AMENDMENT NO. 5

TO THE

NEERABUP INDUSTRIAL AREA

AGREED STRUCTURE PLAN NO. 17

This Amendment to the Agreed Structure Plan has been prepared under the provisions of the City of Wanneroo District Planning Scheme No. 2

RECORD OF AMENDMENTS MADE TO THE NEERABUP INDUSTRIAL AREA

AGREED STRUCTURE PLAN NO. 17

Amendment No.	Summary of the Amendment	Date approved by WAPC
2	Makes provisions for some design guidelines applicable to a portion of the Agreed Structure Plan known as Meridian Park and addition of Plan 6 to illustrate the Meridian Park area.	18.08.2008
3	Realignment of 'Road B' and intersection with Pederick Road.	12.10.2011
4	Deleting Plan 2 Neerabup Industrial Area Final Surface Contour Plan (Sept 2004) and replace with the updated Plan 2 Neerabup Industrial Area Final Surface Contour Plan (August 2015)- Drawing No.5920-00-SK128 Rev F. Plan 1 and Figure 8.1 being modified to delineate and annotate the 98ha area within the northern part of the site as 'Proposed Conservation Areas Subject to Environmental Review', so as to match the delineation and annotation on the Final Surface Contour Plan. Plan 1 and the Final Surface Contour Plan being modified to delineate and annotate the 47ha area within the south eastern part of the site as 'Reserve for Conservation'. Deleting Figure 6.1 Neerabup Industrial Area Final Surface Contour Plan (Sept 2004) and replace with the updated Figure 6.1 Neerabup Industrial Area Final Surface Contour Plan (August 2015) - Drawing No.5920-00-SK128 Rev F. Amend Part 1 – Statutory Planning Section to align with the Planning and Development (Local Planning Schemes) Regulations 2015. Part 1 following section 11.0 the following section being added: 12.0 Bushfire and include Appendix 9 – Bushfire Management Plan (Strategen, June 2017)	
5	Plan 1 and Figure 8.1 being modified to replace the 'Service Industrial' land use on Lots 1001 and 1021 Greenwich Parade with a 'Business' designation.	

AMENDMENT NO. 5 TO THE
NEERABUP INDUSTRIAL AREA AGREED STRUCTURE PLAN NO. 17

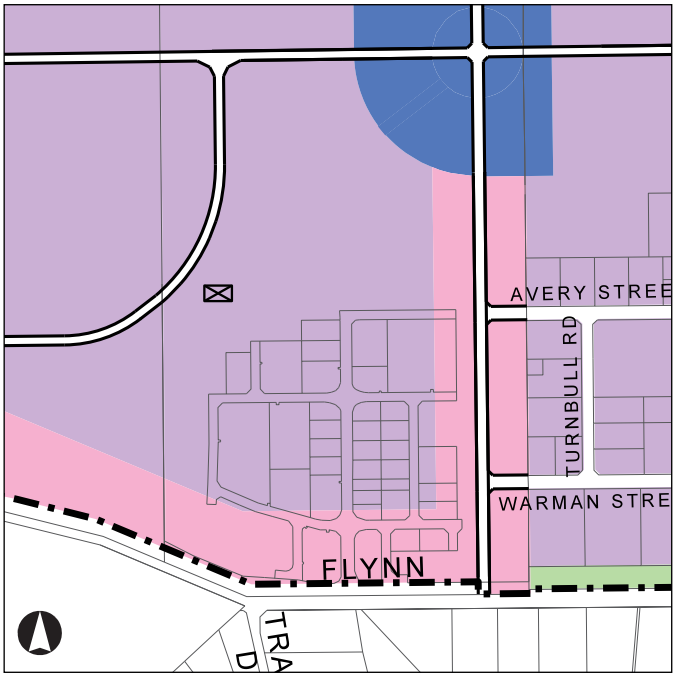
The City of Wanneroo, pursuant to its District Planning Scheme No. 2, hereby recommends to the Western Australian Planning Commission to approve the abovementioned amendment by:

1. Modifying *Plan 1 – Local Structure Plan Neerabup Industrial Area* to replace the 'Service Industrial' designation on Lots 1001 and 1021 Greenwich Parade with 'Business'.
2. Under Part 2, modifying Figure 8.1 – Local Structure Plan Neerabup Industrial Area to replace the 'Service Industrial' designation on Lots 1001 and 1021 Greenwich Parade with 'Business'.
3. Under Part 2 Clause 8.2.3 Business, deleting the words:

   'The Business Zone is located at the centre of the Structure Plan on the major north south spine road. This precinct has been identified in recognition of its strategic location at the centre of the Structure Plan area to encourage more service uses such as banks, local shop, newsagent etc to service the Industrial Estate, both businesses and employees.'

And replacing with

'The Business Zone is located at the centre of the Structure Plan on the major north south spine road and the entrance to the Stage 1 development. These precincts have been identified in recognition of their strategic location which encourages more service uses such as banks, local shop, newsagent etc to service the Industrial Estate, for both businesses and employees.'



LEGEND

- GENERAL INDUSTRIAL
- SERVICE INDUSTRIAL
- BUSINESS
- OPEN SPACE
- STRUCTURE PLAN BOUNDARY
- DISTRIBUTOR OR ARTERIAL ROADS
- MANDATORY ROAD INTERFACE TO TO OPEN SPACE
- POSSIBLE SEWER PUMP STATION SITE (NOTIONAL SIZE ONLY)
- PROPOSED CONSERVATION AREA (SUBJECT TO ENVIRONMENTAL REVIEW)

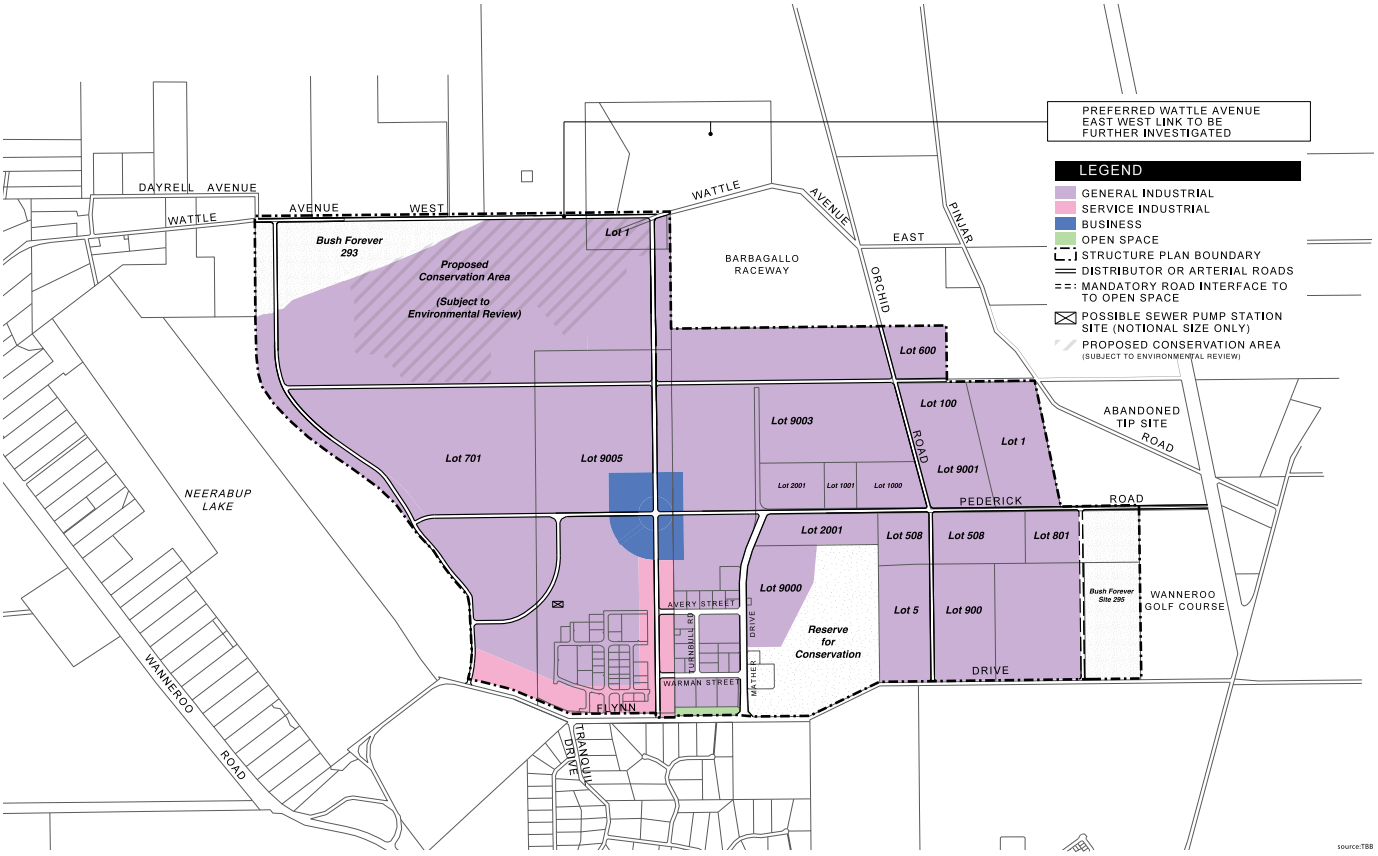
EXISTING STRUCTURE PLAN

PROPOSED STRUCTURE PLAN CHANGES

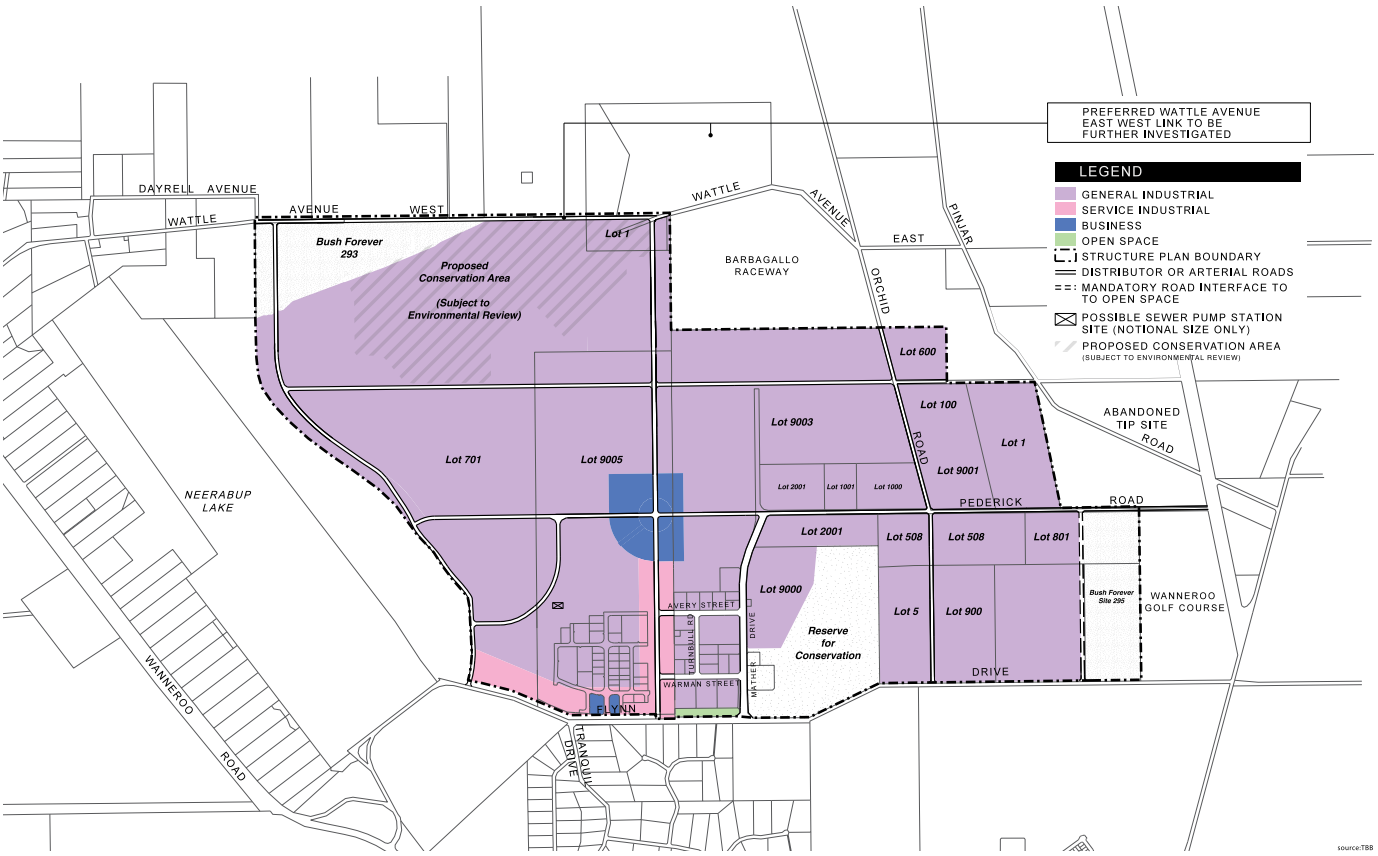
URBIS

PROPOSED AMENDMENT NO. 5
NEERABUP STRUCTURE PLAN 17

DATE: 05.12.2018
JOB NO: P0002151
DWG NO: FIG-8
REV: A



AGREED NEERABUP INDUSTRIAL AREA STRUCTURE PLAN NO. 17 - FIGURE 8.1



PROPOSED AMENDMENT NO. 5 TO AGREED NEERABUP INDUSTRIAL AREA STRUCTURE PLAN NO.17 - FIGURE 8.1

URBIS

PROPOSED AMENDMENT NO. 5
MERIDIAN PARK STRUCTURE PLAN

DATE: 09.10.2018
JOB NO: P0002151
DWG NO: FIG-7
REV: A

This Structure Plan Amendment is prepared under the provisions of the City of Wanneroo District Planning Scheme No. 2

IT IS CERTIFIED THAT THIS STRUCTURE PLAN AMENDMENT NO. 5 TO THE NEERABUP INDUSTRIAL AREA AGREED STRUCTURE PLAN NO. 17

WAS APPROVED BY

RESOLUTION OF THE WESTERN AUSTRALIAN PLANNING COMMISSION ON

.....

Signed for and on behalf of the Western Australian Planning Commission

.....

an officer of the Commission duly authorised by the Commission pursuant to section 24 of the *Planning and Development Act 2005* for that purpose, in the presence of:

..... Witness

..... Date

..... Date of Expiry

PART 2 - EXPLANATORY REPORT

AMENDMENT NO. 5 TO THE

NEERABUP INDUSTRIAL AREA AGREED STRUCTURE PLAN NO. 17

Table of Contents

1 Introduction

This report was prepared by Urbis on behalf of LandCorp to request the City of Wanneroo initiate an amendment to Agreed Structure Plan 17 (ASP 17).

The proposed amendment seeks to redesignate Lots 1001 and 1021 Greenwich Parade from 'Service Industrial' to 'Business' and amend Plan 1, Figure 8.1 and associate text accordingly.

2 Background

2.1 Neerabup Industrial Area

Located 35kms north of Perth, the Neerabup Industrial Area (NIA) provides approximately 1,000ha of industrial land 8km north east of Joondalup City Centre and immediately north of the suburbs of Carramar and Banksia Grove.

The NIA has been in development for over 25 years. The North West Corridor Structure Plan (Department of Planning and Urban Development 1992) identified the NIA as strategically significant in providing employment and industrial activities.

Adopted in 2005, the Neerabup Industrial Area Agreed Structure Plan (ASP 17) deals with the delivery of the industrial area as an employment hub for the northern corridor, providing employment opportunities, and reflecting the City of Wanneroo's Local Planning Framework.

The delivery of land and uptake of lots has commenced with Stage 1 being Meridian Park, more specifically those lots fronting onto Greenwich Parade. With a considerable number of lots within Stage 1 and the ongoing extraction of land to the north, the release of further industrial designated land is considered to be some time off.

A number of amendments have been made to ASP 17 in order to reflect changing planning and market conditions including the realignment of roads, updates to the surface contour plan and omnibus amendments to reflect the *Planning and Development (Local Planning Schemes) Regulations 2015*.

2.2 Legal Description and Ownership

The subject sites being Lots 1001 and 1021 Greenwich Parade, Neerabup are in single ownership. Lot details for the subject sites have been summarised in Table 1.

Table 1 – Summary of Lot Details

Lot	Area	Plan/Diagram	Proprietor
1001	9811sq.m	P061212	Western Australian Land Authority
1021	6620sq.m	P061212	Western Australian Land Authority

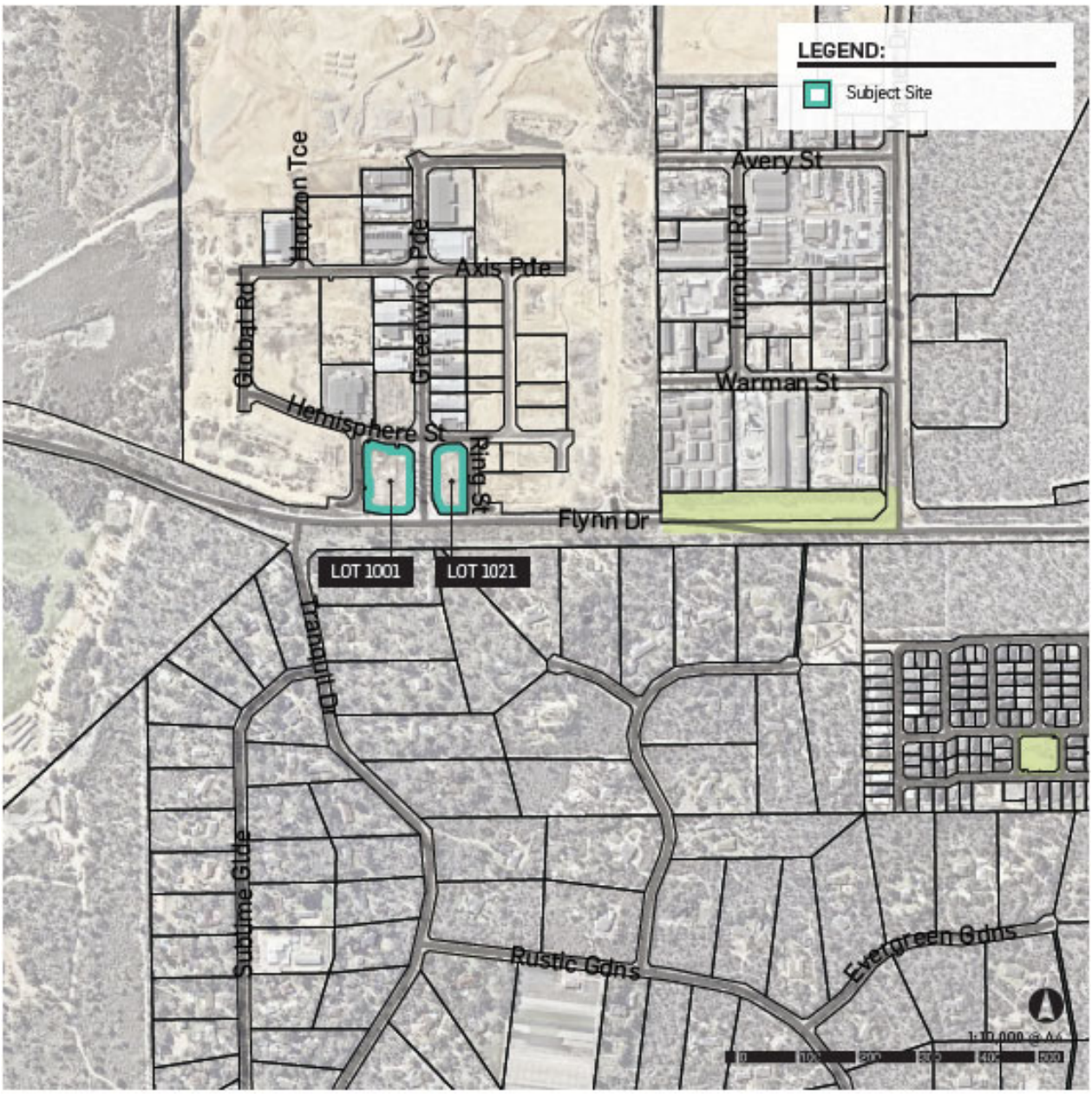
2.3 Local Context

The subject lots are located on the southern boundary of Meridian Park/NIA, providing for landmark development on the entry roads into Meridian Park Stage 1. The location of the site and aerial of the immediate surrounds are depicted in Figure 1.

