TRAFFIC IMPACT ASSESSMENT (TIA)

Rooty Hill Materials Recycling Facility (SSD 29999239)
600 Woodstock Avenue, Rooty Hill

Reference: 21.182r02v04
Date: February 2022

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DOCUMENT VERIFICATION

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CONTENTS

Appendices

1. INTRODUCTION

TRAFFIX has been commissioned by Project Strategy to undertake a Traffic & Accessibility Impact Assessment in support of a State Significant Development Application (SSD-29999239) for a proposed materials recycling facility at 600 Woodstock Avenue, Rooty Hill. The development is located within the Blacktown City Council Local Government Area (LGA) and has been assessed under that Council's controls.

As part of the SSD Applicant process, the Secretary's Environmental Assessment Requirements (SEARs) have been issued for the proposal. This TIA has been prepared to assess the traffic and access impacts of the proposal and respond to the relevant SEARs. The report is structured as follows:

- Section 2: Addresses the SSDA Responses
- Section 3: Describes the site and its location
- Section 4: Discusses strategic context
- Section 5: Documents existing traffic conditions
- Section 6: Describes the proposed development
- Section 7: Assesses the parking requirements
- Section 8: Outlines the site operations
- Section 9: Assesses traffic impacts
- Section 10: Discusses Sustainable travel plans
- Section 11: Discusses access and internal design aspects
- Section 12: Outlines preliminary construction traffic management measures
- Section 13: Presents the overall study conclusions

2. SSDA RESPONSES

2.1 SEARS Responses

A response to each relevant requirement of the Secretary's Environmental Assessment Requirements (SEARs) is provided below, including references to sections of this report where applicable. Reference should also be made to the SEARs and the below matters relate specifically to Item 5.

5. Traffic and Transport

SEARS Requirements	Reference
A quantitative traffic impact assessment prepared in accordance with relevant Roads and Maritime Services and Austroads guidelines, that includes:	
• details of all traffic types and volumes likely to be generated during construction and operation of the development, including a description of key accesses.	**Refer to Section 9.2 and 12.2**
• details of heavy vehicle haul routes which would avoid travelling via residential areas to the west of M7 Motorway	**Refer to Section 8.14**
• an assessment of the predicted impacts of traffic on road safety and the capacity of the road network, including consideration of cumulative traffic impacts at key intersections using SIDRA or similar traffic modelling	**Refer to Section 9.4**
• an assessment of the proposed car park access at Woodstock Avenue and its impacts on safety and efficiency of the roundabout at Woodstock Avenue/ Glendenning Road intersection	**Refer to Section 9.4 and 11.1.1**
• details of the largest vehicle anticipated to access and manoeuvre within the site, including swept path analysis depicting vehicles entering, existing, and manoeuvring throughout the site	**Refer to Section 8.8 and Appendix E**
• plans demonstrating how all vehicles associated with construction and operation of the development could be	**Refer to Appendix E**

accommodated on the site to avoid queuing in the street network	
• details of the duration of loading and unloading activities at the facility to demonstrate the site could sufficiently accommodate all vehicles loading, unloading, servicing, travelling on internal roads without impacts on manoeuvrability	**Refer to Section 8.11, 8.12 and Appendix E**
• details of any traffic control measure to ensure traffic flowing orderly and safely within the site	**Refer to Section 8.9**
• details and plans of any proposed internal road network, loading docks, on-site parking provisions, and sufficient pedestrian facilities, in accordance with the relevant Australian Standards	**Refer to Appendix B and Section 11**
• details of road upgrades, infrastructure works, or new roads or access points required for the development if necessary	**Refer to Section 9.4, 11.1 and 11.4**
• Relevant Policies and Guidelines: – State Environment Planning Policy (Infrastructure) 2007 – Blacktown Local Environmental Plan 2015 – Greater Sydney Region Plan: A Metropolis of Three Cities – Central City District Plan – Blacktown Local Strategic Planning Statement 2020	**The relevant policies and guidelines are referenced as applicable throughout this assessment.**

2.2 Transport for NSW (TfNSW) Responses

In addition, a response to each of Transport for NSW's requirements is provided below, including references to sections of this report where applicable.

TfNSW Requirements	Reference
Key Issues: Transport and Accessibility	
• Details of all traffic types and volumes likely to be generated by the proposed development during construction and operation, including predicted haulage routes, including over size over mass vehicles, and consider any impacts to the state road network (i.e. where the haulage route meets the state road);.	**Refer to Section 8.8, 8.11 and 12**
• Daily inbound and outbound traffic profile by time of day and day of week broken down per vehicle types	**Refer to Section 8.11**
• Details of the origin/destination of dangerous goods movements to/from the site (if any)	**Refer to Section 8.17**
• Detailed plan site layout to demonstrate that the site will be able to accommodate the most productive vehicle types as well as the worst performing vehicles (sufficient loading/ unloading) and parking on site in accordance with the relevant Australian Standard and Council's Development Control Plan;	**Refer to Appendix B and E**
• Details of the driver facilities provided on site;	**Refer to Section 8.16**
• Swept path diagrams to demonstrate the largest vehicles as well as the worst performing vehicles entering, exiting and manoeuvring throughout the site;	**Refer to Appendix E**
• An assessment of the predicted impacts of this traffic on road safety and the capacity of the road network, including consideration of cumulative traffic impacts at key intersections using SIDRA or similar traffic model. This is to include the identification and consideration of approved and proposed developments/planning proposals/road upgrades in the vicinity. The assessment needs to include the pprox. gg intersections;	**Refer to Section 9.4 and 9.5**

○ Woodstock Avenue/ Westlink M7 on-ramp and off-ramp ○ Woodstock Avenue / Kellogg Road	
• Detailing how the proposed development connects to adjoining sites to facilitate their future development for their intended purposes;	**Refer to Section 6**
• Traffic management plan on how to manage number of vehicles likely to be generated during construction and operation and awaiting loading, unloading or servicing that can be accommodated on the site to avoid queuing in the surrounding road network. This to demonstrate how internal and external traffic can be managed in conjunction with existing traffic on site;	**Refer to Section 8**
• Detailed plans of the site access and proposed layout of the internal road and pedestrian network and parking on site in accordance with the relevant Australian Standards and Council's DCP;	**Refer to Appendix B and Section 11**
• Swept path diagrams depicting vehicles entering, exiting and manoeuvring throughout the site;	**Refer to Appendix E**
• Details of road upgrades, infrastructure works, or new roads or access points required for the development;	**Refer to Section 9.4 and 11.4**
• Details of travel demand management measures to minimise the impact on general traffic and bus operations, including details of a location-specific sustainable travel plan (Green Travel Plan and specific Workplace Travel Plan) and the provision of facilities to increase the non-car mode share for travel to and from the site;	**Refer to Section 10**
• Details of the adequacy of existing public transport or any future public transport infrastructure within the vicinity of the site, pedestrian and bicycle networks and associated infrastructure to meet the likely future demand for the proposed development; and	**Refer to Section 9.7**
• Measures to integrate the development with the existing/future public transport network.	**Refer to Section 9.6**

3. LOCATION AND SITE

The subject site at 600 Woodstock Avenue, Rooty Hill (Lot 67 of DP804292) is located on the south-east corner of the intersection of Woodstock Avenue and Kellogg Road. In a regional context, it is located approximately 15.5 kilometres north-west of Parramatta City Central Business District and 1.1 kilometres north-east of Rooty Hill Railway Station.

The site is generally rectangular in configuration with a total site area of approximately 19,948m^2. It has a northern frontage of approximately 83 metres to Woodstock Avenue, a western and southern frontage to Kellogg Road of approximately 201 metres and 83 metres respectively. The eastern boundary is bound by a neighbouring industrial development for approximately 217 metres.

The site currently accommodates a 11,610m^2 industrial development (including ancillary office) and provides three (3) vehicular crossings, including one (1) access to Woodstock Avenue and two (2) accesses to Kellogg Road (western and southern boundary).

A Location Plan is presented in **Figure 1**, with a Site Plan presented in **Figure 2**. Reference should also be made to the Photographic Record presented in **Appendix A** which provides an appreciation of the general character of roads and other key attributes in proximity to the site.

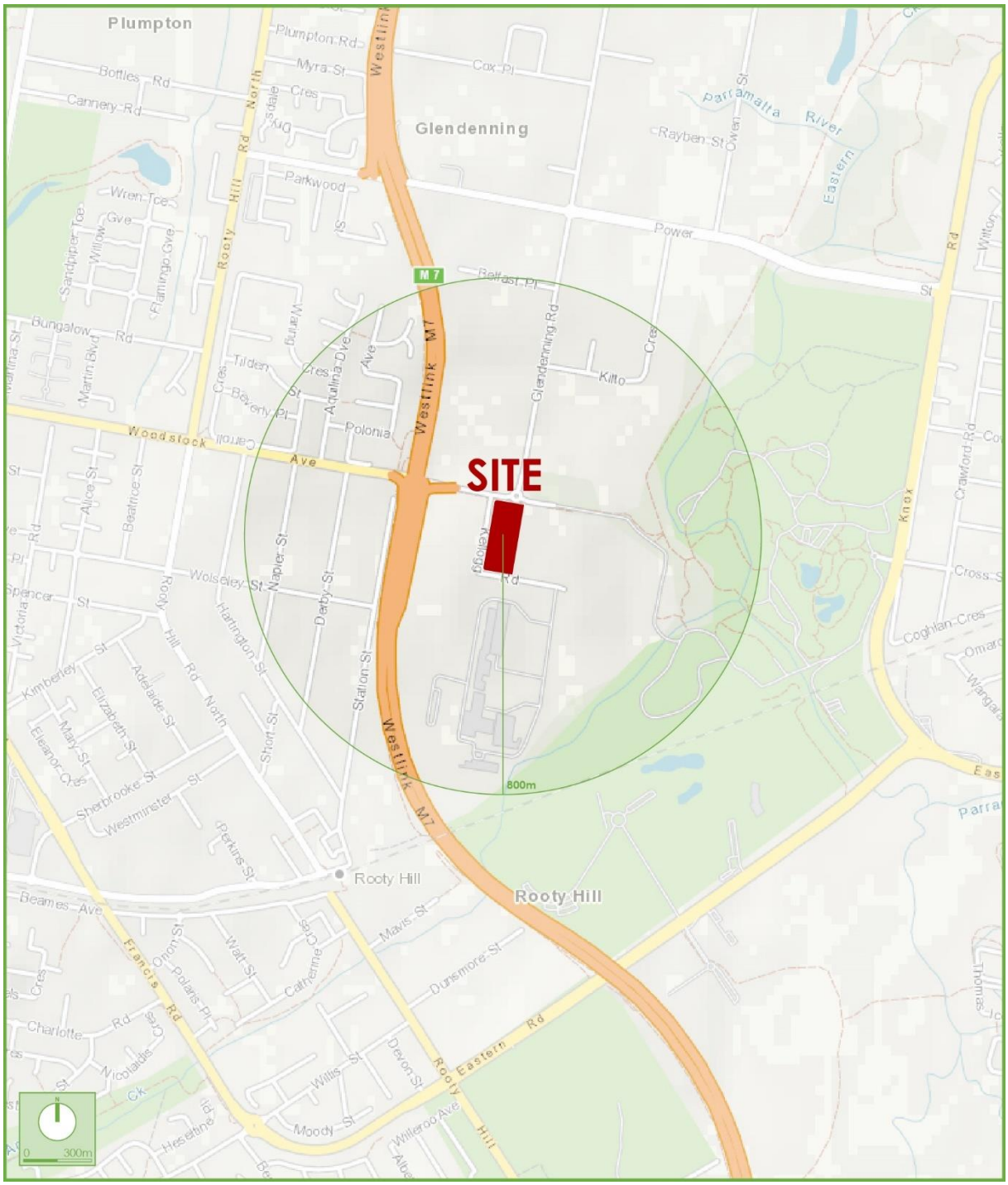


Figure 1: Location Plan

Figure 2: Site Plan

4. STRATEGIC CONTEXT

4.1 Environmental Planning Policy

4.1.1 State Environmental Planning Policy (Infrastructure) 2007

This policy aims to provide a consistent planning regime for infrastructure and the provision of services. This planning policy outlines where consultation with the relevant public authorities is required during the assessment process and prior to development commencing.

4.2 State Transport or Infrastructure Plans

4.2.1 The Greater Sydney Regional Plan, A metropolis of three cities

This transport strategy presents a vision and innovative actions for managing Greater Sydney's growth. It is prepared concurrently with *Future Transport 2056* and the State Infrastructure Strategy and aims to re-shape Greater Sydney as three unique and connected cities. These three cities are described as follows:

- The Western Parkland City.
- The Central River City.
- The Eastern Harbour City.

The transport initiatives within this Plan are sourced from the Future Transport Strategy 2056. The subject site falls within the bounds of the Western Parkland City.

Generally, this strategy encourages a city supported by infrastructure with an indicator being access to metropolitan centres/clusters within 30 minutes and a collaborative city that would involve an increased use of public resources such as open spaces and community facilities.

4.2.2 Future Transport Strategy 2056

This transport strategy document presents a vision for the transport system that revolves around growing Sydney as a metropolis driven by major placed-based planning and investment around the new Western Sydney Airport and Badgerys Creek Aerotropolis. Planning for Greater

Sydney will focus on the concept of three cities, that being the Western Parkland City, the Central River City and the Eastern Harbour City. The future transport strategy for Greater Sydney aims to enable most customers to travel to their nearest strategic centre within 30 minutes of their residence by public or active transport.

This aim will ultimately be achieved through a focus into an integrated network of corridors which will facilitate these movements. These corridors are summarised below:

- City-shaping corridors – major trunk road and public transport corridors providing higher speed and volume connections between our cities and centres that shape locational decisions of residents and businesses.
- City-serving corridors – higher density corridors within 10km of metropolitan centres providing high frequency access to metropolitan cities/centres with more frequent stopping patterns.
- Centre-serving corridors – local corridors that support buses, walking and cycling, to connect people with their nearest centre and transport interchange.

4.3 Local Land Use Planning

4.3.1 Local Environmental Plans (LEPs)

The LEPs that are relevant to the site are as follows:

- Blacktown Local Environmental Plan 2015.

4.3.2 Development Control Plans (DCPs)

The applicable DCPs for the subject site are a s follows:

- Blacktown Development Control Plan 2015.

4.3.3 Central City District Plan

The Central City District encompasses Blacktown, Cumberland, Parramatta and the Hills. This plan supports the Parramatta CBD and the health and educational precincts at Westmead

and Blacktown Hospital. This local strategic planning informs the preparation or local strategic planning statements such as the Blacktown Local Strategic Planning Statement.

4.3.4 Blacktown Local Strategic Planning Statement 2020

This planning statement sets out a 20-year vision for the future of Blacktown City. It sets out how continued growth in the area will be managed, focused on the Northwest Growth Area, Strategic Centres and the Urban Renewal Precincts.

5. EXISTING TRAFFIC CONDITIONS

5.1 Road Network

The road hierarchy in the vicinity of the site is shown in **Figure 3** with the following roads of particular interest:

- Westlink M7: a privately operated tollway (6009) that generally traverses north-south between the M2 Hills Motorway in the north and the M5 Motorway in the south. Within the vicinity of the site, it is subject to a 100km/h speed zoning and accommodates two (2) lanes of traffic in each direction separated by a median. The Westlink M7 is currently an approved 25/26 metre B-Double route.
- Woodstock Avenue: comprising multiple TfNSW main roads (MR 537, MR 629 & MR 654), a portion of unclassified regional road (7160) and local roads, Woodstock Avenue generally traverses east-west between a cul-de-sac in the east and Popondetta Road in the west. In the vicinity of the site, it is subject to a 60km/h speed zoning and generally accommodates two (2) lanes of traffic in each direction separated by a median. Woodstock Avenue is an approved 25/26 metre B-double route west of the M7 and is within an approved area for 25/26 metre B-double trucks. Kerbside parking is not permitted along either side of the road.
- Glendenning Road: part of an unclassified regional road (7160) road that traverses in a north-south between Lamb Street in the north and Woodstock Avenue in the south. It is subject to a 60km/h speed zoning and accommodates a single lane of traffic in each direction. Glendenning Road is within an approved area for 25/25 metre B-double trucks and permits kerbside parking along either side of the road subject to restrictions.
- Kellogg Road: a local road that traverses north-south between Woodstock Avenue in the north and ending in a cul-de-sac in the south-east. It is subject to a 50km/h speed zoning and accommodates a

single lane of traffic in either direction. Kellogg Road is within an approved area for 25/26 metre B-double trucks and permits unrestricted kerbside parking along either side of the road.

Figure 3: Road Hierarchy

5.2 Key Intersections

The key intersections in the vicinity of the site are shown below and provide an understanding of the existing road geometry and alignment.

5.2.1 Woodstock Avenue and Glendenning Road

Figure 4: Intersection of Woodstock Avenue and Glendenning Road

It can be seen from **Figure 4** that the intersection of Woodstock Avenue and Glendenning Road is a three-legged roundabout. The main attributes of each approach outlined as follows:

- Glendenning Road (northern leg)
  - The southbound approach provides a short lane which permits right and left turns and a right turn lane.
- Woodstock Avenue (eastern and western legs)
  - The westbound approach provides a single through lane, permitting all movements.
  - The eastbound approach provides two (2) lanes, with the northern lane permitting only left turns and the southern lane allowing through movements and left turns.

5.2.2 Woodstock Avenue and Kellogg Road

It can be seen from **Figure 5** that the intersection of Woodstock Avenue and Kellogg Road is a three-legged signalised intersection, with signalised pedestrian crossings provided on the west and south legs. The main attributes of each approach outlined as follows:

Figure 5: Intersection of Woodstock Avenue and Kellogg Road

- Kellogg Road (southern leg)
  - The northbound approach provides a left turn lane and a right turn lane.
- Woodstock Avenue (eastern and western legs)
  - The westbound approach provides two (2) through lanes and a short right-turn lane.
  - The eastbound approach provides two (2) through lanes and a short right-turn lane.

5.2.3 Woodstock Avenue and Westlink M7 Woodstock Avenue On-ramp

It can be seen from **Figure 6** that the intersection of Woodstock Avenue and M7 Woodstock Avenue on-ramp is a three-legged signalised intersection, with a signalised pedestrian crossing provided on the southern leg only (including slip lane). The main attributes of each approach outlined as follows:

Figure 6: Intersection of Woodstock Avenue and M7 Woodstock Avenue On-ramp

- Woodstock Avenue (eastern and western legs)
  - The eastbound approach provides two (2) through lanes and two (2) right-turn lanes onto the M7 southbound.
  - The westbound approach provides two (2) through lanes and a slip lane for left turns onto the M7 southbound.
- M7 Woodstock Avenue On-ramp(south)
  - No approach lanes are provided on this leg.

5.2.4 Woodstock Avenue and Westlink M7 Woodstock Avenue Off-ramp

It can be seen from **Figure 7** that the intersection of Woodstock Avenue and the Woodstock Avenue Off-ramp from the M7 is a three-legged signalised intersection, with signalised pedestrian crossings provided for the western and southern legs. The main attributes of each approach outlined as follows:

Figure 7: Intersection of Woodstock Avenue and M7 Woodstock Avenue Off-ramp

- Woodstock Avenue (eastern and western legs)
  - The eastbound approach provides two (2) through lanes and two (2) short lanes which allow for queuing for the right turn lanes at the M7 on-ramp intersection.
  - The westbound approach provides two (2) through lanes.
- M7 Woodstock Avenue Off-ramp (southern leg)
  - The northern approach provides two (2) short left turn lanes and a right turn lane.

5.3 Public Transport

The subject site is located within 1 kilometre of the 756 Mount Druitt to Blacktown bus route. In addition, the site is located approximately 1.8 kilometres (23 min walk) south-west of the Rooty Hill Railway Station.

More information concerning all bus and train service information can be found on the Transport for NSW Info website: https://www.transportnsw.info. Some changes and restrictions to the timetable are still being made in response to the COVID-19 pandemic.

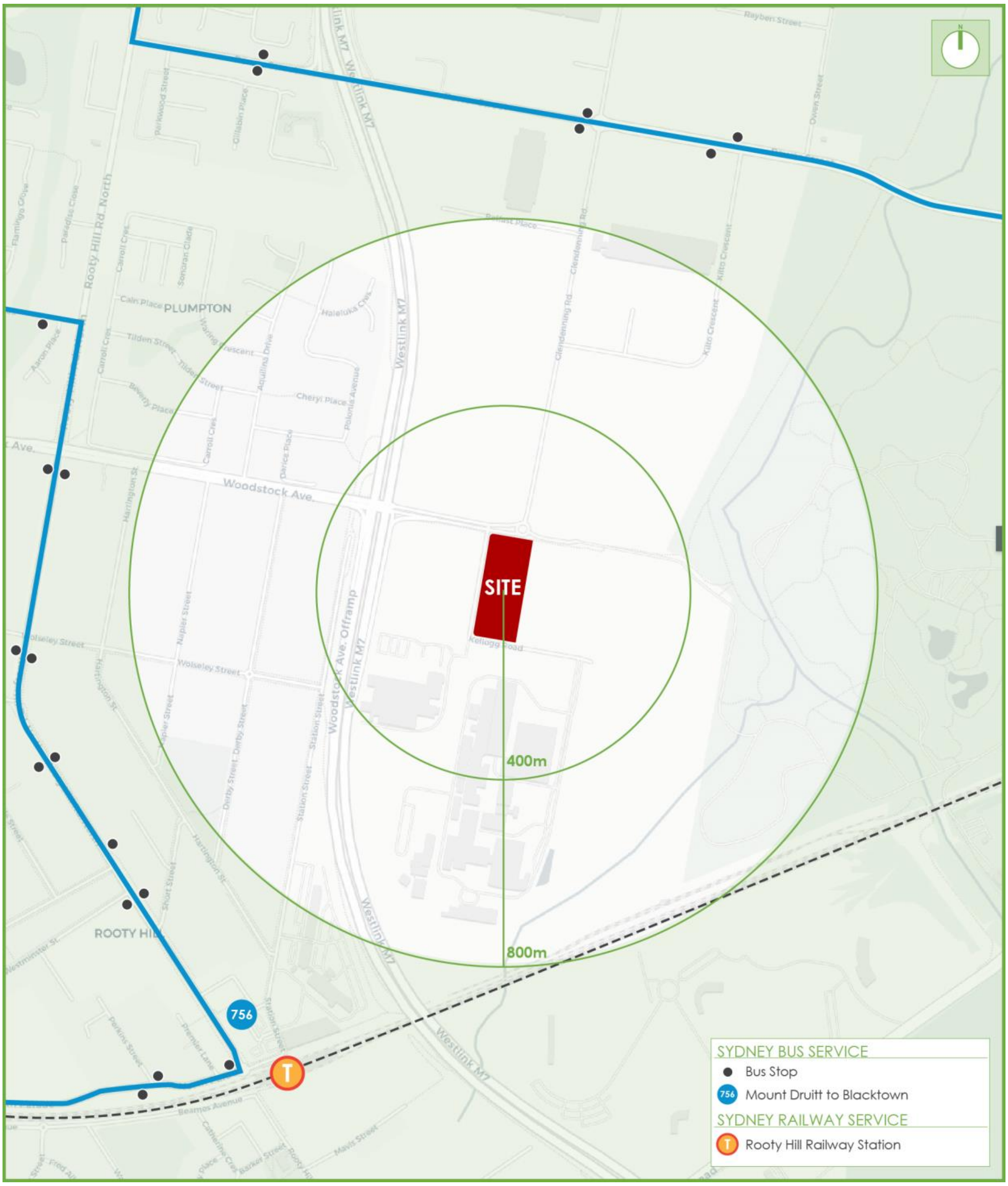


Figure: 8 Public Transport

6. DESCRIPTION OF PROPOSED DEVELOPMENT

A detailed description of the proposed development is provided in the Statement of Environmental Effects prepared separately. In summary, the development for which approval is a material recycling facility comprising the following components:

- Demolition of all existing buildings;
- Construction of a material recycling facility (MRF) with the following attributes:
  - Throughput of 120,000 tonnes per annum.
  - Operation 24 hours, seven days a week.
- Two (2) vehicle weigh bridges;
- Vehicle unloading/loading bays as follows:
  - Six (6) commingled receival bays;
  - One (1) glass despatch bay;
  - Two (2) OCC receival bays;
  - Two (2) wet waste despatch bays;
  - One (1) despatch bay for large articulated vehicles.
- 40 car parking spaces within an at-grade parking area.
- Amendment to the existing vehicular access onto Woodstock Avenue;
- Amendment to the existing vehicular access onto the southern frontage of Kellogg Road.
- New vehicular access on the western frontage of Kellogg Road.
- Removal of a vehicular access on the western frontage of Kellogg Road.

