Technical report K

Traffic and transport assessment report

Cleanaway & Macquarie Capital

Western Sydney Energy and Resource Recovery Centre

Traffic and Transport Assessment Report

WSERRC-ARU-SYD-TTEM-RPT-0001

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Executive summary

The Western Sydney Energy and Resource Recovery Centre is located at 339 Wallgrove Road in Eastern Creek, NSW (Lot 1 DP 1059698) which is in the Blacktown local government area (LGA). The site is in the Wallgrove Precinct of the Western Sydney Parklands (WSP) Plan of Management. The plot is adjacent to the M7 and connects to the wider road network via the Austral Bricks Road and Wallgrove Road. It is expected these would be the main roads used by vehicles accessing the proposal.

Access via public transport is possible using bus stops on Wallgrove Road which are served by the 738 and 835 bus services. A shared path also runs along the east side of the M7 and connects to Austral Bricks Road enabling cycling to the site via a segregated facility.

A range of legislative documentation was considered when developing the assessment including:

- Guide to Traffic Generating Development (RTA)
- Future Transport 2056 (GSC)
- NSW Government's Freight and Ports Plan 2018-2023
- Blacktown Development Control Plan (Blacktown Council 2015)

The assessment has considered other future infrastructure schemes in the vicinity of the proposal and the impacts they may have. This includes the Gazcorp Industrial Estate (SSD 5248), on the western side of Wallgrove Road, which will generate a significant amount of traffic in both network peak hours. To accommodate this uplift this SSDA proposes to add a western arm to the Wallgrove Road / Austal Bricks Road intersection and signalise it. This impact assessment has therefore considered the impact of the traffic generated by the proposal on the intersection arrangement proposed by the Gazcorp industrial Estate in 2021.

In the peak construction period there are expected to be 75 two-way construction vehicle movements and 600 workers on site. It is expected 25% of workers will car share or arrive in construction vehicles. Parking will be provided for all construction workers on site to minimise the impact on surrounding streets. The CTMP provides more detailed information on traffic management relating to the construction phase (Appendix A).

In operation the proposal is expected to generate 236 two-way trips daily with 33 occurring in the peak hour between 09:00-10:00. This consists of servicing, staff and visitor vehicles. To reduce the number of residual waste vehicles visiting the site it is estimated 50% of waste will be delivered to the facility from the Erskine Park Transfer facility in vehicles with large loading capacities (up to 20 tonnes).

The estimated traffic volumes were applied to the Gazcorp 2021 intersection layout to understand the impact of the proposal on this intersection in construction and operation. The results of the traffic modelling are presented in Table 1.

Table 1: Traffic modelling results

Scenario		Total intersection			Austral Bricks approach	
		Average delay (s)	Level of Service	Degree of saturation	Average delay (s)	95th percentile queue (m)
2021 Gazcorp	AM	37.4	C	0.925	70.3	19
	PM	36.5	C	0.864	55.9	24
2021 Gazcorp + WSERRC construction	AM	36.6	C	0.926	72.4	26
	PM	37.7	C	0.864	69.0	72
2021 Gazcorp +WSERRC operation	AM	37.3	C	0.925	70.3	19
	PM	36.6	C	0.864	57.2	34

The modelling results indicate that despite the uplift in traffic in construction and operation relating to the proposal the intersection will continue to operate with a Level of Service C.

In most scenarios the queuing and average delay on the Austral Bricks Road increases, however, the 95th percentile queue will only impede the access to the site in the PM construction scenario. This impact is considered acceptable as the peak construction is only programmed to last 3 months. Despite this queue vehicles would still be able to egress the site without major delays in most cases.

In some AM scenarios the average delay actually improves as vehicle volumes added to the left turn into Austral Bricks Road will experience minimal delays.

The existing access will be upgraded to accommodate two-way B-Double movements. This access is approximately 50m east of the Wallgrove Road / Austral Bricks Road intersection and will operate as a give-way intersection. Traffic modelling has confirmed the proposed arrangement will have suitable capacity to accommodate the expected vehicle movements in construction and operation.

A paved path into the site for pedestrians and cyclists will also be provided.

The site layout has been designed to separate servicing vehicle movements from staff and visitors, to maintain safety for these users. All servicing vehicles will circulate the facility in a clockwise direction allowing a large number of vehicles to queue within the extents of the site and avoid any queuing onto the public road network. It is estimated the three weighbridges and ten tipping bays will have sufficient capacity to accommodate peak servicing vehicle volumes.

40 parking spaces will be provided within the site for FTE staff. In addition to this 4 coach parking spaces and 10 car spaces will be provided to support the visitor centre and contractors visiting the Energy-from-waste facility on an irregular basis.

Mitigation measures will be applied to reduce traffic impacts of the facility and encourage sustainable travel patterns including:

- Developing a Construction Traffic Management Plan which uses shift patterns and encourages car sharing;
- Managing vehicle movements to and from the site including queuing servicing vehicles within the extents of the site;
- Implementing a Green Travel Plan;
- Providing cycle parking, end of trip facilities and information on the M7 shared path; and
- Using coaches to transport groups of visitors to the site.

Contents

List of appendices

Environmental assessment requirements

The below tables list the Secretary's Environmental Assessment Requirements (SEARs) and agency responses relevant to traffic and transport and where they are addressed in this report.

Table 2: SEARS – Traffic and Transport

Assessment Requirements	Reference in this technical paper
A quantitative traffic impact assessment prepared in accordance with relevant Roads and Maritime Services guidelines that assesses both construction and operational traffic.	Section 4.1
Daily and peak traffic movements likely to be generated by the proposed development during construction and operation, including consideration of cumulative traffic impacts at key intersections using SIDRA or similar traffic model and the need (and associated funding) for road improvement works (if required).	Section 4
An assessment of impacts on the intersection of Wallgrove Road and the Austral Bricks Road (Unnamed).	Section 4
Details of the proposed site access / egress and parking provisions, including compliance with the requirements of the relevant Australian Standards (i.e. turn paths, sight distance requirements, aisle widths, etc.).	Section 4.2 and Appendix B
Detailed plans of the proposed layout of the internal road network, heavy and light vehicle traffic movements and parking on site in accordance with the relevant Australian Standards.	Section 4.4
Identification of the truck routes between waste source locations and the site for fuel deliveries, and between the site and potential waste disposal sites for waste fuel products.	Section 4.5.3
Details of the types of material being transported and whether the material would be classified as dangerous goods under the Australian Dangerous Goods Code.	Technical report J (WSERRC-ARU-SYD-ENRI-RPT-0001)
Consideration of the NSW Government's Freights and Ports Plan 2018 – 2023.	Section 3.1.1
A draft construction traffic management plan.	WSERRC-ARU-SYD-TTEM-RPT-0002 (Appendix A)
An assessment of the accessibility of the development by public and active transport, including details of measures to prevent detrimental impacts on any bike and active transport routes in the vicinity of the site, the potential for implementing a location-specific sustainable travel plan.	Section 2 and 5
Describe how waste would be treated, stored, used, disposed of and handled on site, and transported to and from the site, and the potential impacts associated with these issues, including current and future off-site waste disposal methods.	Section 4.3.3.1 and Technical Report C (WSERRC-ARU-SYD-WEWM-RPT-0001)

Table 3: Blacktown City Council submission – Traffic and Transport

Assessment Requirements	Reference in this technical paper
Detail access arrangements at all stages of construction and measures to mitigate any associated pedestrian, cycleway or traffic impacts.	WSERRC-ARU-SYD-TTEM-RPT-0002 (Appendix A)
A traffic report should be submitted that covers traffic movements in and out of the site and its impact on the existing and future road network.	Section 4
Detail access arrangements at all stages of operation and measures to mitigate any associated traffic impacts.	Section 4.2
Demonstrate how users of the development will be able to make travel choices that support the achievement of State Plan targets.	Section 5.2
Detail existing pedestrian and cycle movements within the vicinity of the site and determine the adequacy of the proposal to meet the likely future demand for increased public transport and pedestrian and cycle access.	Section 2
Describe the measures to be implemented to promote sustainable means of transport, including public transport usage and pedestrian and bicycle linkages, in addition to addressing the potential for implementing a location specific sustainable travel plan.	Section 5.2
Detail the proposed transportation of hazardous goods from the plant.	Technical report J (WSERRC-ARU-SYD-ENRI-RPT-0001)
Demonstrate the provision of sufficient on-site car parking having regard to the availability of public transport.	Section 4.4.3
Estimate the total daily and peak hour trips generated by the proposed development, including accurate details of the current and future daily vehicle movements. Assess the impacts of the traffic generated on the local road network, including intersection capacity and any potential need for upgrading or road works Relevant policies and guidelines are: • RMS Guide to Traffic Generating Development • EIS Guidelines for Road and Related Facilities (DPIE) RMS Walking and Cycling Program Guidelines.	Section 4.1

Table 4: Fairfield City Council submission – Traffic and Transport

Assessment Requirements	Reference in this technical paper
The existing access road to the site shall be upgraded to accommodate the volume and types of vehicles proposed to service the development. The relevant authorities shall be consulted in regard to the upgrade to the access road.	Section 4.2
Adequate on-site parking shall be provided for staff and visitors. Also, on- site parking to be provided for heavy vehicles.	Section 4.4
No off-street parking and queuing of waste delivery vehicles onto the public road will be permitted.	Section 4.4

The available clear height from the access road off Wallgrove Road and M7 needs to be checked in regard to permitting use of heavy vehicles to service the subject development.	Section 2.1
Approval shall be obtained from the Roads and Maritime Services and relevant Councils in regard to servicing the development by B-Double vehicles.	RMS have been consulted on the proposal throughout the development of the EIS

Table 5: RMS submission – Traffic and Transport

Assessment Requirements	Reference in this technical paper
Roads and Maritime require the following issues to be included in the transport and traffic impact assessment of the proposed development: Daily and peak traffic movements likely to be generated by the proposed development including the impact on nearby intersections and the need/associated funding for upgrading or road improvement works (if required). The key intersections to be examined/modelled include: • Wallgrove Road / Unnamed Road (also known as Austral Bricks Road) The applicant is advised that this intersection is being upgraded to a signalised intersection and as such the applicant is to include the signalised intersection in their assessment.	Section 4
Details of the proposed accesses and the parking provisions associated with the proposed development including compliance with the requirements of the relevant Australian Standards (ie: turn paths, sight distance requirements, aisle widths, etc) and relevant parking codes. Swept path plans need to be provided.	Section 4.2 and 4.4
Details of service vehicle movements (including vehicle type and likely arrival and departure times).	Section 4
Roads and Maritime requires the environmental assessment report to assess the implications of the proposed development for non-car travel modes (including public transport use, walking and cycling); the potential for implementing a location-specific sustainable travel plan and the provision of facilities to increase the non-car mode share for travel to and from the site. This will entail an assessment of the accessibility of the development site by public transport.	Section 5

Table 6: TfNSW submission – Traffic and Transport

Assessment Requirements	Reference in this technical paper
The relevant documents have been reviewed and TfNSW advises that the following should be addressed within the Environmental Impact Statement (EIS): Consideration of the NSW Government's Freights and Ports Plan 2018 – 2023.	Section 3.1.1.2

A qualitative Traffic Impact Assessment which details all daily and peak traffic and transport movements likely to be generated during the construction and operation of the development.	Section 4
Details of the current daily and peak hour vehicle, public transport and pedestrian and bicycle movements and existing traffic and transport facilities provided on the road network located adjacent to the proposed development.	Section 4
An assessment of the operation of existing and future transport networks including public transport, pedestrian and bicycle provision and their ability to accommodate the forecast number of trips to and from the development.	Section 4
Details of the type of heavy vehicles likely to be used during the operation of the development and the impacts of heavy vehicles on nearby intersections.	Section 4
Details of access to, from and within the site from the road network including intersection location, design and the impacts of heavy vehicles on nearby intersections.	Section 4
Details of access to, from and within the site from the road network including intersection location, design and sight distance.	Section 4.2 and Appendix B
Impact of the proposed development on existing and future public transport and walking and cycling infrastructure within and surrounding the site, including an assessment of the adequacy of public transport, pedestrian and bicycle provisions to meet future demand.	Section 4
An assessment of the existing and future performance of key intersections providing access to the site, and any upgrades required as a result of the development.	Section 4.5
An assessment of predicted impacts on road safety and the capacity of the road network to accommodate the development.	Section 4.5
Plans of any road upgrades or any new roads required for the development, if necessary.	Section 4
Demonstrate the measures to be implemented to encourage employees of the development to make sustainable travel choices, including walking, cycling, public transport and car sharing.	Section 5
Appropriate provision, design and location of on-site bicycle parking, and how bicycle provision will be integrated with the existing bicycle network.	Section 4.4 and 5
Details of the proposed number of car parking spaces and compliance with appropriate parking codes and justify the level of car parking provided on the site.	Section 4.4
Details of access and parking arrangements for emergency vehicles.	Section 4.3
Detailed plans of the proposed layout of the international road network and parking provision on-site in accordance with relevant Australian Standards.	Section 4.4 and Appendix C
Details of any likely dangerous goods to be transported on arterial and local roads to and from the site, if any, and the preparation of an incident management strategy, if necessary.	Technical report J (WSERRC-ARU-SYD-ENRI-RPT-0001)
The existing and proposed pedestrian and bicycle routes and end of trip facilities within the vicinity of and surrounding the site and to public transport facilities as well as measures to maintain road and personal safety in line with CPTED principles.	Section 2.2 and 5

The preparation of a draft Construction Traffic Management Plan which include: • Details of vehicle routes, number of trucks, hours of operation, access management and traffic control measures for all stages of construction. • Assessment of cumulative impacts associated with other construction activities. • An assessment of road safety and key intersections. • Details of anticipated peak hour and daily truck movements to and from the site. • Details of access arrangements for workers to and from the site, emergency vehicles and service vehicle movements. • Details of temporary cycling and pedestrian access during constructions. An assessment of traffic and transport impacts during construction and how these impacts will be mitigated for any associated traffic, pedestrians, cycling and public transport operations.	WSERRC-ARU-SYD-TTEM-RPT-0002 (Appendix A)

Table 7: Water NSW submission – Traffic and Transport

Assessment Requirements	Reference in this technical paper
Traffic - WaterNSW expect that the current Pipeline configuration will require augmentation to cater for the increasing demand for Sydney's drinking water supply, and that the Pipelines adjacent to this property (and along the length of the corridor) will eventually be replaced. No timeframes can be provided. This could cause access difficulties into the subject site for a significant length of time that would need to be carefully considered. In addition, the current access road into the property is not rated for heavy vehicles. A detailed traffic impact assessment should be included in the EIS.	Section 4.2

Abbreviations and glossary

Abbreviations	
CTMP	Construction Traffic Management Plan
C&I	Commercial and Industrial
EfW	Energy-from-waste
HGV	Heavy Goods Vehicle
IBA	Incinerator Bottom Ash
FGTr	Flue Gas Treated residues
MSW	Municipal solid waste
Proposal (the)	The purpose of the proposal is to build an energy-from-waste (EfW) facility that can generate up to 58 megawatts (MW) of power by thermally treating up to 500,000 tonnes per year of residual municipal solid waste (MSW) and residual commercial and industrial (C&I) waste streams that would otherwise be sent to landfill.
SSDA	State Significant Development Application
WSERRC	Western Sydney Energy and Resource Recovery Centre

1 Introduction

This Chapter introduces the proposal and applicant including key aspects relating to traffic and transport while describing the purpose and structure of this report.

1.1 Proposal description

Cleanaway and Macquarie Capital are jointly developing an energy-from-waste (EfW) facility known as the Western Sydney Energy and Resource Recovery Centre (WSERRC) (the proposal).

