOIL AREA (Small including shrubs) : In-ground garden bed, soft landscape area, which supports the growth of small upright trees, screening shrubs, low groundcovers

Landscape Note: In accordance with City Policy, a Deep Soil Area is a soft landscape area with no impeding building structure or feature above or below.



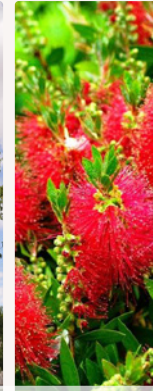
Agonis flexuosa
PEPPERMINT WILLOW
MATURE SIZE: 4 - 10 X 4 - 10 M
POT SIZE: 300L



Angophora costata
SYDNEY RED GUM
MATURE SIZE: 15 X 30 M
POT SIZE: 200L



Callistemon 'Kings Park Special'
BOTTLEBRUSH
MATURE SIZE: 3 X 4 M
POT SIZE: 150/200L



Corymbia maculata
SPOTTED GUM
MATURE SIZE: 25 X 40 M
POT SIZE: 150/200L



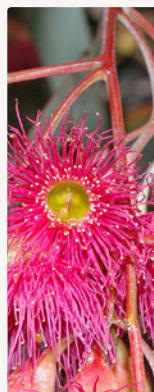
Cupaniopsis anacardioides
TUCKEROO
MATURE SIZE: 6 X 15 M
POT SIZE: 300L



Eucalyptus leucoxylon
YELLOW GUM
MATURE SIZE: 10 X 30 M
POT SIZE: 200L



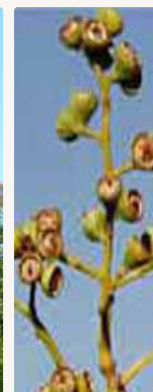
Eucalyptus sideroxylon rosea
PINK FLOWERED IRONBARK
MATURE SIZE: 10-25 M X 5-15 M
POT SIZE: 150/200L



Eucalyptus nicholii
WILLOW PEPPERMINT
MATURE SIZE: 15 X 18 M
POT SIZE: 150/200L



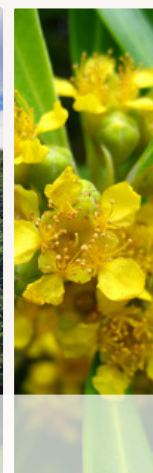
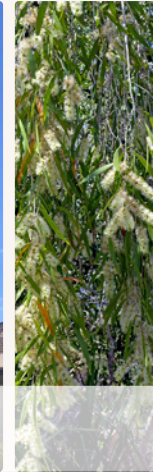
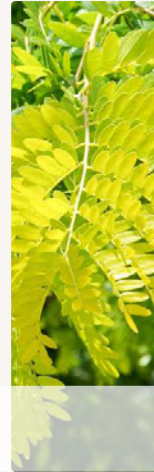
Eucalyptus victrix
LITTLE GHOST GUM
MATURE SIZE: 5 X 8 M
POT SIZE: 150/200L



Planting species will be selected with a mixture of textures and shades while also being low maintenance and low water use. To enhance the existing Dianella Landscape Character, the tree palette includes 'white-trunked' tree species to compliment the existing retained tree canopy within, and around the site. All planting to be permanently irrigated with organic mulch, tree stakes, and structural soil to trees within carpark areas.

NOTE:

Tree species to be reviewed against PSHB List and City requirements at time of plant design / selection.



Tree and plant species are predominantly native, reflecting the site's existing character and ecological context.

A diverse mix of flowering species and varied foliage introduces vibrant colour, seasonal interest, and sensory richness, while supporting local biodiversity.

Planting will be predominantly Australian Native species that enhance the broader landscape themes of the shopping precinct.

Species selected will aim to reinforce the existing landscape character of Dianella, and strengthen placemaking elements of the new landscape design.



Acacia cognata limelight
LIMELIGHT WATTLE
MATURE SIZE: 1.8M H X 4.5M W



Acacia saligna prostrate
WATTLE
MATURE SIZE: 0.4M H X 3M W



Acacia 'Honey Bun'
STICKY WATTLE
MATURE SIZE: 1.5M H X 1.5M W



Acacia lasiocarpa 'prostrate'
GLOW WATTLE
MATURE SIZE: 0.2M H X 1.5M W



Acmena smithii allyn magic
LILY PILLY
MATURE SIZE: 0.5M H X 0.5M W



Adenanthos sericeus 'compact'
DWARF WOOLLY BUSH
MATURE SIZE: 0.7M H X 1.5M W



Banksia ashbyii 'Dwarf'
BANKSIA
MATURE SIZE: 1.5M H X 2M W



Callistemon 'Better John'
BOTTLEBRUSH
MATURE SIZE: 1.2M H X 0.6 M W



Conostylis candicans
GREY COTTONHEADS
MATURE SIZE: 0.3M H X 0.5M W



Calothamnus quad. prostrate
COMMON NET BUSH
MATURE SIZE: 0.8 X 2.0 M



Chrysocephalum silver & gold
PAPER DAISY
MATURE SIZE: 0.2M H X 1M W



Darwinia citriodora prostrate
LEMON SCENTED MYRTLE
MATURE SIZE: 0.1M H X 0.9M W



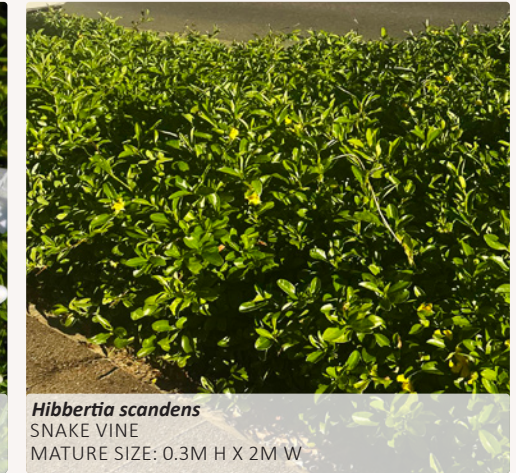
Dianella 'Streetscape'
FLAX LILY
MATURE SIZE: 0.5M H X 0.6M W



Eremophila 'kalbarri carpet'
EMU BUSH
MATURE SIZE: 0.2M H X 2M W



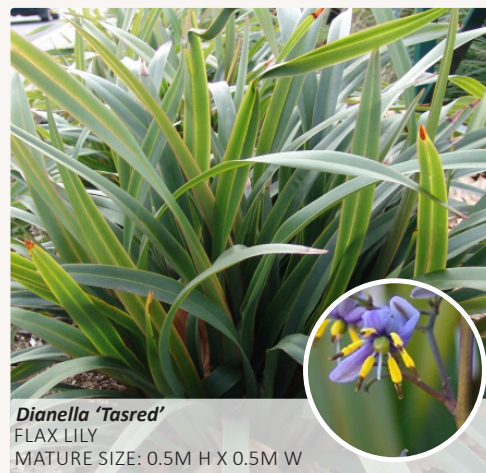
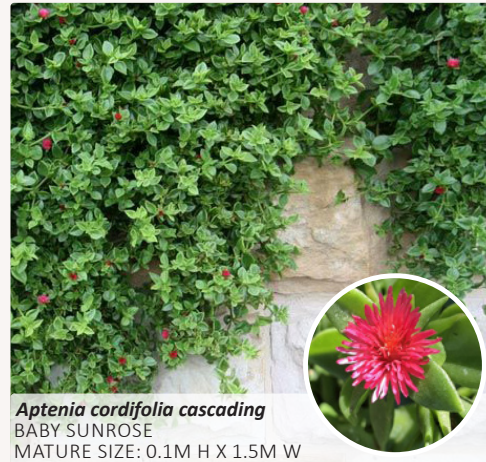
Ficinia nodosa
KNOBBY CLUB RUSH
MATURE SIZE: 1.0M H X 1.0M W



A mix of leaf typologies, colours and growth characteristics will be used to create a textured natural palette. All planting to be permanently irrigated with organic mulch.

Species will be selected to handle a variety of light conditions with a mix of textures, shades and structures. All planting to be permanently irrigated with organic mulch.

Raised planters with upright feature plants and cascading species to further enhance and define the public realm.





Appendix B

Transport Impact
Assessment



Greenpool Capital

Dianella Centre PSP

Transport Impact Assessment

August 2026

Project Code: 8052_B

Document Reference: TP_RP_0001

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Version Control and Approval

Version	Date	Main Contributor	Issued by	Approved by
A – Prelim Draft	26 June 2026	Gary Soo	Rodney Ding	
B – Draft Address client comments	03 July 2026	Gary Soo	Rodney Ding	
C – FINAL Add responses to CoS meeting queries	22 July 2026	Rodney Ding	Rodney Ding	Simon Davies
D – FINAL Final edits	11 August 2026	Rodney Ding	Rodney Ding	Rodney Ding

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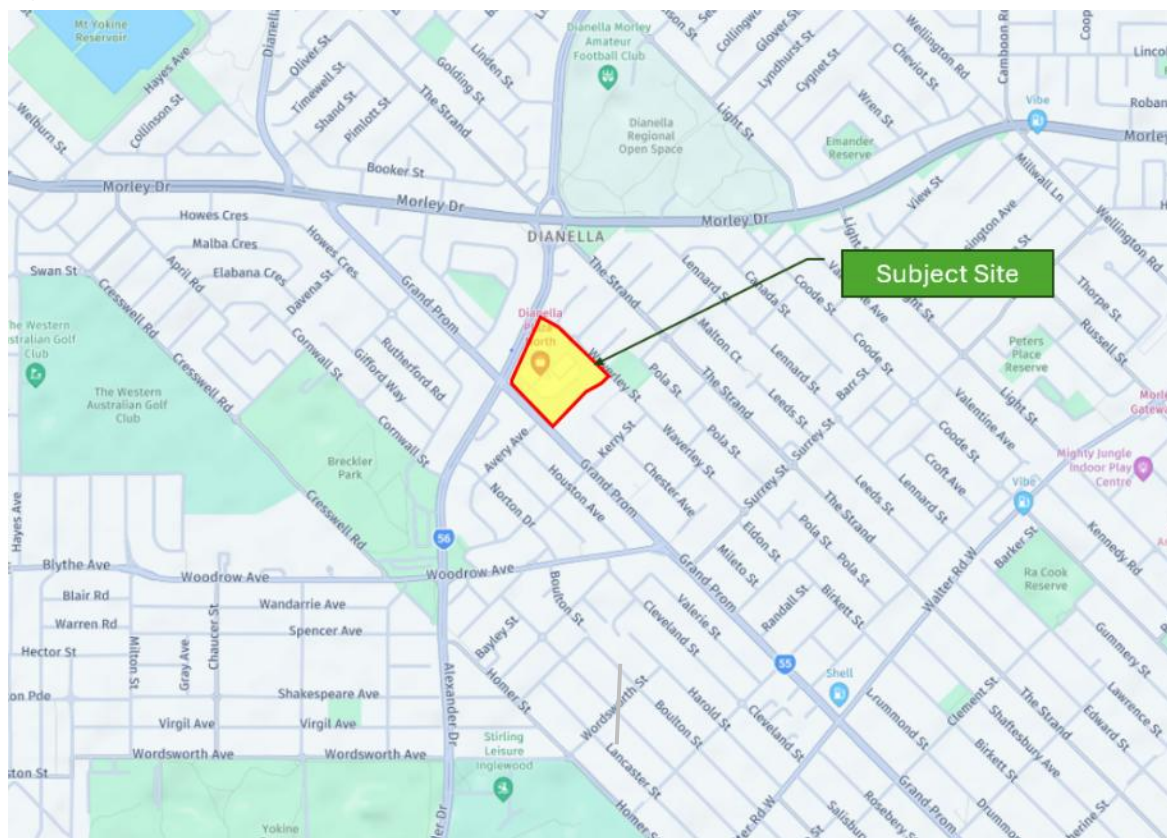
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I Introduction

I.1 Background

PJA Australia has been commissioned by Greenpool Capital (Applicant) to prepare this Transport Impact Assessment (TIA) in relation to the proposed Dianella Centre Precinct Structure Plan (PSP), Dianella, WA. The location of the Site in relation to the wider and the immediate surrounding road network is shown in **Figure 1-1**.

Figure 1-1: Site Location



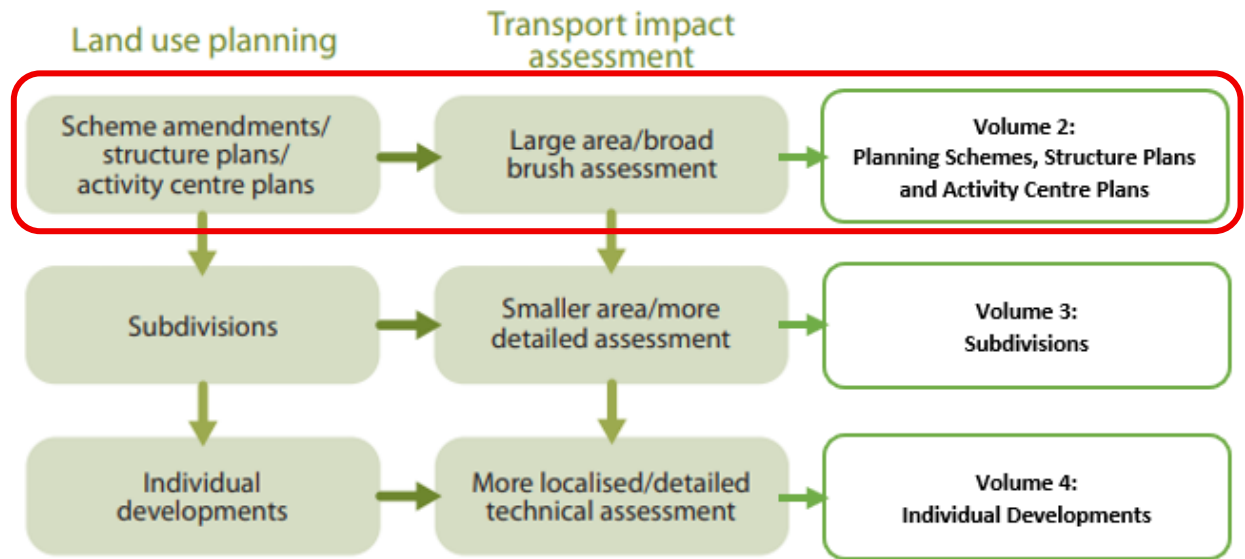
Source: Nearmap

I.2 Purpose of a Transport Impact Assessment

The planning system in Western Australia stipulates that all developments go through a process of stages to ensure that the statutory planning is consistent with the strategic planning. A more detailed assessment of the transport networks for developments is required within the land use planning stages. The Western Australian Planning Commission (WAPC) guidelines for a TIA shows the level of detail required at each stage as shown in **Figure 1-2**.



Figure 1-2: WAPC Land Use / Transport Planning Process



Source: Western Australian Planning Commission (WAPC)

The PSP forms part of an Activity Centre Plan (ACP) and would fall under *Volume 2* of the WAPC Guidelines. This means that the level of detail required at this stage allows for a *large area/broad brush* assessment of the existing and proposed transport networks to be undertaken.

The intent of this TIA is to “*assess the proposed internal transport networks with respect to accessibility, circulation and safety for all modes, that is, vehicles, public transport, pedestrians and cyclists, and the level of transport integration between the structure plan area and the surrounding land uses; determine the impacts of the traffic generated by structure plan area on the surrounding land uses and transport networks.*”.

1.3 Proposed Precinct Structure Plan

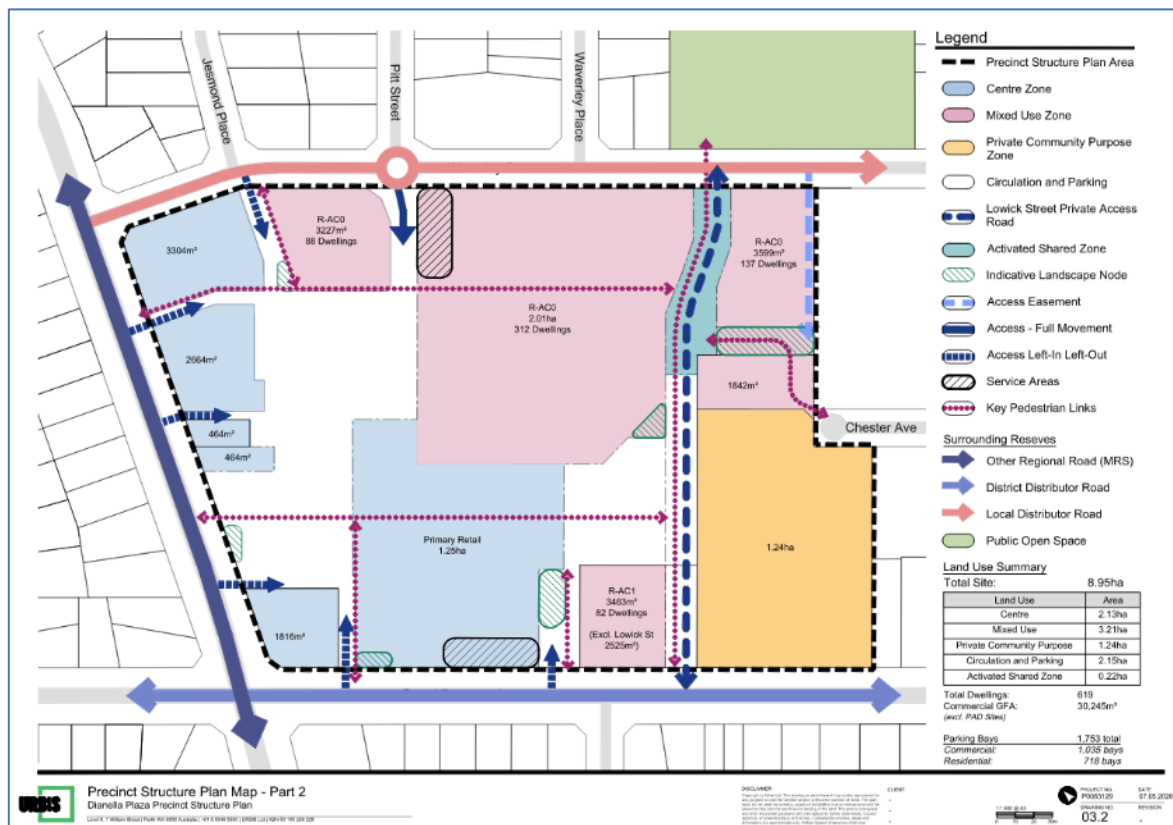
The proposed PSP consists of multiple land uses within the Site, including centre, mixed-use, private community purpose, circulation and parking, and activated shared zone. The expected yield for each land use is as below (concept plan shown in **Figure 1-3**):

- Centre 2.13ha
 - Commercial (shopping centre) GFA 30,245m²
 - Multiple PAD sites of 3,304m², 2,664m², 464m², 464m² and 1,816m²
- Mixed Use 3.21 ha
 - Residential 619 dwellings
 - Existing Stirling Libraries – Dianella

- Private Community Purpose 1.24ha
 - Existing Our Lady's Assumption School
- Circulation and Parking 1,753 bays
 - Commercial parking 1,035 bays
 - Residential parking 718 bays
 - Activated Shared Zone 0.22ha

This TIA report undertakes an analysis of the impact of the proposed PSP, specifically the impact of the combined additional generated traffic on the immediate and surrounding road network and also the car park circulation.

Figure 1-3: Proposed Development Site Layout



Source: Urbis (Concept Plan dated 07.05.2026)



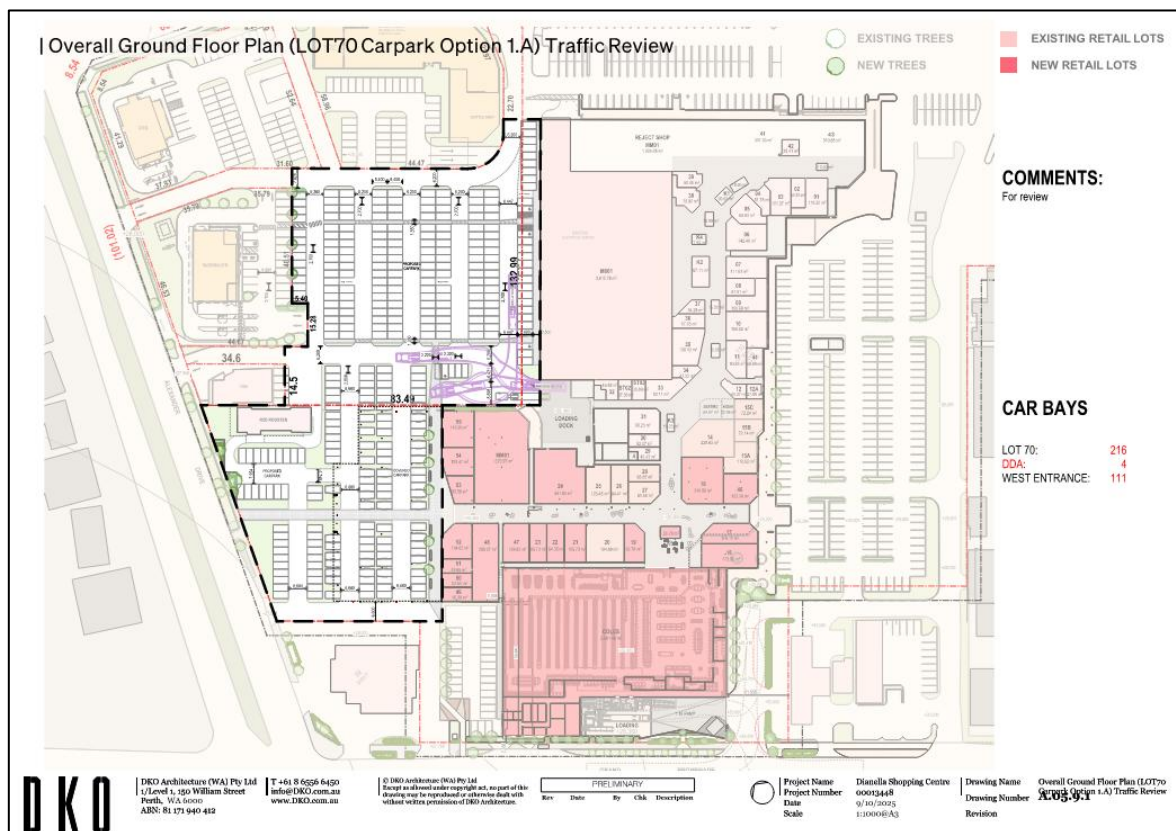
1.4 Approved Subdivision / Development Application within Site

Prior to the PSP, a subdivision application has been lodged for the Site to allow for three PAD sites within the PSP, in the north west corner of the Site on the corner of Alexander Drive and Waverley Street. The subdivision application is under assessment by WAPC, and further Development Applications (DA) are being sought for them. The subdivision is expected yield to yield the following:

- Tavern 1,200m² GFA
- Bottle Shop 200m² GFA
- Guzman Gomez Restaurant 1,220m² GFA
- McDonalds Restaurant 1,350m² GFA
- Drive Thru Coffee Shop 45m² GFA

In addition to these pad sites, a DA to relocate the Coles Store within Dianella Centre (shown in **Figure 1-4**) has been lodged and approved. The DA seeks to relocate the existing Coles Store on the western side of the shopping centre to the south, fronting Grand Promenade. The relocation results in reconfigure car park layout with additional car parking bays within the Site.

Figure 1-4: Relocation of Coles Store Within Dianella Centre



Source: DKO



1.5 Staging of Development of the PSP

The PSP is proposed to be developed in 4 stages as noted below and shown in **Figure 1-5**.

- Stage 1

This is currently being assessed and includes a new relocated Coles box and new loading dock and car park. This Stage 1 was found not to require any major upgrades to intersections etc, except for modifications to the access and egress arrangements for the service station on Grand Promenade to include full movement on Lowick Street and closure of the median gap opposite the service station

- Stage 2

This stage is likely to include development of the mixed-use development along the northern frontage of the PSP along Waverley Street. Assessment of the traffic and transport impacts of this development will be undertaken at the DA stage for this development, once yields are determined. This will inform, what transport infrastructure changes will be required to support this development. At a high level, this is likely to require an intersection upgrade of the intersection of Alexander Drive and Waverley Street.

- Stage 3

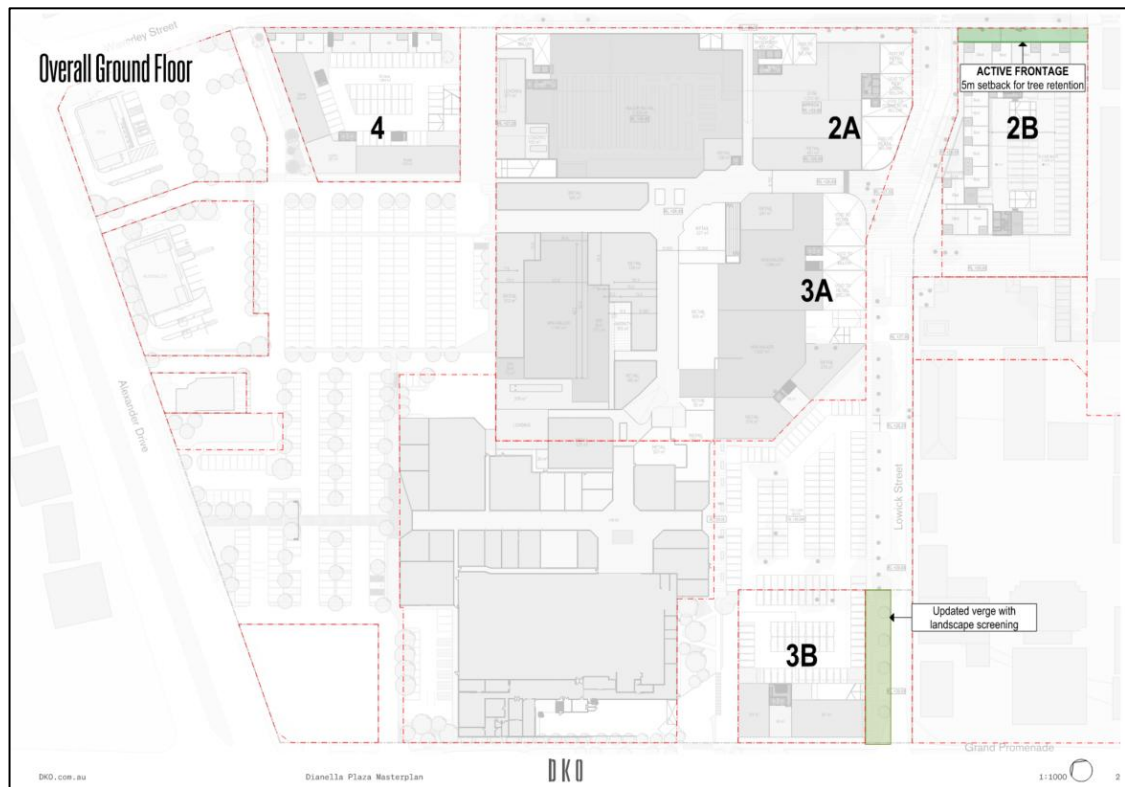
This would broadly encompass the development of the service station site on the corner of Lowick Street and Grand Promenade as well as a central mixed-use site on the western side of Lowick Street. Again, assessment of the traffic and transport impacts of this development will be undertaken at the DA stage for this development. This will inform, what transport infrastructure changes will be required to support this development.

- Stage 4

This is planned to be the development of a site on the south western corner of the Waverley Street and Pitt Street roundabout to bring the site to its full potential under the proposed PSP.



Figure 1-5: Possible Staging Plan



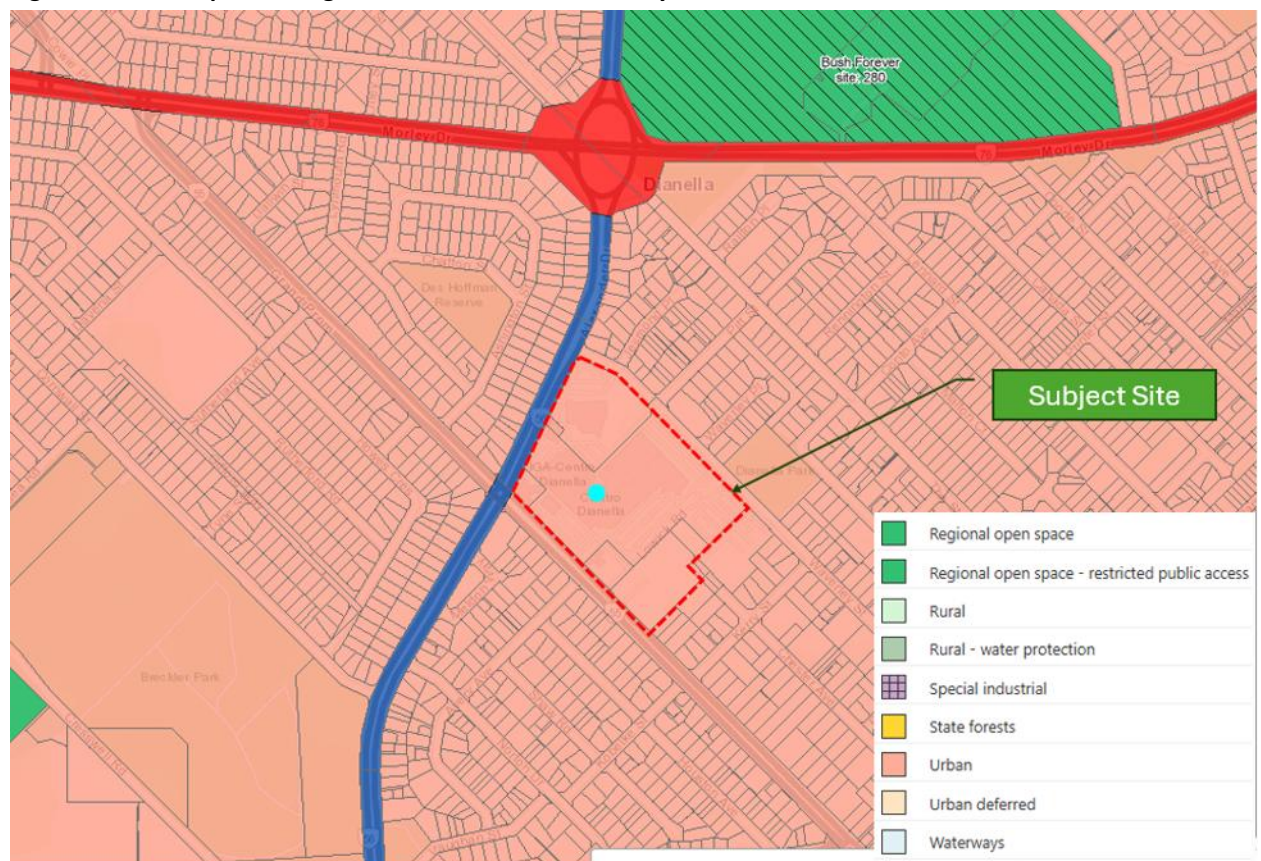
1.6 Planning Framework

1.6.1 Metropolitan Region Scheme

The Metropolitan Region Scheme (MRS) is the statutory land use planning scheme for the Perth Metropolitan Region. The principal functions are to reserve and zone land and control development. The MRS reflects the agreed strategic direction for land within the Metropolitan Region and is a catalyst for changes to planning controls at the local level and subsequent local area planning.

The PSP is zoned as a 'Urban' under the MRS, with Alexander Drive reserved as 'Other Regional Roads' and nearby Morley Drive as a 'Primary Regional Road'.

Figure 1-6: Metropolitan Region Scheme – Dianella Locality South



Source: Department of Planning, Lands and Heritage



1.6.2 Directions 2031 and Beyond

Directions 2031 and Beyond: Metropolitan Planning Beyond the Horizon (Directions 2031), is a high level spatial framework and strategic plan for the Perth and Peel regions. It provides a framework for the detailed planning and delivery of housing, infrastructure and services necessary to accommodate growth up until 2031 and beyond.

Within the hierarchy of activity centres established by Directions 2031, Dianella is identified as a 'District Centre'. These centres are described in the following terms: "District town centres generally serve the main weekly household shopping, service and community needs of the district. They are predominantly retail focused but may also include a limited mix of other uses such as office, medical and professional services, hospitality and entertainment and housing. Some also include or are associated with civic, community and recreational facilities." This is also a very good description of the land uses presently in and around the Dianella Precinct.

1.6.3 Local Planning Scheme No.3

The City of Stirling Local Planning Scheme No. 3 (LPS3) zones the majority of the Dianella PSP as 'District Centre', within which a wide variety of appropriate land uses may be considered for approval. There are however, some significant sites within the centre that have quite restricted zoning, which may limit their ability to be redeveloped if necessary for the best arrangement and type of land uses to achieve a pleasant, diverse and legible centre. These are:

- The hotel site on the corner of Alexander Drive and Waverley Street. The 'Hotel' zone limits the range of uses permissible on this land.
- Service station adjacent to Our Lady's Assumption school, on Grand Promenade. This is zoned 'Service Station', which is a restricted use. Interestingly, the previous service station site on the corner of Alexander Drive and Grand Promenade is zoned 'District Centre'.
- Dianella Library, off Chester Avenue, and the Dianella Community Centre in Kerry Street are both designated Local Reserves for 'Civic' purposes. This would limit alternative uses of the land. Our Lady's Assumption school and church are zoned as 'Private Institution'. A limited range of uses may be considered within such a zone.

The surrounding residential area is Residential R30, R20 and R25. **Figure 1-7** shows the zoning under the Local Planning Scheme. The implications of the applicable zones are the subject of further discussion in later sections of this report.

Figure 1-7: City of Stirling Local Planning Scheme No. 3 – Site Zoning



Source: City of Stirling



1.6.4 Draft Local Planning Scheme No.4

The City of Stirling Draft Local Planning Scheme No. 4 (LPS4) has been prepared to replace the existing LP3 as the primary statutory document for land within the City. LPS4 seeks to rezone the Site to 'Centre' zone to allow the development of the proposed land uses.

Figure 1-8 shows the zoning under the LSP4.

Figure 1-8: City of Stirling Local Planning Scheme No. 4 – Site Zoning



Source: City of Stirling

1.7 Specific Issues

The signal-controlled intersection of Alexander Drive / Grand Promenade and priority-controlled intersection of Alexander Drive / Waverley Street have significant number of recorded crashes in the last five years.

Mast arm signals have been installed on Alexander Drive approaches in mid-2025 to address rear-end collisions.

A detailed crash data assessment is presented in **Section 2.13**.



2 Existing Situation

2.1 Existing Site Context and Land Uses

The proposed PSP is located on Lot 70 & 170 (TAB Dianella) Alexander Drive, Lot 59, 78, 100 & 110 Grand Promenade and Lot 79 Chester Avenue Coles, Dianella. The Site is bounded by Waverley Road to the north, Grand Promenade to the south and Alexander Drive to the west, situated approximately 10km north of Perth city centre.

The existing Dianella Centre, Our Lady's Assumption School, Stirling Libraries – Dianella, several restaurants and PAD sites are located within the Site as shown in **Figure 2-1**.

Figure 2-1: Site Location



Source: Nearmap 2026



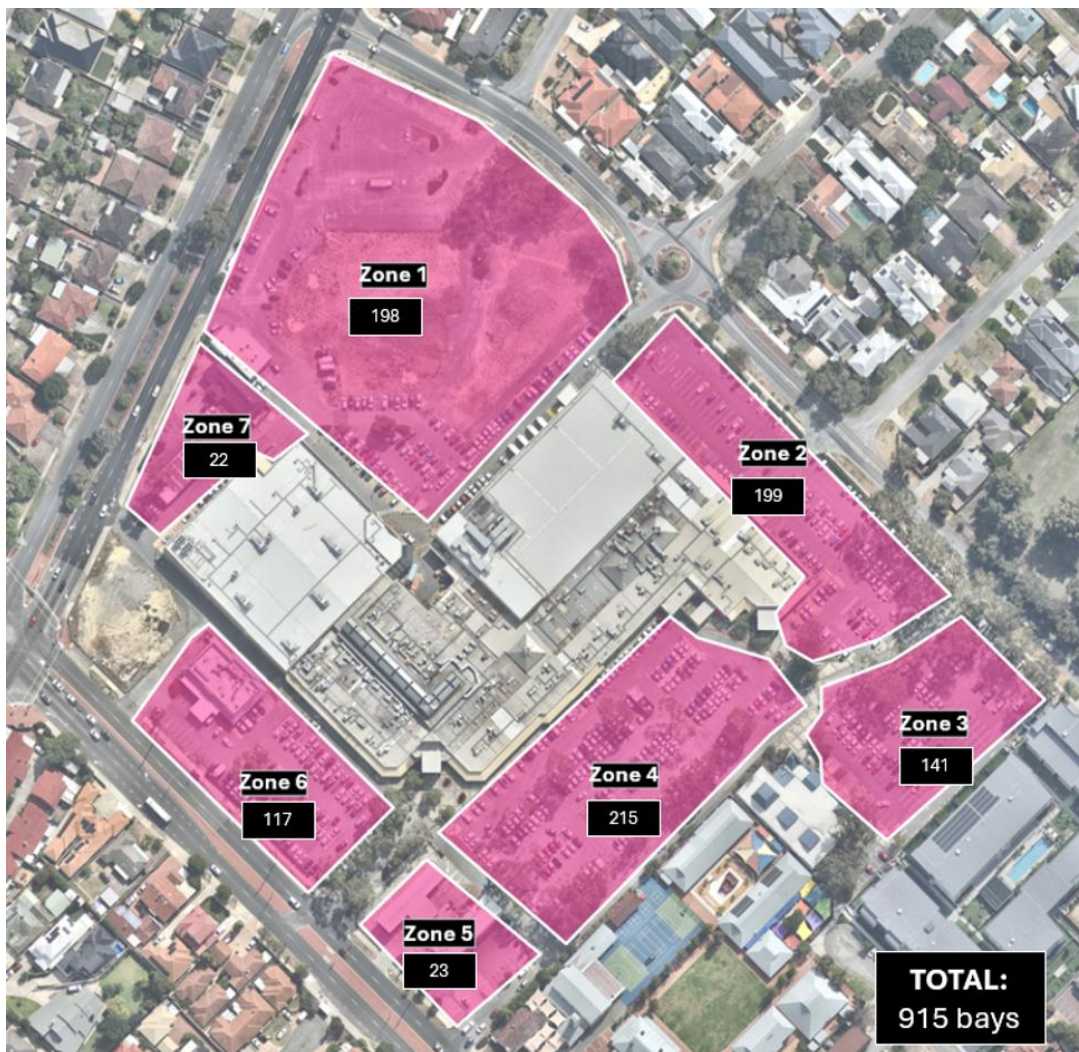
2.2 Car Parking Provision and Demand

PJA engaged *Matrix Traffic and Transport Data* (Matrix) to undertake a car park occupancy survey of the existing car park in 30-minute intervals. The occupancy survey is undertaken for the following periods:

- Thursday 23 October 2025 : 2:00 pm – 7:00 pm
- Saturday 25 October 2025 : 10:00 am – 2:00 pm

The extent of the car park survey includes the car park around Dianella Centre, pad sites and Stirling Libraries. The number of car parking bays around the site is shown in **Figure 2-2** and the analysis of car parking demands are shown in **Figure 2-3** and **Figure 2-4**.

Figure 2-2: Existing Parking Provision



Source: Google Map

Figure 2-3: Existing Car Park Occupancy Survey Results on Thursday

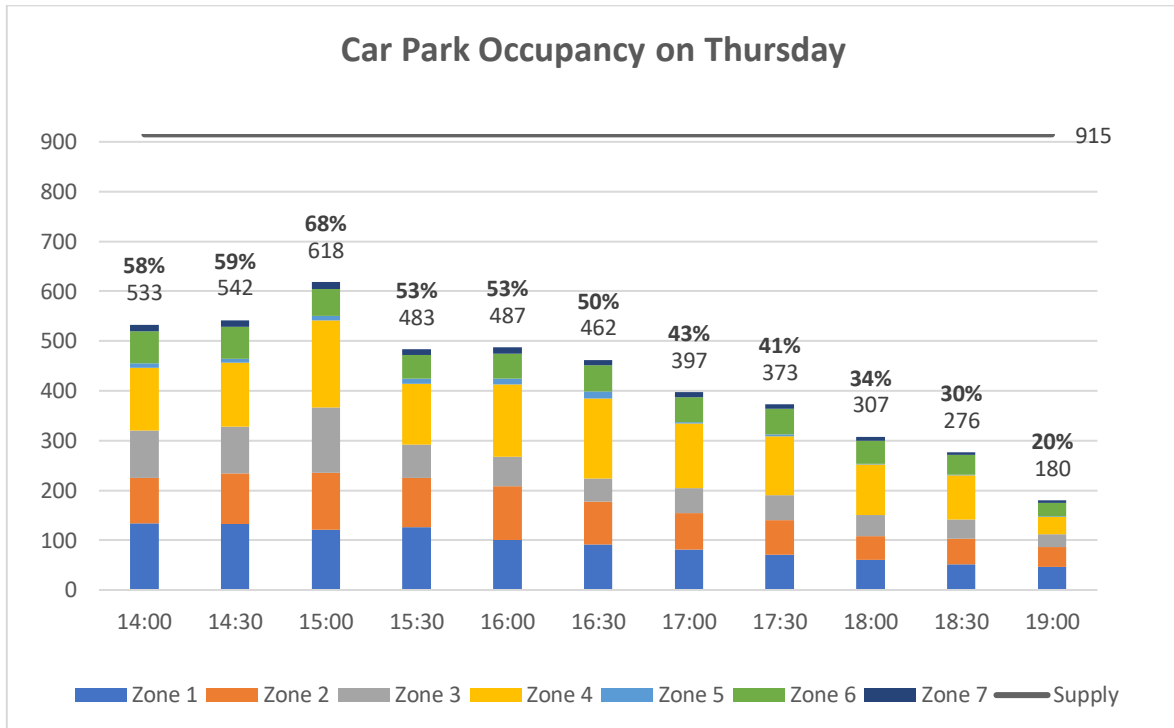
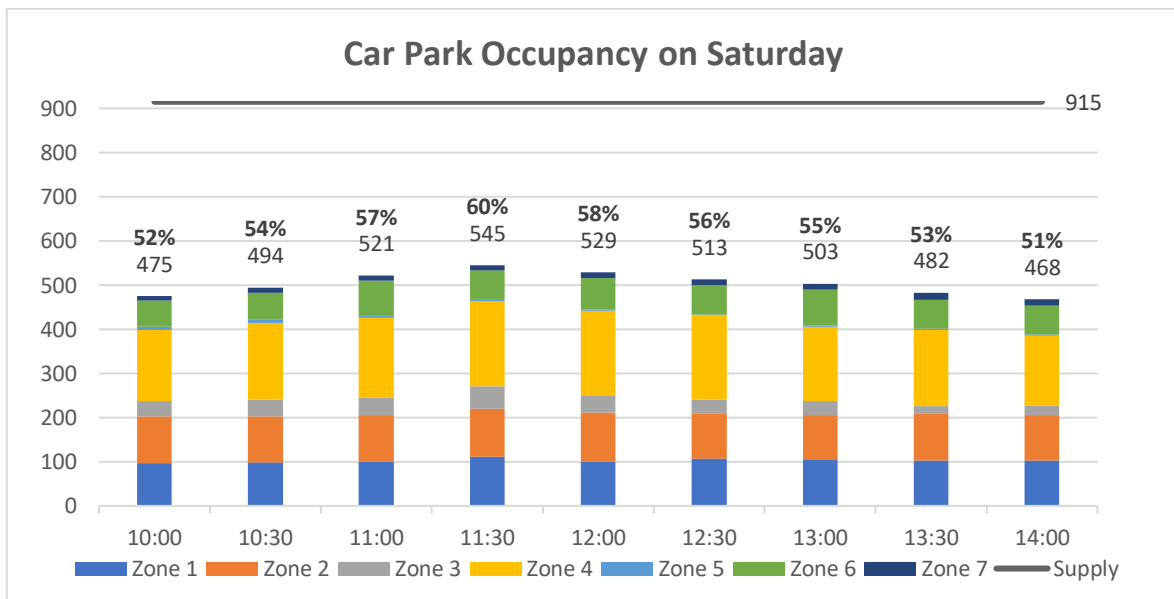


Figure 2-4: Existing Car Park Occupancy Survey Results on Saturday



The peak occupancy was observed at 3:00pm on Thursday and 11:30am on Saturday, where 68% and 60% respectively of the total supply was occupied. This indicates that there is a surplus of 293/370 bays across the Dianella PSP at the time of peak parking demand.



2.3 Bicycle Parking Provision

There is currently a rack of four and a rack of eight for bicycle parking around the entrances into the Dianella Centre for a total of 12 spaces for bicycles.

2.4 Current Access Arrangements

The Site is currently accessible via Alexander Drive, Waverley Street and Grand Promenade. The existing access arrangements are shown in **Figure 2-5**.

Figure 2-5: Current Dianella Centre Access Arrangements



Base map source: Nearmap



2.5 Traffic Generation

Based on the video survey undertaken for the Dianella PSP, the Daniella PSP is generating approximately **1,213 vehicle trips in the Thursday PM peak (4:30 pm – 5:30pm)** and **1,400 vehicle trips in the Saturday mid-day peak (11:45 am – 12:45 pm)**.

2.6 Surrounding Road Network

Alexander Drive

In terms of the Metropolitan Road Hierarchy, Alexander Drive is classed as a District Distributor (A) road under the functional road hierarchy and an Other Regional Road (ORR or Blue Road) under the MRS. It is a four-lane divided road with two extra turning lanes at the intersection with Grand Promenade.

Left in, left out entry to the centre is available on the north-south carriageway of Alexander Drive. A median prevents right turns from the Centre.

Footpaths are provided on both sides of Alexander Drive with an informal mid-block pedestrian crossing point situated between Grand Promenade and Waverley Street at the location of the existing bus stops. Signal controlled crossings are available for pedestrian at the traffic signal intersection with Grand Promenade.

Grand Promenade

Grand Promenade is also classed as a District Distributor (A) road but it is not an ORR. It is a four-lane divided road with three median breaks providing access into the Centre for west bound vehicles turning right.

Footpaths are provided on both sides of Grand Promenade with an informal mid-block pedestrian crossing point situated between Alexander Drive and Kerry Street. Signal controlled crossings are available for pedestrian at the traffic signal intersection with Alexander Drive.

Waverley Street

Waverley Street is classified as a Local Distributor road hierarchy. Waverley Street is a two-lane undivided road with five access points serving the Centre. One of the access points forms a four-way roundabout with Pitt Street and Waverley Street.



Kerry Street

Kerry Street is classed an Access Road and is also a two-lane undivided road on the south-eastern boundary of the precinct which links Grand Promenade and Waverley Street. Kerry Street forms a t-intersection with Waverley Street and there is stop sign access control and a ban of right turn exits from Kerry Street into Grand Promenade.

Kerry Street also intersects Chester Avenue, which ends as a cul-de-sac at the Our Lady's Assumption primary school west of Kerry Street.

2.7 Current Traffic Management on Frontage Streets

The traffic management on frontage streets is summarised in **Figure 2-6**. Alexander Drive and Grand Promenade are dual carriageway with central medians while Waverley Street is an undivided single carriageway. Footpath or shared path are presented on both sides of these streets.

Figure 2-6: Current Traffic Management Fronting Site



Base map source: Nearmap

2.8 Existing Traffic Volumes

2.8.1 MRWA Traffic Map – Alexander Drive and Grand Promenade

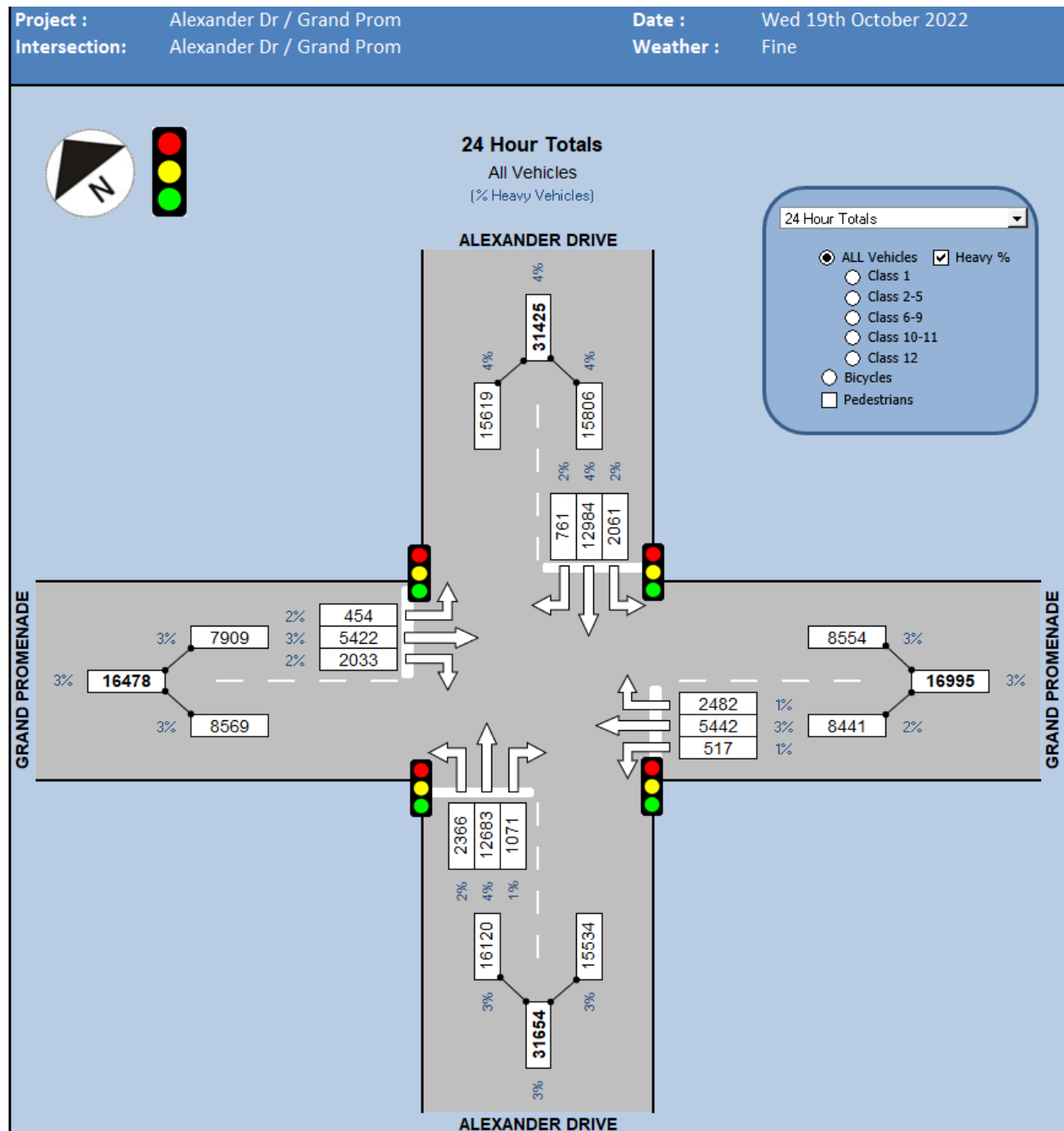
Alexander Drive intersects Grand Promenade as a signal controlled four-way intersection. As per video survey (shown in **Figure 2-7**) and SCATS Data for the intersection dated 19 October 2022 and 22 May 2026 on Main Roads WA Trafficmap respectively, Alexander Drive is recorded as carrying 31,400 vehicles per day in 2022 (Monday to Friday average), with an average of 4% heavy vehicle composition, and 31,900 vehicles per day in 2026.

Grand Promenade is recorded as carrying 17,000 vehicles per day in 2022 (Monday to Friday average) and 16,200 vehicles per day in 2026, to the east of Alexander Drive and 16,500 vehicles per day to the west, with an average of 3% heavy vehicle composition.

The AM and PM peak hour periods at this intersection are 08:00 – 09:00 and 16:30 to 17:30 during the week. Alexander Drive carries approximately 2,500 vehicles per hour two-way in the AM peak and some 2,700 vehicles per day in the PM peak.



Figure 2-7: 2022 Traffic Volumes – Intersection of Alexander Drive / Grand Promenade



2.8.2 Surrounding Road Network

Matrix has also undertaken video surveys of the surrounding intersections to determine the existing volumes. The video survey is undertaken for the following periods:

- Thursday, 30 January 2025 (4:30pm – 5:30pm, **Figure 2-8**) & Saturday, 1 February 2025 (11:45am – 12:45pm, **Figure 2-9**)
 - Alexander Drive / Waverley Road
 - Waverley Street / Pitt Street / Site Access
 - Waverley Street / Jesmond Place (Access 1)
 - Alexander Drive / Access 2
 - Alexander Drive / Access 3
 - Alexander Drive / Access 4
- Thursday, 23 October 2025 (4:30pm – 5:30pm, **Figure 2-10**) & Saturday, 25 October 2025 (11:45am – 12:45pm, **Figure 2-11**)
 - Alexander Drive / Grand Promenade
 - Grand Promenade / Access 5
 - Grand Promenade / Access 6
 - Grand Promenade / Access 7
 - Grand Promenade / Access 8
 - Waverley Street / Access 9
 - Waverley Street / Access 10



Figure 2-8: Thursday, 30 January 2025 Existing Volumes

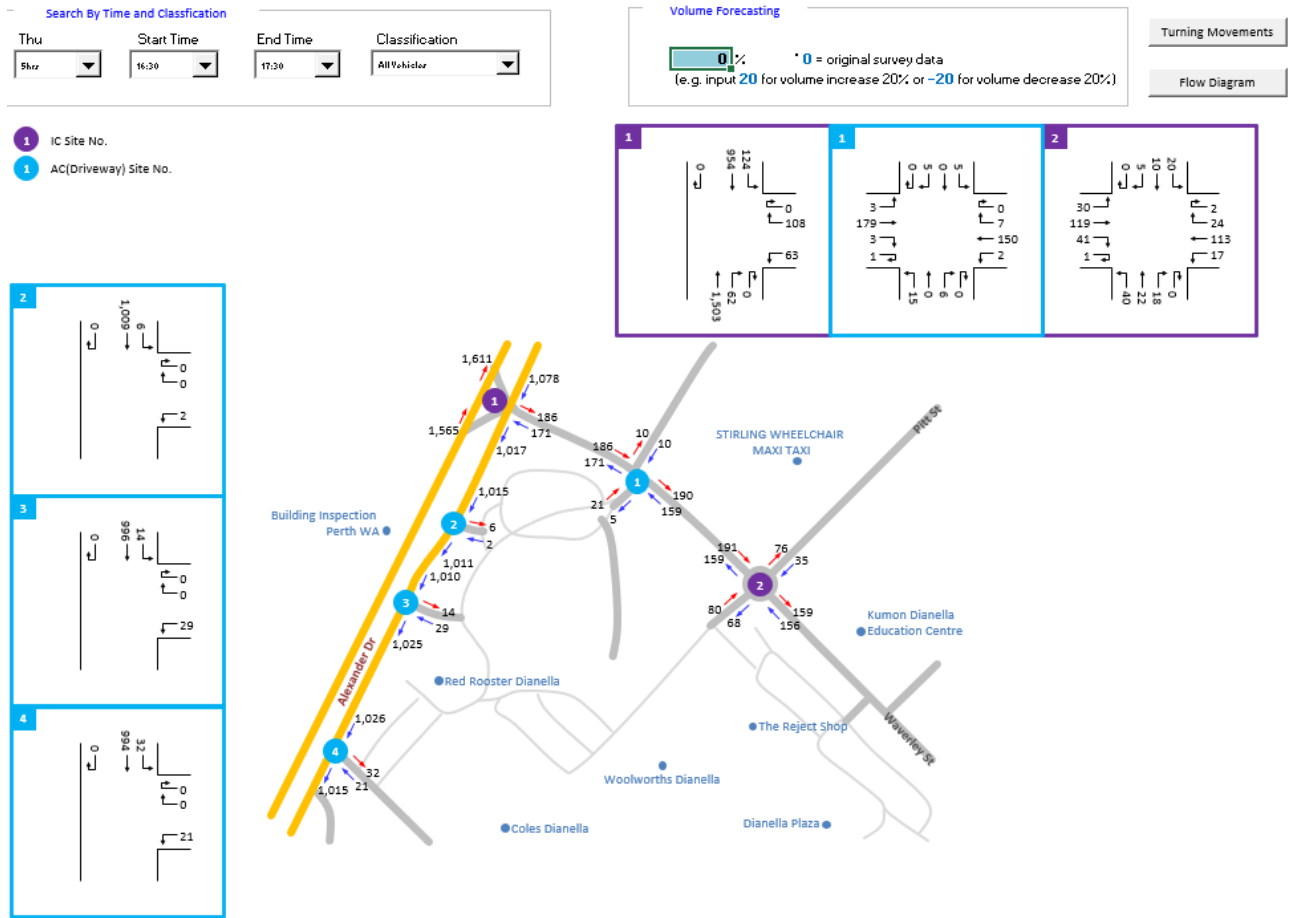


Figure 2-9: Saturday, 1 February 2025 Existing Volumes

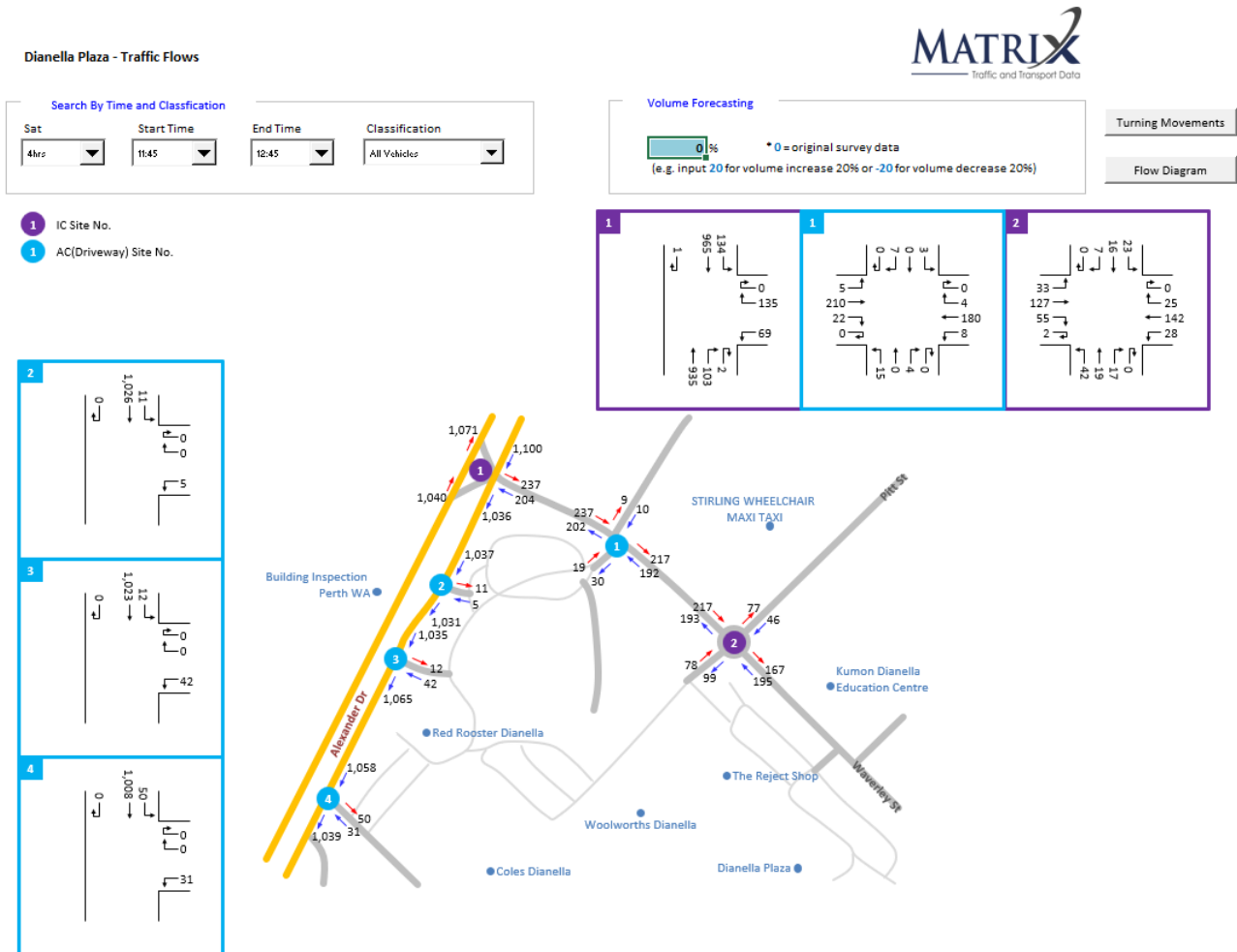




Figure 2-10: Thursday, 23 October 2025 Existing Volumes

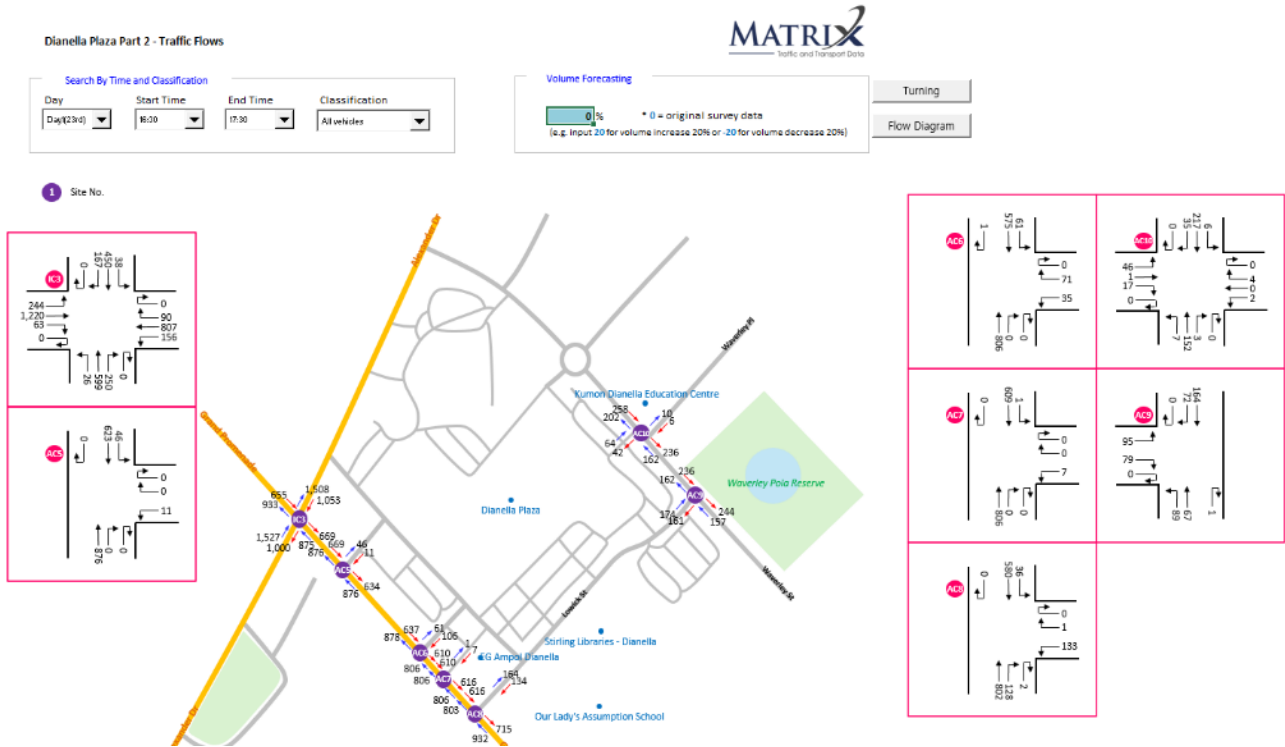
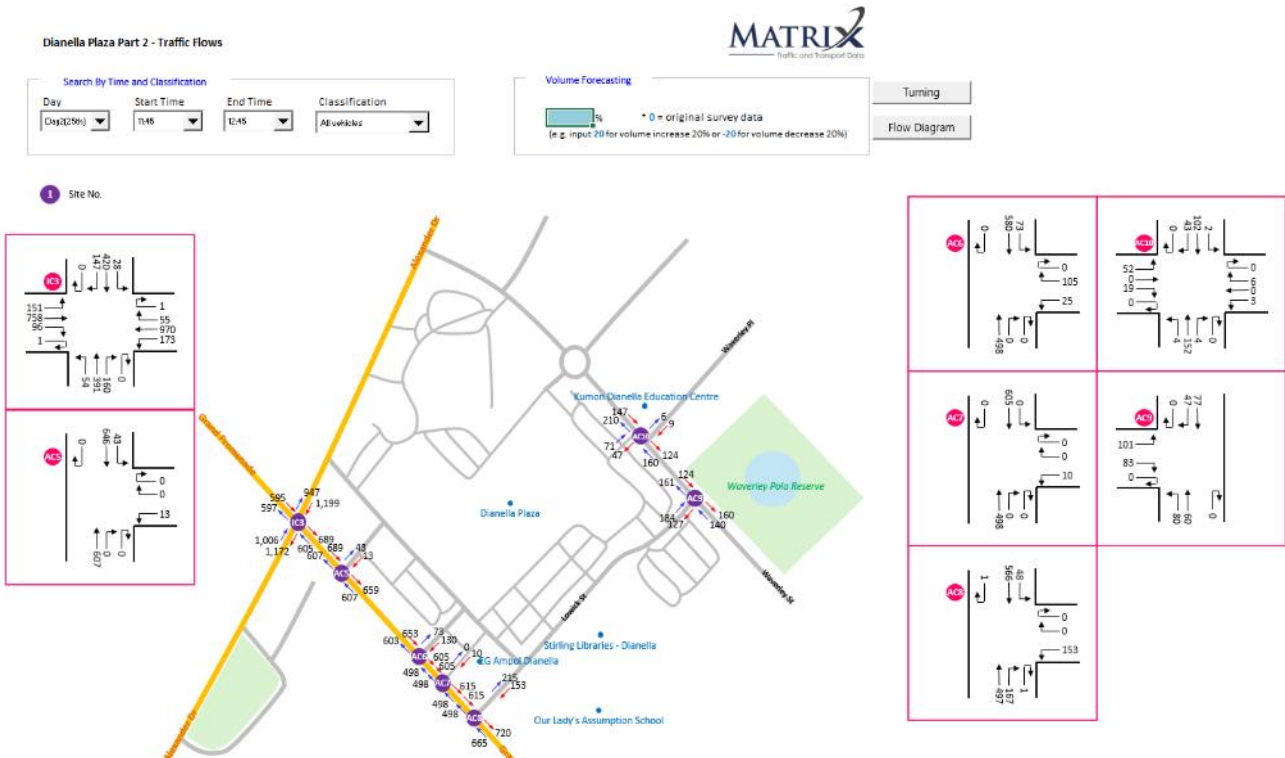


Figure 2-11: Saturday, 25 October 2025 Existing Volumes



2.9 Existing External Road Network - Traffic Modelling

SIDRA Intersection modelling of each of the following existing intersections/accesses has been undertaken to establish a baseline of the operation of the existing road network and the key intersections surrounding the Dianella PSP site.

The results of the operation and performance of each intersection is summarised in the following sections.

Figure 2-12: 2025 Thursday PM Peak Existing Condition (Degree of Saturation/DOS and Level of Service/LOS)

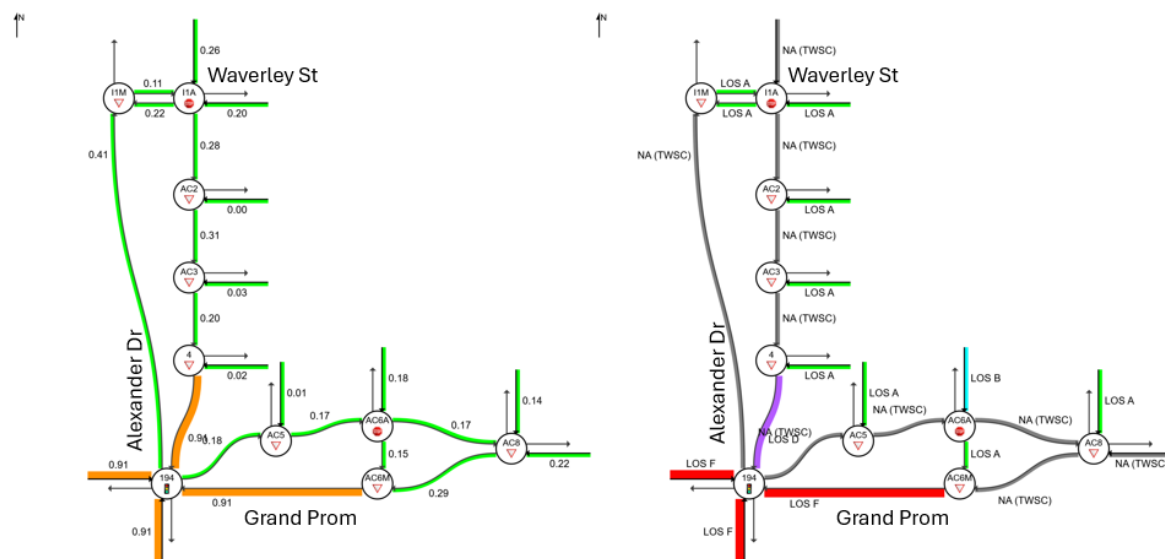
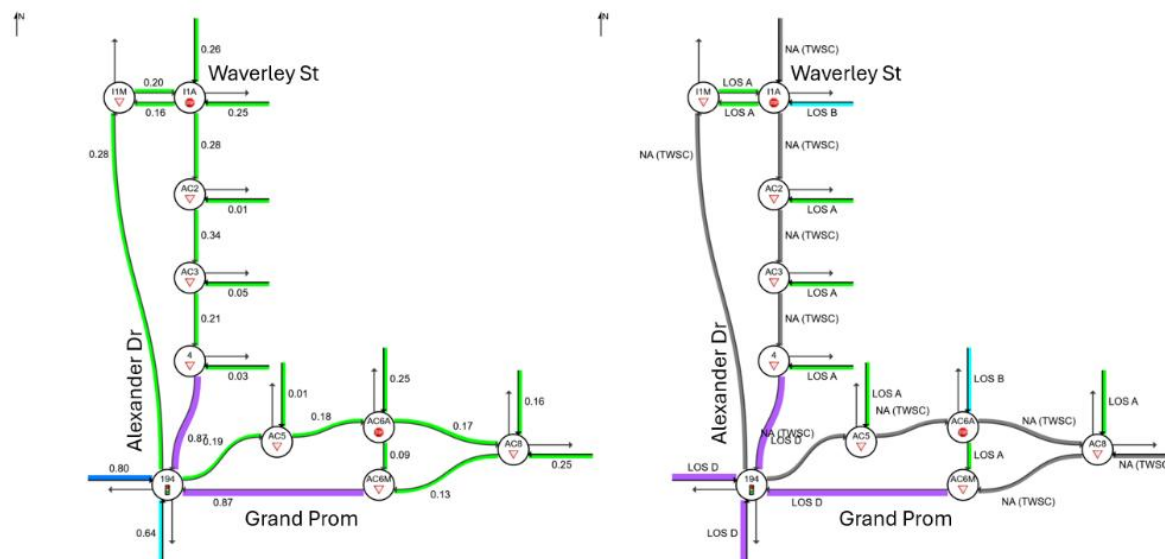


Figure 2-13: 2025 Saturday Mid-Day Peak Existing Condition (Degree of Saturation/DOS and Level of Service/LOS)





As shown in the figures above, the existing road network is currently operating within capacity in both Thursday and Saturday peak periods, this based on DoS of the approaches to intersections. Delays of the intersection of Grand Promenade and Alexander Drive result in a LoS of F for these approaches under current peak flows.

During Thursday PM peak, the intersection of Alexander Drive and Grand Promenade is operating close to its capacity. All the access points are operating with Level of Service B or better (≤ 15 s delay), with the exception of signalised intersection of Alexander Drive / Grand Promenade as noted above. The east, south and west approaches of the signalised intersection are operating at LOS F (delay > 80 s).

In the Saturday peak, all access points are operating satisfactorily with acceptable LOS D or better (delay < 55 s).

2.10 Existing Active Travel Network Surrounding Site

The cycling environment around Dianella PSP is depicted on the Perth Bicycle Network (PBN) Maps published by the Department of Planning (**Figure 2-16**). A high-level assessment has been made of the roads' suitability for cycling on the basis of a good, medium or poor road. Both Alexander Drive and Grand Promenade are not promoted as 'Good Road Riding Environments', with no specific on-road infrastructure present on the multi-lane roads

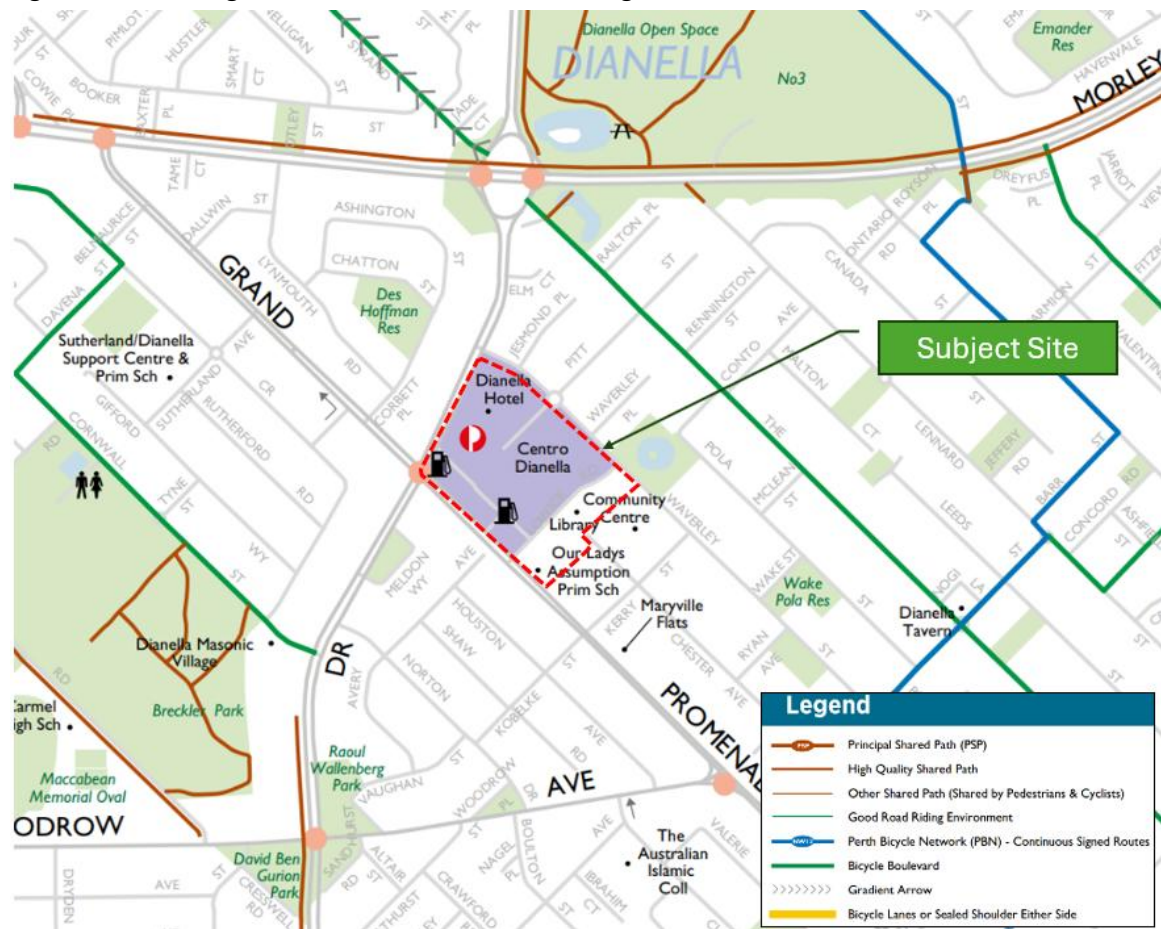
To the north-west and south-east The Strand is allocated as a 'Good Road Riding Environment' with on-road cycle lanes (unprotected – white line separation) in both directions. A shared path along the northern side of Morley Drive provides access from the east and west in a strategic sense.

The local streets such as Pitt Street and Rennington Street provide an alternative route to/from the Morley Drive shared path and whilst they do not provide any further specific cycle infrastructure, the low-traffic volume nature of these residential access streets would provide confident cyclists with a relatively low level of exposure to vehicular traffic and less confident cyclists could legally use the available footpaths surrounding the site.

PBN route NW7 connects to Dianella Open Space, which provides links to the Centre from the north-west/north-east via a shared path connecting to The Strand. From the south-east and southwest,

PBN routes NE4 and NE6 are in close proximity but do not coherently link to the Centre. Similarly a shared path provides access northward along Alexander Drive but this terminates at Cornwall Street before making any connection to the Centre. Generally there is a lack of direct connections to the centre from regional cycle routes.

Figure 2-14: Existing Active Travel Network Surrounding Site



Source: Department of Transport and Major Infrastructure

2.11 Perth and Peel Long-Term Cycle Network

The Department of Transport and Major Infrastructure's (DTMI) Long Term Cycle Network (LTCN) is a long-term vision for the metropolitan bicycle network, designating routes by function according to the WA Cycling Network Hierarchy.

Within the vicinity of development site, the following future cycle routes are identified within the LTCN as either Local Routes, Secondary Routes or Primary Routes.

- Alexander Drive – Primary Route
- Brook Street / Morley Drive – Local Route
- Howe Crescent / Corbett Place / Grand Promenade – Secondary Route (Connecting to Alexander Drive)

The proposed development is well located to take advantage of the existing and future proposed cycling and walking infrastructure as part of the LTCN aspirations.