It is noted that the proposed development does not seek to connect into adjoining sites and that all proposed future activities will be contained within the bounds of 600 Woodstock Avenue, Rooty Hill (Lot 67 of DP804292).

The parking and traffic impacts arising from the development are discussed in **Section 7** and **Section 9**. Reference should be made to the plans submitted separately to the department which are presented at reduced scale in **Appendix B**.

7. PARKING REQUIREMENTS

7.1 Car Parking

7.1.1 Council Controls

The Blacktown Development Control Plan 2015 (DCP) does not provide a car parking rate for Materials Recycling Facilities. The most applicable rate that the DCP provides is in relation to industry and warehouse uses, which prescribes the following:

- 1 space per 75m2 GFA; plus
- 1 space per 40m2 GFA for the office component.

Adoption of the above is rate is not considered appropriate as it is a generic rate that does not reflect the daily operations and needs of the proposed development. Noting the proposed GFA and the small number of operational staff on-site at any one time, it is proposed that the car parking provision is determined using a first principles method. This analysis is presented section below.

7.1.2 First Principles Parking Assessment

Operational data provided by Cleanaway informs that there will be a maximum of 40 staff on-site at any one time. Journey to Work data as published by the Australian Bureau of Statistics (ABS) for the SA2 area Rooty Hill – Minchinbury has been analysed to estimate the percentage of staff that drive to work in this area. The ABS data shows that 85.3% of staff drive themselves to work within this SA2 area. This breakdown is provided in **Table 1** below.

Table 1: Journey to Work Data – SA2 Area: Rooty Hill – Minchinbury

Method of Travel to Work	Percentage (%)
Car, as driver	85.3%
Car, as passenger	6.2%
Train	2.5%
Truck	1.6%
Bus	1.5%
Walked only	1.0%
Motorbike/scooter	0.6%
Other Mode	0.6%
Taxi	0.4%
Bicycle	0.2%
Ferry	0%
Tram	0%

*Travel mode categories 'Not Stated',' Not Applicable', 'Did not go to work', and 'Worked from home' have been excluded from this analysis.

Application of this to the 40 staff on-site at any one-time results in 34 staff that drive themselves to work. Therefore, it is appropriate that at least 34 car parking spaces are provided as staff car parking, noting this does not take into account any carpooling initiatives and is considered conservative in this regard. In response, the development provides a total of 40 car parking spaces. Of this total amount, it is proposed that 35 spaces are allocated to staff parking and five (5) spaces provided for visitor parking.

It is noted that 28 parking spaces are in a tandem arrangement. These spaces are to be allocated to staff to ensure that their use can be appropriately managed by the operator, noting tandem parking is not uncommon in industrial estates. Management of these spaces is further aided through the implementation of staggered shift start and finish times as detailed in the Operational Plan prepared separately by Cleanaway and in **Section 8.5** and **8.7** of this report.

7.2 Accessible Parking

Council's DCP requires that all parking areas provide for accessible parking in accordance with the provisions of the Building Code of Australia (BCA). The BCA requires one (1) accessible space for every 100 car parking spaces or part thereof. In response, a single accessible parking space is proposed, meeting the BCA requirement.

7.3 Bicycle Parking

The DCP states that applicants are encouraged to incorporate safe storage/parking areas for bicycles with adequate shower and change facilities provided for staff where appropriate. However, the DCP does not stipulate a bicycle parking rates and therefore the development is not required to provide any bicycle parking. Accordingly, no bicycle parking is proposed on-site, noting that the ABS data outlined above suggest minimal bicycle trips to/from work in this area.

7.4 Waste Collection

The site has been designed to accommodate 26 metres long B-Double vehicles circulating around the site. Therefore, all waste collection vehicles (whether private or Council) can be accommodated within the site. Reference should be made to the waste consultant's report in this regard.

8. SITE OPERATIONS

8.1 Background

Reference should be made to the Operational Plan dated July 2021 and Traffic Management Plan dated 9 December 2021 prepared by Cleanaway. Nevertheless, the following items discussed below are noteworthy from a traffic engineering perspective and will provide context for the measures that will be implemented once the development is operational.

8.2 On-site Activities

The facility has the capacity to process up to 120,000 tonnes per annum of paper, carboard, glass, aluminium, plastics, and steel. Inbound recyclables, including yellow lidded bins will be collected by Blacktown Council and other local governments. The plant will also be designed to accommodate other recyclables from commercial customers.

Waste produced by the plant will generally comprise 90% dry waste (film, food trays, plastic bags, textiles, lost small recyclable fibre and plastics) and 10% wet waste (nappies, organics, bags, garbage). Dry waste will be baled, and wet waste will be stored in packers. Both outputs will be disposed weekly or as required

8.3 Hours of Operations

The facility has been designed to operate 24 hours a day, 7 days a week.

8.4 Recyclable Material Volumes

The facility has been designed for the following material volumes:

- Daily incoming volumes: pprox.. 400 tonnes per day;
- Co-mingled receival: 5,000m^3; and
- Finished goods storage: 5,000m^3.

8.5 Staffing and Shift Patterns

The facility has been designed to accommodate a total of 40 staff members, including office personnel. Details of each shift and the number of staff is outlined below:

- MRF AM Shift — 4am to 2:15pm — 24 MRF staff.
- MRF PM Shift (if required) — 2:30pm to 12:30am — 20 MRF staff.
- Office Staff Shift — 9am to 5pm — 11 office staff.

8.6 Vehicular Access

The development proposes three (3) driveway crossings, including:

- A driveway crossing to Woodstock Avenue. This driveway seeks to utilise an existing driveway crossing to Woodstock Avenue and will be exclusively used by staff and visitors, generally at the end/beginning of each shift.
- A driveway crossing to Kellogg Road (western frontage). This driveway will permit truck entries only.
- A driveway crossing to Kellogg Road (southern frontage). This driveway will generally permit truck exits only.

8.7 Light Vehicle Parking

The development provides 40 at-grade parking spaces off Woodstock Avenue for staff and visitors. As mentioned in Section 7.1 of this report, the proposal includes 28 tandem parking spaces to be utilised by staff only. **Figures 9** and **10** below outline the parking arrangements that will be implemented for the AM and PM shifts respectively.

8.7.1 AM Shift Parking Arrangement

- 21 MRF spaces (85.3% of AM MRF workforce drive to work).
- 10 office staff spaces (85.3% of office workforce drive to work).
- 5 visitors spaces based on typical Cleanaway visitor demands.
- 4 spaces as float.

Figure 9: AM Shift Parking Arrangement

8.7.2 PM Shift Parking Arrangement

- 17 MRF spaces (85.3% of PM MRF workforce drive to work).
- 10 office staff spaces (85.3% of office workforce drive to work).
- 5 visitors spaces based on typical Cleanaway visitor demands.
- 8 spaces as float.

Figure 10: PM Shift Parking Arrangement

8.8 Truck Types

The development has been designed to accommodate the following vehicles:

- 26 metre B-doubles;
- 20 metre articulated vehicles;
- 19.6 metre truck and dogs;
- 9.06m Hook Lift Trucks; and
- 8.625m rigid trucks.

8.9 Weigh Bridges and Vehicle Control

The development provides two (2) weighbridges, including a weighbridge on the western hard stand area that can accommodate vehicles up to 12.5 metres long and a weighbridge on the southern hard stand area that can accommodate vehicles up to 26 metres long. It is noted that each weighbridge will incorporate an automated vehicle control system including a traffic signal, RFID reader, driver control station, sensor loop, camera, and boom gate. This type of vehicle management system has been utilised on other Cleanaway sites and ensures vehicles and materials can be easily monitored. Vehicles exiting weighbridges can only do so once the required loading/unloading area is available. The critical western weighbridge (closest to entry driveway on Kellogg Road) provides sufficient space for four (4) 12.5 metre heavy rigid vehicles, which is significant more than the expected arrival rate for vehicles utilising this weighbridge. More details relating to this queuing is discussed below.

8.10 Loading/Unloading Areas

The development provides the following recycling loading/unloading areas:

- Six (6) commingled receival bays accommodating 8.625m rigid trucks;
- One (1) glass receival bay accommodating 20m articulated vehicles;
- Two (2) OCC receival bays accommodating 8.625m rigid trucks;
- Two (2) wet waste bays accommodating 9.060m hook lift trucks;
- One (1) finished goods loading bay accommodating 26m B-double trucks.

8.11 Truck Frequencies

The anticipated truck volumes for the development are as follows:

- 26m B-Doubles/20m Articulated Vehicles/19.6m Truck and Dogs:

  60 vehicle trips per day (30 in, 30 out).

- Rigid Vehicles:

  160 vehicle trips per day (80 in, 80 out).

8.12 Duration of Loading Activities

As advised by Cleanaway, 26 metre B-Doubles, 20 metre articulated vehicles and 19.6m truck and dogs will take approximately 1 hour to complete activities, whilst rigid vehicles will take approximately 15 minutes per vehicle.

8.13 Queuing

As mentioned above, all queuing will be accommodated within the site. Of note, all unloading/loading bays and weighbridges will be equipped with automated vehicle control systems to manage vehicle movements through the site. The weighbridges are located well within the site providing ample space for on-site queuing, noting the modest vehicle arrivals outlined above. In addition, all drivers will be inducted to ensure they are aware of weighbridge protocols and on-site staff will be trained to re-direct truck to an alternate weighbridge should vehicle queues extend near the site access on Kellogg Road (western frontage).

8.14 Truck Routes

The following truck routes aim to avoid residential areas and direct trucks to and from the M7, minimising impacts in the area. The truck routes to and from the site is presented in **Figure 11**, with the route summarised as follows:

Arriving/Departing south on the M7

- Routes to the subject site (IN): 1. Trucks will arrive on the M7 northbound

2. Trucks will use the Woodstock Avenue off-ramp and turn right onto Woodstock Avenue.
3. Trucks will travel eastbound on Woodstock Avenue.
4. Turn right onto Kellogg Road.
5. Trucks turn left into access (along western or southern boundary).

- Route from the subject site (OUT)

1. Trucks will turn right onto Kellogg Road.
2. Trucks will turn left onto Woodstock Avenue.
3. Trucks will turn left onto the M7 on-ramp (southbound).

Arriving/Departing north on the M7

- Routes to the subject site (IN):

1. Trucks will arrive on the M7 southbound.
2. Trucks will use the Power Street off-ramp and turn left onto Power Street.
3. Vehicles travel eastbound along Power Street.
4. Turn right onto Glendenning Road.
5. Turn right onto Woodstock Avenue.
6. Turn left onto Kellogg Road.
7. Turn left into western on southern access from Kellogg Road.

- Route from the subject site (OUT)

1. Trucks turn right out of site onto Kellogg Road.
2. Turn right onto Woodstock Avenue.
3. Turn left onto Glendenning Road.
4. Trucks turn left onto Power Street and travel westbound.
5. Turn right onto the M7 on-ramp (northbound).

It is noted that the above roads are located within an approved 25/26m B-double route area and no concerns are raised in relation to vehicle manoeuvrability at public intersections.

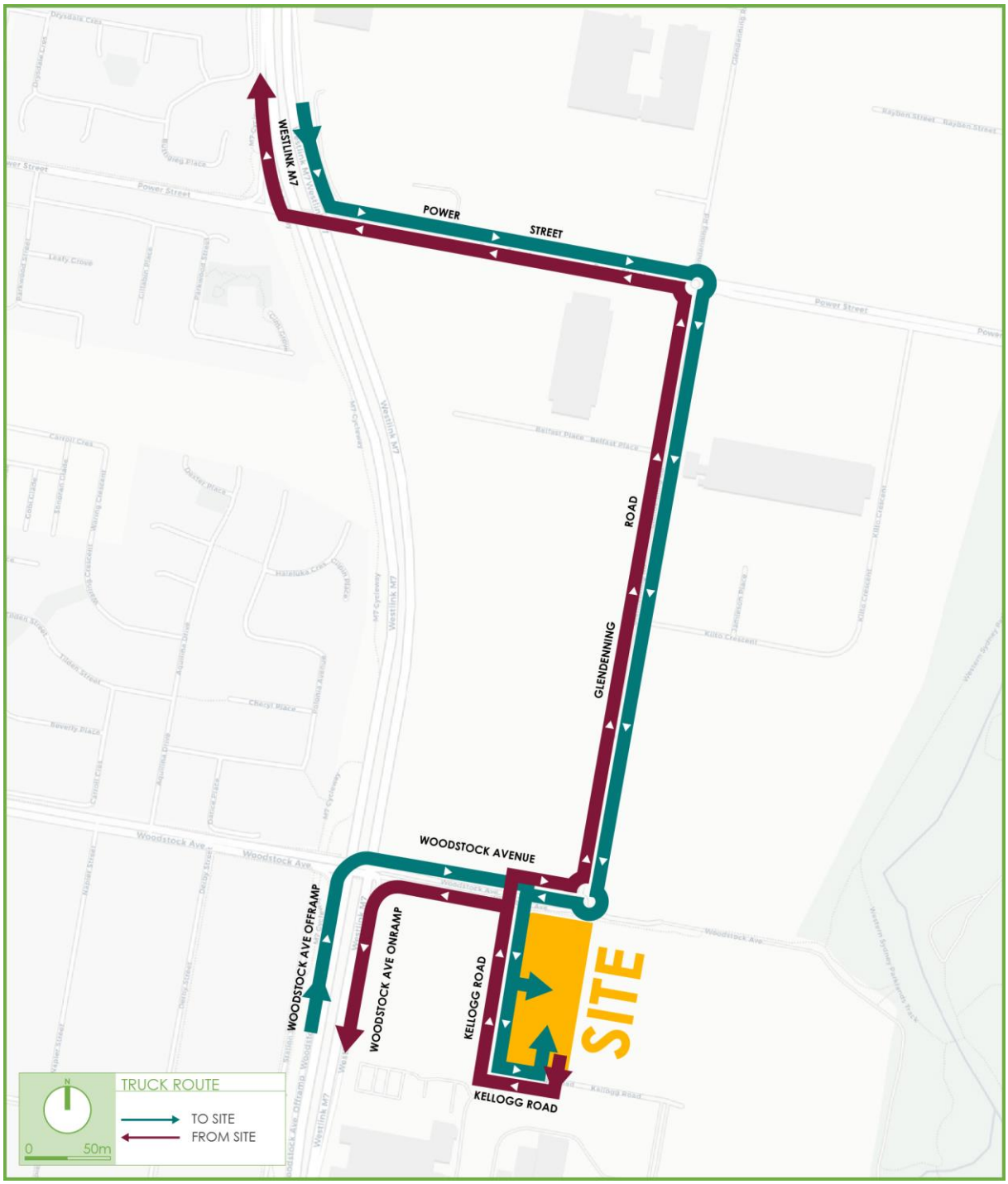


Figure 11: Truck Routes

8.15 Internal Speed Limits

The following speed limits will be enforced within the site:

- 10km/h for vehicle traffic areas;
- Walking pace in loading/unloading areas;
- Walking pace in pedestrian designated areas; and
- 5km/h in vehicle parking areas.

8.16 Driver Facilities

Noting that the proposed facility is a recycling processing plant only, and that Cleanaway operates a truck storage facility nearby, there will be not driver facilities (toilets and tea/coffee facilities etc.) provided on-site. It is expected that the majority of drivers will not be required to leave their vehicles. Facilities will however be provided within the ancillary office space for on-site workers.

8.17 Dangerous Goods

Cleanaway have advised that the site does not accept dangerous goods. In the rare occurrence that the development receives a gas bottle, battery etc. staff will store these items in a designated isolated area to be picked up and disposed of by a contractor licenced to do so.

9. TRAFFIC AND TRANSPORT IMPACTS

9.1 Existing Site Generation

The subject site currently accommodates an industrial/warehouse facility development with an approximate gross floor area (GFA) of 11,610m^2.

The Transport for NSW (former Roads and Maritime Services) Guide to Traffic Generating Developments (2002) recommends traffic generation rates for warehouse developments, which is considered suitable for estimating the traffic generation an industrial facility with ancillary office space. The guide recommends 0.5 vehicle trips per 100m^2 of GFA in the morning peak period. The evening vehicle trip rate is assumed to be equal to the morning peak period. Application of the above traffic generation rates and an 80/20 directional split to the 11,610m^2 GFA results in the following traffic generation:

- 58 vehicle trips per hour during the morning peak period (46 in, 12 out); and
- 58 vehicle trips per hour during the evening peak period (12 in, 46 out).

9.2 Development Trip Generation

The impacts of the proposed development on the external road network have been assessed having regard for the indicative yield scenarios as summarised in **Section 6** above.

The TfNSW Guide 2002 and TfNSW Technical Direction (TDT 2013) do not accurately reflect the anticipated trip generation for a materials recycling facility. Accordingly, a first principles approach has been used to assess the traffic generation of the site. Cleanaway has provided the anticipated operational details the site and this is summarised below for each vehicle category:

9.2.1 Articulated Vehicles

The anticipated truck volumes for the development are as follows:

- 26m B-Doubles / 20m Articulated Vehicles / 19.6m Truck and Dogs:

  60 vehicle trips per day (30 in, 30 out).

- Rigid Vehicles:

  160 vehicle trips per day (80 in, 80 out).

As advised by Cleanaway, 26 metre B-Doubles, 20 metre articulated vehicles and 19.6m truck and dogs will take approximately 1 hour to complete activities, whilst rigid vehicles will take approximately 15 minutes per vehicle. Cleanaway has informed that the peak arrival times for articulated vehicles will be between 5am and 5pm and rigid vehicles between 5am and 1pm.

It is assumed that 80% of all 26m B-Doubles / 20m Articulated Vehicles and 19.6m Truck and Dogs arrive between 5am and 5pm (12-hour period) and evenly distributed, this would result in a peak hourly truck arrival rate of two (2) trucks per hour.

Similarly, it is assumed that 80% of all rigid vehicles arrive between 5am and 1pm (eight-hour period). If this is to be evenly distributed, as expected on site, this would result in a peak hourly truck arrival rate of eight (8) trucks per hour. As the majority of peak truck arrivals occur during the morning/day, the morning peak hour is most significant.

This can therefore be summarised as follows:

- 26m B-Doubles / 20m Articulated Vehicles / 19.6m Truck and Dogs:

  4 vehicle trips in the morning peak period (2 in, 2 out); and

  4 vehicle trips in the evening peak period (2 in, 2 out).

- Rigid Vehicles:

  8 vehicle trips in the morning peak period (4 in, 4 out); and

  0 vehicle trips in the evening peak period (0 in, 0 out).

- Combined Heavy Vehicle Trips:

  12 vehicle trips in the morning peak period (6 in, 6 out); and

  4 vehicle trips in the evening peak period (2 in, 2 out).

9.2.2 Light Vehicles (Staff)

A total of two (2) MRF shifts, and a single office staff shift are proposed for the facility, noting that the above truck number are in reference to the full capacity of the sites and that initially

the site will operate with one (1) MRF shift and then increase to two (2) MRF shifts, dependent on demand. The shifts that are proposed are outlined below:

- MRF AM Shift: 4:00am-2:15pm Staff Numbers: 24 Staff
- MRF PM Shift: 2:30pm – 12:30am Staff Numbers: 20 Staff
- Office Shift: 9:00am – 5:00pm Staff Numbers: 11 staff

It can be seen that the MRF shifts are staggered to ensure that a maximum of 40 staff will be expected on-site at any one-time.

It is also highly noteworthy that all MRF shift change over times are outside of the morning and evening network peak periods. Accordingly, only the office shift coincides with the morning and evening network peak periods, and this is the staff scenario that will be assessed. As determined by the Journey to Work data presented in Section 7.1.2, 85.3% of staff in the areas drive to work themselves. Application of this rate to the expected staff arrivals and departures results in the following staff movements:

- 10 vehicle trips per hour during the morning peak period (10 in, 0 out); and
- 10 vehicle trips per hour during the evening peak period (0 in, 10 out).

9.2.3 Summary of Combined Traffic Generation

Therefore, the combined traffic generation of the site can be summarised as follows:

Heavy Vehicle Trips

- 12 vehicle trips per hour during the morning peak period (6 in, 6 out); and
- 4 vehicle trips per hour during the evening peak period (2 in, 2 out).

Light Vehicle Trips

- 10 vehicle trips per hour during the morning peak period (10 in, 0 out); and
- 10 vehicle trips per hour during the morning peak period (0 in, 10 out).

Combined Vehicle Trips

- 22 vehicle trips per hour during the morning peak period (16 in, 6 out); and
- 14 vehicle trips per hour during the evening peak period (2 in, 12 out).

9.3 Net Trip Generation

The above traffic generation is not a net increase over existing conditions. When accounting for the existing uses of the site, the proposed development will generate:

- -36 vehicle trips per hour during the morning peak period (-30 in, -6 out); and
- -44 vehicle trips per hour during the evening peak period (-10 in, -34 out).

As can be seen from the above, there is a net decrease in total vehicle movements to and from the site during the morning and evening peak hours.

However, in response to the SEARS and the request from TfNSW, SIDRA 9 Intersection modelling has been conducted of the intersections outlined in **Section 5.2**, with the modelling assessing the base case scenario and the base case plus development volumes, not taking into account that the net traffic generation has decreased with respect to the historic use of the site. This analysis is presented in **Section 9.4.6**.

9.4 Intersection Performance

9.4.1 Traffic Surveys

For the purposes of assessing the traffic impacts of this development, historic surveys were obtained at the critical intersections within proximity of the site. These surveys were conducted on Tuesday 10 December 2019 during the network peak periods between 7:00am – 10:00am and 4pm – 7:00pm at the following key intersections.

- The intersection of Woodstock Avenue and Glendenning Road; and
- The intersection of Woodstock Avenue and Kellogg Road.

9.4.2 SCATS Data

Historic surveys were not available for the intersection of the M7 on/off ramps and Woodstock Avenue; therefore, SCATS data was obtained at these intersections to conduct intersection modelling using SIDRA 9. The historic SCATS data was from 10 December 2019 to align with the historical intersection counts.

9.4.3 Trip Distribution

Journey to work data from the 2016 Census for the Rooty Hill – Minchinbury SA2 area has been used to determine the distribution of traffic due to staff trips to and from the proposed development. In this regard, the localised distribution of traffic onto the surrounding road network is summarised in **Table 2** below.

Table 2: Traffic Distributions

Direction	Inbound Movements	Outbound Movements	Locations (To/From)
Arrives/departs south via the M7	41%	41%	Rooty Hill, Minchinbury, St Clair, St Marys
Arrives/departs north via the M7	8%	8%	Riverstone, Marsden Park, Parklea
Arrives/departs west on Woodstock Avenue	40%	40%	Rooty Hill, Minchinbury, Mount Druitt, Plumpton
Arrives/departs north on Glendenning Road	11%	11%	Doonside, Quakers Hill

The trip distribution of trucks arriving and departing during the peak hours has been determined by the proposed truck route which provides a connection to and from the M7. The traffic distribution has been split evenly between the northbound and southbound route to the M7.

Based on the above, **Figures 12** and **13** show the distribution of light vehicle traffic (staff vehicles) in the morning and evening peak periods.

Figure 14 and **Figure 15** below show the distributions of heavy vehicle traffic generated by the proposed development at the key intersections in the vicinity of the site in the morning and evening peak period.

