Prepared for

GOODMAN PROPERTY SERVICES

Transport Assessment Report

Proposed Oakdale East Industrial Estate

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Revision History

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I	11/12/2018	Issue	R. Butler-Madden	J. Mulhaire
II	8/03/2019	Issue	R. Butler-Madden	R. Butler-Madden

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1 Introduction

1.1 Overview

Ason Group has been engaged by Goodman Property Services (Aust) Pty Ltd to prepare a Transport Assessment (TA) to support a proposed industrial development within the land known as the Oakdale East Industrial Estate (OEE). The Proposal relates to some 10.9 hectares (ha) of land of Old Wallgrove Road (the Site) across the central and southern parts of the broader OEE, and provides for:

- 4 warehouses with a combined Gross Floor Area (GFA) of 22,496m^2;
- Ancillary office space with a combined GFA of 2,360m^2;
- A Masonry Plant with a GFA of 10,430m^2 and ancillary office space of 520m^2;
- A total of 228 car parking spaces, including 6 accessible spaces, across the Site;
- The construction of a new access road extending from Old Wallgrove Road into the Site (termed Estate Road 1 for ease of reference); and
- Separated light vehicle and truck access points to Estate Road 1 for the individual development lots.

It is noted that the OEE has a total developable area of some 32 ha; at this time there is no expectation of the development on the northern part of the OEE (some 21.1 ha across the southern portion of the adjacent Austral Site) in the short-medium term while Austral Bricks continue their operations.

OEE comprises the fourth and final stage of the broader Oakdale Industrial Estate development. The other development stages of the Oakdale Industrial Estate include:

- Oakdale Central – which is nearing completion.
- Oakdale South – under construction.
- Oakdale West – State Significant Development Application is currently being considered by the Department of Planning & Environment (DP&E).

The Site is located within the Western Sydney Employment Area (WSEA) and within the Fairfield Local Government Area (LGA) and is therefore subject to Fairfield City Council (Council) development controls as well as State Environmental Planning Policy (Western Sydney Employment Area) 2009 (SEPP WSEA) development controls.

This TA provides an assessment of the access, traffic and parking characteristics of the Proposal. From the outset, it is noted that the assessment of potential traffic impacts arising from the Proposal

specifically references recent assessments of key infrastructure projects within the broader WSEA. These assessments account for development including the broader Oakdale Industrial Estate and detail the suite of road network upgrades required to accommodate future traffic demands. Key references include:

- *Western Sydney Employment Area – Southern Link Road Network Strategic Transport Assessment*, prepared by AECOM, 18 April 2011 (SLRN Report)
- *Old Wallgrove Road Upgrade (Roberts Road - M7 Motorway) Traffic and Transport Report*, prepared by GHD, 30 April 2012 (OWR 2012 Report)
- *Broader Western Sydney Employment Area – Transport Planning Preliminary Analysis, Exhibition Draft*, prepared by GHD, June 2013 (BWSEA Transport Report)
- *Old Wallgrove Road Extension Traffic Modelling* prepared by GHD, 18 July 2013 (OWR Extension Report)
- *Old Wallgrove Road Extension Interim Network Testing*, prepared by GHD, 28 March 2014 (OWR Extension Testing Report)
- *Broader WSEA SLRN – Options Refinement* (2014), prepared by AECOM, 6 May 2014 (SLRN Options Report)
- *Erskine Park Traffic Modelling – Proposed Western North South Link Road*, prepared by GHD, May 2016 (WNSLR Report)

This TA also references general access, traffic and parking controls and guidelines, including:

- Council's *Fairfield Citywide Development Control Plan 2013* (DCP 2013)
- Roads and Maritime Service (RMS) *Guide to Traffic Generating Developments* (RMS Guide)
- RMS *Technical Direction TDT 2013/04a, Guide to Traffic Generating Developments – Updated Traffic Surveys* (RMS Guide Update)
- Austroads *Guide to Road Design* (Austroads GRD)
- *Australian Standard 2890.1: Parking Facilities – Off Street Car Parking* (AS 2890.1)
- *Australian Standard 2890.2: Parking Facilities – Off Street Commercial Vehicle Facilities* (AS 2890.2)
- *Australian Standard 2890.6: Parking Facilities – Off Street Parking for People with Disabilities* (AS 2890.6)

Finally, this TA references the recent *Oakdale East Industrial Estate DCP Submission* prepared by Ason Group, October 2018 (DCP Submission) which provides recommendations regarding appropriate

development controls within the OEE, noting that these controls are generally identical to controls provided for other (approved) precincts within the wider Oakdale Industrial Estate.

1.2 Site & Location

The Site has a formal address of 224 – 398 Burley Road, Horsley Park, and is located north of Burley Road and east of Old Wallgrove Road, across the southern part of the Austral Bricks Plant 3 site (Austral Site). At a regional level, the Site is located approximately 40 kilometres west of the Sydney CBD and 20 kilometres west of the Parramatta CBD. As stated, the Site lies within the Fairfield LGA and is zoned IN1 *General Industrial*.

The broader Oakdale Industrial Estate comprises some 421 hectares of industrial-zoned land to the immediate south of the Sydney Water Pipeline (previously referenced as 'Lands South of Sydney Water Pipeline'). The OEE lies immediately to the east of the Oakdale Central Estate (OCE), with the two estates separated by Old Wallgrove Road as shown in **Figure 1**.

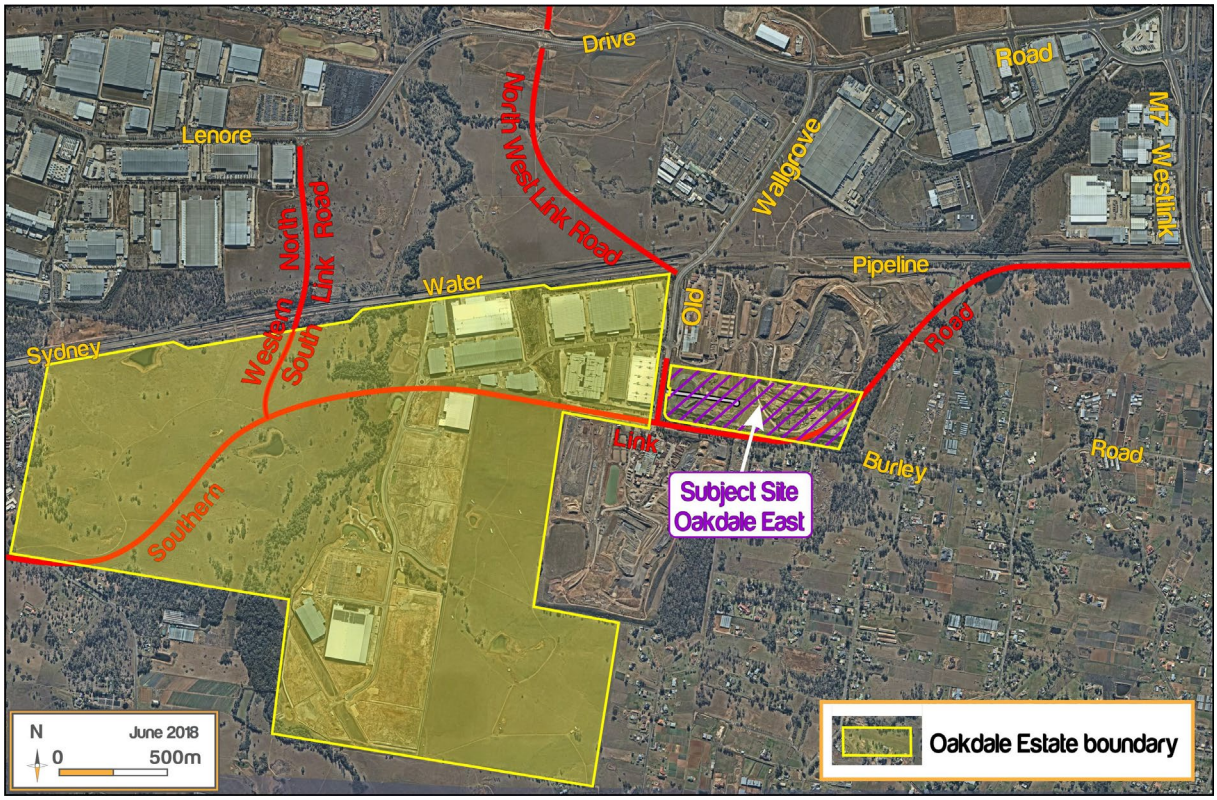

Figure 1: Oakdale East Estate Local Context

1.3 Secretary's Environmental Assessment Requirements

Secretary's Environmental Assessment Requirements (SEARs) were issued by the Department of Planning & Environmental (DPE) on 19th September 2018 regarding the proposed development within the OEE. The SEARs outline the key areas for consideration in any subsequent development application within the OEE, and include specific assessment requirements determined by the RMS

The General SEARs relating to transport issues are outlined in **Table 1** below, while the Site-specific SEARs prepared by the RMS are outlined in **Table 2**. Both tables provide a summary response to each SEARs requirement, and reference to the section of this TA providing a more detailed analysis of each requirement.

Table 1: Secretary's Environmental Assessment Requirements - General

SEARs - General	Summary Response	TA Section
A transport and traffic impact assessment to be complete with the relevant Roads and Maritime Services guidelines.	This Transport Impact Assessment has been prepared with reference to RMS and TfNSW study guidelines.	
Details of road transport routes and access to the site.	All access would be via the new Estate Road 1 to Old Wallgrove Road and then to Lenore Drive.	7
Road traffic predictions for the development during construction and operation.	Noting that the developable area of the OEE is significantly less than previous assessed by the DPE and RMS, the total traffic generation of the OEE (including the Site and the adjacent Austral Site) is estimated to be up to 360vph during the peak periods; this represents less than 50% of the OEE traffic generation estimate upon which local road upgrades were based.	7
An assessment of impacts to the safety and function of the road network and the details of any road upgrades required for the development.	The local road network has been upgraded in accordance with relevant guidelines and standards further to RMS approvals. Noting the significantly lower traffic generation of the OEE to a road network designed to accommodate significantly higher (OEE) levels of traffic, it is concluded that the OEE would have no impact on the previously determined local road and intersection operations, and indeed local intersections are expected to operation at better levels of service given the reduced traffic generation of the OEE.	7

Table 2: Secretary's Environmental Assessment Requirements - RMS

SEARs - RMS	Summary Response	TA Section
Daily and peak traffic movements likely to be generated by the proposed development including the impact on nearby intersections and the need/associated funding for upgrading or road improvement works (if required).	Noting that the developable area of the OEE is significantly less than previous assessed by the DPE and RMS, the total traffic generation of the OEE (including the Site and the adjacent Austral Site) is estimated to be up to 360vph during the peak periods; this represents less than 50% of the OEE traffic generation estimate upon which local road upgrades were based.	7
Details of the proposed accesses and the parking provisions associated with the proposed development including compliance with the requirements of the relevant Australian Standards (i.e. turn paths, sight distance requirements, aisle widths, etc.).	Separate light vehicle and truck access driveway are provided for each lot within the Site. All access driveways, internal roads, parking spaces and service areas have been designed to provide compliance with the relevant Australian Standards.	6
Proposed number of car parking spaces and compliance with the appropriate parking codes.	A total of 265 parking spaces will be provided across the Site, with an appropriate allocation to each lot based on GFA. This level of parking exceeds the requirement determined with reference to the recent DCP Submission prepared by Ason Group for the OEE.	6
Details of service vehicle movements (including vehicle type and likely arrival and departure times).	Service vehicle (truck) trips are estimated to comprise approximately 25 - 30% of peak hour traffic flows	7
Roads and Maritime requires the EA report to assess the implications of the proposed development for non-car travel modes (including public transport use, walking and cycling); the potential for implementing a location-specific sustainable travel plan (e.g.; Green Travel Plan, 'Travelsmart' or other travel behaviour change initiative); and the provision of facilities to increase the non-car mode share for travel to and from the site. This will entail an assessment of the accessibility of the development site by public transport.	Public and active transport opportunities for the OEE and broader Oakdale Estate are focused on the provision of additional bus links (particularly to sub-regional centres and railway stations) and new connections to the sub-regional cycle network. The provision of on-site cycle facilities (i.e. bike storage, lockers and showers) would be determined prior to the development of each lot within the Site.	5
Roads and Maritime requires an assessment of the likely toxicity levels of loads transported on arterial and local roads to / from the site and, consequently, the preparation of an incident management strategy for crashes involving such loads, if relevant.	These issues are detailed in the Statement of Environmental Effects that this TA accompanies.	
Roads and Maritime will require in due course the provision of a traffic management plan for all demolition/construction activities, detailing vehicle routes, number of trucks, hours of operation, access arrangements and traffic control measures.	Noted. The controls of the Site-Specific DCP require construction traffic management to be considered. During the construction phase for each warehouse detailed Construction Traffic Management Plans would be produced, in consultation with Council and RMS / TfNSW. It is expected that these would be suitably conditioned as part of a Development Approval	

1.4 Authority Consultation

As part of the SEARs it has been requested that RMS be consulted to address any issues raised within their response. Ason Group requested meetings on multiple occasions and following a phone call with the Senior Land Use Planner for the North West Precinct, Sydney Division, we were re-provided with the RMS SEARs Response Letter via email on 22nd November 2018 which was issued with the SEARs (which have been addressed as part of this assessment).

A meeting / teleconference was also offered as part of this email. As the RMS SEARs request have been addressed as part of this assessment (as detailed in Table 2) it is deemed that a consultation meeting is not required at this time. Once RMS have had the opportunity to review the Proposal and should then require a meeting, Ason Group could be available when required.

It should be noted that the assessment for the Proposal is consistent with others conducted for the broader Oakdale Industrial Estate.

1.5 Study Objectives

The key objectives of this TA are as follows:

- To provide an appropriate response to the SEARs;
- To establish that the development of the Site further to the Proposal is compliant and consistent with the access, traffic and parking principles outlined in the DCP Submission for the OEE;
- To establish that the trip generation of the Site and broader OEE is consistent with that assigned in recent WSEA assessments, and in turn can appropriately be accommodated by completed/committed upgrades to the local road network;
- To demonstrate that there is an appropriate and sustainable provision of car parking across the Site; and
- To demonstrate that the proposed access driveways, internal roads, car parks and service facilities comply with the relevant Australian Standards.

1.6 Report Structure

The report is structured as follows:

- Section 2 provides an overview of the Proposal;
- Section 3 details the strategic context of the Site;
- Section 4 describes existing local traffic and transport conditions;

- Section 5 outlines existing and proposed public transport, pedestrian and cycling links;
- Section 6 outlines the parking requirements applicable to the proposed development, and proposed parking provision;
- Section 7 assesses the traffic impacts of the development, including the Site's projected trip generation and forecasted network performance;
- Section 8 reviews the design of internal access driveways, parking and service areas with reference to the appropriate Australian Standards; and
- Section 9 provides a summary of the key conclusions.