To the north, uses include a range of industry such as panel and paint operations, rural supplies, fabrication warehouses, trade supplies and storage. The site layout and built form accords with approved design guidelines and present a high quality, high amenity estate.

To the south of Flynn Drive, the land uses demonstrate characteristics of the Special Rural zone in which it is located. The area contains large lifestyle lots which are highly vegetated and support residential dwellings and associated amenities. More intensive residential development is located within Banksia Grove, to the south east of the subject site.

FIGURE 1 – LOCATION PLAN



Road transport linkages to Neerabup include connections to Primary Regional Roads (Mitchell Freeway) and Wanneroo Road to the west. Both roads are accessed off Flynn Drive on the southern border of the area and offer north/south connections.

To the east, Flynn Drive will eventually provide a link through to Perth to Darwin Highway via Neerabup Road and Neaves Road, further connecting the NIA to Western Australia's freight and industrial network.

Further, these links provide for Restricted Access Vehicle 4 (RAV4) access, allowing accessibility for vehicles up to 36.5m in length.

2.4 Current Zoning

The subject sites are zoned Industrial under the Metropolitan Region Scheme as shown in Figure 2, and Industrial Development under the City of Wanneroo District Planning Scheme No. 2 as shown in Figure 3.

Figure 2 – Metropolitan Region Scheme Extract

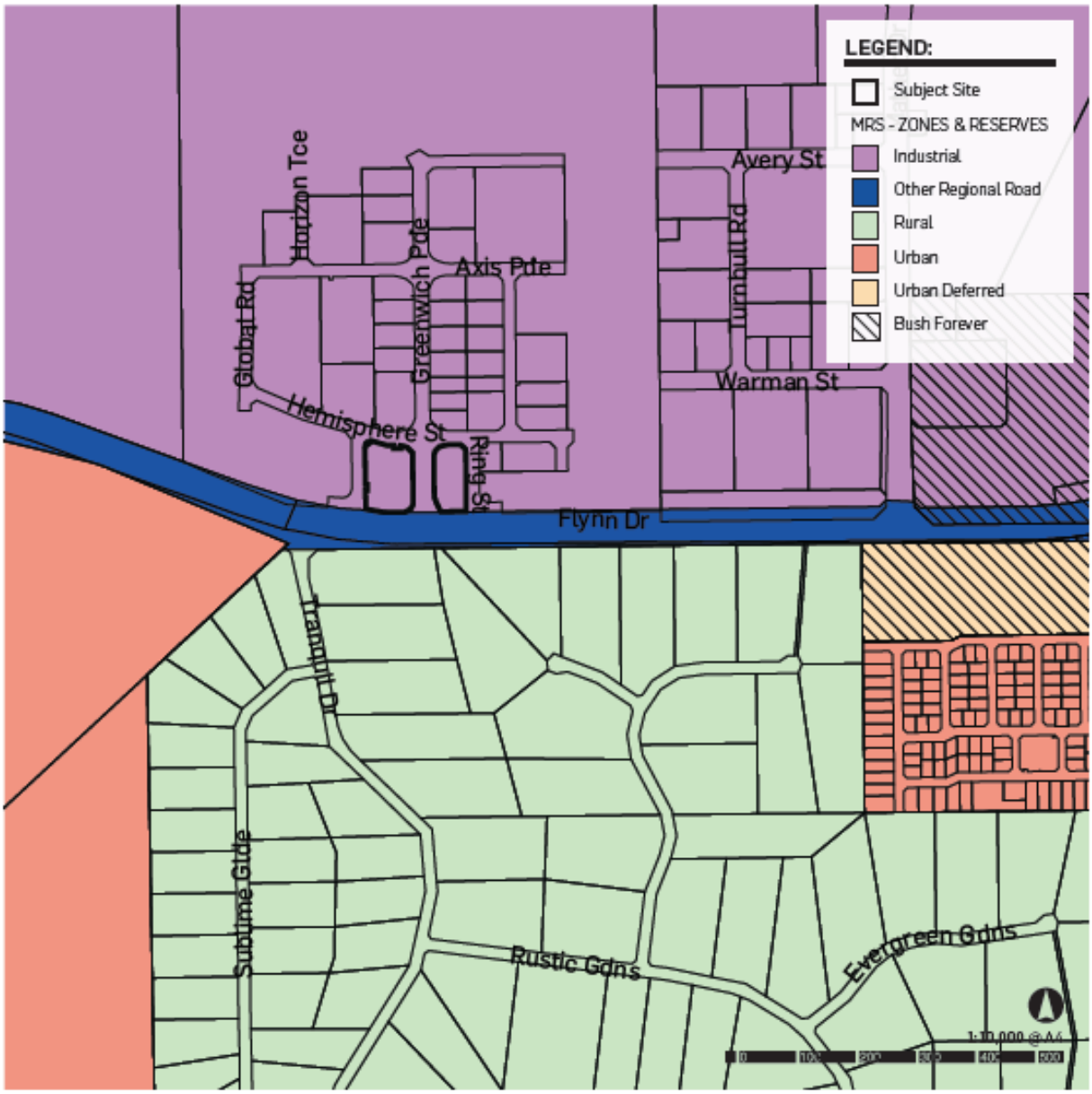
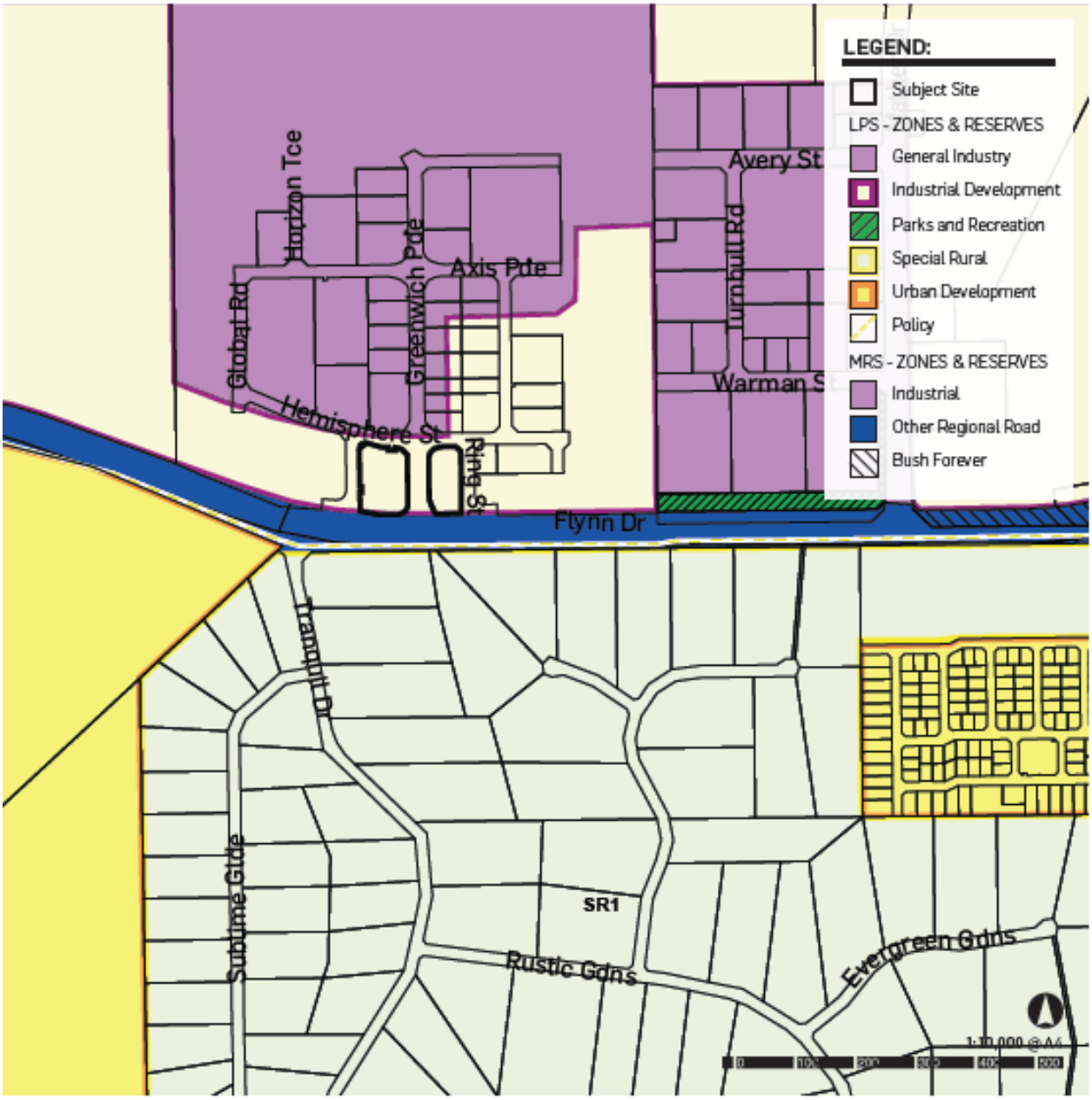


Figure 3 – District Planning Scheme No. 2 Extract



3 Structure Plan Provisions

3.1 Proposed Changes

The following changes are proposed, in order to facilitate the redesignation of Lots 1001 and 1021 from 'Service Industrial' to 'Business':

- Modifying *Plan 1 – Local Structure Plan Neerabup Industrial Area* to replace the 'Service Industrial' designation on Lots 1001 and 1021 Greenwich Parade with 'Business'.
- Under Part 2, modifying Figure 8.1 – Local Structure Plan Neerabup Industrial Area to replace the 'Service Industrial' designation on Lots 1001 and 1021 Greenwich Parade with 'Business'.
- Under Part 2 Clause 8.2.3 Business, deleting the words:

'The Business Zone is located at the centre of the Structure Plan on the major north south spine road. This precinct has been identified in recognition of its strategic location at the centre of the Structure Plan area to encourage more service uses such as banks, local shop, newsagent etc to service the Industrial Estate, both businesses and employees.'

And replacing it with

'The Business Zone is located at the centre of the Structure Plan on the major north south spine road and the entrance to the Stage 1 development. These precincts have been identified in recognition of their strategic location which encourages more service uses such as banks, local shop, newsagent etc to service the Industrial Estate, for both businesses and employees.'

3.2 Objectives and Intentions

The proposed modification reflects the objectives and intent for the Business zone as outlined in ASP as follows:

In accordance with DPS2, 'the Business Zone is intended to accommodate wholesaling, retail warehouses, showrooms and trade and professional services and small scale complementary and incidental retailing uses, as well as providing for retail and commercial businesses which require large areas such as bulky goods and category/theme based retail outlets that provide for the needs of the community but which, due to their nature, are generally not appropriate to or cannot be accommodated in a commercial area.'

The objectives of the Business Zone are to:

a) provide for retail and commercial businesses which require large areas such as bulky goods and category/theme-based retail outlets as well as complementary business services; and
b) ensure that development within this zone creates an attractive façade to the street for the visual amenity of surrounding areas.

Specifically, the objectives of the NIA Business Zone are to:

a) facilitate the provision of community/commercial services to support business and the workforce within the industrial estate;
b) minimise the need for local (work day) convenience retail and support business demand to leave the NIA and access centres in other localities (i.e. maximise sustainability); and
c) ensure that development within this precinct creates an identifiable central place for functional and legibility purposes.'

The proposed modification would result in a Business site most suited to achieving the above, consistent with ASP17. The centrally located Business area is still some years from development based on current take up rates within Meridian Park. A Business site located in the first stage of development and at the key entry into the same (where Estate passing trade is maximised) has a far greater opportunity for early activation via delivery of retail and services to support business/employees as the estate unfolds.

Any future development would be subject to a formal development application process taking into account the ASP17 provisions relating to land use:

'*The permissibility of uses and development provisions shall be in accordance with the Business Zone of DPS No.2 to ensure that the necessary support activities are able to locate within the NIA. In addition to those uses permitted under the Scheme, it is considered appropriate to allow limited shop development in the Business precinct. This will ensure that uses such as a newsagency, chemist, delicatessen etc, which are entirely appropriate within the Business precinct, are allowed.*

It is therefore, proposed to include Shop as an 'A' use and to limit the floorspace per shop to 300m2 NLA. This will ensure development in scale with the NIA and in particular, the Business Zone.'

However, it demonstrates that this modification requests represents a sound and highly responsive planning process that allows the estate to evolve over time according to need and demand.

4 Planning Discussion

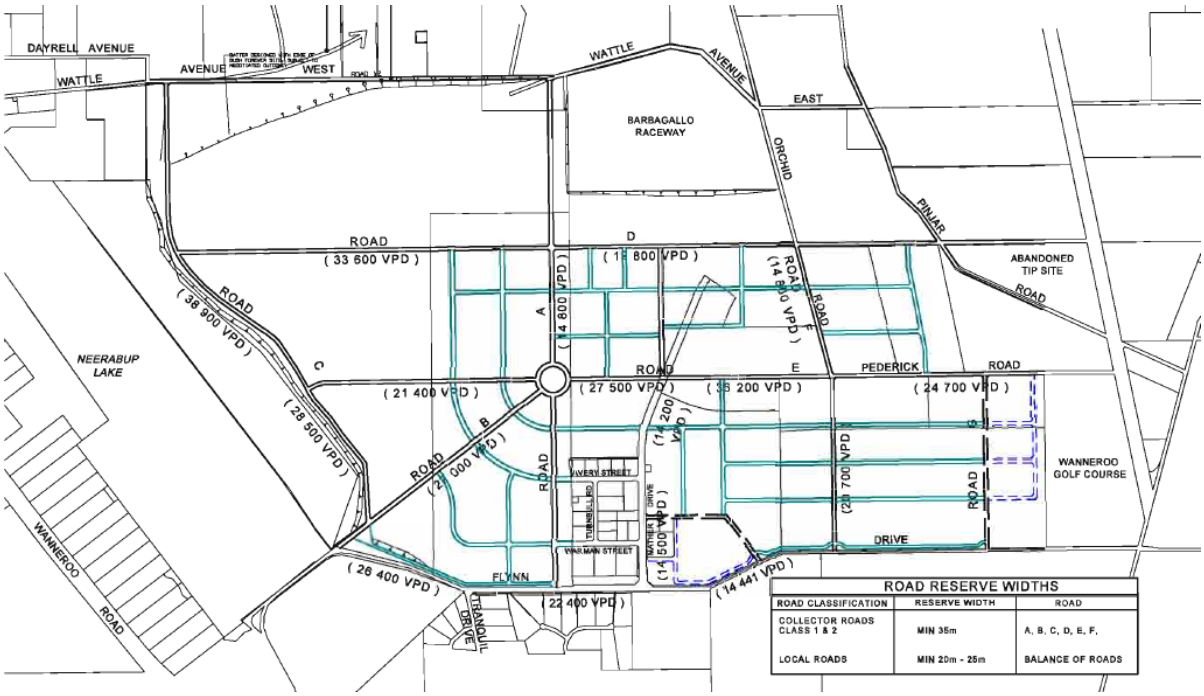
4.1 Neerabup ASP 17 – History and Change

As mentioned in Section 2.1 the NIA was adopted by the City in 2005, the structure plan did however, commence preparation many years prior. There were two critical design aspects and assumptions that impact on the design rationale for the location of the Business core, being; the movement network and basic raw materials extraction.

The original structure included a strong road network that had a direct diagonal connection, being Road B. Road B was planned to extend from the Business core in the centre of the NIA through to Flynn Drive connecting to Wanneroo Road and directly to the Mitchell Freeway. Road B was projected to carry 22,000 vehicles per day, refer plan below, extract Part 2 ASP17.

In 2011 Road B was realigned and no longer provides any connection to the Business core. This traffic is now deviated east along Flynn Drive prior to then heading north either via Greenwich Parade, Road A or Mather Drive. The road hierarchy has fundamentally changed with Flynn Drive increasing in status. It is however noted that the traffic planning for Flynn Drive has continued to seek to minimise the interactions between industrial and residential traffic and avoid conflicts. To this end, limited connections to Flynn Drive from the southerly aspect are provided, thus directing residential traffic south to Golf Links Drive and providing access to regional linkages and amenities.

Figure 4 – Traffic Number Projections, ASP17



Secondly, the NIA contains basic raw materials, being limestone and sand. The structure plan has therefore, been planned with consideration to the finished estate levels to enable limestone and/or sand extraction prior to development.

As mentioned in the Part II Explanatory Section of ASP 17 Section 6.4.1 Finished Levels;

> 'The final surface levels have been derived from consideration of the resource extraction objectives, current developments and quarrying and the need to achieve optimum grades for industrial development. The plan also considers a reasonable balance between the rate of extraction and the rate of land development. The final surface levels recommended

discourage excessive extraction which may otherwise retard the rate of land release for industrial uses.'

In identifying the Business core in the centre of the site, there were assumptions regarding the staging of development, in that the development front would reach the Business core in a reasonable amount of time to open up the opportunity to provide a level of amenity within the NIA. Some 23 years after the structure plan was adopted, the Business core land is still not available, nor is there a prospect that it will be available for another 10 years.

In summary;

The strategic elements contributing to the structure plan design locating the business core centrally within the 1000ha industrial estate have changed. Road B is no longer planned to connect directly from the Freeway and Wanneroo Road to the Business core and the higher order road connection to the Freeway is Flynn Drive; and

The combined extraction and staging of development have meant that development has not reached the Business core and there is no prospect of reaching the Business core, potentially even in 10 years.