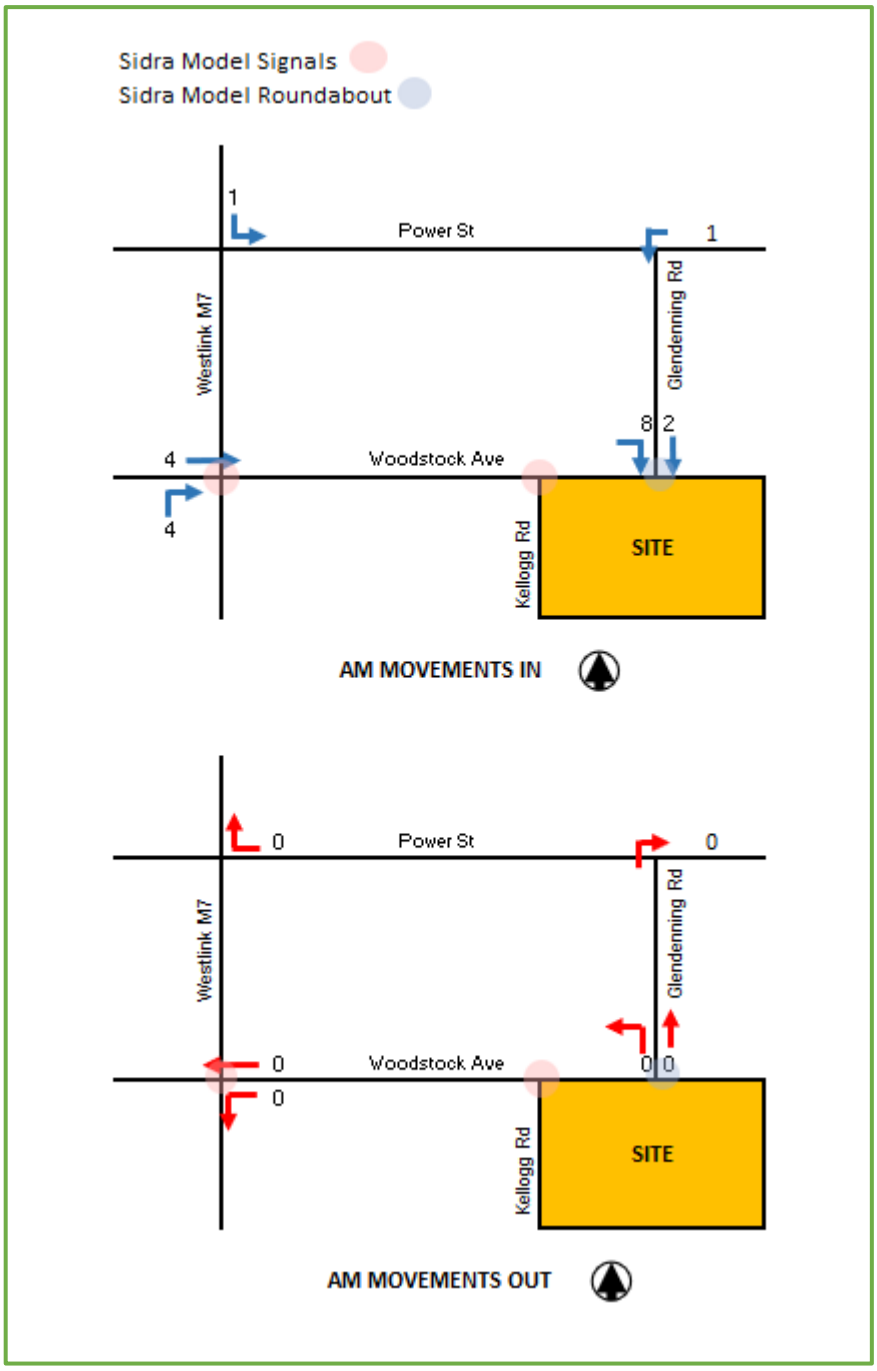


Figure 12: AM Peak Period Distribution Light Vehicles

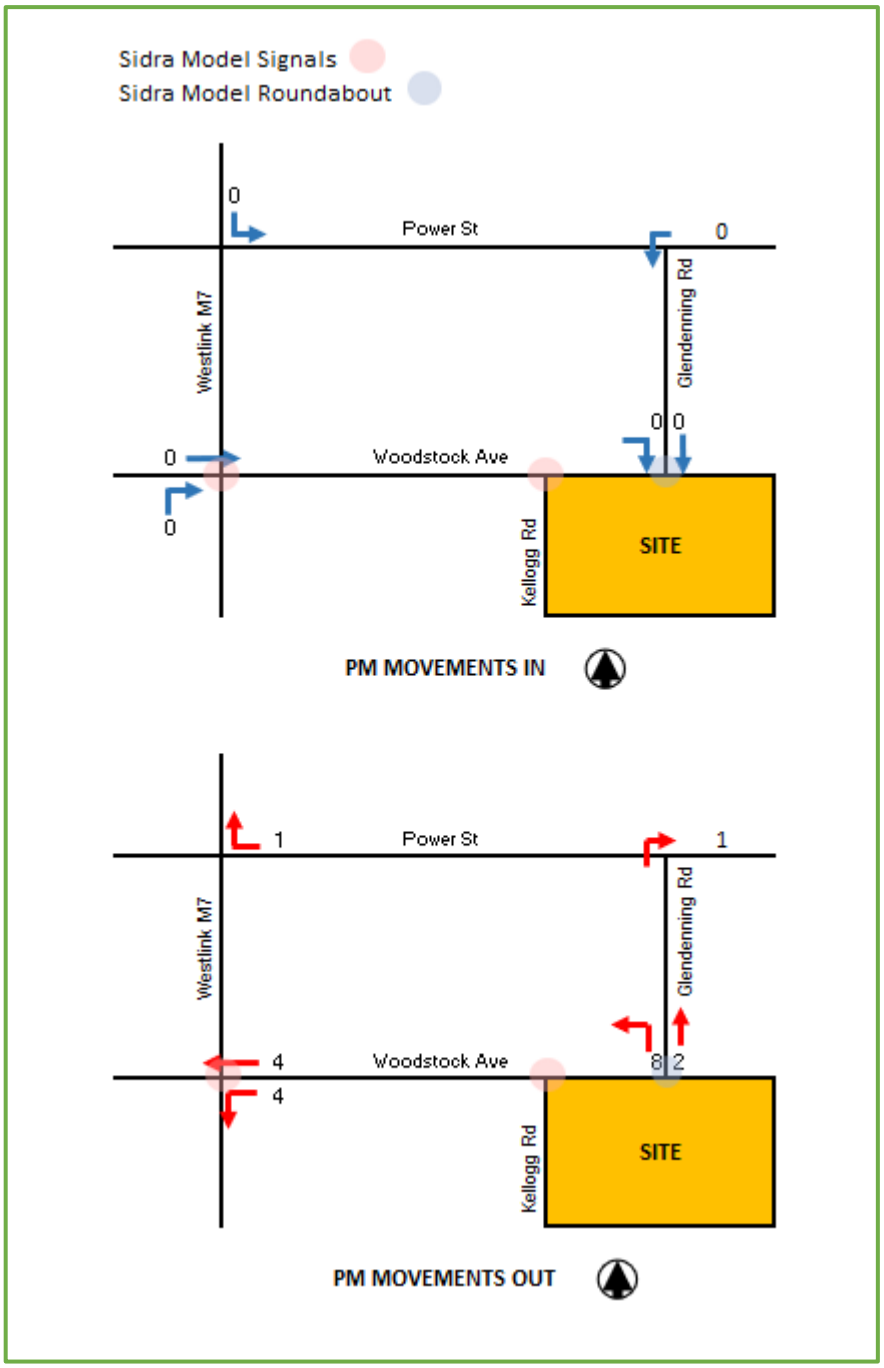


Figure 13: PM Peak Period Distribution Light Vehicles

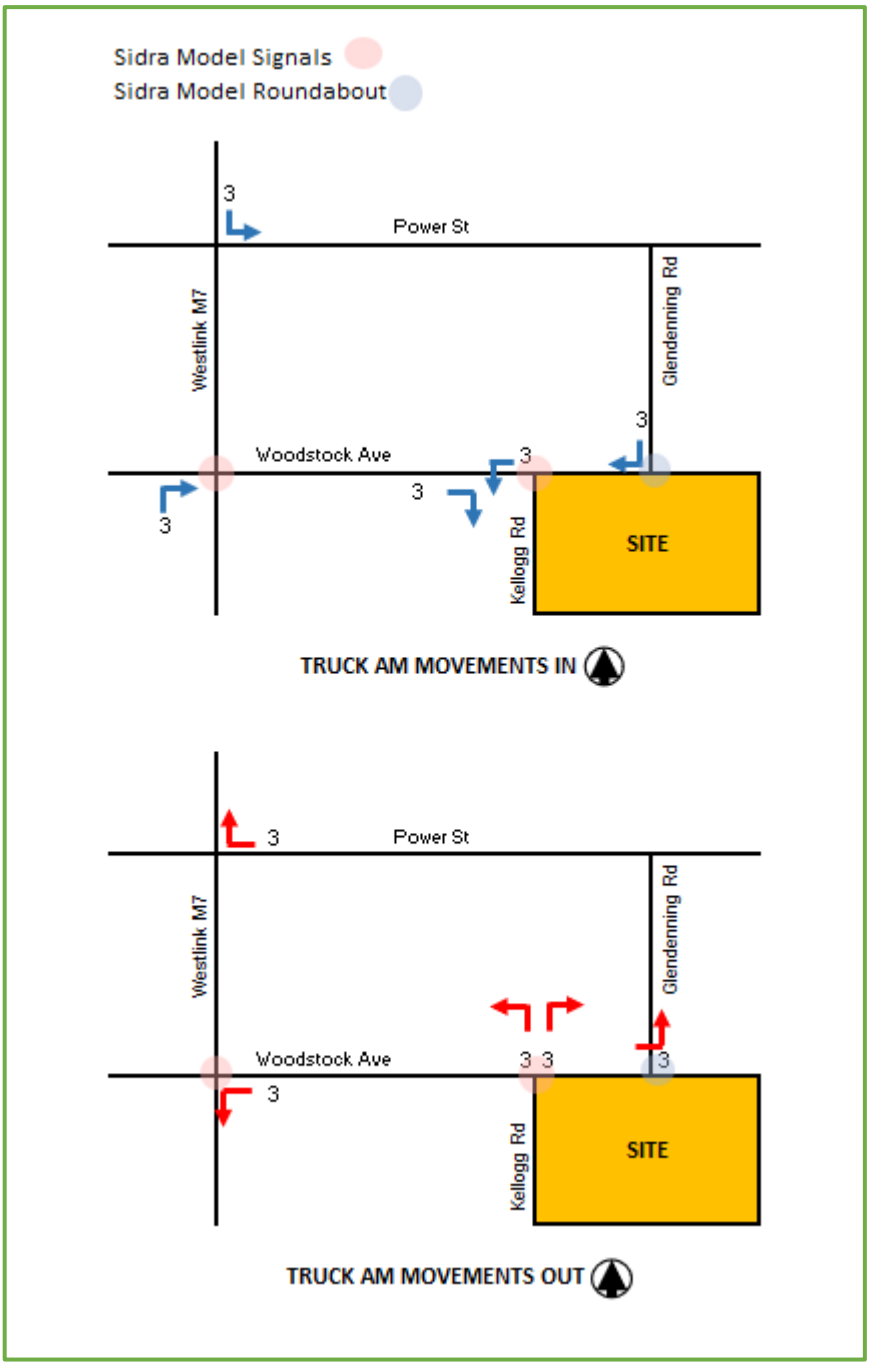


Figure 14: AM Peak Period Distribution Heavy Vehicles

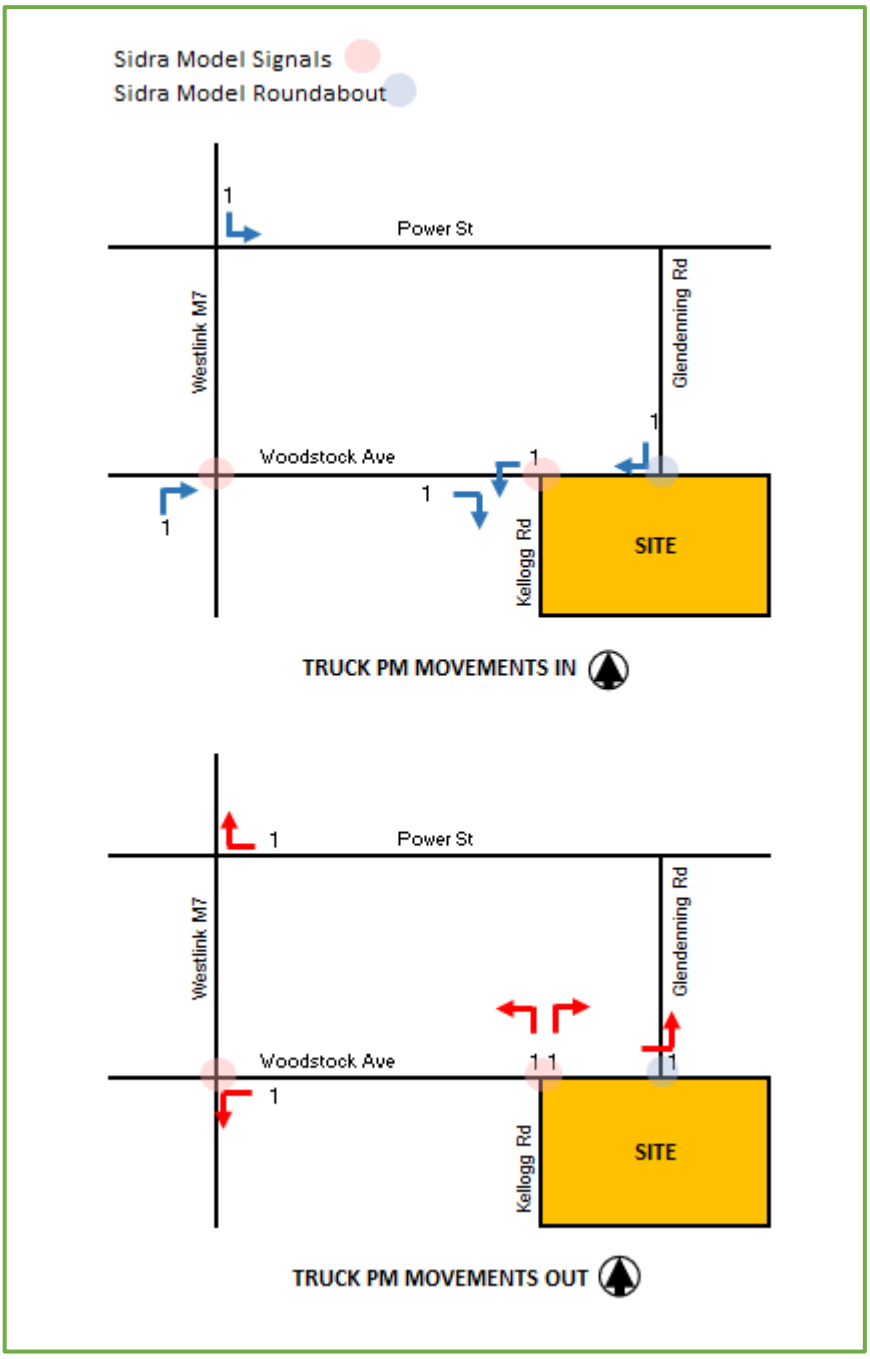


Figure 15: PM Peak Period Distribution Heavy Vehicles

9.4.4 Scenarios

In order to assess the potential traffic impacts of a proposed development, the following scenarios were identified:

- 2019 Base Case;
- 2019 Base Case + Development; and
- 2029 Base Case.

9.4.5 SIDRA Network Layouts

Intersection of M7 and Woodstock Avenue

This intersection has been separated into two sites, one site containing the M7 off-ramp and Woodstock Avenue and the other intersection containing the M7 on-ramp and Woodstock Avenue. This arrangement is depicted in **Figure 16** below.

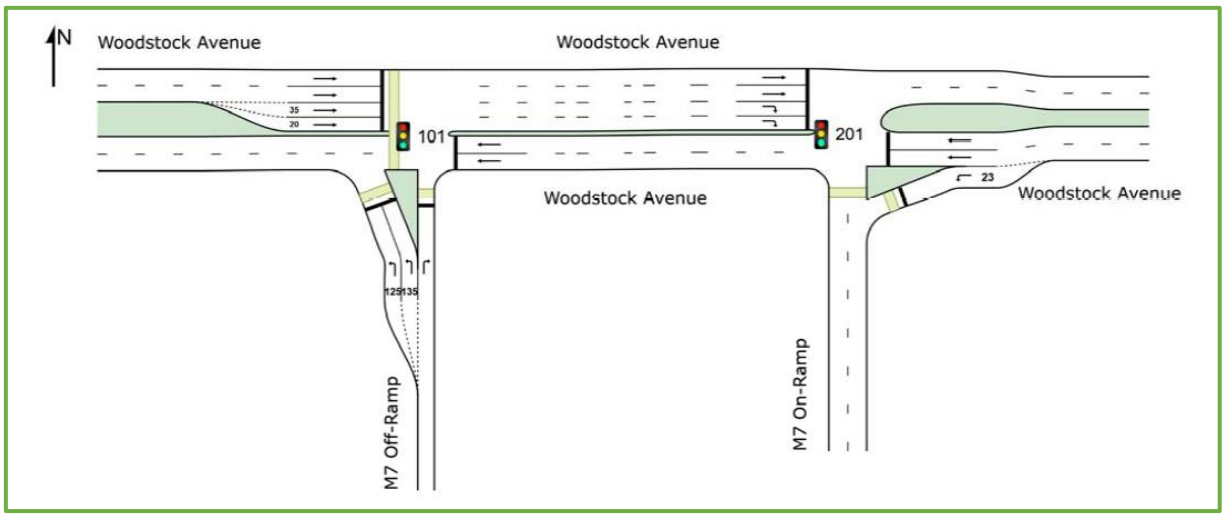


Figure 16: Network layout of the intersection of the M7 on/off ramps and Woodstock Avenue

Intersection of Glendenning Road and Woodstock Avenue

This network consists of a roundabout (with signalised leg) and a signalised intersection. As the roundabout located at the intersection of Glendenning Road and Woodstock Avenue is coordinated with the signalised intersection of Kellogg Road and Woodstock Avenue, this

cannot be modelled as a typical roundabout in SIDRA 9. As the southbound approach is signalised, the southbound approach is required to be split in two legs diagrammatically (free-flowing northbound and signalised southbound approach) to enable the intersection to be modelled accurately. It is noted that the separation of these approaches will cause negligible additional geometric delays, however, the modelled layout is the most feasible method of replicating this intersection in SIDRA 9. This arrangement is depicted in **Figure 17** below.

Figure 17: Network Layouts of the intersection of Glendinning Rd and Woodstock Ave and the intersection of Kellogg Rd and Woodstock Ave

9.4.6 SIDRA Intersection Analysis

The surveys were analysed using the SIDRA Intersection 9 computer program to determine their performance characteristics under existing traffic conditions. The SIDRA model produces a range of outputs, the most useful of which are the Degree of Saturation (DoS) and Average Vehicle Delay per vehicle (AVD). The AVD is in turn related to a level of service (LoS) criteria. These performance measures can be interpreted using the following explanations:

DoS the DoS is a measure of the operational performance of individual intersections. As both queue length and delay increase rapidly as DoS approaches 1, it is usual to attempt to keep DoS to less than 0.9. When DoS exceeds 0.9 residual queues can be anticipated, as occurs at many major intersections throughout the metropolitan area during peak periods. In this regard, a practical limit at 1.1 can be assumed. For intersections controlled by roundabout or give way / stop control, satisfactory intersection operation is generally indicated by a DoS of 0.8 or less.

AVD the AVD for individual intersections provides a measure of the operational performance of an intersection. In general, levels of acceptability of AVD for individual intersections depend on the time of day (motorists generally accept higher delays during peak commuter periods) and the road system being modelled (motorists are more likely to accept longer delays on side streets than on the main road system).

LoS this is a comparative measure which provides an indication of the operating performance of an intersection as shown in **Table 3**.

Table 3: Intersection Performance Indicators (TfNSW)

Level of Service (LoS)	Average Delay per Vehicle (secs/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 and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode	At capacity and requires other control mode
F	More than 70	Unsatisfactory and requires additional capacity.	Unsatisfactory and requires other control mode or major treatment.

A summary of the modelled results is provided in **Table 4**, reference should also be made to the SIDRA outputs provided in **Appendix C** which provide detailed results for each movement.

Table 4: Intersection Performance for 2019 Scenario

Intersection	Control Type	Scenario	Period	Degree of Saturation (DoS)	Average Delay	Level of Service
Glendenning Road Signal	Signalised	2019 Base	AM	0.286	11.0	A
			PM	0.350	11.4	A
		Base + Development	AM	0.290	11.0	A
			PM	0.351	11.5	A
Woodstock Avenue and Glendenning Road	Roundabout	2019 Base	AM	0.230	10.5	A
			PM	0.334	10.3	A
		Base + Development	AM	0.234	10.5	A
			PM	0.344	10.3	A
Woodstock Avenue and Kellogg Road	Signalised	2019 Base	AM	0.294	9.7	A
			PM	0.355	11.6	A
		Base + Development	AM	0.295	9.9	A
			PM	0.360	11.7	A
Woodstock Avenue and M7 On-ramp	Signalised	2019 Base	AM	0.321	10.4	A
			PM	0.253	8.5	A
		Base + Development	AM	0.322	10.3	A
			PM	0.255	8.5	A
Woodstock Avenue and M7 Off-ramp	Signalised	2019 Base	AM	0.570	12.4	A
			PM	0.342	11.2	A
		Base + Development	AM	0.572	12.5	A
			PM	0.342	11.2	A

9.4.7 2019 Base Case + Development Performance

It can be seen from Table 4 that all intersections operate at a LoS A during both the base and development scenarios.

The intersection of Glendenning Road and Woodstock Avenue experiences no change to average delay in the development scenario for both the morning and evening peak periods. This intersection operates with spare capacity in all scenarios.

Similarly, the intersection of Woodstock Avenue and Kellogg Road operates with spare capacity in all scenarios with the highest increase in average delay for the development scenario being 0.2 seconds in the morning peak period.

The intersections of Woodstock Avenue with the M7 on-ramp and the M7 off-ramp all operate with spare capacity. The largest increase in delay is experienced at the intersection of Woodstock Avenue and the M7 off-ramp whereby the morning development scenario results in an increase in the average delay by 0.1 seconds. Nonetheless, this intersection continues to operate at a LoS 'A' in all scenarios.

As such, no external infrastructure improvements (intersection upgrades etc.) are required to accommodate the proposed development.

9.4.8 Sensitivity Testing 2029 Scenario

The '2029 Base Case' scenario reflects traffic conditions arising from 10 years of 'background' traffic growth at a rate of 2% per annum, which is a cumulative increase of 22% on all movements at all intersections. It is noted that the '2029 Base Case' scenario will arise even if the proposed development is not considered and does not occur. It was modelled to provide an indication of the traffic flows within proximity of the site in 10 years' time, which is a scenario that Council and TfNSW will be required to address in any event (without the development), in terms of road network performance and required associated infrastructure.

With this in mind, it can be seen from **Table 5** that all intersections experience a LoS A, noting minor increases to average intersection delays. Accordingly, all intersections in the 2029 scenario will continue to operate good with acceptable delays and no external improvements required to support the proposed development.

Table 5: Intersection Performance for 2029 Scenario

Intersection	Control Type	Scenario	Period	Degree of Saturation (DoS)	Average Delay	Level of Service
Glendenning Road Signal	Signalised	2029 Base	AM	0.349	11.5	A
			PM	0.468	12.4	A
Woodstock Avenue and Glendenning Road	Roundabout	2029 Base	AM	0.373	10.8	A
			PM	0.477	10.8	A
Woodstock Avenue and Kellogg Road	Signalised	2029 Base	AM	0.382	11.1	A
			PM	0.459	12.9	A
Woodstock Avenue and M7 On-ramp	Signalised	2029 Base	AM	0.391	10.7	A
			PM	0.309	8.6	A
Woodstock Avenue and M7 Off-ramp	Signalised	2029 Base	AM	0.765	13.6	A
			PM	0.417	11.5	A

9.5 Cumulative Impacts

Whilst TRAFFIX can appreciate the request from TfNSW to ensure nearby intersections continue to operate satisfactorily, the request for the applicant to undertake a cumulative traffic impact of 'other developments' (undefined) in the surrounding locality is an abrogation of Council's and TfNSW's responsibilities to undertake these strategic planning functions. This obligation is considered unnecessary in the circumstances for the following reasons:

i. The '2029 Base Case' development provides an assessment that takes into consideration a level of background growth that results in a cumulative increase of 22% on all vehicle movements. This is well above the increase associated with the proposal, noting the modest vehicle trips generated during the peak hour periods.

ii. It is noted that the Environmental Planning and Assessment Act 1979 and TfNSW Guidelines require a nexus to be established between a development's impacts and any infrastructure improvements that may be required. The subject development generates minor impacts on the road network and proportionally would contribute negligibly to external network improvements. Hence, any impacts associated with the suggested cumulative impact assessment would not, with respect, advance the assessment process and this aspect has been tested in previous Court proceedings. In

particular, the need to include developments that have been proposed and not determined is quite concerning, as development impacts can only be based on what can be termed 'planning certainty' as generally held by the NSW Land and Environment Court.