The proposal will be designed to thermally treat up to 500,000 tonnes per year of residual Municipal Solid Waste (MSW) and residual Commercial and Industrial (C&I) waste streams that would otherwise be sent to landfill. This process would generate up to 58 megawatts (MW) of base load electricity some of which would be used to power the facility itself with the remaining 55MW exported to the grid. The proposal involves the building of all onsite infrastructure needed to support the facility including site utilities, internal roads, weighbridges, parking and hardstand areas, storm water infrastructure, fencing and landscaping.

The proposal site is located at 339 Wallgrove Road in Eastern Creek, NSW (Lot 1 DP 1059698) which is in the Blacktown local government area (LGA). The site is in the Wallgrove Precinct of the Western Sydney Parklands (WSP) Plan of Management.

The 8.23ha site is divided by a small strip of land not part of the proposal site, resulting in a 2.04ha northern section and a 6.19ha southern section. This dividing strip is part of the adjacent lot and includes a right of carriageway benefitting the proposal site allowing vehicles to move between the two parts of the site. The proposal area will be fully contained in the 6.19ha portion of the site. Works to occur on the 2.04 ha northern section of the site include the clearing of weeds and exotic vegetation within the existing overland flow channel which is confined to the eastern section of this parcel of land. The northern section will also be used temporarily to support construction works. It is not currently expected that any other works will occur on the 2.04 ha northern section of the site as part of this proposal.

1.2 Document purpose

The purpose of this technical report is to understand the traffic and transport impacts of the Western Sydney Energy and Resource Recovery Centre (WSERRC) and to identify appropriate mitigation and management measures where required. To satisfy the Secretary's Environmental Assessment Requirements this report contains the following information:

- An assessment of the existing transport network in the vicinity of the proposal;
- Consideration of future infrastructure and development that may impact the proposal;
- A quantitative assessment of the vehicle generation of the proposal in construction and operation;
- An assessment of the impact on the road network including traffic modelling of intersections directly impacted by the proposal;
- A description of the proposed site layout including servicing vehicle routeing, operational, staff and visitor parking;
- Outline designs for the proposed access arrangements; and
- Mitigation measures to manage the traffic impacts of the development and encourage sustainable travel patterns.

2 Existing environment

This Chapter provides information relevant to the existing traffic and transport environment across the study area.

2.1 Baseline traffic conditions

The site is located north of the Austral Bricks Road and connects to this road via a give-way intersection. Austral Bricks Road travels east-west connecting to Wallgrove Road at its western end. Wallgrove Road is a major distributor which connects to larger arterial routes such as the M7.

To assess the baseline traffic conditions on the road network surrounding the proposal manual classified traffic counts were commissioned for the two intersections presented on Figure 1. These were selected as they are the intersections expected to be used by any vehicle accessing the proposal.

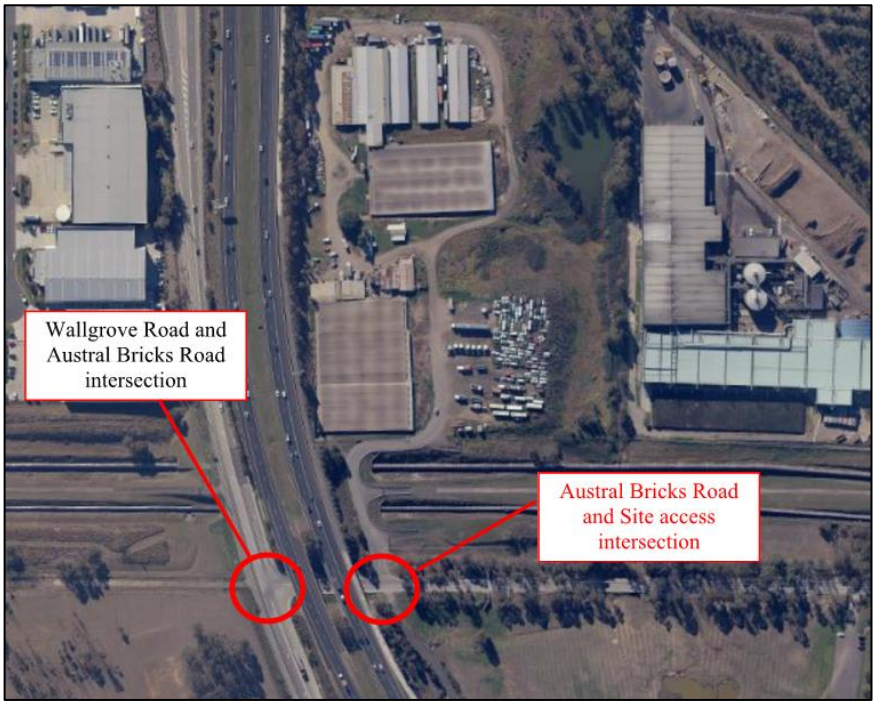

Figure 1: Traffic survey locations

The traffic surveys were conducted in July 2019. A summary of the daily traffic movements and HGV percentage (in brackets) for each intersection are presented in Table 8 and Table 9.

Table 8: Daily traffic movements – Austral Bricks Road / Site Access

	Site Access	Austral Bricks Road (East)	Austral Bricks Road (West)
Site Access	-	15 (13%)	53 (36%)
Austral Bricks Road (East)	10 (20%)	-	523 (57%)
Austral Bricks Road (West)	60 (37%)	495 (57%)	-

Table 9: Daily traffic movements – Wallgrove Road / Austral Bricks Road

	Wallgrove Road (North)	Austral Bricks Road	Wallgrove Road (South)
Wallgrove Road (North)	-	385 (60%)	10,675 (12%)
Austral Bricks Road	397 (61%)	-	185 (43%)
Wallgrove Road (South)	9,709 (13%)	170 (44%)	-

The data indicates that the existing uses on the site are currently generating approximately 70 two-way trips daily. A large proportion of vehicle accessing the site are HGVs.

The videos relating to the surveys also confirmed that B-double's currently use the Austral Bricks Road indicating there was sufficient clear height under the M7 for HGVs likely to be visiting the WSERRC.

2.2 Sustainable transport

Despite its remote location, there are facilities surrounding the site that encourage travel by sustainable modes

2.2.1 M7 shared path

The M7 shared path is located on the western side of the site and connects to Austral Bricks Road. The shared path is separated from road traffic and extends almost the entire length of the M7, from Campbelltown to Kings Langley with key urban centres along the way, including:

- Rooty Hill town centre
- Blacktown sporting district; and
- Liverpool CBD

The shared path route is outlined on Figure 2.

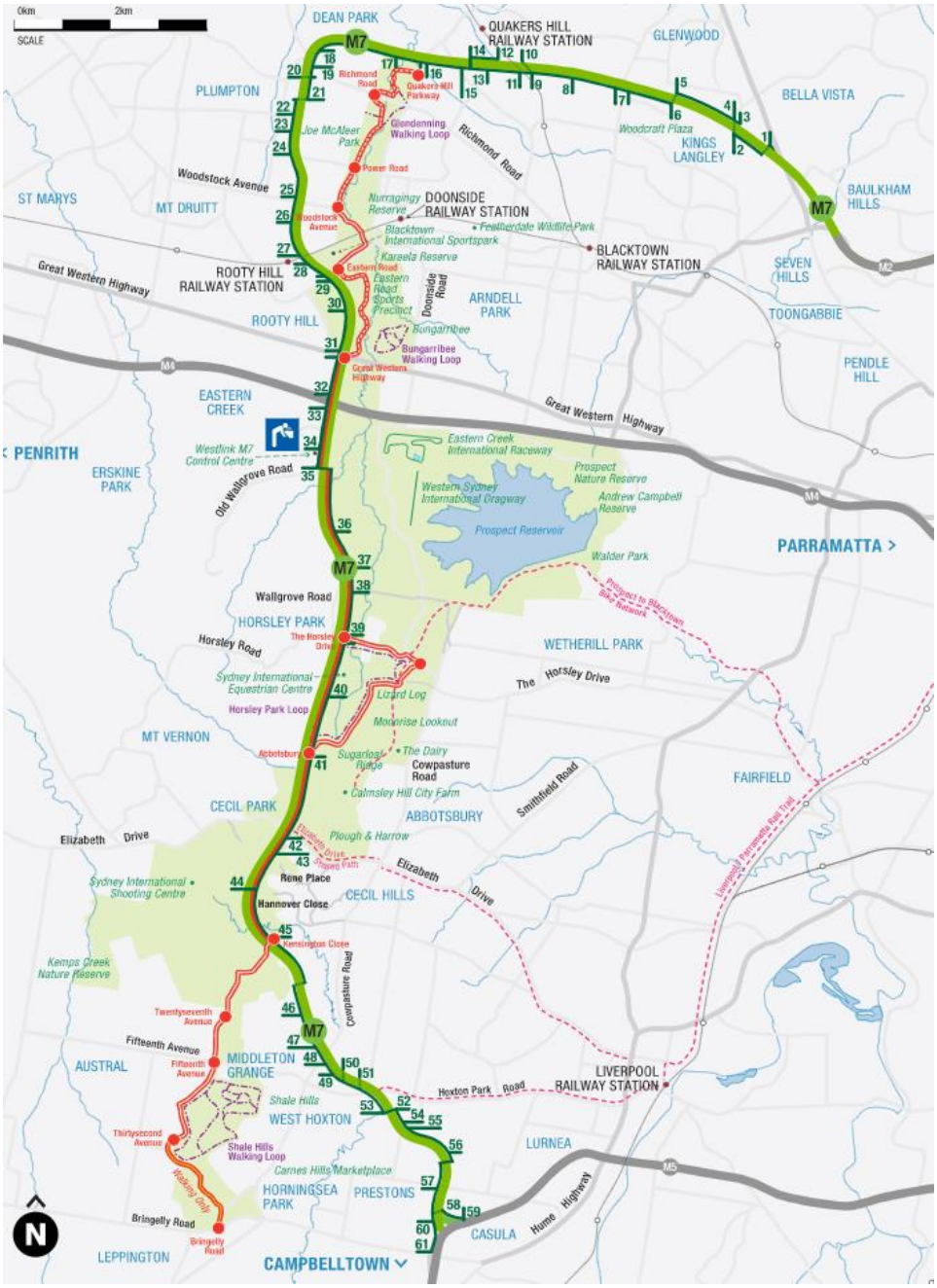

Figure 2: M7 shared path route

2.2.2 Public transport

Bus stops are located on Wallgrove Road north of the intersection with Austral Bricks Road. Both the 738 and 835 bus services use these stops. However, there is currently no footpath or pedestrian crossings to aid people using the bus stops.

2.2.2.1 Bus route 738

The 738 bus route from Mount Druitt and Rooty Hill to Eastern Creek & Horsley Drive is a loop service with runs every 30 minutes during peak hour. The 738 bus route and closest stop to the proposal are presented on Figure 3.

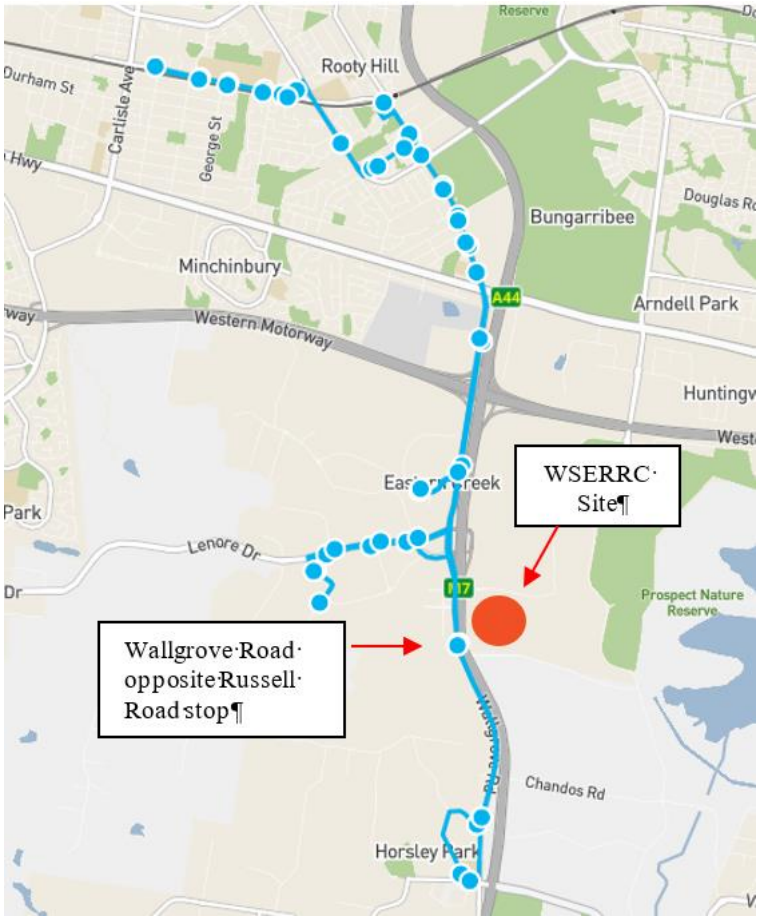

Figure 3: 738 bus route

2.2.2.2 Bus route 835

The 835 bus route from Prairiewood to the Western Sydney University (WSU) has a 30 minute frequency. The 835 bus route and the closest stop to the proposal are presented on Figure 4.

Figure 4: 835 bus route

2.3 Future considerations

Due to the proposals location in Western Sydney a range of infrastructure is planned in proximity of the site to support the NSW Government's planned growth in this region. This may mean the surrounding transport network will change significantly over the next 20-30 years.

2.3.1 Western Sydney Employment Area

The proposal is located adjacent to the Western Sydney Employment Area which has been developed to provide an area for industry and employment uses in Western Sydney. To support this residential development is not permitted within the area. A large proportion of the WSEA has already been developed and the road network supporting the area has been upgraded to accommodate this uplift.

To unlock further land for industrial uses land in the vicinity Mamre Road is being re-zoned. The Southern Link Road is an infrastructure scheme being developed to support the future growth.

The EfW plant suits the typology of land use in the WSEA and can use the upgraded road network to support its construction and operation.

2.3.2 Southern Link Road

In 2014, the Department of Planning and Environment proposed a Southern Link Road, that would provide an east-west arterial link from Wallgrove Road to Mamre Road. The links purpose would be to support the growth of employment opportunities in the Western Sydney Employment Area south of the Warragamba Pipeline. A report was produced by AECOM in 2014 to outline the preferred route for the project, this is presented on Figure 5. Following more recent engagement with RMS they have confirmed the alignment of the Southern Link Road is not yet confirmed with a number of alignments still being considered. A potential alignment for the Southern Link Road would connect to the Wallgrove Road / Austral Bricks Road intersection, as outlined on Figure 5.