There is the need to rethink the best location for the Business land use, in favour of a location in proximity to existing and prevailing development.

In addition to the historic matters raised above, there has been a shift in what is considered contemporary planning for industrial estates. Consequently, the City is reviewing, more broadly, the NIA ASP17, which is discussed in more detail below.

4.2 Neerabup Industrial Area Review

LandCorp is aware of the City of Wanneroo's intentions to undertake a wider review of ASP 17 in order to facilitate the outcomes of recent economic strategies that seek to increase employment within the locality and maximise the potential of the NIA.

Consideration has been given to the appropriateness of undertaking the structure plan amendment to rezone the subject lots ahead of the full-scale review of ASP17:

- The redesignation of Lots 1001 and 1021 to Business will not prejudice the ability of the City to undertake the wider NIA review – the scope and scale of the proposal is minor in the context of the wider estate.
- The redesignation of the subject lots is consistent with the City of Wanneroo's intentions of maximising employment and economic opportunities within NIA.
- The introduction of the 'Business' zone within Stage 1 will provide for a range of every day services for the employees within Meridian Park and will create an additional level of amenity in attracting further land sales and development.
- The range of uses anticipated, as discussed in section 4.3 below is considered to be consistent with and complementary to the overall vision for the NIA and the intentions of the existing 'Business' zone.
- It is understood an aspect of the review is to include the redistribution of the existing core 'Business' zone into small nodes across the NIA – including to the subject lots. As the entrance to the Stage 1 of Meridian Park, the subject lots provide an optimal location for business uses, creating opportunities for activation and a high-quality landmark entrance to the estate.

- The proposal is demonstrably consistent with DPS2 objectives as discussed previously in this report.
- By contrast, waiting for the wider review of ASP 17 to be completed (and with no set timeframe in place) does not represent a responsive or flexible approach to planning as sought by DPS2 objectives.
- The intent of the wider review is not and should not be to frustrate legitimate planning proposals that are consistent with orderly and proper planning, as is the case with this modification.
- As an early stage of development, a Business designation on the subject land is far less restrictive (on further review) than would be the development of the larger, more centrally located Business land within the Estate.

4.3 The Changing Face of Industrial Development

Industrial development has changed significantly in the past 20 years. The industrial market itself faces changes as technology and market drivers also change. As a result, industrial estates must be flexible and responsive.

Specific to this amendment is that previously industrial estates were established with little to no provision of support services or commercial land uses. Amenity is often lacking in these areas, and staff has to travel to utilise support services such as banks, post offices and suitable food and beverage offerings.

A need to provide up-front amenity in industrial estates has been highlighted by industry bodies and developers within LandCorp industrial estates. The provision of amenity in the form of commercial service hubs is a common trend arising in industrial areas, allowing for efficiencies in the operation of industrial areas and amenity for workers. The provision of service hubs has been or is being incorporated into the following industrial estates:

- Anzac Drive Industrial Estate, Kalgoorlie
- Gap Ridge Industrial Estate, Gap Ridge
- Latitude 32 Industrial Estate, Latitude 32
- Nambeelup Industrial Estate, Nambeelup

The Economic and Employment Lands Strategy (EELS) for Perth Metropolitan and Peel Regions recognises the changing direction of Industrial development, particularly the inclusion of supporting and ancillary land uses. The strategy identifies the inclusion of mixed-use development within industrial estates in order to create amenity and lists the following benefits:

- *Improved and greater efficiency in operations for tenants;*
- *The option for a greater workforce diversity;*
- *Higher levels of amenity for a workforce located within an estate with services such as gyms, childcare centres and cafes being available within the estates;*
- *Incorporation of planned transition zones between industrial and residential uses, reducing land use conflicts;*

The strategy expressly states that industrial areas should include "*mixed use and suitable retail opportunities. These developments could be established in buffer areas and act as noise barrier to residential areas*".

The proposal seeks to provide a Business designation, in order to allow for the establishment of a range of uses targeted at supporting the existing and future business and workers within the Neerabup Industrial Area. Providing these uses is directly aligned with EELS in facilitating higher levels of amenity, greater efficiency in operations and workforce diversity.

4.4 Appropriateness of Business Zone

Introducing a Business designation to the subject reflects the overarching objectives and intentions for the MRS Industrial Zone and the DPS Industrial Development Zone where it has been considered appropriate to allow for some 'business' and 'commercial' land use under the same framework to cater for businesses and workers. The closest example is within Neerabup Industrial Area itself where a Business designation already exists centrally within the site. Other examples include Nambeelup Industrial Area, Wangara Industrial Area and Forrestdale Business Park.

The purpose of the Industrial zone as set out in the MRS is as follows:

Land in which manufacture, processing, warehousing and related activities are undertaken.

The purpose and objectives of Industrial Development Zone as set out in DPS2 as follows:

3.15.1 The purpose of the Industrial Development Zone is to provide for the orderly planning of larger areas of land proposed for industrial use in an integrated manner within a regional context whilst retaining flexibility to review planning with changing circumstances.

3.15.2 The objectives of the Industrial Development Zone are to:

a) designate land for future industrial development;

b) provide for the orderly and comprehensive planning and development of large areas of industrial land for industrial and employment purposes;

c) enable planning to be flexible and responsive to changing circumstances throughout the developmental stages of the area.

The proposal is highly consistent with the above objectives by reason that:

- The Business designation will add to the employment opportunities and mix within the NIA;
- It will result in the early delivery of services and retail to support businesses and workers. This makes the NIA a more attractive place to work and do business, thereby further facilitating employment and industrial development in the locality;
- As mentioned, the amendment is in response to changing circumstances and need with a desire to locate Business land where it is best able to achieve early delivery (certainly in comparison to the current, central location) – this represents a flexible and responsive approach to planning consistent with DPS2 objectives.

4.5 Potential Future Development

The intent of the 'Business' zone is to provide for a range of services to support existing and developing businesses within Meridian Park.

The following table outlines the range of uses that might occur under a Business zone compared to the current Service Industrial designation:

Table 1 – Anticipated Land Uses

Land Use	Permissibility Service Industrial Zone	Permissibility Business Zone
Office	X	P
Convenience Store	D	P
Service Station (petrol filling station)	D	D
Restaurant/Cafe	X	P
Bank	X	P
Post Office	Use not listed[1]	Use not listed[1]
Medical Centre	X	P
Recreation Centre (gym)	D	D
Pharmacy	X	D
Take Away Food Outlet	X	D
Shop	D	D

Notes:

1. *Post Office does not neatly fall under any land use category defined in Schedule 1 of DPS 2, and therefore is considered an 'Unlisted Use'. Under Clause 3.3 of DPS 2, the City may determine whether an unlisted use is consistent with the objectives of the respective zone – and if it is, the Unlisted Use is considered a discretionary ('D') use in that zone.*

As noted, any future development would need to be subject to an approval under DPS2.

In this way, the proposed modification does not add a 'new' element to the planning for Meridian Park – it merely represents a relocation of planned land uses to a site more likely to facilitate early delivery in response to market demand and is consistent with DPS2/ASP 17 objectives.

4.6 Impact on other Activity Centres

The proposed amendment would not negatively impact the existing activity centre hierarchy within the City of Wanneroo.

The proposed Business zoned land seeks to provide a range of services and employment opportunities specifically for the employees within Meridian Park and the broader NIA.

The zone and associated uses will not be a destination in and of itself to draw trade from other existing and planned activity centres within the City of Wanneroo – that is simply not the purpose of the Business zone in this industrial location.

The existing designated activity centres in proximity to NIA are:

- Neerabup (Banksia Grove): District Centre – approx. 3.5kms to the south east
- Clarkson (Ocean Keys): Secondary Centre – approx. 6.5kms west
- Wanneroo – Secondary Centre – approx. 10kms south

The proposed Business land is of insufficient size and scale to have any impact on the above-mentioned centres, which are much larger, of a different purpose and are in any case distant from Meridian Park.

Similarly, existing Business zoned land in the locality includes:

- Neerabup Business zone – approx. 1km north
- Carramar Village - approx. 4km south
- Drover Place – approx. 5.5km south

The nature of services to be provided at Meridian Park are not such that they would attract customers from these other Business sites. Because these Business zones respond to local needs, it is very unlikely that a customer would elect to travel 4km to use a Lunch Bar in Meridian Park as opposed to one within Carramar.

Existing activity centres and Business zones provide for a wider range of retail uses such as numerous full line supermarkets, fast food outlets, taverns/food and beverage offerings, discount department stores, liquor, and services such as vets. By comparison, uses proposed for Meridian Park would be smaller in scale and targeted towards providing for employees as they head on their break rather than for weekly shopping or service needs.

The development of service hubs is considered to be more consistent with the objectives of maintaining the activity centre hierarchy than the development of a conglomeration of commercial uses within the centre of the estate. The proposed amendment, along with the City's wider review of ASP17 seek to reduce the need for a large, centrally located business zone in favour of smaller service hubs. The size and potential development of the current mass of business zoned land is considered to be in direct conflict with the existing activity centres. The smaller service hubs are limited in size and therefore activities, thus ensuring there is minimal draw from outside the industrial area.

The above information illustrates that the proposed Business land facilitated by this amendment is intended to be complementary to other existing and planned centres, rather than competing.

4.7 Retail Analysis

The Retail Note at Appendix B concludes that the proposal would:

- Have a net positive impact on the performance of Neerabup as an industrial area;
- Reduce costs associated with travel by employees during the workday;
- Will better meet the retail and service needs of existing and future employees and businesses; and
- Have only minimal impacts on other activity centres.

4.8 Interface with Adjacent Land Uses

The proposal is not anticipated to result in a substantive (and certainly not a negative) impact upon Special Rural land owners to the south:

- Generally speaking the standard of Business development (built form) is higher than would be expected for Industrial development.
- Any future development would be subject to a development application process and would need to accord with DPS2 requirements, including the opportunity for nearby landowners to comment on an advertised proposal where discretion is sought.
- Any future development would need to accord with an approved Local Development Plan that applies to the site and ensures high-quality built form outcomes.
- Any future development would need to accord with LandCorp Design Guidelines that further ensure an appropriate standard of built form.
- There are no residences located in close proximity to the land – the nearest house is located almost 100m to the south, across Flynn Drive and screened by mature vegetation.

4.9 Traffic Considerations

The Transport Assessment included at Appendix C confirms the following:

- 'Based on the assessment of traffic generation it is predicted that there will be no unacceptable impact.
- The change in land use does not trigger upgrade of the intersection of Flynn Drive / Greenwich Parade.
- The change in land use is expected to attract direct traffic rather than passing traffic as Flynn Drive is used as a regional link for freight and others.
- The additional traffic resulted from the change of use will have minor impact to the operation of surrounding intersections, however the background traffic growth due to the Neerabup Structure Plan will trigger an upgrade to Flynn Drive / Greenwich Parade intersection and the duplication of Flynn Drive.'

5 Consultation

LandCorp has worked alongside the City of Wanneroo in establishing Meridian Park as an employment hub, promoting the establishment of businesses that will allow for employment self-sufficiency and support the ongoing development of the NIA.

In preparing this Structure Plan Amendment, LandCorp and Urbis have met with the City of Wanneroo and the Department of Planning, Lands and Heritage in ascertaining the required information and setting out an agreed approach to preparing and processing the Amendment.

Minutes from the meeting held 29 October 2018 are attached within Appendix D.

6 Conclusion

Amendment No. 5 to ASP17 seeks to amend the designation of the subject lots from 'Service Industrial' to 'Business' in order to provide for development which is responsive to the market demands and allows for flexibility in development outcomes.

The proposal is considered to be consistent with the intentions of the overarching Industrial Development (DPS2) and Industry (MRS) zones in providing for economic and employment opportunities within the NIA. The intention of the zone is to provide for every day services and activities for the employees of Meridian Park ahead of the core Business zone being developed.

The type and scale of uses are considered to be consistent with those seen or envisaged across the state in similar scenarios, such as Forrestdale and Nambeelup. The uses are not considered to compete with existing activity centres or business zoned land which provide for a greater expanse of retail and service uses.

The proposal is consisted to be consistent with the objectives and intentions of the City of Wanneroo in terms of planning and development and economic development within the NIA.

Appendix A – Certificates of Title

WESTERN AUSTRALIA

REGISTER NUMBER	
1001/DP61212	
DUPLICATE EDITION	DATE DUPLICATE ISSUED
1	12/2/2009

VOLUME 2711 FOLIO 65

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 1001 ON DEPOSITED PLAN 61212

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

WESTERN AUSTRALIAN LAND AUTHORITY OF LEVEL 3, 40 THE ESPLANADE, PERTH
(AF K843396) REGISTERED 10/2/2009

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. K843397 RESTRICTIVE COVENANT TO CITY OF WANNEROO - SEE DEPOSITED PLAN 61212 REGISTERED 10/2/2009.
2. K849439 EASEMENT TO ELECTRICITY NETWORKS CORPORATION - SEE DEPOSITED PLAN 61212 REGISTERED 10/2/2009.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.
* Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.
Lot as described in the land description may be a lot or location.

----------END OF CERTIFICATE OF TITLE----------

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:	DP61212
PREVIOUS TITLE:	1598-473
PROPERTY STREET ADDRESS:	11 GREENWICH PDE, NEERABUP.
LOCAL GOVERNMENT AUTHORITY:	CITY OF WANNEROO
RESPONSIBLE AGENCY:	WESTERN AUSTRALIAN LAND AUTHORITY

WESTERN AUSTRALIA

REGISTER NUMBER	
1021/DP61212	
DUPLICATE EDITION	DATE DUPLICATE ISSUED
1	12/2/2009

VOLUME 2711 FOLIO 82

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 1021 ON DEPOSITED PLAN 61212

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

WESTERN AUSTRALIAN LAND AUTHORITY OF LEVEL 3, 40 THE ESPLANADE, PERTH
(AF K843396) REGISTERED 10/2/2009

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

1. K843397 RESTRICTIVE COVENANT TO CITY OF WANNEROO - SEE DEPOSITED PLAN 61212 REGISTERED 10/2/2009.
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SKETCH OF LAND:	DP61212
PREVIOUS TITLE:	1598-473
PROPERTY STREET ADDRESS:	10 GREENWICH PDE, NEERABUP.
LOCAL GOVERNMENT AUTHORITY:	CITY OF WANNEROO
RESPONSIBLE AGENCY:	WESTERN AUSTRALIAN LAND AUTHORITY

Appendix B – Retail Analysis

URBIS

LEVEL 14, THE QUADRANT
1 WILLIAM STREET
PERTH WA 6000

URBIS.COM.AU
Urbis Pty Ltd
ABN 50 105 256 228

30 November 2018

Mr Steve Bennett

Landcorp
Level 6, 40 The Esplanade
Perth Western Australia 6000

Dear Steve,

MERIDIAN PARK STRUCTURE PLAN AMENDMENT

SCOPE OF THIS DOCUMENT

We were engaged to assess the merit of the proposed zoning change of moving approximately 16,400 sq.m of Business Zoned land in Meridian Park, Neerabup Industrial Area (NIA) from the existing location at the intersection of Pederick Road and Greenwich Parade, to Flynn Drive, and assess the associated impacts of the change. In particular, focus was afforded to assessing:

- The role of the Business Zone in the context of the NIA;
- The impact of the Business Zone change on the NIA worker community needs;
- The impact of the Business Zone change on the sustainability of the activity centres hierarchy in the surrounding area; and
- The impact of the Business Zone change on industrial land take-up and employment outcomes in Meridian Park and the wider NIA.

The key outcome desired of the proposed zoning change is to meet the retail and commercial needs of existing and future Meridian Park employees, and position Meridian Park and NIA as an attractive location of prospective tenants.

In order to assist decision makers, this technical note explored the above within the framework of a net community benefit – exploring whether, and to what extent, the proposed zoning changes generate positive economic and social development outcomes for residents, workers, businesses and the wider community in the City of Wanneroo.

BACKGROUND

Meridian Park, Neerabup Industrial Area

Meridian Park is an industrial estate within NIA, in the suburb of Neerabup, around 30 km north-west of Perth CBD and 4 km north-east of Joondalup City Centre. Meridian Park is a LandCorp industrial estate that has been under planning and development since 2003 to the present day.

NIA is comprised of around 1,000 ha of predominantly General Industrial zoned land, with some Service Industrial and Business Zones to complement the land use mix. The Service Industrial Zone is intended to cater for land uses that will service the surrounding resident population and NIA industries,

such as showrooms, warehouses, and entertainment. The Business Zone is intended to cater for the retail and commercial uses needed by the employees working within NIA and therefore minimise the need for these to be located outside NIA, and as noted by the currently approved Neerabup Structure Plan, to accommodate land uses that require large areas, such as bulky goods.

The Business Zone area was originally intended to be developed within 7-20 years of the adoption of the structure plan, which occurred in 2005. However, due to slow take up of industrial land, the extraction of natural resources and sequential land development has also slowed, resulting in some portions of the site continuing to be subject to natural resource extraction at the present day. This has resulted in a longer timeframe for some industrial land within Meridian Park being available for sale than originally envisaged. Additionally, from 2008 there has been an overall reduction in take-up of industrial land across Perth.

As a result of the slower movement of land to market, reduced demand for industrial land across Perth, and the location of industrial lots that have been sold and developed, the original spatial location of the Business Zone is unlikely to be developed before 2030, leaving the existing industrial tenants with almost no access to retail or commercial services within Meridian Park or the wider NIA.

Proposed changes

In order to facilitate bringing to market retail and commercial services at Meridian Park, LandCorp have proposed to rezone a 16,341 sq.m portion of the existing Service Industrial Zone (Lots 1001 and 1021) bordering Flynn Drive to Business Zone. This will not result in a significantly larger Business Zone within Meridian Park.

CENTRE HIERARCHY SUSTAINABILITY

Meeting Worker Community Needs

The proposed zoning change will better enable the delivery of services and amenities required for the growing worker population in Meridian Park, which currently number in the order of 250 workers.

Industrial employees and businesses are more diverse than previous decades and increasingly are seeking locations with amenities and services. Providing suitable amenities within industrial areas to attract employees was identified as one of the top ten tools needed to support development of successful industrial precincts in a recent Urbis study[1].

However, currently, retail and business services provided within Meridian Park is limited to one café, with only one other lunch bar located within NIA. The closest locations providing additional retail and services including fast food, chemists, personal and health services and business services such as banks and post offices, are located at Carramar Village, a 7-minute drive south, or Banksia Grove Village, a 10-minute drive south-east. However, a range of services useful to businesses are not provided at these centres, such as print/publishing services and stationery retailers. The closest location for many of these products and services is Joondalup City Centre, an 11-minute drive away. In contrast, established industrial areas such as Wangara and Malaga have four and more than ten stationery retail and print/publishing services respectively.

