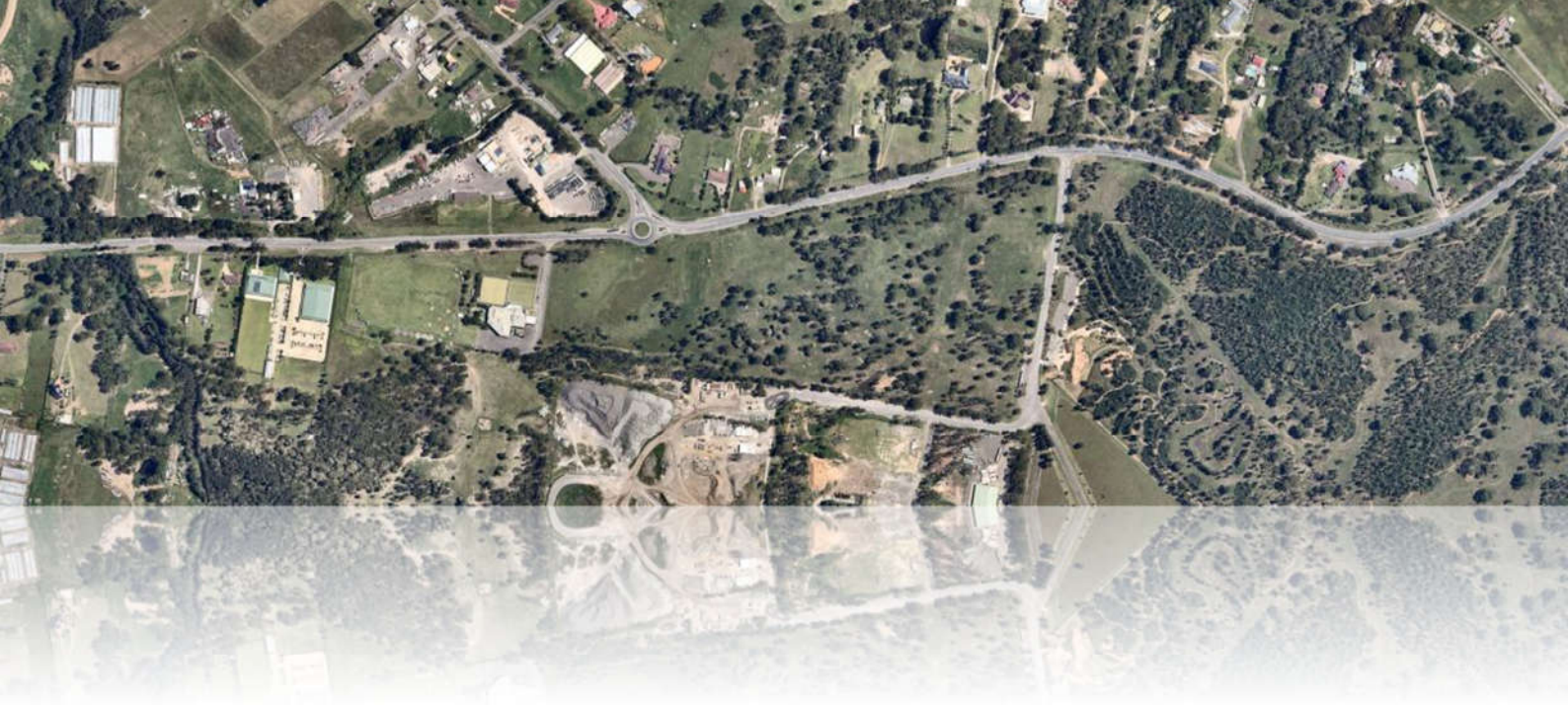

MASTERPLAN TRAFFIC AND PARKING IMPACT ASSESSMENT OF MIXED-USE PLANNING PROPOSAL AT 1400-1480 ELIZABETH DRIVE, CECIL PARK

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Transport Planning, Traffic Impact Assessments, Road Safety Audits, Expert Witness

18244.01FC - 20th March 2019

Development Type: **Mixed-Use Planning Proposal**

Site Address: **1400-1480 Elizabeth Drive, Cecil Park**

Prepared for: **Western Sydney Town Centre**

Document reference: **18244.01FC**

Status	Issue	Prepared By	Checked By	Date
Draft	A	LS/DF	DF	8th March 2019
Final	A	LS/DF	LS	19th March 2019
Final	B	LS		20th March 2019
Final	C	LS		20th March 2019

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1 INTRODUCTION

M^CLaren Traffic Engineering (MTE) was commissioned by *Western Sydney Town Centre* to provide a Masterplan Traffic and Parking Impact Assessment of the Mixed-Use Planning Proposal at 1400-1480 Elizabeth Drive, Cecil Park.

1.1 Description and Scale of Development

The subject Planning Proposal includes the rezoning of Lots 1 to 9 DP 1054778 from the current zoning of RU4 "*Primary Production Small Lots"* to IN2 – Light Industrial. For the purposes of the application, an indicative masterplan has been developed to indicate a possible future scale and use of development on the site. The indicative masterplan is provided in **Annexure A** to this report.

The scale of the development depicted on the indicative masterplan relevant to this traffic and parking report includes:

- 54,790m^2 GFA of Warehouses with an additional 5,770m^2 of associated Office GLA;
- 8,728m^2 GFA of Light Industrial Units;
- Two x 500m^2 GFA Drive-through Fast Food Restaurants;
- Service Station with an associated 800m^2 GFA building including:
    - A 250m^2 GFA convenience store;
    - A 250m^2 GFA restaurant;
    - A 300m^2 GFA restaurant;
- 3,000m^2 GFA of Showroom / Retail use.

The masterplan also depicts some potential parking areas and possible locations for vehicular access to the site as follows:

- At-grade car parking areas providing a total of 624 car parking spaces;
- A left in / left out vehicular access from Elizabeth Drive inclusive of a deceleration lane of approximately 135m in length for vehicles entering the site from the east along Elizabeth Drive. This access is detailed on the indicative masterplan to be located approximately 250m to the west of the intersection of Elizabeth Drive / Range Road;
- An additional shared access road of 10m width which provides vehicular access to both Site 1 and Site 2 from a proposed internal roundabout intersection. This internal roundabout will connect to the Mamre Road / Elizabeth Drive intersection by a proposed fourth intersection leg added to the south of this intersection;
- Two minor two-way vehicular driveways from Range Road which provide access to two separate car parking areas servicing the nearby warehouses. These access driveways are detailed to be located approximately 65m and 300m from the intersection of Elizabeth Drive / Range Road respectively.

1.2 State Environmental Planning Policy (Infrastructure) 2007

If the planning proposal were approved, the subsequent development application for the master plan scale would qualify as a development with relevant size and/or capacity under Clause 104 of the SEPP (Infrastructure) 2007. Additionally, the development fronts a State Classified Main Road (Elizabeth Drive) and proposes direct access to this road. Accordingly, formal referral to the Roads and Maritime Services (RMS) is necessary.

1.3 Site Description

The site is bounded by Elizabeth Drive to the north and Range Road to the east and south. The intersection of Mamre Road and Elizabeth Drive is located at the northern boundary of the land. Early consultation plans for the M12 Motorway (a NSW Government project) show a corridor for the M12 motorway bisecting the subject site (see map attached in **Annexure B**). Detailed acquisition plans have been prepared by the RMS showing an approximately 300m wide road corridor running through the subject site, which is proposed to be acquired by RMS to build the M12 motorway. These plans are yet to be finalised and negotiations with RMS are ongoing.