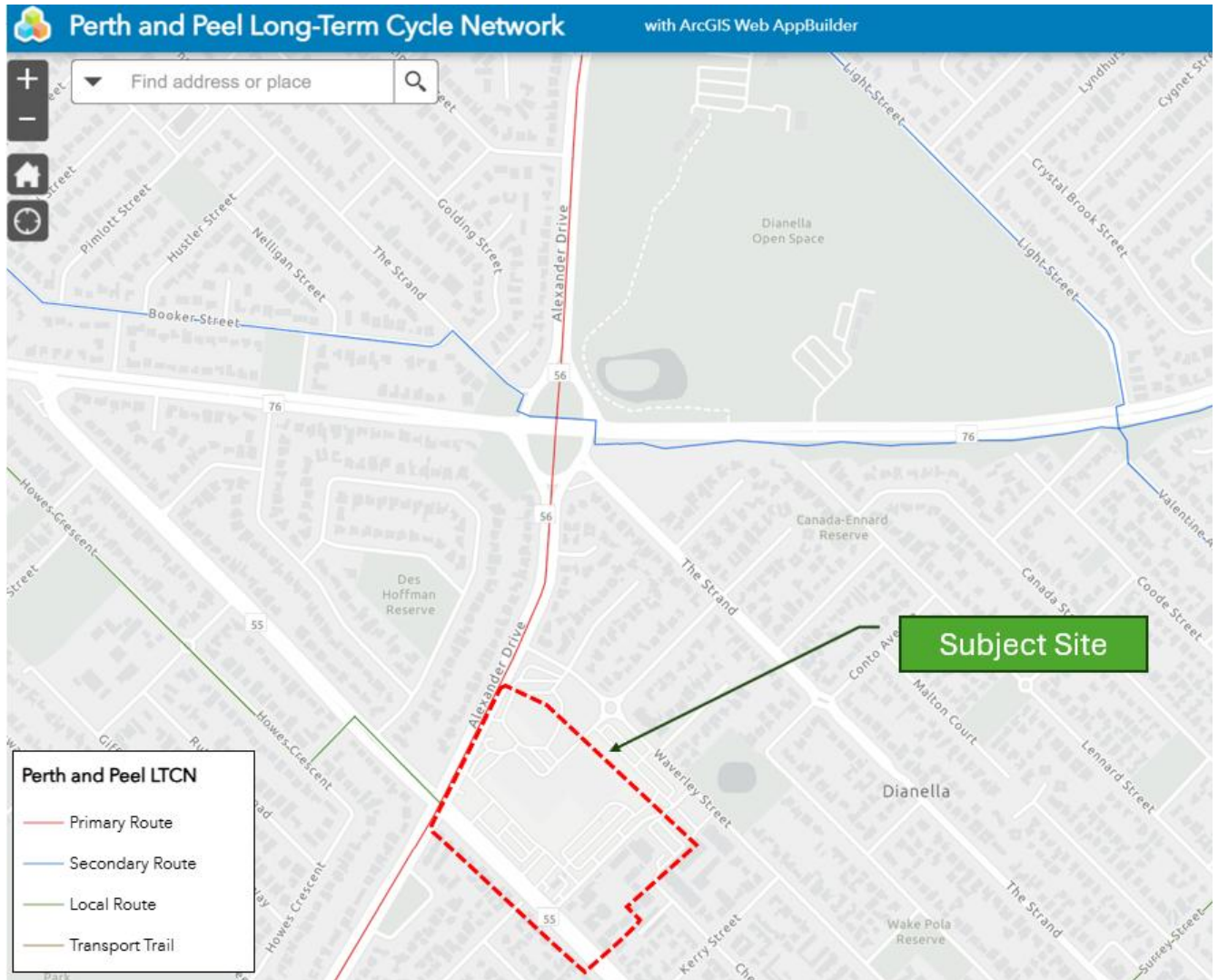


The Western Australian Cycling Network Hierarchy designates routes by their function, rather than built form. Function considers the type of activities that take place along a route, and the level of demand (existing and potential). The built form of a route is based on the characteristics of the environment, including space availability, topography, traffic conditions (speed, volumes), primary users, and so on. When considering appropriate built forms for primary, secondary and local routes, an all ages and abilities design philosophy should be adopted.

Figure 2-15: Western Australian Cycling Network Hierarchy

	1. PRIMARY ROUTE	2. SECONDARY ROUTE	3. LOCAL ROUTE
Function	Primary routes are high demand corridors that connect major destinations of regional importance. They form the spine of the cycle network and are often located adjacent to major roads, rail corridors, rivers and ocean foreshores. Primary routes are vital to all sorts of bike riding, including medium or long-distance commuting / utility, recreational, training and tourism trips.	Secondary routes have a moderate level of demand, providing connectivity between primary routes and major activity centres such as shopping precincts, industrial areas or major health, education, sporting and civic facilities. Secondary routes support a large proportion of commuting and utility type trips, but are used by all types of bike riders, including children and novice riders.	Local routes experience a lower level of demand than primary and secondary routes, but provide critical access to higher order routes, local amenities and recreational spaces. Predominantly located in local residential areas, local routes often support the start or end of each trip, and as such need to cater for the needs of users of all ages and abilities.
Design Philosophy	An <u>all ages and abilities</u> design philosophy is about creating places and facilities that are safe, comfortable and convenient for as many people as possible. By planning for and designing infrastructure that caters for the youngest and most vulnerable users, we create a walking and bike riding network that everyone can use. At the heart of this approach is fairness and enabling all people to use the network regardless of age, physical ability or the wheels they use.		
Form	All routes can take a number of different forms and are designed to suit the environment in which they are located. These forms include: • Bicycle only, shared and/or separated paths; • Protected bicycle lanes (uni or bi-directional, depending on the environment); and • Safe active streets Principal Shared Paths (PSPs) are often built along primary routes. A PSP is a high quality shared path built to MRWA PSP standard which generally means the path will be 4m wide, have adequate lighting and be grade separated at intersections (where possible). In some locations, quiet residential streets incorporating signage and wayfinding may be appropriate for local routes.		

Figure 2-16: Department of Transport's Long Term Cycle Network, Surrounding the Site





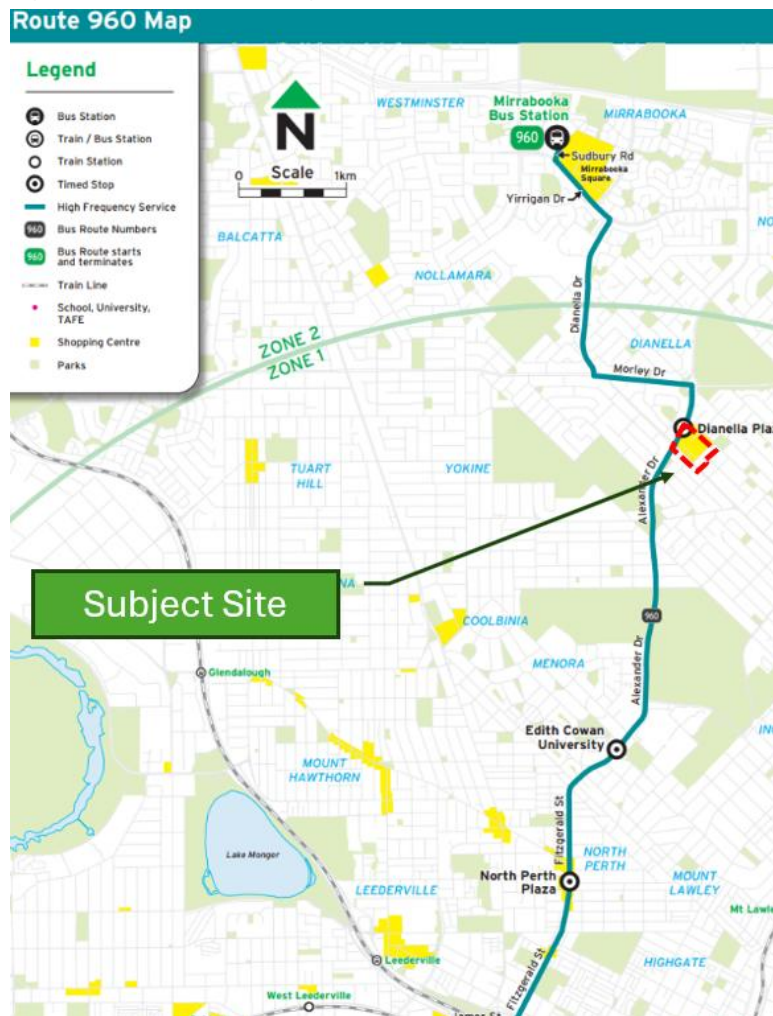
2.12 Existing Public Transport Provision

The following bus service routes pass by the site on either Alexander Drive and/or Grand Promenade stopping at the existing bus stops on each road respectively:

Bus Services Passing Dianella PSP on Alexandr Drive:

- **960** - Mirrabooka Bus Station - Curtin University Bus Stn via Alexander Dr
- **360** - Perth Busport - Alexander Heights via Alexander Dr, Illawarra Cr North & The Avenue
- **20** - Galleria Bus Station - Edith Cowan University Mt Lawley via Alexander Dr

Figure 2-17: Bus Route Map – Service 960



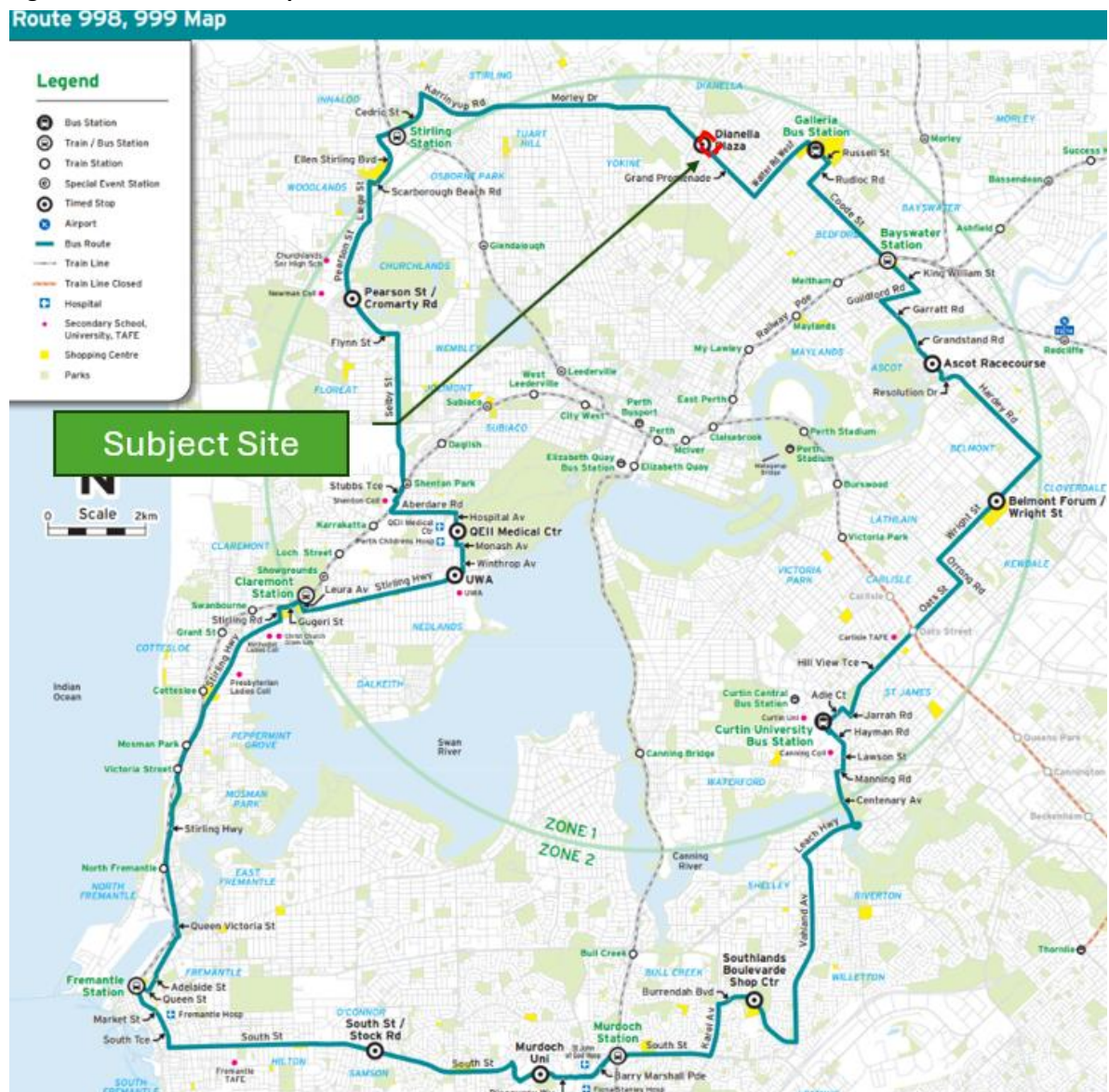
Bus Services Passing Dianella PSP on Grand Promenade:

- 67 - Perth - Mirrabooka Bus Stn via Beaufort St & Grand Promenade
- 998 - CircleRoute – Clockwise
- 998 - CircleRoute – Counter-Clockwise

The Dianella PSP is serviced by an excellent level of bus transport options, particularly the express services 960 and 998 which provide a frequency of bus every 10 to 15 minutes throughout the day Monday to Friday and up to half hourly intervals on Saturdays.

An extract of the 960 and 998 bus routes is shown on **Figure 2-21** and **Figure 2-22**.

Figure 2-18: Bus Route Map – Service 998





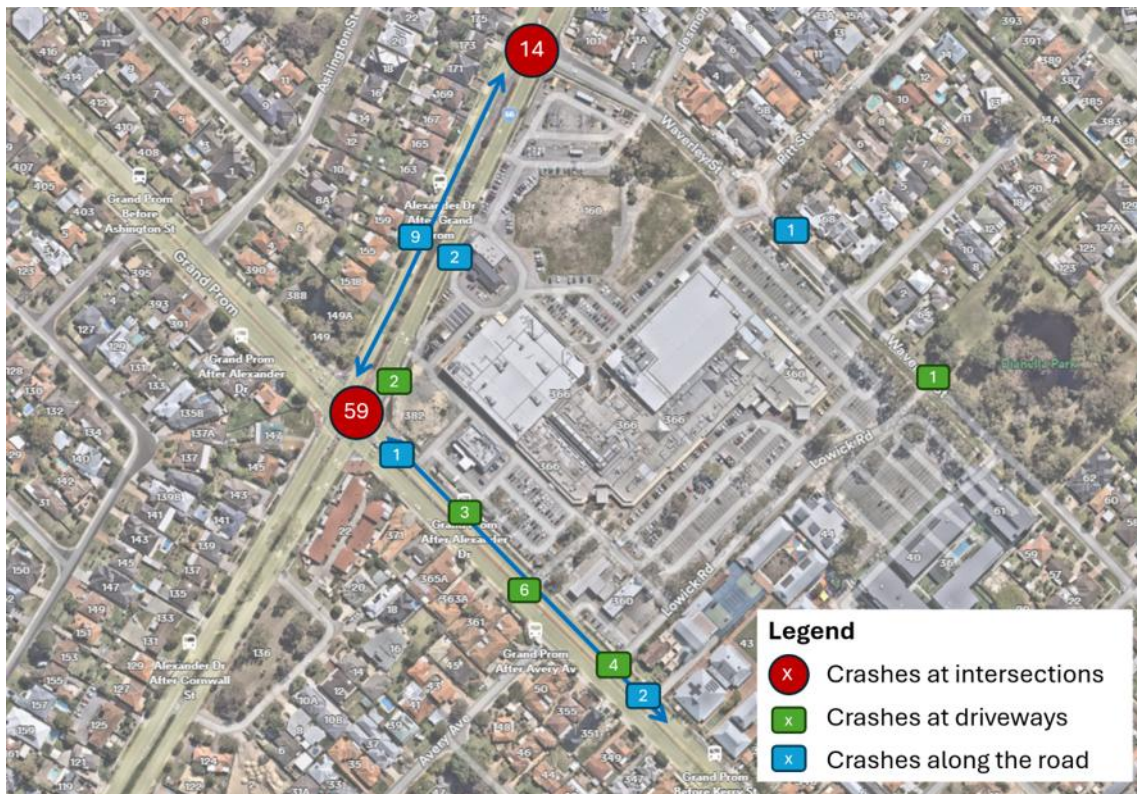
2.13 Existing Crash Data Assessment

A search of the Main Roads WA Reporting Centre for crash data surrounding the site was undertaken. This search covered all recorded traffic accidents for the most recently available five-year reporting period between 1 January 2020 and 31 December 2024 for the following roads surrounding the site:

- Alexander Drive
- Grand Promenade
- Waverley Road
- All site access driveways

The summary of the recorded crash data for the surrounding is shown in **Figure 2-19**.

Figure 2-19: Historic 5-year Crash Data Extract Surrounding Site



Source: Nearmap & Main Roads WA Crash Map

Alexander Drive / Grand Promenade Signal Controlled Intersection

- 59 crashes in total, comprising:
 - 2 Hospitalisation
 - 20 Medical Treatment Required
 - 22 PDO Major
 - 15 PDO Minor

The hospitalisation involved right-turn-thru movements which suggest running a red light. 70% of the Medical crashes involved rear-end collisions. 45% of the PDO major crashes involved rear-end, with right-turn-thru and right-angle crashes making up most of the remainder of the PDO major crashes. 87% of the PDO minor crashes involved rear-end, with side-swipes making up the remainder of PDO minor crashes.

There appears to be an existing trend of rear-end crashes occurring at this intersection resulting in a range of severity consequences.

Alexander Drive / Waverley Street Priority Controlled Intersection

- 17 crashes in total, comprising:
 - 1 Hospitalisation
 - 4 Medical Treatment Required
 - 6 PDO Major
 - 3 PDO Minor

The hospitalisation and medical crashes involved right-turn-thru and right-angle crashes. 8 out of the 9 PDO crashes involved right-angle, with rear-end making up the remaining of the PDO crashes. Of the right angle crashes 8 involved vehicles turning from the median into the northbound traffic lanes of Alexander Drive.

Waverley Street / Access 8 (Lowick Street) Priority Controlled Intersection

- 1 crash only, PDO Minor

While the crash happened at the intersection, the crash actually involved rear-end from the Site.



Alexander Drive between Grand Promenade and Waverley Road:

- 2 crashes in total at driveways, involved 2 PDO Major only
- 11 crashes in total along Alexander Drive, comprising:
 - 1 Hospitalisation
 - 5 Medical Treatment Required
 - 4 PDO Major
 - 1 PDO Minor

Of these crashes, the hospitalisation crash involved rear-end crash due to driver's health condition. Four of the Medical crashes involved side-swipe same direction incident while the other one involved a pedestrian on scooter being hit by a car while crossing the road. The other PDO crashes involved side-swipes from the same direction, right angle and rear-end crash type.

Grand Promenade between Alexander Drive and Eastern Site Access

- 13 crashes in total at driveways, comprising:
 - 1 Hospitalisations
 - 2 Medical Treatment Required
 - 6 PDO Major
 - 4 PDO Minor

All the crashes involved right-angle crash.

- 3 crashes in total along Grand Promenade, comprising:
 - 1 Hospitalisations
 - 1 PDO Major
 - 1 PDO Minor

The hospitalisation crash involved pedestrian being hit on Grand Promenade. The medical crash involved rear-end into a vehicle that stopped at the middle of the road to make an illegal u-turn. The PDO crashes involved rear-end and sideswipe from the same direction.

Waverley Road between Alexander Drive and Eastern Site Access

- 1 crash in total, comprising:
 - 1 PDO Major

The potential impact of the proposed development of the site at the Dianella PSP on the existing crash rates is discussed further in this report at **Section 8.1**.



3 Changes to Internal Transport Network

3.1 Vehicular Access Arrangements

The PSP proposes to retain all the existing access intersections, but some of these will be repurposed for different uses. These are discussed in **Section 3.1**.

Service vehicle access to the relocated Coles loading area is primarily expected to be via the existing access to the west of the EG Ampol along Grand Promenade. Access to the existing loading area for Woolworths will remain via the roundabout at Waverley Street / Pitt Street. This access is currently used by 19m semi-trailers and the swept paths of these vehicles able to use the wide circulatory roadway and the roundabout's annulus to turn right after approaching from Alexander Drive.

Swept paths have been checked and confirmed that semi-trailers up to 19m can access the loading bays. The swept paths can be found in **Appendix B**. This access point from Grand Promenade for the proposed Coles loading dock is currently two-way for general traffic but it will revert to an entry and exit from the proposed Coles loading dock. Access to the service station will be gained via Lowick Street and exit via this same street or via the current service station crossover direct onto Grand Promenade.

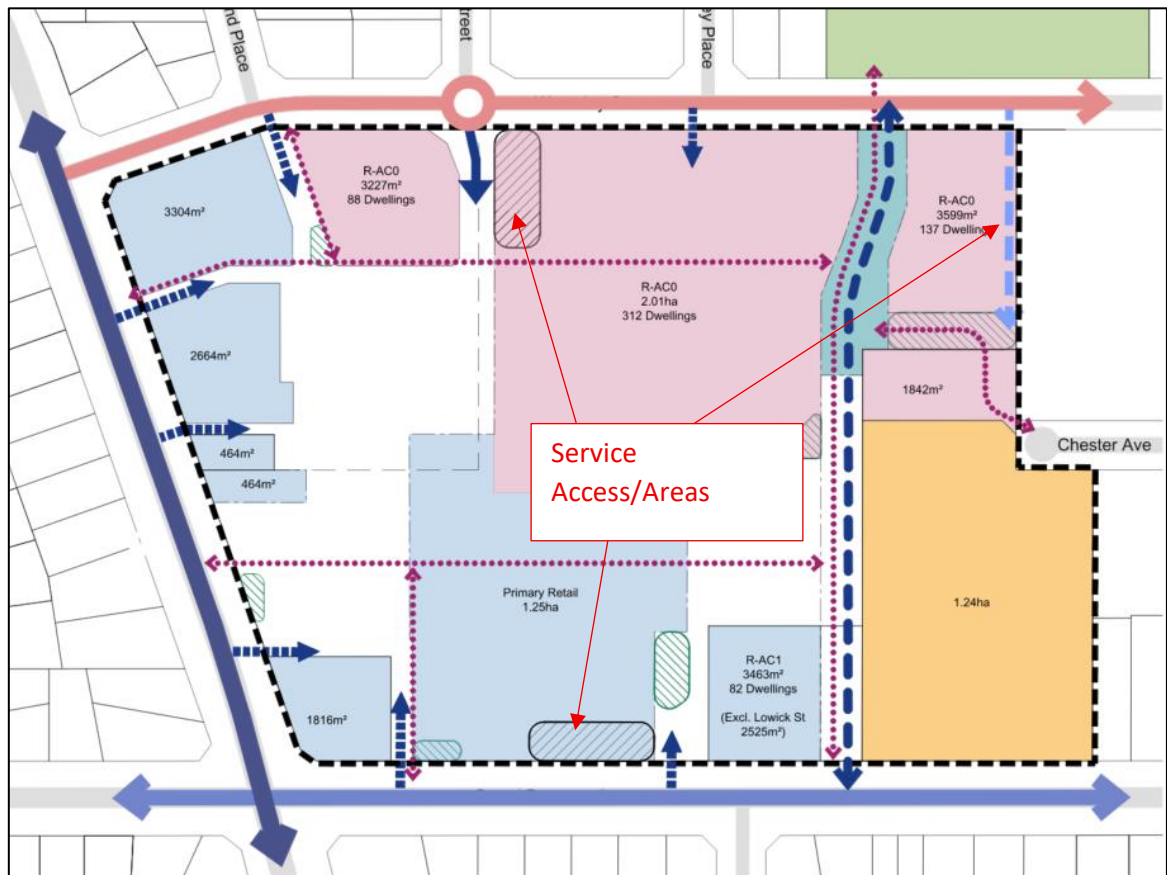
Access to a proposed loading dock area south of Waverley Street opposite the Pitt Street access roundabout is also proposed to be provided. This will allow semi-trailer sized trucks that may currently access the current loading dock area to reverse into this proposed loading dock area. Swept paths of this movement is also shown in **Appendix B**. These vehicles would then exit onto Alexander Drive as they currently do along the north side of the current TAB site.

Servicing of the mixed-use development along Lowick Street will be provided either through use of dedicated short term/loading bays near these sites (not within the Activated Shared Zone) or via the Access Easement along the eastern boundary of the PSP area, accessed from Waverley Street.

Refer to **Figure 3-1**.



Figure 3-1: Service Access/Areas



3.2 Parking Provision

As shown in **Figure 2-2**, the current parking provision across the Dianella Centre PSP area has a total of 915 car bays. The redevelopment of the Dianella Centre in line with the PSP will modify the existing car park layout throughout the centre.

With a proposed modification of the commercial car park layout and the addition of residential car bays, these will bring the total parking provision to approximately 1,753 consisting of 1,035 bays for commercial use and 718 bays for private residential use.

The parking required for the various land uses within the City's jurisdiction are outlined in the City's LPS3, Parking and Access Policy 6.7. This is discussed in more detail later in this report.

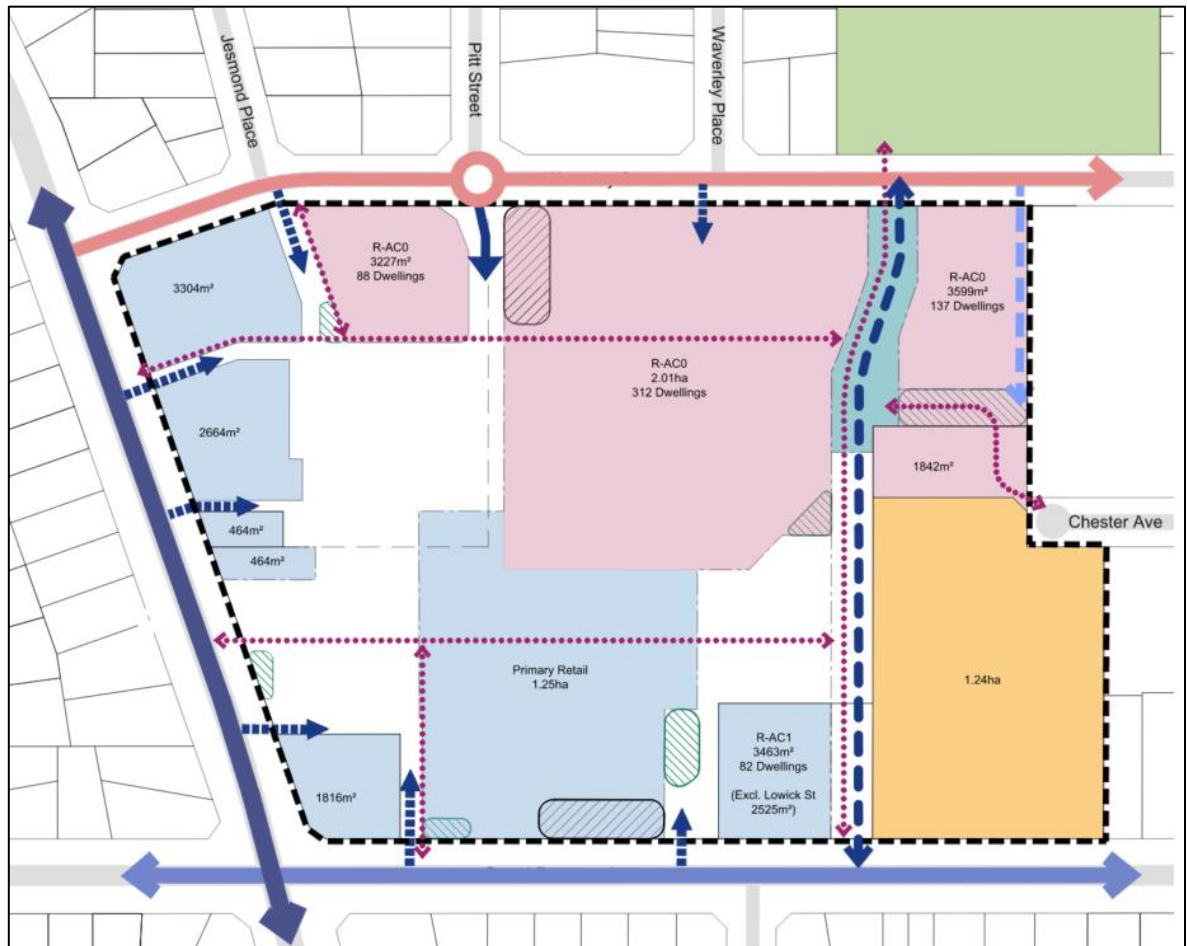
3.3 Road Network and Intersections Controls

The proposed internal road network will remain as private road with all intersections operate as priority-controlled intersections.

3.4 Pedestrian Network

The proposed PSP has planned for several key pedestrian links through the area. These are shown below in **Figure 3-2** with purple dotted lines.

Figure 3-2: Pedestrian Network



These connections link to bus stops located on Alexander Drive and Grand Promenade and provides connectivity through the commercial and mixed-use areas. These then connect with the north-south link proposed along Lowick Street connecting Waverley Street with Grand Promenade.

Connectivity is to be maintained from the PSP back to Chester Avenue.

3.5 Specific Issues

There are no specific transport issues that were initially identified in relation to the proposed development, prior to this assessment apart from ensuring that the road network can support the proposed development.



4 Changes to the External Transport Network

4.1 Road Network Upgrades

The City of Stirling has a continuous program of major projects and works taking place in the City. Interrogation of the City's latest online information confirms there are no major projects or works currently scheduled or taking place in the immediate vicinity of the Dianella Centre PSP.

4.2 Intersection Controls

As proposed under the DA for the relocation of Coles store, the Coles loading area will be located to the west of the EG Ampol along Grand Promenade. Thus, the existing left-in/left-out/right-out access will be converted to left-in/left-out and will be used for service vehicle access only.

The right-out movement will be moved to the existing left-in/left-out/right-in access between EG Ampol and Our Lady's Catholic Church. The access will be reconfigured as a full movement priority-controlled T-junction with two-stage right-turn.

The TIA prepared by PJA for the Coles store DA has identified existing safety constraint at the intersection of Alexander Drive and Waverley Street, this predominantly being current rear end crashes, typical for traffic signals. It is noted that the intersection is expected to perform within capacity up to 2036. While the increase in traffic by the DA would result in longer delay for right turn vehicles, the delay is not to a level that may increase crashes as delays are expected to be within WAPC thresholds.

The current intersection of Jesmond Place and Waverley Street with the current existing driveway opposite it is suggested to be modified to include a raised plateau to reduce vehicle speeds through this intersection. The traffic flows expected at this location are expected to be mostly to and from the south via the driveway with a very low volume of traffic turning to and from Jesmond Place as this is a cul-de-sac with approximately 10 vehicles an hour, 1 every 6 minutes exiting Jesmond Place, in both a Thursday PM peak and a Saturday midday peak. Traffic moving to and from the crossover are expected to be to and from the direction of Alexander Drive with little to no right turn from the driveway onto Waverley Street.

The proposed PSP or subsequent redevelopment stages would greatly increase the traffic at the intersection of Alexander Drive and Waverley Street. This would likely to increase the likelihood of crash at the intersection. As such, the intersection will be considered to be upgraded to a signalised intersection, in conjunction with City of Stirling and possibly under the Black Spot Funding Program. The timing of the upgrade will be assessed under the development application for further stages.

The summary of the changes to external intersections are shown in **Figure 4-1**.



Figure 4-1: Changes to External Intersections



Map source: Nearmap

4.3 Pedestrian/Cycle Networks

DTMI:

As previously mentioned in **Section 2.10**, DTMI's Long Term Cycle Network (LTCN) sets out a long-term vision for the metropolitan bicycle network, designating routes by function according to the WA Cycling Network Hierarchy.

Within the vicinity of development site, the following future cycle routes are identified within the LTCN as either Local Routes, Secondary Routes or Primary Routes.

- Alexander Drive – Primary Route
- Brook Street/Morley Drive – Local Route
- Howe Crescent/Corbett Place/Grand Promenade – Secondary Route (Connecting to Alexander Drive)



Community Infrastructure Plan 2023-2033

Through the City of Stirling's Community Infrastructure Plan 2023-2033, the City has committed to various goals and objectives to guide the development of future pedestrian and cycling infrastructure by ensuring strategies and bike plans be completed and that financial investment is advocated for at all levels of Government.

Goals 2 and 5 below outline the City's commitment to these objectives with timeframes of 2025 for completing the City-wide mountain bike plan and advocating for investment as an on-going commitment.

Goal 2:

Deliver a strategic approach to the provision and improvement of community infrastructure to ensure we have a blueprint for future community needs.

How will we achieve this?	Timeframe	
Develop localised community infrastructure plans to identify gaps in service provision across the City for each infrastructure type to guide the City's annual and longer-term financial planning.	Complete the City's Community Infrastructure Action Plan.	2023
	Update the Skate and BMX Facilities Strategy implementation plan and complete the City-wide mountain bike plan.	2025

Goal 5:

Advocate for increased investment in community infrastructure planning through better integration at all levels of government.

How will we achieve this?	Timeframe	
Advocate across the sector and to State and Commonwealth governments to ensure future urban planning and other relevant planning frameworks capture community infrastructure planning as an essential component and considers density and population growth in an integrated manner.	• Advocate for increased financial investment in community infrastructure provision across State and Commonwealth sectors.	Ongoing
	• Seek funding for community infrastructure provision and improvements to ensure our community has better access to quality community infrastructure that meets their needs.	Ongoing



The PSP proposes two key upgrades to the pedestrian network on Waverley Street as follows:

- Widening of the footpath on the south side of Waverley Street from the current 1.2m wide footpath to a more appropriate width, suggested to be at least 1.8m to 2.0m. This is to cater for the expected increased pedestrian demands walking along Waverley Street with the proposed mixed use development along the northern side of the PSP.
- Provision of pedestrian crossing facilities at the intersection of Lowick Street and Waverley Street. This might take the form on a raise intersection safety platform and/or pedestrian islands, this to provide connectivity from the PSP to the POS at Waverley Pola Reserve



5 Integration with Surrounding Area

5.1 Surrounding Attractors / Generators

Dianella Centre is well located to regional attractions, with the CBD, Swan River and beaches all within an easy drive for employment and recreation. It is central to larger district and regional retail centres (3.8km Inglewood District Centre, 4km to Mirrabooka Regional Centre and 3.5km to Morley Strategic Metropolitan Centre). It is well placed to capture much of the immediate district's weekly retail expenditure.

An audit of retail services in the precinct's surroundings was conducted based on the Department of Planning Land Use and Employment Survey (2008) and the Property Council of Australia - Western Australian Shopping Centre Directory 2009. **Figure 5-1** illustrates the location of Dianella and surrounding centres as well as the supermarket brands associated with each centre.

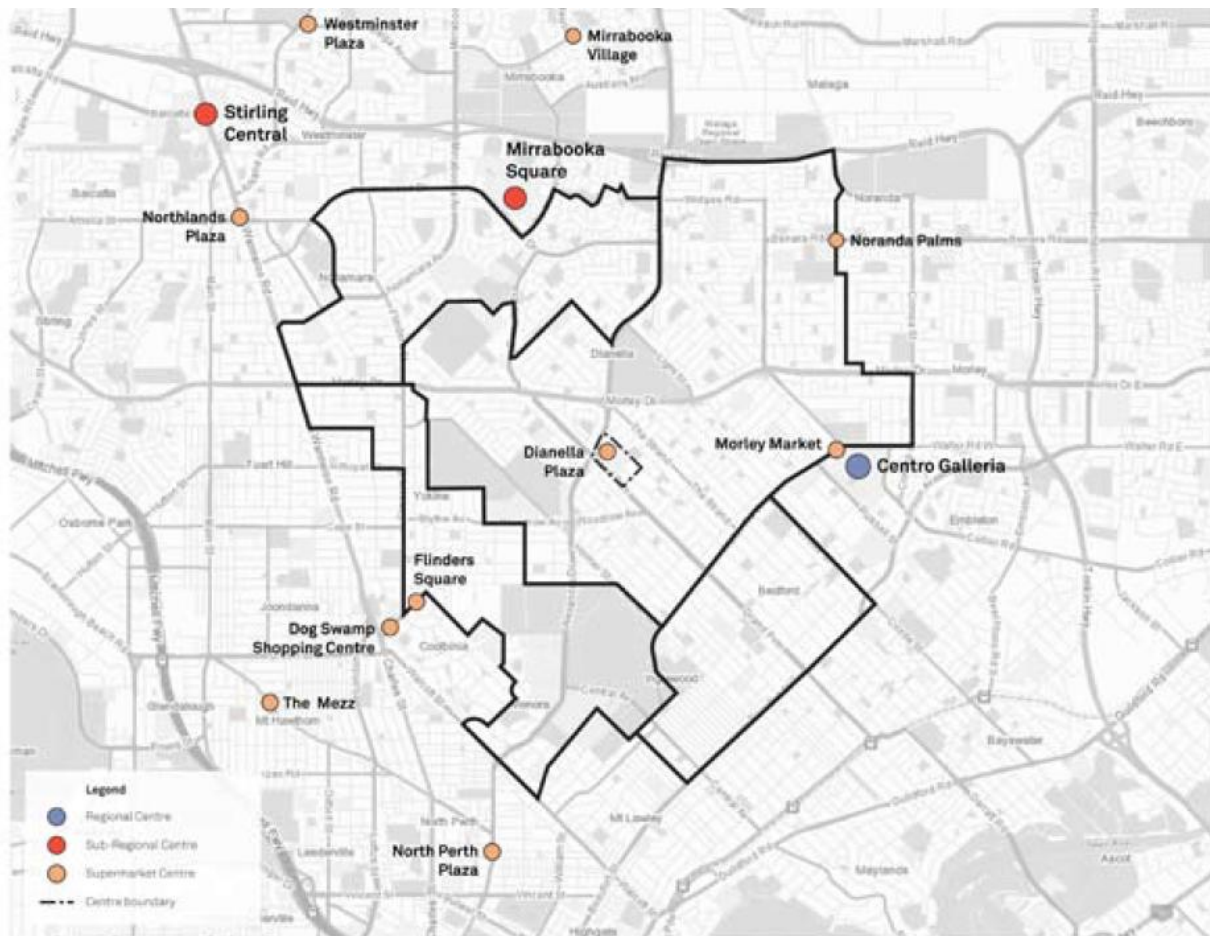
The Dianella PSP is located in close proximity to several regional open space areas that cater for many active and passive recreational activities, including an 18-hole golf course and an Olympic size swimming pool. At the local scale there is a well distributed network of neighbourhood parks with Waverley Pola Reserve located immediately north of the PSP, opposite the intersection of Waverley Street and Lowick Street.

A mix of private and public primary schools is well distributed across the district. With the changing age and cultural demographic of Dianella some historical public schools including the Dianella Primary School have become private. Students living in Dianella attending public secondary schools travel to Morley, John Forrest or Mt Lawley Senior High Schools.

There are limited community/civic facilities within the district, notwithstanding that the Dianella Library and Dianella Community Centre are both located within the PSP and in close proximity to the Dianella Centre shopping centre. To access other community facilities, residents have to travel to Inglewood, Mirrabooka or beyond. **Figure 5-2** shows the relative location of other attractors.

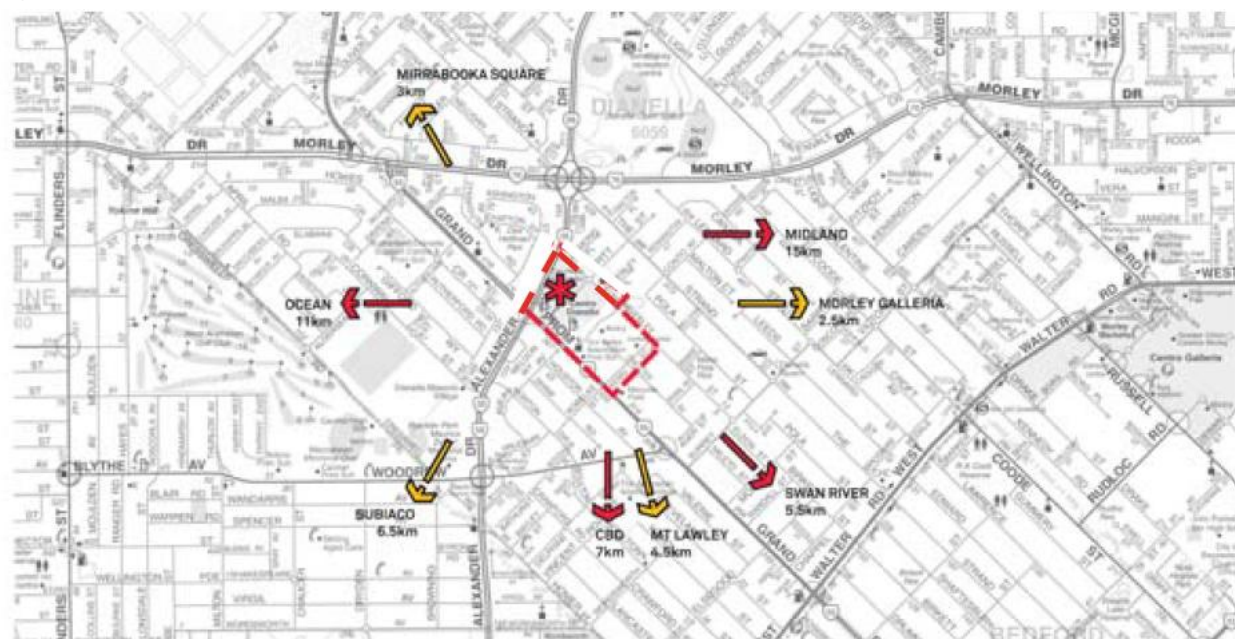


Figure 5-1: Location of Dianella and Surrounding Centres



06_Main and Secondary Trade Areas in 2006 - Based on Urbis 2008 report

Figure 5-2: Location of Other Attractors



07_Attractors



5.2 Level of Overall Accessibility and Integration

There is a good level of cycling and pedestrian movement network presently surrounding the proposed development site, however cycling infrastructure is lacking in the immediate vicinity surrounding the Centre. Generally, there is a lack of direct connections to the centre from regional cycle routes.

The proposals contained within the Department of Transport's Long Term Cycle Plan for improved cyclist infrastructure on Alexander Drive will integrate with the future land uses proposed at the development site.

Generally, the development site is well positioned to take advantage of the future facilities proposed within the surrounding areas.

5.3 Access to Public Transport

The Dianella Centre PSP is serviced by an excellent level of bus transport options, particularly the high-frequency services 960 and 998/999 which provide a frequency of bus every 10 to 15 minutes throughout the day Monday to Friday and up to half hourly intervals on Saturdays. The development site is well located to take advantage of this existing transport provision.

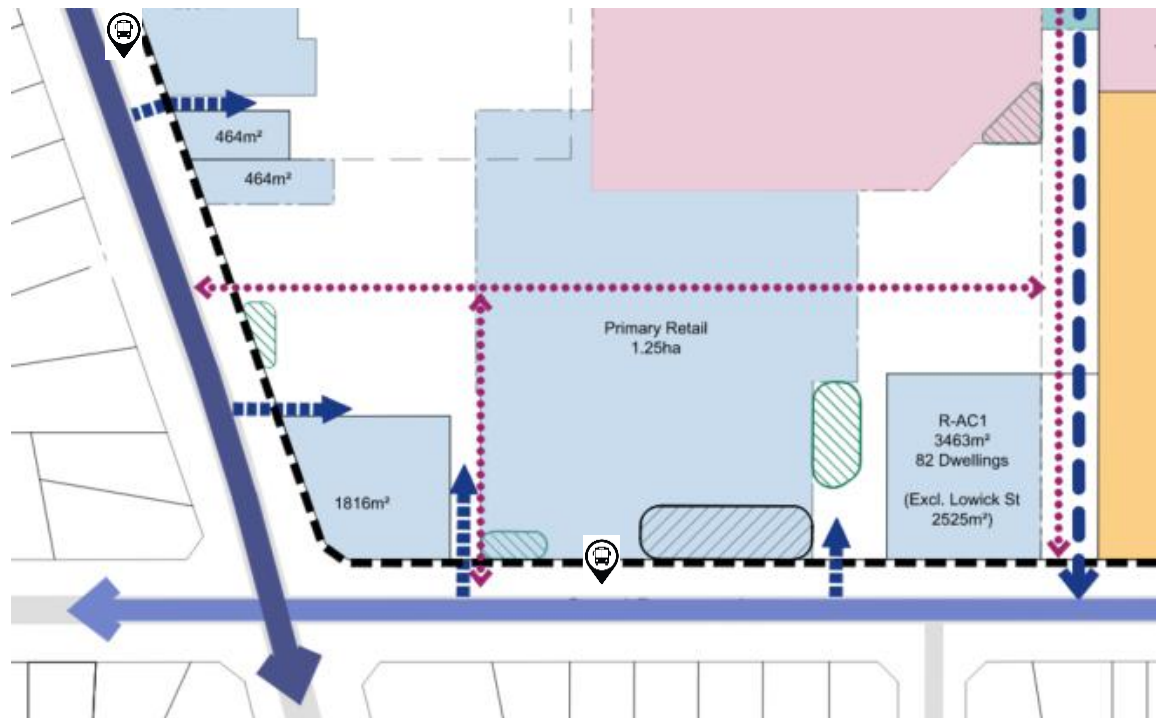
Bus stops are located on Alexander Drive for Route 960 running from Mirrabooka Bus Station, through the Perth CBD and then to the Curtin University Bus Station. 100% of the PSP area is located within 400m of these stops with the majority of the PSP within 250m.

Bus stops are also located on Grand Promenade these for Circle Routes 998/999. Again, 100% of the PSP area is located within 400m of these stops with the majority of the PSP within 250m.

These bus stops are to be accessed via connections from the Alexander Drive and Grand Promenade paths to key pedestrian links initially into the Primary Retail area of the PSP. There is then a further linkage to the Lowick Street NS key pedestrian link to connect with the mixed use zone along Waverley Street. Refer to **Figure 5-3**.



Figure 5-3: Key Pedestrian Links to High Frequency Bus Stops





6 Analysis of External Transport Networks – Assessment Parameters

6.1 Assessment Years

In accordance with the WAPC Transport Impact Assessment Guidelines, the assessment years will generally be the year of full development (ultimate year).

On this basis, an assessment of the ultimate development was undertaken for full development in 2036.

As such, the assessment year is defined as follows:

- 2036 ‘Design Year Horizon’

6.2 Assessment Time Periods

The assessment time periods will be consistent with the identified Thursday PM peak and Saturday peak periods on the surrounding road network, taken from the traffic surveys commissioned in January/February 2025 which are:

- 16:30 to 17:30 – Thursday
- 11:45 to 12:45 – Saturday

As discussed previously in Section 2.7, an AM peak assessment was not undertaken as the development is commercial and industry surveys denote the highest site traffic generation in the PM peak and Saturday midday period.

Mixed developments (shopping centre, fast food, restaurant etc) such as this will have lower traffic flows during the AM peak as one of the fast-food restaurants will have lower patronage whilst the tavern and drive-through will not be expected to be operating during the AM peak. Also, the main centre will typically open after the AM peak hour. This approach is in accordance with the guidance provided in the WAPC publication Transport Impact Assessment guidelines, Part 5, Technical Guidance.

While the residential land use within the PSP will generate trips during the AM peak, that is only approximately 15% of the total trips generated by the PSP.



6.3 Traffic Growth

An interrogation of available traffic data from Main Roads WA's reporting centre for the nearby count sites with long term data available (Grand Promenade and Alexander Drive) has revealed that traffic has been decreasing over periods extending back to 2006 to 2010. For the period 2006 to 2020 there has been an average decrease in traffic volume of -0.3% across 15-20 years. The existing 2022 and 2026 traffic flows at the intersection of Alexander Drive and Grand Promenade discussed in Section 2.8.1 also shows that the traffic flows in 2026 is similar or less than the traffic flows in 2022.

It could be reasonable for no material traffic growth to be assumed over the next 10-year period, and beyond. However, in order to achieve a robust assessment and test the resilience of the future road network immediately surrounding the site, this TIA assumes a rate of 1% traffic growth per annum to 2036. This is considered a robust assessment of traffic growth up to 2036 as the current noted sites have shown that traffic flows have been decreasing over the last 15-20 years.

6.4 Traffic Scenario for Assessment

In order to establish the relative impact of the proposed development on the operation of the surrounding road infrastructure, a single time horizon assessment scenario was undertaken as part of this TIA.

The following traffic assessment scenarios have been included:

Scenario– 2036 Design Year Horizon:

Assumed Traffic Composition Includes:

- 2036 Road Network Traffic Volumes (2025 traffic + growth).
- Traffic generation from the proposed ALL pad sites, effect of the supermarket relocation, increase of shopping centre GFA and residential apartments.
- Assessment undertaken on key external intersections surrounding the site, including but not limited to:
 - Alexander Dive/Waverley Street – Priority-Controlled T-junction & Signalised Intersection;
 - Waverley Street/Pitt Street/Site Access – Roundabout Controlled Intersection
 - Waverley Street/Jesmond Place/Site Access – 4-way intersection
 - Grand Promenade/Site Access 8 (Lowick Street) – Priority-Controlled T-junction



6.5 Proposed Traffic Generation

In relation to the potential development scenario, traffic generation have been derived based on the change in the Dianella Centre's gross floor area and the number of residential car parking bays. With reference to **Table 6-1**, the proposed PSP will increase the shopping centre's gross floor area from 18,616 m² to 30,971 m², approximately 66.4%. As such, the existing turning movements in and out of the Dianella PSP is expected to increase by the same factor to derive the proposed traffic generation, resulting in additional 538 vehicles per hour by the shopping centre in both the Thursday PM peak and Saturday mid-day peak.

Table 6-1: Change in Development Yield – Dianella Centre

Development	Gross Floor Area (GFA) Size
Existing Dianella Centre	18,616m ²
Dianella Centre with Coles Store Relocation	30,971m ²

Reference is made to the Institute of Transportation Engineers (ITE) *Trip Generation Manual (9th Edition)*, WAPC TIA Guidelines and Transport for NSW's *Guide to Transport Impact Assessment (NSW)* for the trip generation rate for the residential apartment development. The generation rates adopted in the assessment are shown in **Table 6-2**. The total expected vehicle trips generated by the development is shown in **Table 6-3**. The trip rate for Saturday peak has adopted the same trip rate in the AM peak as a robust test pushing more traffic through intersections, exiting the PSP area.

Table 6-2: Adopted Trip Generation Rate

Land Use	Units	Daily Trip	Sat Trip	Sat In	Sat Out	PM Trip	PM In	PM Out	Source
Resident	Vehicle	3.34	0.24	16%	84%	0.32	66%	34%	ITE (Resd/Condo/Townhouse 230)

Table 6-3: Trips Generation

Land Use	Units	Quantity	Daily Trip	Sat Trip	Sat In	Sat Out	PM Trip	PM In	PM Out
Resi.	Vehicle	718	1,198	172	28	145	230	152	77

With the above, the proposed PSP is expected to generate up to additional **768 vehicles per hour** during busiest peak.



7 Analysis of External Transport Networks – Intersection Assessments

7.1 Introduction

This section of the TIA presents the analysis of the existing road network around the Dianella PSP. The following scenarios have been assessed in this assessment:

- 2036 Thursday Base Case (background traffic only)
- 2036 Thursday & Saturday Future Case (existing Alexander Drive / Waverley Street intersection layout) (with proposed PSP)
- 2036 Thursday & Saturday Future Case (proposed new Signals at Alexander Drive / Waverley Street intersection) (with proposed PSP)

7.2 Impact on Intersections

Across each of the following four assessment scenarios, the SIDRA Intersection capacity results for each approach are presented in the form of Degree of Saturation (DOS), Average Delay, Level of Service (LOS) and 95th Percentile Queue. These characteristics are defined as follows:

- **Degree of Saturation (DOS):** is the ratio of the arrival traffic flow to the capacity of the approach during the same period. The theoretical intersection capacity is exceeded for an un-signalised intersection where $DOS > 0.80$;
- **95% Queue:** is the statistical estimate of the queue length up to or below which 95% of all observed queues would be expected.
- **Average Delay:** is the average of all travel time delays for vehicles through the intersection. An unsignalised intersection is considered to be operated at capacity where the average delay exceeds 45 seconds for any individual movement.
- **Level of Service (LOS):** is the qualitative measure describing operational conditions within a traffic stream and the perception by motorists and/or passengers.



7.3 Assessment Results – 2036 Thursday & Saturday Base Case

Under this scenario, the surrounding road network has been assessed in SIDRA Intersection and the results are provided in **Figure 7-1** and **Figure 7-2**.

Figure 7-1: 2036 Thursday PM Peak Base Case Condition (DoS & LoS)

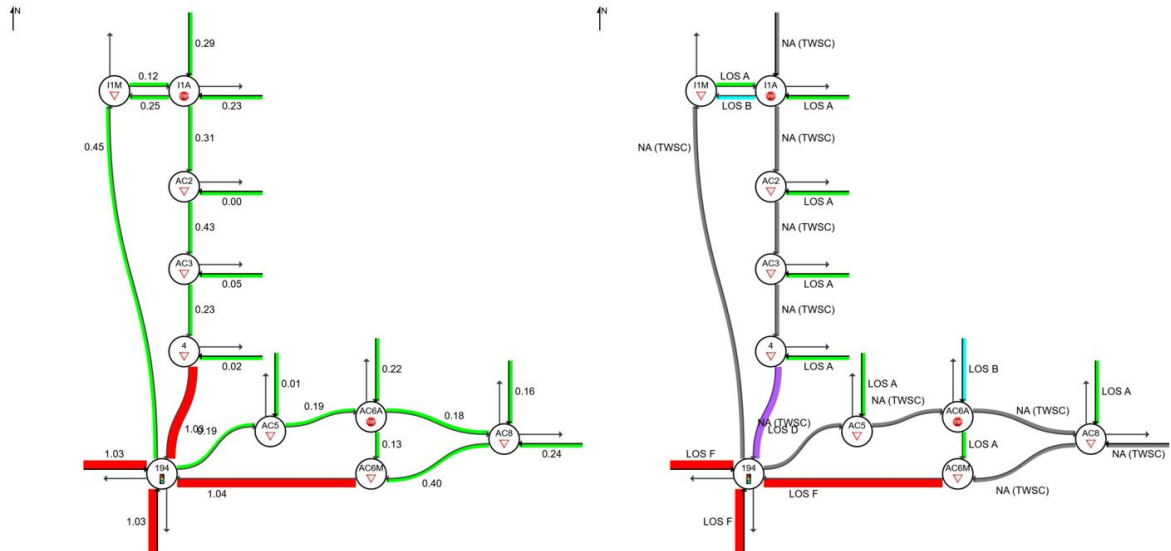
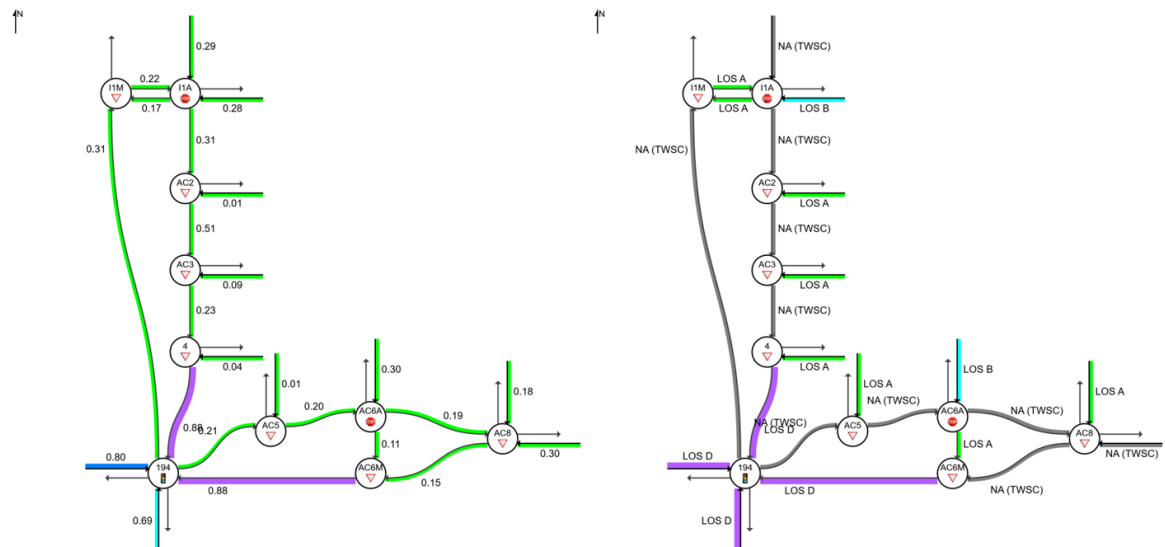


Figure 7-2: 2036 Saturday Mid-Day Peak Base Case Condition





As demonstrated above, the existing road network is expected to operate beyond capacity during Thursday peak, as expected based on the existing condition. The intersection of Alexander Drive / Grand Promenade is expected to operate with Degree of Saturation of 1.04. The queue along Alexander Drive northbound approach is expected to be 697m long, almost tailing back to the intersection at Woodrow Avenue. The queue along Alexander Drive southbound approach is expected to be 242m, tailing back to the intersection at Waverley Street.

Other than that, the other access points are operating with Level of Service B or better ($\leq 15s$ delay), with the exception of signalised intersection of Alexander Drive / Grand Promenade. The east, south and west approaches of the signalised intersection are operating at LOS F (delay $> 80s$).

In the Saturday peak, all access points are operating satisfactorily with acceptable LOS D or better (delay $< 55s$).

This shows that the background traffic growth on the existing road network may cause the intersection of Alexander Drive / Grand Promenade to fail by 2036.

7.4 Assessment Results – 2036 Thursday & Saturday Future Case (no Signals)

The 2036 future case (no signals) has been assessed with the inclusion of proposed changes to external intersections discussed in **Section 4.2**, except for the potential new traffic signals at the intersection of Alexander Drive / Waverley Street. The road network set up in SIDRA Intersection for the scenario is shown in **Figure 7-3**. Under this scenario, the surrounding road network has been assessed in SIDRA Intersection and the results are provided in **Figure 7-4** and **Figure 7-5**.

Figure 7-3: Proposed PSP Road Network without Signals

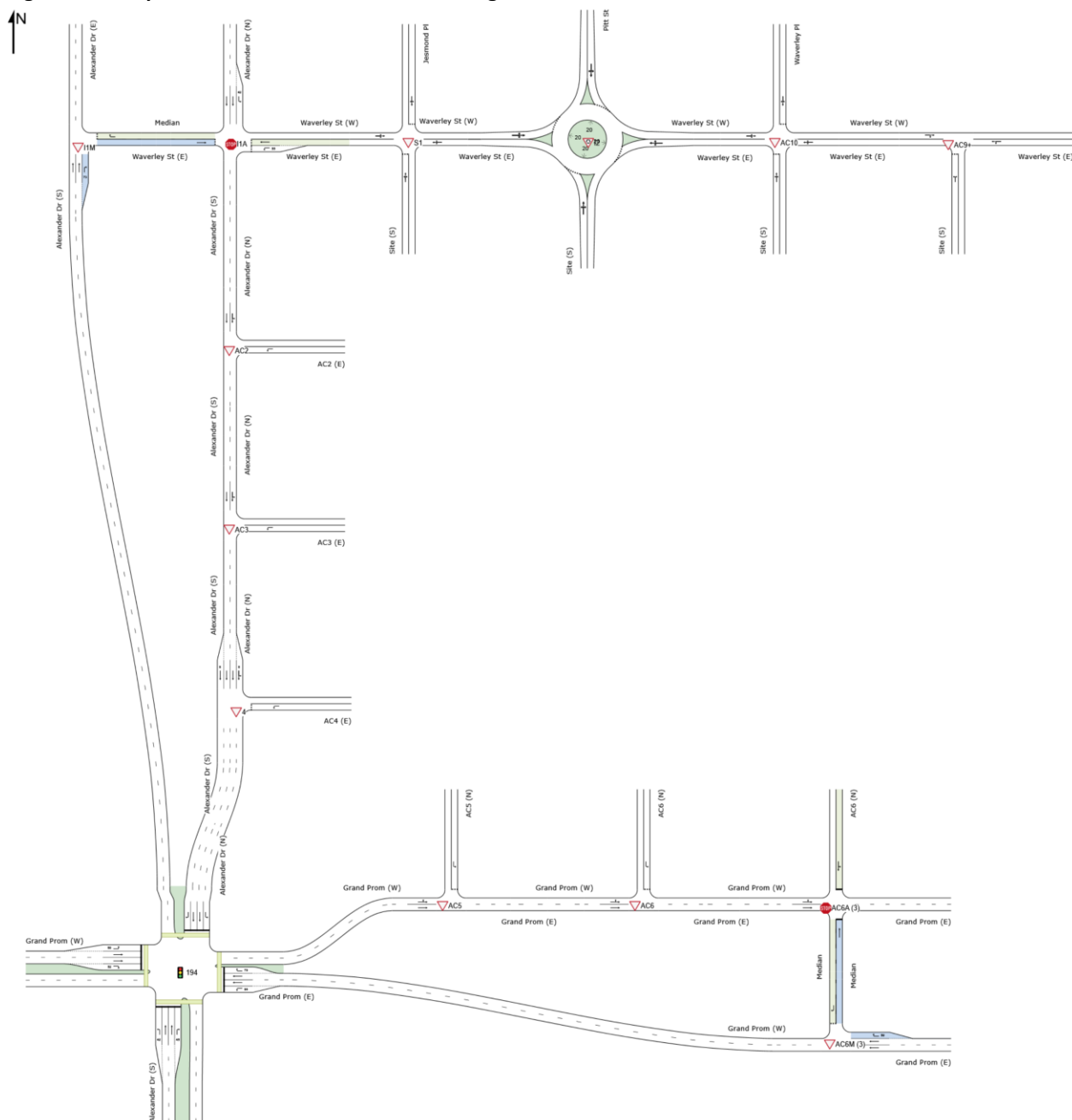


Figure 7-4: 2036 Thursday PM Peak Future Case (no Signals) Condition

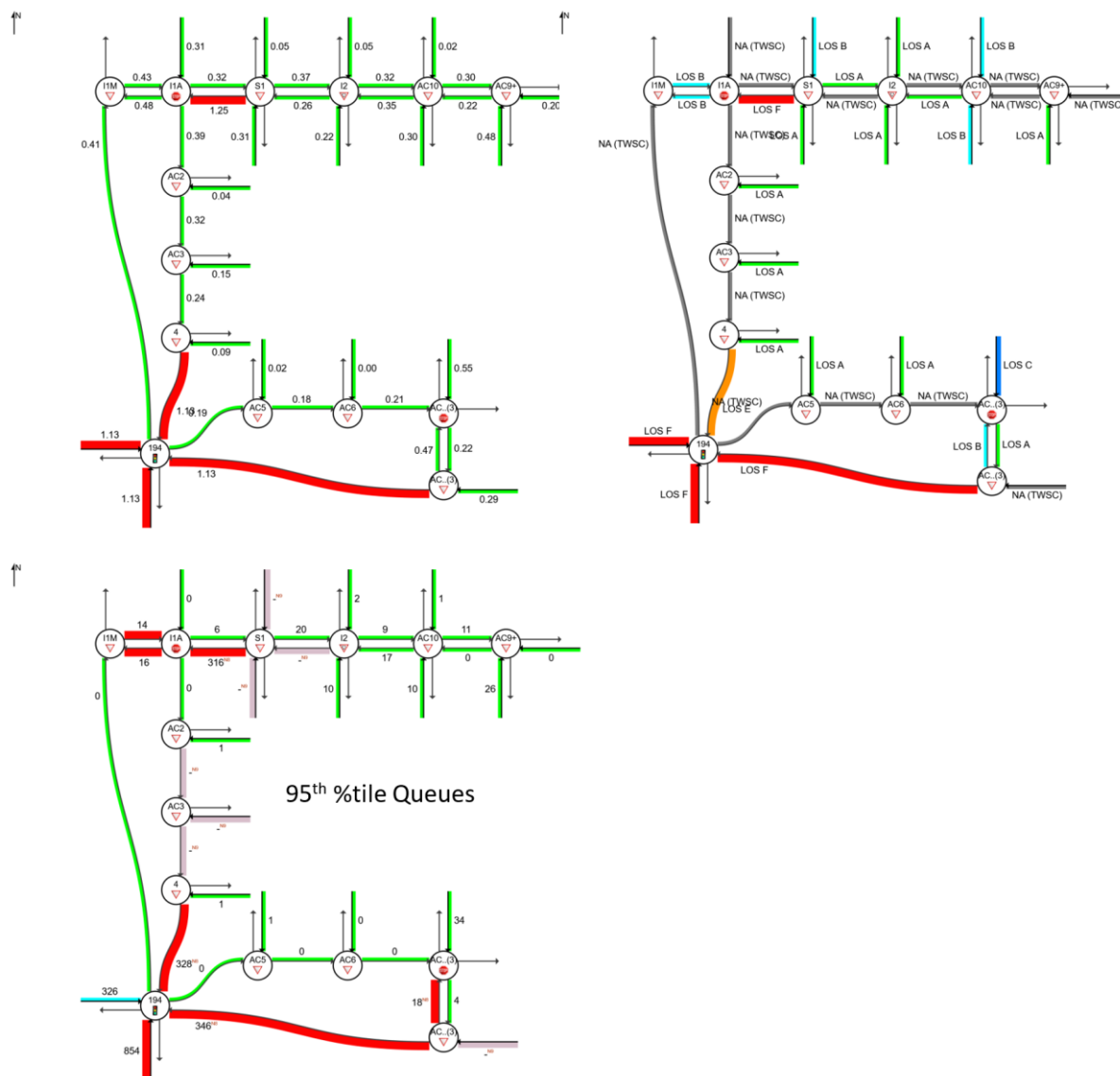


Figure 10 displays four diagrams illustrating traffic flow and queue lengths at the I-194/US-101 interchange, comparing different traffic control scenarios.

The diagrams are organized into four quadrants, each showing the interchange layout with various approaches and associated traffic data:

- Top Left:** Traffic flow (veh/h) for various approaches. Key values include 0.66, 0.41, 0.31, 0.50, 0.09, 0.40, 0.29, 0.08, 0.03, 0.25, 0.62, 0.23, 0.20, 0.45, 0.19, 0.32, 0.34, 0.07, 0.33, 0.09, 0.25, 0.13, 0.03, 0.00, 0.76, 0.98, 0.24, 0.90, 0.88, 0.90, 0.63, 0.14, 0.17.
- Top Right:** Traffic flow (veh/h) and lane occupancy (LOS) for various approaches. Key values include 0.66, 0.41, 0.31, 0.50, 0.09, 0.40, 0.29, 0.08, 0.03, 0.25, 0.62, 0.23, 0.20, 0.45, 0.19, 0.32, 0.34, 0.07, 0.33, 0.09, 0.25, 0.13, 0.03, 0.00, 0.76, 0.98, 0.24, 0.90, 0.88, 0.90, 0.63, 0.14, 0.17. Lane occupancy values include LOS A, LOS B, LOS C, LOS D, LOS E, LOS F, LOS G, LOS H, LOS I, LOS J, LOS K, LOS L, LOS M, LOS N, LOS O, LOS P, LOS Q, LOS R, LOS S, LOS T, LOS U, LOS V, LOS W, LOS X, LOS Y, LOS Z.
- Bottom Left:** 95th percentile queue lengths (ft) for various approaches. Key values include 27, 14, 402, 22, 13, 9, 7, 0, 0, 32, 10, 0, 22, 12, 0, 1, 0, 0, 71, 439, 0, 218, 158, 262, 28, 3, 0.
- Bottom Right:** 95th percentile queue lengths (ft) and lane occupancy (LOS) for various approaches. Key values include 27, 14, 402, 22, 13, 9, 7, 0, 0, 32, 10, 0, 22, 12, 0, 1, 0, 0, 71, 439, 0, 218, 158, 262, 28, 3, 0. Lane occupancy values include LOS A, LOS B, LOS C, LOS D, LOS E, LOS F, LOS G, LOS H, LOS I, LOS J, LOS K, LOS L, LOS M, LOS N, LOS O, LOS P, LOS Q, LOS R, LOS S, LOS T, LOS U, LOS V, LOS W, LOS X, LOS Y, LOS Z.

As for the Saturday midday peak, the intersection of Alexander Drive / Grand Promenade is still expected to operate within capacity. However, Grand Promenade approaches will operate at LOS F with queues of 439m long on Alexander Drive southbound approach. The intersection of Alexander Drive / Waverley Street is also expected to operate beyond capacity with a 400m long queue.



7.5 Assessment Results – 2036 Thursday & Saturday Future Case (with Signals)

The 2036 future case (with signals) has been assessed with the inclusion of potential new traffic signals at Alexander Drive and Waverley Street along with the other proposed changes to external intersections. The road network set up in SIDRA Intersection for the scenario is shown in **Figure 7-6**. Under this scenario, the surrounding road network has been assessed in SIDRA Intersection and the results are provided in **Figure 7-7** and **Figure 7-8**.

Figure 7-6: Proposed PSP Road Network with Signals

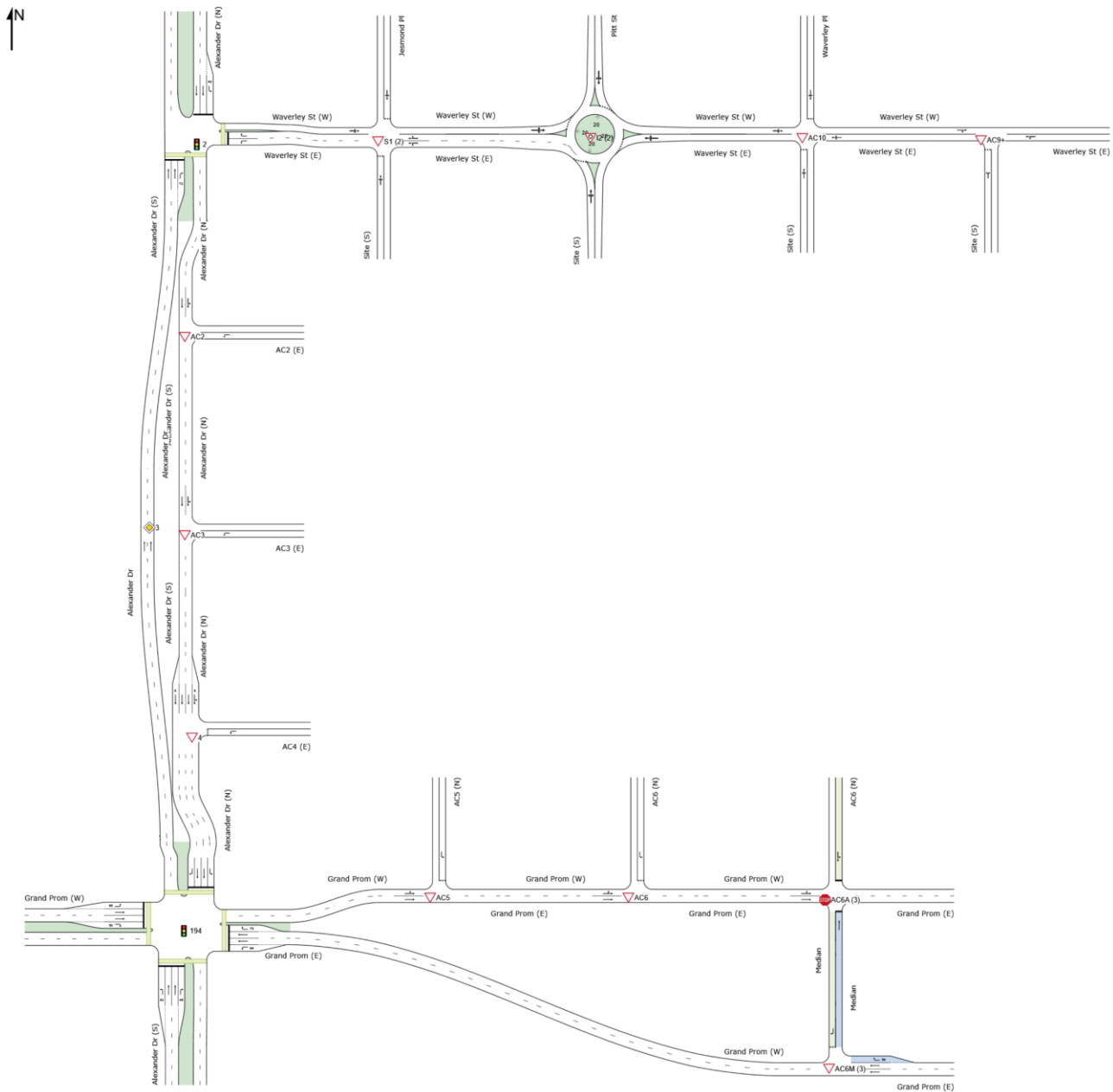




Figure 7-7: 2036 PM Peak Future Case (with Signals) Condition





Figure 7-8: 2036 Saturday Mid-Day Peak Future Case (with Signals) Condition





With the proposed new traffic signals at Alexander Drive / Waverley Street, the intersection is expected to operate within capacity and LOS E in both Thursday and Saturday peak periods. However, the queues along Waverley Street may queue beyond the roundabout at Pitt Street.

As such, this shows that the failure of the intersection of Alexander Drive / Grand Promenade is caused by the assumed 1% background traffic growth, which is noted to be higher to the slightly negative traffic growth historically recorded, and not the proposed development. This suggests that the intersection of Alexander Drive / Grand Promenade and Alexander Drive corridors may need to be upgraded with a possible upgrade to three lanes on each direction to accommodate the traffic growth. The potential traffic signals at intersection of Alexander Drive / Waverley Street can accommodate the impact of the proposed PSP.



8 Road Safety Issues

8.1 Impact of the Development on Road Safety Issues

Alexander Drive / Grand Promenade Signal Controlled Intersection:

The current existing crash trend at the signal-controlled intersection of Alexander Drive / Grand Promenade shows that 64% of Medical crashes involving rear-end shunt type. 59% of the PDO major crashes and 92% of the PDO minor involved rear-end collisions.

This existing crash trend at this location is typical of signalised intersections under moderate to high traffic flows, where there are a high number of rear end type crashes. This crash type has been addressed with the installation of mast arm signals on Alexander Drive approaches and in mid 2025 the installation of mast arm traffic signals on the Grand Promenade approaches. This treatment may begin to reduce these crashes as traffic data for 2025 is yet to be released.

The traffic signals presently allow filter right turns on all approaches and there may be an issue related to gap selection for right turn vehicles across oncoming traffic and these are mostly occurring outside peak periods. This is a current recurring issue and not related to the proposed development.

Alexander Drive / Waverley Road Priority Controlled Intersection:

The unsignalised T-intersection of Alexander Drive and Waverley Street would experience an increase in delays for right turn vehicles which would cause drivers to accept shorter gaps

The potential new traffic signals at the intersection would reduce the number of conflict points and likelihood of crashes.



9 Parking Assessment

9.1 Car Parking Requirement

The City of Stirling's 'Policy 6.7: Parking and Access' sets out the requirements for access and parking provisions for non-residential development (including commercial and mixed-use developments) under their LPS3. The required amount of parking for residential apartments is covered by the Residential Design Codes Volume 2 for Apartments.

In general, the parking ratios vary across different commercial use types and locations (within the commercial category and activity centre type). The existing Dianella Centre falls within the **Dianella Centre District Centre (DC1)** and is covered under Table 1 Activity Centre Car Parking Ratios under this policy where a ratio of **1 space per 25m² GFA** is required.

Under WAPC guidance provided in the WA Planning Manual Non-Residential Car Parking Rates in Perth and Peel. This sets out minimum and maximum parking rates for district centres, these being 1 space per 100m² as a minimum and 1 space per 25m² as a maximum.

Based on the expected 30,245m² GFA for the Dianella Centre PSP, a total of **1,209 commercial car parking spaces** is required based on the City of Stirling's parking policy, which is at the maximum limit now suggested by WAPC guidance. The minimum rate suggested by the WAPC guidance would suggest 302 bays could be provided on that basis. It is recommended that the WAPC parking rates are adopted for the site, as these present best practice standards, and intended to deliver a state-wide consistent approach to provision of parking and in this case, no more than 1,209 commercial car parking spaces should be provided at a rate of no more than **1 space per 25m² GFA**.

As discussed in **Section 3.2**, the modified car park layout will have a **car parking provision of 1,035 commercial spaces, this is at a rate of approximately 1 space per 30m²**, this slightly less than the City's requirement and the maximum suggested by WAPC guidance. This shows that the Dianella District Centre proposes an appropriate amount of commercial car parking spaces.

It is further noted that the current peak parking demand for the current 18,616m² GFA recorded at 618 parked cars or a generation rate of approximately 1 space per 30m². On a demand basis the proposed 30,245m² GFA is expected to generate approximately 1,010 parked cars on a Thursday PM, thus there is expected to be approximately 25 empty parking spaces at these times.

For the residential component of the PSP, the 619 dwellings proposed are currently proposed to have 718 parking spaces, thus an average parking provision of approximately 1.16 space per dwelling. The location of the residential development places it within proximity of a high frequency bus route and within a district centre and thus would fall within Location A in consideration as to the amount of parking required under the Residential Design Codes Volume 2 for Apartments.



On this basis and assuming 25% of apartments were one bedroom, the residential development would need to provide approximately 665 residential parking bays inclusive of residents and visitors. With 718 residential parking spaces proposed, the residential component is expected to have surplus parking with approximately 50-55 more parking spaces above the minimum required.