[1] Industrial and Urban Services Precinct: Snapshot, Urbis, June 2018

The following table compares different types of floorspace provided at three northern corridor industrial areas, NIA (Flynn Drive), Gnangara and Malaga. The latter two industrial areas are highly mature and provide an indication of what NIA may look like in the long term future. At present, the lack of any floorspace in several categories highlights the current shortcomings of NIA in providing an attractive location for businesses to locate – in particular there is no floorspace in the Health/Welfare/Community and Other Retail categories, and only minimal floorspace in Entertainment/Recreation/Culture (0.2% of NIA, vs 1.3% in Wangara and 2.0 in Malaga). The proportion of Office/Business floorspace in NIA is on par with the comparison industrial areas.

Table 1. Comparison of industrial floorspace

Floorspace Type (PLUC)	Flynn Drive (Neerabup) Industrial Area (sq.m)	%	Wangara Industrial Area (sq.m)	%	Malaga Industrial Area (sq.m)	%
Entertainment/ Recreation/ Culture	250	0.2%	14,751	1.3%	29,402	2.0%
Health/ Welfare/ Community	-	0.0%	6,162	0.5%	11,215	0.8%
Manufacturing/ Processing/	26,415	24.7%	192,564	17.0%	298,819	20.0%
Office/Business	13,056	12.2%	138,877	12.3%	192,653	12.9%
Primary/ Rural	3,170	3.0%	-	0.0%	-	0.0%
Residential	-	0.0%	287	0.0%	1,220	0.1%
Other Retail	-	0.0%	35,148	3.1%	54,533	3.6%
Service Industry	12,228	11.4%	132,625	11.7%	197,599	13.2%
Shop/Retail	253	0.2%	29,457	2.6%	40,199	2.7%
Storage/ Distribution	29,585	27.7%	423,635	37.4%	491,636	32.9%
Utilities/ Communication	16,724	15.7%	9,590	0.8%	15,483	1.0%
Total Floorspace (inc. Vacant Floor	106,851	100%	1,133,195	100%	1,494,472	100%

Source: Urbis analysis of Land Use and Employment Survey, Department of Planning, 2015

There were an estimated 835 workers in NIA as of 2016[2] and at build-out the estate is expected to accommodate 20,000[3] workers. The current workforce alone is expected to be able to sustain up to

[2] Urbis analysis of ABS Census 2016
[3] Meridian Park Economic Development and Employment Generation Strategy, LandCorp, 2008

500 sq.m of retail floorspace[4]. The future workforce can potentially sustain up to 12,000 sq.m of retail floorspace. In addition, the 40+ businesses already located at NIA will spend on retail goods and services, and business services. This reinforces that the zoning change is unlikely to lead to the delivery of retail floorspace that will cater notably to the residential catchment.

Reducing Travel Time and Productivity Inefficiencies

The earlier provision of land uses able to be located in the Business Zone, such as retail, health services and business services, will significantly reduce travel time during the workday for NIA employees, reducing costs and improving associated efficiencies.

As noted in the approved Neerabup Structure Plan, the Business Zone is intended to reduce the amount of travel required by NIA employees for both business and personal purposes. *'Reduce the overall need to travel'* is the first of three key outcomes desired of *State Planning Policy 4.2: Activity Centres for Perth and Peel*. A recent study identified that mixed use industrial areas could provide key economic benefits of reduced travel times and costs for workers and improve the efficiency of freight by bringing supply chains closer together[5].

The largest activity centre nearby, Banksia Grove District Centre, is a 10-minute drive away from the southern edge of NIA. This, and the lower level centre at Carramar, are designed and located to be convenient for their surrounding resident populations, and do not present an attractive offer for Meridian Park employees unless they have no other alternative. The local road network has been planned to keep residential traffic separate from industrial traffic by limiting access into the residential estates from Flynn Drive, i.e. Tranquil Way left turn out only, Flynn Drive No Entry permitted, and the proposed access point east end of Flynn adjacent to Wanneroo Golf Course.
Workers who need to leave NIA for lunch or to attend a medical appointment during the workday may spend 15-20 minutes travelling to and from their workplace at present, in addition to the time spent at their destination. For some workers it may simply not be feasible to take this amount of time out of their workday.
A reduction in an average of two trips per week to Banksia Grove or an equivalent centre could lead to productivity and travel cost benefits equivalent to $878,712 per annum currently and $21,046,989 per annum at build-out[6]. Given sufficient provision of amenities within NIA, these trips may be reduced even further leading to even greater productivity and travel cost benefits.

Impact on Nearby Centres

Given the scale of the Business Zone is not intended to change significantly, a substantial proportion of the proposed new Business Zone can already be easily supported by the current 835 employees of

---

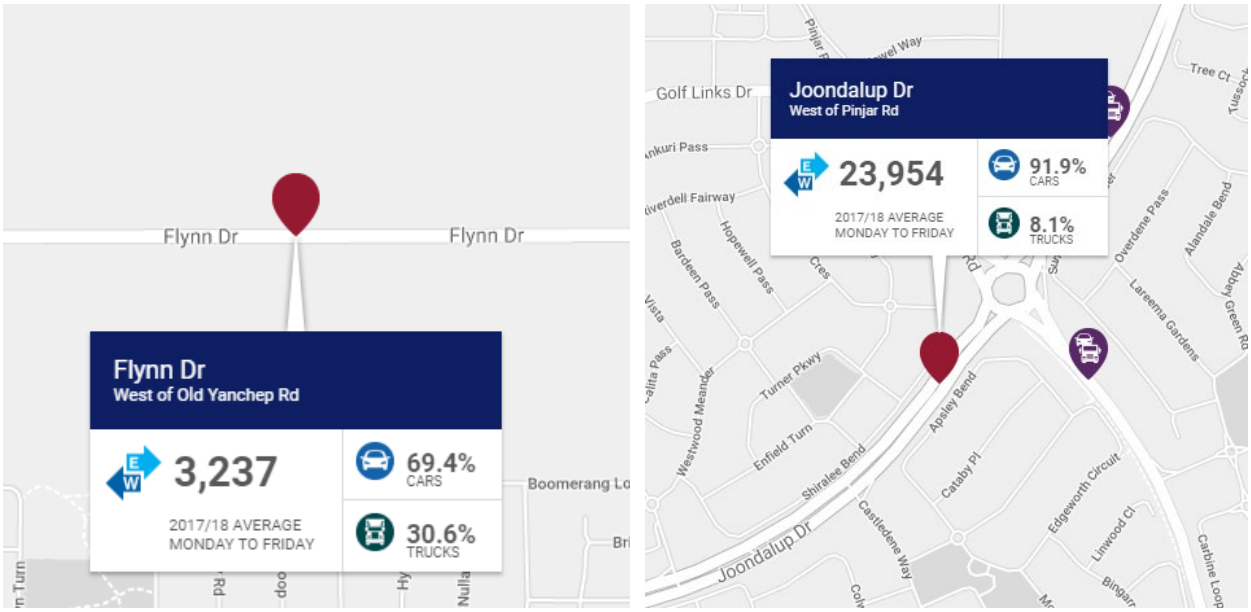
[4] Urbis Office Working Spending Survey
This assumes the average NIA worker spend for the above categories is around half of the average office worker spend. Spend categories have been limited to food and beverage, retail services and convenience goods, and represent the offer expected to be available at NIA in the short to medium term, and spend per capita estimate do not represent the whole spend of office workers.
[5] The benefits of mixed use industrial in Southern Industrial Area, Deloitte, March 2015
[6] *Based on the 2018 fuel cost and time cost savings from two 7-km trips per employee per week, using analysis of ABS and Fuelwatch data. This approach is in line with the MainRoads WA and Austroads approach.*

NIA, there are not expected to be any notable impacts on nearby existing or proposed activity centres. The retail turnover implications are therefore expected to be minimal. Furthermore, the zoning change reflects a change in the configuration rather than a substantive change to the quantum of business zoned land. As such, the proposed change will have a negligible impact compared to the status quo over the medium and longer term. Any bulky goods floorspace impacts are expected to be minimal as the amount of floorspace that can be taken up by bulky goods on the rezoned land is minimal for this type of land use.

While it is possible that people who do not work within NIA will undertake transactions within tenants of the Business Zone, given there is already good provision of daily and weekly goods and services at Carramar Village and Banksia Grove Shopping Centre, and there are no destinations along Flynn Drive to induce drive-by trade, any impact from this spending is considered minimal.

Main Roads WA traffic data (Figure 1) shows the difference between traffic volumes on Flynn Drive, which serves NIA traffic, and Joondalup Drive, which serves Banksia Grove Village Shopping Centre, Carramar Village Shopping Centre. This data shows the very low volume of passenger car movements on Flynn Drive, with only 2,246 cars per day on average compared to 22,014 cars per day on average for Joondalup Drive. There is therefore only minimal opportunity for passing trade to be captured by retail and commercial floorspace on Flynn Drive.

Figure 1. Flynn Drive vs Joondalup Drive Traffic Volume



Source: MainRoads WA, 2018 https://trafficmap.mainroads.wa.gov.au/map

Not providing suitable retail and amenities at NIA in the short to medium term future may have a negative impact on the future viability of these land uses at NIA in the future, as rather than travel for

retail and service needs, NIA employees may fulfil these needs closer to their place of residence, elsewhere along their commute, or via delivery services from the outside the area (e.g. Uber Eats, online stationery orders).

The Business Zone will also accommodate business services and ancillary office development. While the current development of office floorspace within NIA is proportionally similar to the comparison areas of Wangara and Malaga, a number of key services which fall under this floorspace category are currently missing within NIA, such as general practitioners, financial advisors, and shared office spaces. As with retail and services, if these services are not provided within NIA when needed by the existing tenants, this may limit the viability of these land uses at v in the future, as well as negatively impact the attractiveness of NIA to future tenants.

OPTIMISING NIA PERFORMANCE

Attracting Tenants and Employment

Based on a review of other industrial areas and the needs and desires of industrial area tenants, the zoning change is expected to encourage a greater take-up of industrial lots and lead to greater outcomes than the current configuration.

A 2018 Urbis study on Greater Sydney industrial precincts found that people-centricity was a key factor in supporting development of industrial precincts, including creating positive customer experiences, attractive urban landscapes, providing retail, and recreation options[7]. A 2018 Colliers report noted that demand for industrial floorspace was widening beyond the sectors traditionally accommodated, to include retail trade, construction, information media and communications, administration and support services, professional scientific and technical services, and electricity gas water and waste services[8]. In addition, the report notes that new industrial developments are needing to provide high quality office components to secure tenants.

[7] Industrial and Urban Services Precinct: Snapshot, Urbis, June 2018
[8] Employment and Demand in the Industrial Sector – Beyond the Headline Figures, Colliers, February 2018

CONCLUSION

From our analysis we conclude that the proposed zoning change will:

- Have a net positive impact on the performance of NIA as an industrial area;
- Reduce costs associated with travel by employees during the workday;
- Will better meet the retail and service needs of existing and future employees and businesses; and
- Have only minimal potential negative impacts on nearby activity centres.

It would therefore be advantageous to the development of Neerabup Industrial Area to allow the zoning amendment.

Yours sincerely,

Tim Connoley
Director

Appendix C – Traffic Assessment

Transport Impact Assessment

Project:	Lots 1021 & 1001 (#10-11) Greenwich Parade Proposed Change of Land Use
Client:	LandCorp
Author:	Keli Li
Version:	2
Document #	1811021-TIA-001

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Document Status

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Contents

Tables

Figures

1. Summary

Shawmac was commissioned to assess the traffic impacts associated with the proposed change of land use for Lots 1001 & 1021 Greenwich Parade from “Service Industrial” to “Business”.

This Transport Impact Assessment has been prepared in accordance with the WAPC Transport Impact Assessment Guidelines for Developments: Volume 2 – Planning Schemes, Structure Plans and Activity Centre Plans (2016), for lodgement with the Structure Plan Amendment application to the City of Wanneroo.

The following conclusions have been made in regards to the proposed change of use:

- The change of land use will generate an additional 493 vehicle movement per day and 51 and 36 vehicles movement during the AM and PM periods, respectively;
- The additional traffic resulted from the change of use will have minor impact to the operation of surrounding intersection and not change the intersection treatment required in the short and long term compared to the existing traffic.
- The projected growth in long term background traffic volume for Flynn Drive, will potentially trigger an upgrade or modification to Flynn Drive / Greenwich intersection.

2. Introduction

2.1. Background

Shawmac has been commissioned to prepare a Transport Impact Assessment to assess the potential traffic impacts associated with the proposed change of land use planned for Lots 1001 & 1021 Greenwich Parade from "Service Industrial" to "Business".

2.2. Site Location

Both lots are located within the Neerabup Industrial Structure Plan Area. The locations of the lots are as shown in **Figure 1**.

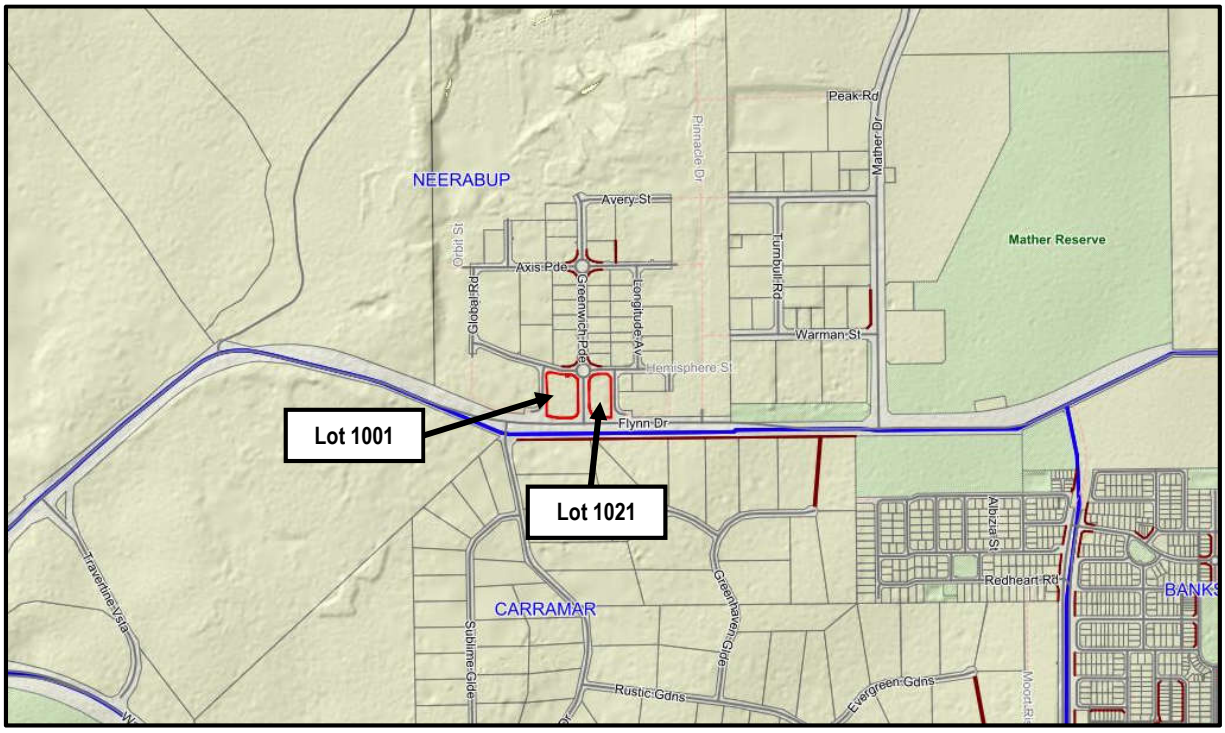


Figure 1 - Site Location

The subject lots together with the majority of surrounding land are currently vacant. An aerial photo of the subject site is shown in **Figure 2**.

Figure 2 - Aerial View

2.3. Reference Information

In undertaking the study, the information listed below was referenced.

- WAPC Transport Impact Assessment Guidelines for Developments: Volume 2 – Planning Schemes, Structure Plans and Activity Centre Plans Developments
- MRWA Functional Hierarchy Criteria;
- Livable Neighbourhoods Guidelines 2009;
- Trip Generation 9th edition, 2003 - Institute of Transportation Engineers, Washington, USA;
- Guide to Traffic Generating Developments Version 2.2, October 2002 – Roads and Traffic Authority, New South Wales;
- City of Wanneroo Local Planning Scheme No.17

3. Site Proposal

3.1. Regional Context

The subject lots are located to the northern side of Flynn Drive approximately 3.0 km from the nearest commercial complex (Banksia Grove Village Shopping Centre) and 30 km from the Perth CBD. The land within the Neerabup Industrial Structure plan are predominantly planned for industrial developments. Land to the south of Flynn Drive involves of rural commercial and residential developments.

Figure 3 shows the site location in a regional context.

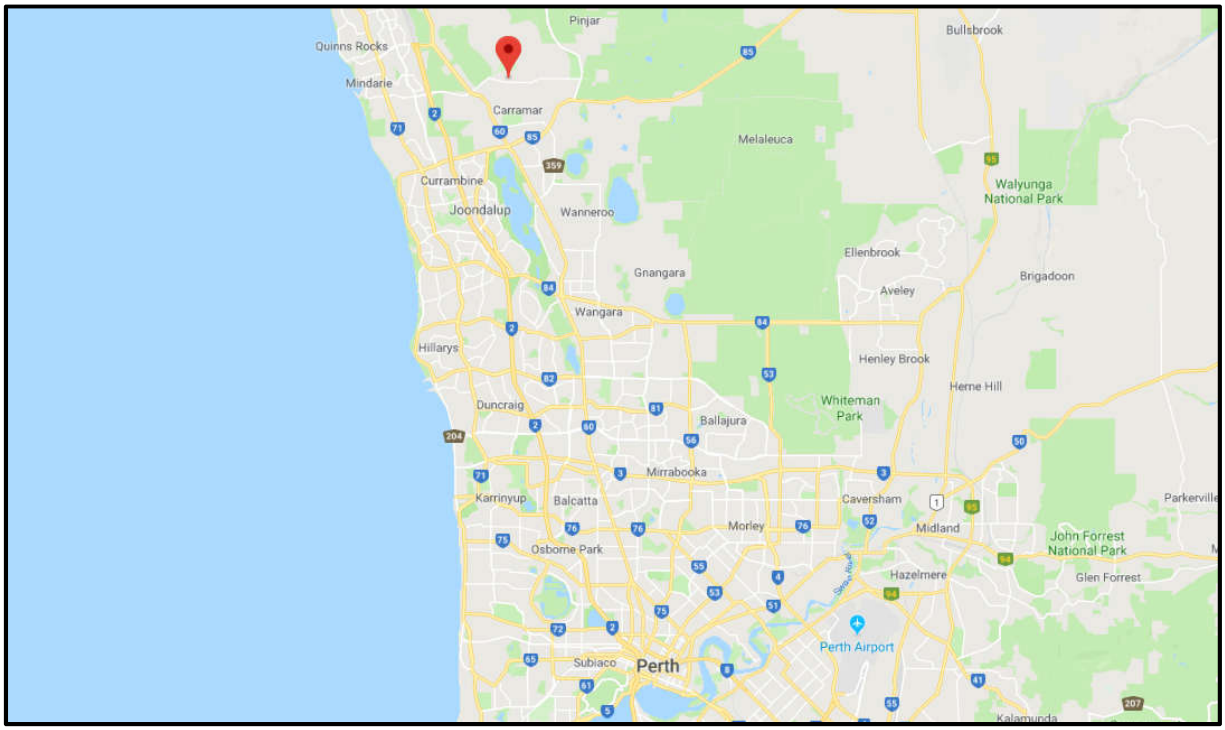


Figure 3 - Regional Context

3.2. Land Use

The proposal is to change the planned land use for Lots 1001 & 1021 Greenwich Parade from “Service Industrial” to “Business”. Although detailed development is unknown at the current stage, the client has advised that potential uses would reflect the land uses available within the Business Zone as outlined in the City of Wanneroo DPS2.