Even if this requirement were to be undertaken, though this is strongly opposed for the above reasons, it would require a detailed Peer Review of traffic impact assessment reports undertaken for all candidate sites and these would need to be specifically nominated by TfNSW. These reports will all need to include trip generations, traffic generations, trip distributions and proposed improvements for the same time-periods. TfNSW would presumably also provide this same information to all developments that qualify for a 'cumulative assessment', noting that there appears to be no criteria that identifies the 'threshold level' of traffic generation or development intensity that triggers this requirement.

9.6 Pedestrian Safety and Connectivity

The Woodstock Avenue frontage and Kellogg Road frontages provide pedestrian footpaths that traverses the length of the site. Signalised pedestrian crossings are provided at key pedestrian desire lines between the subject site and the residential land zoning west of the M7 Motorway. An off-road shared path is also provided on the northern side of Woodstock Avenue, providing viable bicycle connections between the site and residential areas.

It is noted that the 756 bus service (Mount Druitt to Blacktown) operates along Power Street with two (2) bus stops located approximately 915 metres north of the site. The following pedestrian infrastructure is missing between the bus stops and the subject site:

- Pedestrian footpath along the western side of Glendenning Road between Woodstock Avenue and 49 Glendenning Road.

The above missing links may already be scheduled on Council's capital works program and further discussions with Council will be required to determine the need for any infrastructure improvements in the vicinity of the site.

9.7 Adequacy of Public Transport

As discussed in **Section 5.3**, the 756 bus service (Mount Druitt to Blacktown) operates along Power Street, providing connections to Plumpton, Doonside, Woodcroft and Blacktown. In addition, the Rooty Hill Railway Station is located 1.8 kilometres (23 min walk) from the site. Whilst the 2016 Census Data suggests that only one (1) staff member would utilise bus services and rail services, the implementation of a Workplace Travel Plan will likely increase this number. Overall, no concerns are raised over the additional bus or train trips, with existing services expected to easily accommodate the additional demand.

10. SUSTAINABLE TRAVEL PLAN

10.1 Green Travel Plan

A comprehensive Green Travel Plan (GTP) can be developed for staff of the development. This GTP is intended to encourage the use of public transport and alternative modes of transportation, with the primary objectives outlined as follows:

- Promote the use of sustainable transport methods, thus reducing congestion and pollution in the local area;
- Promote the development as an innovative and environmentally aware organisation; and
- Provide an active environment by encouraging healthier travel options for staff, such as walking and cycling.

A comprehensive GTP is considered to be an important part of managing the transport demand generated by the development. These plans would provide relevant transport and access information, including:

- Local bus facilities and network maps;
- Local railway and light rail stations; and
- Local walking and cycling routes.

Accordingly, the preparation of a GTP is encouraged to promote alternative modes of transport, noting that these plans are generally more effective for new developments, prior to the establishment of regular travel habits. Whilst the main objective of these plans is to reduce private vehicle usage, it is acknowledged that the development proposes adequate on-site car parking facilities. Consequently, the travel targets in this case must be uniquely tailored to encourage alternative modes of transport and car-pool schemes.

In this regard, a formal carpool scheme for staff could be considered to reduce the impact of private vehicle usage. As an added incentive, on-site staff parking can be prioritised to vehicles transporting two (2) or more staff members to and from work. As such, the development of such a scheme would assist in actively reducing the reliance on private vehicle usage for staff of the development.

10.2 Travel Demand Management

It is envisaged that the reductions in car based travel modes to achieve any future nominated targets could be facilitated by the following travel demand management measures:

- A Transport Access Guide (TAG) is considered to be a useful travel tool to encourage travel by alternative means other than private cars. This TAG would illustrate the public transport routes operating in the locality and is envisaged to be distributed for staff of the development; and
- Car sharing schemes can be encouraged for staff of the development. Initiatives could be implemented for staff whereby on-site parking spaces are prioritised for vehicles with two (2) or more staff members.

10.3 Travel Coordinator

This GTP would require the nomination of an individual or a team to maintain and oversee its implementation for staff of the development. The Travel Plan Coordinator will monitor and review the GTP, with the main roles outlined as follows:

- A monitoring and review process for the GTP;
- Updating the GTP to reflect the site operation and any changes to the public transport network such as the operational status of the future light rail and metro services;
- Re-examine the proposed targets to refine and update the proposed modal-split for staff travelling to and from the development.
- Undertake intermittent review of the success measures outlined in the plan to determine whether alternative or supplementary measures are necessary.

This evaluation will provide a reliable overview of the areas in which the GTP is operating effectively, and which areas require more attention in order to achieve the proposed long term targets of the GTP.

11. ACCESS AND INTERNAL DESIGN ASPECTS

11.1 Site Vehicular Access

11.1.1 Carpark Access (northern boundary)

The development proposes a total of 40 car parking spaces (User Class 1A) accessed from Woodstock Avenue, a local road east of the intersection with Glendening Road. It will therefore require a Category 1 driveway in accordance with AS2890.1 (2004), being a combined entry and exit driveway with a width of 3.0-5.5 metres. In response, the development proposes a 6.4-metre-wide combined entry and exit driveway at the property boundary.

It is highly noteworthy that the proposed access replaces an existing driveway crossing that currently services the existing industrial development. The proposed access reduces the existing width by approximately 1.56 metres, and it is recommended that the existing roundabout splitter island be extended east by approximately 6.0 metres to encourage drivers to turn within the cul-de-sac before entering the site. A concept design for the island extension is presented in **Appendix D**, and it is envisaged that a detailed design will be prepared by a suitably qualified civil engineer in response to a condition of consent in accordance with the relevant design standards. As discussed in **Section 9.2.2**, staff movements at the roundabout are undertaken outside of the network peak hour periods, and SIDRA analysis demonstrates that the roundabout continues to operate satisfactory under a 'worse case' scenario (staff movements occur in morning peak period). In addition, all staff will also be inducted to the staff car park access arrangements.

A swept path analysis has been included in **Appendix E** demonstrating satisfactory vehicle movements at the proposed access in accordance with AS2890.1 (2004).

11.1.2 Trucks Accesses (western and southern boundary)

A new western access of 12.3 metres at the property boundary is proposed for heavy vehicles. This access will be restricted to entry movements only. A southern access of 11 metres is also proposed for heavy vehicles. This access will facilitate both entry and exit movements and requires minor amendments to the existing driveway crossings in this location.

A swept path analysis has been included in **Appendix E** demonstrating satisfactory vehicle movements at the proposed access in accordance with AS2890.2 (2018).

11.2 Mitigation Measures for Vehicle Conflict at Accesses

Signage and line marking will be installed to manage potential vehicle conflicts at access driveways. This will ensure vehicles on-site give way to entering vehicles, minimising potential for queuing on the public roadways. These additional measures such as signage, line marking and potentially signals can be documented in further detail at Construction Certificate stage.

11.3 Internal Design

The internal car park complies with the requirements of AS2890.1 (2004), AS2890.2 (2018) and AS2890.6 (2009), and the following characteristics are noteworthy:

11.3.1 Parking Modules

- All car parking spaces have been designed in accordance with AS2890.1 (2004), User Class 1A, being a minimum width of 2.4 metres and length of 5.4 metres.
- All accessible parking spaces are to be designed in accordance with AS2890.6 (2009), being a minimum width of 2.4 metres, length of 5.4 metres and provided an adjacent shared area with the same dimensions.
- All spaces located adjacent to obstructions of greater than 150mm in height are to be provided with an additional width of 300mm.

11.3.2 Clear Head Heights

- A minimum clear head height of 2.2 metres is to be provided for all trafficable areas within the car park, as required under AS2890.1 (2004).
- A minimum clear head height of 2.5 metres is to be provided above all accessible spaces, as required under AS2890.6 (2009).

11.3.3 Loading

- Loading bays have been designed in accordance with AS2890.2 (2018) for the largest design vehicles discussed in **Section 8.8**.
- A minimum clear head height of 4.5 metres is to be provided for all trafficable areas of the service vehicles, as required under AS2890.2 (2018).

11.3.4 Other Considerations

- All columns/structures are to be located outside of the parking space design envelope, as required under AS2890.1 (2004), Figure 5.2.
- All dead-end aisles are provided with the required 1.0 metre aisle extension, as required under AS2890.1 (2004), Figure 2.3.
- Appropriate visual sight splays have been provided at the access driveways, as required under AS2890.1 (2004), Figure 3.3.

11.4 Internal Design Summary

In summary, the internal configuration of the car park has been designed in accordance with AS2890.1 (2004), AS2890.2 (2018) and AS2890.6 (2009). It is however envisaged that a standard condition of consent could be imposed requiring compliance with these standards and as such any minor amendments considered necessary (if any) can be dealt with prior to the release of any Construction Certificate.

11.5 Remedial Measures Summary

In summary, the following risks and mitigation measures have been identified for the subject project:

Table 6: Proposed Remediation Measures

Location	Risk	Mitigation Measure	Timing
Light vehicle driveway on Woodstock Avenue	Drivers turning right into the access driveway from Woodstock Avenue may be tempted to U-turn at the splitter island to enter the site.	It is proposed that the existing splitter island on the eastern leg of the Woodstock Ave/Glendenning Rd intersection be extended by approx. 6.0m to encourage drivers to turn around within the existing cul-de-sac. A concept plan is presented in Appendix D. In addition to the physical island, all staff will be inducted and advised that they are required to turn within the cul-de-sac before entering the site.	It is envisaged that the island extension be completed prior to the release of an Occupation Certificate.

12. PRELIMINARY CONSTRUCTION TRAFFIC MANAGEMENT PLAN

A detailed Construction Traffic Management Plan (CTMP) will be prepared in response to a suitable condition of consent for the SSD application. The below commentary addresses the overall management principles for the site during the construction process. It is noted that the preparation of a detailed CTMP requires significant input from the appointed builder and would heavily rely upon the construction methodology, which at this point cannot be confirmed.

The proposed development would however adhere to the general CTMP aspects as outlined below, which have been provided for information purposes.

12.1 Vehicular Access

It is expected that the existing and proposed accesses which cater to heavy vehicles, located on the western and southern boundary to Kellogg Road would be utilised for all access during construction. Sufficient area is provided within the site to allow all vehicles to be contained wholly within the property boundary and to turn around within the site area.

12.2 Truck Size and Volumes

Based on the proposed building volume, a range of between 10-50 heavy vehicle movements are expected per day.

Note that the above construction truck volumes are preliminary in nature and a comprehensive CTMP will be prepared once a builder is appointed and the construction methodology is finalised.

12.3 Truck Routes

The truck routes for the construction of the development would utilise the main arterial roads serving the region, noting that all truck routes will begin and end at the M7.

Preliminary truck routes are presented in **Figure 18** below. However, may be subject to change once a builder is appointed and further information about the construction methodology is discussed.

A copy of the routes would be provided to all drivers prior to attending the site and all trucks serving the site will do so via the proposed route only.

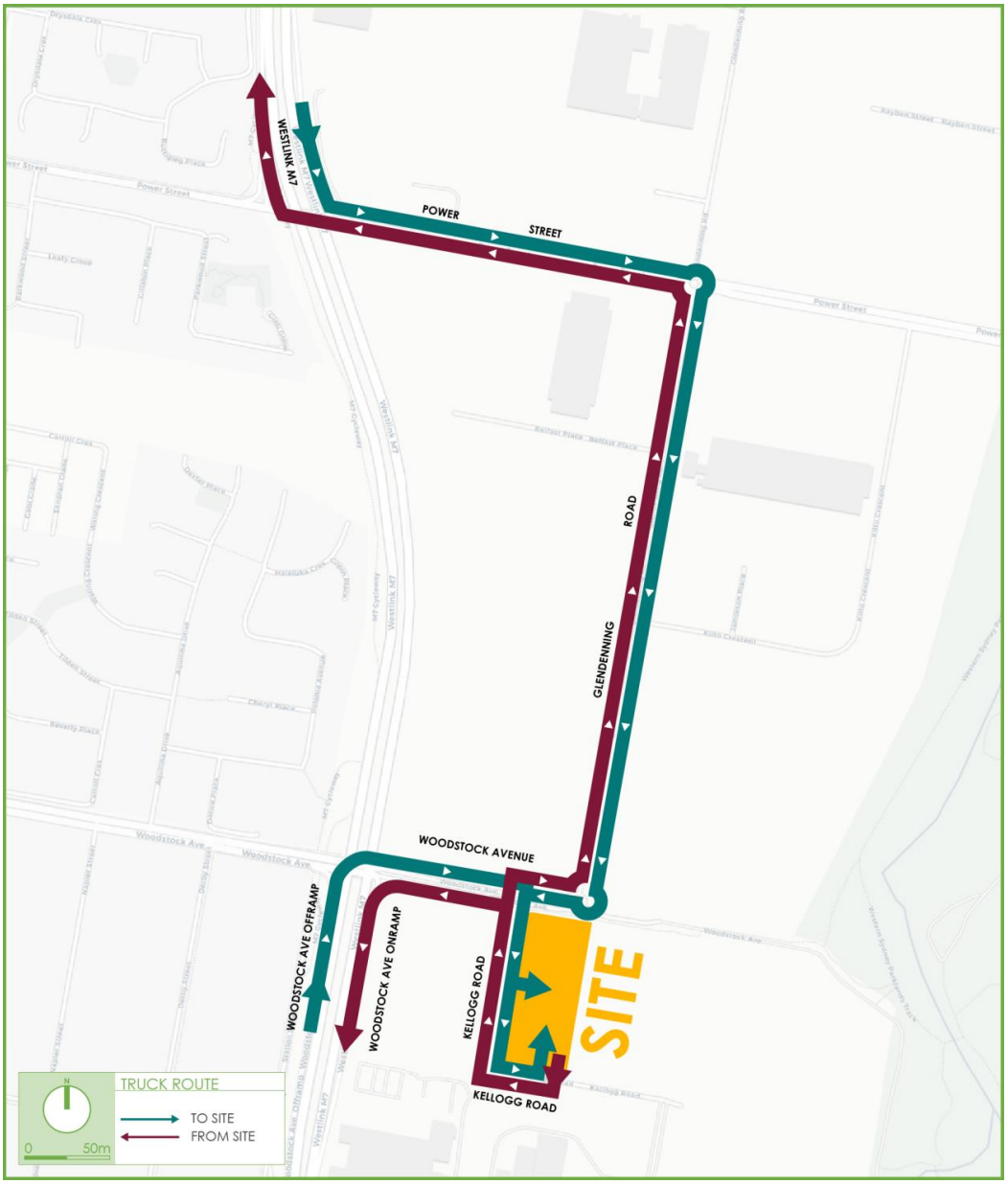


Figure 18: Preliminary Construction Truck Routes

12.4 Road Safety

The road safety at each key intersection will be assessed once the construction truck volumes and truck routes are finalised with the appointed builder. It is expected that any identified pedestrian, bicycle or vehicle safety issues will be appropriately managed through the implementation of Traffic Control Plans at key intersections or conflict points in the vicinity of the site.

12.5 Trucks Arriving to Site

All trucks will be linked via CB radio and/or hands-free mobile and will only be called to the site when required and when there is capacity within the site to accommodate the truck. Truck movements will also be staged to mitigate the potential for on-street queuing. This management arrangement of loading / unloading / deliveries will help minimise on-street queuing and will result in minimal disruptions to the surrounding road network. As such, there is no requirement for a layover area under the proposal.

12.6 Traffic Control Plans

Traffic Control Plans (TCP) will be prepared in accordance with the TfNSW Traffic Control at Worksites Manual and AS 1742.3 during all stage of construction, as necessary. The TCPs would generally relate to the following traffic related impacts:

- Footpath closures;
- Vehicle lane/cycle lane closures;
- Road closures and detours;
- Vehicle access to/from works zone/s; and
- Public domain works.

The development of these TCP will be undertaken in coordination with the appointed builder once the construction methodology is confirmed. The TCPs are included in the comprehensive CTPMP and would be approved by Council or the Private Certifying Authority.

12.7 Traffic Controllers

SafeWork NSW certified Traffic Controllers will be utilised at the site to assist construction vehicles and pedestrians around the site at all times. It is noted that Traffic Controllers are not to stop traffic on public street(s) to allow trucks to enter or leave work zones and must wait until a suitable gap in traffic allows them to assist trucks.

Additionally, pedestrians may be held only for very short periods to ensure safety when trucks are leaving or entering but they are not to be stopped in anticipation i.e., at all times the pedestrians have right of way on the footpath.

12.8 Employee Vehicles

All site staff related with the works are to park in designated off-street areas or be encouraged to use public transport and not park on the public road. Information relating to the available public transport options will be provided within induction material provided to contractors by the appointed builder.

12.9 Pedestrian Control

Pedestrian access surrounding the site will be managed safely during all construction stages. It is expected that 'A Class' and/or 'B Class' hoarding and associated access gate/s will be installed around the perimeter of the work site to provide security to the site and pedestrians. Pedestrian footpaths will not be closed without appropriate pedestrian control measures, such as detours or traffic controller's assistance. No crane works will be permitted over pedestrian footpaths without footpath closures/detours or 'B Class' hoardings. Pedestrian access to neighbouring properties shall be maintained at all times and no building materials shall be placed, dumped or left on any Council road or footpath area. Footpaths are to remain in a safe condition for use by pedestrians. SafeWork NSW certified traffic controller/s will also be positioned at any vehicle access point to manage vehicle movements and to ensure pedestrian safety.

12.10 Bicycle Parking/End of Trip Facilities

Temporary bicycle parking and end of trip facilities are expected to be provided on-site with the site's compound. Details relating to these facilities will be detailed in the comprehensive CTPMP once a builder is appointed.

12.11 Emergency Vehicle Access

Emergency vehicle access adjacent to the work site will be maintained at all times, including vehicle access along Woodstock Avenue and Kellogg Road. Emergency access for pedestrians will be further detailed by the appointed builder once the extent of the works site is known and pedestrian controls (hoarding, access gates etc.) are detailed.

13. CONCLUSIONS

The following is noteworthy:

- The proposal seeks approval for a materials recycling facility at 600 Woodstock Avenue, Rooty Hill. The material recycling facility will produce a total throughput of 120,000 tonnes per annum and is proposed to operate 24 hours, seven (7) days a week.
- The proposed development provides 40 car parking spaces within an at-grade carpark. Demand based on a first principles parking assessment as outlined in **Section 7.1.2**, results in a requirement for 34 staff car parking spaces. Of the 40 proposed car parking spaces on site, 35 spaces are to be allocated to staff parking with five (5) spaces allocated for visitors. This quantum meets the operational parking demands.
- The proposed development provides six (6) commingled receival bays accommodating 8.625m rigid trucks, one (1) glass dispatch bay accommodating 20m articulated vehicles, two (2) OCC receival bays accommodating 8.625m rigid trucks, two (2) wet waste dispatch bays accommodating 9.060m hook lift trucks and one (1) finished goods dispatch loading bay accommodating 26m B-double trucks. Swept path analysis has been undertaken of each bay using the largest design vehicle, demonstrating compliant access in accordance with AS2890.2 (2018).
- Traffic generation arising from the proposal has been assessed using various scenarios as discussed in **Section 9.4**. In terms of the overall network performance arising from the proposed development, all intersections operate satisfactorily at a LoS A and with spare capacity under both the Base Case and Base Case + Development scenarios. The 2029 Base Case scenario demonstrated small increases in average delay at the key intersections during both peaks period. No external road infrastructure upgrades are required in this regard.
- The car park is designed to comply with the requirements of AS2890.1 (2004) and AS2890.6 (2009) in order to ensure safe and efficient operation.
- The loading bays are designed to accommodate the largest vehicle expected in accordance with AS2890.2 (2018).

This traffic impact assessment therefore demonstrates that the subject application is supportable on traffic planning grounds. TRAFFIX anticipates an ongoing involvement during the development approval process.

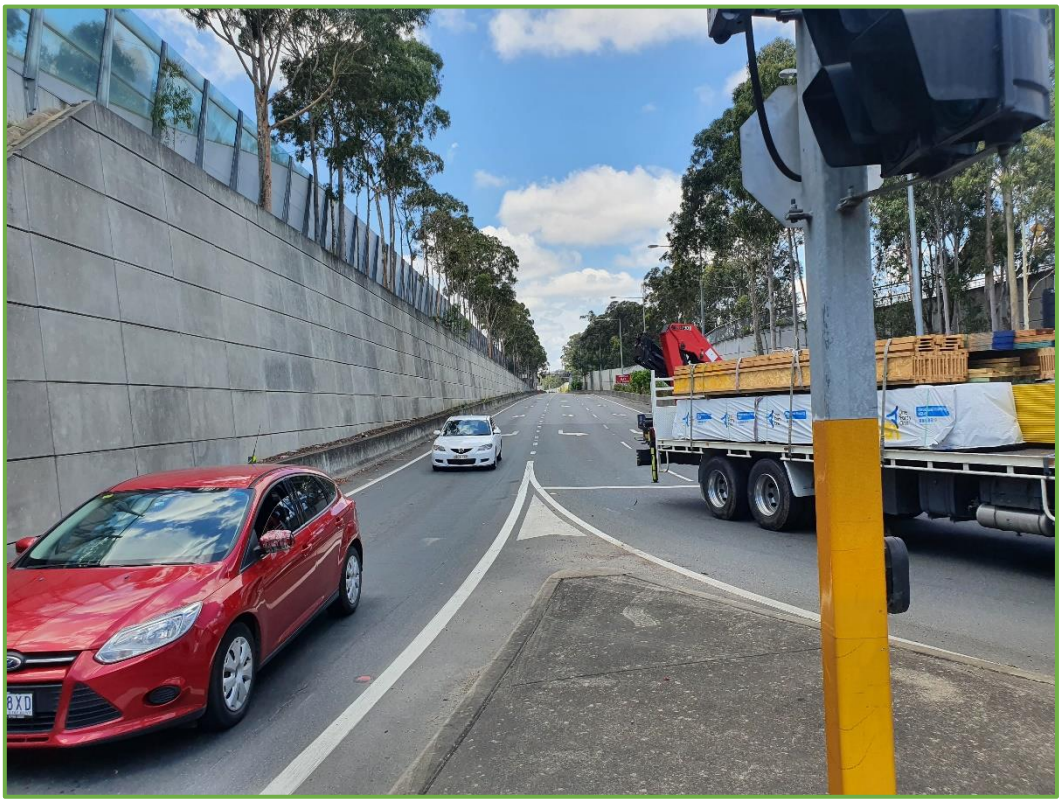
APPENDIX A

Photographic Record

View looking south towards intersection of Woodstock Avenue and Glendenning Road

View looking north towards the intersection of Kellogg Road and Woodstock Avenue

View looking west towards M7 on-ramp at Woodstock Avenue



View looking south at M7 off-ramp onto Woodstock Avenue

View looking south towards subject site at intersection of Woodstock Avenue and Glendenning Road

View looking south-east towards subject site from Kellogg Road

APPENDIX B

Reduced Plans

LEGEND	
EXISTING BUILDING FOOTPRINT (SURVEYED)	
EXISTING LANDSCAPE AREA (SURVEYED)	
PREVIOUS WAREHOUSE (2.0m FROM EXISTING OFFICE)	GLA - 10,575sqm

AREA SCHEDULE (GLA)	
PROPOSED WAREHOUSE (GLA)	10,483 sqm
EXISTING OFFICE (2 LEVELS) (GLA)	822 sqm
PROPOSED BUILDING AREA (GLA)	11,305 sqm

AREA SCHEDULE (GFA)	
SITE AREA	19,705 sqm
8M CORNER SPLAYS	32 sqm
NET DEVELOPABLE AREA	19,673 sqm
PROPOSED WAREHOUSE (GFA)	6,732 sqm
EXISTING OFFICE (2 LEVELS) (GFA)	587 sqm
WAREHOUSE AMENITIES	235 sqm
WEIGH BRIDGE OFFICE	18 sqm
PROPOSED BUILDING AREA (GFA)	7,572 sqm
AWNING AREA	1,100 sqm
HEAVY DUTY AREA	5,420 sqm
LIGHT DUTY AREA	940 sqm
CAR PARKING REQUEST (RMS)	39.5 cars
CAR PARKING REQUEST (COUNCIL)	108.0 cars
CAR PARKING PROVIDED	40 cars