2 Overview of Proposal

2.1 Summary of Proposed Development

A detailed description of the Proposal is included in the Environmental Impact Assessment (EIS) which this TA accompanies. In summary, the Proposal provides for industrial development across approximately 18.1ha of the OEE, and specifically provides for:

- 4 warehouses with a combined Gross Floor Area (GFA) of 21,156m^2;
- Ancillary office space with a combined GFA of 3,186m^2;
- A Masonry Plant with a GFA of 10,430m^2 and ancillary office space of 1,040m^2;
- A total of 265 car parking spaces, including 6 accessible spaces, across the Site;
- The construction of Estate Road 1; and
- Separated light vehicle and truck access points for each lot to Estate Road 1.

A summary of the key components of the Proposal is provided in **Table 3** below.

Table 3: Proposal

Building	Warehouse GFA (m^2)	Office GFA (m^2)	Parking Provision
Masonry Plant	10,430	1040	120
Warehouse 1	3,056	1,571	
Warehouse 2	4,140	490	28
Warehouse 3A	4,180	370	48
Warehouse 3B	4,180	370	
Warehouse 4	5,600	385	69
Total	**31,586**	**4,226**	**265**

Reference should be made to the plans prepared by SBA Architects which have been submitted separately within the broader EIS. A reduced copy of the Site Plan is provided for context as **Figure 2**.

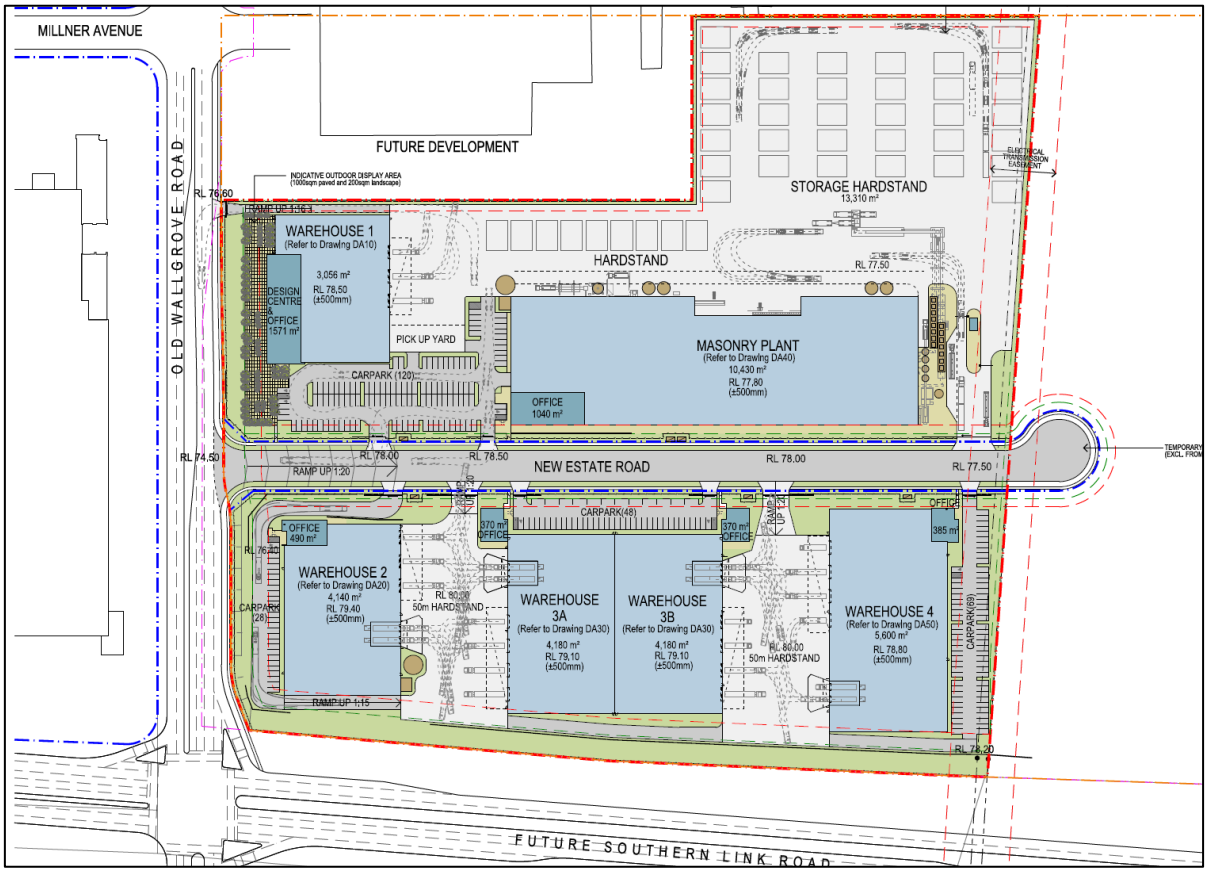

Figure 2: Site Plan

3 Strategic Context

3.1 Western Sydney Employment Area

The WSEA was established by the NSW Government to provide businesses in the region with land for industry and employment, including transport and logistics, warehousing and office space. Centred approximately 50 kilometres west of the Sydney CBD, the WSEA provides for employment generating development further to the provision of significant new transport infrastructure connecting the WSEA to the regional road network and to the future Badgerys Creek Airport.

3.2 Broader Western Sydney Employment Area

The Draft Structure Plan for the WSEA proposes the inclusion of lands to the south of the OEE at Kemps Creek in an expansion of the WSEA. Once implemented, it is anticipated that a future formal Structure Plan for an expanded 'Broader Western Sydney Employment Area' (BWSEA, as shown in **Figure 3**) will provide for changes in the land use zoning and character of these additional lands to an industrial/employment focus consistent with that of the existing WSEA.

The BWSEA within the regional planning context is presented in **Figure 4**.

It is important to note that as with approved development within other Oakdale Industrial Estate precincts, the Proposal is entirely consistent with the goals of the Draft Structure Plan.

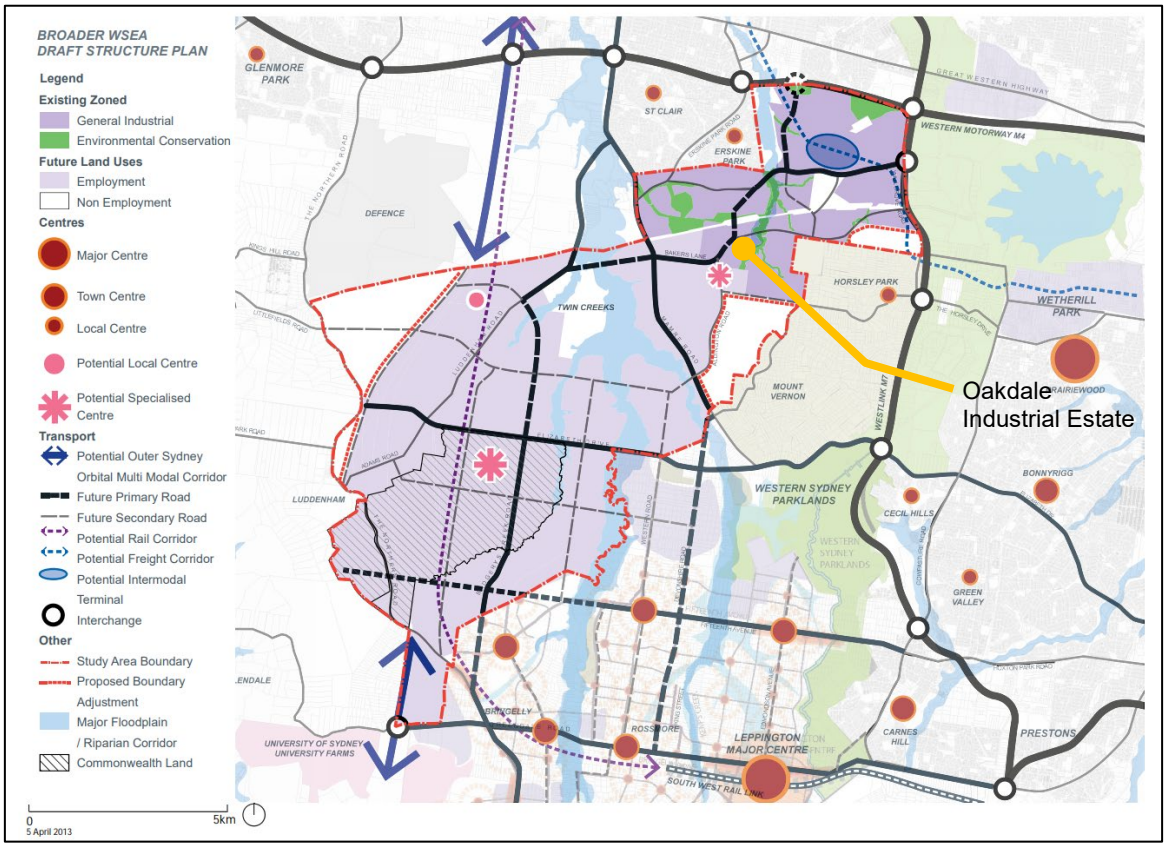

Figure 3: BWSEA Precinct Plan

Source: GHD

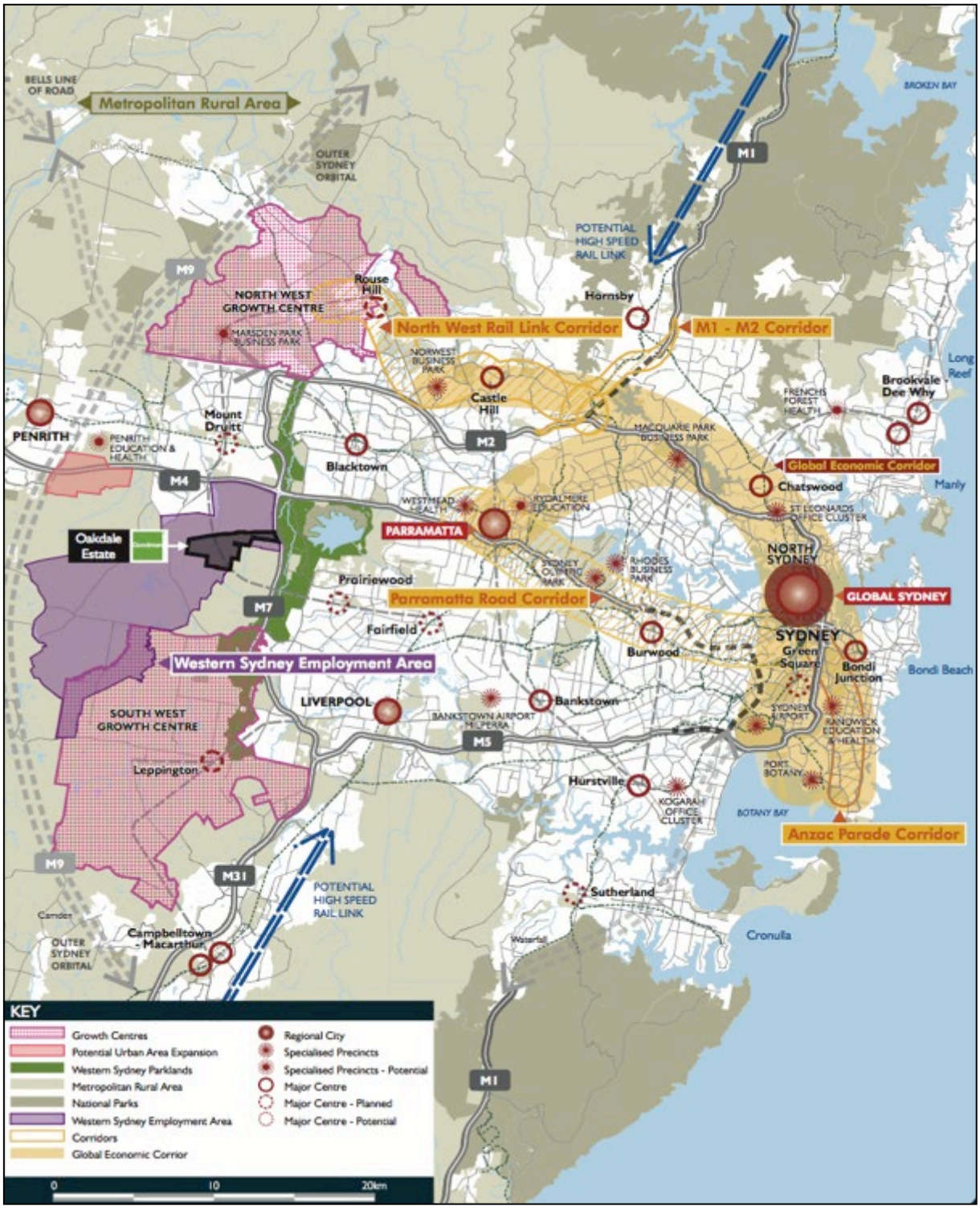

Figure 4: Oakdale Industrial Estate Regional Context

Source: DPE

4 Existing Conditions

The existing and proposed road network providing access for the Site is shown in **Figure 5**; key existing roads and recently completed network upgrades are detailed in sections below.

4.1 Existing Road Network

4.1.1 M7 Motorway

The M7 Motorway is a high capacity road link of state significance and was built to accommodate future traffic growth in the Western Sydney region. It provides a key north-south link between the M2 Motorway to the north and the M5 Motorway to the south as part of the Sydney orbital road network. A major interchange between the M7 Motorway and M4 Western Motorway is located approximately 3.5 km north of the Site, which connects the Sydney CBD and western Sydney suburbs. The M7 Motorway provides 4 lanes (2 lanes per direction, divided carriageway) and has a posted speed limit of 100 km/h.

4.1.2 Wallgrove Road

Wallgrove Road is an arterial road that runs in a north-south direction parallel to the M7 Motorway east of the Site. It provides a link between the Great Western Highway to the north and Elizabeth Drive to the south, as well as a connection to the M7 Motorway some 2.5k north-west of the Site. North of Russell Road, Wallgrove Road generally provides 4 lanes (2 lanes per direction), while south of Russell Road it generally provides 2 lanes (1 lane per direction). Wallgrove Road in the vicinity of the Site has a posted speed limit of 60km/h.

4.1.3 Lenore Drive

Lenore Drive is a sub-arterial route providing an east-west connection between Old Wallgrove Road to the east and Mamre Road to the west. Lenore Drive provides 4 lanes (2 lanes per direction) along a divided carriageway with a shared path along the northern side of the road, and has a posted speed limit of 80km/h.