Based on the above it is concluded that an appropriate amount of parking has been proposed for the PSP to cater for both the commercial and residential parking demands.

9.2 Motorcycle Parking Provision

In accordance with the City of Stirling's 'Policy 6.7: Parking and Access', parking should be provided at a rate of 1 space per 1,000m² for a development in excess of a total of 500m² GFA. On this basis, the Dianella Centre would require 30 motorcycle parking spaces based on the GFA of the entire site.

9.3 Bicycle Parking Provision

In accordance with the City of Stirling's 'Policy 6.7: Parking and Access', bicycle parking should be provided at a rate of 1 space per 200m² for a development in excess of a total of 10,000m² GFA. On this basis, the Dianella Centre would require 152 bicycle parking spaces based on the GFA of the entire site. The PSP is proposing to increase the number of non-residential car parking bays by about 120 bays from 915 bays to 1,035 bays equating to an increase of about 13% in non-commercial parking bays.

This rate of provision is high when considered to say the Perth CBD where a rate of 1 per 500m² is adopted for non-residential developments. A further consideration is the location of the proposed development, which is not located with immediate access to high standard bike facilities such as regional and principal shared paths.

A more reasonable rate of bike parking is suggested in the region of 1 per 400 to 500m² and on this basis 60-75 bike spaces should be provided with this divided between public access in the public realm and secure bike parking for employees. The 1 per 400m² is somewhat support by the City's policy as this is the rate for "other" type developments not being a "shop". If there were to be in excess of 10 secure employee spaces then end-of-trip facilities would need to be considered in accordance with the City's policy.



10 Conclusions

10.1 Summary of Key Findings

This Transport Impact Assessment evaluates the proposed Dianella Centre PSP, in accordance with Western Australian Planning Commission (WAPC) guidelines. The assessment considers existing transport conditions, projected traffic impacts, road safety, and the integration with surrounding transport networks.

- **Existing Conditions:** The existing Dianella Centre is located at the intersection of Alexander Drive and Waverley Street, approximately 10 km north of the Perth CBD. The surrounding road network includes Alexander Drive (classified as a District Distributor A), Grand Promenade, Waverley Street, and Kerry Street.
- **Traffic Impact:** The development is anticipated to generate approximately 768 additional vehicle movements during peak hours, a substantial portion of which will be pass-by trips. The critical intersection of Alexander Drive / Waverley Street is expected to require signalisation by 2036.
- **Parking and Access:** The proposed development and pad sites will increase the total car parking spaces to 1,753 spaces to cater for commercial and residential demands. This is considered appropriate and in line with current observed demands and current guidance for District Centres.
- **Active and Public Transport Integration:** Currently, the site has limited active travel connectivity; however, future enhancements along Alexander Drive under the Long-Term Cycle Network (LTCN) will improve accessibility. Public transport access is robust, with high-frequency bus services (routes 960 and 998) operating near the site.

10.2 Conclusion and Recommendations

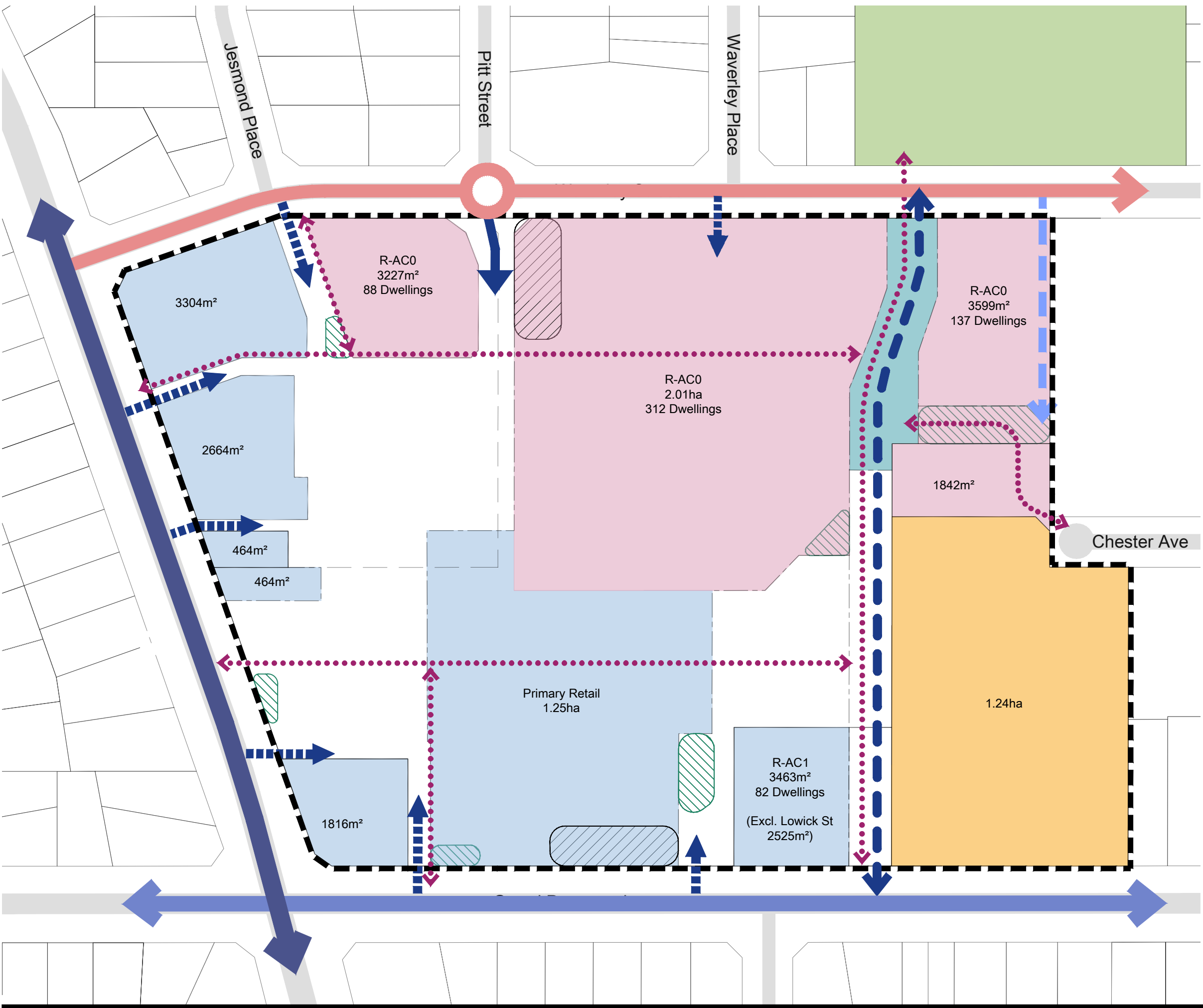
The assessment concludes that the proposed development can be accommodated within the existing and future road network with manageable impacts. Key recommendations include:

- **Active Travel Enhancements:** It is recommended to coordinate with the City of Stirling to expedite the implementation of Long-Term Cycle Network (LTCN) infrastructure along Alexander Drive, which will improve cycling/active travel connectivity.
- **Parking Management:** While adequate parking provision has been planned, ongoing monitoring of parking demand and user patterns is recommended.

Overall, the proposed development aligns with transport planning objectives and is expected to integrate effectively with the surrounding area while maintaining acceptable traffic and transportation outcomes.



Appendix A Master Plan



Legend

Precinct Structure Plan Area

Centre Zone

Mixed Use Zone

Private Community Purpose Zone

Circulation and Parking

Lowick Street Private Access Road

Activated Shared Zone

Indicative Landscape Node

Access Easement

Access - Full Movement

Access Left-In Left-Out

Service Areas

Key Pedestrian Links

Surrounding Reseves

Other Regional Road (MRS)

District Distributor Road

Local Distributor Road

Public Open Space

Land Use Summary

Total Site:

8.95ha

Land Use	Area
Centre	2.38ha
Mixed Use	2.96ha
Private Community Purpose	1.24ha
Circulation and Parking	2.15ha
Activated Shared Zone	0.22ha

Total Dwellings:

619

Commercial GFA:

30,245m²

(excl. PAD Sites)

Parking Bays

1,753 total

Commercial:

1,035 bays

Residential:

718 bays



Precinct Structure Plan Map - Part 2

Dianella Plaza Precinct Structure Plan

Level 8, 1 William Street | Perth WA 6000 Australia | +61 8 9346 0500 | URBIS Ltd | ABN 50 105 256 228

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PROJECT NO.

P0063129

DATE

21.05.2026

DRAWING NO.

03.2

REVISION

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Appendix B Swept Paths

Appendix **C**

Engineering Report

Dianella Plaza Shopping Centre Redevelopment – Precinct Structure Plan

Engineering Report

Project No: 25-370

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Revision	Description	Author	Date
A	Site Servicing Report - Initial	Andrew Tucker	28 April 2026
B	Site Servicing Report - Updated	Andrew Tucker	15 May 2026
C	Engineering Report	Andrew Tucker	11 June 2026
D	Engineering Report - Update	Andrew Tucker	6 August 2026

1 Introduction

1.1 General

As requested by Bureau Veritas on behalf of Greenpool Capital, Colliers has undertaken a preliminary assessment of existing conditions and services associated with the proposed development of a combined landholding that is predominantly occupied by the Dianella Plaza Shopping Centre and includes the neighbouring site of Our Lady's Assumption School, Ampol service station, TAB, Stirling Libraries, Chargrill Masters restaurant and a previously demolished building site with remnant carpark. This report will focus on the proposed development of these sites which consist of seven Lots (59, 70, 71, 78, 79, 100 & 110), covering a combined area of 8.95 ha.

The redevelopment site is located at 366 Grand Promenade, Dianella and is within the City of Stirling jurisdiction. Dianella Plaza is bordered by Alexander Drive to the northwest, Waverley Street to the northeast, Grand Promenade to the southwest and residential a mix of residential and district centre property to the southeast. City of Stirling local planning scheme has zoned this site as District Centre, where it is largely being operated as a shopping centre with supporting carpark and businesses.

Landgate's historical imagery reveals that the site was previously undeveloped bushland until the early 1970s, where the northwest portion of the site was transformed into a commercial shopping center within Lot 100 and included parking facilities surrounding the shopping centre. Throughout the 1980s, the shopping centre underwent an expansion to the southeast, which included the extension of the existing shopping centre, construction of isolated buildings and supporting carparking. This configuration has generally been preserved and remains in its current state.



Figure 1 - Aerial Photograph of Proposed Development Site (Landgate)

1.2 Consulting Scope of Work

Colliers scope of work includes the following:

- Due Diligence
 - Source as constructed data from the Water Corporation, City of Stirling, and relevant authorities.
 - Review and assess geotechnical mapping, groundwater levels, and geotechnical investigation (if available).
 - Review and assess the likely sewer, water, power, communications, and gas connectivity and/or extension requirements with associated costs.
 - Provide advice with respect to the stormwater solution in accordance with the City of Stirling requirements.
- Summary of Findings
 - Prepare and issue a letter summarising the above, confirming the developability of the site.
- Concept Design
 - Conceptual design of critical levels to interface with the surrounding road reserves and proposed structures.
 - Extent of retaining walls and indicative heights as a function of the proposed hardstand levels and existing boundary levels.

1.3 Report Qualifications

In line with this report, Colliers make the following qualifications:

- This report was prepared exclusively for the Bureau Veritas. Unless otherwise stated, the use of this report by third parties is not permitted.
- The information provided in this report may be considered valid for three (3) months from the date of the report.
- The information provided in this report is based upon the information and documentation provided by the developer. Colliers have relied on such information and documents being true. Where we are uninformed of developments outside of this report, Colliers cannot be held responsible or liable for any problems or issues that may arise as a consequence.
- Assumptions have been made which, if incorrect, have the potential to impact the recommendations of this report. Major development implications exist through avenues which cannot be assured at the time of this report, including the upgrading and provision of utility services, WAPC Conditions, DA Conditions, Local Authority Scheme Requirements, timing of adjacent developments, etc.
- Unless otherwise stated, the capacity of existing services has not been verified via engineering calculations. Where required, external consultants may need to be engaged to provide accurate assessments of existing and future servicing capacity.
- A site visit has not been conducted as part of this desktop study. An underground service scan has not been completed and information containing existing service information may differ from the physical service locations. Where possible, Colliers recommend verifying existing service locations and conditions.
- Where design is carried out by third parties using information provided by Colliers, it is recommended that Colliers be engaged or involved in the design process.

2 Data Sources

The table below outlines the background and service information obtained by Colliers to facilitate this report.

Description of Data	Obtained From	Date
Architectural	DKO	21 April 2026
Precinct Structure Plan	Urbis	7 May 2026
Aerial Imagery	MNG	9 June 2026
Before You Dig Australia	1100	11 December 2025
Geology Mapping	Department of Mines, Petroleum & Exploration (GeoView)	2 December 2025
Geotechnical Investigation	Galt Geotechnics	12 April 2024
Survey Data	Jurovich Surveying	12 April 2024
Groundwater Data	Department of Water & Environmental Regulation	2 December 2025
Acid Sulphate Soils	Department of Water & Environmental Regulation	2 December 2025
Contaminated Site Register	Department of Water & Environmental Regulation	2 December 2025
Road and Rail Noise	Department of Planning, Lands & Heritage	15 December 2025
Trees and Vegetation	City of Stirling	7 January 2026
Stormwater Data	City of Stirling	16 December 2025
Drainage Plumbing Drawings	DEMIRS	2 December 2025
Power Capacity	Western Power Network Capacity Mapping Tool	15 December 2025

3 Site Conditions

3.1 Geology

Colliers has utilised the Department of Energy, Mines, Industry Regulation and Safety 1:50,000 geological online mapping to provide an indication of the geological conditions. The site geology is likely to comprise of SAND (S10), summarised as:

- SAND (S10)
 - (as S8) Very light grey at surface, yellow at depth, fine to medium-grained, sub-rounded quartz, moderately well sorted of eolian origin.
 - High permeability
 - Low slope stability
 - Medium to high bearing capacity

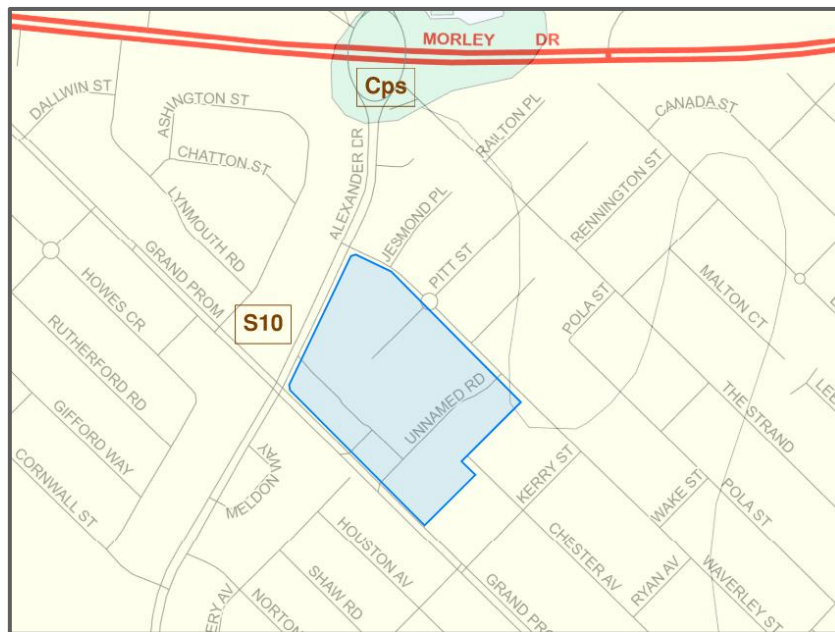


Figure 2 - Geology mapping (DMPE)

A geotechnical investigation was undertaken by Galt Geotechnics, in April 2025 (WAE200102-02 002 R Rev0) to assess the ground conditions of the Dianella Plaza redevelopment in its entirety. The investigation focused more to the western portion of the development, with findings anticipated to provide an accurate assessment for the development as a whole owing to the proximity of the subject site and the collective historical development of the area. The findings can be summarized as follows:

- Cone Penetration Tests (CPT)
 - 8 tests to a depth of 8m
- Machine Auger Boreholes (BH)
 - 5 bore hole to a depth of 1.5m
- Perth Sand Penetrometer (PSP)
 - 5 tests with depth ranging between 1.05 to 2.1m
- Infiltration Testing
 - 3 tests to a depth of 0.91m

Based on the field investigation testing and results, subsurface conditions across the site can be generalised as follows:

- Fill gravelly sand (SP)
 - Between 0.2 and 0.3m BGL
- Fill sand (SP)
 - Between 0.7 and 1.0m BGL
- Natural sand (SP)
 - Greater than 1.5m BGL

Galt Geotechnics classify the site as Class 'A' in accordance with AS2870 (2011), with a CBR of 10% applied to the site. Standard earthworks and preparation practises would be required to prepare the site for redevelopment. Infiltration was found over the three locations tested was found to be between 7.4 and 8.7m/day, with 5m/day to be adopted for the stormwater design, supporting the use of onsite stormwater disposal such as soakwells and belowground cells.

Colliers expect the site to be geotechnically appropriate for the proposed development.

3.2 Topography

The topography has been considered using feature and contour survey provided by Jurovich Surveying on 12 April 2024 (DWG name: 24279-04), covering Lot 70, 71, 78, 79 & 110. Topology for Lots 59 & 100 that were excluded from the feature survey, was considered using data available from MNG Access online resources which utilises Landgate contours. The site constraints depicted within the survey data are as follows:

- The site grades across the site generally from the west to the east.
- The existing shopping centre is at an estimated 29.0m AHD and currently utilises retaining along half of the northeast and a small portion of the southwest to interface between shopping centre and carpark.
- Carpark to the southwest of Lot 110 is situated at a lower level to that of the adjacent Grand Promenade road reserve, with a retaining wall utilised to facilitate separation at the boundary.

Boundary details show the site topography as:

- Northwestern Verge (Alexander Drive)
 - Elevates from 27.0m AHD to the west, to 28.0m AHD to the east.
 - Typical crossfall of less than 1%.
- Northeastern Verge (Waverley Street)
 - Elevates from 25.6m AHD to the south, to 28.0m AHD to the north.
 - Typical crossfall of less than 1%.
- Southeastern Verge (Boundary to private properties)
 - Elevates from 25.6m AHD to the east, to 30.2m AHD to the west.
 - Typical crossfall of between 1 to 2%.
- Western Verge (Grand Promenade)
 - Elevates from 27.4m AHD to the north, to 30.2m AHD to the south.
 - Typical crossfall of an estimated 1.5%.



Figure 3 - Site Topology (Jurovich Surveying)

3.3 Groundwater

Department of Water and Environmental Regulation groundwater mapping provide historical data, which indicates that:

- Historical maximum groundwater is likely to be encountered between RL 23.5 and 24m AHD.
- The existing surface of the site is estimated to be between 29.0m and 25.6m AHD.
- Depth of ground water can be described as being 1.6m to 5.5m BGL.

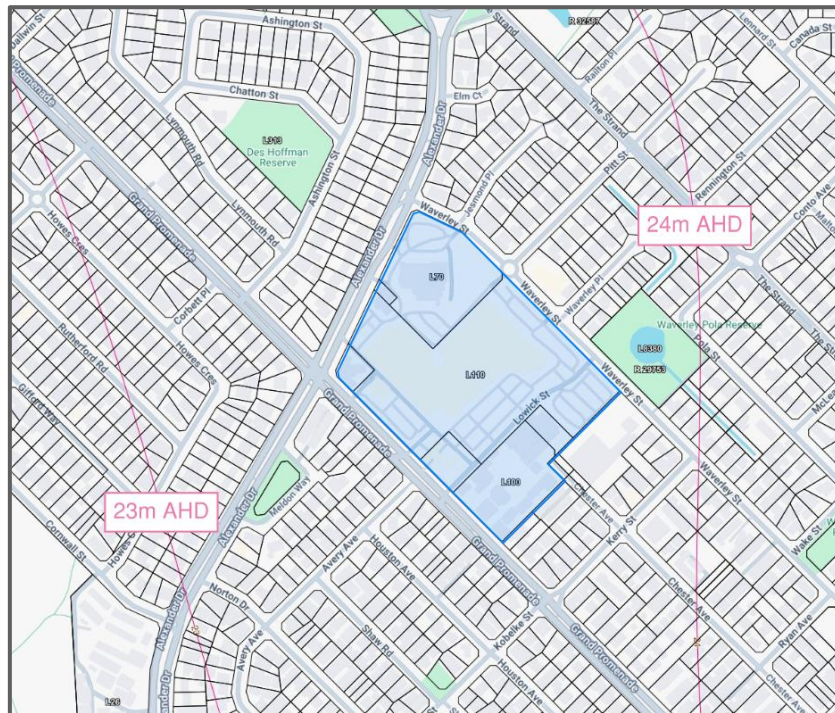


Figure 4 - Groundwater mapping (DWER)

Galt Geotechnics geotechnical investigation provided findings for groundwater conditions at the time of testing. Groundwater was encountered during CPTu testing, which can be summarised as follows:

- Groundwater levels estimated to be between 23.5 and 21.3m AHD
- Galt Geotechnics recommend a minim separation of 500mm from the base of infiltration structures to the maximum ground water level.

Groundwater levels recorded by Galt Geotechnics reflected similar to that of historical data provided by DWER. The proposed development indicates the inclusion of an undercroft carpark, with an estimated floor level of 25.29m AHD may be impacted by groundwater if drainage were to be utilised beneath. However, the remainder of the site would likely be unaffected for the proposed development.

It is important to note that this finding may not accurately reflect the true groundwater maximum condition, as testing was undertaken following summer conditions, where groundwater may be at seasonal lows. It is recommended that further groundwater monitoring throughout all seasonal conditions should be undertaken to provide actual maximum groundwater levels within the site.

3.4 Acid Sulphate Soils

The proposed development site has an Acid Sulphate Soil (ASS) of high to moderate risk of occurring within 3m of the natural soil surface.

Testing of acid sulphate soils should be undertaken by the geotechnical consultant prior to design works being undertaken to ensure that the consultant team implements a design which will mitigate impacting the ASS. Subject to the final development levels, the depth of excavation in proximity to the potential acid sulphate soils shall be limited to minimise the risk associated with encountered acid sulphates.

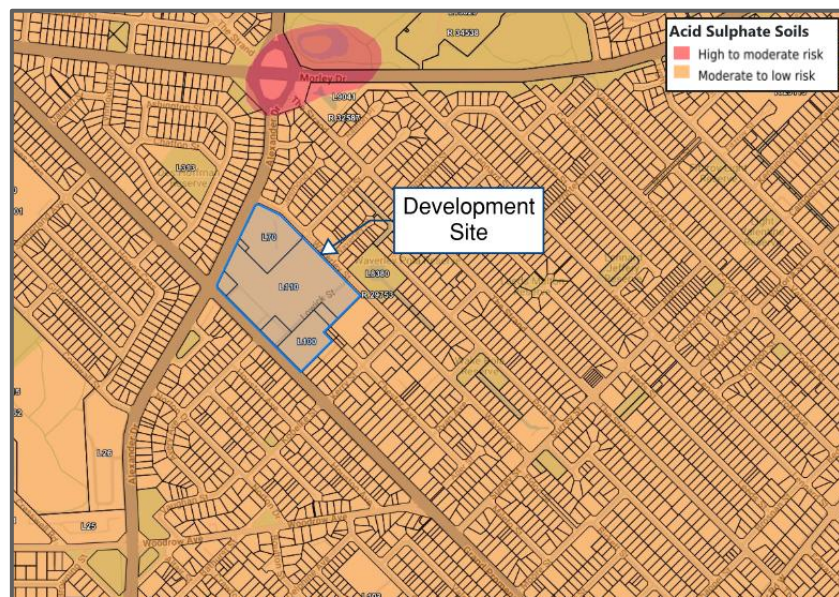


Figure 5 - ASS Risk Map (DWER)

3.5 Contaminated Sites

The DWER contaminated site database mapping indicates that there are contaminated sites within the proposed development, which can be summarised as follows:

ID: 78606

- Previous use:
 - Former dry-cleaning facility for approximately 6 years.
- Restrictions of use:
 - The land use of the site is restricted to commercial/industrial, which excludes sensitive uses with accessible soil such as childcare centres, kindergartens, pre-schools and primary schools. The site should not be developed for a more sensitive use such as residential use, childcare centres or recreational open space, without further contamination assessment and/or remediation.

ID: 2990

- Previous use:
 - Historically used as a service station.
- Restrictions of use:
 - The land use of the Site is restricted to commercial/industrial use; which excludes childcare centres, kindergartens, pre-schools and primary schools and should not be developed for a more sensitive use such as recreational open space; residential use or childcare centres.

ID: 65218

- Previous use:
 - Historically used as a service station for approximately 53 years.
- Restrictions of use:
 - The land use of the site is restricted to commercial/industrial use. The site should not be developed for a more sensitive use such as residential use, childcare centres or recreational open space, without further contamination assessment and/or remediation. Due to the nature and extent of groundwater contamination, the abstraction of groundwater for any purpose is not recommended.

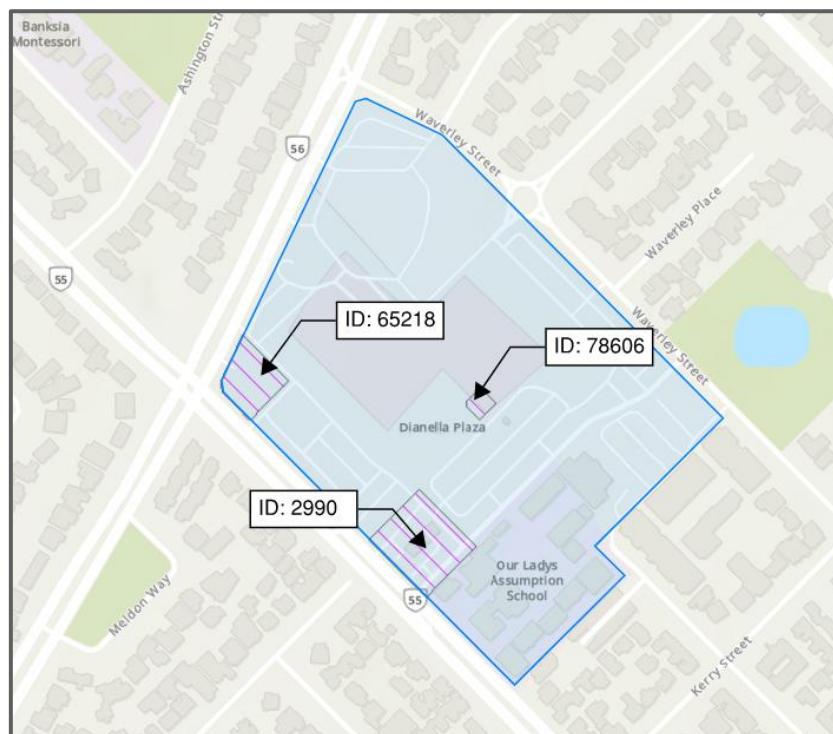


Figure 6 - Contaminated sites mapping (DWER)

3.6 Road and Rail Noise

The Department of Planning, Lands and Heritage road and rail noise mapping indicates that the site is contained within a Strategic Freight and/or Major Traffic Route zone. Colliers recommends that this be further investigated during consideration of the most appropriate built-form design.

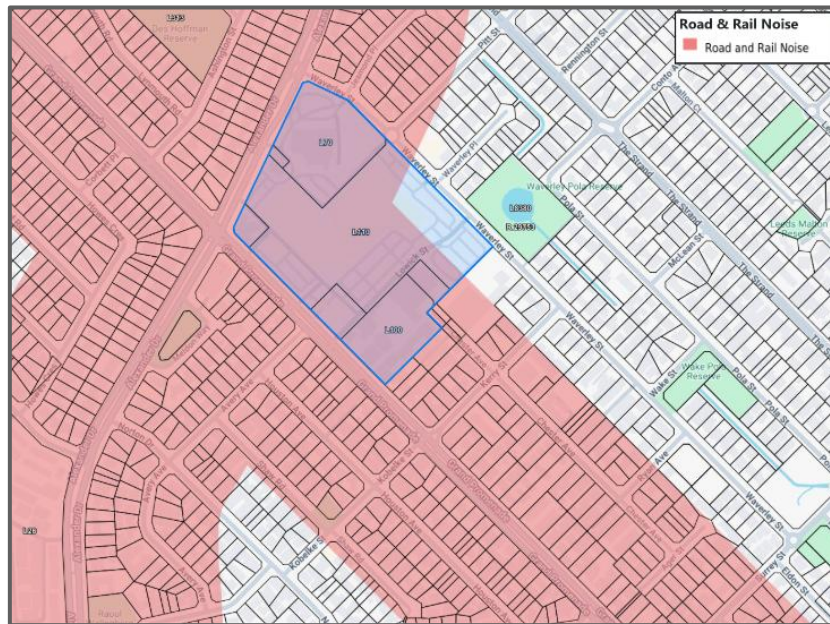


Figure 7 - Noise and rail mapping (DPLH)

3.1 Trees and Vegetation

City of Stirling provides a register for trees that are managed by the city, of which multiple trees are located within the three verges fronting road reserves to the proposed development. Developments within an area of a register tree would require that protection be provided to ensure the health of the tree. City of Stirling detail that a maximum impact to the Tree Protection Zone (TPZ) is 10%, which would require a tree root survey to identify. However, it is possible that the proximity of registered trees to the proposed development may impede the TPZ. In any such case, approval by the city will be required under the City of Stirling Street and Reserve Tree Policy (section 5).

Location of the City's trees should be considered during the design phase to mitigate disturbance of any TPZ's and limitation of sightlines obstructed for vehicles entering or exiting the development.

3.2 Demolition and Remediation

3.2.1 Controlled Modifications of Existing Buildings (Including HAZMAT Materials)

To facilitate the proposed development, demolition of the existing buildings will be required. Given the date of construction of these buildings (late 1980's), a hazardous materials inspection by Prensa (2020) was conducted, identified non-friable Asbestos Containing Materials (ACM) within the existing shopping center.

It would be advised to carry out a more intrusive investigation into the modification and demolition prior to commencement of works. Implement of an asbestos management plan and work to conform with Work Health and Safety Act (2020) would be required if the site was found to include ACM, which may involve a staged approach during construction.

Colliers notes that screening for ACM materials to a depth of 1m may be required in proximity to the former Dianella Hotel within Lot 70, with ACM cement sheet fragments present in unsealed surface soils from historical demolition building footprint following any demolition process. Colliers expect that a removal rate of less than 10% will be applicable, of which any material captured by the screening process will likely require disposal as Class I Special.

Lot 59 & 78 had historically been used as service stations, therefore classified as Remediated for Restricted Use. Residual hydrocarbons remain in soil and groundwater at depths of 5.0 to 8.0 m below ground level on Lot 78, which should be considered for any deep service trenching or excavations.

Products that contain Synthetic Mineral Fibres (SMF) were observed during building inspections, generally within the sarking, duct work and water heaters. Managed of such material should be in accordance with the Worksafe Australia Synthetic Mineral Fibre National Standard & Code of Practice (1990).

Furthermore, due to the era of original construction, there is potential for further hazardous materials to be contained within the building, such as;

- Polychlorinated Biphenyls (PCBs)
 - Within electrical fittings and assets
- Lead Containing Paint (LCP)
- Ozone Depleting Substances
 - From original air-conditioning units that may be onsite

Colliers recommend that further investigations are undertaken prior to any demolition work required for the modification to the existing building (if possible).

4 External Infrastructure

4.1 Roads and Traffic

The proposed development fronts three roads, in which the Precinct Structure Plan Map (PSP) by Urbis (7 May 2026) propose multiple access points to the ultimate development. Road hierarchy online mapping is provided by Main Roads WA, which indicate the following.

- Alexander Drive
 - Hierarchy: Distributor A
 - 3 left-in, left-out points of access
- Grand Promenade
 - Hierarchy: Distributor A
 - 2 left-in, left-out points of access
 - 1 Private access road
- Waverley Street
 - Hierarchy: Local Distributor
 - 1 left-in, left-out points of access
 - 1 access via roundabout
 - 1 private access road
 - 1 undercroft access point

The PSP seeks to retain the site's established access points for the ultimate development. With the development to include an increase of retail facilities and the inclusion of residential properties, it is expected that an increase in local traffic would result.

The development masterplan incorporates a lower ground undercroft car park containing 283 parking bays. Primary access to this facility is to be provided via a graded driveway transitioning directly to Waverley Street, with an expected elevation difference of 1m. Given the frontage being a local road type, the access facility category of 4 would be considered to comply with AS2890.1 (2004). Access to the undercroft is proposed to cross a pedestrian access footpath within the verge of Waverley Street, that abuts the site boundary. Level 1 & 2 will include an additional carpark consisting of a combined 276 car bays and will provide a single access point from the private access road internal of the site, interfacing with Waverley Street.

In all cases, sight distances at access driveway exits and geometry of ramps will need to be considered to AS2890.1 (2004) that would allow safe sight distances for pedestrians and vehicle movements.

Consultation with Main Roads WA will be required for approvals concerning the arterial road interfaces along both Alexander Drive and Grand Promenade, while Waverley Street crossovers, verge reinstatements, pedestrian path configurations, and local traffic assessments would require approval from City of Stirling.

4.2 Sewer

The Water Corporation Esinet data indicates the location of sewer reticulation mains within the vicinity of the proposed development:

- Waverley Street (Northeast boundary)
 - Lot connection via Ø150mm VC to the northeast and southeast corners of Lot 110 (IL's 25.19 & 23.44).
 - Lot connection via Ø150mm VC to the southeast corners of Lot 70 (IL 24.05m AHD).
 - Ø900mm RCPL gravity transfer main (Bedford Bypass Sewer) beneath Waverley Street.
- Alexander Drive (Northwest boundary)
 - Ø1370mm RCPL gravity transfer main (Dianella Main Sewer) beneath southbound lane of Alexander Drive.
 - Lot connection via Ø225mm PVC-U to Lots 59 (IL 22.36m AHD), 71 (IL 26.50m AHD) and 110 (IL 22.41m AHD).
- Grand Promenade (Southwest boundary)
 - Lot connection via Ø150mm VC to Lots 78 (IL – 26.96m AHD) and 100 (IL's 26.45, 25.08m AHD).
- Chester Avenue (Southeast boundary)
 - Lot connection via Ø150mm VC to Lots 79 (IL – 25.17m AHD).

Historic plumbing documents obtained from the Department of Mines, Industry Regulations and Safety indicate lot connections to past and current buildings.

It is indicated that the Ø150mm Lot connection from Alexander Drive extends southeast to the existing shopping center servicing the western tenancies and extends northeast along the boundary to service the isolated buildings that front Alexander Drive.

The Ø150mm Lot connection to Lot 70 extends along the internal road leading from the Waverley Street and Pitt Street roundabout to the shopping centre. It then connects to a pit where two Ø150mm PVC-U sewer lines connect to tenancies along the northeast and northwest of the building.

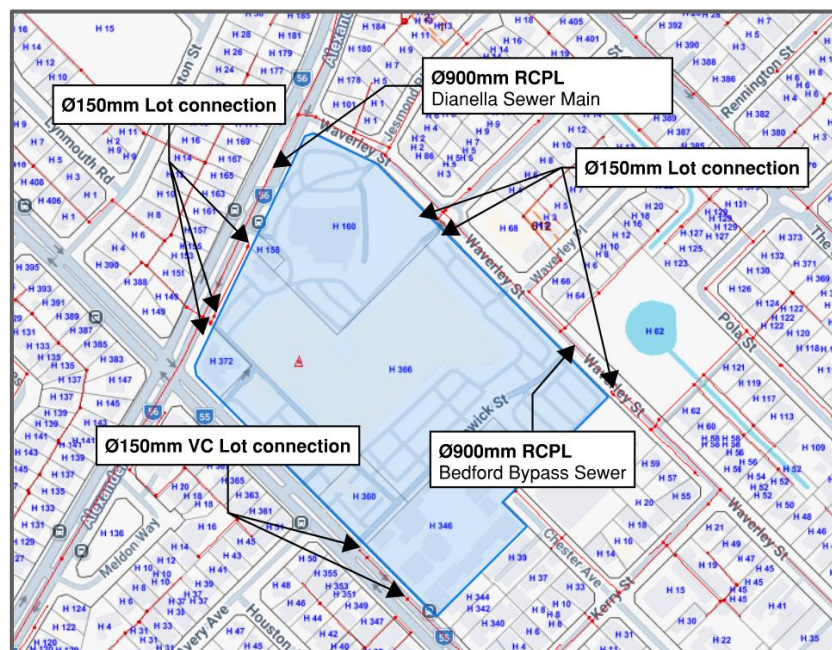


Figure 8 - Water Corporation sewer network mapping (ESinet)

It is expected that the Ø900mm sewer main within Waverley Street would have capacity to service the three buildings fronting Waverley Street, which comprise of mixed-use buildings of 537 dwellings and commercial tenancies, via a gravity sewer. With the current Lot connections being at an estimated depth of 2 to 3 m below ground level and based on an estimated SDF of 3.9L/s, discharge would likely be spread over multiple Lot connections to the Ø900mm sewer main within Waverley Street. As the development is intending on subdividing lots, it may require an easement to be introduced due to the internal sewer line.

It is expected that the remaining retail and community purpose-based buildings would be able to discharge via existing lot connections within their corresponding lot.

This will need to be confirmed with Water Corporation prior to design stage to mitigate construction of services and structural components interfering with the service.

4.3 Water Reticulation

The Water Corporation Esinet data indicates water reticulation infrastructure within the adjacent road reserves as follows:

- Waverley Street (Northeast boundary)
 - Ø150mm P-16 reticulation main within the northeast verge.
 - Ø150mm RC reticulation main within the northwest verge.
 - Lot connection via Ø150mm VC to the southeast corners of Lot 70 (IL 24.05m AHD).
 - Ø900mm RCPL gravity transfer main (Bedford Bypass Sewer) beneath Waverley Street.
- Alexander Drive (Northwest boundary)
 - Ø150mm Reinforced Concrete reticulation main within the northwest verge.
- Grand Promenade (Southwest boundary)
 - Ø150mm Steel reticulation main within the verge of Lot 59, reducing to Ø100mm Reinforced Concrete within the verge of Lots 110, 78 and 100.
- Chester Avenue (Southeast boundary)
 - Ø150mm RC reticulation main within both verges.

Currently the existing services for the buildings fronting Waverley Street would not likely be suitable for the proposed development intent. Given the demand and proposed intent of the ultimate development, which would include an include an aged care facility, it is expected that an upgrade to the surrounding Water Corporation infrastructure and the establishment of a new service to the premises. A Ø150mm reticulation main along the Waverley Street frontage to the development would likely be required to satisfy fire servicing requirements for such a mixed-use premises.

BYDA indicate that Alexander Drive and Grand Promenade currently have existing potable services to all lots. No fire connections are existing, however it is expected that Lots fronting Alexander Drive and Lots 59 and Grand Promenade would be able to be serviced with the Ø150mm fire connection adjacent to the boundary, with standard headworks to apply. However, if a fire connection would be required for Lot 78 and 100, it is expected that an extension of the Ø150mm main fronting Lot 59 to the site would result.

Furthermore, Water Corporation mapping indicates a dead Ø100 RC pipe that traverses' northeast to southwest through the center of the site, on an alignment to that of Waverley Place. It is anticipated that the commercial development may expose this service; therefore, it would be advisable to consider the complete removal or capping of this pipe.

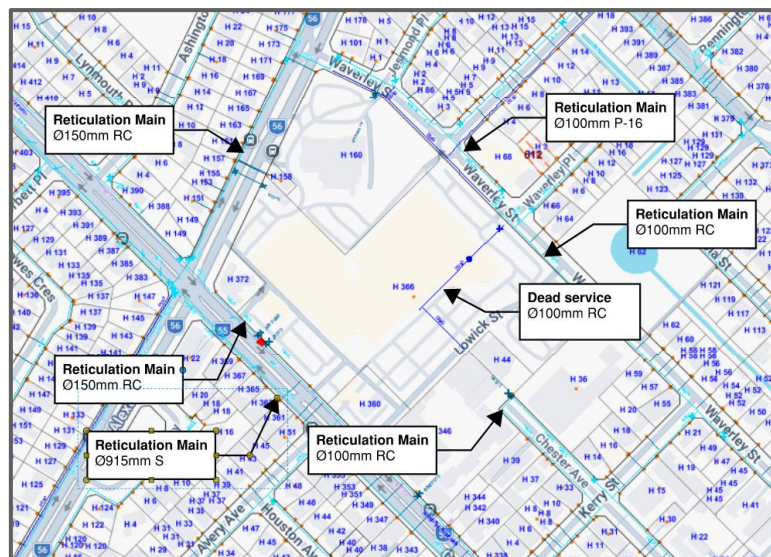


Figure 9 - Water Corporation water network mapping (ESInet)

The Water Corporation have provided advice to confirm in order to service the expansion site with an appropriate fire service, a Ø150mm reticulation main, involving an approximate 340m extension from The Strand's 220RC water main to the proposed development is required. The Water Corporation has indicated that the extension route would nominally be along Waverley Place, traverse Crown Land managed by the Water Corporation, to Pitt Street and subsequently connecting to the 220RC main within the western verge of The Strand. Final alignment of such extension would be subject to detailed design and negotiation.

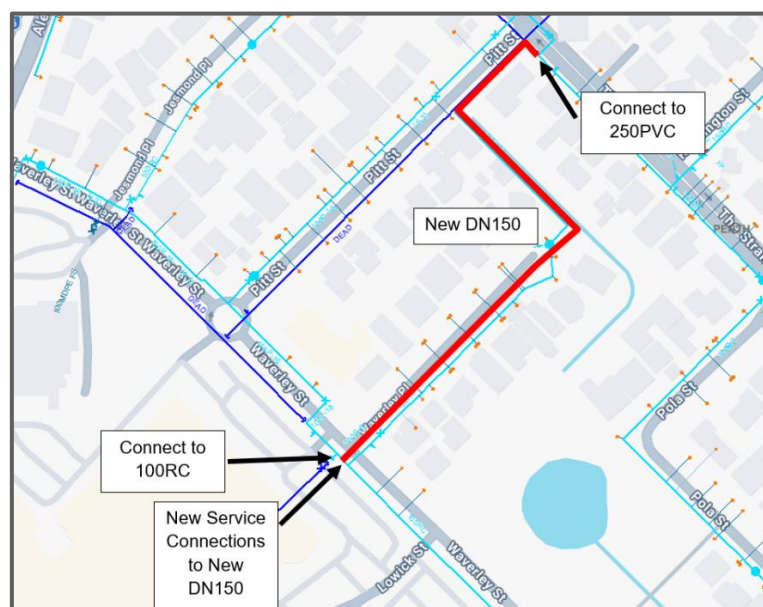


Figure 10 - Water Corporation initial water servicing advice

It is anticipated that the proposed development can be adequately serviced with potable water and fire connections through the existing Ø150mm water mains surrounding the site and extensions where required. A hydraulic consultant will be required to assess each individual building within the development site at the time of future development in order to review the water pressure and flow within the existing water mains to verify capacity to support.

4.4 Gas

A Before You Dig Australia (BYDA) search has indicated that there is existing gas infrastructure within the adjacent road reserves.

- Waverley Street (Northeast boundary)
 - Ø50mm PVC distribution pipe (MAOP 7kPa) located within the northeastern verge.
- Alexander Drive (Northwest boundary)
 - Ø250mm Steel distribution pipe (MAOP 1900kPa) located within the northeastern verge.
 - Ø100mm PE distribution pipe (MAOP 7kPa) located within the southeastern verge.
- Grand Promenade (Southwest boundary)
 - Ø80mm PVC distribution pipe (MAOP 7kPa) located within the northeastern verge
 - Ø100mm PE distribution pipe (MAOP 7kPa) located within parts of the southwestern verge.
- Internal
 - Ø80mm PVC service within Lot 110.

Colliers believe that if the site required gas servicing, it would expect that the service passing the development on Waverley Street would not provide adequate capacity if servicing was needed. If required, it would be likely an extension around 200m north to Alexander Drive where a Ø110mm PE exists within the southern verge. Based on the available gas mains, it is expected that the remainder of the proposed development would be supported with the existing Lot connections and external network.

4.5 Electrical Power

A Before You Dig Australia (BYDA) search has provided data on Western Power infrastructure within the adjacent road reserves as follows:

- Waverley Street (Northeast boundary)
 - HV 11kV underground powerline within the southwest verge.
 - LV 415V underground powerline within the southwest verge.
 - LV 415V overhead powerline within the southwest verge.
 - Electrical Transformer (WAVERLEY) within Lot 70.
- Alexander Drive (Northwest boundary)
 - HV 132kV overhead powerline within both verges.
 - LV 415V underground powerline within both verges.
 - LV 415V overhead powerline within the northeast verge.
- Grand Promenade (Southwest boundary)
 - HV 132kV overhead powerline within northeast verge.
 - HV 11kV underground powerline within both verges.
 - LV 415V underground powerline within both verges.
 - Electrical Transformer and switch gear (356 GRAND PROM) within Lot 100.
- Chester Avenue (Southeast boundary)
 - 2 x Electrical Transformers (370 GRAND PROM 1&2) within Lot 110.
- Internal
 - Electrical Transformer (WAVERLEY) within Lot 70.

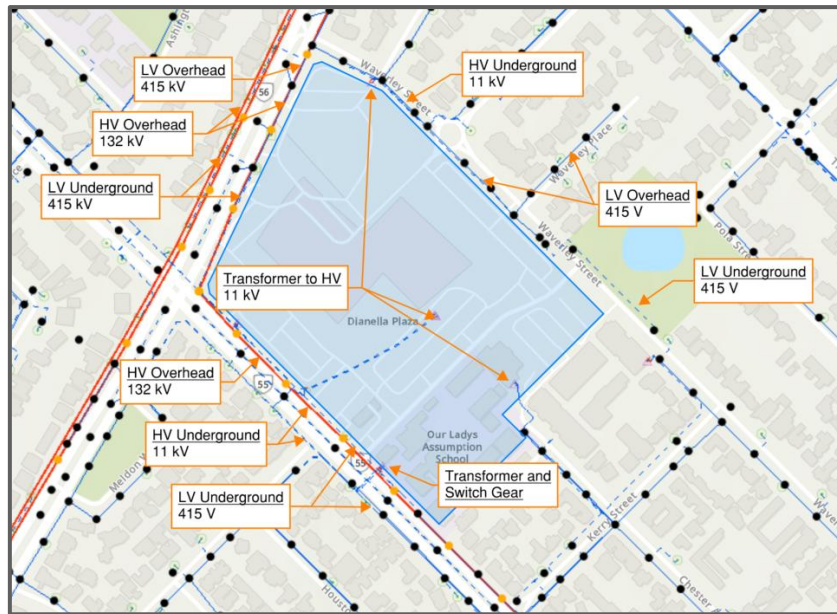


Figure 11 - Western Power mapping

To facilitate the proposed multi-storey, mixed-use residential and commercial development along the property boundaries, clearance requirements of the surrounding overhead power lines is to be considered. Western Power require clearance from any works to overhead powerlines, with a minimum of 1m for low-voltage lines and 3m for high-voltage infrastructure. Furthermore, any construction works occurring within 3m of cables 33kV and above necessitate permits and authorisations from Western Power. Because the proposed building footprints abut the property boundaries along Alexander Drive and Grand Promenade, they are likely to encroach upon this 3m danger zone. To mitigate this constraint, the undergrounding of these electrical services is recommended; this approach not only ensures regulatory compliance but also eliminates visual obstructions, thereby enhancing the overall aesthetic appeal and streetscape of the development. If powerlines were to remain, vertical clearance should be considered for future loading dock routes that will facilitate access for delivery vehicles. A survey of the power line elevations, including any sags and pole connection points, will be necessary to assess the implications for future civil design.

In addition to the power line clearances, an asset conflict exists opposite the Waverley Place intersection, where an overhead power pole is structurally supported by a stay wire anchored directly within the existing carpark. The impact to the building footprint is unknown, however, if not directly within the building footprint, it is likely that the construction process may be impacted due to its location and will need to be considered.

The Western Power Network Capacity Mapping Tool indicates that the development area is fed by the Morley (MO) substation region and that the remaining capacity (2025) on the network is between 15 to 20 MVA. The site demand can be estimated to be 6.7MVA, based on an area of 30,245m² retail/commercial with a demand of 140VA/m² and 619 residential dwellings with demand of 4kVA per dwelling.

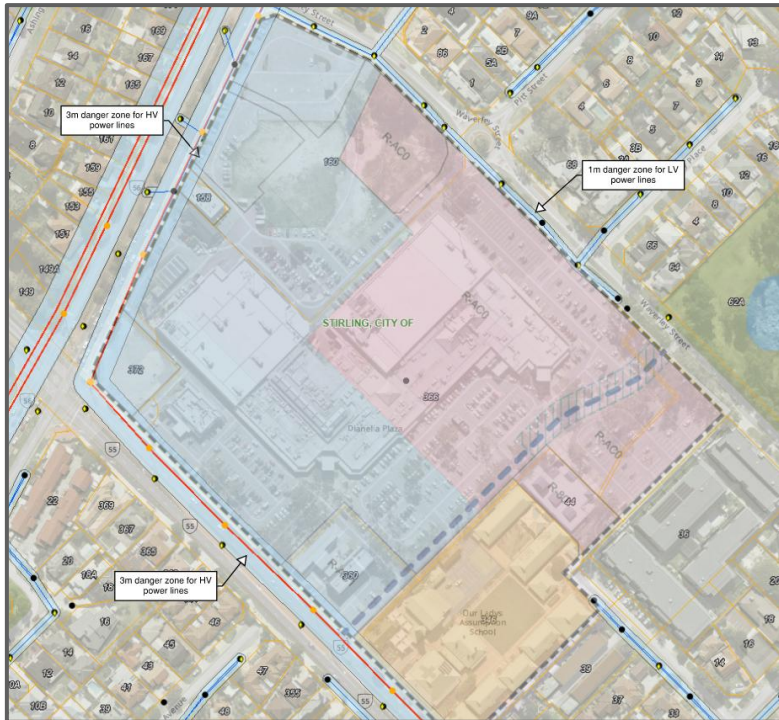


Figure 12 - Western Power danger zone mapping (Wester Power)

An appointed electrical consultant will be required to confirm if any potential Western Power upgrades are required to facilitate the capacity required for the proposed development. Communication with Western Power will be required regarding the sourcing of additional grid capacity for the development site.

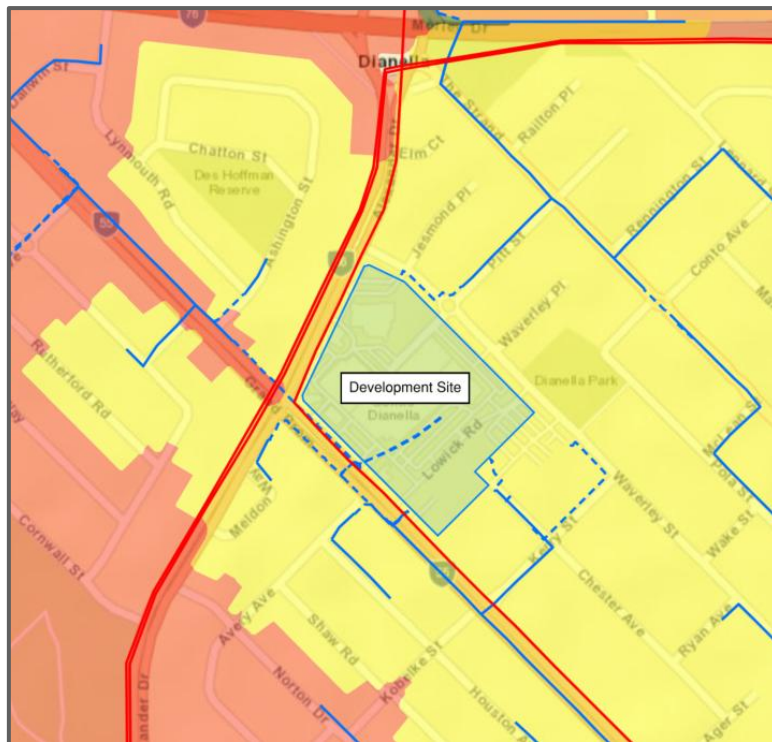


Figure 13 - Western Power capacity mapping (Western Power)

4.6 Communications

A Dial Before You Dig investigation indicates that there is existing communications infrastructure within the vicinity of the proposed redevelopment as below:

Telstra

- Mains cable pit and pipe network located within northwest verge of Alexander Drive.
- Mains cable pit and pipe network located within southwest verge of Grand Promenade, with a connection to Lots 100 & 110.
- Mains cable pit and pipe network located within Chester Avenue, with a connection to Lot 100.

NBN

- Pit and pipe network located within all road reserves surrounding the site.

Optus

- Pit and pipe network located within the southwest verge of Waverley Street and the northeast verge of Alexander Drive.
- Lot connection to the northeast boundary, with an estimated alignment with Waverly Place.

Although there is adequate NBN pit and pipe network within the surrounding road reserves, capacity to support the 619 residential dwelling and retail/commercial premises would need to be investigated.

Communications mapping illustrates that there are several minor and major manholes located within proximity site boundary which will require protection during construction. With the development intending to use the existing access points throughout the site, it is not expected that such pit would be affected. We note that communication manholes cannot be located within pavements, including crossovers, and therefore should a proposed crossover clash with an existing communication asset, the relocation of the communication asset will be required. However, consideration of widening any of these driveways would be required as to not introduce the requirement for costly relocation of communication assets.

Based on available service mapping, several minor and major telecommunications manholes are located in close proximity to the site boundaries, which would require protection during construction phase. Because the development intends to utilise the existing site access points, impacts on these service pits are expected to be negligible under the current layout. However, telecommunications manholes should not be located within trafficable pavements, including vehicle crossovers. Should any proposed crossover conflict with an existing telecommunications asset, relocation of the utility infrastructure may result in relocation costs. To avoid these such costs, any proposed widening or modification of the existing driveways should be designed with consideration clearance from existing communication assets.

4.7 Stormwater Drainage

A Before You Dig Australia (BYDA) search has provided data from the City of Stirling, identifying stormwater structures within the site. The existing stormwater network can be summarised as:

- Ø225mm RC Lot connection to Lot 110, fronting Alexander Drive
- boundary and two connections from the Waverley Street boundary. BYDA provided City of Stirling's stormwater mapping, which indicated that the Alexander Drive connection discharges northwest via a Ø225mm RC stormwater pipe to Lot 232, Ø300mm RC stormwater main within the southwest verge of Waverley Street, extending 65m from the Pitt Street roundabout, increasing to Ø600 for a further 55m before diverting east into the Waverley Street compensation basin.
- Grated drainage pit and manhole along the northeast boundary, discharging into the Waverley Street stormwater main 15m north of Waverley Place via a Ø450mm RC pipe connection.
- 2 x Grated drainage pits along the northeast boundary, discharging into the Waverley Street stormwater main 35m south of Waverley Place via a Ø450mm RC pipe connection.
- 30m of stormwater pipe (unknown size) extending 30m into the site from the southeast boundary, aligned 10m offset with the northeast boundary.

A feature survey by Jurovich Surveying (12 April 2024) and City of Stirling mapping indicate that site runoff currently discharges into the Waverley Street network and Water Corporation compensation basin. While the internal pit and pipe configuration requires further investigation to confirm interconnectivity, roof catchment currently routes through the existing carpark network.

Historically, Lot 110 has utilised lot connections to discharged stormwater to the City's surrounding stormwater network, one connection from the Alexander Drive boundary and two connections from the Waverley Street boundary. BYDA provided City of Stirling's stormwater mapping, which indicated that the Alexander Drive connection discharges northwest via a Ø225mm RC stormwater pipe to Lot 232, while the boundary fronting Waverley Street discharges east via two separate Ø450mm RC stormwater pipes located both north of and south of Waverley Place (IL 25.89 & 24.48m AHD respectively) to Waverley Pola Reserve, and via a Ø375mm ASB stormwater pipe (IL 24.24m AHD) to Waverley Pola Reserve after passing through a junction pit within the neighbouring Lot 888.

City of Swan mapping also not that within Lot 110 where the proposed Stage 2A & 2B building are to be located, parts of the existing internal drainage stormwater piping consists of potential Asbestos Containing Material (ACM). As such, the development would require these internal drainage networks to be removed and augmented to provide a compliant stormwater network. According to Jurovich Surveying's Underground Utility Investigation (2 April 2024), materials of the internal stormwater network that was identified consisted of reinforced concrete and PVC materials. An asbestos management plan would be required for demolition of any drainage structures that would be found to be of ACM, compliant with Work Health and Safety Act (2020).

Where the Dianella Plaza carpark is found to share a pit and pipe network with the subject site to attenuate towards the City of Stirling's stormwater network, it is likely that augmentation of the existing stormwater network would be required. Correspondence from the City of Stirling provided comment on relocation of any such connection points, specifically;

'Additionally, any of the City's pipes within the lot which may be affected by works, will need to be either relocated at the applicant's expense or protected throughout the duration of works. A pre and post inspection of these assets will be required.'

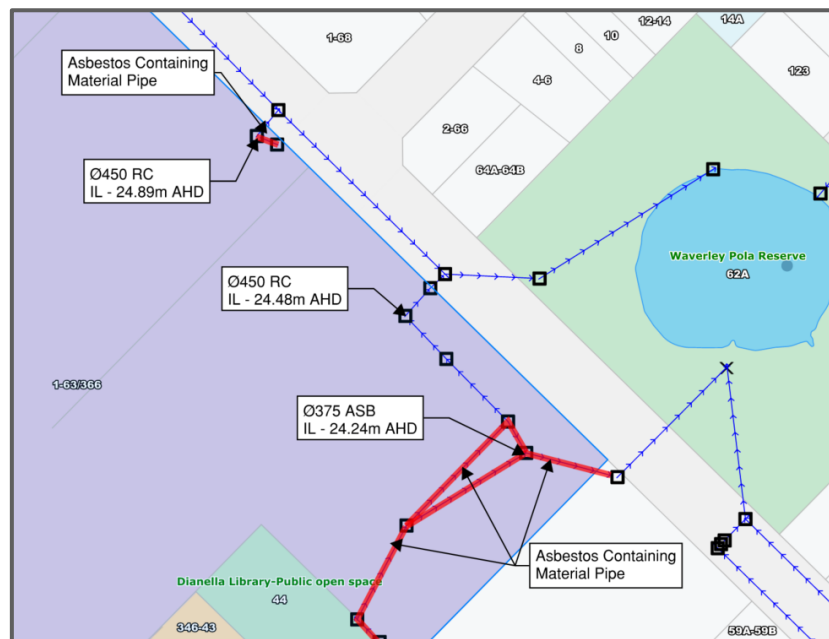


Figure 14 - City of Stirling stormwater network mapping (COS)

Following recent discussions, the City has agreed to allow the proposed development to retain its existing Lot connection discharge to the City's external network for developments fronting Waverley Street within Lot 110. This is conditional upon implementing environmental controls to treat the first 15mm of hardscape runoff via bio-retention basins. Roof runoff from the development would be considered clean of nature and not require treatment within these bio-retention basins. As the proposed undercroft level for Stage 2 is to be 25.29m AHD, an overland flow path or gravity connection may not be achievable to connect to the surrounding stormwater network. If not achieved, an impervious storage system would likely be required beneath the car park due to the expected groundwater being at 24m AHD, to mitigate the risk of trapped water within the undercroft and drainage system. This would also require a mechanical pumping aid to discharge any water ingress that may enter the area.

Based on the sandy soil geology, groundwater table and discussions with City of Stirling for Lot 110, it is anticipated that stormwater management of the first 15mm onsite on site would be required via the use of shallow depressions in the surrounding landscape areas to treat runoff from carpark and internal roadways, with larger events to discharge into the City's network via the pre-existing Lot connection. City of Stirling would require a compliant Drainage Management Plan (DMP) to be approved during the DA design phase.

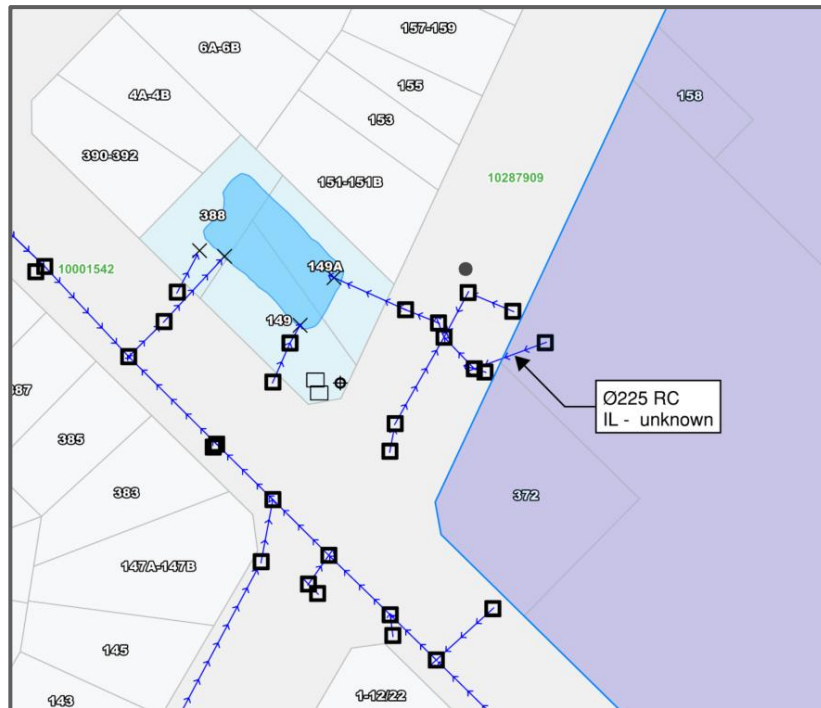


Figure 15 - City of Stirling stormwater network mapping (COS)

Lot connections for remaining lots would not be accepted by the City, where separation to groundwater and infiltration opportunities are expected to be achieved. The City of Stirling would require the stormwater system within these stages to cater for a 5% AEP. If the site cannot provide overland path to the City's road reserves, the development would be required to increase the containment to cater for a 1% AEP critical event. Developments exceeding two storeys typically require a comprehensive Drainage Management Plan (DMP) to meet the City of Stirling's On-Site Stormwater Drainage Criteria.

5 Conclusion

This site servicing report outlines the likely geotechnical conditions and services supporting the proposed development site. Colliers confirm that the site is accessible and can be service via local upgrades of the existing sewer, water and communication services.

It is recommended that further groundwater monitoring throughout all seasonal conditions should be undertaken to provide actual maximum groundwater levels within the site. Current geotechnical groundwater measurements may not reflect seasonal highs and have the potential to impact underground services, with groundwater mapping indicating a level of 23.5 and 24m AHD. As the site is expected to use infiltration methods for stormwater catchment, separation of any below ground drainage structures needs to be considered.

The current gas service passing the site is not expected to have adequate capacity if servicing the site is intended. If gas servicing is required, it would be expected that an estimated 200m to Alexander Drive Ø110mm PE gas main would be required but would be subject to ATCO gas advice.

Overhead powerlines adjacent the Alexander Drive and Grand Promenade fronting boundaries may be impacted by Wester Power's dander zone, that indicated would interfere with buildings that about these boundaries. For this reason, undergrounding of these services may be considered, as it may also mitigate visual obstructions and enhance the aesthetic appeal of the development.

NBN provide a pit and pipe network within the surrounding road reserves, however it is recommended that the capacity to support the 619 residential dwelling and retail/commercial premises should be investigated further. Design of access and services should also consider the location of significant communication pits as to mitigate relocation and augmentations costs of the existing network.

Water Corporation have provided initial advice to provide a suitable fire service to the ultimate mixed-use intent of the development. This would require an estimated 340m of DN150, extended from The Strand, northeast of the site to Waverley Street.

Discussions with City of Stirling has indicated that the current stormwater management method of a lot connection to discharge into the City's surrounding network for Lot 100 will continue to service the overflow of the southeast and northwest portions of the development. This would be conditional on design and treatment of stormwater onsite prior to discharge. There is potential that an underground impervious stormwater storage and mechanical pumping aid would be required to facilitate discharging of trapped water within the undercroft, which is at a lower level to than that of the surrounding stormwater network. Stormwater lot connections are not expected to be accepted by the City for the remainder of the development stages and pad sites, which have greater separation to groundwater. Management of stormwater onsite would be required, that would be in line with the City's stormwater management guidelines.

Appendix D

Local Water Management
Report



AVANT HYDRO
CONSULTANTS

Dianella Centre Precinct Structure Plan

Local Water Management Report



Prepared for:
GREENPOOL CAPITAL

AUGUST 2026

Report ref: AVH1097B_1

DOCUMENT CONTROL

Document Name: Dianella Centre Precinct Structure Plan - Local Water Management Report

Document No: AVH1097B_1

Version	Purpose	Author	Review	Approved	Date
Rev 0	Draft to Client	M Ioannidis	M Yan	M Yan	22 June 2026
Rev 1	Final	M Ioannidis	M Yan	M Yan	11 August 2026
Rev 2					

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1. EXECUTIVE SUMMARY

This **Local Water Management Report [LWMR]** has been prepared to support the *Dianella Centre Precinct Structure Plan [PSP]* (URBIS, 2026) which encompasses Lots 59, 78, 100 & 110 Grand Promenade; Lots 70 & 71 Alexander Drive; and Lot 79 Chester Avenue, Dianella, and is herein referenced to as the Study Area.

The PSP covers an area of approximately 9 ha and incorporates an existing School (Our Lady's Assumption School) and library (Stirling Libraries – Dianella) and a proposed re-development of the balance of the PSP area, including Dianella Plaza with mixed use and commercial/retail (Centre Zone) uses, Figure 1.

This LWMR provides the framework for the application of total water cycle management to the development, consistent with the Department of Water and Environmental Regulation's principles of Water Sensitive Urban Design as described in the *Stormwater Management Manual for Western Australia* (DWER, 2022) and *State Planning Policy 2.9 Water* (WAPC, 2025a) and associated design guidelines (WAPC, 2025b).

It identifies the hydrological characteristics of the site and demonstrates that the proposed re-development can be supported with the application of an appropriate water management strategy.

A summary of the LWMR design objectives is presented in Table 1.

Table 1: Summary of LWMR Design Principles and Criteria

Key Guiding Principles	
- Facilitate implementation of sustainable best practice in urban water management - Provide integration with planning processes and clarity for agencies involved with implementation - To minimise public risk, including risk of injury or loss of life. - Protection of infrastructure and assets from flooding and inundation. - To maintain the total water cycle.	
Category	LWMR Design Criteria
Water Conservation and Sustainability	- Ensure non-potable water supply systems are considered as part of an integrated water supply. - Household target water use of 100 kL/person/year. - Scheme water target use of 40-60 kL/person/year. - Use of waterwise landscaping practices both at development and lot scale.
Stormwater Management	- Maintenance of the pre-development hydrological regime including outflow rates. - Safe conveyance and management of stormwater runoff in accordance with ARR 2019 (Ball et al., 2019) - At source retention of the 5% AEP (20% AEP) and detention/retention of stormwater runoff up to the 1% AEP (100 year ARI) storm event. - Water quality treatment systems and water sensitive urban design structures designed in accordance with <i>Stormwater Management Manual for Western Australia</i> (DoW, 2007) Chapter 9 (<i>Structural Controls</i>) and <i>Australian Runoff Quality</i> (Engineers Australia, 1997). - Non-structural measures to reduce applied nutrient loads.
Groundwater Management	- Ensure adequate separation, minimum 1.5 m between building floor levels and the design groundwater level. - Manage fertiliser and pesticide application in vegetated areas. - Manage and minimise changes in groundwater levels and groundwater quality following development.
Water Quality	- Adopt nutrient load reduction design objectives for stormwater runoff. - Minimise nutrient applications to vegetated areas.

2. INTRODUCTION

2.1 BACKGROUND

Avant Hydro has been appointed by Greenpool Capital to prepare this **Local Water Management Report [LWMR]** to support the *Dianella Centre Precinct Structure Plan [PSP]* (URBIS, 2026). The PSP covers approximately 9 ha and includes Lots 59, 78, 100 & 110 Grand Promenade; Lots 70 & 71 Alexander Drive; and Lot 79 Chester Avenue, Dianella, and is herein referred to as the Study Area. The Study Area is bound by Grand Promenade to the south, Alexander Drive to the west, Waverley Street to the north and residential properties to the east.

This LWMR outlines a conceptual water management strategy for stormwater, groundwater, water supply and water quality management, at a level of detail suitable for the purpose of the local planning scheme. This is consistent with the level of water management reporting required, and the general requirements for a LWMR as outlined in Table D.1 of *State Planning Policy 2.9 Water* design guidelines (WAPC, 2025b).

2.2 STATUTORY FRAMEWORK

2.2.1 Regional Planning

The Study Area is zoned *Urban* in the Metropolitan Region Scheme, and predominantly *District Centre* in the City of Stirling Local Planning Scheme No. 3, with the south-east corner zoned as *Service Station* and north-east corner as *Hotel*. The draft City of Stirling Planning Scheme No. 4 shows the whole area zoned as *Centre*. This new planning scheme was supported by the City of Stirling council in June 2025.

There are no guiding water management documents for the Study Area.

2.2.2 Local Planning

The majority of the Study Area is located within the Dianella Centre Plan area (City of Stirling, 2012) which was prepared and adopted by the City of Stirling in 2012.

The *Dianella Centre Precinct Structure Plan [PSP]* (URBIS, 2026) predominantly proposes a mix of Mixed Use and Centre Zones with circulation and parking areas to maintain traffic flow and the retention of Our Lady's Assumption School and Stirling Libraries - Dianella, Figure 1.

This LWMR is presented in support of this PSP and develops surface water and groundwater management strategies at a local scale and has been prepared in accordance with the requirements of DWER (2017a; 2022) and WAPC (2025a&b).

2.3 KEY DESIGN PRINCIPLE AND OBJECTIVES

The LWMR uses the following documents to define its content, key principles and objectives some of which are described in further detail below:

- *Decision Process for Stormwater Management in Western Australia* (DWER, 2017a);
- *Stormwater Management Manual for Western Australia* (DWER, 2022);
- *City of Stirling On Site Stormwater Drainage Criteria* (City of Stirling, 2024);
- *State Planning Policy 2.9 – Water* (WAPC, 2025a);
- *State Planning Policy 2.9 – Water: Planning for Water Guidelines* (WAPC, 2025b); and
- *Local Governmental Guidelines for Subdivision Development* (IPWEA, 2026).

2.3.1 Decision Process for Stormwater Management in Western Australia (DWER, 2017a)

The *Decision Process for Stormwater Management in Western Australia* (DWER, 2017a) was developed to provide an approach and outcome criteria for planning and designing stormwater management systems for urban developments and retrofitting of existing stormwater management systems. The document is the third edition and was originally published in 2005 then updated in 2009.

The purpose of the decision process is to:

- Design urban stormwater management systems that reduce risk to people and property from flooding to within acceptable levels;
- Design urban stormwater management systems that mimic natural hydrological process for the relevant stormwater catchment;
- Retain natural water bodies as the receiving environments for runoff of suitable quality from minor and major rainfall events;
- Retain and plant vegetation (preferably local native species), where possible, to reduce stormwater runoff volumes and peak flow rates, reduce urban temperatures, improve water quality, increase urban biodiversity and improve aesthetics and urban amenity;
- Implement stormwater management systems and site management, maintenance and other practices to prevent, reduce and treat pollutants' and
- Design urban stormwater management systems that achieve good urban amenity and provide multiple functions.

2.3.2 Stormwater Management Manual for Western Australia (DWER, 2022)

The Water and Rivers Commission (Department of Water, DoW, 2006-2017; Department of Water and Environmental Regulation, DWER, 2017-present) released *A Manual for Managing Urban Stormwater Quality in Western Australia* in 1998 to define and practically describe Best Management Practices (BMP's) to reduce pollutant and nutrient inputs to stormwater drainage systems. The Manual also aimed to provide guidelines for the incorporation of water sensitive design principles into urban planning and design, which would enable the achievement of improved water quality from urban development.

The document was released to provide a guideline for best planning and management practices and was intended for use by Water and Rivers Commission, but also by other State and Local Government Authorities and sectors of the urban development industry.

In consultation with a working team comprising industry and government representatives a major review of the manual was completed in 2007. The revised manual was officially launched in August 2007.

Principle objectives for managing urban water in WA are stated as:

- Water Quality: To maintain or improve the surface and groundwater quality within development areas relative to pre-development conditions.
- Water Quantity: To maintain the total water cycle balance within development areas relative to the pre-development conditions.
- Water Conservation: To maximise the reuse of stormwater.
- Ecosystem Health: To retain natural drainage systems and protect ecosystem health.
- Economic Viability: To implement stormwater systems that are economically viable in the long term.
- Public Health: To minimise the public risk, including risk of injury or loss of life to the community.
- Protection of Property: To protect the built environment from flooding and waterlogging.

- Social Values: To ensure that social aesthetic and cultural values are recognised and maintained when managing stormwater.
- Development: To ensure the delivery of best practice stormwater management through planning and development of high quality developed areas in accordance with sustainability and precautionary principles

The manual was reviewed and updated in 2022 from the August 2007 version to ensure all information contained in the document was correct and up-to-date.

2.3.3 City of Stirling On Site Stormwater Drainage Criteria (City of Stirling, 2024)

The *City of Stirling On Site Stormwater Drainage Criteria* has been devised by the City of Stirling to aid private property owners who seek to develop or subdivide their property whilst managing stormwater runoff within their property.

The criteria states that on-site retention storage volumes are to be designed to cater for the 20 year ARI (5% AEP) critical storm event. However in the case that the overflow from the on-site 20 year ARI (5% AEP) stormwater system could not be safely stored within its boundaries or have an overflow path where it would not enter other private properties, then the on-site storage volumes are to be designed to cater for the 100 year ARI (1% AEP) critical storm event.

The criteria further states that no private lot connections to the City's stormwater system would be permitted unless the applicant (property owner) has provided sufficient evidence that on-site stormwater retention will be adversely affected by a shallow groundwater table.

General information of drainage infrastructure locations and soakwell sizes and capacities are also detailed in the criteria.

2.3.4 State Planning Policy 2.9 – Water (WAPC, 2025a) and Planning for Water Guidelines (WAPC, 2025b)

State Planning Policy 2.9 – Water (WAPC, 2025a) and its associated *Planning for Water Guidelines* (WAPC, 2025b) were prepared under Part 3 of the Planning and Development Act 2005 and released by the Western Australian Planning Commission in December 2025. This document repealed a number of former State Planning Policies and replaced *Better Urban Water Management* (WAPC, 2008) and Government sewerage policy which had till then been the planning instrument and process for urban water development in Western Australia.

The Policy outlines how water resource management should be integrated into the planning process with objectives:

- Protect and improve the environmental, social, cultural and economic values of the state's water resources;
- Protect public health and the long-term supply of good quality and affordable drinking water;
- Manage the risk of flooding to people, property and infrastructure;
- Ensure the secure and sustainable supply, use, disposal and re-use of water resources;
- Ensure future development is resilient to the water-related impacts of climate change; and
- Minimise future costs and protect public health by ensuring appropriate wastewater infrastructure is provided.

This Policy and its Guidelines apply to the preparation and assessment of proposals in relation to water matters, including regional and sub-regional frameworks, region and local planning schemes and scheme amendments, local planning policies, planning strategies, precinct plans, activity centre plans, structure plans, subdivision applications and development applications across Western Australia.

The most appropriate report type as detailed in WAPC (2025b) for this stage of planning is the LWMR. The stated requirements in for a LWMR in WAPC (2025b) largely mirror those of the similarly titled Local Water Management Strategy in *Better Urban Water Management* (WAPC, 2008).

2.3.5 Local Government Subdivisional Guidelines (IPWEA, 2026)

The Institution of Public Works Engineering Australia [IPWEA] Subdivisional Guidelines (Edition 3.1 – March 2026) aim to achieve best practice for managing both water quantity and quality in a sustainable way as required in *State Planning Policy 2.9 – Water* (WAPC, 2025a).

Design criteria are to be used as a guide for development of the urban water management system for strategic planning, subdivision and development. Water management requires consideration of water quality and quantity.

Post-development annual discharge (the critical 1 Exceedance per Year [EY] event) volume and peak flow should be maintained relative to pre-development conditions in all parts of the catchment where there are identified impacts on significant ecosystems. The built environment also needs to be protected from flooding (up to the 1% Annual Exceedance Probability [AEP]) and waterlogging, minimising the public risk.

Surface and groundwater quality should be at least maintained at pre-development levels (winter concentrations) and, if possible, improved. This should be achieved through a treatment train approach including non-structural measures (e.g. community education), on-site retention of the first 15 mm of rainfall and bio-retention structures/systems sized at 2% of the constructed impervious areas. As compared to a development that does not actively manage stormwater quality; the following design objectives are required:

- At least 80% reduction of the total suspended solids;
- At least 60% reduction of total phosphorus;
- At least 45% reduction of total nitrogen; and
- At least 70% reduction of gross pollutants.

Key elements of the water-sensitive design include water conservation, flood protection, management of frequent events, groundwater drainage and general drainage design principles.

3. PROPOSED DEVELOPMENT

The Dianella Centre Precinct Structure Plan [PSP] is located within the City of Stirling and covers an area of 8.95 ha. The PSP proposes re-development of the existing Dianella Plaza complex and surrounding commercial lots to provide broader and revitalised retail zones supplemented by mixed use zones for upward of 600 apartment dwellings and public realm improvements.

The proposed Mixed Use zone incorporates R-AC0 and R-AC1 R-codes with the existing Stirling Libraries – Dianella coded R80. Both the library and Our Lady’s Assumption School are proposed to remain unchanged with the associated PSP re-development.