WAREHOUSE LAYOUT:
TITLE: BLACKTOWN GENERAL ARRANGEMENT PLAN
DRW: 10840-MRF-01 [F]
PREP: RESOURCE RECOVERY DESIGN PTY LTD

TRAFFIC SWEPT PATHS:
TITLE: SWEPT PATH ANALYSIS
DRW: 21.182d02v02 TRAFFIX 210916 Plans Design Review
PREP: TRAFFIX

SURVEY REFERENCE:
TITLE: PLAN OF ROAD FRONTAGE DETAIL AND LEVELS
DRW: 11188-001-(A)
PREP: BOXALL SURVEYORS

1 SITE / GROUND FLOOR
1 : 400

Client
Charter Hall

Project Name
Cleanaway - Charter Hall Rooty Hill

Project Address
600 Woodstock Avenue
Rooty Hill NSW 2766

Drawing Title:
SITE & GROUND FLOOR PLAN

Date:	Sheet Size:	Scale:
22.12.2021	A1	1:400

Drawing Number:	Issue:
12272_DA001	P4

nettletontribe

APPENDIX C

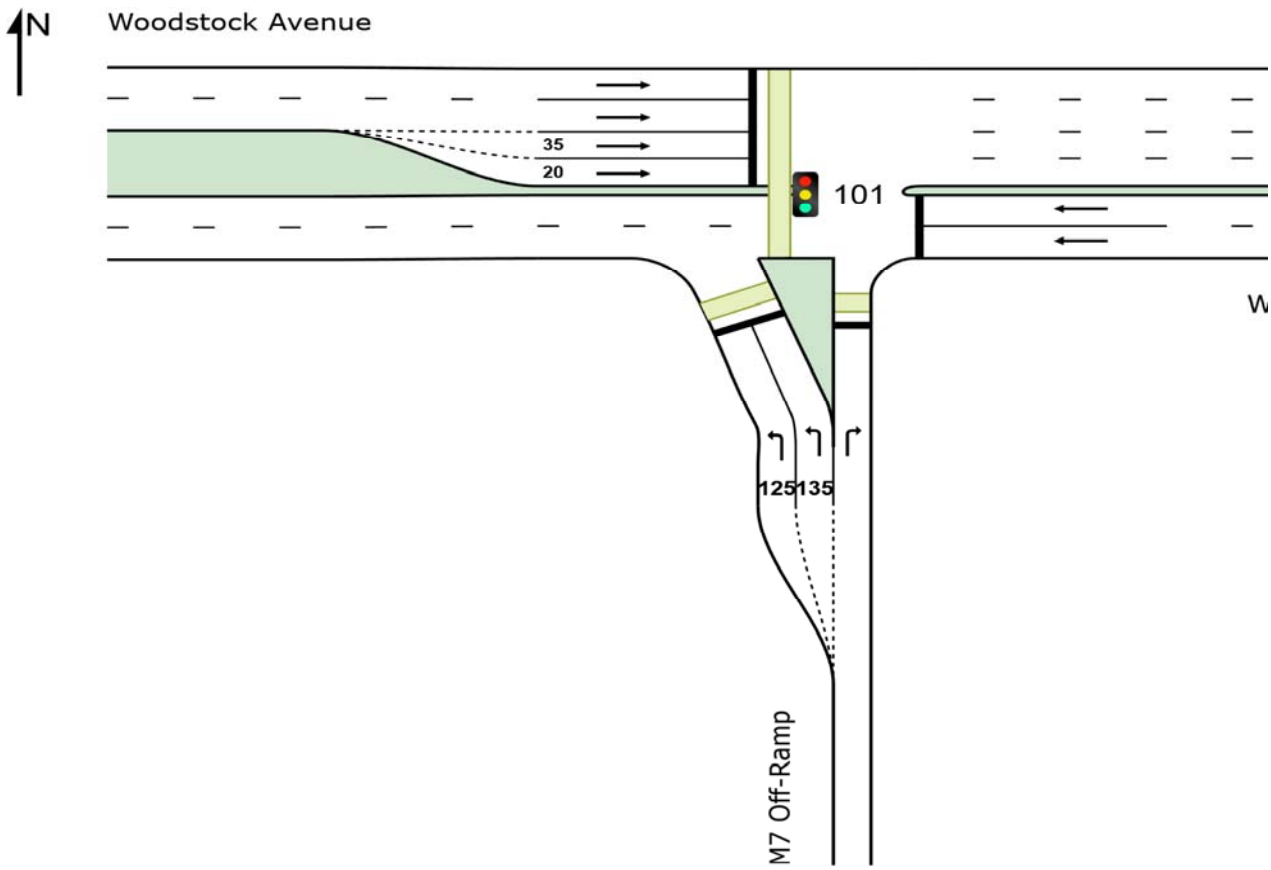
SIDRA Intersection Outputs

SITE LAYOUT

Site: 101 [101_EXAM_M7 Off-Ramp x Woodstock Ave (Site Folder: M7)]

Existing AM
7:30am-8:30am
M7 Off-Ramp and Woodstock Avenue
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.

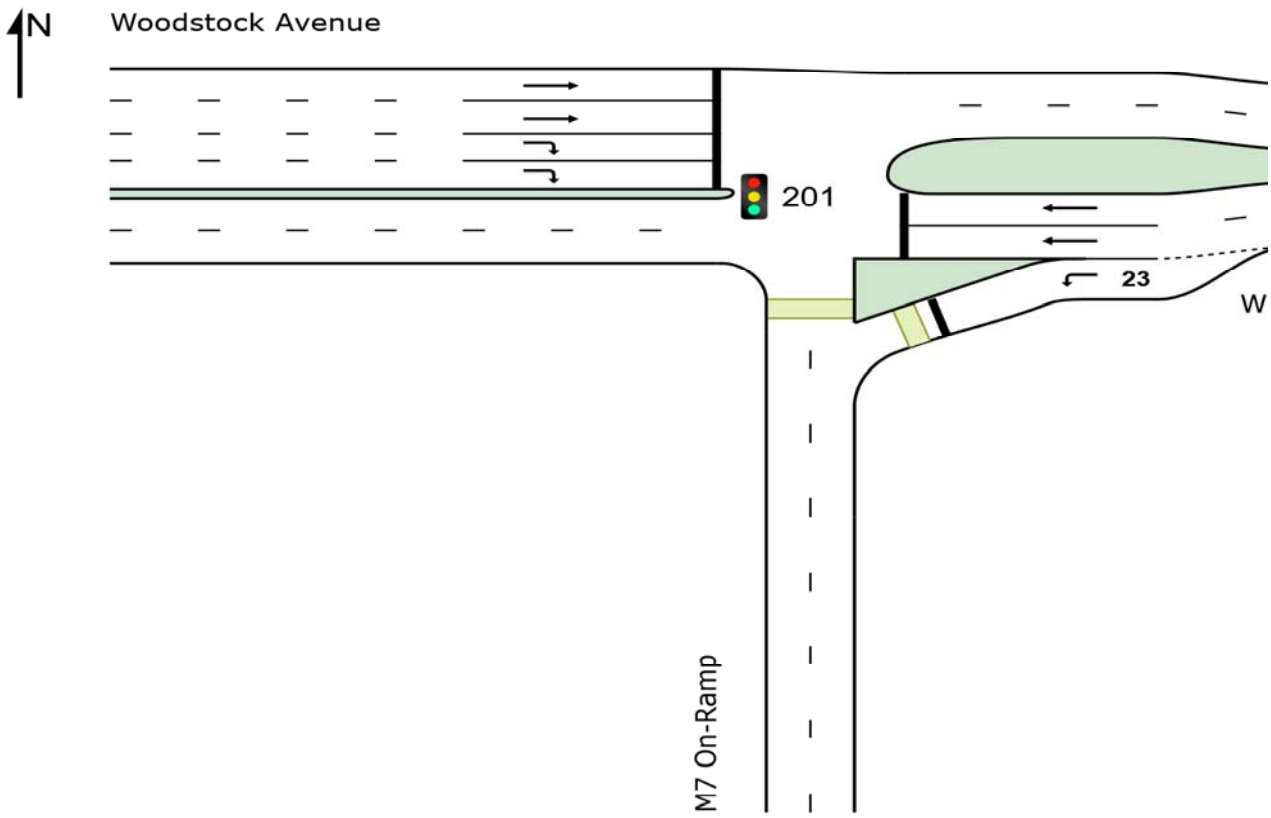


SITE LAYOUT

Site: 201 [201_EXAM_M7 On-Ramp x Woodstock Ave (Site Folder: M7)]

Existing AM
7:30am-8:30am
M7 On-Ramp and Woodstock Avenue
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.

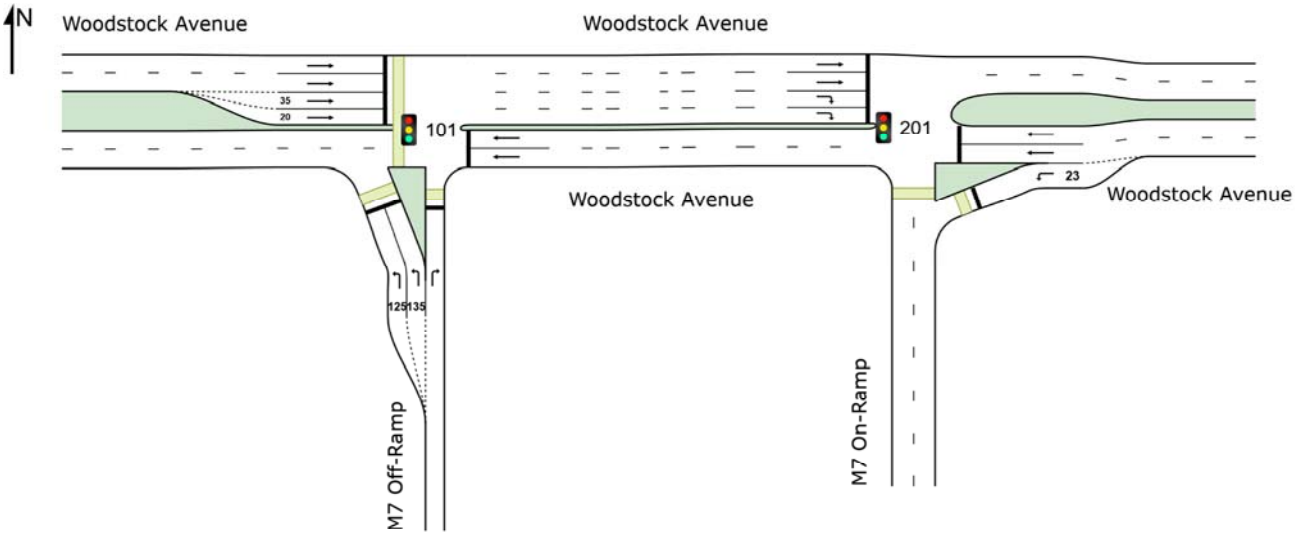


NETWORK LAYOUT

Network: N101 [EXAM_M7 Network (Network Folder: General)]

New Network
Network Category: (None)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
101	NA	101_EXAM_M7 Off-Ramp x Woodstock Ave
201	NA	201_EXAM_M7 On-Ramp x Woodstock Ave

USER REPORT FOR NETWORK SITE

All Movement Classes

Project: 21.182m01v02 600 Woodstock Ave, Rooty Hill **Template: Movement Summaries**

Site: 101 [101_EXAM_M7 Off-Ramp x Woodstock Ave (Site Folder: M7)]

Network: 1 [EXAM_M7 Network (Network Folder: General)]

Existing AM
7:30am-8:30am
M7 Off-Ramp and Woodstock Avenue
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 50 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: TCS Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: M7 Off-Ramp														
1	L2	246	5.0	246	5.0	0.191	17.1	LOS B	1.3	9.2	0.70	0.73	0.70	46.3
3	R2	341	5.0	341	5.0	* 0.554	20.5	LOS B	4.3	31.4	0.86	0.81	0.86	36.0
Approach		587	5.0	587	5.0	0.554	19.1	LOS B	4.3	31.4	0.80	0.78	0.80	41.5
East: Woodstock Avenue														
5	T1	271	5.0	271	5.0	0.187	0.5	LOS A	0.1	0.5	0.03	0.03	0.03	59.2
Approach		271	5.0	271	5.0	0.187	0.5	LOS A	0.1	0.5	0.03	0.03	0.03	59.2
West: Woodstock Avenue														
11	T1	883	5.0	883	5.0	* 0.570	11.6	LOS A	2.8	19.8	0.75	0.64	0.76	43.6
Approach		883	5.0	883	5.0	0.570	11.6	LOS A	2.8	19.8	0.75	0.64	0.76	43.6
All Vehicles		1741	5.0	1741	5.0	0.570	12.4	LOS A	4.3	31.4	0.66	0.59	0.66	44.3

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

* Critical Movement (Signal Timing)

Site: 201 [201_EXAM_M7 On-Ramp x Woodstock Ave (Site Folder: M7)]

Network: 1 [EXAM_M7 Network (Network Folder: General)]

Existing AM
7:30am-8:30am
M7 On-Ramp and Woodstock Avenue
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 50 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: TCS Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Woodstock Avenue														
4	L2	228	5.0	228	5.0	* 0.321	19.1	LOS B	2.6	18.9	0.78	0.76	0.78	45.2
5	T1	268	5.0	268	5.0	0.207	12.9	LOS A	1.5	10.6	0.75	0.60	0.75	42.2
Approach		497	5.0	497	5.0	0.321	15.8	LOS B	2.6	18.9	0.76	0.67	0.76	44.0
West: Woodstock Avenue														
11	T1	753	5.0	753	5.0	0.259	0.5	LOS A	0.4	2.9	0.15	0.12	0.15	59.1
12	R2	472	0.0	472	0.0	* 0.307	20.7	LOS B	3.6	24.9	1.00	0.83	1.00	35.2
Approach		1224	3.1	1224	3.1	0.307	8.3	LOS A	3.6	24.9	0.47	0.40	0.47	46.8
All Vehicles		1721	3.6	1721	3.6	0.321	10.4	LOS A	3.6	24.9	0.56	0.48	0.56	45.8

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

* Critical Movement (Signal Timing)

USER REPORT FOR NETWORK SITE

All Movement Classes

Project: 21.182m01v02 600 Woodstock Ave, Rooty Hill — **Template: Movement Summaries**

Site: 101 [101_EXAM_M7 Off-Ramp x Woodstock Ave (Site Folder: M7)] — **Network: 12 [EXAM_M7 Network - 10 year (Network Folder: General)]**

Existing AM
7:30am-8:30am
M7 Off-Ramp and Woodstock Avenue
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 50 seconds (Network User-Given Cycle Time)
Design Life Analysis (Final Year): Results for 10 years

Timings based on settings in the Network Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: TCS Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: M7 Off-Ramp														
1	L2	300	5.0	300	5.0	0.233	17.3	LOS B	1.6	11.4	0.72	0.74	0.72	46.2
3	R2	416	5.0	416	5.0	* 0.765	26.1	LOS B	6.4	47.0	0.97	0.92	1.14	32.5
Approach		716	5.0	716	5.0	0.765	22.4	LOS B	6.4	47.0	0.86	0.84	0.96	39.4
East: Woodstock Avenue														
5	T1	330	5.0	330	5.0	0.227	0.5	LOS A	0.1	0.6	0.03	0.03	0.03	59.2
Approach		330	5.0	330	5.0	0.227	0.5	LOS A	0.1	0.6	0.03	0.03	0.03	59.2
West: Woodstock Avenue														
11	T1	1077	5.0	1077	5.0	* 0.694	11.9	LOS A	3.8	26.5	0.74	0.67	0.82	43.5
Approach		1077	5.0	1077	5.0	0.694	11.9	LOS A	3.8	26.5	0.74	0.67	0.82	43.3
All Vehicles		2122	5.0	2122	5.0	0.765	13.6	LOS A	6.4	47.0	0.67	0.63	0.75	43.2

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

* Critical Movement (Signal Timing)

Site: 201 [201_EXAM_M7 On-Ramp x Woodstock Ave (Site Folder: M7)]

Network: 12 [EXAM_M7 Network - 10 year (Network Folder: General)]

Existing AM
7:30am-8:30am
M7 On-Ramp and Woodstock Avenue
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 50 seconds (Network User-Given Cycle Time)
Design Life Analysis (Final Year): Results for 10 years

Timings based on settings in the Network Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: TCS Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Woodstock Avenue														
4	L2	278	5.0	278	5.0	* 0.391	19.5	LOS B	3.2	23.7	0.81	0.78	0.81	45.0
5	T1	327	5.0	327	5.0	0.252	13.2	LOS A	1.8	13.2	0.76	0.62	0.76	42.0
Approach		606	5.0	606	5.0	0.391	16.1	LOS B	3.2	23.7	0.78	0.69	0.78	43.8
West: Woodstock Avenue														
11	T1	917	5.0	917	5.0	0.316	0.5	LOS A	0.5	3.8	0.16	0.13	0.16	59.0
12	R2	575	0.0	575	0.0	* 0.374	21.2	LOS B	3.6	25.0	1.00	0.84	1.00	34.8
Approach		1492	3.1	1492	3.1	0.374	8.5	LOS A	3.6	25.0	0.48	0.41	0.48	46.6
All Vehicles		2098	3.6	2098	3.6	0.391	10.7	LOS A	3.6	25.0	0.57	0.49	0.57	45.5

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

* Critical Movement (Signal Timing)

USER REPORT FOR NETWORK SITE

All Movement Classes

Project: 21.182m01v02 600 Woodstock Ave, Rooty Hill **Template: Movement Summaries**

Site: 102 [102_EXPM_M7 Off-Ramp x Woodstock Ave (Site Folder: M7)] **Network: 4 [EXPM_M7 Network (Network Folder: General)]**

Existing AM
7:30am-8:30am
M7 Off-Ramp and Woodstock Avenue
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 50 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: TCS Phasing (phase reduction applied)
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, C

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: M7 Off-Ramp														
1	L2	401	5.0	401	5.0	* 0.342	19.4	LOS B	2.3	16.9	0.79	0.77	0.79	45.0
3	R2	189	5.0	189	5.0	0.308	19.0	LOS B	2.2	15.7	0.78	0.77	0.78	37.1
Approach		591	5.0	591	5.0	0.342	19.3	LOS B	2.3	16.9	0.79	0.77	0.79	43.3
East: Woodstock Avenue														
5	T1	528	5.0	528	5.0	* 0.330	3.4	LOS A	1.0	7.4	0.27	0.22	0.27	54.3
Approach		528	5.0	528	5.0	0.330	3.4	LOS A	1.0	7.4	0.27	0.22	0.27	54.3
West: Woodstock Avenue														
11	T1	434	5.0	434	5.0	0.160	9.7	LOS A	1.2	8.9	0.65	0.52	0.65	45.6
Approach		434	5.0	434	5.0	0.160	9.7	LOS A	1.2	8.9	0.65	0.52	0.65	45.6
All Vehicles		1553	5.0	1553	5.0	0.342	11.2	LOS A	2.3	16.9	0.57	0.51	0.57	46.4

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

* Critical Movement (Signal Timing)

Site: 202 [202_EXPM_M7 On-Ramp x Woodstock Ave (Site Folder: M7)]

Network: 4 [EXPM_M7 Network (Network Folder: General)]

Existing AM
7:30am-8:30am
M7 On-Ramp and Woodstock Avenue
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 50 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: TCS Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Woodstock Avenue														
4	L2	253	5.0	253	5.0	0.231	12.2	LOS A	2.0	14.6	0.56	0.71	0.56	49.4
5	T1	522	5.0	522	5.0	* 0.253	6.7	LOS A	2.1	15.3	0.57	0.48	0.57	49.3
Approach		775	5.0	775	5.0	0.253	8.5	LOS A	2.1	15.3	0.56	0.55	0.56	49.3
West: Woodstock Avenue														
11	T1	431	5.0	431	5.0	* 0.148	0.8	LOS A	0.4	2.7	0.23	0.19	0.23	58.5
12	R2	193	0.0	193	0.0	0.239	25.5	LOS B	1.5	10.4	1.00	0.78	1.00	32.3
Approach		623	3.5	623	3.5	0.239	8.5	LOS A	1.5	10.4	0.47	0.37	0.47	46.8
All Vehicles		1398	4.3	1398	4.3	0.253	8.5	LOS A	2.1	15.3	0.52	0.47	0.52	48.3

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

* Critical Movement (Signal Timing)

USER REPORT FOR NETWORK SITE

All Movement Classes

Project: 21.182m01v02 600 Woodstock Ave, Rooty Hill **Template: Movement Summaries**

Site: 102 [102_EXPM_M7 Off-Ramp x Woodstock Ave (Site Folder: M7)]

Network: 13 [EXPM_M7 Network - 10 year (Network Folder: General)]

Existing AM
7:30am-8:30am
M7 Off-Ramp and Woodstock Avenue
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 50 seconds (Network User-Given Cycle Time)
Design Life Analysis (Final Year): Results for 10 years

Timings based on settings in the Network Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: TCS Phasing (phase reduction applied)
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, C

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: M7 Off-Ramp														
1	L2	489	5.0	489	5.0	* 0.417	19.8	LOS B	2.9	21.3	0.81	0.78	0.81	44.8
3	R2	231	5.0	231	5.0	0.375	19.4	LOS B	2.7	19.7	0.80	0.78	0.80	36.8
Approach		720	5.0	720	5.0	0.417	19.7	LOS B	2.9	21.3	0.81	0.78	0.81	43.0
East: Woodstock Avenue														
5	T1	644	5.0	644	5.0	* 0.402	3.5	LOS A	1.4	9.9	0.29	0.25	0.29	54.1
Approach		644	5.0	644	5.0	0.402	3.5	LOS A	1.4	9.9	0.29	0.25	0.29	54.1
West: Woodstock Avenue														
11	T1	529	5.0	529	5.0	0.195	9.9	LOS A	1.5	11.0	0.66	0.53	0.66	45.4
Approach		529	5.0	529	5.0	0.195	9.9	LOS A	1.5	11.0	0.66	0.53	0.66	45.4
All Vehicles		1893	5.0	1893	5.0	0.417	11.5	LOS A	2.9	21.3	0.59	0.53	0.59	46.2

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

* Critical Movement (Signal Timing)

Site: 202 [202_EXPM_M7 On-Ramp x Woodstock Ave (Site Folder: M7)]

Network: 13 [EXPM_M7 Network - 10 year (Network Folder: General)]

Existing AM
7:30am-8:30am
M7 On-Ramp and Woodstock Avenue
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 50 seconds (Network User-Given Cycle Time)
Design Life Analysis (Final Year): Results for 10 years

Timings based on settings in the Network Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: TCS Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Woodstock Avenue														
4	L2	308	5.0	308	5.0	0.281	12.4	LOS A	2.5	18.4	0.58	0.72	0.58	49.2
5	T1	636	5.0	636	5.0	* 0.309	6.9	LOS A	2.7	19.4	0.59	0.50	0.59	49.0
Approach		944	5.0	944	5.0	0.309	8.7	LOS A	2.7	19.4	0.58	0.57	0.58	49.1
West: Woodstock Avenue														
11	T1	525	5.0	525	5.0	* 0.181	0.7	LOS A	0.4	3.0	0.21	0.17	0.21	58.7
12	R2	235	0.0	235	0.0	0.292	25.8	LOS B	1.8	12.7	1.00	0.79	1.00	32.2
Approach		760	3.5	760	3.5	0.292	8.5	LOS A	1.8	12.7	0.45	0.36	0.45	46.7
All Vehicles		1704	4.3	1704	4.3	0.309	8.6	LOS A	2.7	19.4	0.53	0.48	0.53	48.1

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

* Critical Movement (Signal Timing)

USER REPORT FOR NETWORK SITE

All Movement Classes

Project: 21.182m01v02 600 Woodstock Ave, Rooty Hill **Template: Movement Summaries**

Site: 1013 [103_PRAM_M7 Off-Ramp x Woodstock Ave (Site Folder: M7)]

Network: 10 [PRAM_M7 Network (Network Folder: General)]

Existing AM
7:30am-8:30am
M7 Off-Ramp and Woodstock Avenue
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 50 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: TCS Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: M7 Off-Ramp														
1	L2	246	5.0	246	5.0	0.191	17.1	LOS B	1.3	9.2	0.70	0.73	0.70	46.3
3	R2	348	5.8	348	5.8	* 0.569	20.6	LOS B	4.4	32.5	0.87	0.82	0.87	35.9
Approach		595	5.5	595	5.5	0.569	19.2	LOS B	4.4	32.5	0.80	0.78	0.80	41.4
East: Woodstock Avenue														
5	T1	271	5.0	271	5.0	0.187	0.8	LOS A	0.1	0.8	0.06	0.05	0.06	58.5
Approach		271	5.0	271	5.0	0.187	0.8	LOS A	0.1	0.8	0.06	0.05	0.06	58.5
West: Woodstock Avenue														
11	T1	887	5.0	887	5.0	* 0.572	11.7	LOS A	2.8	19.8	0.75	0.64	0.76	43.6
Approach		887	5.0	887	5.0	0.572	11.7	LOS A	2.8	19.8	0.75	0.64	0.76	43.5
All Vehicles		1753	5.1	1753	5.1	0.572	12.5	LOS A	4.4	32.5	0.66	0.60	0.66	44.2