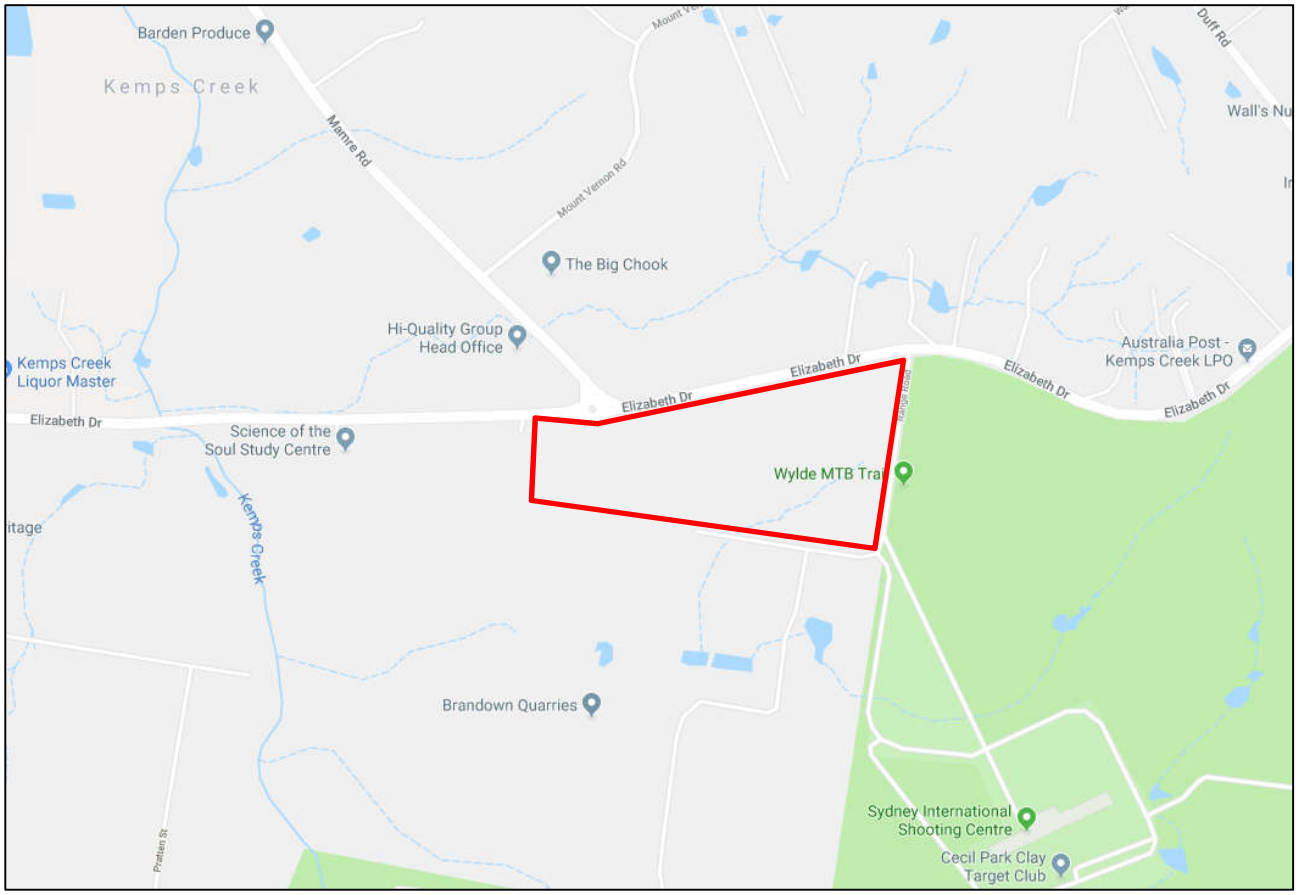
The subject site is located within the South West Growth Area and partially located within the Western Sydney Aerotropolis Growth Area. The site is currently zoned RU4 – Primary Production Small Lots and is proposed to be rezoned from its current Rural use to IN2 – Light Industrial. The site is surrounded by a range of land uses including low-density residential dwellings to the north of the site, vacant land and Kemps Creek Sporting and Bowling Club located to the west of the site, and Brandown Quarries located to the south of the site.

1.4 Site Context

The site location is shown on aerial imagery and a map in **Figure 1** & **Figure 2** respectively.

Site Location

FIGURE 1: SITE CONTEXT – AERIAL PHOTO



Site Location

FIGURE 2: SITE CONTEXT – STREET MAP

2 EXISTING TRAFFIC AND PARKING CONDITIONS

2.1 Road Hierarchy

The road network surrounding the site has the following characteristics:

Elizabeth Drive

- RMS Classified STATE Road (No. 535);
- Approximately 11m in width facilitating two traffic flow lanes in the eastbound direction and one traffic flow lane and road shoulders in both sides of the road;
- Signposted 80km/h carriageway;
- No kerbside permitted along both sides of the road

Range Road

- Unclassified LOCAL Road;
- Approximately 10m facilitating one traffic flow lane in each direction and road shoulders on both sides of the road;
- No speed limit signposted, default 50km/h applies;
- Kerbside parking available on both sides of the road.

Mamre Road

- RMS Classified STATE Road (No. 536);
- Approximately 10m in width facilitating one traffic flow lane in each direction and road shoulders on both sides of the road;
- Signposted 80km/h carriageway;
- No kerbside parking permitted on both sides of the road.

2.2 Existing Traffic Management

- Round-about controlled intersection of Elizabeth Drive / Mamre Road;
- Prioirty-controlled intersection of Elizabeth Drive / Range Road.

2.3 Existing Traffic Environment

Traffic counts were collected along Elizabeth Drive by Tracsis in 2015 within the following sections.

A. The Northern Road to Luddenham Road;
B. Badgerys Creek Road to Devonshire Road;
C. Devonshire Road to Mamre Road;
D. Mamre Road to Wallgrove Road;

The surveyed sections of Elizabeth Drive are shown in **Figure 3** below.

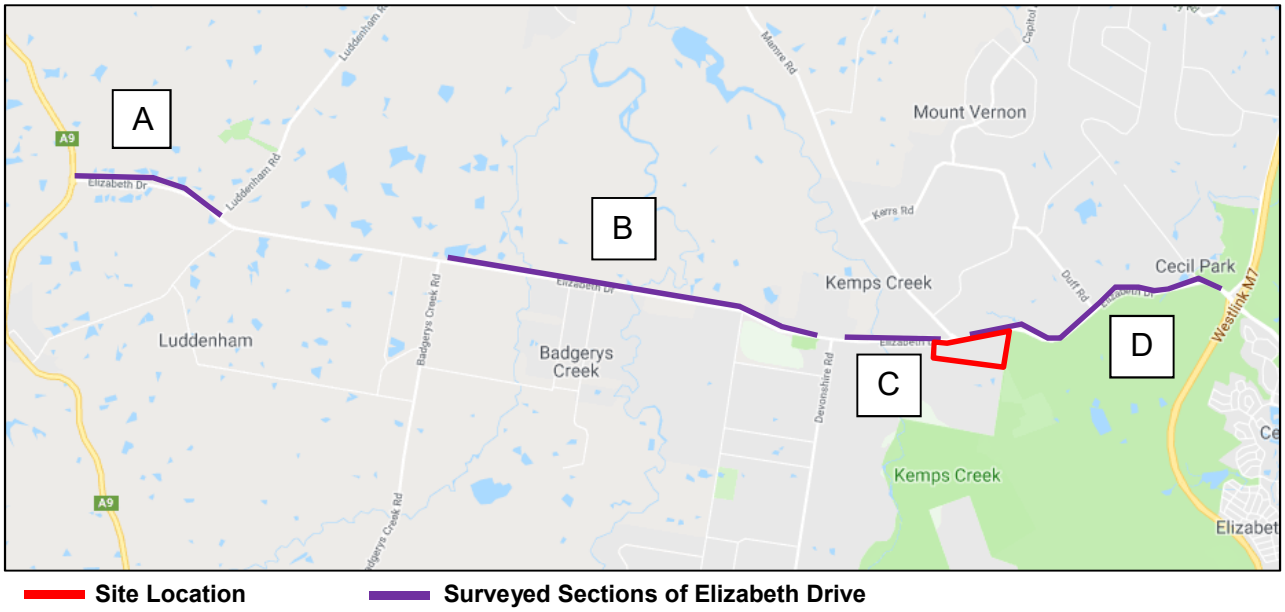


FIGURE 3: ELIZABETH DRIVE 2015 TRAFFIC SURVEY SECTIONS

The intersection relevant to this proposal is Elizabeth Drive / Mamre Road. Therefore, data from Devonshire Road to Wallgrove Road (Sections C and D) has been used to interpolate existing turning movement volumes for the relevant intersection.

2.3.1 Intersection Performances

Existing intersection performances have been assessed using SIDRA INTERSECTION 8.0, the results of this analysis are summarised in **Table 1**.