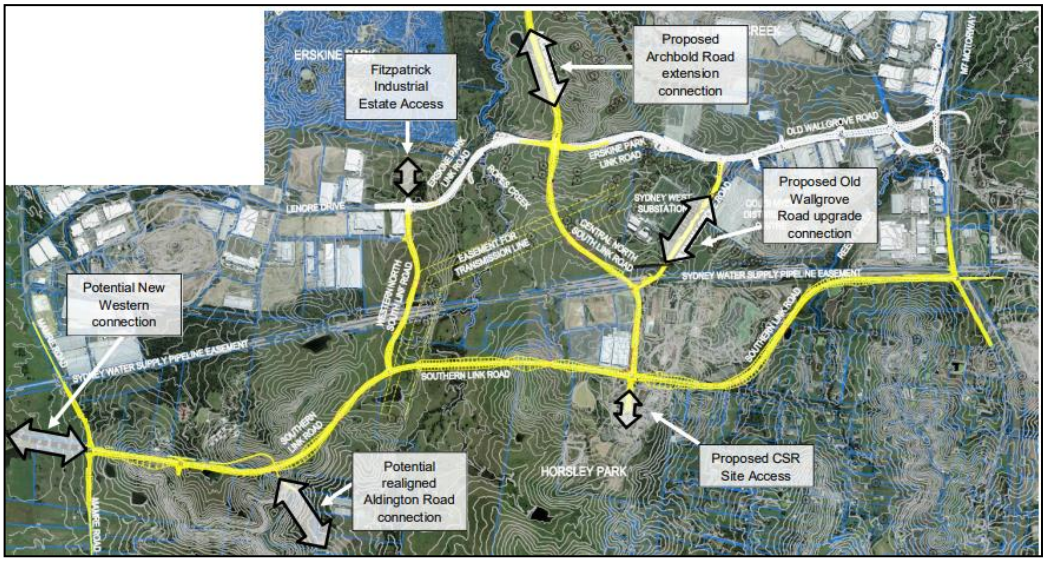

Figure 5: Potential Southern Link Road alignment

2.3.3 Erskine Park road upgrade

As part of the Australian Government's Local Roads Package a study was undertaken to identify issues on the Erskine Park Road corridor. From this a number of intersections were identified to be upgraded to improve safety and traffic flow efficiency:

- Peppertree Drive;
- Bennett Road;
- Coonawarra Drive; and
- Explorers Way.

By mid-2020 all these upgrades will be complete improving journey time reliability on the corridor.

2.3.4 Mamre Road Upgrade

Mamre Road is a key transport corridor which passes through the Western Sydney Priority Growth Area. To accommodate future economic and residential growth within the surrounding area RMS has plans to upgrade Mamre Road. This includes providing two lanes in each direction, shared bicycle and pedestrian facilities and a number of new signalised intersections.

2.3.5 Gazcorp Industrial Estate (SSD 5248)

A Staged State Significant Development Application was approved in November 2019 for an industrial warehouse estate located at 813 – 913 Wallgrove Road. The Concept Proposal sought approval for 211,550m² GFA across 16 lots. The project will be developed in stages with Stage 1 comprising 45,255m² of warehouse plus associated infrastructure.

Stage 1 of the proposal is expected to generate 157 peak hour trips with this increasing to 600 once the Concept Proposal is complete.

This application is relevant to the Proposal as it proposes to signalise the Wallgrove Road / Austral Bricks Road intersection. The arrangement proposed for the intersection in 2021 by this application will be considered in the impact assessment.

3 Methodology

This Chapter describes the methodology used to define the baseline and undertake the environmental assessment of potential impacts of the proposal on traffic and transport including definition of the study area used as the basis of the assessment. This Chapter also presents relevant regulation, legislation and policy governing management of traffic and transport as it relates to the proposal.

3.1 Legislative context

3.1.1 New South Wales legislation

The following relevant legislation has been considered when developing the study methodology and undertaking the impact assessment:

- Guide to Traffic Generating Development (RTA)
- Guide to Traffic Management Part 12: Traffic Impacts of Developments
- Traffic Modelling Guidelines (RMS)
- Road Design Guide (RTA)
- Future Transport 2056 (GSC)
- NSW Long Term Transport Master Plan (TfNSW 2012)
- NSW Government's Freight and Ports Plan 2018-2023
- Blacktown Development Control Plan (Blacktown Council 2015)
- Blacktown Local Environment Plan (Blacktown Council 2015)

Further detail on the relevance of several policy documents is provided in the following sections.

3.1.1.1 Future Transport 2056

The Strategy outlines a vision for Sydney's transport network over the next 30 years. This includes focusing on six customer outcomes to create a more efficient and sustainable transport network. To align with this strategy the proposal will need to implement mitigation measures to encourage sustainable travel and develop strategies to avoid queuing of freight movements onto the public highway. The feedstock strategy and vehicle fleet composition will contribute to this.

3.1.1.2 NSW Government's Freight and Ports Plan 2018-2023

The Plan aims to achieve improved sustainability of the waste management process across the state. The Plan notes that managing growing volumes of waste

is a key objective of the NSW government. The NSW Government has a goal to protect land needed for freight and logistics uses and infrastructure. Part of this is to identify and protect land to handle bulk waste and recycling materials. The proposal will provide a facility that reduces the amount of waste being transported to landfill sites, contributing to the sustainable management of waste within NSW.

3.1.1.3 Blacktown Development Control Plan (Blacktown Council 2015)

The Blacktown DCP includes guidance on the appropriate vehicle parking rates for different land uses. The parking rates for expected land uses on the site are presented in Table 10.

Table 10: Blacktown DCP parking rates

Land use	Parking rate
Light industry, general industry and heavy industry	1 space per 75m² Plus 1 space per 40m² GFA for the office component

3.2 Method

To address the proposal SEARS and agency advices the following methodology was developed:

- Review available data and policy documentation to understand the transport requirements of the facility;
- A desktop study of the transport facilities available to access the site by walking, cycling, public transport and private vehicle;
- Commission traffic surveys to understand conditions of the surrounding road network and form a baseline for the assessment (data collected in 2019);
- Identify key routes to be used by construction and operational vehicles considering the suitability of roads and the expected origins and destinations of trips;
- Understand the different vehicle types expected to be accessing the site to service the various uses;
- Undertake a quantitative traffic generation exercise to estimate vehicle movements in construction and operation;
- Traffic modelling of the existing or future arrangement of intersections that would be directly impacted by the proposal;
- Develop preliminary designs for the access onto the Austral Bricks Road including turning paths and sight distance requirements;

- Develop a site layout and internal road network including information on different servicing vehicle routes and parking arrangements; and
- Assess the onsite storage capacity including any managing waiting times for all servicing vehicles.

3.3 Study area

The study area for traffic and transport assessment of the proposal is outlined on Figure 6.

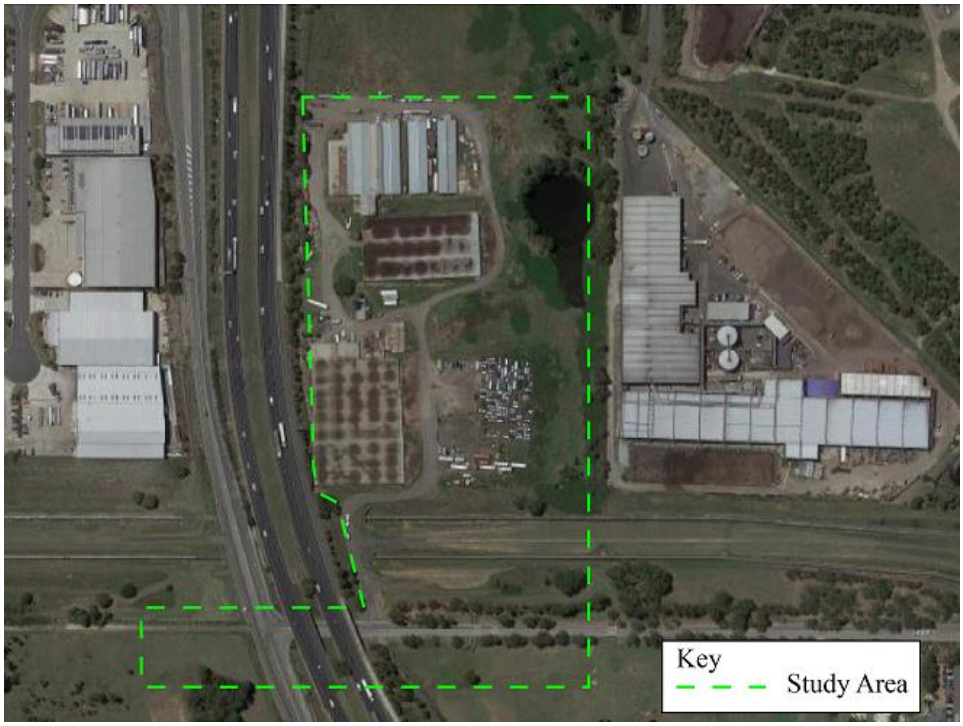

Figure 6: Traffic and Transport study area

4 Impact assessment

This Chapter details the traffic and transport assessment in relation to both construction and operational impacts.

4.1 Traffic generation

Traffic generation of the proposal has been considered in construction and operation to assess the impacts.

4.1.1 Construction traffic

The CTMP (Appendix A) outlines the volumes of construction vehicles required at different stages of the Proposal and the number of workers likely to be on site.

4.1.1.1 Construction vehicle traffic generation

The CTMP outlines daily construction vehicle movements for each stage of the works indicating a peak daily vehicle volume of 75, will occur in Weeks 16 and 17 of the programme. This peak volume has been distributed evenly across the hours of operation for the site (07:00-18:00) meaning there will be seven two-way vehicle movements per hour.

4.1.1.2 Construction workers traffic generation

The CTMP (Appendix A) indicates the peak number of workers likely to be onsite will be 600 in the Main Construction stage. This peak period within the Main Construction stage would have a duration of approximately 3 months. On average in the Main Construction stage the number of workers on site will only be 340 and all other stages will require less workers than this stage.

To ensure the assessment is robust the peak number of 600 has been assessed. It is assumed 25% of workers would carshare or arrive to the site in construction vehicles. Construction workers would therefore contribute an additional 450 vehicle trips inbound in the AM period and outbound in the PM period.

It is expected that all construction workers would park on the northern portion of the site which is currently paved and will not be impacted by the construction footprint of the facility.

Given the operational hours of the construction will be 07:00 to 18:00. Monday to Friday. In the AM period it has been assumed 50% of workers would arrive in the first hour of the site opening (07:00-08:00) with 25% arriving in the shoulder hours either side of these peaks.

In the afternoon it is expected shifts would end at 15:30 or 17:30. Due to this construction worker traffic departing in the PM period has been distributed as outlined in Table 11.

Table 11: Construction worker – PM period distribution

Time	Distribution	Outbound traffic volume
15:00-16:00	30%	135
16:00-17:00	20%	90
17:00-18:00	30%	135
18:00-19:00	20%	90
Total		450

The result of combining the construction vehicle and worker daily profiles is presented on Figure 7.

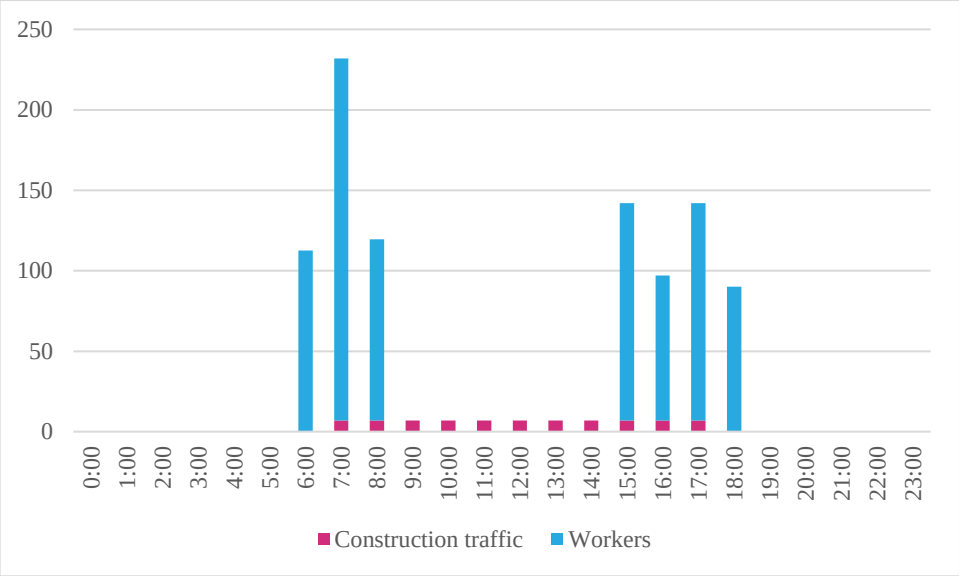

Figure 7: Peak construction daily traffic profile

The traffic volumes from 08:00-09:00 and 16:00-17:00 have been assessed in Section 4.4 to align with the Gazcorp traffic modelling of the Wallgrove Road / Austral Bricks Road intersection.

4.1.2 Operational traffic

The proposal will generate traffic due to a range of different operations occurring on the site. These can be aggregated into two categories servicing vehicles and staff and visitors.

4.1.2.1 Servicing vehicle traffic generation

For the servicing vehicles there a range of different materials that require transport to or from the Efw facility:

- Residual waste;
- Lime;
- Activated carbon;
- Ammonia;
- IBA;
- FGTr;
- Recycled metals;
- Sodium Hydroxide; and
- Diesel fuel.

Technical Report C provides further detail on the purpose of these deliveries in relation to the Efw facility.

A quantitative demand profile has been developed based on the expected annual waste throughput of 500,000 tonnes and the assumption that deliveries will occur 300 days a year. For the purposes of the demand assessment 50% of residual waste was assumed to be delivered by bulk trucks with the remaining via refuse trucks.

All other servicing vehicles would be semi-trailers. In practice B-double's may also be used, however, to ensure the estimated vehicle volumes are robust smaller vehicles have been assumed for this assessment. Daily volumes for each vehicle type are presented in Table 12.

Table 12: Estimated daily operational vehicle two-way trips

Type	Assumption	Yearly volume (tonnes)	Truck capacity (tonnes)	Daily deliveries
Residual waste	50% of waste	250,000	20	42
	50% of waste	250,000	7	119
Lime	15kg / tonne of waste	7,500	20	2
IBA	16% of processed waste	80,000	20	14
FGTr	4% of processed waste	20,000	20	4
Recycled materials	-	15,000	20	3
Activated Carbon	0.5kg / tonne of waste	250	20	~1
Ammonia	4kg / tonne of waste	2,000	20	~1
Sodium Hydroxide	1kg / tonne of waste	500	20	~1
Diesel	Fuel deliveries		20	~1
Total				**188**

Figures are subject to rounding

To develop a daily profile for the servicing vehicles the demand profile for waste collection vehicles arriving at the Erskine Park Transfer Facility, operated by Cleanaway, has been used. The result of applying the demand profile to the daily volumes is presented on Figure 8.

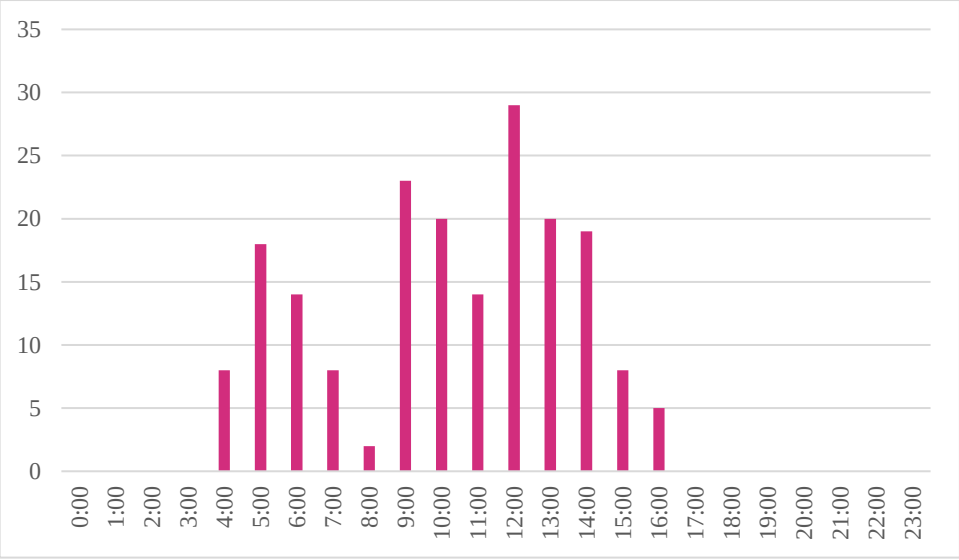

Figure 8: Servicing vehicle daily demand profile

This indicates the peak hour servicing vehicle demand would be 29 vehicles from 12:00-13:00.