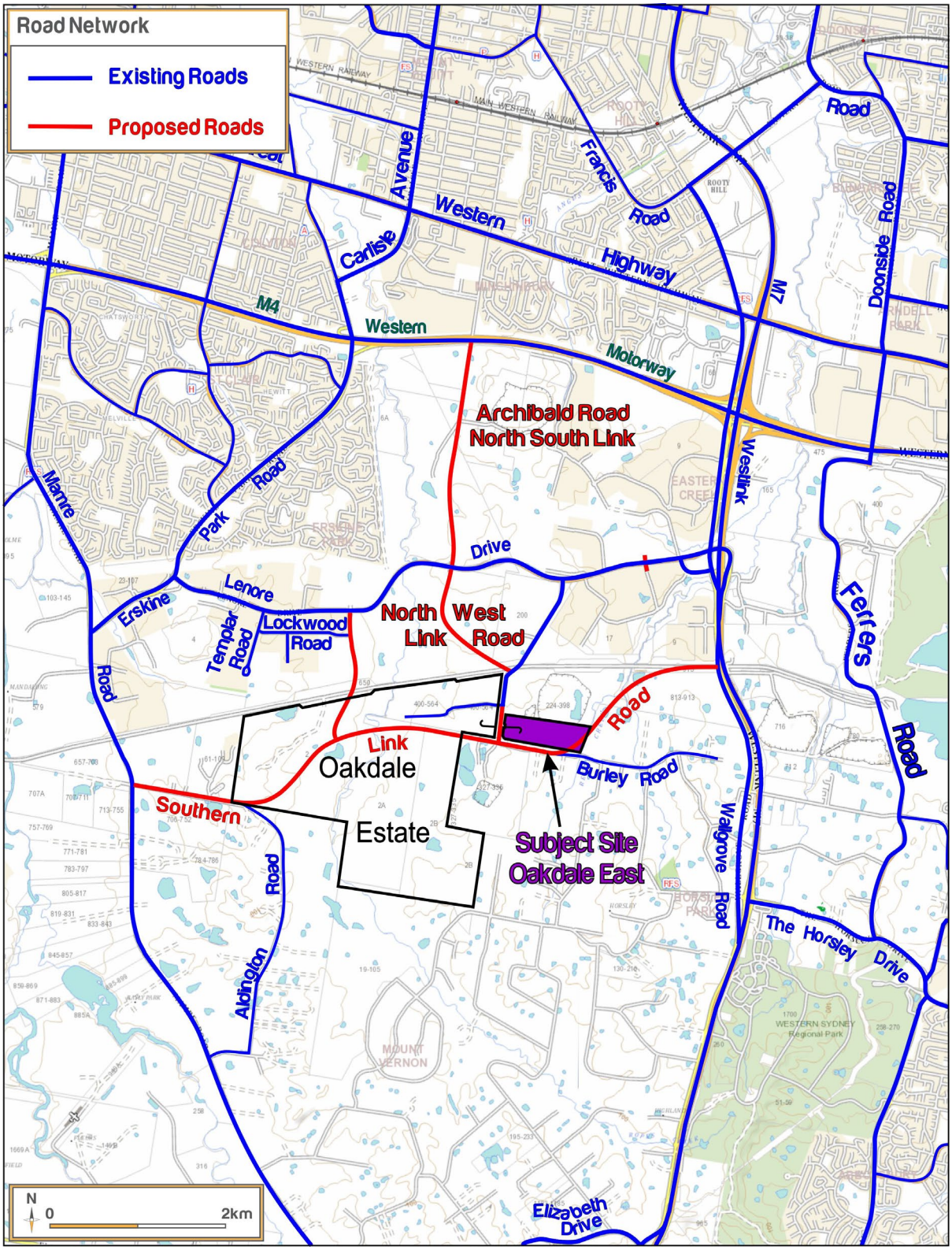

Figure 5: Existing and Proposed Road Network

4.1.4 Old Wallgrove Road

Old Wallgrove Road generally runs north-south in the vicinity of the Site before turning east to connection to Lenore Drive and through to Wallgrove Road, forming part of the RMS Main Road (MR 629) route. To the south of Lenore Drive (i.e. adjacent to the Site) Old Wallgrove Road functions as a local collector road.

The recent upgrade of Old Wallgrove Road between Lenore Drive and Wallgrove Road (OWR Upgrade) was officially opened in April 2017 and is seen as a key east-west link connection for the development of the broader WSEA.

As part of the OWR Upgrade planning process, GHD (on behalf of RMS) undertook extensive traffic modelling and analysis using strategic, microsimulation, and local intersection modelling platforms to determine appropriate road and intersection treatments within the OWR Upgrade study area to accommodate future traffic demands. The modelling presented in the OWR 2012 Report was based upon assumptions regarding future land use and associated traffic generation of existing and future development in the area, consistent with planning for the WSEA over the next 20 years.

The OWR 2012 Report and subsequent OWR Extension Report specifically informed the design for the now completed OWR Upgrade corridor (as shown in **Figure 6**). In order to achieve satisfactory traffic operations within the OWR Upgrade study area, key upgrades include:

- Widening 700m of Old Wallgrove Road to two lanes in each direction between Roberts Road and Southridge Street, with a central median to allow for 3 lanes in the future;
- Widening a further 700m of Old Wallgrove Road to three lanes in each direction between Southridge Street and the Wallgrove Road / M7 interchange;
- A 400m Mini Link Road with two lanes in each direction between Old Wallgrove Road at Quarry Road and Wallgrove Road to provide a connection to the M7 northbound on and off ramps;
- Bus stops adjacent to each intersection along Old Wallgrove Road, and bus priority treatments at signalised intersections;
- 4.5km of shared path for pedestrians and cyclists from Lenore Drive to the shared pathway on the M7 Motorway; and
- The upgrade and signalisation of six intersections.

Figure 6: Old Wallgrove Road Completed Upgrades

Source: NSW Roads and Maritime Services

It is noted that at this time (November 2018) the only significant traffic generators to Old Wallgrove Road are the Oakdale Central Estate and Oakdale South Estate, both of which are accessed via Millner Avenue. Both the Austral Site (accessed via the Old Wallgrove Road / Millner Road intersection) and the PGH Site generate only minor traffic flows to Old Wallgrove Road.

4.2 Future Road Network

4.2.1 Southern Link Road

The Southern Link Road (SLR) will provide additional road infrastructure to accommodate travel demand generated by employment areas within the Warragamba Pipeline area. The indicative route alignment for the SLR was initially identified in SEPP (WSEA) 2009 and has since been refined to the current alignment as shown in **Figure 7**; key components of the SLR include:

- A new sub-regional east-west connection, generally running parallel to Lenore Drive between Wallgrove Road to the east and Mamre Road to the west.

- A connection to Old Wallgrove Road and then to a future North-South Link Road connection to Archbold Road at Lenore Road. The proposed Archbold Road extension would connect the M4 to Lenore Drive, with a new interchange of M4 Western Motorway and Archbold Road; this extension is currently being progressed by the RMS and is expected to be delivered in 5-10 years, providing improved WSEA accessibility to the M4 Western Motorway without the need to access either Wallgrove Road or the M7 Motorway.
- A connection to a future additional (Western) North-South Link Road between Lenore Drive and the SLR.

It is noted that the SLR network planning and development process is ongoing and is potentially therefore subject to change due to further refinement of the route alignment and access arrangements. Importantly in the context of the Proposal, the development of the Site does not rely on the SLR for access.

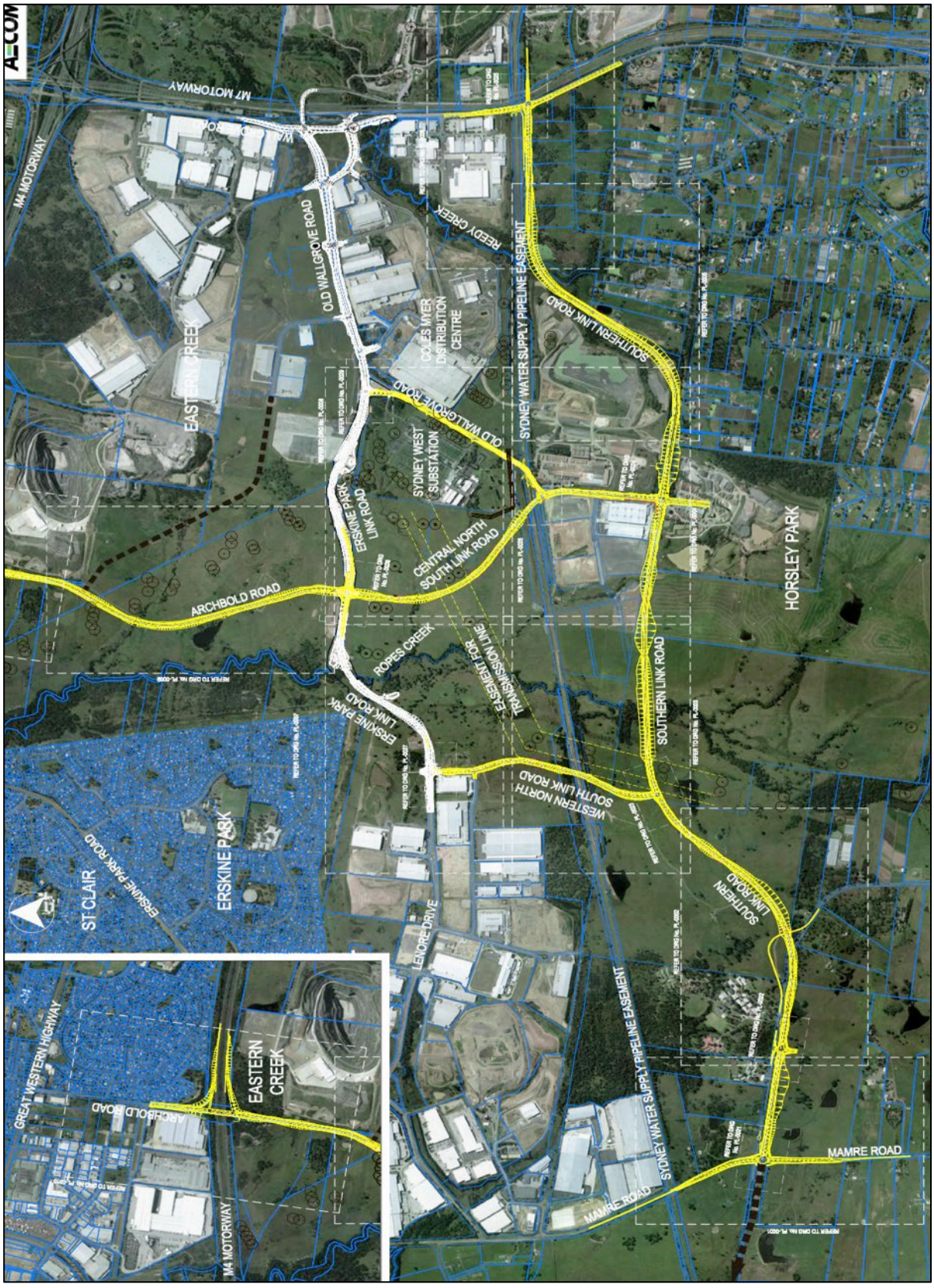

Figure 7: Proposed Southern Link Road Network and Alignment

Source: AECOM

4.2.2 Western Sydney Infrastructure Plan

Additional road and infrastructure upgrades are proposed for the area as part of the Western Sydney Infrastructure Plan (WSIP) – a road investment program funded by the Federal and State Government. The aim of the plan is to provide increased road transport capacity ahead of future traffic demand, as planned residential and employment developments are delivered across western and south-western Sydney growth centre precincts, and across the BWSEA.

As shown in **Figure 8**, the WSIP involves significant road network improvements in the vicinity of the Site, including:

- Upgrade of The Northern Road to a minimum of 4 lanes between Narellan and the M4 Motorway, South Penrith, including an interchange (underpass) at Bringelly Road. Construction on the first section of The Northern Road started in 2016;
- Construction of a new east-west motorway to the airport between the M7 Motorway and The Northern Road, (to be known as the M12 Motorway). Consultation on the preliminary design and access strategy was undertaken in February and March 2018 and construction is expected to start in the early 2020s;
- Upgrade of Bringelly Road to a minimum of 4 lanes between The Northern Road and Camden Valley Way. Construction started in January 2015;
- Construction of the Werrington Arterial Road by upgrading Kent Road and Gipps Street to 4 lanes between the Great Western Highway and at the M4 Motorway. This project was completed in May 2017;
- Upgrade of the Glenbrook intersection of Ross Street and the Great Western Highway. Work began in June 2018; and
- A $200 million package for local roads upgrades (Australian Government funded).

In summary, the arterial road network in the vicinity of the Site is undergoing - and will continue to undergo - significant upgrades to benefit all road users.

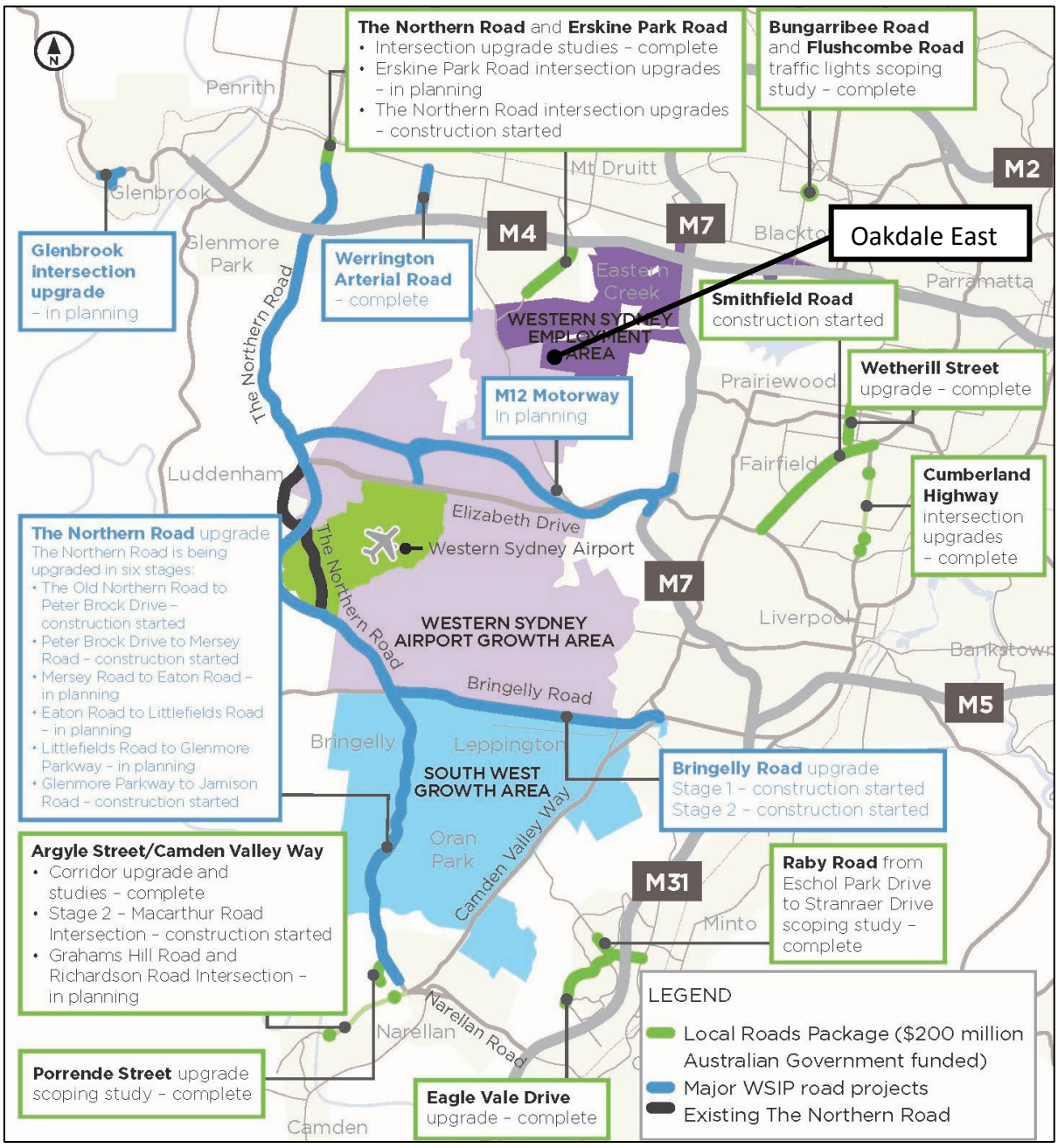

Figure 8: Western Sydney Infrastructure Plan Road Network Upgrades

Source: RMS

4.2.3 Truck Routes

As is appropriate for a predominately industrial area, all key roads providing access for the Site are designated for Restricted Access Vehicles (RAVs) as summarised in **Table 4** and shown in **Figure 9**.