Key elements of the PSP related to urban water management include:

- Retention and infiltration of frequently occurring rainfall events from roof areas and circulation and parking areas within underground storage and/or planted treatment areas.
- Retention and infiltration of the minor event stormwater (5% AEP / 20 year ARI) within the Study Area.
- Retention of rarer major event stormwater (1% AEP / 100 year ARI) within underground storage or temporarily within low-points in the circulation and parking areas and/or discharge to the external City of Stirling drainage system, consistent with pre-development.
- Retention of existing trees, where possible, within circulation and parking areas.
- Use of local native vegetation species in public realm areas to reduce nutrient input and conserve water resources.

A breakdown of the land use within the Study Area is presented in Table 2 below.

Table 2: Precinct Land Use Breakdown

Land Use Description	Area (ha)
Centre Zone	2.38
Mixed Use Zone	2.96
Private Community Purpose Zone	1.24
Activity Shared Zone	0.23
Circulation and Parking	2.15
Total	8.95

4. PRE-DEVELOPMENT ENVIRONMENT

4.1 EXISTING LAND USE

The majority of the Study Area as at April 2026 comprises of impervious areas either in the form of roofing or hardstand associated with the existing buildings (e.g. Dianella Plaza, Stirling Libraries – Dianella, our Lady’s Assumption School, etc.) and parking areas.

Two cleared, vacant areas are currently located in the north-west and south-west corners of the Study Area. Part of the north-west was formerly the Dianella Hotel (demolished in late-2015) and the south-west area was formerly a petrol station (demolished in 2023).

4.2 CLIMATE

The Dianella area, along with most of the Greater Perth Metropolitan Area, is characterised by a Mediterranean climate with warm dry summers and cool wet winters with rainfall predominantly occurring from May to September.

Rainfall data is provided by the following Bureau of Meteorology [BoM] rain gauges - *Perth Regional Office* (Site ID: 009034; 1880-1991), located 6.5 km south of the Study Area, and *Perth Metro WA* (Site ID: 009225; 1993-2025), located 2.5 km south of the Study Area, Figure 2.

The long-term average annual rainfall for Perth, 1880 to 2025, is 833 mm and short-term (50-year average) is 753 mm, a 10% decline from the long-term average. This is consistent with the decreasing rainfall trend across south-west Western Australia since the 1970s (DoW, 2015b) and is evident at the Perth rainfall gauges with pre-1930s annual rainfall typically exceeding 800 mm in most years whereas post-1970, there are few years with rainfall above 800 mm, Figure 2.

The seasonal rainfall distribution has also altered, with a reduction of monthly rainfall across the wetter months of May to August but no reduction or slight increases in the drier months (November to April), Figure 2 *top*.

Average annual pan evaporation is estimated at 1,925 mm for the Study Area from pan evaporation data recorded at the Department of Primary Industries and Regional Development (DPIRD) Floreat Park weather station (2009-2025). This is slightly lower than estimated pan evaporation for the Study Area from Luke et al. (1987) of 1,850 mm. Average monthly pan evaporation from DPIRD (2026) is shown on Figure 2.

4.3 TOPOGRAPHY

The topography (DoW, 2008) of the Study Area is shown on Figure 3 and shows the land generally grades south-west to north-east from about 30 mAHD to 26 mAHD, towards Waverley Street. A small portion of the western area grades outward towards the adjacent road reserves (Grand Promenade & Alexander Drive). Feature survey of the Study Area (Jurovich Surveying, 2024) is attached as Appendix B.

External drainage basins are visible in the DoW (2008) LiDAR DEM on Figure 3 to the west and north-east of the Study Area.

4.4 SURFACE GEOLOGY

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

The Study Area is generally mapped as “S8” *Sand*. “S8” soils are described in Gozzard (1986) as very light grey at surface, yellow at depth, fine to medium-grained, sub-rounded quartz, moderately well sorted and of aeolian origin.

A geotechnical investigation of the proposed Stage 1 of the re-development, the western half of the Study Area, was conducted by Galt Geotechnics in April 2024 involving the excavation of 5 boreholes, BH01 to BH05, to a target depth of 1.5 m; Perth Sand Penetrometer tests adjacent to each borehole; Cone Penetration Tests [CPTs], CTPu01 to

CPTu08, to a target depth of 8 m; and 3 inverse auger infiltration tests, IT01 to IT03, at depths of 0.91 m. Test locations are shown on Figure 4.

The surface geology of the Study Area is inferred in Galt Geotechnics (2024) as Sand to 8 m depth. Loose sand was encountered within the upper 2 m of the soil profile, typically in the north of the investigation area, and was described as fine- to medium-grained and of grey, brown and yellow colour. Medium Dense to Dense Sand was encountered elsewhere underlying the investigation area and was described as comprising fine- to medium-grained gravelly sand with fine to medium sized gravel. Bore lithological logs in Galt Geotechnics (2024) typically describe the soil profile to 0.7-1 m as Fill Gravelly Sand / Fill Sand with Natural Sand thereafter to the target depth of 1.5 m.

The in-situ derived unsaturated hydraulic conductivities ranged from 7.4 to 8.7 m/day at the tested depth of 0.91 m. Avant Hydro notes that testing locations were typically in car parks where in-situ natural soils have been previously compacted for the current commercial land use.

No groundwater was encountered in boreholes but the groundwater level was inferred from CPT results at about 5.2 to 6.2 m below natural surface (Galt Geotechnics, 2024).

The geotechnical results in Galt Geotechnics (2024) aligns with regional surface geology mapping in Gozzard (1986) and are likely to similarly occur across the balance of the Study Area.

A copy of the geotechnical investigation (Galt Geotechnics, 2024) is attached in Appendix C.

4.5 ACID SULPHATE SOILS

The Study Area is generally classified as Class 1, having a moderate to low risk of Acid Sulphate Soils [A.S.S.] occurring within 3 m of natural surface but a high to moderate risk of A.S.S. at depths beyond 3 m of natural soil surface (DWER, 2017b), Figure 4.

4.6 GROUNDWATER

4.6.1 Regional Hydrogeology

The hydrogeological formations under the Study Area can be grouped into three distinct aquifers, each being assigned the name of the major geological unit contributing to it. In descending order of depth from natural surface they are: Superficial Aquifer (unconfined); Leederville Aquifer (confined) and Yarragadee Aquifer (confined).

Superficial Aquifer

The Superficial aquifer in the Study Area forms part of the Gngangara Mound and flows in southerly direction towards the Swan River. The aquifer underlying the Study Area has a maximum thickness of 40 m and three formations have been inferred from Davidson (1995) as underlying the Study Area which are, in order of increasing depth: Bassendean Sand; Gngangara Sand; and Ascot Formation. The base of the superficial formations at the Study Area is approximately -15 mAHD.

The Bassendean Sand consists of fine- to coarse-grained, moderately-sorted, sub-rounded to rounded quartz sand. The sand is mapped as highly permeable with horizontal hydraulic conductivity ranging between 10 m to 50 m/day.

Gngangara Sand beneath the Bassendean Sand consists of pale-grey, fine- to very coarse-grained, very poorly-sorted, sub-rounded to rounded quartz and feldspar (Davidson & Yu, 2008).

The Ascot Formation beneath the Gngangara Sand consists of hard to friable, grey calcarenite with thinly interbedded sand, with shell fragments commonly near the base of the formation. Sands are fine- to coarse-grained and are poorly sorted and angular to rounded in shape (Davidson, 1995).

The Ascot Formation overlies the Kardinya Shale (part of the Osborne Formation) and which is a confining bed, consisting of moderately to tightly consolidated, interbedded siltstones and shales (Davidson, 1995).

Vertical fluctuations in the groundwater table may be several metres and occur seasonally, consistent with Perth's winter-dominated Mediterranean rainfall pattern. Rainfall recharge to the superficial aquifer is 15 to 20% of total annual rainfall (Davidson, 1995). The regional aquifer salinity underlying the Study Area is 250 to 500 mg/L TDS and fresh with Nitrate concentrations generally exceeding 1 mg/L (Davidson, 1995).

Leederville Aquifer

The Leederville aquifer is found at the base of the superficial aquifer and flow south-westward beneath the Study Area (Davidson, 1995). The aquifer is multi-layered and consists of discontinuous interbedded sandstones, siltstones and shales with average horizontal hydraulic conductivity in the sandstone beds of 10 m/day and in the siltstone and shale beds of 1×10^{-6} m/day and average transmissivity of 300 to 400 m²/day (Davidson, 1995). The Leederville aquifer in the vicinity of the Study Area is fresh at less than 500 mg/L TDS (Davidson, 1995).

Yarragadee Aquifer

The Yarragadee aquifer is a multi-layered aquifer which underlies the entire Perth region and is more than 2000 m thick (Davidson, 1995). The top of the aquifer beneath the Study Area is at approximately -850 mAHD and is confined from the Leederville aquifer by the Gage Formation which underlies the South Perth Shale (Davidson, 1995). The aquifer is interbedded in similar proportion to the Leederville aquifer and has similar average horizontal hydraulic conductivities in respective sandstones and siltstone/shale beds. The flow direction beneath the Study Area is generally south/south-west (Davidson, 1995). The Yarragadee aquifer in the vicinity of the Study Area is likely fresh to marginally brackish at between 500 mg/L and 2,000 mg/L TDS (Davidson, 1995).

4.6.2 Groundwater Levels and Quality

Groundwater levels across the Study Area have been inferred from available groundwater contour mapping in WRC (1997) and DoE (2004).

The groundwater contours presented in WRC (1997) were produced from the then maximum groundwater levels recorded in the then Waters and Rivers Commission [WRC] (now Department of Water and Environmental Regulation) long-term bore monitoring network and effectively represent maximum groundwater levels [MGLs]. Across the Study Area, WRC (1997) groundwater contours suggest that groundwater flow is in a south-west direction from about 25.3 mAHD (north) to 24.7 mAHD (south) with the depth to MGL from natural surface generally greater than 2 m except in the east corner of the Study Area, Figure 5.

Groundwater contours in DoE (2004) are based on groundwater levels measured in Department of Water and Environmental Regulation bores [DWER] on May 2003, i.e. an approximate annual minima. These contours show groundwater levels beneath the Study Area at approximately 19.5 to 20.2 mAHD, a few metres lower than the groundwater minima inferred in Galt Geotechnics (2014) for April 2024 of about 23 mAHD, Figure 5.

The nearest long-term DWER bore to the Study Area is *Lakes And Wetlands Bore – 637* (Site Ref No: 61610204), located 500 m north-east of the Study Area, Figure 5. There are two distinct periods of data for this bore, being 1947 to 1976 and 1980 to 2026, with a downward shift of about 1 m over the latter period. The annual recorded groundwater maxima at the bore from 1980 to 2026 ranged from about 23.5 to 24.5 mAHD with the 2025 recorded peak of approximately 24.7 mAHD this highest recorded over this period. These groundwater levels are well below the approximate WRC (1997) MGL inferred from the bore of about 25.8 mAHD. The seasonal variation at the bore is on average about 1.2 m. Groundwater levels beneath the Study Area may be similarly lower than the MGLs inferred from WRC (1997) although levels within the bore may also be influenced by the nearby Water Corporation compensation basins, Figure 6, which have base inverts less than 24 mAHD compared to the surrounding topography at 26 to 27 mAHD.

Groundwater levels across the Study Area may also be marginally controlled by Water Corporation's nearby Waverley Street compensation basin, Figure 6, which is up-gradient of the Study Area and has a base invert of less than 23 mAHD and a low water level of 23.24 mAHD, Figure 3, about 2.5 m lower than the inferred WRC (1997) MGL, Figure 5.

No groundwater quality data has been captured at *Lakes And Wetlands Bore – 637* nor any bores at similar proximity to the Study Area.

Avant Hydro understands groundwater monitoring bores have been installed within the Study Area as part of a contamination investigation for a former dry cleaning tenancy (Section 4.9) but Avant Hydro does not have a copy of the reporting associated with this nor any collected data.

4.6.3 Groundwater Resources for Irrigation

The Department of Water and Environmental Regulation manages the groundwater of the State under the *Rights in Water and Irrigation Act 1914* (RIWI Act). The Study Area is located within the City of Stirling sub-area of the Perth Groundwater Management Area for the superficial and the Perth Confined North sub-area for the Leederville and Yarragadee aquifers. The City of Stirling sub-area generally aligns with the local government boundary but excludes areas in Balcatta, Gwelup, Stirling and Warwick which form a separate Gwelup sub-area.

The Perth Groundwater Management Area forms part of the Gngangara Groundwater Allocation Plan area. A new groundwater allocation plan (DWER, 2022) was released in June 2022 to replace the previous allocation plan (DoW, 2009). The new plan changed the allocation limits for the City of Stirling in the superficial aquifer from 11,150,000 kL/year in DoW (2009) to 15,121,000 kL/year in DWER (2022) of which only 6,338,000 kL/year is available for general licencing. The majority of the allocation in the sub-area is categorised as “exempt”, mostly related to estimates of water use in domestic garden bores and market gardens, with a further 2,550,000 kL/year allocated for public water supply.

The DWER groundwater allocation limit and water allocations applicable to the Study Area are shown in Table 3 based on a Resource Allocation Report from DWER as at 28 November 2025.

Table 3: DWER Groundwater Resource Allocation and Limit, November 2025

GW Sub -Area	Aquifer	Allocation Limit Licensable component, (kL/yr)	Allocated (kL/yr)	Additionally Requested (kL/yr)	% Allocated, committed & requested
City of Stirling	Superficial Swan	6,338,000	8,073,058	0	127
Perth North Confined	Leederville	1,245,000	1,451,667	2,253	117
Perth North Confined	Yarragadee	80,000	80,000	0	100

A water supply source is required for irrigation of planted areas and for construction / dust suppression. This water can be sourced either from scheme water or groundwater abstraction from the superficial aquifer.

Scheme water can be a viable option if the required allocation is low and only required for a short-term period to establish vegetation. Otherwise, it can be costly and is not consistent with water efficiency and water sensitive urban design principles and guidelines.

Groundwater abstraction from the superficial aquifer is generally the preferred non-potable water supply source, however, all groundwater aquifers beneath the Study Area are fully or over allocated. Water trading is an alternative method to obtain a Licence to Take Water from a third party but the majority of existing licences within the City of Stirling sub-area are either held by the City of Stirling, education institutions or sporting clubs and limited water may be available for trading. There are numerous contaminated sites within the Study Area and groundwater modelling and further analytical testing is recommended to ensure abstraction activities do not significant impact existing contaminant plumes within the vicinity of the Study Area and to ensure that groundwater is suitable for irrigation.

The development zones within the Study Area will remain in private ownership as will the associated drainage assets. Therefore, should a groundwater licence be obtained, it will be retained by the developer as no drainage assets will be transferred to the City of Stirling.

A reticulation system is present at Dianella Plaza to irrigate carpark trees and is its likely these small irrigation volumes are supplied from scheme water.

4.7 SURFACE WATER

There are no watercourses which flow through the Study Area nor are there any open water bodies located within the Study Area.

The Study Area is located within the Bayswater Main Drain sub-catchment of the Swan-Canning catchment (DBCA, 2018). The Bayswater Main Drain [BMD], also referred to as Bayswater Brook, is a permanently flowing drainage network of both open and piped drains and several compensation basins [CBs]. The BMD was formerly a number of natural watercourses that were modified to allow development of the area with the BMD generally flowing north-west to south-east towards the Swan River (DBCA, 2018). The BMD is managed by Water Corporation for flood protection of the surrounding commercial and residential areas. Local government managed drains feed into the BMD and several of the compensation basins are located within parks and recreation reserves managed by the local government (DBCA, 2018).

The Study Area is located adjacent to the Waverley Street CB, Figure 6. City of Stirling managed drainage infrastructure is shown on Figure 6 *right* and suggests there are four drainage discharge points from the Study Area. Of these, 3 are in the north-east drain to the Waverley Street drainage system and thereafter to the Waverley Street CB with the fourth in the south-west of the Study Area that drains to the Alexander Drive drainage system and thereafter to a City of Stirling drainage sump at the corner of Grand Promenade and Alexander Drive, Figure 6.

No existing internal drainage details have been provided to Avant Hydro for the Study Area, however, details in MPA (2023) suggest that existing roof areas discharge to the carpark stormwater system and not separate underground storage units. It is unclear to Avant Hydro whether there is a direct connection of the Dianella Plaza carpark stormwater drainage system to the City of Stirling drainage as shown on Figure 6 *right*, and whether any of the carpark pits shown on the feature survey, Appendix B, also function as soakwells and retain and infiltrate stormwater runoff from relatively frequent rainfall events within the carpark. In rarer events, stormwater will flow with the grade of the land which for the eastern half of Dianella Plaza is south-west to north-east towards Waverley Street and the associated discharge points to the City of Stirling drainage system, Figure 6 *right*. Most of the western half of the Study Area drains radially outward towards Alexander Drive / Grand Promenade and it is unclear where stormwater runoff generated within these areas is wholly retained within the Study Area or there are outlets to nearby City of Stirling drainage infrastructure on Alexander Drive and Grand Promenade.

It is expected that all stormwater runoff currently generated within Our Lady's Assumption School is retained and infiltrated on-site.

4.8 WETLANDS AND VEGETATION

There are no mapped Geomorphic wetlands (DBCA, 2025) within or in close proximity to the Study Area. The nearest mapped wetland is Water Corporation's Morley Drive Compensation Basin, Figure 6 *left*, which is located 400 m north of the Study Area and is mapped in DBCA (2025) as a Conservation sumpland.

There are no Bush Forever sites located within or in close proximity to the Study Area with then nearest site located in Dianella Regional Open Space, 400 m north of the Study Area.

4.9 CONTAMINATED SITES

Current / former service stations located in the south-east and south-west of the Study Area corners of the Study Area are classified on the Contaminated Sites Database as *Remediated for Restricted Use* due to the presence of hydrocarbons in soil and groundwater. Some historical remedial works were conducted but residual contamination was considered to remain in the soil and was still suitable for commercial/industrial land use (MPA, 2023). MPA (2023) notes that this contamination is between 5 to 8 m below natural surface and is unlikely to be impacted during any proposed re-development works.

The former dry cleaner tenancy in Dianella Plaza is also classified as *Remediated for restricted use* due to use of chlorinated solvents (Tetrachloroethylene) associated with dry cleaning activities. Findings summarised in MPA (2023) indicates that the Department of Health were satisfied the tenancy was suitable for commercial use as the chlorinated solvents in groundwater no longer posed a public health risk to site users.

Some fragments of anthropogenic waste including suspected asbestos-containing fibre cement sheet fragments were noted in MDA (2023) in the surface soils associated with the now demolished Dianella Hotel in the north-west of the Study Area.

The Environmental and Hazardous Materials Assessment in MPA (2023) identified some hazardous materials (asbestos, synthetic mineral fibres) and further investigation is recommended prior to commencement of any future refurbishment and/or demolition works to identify and removed said hazardous materials.

5. WATER SUSTAINABILITY

5.1 WATER SUPPLY

The Study Area is currently provided scheme water via an existing DN100 reticulation main on the southern verge of Waverley Street; and DN150 reticulation mains on the western verge of Alexander Drive and northern verge of Grand Prom.

The site servicing report for Stage 1 (Colliers, 2026) notes that upgrades to the surrounding Water Corporation infrastructure and the establishment of a new service for the premises is required to support the proposed development. Stage 1 of the re-development generally incorporates the mixed use zones and is currently only serviced via the DN100 main on Waverley Street. Colliers (2026) indicates that further connections are likely required from the Alexander Drive and Grand Promenade mains to support these areas and satisfy the expected fire servicing requirements.

A dead DN100 reticulated connection which traverses through the Study Area will also need to be completely removed or capped (Colliers, 2026).

5.2 WASTEWATER MANAGEMENT

The Study Area is generally currently serviced via 2 DN100 VC lot connections located in the south-east and north-east of the Study Area which connect to a DN900 transfer branch within the Waverley Street road reserve (Bedford Bypass Sewer Main), and a DN225 lot connection in the south-west which connects to a DN230 VC gravity pipe on Grand Prom which ultimately connects to the DN1370 transfer main on Alexander Drive (Colliers, 2026).

Further detail on water supply and wastewater is to be provided in a servicing report for the PSP area.

5.3 WATER USE EFFICIENCY MEASURES

The *State Planning Policy 2.9 Water* (WAPC, 2025a) was developed to ensure that urban development is located adequately, serviced with appropriate wastewater, stormwater and groundwater management infrastructure and contributes towards the management of water quality and quantity, ecological health and the social and cultural values of water resources. This section addresses water conservation measures and fit for purpose non-potable supply.

The Water Conservation Strategy for the development is detailed below, with initiatives to be considered for adoption:

- Use of water-wise practices, including water efficient fixtures and fittings (WELD rated taps, showerheads, toilets, appliances, rainwater tanks) and water-wise landscaping including native plant species;
- Residential apartments in Mixed Use Zones to be constructed to current 7-star building standards as per the current National Construction Code [NCC]. The NCC 2022 was published on 01 October 2022 and incorporates a minimum 7-star energy efficient rating for new dwellings. NCC 2022 was adopted on 01 May 2023 by the WA Government with the residential energy efficiency provisions mandatory from 01 May 2025.
- Use of native, low water-use vegetation within planted areas with mulches and ground covers to be used to increase the efficiency of irrigation and conserve water. The associated irrigation system is to be designed to water wise principles.

The proposed conservation measures aim to reduce scheme water consumption in the development area within the constraints of the site.

6. STORMWATER MANAGEMENT

6.1 DESIGN OVERVIEW

Local stormwater management is proposed to be consistent with current water sensitive design practices and to meet key LWMR objectives and criteria as detailed in Table 1 and designed in accordance with the *Decision Process for Stormwater Management in Western Australia* (DWER, 2017a) and the *City of Stirling On Site Stormwater Drainage Criteria* (City of Stirling, 2024).

The stormwater system for the Study Area should be based on the management of the ‘small’, minor and major events.

‘Small’ event management concentrates on the first 15 mm of rainfall (approximately the 1 EY 1 hour event) and represents over 90% of rainfall events. Runoff generated from the first 15 mm of rainfall can mobilise substances such as soluble materials, silts, oils and grease and therefore should be retained and managed at-source (if possible) to prevent transport of pollutants to downstream receiving environments (DWER, 2017a). Stormwater runoff from roofs should be retained within underground storage units (e.g soakwells, StormTrap, GRAF cells, etc.) and stormwater from pavements, bitumen, hardstand, etc. should be retained and infiltrated either in underground storage units or within vegetated treatment structures such as rain gardens or tree pits.

The minor drainage system is designed as a system of pipes, kerbs, gutters, etc. and has the capacity to convey stormwater runoff generated by low frequency storms, typically less than the 10% AEP (10 year ARI) for commercial/industrial areas and 20% AEP (~ 5 year ARI) for residential areas. For the Study Area, the minor event should be considered the 5% AEP (20 year ARI) as the City of Stirling (2024) requires the on-site stormwater retention system be designed to manage the critical 5% AEP storm event.

The major drainage system is designed as the arrangement of stormwater and civil design elements planned to provide a safe passage of stormwater runoff from extreme rainfall events (up to the 1% AEP) to catchment low points. There are existing private stormwater connections to the City of Stirling’s drainage system from the Study Area, Figure 6 right, in the north-west (3) and south-west (1). The north-west outlets discharge to Water Corporation’s Waverley Street CB north of the Study Area and the south-west outlet discharges to the City of Stirling drainage sump on Alexander Drive.

City of Stirling (2024) notes the following: *The onsite retention storage volume is to be designed to cater for a 1 in 20 ARI (5% AEP) critical storm. In the case that the stormwater system for a 1 in 20 ARI (5% AEP) would overflow and runoff from the site could not be safely stored within its boundaries or have a safe overland path where it would not enter other private properties, the development shall be designed to cater for the 1 in 100 ARI (1% AEP) critical storm*, however, City of Stirling (2024) also notes that no private lot connections to the City’s stormwater system are permissible.

Water Corporation has advised that stormwater discharge from the Study Area should be limited to the pre-development flow rate with no overland flow into the Water Corporation drainage system in a minor storm event – this should be managed within the pit-pipe local government drainage system. Overland flows into the Water Corporation system in excess of the minor event were considered by Water Corporation as both likely and permissible.

In this LWMR, Avant Hydro has conservatively assumed all stormwater runoff up to the major event (1% AEP) is retained within the Study Area, either in WSUD structures (‘small’ event), underground storage and/or above-ground in depressions within car park areas. Whilst there are numerous stormwater connection points as detailed above, Avant Hydro does not have any details of the internal Study Area drainage system and its connectivity to the local government drainage system except for drainage pit locations as shown in the feature survey (Jurovich Surveying, 2024; Appendix B). The general grade of land, particularly the eastern half of the Study Area, is towards these connection points and stormwater runoff pre-development likely discharges to the local government piped drainage system as piped flow and possibly overland flow in rarer storm events.

Stirling Libraries – Dianella is owned and operated by the City of Stirling and is connected to the Waverley Street drainage system via a pipe network across the private Dianella Plaza landholding. This connection will need to be maintained post-development with the existing pipe network likely relocated further west through the future Activity Shared Zone.

Connections from the Study Area to the City of Stirling drainage system are to be investigated further as part of detailed design and any future Subdivision and Development Water Management Plan(s), in discussion with the City of Stirling.

Avant Hydro assumes stormwater runoff generated within the Our Lady's Assumption School is retained and infiltrated on-site and is not considered further in this LWMR.

6.2 DRAINAGE CATCHMENTS AND STORMWATER MODELLING PARAMETERS

Preliminary post-development stormwater drainage catchments have been determined from the proposed precinct land use, Table 2 and Figure 1, and are shown on Figure 8.

Indicative storage volumes to be retained within each catchment (up to the 1% AEP) have been estimated based on the following assumptions:

- A runoff coefficient of 95% as the precinct land use zones will comprise predominantly of impervious areas including roofs, pavements, bitumen and hardstand.
- Rainfall was assumed to be both spatially and temporarily uniform. BoM (2016) design rainfalls have been adjusted to 2030 based on climate change factors for the Study Area as shown on the Australian Rainfall and Runoff [ARR] Data Hub.
- The required storage volumes up to the major event (1% AEP) were assumed to be retained and infiltrated within underground storage.
- Underground storage units modelled as 1 m x 1 m x 1 m with 80% of the base of the units open (equivalent infiltration area).
- A constant infiltration rate of 5 m/day was used based on Galt Geotechnics (2024) results for compacted in-situ soils and is approximately equivalent to the Green-Ampt equation.

6.3 STORMWATER MODELLING RESULTS

Catchment areas, equivalent impervious areas [EIA] and indicative storage areas, depths and volumes for each stormwater drainage catchment is summarised in Table 4 and shown on Figure 6.

The calculated critical duration for all catchments was 2 hours for the minor event (5% AEP) and 6 hours for the major event (1% AEP).

Stormwater storage volumes required are indicative only and assume all stormwater generated within each catchment is retained and infiltrated in underground storage. Should stormwater be partially retained above-ground in depressions in parking areas or discharge to the existing City of Stirling drainage system, drainage calculations should be revised to account for potentially smaller underground storage area and associated infiltration area as part of detailed design and documented in any associated future *Subdivision and Development Water Management Report* [SDWMR].

City of Stirling (2024) requires stormwater from roofs to be managed separately to stormwater from other impervious areas including car parks and Avant Hydro assumes this approach will be applied to the Study Area.

Table 4: Indicative Storage Requirements

Catch ID	Catch Area (m ²)	EIA (m ²)	Storage Area (m ²)	Infiltration Area (m ²)	Minor Event (5% AEP)		Major Event (1% AEP)	
					Depth (m)	Volume (m ³)	Depth (m)	Volume (m ³)
AS1	2,255	2,145	125	100	0.60	75	0.95	120
C1	12,000	11,400	650	520	0.60	390	1.00	650
C2	1,815	1,725	100	80	0.60	60	1.00	100
C3	525	500	30	25	0.55	16	0.90	27
C4	465	440	25	20	0.60	15	1.00	25
C5	2,660	2,525	145	115	0.60	85	1.00	145
C6	3,310	3,145	180	145	0.60	110	1.00	180
C7	2,520	2,395	135	110	0.60	80	1.00	135
MU1	3,245	3,085	175	140	0.60	105	1.00	175
MU2	20,050	19,050	1,090	870	0.60	655	1.00	1,090
MU3	4,435	4,215	240	190	0.60	145	1.00	240
MU4	1,845	1,755	100	80	0.60	60	1.00	100
P1	5,375	5,105	290	230	0.60	175	1.00	290
P2	9,315	8,850	510	410	0.60	305	1.00	510
P3	12,435	11,815	680	545	0.60	410	1.00	680

7. GROUNDWATER MANAGEMENT

7.1 DESIGN CRITERIA

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

- Protect infrastructure and assets from flooding and inundation by high seasonal groundwater levels and/or soil moisture.
- Protect groundwater-dependent ecosystems from the impacts of urban runoff.
- Manage and minimise changes in groundwater levels and groundwater quality following development.
- Adopt nutrient load reduction design objectives for discharges to groundwater.

7.2 MANAGING GROUNDWATER LEVELS

Groundwater management is generally required to ensure there is a minimum separation of 1.5 m between finished surface level and the design groundwater level [DGL].

In the absence of site-specific monitoring data, the WRC (1997) groundwater contours have been used as the DGL for this LWMR and show there is currently 2 to > 5 m separation to the DGL. As the WRC (1997) groundwater contours typically represent 'Maximum Groundwater Levels', most of which were recorded in the 1970s/80s, it is likely that site-specific groundwater levels will be lower than those inferred from WRC (1997).

Post-development, the landform of the Study Area may be slightly recounted to suit the proposed development but will still likely achieve the minimum separation requirement. Given the separation to groundwater, groundwater level management measures are likely not required across the Study Area but should be reviewed as part of the detailed design process in any *Subdivision and Development Water Management Report* [SDWMR] after review and consideration of any further geotechnical investigations, site-specific monitoring data and detailed site earthworks.

As stormwater retention via infiltration forms a significant component of the proposed stormwater strategy within the Study Area, it is recommended that any underground storage devices (e.g. soakwells, GRAF drainage cells, StormTrap, etc.) have a minimum 1 m clearance from their base to the DGL.

7.3 GROUNDWATER QUALITY

Groundwater quality management will be achieved by infiltrating stormwater runoff treated via non-structural and structural management measures.

8. WATER QUALITY MANAGEMENT

The effective implementation of the structural and non-structural controls as part of the development will enhance water quality infiltrating from the Study Area to the underlying regional groundwater table.

8.1 NON-STRUCTURAL SOURCE CONTROLS

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

- Local native plants make up a minimum 50% of the planted areas. Any non-local species will be selected for drought tolerance and low fertiliser requirements; and
- Maintenance practices such as sweeping and pit eduction to remove sediment build-up. Future *Subdivision and Development Water Management Reports* [SDWMRs] will outline the schedule and cleaning requirements for sweeping/pit eductions.

8.2 STRUCTURAL SOURCE CONTROLS

The *Stormwater Management Manual for Western Australia* (DWER, 2022) outlines expected pollutant removal efficiencies for detention/retention systems, Table 5.

Structural source controls complement the non-structural source controls and may include flush kerbing, tree pits and rain gardens within circulation and parking areas.

Table 5: BMP Water Quality Performance

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

Note 1. Typical Performance Efficiencies via DWER (2022)

In areas such as the Study Area with sandy soils and depth to groundwater, most rainfall is infiltrated at-source and treated by current best management practices (ie. Tree pits / rain gardens) and achieve modest pollutant removal efficiencies which may be lower than the typical performance efficiencies in DWER (2022).

Tree pits and/or rain gardens with flush kerbing can be utilised as an alternative to traditional soakwells or underground storage to capture, treat and infiltrate the small event rainfall (first 15 mm) in circulation and parking areas. These structural controls should be considered as part of detailed design and documented in an future SDWMRs. Tree pits / Rain gardens, if implemented, should be planted with suitable water tolerant vegetation to provide water quality treatment and should dry out in less than a day after rain ceases. Typical details on plant selection, density and distribution for south-west Western Australia are detailed in Monash University (2014).

8.3 DISEASE VECTOR AND NUISANCE INSECT MANAGEMENT

Structural stormwater management systems are designed to minimise the risk of chironomid midge and mosquito breeding. Infiltration and evapotranspiration will prevent stormwater pooling for longer than four days (96 hours) in late spring to early autumn will prevent completion of the larval stages of the mosquito life cycle (DWER, 2022a), as per requirement of the Department of Health.

9. IMPLEMENTATION

Implementation of this Local Water Management Report involves defining the roles and responsibilities of the developer and local authority, outlining future documentation required to support the development and defining operation, monitoring and maintenance of the stormwater system.

9.1 ROLES AND RESPONSIBILITIES

The entirety of the Study Area will remain in private ownership. The construction and initial operation of the stormwater management system will be the responsibility of the developer(s). Thereafter, the ongoing maintenance will either remain with the developer or will be relegated to the lessor or an appointed development manager.

Preparation of any future *Subdivision and Development Water Management Report(s)* [SDWMR] will be the responsibility of the developer(s).

9.2 CONSTRUCTION MANAGEMENT

9.2.1 Dewatering

Dewatering may be required for sewer installation but is to be confirmed by the civil engineer and contractor. Given the potential depth of constructions, dewatering, if to occur, would only be in the superficial aquifer.

Prior to commencement of any dewatering, the construction contractor may need to apply for and obtain from DWER a "Licence to Take Water". A licence is not required for dewatering if the pump rate does not exceed 10 L/s over a period of less than 30 days and the volume of water taken over the period does not exceed 25,000 kL.

Dewatering will need be carried out in accordance with the licence conditions should a licence to take water be required. Where possible, construction will be timed to minimise impacts on groundwater and any dewatering requirement.

9.2.2 Acid Sulphate Soils

Figure 3 generally shows a moderate to low risk of A.S.S. occurring within 3 m of natural surface.

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

9.3 STORMWATER SYSTEM OPERATION AND MAINTENANCE

The stormwater drainage system within the proposed development will require maintenance to ensure correct operation and minimise risk of inundation of the Study Area and surrounding properties. It is considered the following operating and maintenance practices will be required periodically:

- Inspection and removal of debris, litter and sediments surrounding pipe inlets/outlets to prevent blockages.
- Regular sweeping of circulation and parking areas to reduce particulate build-up on impervious surfaces.
- Maintenance of planted areas including plant condition and weeds and cleaning of sediment at base.

The operating and maintenance schedule required is presented in Table 6.

Table 6: Maintenance Schedule for Drainage Infrastructure

Item	Maintenance Interval		
	Quarterly	Bi-annually	As required
Underground Storage / Pit-Pipe Drainage			
Street sweeping to reduce particulate build-up			✓
Removal of debris to prevent blockages	✓		
Inspection of sediment and rubbish in manholes	✓		
Planted Areas (Tree Pits/Rain Gardens)			
Inspect for erosion + sediment accumulation		✓	
Assess health of vegetation. Remove dead plants and replace where necessary.		✓	
Inspect for standing water 1 day after rainfall events			✓
Removal of sediment and leaf litter layer build up.			✓

9.4 MONITORING PROGRAM

Given the minimal changes to the overall land use across the Study Area post-development compared to pre-development, there is likely to be minimal changes to the overall groundwater quantity and quality and therefore no post-development monitoring is proposed.

9.5 FUTURE WATER MANAGEMENT REPORTING

A *Subdivision and Development Water Management Report* [SDWMR] forms part of the planning process outlined in *State Planning Policy 2.9 – Water* (WAPC, 2025a&b). Any future SDWMR(s) will build on the water management strategies presented in this LWMR and provide further detail on the following areas:

- Design of water quality treatment structures and underground storage devices as outlined in the *Stormwater Management Manual* (DWER, 2022);
- Refinement of catchment areas and treatment/storage locations, dependent on final site earthworks.
- Confirmation of post-development discharge to existing external drainage based on detailed existing drainage design detail and final post-development site earthworks following discussions with the City of Stirling.
- Confirmation of water source for irrigation of planted areas.

Any SDWMR(s) are to be prepared consistent with the requirements outlined in Table E.1 of SPP 2.9 design guidelines (WAPC, 2025b).

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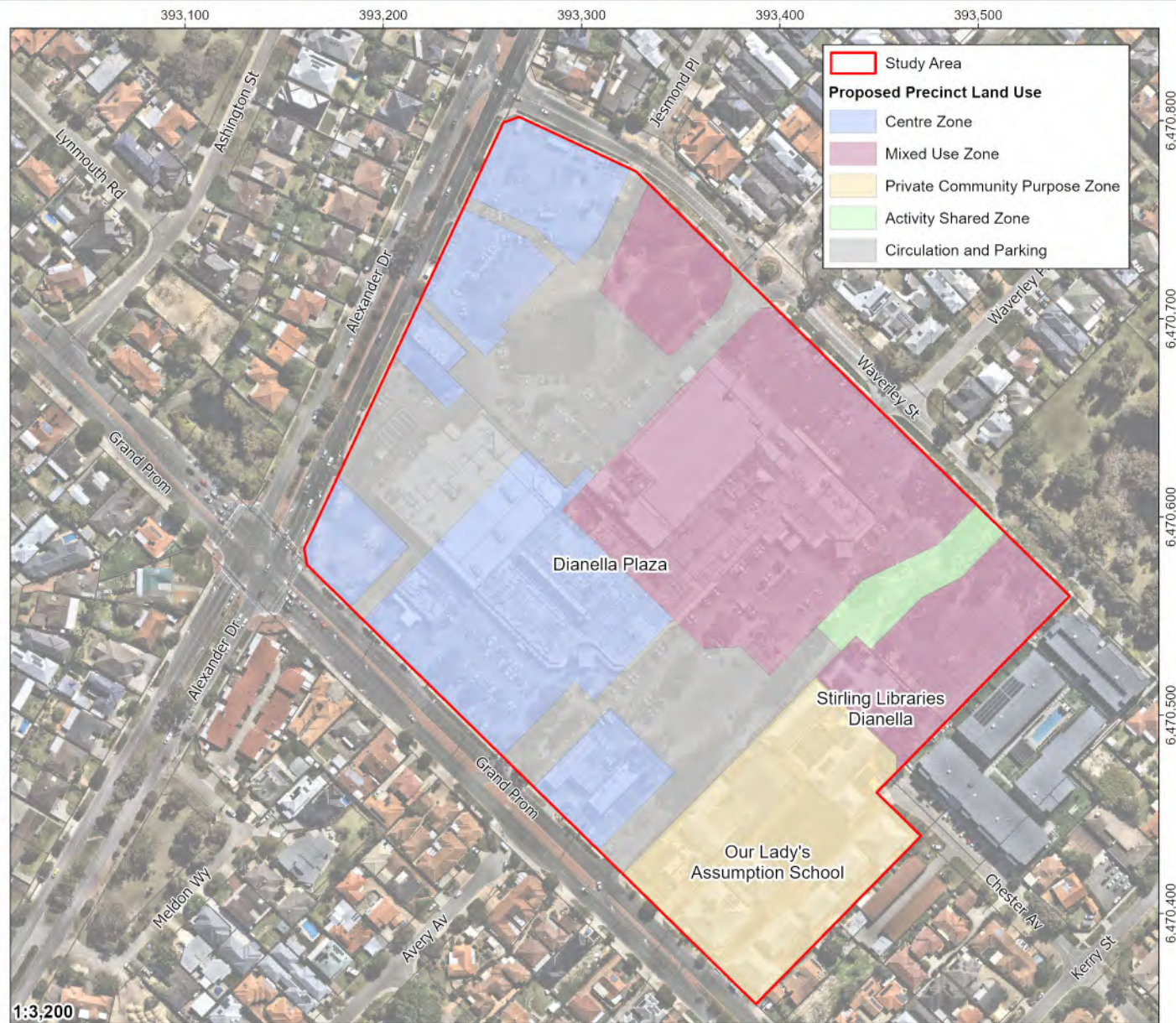
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FIGURES

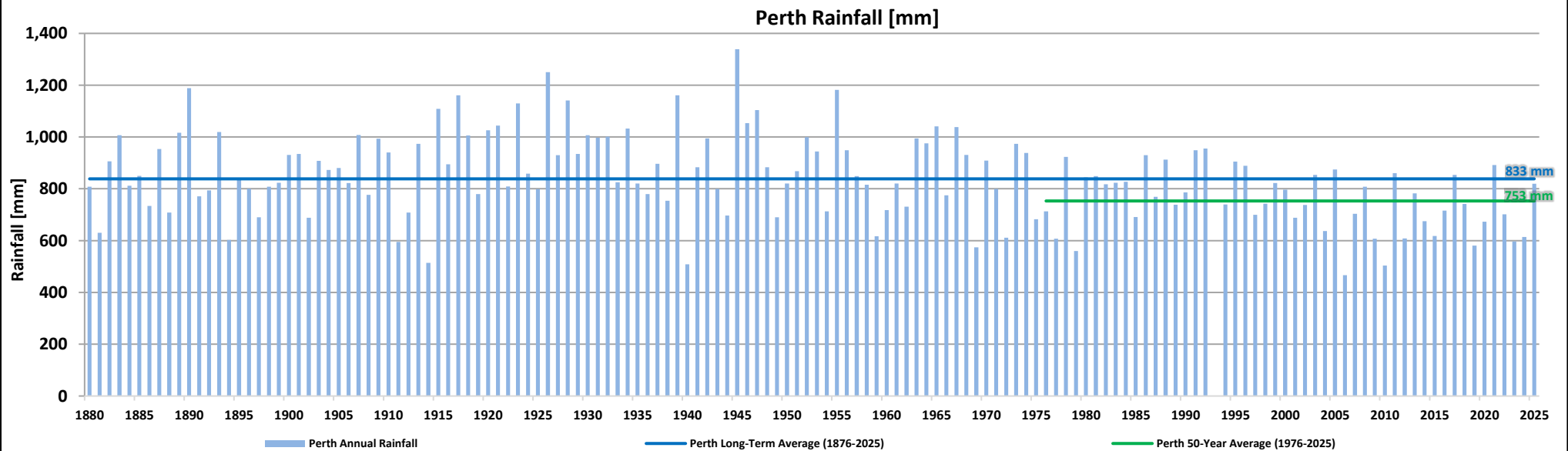
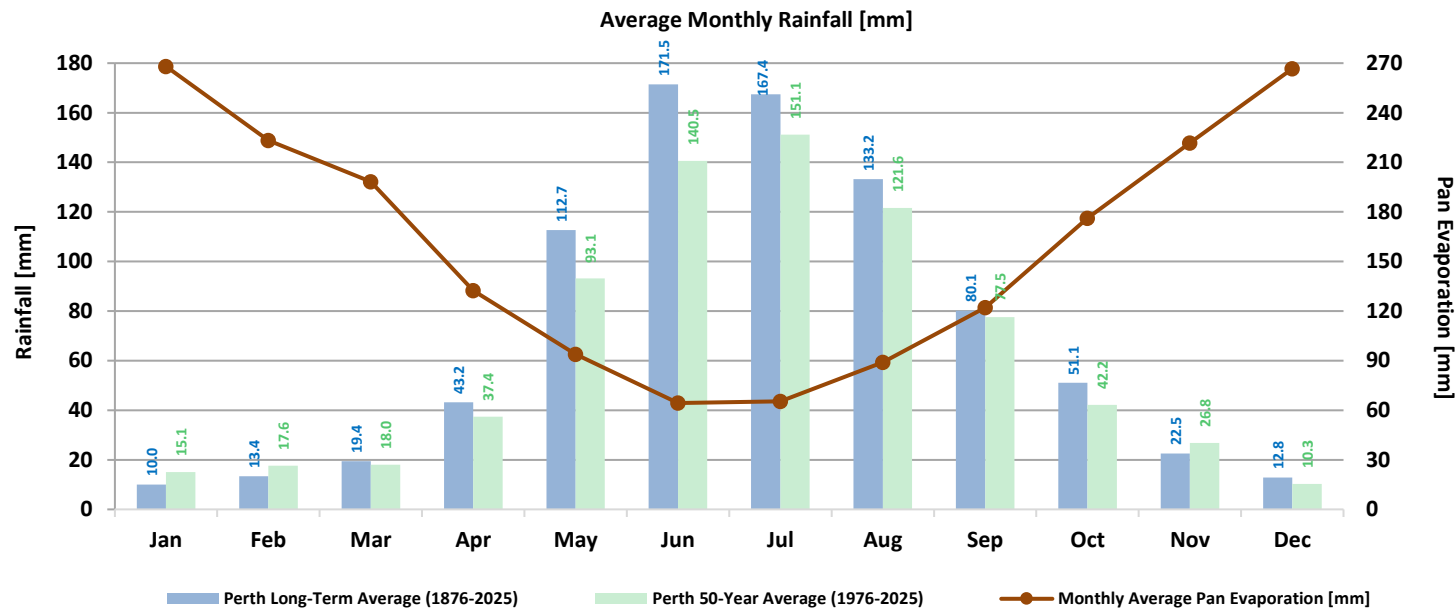




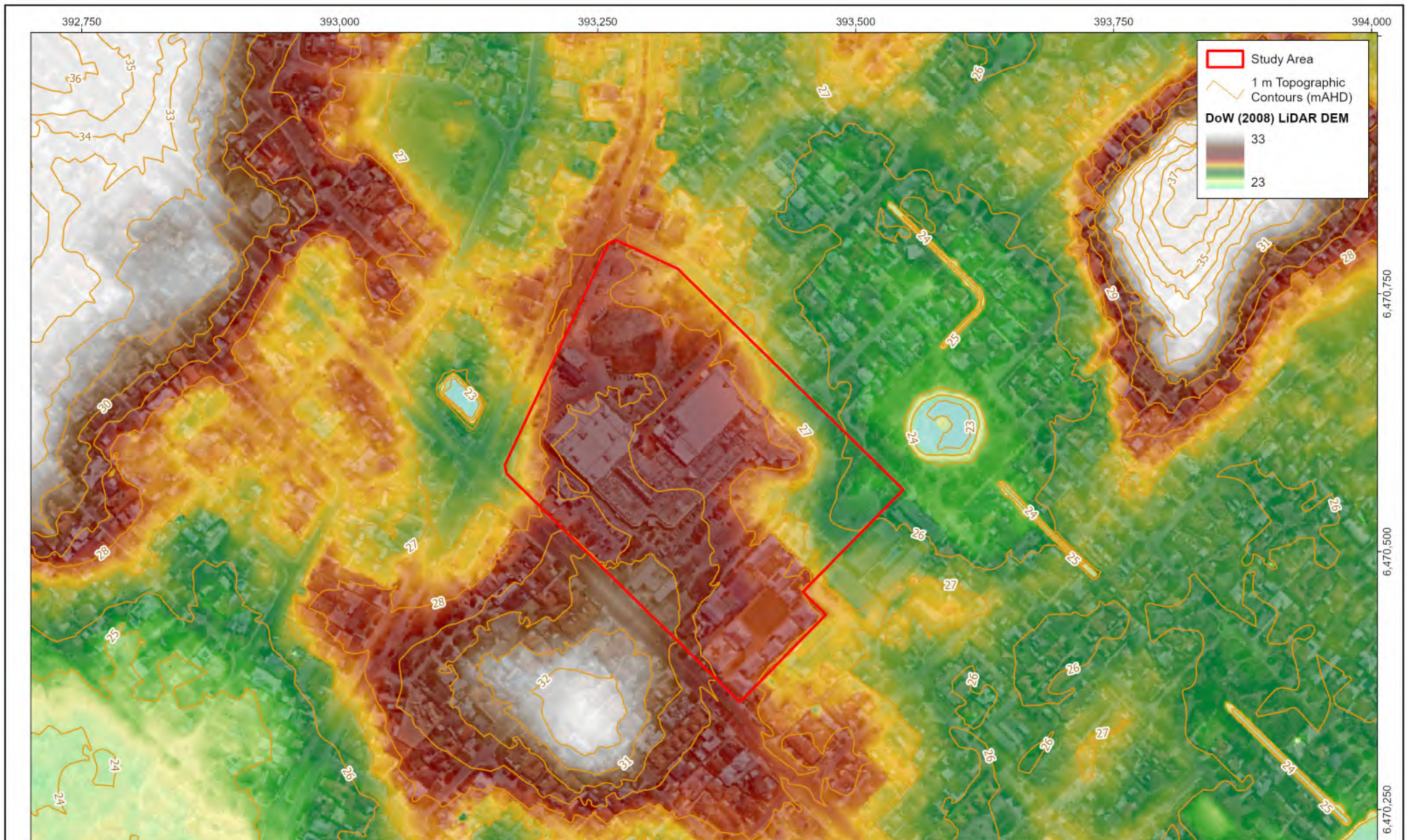
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GDA2020 MGA Zone 50



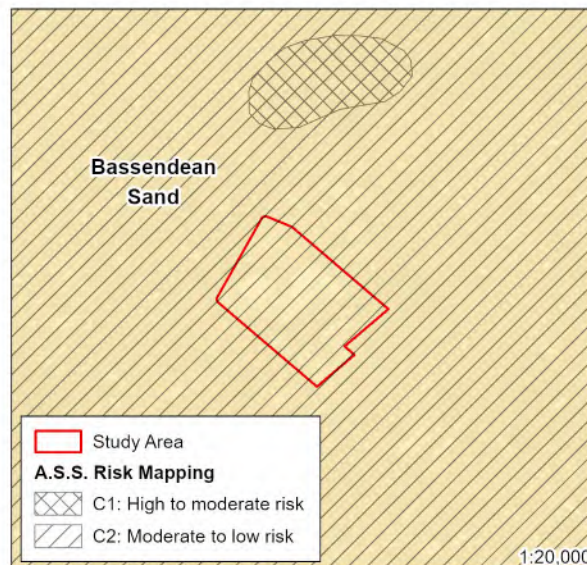


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Data Source: DoW (2008); NearMaps (2025).

GDA2020 MGA Zone 50



Lithological Classification

S8 Sand - very light grey at surface, yellow at depth, fine to medium-grained, sub-rounded quartz, moderately well sorted, of aeolian origin.

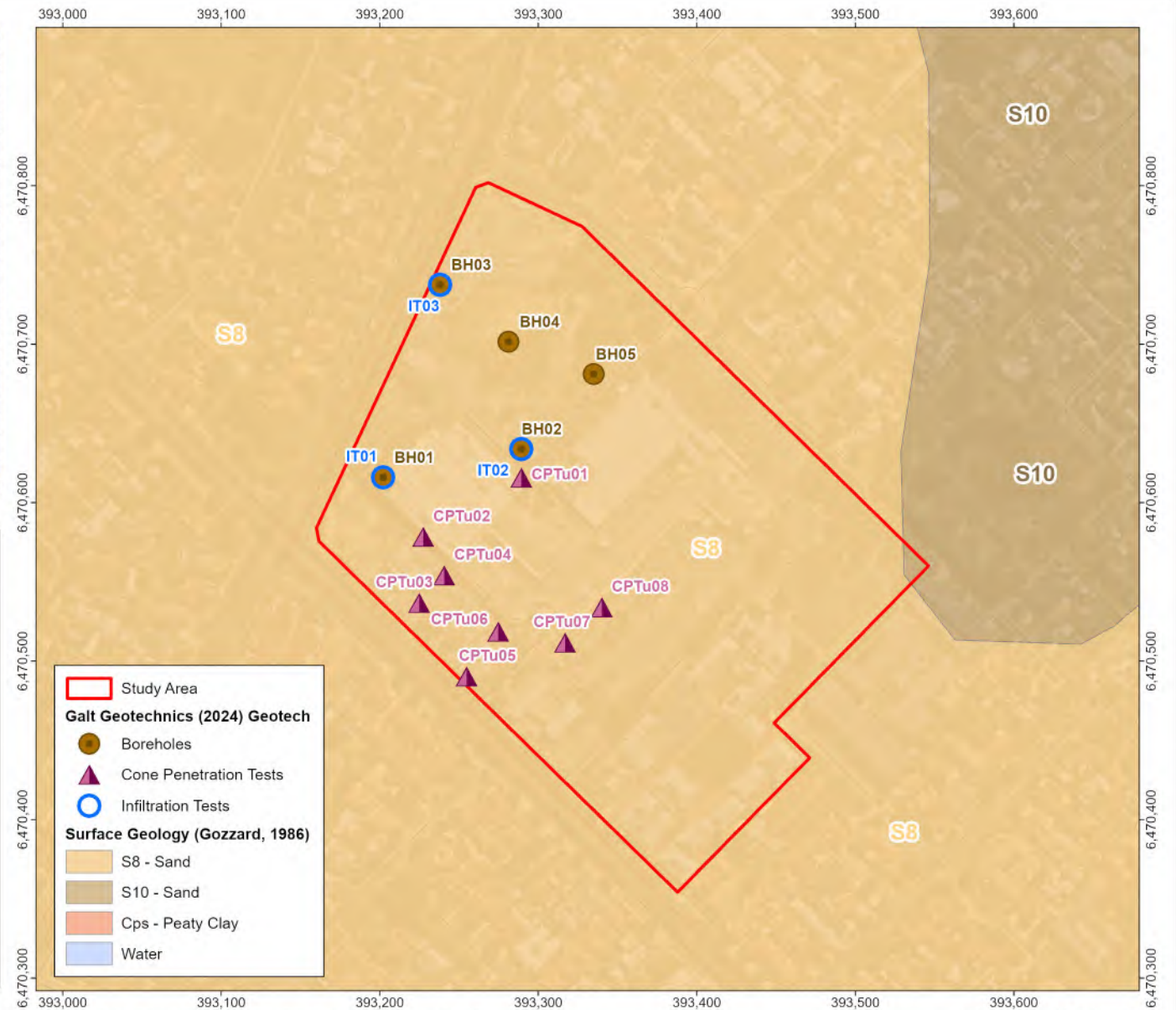
S10 Sand - as S8 (Thin Bassendean Sand over Guildford Formation).

Bassendean Sand

Basal conglomerate overlain by dune quartz sand with heavy mineral concentrations.

Acid Sulphate Soils

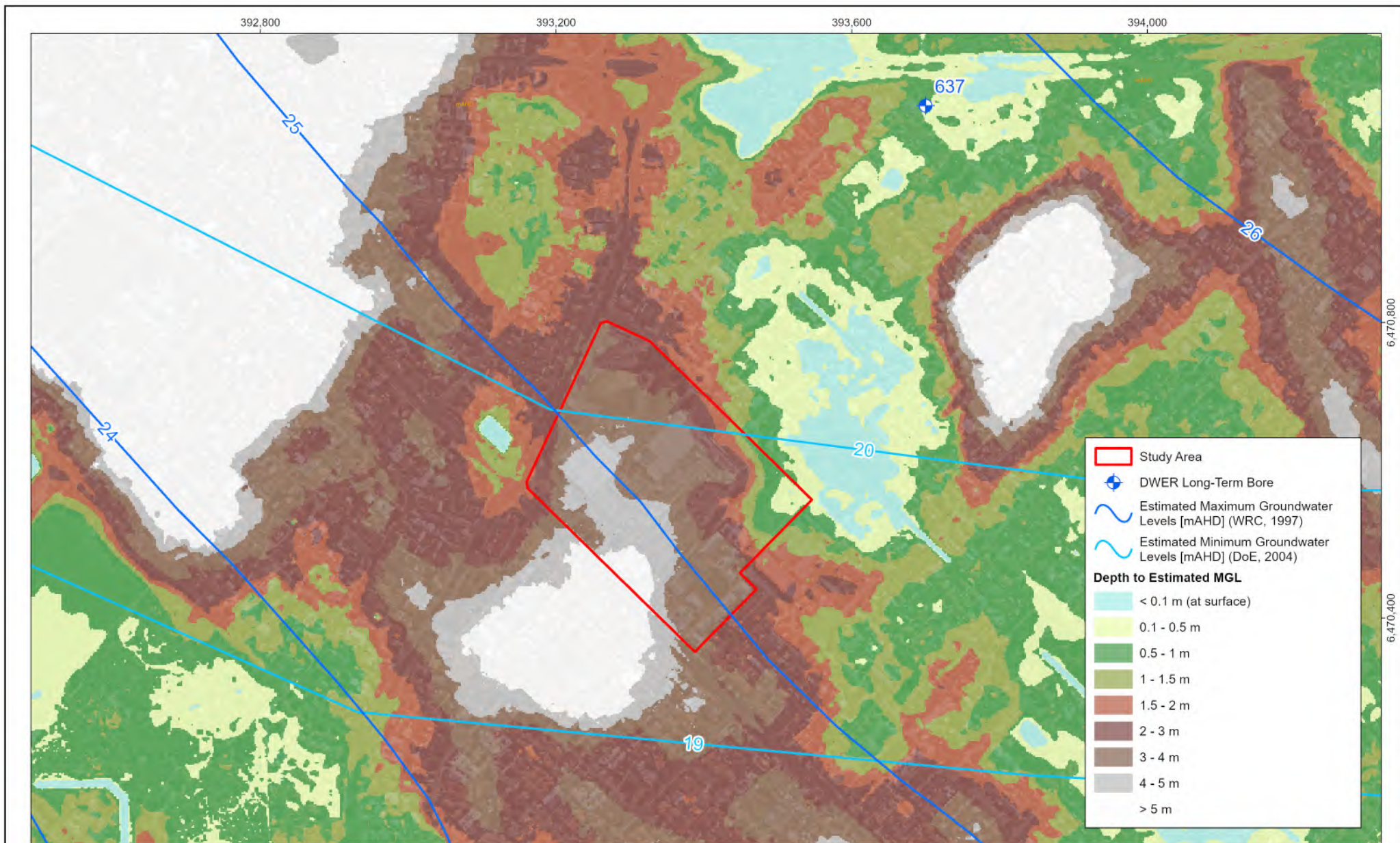
Class 2 - Moderate to low risk of A.S.S. occurring within 3 m of natural soil surface that could be disturbed by most land development activities (activities disturbing soils at depths greater than 3 m carry a high to moderate risk of disturbing A.S.S.).



Data Source: Gozzard (1986) Environmental Geology Series *Perth*; A.S.S. Risk Mapping (DWER, 2017b); NearMaps (2025).

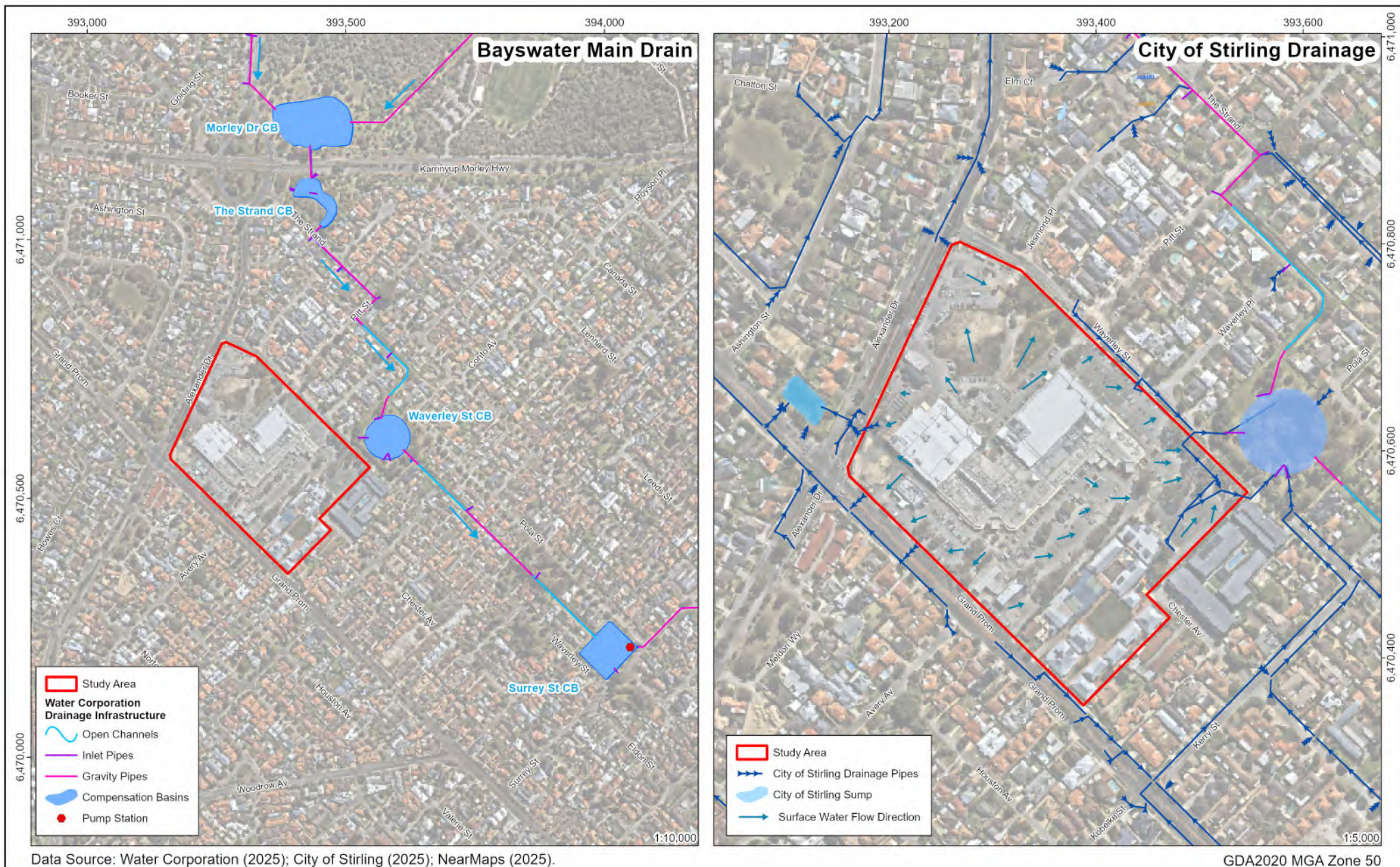
GDA2020 MGA Zone 50

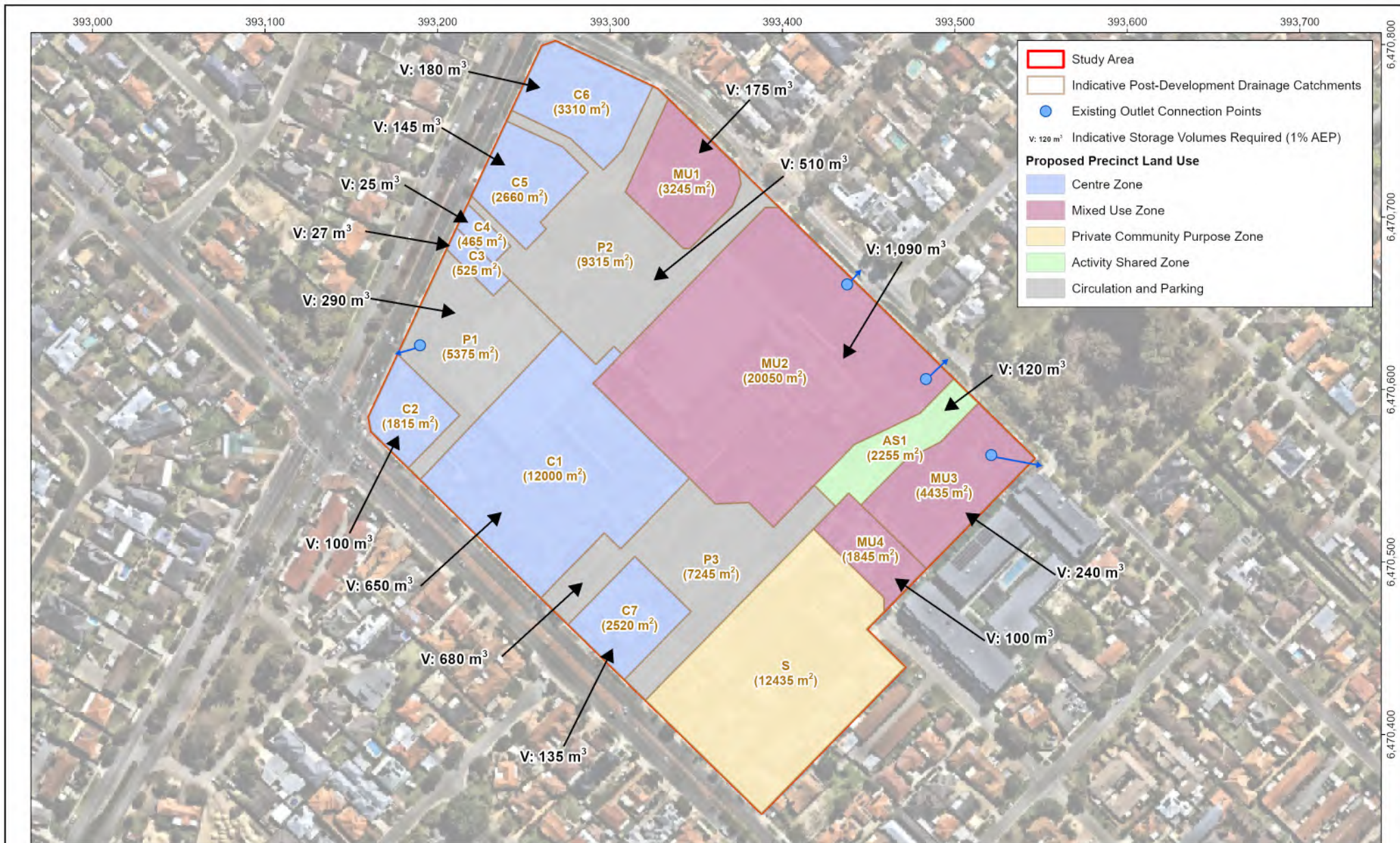




Data Source: DoW (2008); WRC (1997); DoE (2014); NearMaps (2025).

GDA2020 MGA Zone 50





Data Source: NearMaps (2025); URBIS (2026).

GDA2020 MGA Zone 50

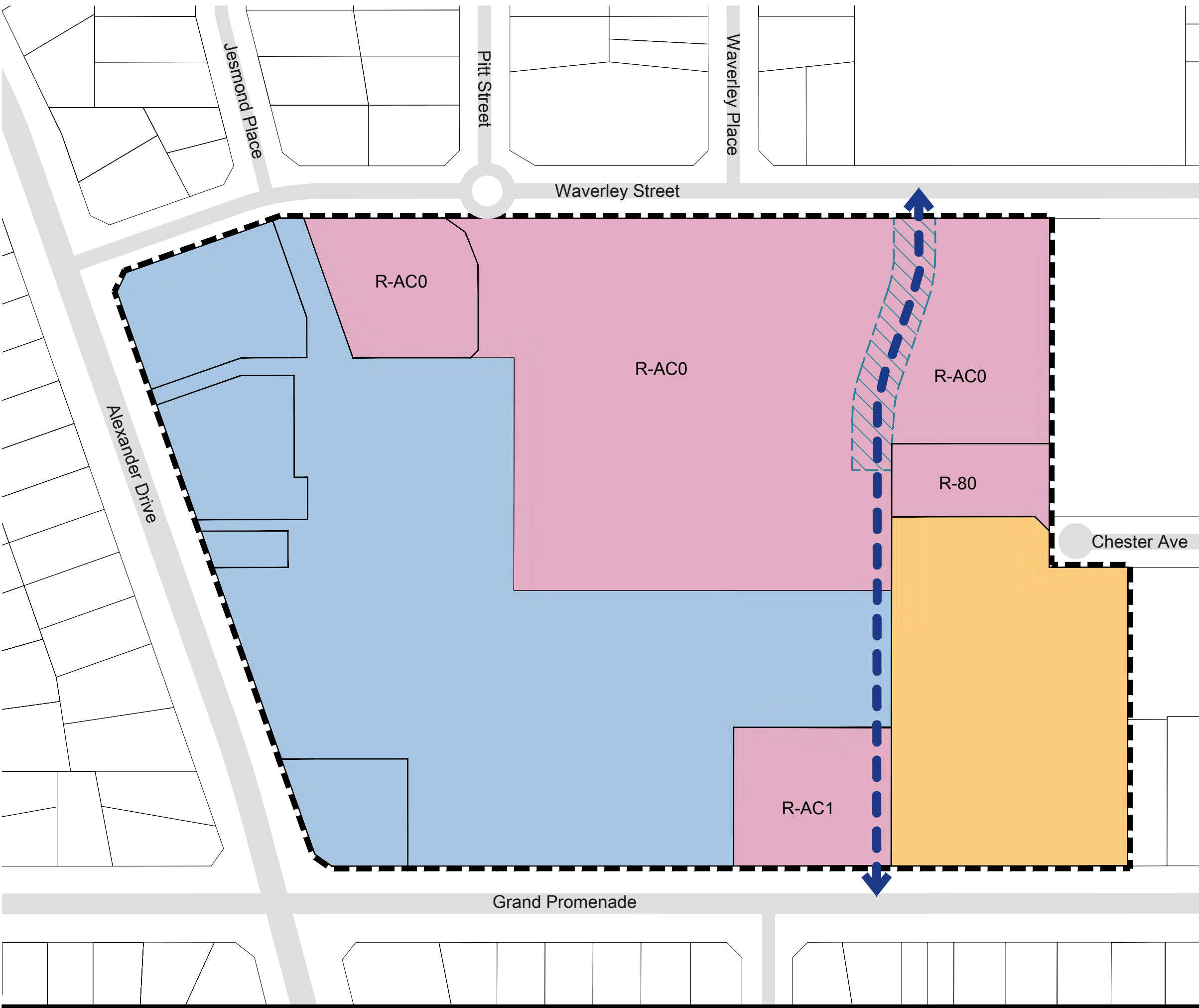
APPENDICES



APPENDIX A

Precinct Structure Plan (URBIS, 2026)





- Legend**
- Precinct Structure Plan Area
 - Centre Zone
 - Mixed Use Zone
 - Private Community Purpose Zone
 - Lowick Street Private Access Road
 - Shared Zone



Precinct Structure Plan Map - Part 1
Dianella Plaza Precinct Structure Plan

Level 8, 1 William Street | Perth WA 6000 Australia | +61 8 9346 0500 | URBIS Ltd | ABN 50 105 256 228

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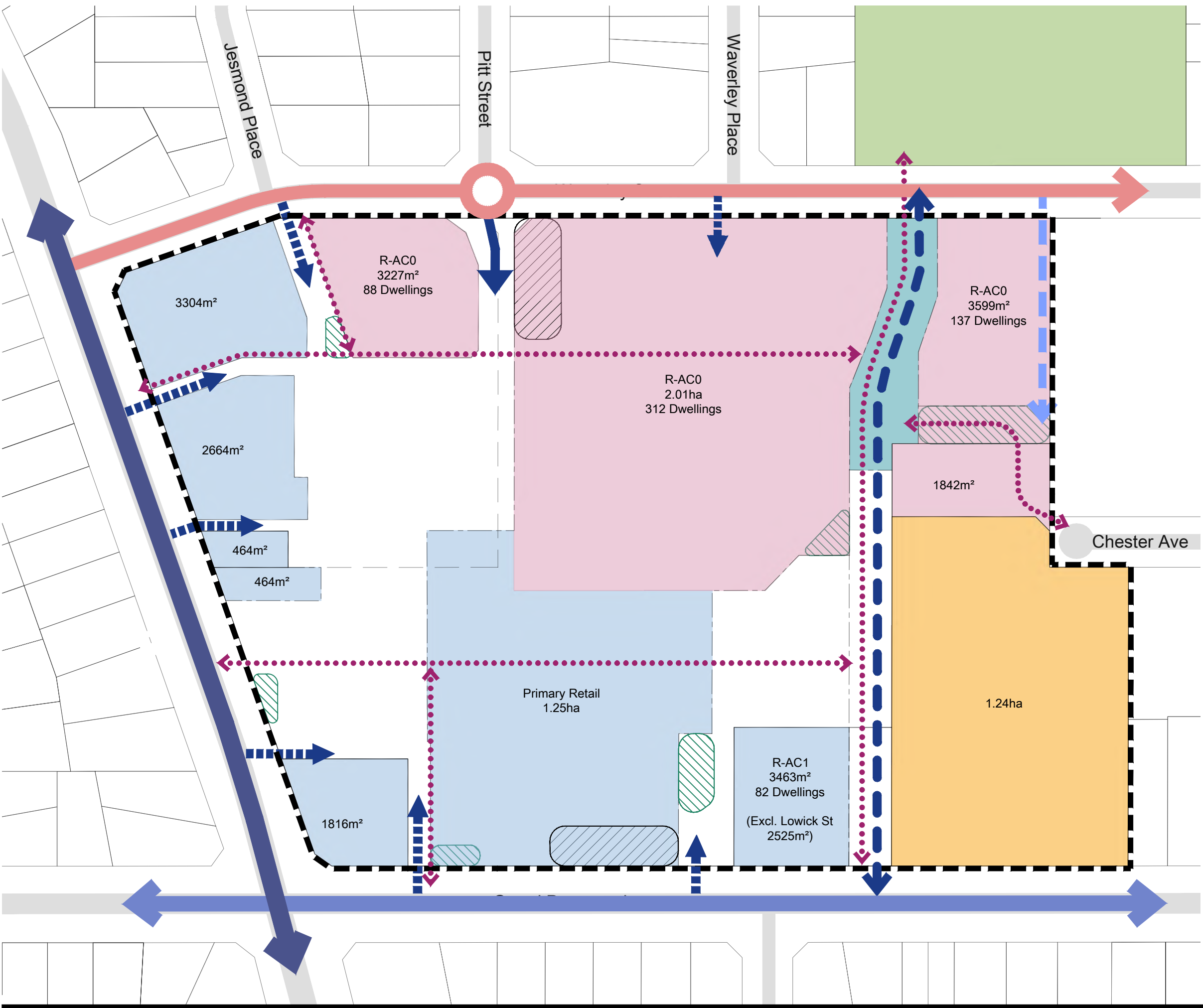
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PROJECT NO.
P0063129
DRAWING NO.
03.1

DATE
07.05.2026
REVISION
.



Legend

Precinct Structure Plan Area

Centre Zone

Mixed Use Zone

Private Community Purpose Zone

Circulation and Parking

Lowick Street Private Access Road

Activated Shared Zone

Indicative Landscape Node

Access Easement

Access - Full Movement

Access Left-In Left-Out

Service Areas

Key Pedestrian Links

Surrounding Reseves

Other Regional Road (MRS)

District Distributor Road

Local Distributor Road

Public Open Space

Land Use Summary

Total Site:	8.95ha
Land Use	Area
Centre	2.38ha
Mixed Use	2.96ha
Private Community Purpose	1.24ha
Circulation and Parking	2.15ha
Activated Shared Zone	0.22ha
Total Dwellings: 619	
Commercial GFA: (excl. PAD Sites)	30,245m²
Parking Bays 1,753 total	
Commercial:	1,035 bays
Residential:	718 bays

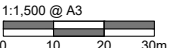


Precinct Structure Plan Map - Part 2
Dianella Plaza Precinct Structure Plan

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PROJECT NO.
P0063129
DRAWING NO.
03.2

DATE
21.05.2026
REVISION
a

APPENDIX B

Feature Survey (Jurovich Surveying, 2024)

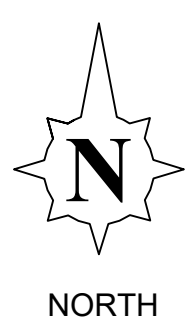


- LEGEND
- Lot Boundary
 - Lane Marking
 - Kerb
 - Edge of Driveway/Concrete
 - Edge of Bitumen
 - Major Contour (1m)
 - Minor Contour (0.2m)
 - Building
 - Average/Level/Outer
 - Retaining Wall
 - Wall
 - Fence Line
 - Gate
 - Guardrail
 - Line of Levels
 - Power Pole
 - Power Pole
 - Light Pole
 - Electrical Pt
 - Significant Tree
 - Telecom Pt
 - Telecom Pole
 - Communication Pt
 - Sewer Manhole
 - Sewer Inspection Shaft
 - Gas Valve
 - Gas Meter
 - Water Meter
 - Stop Valve
 - Hydrant
 - Bore Water
 - Grate
 - Drainage Manhole
 - Unknown Valve
 - Unknown Pt
 - Column
 - Bollard
 - Sign
 - BM
 - Sight Height
 - Photo Position & Direction



- NOTES:
1. THE INFORMATION SHOWN ON THIS DRAWING IS FOR FEATURE SURVEY PURPOSES ONLY AND WAS CORRECT AT DATE OF SURVEY.
 2. FOR ADDITIONAL INFORMATION (EASEMENTS AND OTHER INTERESTS) ENCUMBRANCES REFER TO CERTIFICATE OF TITLES AND PLAN / DIAGRAM.
 3. BOUNDARIES ARE INDICATIVE ONLY AND SUBJECT TO A RE-ESTABLISHMENT SURVEY.
 4. SEVERAL DRAINAGE LOCATIONS MAY VARY FROM SCHEMATIC PRESENTATION. CLEARANCES TO BE CHECKED ON SITE.
 5. CHECKED ON SITE.
 6. SERVICES CONTACTED TO BE CONFIRMED WITH RELEVANT AUTHORITIES. FOR UNDERGROUND SERVICES CONTACT TIA BEFORE YOU DIG FOR CONFIRMATION OF THOSE SERVICES.
 7. AND CONNECTION DETERMINED FROM CONNECTION MADE TO SHM TYPING BOX.
 8. SOME LEVELS ARE FROZEN FOR CLARITY.