TABLE 1: SIDRA INTERSECITION 8.0 EXISTING PERFORMANCE

Intersection	Peak Hour	Degree of Saturation(1)	Average Delay(2) (sec/veh)	Level of Service(3)	Control Type	Worst Movement	95th Percentile Queue
EXISTING PERFORMANCE							
Elizabeth Drive / Mamre Road	AM	0.32	4.4	**A**	Roundabout	RT from Mamre Road	1.7 veh (12m) Elizabeth Drive
	PM	0.55	4.5	**A**		RT from Mamre Road	4.1 veh (28.9m) Elizabeth Drive

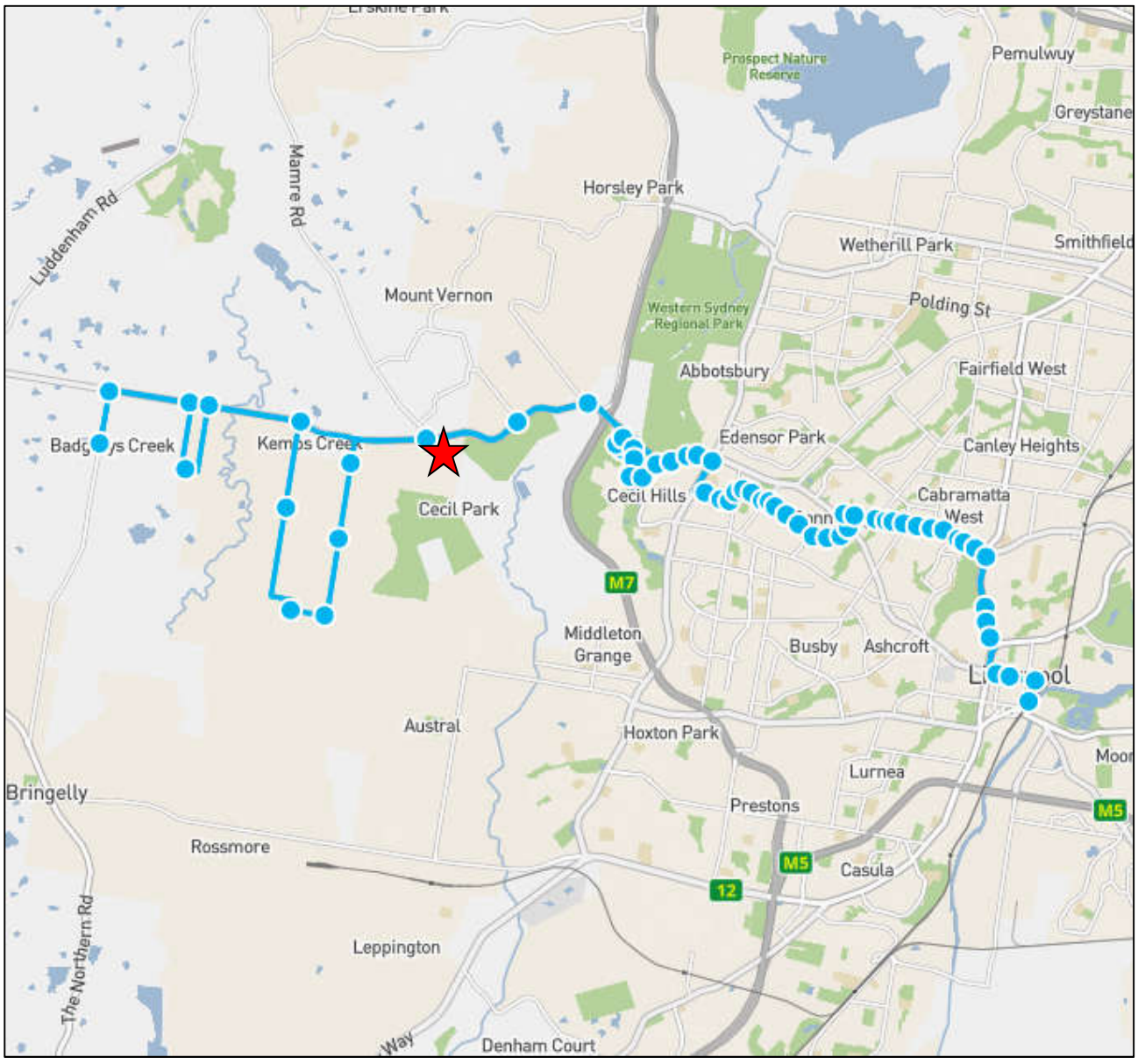
NOTES:
(1) Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.
(2) The average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.
(3) The level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst. The LoS of the intersection is shown in bold, and the LoS of the most disadvantaged movement is shown in brackets.

As shown above, the Elizabeth Drive / Mamre Road intersection is currently performing at a high level of efficiency with a level of service “A” condition in both the AM & PM peak hours.

The level of service “A” performance is characterised by low approach delays and spare capacity.

2.4 Public Transport

The subject site has access to existing bus route 801 provided by Transit Systems which runs along Elizabeth Drive, with the nearest bus stop located directly to the west of the site and in front of Kemps Creek Sporting and Bowling Club. The 801 service provides a connection between Badgerys Creek and Liverpool with only three services operating in each direction per day. The location of the site relative to the surrounding public transport infrastructure is presented in **Figure 4** below.



Site Location

FIGURE 4: PUBLIC TRANSPORT CONTEXT

Due to the Western Sydney Airport Precinct growth to the west of the site, it is expected that there will be an improvement in public transport accessibility in the future.

2.5 Future Road and Infrastructure Upgrades

The site will be significantly influenced by the implementation of the M12 Motorway. The M12 Motorway is a new motorway proposed as a part of the Western Sydney Infrastructure Plan (WSIP), which is currently in the planning stage. The M12 will connect the M7 at Cecil Park to The Northern Road at Luddenham and will act as a major access thoroughfare for the Western Sydney Airport at Badgerys Creek. The M12 in the context of the WSIP is shown in **Figure 5** below.

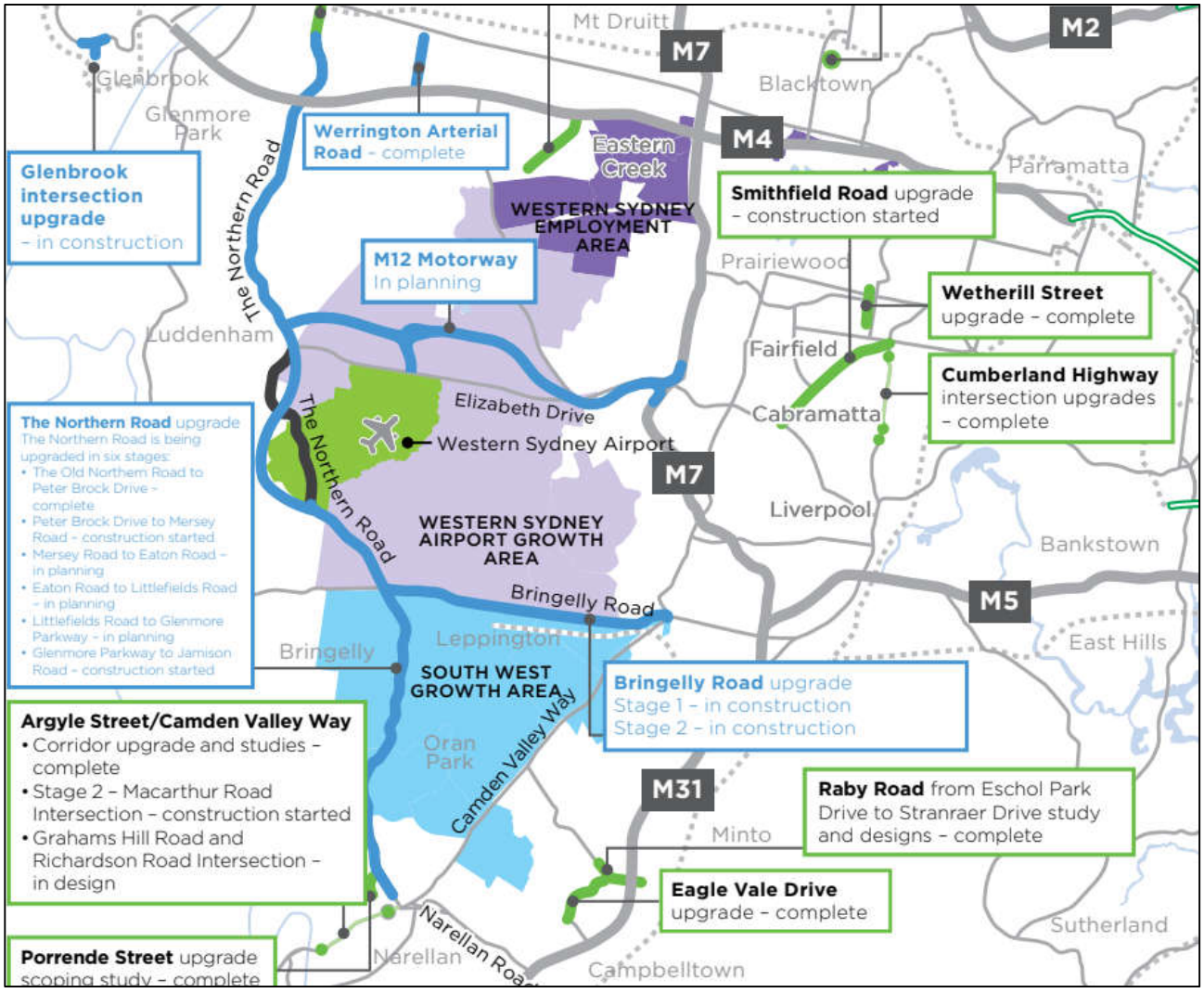


FIGURE 5: WESTERN SYDNEY INFRASTRUCTURE PLAN

The current land acquisition concept for the M12 motorway will split the subject site into two sections, Site 1 and Site 2. The intersection of Elizabeth Drive / Mamre Road will remain unaltered, as the M12 is a raised motorway which will pass over Elizabeth Drive near the Mamre Road intersection. The M12 is expected to acquire a significant portion of traffic from Elizabeth Drive, as the two roadways stretch between the M7 and The Northern Road (M9) in similar locations.