4.1.2.2 Employee and visitor traffic generation

In standard operation approximately 30 employees will be required on site. As the majority of staff will work standard hours we have assumed 50% arrive between 08:00-09:00 and depart between 17:00-18:00 with 25% arriving in the shoulder hours either side of these peaks.

A visitor centre is being provided as part of the proposal. Although this will not be a major trip generator it is expected this may contribute up to 2 trips an hour between 08:00-17:00. This also accounts for adhoc contractors relating to the operations of the proposal.

The majority of these trips will be made by car with a small number being coaches taking groups to the visitor centre.

Using these estimations, the overall daily vehicle trips relating to staff and visitors would be 48 two-way trips.

4.1.2.3 Overall trip generation

Overall combining these trip numbers, 236 two-way trips would be generated by the proposal daily. Comparing this to the 70 two-way trips generated by the existing uses on the site indicates the net increase would be 166 two-way trips daily.

Combining the demand profiles for both types of traffic generation produces a daily vehicle movement profile for the proposal. This is presented on

Figure 9.

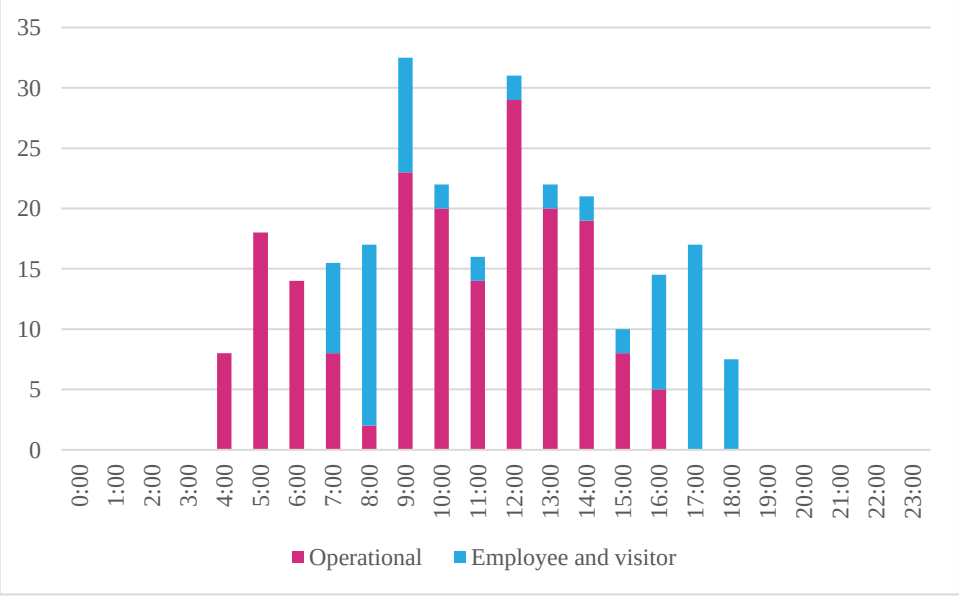

Figure 9: Operational vehicle demand profile

This profile indicates that the peak hour is 09:00-10:00 with 33 vehicles arriving. When modelling the impact of operational vehicles on intersections in the vicinity the morning (08:00-09:00) and afternoon (16:00-17:00) peak values will be used as they align with peak network hours modelled as part of the Gazcorp Industrial Estate (SSD 5248).

4.2 Site access

The existing give-way access to the site will be upgraded to accommodate two-way B-double movements. To accommodate these movements the kerblines will be adjusted. Vehicle swept analysis of the proposed access has been conducted using expected design vehicles (including B-doubles).

The Safe Intersection Sight Distance has also been checked considering a speed limit of 30km/h on the access road and a reduced deceleration coefficient to consider truck movements.

The preferred access solution has been agreed in principle with Water NSW. Ongoing consultation will continue with Water NSW to agree the detailed design and construction method.

Technical drawings showing the swept paths and sight lines are presented in **Appendix B**.

4.3 Emergency vehicle access

Emergency vehicles will access the site via the give-way access connecting to Austral Bricks Road. Once entering the site sufficient width is provided for emergency vehicles to circulate around the main building of the facility to gain access to various parts of the site. In the event of an emergency servicing vehicles within the site will be directed to areas where they would not obstruct the circulation loop for any emergency vehicles.

4.4 Site layout

The site layout is presented in **Appendix C**. All vehicles will enter the site through a road which passes over the Warragamba pipelines. All servicing vehicles will be directed to the three entry weighbridges. Staff and visitors will be directed to turn right onto a different road from which they can access the car park, office and visitor centre. This road has been separated from the rest of the facility to ensure safety and reduce the likelihood conflicts with servicing vehicles.

A paved path will be provided allowing pedestrians and cyclists to gain access the office and visitor centre.

Adequate signage and a traffic light system will be required at the site entrance to ensure that incoming and outgoing light vehicles do not cross outgoing servicing vehicles. The site will operate a one-way system for servicing vehicles with a clockwise circulation. This clockwise circulation allows a large number of vehicles to queue within the extents of the site, if necessary.

Servicing vehicles exiting the site will be required to use the outgoing weighbridges before proceeding to the site exit.

4.4.1 Entrance and weighbridges

Three weighbridges are located on the entrance route to the facility to ensure all servicing vehicles are weighed before circulating. It is estimated it will take approximately 2 minutes for any truck to be weighed. The facility would therefore be able to process approximately 90 incoming servicing vehicles in an hour.

Given the peak number of hourly deliveries is expected to be 29, the capacity of the three weighbridges would be able to manage this influx of vehicles without queuing back onto Austral Bricks Road.

If a scenario was to arise where a large number of servicing vehicle arrive in a short period of time. Vehicles would be asked to circulate around the site to avoid any queuing back onto the public highway.

4.4.2 Tipping Hall

The facility will contain 10 tipping bays for waste deliveries to transfer waste into the facility. The processing time for one vehicle in the Tipping Hall is estimated to be seven minutes. This indicates that the Tipping Hall could process up to 80 waste deliveries per hour. Given the expected peak for waste deliveries is 24 vehicles queuing is not expected to form prior to the Tipping Hall.

In cases where a large number of waste deliveries arrive at the Tipping Hall over a short period of time. They would be asked to queue within the extents of the site to avoid any impacts on the surrounding road network.

4.4.3 Parking

Parking for all modes on the site has been developed through considering local planning controls and the demands related to the Proposal.

4.4.3.1 Vehicle parking

Two different methodologies were used to develop the parking requirement for the facility. The first was using the parking rates outlined in the Blacktown DCP and is presented in Table 13.

Table 13: Blacktown DCP parking requirement

Land use	Gross Floor Area (m^2)	DCP parking rates	Parking requirement
Main Facility - Operations	666	1 space per 75m^2	9
Main Facility - Office	769	1 space per 40m^2 GFA	20
Visitor Centre	582	1 space per 40m^2 GFA	15
Total			**44**

As a comparison a parking requirement was developed based on FTE employees and the expected types of visitors. The parking requirement related to the first principles approach is outlined in Table 14.

Table 14: First principles parking requirement

Land use	Parking requirement
Main Facility and Office	40
Visitor Centre	14 (including 4 coach spaces)
Total	**54**

This methodology provides a parking space for all FTE staff on the site (40). In addition to this, 10 spaces are provided for visitors and contractors plus four coach bays which will accommodate groups relating to the visitor centre. It is assumed the visitor centre would mainly accommodate large groups arriving on coaches.

By testing both methodologies this confirms an approach based on FTE staff will provide 10 more spaces than the Blacktown DCP. The FTE approach has been adopted as the appropriate methodology for calculating parking requirement as the Blacktown DCP does not have a parking rate directly related to an EfW plant which is considered different to usual light industry uses.

By ensuring all FTE staff relating the facility have a parking space the aims is to mitigate the likelihood of any vehicles relating to the EfW plant parking on the surrounding streets.

4.4.3.2 Cycle parking

To estimate the cycle parking requirement for the proposal it has been assumed the maximum number of FTE staff who may choose to cycle to work will be 50%. Therefore, 15 secure bike racks will be provided for staff. The office component of the proposal will include end of trip facilities to complement the cycle parking.

Information will also be provided to cyclists outlining cycle routes in the area such as the M7 shared path.

4.5 Network impacts

Vehicles travelling to and from the site in construction and operation will originate from a variety of locations. This impact assessment has focused on the intersections in the vicinity of the site which will be used by all traffic accessing the proposal. The key intersections which have been assessed are:

- Wallgrove Road / Austral Bricks Road
- Austral bricks Road / Site Access

In some cases, further information on the routeing of vehicles has been provided.

4.5.1 Wallgrove Road / Austral Bricks Road upgrade

SSDA 5248 relating to the Gazcorp Industrial Estate has been approved on the western side of Wallgrove Road. The planning application proposes to upgrade the Wallgrove Road / Austral Bricks Road intersection in two stages aligning with the implementation programme for their Concept Proposal. The initial upgrade of the intersection aims to be implemented by 2021 and involves:

- Signalising the intersection;
- Widening both Wallgrove Road approaches; and
- Adding an approach on the western side which will connect to the Gazcorp Industrial Estate.

Although detailed designs have not yet been developed for the intersection a schematic from a traffic model is presented in the SSD 5248 Assessment Report. Figure 10 presents the schematic layout.

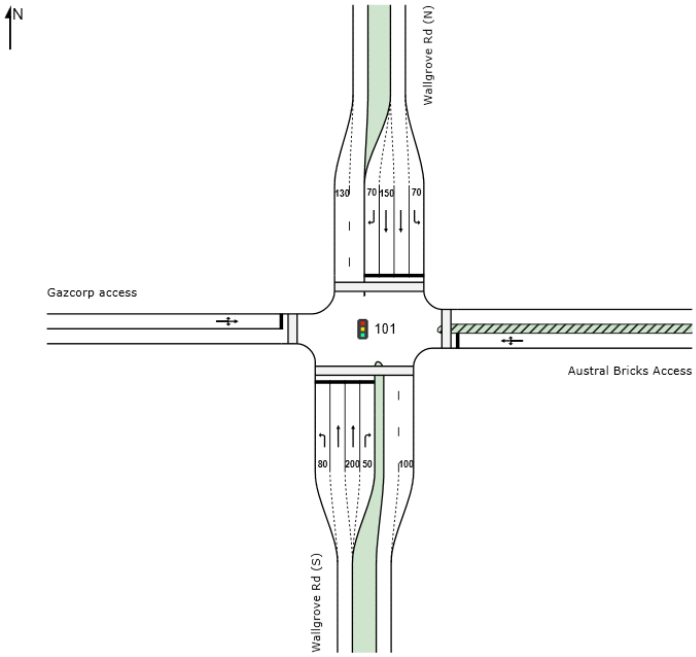

Figure 10: Wallgrove Road / Austral Bricks Road – Gazcorp Industrial Estate 2021 layout

The SSD 5248 Assessment Report also outlines a further upgrade to the intersection required in 2036 to accommodate the increased traffic generated by the ultimate development. However, this intersection layout has not been approved by RMS and therefore, has not been considered as part of this assessment.

When replicating the Gazcorp models similar cycle times were used. In some scenarios adjustments to the cycle time may improve the overall performance of the intersection and reduce queuing on certain arms.

4.5.2 Construction traffic impact

It is expected all vehicle traffic related to the construction will use the Wallgrove Road / Austral Bricks Road intersection. For the purposes of the impact assessment it is assumed that all traffic approaches from Wallgrove Road (north) turning left into Austral Bricks Road and departs via the reverse route.

4.5.2.1 SIDRA modelling

Wallgrove Road / Austral Bricks Road intersection

The construction traffic expected to be generated for the development in the AM and PM peaks has been applied to the Gazcorp intersection layouts in 2021 to understand the potential impacts.

Data to drive the models for this assessment was extracted from the modelling results presented in SSD 5248 Traffic Assessment Addendum submitted on 18

February 2015. Note the Gazcorp SIDRA models were not provided so there may be minor discrepancies between the SIDRA models used for this assessment and the models produced to support SSD 52548.

The SIDRA modelling results are presented in Table 15.

Table 15: Gazcorp 2021 Wallgrove Road / Austral Bricks Road – Construction modelling results

Scenario		Total intersection			Austral Bricks approach	
		Average delay (s)	Level of Service	Degree of saturation	Average delay (s)	95th percentile queue (m)
2021 Gazcorp	AM	37.4	C	0.925	70.3	19
	PM	36.5	C	0.864	55.9	24
2021 Gazcorp + WSERRC construction	AM	36.6	C	0.926	72.4	26
	PM	37.7	C	0.864	69.0	72

The modelling results indicate despite the addition of the construction traffic in both peak periods an overall Level of Service C is maintained for the intersection.

A minimal impact is seen on the Austral Bricks approach in the AM with a 7m increase in the queue and a small increase in average delay. In this scenario the average delay at the intersection decreases due to the increased number of left turners into the Austral Bricks Road who experience minimal delays.

However, in the PM the average delay and queue length significantly increase on the Austral Bricks approach with the queue extending beyond the access intersection location. We note that the average delay is lower than the AM scenario as this approach receives more green time in the afternoon cycle.

This impact is only likely to occur in the peak construction period of 3 months. Throughout the rest of the construction programme the number of workers on site will be lower and the queuing on the Austral Bricks Road is expected to reduce.

If required mitigation measures could be considered in the PM period such as encouraging to turn left onto Wallgrove Road (S) which would cause fewer delays.

Austral Bricks Road / Site access intersection

A SIDRA model of the give-way intersection connecting the site to Austral Bricks Road was also produced. The construction vehicle volumes were added to this arrangement to confirm the arrangement could accommodate the expected traffic. The SIDRA modelling results are presented in Table 16.

Table 16: Austral Bricks Road / Site access – Construction modelling results

Scenario	Average delay (s)	Level of Service	Degree of saturation
AM peak hour (09:00-10:00)	2.8	A	0.107
PM peak hour (17:00-18:00)	4.7	A	0.083

The modelling results indicate the give-way arrangement has sufficient capacity to accommodate the expected traffic in the AM and PM peak periods. The key delay is in the PM period when the queue from the Austral Bricks approach may block traffic exiting the site, but this is not expected to be a regular occurrence.

The full SIDRA model outputs are presented in **Appendix D**.

4.5.3 Operational traffic impact

All operational traffic is expected to access the proposal via Wallgrove Road. For the purposes of the impact assessment it is assumed that all traffic approaches from Wallgrove Road (north) turning left into Austral Bricks Road and departs via the reverse route.

4.5.3.1 Servicing vehicle routeing

Approximately 50% of residual waste deliveries will originate at the Cleanaway Erskine Park Transfer facility. The expected route between the two facilities would be via Erskine Road, Lenore Drive and Old Wallgrove Road, which can all accommodate B-doubles. The expected route is presented on Figure 11.