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SCALE: 1:500 @ A0
ALL DISTANCES ARE IN METRES



SURVEYOR:	EG/PI
SURVEY DATE:	12/04/2024
FILE:	24279A.see
HOR. DATUM:	PCG94
VERT. DATUM:	AHD71
DRAWN:	BC
CHECKED:	EG/PI

JUROVICH SURVEYING

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IDENTIFICATION & FEATURE / LEVEL SURVEY
DIANELLA PLAZA SHOPPING MALL
366 GRAND PROMENADE, DIANELLA
CITY OF STIRLING

CLIENT:	PROJECTIVE DM
A0 SCALE:	1 : 500
JS JOB No:	24279
DWG Name:	24279-04
REV	A

APPENDIX C

Geotechnical Investigation (Galt Geotechnics, 2024)



Report on:

**GEOTECHNICAL STUDY
PROPOSED DIANELLA PLAZA SHOPPING
CENTRE REDEVELOPMENT – PHASE 1
ALEXANDER DRIVE
DIANELLA**

WAE200102-02 002 R Rev0

Submitted to:

Projective DM Pty Ltd

16 April 2024

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2. KEY FINDINGS	3
3. SITE DESCRIPTION	3
4. PROPOSED DEVELOPMENT	4
5. PROJECT OBJECTIVES	4
6. FIELDWORK	4
6.1. Infiltration Test Results	5
7. SITE CONDITIONS	5
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8. GROUND MODEL	6
9. GEOTECHNICAL ASSESSMENT	8
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Table 2: Summary of Proposed Development.....	4
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Figure 1: Site and Location Plan

Appendix A:	Supplied Information
Appendix B:	Site Photographs
Appendix C:	Cone Penetration Test Results
Appendix D:	Borehole Reports
Appendix E:	Infiltration Test Results

Standard Geotechnical Definitions, Recommendations, Requirements and Limitations

1. INTRODUCTION

This report presents the outcomes of Galt Geotechnics' (Galt's) geotechnical study for the proposed Stage 1 of the Dianella Plaza Shopping Centre redevelopment on Alexander Drive, Dianella ("the site").

This report is to be read in conjunction with the appended "Geotechnical Definitions, Recommendations, Requirements and Limitations", 'Clause GDR1', etc. found at the back of this report.

2. KEY FINDINGS

The site is underlain by Sand to the maximum investigated depth of 8 m. The sand is typically medium dense to dense with some near surface loose sand present in some test locations.

Groundwater was recorded at depths ranging from 6.5 m to 7.7 m.

An unsaturated hydraulic conductivity (k) of 5 m/day may be adopted for the design of soakwells.

3. SITE DESCRIPTION

Table 1: Summary of Site

Item	Comment
Site Extent	Refer Figure 1
Site Area	Around 7.7 ha
Current Site Surface Levels ¹	Typically RL 26 m AHD to RL 30 m AHD in middle of site
Vegetation	Mature trees within car park and near northern boundary. Typically paved across balance of the site.
Current Land Use	Commercial.
Existing Infrastructure	Dianella Plaza Shopping Centre and associated car parking
Site History ²	1953 to 1965: Bushland 1965 to 1995: Construction of Dianella Plaza and associated car parks 1995 to present: Relatively unchanged. Northern-most building demolished in 2015 and area remains vacant.

- NOTES:**
1. Site levels based on publicly available data (Landgate).
 2. Site history based on aerial imagery (Landgate).

4. PROPOSED DEVELOPMENT

Table 2: Summary of Proposed Development

Item	Comment
Proposed Development	Demolition of the existing Coles building, followed by construction of new Coles building further south (fronting Grand Promenade). The footprint of the existing Coles building will be occupied by several smaller commercial tenancies and car parking areas.
Basements Proposed	Assumed none
Proposed Finished Level	Assumed near current surface level
Cut/Fill	Minor to facilitate earthworks.
Assumed Foundation Type	Shallow footings and ground slabs
Assumed Retaining Walls	Minor if any
Assumed Stormwater Disposal	On-site via soakwells
Assumed Sewage Disposal	Off-site via sewer network

NOTES: 1. Proposed development details based on supplied information presented in Appendix A.

5. PROJECT OBJECTIVES

The objectives of the study were to:

- assess subsurface soil and groundwater conditions across the site;
- provide recommendations on suitable footing systems for the proposed development;
- provide allowable bearing pressure and settlement estimates for shallow foundations;
- provide a site classification(s) in accordance with AS 2870-2011 "Residential Slabs and Footings";
- provide recommendations and geotechnical design parameters for earth retaining structures;
- recommend appropriate site preparation procedures including compaction criteria;
- assess the permeability of the soils at the site for potential on-site disposal of stormwater by infiltration; and
- provide a subgrade California bearing ratio (CBR) value for pavement thickness design by others.

6. FIELDWORK

Fieldwork was carried out in the presence of a representative from Galt on 2 April 2024 and comprised:

Table 3: Summary of Field Data

Type	Results Appendix	Summary	GDR Clause	Equipment Used	No. Tests	Depth Range (m)
Site Plan	Figure 1	-	-	Hand held GPS ¹	-	-
Photographs	B	-	-	-	-	-
Cone Penetration Tests (CPTs)	C	Section 8	GDR3.2	22-tonne truck	8	8
Machine Auger Boreholes (BH)	D	Section 8	GDR3.3	EVH Scout on utility	5	1.5
Perth Sand Penetrometer (PSP)			GDR3.5	Hand operated PSP	5	1.05-2.1
Infiltration Tests (IT)	-	Section 6.1	GDR3.7	Inverse auger hole	3	0.91

NOTES: 1. Hand held GPS is accurate to ± 5 m.

6.1. Infiltration Test Results

Table 4: Infiltration Test Results

Test Location	Soil Description	Depth (m)	Minimum Unsaturated Hydraulic Conductivity, k_{unsat} (m/day)
IT01	SAND (SP)	0.91	8.5
IT02			8.7
IT03			7.4

NOTES: 1. Infiltration test method using inverse auger is explained in GDR3.7

7. SITE CONDITIONS

7.1. Geology

Table 5: Summary of Geology Mapping

Map Sheet	Map Scale	Mapped Soils	Site Findings
Perth	1:50,000	Bassendean Sand	FILL: SAND (SP-SM); over SAND (SP)

7.2. Groundwater

Table 6: Summary of Groundwater Levels

Item	Date	Depth (m)	Elevation (m AHD)	Comment
Perth Groundwater Atlas	1997	1-5	25	
Site observations	2024	5.2-6.2	~23 ²	Groundwater depths inferred from pore pressure measurements

NOTES: 1. Perth Groundwater Atlas 1997 shows the historical maximum groundwater elevations.
2. Groundwater elevation estimated from assumed surface elevation of RL 28 m AHD.

8. GROUND MODEL

The subsurface conditions are generalised in the inline image and table below. The generalised subsurface units are described in the table with geotechnical design parameters.

Inline Image 1 – Idealised cross section of subsurface conditions on site.

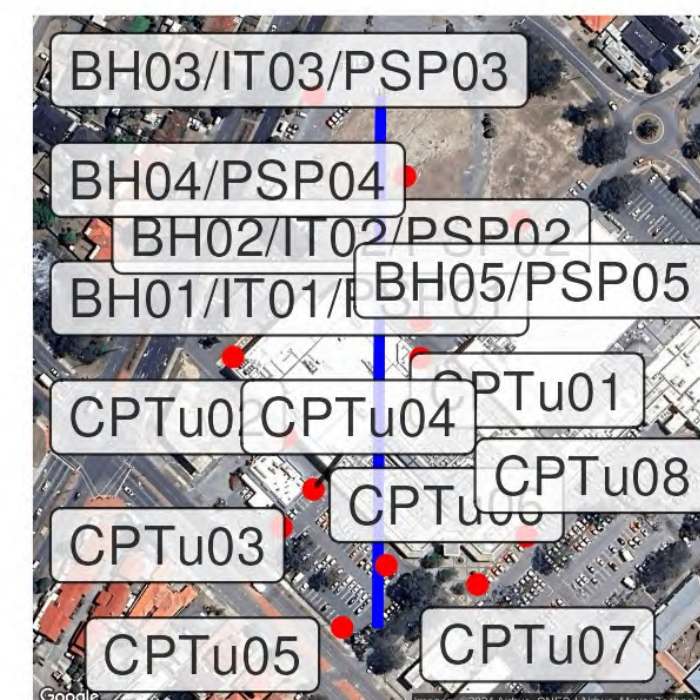
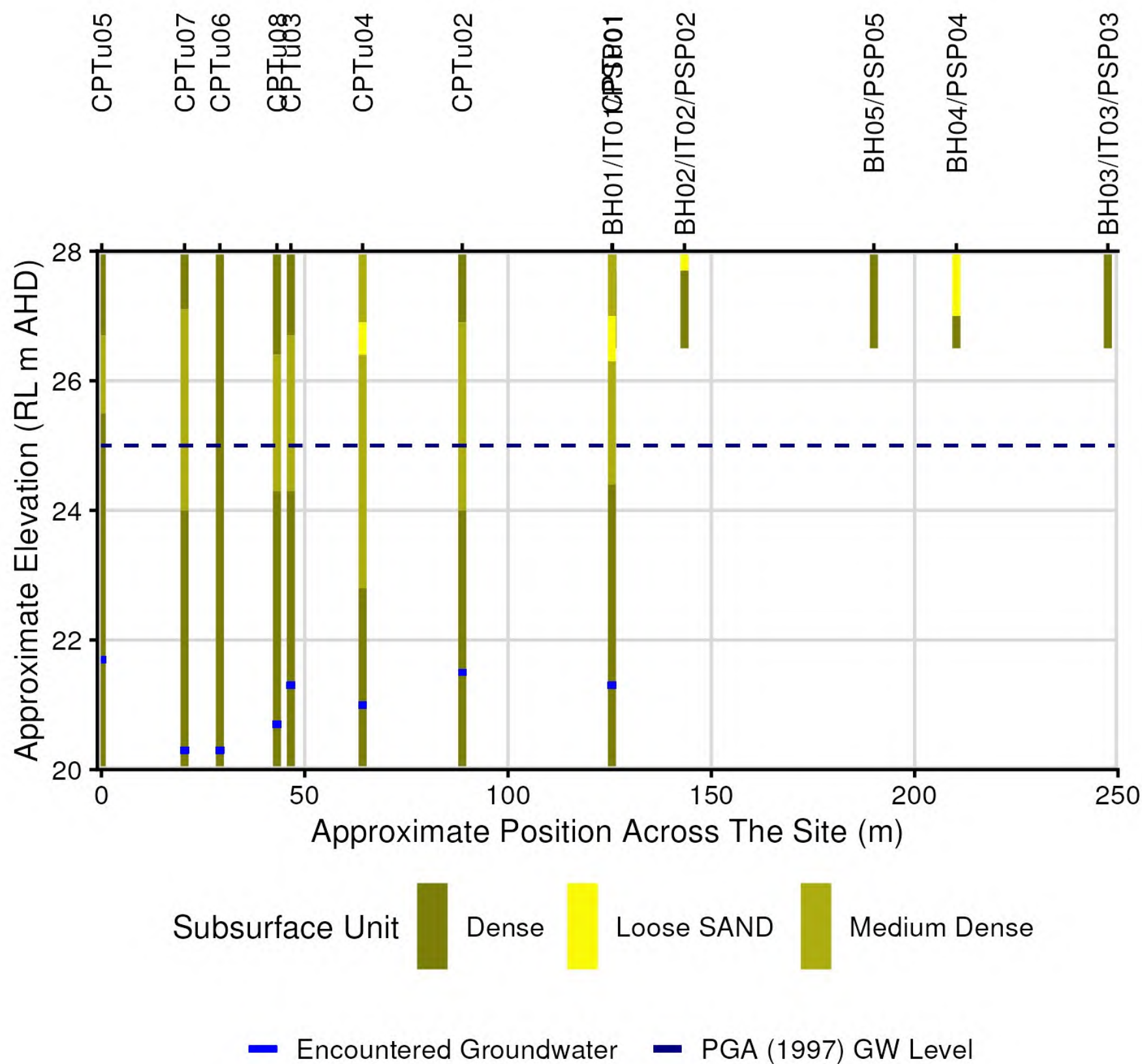


Table 7: Geotechnical Model Units and Design Parameters

Unit Name	Material Type	Where Found	Description	Comment	γ_{bulk} (kN/m ³)	ϕ' (°)	c' (kPa)	S_u (kPa)	E_v (MPa)	ν	k_0	Wall Friction=0		Wall Friction=0.5 ϕ	
												k_a	k_p	k_a	k_p
A	Loose SAND	Within the upper 2 m of soil profile, typically toward the north of the site.	Fine to medium grained, grey, brown, yellow.	Local fill similar to in situ material as noted on ground model.	17	32	-	-	5	0.3	0.42	0.31	3.25	0.27	5.55
B	Medium Dense SAND	Typically between RL 27 m AHD and RL 23 m AHD.	Near surface FILL typically comprises gravelly SAND, fine to medium grained, fine to medium sized gravel.		18	34	-	-	20	0.25	0.39	0.28	3.54	0.25	6.47
C	Dense SAND	At the surface and typically below RL 24 m AHD.			18	36	-	-	40	0.25	0.36	0.26	3.85	0.22	7.63

- NOTES:**
1. These units are a generalization of results from individual tests, which should be referred to for more information.
 2. Conditions at CPT locations below depth of soil sample recovery are inferred (refer to clause GDR3.2)
 3. Topsoil is not included as a discrete unit.
 4. For all earth pressure coefficients (retaining wall design) refer to clause GDR11.2 for more detail and interpretation. Unit weights for retaining structure design should be as per GDR11.2 or 1 kN/m³ greater than the values in the table above.
- γ_{bulk} – bulk unit weight
 ϕ' – effective friction angle
 S_u – undrained shear strength
 c' – effective cohesion
 E_v – vertical elastic modulus
 ν – Poisson's Ratio
 k_a – coefficient of active earth pressure (Coulomb – AS4678-2002, Appendix E)
 k_p – coefficient of passive earth pressure (Coulomb – AS4678-2002, Appendix E)
 k_0 – coefficient of at-rest earth pressure (Jaky)

9. GEOTECHNICAL ASSESSMENT

9.1. Summary

Table 8: Summary of Geotechnical Assessment

Type	Clause	Parameter	Comment
Site Suitability	-	-	We consider the site to be geotechnically suitable for the proposed development. Standard site preparation measures will apply.
Construction Methodology and Suitability	-	-	Shallow footings in accordance with AS2870-2011 will be suitable for this site. Mass retaining will be suitable for retaining above groundwater. Stormwater disposal via infiltration is suitable.
Site Classification (AS2870)	GDR5	A	$y_s < 5 \text{ mm}$
Site Preparation	GDR6	-	GDR6.2.1 Common Measures followed by GDR6.2.2 Sand Sites .
Approved Fill	GDR8	-	Approved Fill for this site is to comprise Permeable Sand . All <u>natural</u> and <u>existing fill</u> sand may be assumed to be Permeable Sand .
Compaction Control	GDR7	-	A PSP may be used for compaction control on site-derived Permeable Sand . Deemed to comply values for 'Bassendean Sand' in GDR7.4 are applicable.
Shallow Footings	GDR9	$q_{all} = 250 \text{ kPa}$	Design tables for shallow footings are presented in Section 9.2. 70% of the settlement is expected to occur during construction.
Earth Pressure Coefficients	GDR11	Section 8	Earth pressure coefficients can be used for the generalised subsurface unit presented. Any Permeable Sand fill may be assumed to be Unit B – Medium Dense SAND.
Unsaturated Hydraulic Conductivity	GDR13	$k_{unsat} = 5 \text{ m/day}$	k_{unsat} values apply where disposing into Approved Fill (Permeable Sand) or natural sand, minimum 0.5 m above the groundwater table GDR13.4.
Pavement Subgrade CBR	GDR16	CBR = 10%	Subgrade to comprise compacted in-situ sand or compacted Approved Fill

NOTES: 1. q_{all} – allowable bearing pressure (maximum for all footings, refer to footing tables for further details)

9.2. Shallow Footings

Table 9: Isolated Pad - Footing Allowable Bearing Pressures and Estimated Settlements

d_e (m)	b (m)	q_{all} (kPa)	s (mm)
0.5	0.5	160	<5
	1.0	180	5-10
	1.5	200	10-15
	2.0	200	15-20
	3.0	200	20-25
1.0	1.0	200	5-10
	2.0	200	10-15
	3.0	200	15-20
	4.0	200	20-25

- NOTES:**
1. d_e – minimum embedment depth (below finished ground level or floor slab)
 2. b – Footing breadth (footings assumed approximately square)
 3. q_{all} – allowable bearing pressure (peak).
 4. s – estimated settlement (excludes shrink/swell from site class)
 5. Refer to GDR9

Table 10: Isolated Strip Footing - Allowable Bearing Pressures and Estimated Settlements

d_e (m)	b (m)	q_{all} (kPa)	s (mm)
0.5	0.5	140	<5
	1.0	140	5-10
	1.5	150	10-15
	2.0	160	15-20
	3.0	160	20-25
1.0	1.0	160	5-10
	2.0	160	10-15
	3.0	160	15-20

- NOTES:**
1. d_e – minimum embedment depth (below finished ground level or floor slab)
 2. b – Footing width (footings assumed long relative to width)
 3. q_{all} – allowable bearing pressure (peak).
 4. s – estimated settlement (excludes shrink/swell from site class)
 5. Refer to GDR9

10. CLOSURE

GALT GEOTECHNICS



Timothy Dunton
Engineering Geologist



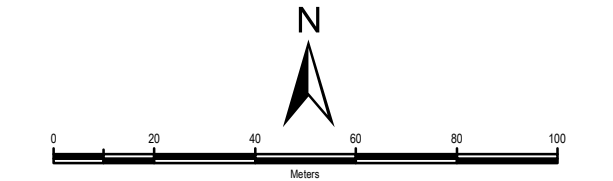
Rick Piovesan CPEng
Geotechnical Engineer

[https://galtgeo.sharepoint.com/sites/wae200102/shared documents/02 projective dm/03 correspondence/wae200102-02 002 r rev0.docx](https://galtgeo.sharepoint.com/sites/wae200102/shared%20documents/02%20projective%20dm/03%20correspondence/wae200102-02%20002%20r%20rev0.docx)

Figures



- Legend**
- Site Boundary
 - Borehole / Infiltration Test / Perth Sand Penetrometer
 - Borehole / Perth Sand Penetrometer
 - Cone Penetration Test with Pore Pressure Measurement



NOTES
Aerial Imagery and Cadastre sourced from Landgate/SLIP

	SCALE	1:1,500	(A3)
	DRAWN	CED	
	DATE DRAWN	5/4/2024	
	CHECKED	RP	
	DATE CHECKED	16/4/2024	
	PROJECTION	GDA 1994 MGA Zone 50	

Galt Geotechnics Pty Ltd
ACN : 138 490 865
Tel : +61 (0)8 6272-0200
Address : 50 Edward Street
Osborne Park WA 6017

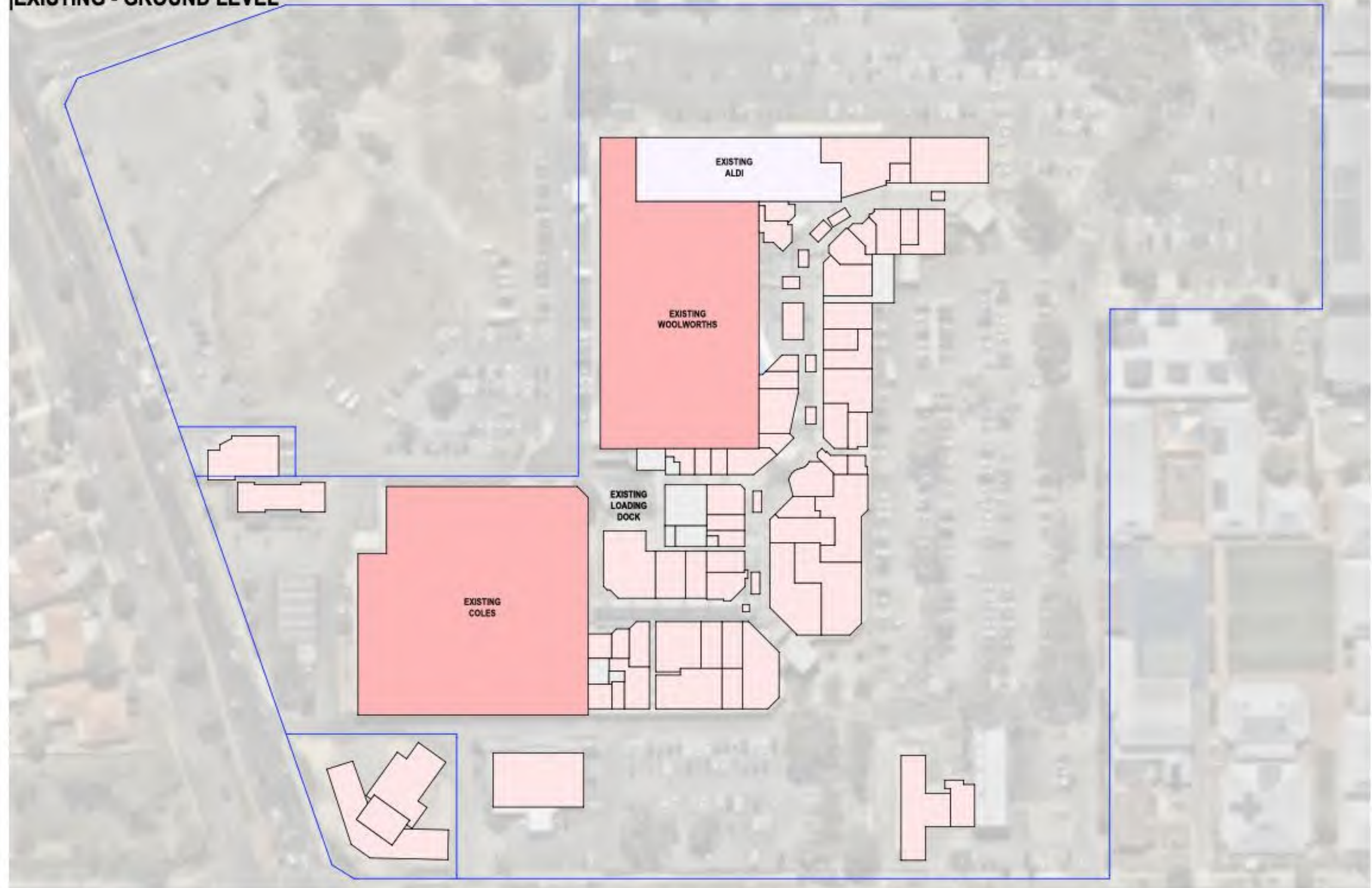
COPYRIGHT © 2024 THIS FIGURE AND ITS CONTENTS REMAINS THE PROPERTY OF GALT GEOTECHNICS PTY LTD AND MAY NOT BE REPRODUCED WITHOUT PRIOR APPROVAL. THIS FIGURE SHOULD BE READ IN CONJUNCTION WITH THE ACCOMPANYING REPORT.

CLIENT	PROJECTIVE DM PTY LTD		
PROJECT	PROPOSED PHASE 1 REDEVELOPMENT		
LOCATION	DIANELLA PLAZA SHOPPING CENTRE ALEXANDER DRIVE, DIANELLA		
TITLE	SITE & LOCATION PLAN		
Job No	WAE200102-02	Fig No	FIGURE 1
		Rev	A

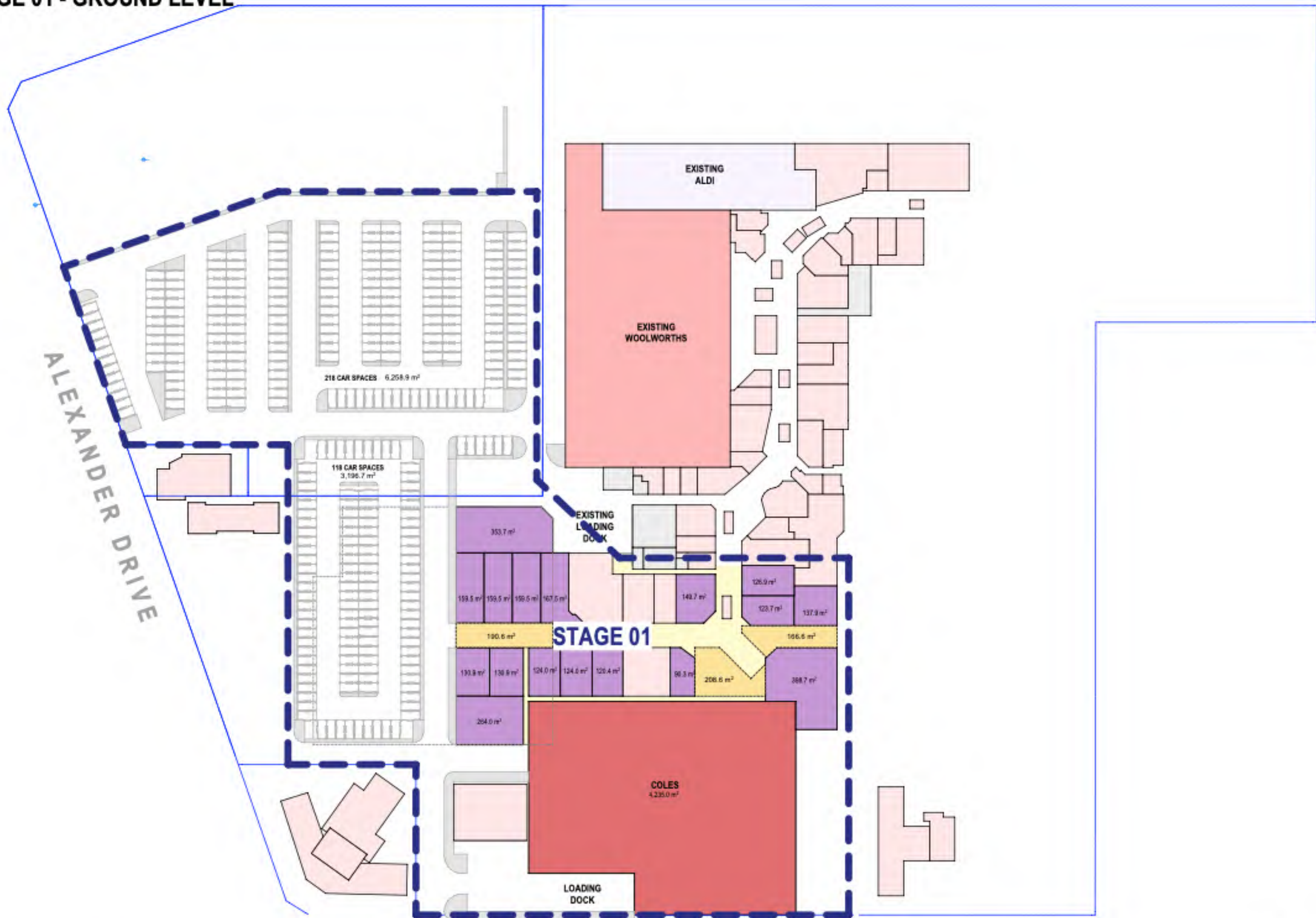
Appendices

Appendix A: Supplied Information

EXISTING - GROUND LEVEL



|STAGE 01 - GROUND LEVEL



Appendix B: Site Photographs

Photograph 1: Facing northeast at BH01 location.



Photograph 2: Facing southeast at BH01 location.



Photograph 3: Facing southwest at BH01 location. IT01 in progress.



Photograph 4: Facing southeast at BH02 location.



Photograph 5: Facing northeast at BH03 location.



Photograph 6: Facing southeast at BH03 location.



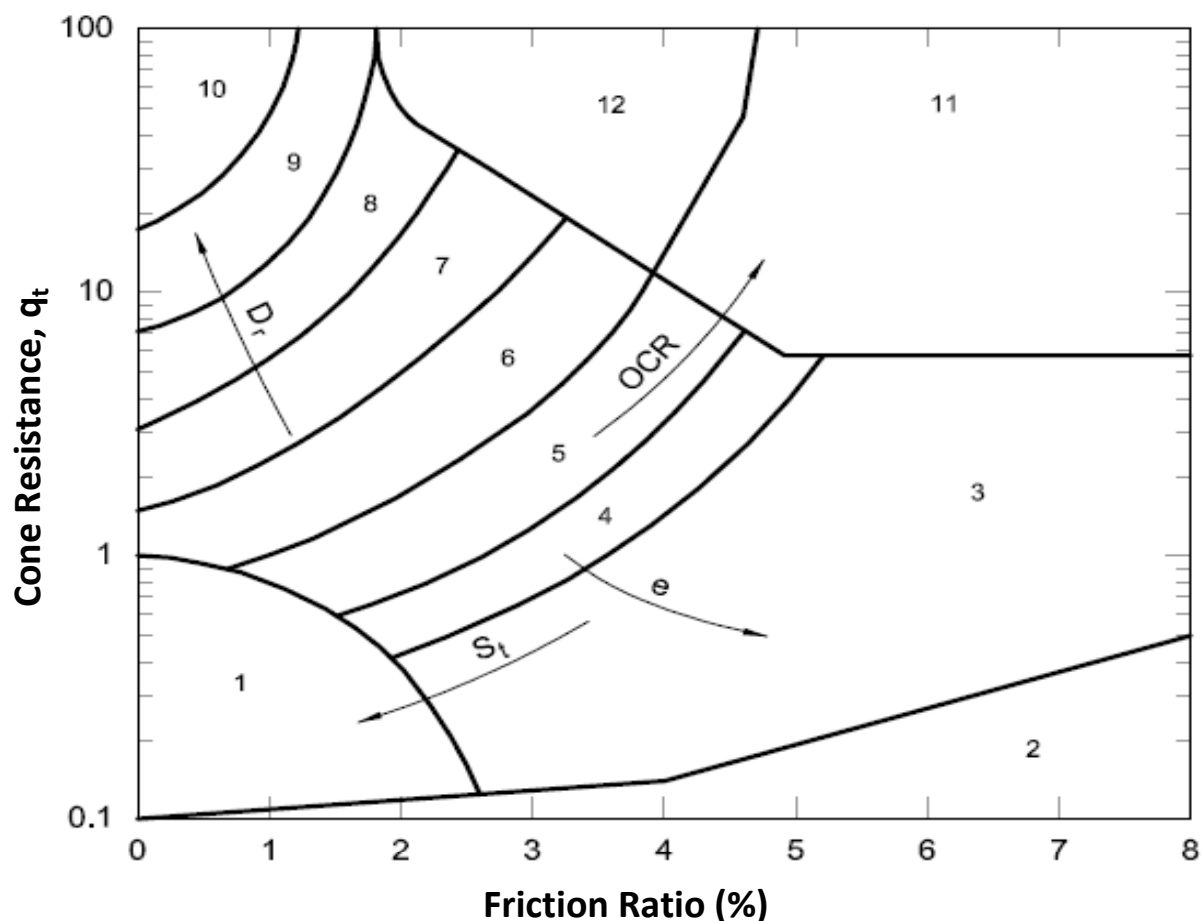
Photograph 7: Facing southwest at BH05 location.



Photograph 8: Facing south at CPT01 location.



Appendix C: Cone Penetration Test Results



DEFINITIONS

- q_t : Cone tip resistance corrected for pore water pressure
 S_t : Sensitivity
 e : Void ratio
 D_r : Relative density
 OCR : Overconsolidation ratio
 OC : Overconsolidated

SOIL BEHAVIOUR TYPE ZONES

- | | |
|------------------------------|--|
| 1. Sensitive fine grained | 7. Silty sand to sandy silt |
| 2. Organic material | 8. Sand to silty sand |
| 3. Clay | 9. Sand |
| 4. Silty clay to clay | 10. Gravelly sand to sand |
| 5. Clayey silt to silty clay | 11. Very stiff fine grained material (OC/cemented) |
| 6. Sandy silt to clayey silt | 12. Sand to clayey sand (OC/cemented) |

NOTES

- A. Some overlap in type zones is expected
 B. Local correlations are preferred and may indicate soil type boundaries that are different from those shown above

Reference: Robertson, P.K., Campanella, R.G., Gillespie, D. and Grieg, J. (1986) "Use of Piezometer Cone Data". Proceedings of the ASCE Speciality Conference In Situ '86: Use of In Situ Tests in Geotechnical Engineering, Blacksburg, pp 1263-80, American Society of Civil Engineers (ASCE)



CONE PENETRATION TESTING (CPT) SOIL TYPE INTERPRETATION

CONE PENETRATION TEST

ALL TESTS

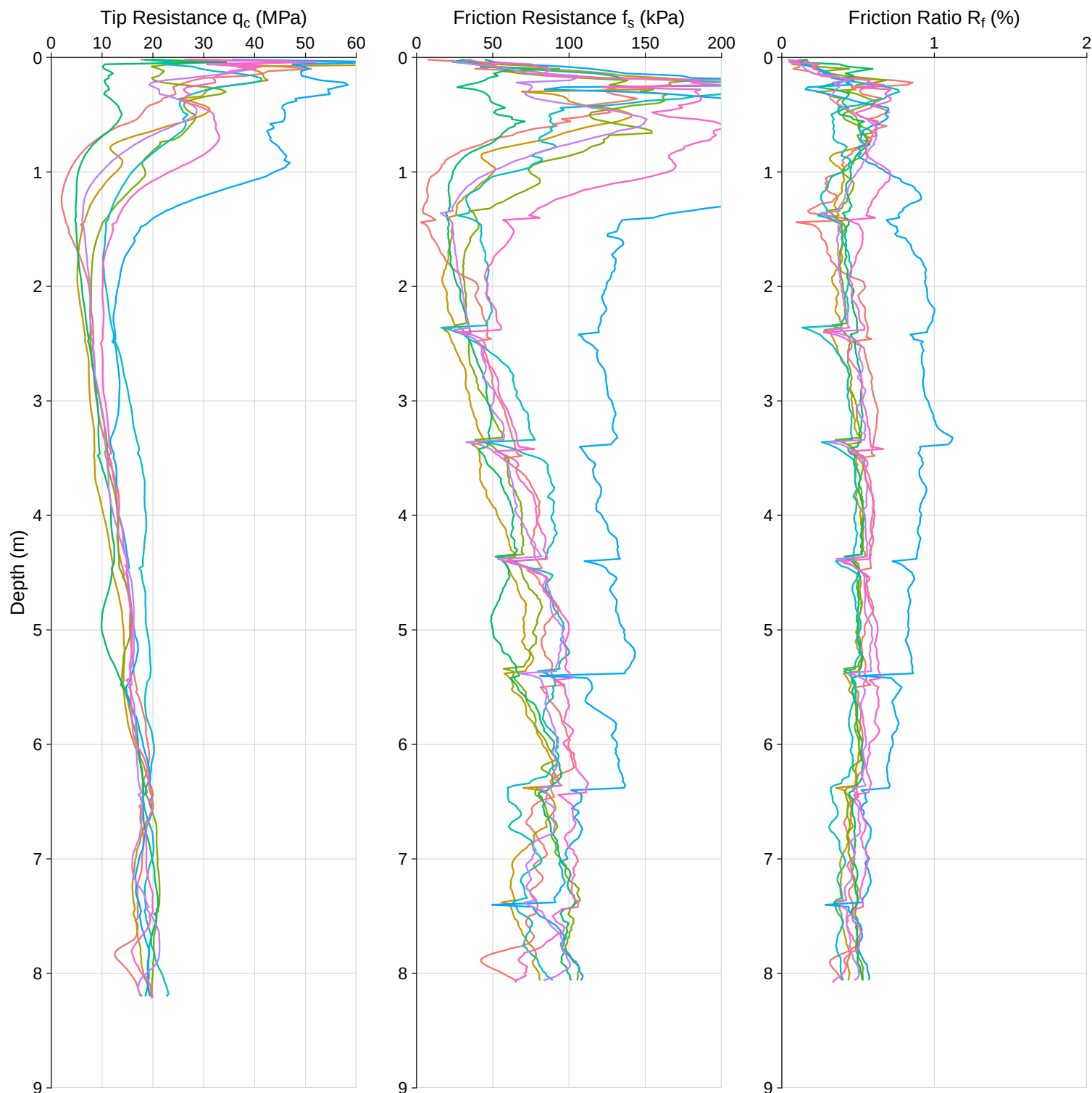
JOB NUMBER: WAE200102-02

DATE: 02/04/2024 - 03/04/2024

CLIENT: Projective DM PTY LTD

PROJECT: Proposed Phase One Redevelopment

LOCATION: Dianella Plaza Shopping Centre

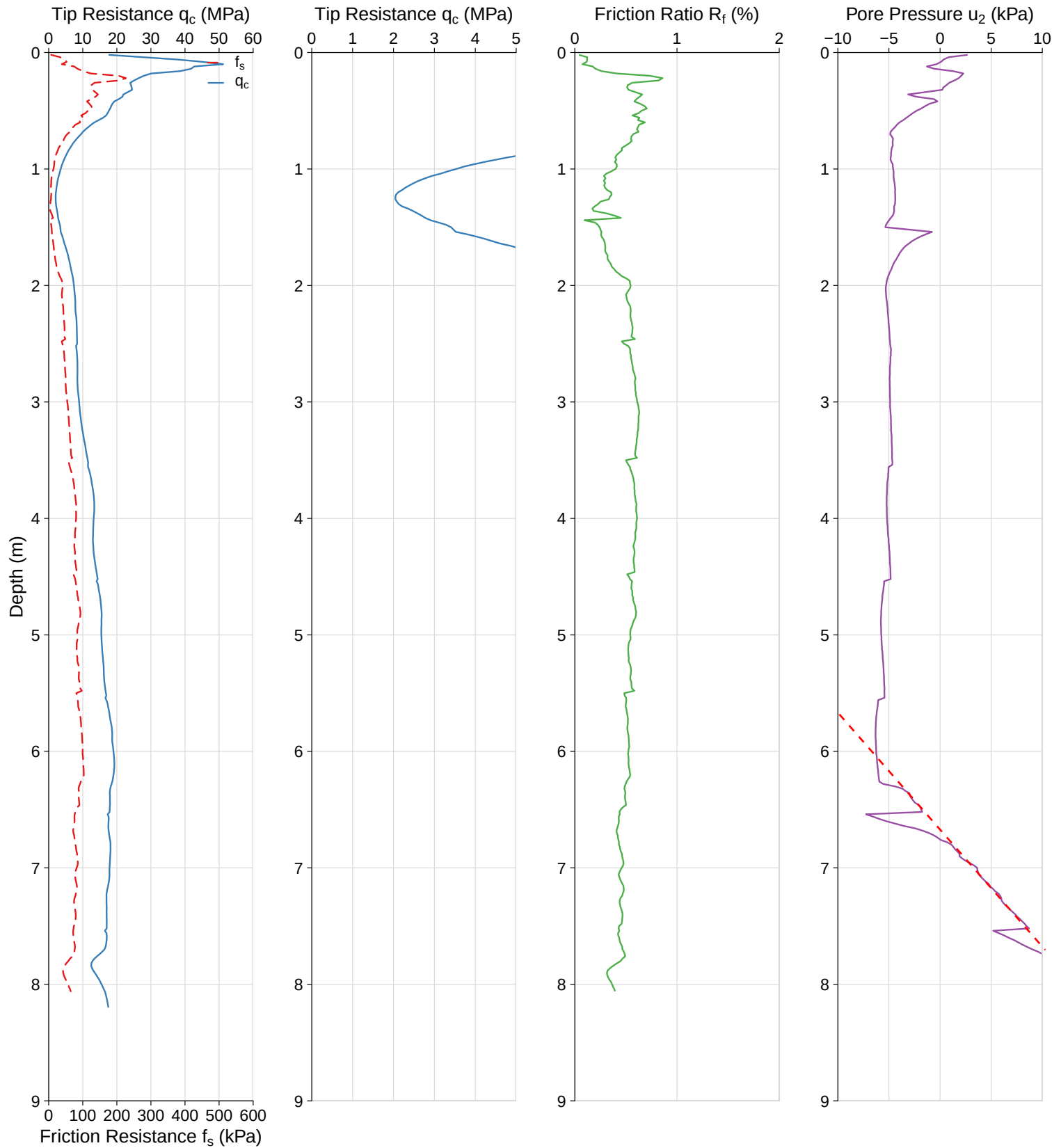


RIG: AP van den Berg Hyson 200kN 14T Truck

CONE PENETRATION TEST

CPT ID: WAE200102-02_CPTU01
JOB NUMBER: WAE200102-02
DATE: 02/04/2024

CLIENT: Projective DM PTY LTD
PROJECT: Proposed Phase One Redevelopment
LOCATION: Dianella Plaza Shopping Centre



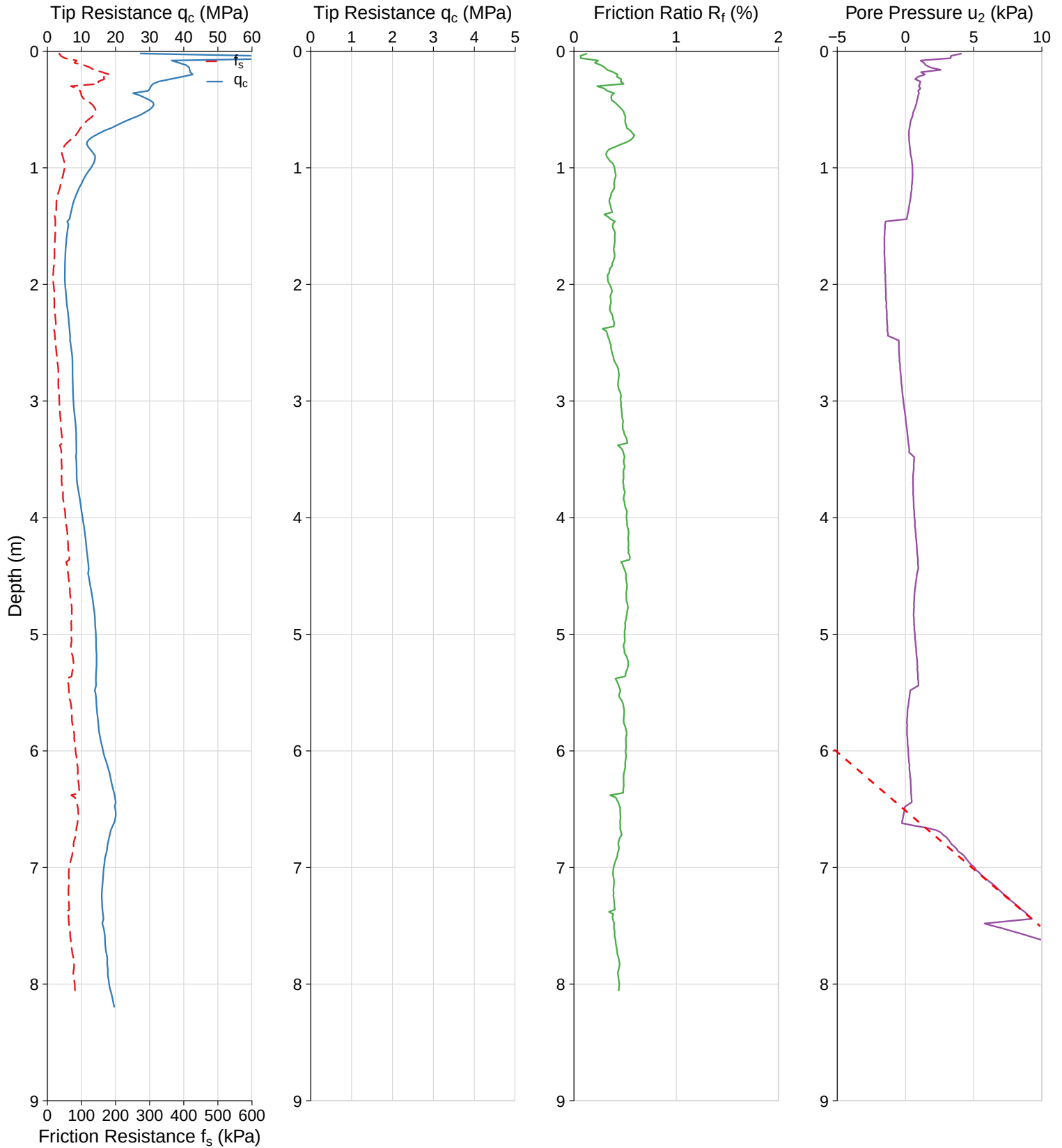
WATER:
TERMINATION:
DUMMY PROBE:
RIG: AP van den Berg Hyson 200kN 14T Truck

CO-ORDS:
ELEVATION:
PRE-DRILL:
WASHER/DISC: Porous

CONE PENETRATION TEST

CPT ID: WAE200102-02_CPTU02
JOB NUMBER: WAE200102-02
DATE: 02/04/2024

CLIENT: Projective DM PTY LTD
PROJECT: Proposed Phase One Redevelopment
LOCATION: Dianella Plaza Shopping Centre



WATER:
TERMINATION:
DUMMY PROBE:
RIG:

AP van den Berg Hyson 200kN 14T Truck

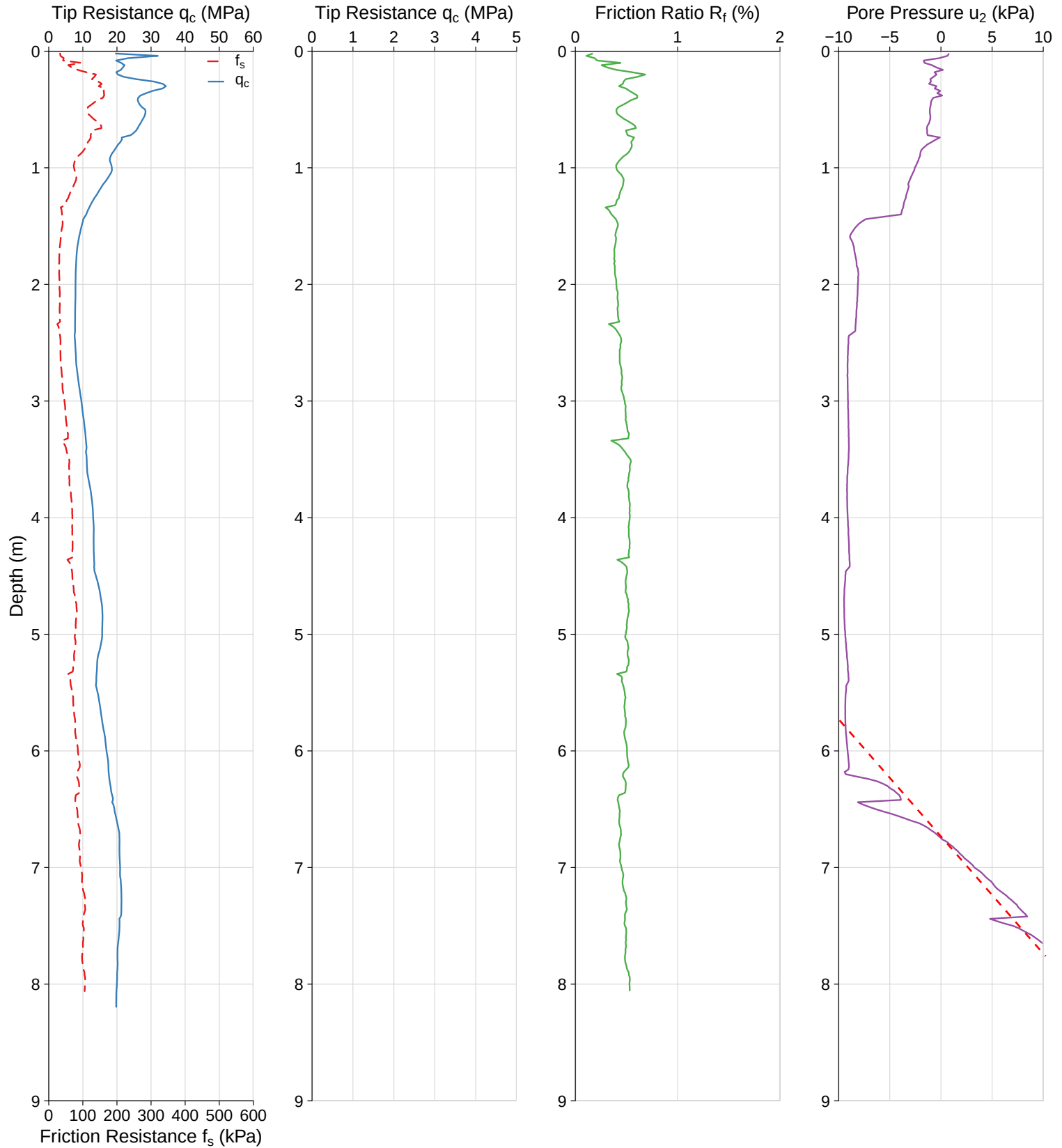
CO-ORDS:
ELEVATION:
PRE-DRILL:
WASHER/DISC: Porous



CONE PENETRATION TEST

CPT ID: WAE200102-02_CPTU03
JOB NUMBER: WAE200102-02
DATE: 02/04/2024

CLIENT: Projective DM PTY LTD
PROJECT: Proposed Phase One Redevelopment
LOCATION: Dianella Plaza Shopping Centre



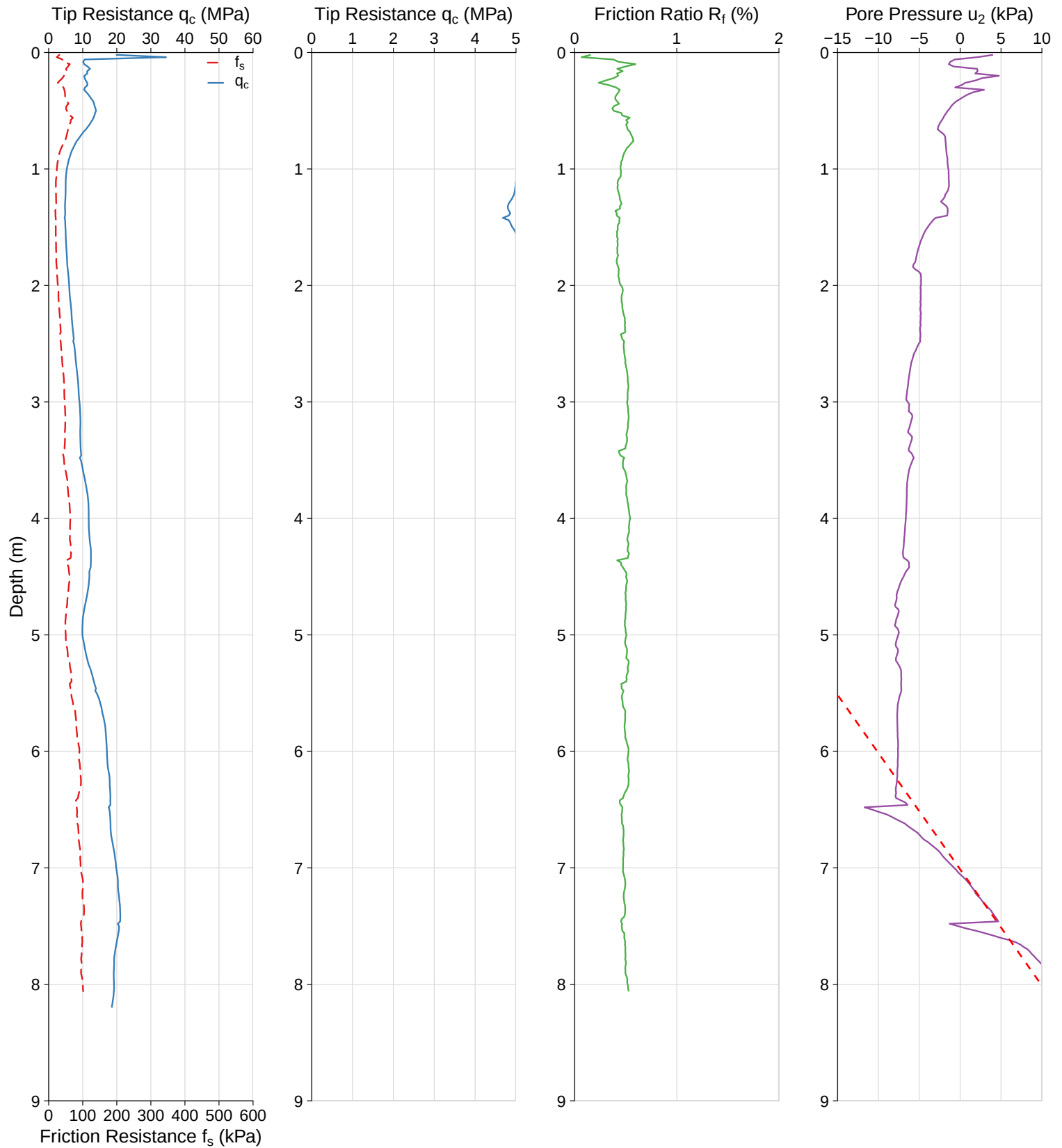
WATER:
TERMINATION:
DUMMY PROBE:
RIG: AP van den Berg Hyson 200kN 14T Truck

CO-ORDS:
ELEVATION:
PRE-DRILL:
WASHER/DISC: Porous

CONE PENETRATION TEST

CPT ID: WAE200102-02_CPTU04
JOB NUMBER: WAE200102-02
DATE: 02/04/2024

CLIENT: Projective DM PTY LTD
PROJECT: Proposed Phase One Redevelopment
LOCATION: Dianella Plaza Shopping Centre



WATER:
TERMINATION:
DUMMY PROBE:
RIG: AP van den Berg Hyson 200kN 14T Truck

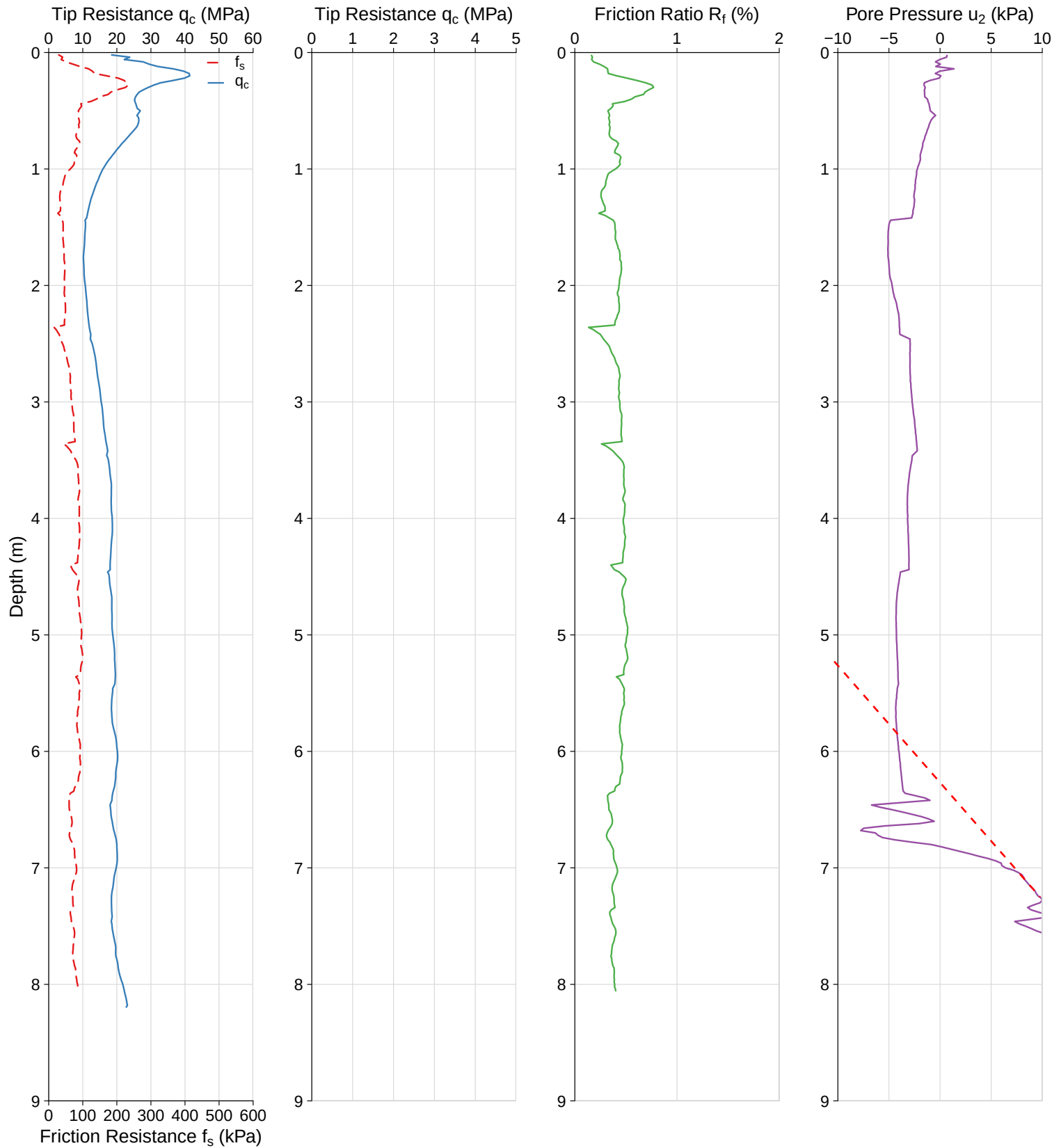
CO-ORDS:
ELEVATION:
PRE-DRILL:
WASHER/DISC: Porous



CONE PENETRATION TEST

CPT ID: WAE200102-02_CPTU05
JOB NUMBER: WAE200102-02
DATE: 02/04/2024

CLIENT: Projective DM PTY LTD
PROJECT: Proposed Phase One Redevelopment
LOCATION: Dianella Plaza Shopping Centre



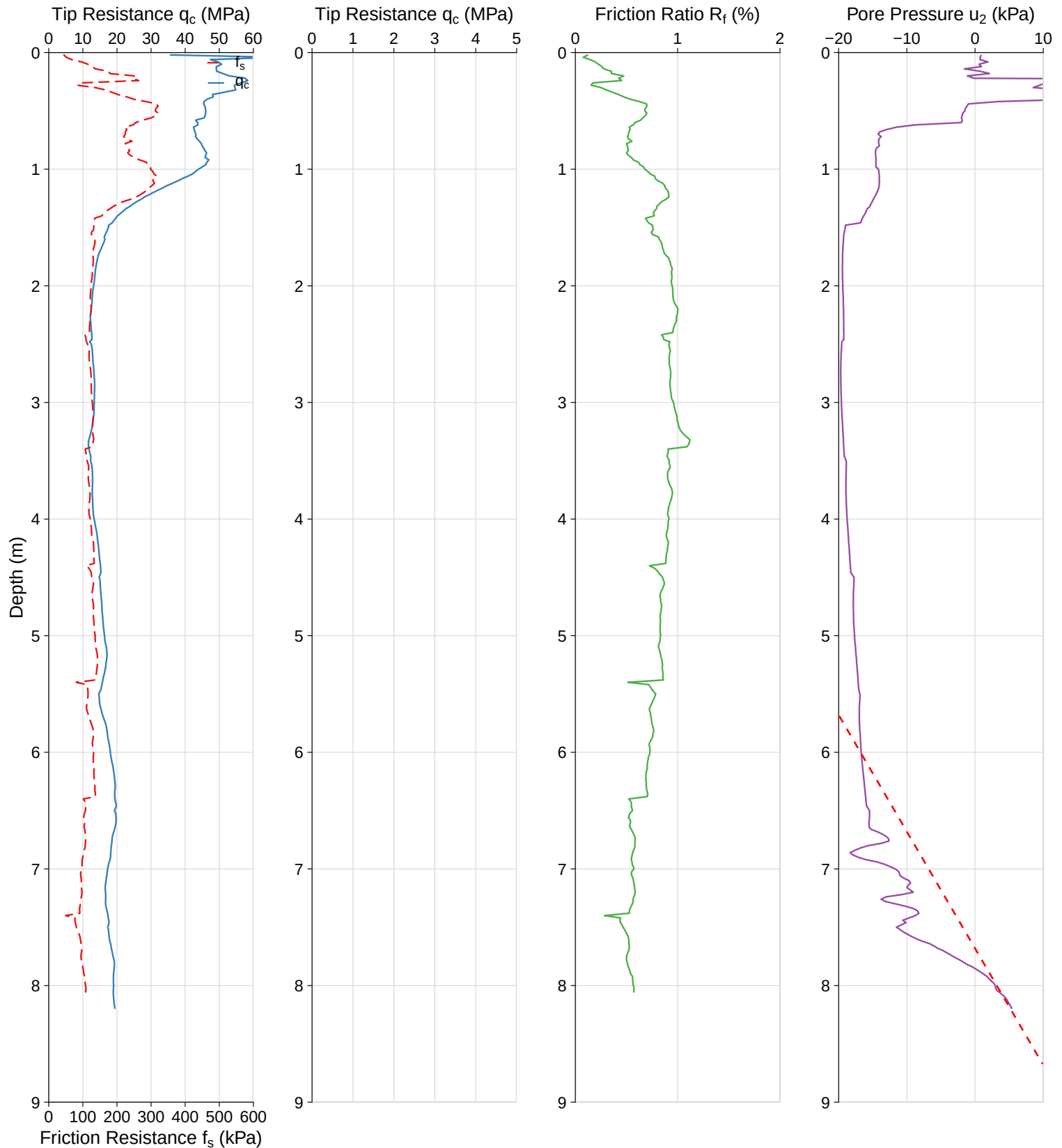
WATER:
TERMINATION:
DUMMY PROBE:
RIG: AP van den Berg Hyson 200kN 14T Truck

CO-ORDS:
ELEVATION:
PRE-DRILL:
WASHER/DISC: Porous

CONE PENETRATION TEST

CPT ID: WAE200102-02_CPTU06B
JOB NUMBER: WAE200102-02
DATE: 02/04/2024

CLIENT: Projective DM PTY LTD
PROJECT: Proposed Phase One Redevelopment
LOCATION: Dianella Plaza Shopping Centre



WATER:
TERMINATION:
DUMMY PROBE:
RIG: AP van den Berg Hyson 200kN 14T Truck

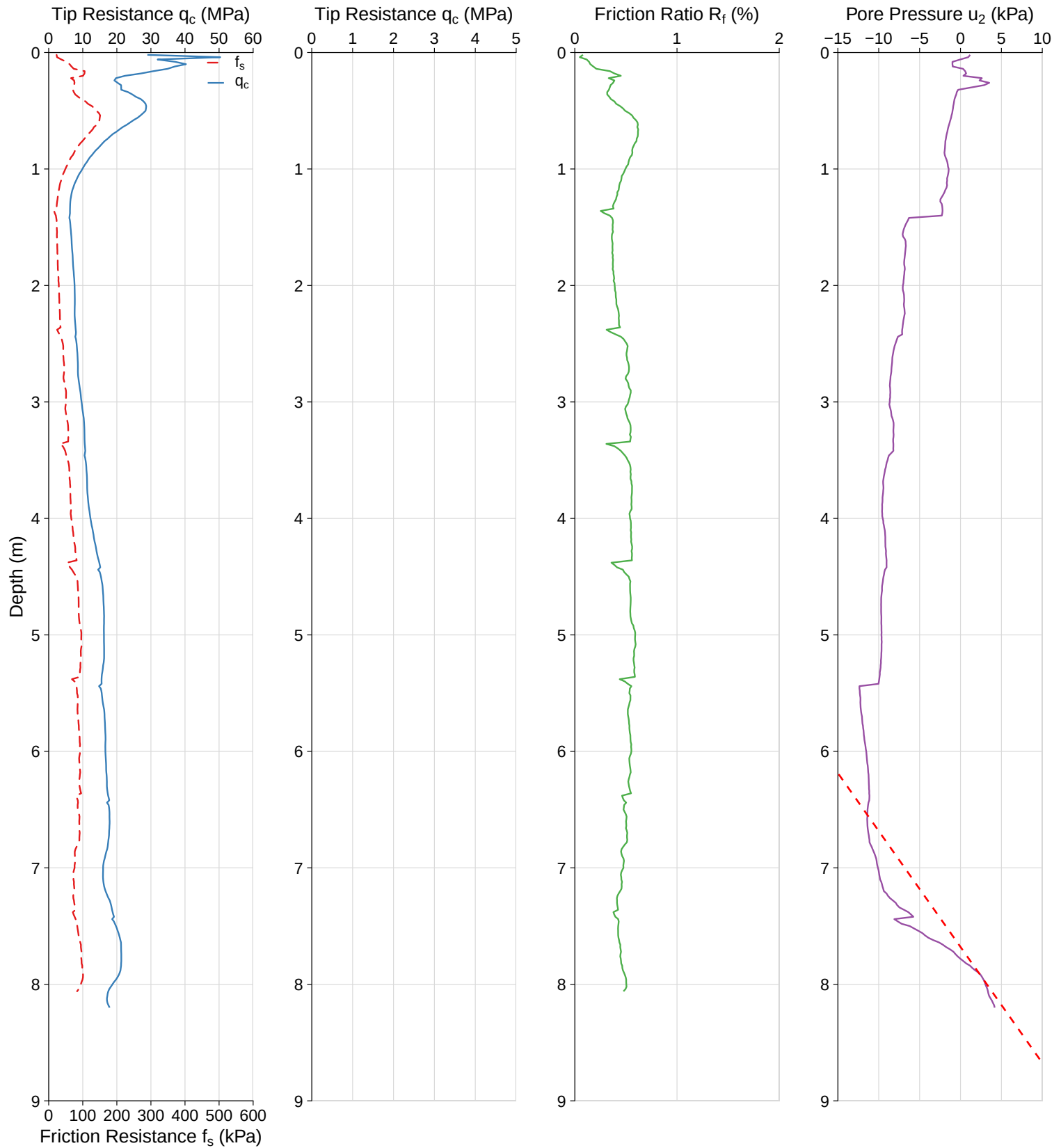
CO-ORDS:
ELEVATION:
PRE-DRILL:
WASHER/DISC: Porous



CONE PENETRATION TEST

CPT ID: WAE200102-02_CPTU07
JOB NUMBER: WAE200102-02
DATE: 02/04/2024

CLIENT: Projective DM PTY LTD
PROJECT: Proposed Phase One Redevelopment
LOCATION: Dianella Plaza Shopping Centre



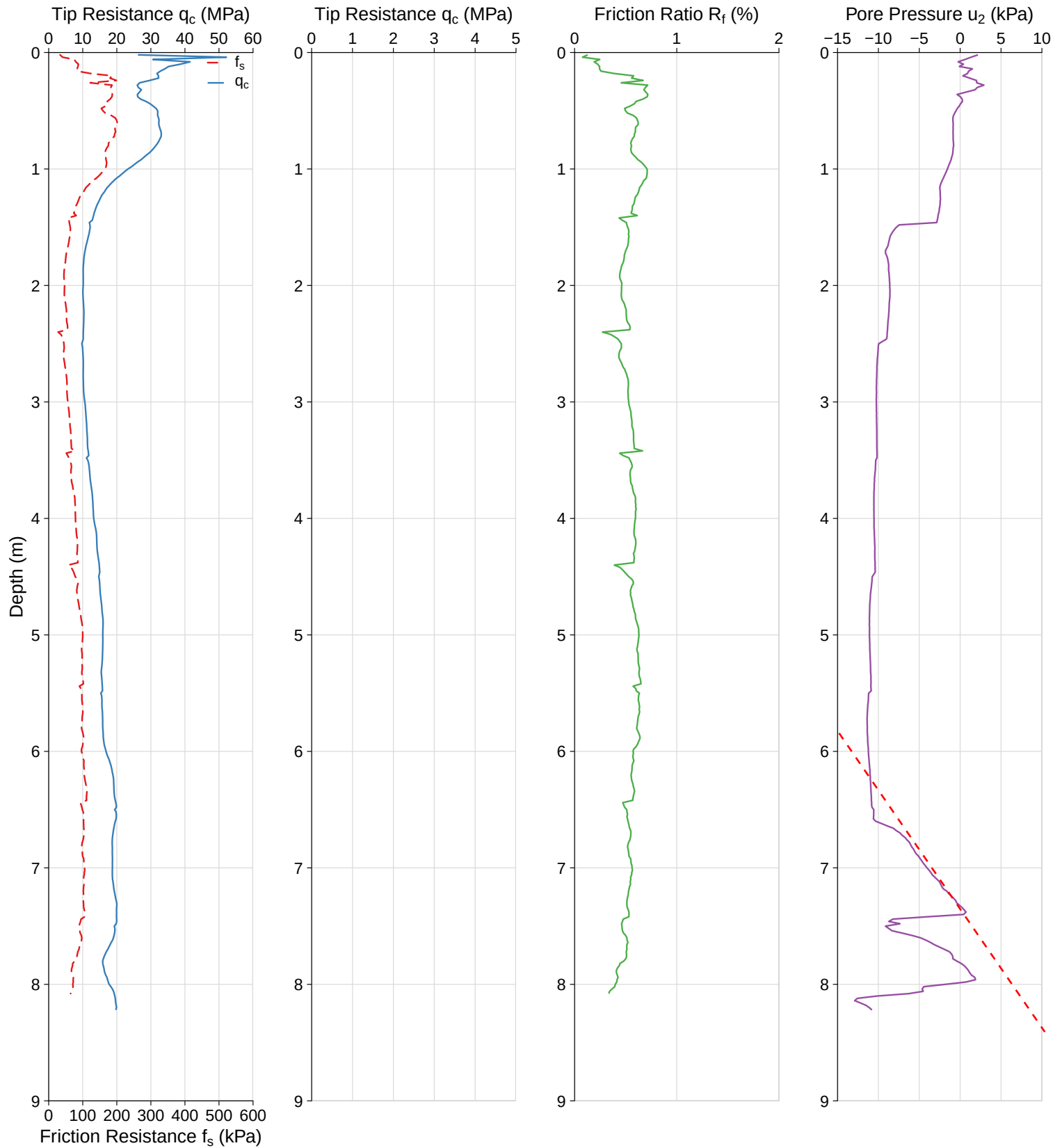
WATER:
TERMINATION:
DUMMY PROBE:
RIG: AP van den Berg Hyson 200kN 14T Truck

CO-ORDS:
ELEVATION:
PRE-DRILL:
WASHER/DISC: Porous

CONE PENETRATION TEST

CPT ID: WAE200102-02_CPTU08
JOB NUMBER: WAE200102-02
DATE: 02/04/2024

CLIENT: Projective DM PTY LTD
PROJECT: Proposed Phase One Redevelopment
LOCATION: Dianella Plaza Shopping Centre



WATER:
TERMINATION:
DUMMY PROBE:
RIG: AP van den Berg Hyson 200kN 14T Truck

CO-ORDS:
ELEVATION:
PRE-DRILL:
WASHER/DISC: Porous

Appendix D: Borehole Reports

EXPLANATORY NOTES TO BE READ WITH BOREHOLE AND TEST PIT REPORTS



METHOD OF DRILLING OR EXCAVATION

AC	Air Core	E	Excavator	PQ3	PQ3 Core Barrel
AD/T	Auger Drilling with TC-Bit	EH	Excavator with Hammer	PT	Push Tube
AD/V	Auger Drilling with V-Bit	HA	Hand Auger	R	Ripper
AT	Air Track	HMLC	HMLC Core Barrel	RR	Rock Roller
B	Bulldozer Blade	HQ3	HQ3 Core Barrel	SON	Sonic Rig
BH	Backhoe Bucket	N	Natural Exposure	SPT	Driven SPT
CT	Cable Tool	NMLC	NMLC Core Barrel	WB	Washbore
DT	Diatube	PP	Push Probe	X	Existing Excavation

SUPPORT

T	Timbering
---	-----------

PENETRATION EFFORT (RELATIVE TO THE EQUIPMENT USED)

VE	Very Easy	E	Easy	F	Firm
H	Hard	VH	Very Hard		

WATER

▶	Water Inflow	▼	Water Level
◀	Water Loss (complete)		
◁	Water Loss (partial)		

SAMPLING AND TESTING

B	Bulk Disturbed Sample	P	Piston Sample
BLK	Block Sample	PBT	Plate Bearing Test
C	Core Sample	U	Undisturbed Push-in Sample
CBR	CBR Mould Sample		U50: 50 mm diameter
D	Small Disturbed Sample	SPT	Standard Penetration Test
ES	Environmental Soil Sample		Example: 3, 4, 5 N=9
EW	Environmental Water Sample		3,4,5: Blows per 150 mm
G	Gas Sample		N=9: Blows per 300 mm after
HP	Hand Penetrometer		150 mm seating interval
LB	Large Bulk Disturbed Sample	VS	Vane Shear; P = Peak
M	Mazier Type Sample		R = Remoulded (kPa)
MC	Moisture Content Sample	W	Water Sample

ROCK CORE RECOVERY

$$\text{TCR} = \text{Total Core Recovery (\%)} = \frac{\text{CRL}}{\text{TCL}} \times 100$$

$$\text{RQD} = \text{Rock Quality Designation (\%)} = \frac{\text{ALC} > 100}{\text{TCL}} \times 100$$

TCL Length of Core Run

CRL Length of Core Recovered

ALC>100 Total Length of Axial Lengths of Core Greater than 100 mm Long

METHOD OF SOIL DESCRIPTION BOREHOLE AND TEST PIT REPORTS



GRAPHIC LOG & SOIL CLASSIFICATION SYMBOLS

Graphic	USCS	Soil Name
		FILL (various types)
		COBBLES / BOULDERS
	GP	GRAVEL (poorly graded)
	GW	GRAVEL (well graded)
	GC	Clayey GRAVEL
	GM	Silty GRAVEL
	SP	SAND (poorly graded)
	SW	SAND (well graded)
	SC	Clayey SAND

Graphic	USCS	Soil Name
	SM	Silty SAND
	ML	SILT (low liquid limit)
	MH	SILT (high liquid limit)
	CL	CLAY (low plasticity)
	CI	CLAY (medium plasticity)
	CH	CLAY (high plasticity)
	OL	Organic SILT (low liquid limit)
	OH	Organic SILT (high liquid limit)
	Pt	PEAT

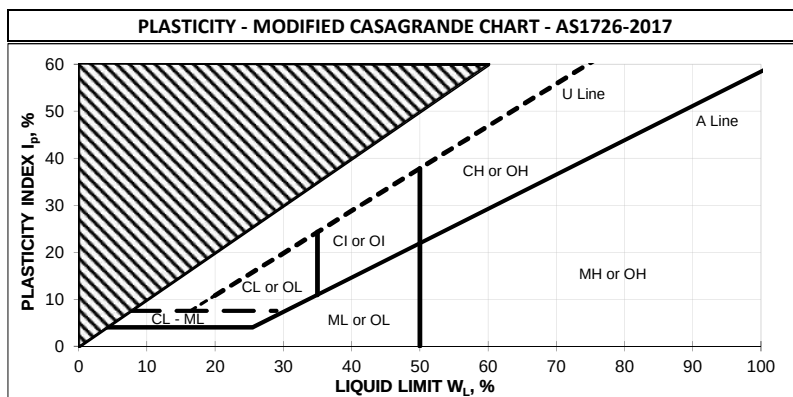
NOTE: Dual classification given for soils with a fines content between 5% and 12%.

SOIL CLASSIFICATION AND INFERRED STRATIGRAPHY

Soil descriptions are based on AS1726-2017. Material properties are assessed in the field by visual/tactile methods in combination with field and laboratory testing techniques (where used).

NOTE: AS 1726-2017 defines a fine grained soil where the total dry mass of fine fractions (<0.075 mm particle size) exceeds 35%.