3 PARKING ASSESSMENT

3.1 Council Parking Requirement

Reference is made to Liverpool City Council's *Liverpool Development Control Plan 2008 Part 1 General Controls for all Development, 20 Carparking and Access* which provides the following car parking rates applicable to the proposed development:

Drive-in food Outlets

For type definitions refer to Appendix 1 in Part 1.1

Drive-in Food Outlets

One of three types of drive-in facilities:

1. *Where customers park on site and walk to the food outlet, with no seating for the on site consumption of food.*
2. *Similar to 1 but with seating for on site food consumption.*
3. *With the features of 1 and/or 2 plus a drive through service for customers not wishing to consume food on the premises.*

Type 1 – 1 space per 8sqm of LFA

Type 2 - 1 space per 8sqm of LFA plus 1 space per 5 seats

Type 3 - 1 space per 6 seats plus queuing area for 10 cars

Industry

1 space per 35sqm of office LFA

1 space per 75sqm factory/warehouse LFA or 1 space per 2 employees, whichever is the greater

Warehouse developments of GFA >1000sqm: 1 space per 250sqm in GFA

Service station

2 spaces per fuel outlet plus

3 spaces per service bay plus1 spaces per employee

1 space per 20sqm of LFA of any convenience store

Warehouses

1 space per 35sqm of office LFA

1 space per 75sqm factory/warehouse LFA or 1 space per 2 employees, whichever is the greater

Where it can be shown that employee numbers will be significantly less than the required car parking provision, some of the car spaces may be set aside as unformed car parking

Warehouse developments of GFA >1000sqm: 1 space per 250sqm in GFA

Bulky Goods Premises (in the B5 zone)

Developments of LFA < 600sqm: 1 space per 30sqm LFA,

Developments of LFA 600 to 3,000sqm: 1 space per 90sqm LFA,

Developments of LFA > 3,000sqm: 1 space per 150sqm LFA

Restaurant

Industrial Zones: 1 space per 7sqm of LFA under licence or 1 space per 3 seats, whichever is greater

In proposals where calculations of parking requirements result in fractions of spaces being required, the fraction will be rounded up to the nearest whole space. Where developments comprise separately defined facilities, for example a hotel with a restaurant; the relevant requirements of each facility must be satisfied.

Both drive-through fast food restaurants detailed within the masterplan are expected to be Type 3 fast food developments. However, given the early planning nature of the masterplan, the number of seats is not detailed for the fast food developments at the time of this report. As such, it is considered reasonable that the DCP for the drive-through fast-food restaurants can be approximated based upon the LFA requirement for a type 1 fast-food development.

Similarly, the specific use of the 3000m^2 GLA retail development is not specified at the time of this planning proposal. Given the location within an industrial-focused masterplan and scale of the development, for the purposes of this assessment, the retail development has been assumed to be used as a Bulky Goods retail store. For the purposes of this assessment, the service station with 250m^2 convenience store has been adopted as containing eight (8) fuel outlets, two (2) employees and no work bays.

Liverpool City Council's DCP parking requirements are summarised in **Table 2**.

TABLE 2: DCP PARKING REQUIREMENTS

Land Use	Scale	Rate	Spaces Required
Drive-through Fast food restaurant (type 3)	1,000m^2 GFA (Unknown seating)	Type 3 - 1 / 6 seats, queueing for 10 cars; Type 1 – 1 / 8m^2 of LFA	**125**(1)
Restaurant	550m^2 GFA	1 / 7m^2 of LFA	**79**
Light Industrial Units	8,728m^2 GFA (unknown employees)	1 / 75m^2 GLA	116.37 (**117**)
Service Station	250m^2 GFA convenience store, 8 fuel outlets and two employees	2 / fuel outlet plus 3 / service bay plus 1 / employee 1 / 20sqm of LFA of any convenience store	16 + 2 + 12.5 = 30.5 (**31**)
Warehouse	54,790m^2 GFA	1/250m^2 GFA	219.16 + 164.86 (**385**)(2)
Warehouse office	5,770m^2 GFA	1/35m^2 GFA	
Retail	3,000m^2 GFA	1 / 90m^2 GFA	33.3 (**34**)
Total			**771**

Notes:
(1) The parking space requirement for all drive-through fast food developments is based upon the Type 1 parking rate of the Liverpool City Council DCP. However, it is expected that the drive-through restaurants depicted in the masterplan would operate as a Type 3 restaurant
(2) The minimum parking requirement has been calculated through using the masterplan GLA as the expected GFA. This calculation should be modified during any further DA stage where details regarding GFA are available.

As shown in **Table 2** above, based upon Council's DCP car parking requirements the masterplan development would be required to provide a minimum of **771** car parking spaces. The indicative masterplan provides a total of **624** car parking spaces, representing a numerical shortfall of **147** car parking spaces from the DCP requirements.

Although the Liverpool Council provides car parking rates for industrial and warehouse developments, the following rates provided by the *RMS Guide to Traffic Generating Developments* should be considered.

> *Factories: Provision of 1.3 spaces per 100m^2 gross floor area is recommended*
>
> *Warehouses: Provision of one car space per 300m^2 gross floor area is recommended*

The resultant car parking rate is shown in **6** below.

TABLE 3: DCP AND RMS PARKING REQUIREMENTS

Land Use	Scale	Rate	Authority	Spaces Required
Drive-through Fast food restaurant (type 3)	1,000m^2 GFA (Unknown seating)	Type 3 - 1 / 6 seats, queueing for 10 cars; Type 1 – 1 / 8m^2 of LFA	DCP	**125**
Restaurant	550m^2 GFA	1 / 7m^2 of LFA	DCP	**79**
Light Industrial Units	8,728m^2 GFA (unknown employees)	1.3 / 100m^2 GLA	RMS	113.46 (**114**)
Service Station	250m^2 GFA convenience store, 8 fuel outlets and two employees	2 / fuel outlet plus 3 / service bay plus 1 / employee 1 / 20sqm of LFA of any convenience store	DCP	16 + 2 + 12.5 = 30.5 (**31**)
Warehouse	54,790m^2 GFA	1/300m^2 GFA	RMS	182.63 + 57.70 (**241**)
Warehouse office	5,770m^2 GFA	1/100m^2 GFA(1)		
Retail	3,000m^2 GFA	1 / 90m^2 GFA	DCP	33.3 (**34**)
Total				**624**

Notes:

(1) The RMS Guide does not provide parking rates for warehouse associated offices. It is interpreted that the 1 per 300m^2 rate includes all employees including office. An industrial office rate of 1/100m^2 is added as a worst case.

As shown in **Table 3**, based upon Council's DCP and RMS car parking requirements the masterplan development would be required to provide a minimum of 624 car parking spaces if the industrial and warehouse rates from the RMS Guide are used. The indicative masterplan provides a total of 624 car parking spaces, complying with the requirements outlined in **Table 3**.

The subject proposal therefore will require a range of **624-771** spaces to satisfy the above demand in accordance with the relevant Australian Standards. It is relevant to note that the main point of difference between these two car parking demands is the potential difference in use of warehouse office assessed. The DCP rate of 1/35m^2 is equivalent to a typical office use whilst the 1/100m^2 rate from the RMS Guide is more representative of a factory-type usage. The specific use and parking rate of the allocated office use can be detailed further during the DA stage.

3.1.1 Fast-food parking demand

It should be noted that whilst the fast food developments require a total of 125 spaces under application of the Type 1 DCP parking rates, this level of parking unlikely to be required during Development Application stages for each tenancy. A requirement of 125 car parking spaces under the Type 3 parking requirement of 1 space per 6 seats suggests that the total number of seats between the two drive-through fast food tenancies would represent 750 seats (or 375 seats per fast food tenancy) which appears excessive. Therefore, the resultant parking requirement of 125 car parking spaces between the two tenancies is considered excessive. A more appropriate parking demand for each fast food tenancy can be further assessed during Development Application stages of development.

In view of the foregoing, the site is not constrained by its ability to provide an adequate quantum of car parking and the car parking demands of the considered uses can be fully provided on-site. In addition, when considering the operation of the site as a whole, if one or two of the internal developments were to have parking shortfalls, the site could potentially operate with the sharing of car parking across all developments to under easements and/or collective agreements between the sites. It should be noted that no dual-use/linked parking discounts have been applied for trips to more than one of the premises on-site. Furthermore, the parking requirement shown in **Table 2** and **Table 3** assumes all land uses on the site share a common peak parking period, which operationally will not occur. Therefore, the car parking demands calculated above are a worst-case outcome.