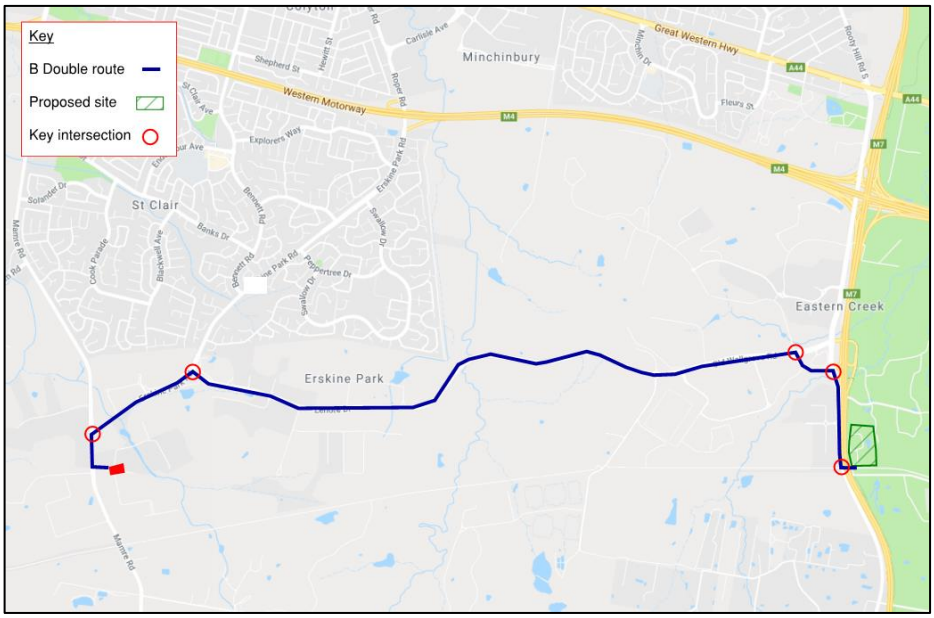

Figure 11: Residual waste route from the Cleanaway Erskine Park facility

FGTr deliveries will need to be treated off-site before being transported to landfill. The facility expected to be used to treat this by-product is located in St Marys. After treatment the FGTr will be transports to the SUEZ Kemps Creek landfill.

For all other servicing vehicles origins and destinations may vary so details of expected routes have not been provided. Further detail on these can be found in Technical Report J.

4.5.3.2 SIDRA modelling

Wallgrove Road / Austral Bricks Road intersection

The operational traffic expected to be generated for the development in the AM and PM peaks has been applied to the Gazcorp intersection layouts in 2021 to understand the potential impacts.

Data to drive the models for this assessment was extracted from the modelling results presented in SSD 5248 Traffic Assessment Addendum submitted on 18 February 2015. Note the Gazcorp SIDRA models were not provided so there may be minor discrepancies between the SIDRA models used for this assessment and the models produced support SSD 52548.

The SIDRA modelling results are outlined in Table 17.

Table 17: Gazcorp 2021 Wallgrove Road / Austral Bricks Road – Operation modelling results

Scenario		Total intersection			Austral Bricks approach	
		Average delay (s)	Level of Service	Degree of saturation	Average delay (s)	95th percentile queue (m)
2021 Gazcorp	AM	37.4	C	0.925	70.3	19
	PM	36.5	C	0.864	55.9	24
2021 Gazcorp +WSERRC operation	AM	37.3	C	0.925	70.3	19
	PM	36.6	C	0.864	57.2	34

The SIDRA modelling indicates that in both cases the increase in traffic relating to the proposal has a minimal impact on the performance of the intersection and an overall Level of Service C is maintained.

The average delay decreases slightly in the AM scenario due to the addition of left turners into Austral Bricks Road who experience minimal delays. No change to delay or queuing is observed on the Austral Bricks Road approach in the AM scenario. In the PM scenario queuing increases by 10m on the Austral Bricks approach.

These impacts are considered acceptable as the Level of Service of the intersection is maintained and impacts on the Austral Bricks Road approach are minimal.

Austral Bricks Road / Site access intersection

A SIDRA model of the give-way intersection connecting the site to Austral Bricks Road was also produced. The operational vehicle volumes were added to this arrangement to confirm the arrangement could accommodate the expected traffic. The SIDRA modelling results are presented in Table 16.

Table 18: Austral Bricks Road / Site access – Operation modelling results

Scenario	Average delay (s)	Level of Service	Degree of saturation
AM peak hour (09:00-10:00)	1.1	A	0.047
PM peak hour (17:00-18:00)	3.2	A	0.015

Given the expected flows using the Austral Bricks Road in 2021 are low the intersection operates with Level of Service A. This indicates the proposed access can accommodate the operational traffic likely to be generated by the Proposal.

Queuing from the signalised intersection to the west is not expected to restrict vehicles from exiting the site in either time period.

The full SIDRA model outputs are presented in **Appendix D**.

5 Proposed mitigation measures

This Chapter outlines proposed mitigation and management measures that have been developed to mitigate the potential traffic and transport impacts of the proposal during construction and operation.

5.1 Construction

To manage the impacts of construction vehicles a CTMP (Appendix A) has been developed. This will ensure impacts on the road network are minimised and ensure safety for all other road users. A key focus of the CTMP is to reduce the impact of construction worker traffic by adjusting shift patterns, encouraging car sharing and making workers aware of other transport options. A bus service is available from Wallgrove Road and the M7 shared path means cycling is a viable option. Once a contractor is appointed the CTMP will be updated in more detail.

5.2 Operation

Reducing the traffic impacts of the proposal during operation is centred around several key initiatives:

- Encouraging staff and visitor travel by sustainable modes;
- Managing the outflow of servicing vehicles from the site by utilising storage space within the proposal and recirculating vehicles if necessary
- Managing the inbound flow to the facility of vehicles from the Erskine Park Transfer Facility; and
- Managing the traffic impacts on the Wallgrove Road / Austral Bricks Road intersection.

5.2.1 Employee and visitor travel

Prior to the proposal opening a Green Travel Plan will be produced providing users information on sustainable travel modes and will include measures to support the initiatives. A member of the FTE staff will be appointed the Green Travel Plan co-ordinator tasked with implementing and updating the plan.

5.2.1.1 Staff vehicles and car share

Shared staff car travel to WSERRC will be encouraged for their journey to and from work. Parking bays will be prioritised for employees choosing to car share. A system will also be setup for all employees who wish to car share, so they can co-ordinate their requirements and schedules.

5.2.1.2 Staff cycling

Adequate cycle parking and end of trip facilities will be provided within the office component of the site. This will support employees wishing to travel to the site via bicycle, who can use the M7 shared path to access the site safely. Information will also be issued as part of the Green Travel Plan to improve awareness of the surrounding cycling routes. The site layout will have a paved path connecting from the entrance to the visitor centre, so pedestrians and cyclists can access the proposal safely.

5.2.1.3 Visitor travel

To minimise the impact of visitor travel, all groups visiting the visitor centre will use coaches to reduce the number vehicles travelling to the facility. This is seen as the most appropriate measure for managing travel demand for people visiting the site on one occasion. Information will also be disseminated to contractors stating that access to the facility by other modes is possible.

5.2.2 Wallgrove Road / Austral Bricks Road intersection

Current traffic modelling results indicate that the proposal will not impact the Level of Service of the 2021 layout for the intersection which has been proposed by the Gazcorp Industrial Estate application. As the design of the intersection progresses Cleanaway will continue to engage with Gazcorp and the approving authorities. This will ensure the traffic generated by the proposal is considered and any design requirements are fed into the design process.

6 Conclusions

The traffic and transport assessment of the proposal has concluded the following:

- The peak construction phase is expected to generate 75 construction and 450 worker vehicle two-way trips daily. The peak construction period will have a duration of approximately 3 months;
- The proposal is expected to generate 236 two-way vehicle movements with 33 occurring in the peak hour between 09:00-10:00, this includes a high proportion of heavy vehicles;
- To reduce the number of residual waste deliveries required to serve the facility it is estimated 50% of these would be made with HGVs from the Cleanaway Erskine Park Transfer Facility;
- 40 car parking spaces and 4 coach spaces will be provided within the site to accommodate the parking demand of the proposal;
- The Gazcorp Industrial Estate (SSD 5248) will need to be monitored due to its proximity to the proposal and the plans of this application to upgrade the Wallgrove Road / Austral Bricks Road intersection;
- Access to the site will be via an upgraded version of the existing access which passes over the Warragamba pipeline. The kerblines will be adjusted so swept paths for B-doubles can be accommodated. Traffic modelling confirmed this arrangement can accommodate the expected traffic volumes;
- Traffic modelling undertaken considering the Gazcorp Industrial Estate 2021 intersection layout suggests despite the uplift in traffic due to the proposal. In construction and operation, the Level of Service at the intersection would be maintained; and
- Mitigation measures will be applied to encourage sustainable travel patterns to the proposal in construction and operation aiming to minimise vehicle traffic.

Appendix A

Construction Traffic Management Plan

OUTLINE CONSTRUCTION TRAFFIC MANAGEMENT PLAN

JUNE 2020

PROJECT GREEN WARATAH

MACQUARIE GROUP / CLEANAWAY

Prepared For

Submitted on

24 June 2020

Prepared By

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Our Ref

17384.6.1

Project number

17384

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j.17384.6.1.CTMP Report

24 June 2020

Cleanaway Operations Pty Ltd
Macquarie Corporate Holdings Pty Ltd
Level 6, 50 Martin Place,
Sydney NSW 2000

Dear Sirs

PROJECT GREEN WARATAH
DRAFT CONSTRUCTION TRAFFIC MANAGEMENT PLAN

Please find attached our draft construction traffic management plan report input for the above development.

We trust this is to your satisfaction and should you have any queries or require any further information or comment, please do not hesitate to contact us.

Yours faithfully

Matthew Harris
Managing Director
Rider Levett Bucknall

matthew.harris@au.rlb.com

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Cleanaway and Macquarie Capital are jointly developing an energy-from-waste (EfW) facility known as the Western Sydney Energy and Resource Recovery Centre (WSERRC) (the proposal).

The proposal will be designed to thermally treat up to 500,000 tonnes per year of residual Municipal Solid Waste (MSW) and residual Commercial and Industrial (C&I) waste streams that would otherwise be sent to landfill. This process would generate up to 58 megawatts (MW) of base load electricity some of which would be used to power the facility itself with the remaining 55MW exported to the grid. The proposal involves the building of all onsite infrastructure needed to support the facility including site utilities, internal roads, weighbridges, parking and hardstand areas, storm water infrastructure, fencing and landscaping.

Rider Levett Bucknall (RLB) has prepared this preliminary Construction Traffic Management Plan (CMTP) report as an Overview Method Statement to provide an indication of the proposed construction traffic management impacts expected to arise during construction of the WSERRC. It should be read in conjunction with a separately prepared constructability report for the project.

The scope of this report includes comment upon and description of:

- Overview and scope of construction works.
- Likely staging of the development - including demolition, construction and timeframes
- Assessment of the workforce required for the construction
- Construction Traffic Volumes including daily and peak traffic movements likely to be generated by the proposed development during construction.
- Impact of vehicles travelling on the road network
- Site Parking
- Stakeholders

1.0 INTRODUCTION

1.1 BACKGROUND

Cleanaway and Macquarie Capital are jointly developing an energy-from-waste (EfW) facility known as the Western Sydney Energy and Resource Recovery Centre (WSERRC) (the proposal).

The proposal will be designed to thermally treat up to 500,000 tonnes per year of residual Municipal Solid Waste (MSW) and residual Commercial and Industrial (C&I) waste streams that would otherwise be sent to landfill. This process would generate up to 58 megawatts (MW) of base load electricity some of which would be used to power the facility itself with the remaining 55MW exported to the grid. The proposal involves the building of all onsite infrastructure needed to support the facility including site utilities, internal roads, weighbridges, parking and hardstand areas, storm water infrastructure, fencing and landscaping.

The proposal site is located at 339 Wallgrove Road in Eastern Creek, NSW (Lot 1 DP 1059698) which is in the Blacktown local government area (LGA). The site is in the Wallgrove Precinct of the Western Sydney Parklands (WSP) Plan of Management.

The 8.23ha site is divided by a small strip of land not part of the proposal site, resulting in a 2.04ha northern section and a 6.19ha southern section. This dividing strip is part of the adjacent lot and includes a right of carriageway benefitting the proposal site allowing vehicles to move between the two parts of the site. The proposal area will be fully contained in the 6.19ha portion of the site. Works to occur on the 2.04 ha northern section of the site include the clearing of weeds and exotic vegetation within the existing overland flow channel which is confined to the eastern section of this parcel of land. The northern section will also be used temporarily to support construction works. No other works will occur on the 2.04 ha northern section of the site as part of this proposal.

The existing site includes buildings associated with a disused poultry facility, which will be cleared from the site prior to starting construction.

The site is bounded by the M7 Motorway to the west with the Eastern Creek industrial area located farther west. The now-closed Eastern Creek landfill site (which still has an operational organics recycling facility component) is located to the north and north-east, with the operational Global Renewables waste management facility located immediately to the east. To the south, the site is bounded by the Warragamba Pipeline Corridor with the Austral Bricks facility located farther south.

The nearest residential area is located around 1 km to the south of the site. The Erskine Park residential area is located around 3.5 km to the west with Minchinbury located around 3 km to the north. Horsley Park Public School is located over 2 km south of the site and a childcare centre is located within the Eastern Creek industrial area approximately 1 km to the west of the site.

1.2 PURPOSE

This draft construction traffic management plan is prepared as an input to the EIS for the WSERRC.

The draft construction traffic management plan includes:

- Assessment of daily and peak traffic movements likely to be generated by the proposed development during construction.
- Number of vehicles travelling on the road network
- Information on heavy vehicle movements on a typical construction day and what this number would be at peak construction.

1.3 SITE DESCRIPTION

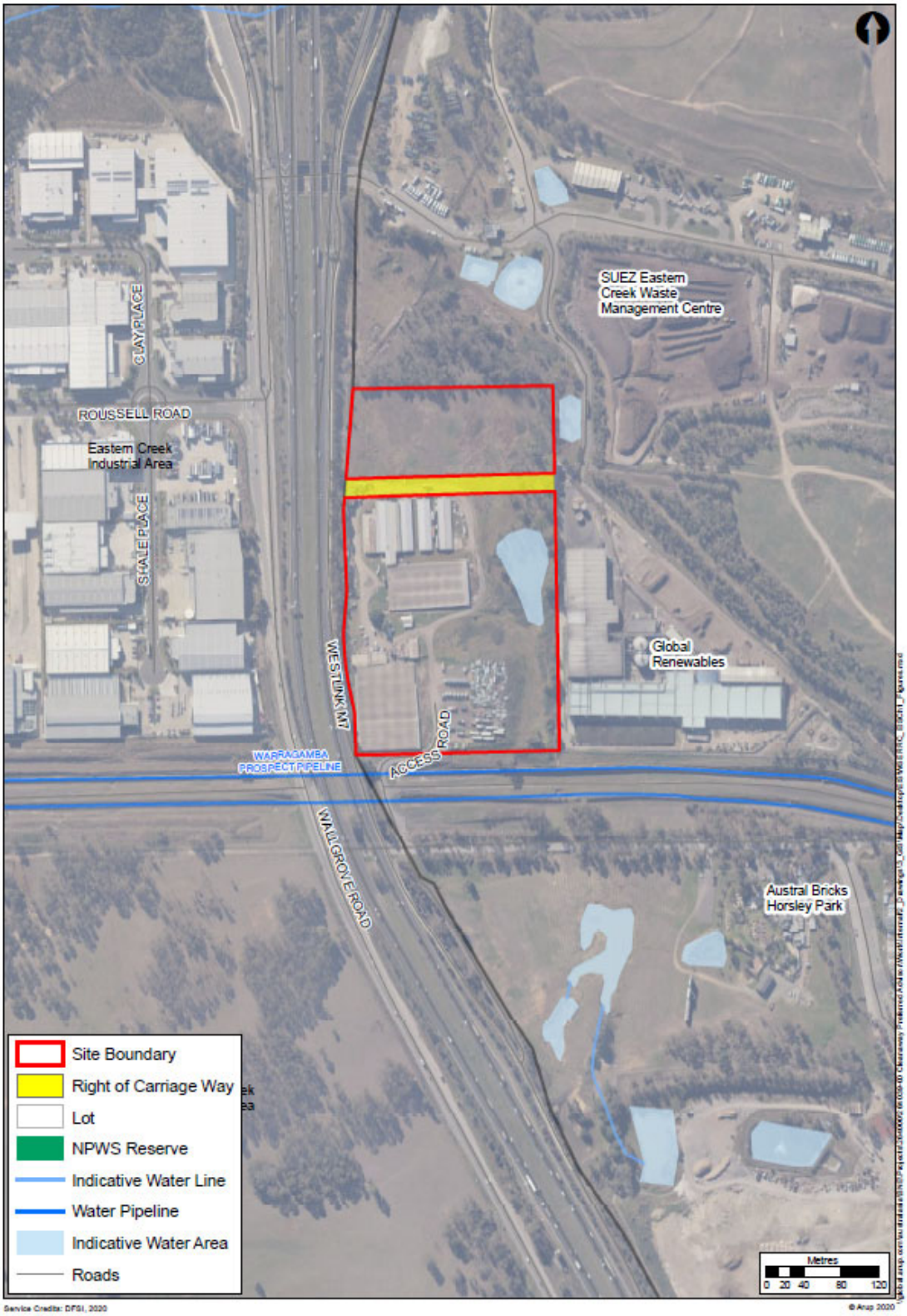
The site is located at 339 Wallgrove Road, (Lot 1 DP 1059698), Eastern Creek, Western Sydney, and is approximately 8.23Ha in area, is currently accessed from the Austral Bricks Road via a private road crossing of the Warragamba Pipelines owned by WaterNSW. Austral Bricks Road connects to Wallgrove Road via an

underpass under the M7 Westlink Motorway. The site is currently occupied by derelict buildings, underground services, abandoned vehicles, miscellaneous facilities and vegetation.