3.3. Planning Framework

The subject lots are within the Neerabup Industrial Structure Plan Area and are both zoned for "service industrial". Refer **Figure 4** below.

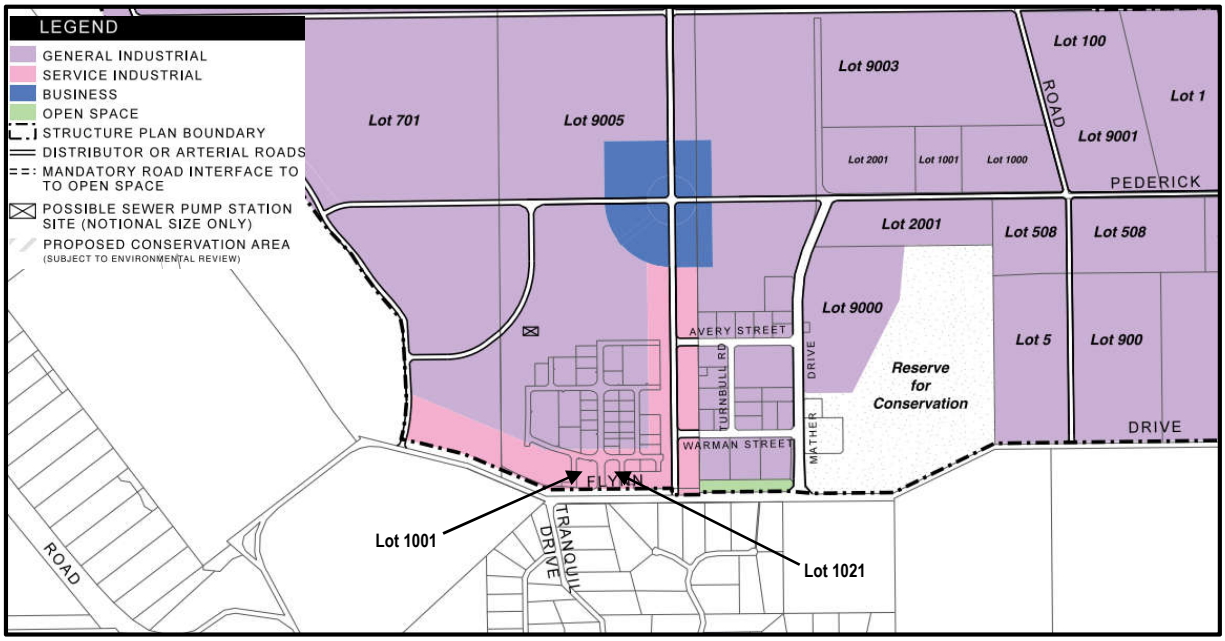


Figure 4 - Zoning Map - Extract from Neerabup Industrial Area Structure Plan

3.4. Major Attractors and Generators of Traffic

The subject lots and the surrounding industrial park will be traffic attractors and generators. The main attractors expected to influence traffic flows are from local residential areas whilst the industrial traffic is likely to be regional traffic.

4. Existing Situation

4.1. Existing Roads

An extract of the Main Roads *Road Information Mapping* web tool is shown in **Figure 5** and shows the road hierarchy surrounding the site.

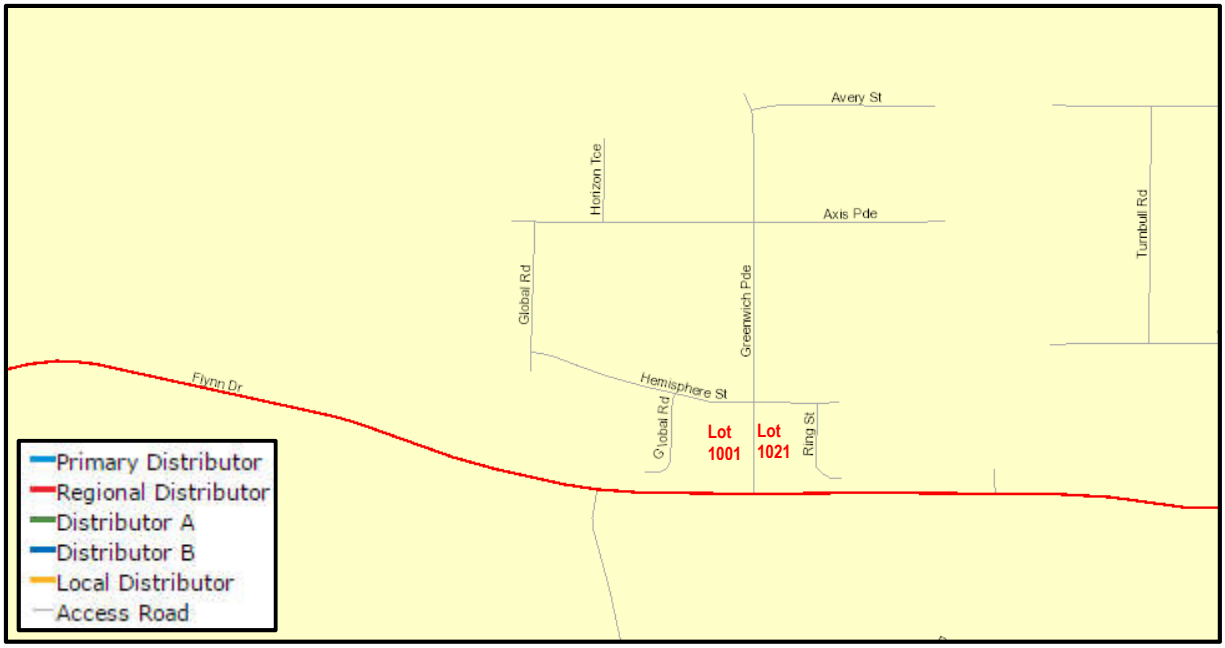


Figure 5 - Road Hierarchy

Flynn Drive

Flynn Drive is the southern boundary of both subject lots. It is a two-way, single carriageway road. Flynn Drive is a sealed and kerb road in the vicinity of Greenwich Parade intersection and it transitions into unkerb road with sealed shoulder further east and west. The general kerb-to-kerb width of Flynn Drive is approximately 9.8m and it has been widened with a Basic Right Turn treatment to 14.0m at Greenwich Parade intersection. According to the MRWA Mapping Tool, Flynn Drive is classified as a Reginal Distributor road and operates under an 80km/h speed limit.

Greenwich Parade

Greenwich Parade runs between Lot 1001 and Lot 1021. Greenwich Parade a two lane, dual carriageway road with a median adjacent to the subject lots. Greenwich Parade when transitions into an undivided road north of Hemisphere Street roundabout intersection. Pedestrian footpaths are available along the both sides of Greenwich Parade. Sealed shoulders are available adjacent to Lots1001 and 1021 and street parking are provided north of Hemisphere Street roundabout intersection. According to the MRWA Mapping Tool, Greenwich Parade is classified as an Access Road and operates under a 50km/h speed limit.

4.2. Road Hierarchy vs Actual Flows

The latest traffic volumes of the surrounding roads were derived from MRWA traffic map. **Table 1** compares existing traffic volumes with MRWA and Liveable Neighbourhood Guideline indicative traffic volumes based on road classifications. Detailed traffic count data is included in **Appendix C**. Traffic data for Greenwich Parade is not available, however considering the majority land within the structure plan is vacant existing daily and peak hour traffic are assumed as 500 vpd and 50 vph.

Table 1 - Road Classification and Indicative Traffic Volumes

Road Name	Road Features	MRWA Classification / Indicative Daily Volume (vpd)	Liveable Neighbourhood Classification / Indicative Daily Volume (vpd)	Existing Daily Traffic Volume (vpd)	Source
Flynn Drive (west of Greenwich Parade)	2-lane single carriageway	Reginal Distributor / above 100	District Distributor B / 15,000	5,375 (37.8% HV)	MRWA (2018)
Flynn Drive (west of Greenwich Parade)	2-lane single carriageway	Reginal Distributor / above 100	District Distributor B / 15,000	3,237 (30.6% HV)	MRWA (2018)
Greenwich Parade	2-lane dual carriageway	Access Road / Above 3,000	Access Street A / 3,000	500	Assumed

As shown, all roads are operating below their indicative traffic volumes ranges for their respective classifications. It is noted that since the site is located within a developing area and the site surrounding vacant land is planned for future development, existing traffic of the road network is unlikely to represent the fully established scenario.

The traffic data for Flynn Drive shows that the route is a key route for freight as it provides connection, via Neaves Road, through to Bullsbrook as well as Great Northern Highway and Brand Highway.

The Neerabup Industrial Area Structure Plan has identified the need to upgrade roads (Refer to SKM's Neerabup Industrial Estate Traffic Review) to cater for the growth of the Neerabup industrial developments to the north of Flynn Drive and the residential developments to the south and east of Flynn Drive. As outlined in Section 5 the change in land use does not alter the proposed road network.

4.3. Changes to the Surrounding Network

Apart from the planned structure plan internal road network shown in **Appendix B**, the following network changes were identified from the Neerabup Industrial Area Structure Plan that can affect traffic travelling to and from Lot 1001 and 1021 Greenwich Parade:

- Provision of road network as outlined in the Neerabup Industrial Area Structure Plan (Figure 1)
- Duplication of Flynn Drive to four lane dual carriageway;
- A realignment of Flynn Drive at the western end to connect Wanneroo Road and Neerabup Road via a

4-way signalised intersection (constructed);

- Extension of Neerabup Road to connect the realigned Flynn Drive and Mitchell Freeway (constructed);
- Mitchell Freeway extension from Burns Beach Road to Romeo Road (constructed to Hester Avenue)

The above road works except for duplication of Flynn Drive to a 4-lane dual carriageway were finished in early 2017. The road links provide convenient access between the Neerabup Industrial Structure Plan area and Mitchell Freeway.

There is also work progressing to duplicate Wanneroo Road between Flynn Drive and Joondalup Drive as well as work starting in 2019 to grade separate Wanneroo Road and Joondalup Drive.

5. Transport Assessment

5.1. Assessment Years

The Development is assessed on the development year when the Neerabup Industrial Area Structure Plan Area is fully occupied, assumed as 2031. The 2031 traffic volumes of adjacent road network were adopted from Neerabup Structure Area Plan as attached in **Appendix B**. An assessment has been undertaken of both the impact of the change in use on the existing and the 2031 road network.

5.2. Time Periods for Assessment

This assessment assumes the peak periods of the change of use sites correspond to the AM and PM peak hours of existing Flynn Drive which are 6:00 to 7:00 (AM Peak) and 16:00 to 17:00 (PM Peak).

5.3. Development Generation

In order to compare the traffic generation of "Service Industrial" developments and "Business" developments reference was made to the Institute of Transportation Engineers "Trip Generation" 9th edition. As details of the development is not known at current stage, it is assumed that the gross floor area of the development will equivalent to 50% of lot size. This approach is consistent with the approach in SKM's Neearbup Industrial Estate Traffic Review.

The trip generation has been determined for both daily and peak hour. Detailed explanations of the trip generation are summarised **Table 2.** Peak hour distribution of additional movements is calculated in **Table 3**. Note that the rates are higher than the rates utilised in SKM's Neearbup Industrial Estate Traffic Review and therefore considered conservative.

Table 2 - Predicted Weekday Trip Generation

Land Use	Units	Quantum	Trip Generation Rate			Estimated Generation			Source
			ADT	AM Peak	PM Peak	ADT	AM Peak	PM Peak	
Industrial Park (130)	GFA (,00 m^2)	8,215.5	7.38	0.88	0.91	607	73	75	ITE
Business Park (770)	GFA (,00 m^2)	8,215.5	13.39	1.51	1.36	1100	124	111	ITE
Difference						**+493**	**+51**	**+36**	

Table 3 - Predicted Peak Hour Distribution (Additional Trips)

Land use	Peak Distribution			
	AM Peak In	AM Peak Out	PM Peak In	PM Peak Out
Business Park (770)	79%	21%	28%	72%
	40	**11**	**10**	**26**

It is estimated that the proposed change of land use will add additional 493 vehicle movements per day and 51

and 36 movements during weekday AM and PM peak hours respectively. ITE does not indicate the trips generated by the "Industrial Park" and "Business Park" could be considered as passer-by trips (passing trade), for conservatism this assessment considers all additional traffic due to change of use will be new trips (direct trade).

As the development has not been realised the traffic generation for the existing plus development includes the full traffic generation of the business land use. The 2031 traffic generation however includes the current land use traffic and therefore the additional traffic generated by the business use versus service industry has been added to the predicted traffic.

5.4. Passing Trade vs Direct Trade

A review of the existing traffic on Flynn Drive indicates that a high proportion of traffic is regional through traffic rather than local traffic. The traffic data for Flynn Drive is counter intuitive to local traffic directions. The majority of workers in the area work to the south and west however the peak direction is eastbound in the AM and westbound in the PM. There is also a high proportion of heavy vehicles on Flynn Drive exceeding 30% which indicates that the majority of traffic on Flynn Drive is regional and therefore highly unlikely to utilise the area whether the developments on Lot 1001 and 1021 are service industry or business. This mean most trips to the developments will be direct trips and unlikely to impact on nearby business uses as the closest is approximately 3km to the south and well located to service that community.

5.5. Distribution

The distribution of the additional traffic has been assumed based on the spatial distribution of adjacent land uses as listed below. It is assumed that access to Lot 1001 will be via a left-in, left-out onto Greenwich Parade and a full movement crossover along Hemisphere Street. Access to Lot 1021 will be via a left-in, left-out crossover on Greenwich Parade and a full movement crossover along its eastern boundary.

The traffic distribution will change as the road network outlined in the Neerabup Industrial Structure Plan Area is realised however a base case utilising the existing road network has been reviewed to understand the impact on the Flynn Drive / Greenwich Parade intersection. The following distribution is assumed:

- 65% of trips generated to and from the east along Flynn Drive;
- 35% of trips generated to and from the west along Flynn Drive.

The site-generated traffic is expected to be distributed onto the existing road network as shown in **Figure 76** and assignment of generated traffic onto the adjacent roads are shown in **Table 54**.

In 2031 the road network outlined in the Neerabup Industrial Structure Plan Area is assumed to be in place and therefore the following distribution is assumed:

- 30% of trips generated to and from the north along across Greenwich Road / Hemisphere Street roundabout);

- 35% of trips generated to and from the east along Flynn Drive;
- 35% of trips generated to and from the west along Flynn Drive.

The site-generated traffic is expected to be distributed as shown in **Figure 7** and assignment of generated traffic onto the adjacent roads are shown in **Table 5**.

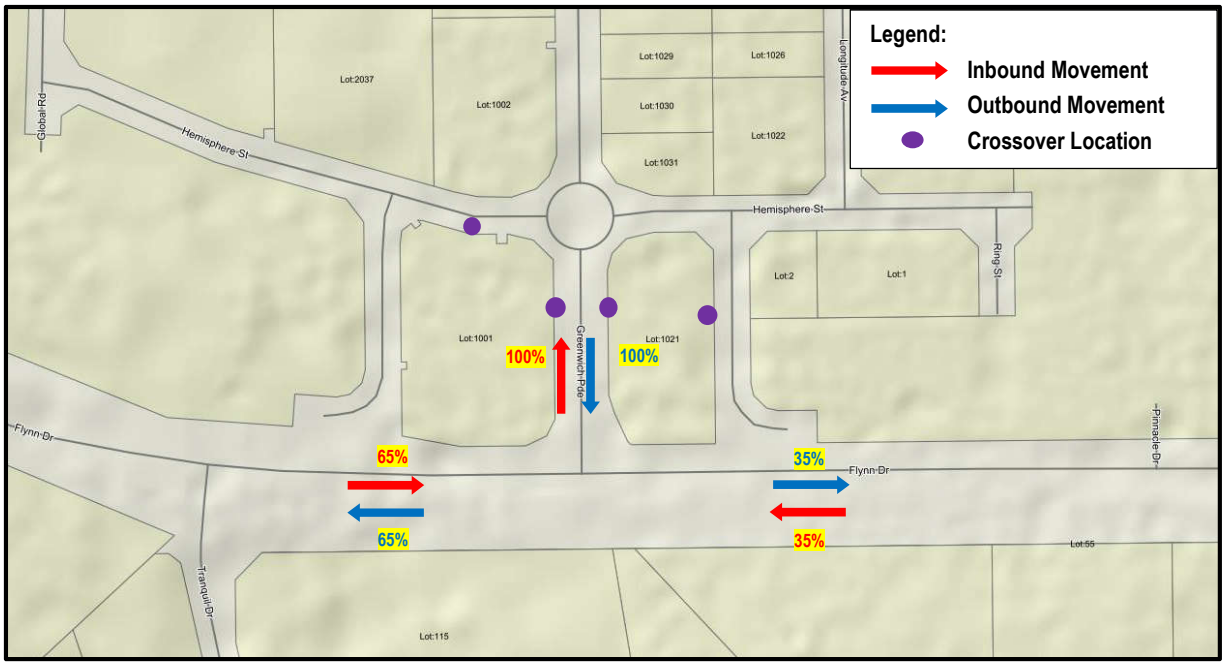


Figure 6 - Trip Distribution based on Existing Road Network

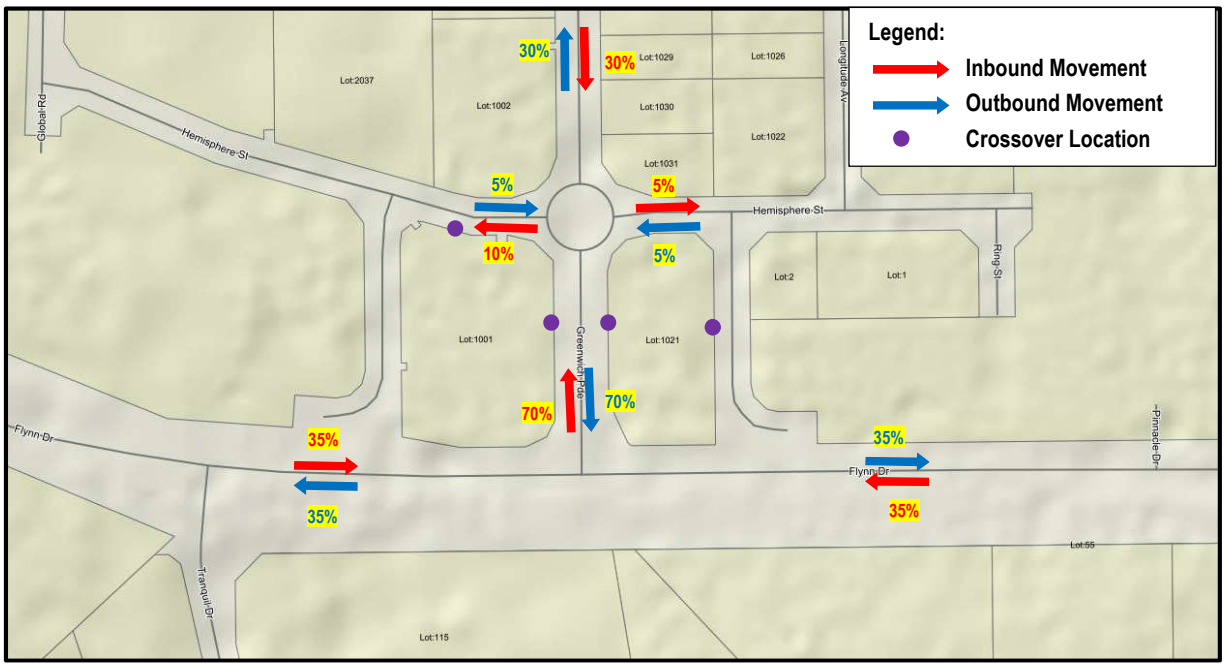


Figure 7 - Trip Distribution in 2031 with Structure Plan Road Network

Table 4 – Existing with Change in Use Traffic Volumes

Road	Time Period	Existing Traffic Volume	Development Additional Volume	Existing with Development Volumes
Flynn Drive East of Greenwich Pde	Daily (vpd)	5375	385	5,760
	AM Peak (vph)	472	43	515
	PM Peak (vph)	496	39	535
Flynn Drive West of Greenwich Pde	Daily (vpd)	5375	715	6,090
	AM Peak (vph)	472	81	553
	PM Peak (vph)	496	72	568
Greenwich Parade South of Hemisphere St	Daily (vpd)	1200*	1100	2300
	AM Peak (vph)	120	124	244
	PM Peak (vph)	120	111	231

The assignment of generated traffic onto the adjacent roads are shown in **Table 5**. The traffic volume on Greenwich Parade is assumed based on the current level of development versus the full development potential.