3.2 Bicycle & Motorcycle Parking Requirements

3.2.1 Bicycle Parking Requirements

Reference is made to Liverpool City Council's *Liverpool Development Control Plan 2008 Part 1 General Controls for all Development, 20 Parking and Access* which provides the following bicycle parking rates applicable to the proposed development:

> *Bulky Goods Premises, Garden Centres, Hardware and Building Supplies premises, Industrial Retail Outlets, and Rural Supplies.*
>
> > *Employee/Resident Parking Spaces (Class 1 or 2 facility): 1 per 1000sqm GFA or 1 per 10 staff (whichever is greater)*
> >
> > *Visitor/Customer Parking Spaces (Class 3 facilities): 1 per 1000sqm GFA*
>
> *Industry, Depots, Warehouses & Distribution Centres*
>
> > *Employee/Resident Parking Spaces (Class 1 or 2 facility): 1 per 10 staff (or 1 per 10 car spaces if staff numbers are undetermined)*
> >
> > *Visitor/Customer Parking Spaces (Class 3 facilities): Nil*
>
> *End-of-trip facilities (showers and change rooms) are to be provided at the rate of 1 per 10 employee bicycle spaces. Where less than 4 facilities are*

proposed, they should be unisex. End-of-trip facilities are optional for residential uses or for visitors to other developments.

In proposals where calculations of parking requirements result in fractions of spaces being required, the fraction will be rounded up to the nearest whole space. Where developments comprise separately defined facilities, for example a hotel with a restaurant; the relevant requirements of each facility must be satisfied.

The Council's DCP does not provide any bicycle parking rates for retail or business developments ≤ 500m^2 GFA and as such, the DCP does not require the provision of this facility. If the scale of the other proposed retail and business premises were to be increased to greater than 500m^2 GFA during Development Application stages, then bicycle parking should be provided in that instance.

Liverpool City Council's DCP parking requirements are summarised in **Table 4** below.

TABLE 4: DCP BICYCLE PARKING REQUIREMENTS

Land Use	Scale	Employee Rate	Class 1 or 2 Spaces Required	Visitor Rate	Class 3 spaces Required
Light Industrial Units	8,728m^2 GLA;114-117 car spaces required	1 per 10 car spaces	12	nil	0
Warehouse (incl. office)	60,560m^2 GLA; 241-385 car spaces required	1 per 10 car spaces	25-39	nil	0
Retail	3,000m^2 GLA	1 / 1000m^2 GFA	3	1 / 1000m^2 GFA	3
Total			**40-54**		**3**

Based upon the above requirements, the proposed development requires the provision of **40-54** Class 1 or 2 Bicycle spaces for staff and three (**3**) Class 3 bicycle spaces for visitors. As a result of these requirements, four to six (**4-6**) end-of-trip facilities (showers and change rooms) should be provided for the masterplan scale in accordance with the DCP. The spaces are to be designed and provided in accordance with AS2890.3 during the development application stage of development. The site is not constrained by its ability to provide an adequate quantum of bicycle parking and the bicycle parking demands of the considered uses can be fully provided on-site.

3.2.2 Motorcycle Parking Requirement

Liverpool City Council's DCP does not provide motorcycle parking rates for developments located outside the Liverpool City Centre, and as such, the DCP does not require the provision of this facility. Therefore, no on-site parking has been provided within the masterplan.

3.3 Servicing & Loading

Reference is made to Liverpool City Council's *Liverpool Development Control Plan 2008 Part 1 General Controls for all Development, 20 Parking and Access* which provides the following servicing and loading rates applicable to the proposed development:

Drive-in food Outlets

Waste collection vehicle service access

Service facilities for a heavy rigid vehicle

Industry

Developments of LFA > 1,000sqm require occasional access for an articulated vehicle

Service Facilities detailed in Section 4

Service station

Service access for an articulated vehicle

Service facilities for a heavy rigid vehicle

Warehouses

Developments of LFA > 1,000sqm require occasional access for an articulated vehicle

Service Facilities detailed in Section 4

Retail premises

Bulky Goods Premises (in the B5 zone)

Developments of LFA < 600sqm require occasional access for an articulated vehicle and service facilities for a heavy rigid vehicle

Developments of LFA > 3,000sqm require service facilities for an occasional articulated vehicle

20.4 Internal Driveways

Loading Facilities

1. Adequate facilities for servicing developments shall be provided on-site to ensure loading/unloading activities do not occur on street and compromise the safety, amenity and capacity of the public road system.

2. Provision for loading facilities shall be provided for development in accordance with AS 2890.2 – 2002.

TABLE 5: LOADING REQUIREMENTS

Land Use	Scale	DCP requirement
Drive-through Fast food restaurant (type 3)	Two restaurants	Service facilities for HRV
Restaurants	Two restaurants	Waste collection vehicle service access
Light Industrial Units	8,728m^2 GLA (unknown GFA or employees)	Occasional AV access; Adequate service facilities
Service Station	250m^{2}GFA convenience store	Service access by AV, Service facility for HRV
Warehouse	54,790m^2 GLA with 5,770m^2 GLA of Office	Occasional AV access; Adequate service facilities
Retail (Bulky Goods)	3,000m^2 GLA	Occasional AV access, Service facility for HRV

Considering the proposed land uses, the internal road network should be designed to provide for access by 20m long Articulated Vehicles (AVs). Based on the layout illustrated in the masterplan, the site has ample area available for the road width and intersection designs necessary to cater for vehicles of this size.

It should be noted that both Elizabeth Drive and Mamre Road are RMS approved 25/26m B-Double Routes, and as such, will be able to provide access by AVs. It is expected that the future design of the M12 Motorway will cater for vehicles of this size, including any intersections with nearby roads.

3.4 Disabled Parking

Reference is made to Liverpool City Council's *Liverpool Development Control Plan 2008 Part 1 General Controls for all Development, 20 Parking and Access* which provides the following servicing and loading rates applicable to the proposed development:

> *Disabled Off-Street Car Parking*
>
> > *Disabled car parking shall be provided in accordance with Table 11 for car parking areas over 20 spaces:*
>
> *Table 11 Disabled Car Parking Provision:*
>
> > *Land Use: Retail, Commercial, Industry or Transport*
> >
> > *No of Spaces: 1 per 100 spaces*

The above parking requirements result in a total requirement for a range of seven to eight (7-8) disabled parking spaces for the car parking requirements in **Table 2** and **Table 3**. These spaces are to be provided on site and in accordance with AS2890.6:2009 within the parking areas of the development which will be detailed at the DA stage.

3.5 Car Park Design & Compliance

The car parking layout and access thereto, shall be assessed for compliance against the relevant sections of AS2890.1:2004, AS2890.2:2018 and AS2890.6:2009. A detailed assessment of this requirement is expected to be undertaken during detailed DA stage. The design is to achieve the following:

- **Car Parking Modules**:
    - **Staff only (User Class 1A)**: If a parking module is allocated only to staff use, then parking spaces can have minimum dimensions 2.4m width and a minimum 5.4m length for employees. The parking module must also have a minimum width 5.8 metres to comply with AS2890.1:2004, or 6.2m to comply with Liverpool city Council's DCP.
    - **Shared module (User Class 3)**: If a parking module is to be shared by both visitors and staff, then the parking spaces can have minimum dimensions 2.6m width and a minimum 5.4m length, with an associated minimum aisle width of 5.8m.
    - A 300mm widening of any parking space is required for each side wall obstruction for car door opening effects. If any small car parking bays are included, these can have the minimum dimensions of 5.0 metres long by 2.3 metres wide.
    - At blind aisles, the aisle shall be extended a minimum of 1 m beyond the last parking space, and the last parking space widened by at least 300mm if it is bounded by a wall or fence to comply with AS2890.1:2004, but ideally widened by the same amount as the aisle is lengthened to comply with Liverpool City Council's DCP.
- **Car Parking Access Driveway Widths:** The minimum widths of access driveways servicing the site are dependent on the following factors: the nature of the frontage road, the number of car parking spaces the driveway services, and the user class of the parking module.
    - For example, a driveway servicing between 25-100 Class 1 and 1A (i.e. all-day parkers including employees) parking spaces from a local road is required to provide a Category 1 driveway in accordance with Table 3.1 of AS2890.1:2004. This example could reflect the size and nature of the two minor access driveways from Range Road within the masterplan (if the carparking areas were staff only). To allow for two-way passing at the driveway, this category of driveway should have a minimum width of 5.5m. Justification of a reduced access driveway width can be considered on a case by case basis based upon the traffic generation of the site and carparking area.

- However, driveways servicing parking modules of a higher User Class, or of a larger volume, may require larger widths subject to further assessment during the DA stage.
- All driveways shall provide a 2m by 2.5m sight triangle upon departure to the road boundary to provide adequate sight lines to pedestrians. See Figure 3.3 of AS2890.1-2004 or Figure 3.4 of AS2890.2:2018.