Table 4: RMS Approved Restricted Access Vehicle Routes

Road	Section	RMS Approval
Old Wallgrove Road	Entire Length	25/26m B-double Routes
Wallgrove Road	Entire length	25/26m B-double Routes
Lenore Drive	Entire length	25/26m B-double Routes
M7 Westlink	Entire Length	25/26m B-double Routes
Erskine Park Road	Entire Length	25/26m B-double Routes
M4 Western Motorway	Entire Length	25/26m B-double Routes
Mamre Road	Entire Length	25/26m B-double Routes

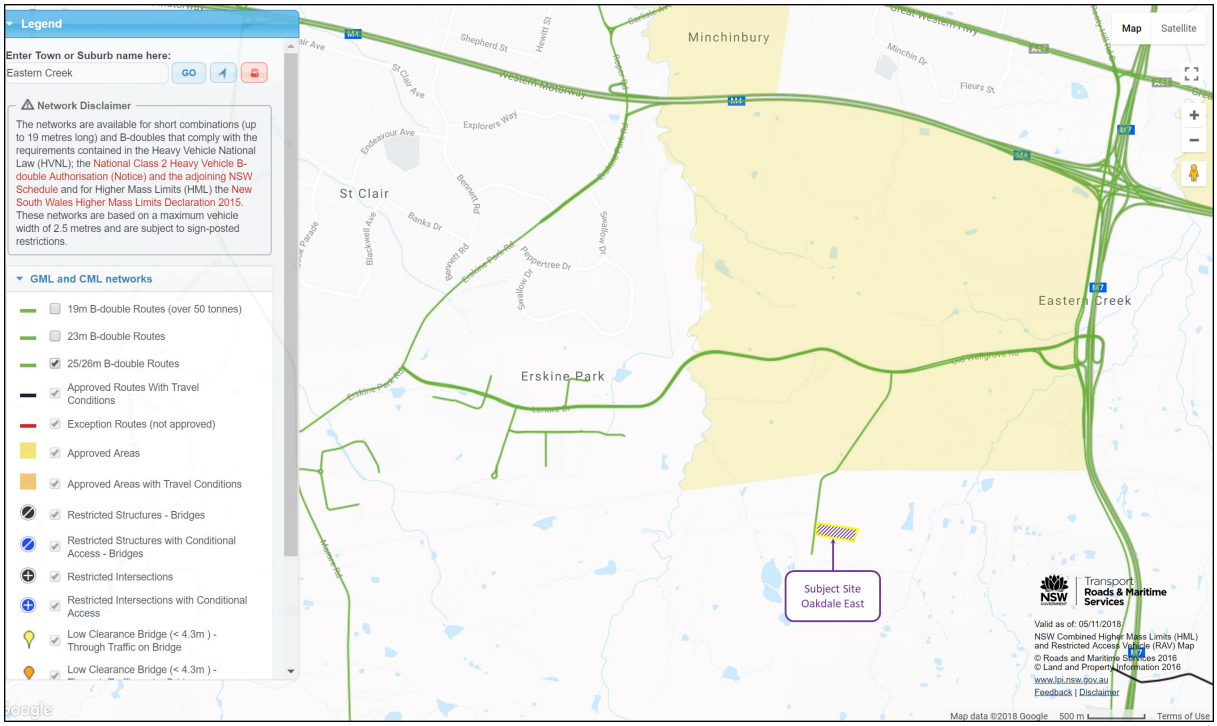

Figure 9: Restricted Access Vehicle Routes

Source: RMS

The future SLR, North-South Link road and the Archbold Road extension are all expected to similarly provide for 25/26m B-doubles.

4.3 Existing Site Generation

The Site are located on land currently occupied by the Austral Site, as shown in **Figure 10**; however, this part of the Austral Site is largely disused other than for general storage and stockpiling, and as such generates little traffic in and of itself.

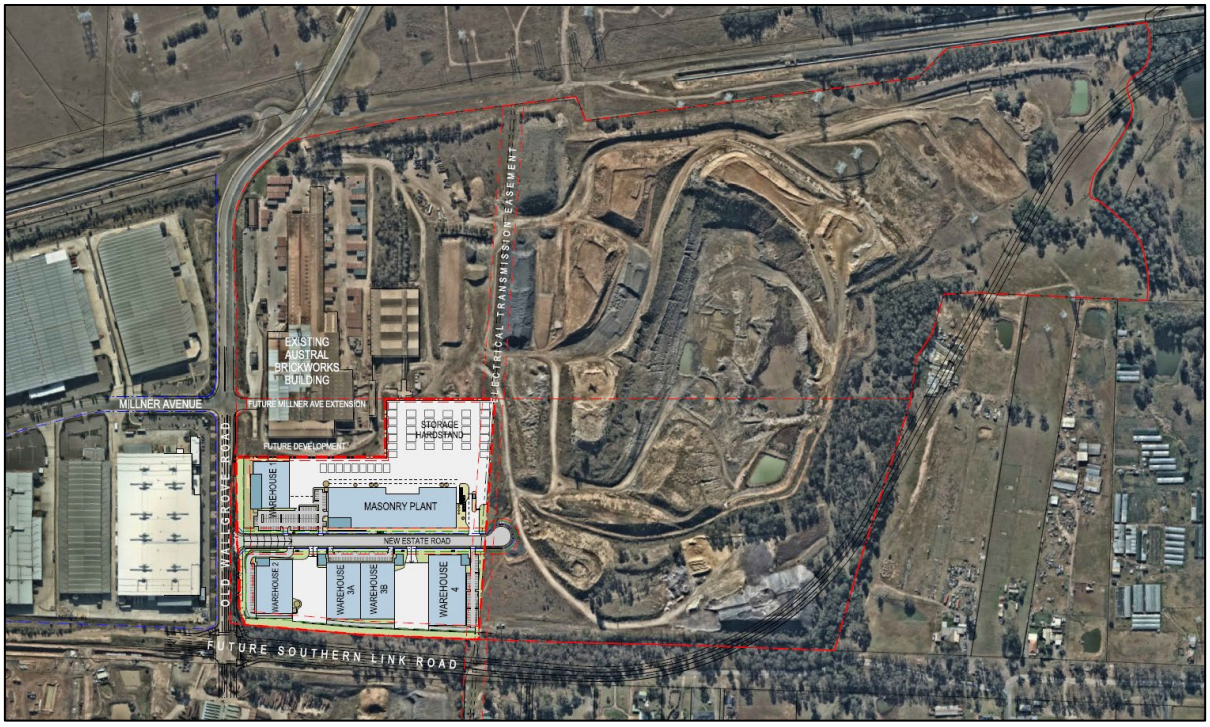

Figure 10: Site Context with the Austral Site

5 Public and Active Transport

5.1 Bus Services

At present, there are only limited bus services operating within the vicinity of the Site (see **Figure 11**). Notwithstanding, there are substantial opportunities to provide improvements to public transport connectivity within WSEA (likely via Lenore Drive and Old Wallgrove Road further to a connection to the SLR) and additional provisions for 'localised' services as employment numbers increase and additional road infrastructure becomes available.

The planning of bus services in Sydney is governed by the NSW *Public Transport Service Planning Guidelines*, which aim to establish Strategic Transport Corridors and a hierarchy of bus route types that:

- Link to regional centres;
- Pass through patronage generators such as district centres, TAFE colleges, hospitals and universities;
- Connect with other transport modes (trains, ferries and other buses);
- Are multifunctional (serving journeys to work, education, shopping and recreation);
- Are direct and frequent; and
- Meet the broader network planning principles.

The establishment of public transport services as early as possible in the development stages of the WSEA will be important to ensure that a culture of public transport use is achieved from the outset. To make public transport a viable choice within the WSEA, the following strategies are expected to be developed:

- Integration of new bus services with existing bus services in the area; and/or extending existing services (such as Route 738, which provides a connection to St Marys and Rooty Hill railway stations).
- Increased frequency of services along key routes, and particularly routes providing connection to regional centres with rail stations (for example Route 835 between the Liverpool to Parramatta T-Way at Prairiewood, and St Marys railway station).
- In the longer term, the provision of new services to Badgerys Creek and to new residential areas such as the South West Growth Centre.

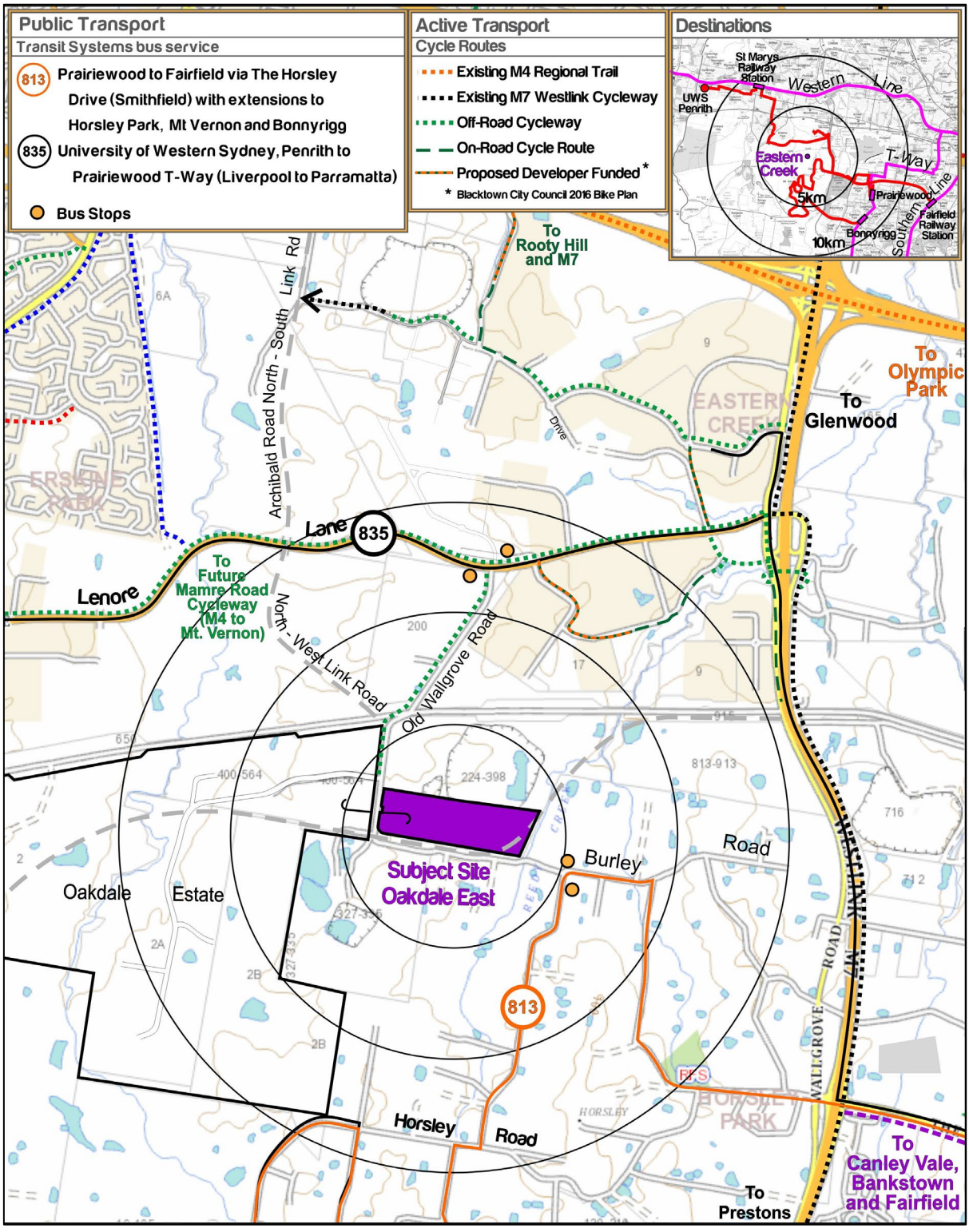

Figure 11: Public and Active Transport Network

5.2 Pedestrian & Cycling Network

Lenore Drive has specifically been designed to provide appropriate cycle infrastructure, linking to the east (to the M7 Motorway cycleway) and the west (to the existing Mamre Road cycle path, itself expected to play a key connector role in the broader framework of cycleways in the sub-region).

The upgraded Old Wallgrove Road and planned Western North-South Link Road both include a 2.5 metre shared path for both pedestrians and cyclists. This infrastructure will provide essential links to encourage the uptake of alternative transport modes from private vehicles.

With reference to the DCP Submission, it is proposed that the provision of appropriate cycle facilities – and specifically cycle storage areas/lockers and shower facilities – is to be considered for each of the future lots within the Site, noting that the provision of such will further encourage the use of the existing and future cycle networks, and in turn assist in the reduction of private vehicle trips for the journey to work.

6 Parking & Servicing Requirements

6.1 Car Parking Rates – DCP Submission

Parking for the development has been proposed in accordance with Table 1 of the DCP Submission, reproduced as **Table 5**.

Table 5: Oakdale East Estate DCP Submission Minimum Car Parking Rates

Land Use	Minimum Parking Rate
Warehouse	1 space per 300m^2 GFA
Masonry Plant	Parking to be based on a First Principles Assessment
Ancillary Office	1 space per 40m^2 GFA

As detailed in the DCP Submission, these minimum car parking rates have been developed with reference to the RMS Guide, RMS Guide Update, and Ason Group surveys of eight comparable industrial developments within the WSEA and are entirely consistent with the parking rates determined for other approved Oakdale Industrial Estate Precincts.

For the purposes of assessing the Oakdale South and Oakdale West Estates, surveys of eight comparable industrial developments were undertaken to establish the effective parking rate of operational developments within the WSEA – adopting the same methodology as that used in establishing the RMS rate (1 space per 300m^2). The surveys included industrial developments (generally warehouse or freight forwarding facilities) in numerous locations including:

- Erskine Park,
- Oakdale Central; and
- M7 Business Hub.

The results of these surveys are summarised in **Table 6**.

Table 6: Effective Parking Rates for Surveyed Developments

Site Address	Car Parking Provided	Total GFA (m^2)	Maximum Parking Demand	Effective Parking Rate (1 space per Xm^2)
Bunning's – 8 Interchange Dr	140	55,550	68	817
Toll – Lot 11 Wonderland Dr	137	27,440	47	584
Ingram Micro – 23 Wonderland Dr	300	36,610	183	200
DHL – Milner Avenue	115	20,170	109	185
Kimberly Clarke – 35 Sarah Andrews Cl	100	45,210	78	580
Linfox – 25 Sarah Andrews Cl	217	51,200	116	441
Ubeeco – 28 Sarah Andrews Cl	150	10,865	71	153
Woolworths – 29 Sarah Andrews Cl	280	52,705	197	268
Total Average Rate				**403**

The surveys demonstrated a range of between 1 space per 153m^2 and 1 space per 817m^2 with a mean and standard deviation of 1 space per 403m^2 and 1 space per 241m^2 respectively. Accordingly, based on the methodology adopted in the RMS Guideline, the "middle range" car parking rate based on the surveys would be in the order of 1 space per 350m^2.