A small strip of land, not part of the proposal site, divides the site into a 2.04ha northern section and a 6.19ha southern section. This dividing strip is part of the adjacent lot and includes a right of carriageway benefitting the proposal site allowing vehicles to move between the two parts of the site. The proposal area will be fully contained in the 6.19ha portion of the site as shown Figure 1.

Works to occur on the 2.04 ha northern section of the site comprise clearing of weeds/exotic vegetation and replanting of native species in the area of the site that is currently vegetated. This will enhance the biodiversity of native vegetation and ensure the existing overland flow channel functions to act as the outfall route of the stormwater drainage serving the site. The existing tarmac area will be retained.

Figure 1 Site Layout



2.0 PROJECT DESCRIPTION

The project can be divided into the following primary areas shown schematically in Figure 2

- Reception Hall
- Waste Bunker Hall
- Boiler Hall (Furnace, Boiler, Turbine Hall and Electrical Rooms)
- Flue Gas Treatment (FGT) Hall (Cooling Tower/Reactor, Bag Filter, Quench/Acid Scrubber)
- Stack
- Air Cooled Condenser (ACC)
- Administration Space including Control Room

Buildings overall will range from 35m to 55m high with a single 75-80m high chimney stack at the southern end of the site.

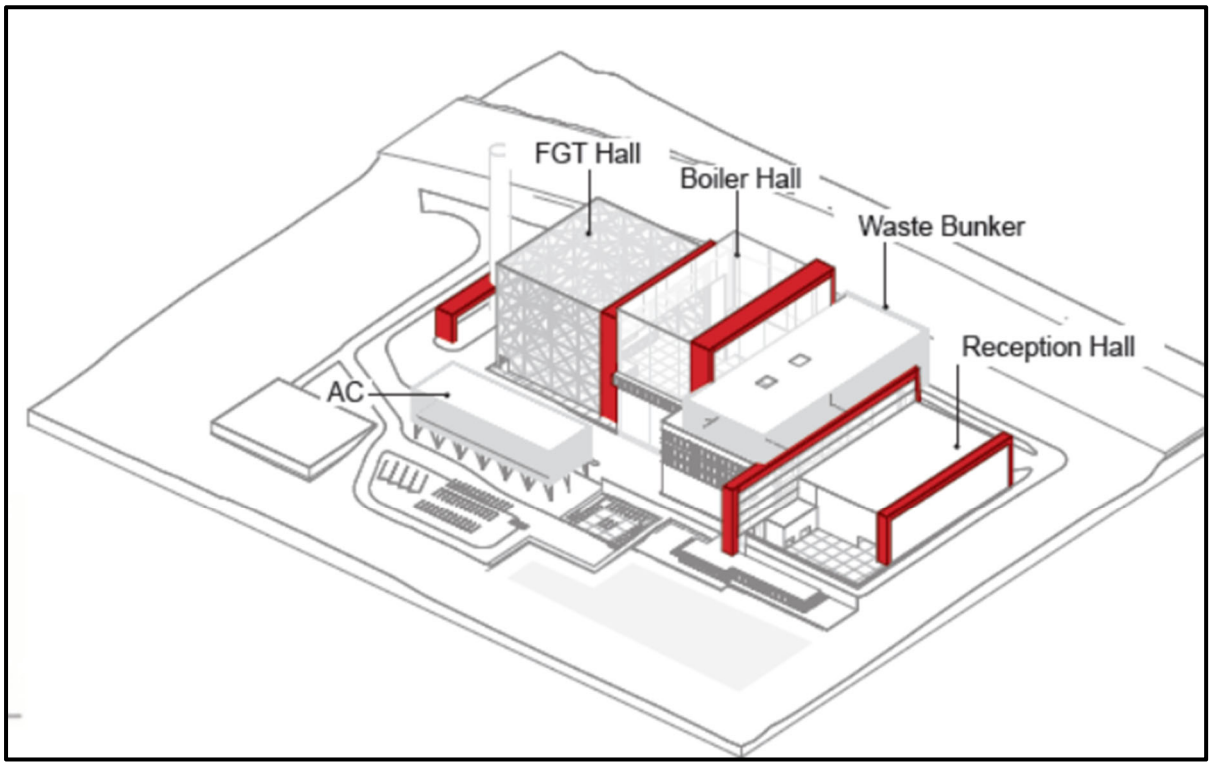


Figure 2 Schematic, Western Sydney Energy and Resource Recovery Centre

Ancillary equipment and facilities comprise:

- Electrical systems;
- Visitor's Centre;
- Administration building;
- Sub-station located at the south-east corner of the site;
- Incoming and outgoing weighbridges;
- Continuous Emissions Monitoring System (CEMS);
- Site works and Landscaping

3.0 SCOPE OF CONSTRUCTION WORKS

3.1 CONSTRUCTION OVERVIEW

Construction of the WSERRC facility will be undertaken in five main phases. These phases will comprise:

- Phase 1 - Demolition
- Phase 2 - Site Establishment and Enabling Works
- Phase 3 - Main Construction Works
- Phase 4 – Testing and Commissioning Works
- Phase 5 - Finishing and Landscaping Works

3.2 CONSTRUCTION FOOTPRINT

Detailed layouts of the construction site will be developed for the project prior to construction and the site will evolve and be progressively reconfigured to suit work sequencing and progress.

Indicative footprint and staged construction site layouts are provided in the following pages to show major construction configurations:

- Layout Stage 1 – Enabling works, bulk earthworks and piling (Refer Figure 3)
- Layout Stage 2 -Main construction works (Refer Figure 4)
- Layout Stage 3 – Ancillary works, testing, commissioning, external works and landscaping (Refer Figure 5)

Key elements are described further in this section.

3.3 SITE ACCESS

Site Access will be provided from Wallgrove Road via an unnamed road (also referred to as the Austral Bricks Road) adjacent to the site's southern boundary. The existing Austral Bricks Access Road-Wallgrove Road junction will be upgraded as part of the Gazcorp Development. Upgrades are currently scheduled to be completed in 2021.

The existing site entry across twin Water NSW mains will be retained as the site access subject to structural integrity but will be upgraded including pavement widening and replacement of vehicle barriers.

An area for site compounds, initial construction laydown and hardstand areas will be provided to the north-east corner of the site. Currently there is a farm dam with associated drainage channels located in this area and reclamation and adjustments will be required to accommodate the work areas. The site compound will be located so that it is clear of overland flow paths. In later stages of construction, part of this area will become the construction site for the visitor centre and air-cooled condensers (ACC).

An area for temporary stockpiles during the bulk earthworks and detailed excavation works is designated at the north west corner of the site. Part of this area may be retained as a temporary stockpile area until later in the construction period and will eventually be used or construction of road pavements.

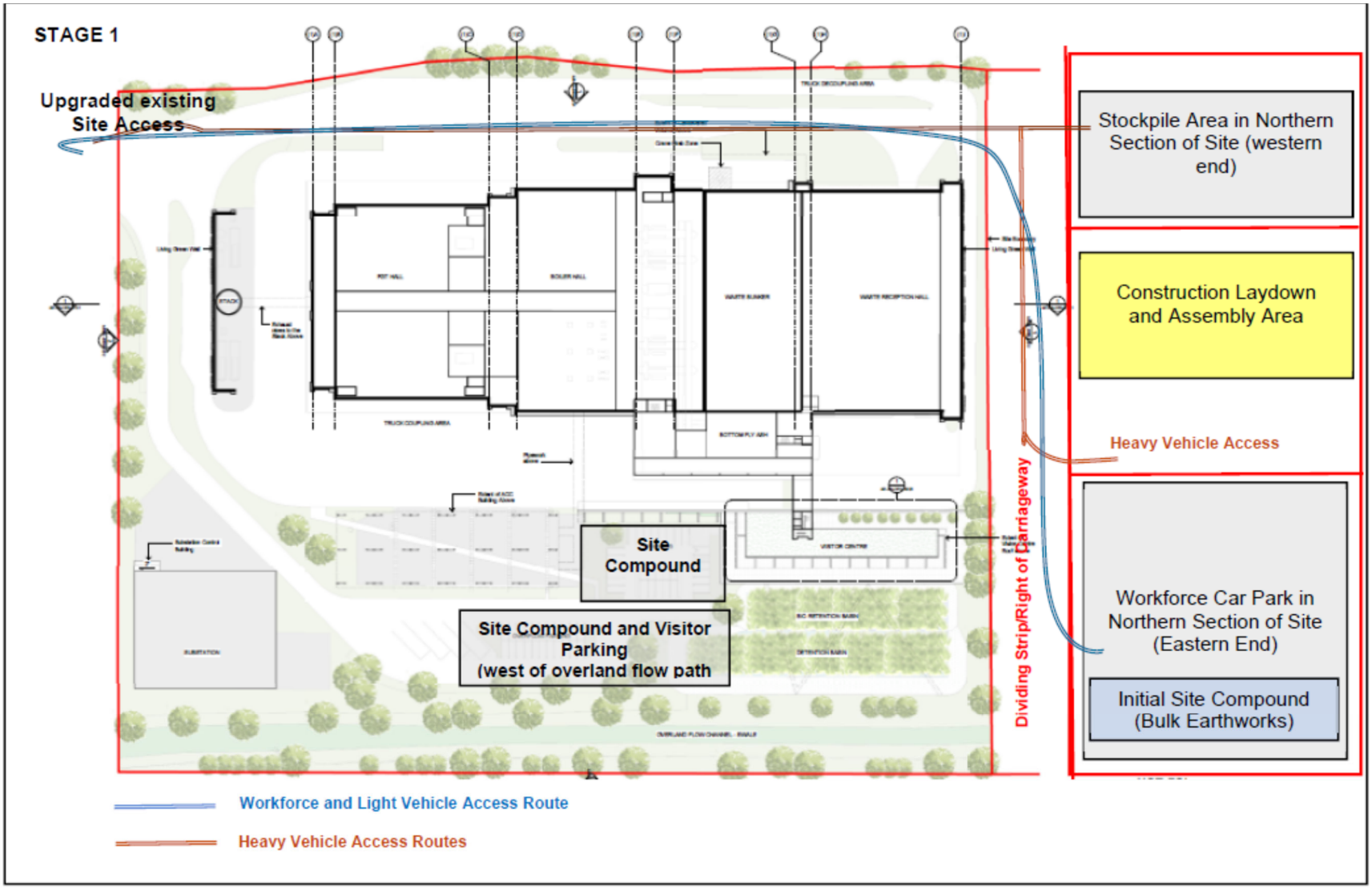


Figure 3 Indicative Site Layout Stage 1 (Enabling Works and Bulk Earthworks)

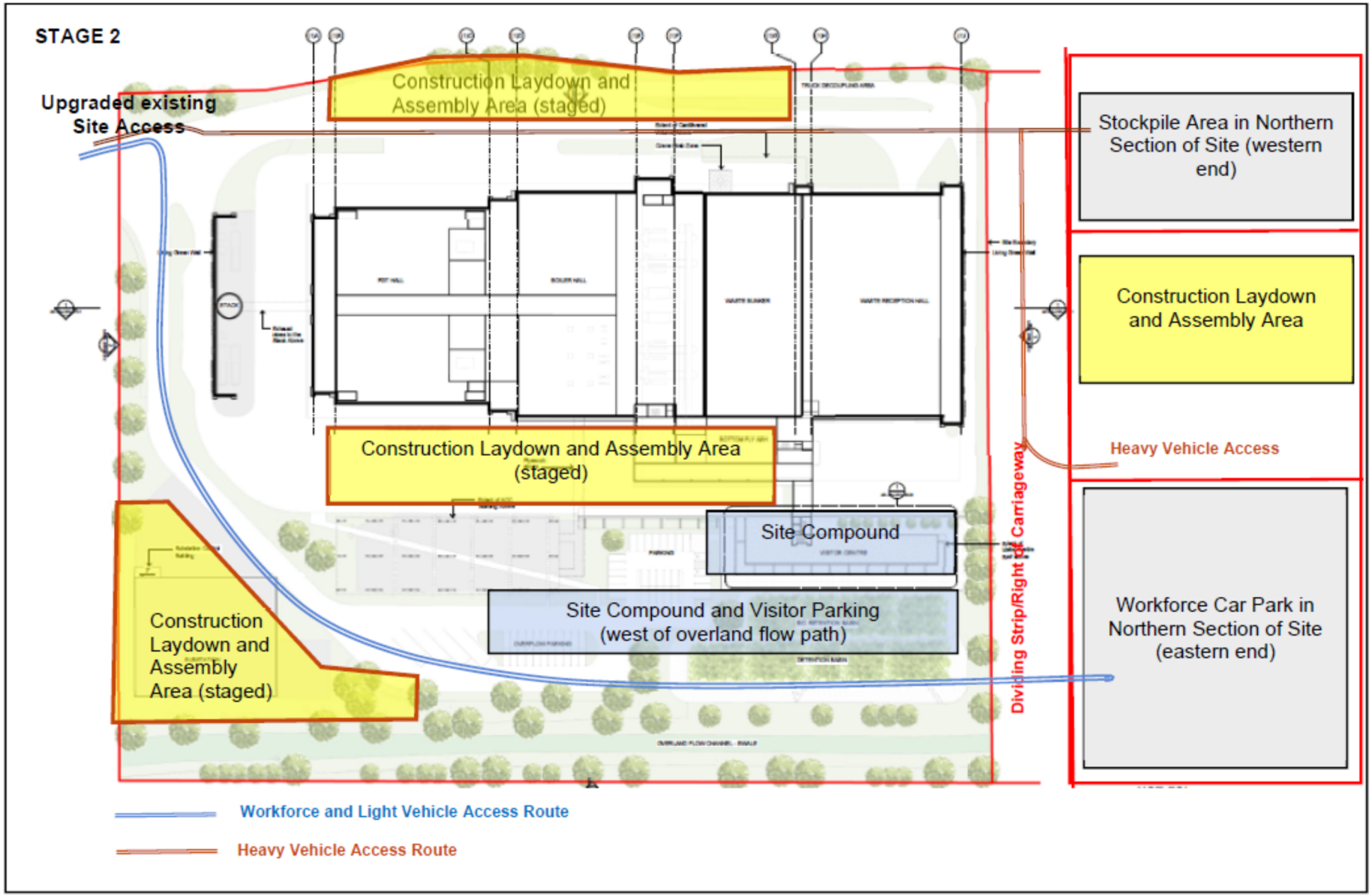


Figure 4 Indicative Site Layout Stage 2 (Main Construction)