- **Disabled Space:** Disabled car parking spaces are to be designed in accordance with AS2890.6:2009, requiring a 2.4m wide spaces by 5.4m in length with adjacent shared space of the same dimensions.
- **Shared Zone**: A shared zone must be located adjacent to the disabled parking bay on either side. A Shared zone must also be included at the front or rear of the parking bay. It should be noted that the aisle can be deemed a shared zone for the front or rear of the parking bay. Where a shared zone separates two parking bays or separates the disabled space and a wall, a Bollard is to be installed in accordance to *Figure 2.3* of *AS2890.6 2009*.
- **Headroom**: Minimum of 2.2m through all carparking and car circulation areas EXCEPT for the area directly above disabled parking spaces (including shared spaces) where minimum headroom of 2.5m is required in accordance with Clause 2.4 of AS2890.6:2009. Circulation roadways and service areas to accommodate vehicles up to and including a 6.4m length Small Rigid Vehicle must have a minimum headroom clearance of 3.5m. Any Circulation roadways and service areas to accommodate vehicles of greater size must provide a minimum headroom clearance of 4.5m.
- **Heavy Vehicle Servicing Bay dimensions:** Service bays for the following vehicles should have the following minimum dimensions
  - SRV: 6.4m length x 3.5m width;
  - MRV: 8.8m length x 3.5m width;
  - HRV: 12.5m length x 3.5m length;
  - AV: 20m length x 3.5m length.
- **Driveway Gradient for User Class 1 and 1A (i.e. all-day parkers including employees)**: To satisfy sight lines to pedestrians on footpaths and to comply with under carriage clearance and overhang checks. In this regard driveways need to achieve acceptable performance as follows:
  - Provide a 2m by 2.5m sight triangle upon departure to the road boundary to provide adequate sight lines to pedestrians. See Figure 3.3 of AS2890.1-2004.
  - 1:20 for the first 6 metres from the property boundary however this can be reduced if necessary based on individual assessments.
  - Max 1:8 for the next 2 to 3m.

- Max 1:5 for up to 20m reducing to maximum of 1:6 if the ramp is greater than 20m, unless otherwise justified. A maximum of 1:4 can be provided for ramps which service staff ONLY.
- 1:8 transition over 2 metres to the car parking level, unless otherwise justified.

- **Driveway Gradient for Heavy Vehicles (including delivery and waste collection)**: To satisfy sight lines to pedestrians on footpaths and to comply with under carriage clearance and overhang checks. In this regard driveways need to achieve acceptable performance as follows:
  - Provide a 2m by 2.5m sight triangle upon departure to the road boundary to provide adequate sight lines to pedestrians. See Figure 3.4 of AS2890.1-2004.
  - Max 1:6.5 gradient for access by vehicles up to and including at 20m length Articulated Vehicle (AV).
  - Maximum rate of change for heavy vehicles as below:
    - SRV: 1:12 (8.3%) in 4.0m of travel
    - MRV: 1:16 (6.25%) in 7.0m of travel
    - HRV: 1:16 (6.25%) in 10m of travel.

- **Vehicular Access Driveways:** The vehicular access driveways detailed within the indicative masterplan are located at appropriate locations and offsets from nearby intersections. In particular, the location and design of a proposed Left In / Left Out intersection of a shared access road with the RMS Classified Road of Elizabeth Drive is considered acceptable given the expected minimal impacts to the safety, efficiency and ongoing operation of the classified road typically associated with a Left In / Left Out intersection design.

  The widths of these vehicular driveways will be detailed further during the DA stage of the project.

The detailed design and review of the car parking areas, heavy vehicle servicing areas and access driveways is subject to further DA assessment.

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4 TRAFFIC ASSESSMENT

The impact of the expected traffic generation levels associated with the subject proposal is discussed in the following sub-sections.

4.1 Traffic Generation

The assessment of traffic volumes generated by the proposed development has been conducted in accordance with the RMS Guide to Traffic Generating Developments (Version 2.2 October 2002) and more recent supplements. The adopted traffic generation rates are summarised below.

It should be noted that the traffic generation rates for the fast food restaurants of 500m^2 GLA have been adopted based upon one high traffic generating food outlets (M^{C}Donalds) (Outlet 1) and one low fast food traffic generating food outlet (KFC) (Outlet 2). In a similar manner the 250m^2 GFA and 300m^2 GFA restaurants have been assessed with only one operating during the AM peak and both operating during the evening.

Fast Food Outlets

McDonalds

Average PM Peak – 180 vehicle trips per hour.

Proportion of passing trade is typically about 35%. This discount should be taken into account assessing external traffic impact.

Kentucky Fried Chicken (KFC)

Average PM Peak – 100 vehicle trips per hour.

Proportion of passing trade is typically at least 50%. This discount should be taken into account assessing external traffic impact.

Restaurants

Evening peak hour vehicle trips = 5 per 100m^2 GFA

Service stations and convenience stores.

Evening peak hour vehicle trips = 0.04 A(S) + 0.3 A(F).

or.

Evening peak hour vehicle trips = 0.66 A(F)

where.
A(S) = area of site (m2).
A(F) = gross floor area of convenience store (m2).

Industry

Factories

Evening peak hour vehicle trips = 1 per 100 m^2 gross floor area.

Warehouses

Morning peak hour vehicle trips = 0.5 per 100m^2 gross floor area

Bulky goods retail stores

Weekday peak hour vehicle trips = 2.7 vehicles per 100 m^2 of gross floor area. (note that the morning site peak hour during weekdays does not generally coincide with the network peak hour.)

Weekend day peak hour vehicle trips = 3.9 vehicles per 100 m^2 of gross floor area.

In addition to the above, traffic generated to / from a service station without a work bay is almost completely comprised of passing trade vehicle trips. In other words, visitors to service stations stop off on their way to other destinations; service stations tend not to be sole traffic generators. As such the service station is unlikely to add any additional traffic to the road network but will rather instead draw vehicles off the main road and back onto the main road. Considering the access arrangements of the site, vehicles will be displaced (i.e. reduced) from certain traffic movements and added to traffic movements to access the site. Given that the site area of the service station is shared with other fast food restaurant uses, it is considered that the most appropriate traffic generation rate from the RMS Guide for the proposed development is 0.66 A(F).

It is relevant to note that the above traffic generation rates assume that each land use operates independently and does not account for any shared trips between the various land uses on-site. That is, it is likely that visitors to the service station may also stop at the fast food outlets and vice versa (fast food outlets to the service station), reducing the traffic generation of the site. To account for this, some 10% of trips to the service station and fast food restaurants will be assumed to be shared amongst the land uses on site. It is likely that the number of shared trips between the service station and fast food land uses would be greater than 10%, but 10% has been adopted as a conservative assessment.

The estimated AM and PM traffic generation is shown in **Table 6** and **Table 7** below.

TABLE 6: ESTIMATED AM PEAK TRAFFIC GENERATION OF SITE

Use	Scale	Peak Hour Rate	Peak Hour Generation	Displaced Vehicle Trips	New Vehicle Trips
AM Peak Hour Period					
Service Station(1)(4) AM Peak	250m^2 GLA	0.66 A(F)	165	165 (83 in, 82 out)	0
Fast Food Outlet 1 (2)(5)	500m^2 GLA	70% of PM peak of McDonalds from RMS Guide	126	88 (44 in, 44 out)	38 (19 in, 19 out)
Fast Food Outlet 2 (7)	500m^2 GLA	N/A	0	0	0
Restaurant(3)	250m^2 GLA	5 per 100m^2	0	0	0
Restaurant(3)	300m^2 GLA		15	8 (4 in, 4 out)	7 (4 in, 3 out)
Light Industrial Unit – Factories(7)	8,728m^2 GLA	1 / 100m^2 GFA	87	0	87 (70 in, 17 out)
Warehouse(8)	54,790m^2 GLA	0.5 per 100m^2 GFA	274	0	274 (219 in, 55 out)
Retail (Bulky goods)	3,000m^2 GLA	2.7 / 100m^2 GFA	81	0	81 (41 in, 40 out)
Total			761	261 (131 in, 130 out)	487 (353 in, 134 out)
10% reduction for shared fast food/restaurant/service station trips					
Total			**717**	**235 (117 in, 118 out)**	**482 (351 in, 131 out)**

NOTES:

(1) Assumes 100% passing trade
(2) 50% passing trade
(3) Assumes that only one of the restaurants is open for breakfast and has a 50% passing trade rate
(4) Assumes that the service station operates at 100% of the PM peak hour period in the AM peak hour period
(5) Assumes that the Fast Food Outlet 1 operates at 70% of the PM peak hour period and is 70% passing trade.
(6) Assumes that the fast food outlet does not open until 10am, as a result does not generate in the morning AM peak hour period
(7) Assumes that the light industrial units operate at 100% of the PM peak hour period in the AM peak hour period
(8) Assumes that the warehouse units experience 80% in, 20% out in the AM and 20% in, 80% out