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

* Critical Movement (Signal Timing)

Site: 203 [203_PRAM_M7 On-Ramp x Woodstock Ave (Site Folder: M7)]

Network: 10 [PRAM_M7 Network (Network Folder: General)]

Existing AM
7:30am-8:30am
M7 On-Ramp and Woodstock Avenue
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 50 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: TCS Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Woodstock Avenue														
4	L2	232	6.3	232	6.3	* 0.311	18.4	LOS B	2.5	18.8	0.76	0.76	0.76	45.6
5	T1	268	5.0	268	5.0	0.195	12.1	LOS A	1.4	10.3	0.72	0.58	0.72	43.0
Approach		500	5.6	500	5.6	0.311	15.0	LOS B	2.5	18.8	0.74	0.66	0.74	44.6
West: Woodstock Avenue														
11	T1	764	5.3	764	5.3	0.264	0.5	LOS A	0.4	3.0	0.15	0.12	0.15	59.1
12	R2	472	0.0	472	0.0	* 0.322	21.4	LOS B	3.6	24.9	1.00	0.83	1.00	34.7
Approach		1236	3.3	1236	3.3	0.322	8.5	LOS A	3.6	24.9	0.47	0.40	0.47	46.6
All Vehicles		1736	4.0	1736	4.0	0.322	10.3	LOS A	3.6	24.9	0.55	0.47	0.55	45.9

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

* Critical Movement (Signal Timing)

USER REPORT FOR NETWORK SITE

All Movement Classes

Project: 21.182m01v02 600 Woodstock Ave, Rooty Hill **Template: Movement Summaries**

Site: 104 [104_PRPM_M7 Off-Ramp x Woodstock Ave (Site Folder: M7)] **Network: 11 [PRPM_M7 Network (Network Folder: General)]**

Existing AM
7:30am-8:30am
M7 Off-Ramp and Woodstock Avenue
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 50 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: TCS Phasing (phase reduction applied)
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, C

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: M7 Off-Ramp														
1	L2	401	5.0	401	5.0	* 0.342	19.4	LOS B	2.3	16.9	0.79	0.77	0.79	45.0
3	R2	191	5.5	191	5.5	0.310	19.1	LOS B	2.2	15.9	0.78	0.77	0.78	37.1
Approach		592	5.2	592	5.2	0.342	19.3	LOS B	2.3	16.9	0.79	0.77	0.79	43.3
East: Woodstock Avenue														
5	T1	533	5.0	533	5.0	* 0.332	3.4	LOS A	1.0	7.5	0.27	0.23	0.27	54.3
Approach		533	5.0	533	5.0	0.332	3.4	LOS A	1.0	7.5	0.27	0.23	0.27	54.3
West: Woodstock Avenue														
11	T1	434	5.0	434	5.0	0.160	9.7	LOS A	1.2	8.9	0.65	0.52	0.65	45.6
Approach		434	5.0	434	5.0	0.160	9.7	LOS A	1.2	8.9	0.65	0.52	0.65	45.6
All Vehicles		1558	5.1	1558	5.1	0.342	11.2	LOS A	2.3	16.9	0.57	0.51	0.57	46.4

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

* Critical Movement (Signal Timing)

Site: 204 [204_PRPM_M7 On-Ramp x Woodstock Ave (Site Folder: M7)]

Network: 11 [PRPM_M7 Network (Network Folder: General)]

Existing AM
7:30am-8:30am
M7 On-Ramp and Woodstock Avenue
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 50 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: TCS Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Woodstock Avenue														
4	L2	258	5.3	258	5.3	0.236	12.2	LOS A	2.0	15.0	0.56	0.71	0.56	49.3
5	T1	526	5.0	526	5.0	* 0.255	6.7	LOS A	2.1	15.5	0.57	0.48	0.57	49.3
Approach		784	5.1	784	5.1	0.255	8.5	LOS A	2.1	15.5	0.56	0.55	0.56	49.3
West: Woodstock Avenue														
11	T1	433	5.2	433	5.2	* 0.149	0.8	LOS A	0.4	2.8	0.23	0.19	0.23	58.5
12	R2	193	0.0	193	0.0	0.239	25.5	LOS B	1.5	10.4	1.00	0.78	1.00	32.3
Approach		625	3.6	625	3.6	0.239	8.4	LOS A	1.5	10.4	0.47	0.37	0.47	46.8
All Vehicles		1409	4.4	1409	4.4	0.255	8.5	LOS A	2.1	15.5	0.52	0.47	0.52	48.3

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

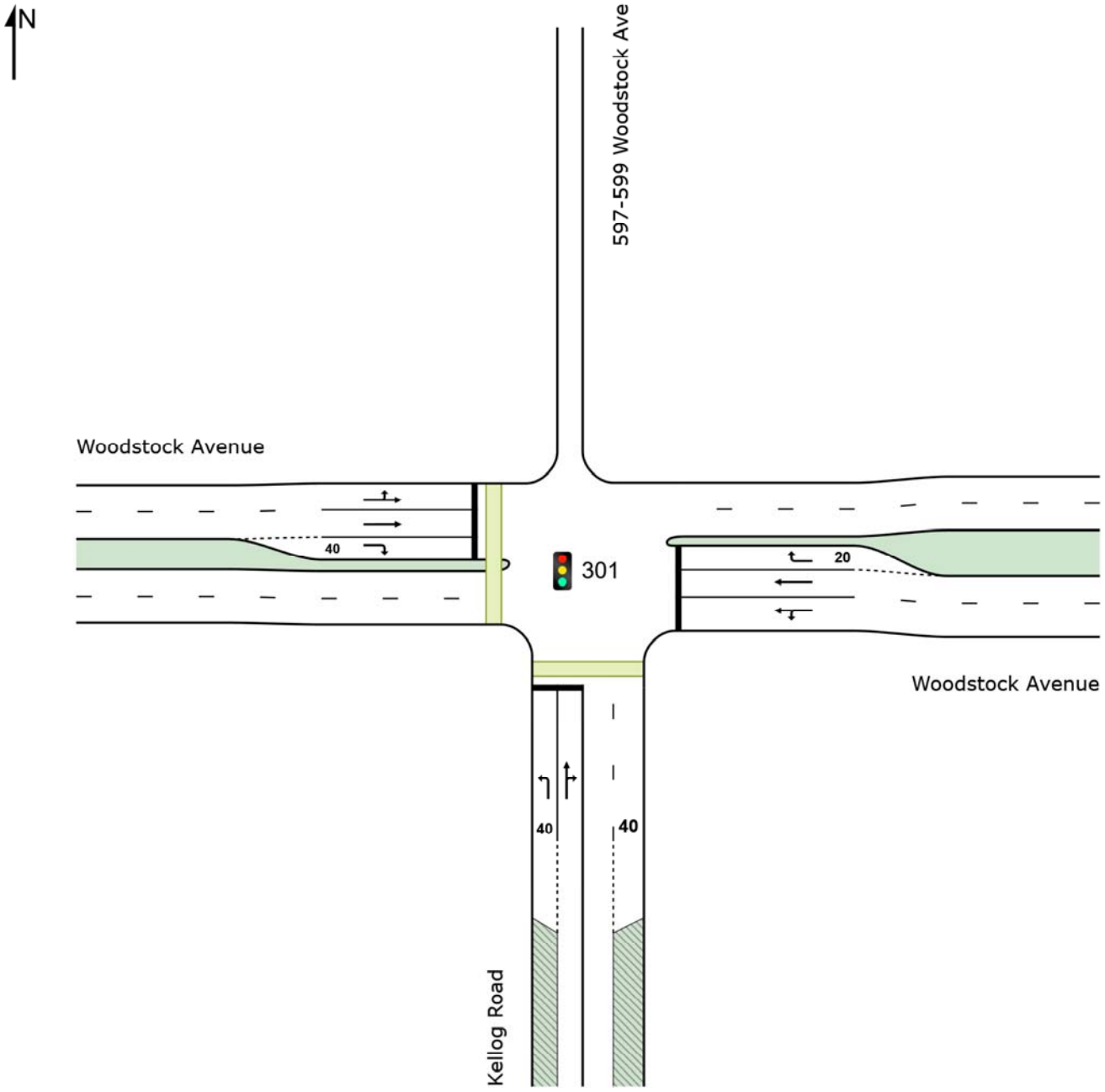
* Critical Movement (Signal Timing)

SITE LAYOUT

Site: 301 [301_EXAM_Kellogg Rd x Woodstock Ave (Site Folder: Glendenning Rd)]

Existing AM
Kellogg Road and Woodstock Avenue
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.

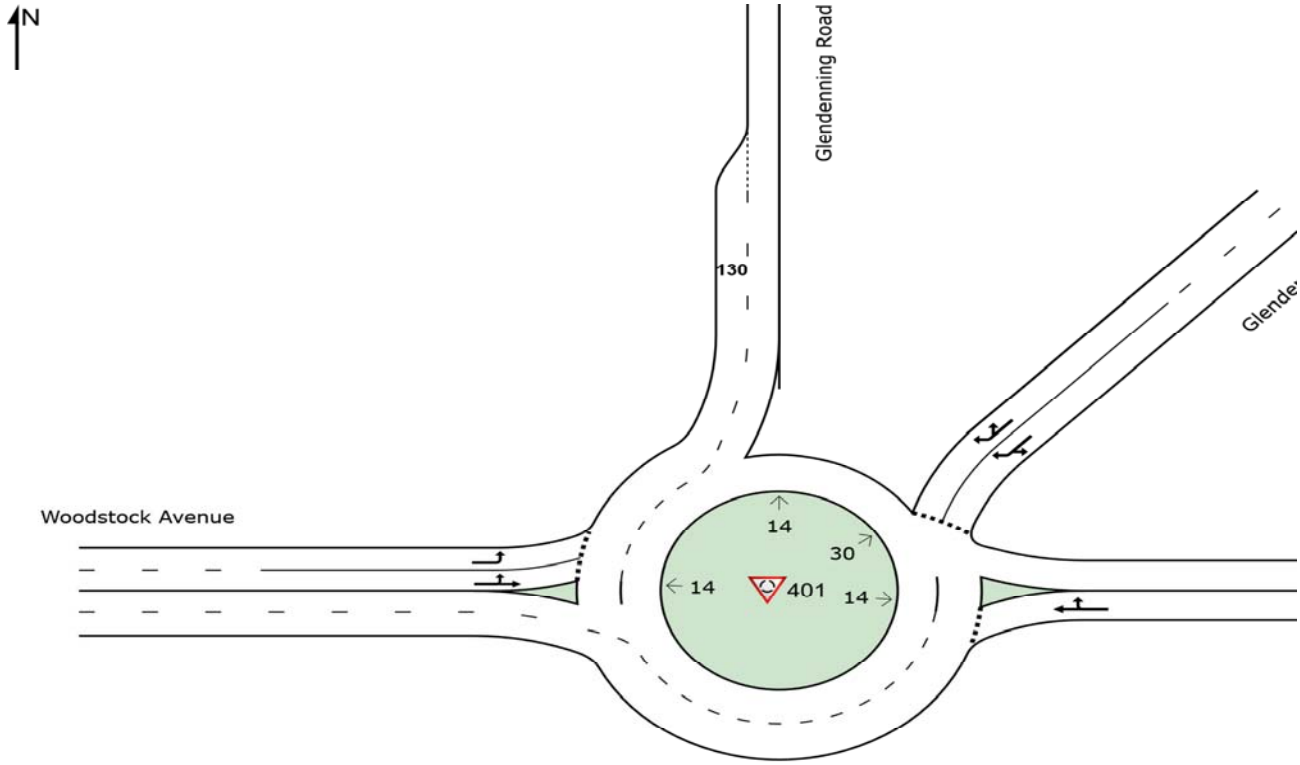


SITE LAYOUT

Site: 401 [401_EXAM_Glendenning Rd x Woodstock Ave (Site Folder: Glendenning Rd)]

Existing AM
Glendenning Road and Woodstock Avenue
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



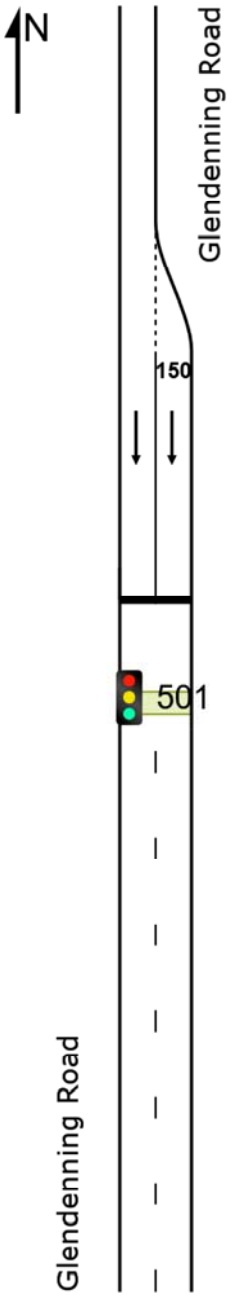
Elliptical shape restrictions apply to this Roundabout.

SITE LAYOUT

Site: 501 [501_EXAM_Glendenning Rd Signal (Site Folder: Glendenning Rd)]

Existing AM
Glendenning Road Signal
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



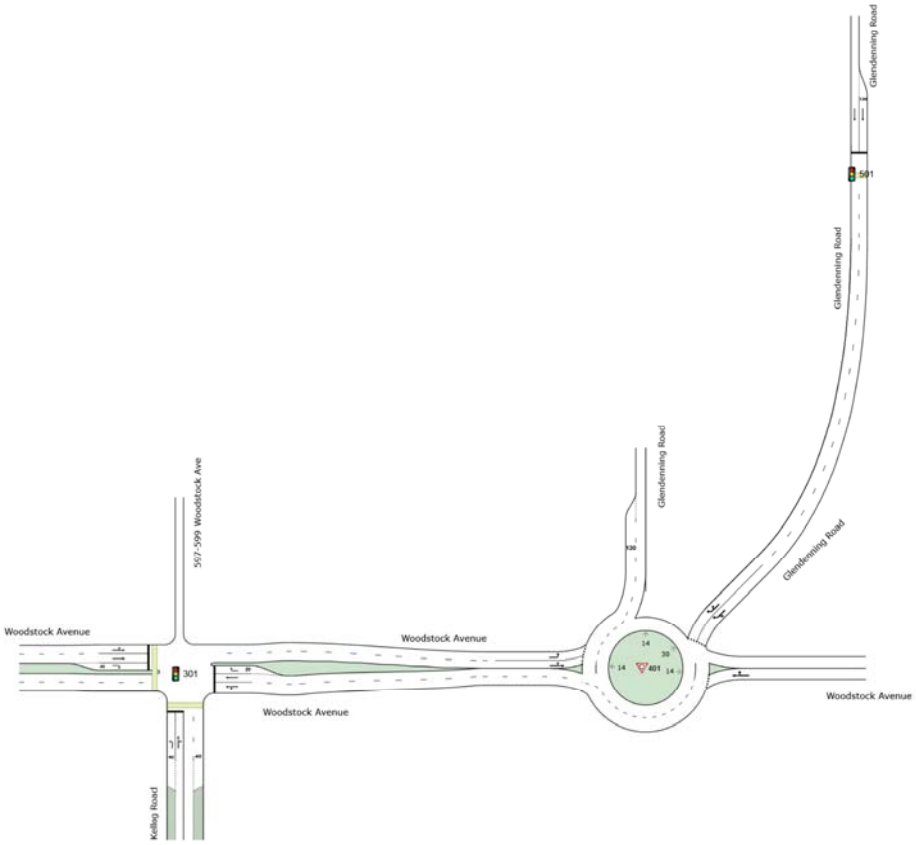
NETWORK LAYOUT

Network: N101 [EXAM_Glendenning x Woodstock (Network Folder: General)]

New Network
Network Category: (None)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.

N



SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
301	NA	301_EXAM_Kellogg Rd x Woodstock Ave
401	NA	401_EXAM_Glendenning Rd x Woodstock Ave
501	NA	501_EXAM_Glendenning Rd Signal

USER REPORT FOR NETWORK SITE

All Movement Classes

Project: 21.182m01v02 600 Woodstock Ave, Rooty Hill — **Template: Movement Summaries**

Site: 301 [301_EXAM_Kellogg Rd x Woodstock Ave (Site Folder: Glendenning Rd)] — **Network: 5 [EXAM_Glendenning x Woodstock (Network Folder: General)]**

Existing AM
Kellogg Road and Woodstock Avenue
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 70 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: TCS Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Kellog Road														
1	L2	46	43.2	46	43.2	0.099	23.9	LOS B	0.7	6.6	0.72	0.71	0.72	28.6
2	T1	2	0.0	2	0.0	* 0.235	29.5	LOS C	0.9	9.9	0.91	0.74	0.91	18.7
3	R2	46	61.4	46	61.4	0.235	35.8	LOS C	0.9	9.9	0.91	0.74	0.91	17.7
Approach		95	51.1	95	51.1	0.235	29.8	LOS C	0.9	9.9	0.82	0.73	0.82	23.6
East: Woodstock Avenue														
4	L2	86	25.6	86	25.6	0.294	14.1	LOS A	3.2	25.8	0.61	0.59	0.61	41.4
5	T1	447	12.7	447	12.7	* 0.294	10.9	LOS A	3.3	25.3	0.62	0.55	0.62	36.5
6	R2	5	0.0	5	0.0	0.015	15.7	LOS B	0.1	0.4	0.59	0.63	0.59	11.3
Approach		539	14.6	539	14.6	0.294	11.5	LOS A	3.3	25.8	0.62	0.56	0.62	37.5
West: Woodstock Avenue														
10	L2	13	0.0	13	0.0	0.277	10.5	LOS A	2.8	21.9	0.43	0.39	0.43	39.3
11	T1	665	12.3	665	12.3	0.277	5.0	LOS A	2.8	21.9	0.43	0.38	0.43	45.2
12	R2	84	37.5	84	37.5	* 0.190	13.5	LOS A	0.8	7.7	0.57	0.71	0.57	43.9
Approach		762	14.9	762	14.9	0.277	6.0	LOS A	2.8	22.0	0.45	0.42	0.45	44.7
All Vehicles		1396	17.3	1396	17.3	0.294	9.7	LOS A	3.3	25.8	0.54	0.49	0.54	39.1

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

* Critical Movement (Signal Timing)

Site: 401 [401_EXAM_Glendenning Rd x Woodstock Ave (Site Folder: Glendenning Rd)]

Network: 5 [EXAM_Glendenning x Woodstock (Network Folder: General)]

Existing AM
Glendenning Road and Woodstock Avenue
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Woodstock Avenue														
5	T1	15	21.4	15	21.4	0.030	6.1	LOS A	0.0	0.3	0.39	0.59	0.39	31.1
6	R2	6	50.0	6	50.0	0.030	10.5	LOS A	0.0	0.3	0.39	0.59	0.39	30.2
Approach		21	30.0	21	30.0	0.030	7.4	LOS A	0.0	0.3	0.39	0.59	0.39	30.8
NorthEast: Glendenning Road														
24b	L3	14	30.8	14	30.8	0.202	1.4	LOS A	0.3	2.5	0.07	0.59	0.07	34.5
26a	R1	493	14.5	493	14.5	0.202	5.2	LOS A	0.3	2.5	0.07	0.59	0.07	25.9
26b	R3	2	0.0	2	0.0	0.202	7.2	LOS A	0.3	2.5	0.08	0.60	0.08	26.4
Approach		508	14.9	508	14.9	0.202	5.1	LOS A	0.3	2.5	0.07	0.59	0.07	26.3
West: Woodstock Avenue														
10	L2	665	14.7	665	14.7	0.230	2.8	LOS A	0.5	4.1	0.07	0.45	0.07	31.4
11	T1	18	11.8	18	11.8	0.230	2.7	LOS A	0.5	4.0	0.06	0.45	0.06	41.7
Approach		683	14.6	683	14.6	0.230	2.8	LOS A	0.5	4.1	0.07	0.45	0.07	31.8
All Vehicles		1213	15.0	1213	15.0	0.230	3.9	LOS A	0.5	4.1	0.07	0.51	0.07	29.3

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

Site: 501 [501_EXAM_Glendenning Rd Signal (Site Folder: Glendenning Rd)]

Network: 5 [EXAM_Glendenning x Woodstock (Network Folder: General)]

Existing AM
Glendenning Road Signal
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 70 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: TCS Phase
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
North: Glendenning Road														
8	T1	508	14.9	508	14.9	* 0.286	11.0	LOS A	3.1	24.6	0.62	0.53	0.62	44.1
Approach		508	14.9	508	14.9	0.286	11.0	LOS A	3.1	24.6	0.62	0.53	0.62	44.1
All Vehicles		508	14.9	508	14.9	0.286	11.0	LOS A	3.1	24.6	0.62	0.53	0.62	44.1

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

* Critical Movement (Signal Timing)

USER REPORT FOR NETWORK SITE

All Movement Classes

Project: 21.182m01v02 600 Woodstock Ave, Rooty Hill **Template: Movement Summaries**

Site: 301 [301_EXAM_Kellogg Rd x Woodstock Ave (Site Folder: Glendenning Rd)] **Network: 16 [EXAM_Glendenning x Woodstock - 10 year (Network Folder: General)]**

Existing AM
Kellogg Road and Woodstock Avenue
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 70 seconds (Network User-Given Cycle Time)
Design Life Analysis (Final Year): Results for 10 years

Timings based on settings in the Network Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: TCS Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Kellog Road														
1	L2	56	43.2	56	43.2	0.111	22.5	LOS B	0.8	7.7	0.70	0.71	0.70	29.2
2	T1	3	0.0	3	0.0	* 0.242	27.6	LOS B	1.1	11.7	0.89	0.74	0.89	19.5
3	R2	56	61.4	56	61.4	0.242	33.8	LOS C	1.1	11.7	0.89	0.74	0.89	18.4
Approach		115	51.1	115	51.1	0.242	28.2	LOS B	1.1	11.7	0.80	0.73	0.80	24.3
East: Woodstock Avenue														
4	L2	105	25.6	105	25.6	0.382	15.9	LOS B	4.3	34.6	0.67	0.63	0.67	40.0
5	T1	545	12.7	545	12.7	* 0.382	12.7	LOS A	4.3	33.7	0.68	0.61	0.68	34.4
6	R2	6	0.0	6	0.0	0.023	18.6	LOS B	0.1	0.6	0.65	0.65	0.65	10.0
Approach		657	14.6	657	14.6	0.382	13.3	LOS A	4.3	34.6	0.68	0.61	0.68	35.5
West: Woodstock Avenue														
10	L2	15	0.0	15	0.0	0.352	11.7	LOS A	4.0	30.7	0.49	0.44	0.49	37.5
11	T1	811	12.3	811	12.3	0.352	6.2	LOS A	4.0	30.7	0.49	0.44	0.49	42.6
12	R2	103	37.5	103	37.5	* 0.274	16.3	LOS B	1.2	11.4	0.67	0.74	0.67	42.0
Approach		929	14.9	929	14.9	0.352	7.4	LOS A	4.0	30.8	0.51	0.47	0.51	42.4
All Vehicles		1701	17.3	1701	17.3	0.382	11.1	LOS A	4.3	34.6	0.60	0.54	0.60	37.4

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

* Critical Movement (Signal Timing)

Site: 401 [401_EXAM_Glendenning Rd x Woodstock Ave (Site Folder: Glendenning Rd)]

Network: 16 [EXAM_Glendenning x Woodstock - 10 year (Network Folder: General)]