PARTICLE SIZE		
Soil Name	Particle Size (mm)	
BOULDERS	>200	
COBBLES	63 to 200	
GRAVEL	Coarse	19 to 63
	Medium	6.7 to 19
	Fine	2.3 to 6.7
SAND	Coarse	0.6 to 2.36
	Medium	0.21 to 0.6
	Fine	0.075 to 0.21
FINES	SILT	0.002 to 0.075
	CLAY	<0.002



RESISTANCE TO EXCAVATION		
Symbol	Term	Description
VE	Very easy	All resistances are relative to the selected method of excavation
E	Easy	
F	Firm	
H	Hard	
VH	Very hard	

MOISTURE CONDITION	
Symbol	Term
D	Dry
M	Moist
W	Wet

CEMENTATION	
Cementation	Description
Weakly cemented	Soil may be easily disaggregated by hand in air or water
Moderately cemented	Effort is required to disaggregate the soil by hand in air or water

CONSISTENCY		
Symbol	Term	Undrained Shear Strength (kPa)
VS	Very Soft	0 to 12
S	Soft	12 to 25
F	Firm	25 to 50
St	Stiff	50 to 100
VSt	Very Stiff	100 to 200
H	Hard	>200

ORGANIC SOILS	
Material	Organic Content % of dry mass
Inorganic soil	<2%
Organic soil	2% to 25%
Peat	>25%

DENSITY		
Symbol	Term	Density Index (%)
VL	Very Loose	<15
L	Loose	15 to 35
MD	Medium Dense	35 to 65
D	Dense	65 to 85
VD	Very Dense	>85



REPORT OF BOREHOLE: BH01

Job No : WAE200102-02
Client : Projective DM Pty Ltd
Project : Proposed Phase 1 Redevelopment
Location : Dianella Plaza, Grand Promenade, Dianella WA
Contractor : Galt Geotechnics

Easting : 0.00
Northing : 0.00
UTM : 50J
Drill Rig : EVH Scout 1750
Inclination : -90 deg

Sheet : 1 OF 1
Logged : Alex Mathew
Logged Date : 02/04/2024
Checked : TD
Checked Date : 09/04/2024

Drilling Method	Excavation Resistance	PSP	DCP graph	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency/Density	Remarks	Sample
AD/V		SET			0.04	Nat Soil		ASP	Asphalt	D			
	4						SP-SM	Fill Gravelly SAND: brown, medium dense to dense, fine to medium grained, fine to coarse sized gravel, with fines.		MD-D			
	5			0.3	Fill		SP	Fill SAND: brown grey, dense to very dense, fine to medium grained, trace fines, trace gravel.		D-VD			
	6												
	8												
	13												
	16												
					1	Natural		SP	Natural SAND: yellow, fine to medium grained, trace fines .				
								BH01 Terminated at 1.5m (Target Depth. Groundwater not encountered)					
													



Easting : 0.00
Northing : 0.00
UTM : 50J
Drill Rig : EVH Scout 1750
Inclination : -90 deg

Sheet : 1 OF 1
 Logged : Alex Mathew
 Logged Date : 02/04/2024
 Checked : TD
 Checked Date : 09/04/2024

Drilling Method	Excavation Resistance	PSP	DCP graph	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency/Density	Remarks	Sample
AD/V		SET				Non-Soil		ASP	Asphalt	D			
	2		0.1	Fill	SP-SM	Fill Gravelly SAND: pale yellow, loose, fine to medium grained, fine to medium sized gravel, with fines.	L						
	5		0.3	Fill	SP	Fill SAND: brown yellow, dense to very dense, fine to medium grained, trace gravel, trace fines.	D-VD						
	8												
	10												
	11		0.7	Natural	SP	Natural SAND: yellow, fine to medium grained, trace fines.							
	12												
			1										
							BH02 Terminated at 1.5m (Target Depth. Groundwater not encountered)						
													



REPORT OF BOREHOLE: BH03

Job No : WAE200102-02

Client : Projective DM Pty Ltd

Project : Proposed Phase 1 Redevelopment

Location : Dianella Plaza, Grand Promenade, Dianella WA

Contractor : Galt Geotechnics

Easting : 0.00

Northing : 0.00

UTM : 50J

Drill Rig : EVH Scout 1750

Inclination : -90 deg

Sheet : 1 OF 1

Logged : Alex Mathew

Logged Date : 02/04/2024

Checked : TD

Checked Date : 09/04/2024

Drilling Method	Excavation Resistance	PSP	DCP graph	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency/Density	Remarks	Sample
AD/V		SET			0.02	Not Soil		ASP	Asphalt	D			
								SP -SM	Fill Gravelly SAND: pale yellow brown, dense to very dense, fine to medium grained, fine to coarse sized gravel, with fines.		D-VD		
		17											
		17			0.3	Fill		SP	Fill SAND: brown, dense to very dense, fine to medium grained, with fine to medium sized gravel, trace fines.				
		20											
		19 R											
					0.8	Natural		SP	Natural SAND: yellow, fine to medium grained, trace fines.				
					1								
									BH03 Terminated at 1.5m (Target Depth. Groundwater not encountered)				
													



REPORT OF BOREHOLE: BH04

Job No : WAE200102-02
Client : Projective DM Pty Ltd
Project : Proposed Phase 1 Redevelopment
Location : Dianella Plaza, Grand Promenade, Dianella WA
Contractor : Galt Geotechnics

Easting : 0.00
Northing : 0.00
UTM : 50J
Drill Rig : EVH Scout 1750
Inclination : -90 deg

Sheet : 1 OF 1
Logged : Alex Mathew
Logged Date : 02/04/2024
Checked : TD
Checked Date : 09/04/2024

Drilling Method	Excavation Resistance	PSP	DCP graph	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency/Density	Remarks	Sample
AD/V		SET				Fill		SP-SM	Fill SAND: grey, loose, fine to medium grained, with fines, trace rootlets within top 0.2 m.	D	L		
		1											
		3											
		2											
		2											
		2											
		2											
		2											
		8			1	Natural		SP	Natural SAND: yellow brown, fine to medium grained, trace fines .		D-VD		
		9											
		10											
		9							BH04 Terminated at 1.5m (Target Depth. Groundwater not encountered)				
		11											
		11											





REPORT OF BOREHOLE: BH05

Job No : WAE200102-02
Client : Projective DM Pty Ltd
Project : Proposed Phase 1 Redevelopment
Location : Dianella Plaza, Grand Promenade, Dianella WA
Contractor : Galt Geotechnics

Easting : 0.00
Northing : 0.00
UTM : 50J
Drill Rig : EVH Scout 1750
Inclination : -90 deg

Sheet : 1 OF 1
Logged : Alex Mathew
Logged Date : 02/04/2024
Checked : TD
Checked Date : 09/04/2024

Drilling Method	Excavation Resistance	PSP	DCP graph	Water	Depth (m)	Soil Origin	Graphic Log	Classification Code	Material Description	Moisture	Consistency/Density	Remarks	Sample
AD/V		SET				Fill		SP-SM	Fill Gravelly SAND: pale yellow, dense to very dense, fine to medium grained, fine to medium sized gravel, with fines.	D	D-VD		
	13	0.2				Fill		SP-SM	Fill SAND: brown, dense to very dense, fine to medium grained, with gravel, with fines.				
	5 HB	0.3				Fill		SP	As above, pale brown, trace gravel, trace fines.				
		1				Natural		SP	Natural SAND: yellow, fine to medium grained, trace fines .				
								BH05 Terminated at 1.5m (Target Depth. Groundwater not encountered)					
													

Appendix E: Infiltration Test Results

Hydraulic Conductivity Calculation - Inverse Auger Hole Method

Galt Geotechnics

Spreadsheet author:

ORW

17-Oct-09

REFERENCE: Cocks, G. *Disposal of Stormwater Runoff by Soakage in Perth, Western Australia*, Journal and News of the Australian Geomechanics Society, Volume 42 No 3 September 2007, pp101-114

Job No: WAE200102-02

Client: Projective DM Pty Ltd

Project: Proposed Phase 1

Redevelopment

Location: Dianella Plaza

Shopping Centre

BH Name: BH01/IT01

Test Depth: 0.91 m

Spreadsheet Legend

Required input

Calculated field

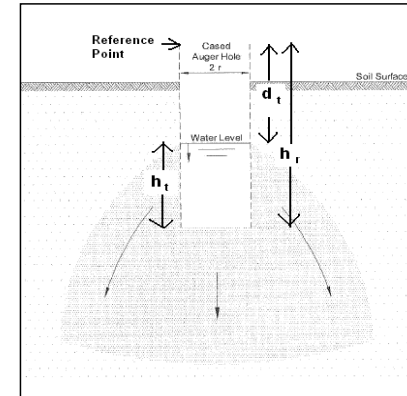
Comment field

Field not used

Fixed field

$$K = 1.15r \frac{\log_{10}(h_0 + \frac{1}{2}r) - \log_{10}(h_t + \frac{1}{2}r)}{t - t_0}$$

Parameter	Description	Value	Units
K	Hydraulic Conductivity		m/s
r	radius of test hole	0.045	m
t	time since start of measurement		s
h_r	reference point height above base	0.91	m
d_t	depth from reference point to water at time t		m
h_t	Water column height at time t		m
h_0	h_t at $t=0$		m



Test 1

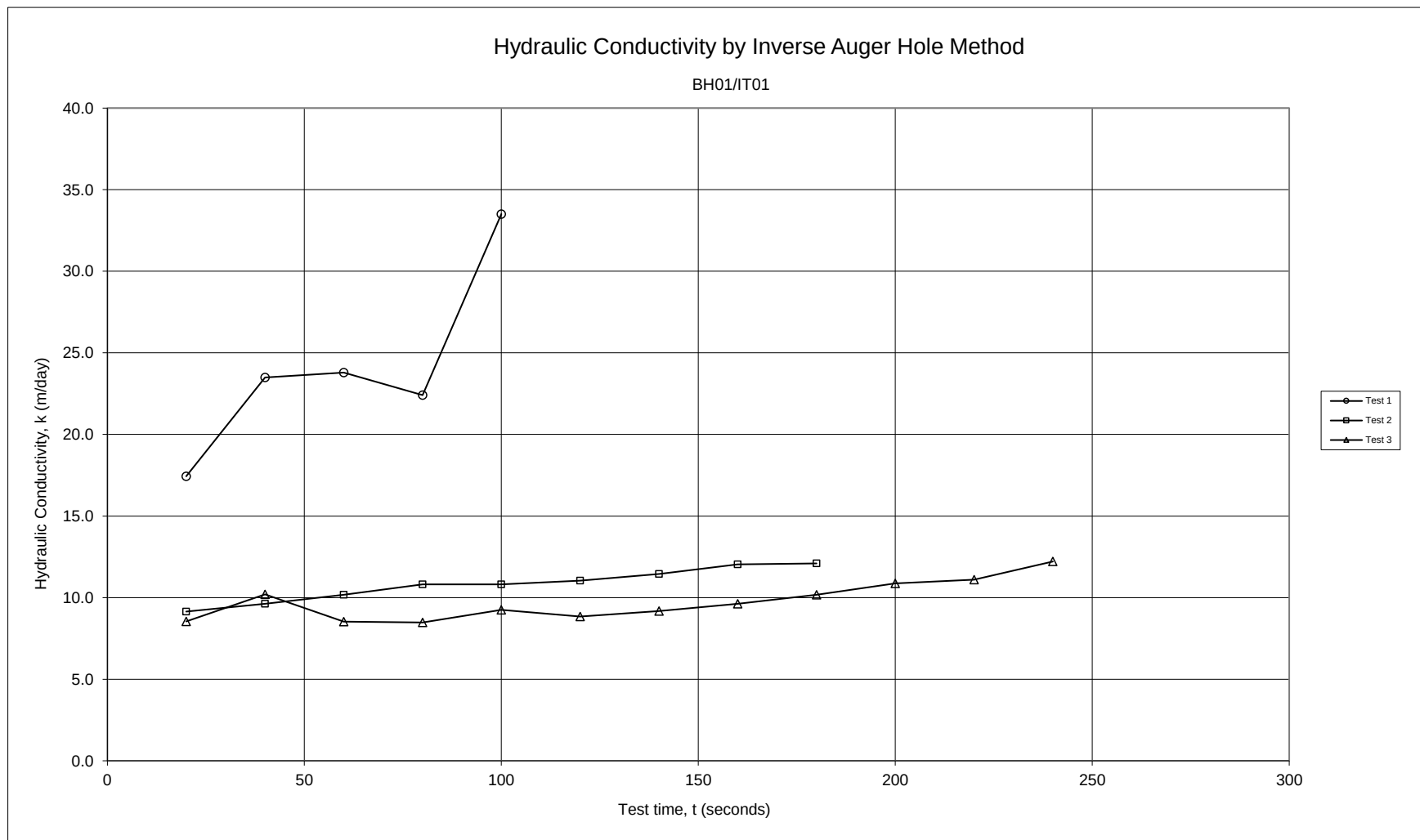
t (s)	d_w (m)	h_t (m)	K (m/s)	K (m/day)
0	0.75	0.16		
20	0.78	0.13	2.0E-04	17.4
40	0.82	0.09	2.7E-04	23.5
60	0.845	0.065	2.8E-04	23.8
80	0.86	0.05	2.6E-04	22.4
100	0.9	0.01	3.9E-04	33.5
AVERAGE			2.8E-04	24.1

Test 2

t (s)	d_w (m)	h_t (m)	K (m/s)	K (m/day)
0	0.71	0.2		
20	0.73	0.18	1.1E-04	9.1
40	0.75	0.16	1.1E-04	9.6
60	0.77	0.14	1.2E-04	10.2
80	0.79	0.12	1.3E-04	10.8
100	0.805	0.105	1.3E-04	10.8
120	0.82	0.09	1.3E-04	11.0
140	0.835	0.075	1.3E-04	11.4
160	0.85	0.06	1.4E-04	12.0
180	0.86	0.05	1.4E-04	12.1
AVERAGE			1.2E-04	10.8

Test 3

t (s)	d_w (m)	h_t (m)	K (m/s)	K (m/day)
0	0.695	0.215		
20	0.715	0.195	9.9E-05	8.5
40	0.74	0.17	1.2E-04	10.2
60	0.75	0.16	9.9E-05	8.5
80	0.765	0.145	9.8E-05	8.5
100	0.785	0.125	1.1E-04	9.2
120	0.795	0.115	1.0E-04	8.8
140	0.81	0.1	1.1E-04	9.2
160	0.825	0.085	1.1E-04	9.6
180	0.84	0.07	1.2E-04	10.2
200	0.855	0.055	1.3E-04	10.9
220	0.865	0.045	1.3E-04	11.1
240	0.88	0.03	1.4E-04	12.2
AVERAGE			1.1E-04	9.7



Hydraulic Conductivity Calculation - Inverse Auger Hole Method

Galt Geotechnics

Spreadsheet author:

ORW

17-Oct-09

REFERENCE: Cocks, G. *Disposal of Stormwater Runoff by Soakage in Perth, Western Australia*, Journal and News of the Australian Geomechanics Society, Volume 42 No 3 September 2007, pp101-114

Job No: WAE200102-02

Client: Projective DM Pty Ltd

Project: Proposed Phase 1

Redevelopment

Location: Dianella Plaza

Shopping Centre

BH Name: BH02/IT02

Test Depth: 0.91 m

Spreadsheet Legend

Required input

Calculated field

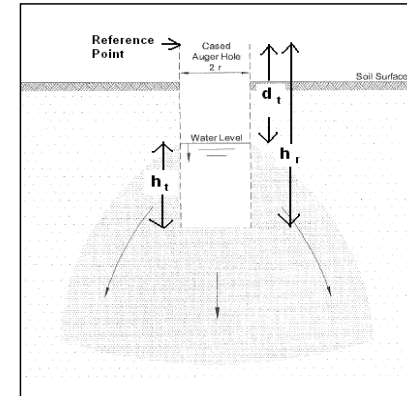
Comment field

Field not used

Fixed field

$$K = 1.15r \frac{\log_{10}(h_0 + \frac{1}{2}r) - \log_{10}(h_t + \frac{1}{2}r)}{t - t_0}$$

Parameter	Description	Value	Units
K	Hydraulic Conductivity		m/s
r	radius of test hole	0.045	m
t	time since start of measurement		s
h_r	reference point height above base	0.91	m
d_t	depth from reference point to water at time t		m
h_t	Water column height at time t		m
h_0	h_t at t=0		m



Test 1

t (s)	d_w (m)	h_t (m)	K (m/s)	K (m/day)
0	0.7	0.21		
20	0.765	0.145	3.7E-04	31.8
40	0.79	0.12	2.8E-04	23.8
60	0.82	0.09	2.7E-04	23.5
80	0.84	0.07	2.6E-04	22.4
100	0.86	0.05	2.6E-04	22.6
120	0.89	0.02	3.2E-04	27.5
AVERAGE			2.9E-04	25.3

Test 2

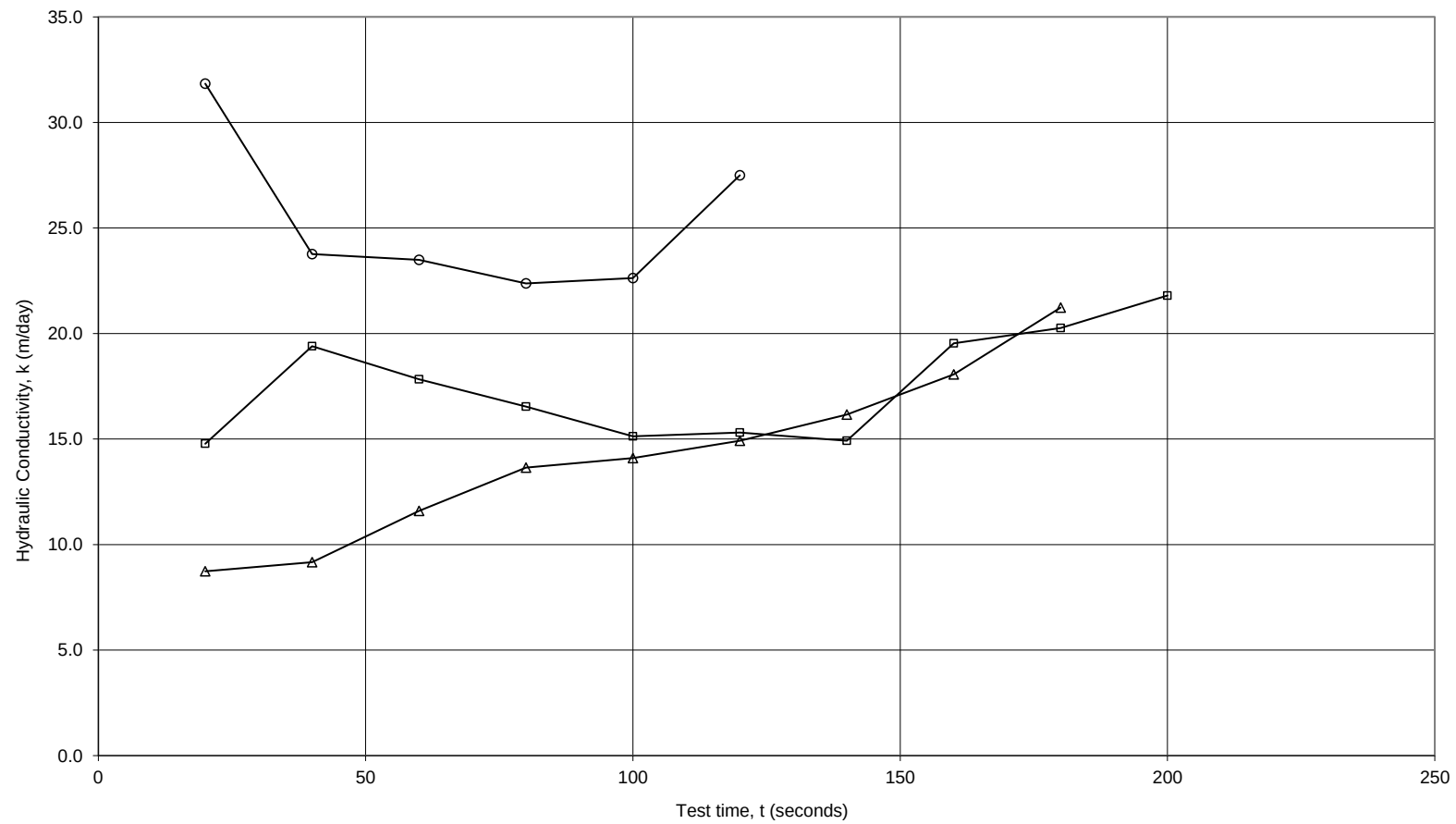
t (s)	d_w (m)	h_t (m)	K (m/s)	K (m/day)
0	0.72	0.19		
20	0.75	0.16	1.7E-04	14.8
40	0.79	0.12	2.2E-04	19.4
60	0.81	0.1	2.1E-04	17.8
80	0.825	0.085	1.9E-04	16.5
100	0.835	0.075	1.8E-04	15.1
120	0.85	0.06	1.8E-04	15.3
140	0.86	0.05	1.7E-04	14.9
160	0.89	0.02	2.3E-04	19.5
180	0.9	0.01	2.3E-04	20.3
200	0.91	0	2.5E-04	21.8
AVERAGE			2.0E-04	17.5

Test 3

t (s)	d_w (m)	h_t (m)	K (m/s)	K (m/day)
0	0.7	0.21		
20	0.72	0.19	1.0E-04	8.7
40	0.74	0.17	1.1E-04	9.2
60	0.77	0.14	1.3E-04	11.6
80	0.8	0.11	1.6E-04	13.6
100	0.82	0.09	1.6E-04	14.1
120	0.84	0.07	1.7E-04	14.9
140	0.86	0.05	1.9E-04	16.2
160	0.88	0.03	2.1E-04	18.1
180	0.9	0.01	2.5E-04	21.2
AVERAGE			1.6E-04	14.2

Hydraulic Conductivity by Inverse Auger Hole Method

BH02/IT02



Hydraulic Conductivity Calculation - Inverse Auger Hole Method

Galt Geotechnics

Spreadsheet author:

ORW

17-Oct-09

REFERENCE: Cocks, G. *Disposal of Stormwater Runoff by Soakage in Perth, Western Australia*, Journal and News of the Australian Geomechanics Society, Volume 42 No 3 September 2007, pp101-114

Job No: WAE200102-02

Client: Projective DM Pty Ltd

Project: Proposed Phase 1

Redevelopment

Location: Dianella Plaza

Shopping Centre

BH Name: BH03/IT03

Test Depth: 0.91 m

Spreadsheet Legend

Required input

Calculated field

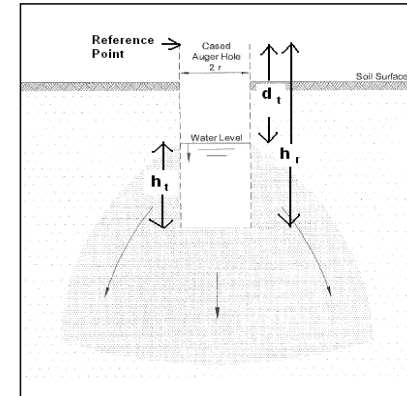
Comment field

Field not used

Fixed field

$$K = 1.15r \frac{\log_{10}(h_0 + \frac{1}{2}r) - \log_{10}(h_t + \frac{1}{2}r)}{t - t_0}$$

Parameter	Description	Value	Units
K	Hydraulic Conductivity		m/s
r	radius of test hole	0.045	m
t	time since start of measurement		s
h_r	reference point height above base	0.91	m
d_t	depth from reference point to water at time t		m
h_t	Water column height at time t		m
h_0	h_t at t=0		m



Test 1

t (s)	d_w (m)	h_t (m)	K (m/s)	K (m/day)
0	0.74	0.17		
20	0.78	0.13	2.6E-04	22.6
40	0.8	0.11	2.1E-04	18.1
60	0.835	0.075	2.5E-04	22.0
80	0.865	0.045	2.9E-04	25.4
100	0.89	0.02	3.4E-04	29.3
AVERAGE			2.7E-04	23.5

Test 2

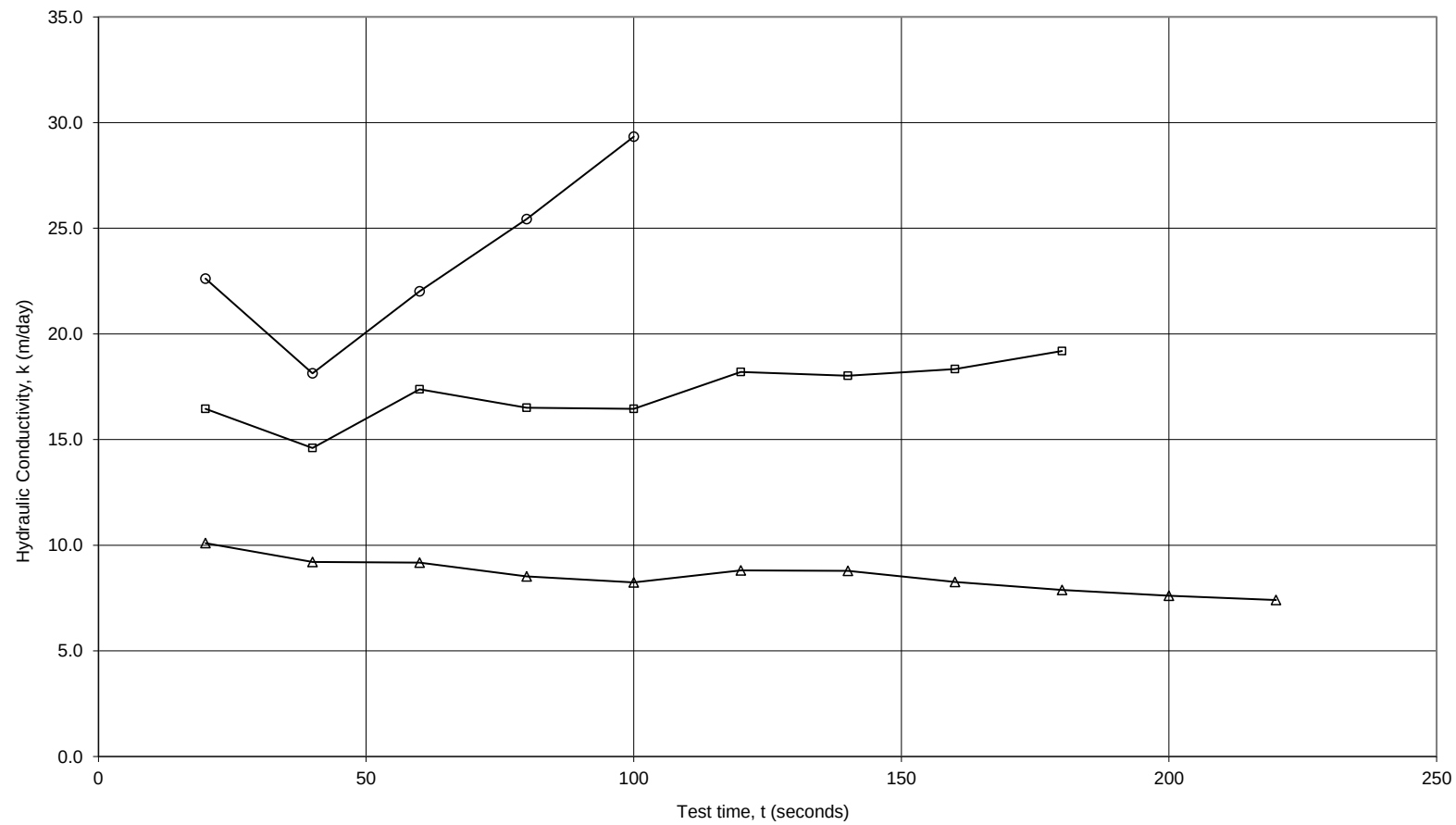
t (s)	d_w (m)	h_t (m)	K (m/s)	K (m/day)
0	0.74	0.17		
20	0.77	0.14	1.9E-04	16.4
40	0.79	0.12	1.7E-04	14.6
60	0.82	0.09	2.0E-04	17.4
80	0.835	0.075	1.9E-04	16.5
100	0.85	0.06	1.9E-04	16.5
120	0.87	0.04	2.1E-04	18.2
140	0.88	0.03	2.1E-04	18.0
160	0.89	0.02	2.1E-04	18.3
180	0.9	0.01	2.2E-04	19.2
AVERAGE			2.0E-04	17.2

Test 3

t (s)	d_w (m)	h_t (m)	K (m/s)	K (m/day)
0	0.73	0.18		
20	0.75	0.16	1.2E-04	10.1
40	0.765	0.145	1.1E-04	9.2
60	0.78	0.13	1.1E-04	9.2
80	0.79	0.12	9.9E-05	8.5
100	0.8	0.11	9.5E-05	8.2
120	0.815	0.095	1.0E-04	8.8
140	0.825	0.085	1.0E-04	8.8
160	0.83	0.08	9.6E-05	8.3
180	0.835	0.075	9.1E-05	7.9
200	0.84	0.07	8.8E-05	7.6
220	0.845	0.065	8.6E-05	7.4
AVERAGE			9.9E-05	8.5

Hydraulic Conductivity by Inverse Auger Hole Method

BH03/IT03





Standard Geotechnical Definitions, Recommendations, Requirements and Limitations

GDR1 ABOUT THIS APPENDIX

These technical notes are to be read with the attached report. These notes contain important information regarding the study in the attached report, and the report cannot be considered in isolation without full reading of these notes.

Where there are conflicts between this appendix and the report text, the report text takes precedence.

Unless noted otherwise, geotechnical investigations are conducted in accordance with AS1726-2017, "Geotechnical site investigations".

Unless noted otherwise, the report does not include any assessment (or implied assessment) of karst risk.

GDR2 DEFINITIONS

The following definitions apply:

- **Approved Fill** – fill that has been assessed and approved by the geotechnical engineer or civil designer for a particular purpose.
- **Bulk Fill** – Controlled fill intended to support future infrastructure, but potentially lacking some engineering properties required for upper fill layers or adjacent to structures, where fill with specific properties may be required. Contrast with Select Fill.
- **Civil Design** – the engineering design of the earthworks including surface water and erosion control and subsurface drainage control (where required) to achieve an earthworked, drained site which is capable of supporting the proposed development (including target site classification to AS2870, where relevant). This design is separate to this geotechnical investigation and is a required element of a site development.
- **Clay** – A component of a soil with particles smaller than 0.002 mm in size.
- **Cohesionless (Non-cohesive) Soil** – A soil mass that has does not hold together at low applied stress levels. The strength of the soil depends solely on friction between particles.
- **Cohesive Soil** – A soil mass that has holds together and can adhere to itself.
- **Collapsible Soil** – a soil with high void ratio that is typically strong when dry but loses strength and consolidates under constant stress when wetted, usually due to loss of soil matric suction or dissolving of a chemical cementing agent.
- **Compaction** – The process of increasing the soil density, typically be mechanical means.
- **Competent Person** – A person who has, through a combination of training, education and experience, acquired knowledge and skills enabling that person to correctly perform a specified task.
- **Consistency** – The stiffness of a cohesive soil, at specific moisture contents, to resist mechanical stress or manipulation (remoulding).
- **Controlled (or engineered) Fill** – Any fill for which engineering properties are controlled during placement. Also referred to as structural fill.
- **Dense** – with respect to sandy soils, at a relatively high density index or dry density ratio, exhibiting better engineering parameters with respect to strength and stiffness than the same material at a lower density index.
- **Density** – A measure of the mass of material per unit volume.
- **Eccentric Load** – a load incorporating either a varying vertical load and/or a horizontal load such that the peak vertical stress exceeds the average vertical stress.
- **Fill** – Any material that has been placed by anthropogenic processes.
- **Fines** – A component of a soil with particles smaller than 0.075 mm in size.
- **Groundwater** – Water located beneath the earth's surface in pore spaces, fractures and voids in soil or rock.
- **Gravel** – A component of a soil with particles between 2.36 mm and 63 mm in size.

- **Heavily Loaded** – in reference to mobile plant, particularly intended for equipment where ground bearing pressures exceed 50 kPa and/or equipment has a high centre of gravity and could be prone to toppling. In reference to buildings/structures, where footing pressures exceed 100 kPa and/or footing dimensions exceed 1 m wide.
- **Hydraulic Conductivity** – ratio of volume flux to hydraulic gradient – a quantitative measure of soil's ability to transmit water when subjected to a hydraulic gradient. k_{sat} – saturated hydraulic conductivity, intended for dewatering assessment, subsoil drainage design and other engineering assessments where saturated soils are relevant. k_{unsat} – unsaturated hydraulic conductivity, intended for design of stormwater disposal elements such as soakwells and infiltration basins, where the base of disposal elements is above the groundwater level.
- **In situ** – In the place and condition in which it exists naturally. May also refer to fill that is present at any site prior to an investigation taking place.
- **Limestone** – A sedimentary carbonate rock. The use of the term does not infer a specific strength, carbonate content or grain size. Refer to GDR4.1 for further detail.
- **Loose** – with respect to sand soils, at a relatively low density index or dry density ratio, typically indicating poorer engineering parameters with respect to strength and stiffness than the same material at a higher density index.
- **Material** – Matter that meets the definitions of 'soil', 'rock', other engineered matter (i.e., concrete, bricks etc.) or non-engineered matter (organics, contaminated refuse, deleterious material).
- **May** – Indicates that the statement is an option.
- **Must** – Indicates that the statement is mandatory.
- **Natural** – In the context of soil or rock, material which is present as a result of natural geological processes and has not been subject to anthropogenic engineering processes (such as filling, excavation, replacement, etc).
- **Organic** – In the context of soil, material derived from living matter, primarily plants.
- **Overconsolidated** – a soil that has been subjected to a greater vertical stress than its current state.
- **Permeable Soil** – soil that meets the civil design permeability requirements to allow relatively rapid flow of water through the soil matrix.
- **Rock** – Any aggregate of minerals and/or materials that cannot be disaggregated by hand in air or water without prior soaking.
- **Sand** – a component of soil with particle size between 0.075 mm and 2.36 mm.
- **Select Fill** – a controlled fill which has been chosen for particular engineering characteristics (such as strength, CBR, grading, permeability, etc), commonly for use as a higher-grade capping layer or adjacent to structures. Contrast with Bulk Fill.
- **Shall** – Indicates that the statement is mandatory.
- **Should** – Indicates that the statement is a recommendation.
- **Silt** – A component of a soil with particles between 0.075 mm and 0.002 mm in size.
- **Soil** – Particulate materials that occur in the ground and can be disaggregated or remoulded by hand in air or water without prior soaking.
- **Sand** – A component of a soil with particle between 0.075 mm and 2.36 mm in size.
- **Uncontrolled Fill** – Any material that has been deposited by anthropogenic process, which does not meet the definition of 'controlled fill'.

GDR3 GEOTECHNICAL TEST METHODS AND INTERPRETATION

GDR3.1 Test Pit Excavation

Test pit excavations are formed using mechanical excavation equipment (typically an excavator) or hand dug, with the objective of inspecting (or profiling) the soil exposed in the excavation.

Typical limitations on test pit excavations are:

- Limited depth of excavation – typically governed by reach of the excavator arm.
- Cannot be excavated below groundwater in cohesionless soils, due to collapse and water ingress.
- Cannot be excavated through very stiff / very dense soils (i.e., desiccated clays or cemented soils) or most rock.
- Cannot typically obtain rock samples that are suitable for strength testing.

Test pits are usually mechanically excavated with a toothed bucket (intended for excavation in clay or weak rock) or a flat-edged bucket (typically for sands).

When hand-dug test pits are excavated, it is usually for recovery of near-surface soils or inspection of shallow in-ground elements.

We note that where test pits are excavated on a site, they are only ever loosely backfilled during our studies. They must always be located during site preparation works, over-excavated to their full depth and plan extents and re-filled with approved fill in compacted layers.

GDR3.2 Cone Penetration Tests (CPTs)

Cone penetration testing (CPT) is done by Galt or specialist contractors and typically to AS1289.6.5.1. The test involves pushing an instrumented cone into the soil with a hydraulically operated pushing frame. The test measures tip resistance and sleeve friction on the cone, which are then plotted with depth.

We interpret soil types and associated geotechnical soil parameters from CPT data using the following:

Technical Interpretations and International Guides

- Robertson P.K., Campanella R.G., Gillespie D. and Grieg J. (1986). "Use of piezometer cone data". Proceedings of the ASCE Speciality Conference In Situ '86: Use of In Situ Tests in Geotechnical Engineering, Blacksburg, pp 1263-80, American Society of Civil Engineers (ASCE).
- Robertson, P.K., Cabal K.L. (2016) "Guide to Cone Penetration Testing for Geotechnical Engineering 6th Edition 2015". Gregg Drilling & Testing, Inc., California.
- Baldi G., Bellotti R., Ghionna V.H., Jamiolkowski M., Lo Presti D. C. (1989) "Modulus of sands from CPTs and DMTs". Proc. 12th Int. Conf. on SMFE, Rio de Janeiro, Vol 1, p165-170, Balkema, Rotterdam.

Local (Perth and Western Australia) Research, Interpretation and Guides

- Fahey, M., Lehan, B., Stewart, D. (2003) "Soil stiffness for shallow foundation design in the Perth CBD". Australian Geomechanics Vol. 8 No. 3.
- Main Roads Western Australia (MRWA) (2009) "Structures Engineering Design Manual". Document 3912/03, Perth.
- Lehan B. (2017). "CPT-Based Design of Foundations", E.H. Davis Memorial Lecture, Australian Geomechanics, Vol 54. No. 4' and
- Galt's in-house correlations between CPT data and other geotechnical testing.

GDR3.3 Borehole Drilling

Boreholes are drilled for sampling of the soil and rock, with a small disturbance footprint. Typical techniques are:

- Auger drilling (hand auger or machine auger) – for recovery of soil at relatively shallow depths only. Cannot penetrate cemented soils or rock.
- Push probe drilling – for recovery of soil at relatively shallow depths and below groundwater. Cannot penetrate cemented soils or rock.
- Air core drilling – for recovery of soil, cemented soil and rock (typically up to high strength rock). Not suited to drilling of very high strength rock.
- Diamond coring (or rotary coring) – for recovery of cemented soil, rock and some soil types (typically not sand). Suited to all strengths of rock.

If used, standard penetration tests (SPTs) are done in accordance with AS1289.6.3.1. Correlations for consistency and density are based on:

- Standards Australia (2016), "HB160-2006, Soils Testing".

GDR3.4 Dynamic Cone Penetrometer (DCP)

The DCP is a hand-held tool for assessing penetration resistance of a soil. This comprises a 16 mm rod equipped with a 20 mm cone, hammered into the ground using a falling 9 kg weight on a 510 mm slide hammer on the top of the rod. This is done in accordance with AS1289.6.3.2 and the blow counts to hammer in the rod are measured in 100 mm penetration increments. Where provided, correlations for consistency and density are based on:

- Standards Australia (2016), "HB160-2006, Soils Testing".

GDR3.5 Perth Sand Penetrometer (PSP)

The PSP is a variation on a DCP and uses a 9 kg weight on a 600 mm slide hammer to hammer in a 16 mm rod with a blunt (square-faced) end. Testing is done in accordance with AS1289.6.3.3, with the following typical variations:

- Testing is often done to a greater depth than the 450 mm covered in the standard.
- Blow counts are sometimes recorded in 150 mm intervals (compared to 300 mm intervals used in the standard) to provide better resolution on the tests.

Where provided, correlations for density are based on:

- Standards Australia (2016), "HB160-2006, Soils Testing".

GDR3.6 Dynamic Probing Super Heavy (DPSH)

The DPSH test involves driving a solid cone (20 cm²) into the ground using a 63.5 kg hammer falling 760 mm. Testing is done in accordance with EN ISO 22476-2 – Geotechnical engineering – Field testing – Part 2: Dynamic probing – DPSH-B.

Results may be presented as either:

- N10 (No. of blows required for every 100 mm penetration);
- N30 (No. of blows required for every 300 mm penetration); or
- q_d (dynamic tip resistance, analogous to CPT q_c).

GDR3.7 Inverse Auger Hole Infiltration Test (Falling Head, Unsaturated Soil)

Infiltration tests are carried out using the 'inverse auger hole' method described by:

- Cocks, G (2007), "Disposal of Stormwater Runoff by Soakage in Perth Western Australia", Journal and News of the Australian Geomechanics Society, Volume 42 No. 3, pp 101-114

This test is an unsaturated falling head test, in that it is carried out above the groundwater table and is intended to mimic the behaviour of soak wells and similar drainage elements (i.e. soakage basins), which discharge stormwater into an unsaturated medium.

The hole is wetted only for a short period prior to the testing.

The test is usually repeated three times, with the intention that the second and third tests provide similar results (within about 10%-20%). Tests are done over a short duration, typically 2 minutes to 10 minutes. The focus of the testing is generally when the head is low (200 mm or lower), such that the relevant lateral zone is as saturated as the zone directly below the borehole.

The hydraulic conductivity derived from this test is not to be used for applications where saturated hydraulic conductivity is relevant, e.g.:

- Subsoil drainage design; and
- Dewatering estimations.

Based on Galt's in-house research, this method does not completely saturate the soil in any reasonable test length, and thus may not be suitable for assessment of soils at sites where the critical drainage condition is a fully saturated soil (i.e., in areas with high groundwater tables). Our research on sand sites indicates that the test does correlate well with actual soak well performance, in unsaturated sand zones without impermeable zones.

GDR3.8 Guelph Permeameter Test (Constant Head, Quasi-Saturated Soil)

The Guelph permeameter test, conducted in accordance with the constant head test method outlined in Appendix G of AS1547, is a constant-head test in nominally "saturated" soil (in that the test is conducted until a "steady state" is reached). However, we note that this test can only be done above the groundwater table and as such, is in an unsaturated zone. Therefore, the hydraulic conductivity derived from this test should be used with caution and evaluated against other test methods (such as saturated, constant-head permeability testing from laboratory samples, or in situ saturated hydraulic conductivity testing below the groundwater table).

GDR4 GEOLOGICAL UNITS

GDR4.1 Limestone

The term 'Limestone' is used to describe a carbonate rock. Tamala Limestone is the common limestone in Western Australia, and typically comprises cemented quartz and shell fragments cemented together by calcium carbonate.

Limestone can vary significantly across short distances in composition, strength and cementation. Tamala limestones in Western Australia also have known possible geological features including:

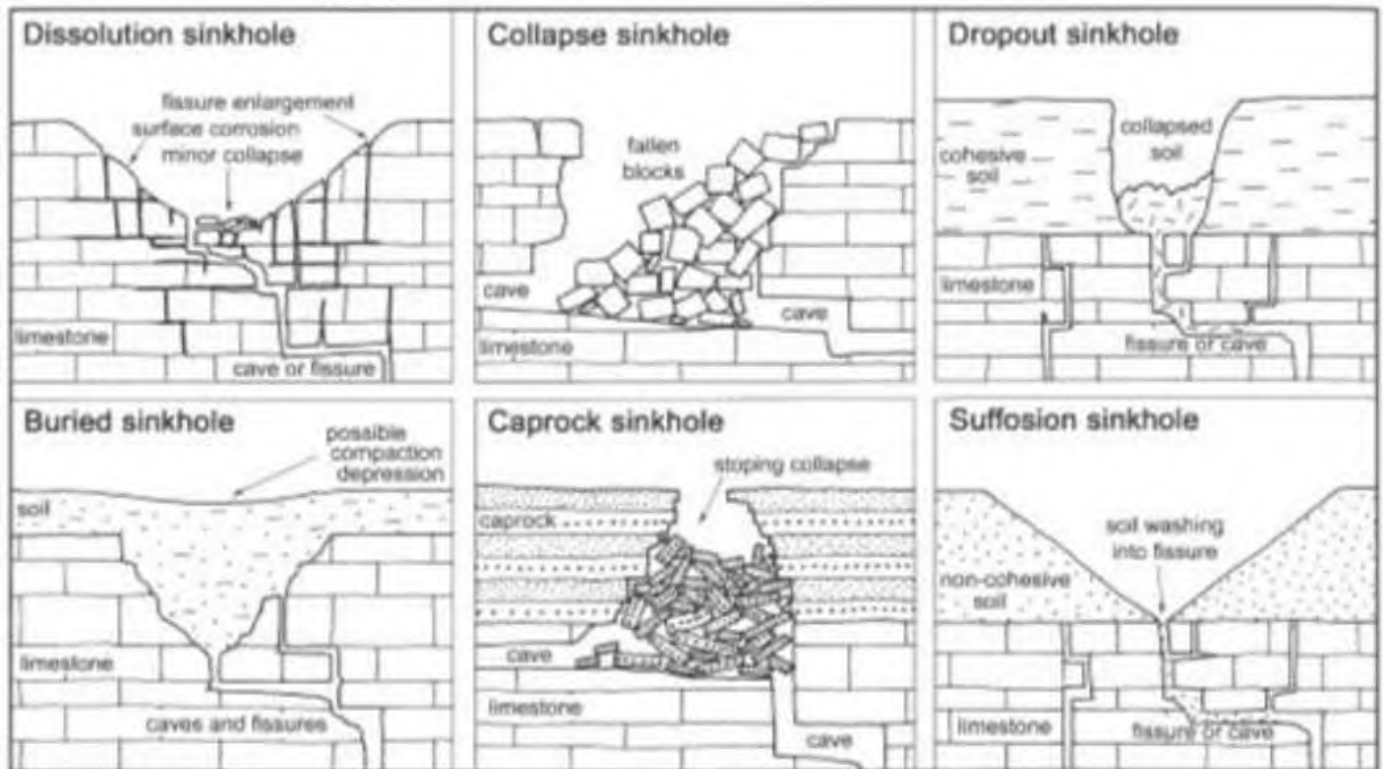
- Caprock/calcrete – The formation of a very hard duricrust, usually due to sun exposure. Caprock may be up to 3 m thick, but typically around 1.5 m thick. Caprock is very difficult to excavate and may require the use of hydraulic rock breakers or rock saws to excavate.
- Solution features/tubes – Often initially formed due to the presence of Eucalypt and Jarrah roots during limestone formation, and often increasing in depth and size due to ongoing weathering. May be up to 500 mm in diameter. These are typically filled with very loose, unconsolidated sand.
- Pinnacles – Pinnacles are usually the limestone that is left around surrounding solution features. Often can comprise very hard limestone/caprock that can be substantially higher than surrounding areas. Pinnacles may have also been formed by surrounding erosion (i.e., wind/water).
- Karst/caves – Karst is caused by the dissolution of limestone, typically where there is interaction in low-lying areas with water and limestone. Karst manifests itself as loose near-surface sand with cavities (caves) in the underlying limestone. This can lead to sinkholes and collapse of overlying structures.

Inline images showing typical pinnacle/solution features and Karstic features follow. These are taken from:

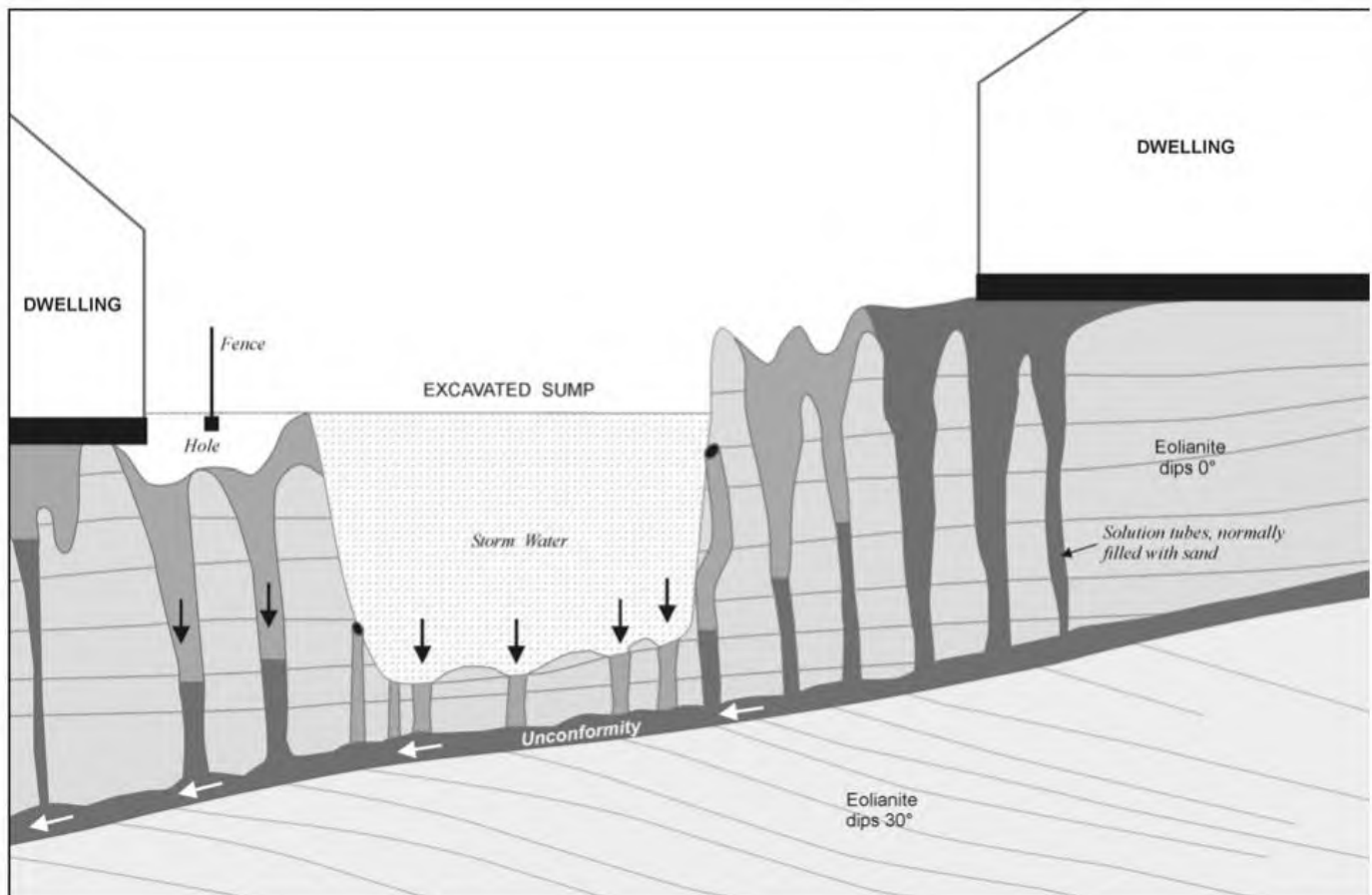
- Gordon, R. (2003). "Coastal Limestones". Australian Geomechanics Vol.38 No. 4, The Engineering Geology of Perth.

- Waltham, A. & Fookes, P. (2003). "Engineering Classification of Karst Ground Conditions: Quarterly Journal of Engineering Geology and Hydrogeology, Vol 36.

Inline Image GDR 1 - Karstic Sinkhole Features from Waltham and Fookes (2003)



Inline Image GDR 2: Pinnacle/Solution Features from Gordon (2003)



GDR4.2 Pindan Sands and Collapsible Soils

In the Western Australian context, Pindan sands are sandy soils present predominantly across the Pilbara and Kimberley regions. Pindan sands are typically:

- Red brown in colour.
- Between 10% and 40% fines.
- Of aeolian origin, usually resulting in unconsolidated in situ conditions (nuclear density gauge testing often indicates these soils have in situ density ratios of 80%-85% of modified maximum dry density).
- Very strong when dry due to high soil suctions in the fine fraction, which create strong bonds between the sand particles.

As the grains are usually held in place by the dry fine fraction, this can lead to:

- very high settlements (i.e., “collapse”) as the grain-to-grain bonds are weakened as matric suction decreases on soaking; and
- loss of vertical and horizontal strength/stiffness as the grain-to-grain bonds weaken.

The risks associate with Pindan sands are usually quantified in terms of the collapse potential/magnitude of possible collapse events.

Other similar soils are present in Western Australia that may exhibit similar collapse potential and may not strictly be Pindan sands (i.e., have other grain-to-grain bonding mechanisms).

GDR5 SITE CLASSIFICATION

Site classification refers to the assessment of a site in reference to AS2870-2011, “Residential slabs and footings”. The method for assessing the site class is outlined in Section 2 of AS2870-2011, which indicates that this may be done by:

- assessing the characteristic surface movement, due to seasonal moisture changes in the soil profile;
- assessing the performance of existing foundations; or
- assessment of the soil profile (where there are deleterious inclusions, landfill, putrescible waste etc.).

The site classifications based on the expected characteristic surface movement are summarised in Table GDR 1.

Table GDR 1: Summary of Site Classifications (AS2870-2011)

Class	Description	Characteristic Surface Movement (y_s)
A	Most sand and rock site with little or no ground movement from moisture change	Not Defined (typically <5 mm)
S	Slightly reactive clay sites with only slight ground movement from moisture changes	0 – 20 mm
M	Moderately reactive clay sites, which may experience moderate ground movements from moisture change	20 – 40 mm
H1	Highly reactive sites, which may experience high ground movements from moisture change	40 – 60 mm
H2	Highly reactive sites, which may experience very high ground movements from moisture change	60 – 75 mm
E	Extremely reactive sites, which may experience extreme ground movements from moisture change	>75 mm
P	Sites which include soft soils, such as soft clay or silt or loose sands; landslip; mine subsidence; collapsing soils; soils subject to erosion; reactive sites subject to abnormal moisture conditions or sites which cannot be classified otherwise	Not Defined

The calculated characteristic surface movement is predominantly based on:

- the reactivity (i.e., the shrink-swell potential) of the soil (and any proposed fill);

- the design depth of soil suction change, which is the maximum expected depth of soil suction change due to seasonal soil moisture changes; and
- the depth to any bedrock and groundwater table.

The design depth of soil suction change for Western Australia has been refined using the Thornthwaite Moisture Index (TMI). We have carried out assessment using the depths as detailed in:

- Hu Y, Saraceni P, Cocks G, Zhou M (2016). "TMI assessment and climate zones in Western Australia". Australian Geomechanics Journal, Vol.51 No.3.
- Hu Y, Raj A, Cocks G, Verheyde F (2019). "Re-assessment of TMI based climate zones in metropolitan Perth, WA". ANZ Geomechanics Conference 2019, Perth Australia.

The design depth of soil suction change for Northern Territory is based on the research presented in:

- Jackson, S (2022), "Thornthwaite moisture index and climate zones in the Northern Territory", Australian Geomechanics Journal, Vol. 57 No. 3.

We highlight that AS2870-2011 does not make any reference to the fines content of a soil when assessing the site classification.

Where a site classification is provided in our reports, it is always predicated on the requirement that the recommended site preparation procedures are carried out.

We also highlight that the footing performance and shrink-swell movements of a site can be impacted by the planting or removal of trees. This should be considered where appropriate, and we refer to the CSIRO BTF 18-2011 "Foundation Maintenance and Footing Performance: A Homeowner's Guide" for further information.

AS 2870 is limited to single and double storey residential buildings with normal shallow footings with a maximum bearing pressure of 100 kPa and is not applicable where development types other than this are proposed.

GDR6 SITE PREPARATION

GDR6.1 General

The intent of the site preparation guidelines provided in the above report are to ensure that the earthworks can be constructed to meet specific requirements, i.e., minimum compaction, fill requirements, removal of unsuitable material etc. The site preparation guidelines are not exhaustive, and on-site conditions may dictate that other preparation measures may be required to meet geotechnical requirements.

GDR6.2 Site Preparation

Site preparation measures outlined in this section relate to bulk earthworks at the site in preparation for the construction of buildings, pavements and other structures.

The preparation of a site in accordance with outlined measures below or those presented in the report text does not imply that the site is suitable for heavily loaded plant or eccentric loads. This is especially applicable for working platforms for mobile plant including cranes, crawlers or the like. The site surface may still not be trafficable for mobile plant. Individual working platform assessments must be done if heavily loaded mobile plant are proposed.

GDR6.2.1 Common Measures

The common measures outlined below are to prepare standard sites in advance of proof compaction, bulk excavation and filling. These measures are applicable to most sites, however the applicability of these measures is stated in the main report.

Table GDR 2: Common Measures

Measure	Commentary
Demolish and remove structures and pavements	Demolish existing structures and pavements, including removal of all buried services and footings and dispose off-site.
Remove demolition debris and other deleterious material	Remove any demolition debris and other deleterious material from site including old footings, slabs, soak wells, buried services, paving and building rubble.
Strip uncontrolled fill (where present)	Strip any uncontrolled fill from the site (where encountered) and, if suitable, stockpile it for potential re-use as non-structural fill. If contaminated, dispose off-site. Refer to the report text for discussions on the presence of detected uncontrolled fill and its composition. It is important to realise that undetected uncontrolled fill may be present between test locations and the absence of its identification in our report does not preclude its presence. If uncontrolled fill is detected during site works, please contact us for inspection and to provide recommendations.
Remove trees	All tree roots must be removed, this may result in significant excavation in places. Where tree roots and stumps are removed, the disturbed soil must be over-excavated and replaced with controlled, compacted fill. Backfilling of over-excavations is discussed in the following sections.
Strip and stockpile topsoil.	Strip and stockpile topsoil from unpaved areas of the site for potential re-use in non-structural applications. The topsoil strip is only necessary to remove roots and we recommend a topsoil strip as necessary to remove all roots from the soil.
Carry out bulk excavation	Excavate to the required level. Stockpile suitable excavated material for potential re-use as fill (the re-use of spoil as fill, if appropriate, is discussed in the report text) and remove unsuitable or excess material off-site.
Batter edges of excavation	Excavations should be battered to a temporary slope as given in the report text where applicable and not in close proximity to adjacent structures etc. If required, construct temporary/permanent retaining walls where batters cannot be accommodated.

By following these measures, the site should have been prepared to a point where topsoil and vegetation has been removed to expose either natural soil or controlled fill. Over-excavation to the required levels may then be required for some projects. Once complete, the site is now ready for proof compaction and filling.

GDR6.2.2 Sand Sites

The preparation measures outlined below are provided for sand sites meeting the following criteria:

- Site underlain by sand.
- No collapsible soils present.
- No deep loose sand.
- Compaction of a loose upper horizon to maximum 1 m depth.
- No shallow groundwater (<1 m deep).
- No limestone or other rock present at shallow depth.
- "Common Measures" outlined in Section GDR6.2.1 have been completed (as required).

The applicability of these measures is stated in the main report. These measures must be carried out for all areas where structures, footings, pavements and any other settlement-sensitive infrastructure is proposed.

Unless specified otherwise in the report, the **Approved Fill** to be used is outlined in Section GDR8 (**Permeable Sand** where permeable fill is required, else **General Sand**). The specific selection is subject to the requirements of the civil designer.

Table GDR 3: Sand Site Measures

Measure	Commentary
Moisture condition and proof compact.	Moisture condition and compact the exposed sandy ground to achieve the density specified in Section GDR7.1 ("sand") to a depth of at least 900 mm.
Test proof compaction	Check that the density specified in Section GDR7.1 ("sand") has been achieved to a depth of at least 900 mm. We note that the applicability of the use of the PSP for compaction control is discussed in the report. Unless specifically approved for use on the subject site, the contractor must not assume that the use of the PSP is appropriate.
Treat areas of loose or unsuitable material	Any areas of loose sand or unsuitable material (including over-excavated areas of former trees and root balls) must be removed and replaced with Approved Fill as outlined in the report or as noted above. The report will explain the suitability of site-derived materials for re-use as approved fill.
Carry out bulk filling	Where fill is required to build up levels, use Approved Fill , placed and compacted in layers of no greater than 300 mm loose thickness. Test compaction to achieve the density specified in Section GDR7.1.

In following this method, shallow/surficial loose sand will be compacted, and the site will be filled (where required) in preparation for supporting footings, ground slabs, pavements and the like.

GDR6.2.3 Deep Loose Sand Sites

The preparation measures outlined below are provided for sand sites meeting the following criteria:

- Site underlain by sand.
- Collapsible soils or deep loose sand present (if applicable, this is discussed in the report).
- Over-excavation, compaction and replacement of loose sand required.
- No shallow groundwater (<1 m deep).
- No limestone or other rock present at shallow depth.
- "Common Measures" outlined in Section GDR6.2.1 have been completed.

The greatest depth of compaction that can be achieved with standard compaction equipment (vibrating roller, etc) is around 1 m (for sands). As such, it is necessary to cut down the site level to a point where this compaction can be done to the lowest level needed to be improved.

The applicability of these measures is stated in the main report. These measures must be carried out for all areas where structures, footings and any other settlement-sensitive infrastructure are proposed. Not typically required for pavement subgrades, however, this is discussed in the report if required.

Unless specified otherwise in the report, the **Approved Fill** to be used is outlined in Section GDR8 (**Permeable Sand** where permeable fill is required, else **General Sand**). The specific selection is subject to the requirements of the civil designer.

Table GDR 4: Deep Loose Sand Site Measures

Measure	Commentary
Over-excavate to the required depth.	Over-excavate sand soil to the depth stated in the report and, if appropriate (discussed in report) retain it for re-use as fill. Over-excavation is likely to be done in stages depending on the site area available for earthworks. Excavations must be battered to a temporary slope as given in the report text where applicable and not in close proximity to adjacent structures etc. If required, construct temporary/permanent retaining walls where batters cannot be accommodated.
Moisture condition and proof compact.	Moisture condition and compact the exposed sandy ground to achieve the density specified in Section GDR7.1 ("sand") to a depth of at least 900 mm.
Test proof compaction	Check that the density specified in Section GDR7.1 ("sand") has been achieved to a depth of at least 900 mm. We note that the applicability of the use of the PSP for compaction control is discussed in the report. Unless specifically approved for use on the subject site, the contractor must not assume that the use of the PSP is appropriate.
Treat areas of loose or unsuitable material	Any areas of loose sand or unsuitable material (including over-excavated areas of former trees and root balls) must be removed and replaced with compacted Approved Fill as outlined in the report or as noted above. The report will explain the suitability of site-derived materials for re-use as approved fill.

Measure	Commentary
Carry out bulk filling	Where fill is required to build up levels (including restoration of the site surface level to the original level), use Approved Fill , placed and compacted in layers of no greater than 300 mm loose thickness. Test compaction as specified in Section GDR7.1.

In following this method, deep, loose sand will be compacted to a sufficient depth to reduce settlement impacts and the site will be filled (where required) in preparation for supporting footings, ground slabs, pavements and the like.

GDR6.2.4 Clayey Sites

The preparation measures outlined below are provided for sand sites meeting the following criteria:

- Site underlain by cohesive soils (typically >12% fines, i.e., clayey enough for the fines proportion of the soil to dominate behaviour).
- No collapsible soils present.
- No deep soft soils or organic soils.
- Over consolidated clayey soils present which will not be subject to significant primary or secondary consolidation (settlements expected to be within the limit of typical seasonal movements occasioned by moisture content changes, which would be captured in assignment of an AS2870 site classification).
- No shallow groundwater (<1 m deep)
- No rock present at shallow depth.
- "Common Measures" outlined in Section GDR6.2.1 have been completed.

The applicability of these measures is stated in the main report. These measures must be carried out for all areas where structures, footings, pavement subgrades and any other settlement-sensitive infrastructure is proposed.

Unless specified otherwise in the report, the **Approved Fill** to be used is **Clay** as outlined in Section GDR8.

Table GDR 5: Clay Site Measures

Measure	Commentary
Moisture condition and proof compact.	Moisture condition and compact the exposed clayey ground to achieve the density specified in Section GDR7.1 ("fine grained soils") to a depth of at least 300 mm.
Test proof compaction	Check that the density specified in Section GDR7.1 ("fine grained soils") has been achieved to a depth of at least 300 mm. The use of a penetrometer for compaction control of cohesive soils is not an appropriate substitute for in situ NDG testing.
Treat areas of loose or unsuitable material	Any areas of soft clayey soils or unsuitable material (including over-excavated areas of former trees and root balls) must be removed and replaced with compacted Approved Fill . The report will explain the suitability of site-derived materials for re-use as approved fill.
Carry out bulk filling	Where excavations are done into clayey soils (e.g. to treat soft zones, remove root balls and the like), they must not be backfilled filled with sand fill (even where a sand topping layer is proposed). Where fill is required (including backfilling of excavations to remove trees), only use Approved Fill , moisture conditioned, placed and compacted in layers of no greater than 300 mm loose thickness. Test moisture and compaction as specified in Section GDR7.1.
Grade completed clayey surface	Surface water control is essential for clayey sites. This also applies to control of infiltrated water into sand topping layers or the like. The surface of clayey ground must be graded at a minimum of 1% crossfall to drain. This is a general recommendation and an appropriate civil design must be done to account for surface and subsoil drainage.
Install sand topping layer	Where a sand topping layer is proposed, this should be done as outlined in Section GDR6.2.5.

These measures do not take into account the objectives of the civil design for the site, particularly with regard to surface water drainage and groundwater control (including clay grading, subsoil drainage, thickness and composition of a sand topping layer and the like). This must be taken into account by the civil designer. General commentary on drainage control measures is presented in Section GDR14.

GDR6.2.5 Sand Topping Layer

Where a sand topping layer is required:

Unless specified otherwise in the report, the **Approved Fill** to be used is outlined in Section GDR8 (**Permeable Sand** where permeable fill is required, else **General Sand**). The specific selection is subject to the requirements of the civil designer.

Table GDR 6: Sand Topping Layer Measures

Measure	Commentary
Prepare Substrate	Prepare the clayey or other substrate as separately outlined prior to installing the topping layer.
Build up sand topping layer	Build up level to the required level with Approved Fill , placed and compacted in layers of no greater than 300 mm loose thickness to achieve the density specified in Section GDR7.1.

For the purposes of achieving the allowable bearing pressures and site classification discussed in the report, it is not necessary to have the bases of slabs and footings in the sand topping layer, i.e. if required, they may extend through the sand topping layer into clayey soil below.

GDR6.2.6 Limestone Sites

The preparation measures outlined below are provided for sites underlain by limestone (refer to Section GDR4.1), meeting the following criteria:

- Site underlain by sand overlying limestone.
- Compaction of a loose upper horizon to maximum 1 m depth, with localised deeper treatments between pinnacles if required.
- No shallow groundwater (<1 m deep)
- “Common Measures” outlined in Section GDR6.2.1 have been completed.

The site preparation measures outlined below are aimed at improvement of the site in preparation for construction of the structures including on-ground slabs, shallow footings, retaining walls and pavements.

Unless specified otherwise in the report, the **Approved Fill** may comprise one of the following as specified in Section GDR8 (the specific selection is subject to the requirements of the civil designer):

- **Permeable Sand** where permeable fill is required
- **General Sand** where permeable fill is not required
- **Mixed Sand/Limestone Fill** where permeable fill is not required

The re-use of any limestone for fill is subject to the requirements of the civil design and discussions in the report text. The use of **Mixed Sand/Limestone Fill** is discussed in Section GDR6.2.7. The preparation measures outlined in Table GDR 7 assume sand fill.

Table GDR 7: Standard Limestone Site Measures (Bulk Earthworks)

Measure	Commentary
Treat zones of loose sand	Where deep loose sand is present (particularly, but not exclusively, between limestone pinnacles), over-excavate to the depth as noted in the report. Sand should be retained for re-use as fill if recommended in the report. Limestone debris and pinnacles should be separated and only re-used if recommended in the report.
Moisture condition and proof compact.	Moisture condition and compact the exposed sandy ground to achieve the density specified in Section GDR7.1 ("sand") to a depth of at least 900 mm. Proof compaction of intact limestone is not required.
Test proof compaction	Check that the density specified in Section GDR7.1 ("sand") has been achieved to a depth of at least 900 mm. We note that the applicability of the use of the PSP for compaction control is discussed in the report. Unless specifically approved for use on the subject site, the contractor must not assume that the use of the PSP is appropriate. If refusal to the test method is encountered within the target test depth on limestone and the results to the refusal depth are acceptable, it is not necessary to repeat compaction testing at that location. Compaction control of intact limestone is not required.
Treat areas of loose or unsuitable material	Any areas of loose sand or unsuitable material (including over-excavated areas of former trees and root balls) must be removed and replaced with compacted Approved Fill as outlined in the report or as noted above. The report will explain the suitability of site-derived materials for re-use as approved fill.
Carry out bulk filling	Where fill is required to build up levels, use Approved Fill , placed and compacted in layers of no greater than 300 mm loose thickness. Test compaction to achieve the density specified in Section GDR7.1.

These measures do not take into account the specifics of the civil design, including the requirement (if any) for excavatable and/or free draining layers to achieve construction and drainage objectives. The civil design must take precedence and is not specifically considered in this advice.

Soakwells can perform poorly in limestone and specific advice may apply to the installation of soakwells in limestone areas. If not discussed in our report, please contact us for further advice.

Without further consultation with the structural designer, footings for any one structure must not be founded on a mixture of sand and intact limestone. This is due to potential differential settlements between limestone zones (relatively stiff) and soil zones (relatively soft). Where this is the case, the measures outlined in Table GDR 8 must be followed, only with guidance from the structural designer and Galt.

Table GDR 8: Standard Limestone Site Measures (Footing and Slab Preparation)

Measure	Commentary
Excavate and compact for slabs, subgrades, pad or strip footings	Excavate for pad and strip footings. Where a mix of soil and limestone is present below any one structure, one of the following must be done (to be agreed with structural designer and us): ▪ Over-excavate limestone and replace with compacted soil: Typically where the foundation largely comprises soil and a relatively small amount of limestone is present. Where footings and slabs are founded partly on soil and partly on limestone, over-excavate the limestone by at least 300 mm below the base of footing or slab and replace the excavated material with compacted Approved Fill. ▪ Remove soil from over limestone and replace with concrete: Typically where the foundation largely comprises limestone and a relatively small amount of soil is present. Localised zones of sand and mixed sand/limestone rubble must be removed and replaced with lean-mix concrete, e.g. 10 MPa blinding concrete. ▪ Design the structure to accommodate differential foundation movements: For example, include construction joints or use a more heavily reinforced footing (subject to the structural designer's requirements).
Test compaction of footing bases, slabs or subgrades.	Compact the exposed bases to achieve the density specified in Section GDR7.1 ("sand"), to a depth of at least 900 mm, or to the depth where limestone is intersected. If refusal to the test method is encountered within the target test depth on limestone and the results to the refusal depth are acceptable, it is not necessary to repeat compaction testing at that location. Compaction control of intact limestone is not required. Remove, replace and compact as required with approved fill any zone not achieving the density specified in Section GDR7.1 ("sand")

GDR6.2.7 Mixed Sand/Limestone Filling

On sites where deemed appropriate by the Civil Design, **Approved Fill** may comprise limestone rubble fill (**Mixed Sand/Limestone**, as specified in Section GDR8).

The preparation measures outlined below are provided for sites meeting the following criteria:

- No shallow groundwater (<1 m deep)
- “Common Measures” outlined in Section GDR GDR6.2.1 have been completed.
- Substrate preparation for the relevant site type has been done in preparation for further filling (as relevant for sand, limestone or clayey sites discussed in the preceding sections).

The site preparation measures outlined below are required prior to construction of structures including on-ground slabs, shallow footings, retaining walls and pavements.

Table GDR 9: Mixed Sand/Limestone Fill Measures

Measure	Commentary
Develop a method specification for the filling	A performance specification is not appropriate for compaction control in Mixed Sand/Limestone fill, due to oversized limestone particles and the limitations of test methods. Therefore, a method specification is required. Development of a method specification is discussed in Section GDR7.5. A tentative method specification for Mixed Sand/Limestone Fill preparation is also provided.
Carry out bulk filling	Where fill is required to build up levels, use Approved Fill , placed and compacted in accordance with the developed method specification.
Maintain Construction Records	As performance testing cannot be done, quality assurance records are limited. Therefore, the parameters mentioned in Section GDR7.5.1 must be kept in a comprehensive record of the earthworks done to the developed method specification. The use of the PSP is possible <u>only to check for loose sand zones between limestone particles</u> . High PSP blow counts, where limestone particles are intersected, are meaningless in terms of assessing density of the prepared fill. The primary means of validation of the earthworks is conformance with the developed method specification.
Install sand topping layer	Where a sand topping layer is proposed, this should be done as outlined in Section GDR6.2.5.

These measures do not take into account the specifics of the civil design, including the requirement (if any) for excavatable and/or free draining layers to achieve construction and drainage objectives. The civil design must take precedence and is not specifically considered in this advice.

Soakwells can perform poorly in limestone fill and specific advice may apply to the installation of soakwells in limestone fill areas. If not discussed in our report, please contact us for further advice.

GDR6.3 Guidance on Sites with Cohesive Soils

Cohesive soils (most commonly, “clayey” soils) require careful moisture conditioning to facilitate compaction. We recommend that the moisture content of the material is between optimum moisture content (OMC) and 2% wet of OMC at the time of placement and compaction. We note that compaction to the densities specified in Section GDR7.1 can be difficult to achieve for clayey material when not appropriately moisture conditioned.

Vibratory padfoot rollers are preferred for compacting cohesive fill to promote proper kneading and interlocking of subsequent layers.

Clayey soils will drain poorly when inundated following rain events and result in saturated conditions that may inhibit compaction of the soil. In general, it is preferable to avoid trying to re-work clayey sites within several days of any substantial rainfall.

We recommend that the surfaces of clayey sites are sealed by compaction (i.e., final compaction should be with a smooth drum roller) and graded to drain (to avoid low spots where water can pond and cause softening) prior to any

rain events. Stripping back of softened materials to expose competent natural or compacted clayey soil is required before continuing earthworks.

If difficulties are experienced during compaction due to water, further advice should be sought from a geotechnical engineer.

GDR6.4 Preparation and Testing of Shallow Footings

It is preferable to dig all footing excavations carefully with a flat-edged bucket to minimise the disturbance of underlying foundation soil.

Where the footing base is disturbed, or compaction is required, this must be done using appropriate compaction equipment particular to the task (as evaluated by the contractor) – typically a 'jumping jack', self-propelled plate compactor or an excavator-mounted plate compactor.

All footing bases must be tested to achieve the density requirements of Section GDR7.1. PSP testing of sand foundations is only applicable where the use of the PSP is specifically approved in the report, otherwise all testing is to be done using the NDG.

Sand Topping Layer - Where a sand topping layer is present over a different soil (i.e., clay, limestone etc.), testing of the density of the sand topping layer is only necessary within the thickness of the sand topping layer. Testing does not need to extend into the underlying compacted substrate, which is separately subjected to compaction control.

Mixed Sand/Limestone Fill – Where mixed sand/limestone fill has been installed to a method specification, no compaction control testing is required, however re-compaction of the base must be done as noted above.

In situ limestone – where in situ limestone (weakly or more cemented limestone, with no sand zones or voids) is present at a footing base and no over-excavation has been done (refer to Section GDR6.2.6 regarding over-excavation of footing bases in limestone), then no compaction control testing is required.

Where loose or soft material is encountered, one of the following actions must be taken:

- Over-excavate the loose / soft layer to expose a suitable layer that does meet the required density (Section GDR7.1) and either:
 - Place and compact Approved Fill (relevant to the appropriate preparation measures outlined in Section GDR6.2) to achieve the required density (Section GDR7.1); or
 - Pouring blinding concrete ($f_c > 15$ MPa at 28 days) from the competent layer up to the underside of the footing.

All foundations must be assessed by a competent person prior to blinding.

Measures must be taken to minimise moisture changes in clayey foundation soils at the base of footing excavations. Concrete footings are to be poured soon after excavation to minimise the potential for excessive moisture change. The use of a concrete blinding layer following foundation preparation should be considered.

GDR7 COMPACTION AND MOISTURE CONDITIONING

GDR7.1 Requirements

Any soil within the significant founding zone of structures (buildings, slabs, pavements, etc.) must be suitably moisture conditioned and compacted. These soils must be compacted to the requirements as outlined below.

Table GDR 10: Compaction and Moisture Requirements

Soil Description	Soil Particle Limits	Moisture Requirement	Density Requirement (DDR)	Possible QA/QC Test Methods
Sand	<5% fines <5% gravel <i>Maximum particle size 9.5 mm</i>	MOMC $\pm 2\%$	95% MMDD	PSP NDG
Gravel	<5% fines >50% gravel <i>Maximum particle size 19.0 mm</i>	MOMC $\pm 2\%$	95% MMDD	NDG
Clayey/Silty Gravel	5-35% fines >50% gravel <i>Maximum particle size 19.0 mm</i>	MOMC $\pm 2\%$	95% MMDD	NDG
Sand with fines or gravel	5-35% fines; and/or 5-50% gravel <i>Maximum particle size 19.0 mm</i>	MOMC $\pm 2\%$	95% MMDD	NDG Method Specification
Fine grained soils (Clayey or Silty)	>35% fines <i>Maximum particle size 19.0 mm</i>	MOMC $\pm 2\%$; or SOMC $\pm 2\%^2$	92% MMDD; or 95% SMDD	NDG Method Specification
Oversize/rubbly soil	Any soils with particles >19.0 mm	MOMC $\pm 2\%$	95% MMDD (Or equivalent to)	Method Specification Detailed Assessment Based on Specific Material

- NOTES:**
1. DDR – Dry Density Ratio
MMDD – Modified maximum dry density (AS1289.5.2.1)
MOMC – Modified optimum moisture content (AS1289.5.2.1)
SMDD – Standard maximum dry density (AS1289.5.1.1)
SOMC – Standard optimum moisture content (AS1289.5.1.1)
PSP – Perth Sand Penetrometer
NDG – Nuclear Density Gauge
 2. Preferably OMC to OMC +2%, for ease of compaction and producing a homogenous fill
 3. Test frequencies are specified in Section GDR7.6.

The soil groups and definitions outlined above are generally based on AS1726-2017. Test methods are discussed in subsequent sections.

GDR7.2 Construction Recommendations

Over-excavation and replacement of loose material must be done where the minimum DDR cannot be achieved.

Fill must be placed in horizontal layers of not greater than 300 mm loose thickness. Each layer must be compacted by suitable compaction equipment, and carefully controlled to ensure even compaction over the full area and depth of each layer.

Care will need to be taken if compacting in the vicinity of existing structures, such as the adjacent properties. This is particularly important if vibratory compaction is being carried out.

- Tynan (1973), "Ground Vibration and Damage Effects on Buildings", Australia Road Research Board, Special Report No. 11.

Tynan (1973) provides guidance on the selection of compaction equipment for use adjacent to structures. The distance of influence (i.e., the definition of "vicinity") will vary depending on the size of compaction plant proposed for use. Where there is concern regarding the impact on nearby structures, a dilapidation study should be done.

Care must be taken when compaction is undertaken when the site surface is within 1 m of the groundwater level, as compaction (particularly with vibration) can draw the water up to the surface. In this instance, consideration should be given to:

- Static rolling only;
- Using a pioneering layer (if possible); or
- Dewatering to keep the water at least 1 m below the surface being compacted.

GDR7.3 Nuclear Density Gauge

Where applicable, a nuclear density gauge (NDG) must be used in accordance with AS1289.5.8.1. NDG tests must be done to a depth of 300 mm or as otherwise indicated in the text of the attached report.

GDR7.4 Perth Sand Penetrometer

Where clean sand is used (<5% fines and <5% gravel), a Perth sand penetrometer (PSP) may be used for compaction control in accordance with AS1289.6.3.3. Refer to the report for recommended blow counts correlating to the specified density.

Where the fines or gravel contents of a sand soil exceed the maximum contents noted above, a PSP must not be used exclusively for compaction control. As a minimum, ongoing confirmation testing with an NDG is required. If not specified in our report, please contact us for further advice regarding test frequencies.

If difficulties are experienced recording the required blow counts, a site-specific PSP correlation should be carried out to determine the PSP blow count correlating to a DDR of 95% MMDD. In addition, a particle size distribution (PSD) test should be carried out to verify that the use of a PSP is suitable for the sands being tested. A site-specific PSP correlation must:

- be done on site;
- use the nuclear density gauge (NDG) to determine density at a minimum of 5 points with varying density to a depth of 300 mm below surface;
- include at least 1 point where the dry density ratio is in excess of 95% MMDD;
- use a calibrated PSP to determine the PSP blow count from 150 mm to 450 mm at each NDG test point; and
- be plotted on a chart of PSP blow count vs DDR.

Only where specifically stated as applicable in the report and where the use of the PSP is relevant as noted above, the following values may be taken as deemed to conform to a dry density ratio of 95% MMDD for the relevant sand type.