It is evident that these rates are consistent with those established by the RMS Guide, and indeed suggest that a further reduction in overall car parking could be justified. Notwithstanding, and with reference to all available information **Table 7** summarises the minimum parking rates proposed for the OEE.

Table 7: Proposed Warehouse Car Parking Rates

Land Use	Minimum Car Parking Rate
Warehouse / Distribution	1 space per 300m^2
Office	1 space per 40m^2

The adoption of a minimum rate of 1 space per 300m^2 for the warehouse floor areas and 1 space per 40m^2 for the office floor areas is considered appropriate and sustainable and is consistent with both the RMS Guidelines and State planning policies. The proposed minimum rates will also enable the required flexibility in the design of future developments whilst still ensuring that parking is provided to accommodate both the current and future parking requirements of tenants. For all other permitted uses, it is proposed that parking be provided in accordance with Council's DCP.

It is noted that the Proposal includes 1 Masonry Plant to be provided. It is understood that this use would require very low staff numbers to be based on-site and results in little demand for visitor parking. Thus, the DCP includes a parking requirement for this use to only be based on a first principles assessment that takes account the actual parking demand generated by the staff numbers.

6.2 Masonry Plant Parking Assessment

In May 2018, Ason Group conducted an assessment for a similar masonry plant in Berrima, NSW for Brickworks Land and Development – who will operate the masonry plant proposed on-site. Brickworks have confirmed that the characteristics of the proposed masonry plant will essentially be identical to the Berrima masonry plant.

With regard to parking demand, the key factor is staff numbers; in this regard, Brickworks have confirmed that the masonry plant will employ a total of 34 staff, comprising:

- 4 Management staff; and
- 30 factory staff equally split between a morning and afternoon shift.

As stated, the factory staff will be split between two work shifts, being generally 5.00am to 1.00pm, and 1.00pm to 9.00pm; 15 staff would be assigned to each shift. Management staff would work standard office hours (generally 8:00am to 5:00pm).

As such, the average parking demand for the majority of the day is estimated at 19 parking spaces, while a potential peak demand for 34 parking spaces would be generated during the shift changeover period. This results in the minimum requirement of 36 parking spaces for the masonry plant site which would accommodate the potential peak demand while providing appropriate spare visitor parking at all times.

Notwithstanding the above, it is proposed to provide parking in compliance with the RMS and OEE DCP rates of 1 per 300m^2 to maintain consistency with these controls. This would ensure that the operational demands are met and ensures all future parking demands are kept off-street.

6.3 Total Car Parking Requirements & Provision

With reference to sections above, the total parking requirements for the Site are detailed in **Table 8** below, as well as the parking allocation for each of the proposed lots within the Site.

Table 8: Parking Requirements

Land Use	GFA (m^2)	Parking Requirements	Parking Proposed
Building 1			
Warehouse	3,056	11	
Office	1,571	40	
Total	**4,627**	**51**	
Masonry Plant			120
Industrial Plant	10,430	35	
Office	1,040	26	
Total	**11,470**	**61**	
Building 2			
Warehouse	4,140	14	
Office	490	13	28
Total	**4,630**	**27**	
Building 3A			
Warehouse	4,180	14	
Office	370	10	
Total	**4,550**	**24**	
Building 3B			48
Warehouse	4,180	14	
Office	370	10	
Total	**4,550**	**24**	
Building 4			
Warehouse	5,600	19	
Office	385	10	
Total	5,985	29	69
Office	1,040		
Total	**11,470**	**34**	
Total	35,812	216	265

With reference to Table 8, it is estimated that the Site would require a minimum total of 216 parking spaces to provide compliance with the DCP Submission proposed parking rates.

In response, the Proposal provides for a total of 265 parking spaces across the Site. In summary therefore, the proposed Site car parking is consistent with DCP Submission parking requirements, and moreover would provide enough parking such that all parking demand is met within the Site.

6.4 Additional Parking Considerations

6.4.1 Bicycle Parking

In accordance with the DCP Submission, bicycle parking spaces (and associated locker and shower facilities) will be encouraged to be incorporated into the design of each building in secure and accessible locations during the Construction Certificate stage.

6.4.2 Accessible Parking

The Proposal provides for a minimum of 6 accessible parking spaces, allocated such that at least 1 accessible space is available for each lot within the Site. This level of accessible parking provision is consistent with the requirements of the National Building Code, which states that all Class 5, 7, 8 and 9c Buildings (as proposed) must provide a minimum of 1 space for every 100 car parking spaces or part thereof. With reference to Section 8, all accessible parking spaces will be designed with reference to AS 2890.6.

6.5 Waste and Servicing Areas

The Proposal provides service/loading areas designed to accommodate B-doubles for each lot within the Site. A more detailed assessment of waste and general servicing areas is provided in Section 8.

7 Traffic Assessment

7.1 Sub-Regional Traffic Assessments

As previously stated, numerous traffic and transport assessments have been prepared examining the WSEA, with the Oakdale Industrial Estate a specific inclusion in these studies. Of particular relevance to this TA are the past assessments of the following key roads and intersections:

- Old Wallgrove Road and its connection to Wallgrove Road and the M7 Motorway;
- Lenore Drive;
- The SLR;
- North-South connections between the SLR and Old Wallgrove Road / Lenore Drive; and
- North-South connections between Lenore Drive and the M4 Western Motorway (specifically via Archbold Road).

An overview of the most recent and relevant assessments is provided below, focusing on the current determination of appropriate infrastructure in the area and of specific relevance to the Site.

7.2 Old Wallgrove Road Upgrade Modelling

7.2.1 OWR 2012 Report Overview

As discussed, the OWR 2012 Report provides a detailed assessment of the future traffic demands in the section of Old Wallgrove Road between the M7 Motorway and Roberts Road, and was the key reference document for the OWR Upgrade works undertaken by the RMS. The assessment included detailed traffic modelling based on previous RMS strategic assessments, including:

- Strategic modelling using a sub-area model in EMME;
- Micro-simulation model of the corridor using Paramics; and
- Intersection modelling of key intersections using SIDRA.

With regard to the Site, the most relevant information provided in the OWR 2012 Report relates to land use assumptions and trip generations rates for the OEE (and the broader WSEA) that underpin the OWR 2012 Report assessment and its findings. These are discussed further below.

7.2.2 OWR 2012 Report Yield Forecasts & Trip Rates

Table 9 below (extracted from the OWR 2012 Report) provides a land use schedule that was at the time consistent with the expectations of development within the Oakdale Industrial Estate, noting that the Oakdale Industrial Estate sits within the area referred to as "Lands south of Pipeline" in the OWR 2012 Report.

Table 9: WSEA Future Land Use & Yield Estimates

Area	Land Use Type	Developable Area (Hectares)	
		2021	2031
Eastern Creek	Industrial	550	550
Ropes Creek	Industrial	115	173
Erskine Park Employment Area	Industrial	326	326
Lands south of Pipeline	Industrial	270	507
Total		**1,261**	**1,556**

Source: OWR 2012 Report

With regard to trip generation (applied to these yield forecasts), the OWR 2012 Report utilised the following trip rates:

- Eastern Creek Precinct: 21 trips per hectare for two-hour peak period.
- Ropes Creek Precinct: 10 trips per hectare for two-hour peak period.
- Erskine Park Employment Area: 10 trips per hectare for two-hour peak period.
- Lands south of Sydney Water Pipeline: 21 trips per hectare for two-hour peak period.

7.2.3 OWR 2012 Report Future Trip Generation Forecasts

With consideration of the OWR 2012 Report yield forecasts and trip generation rates, **Table 10** (also extracted from the OWR 2012 Report) provides a summary of 2031 trip generation forecasts. From the results of the detailed modelling of the sub-regional road network, the OWR 2012 Report then provided recommendations for the upgrade of Old Wallgrove Road between the M7 and Roberts Road, which were the basis of the OWR Upgrade works.

Table 10: OWR 2012 Report Traffic Generation – 2031 AM (2 Hour Peak)

Area	Developed Area (ha)	Percent of Total Area	2-hour AM Peak Vehicle Trips		
			In	Out	Total
Eastern Creek	550	100%	9,240	2,310	11,550
Ropes Creek	173	100%	1,384	346	1,730
Erskine Park Employment Area	326	100%	2,608	652	3,260
Lands south of Pipeline	507	100%	8,518	2,129	10,647
Total	**1,556**	**100%**	**21,750**	**5,437**	**27,187**

Source: GHD (April 2012)

7.2.4 Old Wallgrove Road Extension Report (2013)

Building on their initial report, the OWR Extension Report was prepared by GHD for the DPE (formerly the Department of Planning & Infrastructure) to provide a detailed review of a future extension of Old Wallgrove Road, and included the following modelling methodology:

- *Establish trip generation and future road network assumptions based on reviews of GHD, AECOM and Halcrow transport reports.*
- *Two-tier modelling approach, using the Old Wallgrove Road EMME Strategic Traffic Model (a sub-area built from RMS Highway Model) for the general assignment and SIDRA for intersection performance analysis.*
- *Incorporation of agreed trip generation rates and road network assumptions for 2021 and 2031 horizon years.*
- *Select Link Analysis for apportionment of traffic on proposed Red and Green north-south link roads.*
- *Intersection performance (Average delay and LoS) for key intersections.*

Additionally, the OWR Extension Report included the following infrastructure assumptions:

- Erskine Park Link Road (now Lenore Drive): assumed in all scenarios and both years.
- Archbold Road Extension: assumed in all scenarios and both years.
- Southern Link Road: assumed in all scenarios for 2031 only.
- Red Link Road: assumed to be 4 lanes.

- Green Link Road: tested 2 lane and 4 lane configurations.
- An Oakdale Centre/Oakdale South zone with access to Old Wallgrove Road (and the broader network).

The broader modelling scenarios examined in the OWR Extension Report for the 2031 forecast year are shown in **Figure 12**.

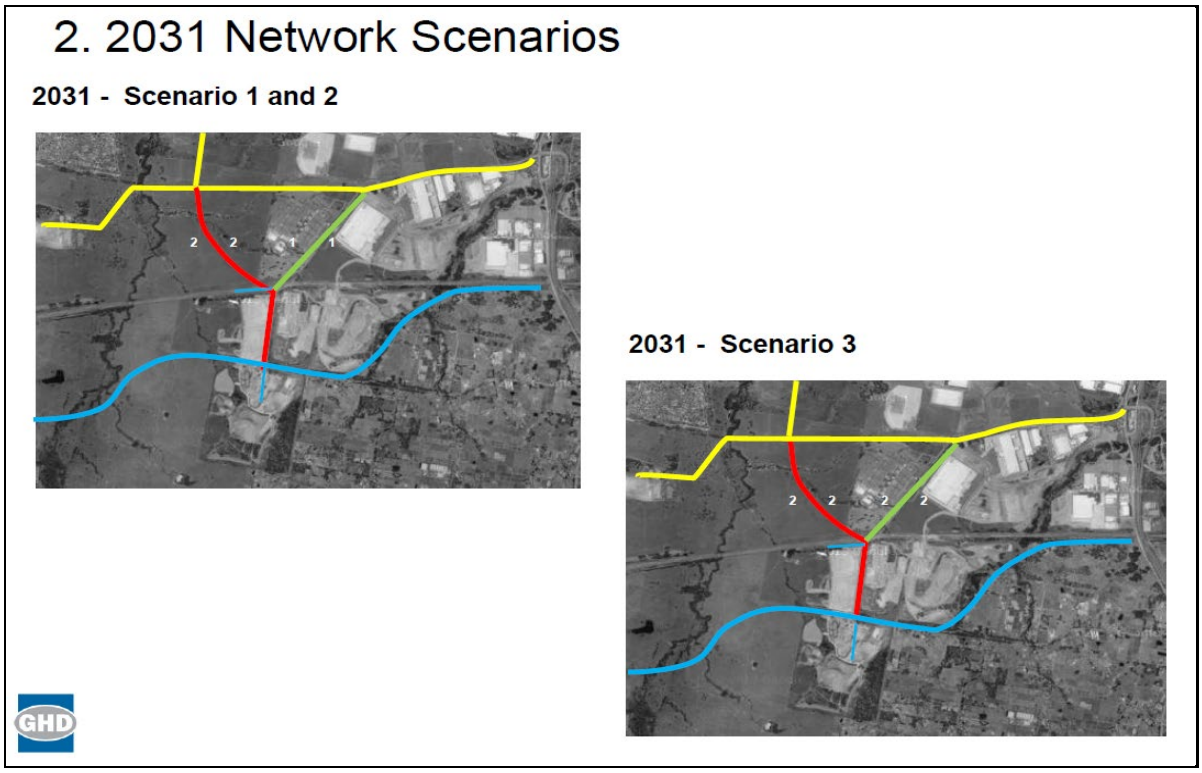

Figure 12: 2031 Network Scenarios

Source: OWR Extension Report

7.2.5 OWR Extension Report (2013) Trip Generation Forecasts

Perhaps of most significant relevance to this TA is the additional breakdown of development yield forecasts within the OWR Extension Report study area, and specifically a breakdown of the individual precincts within the Oakdale Industrial Estate. These precincts, along with the trip generation estimates for 2021 and 2031, are shown in Figure 3 of the OWR Extension Report, reproduced below.