TABLE 7: ESTIMATED PM PEAK TRAFFIC GENERATION OF SITE

Use	Scale	Peak Hour Rate	Peak Hour Generation	Displaced Vehicle Trips	New Vehicle Trips
PM Peak Hour Period					
Service Station(1)(6)	250m^2 GLA	0.66 A(F)	165	165 (83 in, 82 out)	0
Fast Food Outlet 1(2)(7)	500m^2 GLA	As per RMS Guide for McDonalds	180	63 (31 in, 32 out)	117 (59 in, 58 out)
Fast Food Outlet 2(3)	500m^2 GLA	As per RMS Guide for KFC	100	50 (25 in, 25 out)	50 (25 in, 25 out)
Restaurant(4)	250m^2 GLA	5 per 100m^2	13	7 (4 in, 3 out)	6 (3 in, 3 out)
Restaurant(4)	300m^2 GLA		15	8 (4 in, 4 out)	7 (4 in, 3 out)
Light Industrial Unit – Factories(8)	8,728m^2 GLA	1 / 100m^2 GFA	87	0	87 (17 in, 70 out)
Warehouse(5)	54,790m^2 GLA	0.5 per 100m^2 GFA	274	0	274 (55 in, 219 out)
Retail (Bulky goods)	3,000m^2 GLA	2.7 / 100m^2 GFA	81	0	81 (40 in, 41 out)
Total			915	293 (147 in, 146 out)	622 (203 in, 419 out)
10% reduction for shared fast food/service station trips					
Total			**812**	**265 (133 in, 132 out)**	**605 (195 in, 410 out)**

NOTES:

(1) Assumes 100% passing trade
(2) 35% passing trade
(3) 50% passing trade
(4) Assumes that only one of the restaurants is open for breakfast and has a 50% passing trade rate
(5) Assumes that the warehouse operates at 100% of the AM peak hour period in the PM peak hour period, also assumes 80% out, 20% in during the PM peak period
(6) Assumes that the service station operates at 100% of the PM peak hour period in the AM peak hour period
(7) Assumes that the Fast Food Outlet 1 operates at 70% of the PM peak hour period and is 70% passing trade.
(8) Assumes that the light industrial units operate at 100% of the PM peak hour period in the AM peak hour period

As shown above, the site is expected to generate 482 and 605 additional vehicle trips in the AM (351 in, 131 out) and PM (195 in, 410 out) peak hour periods respectively, and displace 235 and 265 vehicle trips in the respective AM and PM peak hour periods.

4.2 Traffic Impact

Reference is made to the *M12 Motorway Strategic Route Options Analysis* report prepared by the Australian Government which discussed the preferred corridors for the M12. Within this report, it discusses a potential upgrade to Elizabeth Drive under the scenario that there is no M12 motorway. Traffic modelling was carried out which evaluated Elizabeth Drive as a principal arterial road (three lanes in each direction) with respect to the increased traffic loads provided by nearby subdivision developments and the Western Sydney Airport. This analysis showed that the upgraded Elizabeth Drive would operate at a Level of Service (LoS) "C" in 2026 and a LoS "E" in 2036 in both the AM and PM peak periods. This is unsatisfactory; therefore the provision of a raised motorway is required to provide efficient traffic flows through this corridor

The M12 and Elizabeth Drive both connect the M7 to The Northern Road (Future M9) at approximately the same locations. Given that the M12 is a major motorway within the Western Sydney Infrastructure Plan, it is expected to carry a much larger volume of traffic than Elizabeth Drive. Currently, Elizabeth Drive is the only major roadway which connects the M7 and M9 along this corridor. This will not be the case in the future, therefore traffic seeking the most efficient path through this corridor will elect to use the M12 in the future rather than Elizabeth Drive. The influence of a major motorway will result in much lower traffic volumes (and therefore an improved LoS) along Elizabeth Drive compared to the LoS assessed within the *Strategic Route Options Analysis* report.

The RMS requires that any road upgrade must perform at a minimum LoS "C" 10 years after opening. *Table 4.4* of the *Austroads Guide to Traffic Management Part 3* provides the maximum service flow rates for uninterrupted multi-lane highways. The M12 is expected to provide three lanes in each direction and have a design speed limit between 80 km/h and 100 km/h. Given the above, the maximum one-way peak hourly volume on the M12 ranges from 3900 to 4650 vehicles in order to operate at LoS "C". According to *Table 4.4* of the *RMS Guide*, the maximum capacity for a two-lane roadway (Elizabeth Drive) operating at LoS "C" is 1800 vehicles. When added to the maximum capacity of the M12 in this location, it follows that this corridor can accommodate a range of 5700 to 6450 one-way vehicles (or 11400 to 12900 two-way vehicles) whilst still operating at a LoS "C".

The proposal is expected to generate approximately 482 and 605 new two-way trips in the AM and PM peak hours respectively. This level of traffic is generally in line with the amount of traffic that the M12 and Elizabeth Drive are expected to be able to accommodate in the future condition. Further localised traffic assignment and impact will be detailed as part of the traffic impact assessment which will be undertaken during the Development Application stage.

4.3 Traffic Distribution

The primary access to the light industrial, retail and warehouse uses of the proposal are provided from the Mamre Road / Elizabeth Drive intersection with a supplemental left in / left out access from Elizabeth Drive intended for use by the service station and fast food developments. Therefore, traffic to the retail, light industrial and warehouse uses will arrive

from / depart to the surrounding suburbs whilst the vast majority of traffic to the fast food and service station will arrive from the east and depart to the west via the left in / left out access. The traffic distribution is shown below.

- Retail, Light Industrial and Warehouse (442 new AM/PM trips);
    - 50% to/from the east along Elizabeth Drive (Liverpool, Bonnyrigg, Cabramatta) (221 trips);
    - 25% to/from the north along Mamre Road (St. Marys, Penrith) (111 trips);
    - 25% to/from the west along Elizabeth Drive (Western Sydney Airport, Luddenham, M9 (110 trips);
- Fast Food, Restaurant and Service Station (180 new PM trips);
    - 90% arrive from the east, depart to the west along Elizabeth Drive (162 trips);
    - 5% to/from the north along Mamre Road (9 trips);
    - 5% to/from the west along Elizabeth Drive (9 trips).

Therefore, the highest volume of generated trips to or from the site is 383 trips arriving from the east along Elizabeth Drive in the PM peak period. This total consists of 221 trips traveling to the retail/industrial/warehouse uses and 162 new trips traveling to the fast food/service station uses. Further localised traffic assignment will be detailed as a part of the traffic impact assessment during the Development Application stage.

5 CONCLUSION

The traffic and parking impacts of the proposed Mixed-Use Planning Proposal at 1400-1480 Elizabeth Drive, Cecil Park, as shown in reduced plans in **Annexure A** to this report, have been assessed.

The proposed development outlined within the indicative masterplan would require a range of **624-771** car parking spaces as per strict DCP requirements, where **624** are detailed to be provided. However, this requirement is likely to be reduced when the quantity of seats within the fast food development is known at a more detailed design stage. A subsequent development application would require 43-57 total bicycle parking spaces, 40-54 of which being Class 1 or 2 spaces intended for staff. The site is not constrained by its ability to provide an adequate quantum of car and bicycle parking, and both parking demands of the considered uses can be fully provided on-site.

The M12 motorway in its current proposed location is expected to accommodate a range of 5700 to 6400 one-way vehicles (or 11400 to 12900 two-way vehicles), and is expected to take traffic away from Elizabeth Drive, which is currently the major roadway through this corridor. A subsequent development application would generate 482 new trips in the AM peak hour (351 in, 131 out) and 605 new trips in the PM peak hour (195 in, 410 out) on Elizabeth Drive. This level of traffic is generally in line with the amount of traffic that the M12 and Elizabeth Drive are expected to be able to accommodate in the future condition, given that the majority of external traffic will elect to utilise the M12 for efficiency.