Table 5 - 2031 Traffic Volumes

Road	Time Period	2031 Structure Plan Forecast Volume	Change of Use Additional Volume	2031 Forecast Volume with Change of Use Additional Volumes
Flynn Drive East of Greenwich Pde	Daily (vpd)	21,200	173	21,373
	*AM Peak (vph)	2,120	18	2,138
	*PM Peak (vph)	2,120	13	2,133
Flynn Drive West of Greenwich Pde	Daily (vpd)	24,400	173	24,573
	*AM Peak (vph)	2,440	18	2,458
	*PM Peak (vph)	2,440	13	2,453
Greenwich Parade South of Hemisphere St	**Daily (vpd)	3,400	345	3,745
	*AM Peak (vph)	340	36	376
	*PM Peak (vph)	340	25	365
Greenwich Parade North of Hemisphere St	**Daily (vpd)	3,400	148	3,548
	*AM Peak (vph)	340	15	355
	*PM Peak (vph)	340	11	351

*Note: Peak hour volumes based on 10% of daily

Note: Daily volume for Greenwich Parade was assumed to be 50% of Road A, a higher hierarchy road than Greenwich Parade. Refer **Appendix B.

5.6. Impact on Roads

5.6.1. Austroads Guidelines

Table 5.1 of Austroads *Guide to Traffic Management Part 3: Traffic Studies and Analysis* (AGTM06) as shown

below in **Table 6** provides the mid-block capacities for urban roads with interrupted flow:

Table 6 - Typical Mid-Block Capacities for Urban Roads with Interrupted Flow

Type of Lane	One-way Mid-Block Capacity (Vph)
Median or inner lane	
Divided Road	1,000
Undivided Road	900
Middle Lane (of a Three-Lane Carriageway)	
Divided Road	900
Undivided Road	1,000
Kerb lane	
Adjacent to Parking Lane	900
Occasional Parked Vehicles	600
Clearway Conditions	900

As per the structure plan, Flynn Drive will become a four-lane dual carriageway and will have a maximum capacity of 3,800 vph (two direction). Greenwich Parade south of Hemisphere intersection have a maximum capacity of 2,000 vph (dual carriageway road). Greenwich Parade north of Hemisphere intersection have a maximum capacity of 1,800 vph (undivided road adjacent to parking).

The resulting traffic volumes on the road network as shown in **Table** 5**4** are shown to be well within the practical capacity of the existing roads and the change of land use is considered to have minimal impact on the capacity of the road network at mid-block locations.

The resulting traffic volumes on the road network as shown in **Table 5** are shown to be well within the practical capacity of the future roads and the change of land use is considered to have minimal impact on the capacity of the road network at mid-block locations.

5.7. Impact on Intersections

SIDRA Intersection 8 has been used to assess the peak hour capacity and performance of the Flynn Drive / Greenwich Parade intersection and Greenwich Parade / Hemisphere Street intersection.

SIDRA is a commonly used intersection modelling tool used by traffic engineers for all types of intersections. Outputs for four standard measures of operational performance can be obtained, being Degree of Saturation (DoS), Average Delay, Queue Length, and Level of Service (LoS).

- Degree of Saturation is a measure of how much physical capacity is being used with reference to the full capability of the particular movement, approach, or overall intersection. A DoS of 1.0 equates to full theoretical capacity although in some instances this level is exceeded in practice. Design engineers typically set a maximum DoS threshold of 0.95 for new intersection layouts or modifications.

- Average Delay reports the average delay per vehicle in seconds experienced by all vehicles in a particular lane, approach, or for the intersection as a whole. For severely congested intersections the average delay begins to climb exponentially.
- Queue Length measures the length of approach queues. In this document we have reported queue length in terms of the length of queue at the 95th percentile (the maximum queue length that will not be exceeded for 95 percent of the time). Queue lengths provide a useful indication of the impact of signals on network performance. It also enables the traffic engineer to consider the likely impact of queues blocking back and impacting on upstream intersections and accesses.
- Level of Service is a combined appreciation of queuing incidence and delay time incurred, producing an alphanumeric ranking of A through F. A LoS of A indicates an excellent level of service whereby drivers delay is at a minimum and they clear the intersection at each change of signals or soon after arrival with little if any queuing. Values of B through D are acceptable in normal traffic conditions. Whilst values of E and F are typically considered undesirable, within central business district areas with significant vehicular and pedestrian numbers, delays/queues are unavoidable and hence, are generally accepted by road users.

The peak hour volumes for these two intersections are assumed as shown in **Figure 8** and **Figure 9**.

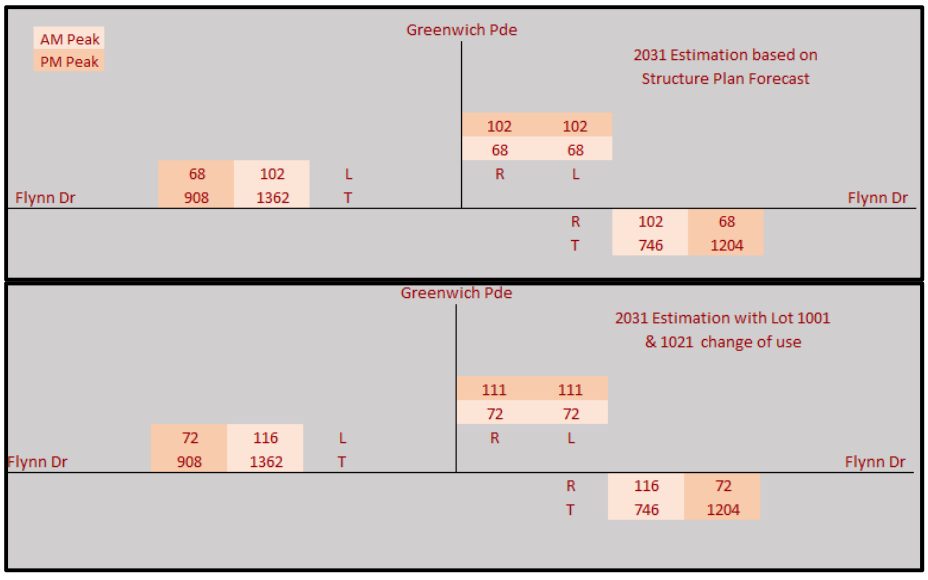


Figure 8 - Flynn Drive / Greenwich Parade Intersection Volumes

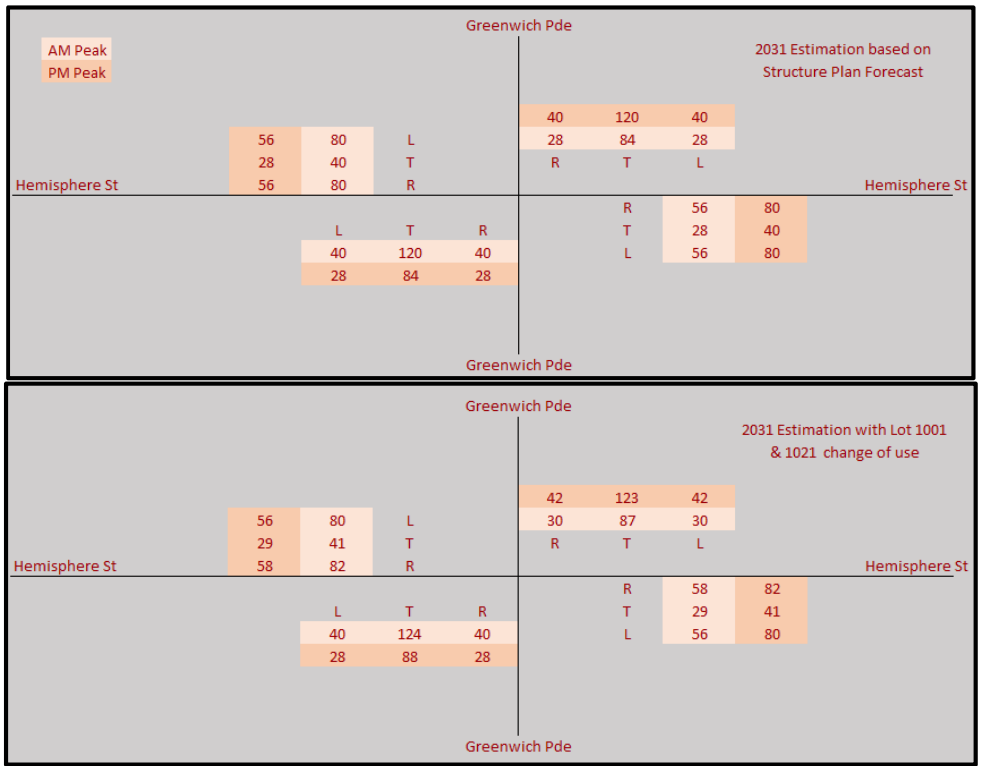


Figure 9 - Hemisphere Street / Greenwich Parade Intersection Volumes

The results of the assessment are summarised in **Table 7**.

Table 7 - SIDRA Outputs – Existing and 2031

Intersection	Scenario	Assessment Period	Worst DoS	95%ile Queue (m)	Average Delay (s)	Worst Delay (s)	Average LoS	Worst LoS
Flynn Drive / Greenwich Parade Intersection	Existing	AM Peak	0.184	1.7	1.6	12.2	A	B
		PM Peak	0.231	4.0	1.8	12.5	A	B
	Existing with Development	AM Peak	0.184	3.5	2.6	13.7	A	B
		PM Peak	0.258	9.4	3.1	13.9	A	B
Flynn Drive / Greenwich Parade Intersection	2031 No Change of Use	AM Peak	0.798	10.1	6.8	104.8	A	F
		PM Peak	0.409	5.0	3.8	26.7	A	D
	2031 With Change of Use	AM Peak	0.882	12.9	8.5	130.7	A	F
		PM Peak	0.450	5.7	4.2	27.8	A	D
Hemisphere Street / Greenwich Parade Intersection	No Change of Use	AM Peak	0.181	7.3	6.5	10.1	A	B
		PM Peak	0.178	7.1	6.4	10.0	A	B
	With Change of Use	AM Peak	0.181	7.3	6.4	10.0	A	B
		PM Peak	0.181	7.3	6.4	10.0	A	B

The results indicate the Hemisphere Street / Greenwich Parade Intersection would perform with acceptable degree of saturation, queue distance and delay under all scenarios.

Result also indicate that the additional traffic generated from the proposed change of land use of Lot 1001 and 1021 can be accommodated easily within the existing intersection operation. In the 10-year scenario the Flynn Drive / Greenwich Parade intersection will have a level of service F for the right-turn movement out of the minor road (Greenwich Parade) during the AM peak for both the existing land use (Service Industry) and the proposed land use (Business). This indicates that the projected background traffic growth will potentially trigger an upgrade or modification to this intersection and not the change in land use.

6. Pedestrian and Cycle Networks

6.1. Existing and Proposed Cycle and Pedestrian Networks and Facilities

Within the structure plan area, pedestrian footpath is available on at least one side of each road. Pedestrian footpath will also be available on the kerbed road sections of Flynn Drive. Since 26th April 2016 Western Australia has permitted cyclists of any age to ride on footpaths. Where the road sections of Flynn Drive are not kerbed, the sealed shoulders will be available for cyclists to access greater bicycle network.

The existing and future pedestrian/cycle facilities in the local vicinity are considered to be adequate.

7. Conclusion

Based on the assessment of traffic generation it is predicted that there will be no unacceptable impact on the adjacent road segments.

With respect to the proposed change of land use from “Service Industrial” to “Business” for Lot 1001 and 1021 Greenwich Parade, it is concluded that:

- The change of land use will generate additional 493 vehicle movement per day and 51 and 36 vehicles movement during the AM and PM periods, respectively;
- The change in land use does not trigger upgrade of the intersection of Flynn Drive / Greenwich Parade.
- The change in land use is expected to attract direct traffic rather than passing traffic as Flynn Drive is used as a regional link for freight and others.
- The additional traffic resulted from the change of use will have minor impact to the operation of surrounding intersections, however the background traffic growth due to the Neerabup Structure Plan will trigger an upgrade to Flynn Drive / Greenwich Parade intersection and the duplication of Flynn Drive.

Appendix A - Traffic Count

mainroads WESTERN AUSTRALIA

SITE 51751

Hourly Volume

Flynn Dr (1100474)

East of Wanneroo Rd (SLK 0.83)

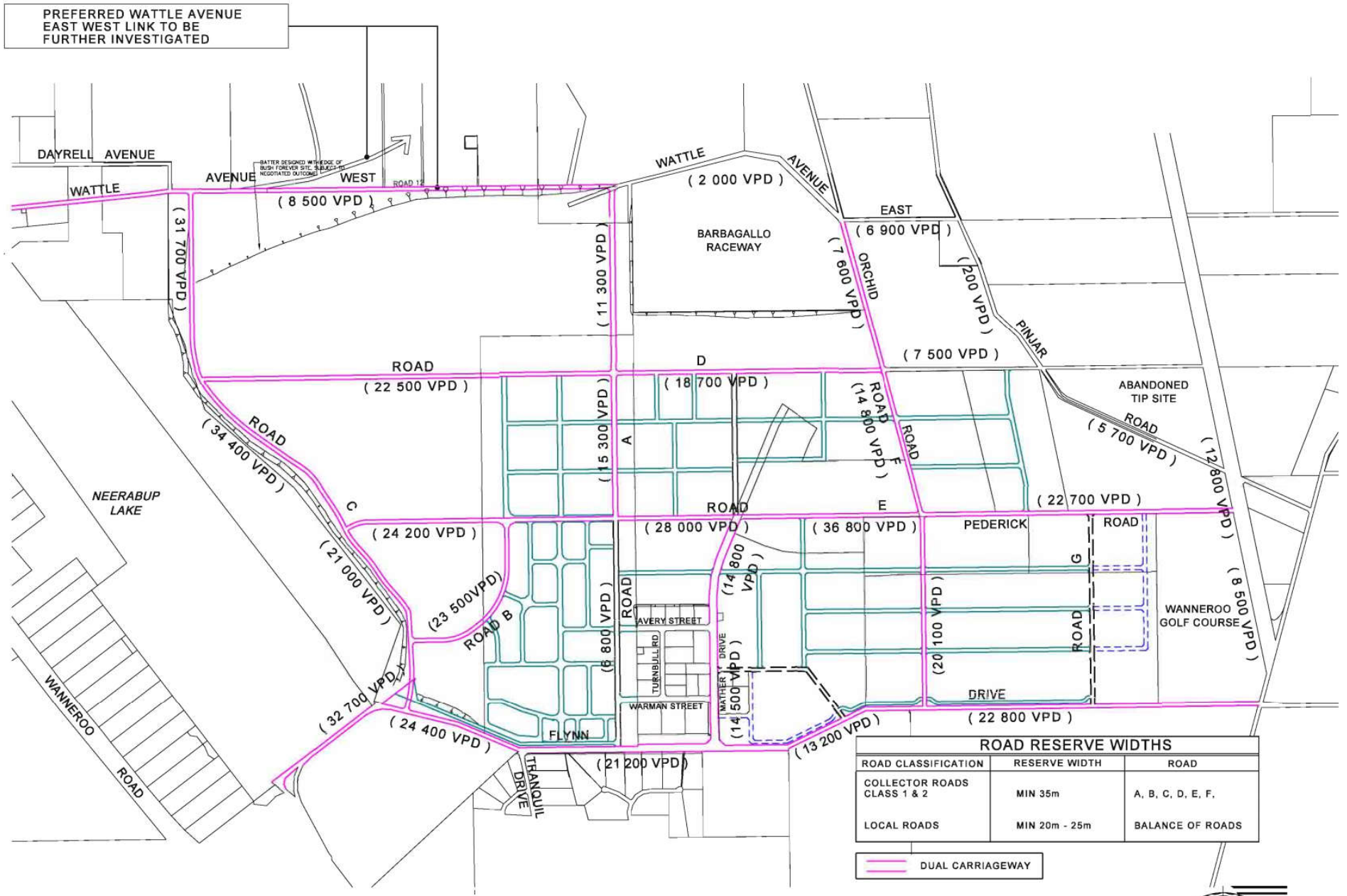
2018/19
Monday to Friday

	All Vehicles			Heavy Vehicles			
	EB	WB	Both	EB	WB	Both	%
00:00	8	6	14	6	1	7	50.0
01:00	7	4	11	2	0	2	18.2
02:00	3	2	5	2	0	2	40.0
03:00	6	9	15	1	1	2	13.3
04:00	33	4	37	7	1	8	21.6
05:00	229	30	259	47	14	61	23.6
06:00	300	172	472	95	79	174	36.9
07:00	246	173	419	89	75	164	39.1
08:00	223	181	404	81	79	160	39.6
09:00	217	163	380	108	91	199	52.4
10:00	174	199	373	100	112	212	56.8
11:00	152	180	332	77	93	170	51.2
12:00	144	158	302	84	72	156	51.7
13:00	164	192	356	84	91	175	49.2
14:00	165	238	403	81	85	166	41.2
15:00	164	282	446	57	79	136	30.5
16:00	120	376	496	39	83	122	24.6
17:00	95	219	314	18	38	56	17.8
18:00	45	117	162	10	17	27	16.7
19:00	26	49	75	4	8	12	16.0
20:00	16	22	38	2	5	7	18.4
21:00	16	15	31	2	3	5	16.1
22:00	10	8	18	1	2	3	16.7
23:00	7	6	13	2	3	5	38.5
TOTAL	2570	2805	5375	999	1032	2031	37.8