Precinct	2021						2031					
	Developed Land (ha)	Trip rate (/ha/2hr)	% inbound AM	% inbound PM	Trips - Outbound AM	Trips - Inbound AM	Developed Land (ha)	Trip rate (/ha/2hr)	% inbound AM	% inbound PM	Trips - Outbound AM	Trips - Inbound AM
Eastern Creek	**550**	**21**	**80%**	**20%**	**2,310**	**9,240**	**550**	**21**	**80%**	**20%**	**2,310**	**9,240**
Ropes Creek	**115**	**21**	**80%**	**20%**	**483**	**1,932**	**173**	**21**	**80%**	**20%**	**727**	**2,906**
Jacfin Ropes Creek	*70*	*21*	*80%*	*20%*	*293*	*1,173*	*105*	*21*	*80%*	*20%*	*441*	*1,764*
Ropes Creek	*45*	*21*	*80%*	*20%*	*190*	*759*	*68*	*21*	*80%*	*20%*	*286*	*1,142*
Erskine Park Employment Area	**326**	**10**	**80%**	**20%**	**652**	**2,608**	**326**	**10**	**80%**	**20%**	**652**	**2,608**
Land South of the Pipeline	**270**	**21**	**80%**	**20%**	**1,134**	**4,536**	**507**	**21**	**80%**	**20%**	**2,129**	**8,518**
Oakdale Central	*23*	*21*	*80%*	*20%*	*96*	*383*	*43*	*21*	*80%*	*20%*	*180*	*719*
Oakdale West	*48*	*21*	*80%*	*20%*	*201*	*802*	*90*	*21*	*80%*	*20%*	*377*	*1,506*
Oakdale South	*34*	*21*	*80%*	*20%*	*142*	*570*	*64*	*21*	*80%*	*20%*	*267*	*1,069*
Oakdale East (current Austral Brick)	*44*	*21*	*80%*	*20%*	*186*	*743*	*83*	*21*	*80%*	*20%*	*349*	*1,395*
Jacfin Land (Lot A)	*56*	*21*	*80%*	*20%*	*235*	*938*	*105*	*21*	*80%*	*20%*	*440*	*1,761*
Current PGH (CSR) Bricks Land	*43*	*21*	*80%*	*20%*	*179*	*718*	*80*	*21*	*80%*	*20%*	*337*	*1,348*
Gazcorp	*23*	*21*	*80%*	*20%*	*96*	*383*	*43*	*21*	*80%*	*20%*	*180*	*719*

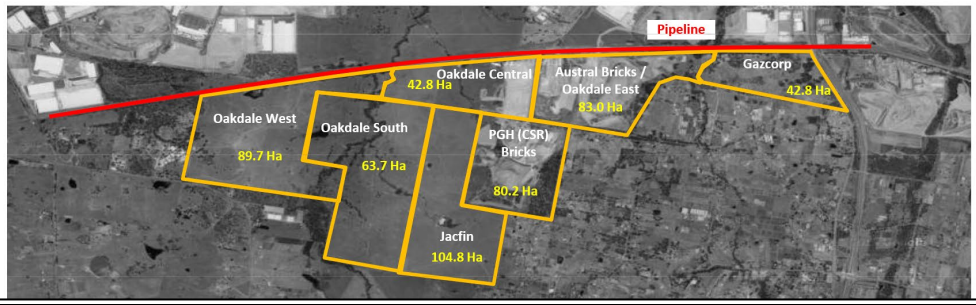

Figure 13: OWR Extension Report Study Area Yields and Trip Generation

Source: OWR Extension Report

With reference to **Figure 13**, the OWR Extension Report assigns a trip generation of 929 two-hour peak trips (or an average of some 465 peak hour trips) to the OEE in 2021 based on 50% completion; and 1,744 two-hour peak trips (or an average of some 872 peak hour trips) to the OEE in 2031 based on 100% completion.

Further to the assignment of trips from all sites within the OWR Upgrade study area, Section 6 of the OWR Extension Report reports the 2031 performance of the key intersections, as summarised in **Table 11**.

Table 11: OWR Extension Report - Future Intersection Performance

Intersection	Control Type	Period	Design Year 2021		Design Year 2031	
			Average Delay (sec)	Level of Service[1]	Average Delay (sec)	Level of Service
Lenore Drive & NS Road Link & Archbold Extension	Signals	AM	34.5	C	43.6	D
		PM	45.9	D	53.2	D
Lenore Drive & Old Wallgrove Road	Signals	AM	17.1	B	18.0	B
		PM	25.1	B	27.3	B
Old Wallgrove Road & NS Link Road	Signals	AM	23.3	B	46.9	D
		PM	25.3	B	51.9	D
Old Wallgrove Road & Southern Link Road	Signals	AM	27.5	B	53.1	D
		PM	42.1	D	52.3	D

Source: OWR Extension Report

[1] See **Appendix A** for an explanatory note on Level of Service and SIDRA performance measures.

In summary, the OWR Extension Report includes a trip generation total for the Oakdale Industrial Estate as previously adopted (i.e. “Lands south of Pipeline”); assigns trips from the Oakdale Industrial Estate precincts and surround developments to the future proposed road network; and ultimately concludes that the proposed road network upgrades (which, as per Scenario 3 in Figure 12 above, are either completed, under construction, approved, or subject to final design consideration) will provide appropriate levels of service at all key intersections.

Finally, and critically in the assessment of the Proposal, the analysis adopts a future traffic generation for the OEE further to full development of 872 peak hour movements.

7.3 Oakdale Industrial Estate Upgrade Commitments

As a result of the sub-regional traffic modelling detailed above, Goodman entered into a Voluntary Planning Agreement (VPA) with the Minister for Planning, the purpose of which was to provide works in kind to offset components of the necessary contributions ($180,000 per hectare of net developable area) for components of the Oakdale Central Estate and Oakdale South Estate. In this regard, the planning agreement provides approval from the Minister to upgrade components of Old Wallgrove Road including (but not limited to):

- The upgrade of the existing roadway from 2 lanes (1 lane each way) to 4 lanes (2 lanes each way) with a central median;

- Traffic signalisation at the intersection of OWR / Milner Avenue /Austral Site – as shown in **Figure 14** below; and
- The provision of an additional right turn lane at the intersection of OWR / Lenore Drive – as shown in **Figure 15**.

The approved works adopted within the VPA generally reference the findings of the OWR 2012 Report and OWR Extension Report, however minor amendments to the intersection layouts were also proposed (and incorporated in the final RMS approved works) to ensure that the works would accommodate all future demands generated through the development of lands in the locality.

The works identified under the VPA have now been completed.

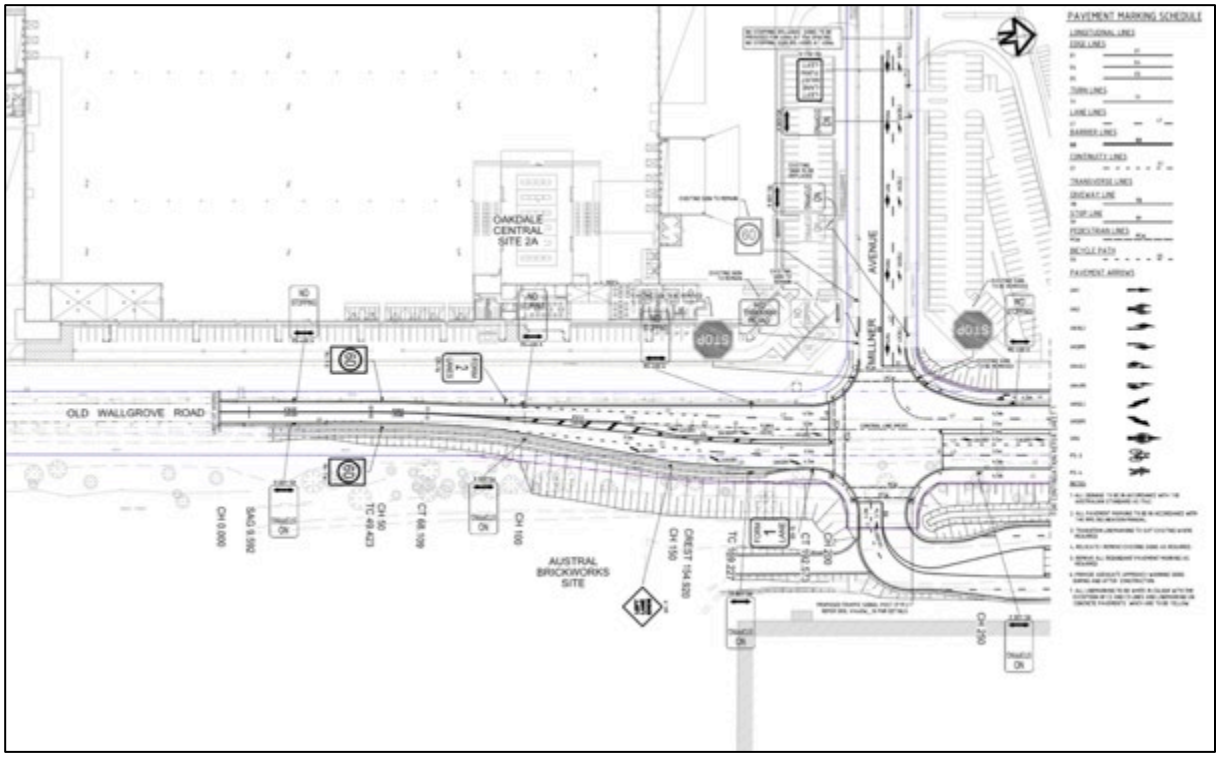

Figure 14: Approved Intersection Layout of Old Wallgrove Road / Millner Avenue / Austral Site

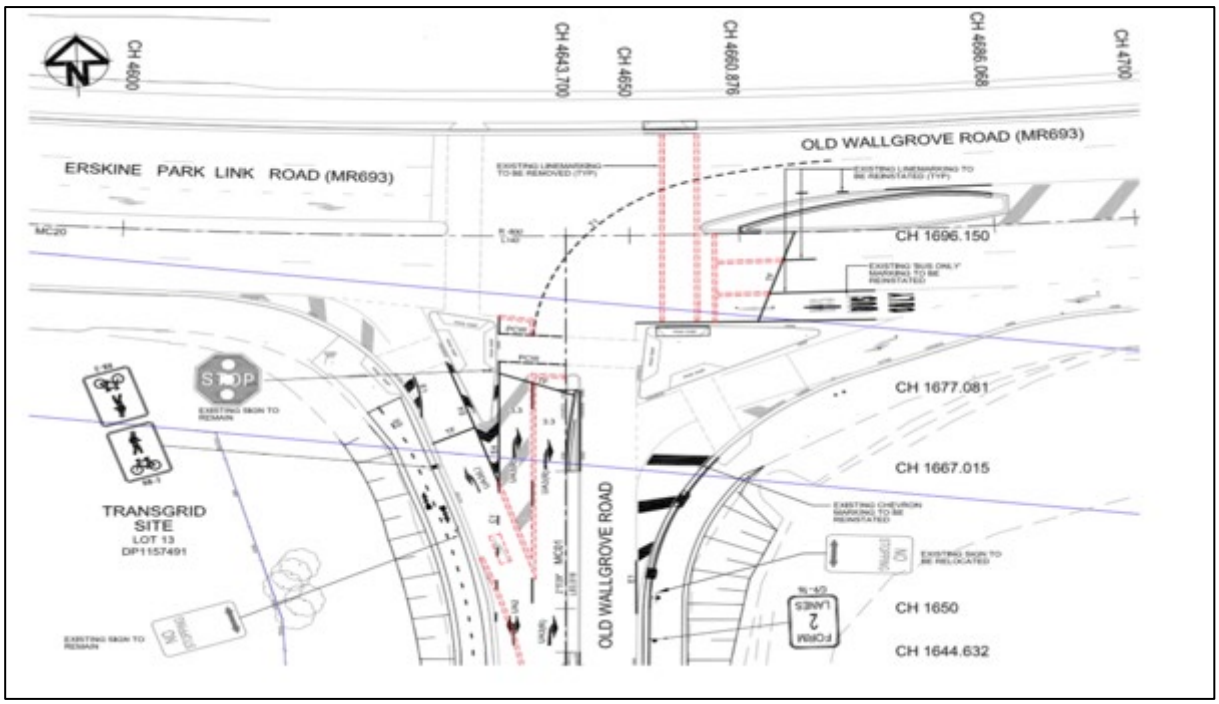

Figure 15: Approved Intersection Layout of Old Wallgrove Road / Lenore Drive

7.4 Site Traffic Generation

7.4.1 OWR Extension Report Warehouse Trip Rates

As previously discussed, the analysis provided in the OWR Extension Report adopts a future traffic generation forecast for the OEE under full development of 872vph in the peak periods. This forecast is based on a traffic generation rate of 21 trips per hectare over a two-hour peak period applied to the previously estimated 83ha OEE, or 10.5 trips per hectare during the peak hour.

Application of this trip rate to the Site alone (10.9 ha) results in a forecast traffic generation for the Site of 114vph in the peak periods, while application of this rate to the total OEE (32 ha) results in a forecast traffic generation for the OEE of 336vph in the peak periods.

7.4.2 RMS Guide Update Warehouse Trip Rates

The traffic generation of the Site (and OEE) can also be estimated with reference to trip rates provided in the RMS Guide Update, and more specifically with reference to trip data provided for the following three industrial sites:

- Site 1: Erskine Park Industrial Estate, Erskine;
- Site 3: Wonderland Business Park, Eastern Creek; and

- Site 4: Riverwood Business Park, Riverwood.

These Sydney sites all exhibit similar characteristics to those proposed for the OEE, including land-use and size of development. It is noted that the other Sydney and non-metropolitan industrial sites reported in the RMS Guide Update are much smaller than the Site and/or have a significantly higher office component that that proposed.

Further to a review of the trip rates for these three sites – and to provide for a conservative estimate of trip generation - the following assessment trip rates have been adopted:

- AM Rate 0.247 trips per 100m^2 of GFA.
- PM Rate 0.182 trips per 100m^2 of GFA.
- Daily Rate 2.64 trips per 100m^2 of GFA.

Based on these trip rates, and noting that these trip rates include consideration for ancillary offices, the total warehouse GFA of the Site (24,342m^2 GFA when excluding the masonry plant, see **Section 7.4.3** below) would generate:

- 60vph in the AM peak;
- 44vph in the PM peak; and
- 643 vehicles trips per day (vpd).

7.4.3 Masonry Plant Trip Generation

The trip generation of the masonry plant has been determined based on information provided by Brickworks (sourcing other operational Brickworks sites) and first principles. In this regard, the daily truck trip generation of the masonry plant is expected to comprise the following:

- 115 trucks per day, or 230 truck trips per day, comprising:
  - 25 – 30 raw material trucks (50 – 60 truck trips)
  - 50 – 60 product trucks (100 – 120 truck trips)
  - 10 – 15 delivery trucks (20 – 30 truck trips)
  - 5 – 10 additional courier/general material trucks (10 – 20 truck trips)

While the masonry plant will be operational 24 hours a day, the majority of these truck trips are expected to occur between the hours of 5:00am and 5:00pm. To provide a conservative assessment, it has been assumed that all the trucks would arrive in this 12-hour period, providing a forecast of 20 truck trips per

hour during the peak periods. These truck trips are expected to have a generally even split between arrival and departure trips in the peak periods.

Regarding masonry plant staff vehicle trips, the majority of trips are expected to occur outside of the peak periods based on the shift structure (for factory staff) with changeover periods at 5:00am and 1:00pm. The only staff that would generate trips during the peak periods are expected to be the 4 administration/management staff, who would generally work standard office hours. If each staff member drives to the masonry plant, these staff could generate up to 4vph in both peak periods.

In summary, the masonry plant is expected to generate up to 26vph in both peak periods, comprising 4 light vehicle trips and 20 truck trips based on a First Principles Assessment.

To provide consistency with the assessment of the OEE, a traditional traffic generation assessment has also been considered. Based on the trips rates outlined in **Section 7.4.2**, the masonry plant could generate:

- 28vph in the AM peak;
- 21vph in the PM peak; and
- 303 vehicles trips per day (vpd).

This traffic generation is consistent with the First Principles Assessment for the AM and PM peak periods.

7.4.4 Total Site Generation

With reference to sections above, the peak traffic generation estimate for the Site is that determined further to the application of the OWR Extension Report trip rate of 10.5 peak hour trips per hectare; this provides an estimated Site generation of 114vph in both peak periods.

With reference to the RMS Guide Update trip rates and the first principles assessment of the masonry plant, the actual generation of the Site is estimated at approximately 86vph in the AM peak and 70vph in the PM peak.