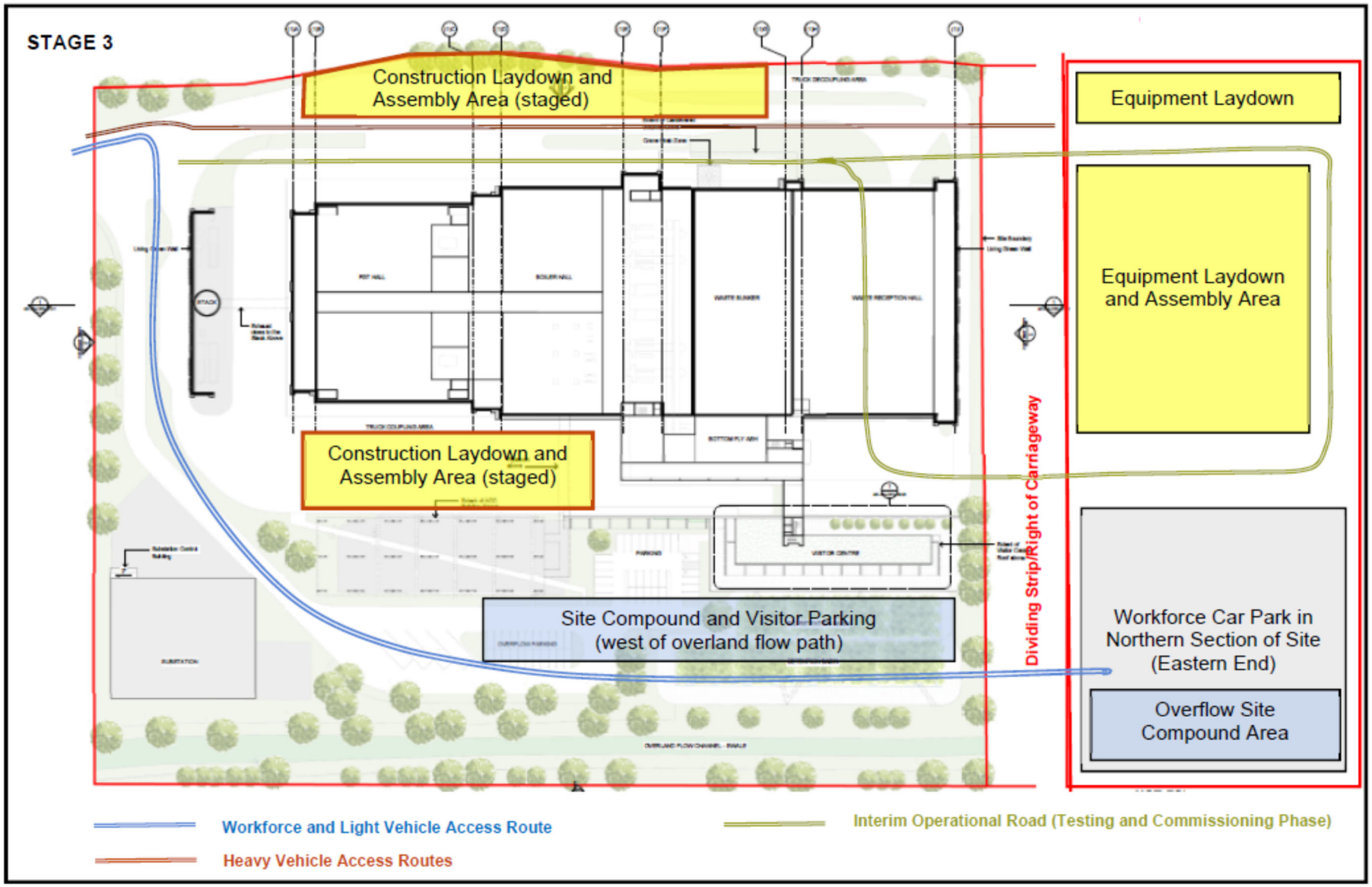


Figure 5 Indicative Site Layout Stage 3 (Ancillary Works, Testing and Commissioning, External Works)

3.4 CONSTRUCTION TIMEFRAMES

Overall construction timeframe is expected to be 3¼ years (39 months). Within this overall time-frame, typical works and expected durations are set out in Table 1, Figure 6 and the following sections.

Table 1 Construction Phase Durations

Phase	Interface	Duration
Phase 1 - Demolition	This phase will commence at the start of the construction process	3 months
Phase 2 - Site Establishment and Enabling Works	This phase is likely to commence prior to completion of Phase 1 and some Phase 2 activities will occur concurrently with demolition.	5 months
Phase 3 - Main Construction Works	This phase is likely to commence progressively and proceed concurrently during Phase 2 activities as areas of the prepared site become available.	27 months
Phase 4 – Testing and Commissioning	This phase will commence progressively on completion of the relevant main works construction and progressively and proceed concurrently with Phase 5.	7 months
Phase 5 - Finishing and Landscaping Works	Some aspects of this phase are likely to commence prior to completion of Phase 3 as site areas become available	6 months

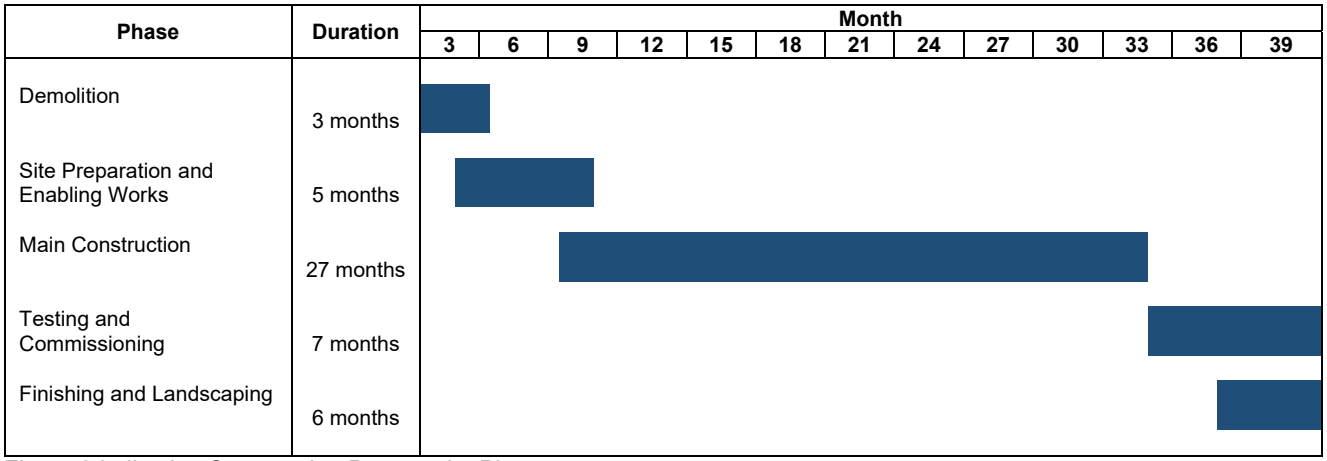


Figure 6 Indicative Construction Program by Phase

4.0 OUTLINE CONSTRUCTION TRAFFIC MANAGEMENT PLAN

4.1 GENERAL

Once the detailed construction methodology and project timeframes are confirmed a Construction Traffic Management Plan (CTMP) will be prepared for the project prior construction, to accurately define and manage traffic impacts at a local level.

The detailed CTMP will address:

- Roles and responsibilities for traffic management
- Information, training, instruction and supervision including site induction
- Site Layout
- Designated travel paths for vehicles including entry and exit points and crossings
- Designated delivery and loading and unloading areas
- Haul routes for plant and materials and debris
- Requirements for special vehicle such as large vehicles and mobile cranes
- Separation of pedestrians and vehicles including pedestrian and traffic routes
- Reversing vehicles
- Traffic control measures including barriers, walkways, signs, warning devices and visibility
- Emergency instructions or procedures
- Monitoring and review
- Site induction

This section outlines the main considerations and preliminary approach to traffic management issues to be addressed in the CTMP for this project.

4.2 CONSTRUCTION WORKFORCE

The construction workforce will comprise trades and construction personnel, sub-contract construction personnel and engineering, functional and administrative staff. Workforce size will vary across the day and throughout the phases project.

The construction workforce is expected to peak at approximately 600.

The workforce numbers have been assessed by considering the value of the average monthly turnover of the main construction phase scope. On the basis that the labour component of building works is in the region of 25% of turnover, the average workforce is in the order of 320 workers during the main construction phase and 230 across the overall project duration. This excludes supervision and other site overhead staff.

Assessed peak and average workforce numbers for each phase, and for the total project (accounting for workforce distribution and overlapping of some phases), is provided in Table 2 .

Table 2 Peak and Average Workforce by Phase

Phase	Peak	Average
Demolition	20	20
Site Preparation and Enabling Works	40	40
Main Construction	600	300
Testing and Commissioning	200	130
Finishing and Landscaping	40	40
TOTAL	**600**	**240**

4.3 HOURS OF OPERATION FOR THE SITE

The following work hours of work are proposed:

- Monday to Friday: 7.00am to 6.00pm
- Saturday: 8.00am to 1.00pm
- Sundays and Public Holidays: No work permitted

For limited specific activities where longer durations of work on site are required for practical, reasons, extended hours of work will be requested. Requests for construction work to be undertaken between 7:00am and 6:00pm on Saturdays and for selected 24-hour operations will be made for the following limited circumstances:

- Utility diversions or upgrades, where impacts to existing services cannot be otherwise reasonably managed within standard working hours.
- Large Concrete Pours (e.g. bunkers) where concrete is poured continuously over periods of 24-hour operation over several days.
- Delivery of Oversized Plant and Equipment (e.g. tanks, stacks, crawler cranes and large earthmoving equipment) which need to travel on NSW roads outside of EPA recommended construction hours. Such activities will be undertaken in line with NSW Police and TfNSW requirements which many include out-of-hours movements when vehicle numbers on the network are lower.
- Installation of oversized plant which is required to be installed safely and sequentially using cranes in a very specific order to maintain stability and safety at all stages of installation and assembly.
- Safety Works including mandatory safety inspections carried out prior to operatives commencing work on a daily and ongoing basis. These inspections will also occur after the operatives have completed works each day.
- Emergency works to avoid the loss-of-life, property and/or to prevent environmental harm.
- Maintenance and Utility Works where out-of-hours work is specified by the Utility stakeholder.
- Maintenance of specialist Construction Plant Maintenance

Any works taking place outside of the standard working hours would be in accordance with the Interim Construction Noise Guideline (ICNG, DECC, 2009).

4.4 CONSTRUCTION TRAFFIC VOLUMES

4.4.1. CONSTRUCTION AND WORKFORCE VEHICLES

A mix of vehicles would be needed to build and service the construction works.

This would include heavy and light vehicles to deliver materials and remove waste. Heavy vehicles would be also used to deliver materials haul materials across the construction site, including between compounds and laydown areas. Construction staff would also travel to and from site by car

Vehicle types considered in assessing construction traffic impacts comprise:

- Cars and Utes (workforce and deliveries)
- Trucks (Earthworks and Deliveries)
- Concrete Agitator Trucks
- Heavy Vehicles for special deliveries (Steel, Heavy Plant and Equipment)
- Mobile Cranes

Heavy vehicles

The balance of deliveries, imported spoil or spoil transferred off-site will be by 30-32t trucks and dogs. It is estimated that an average of approximately 45 heavy vehicles per day (88 daily heavy vehicle movements) are expected to travel to the site across the three-year construction period with maximum of approximately 60 heavy vehicles per day (120 daily heavy vehicle movements) during the main construction phase.

Isolated construction activities including major concrete pours could increase this by 25% to an absolute peak of 75 heavy vehicles (150 heavy vehicle movements) for up to 10 days. Heavy vehicles would include rigid trucks, truck and dogs and semi-trailers.

Light Vehicles

The construction workforce is expected to peak at approximately 600. On average a workforce of 320 during the main construction phase is anticipated with most of those arriving by car or utility vehicle.

Allowing for 25% of workers adopting car sharing or arriving in construction vehicles, it is therefore expected that approximately 200 cars and light vehicles will arrive and leave the site daily on average with a peak of 450 light vehicles per day.

The workforce is likely to arrive and leave site on the fringes of the peak periods. For the PM period it is assumed that two shifts finish work at 3:30pm and 5:30pm respectively with the construction worker traffic distributed shown in Table 3

Table 3 Outbound Construction Traffic (PM Peak)

Time	Distribution	No. Outbound Trips
15:00 – 16:00	30%	135
16:00 – 17:00	20%	90
17:00 – 18:00	30%	135
18:00 – 19:00	20%	90
TOTAL		**450**

Traffic modelling undertaken for the proposal indicates that the operational phase is expected to generate 236 two-way vehicle movements with 33 occurring in the peak hour between 09:00-10:00, this includes a high proportion of heavy vehicles.

Additional occasional vans and small trucks are also likely to arrive and leave site over the course of the day, making small deliveries.

Reductions in trip numbers may also be realised by encouraging workers to use public transport and provision of shuttle bus services from nearby transport hubs including Blacktown, Parramatta or Fairfield.

4.4.2. TRUCK MOVEMENTS

A preliminary estimate of daily peak and average truck movements associated with construction of the proposed facility, is summarised in Figure 7. Average daily movements during the main construction phase is estimated at 60 truck movements per day and over the course of construction is 45 truck movements per day.

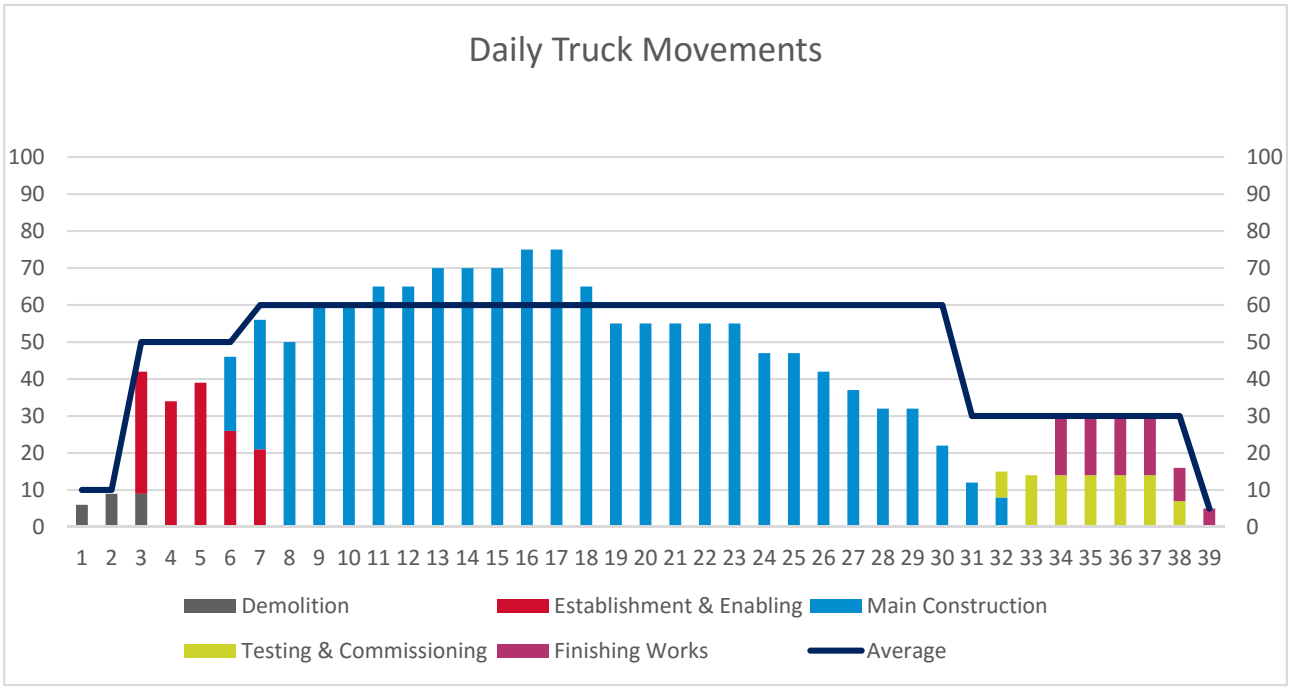


Figure 7 Indicative Daily Truck Movements

4.5 CONSTRUCTION TRAFFIC ROUTES

Construction traffic approach and departure routes

Heavy vehicle movements on local roads would be minimised as far as possible and restricted to designated transport haulage routes.