Table GDR 11: Deemed-to-comply Values for PSP Results in Perth Sands

Depth Interval (mm)	Bassendean	Tamala	Calcareous
0-150	SET	SET	SET
150-450	7	8	12
450-750	9	10	14
750-1050	11	12	16

- NOTES:**
1. Blows per 300 mm interval
 2. Bassendean Sand is typically a white - grey, low-fines quartz sand found on the eastern part of the Perth coastal plain
 3. Tamala / Spearwood sand is typically yellow or orange, low-fines quartz sand found on the western part of the Perth coastal plain
 4. Calcareous sands are typically white or yellow, calcareous sand found in low-lying areas on the western fringe of the Perth coastal plain

5. Values derived from Galt experience on PSP correlations done on sites across Perth for the 150-450 mm interval.

GDR7.5 Method Specifications

GDR7.5.1 General

Where proposed, a method specification should be developed by a geotechnical engineer or similarly qualified person and ratified by us (including a site visit by us). The method specification should be confirmed by the construction of a trial pad or trial area and the compaction methodology should be checked against either:

- density, as assessed using a nuclear density gauge; or
- settlement, as assessed using a dGPS.

Specific advice should be requested for the development of a method specification, taking into consideration the material being compacted.

Method specification compliance should be maintained for all areas on a minimum 20 m grid, with the compliance to include:

- Roller used (weight, style, vibration);
- Water application rate (per lift);
- Layer thickness placed; and
- Number of passes with roller.

GDR7.5.2 Indicative Method Specification – Sand/Limestone Rubble Mix

Where mixed sand/limestone is used as structural fill, a performance specification is not appropriate due to the inaccuracies of standard test methods (NDG/PSP etc.) in this type of material. A method specification can be used instead. The following indicative method specification is provided for evaluation and trial but must be trialled and ratified by us prior to widespread employment on site. The following would be typically adopted:

- Maximum particle size: 250 mm
- Maximum loose layer thickness: 350 mm
- Minimum watering rate: 10 L/m²/100 mm thickness of loose material (e.g. 35 L/m² for a 350 mm thick layer)
- Minimum 8 passes with a vibrating padfoot roller, minimum static weight 10 tonnes.
- The compacted fill must comprise closely packed particles without any significant voids between the larger particles.

GDR7.6 Testing Frequency

After compaction, verify that the required density has been achieved by testing at the base of excavation and through the full depth of any fill, and to a minimum depth of:

- 900 mm where a PSP is used; or
- 300 mm where a NDG is used.

The frequency of testing (when a method specification is not used) should be as follows:

Table GDR 12: Compaction Testing Frequency Requirements

Area	Minimum Testing Frequency	Minimum Tests Per Lot
Proof Compacted Area	1 test per 1,000 m ² (30 m grid)	2
Structural Fill Outside of Building and Pavement Footprints	1 test per 500 m ³ 2 tests per layer <i>Whichever is greater</i>	2
Structural Fill Within Building and Pavement Footprints	1 test per 500 m ³ 4 tests per layer <i>Whichever is greater</i>	4
Spread/Pad Footings	1 test per 9 m ² per footing	1
Strip Footings/Retaining Wall Foundations	Minimum 2 tests At 5 m centres <i>Whichever is greater</i>	2
On-ground slabs, pavements and rafts	Minimum 2 tests At 10 m centres 1 test per 100 m ² <i>Whichever is greater</i>	2

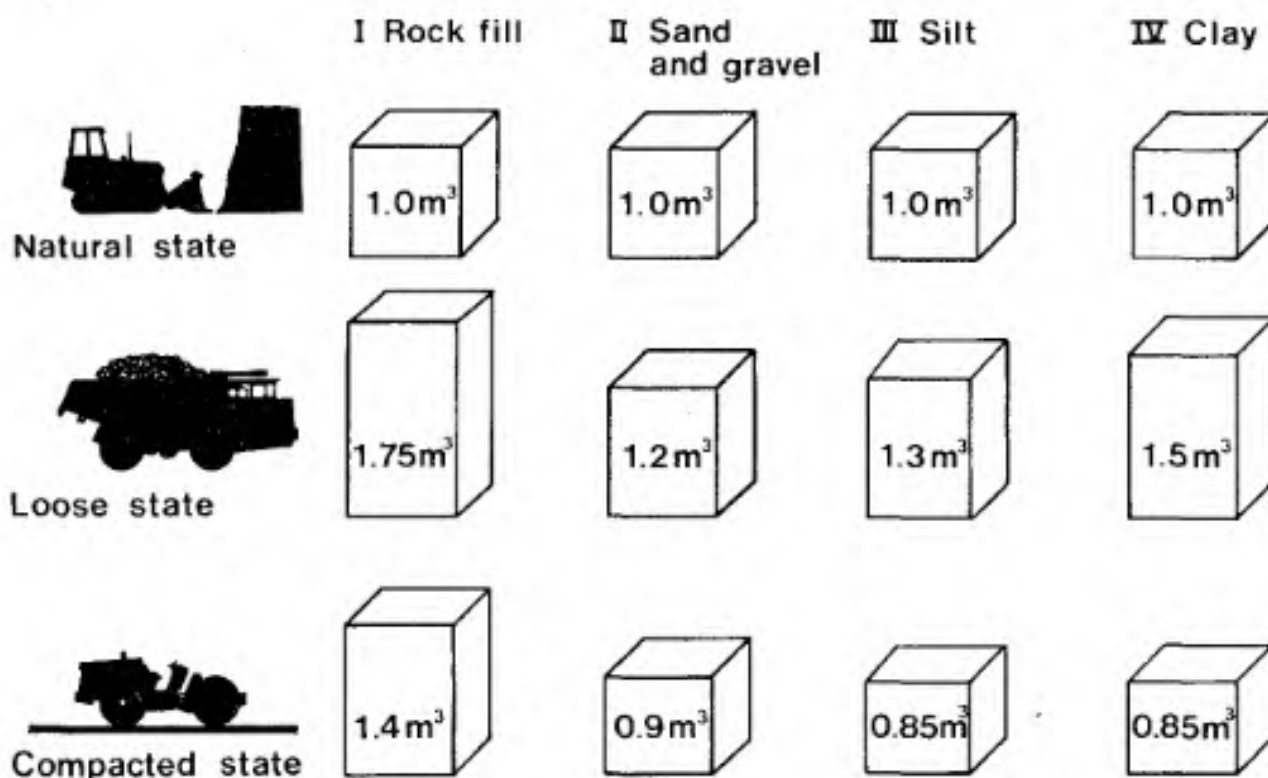
- NOTES:**
1. A 'lot' is defined in the context of this section as a section of earthworks that is undertaken in one operation where the equipment, personnel, materials and methodology are consistent throughout the entire process. This would typically be limited to operations done in one day, but this is not mandatory.
 2. There will frequently be multiple 'lots' in an earthworks process, therefore the number of tests must be adjusted according to the minimum number per lot in this table (where this is more than the frequency specified in 'testing requirements').

GDR7.7 Bulking and Compaction Factors

All soils will "bulk" when excavated to stockpile, and "compact" when placed from stockpile to earthworks layers. Published bulk and compaction factors are presented below for conventional materials, taken from:

- Forssblad, L (1981), "Vibratory Soil and Rock Fill Compaction", Dynapac Maskin AB

Inline Image GDR 3: Volumes of Different Types of Fill Materials in Natural, Loose and Compacted State



These values are indicative only and will vary according to site specific conditions. The values provided here must not be used for commercial volume estimates or settling disputes regarding volumes.

GDR8 APPROVED FILL AND CONFORMANCE TESTING

Imported fill must comply with the material requirements as stated in AS 3798-2007, "Guidelines on Earthworks for Commercial and Residential Developments".

Where doubt exists, a geotechnical engineer must be engaged to inspect and approve the use of potential fill materials.

The following table presents recommended material parameters for standard fill types. This does not take account of availability of materials either on site or in the local area. Refer to the report text for specific advice on fill at the subject site.

Table GDR 13: Standard Fill Recommendations

Soil Description	Application	Soil Particle Limits (%) ³				k_{min} ¹ (m/d)	OC ² (%)	Atterberg Limits		CBR ⁶ (%)	Test Method ⁴
		Fines	Sand	Gravel	Max.			LL (%)	PI (%)		
Permeable Sand	Permeable bulk fill Retaining wall backfill Permeable select fill	≤5	≥90	≤5	9.5	5	≤2	NP	NP	≥12	PSP NDG
General Sand	Bulk fill Select fill (permeability not required)	≤5	≥90	≤5	9.5	N/A	≤2	NP	NP	≥12	PSP NDG
Silty Sand	Bulk fill Select fill	≤35	≥55	≤10	9.5	N/A	≤2	<35	<11	≥12	NDG
Clayey Sand	Bulk fill Select fill	≤35	≥55	≤10	9.5	N/A	≤2	<40	N/A	≥12	NDG
Mixed Sand/Limestone	Bulk fill (permeability not required)	≤5	≥20	≤80	250	N/A	≤2	NP	NP	N/A	NDG Method
Blue Metal Gravel ⁸	Retaining wall backfill Drainage trench backfill	≤3	≤5	≥90	37.5	5	≤1	NP	NP	N/A	NDG
Clay ⁷	Reinstatement of localised excavations in clay Bulk fill	≥12	Varies	≤30	19	N/A	≤2	Varies			NDG

- NOTES:**
- k_{min} – minimum saturated hydraulic conductivity (AS1289.6.7.1, remoulded to minimum DDR 100% MMDD).
 - OC – organic content (Walkley-Black method recommended, AS1289.4.1.1 – not loss on ignition methods)
 - % by mass.
 - Test method indicates possible compaction control methods for this material.
PSP – Perth sand penetrometer (AS1289.6.3.3). Where a PSP is used, a site-specific correlation must be done unless otherwise noted in the report.
NDG – Nuclear density gauge (AS1289.5.8.1)
Method – method specification
 - Atterberg Limits: LL – liquid limit PI – plasticity index NP – non-plastic
 - CBR: California bearing ratio (for sand - remoulded to DDR 95% MMDD @ OMC, 4.5 kg surcharge). CBR values may be changed depending on the design pavement requirements.
 - “Clay” fill type is included for broad reference only and to illustrate preferred applications, particle size limits and recommended test method. Specific discussion on the use of clayey fills is included in the report text if applicable. Atterberg limit and CBR testing of clayey fills may be required and advice must be sought from us if not stated in the report.
 - “Blue metal” gravel refers to single sized, crushed, washed igneous rock gravel used for drainage purposes.
 - In the absence of specific test frequencies by the civil designer, the testing shown in Table GDR 14 must be done (highlights in Table GDR 13 show where the test is required).

Table GDR 14: Conformance Testing Frequency Requirements

Parameter	Frequency (m ³)	Minimum Tests per Source	AS1289 Reference
Particle size distribution	5,000	1	3.6.1
Hydraulic conductivity (permeability)	10,000	2	6.7.1
Organic content	5,000	1	4.1.1
Atterberg limits	5,000	1	3.1.1, 3.2.1, 3.3.1
CBR	10,000	2	6.1.1

- NOTES:**
1. Frequency is for the nominal number of cubic metres of compacted fill.
 2. Unless stated otherwise in the report text, the conformance testing must also be carried out on site-derived materials to confirm suitability.

GDR9 SHALLOW FOUNDATIONS

GDR9.1 Design

Footings and slabs may be designed in accordance with the assigned site classification in accordance with AS2870-2011. We note that AS2870-2011 is limited to single and double storey residential and commercial developments and may not be strictly applicable.

Where the report provides tables for shallow footing design, custom footings may be designed by the structural engineer using the data provided therein.

GDR9.2 Interpretation of Provided Values

BEARING PRESSURES

All settlement and bearing pressures estimates are provided on the assumption that the site preparation requirements outlined in the report are completed below all structures plus a minimum distance of 1 m beyond the outside edge of any footing or slab. It is essential that the soil below all foundations is appropriately prepared as outlined and meets the relevant compaction requirements.

Allowable bearing pressures for footings of intermediate plan dimensions (to any tabulated) can be interpolated. Footings that have a plan dimension either smaller or larger than those presented in the report will need to be considered individually along with other embedment depths.

Allowable bearing pressures, where provided, are considered to be the upper limit for shallow footings to limit total and differential settlements. Footings carrying eccentric loading, such as below retaining walls, must be assessed separately.

SETTLEMENTS

The reporting of settlements to any precision level is not intended to imply a high accuracy of settlement prediction. Settlements as reported should be considered 'order of magnitude'.

Estimated settlements represent vertical downwards movement due to loading and do not take into account potential additional movement associated with the characteristic surface movement of the soil (which must be taken in addition to these settlements from loading, refer Section GDR5). The site classification is discussed in the report.

The actual settlement of any proposed structure will depend upon a number of factors including the applied pressures, footing size and base preparation. The estimated settlement(s) provided in this report are for the working bearing pressures as indicated. Differential settlements are likely between footings of similar sizes, loads and elevations (as

stated in the report text). A proportion of the settlement is expected to occur during construction (i.e., during initial loading).

The provided settlement estimates (unless otherwise stated) do not include interaction effects from footings founded near other footings (i.e., groups of footings). Interaction effects will need to be considered if the spacing between adjacent footings is smaller than the dimension of the footings (i.e., the centre-to-centre spacing between footings is less than twice the width of the footing). This could act to double provided settlements, dependent on the footing configuration. Where an assessment of footing groups is required, a more detailed numerical or finite-element modelling analysis would need to be undertaken.

CREEP AND CONSOLIDATION

Creep settlement is an irreversible component of long-term soil settlement caused by sustained vertical stress. Consolidation is a time-dependent irreversible compression in a soil layer caused by a reduction in pore pressure between soil particles. Both creep and consolidation can occur in natural materials as a result of earthworks or the placement of loads on to soil layers. The settlements as presented for short-term loading do not include consideration for creep and consolidation settlements unless specifically stated.

GDR9.3 Raft Foundations

Where moduli of subgrade reactions are provided for the design of raft foundations, we highlight that these are an estimate of the elastic reaction of the soil. The values are provided based on an expected load and loaded area size. Soils are typically non-linear in their response and will have different stiffnesses at different levels of strain and load repetitions. This is due to the physical interaction of soil particles under different levels of stress.

The possibility of a non-linear response must be considered by the designer of any raft foundation.

GDR10 PILED FOUNDATIONS

Piles must be designed and tested in accordance with AS2159-2009, "Piling – Design and Installation". We use the following interpretation/design methods to provide pile design parameters:

- Franki Africa Pty Ltd (2008) "A Guide to Practical Geotechnical Engineering in South Africa". 4th ed.
- AFNOR (2012) "NF P 94-262 – Justification des ouvrages géo-techniques, Normes d'application nationale de l'Eurocode 7", Afnor, Paris, July 2012.
- Lehane, B. (2017) "CPT-Based Design of Foundations". E.H Davis Memorial Lecture, Australian Geomechanics Vol 54. No. 4.
- Lehane, B. et al. (2020) "A New 'Unified' CPT-Based Axial Pile Capacity Design for Drivel Piles in Sand". Proceedings of the Fourth International Symposium on Frontiers of Offshore Geotechnics.
- Doan., Lehane, B. (2021) "CPT-Based Design Method for Axial Capacities of Drilled Shafts and Cast-in-place Piles." American Society of Civil Engineers (ASCE), Journal of Geotechnical and Geoenvironmental Engineering.

The pile designer must:

- consider the possible variation in subsurface conditions at each pile location;
- consider any pile group effects based on the final piling configuration;
- assume that the unit shaft resistance in tension is less than 80% of the unit shaft resistance in compression to account for Poisson's effect in sand;
- ignore pile resistance in the surficial 0.5 m or 1 x pile diameter (whichever is greater), if relevant;

- consider the impact of weak layers underlying stiffer layers (or vice versa) on end bearing capacity; and
- reduce the pile capacity in tension to no greater than 0.8 of the pile capacity in compression.

The piling contractor must:

- make their own assessment on the suitability of their equipment to install any piles at the subject site; and
- carry out or appoint a suitably experienced contractor to test the piles in accordance with AS2159.

Where dynamic or static testing of the piles does not occur, we consider that a design geotechnical reduction factor (ϕ_g) of 0.4 is applicable for the pile design. If testing of the piles is proposed by the piling contractor, a higher ϕ_g could be adopted.

Unless otherwise stated, providing pile design parameters does not specifically indicate the driveability of any piles into soil units.

A separate driveability study may be required and must be considered by the pile designer and installer. The given pile design parameters must not be used for driveability assessments as these parameters are likely to be un-conservative.

GDR11 EARTH RETAINING STRUCTURES

GDR11.1 General

Retaining structures may be designed in accordance with AS4678 (2002) "Earth Retaining Structures". Unless otherwise specifically stated, we recommend that all retaining walls are backfilled with free-draining soil (Permeable Sand or Blue Metal Gravel as defined in Section GDR8).

Where the cohesive soil is used as retaining wall backfill, a suitable, permanent drainage system must be placed behind the wall such that a build-up of pore pressure is prevented. A separator geotextile (Bidim A24, or similar, or heavier) must be used between the interface of any granular backfill and the cohesive soil.

Where drainage is not provided, the retaining wall must be designed to accommodate water pressure behind the wall (10 kPa per metre height).

GDR11.2 Earth Pressure Coefficients and Strength Parameters

Where earth pressure coefficients are provided for retaining walls, the wall designer must make an independent assessment of the parameters appropriate to the construction method to be used, including alternative values of wall friction. Unless otherwise stated, we have assumed a horizontal ground surface behind and in front of the retaining wall for provided parameters.

GDR11.2.1 Cohesionless Soils

Where cross-referenced for suitability in the report, the following parameters may be adopted for design of earth retaining structures in cohesionless soils (sand and gravel).

Table GDR 15: Retaining Wall Geotechnical Parameters (Cohesionless Soils)

Density	γ (kN/m ³)	ϕ' (°)	k_0	Wall Friction=0		Wall Friction=0.5 ϕ		Wall Friction=0.67 ϕ	
				k_a	k_p	k_a	k_p	k_a	k_p
Very Loose	17	30	0.44	0.33	3.00	0.29	4.81	0.28	5.74
Loose	17	32	0.42	0.31	3.25	0.27	5.55	0.26	6.83
Medium Dense	18	34	0.39	0.28	3.54	0.25	6.47	0.23	8.26
Dense	19	36	0.36	0.26	3.85	0.22	7.63	0.21	10.18
Very Dense (1)	19	38	0.34	0.24	4.20	0.21	9.11	0.20	12.85
Very Dense (2)	19	40	0.31	0.22	4.60	0.19	11.06	0.18	16.73

- NOTES:**
1. Earth pressure coefficients are provided in this table for conditions of zero friction between the wall and the soil and with wall friction of 0.5 ϕ' or 0.67 ϕ' .
 2. A horizontal ground surface behind and in front of the wall has been assumed.
 3. The retaining wall designer should make an independent assessment of the parameters appropriate to the construction method to be used, including alternative values of wall friction.
 4. γ – bulk unit weight
 ϕ' – effective friction angle
 k_a – coefficient of active earth pressure (Coulomb – AS4678-2002, Appendix E)
 k_p – coefficient of passive earth pressure (Coulomb – AS4678-2002, Appendix E)
 k_0 – coefficient of at-rest earth pressure (Jaky)
 5. Maximum fines content 12% for applicability of this table for design purposes.
 6. Unit weights based on Table D1 of AS4678-2002, for moist bulk weight.
 7. Friction angle based on Equation D1 and Table D2 of AS4678-2002, based on rounded, moderately graded siliceous sand.

GDR11.2.2 Cohesive Soils

Where cohesive soils (i.e. clayey or silty soils) are proposed for backfill, geotechnical design parameters may be provided in the form of effective strength and undrained strength parameters. We note that:

- Undrained strength parameters should be used for analysis of short-term stability, or stability under sudden loading of cohesive soils.
- The effective strength parameters should be used for analysis of free-draining soils and the long-term stability of cohesive soils.

Table GDR 16: Retaining Wall Geotechnical Design Parameters (Cohesive Soils – Undrained)

Consistency	γ_b (kN/m ³)	c_u (kPa)
Soft	17	12
Firm	18	25
Stiff	19	50
Very Stiff	20	100
Hard	20	200

- NOTES:**
1. γ_b – bulk unit weight
 c_u – undrained cohesion
 $\phi_u = 0^\circ$ (undrained friction angle)
 2. Unit weights based on Table D1 of AS4678-2002
 3. Undrained cohesion based on lower end of shear strengths as define in AS1726-2017, Table 11

Table GDR 17: Retaining Wall Geotechnical Design Parameters (Cohesive Soils – Drained)

Fines Content	PI (%)	γ_b (kN/m ³)	ϕ' (°)	c' (kPa) ⁵
12-35%	All	19	32	0
>35%	10	20	30	0 – 5
>35%	20	20	26	0 – 5
>35%	30	20	23	0 – 5
>35%	40	20	21	0 – 5

- NOTES:**
1. γ_b – bulk unit weight
 c' – drained cohesion
 ϕ' – effective friction angle
PI – plasticity index
 2. Unit weights based on Table D1 of AS4678-2002, assuming generally stiff to hard overconsolidated soils.
 3. For fines contents <35% (silty sand and clayey sand), strength parameters based on:
 - Lehane, B. et al (2007) "A Laboratory Investigation of the Upper Horizons of the Perth/Guildford Formation in Perth CBD", Australian Geomechanics Vol 42. No. 3.
 4. For fines content >35% (sandy clay), strength parameters based on:
 - CIVL5503 course notes (2004), "Underground Construction", University of Western Australia
 5. $c' = 0$ recommended for long-term design. Table D4 of AS4678 suggests c' up to 5 kPa for 'poor' fine grained soils and 10 kPa for 'average' fine-grained soils. The use of c' for design is subject to the designer's judgement but recommended by us only for temporary works.

Per AS4678-2002 Appendix E, horizontal earth pressures for frictional-cohesive soils may be calculated in accordance with the Rankine-Bell design model (illustrated in Figure E2 of AS4678). The earth pressures are as follows (Z = depth, all other terms have the meanings given in the above tables):

- Active: $p_a = \gamma Z \tan^2 \left(45 - \frac{\phi}{2} \right) - 2c \tan \left(45 - \frac{\phi}{2} \right)$
- Passive: $p_p = \gamma Z \tan^2 \left(45 + \frac{\phi}{2} \right) + 2c \tan \left(45 + \frac{\phi}{2} \right)$

GDR11.3 Design and Construction Considerations

Compaction plant can augment the lateral earth pressure acting on retaining walls. Hand operated compaction equipment is recommended within 2 m of any retaining walls to minimise compaction pressures.

Retaining walls can move and rotate under imposed soil loading resulting in settlement behind the wall. This must be considered in the design and during construction of the retaining walls in order that adjacent infrastructure is not adversely affected.

It is important to note that some ground movement will occur behind any soil retaining system, including gravity retaining walls.

GDR12 EXCAVATIONS, BATTERS AND SLOPES

GDR12.1 Excavatability

Our assessment of the excavatability of rock is based on a combination of:

- Our experience on earthworks and construction projects across Australia; and
- Figure 10 of the revised graphical method of assessing excavatability of rock by:
- Pettifer, G.S. & Fookes, P.G., "A revision of the graphical method for assessing the excavatability of rock", Quarterly Journal of Engineering Geology, 27, pp145-164, 1994.

GDR12.2 Safety

All excavations must be carried out in accordance with:

- Commission for Occupational Safety and Health (2022). "Excavation: Code of Practice", Department of Mines, Industry Regulation and Safety, 89pp, Perth.

Excavations in cohesionless soils are particularly prone to instability unless support is provided. Care must be exercised in such excavations and appropriate safety measures adopted where necessary, particularly in the vicinity of existing buildings, structures and infrastructure.

The toe of any batter must be at least 500 mm above groundwater (including perched groundwater).

Unless a specific slope stability assessment or retention design has been done, the toe of any excavation should not encroach within a line of 1V:3H to any nearby footings, pavements or other settlement-sensitive structures.

Surcharges (such as structures, plant and soil stockpiles) must not be placed at or close to the crest of unsupported excavations, without a specific slope stability assessment.

A geotechnical engineer must be consulted where there is any doubt regarding the stability or safety of unsupported excavations.

GDR12.3 Batters

Temporary batter slopes provided in the report are subject to the following conditions, unless otherwise stated:

- The maximum slope height is 2 m without specific advice and slope stability analysis.
- The groundwater level for the duration of the excavation must be at least 500 mm below the toe of the slope.
- No surcharges are present in the vicinity of the slope (i.e. must be outside a line of 1V:3H from the toe of the slope).

Unless noted specifically in the report, the following batters may be adopted (maximum height: 2 m):

Table GDR 18: Default Batter Angles

Situation	Material	Batter
Temporary	Cohesionless Soils (Sand/Gravel)	1V:2H
Temporary	Cohesive Soils – Soft	1V:2H
Temporary	Cohesive Soils – Firm, Stiff, Very Stiff or Hard	1V:1H
Temporary	Limestone – Variably Cemented	1V:1H
Temporary	Limestone – Well Cemented	1V:0.5H
Permanent	All Soils	1V:3H
Permanent	Limestone – Variably Cemented	1V:2H
Permanent	Limestone – Well Cemented	1V:1H

Where specified batters cannot be accommodated in the vicinity of existing footings, roads and services, temporary or permanent lateral support will be required.

Specific advice is required for batters higher than 2 m.

Erosion control must be considered for permanent slopes.

Rock slopes must be inspected, and all loose cobbles / boulders removed. Permanent rock slopes may require dentition works or possibly rock catch drains.

GDR12.4 Grouting

Permeation or jet grouting involves injecting a microfine cement into soil to form a grouted soil block (soilcrete) to support excavation and structures. Grouting is typically only effective where the soil has the capacity to “take” the grout and form a uniformly cemented soil mass. Permeation grouting is generally limited to relatively permeable, coarse-grained cohesionless soils (sands and gravels with <5% fines).

If grouting is proposed, we recommend the following:

- Grouting must be carried out by a suitably experienced contractor.
- Only microfine cement grout should be used (not GP or coarse cement blends) to ensure adequate penetration into the soil matrix.
- Grouting should be done on a grid of not greater than 300 m.
- Application rates must be discussed with the contractor.
- The grouted soil mass must have intimate contact with any structures it is intended to support.
- The contractor must satisfy themselves that the proposed grouting can be installed with their equipment and into the subsurface conditions encountered at the site, considering possible obstructions, groundwater, cemented layers, loose sands etc.
- Testing of the grouted soil mass must be done to ensure that the grout has adequately permeated through the soil matrix. This can be done by drilling into the soil mass to ensure the cementation is continuous.

Grouting is most effective on permeable, relatively loose natural sand. Where historical filling or other ground disturbances have occurred, the grouting process can be less effective due to the tendency of grout (or other liquids) to follow more permeable paths / zones through the disturbed soil.

GDR13 STORMWATER DISPOSAL AND DRAINAGE DESIGN

GDR13.1 Groundwater Separation – Controlled Groundwater

These recommendations ONLY apply to where regional controls on groundwater (primarily: subsoil drainage, but also surficial ‘main drains’) exist, i.e. only to areas where groundwater is actively controlled.

The following reference:

- IPWEA (2016), “Specification: Separation Distances for Groundwater Controlled Urban Development”, Institute of Public Works Engineering Australasia

recommends the following separation distances from drainage infrastructure to groundwater:

- Underground infiltration systems: 0 mm from the 50% AEP (annual exceedance probability) phreatic surface.
- Surface infiltration systems (vegetated): 300 mm from the 50% AEP phreatic surface.

The above IPWEA reference also states that performance measures for underground infiltration systems are to have a: *demonstration of acceptable volumetric capacity when groundwater is elevated above base of system and that the groundwater recedes below the invert of the system during mosquito breeding seasons (grated or partially open systems).*

GDR13.2 Groundwater Separation – Uncontrolled Groundwater

These recommendations apply where regional controls on groundwater levels are not present. For infiltration into soakwells and soakage basins to be the full theoretical value, an adequate separation to groundwater must be achieved, because otherwise performance is hindered by inadequate separation to groundwater or partial submergence of the infiltrative element.

We recommend a minimum separation of 500 mm from the underside of infiltrative elements to maximum groundwater level.

- To average annual maximum groundwater level (AAMGL), where this has been defined for the site; or
- To historical maximum groundwater level, where this has been defined to the site.

GDR13.3 Design Hydraulic Conductivity Values

Where provided, the values of hydraulic conductivity (k) should be considered the maximum/upper limit design values. As discussed in Section GDR3.7, the inverse auger hole test is an unsaturated field test carried out above the groundwater table and, as such, presents the best-case conditions for drainage.

For soak wells in sand, we provide the design value taking into consideration the variability in materials and reduced permeability as a result of:

- Densification of sand during site preparation works; and
- Natural variation in sands.

Design k_{unsat} values provided for soak wells are only appropriate for the design of unsaturated soils where the base of disposal area is at least 500 mm above groundwater and 500 mm above any impermeable layer.

Where design values of k_{unsat} have been provided, clogging of the base of the soakwell / drainage basin has not been considered. Clogging will need to be controlled with maintenance over the life of the soakwell / drainage basin.

For the design of subsoil drains or modelling of saturated soil performance, a k_{sat} value must be given (in the report text) or assessed by laboratory testing (or a combination of field and laboratory testing). Unless specifically stated, k_{unsat} values presented in our report are for unsaturated conditions and intended for design of stormwater disposal elements above groundwater. If no k_{sat} value has been provided, do not use the provided k_{unsat} value for saturated drainage design. Please contact us for further advice.

For saturated or semi-saturated sands, the hydraulic conductivity must be assessed by testing of representative soil samples at a NATA accredited laboratory to determine:

- The modified maximum dry density (MMDD); and
- The constant-head permeability (AS1289.6.7.1) on a sample remoulded to at least 5% greater than the proposed specification density (i.e., sample should be remoulded to 100% MMDD if the earthworks specification requires a density ratio of 95% MMDD).

For saturated or semi-saturated clayey or silty soils, the hydraulic conductivity must be assessed by testing of representative soil samples at a NATA accredited laboratory to determine:

- The standard maximum dry density (SMDD); and
- The falling-head permeability (AS1289.6.7.2) on a sample remoulded to at least 3% greater than the proposed specification density (i.e., sample should be remoulded to 101% SMDD if the earthworks specification requires a density ratio of 98% SMDD).

GDR13.4 Soakwells

In uncontrolled groundwater environments, the base of any soakwell must be the higher of:

- At least 500 mm above the average annual maximum groundwater level (AAMGL).
- At least 500 mm above any low permeability/impermeable layers (clay, rock or otherwise).

In controlled groundwater environments (refer to Section GDR13.1), the base of any soakwell may be 0 mm above the controlled groundwater level at the location of the soakwell (as determined by the civil engineer).

Soak wells must be placed outside a line of 1V:2H extending below the edge of the nearest footing, subject to local council regulations. Discharge from soak wells has been known to promote densification of loose sandy soils, leading to settlements of footings and slabs. Soak wells should be carefully wrapped with geotextile to prevent migration of sand and fines into the soak well.

Where soak wells are proposed to dispose of water within a line of 1V:2H from any basement walls or similar, the walls must be waterproofed to prevent seepage or damp within the basement wall.

In potentially karstic terrain or areas of potentially collapsible soils, soakwells should typically be located 10 m from the nearest footing, slab or pavement.

GDR13.5 Design Groundwater Elevation

Where applicable, a recommended design groundwater elevation will be provided in the report and will be identified as such.

In the absence of a specific statement on design groundwater elevation, **do not assume** that:

- Absence of comments about groundwater indicates an absence of groundwater (in particular, sites that are dry in the dry season to the investigated depth may well become waterlogged in the rainy season).
- Where groundwater depths/levels are noted, that these are fixed (groundwater fluctuations occur over the course of the year and between wetter and drier years).

Where groundwater elevations are likely to be critical for a development (particularly where large-scale subdivision or large developments are proposed with substantial channelling of stormwater into on-site disposal by infiltration), a site-specific hydrology study is likely to be required to confirm design groundwater elevations.

GDR14 DRAINAGE CONTROL

In addition to the site preparation measures outlined for cohesive soils (refer Section GDR6.2.4), careful control of surface water and stormwater is essential to minimise the likelihood of cohesive soils decreasing in strength and affecting the installed infrastructure. These measures include:

- The ground surface of clayey soils should be graded to drain any seepage away from structures and prevent standing water over the cohesive soils. A grade of at least 1% is recommended.
- Pavements should be sealed to minimise water ingress.
- Stormwater disposal swales should be located at least 10 m away from buildings, retaining walls and pavements.
- Runoff from hardstandings and pavements must either be collected and discharged via pipes into discrete locations (via swales or soakage basins) at least 10 m away from structures and pavements or, alternatively, discharged over a wide area, but not allowed to collect and discharge into concentrated areas, particularly near structures and pavements.

- Spoon drains should be used to collect water at the crest of slopes to capture surface runoff and direct it away from running directly down slopes or seeping into the ground behind slopes.

These measures are general in nature only and do not take into account the civil design objectives, which must be addressed separately by the civil designer.

GDR15 DEWATERING

Dewatering may be required for excavations and construction below groundwater or perched groundwater tables. Common dewatering methods are summarised below:

Table GDR 19: Dewatering Recommendations

Material	Recommended Methods
Sandy Soils	Spears Deep Well Point
Impermeable Clay	Sump Pumping

Dewatering spears are typically suitable for small scale excavations below groundwater, with a typical recommendation for spears to be installed at 1 m below the base of any excavation. Dewatering spears may not be suitable where there are impermeable/cemented/strong transition layers, i.e., it may not be possible to extract water near an impermeable layer (rock/clay), or the spear may not be readily driven through a hard clay/cemented layer (i.e., coffee rock).

Sump pumping can be done by grading a clayey excavation to drain (i.e., by using spoon drains), and excavating a sump in the excavation. A sump can typically be backfilled with a blue metal gravel, with a pump wrapped in a geofabric (i.e., Bidim A14 or similar), with disposal of water away from the excavation.

Deep well point dewatering is typically suitable for larger excavations, where there are transitional layers or where the aquifer is confined. It may not be suitable where there are impermeable layers within the profile. It involves the installation of a deep filtered well to a depth required to draw down the groundwater level at the entire site. A deep well dewatering system must be designed by a suitable designer to provide design flow rates, draw down depths etc.

GDR16 PAVEMENT SUBGRADES

Unless otherwise specified, the provided subgrade California bearing ratio (CBR) is not a pavement design, but an assessment of the subgrade as an input into any required pavement designs.

Provided design values are based on the assumption that the relevant site preparation measures are completed for all pavement subgrades, including the use of appropriate approved fill and adequate compaction. We highlight that specific requirements such as those outlined by Main Roads WA (MRWA) or the local council in their construction specifications may have different requirements.

The provided design value is based on laboratory testing (where done), local experience, and the advice as outlined in:

- Main Roads Western Australia (2013). "Engineering Road Note 9 – Procedure for the Design of Road Pavements". Western Australia Supplement to the Austroads Guide to Pavement Technology Part 2: Pavement Structural Design, East Perth.

Where the subgrade differs from that described in the text, the subgrade CBR must be confirmed.

The performance of any pavement is highly dependent on the surface and subsurface drainage provided (also considering factors like capillary rise from seasonally high groundwater tables). Adequate drainage must be provided to any pavements, and capillary rise must be considered by the designer.

GDR17 SOIL CORROSIVITY AND AGGRESSIVITY

The relevant exposure classifications for concrete and steel piles in soils based on the exposure conditions are presented in Table GDR 20 and Table GDR 21 respectively.

The relevant exposure classifications for concrete in sulfate soils based on the exposure conditions are presented in Table GDR 22.

Table GDR 20: Exposure Classification for Concrete Piles in Soil

Exposure Conditions				Exposure Classification	
Sulfates (expressed as SO ₄) ¹		pH	Chlorides in Groundwater (ppm)	Soil Conditions A ²	Soil Conditions B ³
In Soil (ppm)	In Groundwater (ppm)				
< 5,000	< 1,000	> 5.5	<6000	Mild	Non-aggressive
5,000 – 10,000	1,000 – 3,000	4.5 – 5.5	6,000-12,000	Moderate	Mild
10, 000 – 20,000	3,000 – 10,000	4 – 4.5	12,000-30,000	Severe	Moderate
> 20,000	> 10,000	< 4	>30,000	Very Severe	Severe

- NOTES:**
1. Approximately 100 ppm SO₄ = 80 ppm SO₃
 2. Soil Conditions A – high permeability soils (e.g. sands and gravels) which are in groundwater
 3. Soil Conditions B – low permeability soils (e.g. silts and clays) or all soils above groundwater
 4. Table reproduced from Table 6.4.2(C) of AS2159-2009

Table GDR 21: Exposure Classification for Steel Piles in Soil

pH	Chlorides		Resistivity (ohm.cm)	Exposure Classification	
	In Soil (ppm)	In Water (ppm)		Soil Conditions A ²	Soil Conditions B ³
> 5	< 5,000	< 1,000	> 5,000	Non-aggressive	Non-aggressive
4–5	5,000-20,000	1,000–10,000	2,000 – 5,000	Mildly aggressive	Non-aggressive
3–4	20,000-50,000	10,000–20,000	1,000 – 2,000	Moderately aggressive	Mildly aggressive
< 3	> 50,000	> 20,000	< 1,000	Severely aggressive	Moderately aggressive

- NOTES:**
1. 1 ppm (parts per million) is equivalent to 1 mg/kg
 2. Soil Conditions A – high permeability soils (e.g. sands and gravels) which are in groundwater
 3. Soil Conditions B – low permeability soils (e.g. silts and clays) or all soils above groundwater
 4. Table reproduced from Table 6.5.2(C) of AS2159-2009

Table GDR 22: Exposure Classification for Concrete in Sulfate Soils

Exposure Conditions			Exposure Classification	
Sulfates (expressed as SO ₄) ¹		pH	Soil Conditions A ²	Soil Conditions B ³
In Soil (ppm)	In Groundwater (ppm)			
< 5,000	< 1,000	> 5.5	Mild	Non-aggressive
5,000 – 10,000	1,000 – 3,000	4.5 – 5.5	Moderate	Mild
10, 000 – 20,000	3,000 – 10,000	4 – 4.5	Severe	Moderate
> 20,000	> 10,000	< 4	Very Severe	Severe

- NOTES:**
1. Approximately 100 ppm SO₄ = 80 ppm SO₃
 2. Soil Conditions A – high permeability soils (e.g. sands and gravels) which are in groundwater
 3. Soil Conditions B – low permeability soils (e.g. silts and clays) or all soils above groundwater
 4. For disturbed soils, the assumption of soil A conditions where accelerated corrosion is possible should be considered.
 5. Table reproduced from Table 4.8.1 of AS3600-2018

GDR18 LIQUEFACTION

Soil liquefaction can occur when loose, granular, Holocene age material below the groundwater table is subjected to a seismic event (typically within 15 m of the ground surface). This can cause a loss of strength and result in vertical and lateral movements of the site surface.

Where a liquefaction analysis is carried out and outlined in the report, this has been done in accordance with consideration to the design earthquake details as presented in AS1170.4-2007:

- The hazard factor is taken from Figure 3.2 (C) and Table 3.2. The Hazard Factor (Z) for Western Australia represents the 1 in 500-year annual probability of exceedance of ground motions measured in gravity (g).
- The probability factor (k_p) is taken from Table 3.1.

Unless otherwise stated, an earthquake magnitude of 7.5 for the south-west of WA is based on research by:

- Dhu T., Sinadinovski C., Edwards M., Robinson D., Jones T., Jones A. (2004) "Earthquake Risk Assessment for Perth, Western Australia". 13th World Conference on Earthquake Engineering, Vancouver, B.C., Canada. Paper No. 2748.

GDR19 EXPECTATIONS OF THE REPORT

The following sections have been prepared to clarify what is and is not provided in your report. It is intended to inform you of what your realistic expectations of this report should be and how to manage your risks associated with the conditions on site.

Geotechnical engineering and environmental science are less exact than other engineering and scientific disciplines. We include this information to help you understand where our responsibilities begin and end. You should read and understand this information. Please contact us if you do not understand the report or this explanation. We have extensive experience in a wide variety of projects and we can help you to manage your risk.

GDR20 THIS REPORT RELATES TO PROJECT-SPECIFIC CONDITIONS

This report was developed for a unique set of project-specific conditions to meet the needs of the nominated client. It took into account the following:

- the project objectives as we understood them and as described in this report;
- the specific site mentioned in this report; and
- the current and proposed development at the site.

It should not be used for any purpose other than that indicated in the report. You should not rely on this report if any of the following conditions apply:

- the report was not written for you;
- the report was not written for the site specific to your development;
- the report was not written for your project (including a development at the correct site but other than that listed in the report); or
- the report was written before significant changes occurred at the site (such as a development or a change in ground conditions).

You should always inform us of changes in the proposed project (including minor changes) and request an assessment of their impact.

Where we are not informed of developments relevant to your report, we cannot be held responsible or liable for problems that may arise as a consequence.

Where design is to be carried out by others using information provided by us, we recommend that we be involved in the design process by being engaged for consultation with other members of the project team. Furthermore, we recommend that we be able to review work produced by other members of the project team that relies on information provided in our report.

GDR21 DATA PROVIDED BY THIRD PARTIES

Where data is provided by third parties, it will be identified as such in our reports. We necessarily rely on the completeness and accuracy of data provided by third parties in order to draw conclusions presented in our reports. We are not responsible for omissions, incomplete or inaccurate data associated with third party data, including where we have been requested to provide advice in relation to field investigation data provided by third parties.

GDR22 SOIL LOGS

Our reports often include logs of intrusive and non-intrusive investigation techniques prepared by Galt. These logs are based on our interpretation of field data and laboratory results. The logs should only be read in conjunction with the report they were issued with and should not be re-drawn for inclusion in other documents not prepared by us.

GDR23 THIRD PARTY RELIANCE

We have prepared this report for use by the client. This report must be regarded as confidential to the client and the client's professional advisors. We do not accept any responsibility for contents of this document from any party other than the nominated client. We take no responsibility for any damages suffered by a third party because of any decisions or actions they may make based on this report. Any reliance or decisions made by a third party based on this report are the responsibility of the third party and not of us.

GDR24 CHANGE IN SUBSURFACE CONDITIONS

The recommendations in this report are based on the ground conditions that existed at the time when the study was undertaken. Changes in ground conditions can occur in numerous ways including anthropogenic events (such as construction or contaminating activities on or adjacent to the site) or natural events (such as floods, groundwater fluctuations or earthquakes). We should be consulted prior to use of this report so that we can comment on its reliability. It is important to note that where ground conditions have changed, additional sampling, testing or analysis may be required to fully assess the changed conditions.

GDR25 SUBSURFACE CONDITIONS DURING CONSTRUCTION

Practical constraints mean that we cannot know every minute detail about the subsurface conditions at a particular site. We use professional judgement to form an opinion about the subsurface conditions at the site. Some variation to our evaluated conditions is likely and significant variation is possible. Accordingly, our report should not be considered as final as it is developed from professional judgement and opinion.

The most effective means of dealing with unanticipated ground conditions is to engage us for construction support. We can only finalise our recommendations by observing actual subsurface conditions encountered during construction. We cannot accept liability for a report's recommendations if we cannot observe construction.

GDR26 ENVIRONMENTAL AND GEOTECHNICAL ISSUES

Unless specifically mentioned otherwise in our report, environmental considerations are not addressed in geotechnical reports. Similarly, geotechnical issues are not addressed in environmental reports. The investigation techniques used for geotechnical investigations can differ from those used for environmental investigations. It is the client's responsibility to satisfy themselves that geotechnical and environmental considerations have been taken into account for the site.

Geotechnical advice presented in a Galt Environmental report has been provided by Galt Geotechnics under a sub-contract agreement. Similarly, environmental advice presented in a Galt Geotechnics report has been provided by Galt Environmental under a sub-contract agreement.

Unless specifically noted otherwise, no parties shall draw any inferences about the applicability of the Western Australian state government landfill levy from the contents of this document.

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AVANT HYDRO

C O N S U L T A N T S

www.avanthydro.com.au

Appendix *E*

Retail Needs Assessment
and Net Benefit Test



URBIS

Dianella Centre PSP

Needs & Impact Assessment

June 2026
Prepared for Greenpool Capital

Acknowledgement of Country



Urbis acknowledges the Traditional Custodians of the lands we operate on.

We recognise that First Nations sovereignty was never ceded and respect First Nations peoples continuing connection to these lands, waterways and ecosystems for over 60,000 years.

We pay our respects to First Nations Elders, past and present.

The river is the symbol of the Dreaming and the journey of life. The circles and lines represent people meeting and connections across time and space. When we are working in different places, we can still be connected and work towards the same goal.

Urbis is committed to incorporating our respect for First Nations cultures, peoples and storytelling in our work across the Country. We are proud to have partnered with Darug Nation artist, **Hayley Pigram**, and to profile her artwork – **Sacred River Dreaming**.

Contents

This project involves the preparation of economic analysis to support the Dianella Centre Precinct Structure Plan (PSP). The work focuses on understanding market need, assessing potential impacts, and demonstrating alignment with State and local planning policy requirements.

- The analysis includes a **Needs Assessment** prepared in accordance with SPP 4.2. This assesses demand for the non-residential uses proposed in the Dianella Centre PSP, including retail, food and beverage, health, fitness, childcare and commercial office and professional suites uses. The assessment considers strategic planning context, site and locational attributes, catchment characteristics, population and spending trends, existing and future competitive supply, and benchmarks for District Centres. It also examines future floorspace demand and the extent to which the proposal aligns with Dianella's role in the activity centre hierarchy. A high-level review of residential market trends is also included to support the Structure Plan.
- A Retail **Net Benefit Test (NBT)** is also undertaken to assess trading impacts on surrounding centres, economic and employment outcomes, and whether the proposal delivers a net benefit to the community without undermining the established activity centre network.

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Executive Summary

Urbis has been engaged by Greenpool Capital to prepare an independent economic assessment and the market need, demand and impact of the proposed Precinct Structure Plan (PSP) for the Dianella (Activity) Centre.. This report provides:

- A **Needs Assessment** for the proposed:
 - 6,230 sq.m increase in retail (PLUC 5) floorspace
 - provision of new ancillary uses (gyms/fitness clubs, childcare, medical / health uses, commercial office and professional suites space), other commercial and community uses.
 - 630 residential apartments that will be integrated within the commercial and community activities in the Dianella Centre.
- A **Net Benefits Test** to assess the potential trading impact on other activity centres in the region that is associated with the proposed expansion of retail (PLUC 5) floorspace.

The needs and impact assessments are based on the incremental floorspace relative to the Stage 1 Coles Relocation Development Application (DA), which has been lodged and under assessment.

The analysis and findings outlined in this report indicate that the proposed Dianella Centre PSP would address the need for more retail floorspace, particularly food and convenience shopping, and a greater range of amenities and services for the growing resident population in the area.

The need for the proposed quantum of retail (PLUC 5) floorspace and broader range of ancillary uses and amenities is demonstrated by:

- Over the next 10 years, retail spending by trade area residents is forecast to increase by \$351 million or +25%. The growth in spending will support the requirement for a sizeable increase in retail floorspace (potentially +29,000 sq.m to +32,000 sq.m).
- The Dianella catchment is undergoing a process of regeneration and a greater breadth and depth of retail shops, services and community facilities are required to service the diversifying and growing population in the area.
- The ~630 apartments proposed in the PSP will generate demand for additional retail floorspace, services and other amenities.
- The Dianella Centre is capturing lower than benchmark market shares for a District Centre anchored by supermarkets and other convenience retail. There is market capacity for the proposed increase in retail floorspace.

- The accessibility of convenience retail and food catering floorspace, gyms/fitness clubs, medical & health facilities, childcare and other commercial and community uses is below benchmarks for the inner suburbs of Perth. The proposed PSP would address the existing shortfall in floorspace across these uses and enable the centre to better serve the needs of the growing and diversifying population in the Dianella catchment.

As a District Centre, the Dianella Centre is intended to play a key role in providing the required range of retail shops and services that adequately meet the needs of the community. The PSP supports the Dianella Centre serving this role in the centre hierarchy.

Additionally, the Net Benefit Test indicates that the assessed levels of trading impact (-0.5% to -3.8%) of the proposed expansion of retail floorspace as per the Dianella Centre PSP would not be detrimental to the sustainability of any individual activity centre.

Furthermore, due to future growth in the market virtually all centres are expected to achieve a (real) turnover in 2030 (the assumed opening year of the expanded Dianella Centre) higher than achieved in 2026 and any declines are negligible (-0.1% and -0.2% for a couple centres).

Executive Summary

As a result, the proposed retail floorspace will broaden the range and choice of shops and services available to households.

The Dianella PSP will also have other benefits for the community including:

- Increased consumer choice and liveability associated with the provision of additional shops, services and other amenities.
- Increased employment opportunities through the construction and ongoing operational phases of the proposed Dianella Centre PSP. This includes:
 - 460 direct and indirect full-time equivalent(FTE) jobs over the assumed 2 year construction period.
 - 480 FTE jobs in retail trade, professional services, early childhood education, health care services and sports & recreation industries. These jobs are estimated to generate a further 110 indirect jobs in the wider economy.

The proposed residential housing (~630 apartments) would address the need for a greater quantum and diversity of housing and contribute to the housing targets set by the City of Stirling. The Dianella Centre, with the improvements proposed with the PSP, will be an ideal location for higher density housing.

The proposed PSP will also transform the Dianella Centre into a genuine mixed use activity centre integrating residential housing with retail, commercial and community facilities to create a vibrant community hub that is an exemplar for District Centres.

In summary, the proposed Dianella Centre PSP will address the market need and demand for an expanded and improved range of retail, services and amenities and new residential housing in the Dianella catchment. The scale of the expansion would not be expected to have any adverse effects on the sustainability on the centre hierarchy but rather provide measurable and lasting benefits for the community.



1 Dianella Activity Centre and Site Context

Local Planning Context

State Planning Policy 4.2 sets the strategic framework for activity centres across metropolitan Perth. It defines a hierarchy of centres and identifies the subject site as a District Centre. District Centres are intended to meet the daily and weekly needs of their surrounding catchments and to provide a focus for retail, services, employment and community uses. The policy allows for a wide range of retail, commercial and mixed-use development, provided growth does not undermine the role of other centres. Expansion and redevelopment are anticipated where supported by evidence, with a Retail Needs Assessment required to demonstrate demand and net community benefit.

The policy outlines the expected role and form of District Centres. These centres are intended to include land uses drawn from local, neighbourhood and district categories. This includes small and large shops, supermarkets, liquor stores, medical centres, offices, cafés and restaurants, education and recreation uses, as well as district-level uses such as bulky goods showrooms, cinemas or theatres and hotels / other short stay accommodation. This mix, alongside residential housing, supports the function of District Centres as multipurpose destinations and provides a planning basis for updating and expanding the centre in response to changing needs.

District Centres are also expected to accommodate moderate levels of development intensity. Mid-rise buildings, pedestrian-friendly streets and activated public spaces are encouraged. Higher residential densities within walkable catchments are contemplated. These settings support more efficient use of land in locations with existing services and infrastructure.

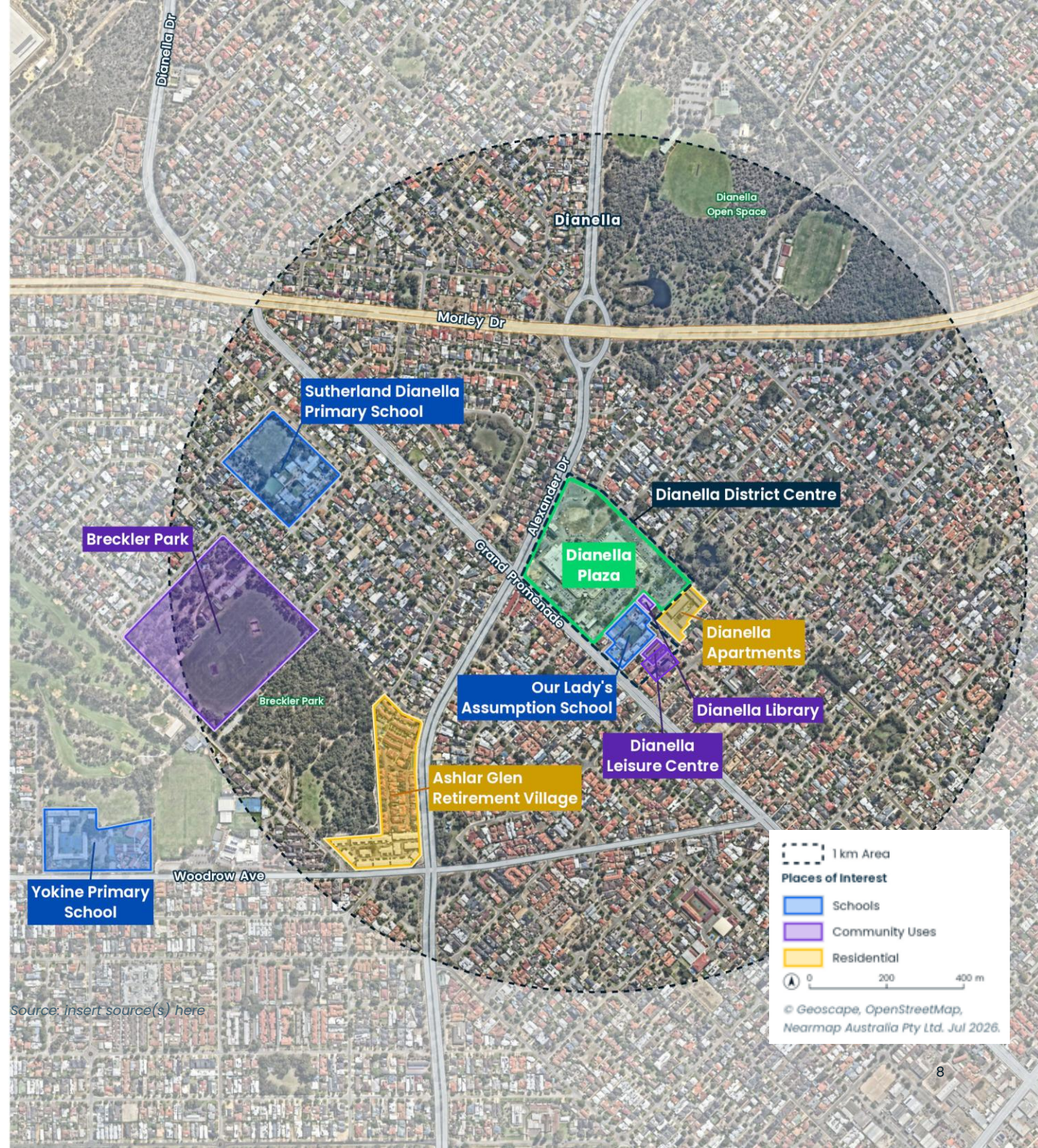
At the local level, the City of Stirling's Local Planning Strategy identifies Dianella DC1 as a District Centre and supports its growth where there is demonstrated demand and impacts on other centres are managed. The Strategy projects an increase in shop floorspace over time, indicating an expectation of additional development capacity. Current zoning under Local Planning Scheme No. 3 allows a broad range of retail, commercial, community, service station and hotel uses. Draft Local Planning Scheme No. 4 proposes a consolidated Centre zone across the site, supporting a wide mix of uses and employment consistent with the activity centre hierarchy.

Local Area Context

Dianella Plaza is located within the Dianella Activity Centre, which is a District Centre under SPP 4.2. Dianella is an established inner northern suburb of Perth that is going through a process of regeneration that is changing how the centre hierarchy responds to the evolving needs of the community.

Dianella Plaza is located at the north-eastern corner of Alexander Drive and the Grand Promenade which are two key collector roads in the area. The site has good frontage to these two roads as well as Waverley Street. An 'internal' road, Lowick Street runs through the eastern part of the property and is earmarked to be upgraded to function as the 'main street' within the Dianella Activity Centre.

Within short distance of the Dianella centre there are a number of schools and recreational reserves, including a range of community and leisure facilities, and the Western Australian Golf Club. All of these uses attract regular visits to the Dianella area, of which the shops and services in the Dianella Activity Centre can serve.



Current Dianella Centre

The area of the Dianella Activity Centre that is owned by Greenpool Capital is shown by the red outline in the figure to the right.

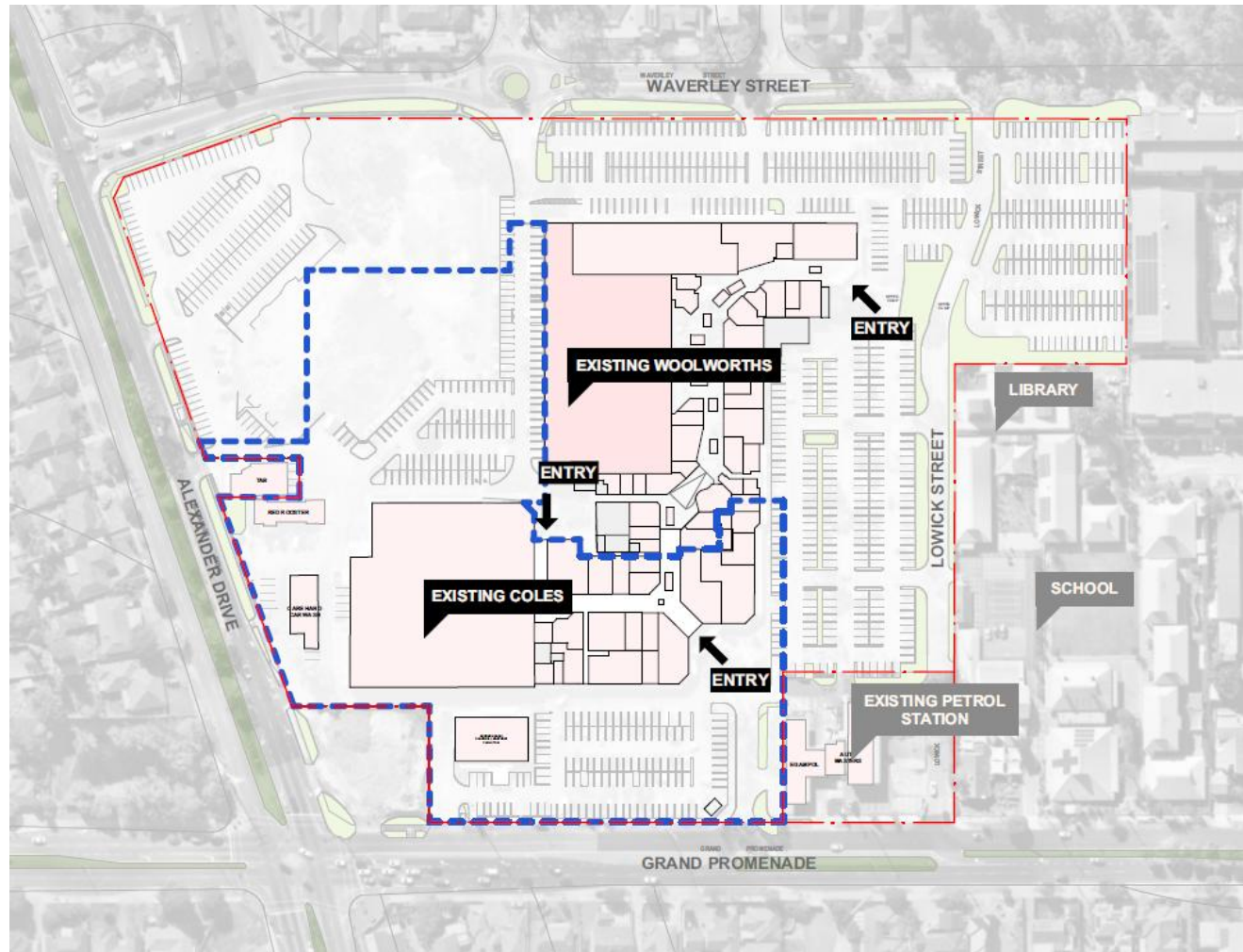
This site includes Dianella Plaza as well as a range of pad site uses and provides the vast majority of commercial / retail activity in the Dianella (Activity) Centre.

Dianella Plaza was first built in 1971 and has been an integral shopping destination in this region of Perth for the past 55 years.

The centre has undergone a series of modifications since its opening however the current format of the centre has not received material improvements for more than 20 years. The current design and layout of the property is inefficient and inconvenient for both visitors and businesses operating in the centre. As a result, the centre's role and ability to meet the needs of the community has progressively eroded.

The improvements planned by Greenpool Capital will bring the centre to modern standards and provide the range of shops and services required to adequately meet the needs of the community it serves. The changes (including high density residential, enhanced carparking and site ingress-egress and a 'main street') will also improve the overall vitality of the Dianella activity centre through better integrating other uses in the activity centre (e.g. library, school, existing and proposed apartments) to create a cohesive area of activity.

Current Centre Plan



Source: Greenpool Capital



2

Proposed Dianella Centre Precinct Structure Plan

Proposed Dianella Centre Structure Plan – Schedule of Uses

A summary of the schedule of uses proposed in the Dianella Centre Precinct Structure Plan is outlined in the table to the right.

The key uses are:

- PLUC5 shop floorspace (20,440 sq.m) within the shopping centre that consists of:
 - Shops within the internal malls
 - An external 'main street' extending along Lowick Street
 - Pad site uses including food & beverage tenants positioned along Alexander Drive.
- Non-PLUC5 floorspace located within the shopping centre, pad sites and at the base of the residential towers, with external frontage to either the at-grade carparking or Waverley Street and at the north-west corner of Lowick Street and Grand Promenade.
- Total non-PLUC5 floorspace amounts to 9,500 sq.m, including a range of ancillary facilities/ amenities (gym / fitness clubs, medical and commercial space, professional suites and a childcare centre).
- The precinct structure plan also proposes to provide approximately 630 residential apartments across a number of buildings that will be integrated with the retail, community and commercial activity within the Dianella Centre. The proposed apartment development addresses underlying demand in the area for additional and a greater diversity of housing. The development of the residential apartments is planned to be staged.

Dianella Centre Precinct Structure Plan – Schedule of Uses

	Dianella Centre PSP
Residential	630 Apartments
PLUC5 (Shop) Retail*	20,440 sq.m
Gym & Fitness	1,730 sq.m
Childcare	1,380 sq.m
Medical & Allied Health	1,500 sq.m
Office / Professional Suites	2,300 sq.m
Other Non-Retail	2,590 sq.m
Total Dianella Centre PSP	29,940 sq.m

** Retail is defined as any floorspace that falls under the PLUC5 shop categorisation and includes food pad sites.
 Note: The above floorspaces figures are based on architectural plans provided by Greenpool Capital
 Source: Greenpool Capital; Urbis*



3

Retail Needs Assessment

3A Trade Area Market

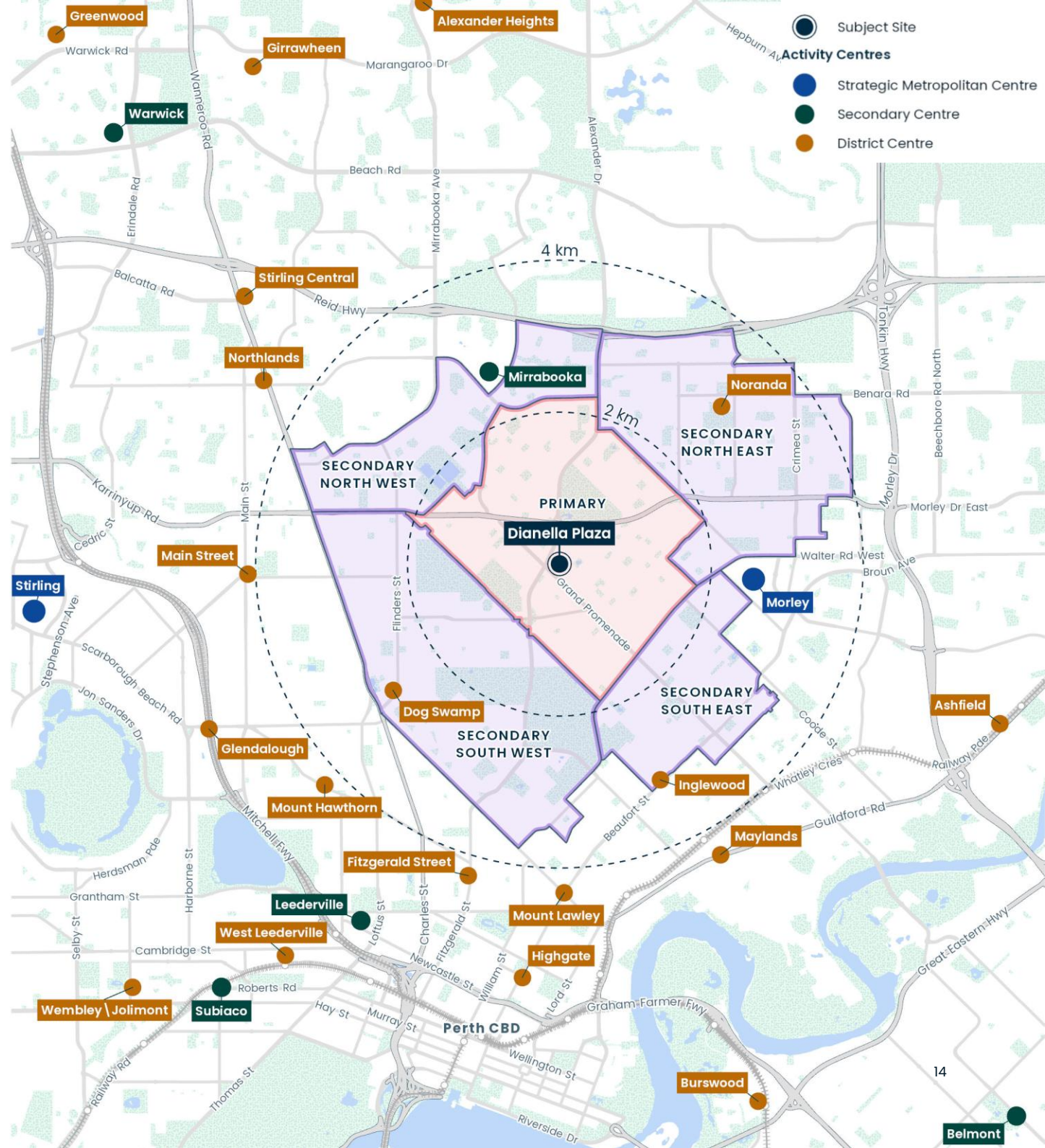
Retail Trade Area

Dianella's trade area has been defined based on analysis of the customer draw of the centre utilising mobile phone analytics.

The centre serves a trade area generally extending 3-4 km in most directions with a primary sector and four secondary sectors.

The trade area is influenced by the following:

- Dianella's role as a District Centre with an emphasis on everyday retail and services needs.
- A prominent and accessible location at the intersection of two key road thoroughfares in the inner northern suburbs of Perth (Grand Promenade and Alexander Drive) that link with Morley Drive. This enables easy access to the centre from all directions.
- Major retail centres on the periphery of the trade area, including the Morley Strategic Metropolitan Centre and Mirrabooka Secondary Centre. These higher order centres have an extended role to that of Dianella, including an emphasis on discretionary expenditure.
- Other District Centres including Dog Swamp in the south-west, Noranda to the north-east and Inglewood, Mount Lawley and North Perth to the south.



Resident Trade Area Population

Dianella's trade area has been attracting good rates of population growth in recent years, with the population increasing by 1.3% or around 1,000 people per annum.

With several infill developments and attractiveness of the area for younger households and continued regeneration of the area, good rates of population growth are expected to be maintained in future years at average of 910 people per annum from 2026 to 2036.

The population forecasts allow for a number of infill developments including:

- The former Channel 9 & 10 Broadcast site in Dianella which has planning provision for development of ~150 residential lots, although the yield could end up being significantly higher, e.g. +300 dwellings.
- The ECU Mount Lawley campus site which is proposed to provide potentially 900+ dwellings.
- The 630 apartments proposed for the Dianella Centre PSP. Urbis has assumed 130 apartments are developed by FY 2030 and occupied by with the balance thereafter.

Trade Area Population – 2016 to 2036 (As at June)

	Population (no.)					Annual Population Growth (%)		Annual Population Growth (no.)	
	2016	2021	2026	2031	2036	16-26	26-36	16-26	26-36
Primary:									
Primary Trade Area	19,800	20,140	22,510	24,060	25,700	1.3%	1.3%	270	310
Secondary:									
North East	16,760	17,270	18,740	19,580	20,320	1.1%	0.8%	200	170
South East	9,360	9,750	10,650	11,260	11,890	1.3%	1.1%	130	120
South West	17,840	19,010	20,460	21,480	22,890	1.4%	1.1%	260	205
North West	9,360	9,880	10,740	11,280	11,760	1.4%	0.9%	140	110
Secondary Trade Area	53,320	55,910	60,590	63,600	66,860	1.3%	1.0%	725	600
Main Trade Area	73,120	76,050	83,100	87,660	92,560	1.3%	1.1%	1,000	910

** Future population estimates include allowance for proposed residential development within the Dianella Centre PSP
Source: WA Tomorrow, Cordell Connect; Greenpool Capital; Urbis*

Trade Area Residents Socio-Economic Profile (2021)

The table compares the key socio economic characteristics of main trade area with Greater Perth, based on the 2021 Census. The profile largely reflects an established suburban inner market.

Key insights of the overall profile include:

- Incomes are similar to the Perth average.
- Average age in the trade area is older than Greater Perth.
- A higher share of residents live in medium to higher density residential housing, 30% in the trade area, compared to the Greater Perth average of 20%.
- 35% of trade area households own their homes outright, compared to 29% in Greater Perth.
- 74% of workers living in the main trade area have white collar occupations, compared to the Greater Perth average of 69%.
- 40% of residents are born overseas, similar to the Perth average.

Defining Demographic Characteristics¹ – Main Trade Area Residents



74% of people are **employed in white-collar industries**, above the Perth average of **69%**



Average **income per capita** is **+2%** to the Perth average.



41.5 is the average age – higher than the Perth average of **38.6 years**



40% of the population **are born overseas**, higher than the Perth average of 38%



2.4 is the average household size – below the Perth average of **2.5**



30% of residents live in medium-high density housing (Perth average 20%).



29% of people are **renters** – above Perth average of **27%**



35% of households own their dwelling outright

1. Defining = Materially different to the Perth average
Source: ABS Census 2021; Urbis

Profile of New Residents to the Trade Area

The Dianella Trade Area is currently undergoing a phase of regeneration and gentrification, as evidenced by:

- The socio-economic profile of new residents, i.e. those who moved into the area in the last five years:
 - The average age of new residents is 6 years younger than the resident base in 2021. The largest shift in the age profile is 25–39 year olds who accounted for 38% of new residents in the trade area.
 - Per capita incomes of new residents is 23% higher than the Perth average, which compares with +2% for the trade area population in 2021. This is influenced by an increasing share of the population in the workforce and white collar workers.
- Analysis of ATO data shows that personal incomes have been growing at a rate slightly stronger than the Perth average, again highlighting the positive impact changing household formation and new housing is having on the area.

The shifts in the socio-economic profile demonstrate the attractiveness of the Dianella catchment for young adults and families and that the area is undergoing a phase of regeneration.

These trends will be supported by provision of a greater diversity of housing and improved access to retail shopping, services and other amenities.

Dianella Main Trade Area Socio-Economic Profile – New Residents vs Existing Residents

	New Residents (2016 to 2021)	Residents in 2016	Variation (New vs Existing)
Income Metrics:			
Per Capita Income (Var. from Perth Avg.)	+23%	+2%	+21% pts
Age Profile:			
% 0–14 years	14%	16%	–2% pts
% 15–24 years	14%	11%	+3% pts
% 25–39 Years	38%	22%	+16% pts
% 40–54 Years	19%	19%	0% pts
% 55–64 Years	7%	12%	–5% pts
% 65+ Years	8%	20%	–12% pts
Average Age	36	42	–6 Years
Other Metrics:			
% White Collar Workers	75%	74%	+1% pts
% Overseas Born	42%	40%	+2% pts

Note: Main trade area new residents refers to people who moved to the main trade area between 2016 and 2021. Data based on Census 2021. Source: Australian Census of Population & Housing (ABS); Urbis

Dianella Main Trade Area – Personal Income Growth

	Annual Growth (%)	
	19–21	21–23
Main Trade Area	+5.4%	+5.1%
Greater Perth	+4.4%	+4.9%
Var'n to Greater Perth	+1.0%	+0.2%

Source: ATO; Urbis

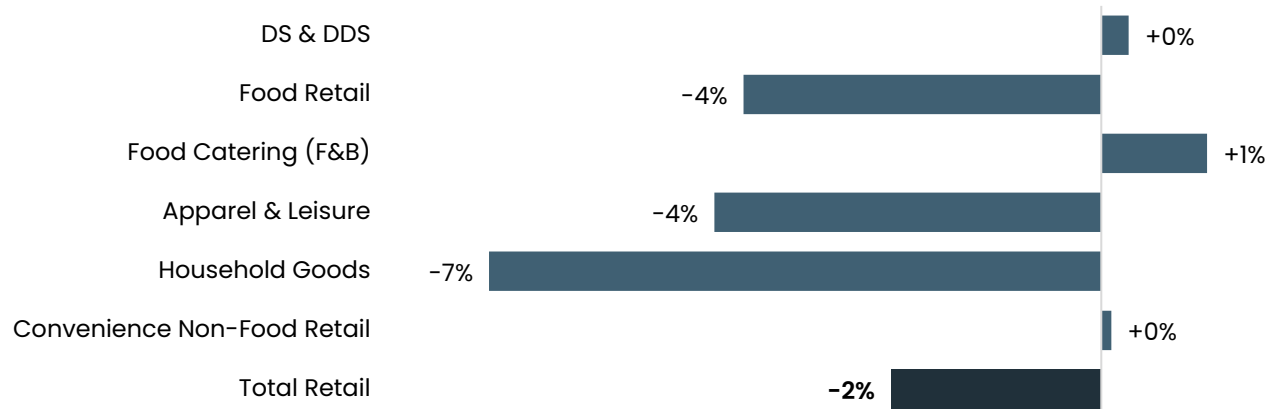
Retail Spending Patterns

A review of the expenditure per capita levels on retail goods and services (based on data from CommBank iQ Data Insights) indicates the following:

- Overall, retail spending per capita levels across the trade area are currently 2% lower than the Perth average.
- Expenditure at food & beverage, department stores and convenience-based non-food stores is similar or above the Perth average.

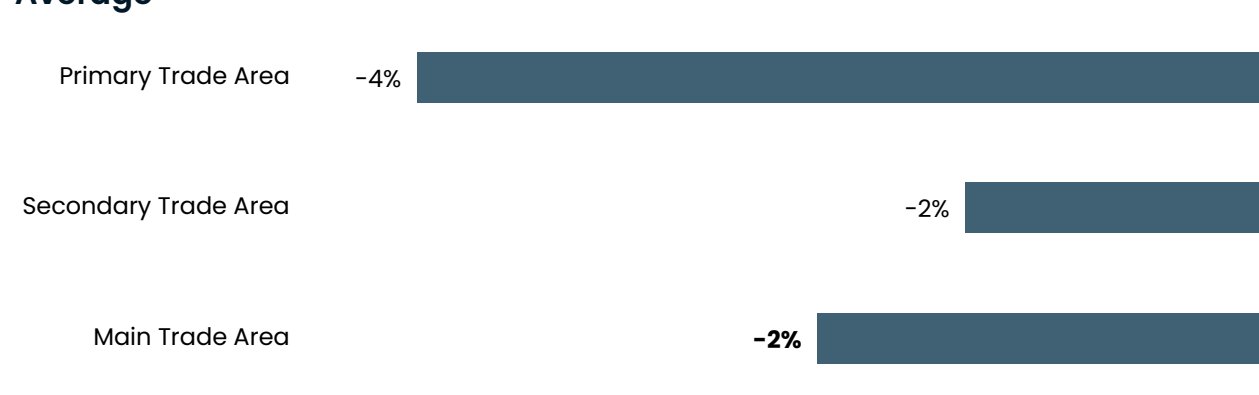
Note: The retail spending market is based on the PLUC5 (shop) categories.

Retail Spending Per Capita by Category – Main Trade Area – Variation to Perth Average



Source: CommBank iQ Spending Insights; Urbis

Total Retail Spending Per Capita by Trade Area Sector – Variation to Perth Average



Source: CommBank iQ Spending Insights; Urbis

Trade Area Retail Spending

The table below outlines the current and forecast spending on PLUC5 shop retail categories by trade area residents. All figures are shown for financial years, including GST and excluding price inflation.

In the year to June 2026, Dianella's trade area residents are estimated to spend approximately \$1.4 billion on retail goods and services, including \$372 million by primary trade area residents.

Over the next 10 years, trade area expenditure on PLUC 5 categories is forecast to increase by an average of 2.2% per annum (\$2026), increasing to \$1.76 billion by 2036, including \$1.57 billion by 2031.