7.5 Additional Traffic Generation Considerations

7.5.1 Remaining Oakdale East Estate Development

As stated, the Proposal provides for the development of some 10.9ha of the total OEE lands; as such, the potential exists for the further development of 21.1ha for industrial development. Application of the

OWR Extension Report trip rates suggests that this remaining OEE land would generate some 222vph in both peak periods.

Alternatively, the RMS Guide Updates trip rates can also be applied based on a proportional allocation of GFA to the remaining OEE land (in line with the Proposal). In this regard, it is estimated that the remaining OEE land could yield approximately 85,000m^2 GFA; application of the RMS Guide Update rates to this projected GFA suggests the remaining OEE land could generate approximately:

- 210vph in the AM peak;
- 155vph in the PM peak; and
- 2,244vpd.

7.5.2 Austral Bricks Site

The final trip generating site to consider is the existing Austral Site. In this regard, traffic surveys were undertaken by Matrix Traffic & Transport Surveys in September 2018 at the intersection of OWR / Millner Avenue / Austral Site. The surveys found the following generation of the Austral Site:

- A site peak hour (6:00am – 7:00am) generation of 51vph, comprising 15 light vehicle trips and 36 truck trips;
- An AM peak hour (8:15am – 9:15am) generation of 29 vehicle trips, comprising 7 light vehicle trips and 22 truck trips; and
- A PM peak hour (4:00pm – 5:00pm) generation of 25 vehicle trips, comprising 19 light vehicle trips and 6 truck trips.

It is noted that while the development of the remaining sections of the OEE (as detailed in Section 7.5.1) would reduce the size of the Austral Site, there is no expectation at this time that the trip generation of the Austral Site would be significantly reduced from current (surveyed) levels.

7.6 Total Traffic Generation

For the purpose of determining the potential impacts of the Proposal on the local road network, a direct comparison is required between the previously estimated development of the OEE (i.e. 83ha for industrial development) and the currently estimated development of the Site; the remaining OEE land; and the Austral Site.

The highest estimate of total traffic generation is provided further to the application of the OWR Extension Report trips per hectare rate to the entire OEE, plus the Austral Site generation. With reference to sections above, this provides a maximum trip estimate of some 362vph in both peak

periods. This trip estimate can be directly compared to the OWR Extension Report estimate (for the same land) of 872vph in both the AM and PM peak periods.

A more realistic estimate of traffic generation is provided further to the application of the RMS Guide Update trips rates to the OEE land; the first principles assessment of the Masonry Plant trip generation; and the surveyed generation of the Austral Site. With reference to sections above, this provides a trip estimate of some 325vph in the AM peak and 250vph in the PM peak.

7.7 Traffic Impacts

7.7.1 Local Road Network

As discussed in Section 4 and Section 7.2 above, the RMS and other government agencies have over recent years invested significant resources in determining the future infrastructure requirements of the WSEA lands (including the Oakdale Industrial Estate). Those assessments have necessarily included a trip generation allocation for the Oakdale Industrial Estate, and indeed for the individual Oakdale Industrial Estate precincts, so as to ensure that the trips generated by the Oakdale Industrial Estate can be appropriately accommodated within the local and broader sub-regional road network further to recommended upgrades.

With reference to sections above, it is clear that the OEE developable area is significantly less than the area adopted in the previous studies, and as such immediately has significantly lower trip generation potential than previously estimated.

In this regard, the analysis provided in Section 7.6 above clearly shows that the total trip generation of the Site, the remaining OEE land, and the continued Austral operations is significantly lower than the OWR Extension Report for the same land. Indeed, even accounting for the maximum trip generation estimate (362vph in both peak periods), the total trip generation of the Site, the remaining OEE land and the Austral Site will represent well less than 50% of the OWR Extension Report (83ha) OEE trip generation estimate.

Given that there are no proposals to scale back the suite of local road upgrades as determined in the OWR Extension Report (many of which have since been completed), it can therefore only be concluded that the conclusions and recommendations of the detailed assessments of key sub-regional intersections remain entirely relevant and valid; and in turn a conclusion that the trip generation of the Site in and of itself would have no significant impact on the future operations of the key local intersections. Indeed, given the scale of the reduction in trips (across the OEE) it is expected that all key intersections would operate with lower average delays than previously assessed.

7.7.2 Intersection Old Wallgrove Road & Estate Road 1

With reference to the traffic surveys as discussed in 7.5.2, traffic flows in Old Wallgrove Road south of Millner Avenue are very minor, being less than 50vph two-way in both the AM and PM peak periods, or approximately 1 vehicle every minute. In the short-medium term (i.e. prior to the development of the SLR) the intersection of Old Wallgrove Road / Estate Road 1 will operate as a Priority T intersection; based on the total intersection traffic flow estimates, SIDRA analysis indicates the intersection will operate at a Level of Service A in both peak periods.

7.7.3 Intersection Old Wallgrove Road / Millner Avenue

Until such time as the SLR is constructed, traffic flows in Old Wallgrove Road are expected to be limited to those generated by the existing PGH and CSR sites at the southern end of Old Wallgrove Road, and the OEE itself. With reference to the traffic surveys and sections above, these total (two-way) flows are estimated at no more than 400vph in both peak periods, with a general distribution of 80% southbound (arrival) and 20% northbound (departure) in the AM peak, and vice versa in the PM peak.

The most recent assessment of the Old Wallgrove Road / Millner Avenue intersection is provided in the *Oakdale South Industrial Precinct, Western Sydney Employment Area: State Significant Development Application Traffic Impact Assessment* prepared by Ason Group, 2015 (OSE TIA). The OSE TIA provides analysis of a 2026 forecast scenario which includes:

- No connection of Old Wallgrove Road to the SLR;
- Full development of the Oakdale Central Estate and the Oakdale South Estate;
- Development of the PGH and CSR sites south of the OEE to provide a total of 57.5ha of industrial land;
- No specific trip generation to/from OEE; and
- A nominal generation to/from the Austral Site.

A summary of the traffic flows adopted in the OSE TIA is shown in **Figure 16**, while the results of the SIDRA analysis (of these flows) is reported in **Table 12**.

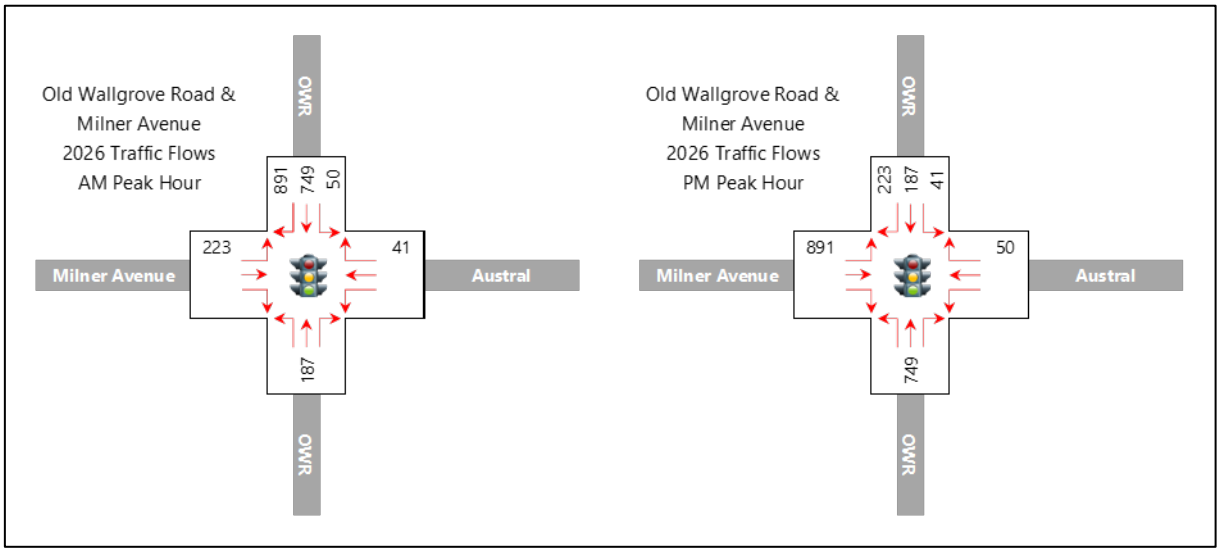

Figure 16: OSE Adopted Traffic Flows

Source: OSE TIA

Table 12: Future Intersection Performance Milner Ave with OWR

Intersection	Period	Degree of Saturation (DoS)	Average Intersection Delay (AVD)	Level of Service (LoS)
Milner Avenue & OWR	AM	0.75	13.4	A
	PM	0.83	24.7	B

Source: OSE TIA

Given that actual trip generation to/from Old Wallgrove Road south of Millner Avenue prior to the construction of the SLR will constitute only the existing generation of the CSR Site and the OEE (i.e. some 400vph); and that those trips would have a similar distribution pattern to that estimated in the OSE TIA (for much high flows); it is concluded that the intersection of Old Wallgrove Road / Milner Avenue / Austral Site will continue to operate at a high Level of Service until such time as the SLR is constructed.

As previously stated in the OSE TIA, the performance of this intersection following the connection to the SLR will require future review, specifically accounting for localised changes further to – for example – additional access connections from the Oakdale Industrial Estate precincts to the SLR.

7.7.4 Intersection Old Wallgrove Road / Lenore Drive

Further to the above, traffic flows in Old Wallgrove Road to/from Lenore Drive will be significantly lower than previously assessed in the OWR Extension Report as a simple factor of the reduced trip generation of the OEE. As such, the Level of Service reported for the intersection (see Table 12 above) would not be impacted by the Proposal, and indeed it is expected that intersection operations would be improved from the OWR Extension Report findings as a factor of the reduction in broader OEE trips.

7.7.5 Future Oakdale East Estate Access Provisions

Further to the construction of the SLR and its connection to Old Wallgrove Road, it is expected that access provision for the OEE Would be revised to provide the following:

- A redesign of the Old Wallgrove Road / Estate Road 1 intersection to provide left in/left out (to/from Estate Road 1) access only.
- An extension of Estate Road 1 to a new access road (Estate Road 2) running generally north-south through the remaining OEE land between the existing Austral Site approach to Old Wallgrove Road and the SLR.

It is noted that the design of the above remains to be determined but would necessarily consider forecast traffic flows and the final alignment/geometry of the SLR.

7.8 Construction Traffic Management Plan

A Construction Traffic Management Plan (CTMP) would be required to be prepared for each development stage within the Site. The CTMP would necessarily detail the appropriate measures by which to minimise traffic impacts on the surrounding road network; ensure safety and efficiency for workers, pedestrians and road users; and provide information regarding construction vehicle access routes and any changed road conditions (if applicable).

The CTMP would be undertaken in consultation with Council and the RMS, and as suggested in the SEARs is expected to be a required as a formal Condition of Consent in future Development Application approvals.

8 Design Commentary

8.1 Relevant Design Standards

The site access, car park and loading areas have been designed to comply with the following relevant Australian Standards:

- AS2890.1 for car parking areas;
- AS2890.2 for commercial vehicle loading areas;
- AS2890.6 for accessible (disabled) parking.

A detailed review of the car park and related areas has been undertaken and the following characteristics are noteworthy:

- The main car park aisles have been designed with a minimum clear width of 6.5m.
- All staff and visitor spaces are designed in accordance with a User Class 1A and are to be provided with a minimum space length of 5.4m, a minimum width of 2.4m.
- Dead-end aisles are provided with the required 1.0m aisle extension in accordance with Figure 2.3 of AS2890.1.
- All disabled and adaptable parking spaces are to be provided in accordance with AS2890.6, which requires a space with a clear width of 2.4m and located adjacent to a minimum shared area of 2.4m.

It is expected that any detailed construction drawings in relation to any modified areas of the car park or site access would comply with these Standards. Furthermore, compliance with the above Standards would be expected to form a standard condition of consent to any development approval.

8.2 Heavy Vehicle Access

The commercial (heavy) vehicle facilities of the development have been designed having regard for the operational requirements of Brickworks in terms of the Masonry Plant and the requirements of AS2890.2. In this regard the following is considered noteworthy:

- The internal design of the service area has been undertaken in accordance with the requirements of AS28090.2 for the maximum length vehicle accessing the site being a B-double truck of 26m in length, and
- All service vehicles can enter and exit the site in a forward direction as shown by the swept path analysis provided as **Appendix B,** demonstrating compliance with relevant sections of AS2890.2.

9 Conclusions

The key findings of this Transport Assessment are:

- The Proposal relates to some 10.9 hectares (ha) of land (the Site) across the central and southern parts of the broader OEE, and provides for:
  - 4 warehouses with a combined Gross Floor Area (GFA) of 21,156m^2;
  - Ancillary office space with a combined GFA of 3,186m^2;
  - A Masonry Plant with a GFA of 10,430m^2 and ancillary office space of 1,040m^2;
  - A total of 265 car parking spaces, including 6 accessible spaces, across the Site;
  - The construction of a new access road extending from Old Wallgrove Road into the Site (termed Estate Road 1 for ease of reference); and
  - Separated light vehicles and truck access points to Estate Road 1 for the individual development lots.
- The Proposal is entirely consistent with the goals of the WSEA Draft Structure Plan and provides a mix of industrial development which is consistent with the other approved / completed Oakdale Industrial Estate precincts.
- There are significant public and active transport opportunities in the broader local area, including the extension of bus services into Old Wallgrove Road (connecting to local centres, rail and the Liverpool – Parramatta T-Way) and the provision of extensive off-road cycle infrastructure. Although there are no bus services currently directly servicing the Site. As the BWSEA is developed, it is understood that the public transport services would be improved in the area. The provision of end user facilities for cyclists will be determined for individual lots within the Site and consideration for methods to encourage sustainable travel would be provided once the public transport infrastructure has improved.
- The Proposal provides for a level of car parking across the Site which exceed the recent DCP Submission recommended parking rates; these rates are identical to those provided for other (approved) Oakdale Industrial Estate precincts and provide an appropriate and sustainable level of parking across the Site.
- Parking has been appropriately allocated across the Site for the individual development lots and includes an appropriate allocation of accessible parking.
- The traffic generation of the Site – and moreover the OEE in which the Site lies – will be significantly lower than previously forecast; it is estimated that the development of the Site, the remaining OEE land and the continued Austral Site operations would generate a total of up to 360vph in the peak

periods. This represents less than 50% of the traffic previously forecast for these same sites in the OWR 2012 Report and OWR Extension Report.

- Given that the suite of local road network upgrades recommended in the OWR 2012 Report and OWR Extension Report remain unchanged, it can be concluded that the Proposal (along with the development of the remaining OEE land and the continued Austral Site operations) would have no significant impact on the local road network, and indeed it is likely that the key local intersections would operate at better levels of service than previously reported simply as a function of these significant traffic generation reductions.
- All vehicular Site access will be provided Estate Road 1 to Old Wallgrove Road; this intersection will operate as a priority T intersection until such time that the SLR is constructed and connected to Old Wallgrove Road. Further to the SLR being constructed, it is anticipated that the intersection of Old Wallgrove Road / Estate Road 1 would operate for left in/left out movements only, with alternative routes provided by future connections of Estate Road 1 to Estate Road 2, and then to either the Old Wallgrove Road / Millner Avenue /Austral Site intersection or SLR / Estate Road 2 intersection. However, this would require review once more information is available for the SLR.
- Estate Road 1 itself will be constructed in accordance with the DCP Submission road profile, noting that this is an identical profile as other (approved) access roads with the Oakdale Industrial Estate.
- The design of all access driveways, car parking aisles and spaces, and servicing areas has been provided with reference to the appropriate Australian Standards. It is expected that a Condition of Consent would be imposed requiring compliance with AS 2890.1, AS 2890.2 and AS 2890.6 to provide for any minor design revisions adjustments prior to the issuing of a Construction Certificate.