Peak Statistics

AM	TIME	05:45	10:00	06:00	09:15	10:00	09:30
	VOL	313	199	472	114	112	218
PM	TIME	13:45	16:00	15:45	12:15	14:15	13:15
	VOL	168	376	519	88	92	175

Appendix B – Neerabup Industrial Area Indicative Movement Network



PROJECT

NEERABUP INDUSTRIAL AREA
INDICATIVE MOVEMENT NETWORK

400m 200m 0m 200m 400m

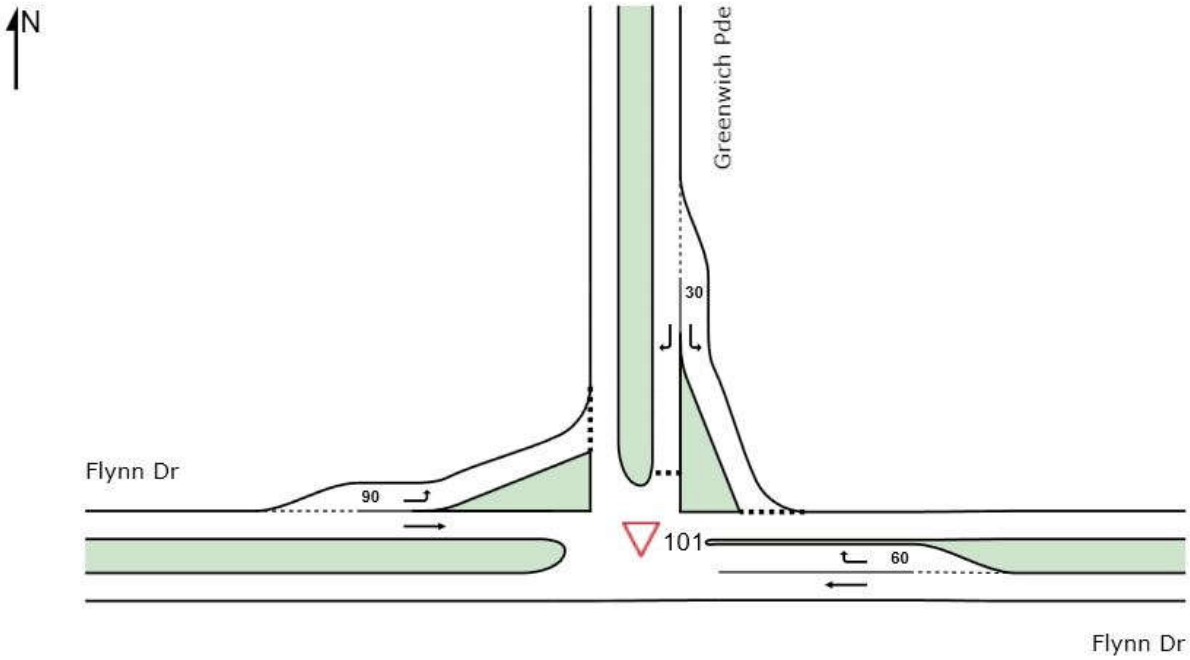
NORTH

PLAN 3

TAYLOR BURRELL BARNETT
Town Planning and Design
187 Roberts Road Subiaco
Western Australia 6008
Telephone: (08) 9382 2911
Facsimile: (08) 9382 4586
admin@tbbplanning.com.au

SINCLAIR KNIGHT MERZ

Appendix C - SIDRA Outputs



MOVEMENT SUMMARY

▽ Site: 101 [Existing AM Flynn-Greenwich]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Flynn Dr												
5	T1	172	30.0	0.106	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	34	30.0	0.032	7.4	LOS A	0.1	1.2	0.44	0.61	0.44	50.9
Approach		206	30.0	0.106	1.2	NA	0.1	1.2	0.07	0.10	0.07	58.3
North: Greenwich Pde												
7	L2	9	30.0	0.009	7.4	LOS A	0.0	0.3	0.41	0.56	0.41	51.7
9	R2	17	30.0	0.040	12.2	LOS B	0.1	1.2	0.60	0.78	0.60	47.8
Approach		26	30.0	0.040	10.6	LOS B	0.1	1.2	0.53	0.70	0.53	49.1
West: Flynn Dr												
10	L2	64	30.0	0.047	6.1	LOS A	0.2	1.7	0.12	0.51	0.12	52.7
11	T1	300	30.0	0.184	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		364	30.0	0.184	1.1	LOS A	0.2	1.7	0.02	0.09	0.02	58.5
All Vehicles		596	30.0	0.184	1.6	NA	0.2	1.7	0.06	0.12	0.06	57.9

MOVEMENT SUMMARY

Site: 101 [Existing PM Flynn-Greenwich]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Flynn Dr												
5	T1	376	30.0	0.231	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
6	R2	14	30.0	0.010	6.4	LOS A	0.0	0.4	0.26	0.54	0.26	51.4
Approach		390	30.0	0.231	0.3	NA	0.0	0.4	0.01	0.02	0.01	59.6
North: Greenwich Pde												
7	L2	29	30.0	0.023	6.5	LOS A	0.1	0.8	0.24	0.52	0.24	52.3
9	R2	54	30.0	0.125	12.5	LOS B	0.5	4.0	0.62	0.84	0.62	47.6
Approach		83	30.0	0.125	10.4	LOS B	0.5	4.0	0.49	0.73	0.49	49.1
West: Flynn Dr												
10	L2	22	30.0	0.016	6.0	LOS A	0.1	0.5	0.07	0.51	0.07	52.9
11	T1	120	30.0	0.074	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		142	30.0	0.074	0.9	LOS A	0.1	0.5	0.01	0.08	0.01	58.8
All Vehicles		615	30.0	0.231	1.8	NA	0.5	4.0	0.07	0.13	0.07	57.7

MOVEMENT SUMMARY

Site: 101 [Existing AM Flynn-Greenwich with Development]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Flynn Dr												
5	T1	172	30.0	0.106	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	68	30.0	0.064	7.5	LOS A	0.3	2.4	0.45	0.63	0.45	50.9
Approach		240	30.0	0.106	2.1	NA	0.3	2.4	0.13	0.18	0.13	57.1
North: Greenwich Pde												
7	L2	18	30.0	0.018	7.5	LOS A	0.1	0.6	0.41	0.58	0.41	51.7
9	R2	33	30.0	0.087	13.7	LOS B	0.3	2.7	0.66	0.86	0.66	46.8
Approach		51	30.0	0.087	11.5	LOS B	0.3	2.7	0.57	0.76	0.57	48.5
West: Flynn Dr												
10	L2	126	30.0	0.095	6.2	LOS A	0.4	3.5	0.19	0.51	0.19	52.5
11	T1	300	30.0	0.184	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		426	30.0	0.184	1.9	LOS A	0.4	3.5	0.06	0.15	0.06	57.5
All Vehicles		717	30.0	0.184	2.6	NA	0.4	3.5	0.12	0.20	0.12	56.6

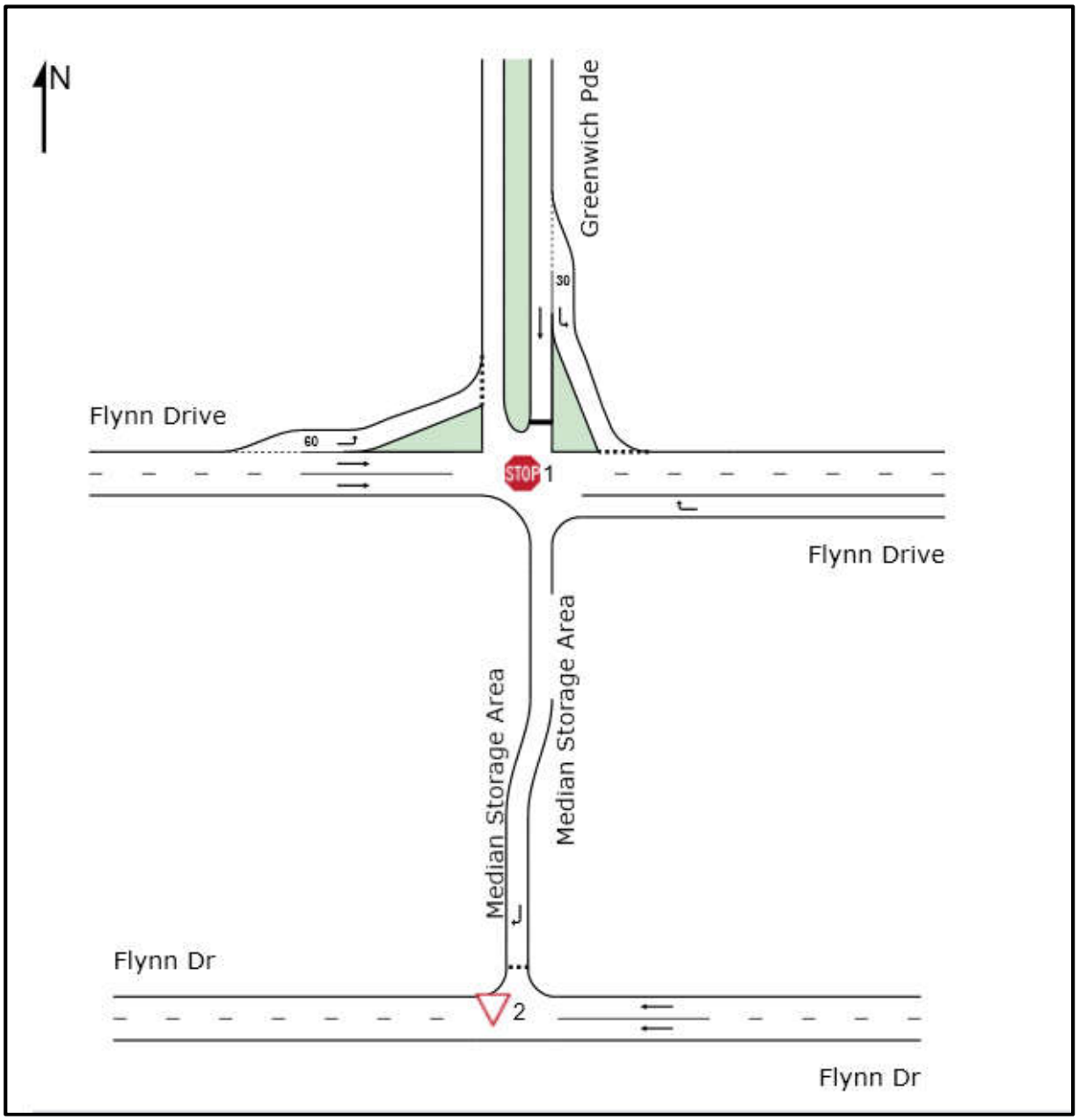
MOVEMENT SUMMARY

▽ Site: 101 [Existing PM Flynn-Greenwich with Development]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Flynn Dr												
5	T1	376	30.0	0.232	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
6	R2	23	30.0	0.017	6.4	LOS A	0.1	0.7	0.26	0.54	0.26	51.4
Approach		399	30.0	0.232	0.4	NA	0.1	0.7	0.01	0.03	0.01	59.4
North: Greenwich Pde												
7	L2	58	30.0	0.047	6.5	LOS A	0.2	1.6	0.25	0.52	0.25	52.3
9	R2	108	30.0	0.258	13.9	LOS B	1.1	9.4	0.67	0.89	0.74	46.7
Approach		166	30.0	0.258	11.3	LOS B	1.1	9.4	0.52	0.76	0.57	48.5
West: Flynn Dr												
10	L2	42	30.0	0.030	6.0	LOS A	0.1	1.1	0.09	0.51	0.09	52.8
11	T1	120	30.0	0.074	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		162	30.0	0.074	1.6	LOS A	0.1	1.1	0.02	0.13	0.02	57.9
All Vehicles		727	30.0	0.258	3.1	NA	1.1	9.4	0.13	0.22	0.14	56.2



Note This intersection layout is just a technique used in SIDRA analysis to simulate two stage right-turn movement from the minor road.

MOVEMENT SUMMARY

Site: 1 [2031 AM Flynn-Greenwich No Change of Use Stage 1] — **Network: N101 [AM Peak No Change of Use]**

Staged crossing Stage 1 (Minor Road) at three-way intersection with 5-lane major road. Major road turn lane is treated as a full-length lane.
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Flynn Drive														
12	R2	102	6.0	102	6.0	0.501	31.3	LOS D	0.8	5.9	0.92	1.06	1.27	38.8
Approach		102	6.0	102	6.0	0.501	31.3	NA	0.8	5.9	0.92	1.06	1.27	38.8
North: Greenwich Pde														
1	L2	68	6.0	68	6.0	0.093	9.3	LOS A	0.1	1.0	0.58	0.78	0.58	51.3
2	T1	68	6.0	68	6.0	0.798	104.8	LOS F	1.4	10.1	0.98	1.19	1.80	13.9
Approach		136	6.0	136	6.0	0.798	57.1	LOS F	1.4	10.1	0.78	0.99	1.19	27.0
West: Flynn Drive														
4	L2	102	6.0	102	6.0	0.081	6.1	LOS A	0.1	1.0	0.22	0.53	0.22	53.3
5	T1	1362	6.0	1362	6.0	0.363	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		1464	6.0	1464	6.0	0.363	0.5	LOS A	0.1	1.0	0.02	0.04	0.02	59.4
All Vehicles		1702	6.0	1702	6.0	0.798	6.8	NA	1.4	10.1	0.13	0.17	0.18	53.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2 [2031 AM Flynn-Greenwich No Change of Use Stage 2] — **Network: N101 [AM Peak No Change of Use]**

Staged crossing Stage 2 (Median) at three-way intersection with 5-lane major road.
Give-way behaviour assumed at Stage 2.
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Flynn Dr														
11	T1	746	6.0	746	6.0	0.199	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		746	6.0	746	6.0	0.199	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
North: Median Storage Area														
3	R2	68	6.0	68	6.0	0.097	3.3	LOS A	0.1	0.7	0.53	0.52	0.53	48.1
Approach		68	6.0	68	6.0	0.097	3.3	LOS A	0.1	0.7	0.53	0.52	0.53	48.1
All Vehicles		814	6.0	814	6.0	0.199	0.3	NA	0.1	0.7	0.04	0.04	0.04	59.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [2031 PM Flynn-Greenwich No Change of Use Stage 1]

Network: N101 [PM Peak No Change of Use]

Staged crossing Stage 1 (Minor Road) at three-way intersection with 5-lane major road. Major road turn lane is treated as a full-length lane.
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Flynn Drive														
12	R2	68	6.0	68	6.0	0.148	12.7	LOS B	0.2	1.6	0.71	0.88	0.71	48.4
Approach		68	6.0	68	6.0	0.148	12.7	NA	0.2	1.6	0.71	0.88	0.71	48.4
North: Greenwich Pde														
1	L2	102	6.0	102	6.0	0.102	7.6	LOS A	0.2	1.2	0.48	0.67	0.48	52.4
2	T1	102	6.0	102	6.0	0.409	26.7	LOS D	0.7	5.0	0.86	1.08	1.13	33.3
Approach		204	6.0	204	6.0	0.409	17.2	LOS C	0.7	5.0	0.67	0.87	0.80	44.0
West: Flynn Drive														
4	L2	68	6.0	68	6.0	0.052	5.9	LOS A	0.1	0.6	0.17	0.52	0.17	53.5
5	T1	908	6.0	908	6.0	0.242	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		976	6.0	976	6.0	0.242	0.4	LOS A	0.1	0.6	0.01	0.04	0.01	59.4
All Vehicles		1248	6.0	1248	6.0	0.409	3.8	NA	0.7	5.0	0.16	0.22	0.18	56.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2 [2031 PM Flynn-Greenwich No Change of Use Stage 2]

Network: N101 [PM Peak No Change of Use]

Staged crossing Stage 2 (Median) at three-way intersection with 5-lane major road.
Give-way behaviour assumed at Stage 2.
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Flynn Dr														
11	T1	1204	6.0	1204	6.0	0.321	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		1204	6.0	1204	6.0	0.321	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
North: Median Storage Area														
3	R2	102	6.0	102	6.0	0.265	9.0	LOS A	0.4	2.1	0.78	0.85	0.89	41.9
Approach		102	6.0	102	6.0	0.265	9.0	LOS A	0.4	2.1	0.78	0.85	0.89	41.9
All Vehicles		1306	6.0	1306	6.0	0.321	0.7	NA	0.4	2.1	0.06	0.07	0.07	58.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [2031 AM Flynn-Greenwich With Change of Use Stage 1]

Network: N101 [AM Peak With Change of Use]

Staged crossing Stage 1 (Minor Road) at three-way intersection with 5-lane major road. Major road turn lane is treated as a full-length lane.
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Flynn Drive														
12	R2	116	6.0	116	6.0	0.569	33.6	LOS D	1.0	7.0	0.93	1.09	1.39	37.9
Approach		116	6.0	116	6.0	0.569	33.6	NA	1.0	7.0	0.93	1.09	1.39	37.9
North: Greenwich Pde														
1	L2	72	6.0	72	6.0	0.098	9.3	LOS A	0.1	1.1	0.58	0.78	0.58	51.3
2	T1	72	6.0	72	6.0	0.882	130.7	LOS F	1.7	12.9	0.99	1.28	2.17	11.6
Approach		144	6.0	144	6.0	0.882	70.0	LOS F	1.7	12.9	0.78	1.03	1.37	24.0
West: Flynn Drive														
4	L2	116	6.0	116	6.0	0.093	6.2	LOS A	0.2	1.1	0.24	0.53	0.24	53.2
5	T1	1362	6.0	1362	6.0	0.363	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		1478	6.0	1478	6.0	0.363	0.5	LOS A	0.2	1.1	0.02	0.04	0.02	59.3
All Vehicles		1738	6.0	1738	6.0	0.882	8.5	NA	1.7	12.9	0.14	0.19	0.22	52.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2 [2031 AM Flynn-Greenwich With Change of Use Stage 2]