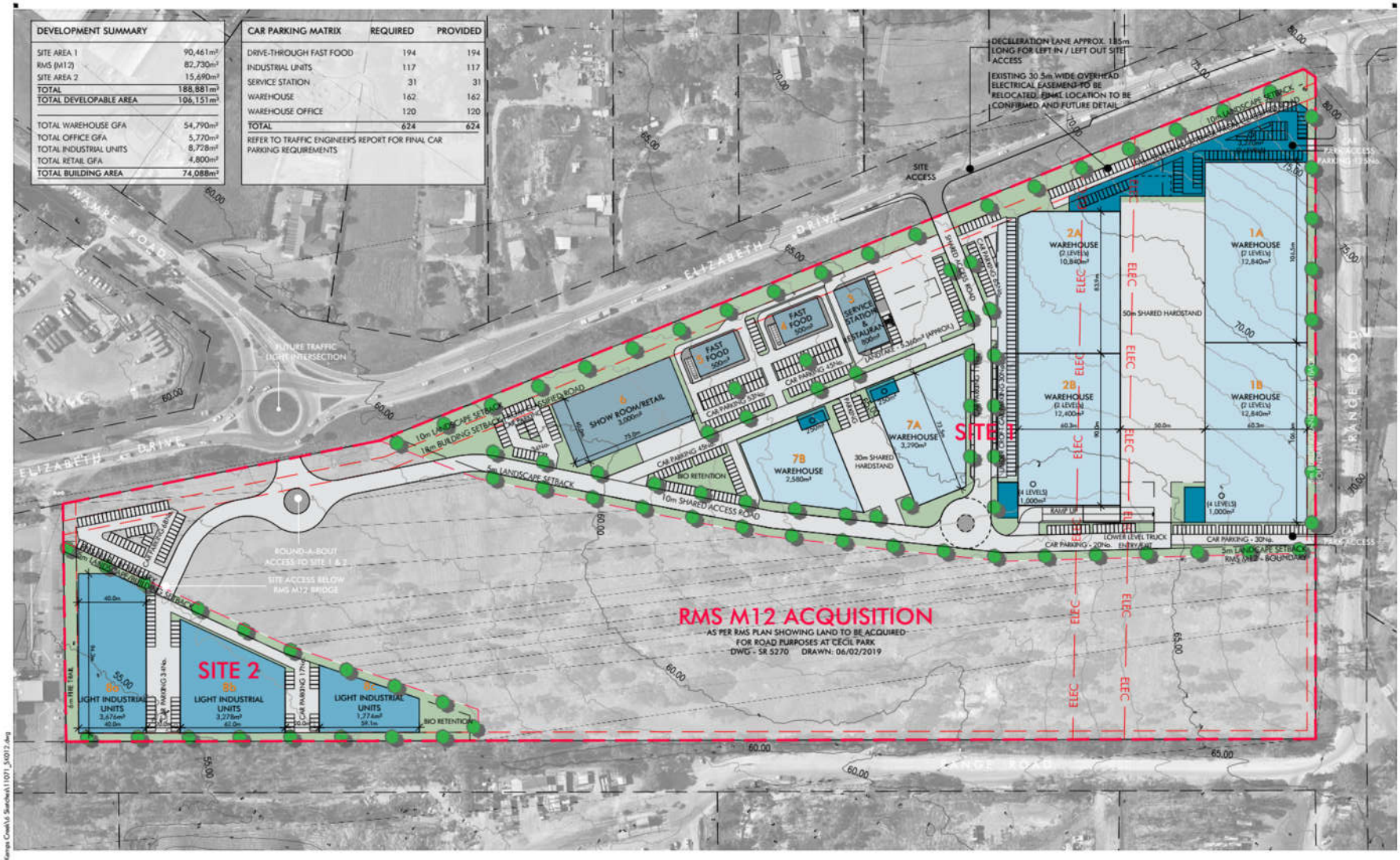
Considering the proposed land uses, the internal road network should be designed to provide for access by 20m long Articulated Vehicles (AVs). Based on the layout illustrated in the masterplan, the site has ample area available for the road width and intersection designs necessary to cater for vehicles of this size.

The Council DCP requirements require a total of seven to eight (7-8) disabled spaces which can be provided on site at the detailed DA stage. The car park layout is to be designed in accordance with AS2890.1:2004, AS2890.6:2009 and AS2890.2:2018.

In view of the foregoing, the traffic and parking impacts of the proposed Mixed-Use Planning Proposal are fully supported.

ANNEXURE A: REDUCED PLANS

(1 SHEET)



Cecil Park

1400-1480 elizabeth drive, cecil park, nsw, australia

march, 2019

site plan

1:2000 (A3)

11071_SK012

nettletontribe

Mar 20, 2019 - 1:28pm N:\11071-Kemps Creek\sf Sketches\11071_SK012.dwg

ANNEXURE B: RMS LAND ACQUISITION MAP

(1 SHEET)

TfNSW M12 Map – M12 Land Acquisition

PLAN
SHOWING LAND TO BE ACQUIRED
FOR ROAD PURPOSES AT CECIL PARK

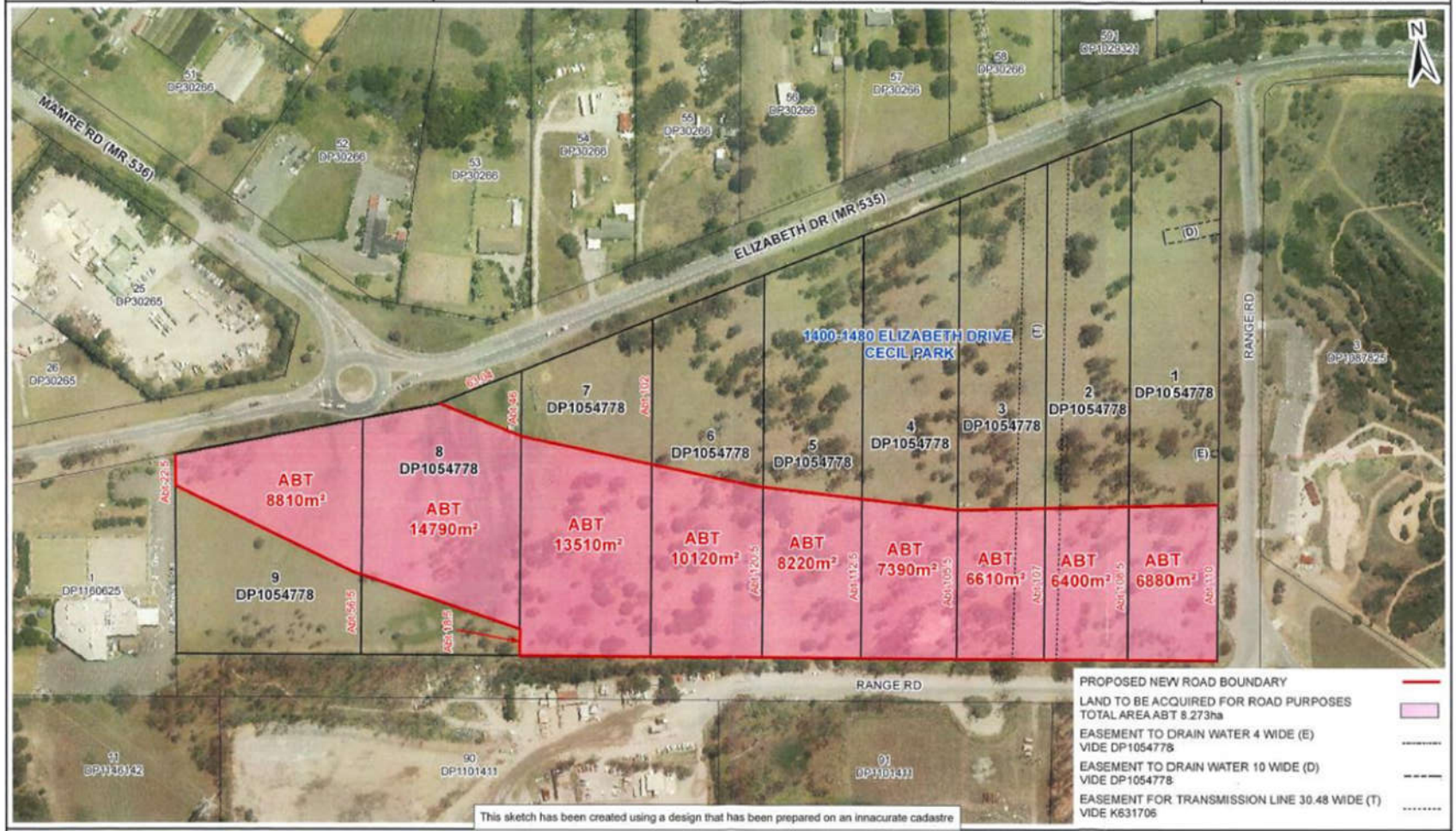
Reduction Ratio 1:2500

Lengths are in metres

ROADS & MARITIME SERVICES
BUSINESS SERVICES

LGA: LIVERPOOL Locality: CECIL PARK
Parish: MELVILLE County: CUMBERLAND

SKETCH
SR 5270
DRAWN 06/02/2019



This sketch has been created using a design that has been prepared on an innacurate cadastre

Transport Roads & Maritime Services

Dimensions and positions of improvements in relation to the boundaries are subject to final survey
Offsets are 90° to property boundaries

0 25 50 100 Metres