It is therefore concluded that the proposed development at the Site is supportable on transport and traffic planning grounds.

Appendix A

SIDRA Level of Service & Performance Measures

EXPLANATORY NOTE

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Reference: 0771tn01

SIDRA Performance Output & Level of Service

SIDRA intersection modelling outputs a range of performance measures, in particular:

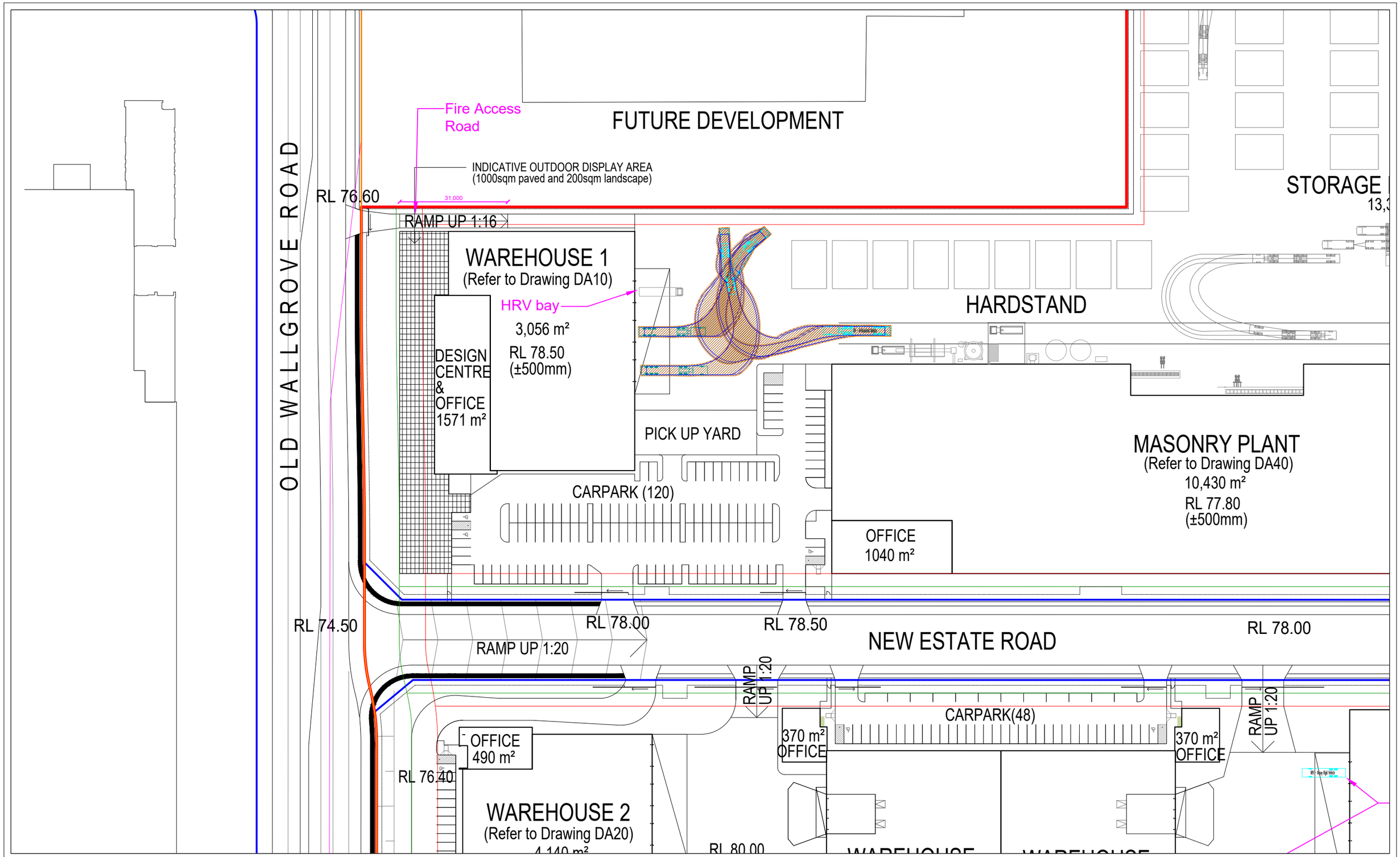
- *Degree of Saturation (DOS)* – The DOS is defined as the ratio of demand (arrival) flow to capacity. The DOS is used to measure the performance of intersections where a value of 1.0 represents an intersection at theoretical capacity, above 1.0 represent over-saturated conditions (demand flows exceed capacity) and degrees of saturation below 1.0 represent under-saturated conditions (demand flows are below capacity). As the performance of an intersection approaches DOS of 1.0, queue lengths and delays increase rapidly. It is usual to attempt to keep DOS to less than 0.9, with satisfactory intersection operation generally achieved with a DOS below 0.8.
- *Average Vehicle Delay (AVD)* – Delay represents the difference between interrupted and uninterrupted travel times through an intersection and is measured in seconds per vehicle. Delays include queued vehicles accelerating and decelerating from/to the intersection stop lines, as well as general delays to all vehicles travelling through the intersection. The AVD (or average delay per vehicle in seconds) for intersections also provides a measure of the operational performance of an intersection and is used to determine an intersection's Level of Service (see below). For signalised intersections, the AVD reported relates to the average of all vehicle movements through the intersection. For priority (Give Way, Stop & Roundabout controlled) intersections, the AVD reported is that for the movement with the highest AVD.
- *Level of Service (LOS)* – This is a comparative measure that provides an indication of the operating performance, based on AVD. For signalised and roundabout intersections, LOS is based on the average delay to all vehicles, while at priority controlled intersections LOS is based on the worst approach delay. The following table provides a recommended baseline for assessment as per the RMS Guidelines to Traffic Generating Developments (2002):

Table 1: Traffic Modelling Performance Criteria

Level of Service	Average Delay per Vehicle (sec/veh)	Traffic Signals, Roundabout	Give Way and Stop Signs
A	less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays. Roundabouts require other control mode	At capacity, requires other control mode
F	More than 70	Unsatisfactory and requires additional capacity.	Unsatisfactory and requires other control mode or major treatment.

Appendix B

Swept Path Analysis



Revision notes:

Rev:	Date:	Notes:

For information purposes only - not for construction

Drawn By: RBM

Client: Goodman Property Services

Project: 0771d08 Oakdale East

Drawing Title: Warehouse 1 - 19m AV Dock Access

Date: 08/03/2019

Scale @ A3: 1:1000

Drawing Number: 01

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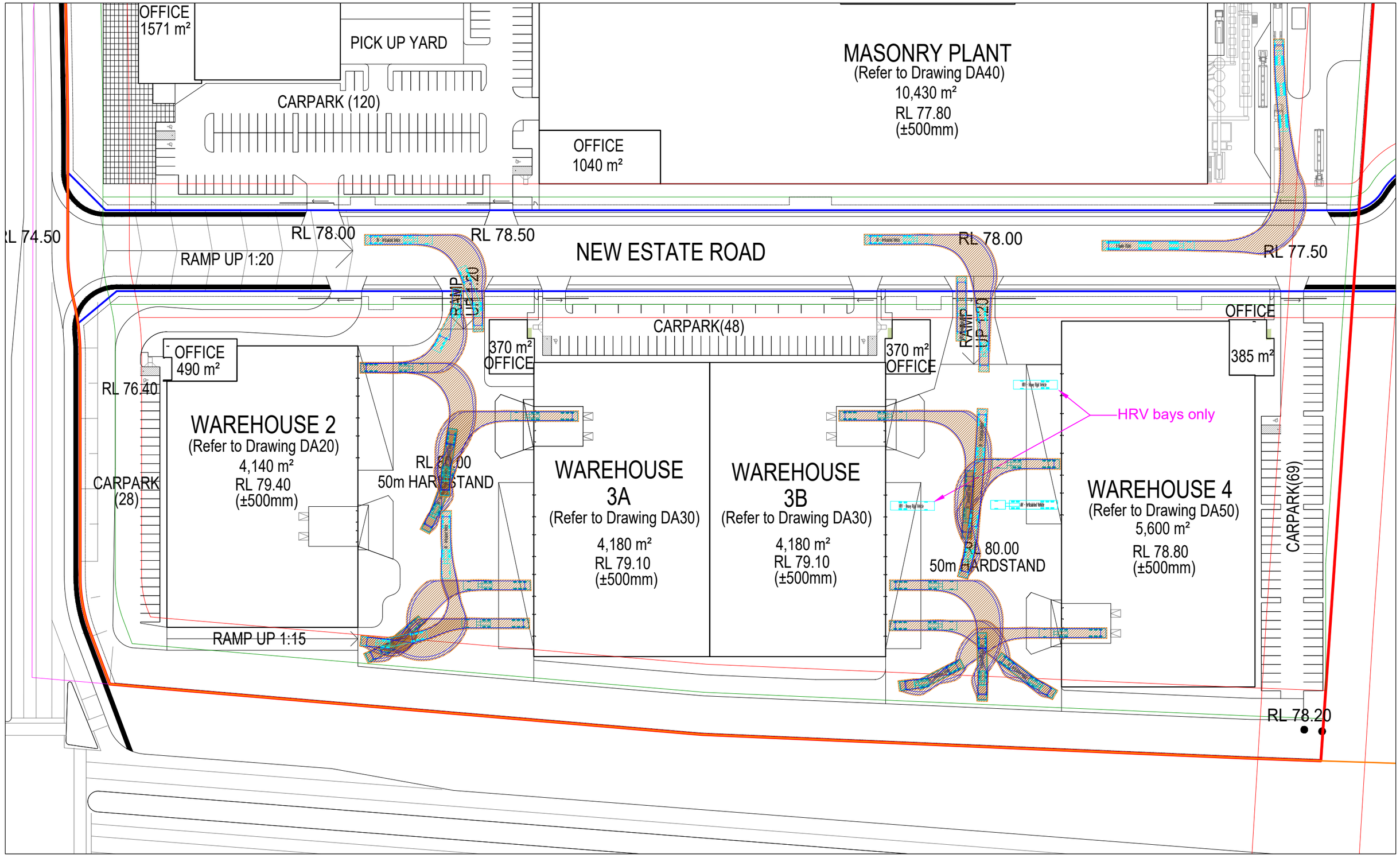

Revision notes:

Rev:	Date:	Notes:

For information purposes only - not for construction

Drawn By: RBM	Project: 0771d08 Oakdale East	Date: 08/03/2019	
Client: Goodman Property Services	Drawing Title: Warehouse 2, 3 & 4 - 19m AV Dock Access	Scale @ A3: 1:1000	Drawing Number: 02

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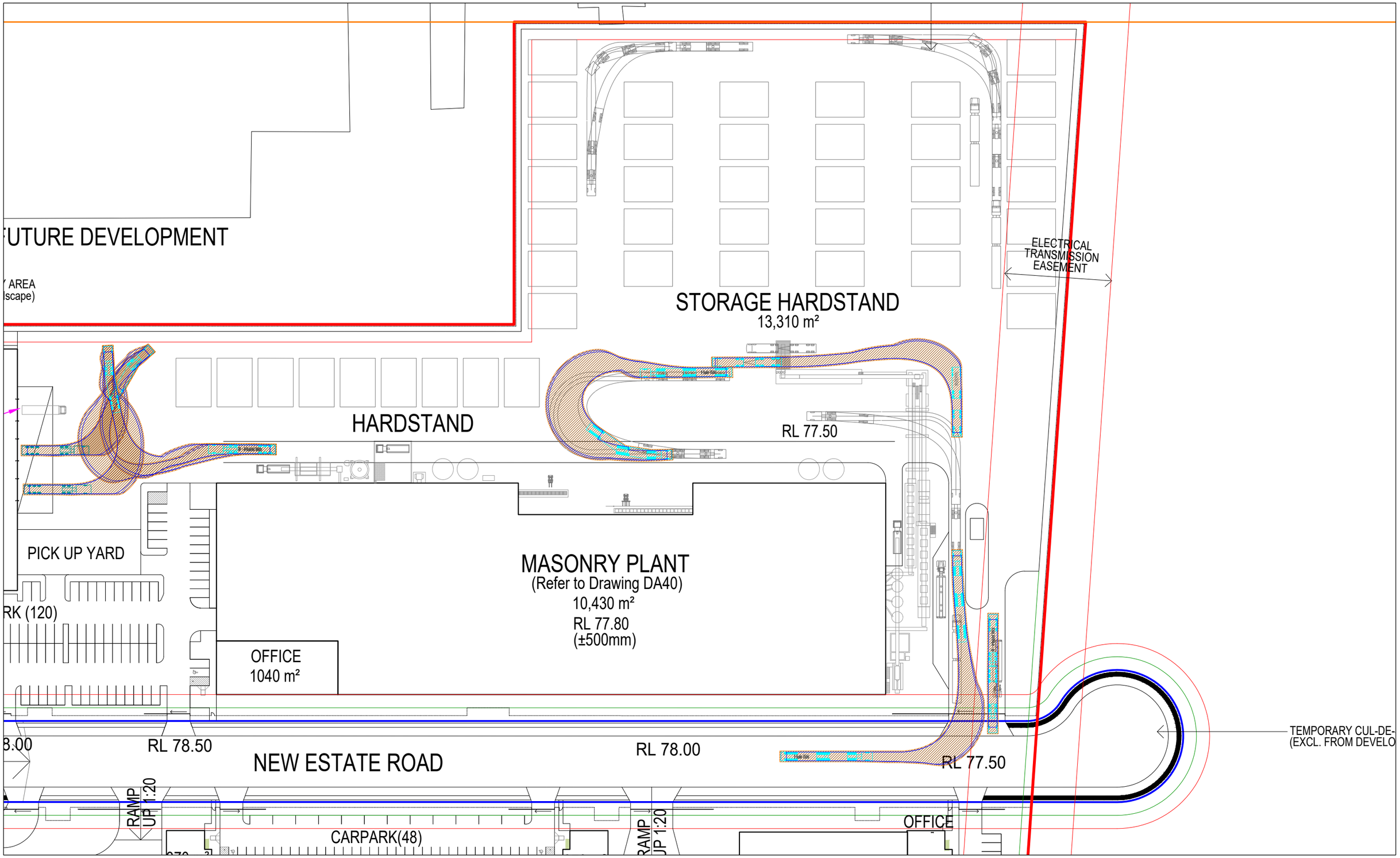

Revision notes:

Rev:	Date:	Notes:

For information purposes only - not for construction

Drawn By: RBM

Client: Goodman Property Services

Project: 0771d08 Oakdale East

Drawing Title: Masonry Plant - Truck & Dog Access Dock Access

Date: 08/03/2019

Scale @ A3: 1:1000

Drawing Number: 03

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