Existing AM
Glendenning Road and Woodstock Avenue
Site Category: (None)
Roundabout
Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Woodstock Avenue														
5	T1	18	21.4	18	21.4	0.052	6.4	LOS A	0.0	0.4	0.42	0.62	0.42	30.7
6	R2	8	50.0	8	50.0	0.052	10.8	LOS A	0.0	0.4	0.42	0.62	0.42	29.8
Approach		26	30.0	26	30.0	0.052	7.7	LOS A	0.0	0.4	0.42	0.62	0.42	30.4
NorthEast: Glendenning Road														
24b	L3	17	30.8	17	30.8	0.373	1.4	LOS A	0.4	3.3	0.08	0.59	0.08	34.4
26a	R1	601	14.5	601	14.5	0.373	5.2	LOS A	0.4	3.3	0.08	0.59	0.08	25.8
26b	R3	3	0.0	3	0.0	0.373	7.2	LOS A	0.4	3.3	0.09	0.60	0.09	26.3
Approach		620	14.9	620	14.9	0.373	5.1	LOS A	0.4	3.3	0.08	0.59	0.08	26.2
West: Woodstock Avenue														
10	L2	811	14.7	811	14.7	0.282	3.0	LOS A	0.7	5.4	0.08	0.45	0.08	31.3
11	T1	22	11.8	22	11.8	0.282	2.7	LOS A	0.7	5.2	0.07	0.45	0.07	41.6
Approach		833	14.6	833	14.6	0.282	3.0	LOS A	0.7	5.4	0.08	0.45	0.08	31.7
All Vehicles		1478	15.0	1478	15.0	0.373	4.0	LOS A	0.7	5.4	0.09	0.51	0.09	29.2

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

Site: 501 [501_EXAM_Glendenning Rd Signal (Site Folder: Glendenning Rd)]

Network: 16 [EXAM_Glendenning x Woodstock - 10 year (Network Folder: General)]

Existing AM
Glendenning Road Signal
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 70 seconds (Network Site User-Given Phase Times)
Design Life Analysis (Final Year): Results for 10 years

Timings based on settings in the Network Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times specified by the user
Phase Sequence: TCS Phase
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
North: Glendenning Road														
8	T1	620	14.9	620	14.9	* 0.349	11.5	LOS A	3.9	31.1	0.65	0.55	0.65	43.7
Approach		620	14.9	620	14.9	0.349	11.5	LOS A	3.9	31.1	0.65	0.55	0.65	43.7
All Vehicles		620	14.9	620	14.9	0.349	11.5	LOS A	3.9	31.1	0.65	0.55	0.65	43.7

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

* Critical Movement (Signal Timing)

USER REPORT FOR NETWORK SITE

All Movement Classes

Project: 21.182m01v02 600 Woodstock Ave, Rooty Hill **Template: Movement Summaries**

Site: 302 [302_EXPM_Kellogg Rd x Woodstock Ave (Site Folder: Glendenning Rd)]

Network: 7 [EXPM_Glendenning x Woodstock (Network Folder: General)]

Existing PM
Kellogg Road and Woodstock Avenue
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 70 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: TCS Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Kellog Road														
1	L2	122	12.9	122	12.9	0.219	24.3	LOS B	1.9	14.6	0.76	0.75	0.76	30.4
2	T1	1	0.0	1	0.0	* 0.211	29.0	LOS C	1.0	8.4	0.91	0.74	0.91	18.8
3	R2	54	17.6	54	17.6	0.211	34.8	LOS C	1.0	8.4	0.91	0.74	0.91	17.7
Approach		177	14.3	177	14.3	0.219	27.5	LOS B	1.9	14.6	0.81	0.75	0.81	26.9
East: Woodstock Avenue														
4	L2	29	32.1	29	32.1	0.355	14.6	LOS B	4.4	32.5	0.64	0.57	0.64	41.3
5	T1	659	4.3	659	4.3	* 0.355	11.4	LOS A	4.4	32.5	0.64	0.56	0.64	36.3
6	R2	2	0.0	2	0.0	0.004	13.7	LOS A	0.0	0.2	0.54	0.60	0.54	12.5
Approach		691	5.5	691	5.5	0.355	11.5	LOS A	4.4	32.5	0.64	0.56	0.64	36.6
West: Woodstock Avenue														
10	L2	1	0.0	1	0.0	0.166	10.1	LOS A	1.5	12.1	0.39	0.33	0.39	40.3
11	T1	396	16.0	396	16.0	0.166	4.5	LOS A	1.5	12.1	0.39	0.33	0.39	46.4
12	R2	34	31.3	34	31.3	* 0.083	13.9	LOS A	0.3	3.0	0.56	0.68	0.56	43.8
Approach		431	17.1	431	17.1	0.166	5.3	LOS A	1.5	12.1	0.41	0.36	0.41	45.8
All Vehicles		1298	10.5	1298	10.5	0.355	11.6	LOS A	4.4	32.5	0.59	0.52	0.59	36.6

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

* Critical Movement (Signal Timing)

Site: 402 [402_EXPM_Glendenning Rd x Woodstock Ave (Site Folder: Glendenning Rd)]

Network: 7 [EXPM_Glendenning x Woodstock (Network Folder: General)]

Existing PM
Glendenning Road and Woodstock Avenue
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Woodstock Avenue														
5	T1	19	11.1	19	11.1	0.059	6.3	LOS A	0.1	0.5	0.42	0.65	0.42	29.3
6	R2	20	15.8	20	15.8	0.059	10.3	LOS A	0.1	0.5	0.42	0.65	0.42	29.0
Approach		39	13.5	39	13.5	0.059	8.4	LOS A	0.1	0.5	0.42	0.65	0.42	29.1
NorthEast: Glendenning Road														
24b	L3	5	60.0	5	60.0	0.334	1.4	LOS A	0.4	3.0	0.06	0.61	0.06	32.5
26a	R1	640	5.1	640	5.1	0.334	5.2	LOS A	0.4	3.2	0.06	0.61	0.06	25.9
26b	R3	11	60.0	11	60.0	0.334	7.2	LOS A	0.4	3.2	0.07	0.61	0.07	26.0
Approach		656	6.4	656	6.4	0.334	5.2	LOS A	0.4	3.2	0.06	0.61	0.06	26.0
West: Woodstock Avenue														
10	L2	409	15.7	409	15.7	0.169	2.8	LOS A	0.3	2.8	0.13	0.45	0.13	30.7
11	T1	13	16.7	13	16.7	0.169	2.8	LOS A	0.3	2.8	0.13	0.45	0.13	40.8
Approach		422	15.7	422	15.7	0.169	2.8	LOS A	0.3	2.8	0.13	0.45	0.13	31.2
All Vehicles		1117	10.2	1117	10.2	0.334	4.4	LOS A	0.4	3.2	0.10	0.55	0.10	27.9

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

Site: 502 [502_EXPM_Glendenning Rd Signal (Site Folder: Glendenning Rd)]

Network: 7 [EXPM_Glendenning x Woodstock (Network Folder: General)]

Existing PM
Glendenning Road Signal
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 70 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: TCS Phase
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
North: Glendenning Road														
8	T1	656	6.4	656	6.4	* 0.350	11.4	LOS A	4.2	30.8	0.65	0.56	0.65	43.7
Approach		656	6.4	656	6.4	0.350	11.4	LOS A	4.2	30.8	0.65	0.56	0.65	43.7
All Vehicles		656	6.4	656	6.4	0.350	11.4	LOS A	4.2	30.8	0.65	0.56	0.65	43.7

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

* Critical Movement (Signal Timing)

USER REPORT FOR NETWORK SITE

All Movement Classes

Project: 21.182m01v02 600 Woodstock Ave, Rooty Hill **Template: Movement Summaries**

Site: 302 [302_EXPM_Kellogg Rd x Woodstock Ave (Site Folder: Glendenning Rd)] **Network: 17 [EXPM_Glendenning x Woodstock - 10 year (Network Folder: General)]**

Existing PM
Kellogg Road and Woodstock Avenue
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 70 seconds (Network User-Given Cycle Time)
Design Life Analysis (Final Year): Results for 10 years

Timings based on settings in the Network Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: TCS Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Kellog Road														
1	L2	149	12.9	149	12.9	0.245	23.0	LOS B	2.2	17.3	0.74	0.75	0.74	31.1
2	T1	1	0.0	1	0.0	* 0.217	27.1	LOS B	1.2	9.9	0.89	0.74	0.89	19.5
3	R2	65	17.6	65	17.6	0.217	32.8	LOS C	1.2	9.9	0.89	0.74	0.89	18.5
Approach		216	14.3	216	14.3	0.245	26.0	LOS B	2.2	17.3	0.79	0.75	0.79	27.6
East: Woodstock Avenue														
4	L2	36	32.1	36	32.1	0.459	16.6	LOS B	4.7	35.0	0.71	0.63	0.71	39.7
5	T1	803	4.3	803	4.3	* 0.459	13.4	LOS A	4.8	35.0	0.72	0.63	0.72	34.0
6	R2	3	0.0	3	0.0	0.006	15.5	LOS B	0.0	0.2	0.59	0.61	0.59	11.4
Approach		842	5.5	842	5.5	0.459	13.5	LOS A	4.8	35.0	0.72	0.63	0.72	34.3
West: Woodstock Avenue														
10	L2	1	0.0	1	0.0	0.211	11.1	LOS A	2.1	16.5	0.44	0.38	0.44	38.8
11	T1	482	16.0	482	16.0	0.211	5.5	LOS A	2.1	16.5	0.44	0.37	0.44	44.2
12	R2	41	31.3	41	31.3	* 0.121	17.0	LOS B	0.5	4.3	0.65	0.70	0.65	41.7
Approach		525	17.1	525	17.1	0.211	6.4	LOS A	2.1	16.5	0.46	0.40	0.46	43.6
All Vehicles		1582	10.5	1582	10.5	0.459	12.9	LOS A	4.8	35.0	0.64	0.57	0.64	35.2

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

* Critical Movement (Signal Timing)

Site: 402 [402_EXPM_Glendenning Rd x Woodstock Ave (Site Folder: Glendenning Rd)]

Network: 17 [EXPM_Glendenning x Woodstock - 10 year (Network Folder: General)]

Existing PM
Glendenning Road and Woodstock Avenue
Site Category: (None)
Roundabout
Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Woodstock Avenue														
5	T1	23	11.1	23	11.1	0.084	6.8	LOS A	0.1	0.7	0.47	0.68	0.47	28.7
6	R2	24	15.8	24	15.8	0.084	10.8	LOS A	0.1	0.7	0.47	0.68	0.47	28.5
Approach		47	13.5	47	13.5	0.084	8.8	LOS A	0.1	0.7	0.47	0.68	0.47	28.6
NorthEast: Glendenning Road														
24b	L3	6	60.0	6	60.0	0.477	1.4	LOS A	1.2	9.0	0.07	0.61	0.07	32.5
26a	R1	780	5.1	780	5.1	0.477	5.2	LOS A	1.2	9.0	0.07	0.61	0.07	25.8
26b	R3	13	60.0	13	60.0	0.477	7.2	LOS A	1.0	7.1	0.08	0.61	0.08	25.9
Approach		799	6.4	799	6.4	0.477	5.2	LOS A	1.2	9.0	0.07	0.61	0.07	25.9
West: Woodstock Avenue														
10	L2	499	15.7	499	15.7	0.208	2.9	LOS A	0.4	3.5	0.15	0.45	0.15	30.5
11	T1	15	16.7	15	16.7	0.208	2.8	LOS A	0.4	3.5	0.15	0.45	0.15	40.6
Approach		515	15.7	515	15.7	0.208	2.9	LOS A	0.4	3.5	0.15	0.45	0.15	31.0
All Vehicles		1361	10.2	1361	10.2	0.477	4.5	LOS A	1.2	9.0	0.12	0.55	0.12	27.8

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

Site: 502 [502_EXPM_Glendenning Rd Signal (Site Folder: Glendenning Rd)]

Network: 17 [EXPM_Glendenning x Woodstock - 10 year (Network Folder: General)]

Existing PM
Glendenning Road Signal
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 70 seconds (Network Site User-Given Phase Times)
Design Life Analysis (Final Year): Results for 10 years

Timings based on settings in the Network Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times specified by the user
Phase Sequence: TCS Phase
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
North: Glendenning Road														
8	T1	799	6.4	799	6.4	* 0.468	12.4	LOS A	5.5	40.8	0.70	0.61	0.70	42.7
Approach		799	6.4	799	6.4	0.468	12.4	LOS A	5.5	40.8	0.70	0.61	0.70	42.7
All Vehicles		799	6.4	799	6.4	0.468	12.4	LOS A	5.5	40.8	0.70	0.61	0.70	42.7

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

* Critical Movement (Signal Timing)

USER REPORT FOR NETWORK SITE

All Movement Classes

Project: 21.182m01v02 600 Woodstock Ave, Rooty Hill — **Template: Movement Summaries**

Site: 303 [303_PRAM_Kellogg Rd x Woodstock Ave (Site Folder: Glendenning Rd)] — **Network: 9 [PRAM_Glendenning x Woodstock (Network Folder: General)]**

Proposed AM
Kellogg Road and Woodstock Avenue
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 70 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: TCS Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Kellog Road														
1	L2	49	40.4	49	40.4	0.104	23.9	LOS B	0.7	6.9	0.73	0.71	0.73	28.7
2	T1	2	0.0	2	0.0	* 0.246	29.6	LOS C	1.0	10.4	0.91	0.74	0.91	18.7
3	R2	49	57.4	49	57.4	0.246	35.8	LOS C	1.0	10.4	0.91	0.74	0.91	17.7
Approach		101	47.9	101	47.9	0.246	29.8	LOS C	1.0	10.4	0.82	0.73	0.82	23.6
East: Woodstock Avenue														
4	L2	89	24.7	89	24.7	0.295	14.2	LOS A	3.2	25.9	0.61	0.59	0.61	41.4
5	T1	447	12.7	447	12.7	* 0.295	11.0	LOS A	3.3	25.4	0.62	0.55	0.62	36.4
6	R2	5	0.0	5	0.0	0.015	15.7	LOS B	0.1	0.4	0.59	0.63	0.59	11.3
Approach		542	14.6	542	14.6	0.295	11.5	LOS A	3.3	25.9	0.62	0.56	0.62	37.5
West: Woodstock Avenue														
10	L2	13	0.0	13	0.0	0.280	10.5	LOS A	2.9	22.3	0.43	0.39	0.43	39.3
11	T1	674	12.2	674	12.2	0.280	5.0	LOS A	2.9	22.3	0.43	0.38	0.43	45.1
12	R2	87	36.1	87	36.1	* 0.199	14.0	LOS A	0.9	8.2	0.59	0.71	0.59	43.5
Approach		774	14.7	774	14.7	0.280	6.1	LOS A	2.9	22.3	0.45	0.42	0.45	44.6
All Vehicles		1417	17.0	1417	17.0	0.295	9.9	LOS A	3.3	25.9	0.54	0.49	0.54	39.0

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

* Critical Movement (Signal Timing)

Site: 403 [403_PRAM_Glendenning Rd x Woodstock Ave (Site Folder: Glendenning Rd)]

Network: 9 [PRAM_Glendenning x Woodstock (Network Folder: General)]

Proposed AM
Glendenning Road and Woodstock Avenue
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Woodstock Avenue														
5	T1	15	21.4	15	21.4	0.030	6.1	LOS A	0.0	0.3	0.39	0.59	0.39	31.1
6	R2	6	50.0	6	50.0	0.030	10.5	LOS A	0.0	0.3	0.39	0.59	0.39	30.2
Approach		21	30.0	21	30.0	0.030	7.4	LOS A	0.0	0.3	0.39	0.59	0.39	30.8
NorthEast: Glendenning Road														
24b	L3	16	26.7	16	26.7	0.208	1.4	LOS A	0.3	2.6	0.09	0.59	0.09	34.7
26a	R1	496	15.1	496	15.1	0.208	5.2	LOS A	0.3	2.6	0.09	0.59	0.09	25.7
26b	R3	2	0.0	2	0.0	0.208	7.2	LOS A	0.3	2.6	0.10	0.59	0.10	26.3
Approach		514	15.4	514	15.4	0.208	5.1	LOS A	0.3	2.6	0.09	0.59	0.09	26.2
West: Woodstock Avenue														
10	L2	668	15.1	668	15.1	0.234	2.9	LOS A	0.5	4.2	0.07	0.45	0.07	31.4
11	T1	26	8.0	26	8.0	0.234	2.6	LOS A	0.5	4.1	0.06	0.45	0.06	41.9
Approach		695	14.8	695	14.8	0.234	2.8	LOS A	0.5	4.2	0.07	0.45	0.07	32.1
All Vehicles		1229	15.3	1229	15.3	0.234	3.9	LOS A	0.5	4.2	0.08	0.51	0.08	29.4

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

Site: 503 [503_PRAM_Glendenning Rd Signal (Site Folder: Glendenning Rd)]

Network: 9 [PRAM_Glendenning x Woodstock (Network Folder: General)]

Proposed AM
Glendenning Road Signal
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 70 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: TCS Phase
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
North: Glendenning Road														
8	T1	514	15.4	514	15.4	* 0.290	11.0	LOS A	3.2	25.0	0.62	0.53	0.62	44.1
Approach		514	15.4	514	15.4	0.290	11.0	LOS A	3.2	25.0	0.62	0.53	0.62	44.1
All Vehicles		514	15.4	514	15.4	0.290	11.0	LOS A	3.2	25.0	0.62	0.53	0.62	44.1

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

* Critical Movement (Signal Timing)

USER REPORT FOR NETWORK SITE

All Movement Classes

Project: 21.182m01v02 600 Woodstock Ave, Rooty Hill — **Template: Movement Summaries**

Site: 304 [304_PRPM_Kellogg Rd x Woodstock Ave (Site Folder: Glendenning Rd)] — **Network: 8 [PRPM_Glendenning x Woodstock (Network Folder: General)]**

Proposed PM
Kellogg Road and Woodstock Avenue
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 70 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: TCS Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Kellog Road														
1	L2	123	13.7	123	13.7	0.222	24.3	LOS B	1.9	14.8	0.76	0.75	0.76	30.4
2	T1	1	0.0	1	0.0	* 0.217	29.0	LOS C	1.1	8.7	0.91	0.74	0.91	18.7
3	R2	55	19.2	55	19.2	0.217	34.8	LOS C	1.1	8.7	0.91	0.74	0.91	17.7
Approach		179	15.3	179	15.3	0.222	27.6	LOS B	1.9	14.8	0.81	0.75	0.81	26.8
East: Woodstock Avenue														
4	L2	31	34.5	31	34.5	0.360	14.7	LOS B	4.5	33.1	0.64	0.57	0.64	41.2
5	T1	667	4.3	667	4.3	* 0.360	11.4	LOS A	4.5	33.1	0.65	0.56	0.65	36.2
6	R2	2	0.0	2	0.0	0.004	13.7	LOS A	0.0	0.2	0.54	0.60	0.54	12.5
Approach		700	5.6	700	5.6	0.360	11.6	LOS A	4.5	33.1	0.65	0.57	0.65	36.5
West: Woodstock Avenue														
10	L2	1	0.0	1	0.0	0.166	10.1	LOS A	1.5	12.1	0.39	0.33	0.39	40.3
11	T1	396	16.0	396	16.0	0.166	4.5	LOS A	1.5	12.1	0.39	0.33	0.39	46.4
12	R2	35	33.3	35	33.3	* 0.087	13.9	LOS A	0.3	3.1	0.56	0.68	0.56	43.7
Approach		432	17.3	432	17.3	0.166	5.3	LOS A	1.5	12.1	0.41	0.36	0.41	45.8
All Vehicles		1311	10.8	1311	10.8	0.360	11.7	LOS A	4.5	33.1	0.59	0.52	0.59	36.5

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

* Critical Movement (Signal Timing)

Site: 404 [404_PRPM_Glendenning Rd x Woodstock Ave (Site Folder: Glendenning Rd)]

Network: 8 [PRPM_Glendenning x Woodstock (Network Folder: General)]

Proposed PM
Glendenning Road and Woodstock Avenue
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Woodstock Avenue														
5	T1	27	7.7	27	7.7	0.078	6.3	LOS A	0.1	0.6	0.42	0.65	0.42	29.7
6	R2	22	14.3	22	14.3	0.078	10.3	LOS A	0.1	0.6	0.42	0.65	0.42	29.3
Approach		49	10.6	49	10.6	0.078	8.1	LOS A	0.1	0.6	0.42	0.65	0.42	29.5
NorthEast: Glendenning Road														
24b	L3	5	60.0	5	60.0	0.344	1.4	LOS A	0.4	3.0	0.06	0.61	0.06	32.5
26a	R1	641	5.3	641	5.3	0.344	5.2	LOS A	0.4	3.2	0.06	0.61	0.06	25.9
26b	R3	11	60.0	11	60.0	0.344	7.2	LOS A	0.4	3.2	0.07	0.61	0.07	26.0
Approach		657	6.6	657	6.6	0.344	5.2	LOS A	0.4	3.2	0.06	0.61	0.06	26.0
West: Woodstock Avenue														
10	L2	411	15.9	411	15.9	0.170	2.8	LOS A	0.4	2.8	0.14	0.45	0.14	30.6
11	T1	13	16.7	13	16.7	0.170	2.8	LOS A	0.4	2.8	0.13	0.45	0.13	40.8
Approach		423	15.9	423	15.9	0.170	2.8	LOS A	0.4	2.8	0.14	0.45	0.14	31.1
All Vehicles		1129	10.3	1129	10.3	0.344	4.4	LOS A	0.4	3.2	0.11	0.55	0.11	28.0

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

Site: 504 [504_EXPM_Glendenning Rd Signal (Site Folder: Glendenning Rd)]

Network: 8 [PRPM_Glendenning x Woodstock (Network Folder: General)]

Proposed PM
Glendenning Road Signal
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 70 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: TCS Phase
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Vehicle Movement Performance

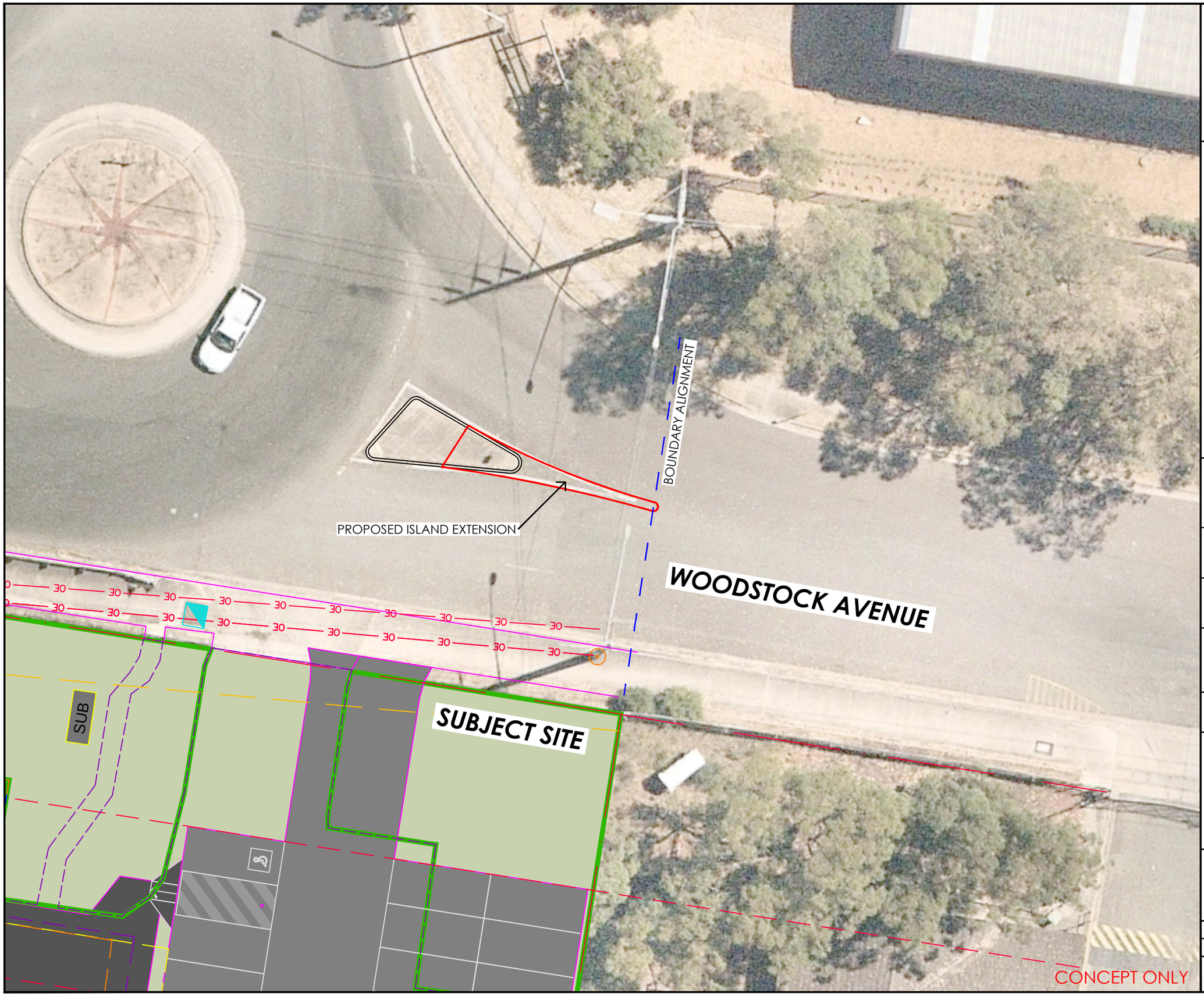
Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
North: Glendenning Road														
8	T1	657	6.6	657	6.6	* 0.351	11.5	LOS A	4.2	30.9	0.65	0.56	0.65	43.7
Approach		657	6.6	657	6.6	0.351	11.5	LOS A	4.2	30.9	0.65	0.56	0.65	43.7
All Vehicles		657	6.6	657	6.6	0.351	11.5	LOS A	4.2	30.9	0.65	0.56	0.65	43.7

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

* Critical Movement (Signal Timing)

APPENDIX D

Concept Plan



Notes:

This drawing is prepared for information purposes only. It is not to be used for construction.