Network: N101 [AM Peak With Change of Use]

Staged crossing Stage 2 (Median) at three-way intersection with 5-lane major road.
Give-way behaviour assumed at Stage 2.
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Flynn Dr														
11	T1	746	6.0	746	6.0	0.199	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		746	6.0	746	6.0	0.199	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
North: Median Storage Area														
3	R2	72	6.0	72	6.0	0.103	3.3	LOS A	0.1	0.8	0.53	0.52	0.53	48.1
Approach		72	6.0	72	6.0	0.103	3.3	LOS A	0.1	0.8	0.53	0.52	0.53	48.1
All Vehicles		818	6.0	818	6.0	0.199	0.3	NA	0.1	0.8	0.05	0.05	0.05	59.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [2031 PM Flynn-Greenwich With Change of Use Stage 1]

Network: N101 [PM Peak With Change of Use]

Staged crossing Stage 1 (Minor Road) at three-way intersection with 5-lane major road. Major road turn lane is treated as a full-length lane.
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Flynn Drive														
12	R2	72	6.0	72	6.0	0.157	12.7	LOS B	0.2	1.7	0.71	0.88	0.71	48.4
Approach		72	6.0	72	6.0	0.157	12.7	NA	0.2	1.7	0.71	0.88	0.71	48.4
North: Greenwich Pde														
1	L2	111	6.0	111	6.0	0.111	7.7	LOS A	0.2	1.3	0.48	0.68	0.48	52.4
2	T1	111	6.0	111	6.0	0.450	27.8	LOS D	0.8	5.7	0.87	1.09	1.19	32.7
Approach		222	6.0	222	6.0	0.450	17.7	LOS C	0.8	5.7	0.67	0.88	0.84	43.6
West: Flynn Drive														
4	L2	72	6.0	72	6.0	0.055	6.0	LOS A	0.1	0.7	0.17	0.52	0.17	53.4
5	T1	908	6.0	908	6.0	0.242	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		980	6.0	980	6.0	0.242	0.5	LOS A	0.1	0.7	0.01	0.04	0.01	59.4
All Vehicles		1274	6.0	1274	6.0	0.450	4.2	NA	0.8	5.7	0.17	0.23	0.20	55.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2 [2031 PM Flynn-Greenwich With Change of Use Stage 2]

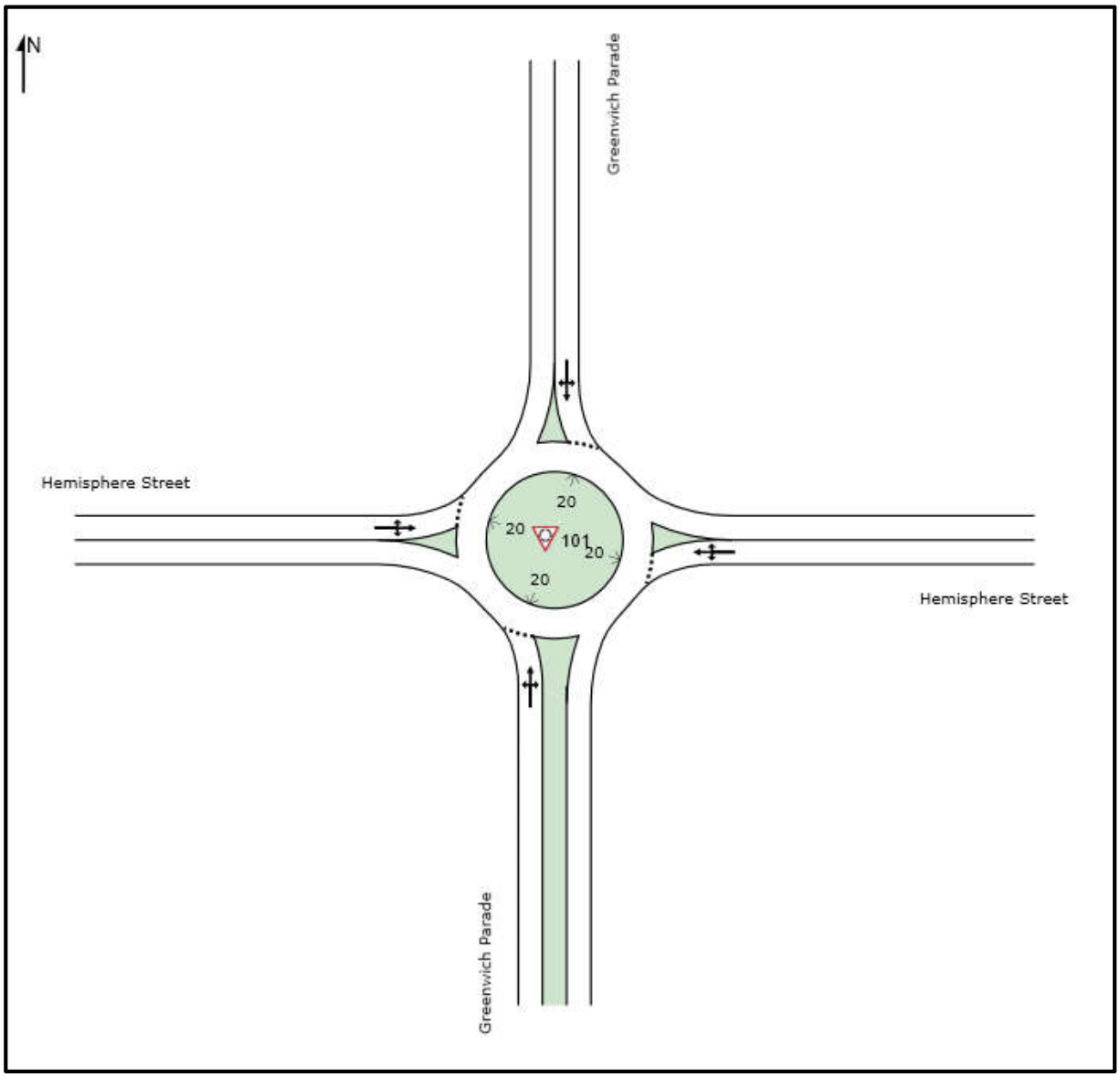
Network: N101 [PM Peak With Change of Use]

Staged crossing Stage 2 (Median) at three-way intersection with 5-lane major road.
Give-way behaviour assumed at Stage 2.
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Flynn Dr														
11	T1	1024	6.0	1024	6.0	0.273	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		1024	6.0	1024	6.0	0.273	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
North: Median Storage Area														
3	R2	111	6.0	111	6.0	0.223	6.2	LOS A	0.3	1.7	0.70	0.73	0.75	14.7
Approach		111	6.0	111	6.0	0.223	6.2	LOS A	0.3	1.7	0.70	0.73	0.75	14.7
All Vehicles		1135	6.0	1135	6.0	0.273	0.6	NA	0.3	1.7	0.07	0.07	0.07	59.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.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Hemisphere Street
Greenwich Parade

MOVEMENT SUMMARY

Site: 101 [2031 AM Peak Hemisphere-Greenwich No Change of Use]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenwich Parade												
1	L2	40	6.0	0.167	4.7	LOS A	0.9	6.8	0.35	0.51	0.35	53.3
2	T1	120	6.0	0.167	4.9	LOS A	0.9	6.8	0.35	0.51	0.35	54.6
3	R2	40	6.0	0.167	9.6	LOS A	0.9	6.8	0.35	0.51	0.35	54.5
Approach		200	6.0	0.167	5.8	LOS A	0.9	6.8	0.35	0.51	0.35	54.3
East: Hemisphere Street												
4	L2	80	6.0	0.174	5.0	LOS A	0.9	6.9	0.39	0.58	0.39	52.7
5	T1	40	6.0	0.174	5.2	LOS A	0.9	6.9	0.39	0.58	0.39	54.0
6	R2	80	6.0	0.174	9.8	LOS A	0.9	6.9	0.39	0.58	0.39	53.9
Approach		200	6.0	0.174	7.0	LOS A	0.9	6.9	0.39	0.58	0.39	53.4
North: Greenwich Parade												
7	L2	28	6.0	0.119	4.8	LOS A	0.6	4.7	0.35	0.51	0.35	53.3
8	T1	84	6.0	0.119	5.0	LOS A	0.6	4.7	0.35	0.51	0.35	54.6
9	R2	28	6.0	0.119	9.6	LOS A	0.6	4.7	0.35	0.51	0.35	54.5
Approach		140	6.0	0.119	5.9	LOS A	0.6	4.7	0.35	0.51	0.35	54.3
West: Hemisphere Street												
10	L2	80	6.0	0.181	5.3	LOS A	1.0	7.3	0.44	0.60	0.44	52.5
11	T1	40	6.0	0.181	5.5	LOS A	1.0	7.3	0.44	0.60	0.44	53.8
12	R2	80	6.0	0.181	10.1	LOS B	1.0	7.3	0.44	0.60	0.44	53.7
Approach		200	6.0	0.181	7.3	LOS A	1.0	7.3	0.44	0.60	0.44	53.3
All Vehicles		740	6.0	0.181	6.5	LOS A	1.0	7.3	0.38	0.56	0.38	53.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2031 PM Peak Hemisphere-Greenwich No Change of Use]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenwich Parade												
1	L2	28	6.0	0.119	4.8	LOS A	0.6	4.6	0.35	0.51	0.35	53.3
2	T1	84	6.0	0.119	5.0	LOS A	0.6	4.6	0.35	0.51	0.35	54.6
3	R2	28	6.0	0.119	9.6	LOS A	0.6	4.6	0.35	0.51	0.35	54.5
Approach		140	6.0	0.119	5.9	LOS A	0.6	4.6	0.35	0.51	0.35	54.3
East: Hemisphere Street												
4	L2	80	6.0	0.178	5.1	LOS A	1.0	7.1	0.41	0.59	0.41	52.6
5	T1	40	6.0	0.178	5.3	LOS A	1.0	7.1	0.41	0.59	0.41	53.9
6	R2	80	6.0	0.178	10.0	LOS A	1.0	7.1	0.41	0.59	0.41	53.8
Approach		200	6.0	0.178	7.1	LOS A	1.0	7.1	0.41	0.59	0.41	53.3
North: Greenwich Parade												
7	L2	40	6.0	0.160	4.5	LOS A	0.9	6.4	0.30	0.49	0.30	53.5
8	T1	120	6.0	0.160	4.7	LOS A	0.9	6.4	0.30	0.49	0.30	54.8
9	R2	40	6.0	0.160	9.4	LOS A	0.9	6.4	0.30	0.49	0.30	54.7
Approach		200	6.0	0.160	5.6	LOS A	0.9	6.4	0.30	0.49	0.30	54.5
West: Hemisphere Street												
10	L2	56	6.0	0.122	4.9	LOS A	0.6	4.6	0.37	0.57	0.37	52.7
11	T1	28	6.0	0.122	5.1	LOS A	0.6	4.6	0.37	0.57	0.37	54.0
12	R2	56	6.0	0.122	9.8	LOS A	0.6	4.6	0.37	0.57	0.37	53.9
Approach		140	6.0	0.122	6.9	LOS A	0.6	4.6	0.37	0.57	0.37	53.5
All Vehicles		680	6.0	0.178	6.4	LOS A	1.0	7.1	0.36	0.54	0.36	53.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2031 AM Peak Hemisphere-Greenwich With Change of Use]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenwich Parade												
1	L2	40	6.0	0.164	4.5	LOS A	0.9	6.6	0.30	0.50	0.30	53.5
2	T1	124	6.0	0.164	4.8	LOS A	0.9	6.6	0.30	0.50	0.30	54.8
3	R2	40	6.0	0.164	9.4	LOS A	0.9	6.6	0.30	0.50	0.30	54.7
Approach		204	6.0	0.164	5.6	LOS A	0.9	6.6	0.30	0.50	0.30	54.5
East: Hemisphere Street												
4	L2	56	6.0	0.125	5.0	LOS A	0.7	4.8	0.38	0.58	0.38	52.7
5	T1	29	6.0	0.125	5.2	LOS A	0.7	4.8	0.38	0.58	0.38	54.0
6	R2	58	6.0	0.125	9.8	LOS A	0.7	4.8	0.38	0.58	0.38	53.9
Approach		143	6.0	0.125	7.0	LOS A	0.7	4.8	0.38	0.58	0.38	53.4
North: Greenwich Parade												
7	L2	30	6.0	0.125	4.8	LOS A	0.7	4.9	0.35	0.52	0.35	53.3
8	T1	87	6.0	0.125	5.0	LOS A	0.7	4.9	0.35	0.52	0.35	54.6
9	R2	30	6.0	0.125	9.6	LOS A	0.7	4.9	0.35	0.52	0.35	54.4
Approach		147	6.0	0.125	5.9	LOS A	0.7	4.9	0.35	0.52	0.35	54.3
West: Hemisphere Street												
10	L2	80	6.0	0.181	5.2	LOS A	1.0	7.3	0.42	0.60	0.42	52.6
11	T1	41	6.0	0.181	5.4	LOS A	1.0	7.3	0.42	0.60	0.42	53.9
12	R2	82	6.0	0.181	10.0	LOS B	1.0	7.3	0.42	0.60	0.42	53.7
Approach		203	6.0	0.181	7.2	LOS A	1.0	7.3	0.42	0.60	0.42	53.3
All Vehicles		697	6.0	0.181	6.4	LOS A	1.0	7.3	0.36	0.55	0.36	53.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2031 PM Peak Hemisphere-Greenwich With Change of Use]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenwich Parade												
1	L2	28	6.0	0.123	4.8	LOS A	0.7	4.8	0.35	0.51	0.35	53.3
2	T1	88	6.0	0.123	5.0	LOS A	0.7	4.8	0.35	0.51	0.35	54.6
3	R2	28	6.0	0.123	9.6	LOS A	0.7	4.8	0.35	0.51	0.35	54.5
Approach		144	6.0	0.123	5.9	LOS A	0.7	4.8	0.35	0.51	0.35	54.3
East: Hemisphere Street												
4	L2	80	6.0	0.181	5.2	LOS A	1.0	7.3	0.42	0.60	0.42	52.6
5	T1	41	6.0	0.181	5.4	LOS A	1.0	7.3	0.42	0.60	0.42	53.9
6	R2	82	6.0	0.181	10.0	LOS B	1.0	7.3	0.42	0.60	0.42	53.7
Approach		203	6.0	0.181	7.2	LOS A	1.0	7.3	0.42	0.60	0.42	53.3
North: Greenwich Parade												
7	L2	42	6.0	0.166	4.5	LOS A	0.9	6.7	0.30	0.50	0.30	53.5
8	T1	123	6.0	0.166	4.8	LOS A	0.9	6.7	0.30	0.50	0.30	54.8
9	R2	42	6.0	0.166	9.4	LOS A	0.9	6.7	0.30	0.50	0.30	54.6
Approach		207	6.0	0.166	5.6	LOS A	0.9	6.7	0.30	0.50	0.30	54.5
West: Hemisphere Street												
10	L2	56	6.0	0.125	5.0	LOS A	0.7	4.8	0.38	0.58	0.38	52.7
11	T1	29	6.0	0.125	5.2	LOS A	0.7	4.8	0.38	0.58	0.38	54.0
12	R2	58	6.0	0.125	9.8	LOS A	0.7	4.8	0.38	0.58	0.38	53.9
Approach		143	6.0	0.125	7.0	LOS A	0.7	4.8	0.38	0.58	0.38	53.4
All Vehicles		697	6.0	0.181	6.4	LOS A	1.0	7.3	0.36	0.55	0.36	53.9

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HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix D – Consultation

URBIS

MINUTES

For:	Neerabup ASP 17 Amendment	
Held at:	City of Wanneroo	
On:	Monday 29 October – 9am	
Attendees:	Mark Dixon – City of Wanneroo	Mat Selby – Department Planning Lands and Heritage
	Josh Coppola – City of Wanneroo	Andrew Cook – Department Planning Lands and Heritage
	Bonnie Butler – City of Wanneroo	
	David Lewis – LandCorp	Karen Wright – Urbis
	Steven Bennett – LandCorp	Emma Dunning - Urbis
	Tim Carr – LandCorp	

POSITIONS AS NOTED:

LandCorp (and Urbis)

- Need to provide amenity within Meridian Park (and industrial estates in general)
- Looking at economic and employment benefits
- Has a proponent looking to develop ($10mil+ investment)
- Service hubs consistent with philosophy for industrial across the state
- Multiple service hubs ensure activity is not drawn away from activity centres rather than a conglomeration of commercial in the centre
- Uses proposed are consistent with those anticipated within the existing commercial area and are directly to service the employees of the estate
- Industrial development is changing and requires more flexibility for innovation and responsiveness to market needs
- Neerabup has not rolled out in the timeframes or form that was initially envisaged i.e business zone was to be brought on board much sooner, cater for larger scale commercial and have a direct connection to freeway/Neerabup road – changes need to occur to allow the full development potential to be realised and for activation and amenity to be provided sooner
- Consistent feedback provided by UDIA and PCA is that industrial estates require early activation/amenity to support workers and service businesses
- LandCorp developer survey supports feedback that amenity is required

City of Wanneroo

- Support the need for service hubs to support industrial
- Current review of Neerabup includes decentralisation of commercial into a number of service hubs
- Irrespective of proposal a service hub would be located on this site due to geographic location and existing development
- Progress on review is in early stages, likely 2+ years till completion
- Service hubs are a better way of planning for industrial areas
- Development in the location of the current business zone is 10+ years away, amenity is required now

Department of Planning, Lands and Heritage

- Inconsistency of land uses within MRS Industrial Zone (broad scale office)
- Ad hoc reactive development not considered to be in line with planning for area

- Locational concerns – traffic and entrance to estate, potentially better located on main spine to east
- Catchment concerns – drawing trade externally from activity centres – cautious of eroding activity centres
- Land use concerns especially restaurant use

OUTCOMES

Key issues

- Disaggregation of the Business uses
- Locational requirements - road hierarchy
- MRS Industrial land - not inconsistent with the MRS
- Road hierarchy/traffic network

Need to provide justification regarding

- What is the role of this centre - support the needs of the industrial development only, details on scale and appropriateness
- The service hub is to be self-sufficient and provide amenity to the industrial estate and not broader area – must demonstrate appropriateness
- Narrative of how Neerabup has changed / how industrial has changed since structure plan inception – provide reports/research/trends to back up
- Build the case for the rezoning, discuss how the philosophy has changed for the Business core and the need to provide amenity up front and in a co-ordinated manner across the NIA
- Consider the traffic movement changes for the DA and for the structure plan modification – location, movements, entrances

Timing

- City does not want the DA lodged prior to structure plan modification, if had to prepare a report would not support to the JDAP
- Urbis to work with the City to develop an agreed timeline