Forecast Retail Expenditure (\$2026M) - 2026 to 2036 (Incl. GST and Excl. Inflation)

	DS + DDS	Food Retail	Food Catering (F&B)	Household Goods	Apparel and Leisure	General	Retail Services	Total Retail	Annual Growth
Primary Trade Area:									
2026	18	139	82	28	49	42	15	372	
2031	20	149	95	34	58	48	17	421	2.5%
2036	21	160	108	42	69	56	20	477	2.5%
Secondary Trade Area:									
2026	48	378	237	80	139	113	42	1,037	
2031	52	396	268	96	161	129	47	1,149	2.1%
2036	56	420	302	116	189	147	53	1,283	2.2%
Main Trade Area:									
2026	65	517	319	108	188	155	57	1,409	
2031	72	545	362	130	220	177	65	1,570	2.2%
2036	77	580	410	158	258	203	73	1,760	2.3%
Average Annual Growth (10 yrs)	1.7%	1.2%	2.5%	3.9%	3.3%	2.7%	2.5%	2.2%	

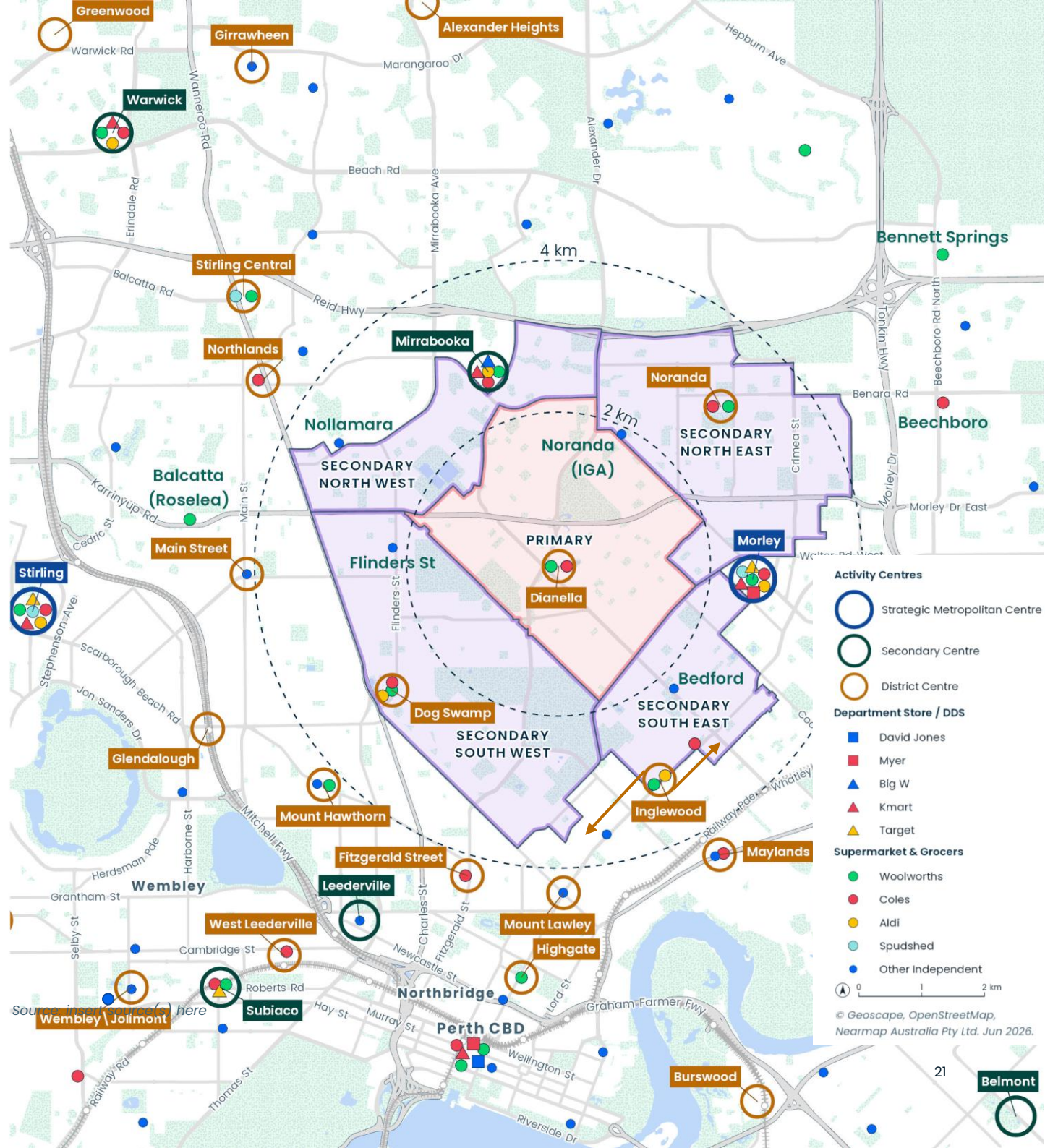
Source: CommBank iQ, ABS, Urbis

3B **Retail Supply**

Retail Supply

The existing network of retail activity centres is shown in the map to the right as per the planning designation under SPP 4.2.

On the page overleaf more detail is provided on the location, estimated retail floorspace, vacancy levels and major tenants for the activity centres in this region of Perth.



Activity Centres in the Region

Within the general region of relevance to the Dianella Activity Centre there is a diverse mix of activity centres ranging from those catering to everyday local shopping and services needs through to larger higher order centres with an emphasis on discretionary shopping.

Dianella is one of 8 District Centres within a 6 km (by road) area of the centre. Mirrabooka and Morely are the only Secondary and Strategic Metropolitan Centres in this region. There is also 5 local / neighbourhood' centres in this area providing a complementary shopping role to the District Centres.

A review of the (non-majors) vacancy in the activity centres indicates a healthy and sustainable retail landscape with generally low vacancy rates. Dianella has one of the higher vacancy rates however this is due to tenancies intentionally being left vacant in preparation of the future redevelopment of the centre.

Of note, the retail floorspace that was provided in the Morley Market centre, which was extensively damaged by a fire in September 2025 and subsequently demolished, has been retained in the retail floorspace figures for the Morley activity centre on the assumption the majority of this space will be provided in the redevelopment of the site.

Activity Centres in the Dianella Catchment

	Distance by Road (km)	Estimated Retail GLA (sq.m)	Estimated Non-Major Vacancy	Major Tenants (PLUC 5)
Strategic Metropolitan Centres:				
Morley	3.5	83,300	n.a.	Myer, Kmart, Target, Coles, Woolworths, Aldi, Spudshed, MCQ
Stirling	10.0	54,800	2%-5%	Kmart, Target, Coles, Woolworths, Aldi, Spudshed
Secondary Centres:				
Mirrabooka	4.0	39,000	<2%	Kmart, Big W, Coles, Woolworths, Aldi
District Centres:				
Dianella		12,600	n.a.	Coles, Woolworths
Dog Swamp (Yokine)	4.0	12,300	<2%	Coles, Woolworths, Aldi
Inglewood	4.0	21,500	<2%	Coles, Woolworths, Aldi
Noranda	4.5	10,100	5%-9%	Coles, Woolworths
Fitzgerald Street (North Perth)	5.5	15,700	2%-5%	Coles
Northlands (Balcatta)	6.0	10,100	2%-5%	Coles
Mount Hawthorn	6.0	14,800	<2%	Woolworths, IGA
Main Street (Osborne Park)	6.0	7,700	2%-5%	IGA
Mount Lawley / Highgate	6.0	11,000	2%-5%	IGA
Stirling Central (Westminster)	7.5	12,700	5%-9%	Woolworths, Spudshed
Local / Neighbourhood Centres:				
Bedford	2.5	1,500	<2%	IGA
Noranda (IGA)	3.0	1,200	<2%	IGA
Yokine (Flinders Street)	3.0	1,000	<2%	Gil and Roofs Fresh Food
Nollamara	4.5	4,400	<2%	IGA
Balcatta (Roselea)	6.0	4,900	<2%	Woolworths

* Centre is in preparation phase for redevelopment.
Source: WA Planning, LUES; Urbis

Proposed Retail Developments

There are a several retail developments underway or planned / mooted in the region of relevance to the Dianella Activity Centre.

These include the following:

- **Galleria (Morley) Redevelopment.** This development is due for completion in late 2026, including an upgraded Coles supermarket, new range of discretionary based retailers and improvements to the dining and entertainment offer. Similar to the Precinct Structure Plan for the Dianella Activity Centre this development is focussed on improving the offer largely within the existing footprint of the centre and providing only a modest increase in overall leasable floorspace. The Galleria centre is about 4 km drive from the Dianella centre.
- A new mixed-use development on **Charles Street in North Perth**, ~6 km from the Dianella Centre, that is proposed to include a Woolworths supermarket, childcare centre, medical / health uses, pharmacy and other retail tenancies. This development would serve the growing density of households in the North Perth area. The development is deferred as of June 2026.
- The **Draft PSP for the ECU Mount Lawley Redevelopment** is currently being considered by the City of Stirling and Department of Planning, Lands and Heritage. At this stage, the Draft PSP anticipates approximately 1,000 sq.m of retail shops and services, primarily of a local-scale / ancillary nature. This type of retail would be complementary to the offer at the Dianella Centre and serve a localised catchment. The ECU Mount Lawley site is approximately 3 km from the Dianella centre.
- **Solara (939 Beaufort Street, Inglewood)** which is a residential development that is proposed to include ground level retail shops, including cafes, services and convenience based retailers.
- A residential development at **969 Beaufort Street in Inglewood**, including around 10 retail tenancies on the ground level. This site is located next to the existing Coles supermarket and about 3.5 km from the Dianella centre.

3C

Existing Centre and Stage 1 Development

Stage 1 Coles Relocation Development Application

A development application for the first stage of the redevelopment of Dianella Plaza (within the Dianella Activity Centre) has been lodged and is under assessment by the City of Stirling at the time of writing this report. This application involves relocating the existing Coles supermarket to the Grand Promenade frontage and associated improvements to the southern and western areas of the site.

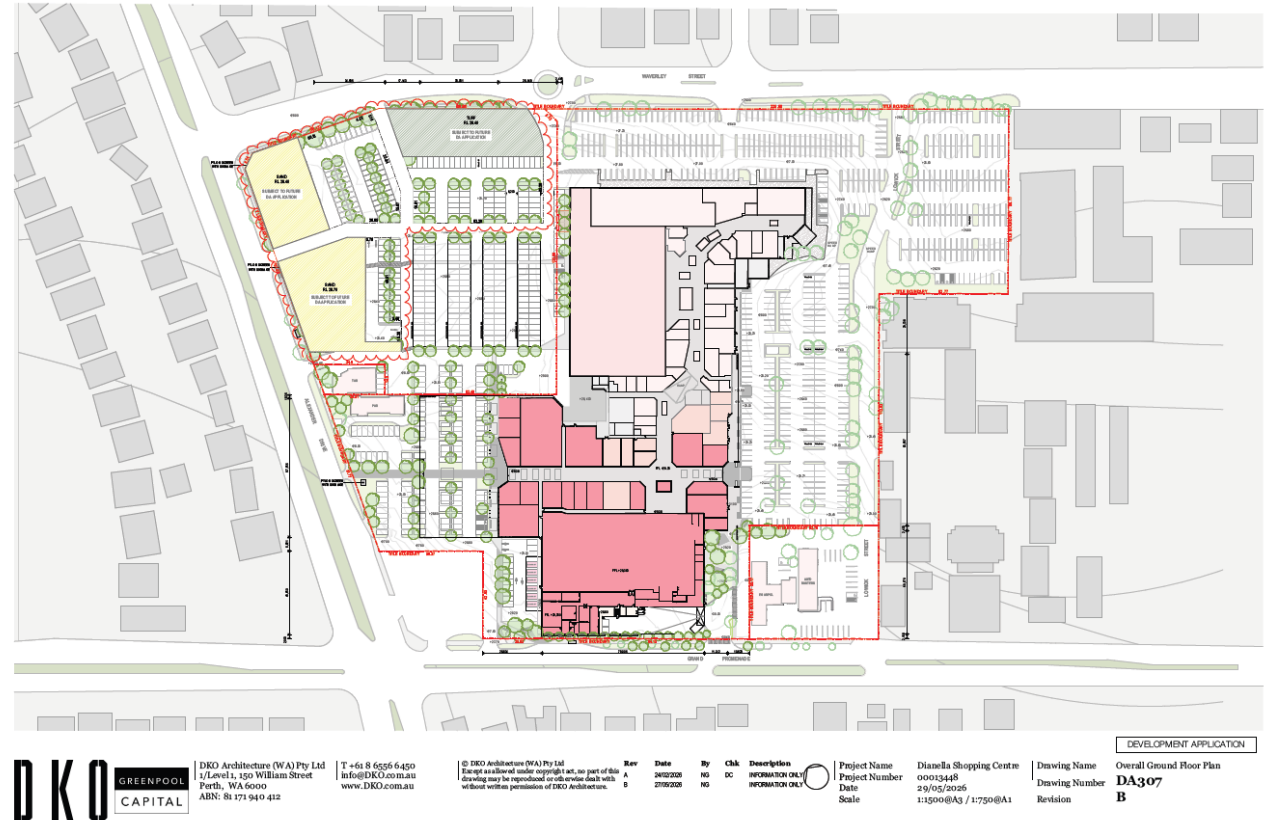
In particular, the Stage 1 application includes:

- The reconfiguration and modest (+170 sq.m of leasable floorspace) expansion of the Coles anchored section of the shopping centre, including a relocated and new Coles supermarket and upgraded and extended mall to the eastern and western at-grade carparking.
- The western end of the mall features a number of external facing tenancies, that will add to the activation of the site.
- Enhancement of the at-grade carparking to provide greater convenience for visitors to the centre and better support the retail shops and services on the site.

Overall, this development provides an important first stage of improvements to the Dianella Centre that will enhance the offer and experience for residents in the surrounding community. Greenpool Capital further propose to progress a separate application for new pad site uses positioned along Alexander Drive (on the corner of Waverley Street), including two fast food restaurants with drive-through access. This application will be lodged in ~Q3 2026.

It is noted that the Needs Assessment and Net Benefit Test (NBT) are based on the further enhancements (beyond Stage 1) proposed for the Dianella Activity Centre as part of the Precinct Structure Plan.

Proposed Stage 1 Coles Development Application



Source: Greenpool Capital

Centre Floorspace – Existing and Stage 1 Coles Application

The Stage 1 Coles Relocation Development Application for the improvements to Dianella Plaza would increase the leasable floorspace by around 170 sq.m or +1% to 16,930 sq.m.

This development application includes the following changes to the centre's floorspace:

- The PLUC5 floorspace increases by 820 sq.m to 14,210 sq.m which assumes:
 - all floorspace in the new section of the centre is occupied (e.g. replacing vacancy in the existing Coles section of the centre that is due to a number of tenancies intentionally left vacant to ready the centre for the Stage 1 Coles Relocation DA); and
 - Coles relocates to a smaller store (approximately -700 sq.m) to 3,930 sq.m.
- The allocation of PLUC 5 floorspace among the tenant categories is based on the typical floorspace mix at benchmark neighbourhood centres.
- An increase in non-PLUC5 floorspace of 320 sq.m.

The Stage 1 Coles relocation development application also provides improvements to the centre's carparking and centre entries which will enhance the quality of the shopping environment and convenience for visitors.

This development is assumed to be completed for an opening year of trade in FY 2030.

Dianella Centre – Current Floorspace by Category

	Current Centre (2026)	Change	Stage 1 – 'Coles Relocation' DA
	GLA (sq.m)	GLA (sq.m)	GLA (sq.m)
Supermarkets / Grocers	8,203	-703	7,500
Other Food Retail	1,031	+559	1,590
Food & Beverage	801	+269	1,070
Total Food	10,035	+125	10,160
Non-Food	3,357	+693	4,050
Total Retail (PLUC 5)	13,392	+818	14,210
Total Non-Retail	2,162	+318	2,480
Vacant Shopfront Space	1,205	-965	240
Total Centre	16,759	+171	16,930

Source: Greenpool Capital; Urbis

Dianella Retail Turnover with Stage 1 Coles Relocation Development Application

In FY 2030 and with the Stage 1 Coles Relocation Development Application, the Dianella Centre's retail (PLUC5) turnover is estimated at \$141 million, including \$119 million in food turnover and \$22 million in non-food turnover.

From 14,210 sq.m of retail floorspace this represents a turnover productivity of \$9,900 per sq.m. Turnover includes GST and is expressed in constant \$2026.

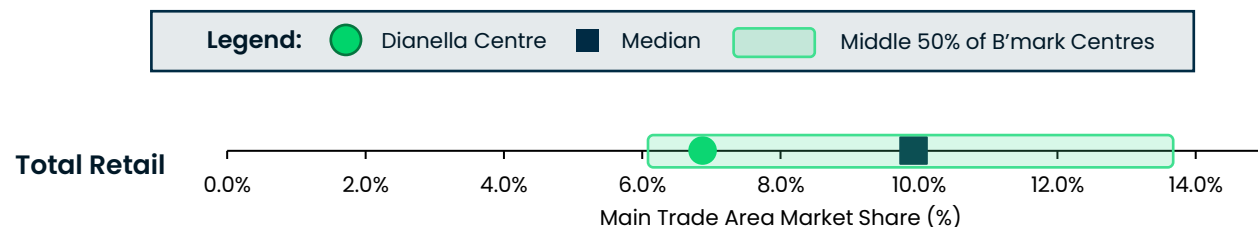
The market share of retail spending from the trade area required to support the Dianella Centre is within the typical range for comparable supermarket anchored shopping centres.

Dianella Centre Turnover Potential with Stage 1 Coles Scheme (2030)

	Turnover Potential with Stage 1 Coles Relocation DA		
	GLA	Turnover (\$M)	Turnover (\$psm)
Food	10,160	119	11,690
Non-Food	4,050	22	5,380
Total Retail	14,210	141	9,900

*Note: Turnover figures are expressed in real terms (\$2026), including GST.
Source: Greenpool Capital; Urbis*

Dianella Centre Main Trade Area Market Share with Stage 1 Coles Scheme – vs Multi-Supermarket Centre Benchmark



Source: Urbis

3D **Need and Demand Assessment**

Centre Floorspace – Dianella PSP

The Precinct Structure Plan for the Dianella Activity Centre is proposed to increase the centre's leasable floorspace to 29,940 sq.m which is 13,010 sq.m more than the centre with the Stage 1 Coles Relocation Development Application.

Under the Precinct Structure Plan the changes in floorspace relative to the Stage 1 development are as follows:

- PLUC5 floorspace increases by 6,230 sq.m to 20,440 sq.m.
 - Supermarkets / large grocer floorspace increases to 8,920 sq.m or +1,420 sq.m.
 - Other PLUC 5 floorspace increases by 4,810 sq.m, including (based on an assumed tenant mix having regard to the floorspace composition in benchmark centres):
 - 470 sq.m of additional food retail floorspace.
 - 1,700 sq.m of additional food & beverage floorspace, which includes the 'main street' dining precinct.
 - A net increase of 2,640 sq.m of non-food shops, including several mini-major sized tenancies.
 - A proportion of this gain in floorspace is attributable to replacement of remaining vacancy in the centre.

The Precinct Structure Plan also proposes the provision of a range of non-retail services and ancillary uses that will provide essential amenities for on-site residents and the surrounding community. This includes services such as banks, real estate agents, travel agents, post office, insurance, automotive, etc.) as well as a childcare centre, several gym / fitness clubs, office / professional suites, medical & allied health and other leasable space (at the base of one of the residential towers and external development near Grand Promenade).

Dianella Centre PSP vs Stage 1 Coles Relocation Development Application

	Stage 1 Coles Relocation DA	Change	Dianella Centre PSP
	GLA (sq.m)	GLA (sq.m)	GLA (sq.m)
Retail (PLUC 5) Uses:			
Supermarkets / Grocers	7,500	+1,420	8,920
Other Food Retail	1,590	+470	2,060
Food & Beverage	1,070	+1,700	2,770
Total Food	10,160	+3,590	13,750
Non-Food	4,050	+2,640	6,690
Total Retail (PLUC 5)	14,210	+6,230	20,440
Other Uses:			
Gyms / Fitness Clubs	0	+1,730	1,730
Childcare	0	+1,380	1,380
Medical & Allied Health	300	+1,200	1,500
Office / Professional Suites	0	+2,300	2,300
Other Non-PLUC 5*	2,180	+410	2,590
Total Other	2,480	+7,020	9,500
Vacant Shopfront Space	240	-240	0
Total Centre	16,930	+13,010	29,940

* Includes non-retail services (banks, real estate agents, post office, automotive, etc.), pad site uses, etc.

Source: Greenpool Capital; Urbis

Retail Needs Assessment

The market need for the proposed range of additional PLUC5 floorspace within the Dianella Centre PSP is demonstrated by a range of key market drivers which are summarised in the pages overleaf and highlighted to the right.

For the purposes of this assessment the market need and demand is assessed for FY 2030. Although the redevelopment of the Dianella Centre incorporating the planned changes under the PSP would be expected to occur at a later point in time, the FY 2030 year has been used as this coincides with the expected timing of the Stage 1 Coles Relocation DA scheme and the base from which the incremental demand and turnover is assessed against.

Given the timing of the delivery of the full range of development within the proposed Dianella Centre PSP is expected to be later than 2030, the market need and demand analysis as well as the trading impacts outlined in the Net Benefit Test (NBT) should be recognised in this context, e.g. there will be greater market capacity for the PSP when its likely to be actually delivered.

Nevertheless, the Needs Assessment indicates that there is more than sufficient market support for the proposed Dianella Centre PSP.

Over the next 10 years retail spending by trade area residents is forecast to increase by \$351 million (\$2026) or +25%. This growth in spending, supported by an expanding population base and evolving demographics from the regeneration of the area, will support the requirement for a sizeable increase in retail floorspace to meet the needs of the community.

The accessibility of convenience retail, including food retail, and food & beverage floorspace is below the average for the inner suburbs of Perth. With future growth in market demand there will be increasing need for more floorspace to better meet the shopping and services requirements of residents living in Dianella's catchment.

The Dianella Centre is capturing lower than benchmark market shares for a District Centre anchored by supermarkets and other convenience retail. There is market capacity for an increase in floorspace and improved offer that enables the Dianella Centre to function as per its intended role as a District Centre.

The 630 residential apartments proposed in the Precinct Structure Plan, will generate demand for additional retail floorspace within the Dianella Activity Centre, particularly for food & groceries stores, food & beverages, general retail and services.

Future Growth in Retail Demand

Within the catchment of Dianella there has been only modest development of new retail floorspace over the last 10 years. Over this period, the increase in retail shops and services has not kept pace with growth in retail demand.

Over the next 10 years to 2036, trade area retail spending is forecast to increase by 25% or \$351 million. Allowing for 15% of future retail demand to be captured by online retailing, the additional \$298 million in retail spending by trade area residents could generate demand for an additional 29,000–32,000 sq.m of retail floorspace.

With convenience and food catering (F&B) spending accounting for a majority share of future real growth in retail spending (62%), a large share of the future demand by trade area residents should be provided locally.

There is also latent demand that needs to be addressed due to lack of new retail supply added in the Dianella catchment in the previous 10+ years.

Overall, there is sizeable underlying demand for new retail floorspace in the Dianella trade area. The Dianella Centre PSP would contribute to providing the range of retail shops and services needed by residents in the area.

Growth in Retail Demand, 2026 to 2036

	Total Market (\$2026M)		Total Growth (2026–2036)	
	2026	2036	\$2026M	%
Convenience	729	856	+126	+17%
Food Catering	319	410	+91	+28%
Discretionary	360	494	+134	+37%
Total Retail	1,409	1,760	+351	+25%

*Note: Spending expressed in constant \$2026, including GST.
Source: Commbank iQ; Urbis*

Convenience Retail and Food & Beverage (Food Catering) Supply and Accessibility

The figures to the right outline the average amount of everyday / convenience retail and food & beverage floorspace accessible by residents of the Dianella Trade Area within a 3 km radius of a household.

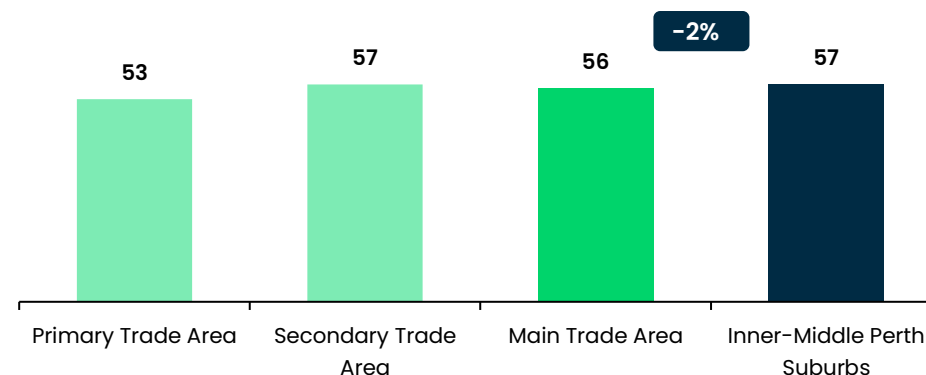
These are the core categories of retail shops and services that are provided in neighbourhood-based centres similar to the role of the Dianella Centre. This includes supermarkets, other food & groceries, liquor stores, general retail and services as well as cafes, restaurants and take-away food shops.

This analysis shows the following:

- Residents of the trade area currently have access to a similar provision of everyday / convenience retail floorspace, i.e. about 56 sq.m per 100 residents, to that of residents generally across the inner suburbs of Perth. With future population growth, including the residents of the proposed additional residential development on the Dianella Centre site, there will be a need for a greater supply of convenience-based retail shops and services to adequately serve the needs of these residents as well as the broader trade area population.
- Access to food catering floorspace is materially lower indicating a significant existing market gap for additional food & beverage floorspace in the area, which can be addressed by the proposed improvements to the Dianella Centre as well as other activity centres in the region. Recognising food & beverages is one of the fastest growth spending categories for consumers and future population growth, the market gap will increase.

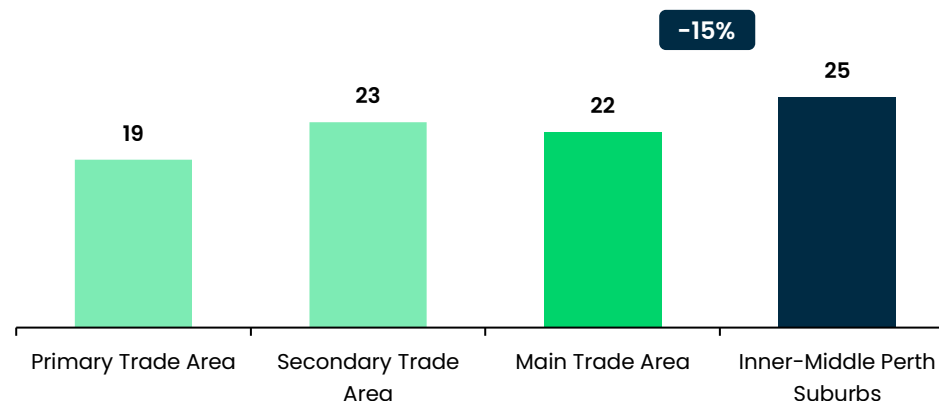
In addition, with convenience / services and food catering shops less exposed to online impacts, the need for floorspace relative to population growth is greater among these categories.

Everyday/Convenience Retail Floorspace Accessibility (Floorspace Per Capita within 3 km)



Source: LUES; Urbis

Food & Beverage (Food Catering) Floorspace Accessibility (Floorspace Per Capita within 3 km)



Source: LUES; Urbis

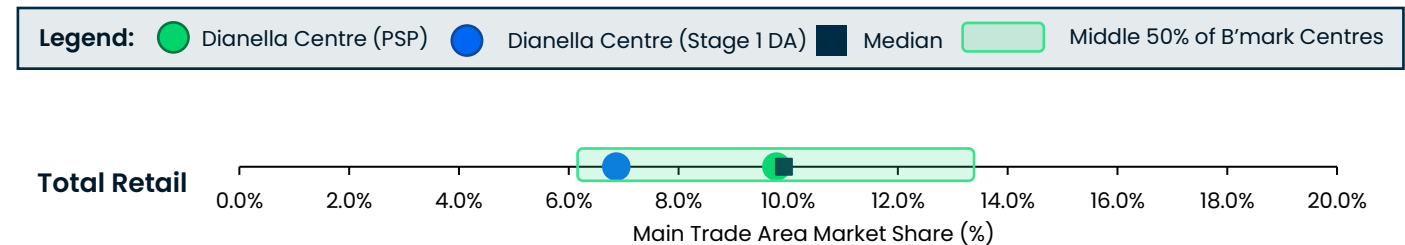
Dianella is Achieving Below Benchmark Market Shares

The Dianella Activity Centre is capturing lower than benchmark market shares for a District Centre anchored by supermarkets and other convenience retail. There is market capacity for the centre to provide an increase in floorspace and better position the centre in terms of its intended role to meet the retail needs of its catchment.

The Precinct Structure Plan development are expected to result in the Dianella Centre's trade area market shares increasing to around 9.8%, slightly above the median for benchmark supermarket anchored centres.

The provision of retail floorspace proposed for the Dianella Centre PSP would therefore capture an appropriate share of trade area spending that is consistent with the centre's role as a District Centre.

Dianella Centre Main Trade Area Retail Market Shares vs Benchmark Centres



Source: Urbis

On-Site High Density Residential and Ancillary Uses to Provide Spending Demand for Dianella

The proposed 630 apartments (approximate) are likely to generate an annual ongoing additional \$7 million (\$2026) in turnover for the retail shops and services in the Dianella Activity Centre.

The benefit to retail activity at the Dianella Centre will likely be higher when factoring in spending by friends and relatives who visit residents living in the on-site apartments.

Retail Demand Generated by On-Site Residents

		On-Site Residents Retail Spend at Dianella Centre	
		By 2030	At Completion of Residential Towers
New Apartments	No.	130	630
New Residents	No.	260	1,260
New Resident PLUC5 Retail Spend	\$2026M	5.0	24.1
Market Share Directed to Dianella	%	28%	28%
Retail Turnover Uplift	\$2026M	1.4	6.7

Source: CommBank iQ, Urbis



4

Retail Net Benefit Test

Introduction and Net Benefit Test Guidelines

A Net Benefit Test (NBT) has been undertaken for the proposed expansion of the retail shops and services within the Dianella Centre. The NBT is based on the full delivery of retail (PLUC 5) shops and service proposed by the Precinct Structure Plan less the retail floorspace already provided up to the Stage 1 (Coles relocation) development.

The Precinct Structure Plan is proposed to provide the Dianella Activity Centre with 29,940 sq.m of leasable floorspace, including 20,400 sq.m of PLUC 5 shop floorspace. Relative to the Stage 1 Coles Relocation DA the additional leasable floorspace is 13,000 sq.m, including an assumed 6,230 sq.m of PLUC 5 shop floorspace, consisting of:

- A net increase of 1,420 sq.m of supermarket / grocer floorspace.
- 4,810 sq.m of net additional mini-major and specialty shop floorspace.
- A 'main street' retail and commercial precinct along Lowick Street that will be centred around a dining offer amongst other uses. The PLUC 5 floorspace of the precinct is included in the figures quoted for the mini-majors/ specialty shops.

In addition to the additional PLUC 5 floorspace, the PSP also includes non-retail services (e.g. banks, post office, etc.) as well as ancillary uses / services, including a childcare centre, additional floorspace for gyms/fitness clubs and medical and allied health uses and professional suites / commercial floorspace. These uses are included in the estimates of the economic benefits that would be derived from the improvements to the Dianella Centre as per the PSP.

The assessment of trading impacts from the proposed shop/retail floorspace are undertaken for financial year 2030, the assumed opening year of the Dianella Centre with the Precinct Structure Plan. At this time, It is assumed that 130 of the proposed ~630 apartments(approximate) will be developed.

As a result, the assessed trading impacts will be slightly higher than would eventually occur, recognising the full benefit of the demand generated from the approximate 630 apartments, in terms of offsetting impacts, would not yet be fully realised.

As per the guidelines set out in State Planning Policy 4.2, the Net Benefit Test is required to assess:

- *The potential impacts and benefits to the community from the proposed retail development within the Dianella Activity Centre on existing and planned activity centres in the locality. This considers:*
 - *The supportable retail / commercial floorspace for an appropriate service population.*
 - *The implications for and optimal use of public and private infrastructure and services provided or planned in the locality.*
 - *The overall costs and benefits of the proposal to the community, considering the objectives, outcomes and measures of SPP 4.2.*
- *The potential loss and/or gain of services and any associated detriment / benefit to the community caused by the proposed retail development.*

The assessment considers impacts and benefits in relation to all activity centres that may be affected by the proposed retail development, including all relevant activity centres in terms of the type of retail offer that will be provided in and relative proximity to the subject retail development.

In this regard, the impacts are assessed for activity centres located within about 5 km from the Dianella Activity Centre site. This area includes a mix of Strategic Metropolitan, Secondary, District, Neighbourhood and local scale activity centres. The District centres would be the most competitive with the offer proposed in the Dianella Activity Centre Precinct Structure Plan. Dianella would also be competitive to some, but lesser degree, with the higher order and smaller local activity centres in the region.

Net Benefit Test Approach & Methodology

Trading impacts are an integral component of a Net Benefit Test to assess the sustainability of a centres hierarchy. Trading impact assessments help to explore whether the potential benefit to the local community through the increase in retail floorspace from the proposed development, is greater than the potential impact of additional floorspace on the long-term sustainability of other existing and planned centres in the hierarchy.

Trading impact assessments involve the development of base case forecast turnover levels (i.e. forecast turnover for existing and future developments under the scenario that the proposed development is not operating). These forecasts are then compared against a 'development scenario' (i.e. forecast turnover for existing and future developments under the scenario that the proposed development is operating). The development scenario is compared to the base case scenario to estimate the potential change to turnover levels if the proposed development is approved.

An impact assessment is expected to provide an indication of the trading environment and average trading conditions within which retailers operate, and implications for likely turnover declines or gains on average for the retailers involved. Given an impact assessment estimates how groups of people are likely to alter their shopping behaviour in response to a given change in the competitive environment, it is not possible to estimate individual retailer impacts in each location.

The impact on any one individual retailer or any small group of retailers in a given location would depend on many factors (e.g. retailer profitability, the type of merchandise offer, etc.), some of which are within their control. The actions taken by retailers will determine the eventual impact on each, and furthermore, the actions they take will determine the eventual impact on the other retailers involved.

All these factors need to be kept in mind when considering the likely impact of any relocation and expansion of a retailer within the existing retail network. Existing retailers are not passive participants but rather play a major role in the eventual impact which they will experience.

Shopper behaviour is influenced by a range of factors. Decisions regarding where to shop are based on several judgments including, relative accessibility, availability of particular retailers, convenience, variety, car parking, and others. As a result, residents like to spread their purchases across a wide variety of shopping centres and areas and use the full range of facilities available to satisfy their needs.

The method of analysis used to assess the impacts on individual centres from a retail development is based on a 'competitive usage' model. This model is based on the principle that if shoppers choose to direct some of their retail expenditure to the subject development proposal, then they will reduce their expenditure at other centres in a similar proportion to their usage of

each centre or location (reflected by each centre's market share from the various trade area sectors). In assessing the potential impacts on other centres in the hierarchy we have adopted a 'turnover allocation approach'.

The assessment of impacts on specific retail centres requires an estimate of the existing turnover and level of usage of centres in the trade area and beyond. The model estimates the degree to which various shopping locations within and beyond the trade area are used for retail shopping, by allocating a proportion of turnover to each trade area sector (i.e. source of sales). These estimates result in market share calculations for each competitive centre, and thereby form the basis on which the impact of the proposed retail development is distributed to all other centres used by residents of the trade area for retail shopping. This is commonly referred to as the 'one-off' impact.

It is also relevant to consider the dollar impacts in relation to the turnover that would potentially be generated by these and other shopping centres over the intervening period. The impact analysis, therefore, details the turnover change, or net impact, which is expected for each centre/location, expressed as a reduction in turnover and as a percentage of the turnover level for each centre.

Dianella Centre PSP – Retail Turnover Potential

In estimating the potential retail turnover of the ultimate development proposed by the Dianella Centre PSP, Urbis has considered the size of the market, the centre hierarchy in the region and the performance of comparable supermarket anchored centres.

In total, PLUC5 retail turnover for the centre is estimated at \$200 million (\$2026, incl. GST) for the first year of trading with the improvements (i.e. FY 2030).

Across the trade area, the Dianella Centre is estimated to capture around a 10% share of resident retail spending, including 21% in the primary trade area and ~6% in the secondary trade area. A further 25% of turnover is estimated to be sourced from beyond the trade area.

Dianella Centre PSP – Potential Retail Turnover (\$M), FY 2030

	Turnover Potential – Dianella Centre PSP		
	GLA	Turnover (\$M)	Turnover (\$psm)
Food	13,750	156	11,370
Non-Food	6,690	44	6,510
Total Retail	20,440	200	9,780

*Note: Turnover expressed in constant \$2026, including GST.
Source: Urbis*

Dianella Centre PSP – Retail Market Shares by Trade Area, FY 2030

	Market Share Potential – Dianella Centre PSP			
	Food	Non-Food	Total Retail	% of MAT
Primary Trade Area	28.3%	10.9%	21.0%	43%
Secondary Trade Area	7.7%	3.0%	5.7%	32%
Main Trade Area	13.2%	5.1%	9.8%	75%
% of Trade from Beyond				25%
Total Turnover (\$M)	156	44	200	

*Note: Turnover expressed in constant \$2026, including GST.
Source: Urbis*

Dianella Centre PSP – Incremental Retail Turnover and Market Shares

The potential trading impacts from the increase in PLUC 5 retail shops and services proposed with the Dianella Centre PSP is assessed in terms of the net additional turnover and market share captured by the centre. That is, the increases relative to market share and turnover achieved with the Stage 1 Coles DA which has been lodged.

Retail turnover is estimated to increase by \$60 million (\$2026, incl. GST), including an additional \$38 million in food turnover and \$22 million in non-food turnover.

The resulting increase in market share is as follows:

- +5.3% points from the primary trade area
- +2.0% points from the secondary trade area
- +2.9% points across the main trade area

Incremental Floorspace and Retail Turnover Dianella PSP vs Stage 1 Coles Relocation DA, FY2030

	Change Dianella PSP vs Stage 1 Coles DA		
	Food	Non-Food	Total Retail
Floorspace & Turnover Change:			
GLA (sq.m)	+3,590	+2,640	+6,230
Retail Turnover (\$2026M)	+37.5	+22.0	+59.5
Market Share Change:			
Primary Trade Area	+5.4% pts	+5.2% pts	+5.3% pts
Secondary Trade Area	+2.3% pts	+1.6% pts	+2.0% pts
Main Trade Area	+3.2% pts	+2.6% pts	+2.9% pts

Source: Urbis

Dianella Centre PSP – Retail Turnover Impacts

With any development there will inevitably be trading impacts on other activity centres. The important consideration however is the extent to which these impacts influence the longer-term sustainability of the retail network.

The table to the right shows the following:

- The estimated one-off trading impacts from the proposed expansion of PLUC5 (shop) floorspace on retail turnover at other activity centres is expected to be within 0.5% to 3.8%. These levels of impact would not be detrimental to the sustainability of any individual activity centre.
- More importantly, due to future growth in the market virtually all centres are expected to achieve a (real) turnover higher than achieved in 2026. That is, they will be in a stronger trading position despite the proposed expansion of the Dianella Centre.
- Several centres are estimated to have a retail turnover marginally lower in 2030 relative to 2026 (i.e. -0.1% to -0.2%) as a result of the expansion to the Dianella Centre. This level of turnover decline is negligible and would not materially impact the sustainability of each centre and provision of shops and services in these centres.
- Furthermore, it's important to also note that the impacts are not concentrated on just a few centres given the established metropolitan location of the Dianella catchment and that the modest impacts are sustainable in the context of a healthy retail environment recognising the low vacancy levels in the region.

Estimated Retail Turnover Impacts – Dianella Centre PSP

	Retail Turnover (\$2026M)			Impact		Turnover Change Between 2026 and 2030	
	Current (2026)	Before Impact (2030)	After Impact (2030)	\$M	(%)	\$M	Annual Average Growth
Strategic Metropolitan Centres:							
Morley	733	786	777	-9.6	-1.2%	+43.7	+1.5%
Stirling	452	479	477	-1.5	-0.3%	+25.6	+1.4%
Secondary Centres:							
Mirrabooka	338	358	352	-5.4	-1.5%	+14.7	+1.1%
District Centres:							
Dog Swamp (Yokine)	146	151	146	-5.4	-3.6%	-0.2	-0.0%
Inglewood	225	237	229	-7.4	-3.1%	+3.9	+0.4%
Noranda	106	109	105	-4.1	-3.8%	-0.9	-0.2%
Fitzgerald Street (North Perth)	156	165	163	-2.1	-1.3%	+6.7	+1.1%
Balcatta (Northlands)	91	95	94	-1.0	-1.0%	+2.7	+0.7%
Mount Hawthorn	141	150	149	-1.0	-0.7%	+7.6	+1.3%
Main Street (Osborne Park)	78	82	82	-0.4	-0.5%	+3.2	+1.0%
Mount Lawley	96	104	103	-1.0	-1.0%	+6.9	+1.8%
Stirling Central (Westminster)	110	114	114	-0.6	-0.5%	+3.6	+0.8%
Local Centres:							
Bedford	14	15	14	-0.5	-3.5%	+0.4	+0.8%
Noranda (IGA)	13	14	14	-0.4	-3.0%	+0.1	+0.3%
Yokine (Flinders Street)	11	11	11	-0.4	-3.3%	-0.1	-0.1%
Nollamara	47	49	48	-0.8	-1.6%	+1.5	+0.8%
Balcatta (Roselea)	60	63	62	-0.7	-1.1%	+1.5	+0.6%

* Morley turnover includes an estimate for the potential turnover of the Galleria centre with its redevelopment (that is to be completed in 2026). Galleria's turnover is estimated by applying the average turnover productivity for a regional shopping centre as per the Urbis Shopping Centre Benchmarks
Source: Urbis

Dianella Centre PSP – Economic and Community Benefits

The Dianella Centre PSP is expected to deliver a range of positive impacts for the community.

Net Community Benefits

Benefit	Assessment Findings
Increased Consumer Choice	▪ The proposed expansion of the range of retail shops and services will provide the community better access to essential day-to-day shopping and services needs and where these activities can be undertaken in one location. ▪ The retail shops will also provide increased choice and price competition for the local community..
Increased Employment Opportunities	▪ The construction and ongoing operation of the new retail shops and services will generate additional employment opportunities for the local and wider communities. ▪ Retail shops are an important employer for young workers and people looking to re-enter the workforce. With the PSP and area generally expected to attract younger single/couple households and families (with children that will mature to working age) the retail shops are well aligned with the future demographics of the area.
Enhanced Access and Low Trading Impacts	▪ Given the scale of new retail shops proposed within the Dianella, the trading impacts on other activity centres in the region of relevance is expected to be low. The level of impacts would not result in any loss of shops and services and the PSP would materially increase services provided to the community.
Community Engagement	▪ The Dianella PSP proposes to established the activity centre as a genuine multi-use destination that incorporates key services required by the community and provides a larger on-site resident and worker populations that will add to the overall vitality of the centre. The proposed evolution of the centre will create a stronger focal point for the community which will positively impact engagement with the centre.

Dianella Centre PSP – Construction Phase Benefits

The total construction cost associated with the improvements proposed with the Dianella Centre PSP is \$300 million (excluding GST). Construction has an expected duration of 2 years, if the full range of development proposed in the Dianella PSP is completed in one period.

Construction of the Dianella Centre redevelopment will generate economic activity across the construction sector and supply chain, supporting around 220 direct and 240 indirect full-time equivalent (FTE) jobs per annum over the assumed 2-year construction period.

Over the course of construction direct and indirect Gross Value Added (GVA) to the Western Australian economy is estimated at approximately \$83 million per annum.

Annual Average Economic Benefits From Construction Phase



Construction – related jobs

550 total FTE jobs p.a.



220

Direct FTE jobs



240

Indirect FTE jobs



Gross value added to the State economy

\$83 million total GVA p.a.



\$43 million

Direct GVA p.a.



\$40 million

Indirect GVA p.a.

**Note: FTE = Full-Time Equivalent Jobs; GVA = Gross Value Added, Indirect benefits refer to Supply Chain effects but not Consumption Effects. A full description of the methodology and key assumptions are included in Appendix A.*

Source: REMPLAN; Urbis

Dianella Centre PSP – Operational Phase Benefits

The number of direct jobs associated with the proposed redevelopment has been estimated using industry benchmarks, the Land Use and Employment Survey (LUES), and Urbis' experience with staffing requirements across different land uses.

The ongoing operation of the expanded range of uses provided in the Dianella Centre is expected to support an additional 480 full-time equivalent (FTE) roles in Retail Trade, Professional Services, Early Childhood Education, Health Care Services, and Sports & Recreation industries.

The 480 direct jobs are projected to generate a further 110 indirect jobs across Western Australia as a result of flow-on effects.

The ongoing operation and management of the Dianella Centre is estimated to contribute an additional \$72 million per annum in direct and indirect gross value added (GVA) to the Western Australian economy on an ongoing basis.

Annual Average Ongoing Economic Benefits From Operational Phase



Jobs owing to operations

590 total FTE jobs



480

Direct FTE jobs



110

Indirect FTE jobs



Gross value added to the State economy

\$72 million total GVA p.a.



\$54 million

Direct GVA p.a.



\$18 million

Indirect GVA p.a.

**Note: FTE = Full-Time Equivalent Jobs; GVA = Gross Value Added, Indirect benefits refer to Supply Chain effects but not Consumption Effects. A full description of the methodology and key assumptions are included in Appendix A.*

Source: REMPLAN; Urbis



5

Residential Need Assessment

Resident Demographics & Housing Mix

The proposed residential offering within the Dianella Activity Centre PSP presents an opportunity to increase housing diversity in the City of Stirling LGA in line with the area's demographic profile.

The City of Stirling has been used throughout this residential need assessment as a proxy for the Dianella Centre's potential apartment demand base and to assess progress toward the municipality's 2050 housing target.

Stirling's residents demonstrate a relatively high propensity for medium- and high-density living, with townhouses and apartments accounting for 35% of the dwelling stock. At the same time, the LGA's housing mix reflects the historical predominance of detached dwellings, with only one-quarter of homes comprising two bedrooms or fewer.

The City of Stirling's higher proportion of single and couple households relative to the Perth average indicates capacity for increased delivery of smaller dwelling types. As infill opportunities become more constrained, apartment development is expected to accommodate a growing share of residents.

Large-scale, retail-led redevelopments such as Karrinyup's West Village demonstrate the role these sites can play in contributing to Stirling's dwelling targets, positioning the Dianella Centre as a comparable opportunity to deliver well-located, higher-density housing.

Resident Demographic Profile, 2021

	City of Stirling LGA	Greater Perth
Avg. Household Income	\$126,400	\$125,900
\$104,000+ (personal income)	45%	47%
Living in Separate Houses	66%	84%
Living in Townhouses	27%	11%
Living in Apartments	8%	5%
Family with children	38%	44%
Family with no children	27%	28%
Lone Persons	31%	25%
Group	4%	4%
Studios	0%	0%
One-bed	5%	4%
Two-bed	20%	13%
Three-bed	46%	37%
Four-Bed+	28%	46%
Average Age	39.6	38.4

*Note: Family characteristics refer to dwellings.
Source: ABS Census 2021*

Residential Development Pipeline and Needs Analysis

The City of Stirling's current apartment supply pipeline is materially below the level required to meet its long-term dwelling targets, indicating a growing need for additional higher-density development.

Using the share of apartments in new dwelling approvals between 2021 and 2025 as a baseline, Stirling's pipeline of approximately 1,820 apartments would account for less than half of the requirement to meet the Council's dwelling targets.

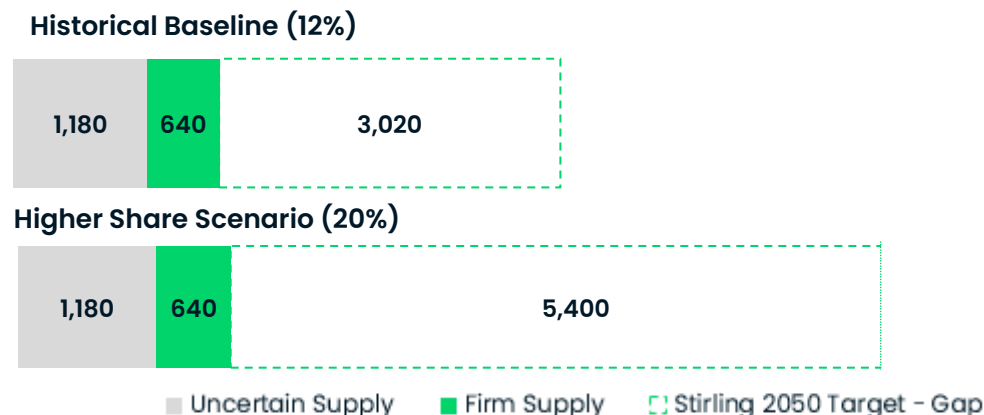
This assumption is conservative, as apartments are expected to comprise a greater share of new supply as infill land becomes increasingly constrained.

On the basis apartments account for 20% of the new dwelling stock added to the market in the City of Stirling there would be a requirement for an additional ~7,500 apartments over the period to 2050.

The scale of the future requirement for apartments in the City of Stirling reinforces the role of well-located redevelopment opportunities, such as the Dianella Centre, in contributing to future housing delivery and meeting the needs of the growing population.

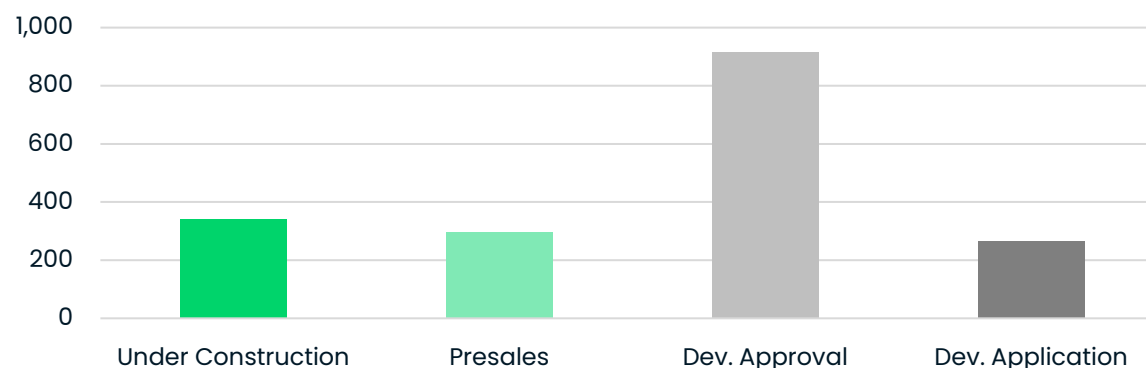
The 630 apartments proposed in the Dianella PSP would account for 20% of additional demand for apartments under the Baseline scenario and a lower 12% under the Higher Share scenario.

City of Stirling Apartment Supply Gap Propensity Testing (2026 to 2050)



Note: Historical baseline reflects proportion of new dwelling approvals made up of apartments in the five years to December 2025. Apartment supply gap is calculated by applying this proportion to Stirling's 2050 overall dwelling target.
Source: Urbis Apartment Essentials, WA Government

Future Apartment Completions by Development Stage – City of Stirling



Source: Urbis Apartment Essentials



6

Ancillary Uses Need Assessment

Non-Retail Use Need Summary

There is demonstrated demand for the ancillary uses proposed as part of the Dianella Centre Precinct Structure Plan.

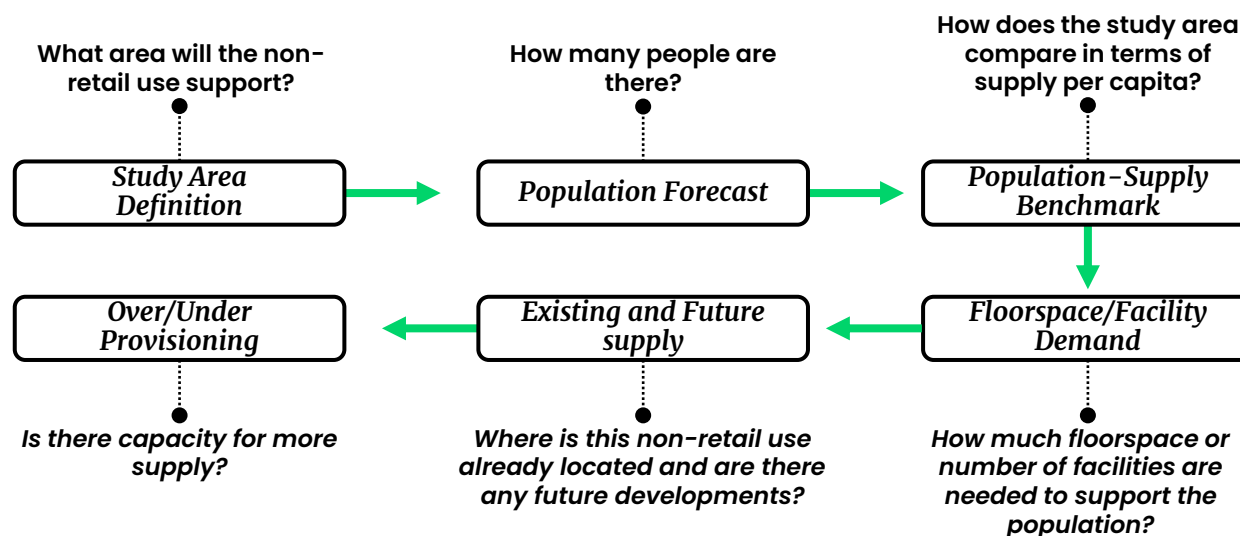
A range of assessment methodologies was applied, tailored to each ancillary use, to evaluate potential supply gaps and opportunity for the Dianella Centre to address these gaps.

Analysis of gym and childcare uses identified a measurable gap between supply and demand within the study area, with existing provision below benchmark rates for Perth's inner to middle-ring suburbs. In addition, demand generated on site following completion of the residential component of the PSP is expected to further support the need for these uses.

Access to medical and health facilities (excluding hospitals) for residents within the study area is currently well below the Inner-Middle Perth average, indicating a clear and material gap in the provision of medical uses. This analysis also demonstrates capacity for additional medical & allied health facilities to be supported within the area.

The proposed provision of commercial office / professional suite space in the Dianella Centre PSP aligns with the amount of such space at other nearby district centres.

Demand Assessment – General Methodology



Demand Assessment – High-Level Summary

Ancillary Use	Market Demand
Medical & Allied Health	Market under-supplied with medical and health care centres, particularly within 2 km of the Dianella Centre
Gym & Fitness Centre	Current supply per capita is similar to the Inner Perth average. Capacity to increase with future growth of the market.
Childcare	The supply of childcare centres is below benchmarks in the Dianella catchment. There is market capacity for additional childcare centres in addition to proposed new facilities.
Professional Suites & Office	Underlying demand for significantly more professional suites floorspace at the Dianella Centre to accommodate business serving the existing and growing population base.

Source: urbis

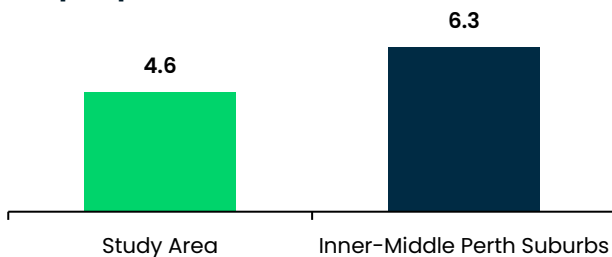
Childcare Supply

There are currently a range of childcare centres provided throughout the study area of the Dianella Centre. However, there are notable gaps in Dianella and the Noranda areas.

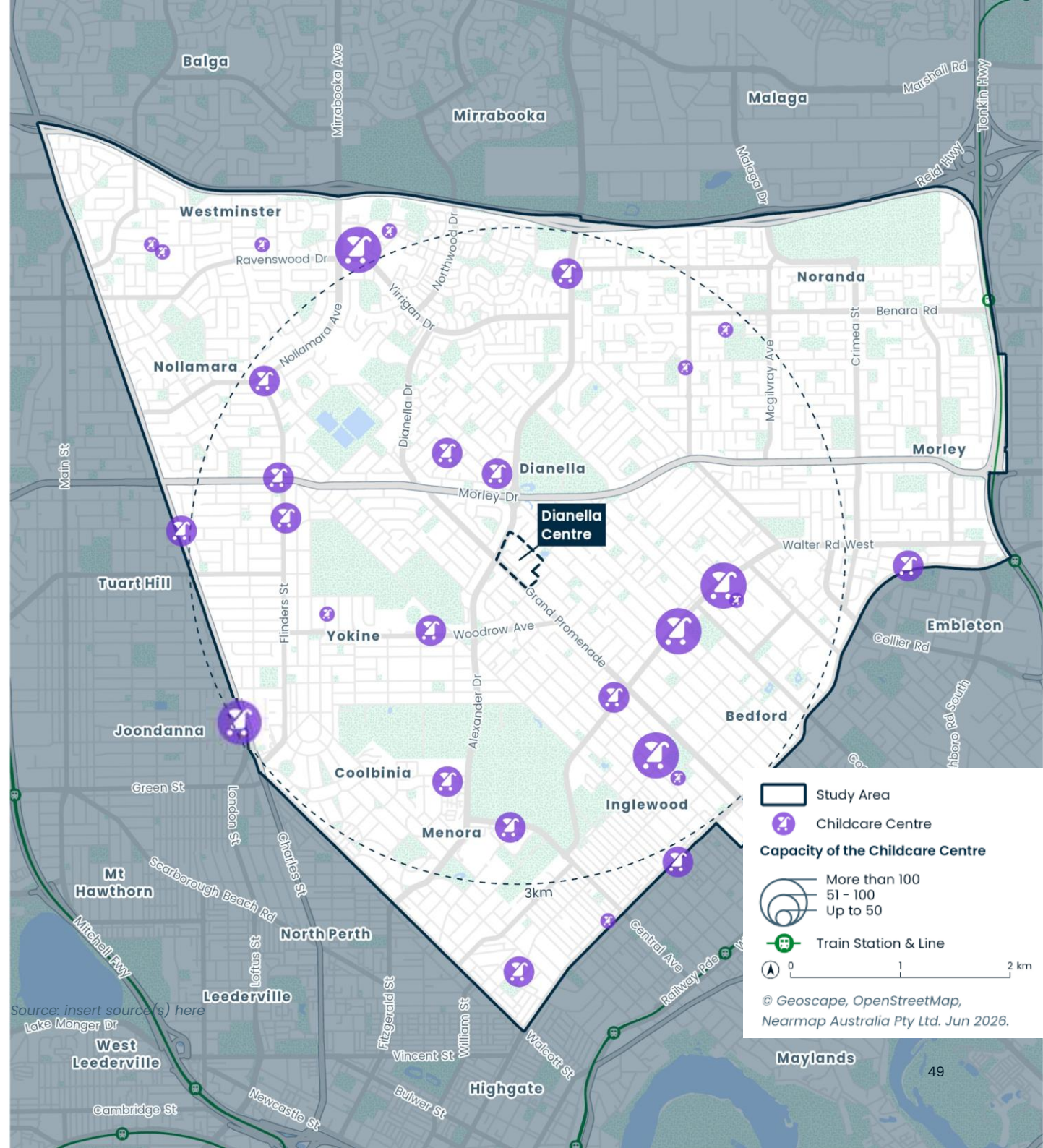
On average, residents within the study area have access to 27% less childcare floorspace than residents of Inner-Middle Perth suburbs, when weighted by population density. This difference indicates that existing childcare provision in the study area is comparatively lower than established benchmark levels. As a result, the analysis indicates that there is capacity for additional childcare centres to be supported within the area.

With the study area undergoing a process of regeneration, the demand for childcare places would be expected to progressively increase (particularly on a per capita basis).

Childcare Accessibility within 3km (sq.m per 100 residents)



Source: LUES, ABS; Urbis



Childcare Demand

There is currently unmet demand for an estimated at around 270 childcare places within the study area. Despite planned new supply, the forecast growth in 0–4 year old population is expected to maintain a shortfall in childcare places of around 150 by 2030 and 540 by 2036.

Population growth across the broader study area is expected to increase the demand–supply gap from approximately 270 to around 460 places by 2030. This demand assumes a continuing increase in the share of 0–4 year children in the study area attending a childcare centre.

With around 390 long day care places identified within the current development pipeline and a target occupancy of 80% this would reduce the projected demand to around 150 additional places. It is noted that not all pipeline supply is confirmed, and as such, the extent of unmet demand may be understated if some of this provision does not proceed.

The demand for childcare places would continue to increase with population growth and regeneration of households in the area. By 2036, the shortfall in childcare places is estimated to increase to around 540.

The Dianella Centre PSP would address the anticipated shortfall in childcare places in the catchment.

Childcare Demand Assessment – Study Area

	Study Area Childcare Demand		
	2026	2030	2036
Total Population	111,130	115,980	123,760
Forecast Population Aged 0–4 Years	6,110	6,380	6,810
Propensity of Attending LDC	43%	46%	49%
Population Aged 0–4 Years Attending LDC (43%)	2,650	2,940	3,360
Children Per LDC Place	1.5	1.5	1.5
Total Demand for LDC Places	1,770	1,960	2,240
Existing/ Future Supply of LDC Places	1,874	2,267	2,267
Sustainable Occupancy	80%	80%	75%
Existing/ Future Supply of LDC Places (Adj. for Target Occupancy)	1,499	1,814	1,700
Surplus (+) / Deficit (-) Supply of LDC Places	-271	-146	-540

*Note: Analysis excludes proposed Childcare Centre at Dianella Centre
Source: Cordell; Department of Education; Urbis*

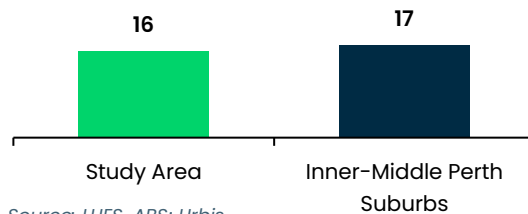
Gym / Fitness Centre Supply

There are currently around 25 gym and fitness facilities within the study area, offering a diverse range of services. These include yoga and Pilates studios, personal training gyms, and conventional gym / fitness club facilities.

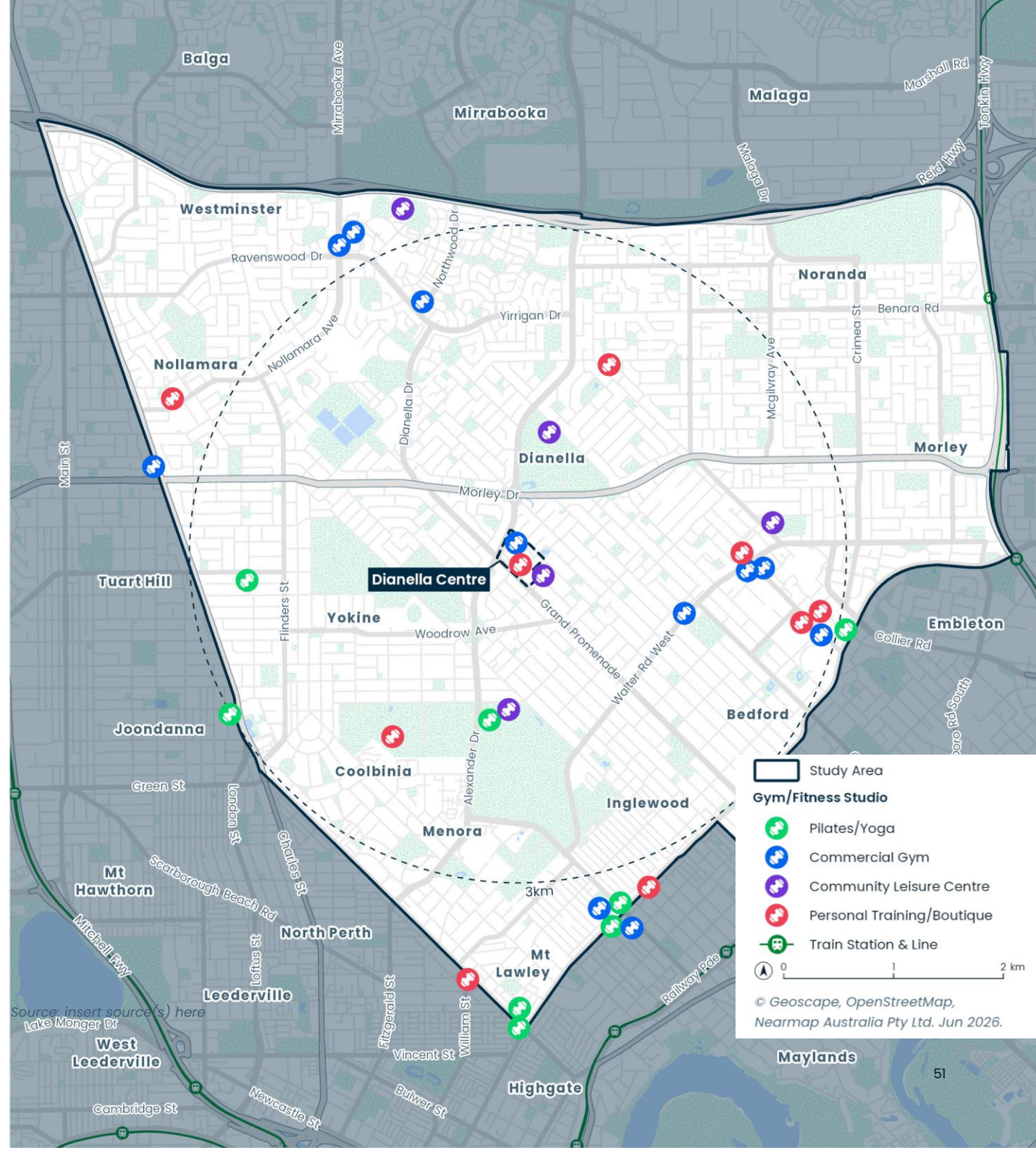
On average, residents within the study area have access to 2 per cent less gym and fitness centre floorspace than residents of Inner-Middle Perth suburbs, when weighted by population density. While this suggests a slightly lower level of access relative to the benchmark, the difference is not considered material.

Areas can support a higher than average supply of gyms and fitness clubs and the future growth in the resident population and the broader trend towards increased participation in wellness and fitness activities will drive demand for more of these facilities to meet the needs of the community.

Gym / Fitness Centre Accessibility within 3km (sq.m per 100 residents)



Source: LUES, ABS; Urbis



Gym / Fitness Centre Demand

By 2030, the study area is expected to have capacity to accommodate approximately 900 additional gym and fitness memberships. This level of capacity would be sufficient to support at least one large-format commercial gym and one smaller fitness, yoga and Pilates studios.

The demand for gyms and fitness clubs is expected to increase beyond 2030 and potentially reach over 2,000 memberships by 2036.

Excluding the Dianella Centre, there is no known additional supply of gym or fitness facilities within the current development pipeline (e.g. not confirmed or not specifically indicated within development proposals).

Residents that will be living the approximate 630 apartments proposed within the Dianella Centre PSP are expected to create demand for in excess of 200 annual memberships. Gyms / fitness studios located within the Dianella Centre would be expected capture the vast majority of this demand.

Gym / Fitness Centre Demand Assessment – Study Area

	2026	2030	2036
Gym/Fitness Centre Membership Demand:			
Study Area Population	111,130	115,980	123,760
Estimated Residents Demand (Using Propensity %)	18,970	19,800	21,130
Gym/Fitness Centre Supply:			
<i>No. of Gym Facilities</i>	25	25	25
<i>Average Memberships per Gym & Fitness</i>	700		
<i>No. of Yoga & Pilates Facilities</i>	8	8	8
<i>Average Memberships per Yoga & Pilates</i>	175		
Estimated Membership Base of Gym Facilities	17,500	17,500	17,500
Estimated Membership Base of Yoga & Pilates Facilities	1,400	1,400	1,400
Total Estimated Membership Base of Gym & Wellness Facilities	18,900	18,900	18,900
Membership Supply Gap (- undersupply)	-70	-900	-2,230

Source: Urbis

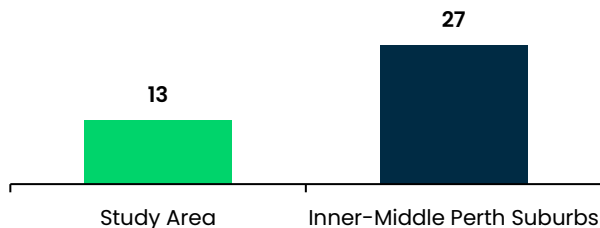
Medical Centre Supply & Demand

On a population-weighted basis, residents within the study area have almost 55% less access to medical centres and other health clinics compared with the average resident in Perth's Inner-Middle suburbs. This highlights an apparent need within the trade area for such services,

There is a clear spatial gap in the distribution of medical centres within the area, with the majority of facilities concentrated around Mirrabooka, Inglewood and along Wanneroo Road. There is currently no medical centre located within a 1 km radius of the Dianella Centre.

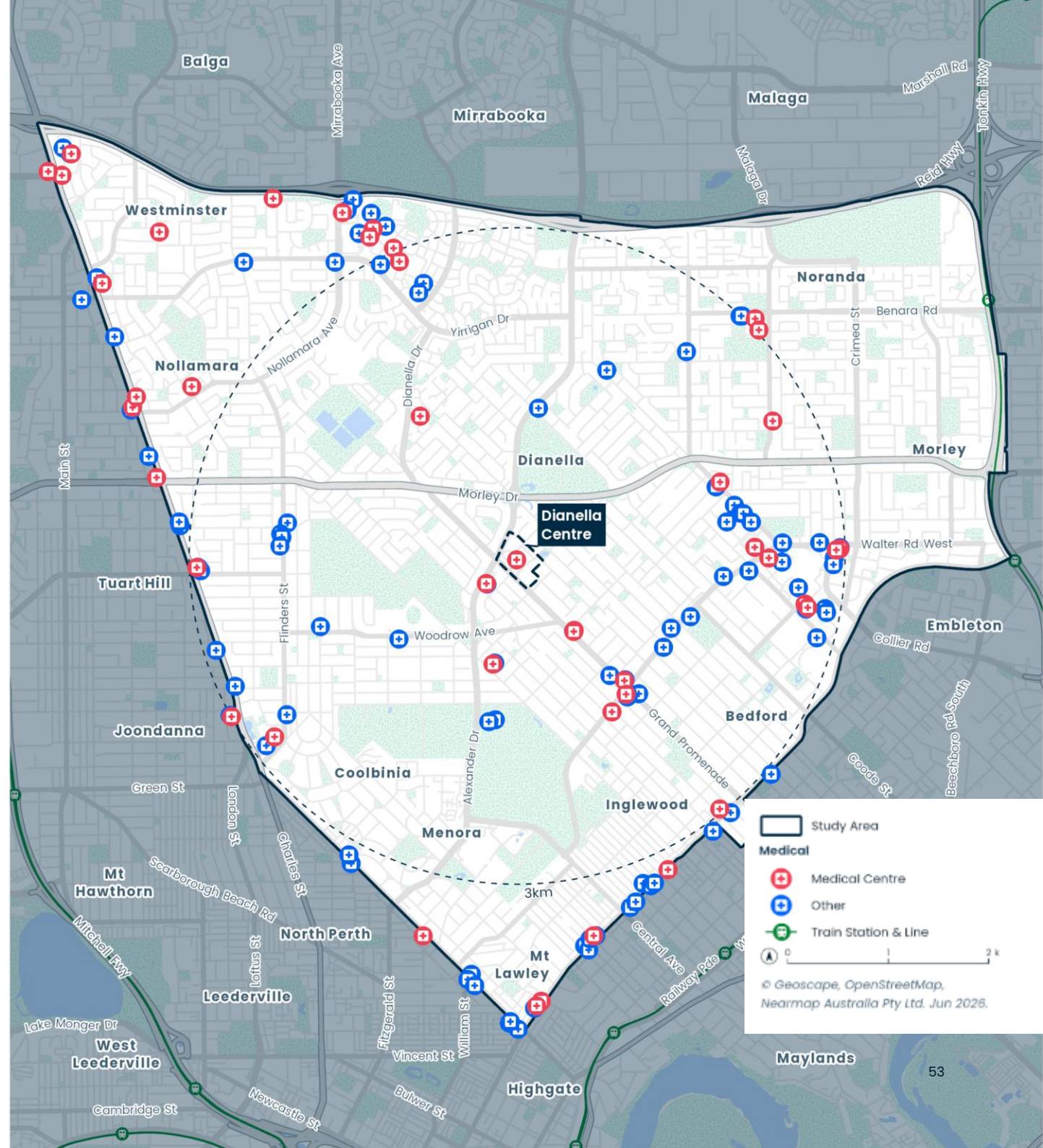
In addition, the residents of the apartment developments proposed as part of the Dianella Centre PSP will generate new demand for medical & allied health floorspace.

Medical Uses Accessibility within 3km (sq.m per 100 residents)



Note: Categories included: Community Health Centres, General Medical Practices, Other Specialist Medical Practices, Child Health Services, Other Health Services

Source: LUES, ABS; Urbis

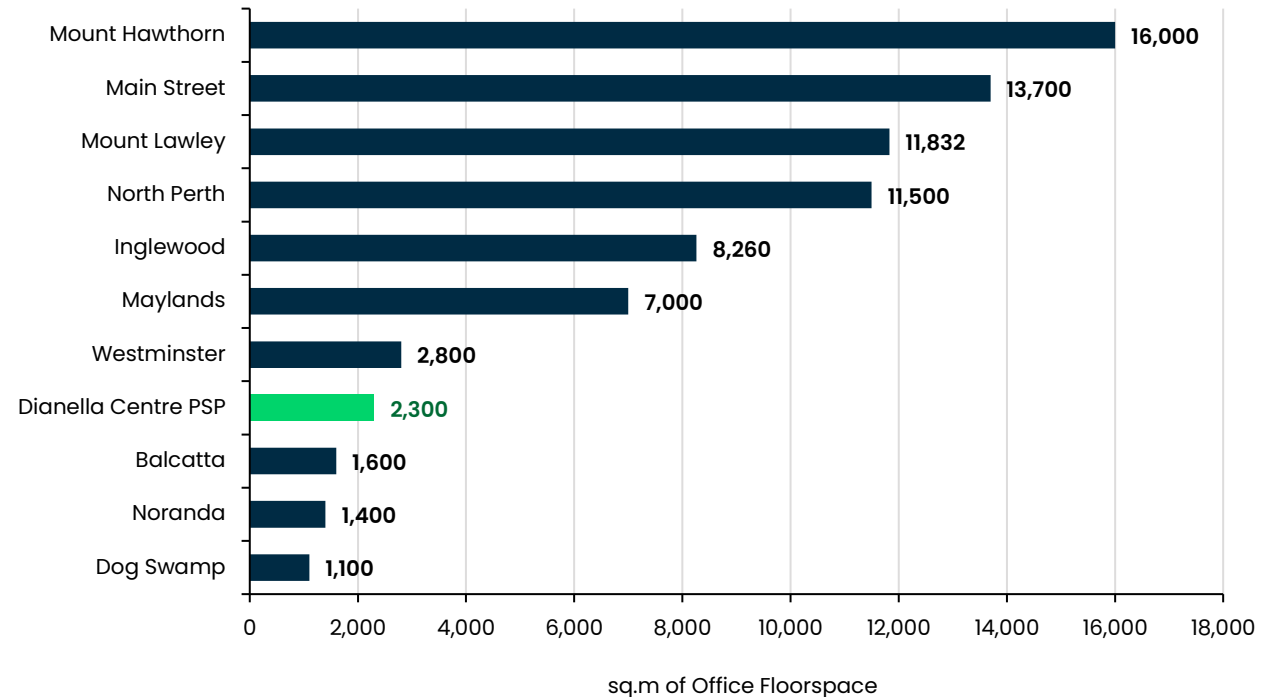


Professional Suites / Office Supply & Demand

The amount of commercial office and professional suites floorspace proposed as part of the Dianella Activity Centre PSP is generally consistent with levels of office provision observed in nearby district centres. This suggests that the proposed supply is comparable with occupied office floorspace in similar centres and is likely to be supported by market demand.

It is noted that the proposed office floorspace within the PSP is lower than that of some nearby district centres. However, these centres are typically characterised by strip retail formats and a more inner-city context, which supports higher levels of office accommodation.

Provision of Office (PLUC – OFF) by District Centre



Source: LUES; Urbis

7

Appendix

Appendix A: Methodology, definitions & assumptions

The REMPLAN Methodology

Analysis presented in the Retail Net Benefit Test section uses REMPLAN economic modelling to assess current and potential economic impacts. REMPLAN is an Input-Output that captures inter-industry relationships within an economy. It can assess the area-specific direct and flow-on implications across industry sectors in terms of employment, wages and salaries, output and value-added, allowing for analysis of impacts at the Western Australia level.

Key points regarding the workings or terminology of the model are as follows:

- REMPLAN uses either the value of investment or employment generation as the primary input. For this analysis, the value of total upfront investment has been used as the key input to assess the benefits of the construction phase.
- Outputs from the model include employment generated through the project and economic Gross Value Added (GVA) at the State level.
- Employment and GVA are presented on an annualised basis. Construction phase benefits accrue each year the project is under construction. On-going benefits accrue each year of operation.
- Employment generated is calculated on a full-time equivalent (FTE) basis over the life of the construction phase; or in terms of the ongoing operations, total ongoing jobs generated.
- Both the direct and indirect benefits are modelled for employment and value added:
 - *Direct* refers to the effect felt within the industry as a result of the investment. For example, the construction phase will directly result in the creation of construction jobs.
 - *Indirect* effects are those felt within industries that supply goods to the industries directly affected.
- It should be noted that the results presented in this report are estimates only based on the existing state of economic activity in the area. Due to the static nature of input-output modelling, they have the potential to overstate the actual effects. Nonetheless, the analysis still reflects the fact that employment growth will be positive for the State.
- Urbis consider that in the absence of the investment package it is unlikely that similar projects would be undertaken within the same period, and therefore the investments can be considered *additional*.

Definitions

Construction cost is the estimated investment value for the development over the anticipated delivery period, measured in constant 2026 dollars (i.e. excluding inflation) excluding GST.

Gross Value Added or GVA is a measure of the value of goods and services produced in an area, industry or sector of an economy during a certain period of time. In this case, GVA represents the total economic contribution of the investment (wages, gross operating profit and net taxes). GVA is measured in constant dollars (i.e. excluding inflation) excluding GST.

Full-Time Equivalent or FTE is defined as a full-time employee who works 35 hours or more in a week, or who are employed in two or more part-time jobs and in total work more than 35 hours.

Urbis staff responsible for this report were:

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Research Analyst	Hopper Fagan
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Project code	P0068016
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