TRAFFIX is responsible for vehicle swept path diagrams and/or drawing mark-ups only. Base drawing prepared by others.

Vehicle swept path diagrams prepared using computer generated turning path software and associated CAD drawing platforms. Vehicle data based upon relevant Australian Standards (*AS/NZS 2890.1:2004 Parking facilities - Off-street car parking*, and/or *AS2890.2:2002 Parking facilities - Off-street commercial vehicle facilities*). These standards embody a degree of tolerance, however the vehicle characteristics in these standards represent a suitable design vehicle and do not account for all variations in vehicle dimensions / specifications and/or driver ability or behaviour.

Rev.	Revision Note	By.	Date
A	Concept Plan	BL	20-12-21

Swept Path Legend

- Wheel Path
- Vehicle Body Envelope
- Clearance Envelope (300mm)

Architect
nettletontribe

Client
Cleanaway

Scale / Plan Orientation

0 2 4 6 8m
1:200 @ A3

Project Description
600 Woodstock Avenue
ROOTY HILL NSW

Drawing Prepared By

TRAFFIX
TRAFFIC & TRANSPORT PLANNERS

Suite 2.08, 50 Holt Street
Surry Hills, NSW 2010
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Drawing Title
CONCEPT DESIGN
PROPOSED SPLITTER ISLAND EXTENSION
WOODSTOCK AVENUE

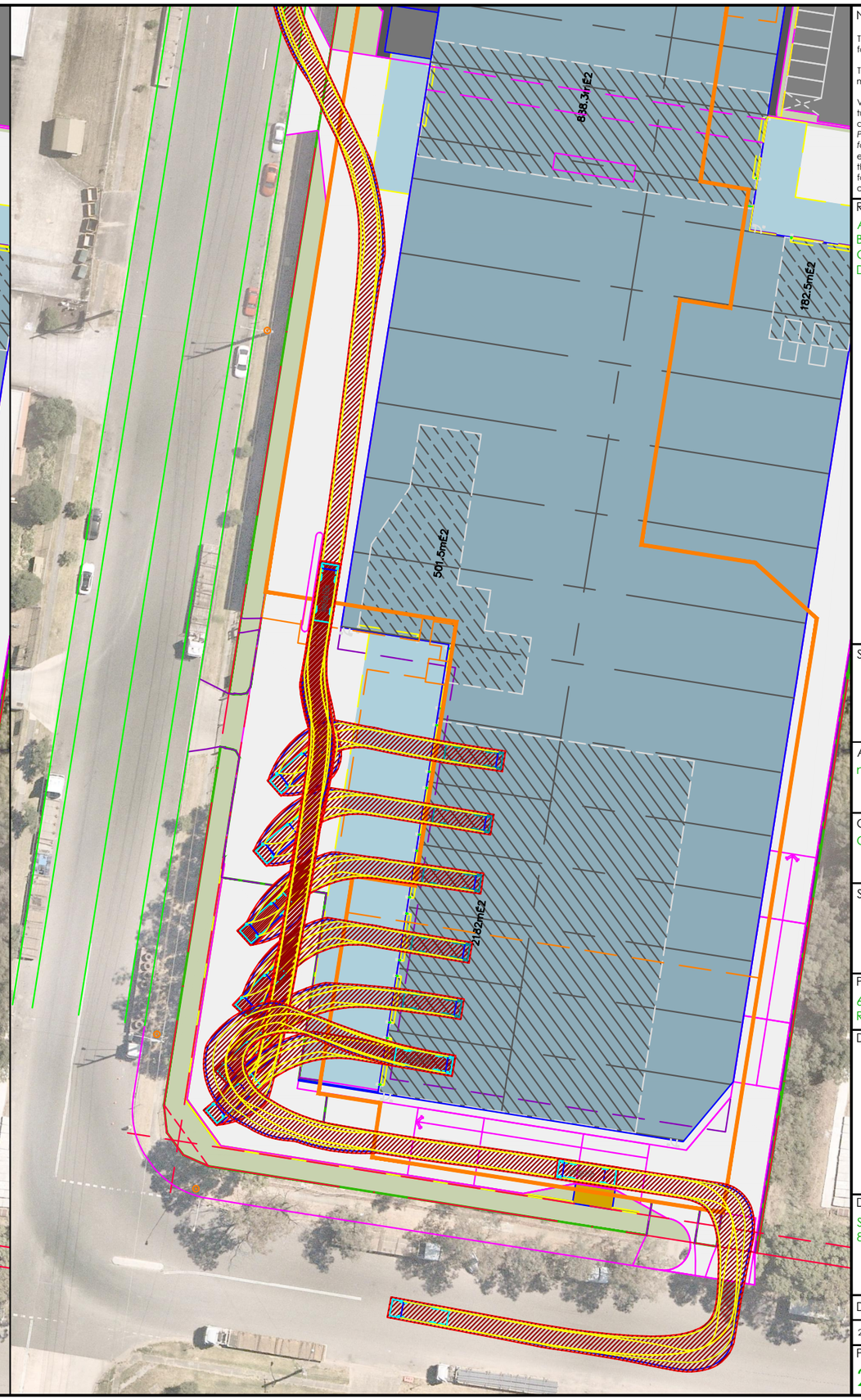
Drawn:	Checked:	Date:
BL	BL	20-12-21

21.182d04v01 TRAFFIX Final DA Swept Path Analysis.dwg

Project No.	Drawing Phase	Drawing No.	Rev.
21.182	-	SK.01	A

APPENDIX E

Swept Path Analysis



Notes:

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TRAFFIX is responsible for vehicle swept path diagrams and/or drawing mark-ups only. Base drawing prepared by others.

Vehicle swept path diagrams prepared using computer generated turning path software and associated CAD drawing platforms. Vehicle data based upon relevant Australian Standards (*AS/NZS 2890.1:2004 Parking facilities - Off-street car parking*, and/or *AS2890.2:2002 Parking facilities - Off-street commercial vehicle facilities*). These standards embody a degree of tolerance, however the vehicle characteristics in these standards represent a suitable design vehicle and do not account for all variations in vehicle dimensions / specifications and/or driver ability or behaviour.

Rev.	Revision Note	By.	Date
A	Initial Design Review	BL	21-04-21
B	Design Review	BL	03-05-21
C	Swept Path Analysis	BL	24-08-21
D	Swept Path Analysis	BL	20-12-21

Swept Path Legend

- Wheel Path
- Vehicle Body Envelope
- Clearance Envelope (300mm)

Architect
nettletontribe

Client
Cleanaway

Scale / Plan Orientation

0 7.5 15 22.5 30m
1:750 @ A3

Project Description
600 Woodstock Avenue
ROOTY HILL NSW

Drawing Prepared By

TRAFFIX
TRAFFIC & TRANSPORT PLANNERS

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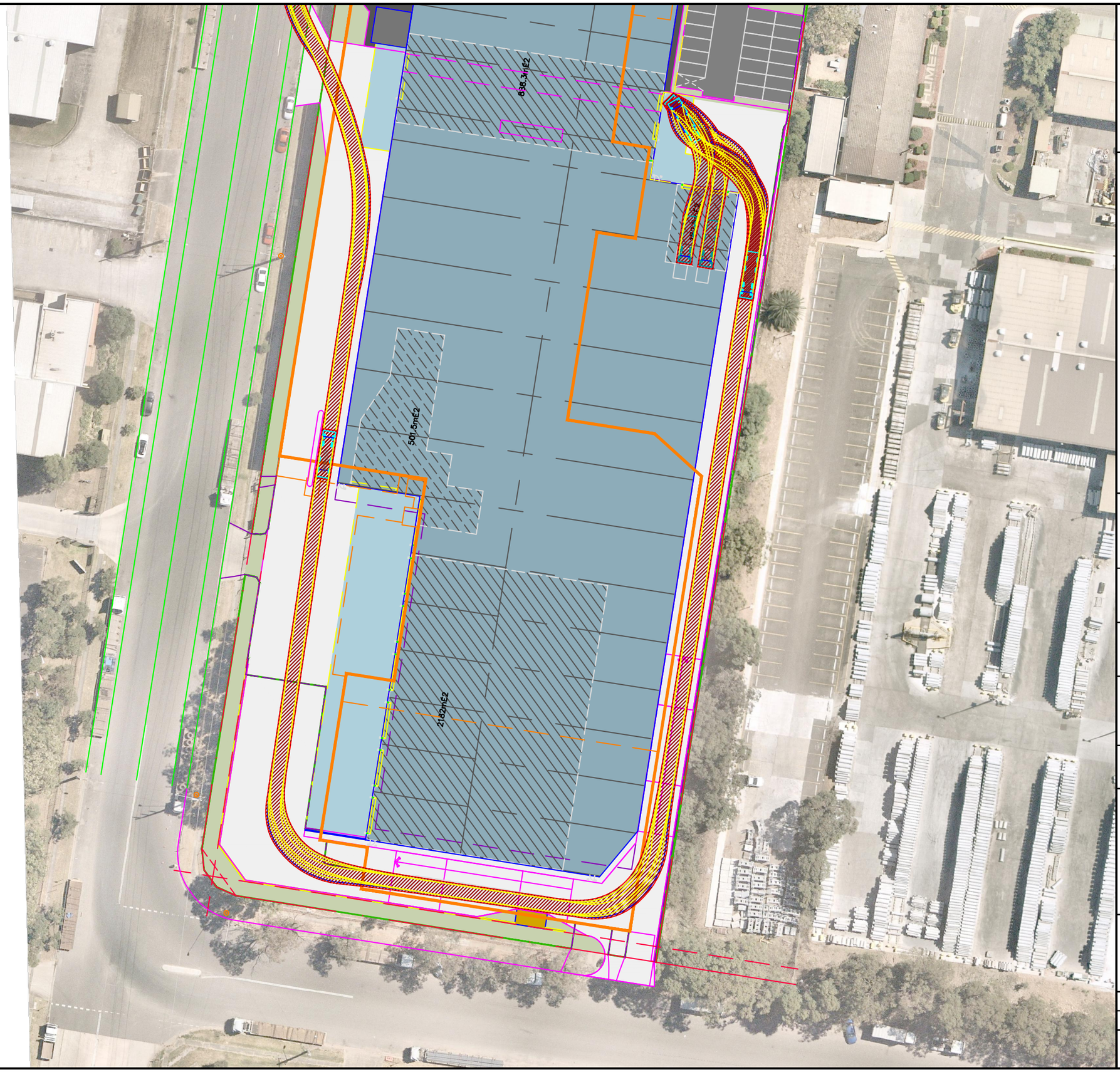
w: www.traffix.com.au

Drawing Title
Swept Path Analysis
8.625m long Rigid Vehicle

Drawn:	Checked:	Date:
BL	-	22-04-21

21.182d04v01 TRAFFIX Final DA Swept Path Analysis.dwg

Project No.	Drawing Phase	Drawing No.	Rev.
21.182	DA	TX.01	D



Notes:

This drawing is prepared for information purposes only. It is not to be used for construction.

TRAFFIX is responsible for vehicle swept path diagrams and/or drawing mark-ups only. Base drawing prepared by others.

Vehicle swept path diagrams prepared using computer generated turning path software and associated CAD drawing platforms. Vehicle data based upon relevant Australian Standards (*AS/NZS 2890.1:2004 Parking facilities - Off-street car parking*, and/or *AS2890.2:2002 Parking facilities - Off-street commercial vehicle facilities*). These standards embody a degree of tolerance, however the vehicle characteristics in these standards represent a suitable design vehicle and do not account for all variations in vehicle dimensions / specifications and/or driver ability or behaviour.

Rev.	Revision Note	By.	Date
A	Initial Design Review	BL	21-04-21
B	Design Review	BL	03-05-21
C	Swept Path Analysis	BL	24-08-21
D	Swept Path Analysis	BL	20-12-21

Swept Path Legend

- Wheel Path
- Vehicle Body Envelope
- Clearance Envelope (300mm)

Architect
nettletontribe

Client
Cleanaway

Scale / Plan Orientation

0 7.5 15 22.5 30m
1:750 @ A3

Project Description
600 Woodstock Avenue
ROOTY HILL NSW

Drawing Prepared By

TRAFFIX
TRAFFIC & TRANSPORT PLANNERS

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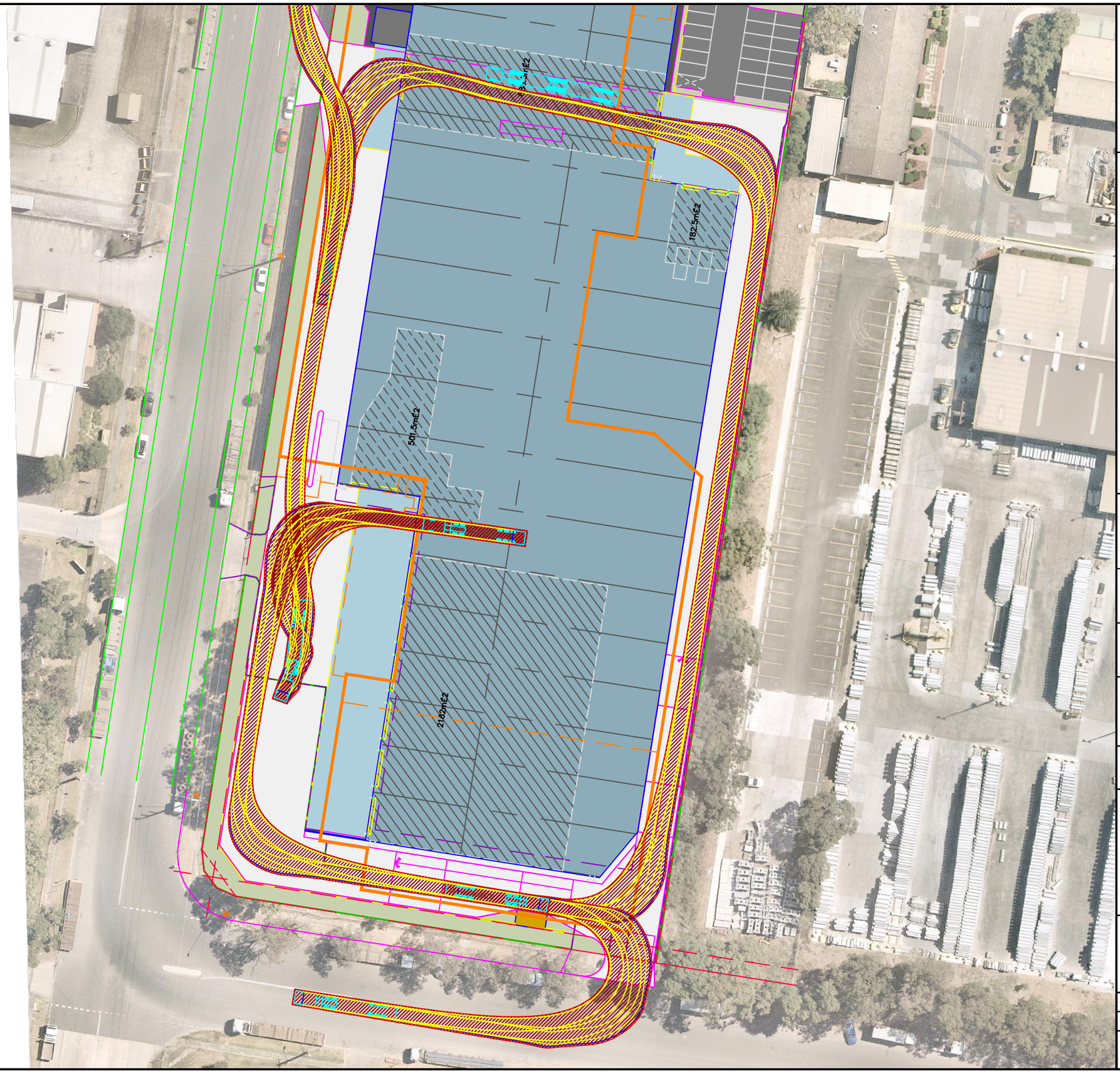
Drawing Title
Swept Path Analysis
9.06m long Rigid Vehicle

Drawn:	Checked:	Date:
BL	-	22-04-21

21.182d04v01 TRAFFIX Final DA Swept Path Analysis.dwg

Project No.	Drawing Phase	Drawing No.	Rev.
21.182	DA	TX.02	D



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Rev.	Revision Note	By.	Date
A	Initial Design Review	BL	21-04-21
B	Design Review	BL	03-05-21
C	Swept Path Analysis	BL	24-08-21
D	Swept Path Analysis	BL	20-12-21

Swept Path Legend

- Wheel Path
- Vehicle Body Envelope
- Clearance Envelope (300mm)

Architect
nettletontribe

Client
Cleanaway

Scale / Plan Orientation

0 7.5 15 22.5 30m
1:750 @ A3

Project Description
600 Woodstock Avenue
ROOTY HILL NSW

Drawing Prepared By

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TRAFFIC & TRANSPORT PLANNERS

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Drawing Title
Swept Path Analysis
20m long Articulated Vehicle

Drawn:	Checked:	Date:
BL	-	22-04-21

21.182d04v01 TRAFFIX Final DA Swept Path Analysis.dwg

Project No.	Drawing Phase	Drawing No.	Rev.
21.182	DA	TX.03	D

Notes:

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Rev.	Revision Note	By.	Date
A	Initial Design Review	BL	21-04-21
B	Design Review	BL	03-05-21
C	Swept Path Analysis	BL	24-08-21
D	Swept Path Analysis	BL	20-12-21

Swept Path Legend

- Wheel Path
- Vehicle Body Envelope
- Clearance Envelope (300mm)

Architect
nettletontribe

Client
Cleanaway

Scale / Plan Orientation

0 7.5 15 22.5 30m
1:750 @ A3

Project Description
600 Woodstock Avenue
ROOTY HILL NSW

Drawing Prepared By

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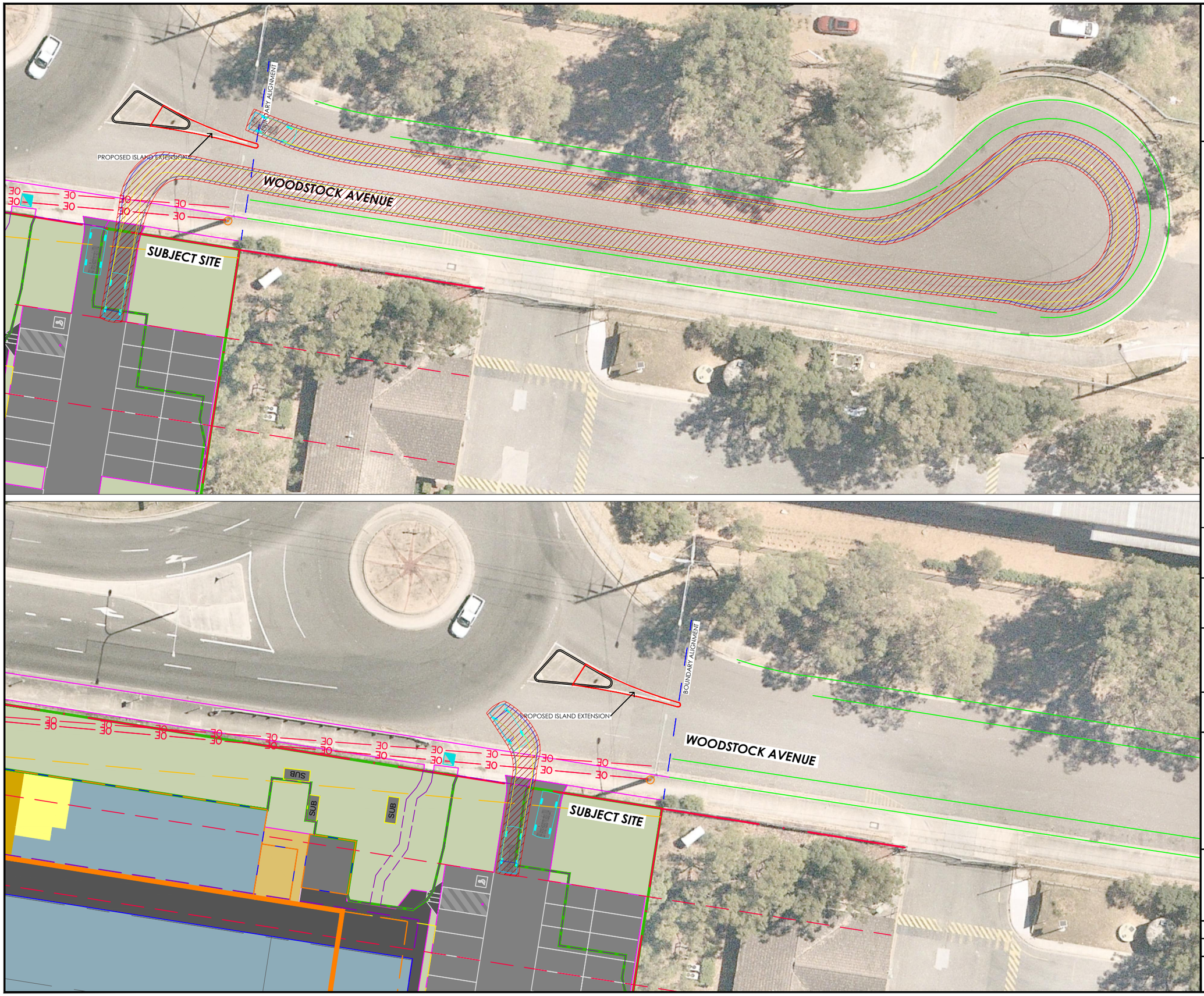
Drawing Title
Swept Path Analysis
26m long B-Double Vehicle

Drawn:	Checked:	Date:
BL	-	22-04-21

21.182d04v01 TRAFFIX Final DA Swept Path Analysis.dwg

Project No.	Drawing Phase	Drawing No.	Rev.
21.182	DA	TX.04	D



Notes:

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Vehicle swept path diagrams prepared using computer generated turning path software and associated CAD drawing platforms. Vehicle data based upon relevant Australian Standards (*AS/NZS 2890.1:2004 Parking facilities - Off-street car parking*, and/or *AS2890.2:2002 Parking facilities - Off-street commercial vehicle facilities*). These standards embody a degree of tolerance, however the vehicle characteristics in these standards represent a suitable design vehicle and do not account for all variations in vehicle dimensions / specifications and/or driver ability or behaviour.

Rev.	Revision Note	By.	Date
A	Initial Design Review	BL	21-04-21
B	Design Review	BL	03-05-21
C	Swept Path Analysis	BL	24-08-21
D	Swept Path Analysis	SW	09-02-21

Swept Path Legend

- Wheel Path
- Vehicle Body Envelope
- Clearance Envelope (300mm)

Architect
nettletontribe

Client
Cleanaway

Scale / Plan Orientation

0 7.5 15 22.5 30m

1:750 @ A3

Project Description
600 Woodstock Avenue
ROOTY HILL NSW

Drawing Prepared By

TRAFFIX
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Drawing Title
Swept Path Analysis
Carpark Access
B99 Design Vehicles

Drawn:	Checked:	Date:
SW	BL	09-02-21

21.182d04v02 TRAFFIX Final DA Swept Path Analysis.dwg

Project No.	Drawing Phase	Drawing No.	Rev.
21.182	DA	TX.05	D