The primary construction access route for heavy vehicle deliveries to the site is via Wallgrove Road and the WestLink M7 Motorway which provides a high standard motorway connection to other parts of the Sydney metropolitan and regional road networks. The M7 exit at Wallgrove Road to the site shares the entry road to the nearby Austral Bricks manufacturing site. Approved routes for heavy vehicle deliveries are also likely to

include Wallgrove Road and Western Motorway (M4). There is no requirement for construction vehicles to utilise residential road networks.

Specific access routes within the construction footprint would be established to control the movement of heavy vehicles onsite.

Site Entrance

Site Access will be provided from WestLink M7 motorway and Wallgrove Road via an unnamed road (also referred to as the Austral Bricks Road) adjacent to the site's southern boundary.

The existing site access to the site from Austral Bricks Road located 50m east of the Wallgrove Road / Austral Bricks Road intersection will be retained as the permanent site entrance subject to structural integrity but will be upgraded including pavement widening and replacement of vehicle barriers.

Site Compounds

Areas for site compounds, initial construction laydown, hardstand areas and workforce parking will be provided at the site. A preliminary layout, showing heavy and light vehicle access routes is provided in section 3.2.

The main site compound will be located to the eastern side of the site so that it is clear of overland flow paths. In later stages of construction, part of this area will become the construction site for the visitor centre and air-cooled condensers (ACC).

An area for temporary stockpiles during the bulk earthworks and detailed excavation works is designated at the northern part of the site. Part of this area may be retained as a temporary stockpile area until later in the construction period and will eventually be used for general engineering fill material.

Final site compound layout to be developed prior to construction will include:

- Perimeter fencing and site security facilities and procedures.
- Stormwater drainage and overland flow channel.
- Designated services corridors (temporary and permanent).
- Erosion and sediment control measures to contain water on site and prevent run-off from the site. These will include silt barriers, drainage channels, sediment treatment pond, dust control and contaminated waste treatment as well as monitoring and reporting.
- Noise and vibration mitigation measures including noise barriers, screening and noise monitoring.
- External construction traffic routes to and from the site and within the site and designating car park and laydown areas.
- Identification and protection of heritage (indigenous and non-indigenous) items (e.g. registered sites and artefacts)
- Hazardous materials storage area and security
- Spill containment and clean-up equipment
- Parking facilities

Public Transport Access

Access via public transport is possible using bus stops on Wallgrove Road which are served by the 738 and 835 bus services. However, there is currently no footpath or pedestrian crossings to aid people using the bus stops.

A shared path also runs along the east side of the M7 and connects to Austral Bricks Road enabling cycling to the site via a segregated facility. The shared path is separated from road traffic and extends almost the entire length of the M7, from Campbelltown to Kings Langley with key urban centres along the way including Rooty Hill town centre, Blacktown sporting district and Liverpool CBD.

While public transport and active transport options are available, it is not considered that these transport modes will account for a significant volume of travel during the construction phase due to work hours and the requirement for many workers to arrive with their own transport to support trade work including light and heavy vehicles.

Temporary Traffic Control and Pedestrian Arrangements

Generally, no specific additional temporary traffic control or pedestrian arrangements are expected to be required on the public road network. However, for very specific deliveries (e.g. delivery of oversized plant and equipment such as tanks, stacks, crawler cranes and large earthmoving equipment which need to travel on NSW roads outside of EPA recommended construction hours), activities will be undertaken in line with NSW Police and TfNSW requirements and may require short term traffic controls to be establishes the two key locations identified above.

Once the detailed construction methodology and project timeframes are confirmed a final Construction Traffic Management Plan (CTMP) will be prepared for the project prior construction, to accurately define and manage traffic impacts at a local level.

Network Impacts

Traffic modelling undertaken for the proposal indicates that the operational phase is expected to generate 236 two-way vehicle movements with 33 occurring in the peak hour between 09:00-10:00, this includes a high proportion of heavy vehicles.

The construction phase of the proposal is expected to generate a general maximum of 106 daily truck movements and absolute peak of 150 daily truck movements. These are both substantially less that the 193 two-way expected daily truck movements after the facility becomes operational.

An assessment of the existing road network capacity has been undertaken at intersections in the vicinity of the site which will be used by all traffic accessing the proposal. This includes potential traffic increases from other future infrastructure schemes in the vicinity of the proposal including the proposed Gazcorp Industrial Estate (SSD 5248), on the western side of Wallgrove Road This development will generate a significant amount of traffic in both network peak hours and the developer proposes to add a western arm to the Wallgrove Road / Austal Bricks Road intersection and signalise it to accommodate this traffic uplift.

The key intersections which have been assessed are:

- Wallgrove Road / Austral Bricks Road
- Austral bricks Road / Site Access

The modelling results indicate that despite the uplift in traffic in construction relating to the proposal the intersection will continue to operate with a Level of Service C.

In both the AM and PM scenarios the queuing and average delay on the Austral Bricks Road increases, however, the queue will only impede the access to the site in the PM construction scenario. This impact is considered acceptable as the peak construction is only programmed to last 3 months. Despite this queue, vehicles would still be able to egress the site without major delays in most cases. Outside the peak construction period the impact to queuing on Austral Bricks Road approach will reduce.

4.6 SITE PARKING ARRANGEMENTS

It is anticipated that parking during peak construction will be required for up to 300 cars and utility vehicles. This allows for staggered shifts and a split between workers arriving in special vehicles, car pooling and using public transport.

A designated area of approximately 6,000m^2 of the existing tarmac area will be allocated within the 2.04ha northern section of the site which is part of the adjacent lot separated from the main construction site by a dividing

strip which includes a right of carriageway benefitting the proposal site and allowing vehicles to move between the two parts of the site.

A separated access route to this area along the eastern section of the main site will provide safe access to the car park which will be accessed from the existing right of way. The route of the access road and right of way crossing points are expected to be realigned from time to time during construction to suit the actual construction phase.

A designated pedestrian walkway from the car park to site offices and main construction site, separated from the vehicle access route, will be identified and delineated with barriers and signage.

Limited visitor and short term parking for light vehicles will be also be provided adjacent to the site offices.

4.7 STAKEHOLDERS

Construction of the WSERRC impacts a number of stakeholders including the following organisations and Authorities who may need to be engaged prior to finalising development of the project:

Authorities and Agencies:

- Blacktown City Council – Blacktown Local Government Area (LGA)
- Transport for NSW
- Westlink M7
- NSW Environment Protection Agency (EPA)
- Water NSW

Adjacent Landholders including:

- Austral Bricks
- Suez Easter Creek Waste Management Centre
- Global Renewables
- Veolia Environmental Services
- Gazcorp

Nearby Local Communities located near to the site:

- Erskine Park residential area located approximately 3.5 km to the west
- Minchinbury located approximately 3 km to the north
- Horsley Park Public School located over 2 km south
- Eastern Creek childcare centre located within an industrial area approximately 1 km to the

4.8 SUMMARY

The construction traffic impacts on the intersections directly impacted by the proposal have been assessed in the Traffic and Transport of the EIS. This analysis concluded that a Level of Service C will be maintained although there will be impacts to queuing on the Austral Bricks Road which will only occur over a 3-month period.

Throughout the rest of the construction programme reduced numbers of workers on site will reduce the impacts. If required further mitigation measures could be applied to manage the traffic impacts as the CTMP is refined when a contractor is appointed.

However once the detailed construction methodology and project timeframes are confirmed a Construction Traffic Management Plan (CTMP) will be prepared for the project prior construction, to accurately define and manage traffic impacts at a local level.

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Appendix B

Site Access Design

A1

LOT 104
DP 1168236

EXISTING TREES THAT MAY REQUIRE TO BE REMOVED BY WIDENING WORKS.

LOT 109
DP 1168236

LOT 100
DP 1168236

EXTENT OF EXISTING ACCESS ROAD NO LONGER REQUIRED IN PERMANENT CONDITION.

HEADWALL FOR WARRAGAMBA PIPELINES

WIDEN EXISTING ROAD AND RE-PROFILE M7 EMBANKMENT

LOT 105
DP 1168236

HEADWALL FOR WARRAGAMBA PIPELINES

LOT 101
DP 1168236

LOT 110
DP 1168236

LOT 102
DP 1107533

LOT 106
DP 1168236

LOT 111
DP 1168236

EXISTING ELECTRICAL EQUIPMENT TO BE RE-LOCATED CLEAR OF WIDENING CARRIAGEWAY.

EXISTING TREES THAT WILL REQUIRE TO BE REMOVED BY WIDENING WORKS.

LOT 103
DP 1107533

LOT 112
DP 1168236

EXISTING CONCRETE BARRIER TO BE MODIFIED TO ACCOMMODATE NEW KERB LINE. MINIMAL CLEARANCE WITH M7 BRIDGE PIER.

R13.5 m

R10.0 m

LOT 107
DP 1168236

LOT 108
DP 1168236

4.24

4.81

LOT 22
DP 1107533

LOT 16
DP 1107533

LOT 7
DP 1059698

EXISTING KERB TO BE REMOVED.

LOT 23
DP 1107533

Scales
Do not scale

0 5 10
Scale 1:250m

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

NOT FOR CONSTRUCTION

Job Title
WSERRC

ARUP
Arup, Level 5, 151 Clarence St
Sydney, NSW, 2000
Tel +61 (02) 9320 9320 Fax +61 (02) 9320 9321
www.arup.com

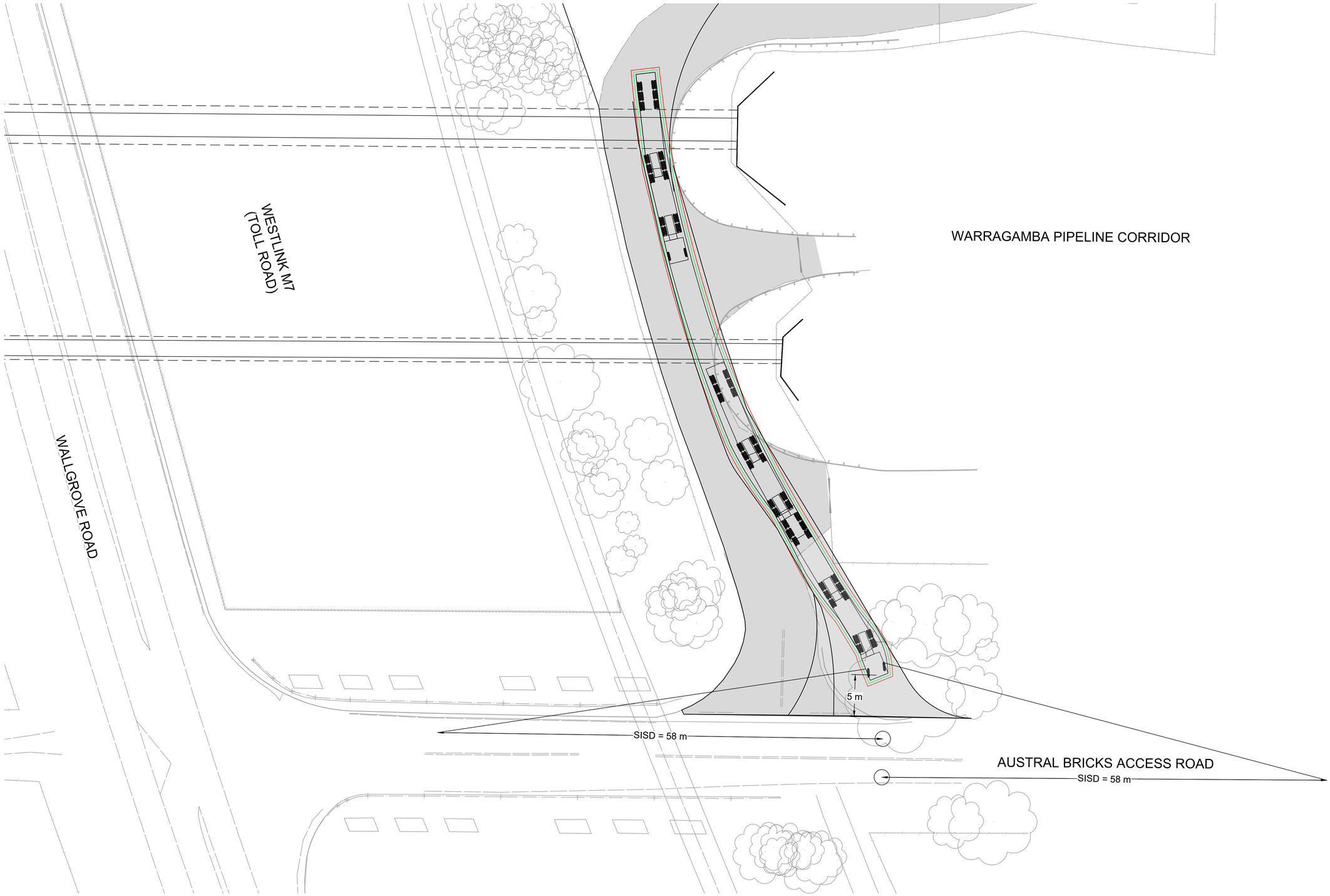
CONSULT AUSTRALIA
Member Firm
Arup Pty Ltd
ABN 18 000 966 165

Drawing Title
Civil Works
Swept Path Analysis
26 m B-Double (West Widening)

Sketch Status
Issued for Review

Sketch No
ARU-SYD-CICW-SKT-0025

Issue
0



NOT FOR CONSTRUCTION

Scales

Filename (Full Drawing No)
WSERRC-ARU-SYD-CICW-DRG-1200
Design Model Version

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd
0	05/06/20	HL	SO	EM

Preliminary Issue

Client
CLEANAWAY
Making a sustainable future possible
MACQUARIE

Engineering Certification (CEng)
Name: .....
Signature: ..... Date: .....

Job Title
WESTERN SYDNEY ENERGY
RESOURCE RECOVERY CENTRE

Scale at A1 1:250m

Discipline Civil

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Sydney, NSW, 2000
Tel +61 (02) 9320 9320 Fax +61 (02) 9320 9321
www.arup.com

CONSULT AUSTRALIA
Member Firm
Arup Pty Ltd
ABN 18 000 966 165

Drawing Title
TRAFFIC
SIGHT LINES

Drawing Status
Preliminary Issue

Job No	Drawing No	Issue
264039-00	**ARU-SYD-CICW-DRG-1200**	

Do not scale

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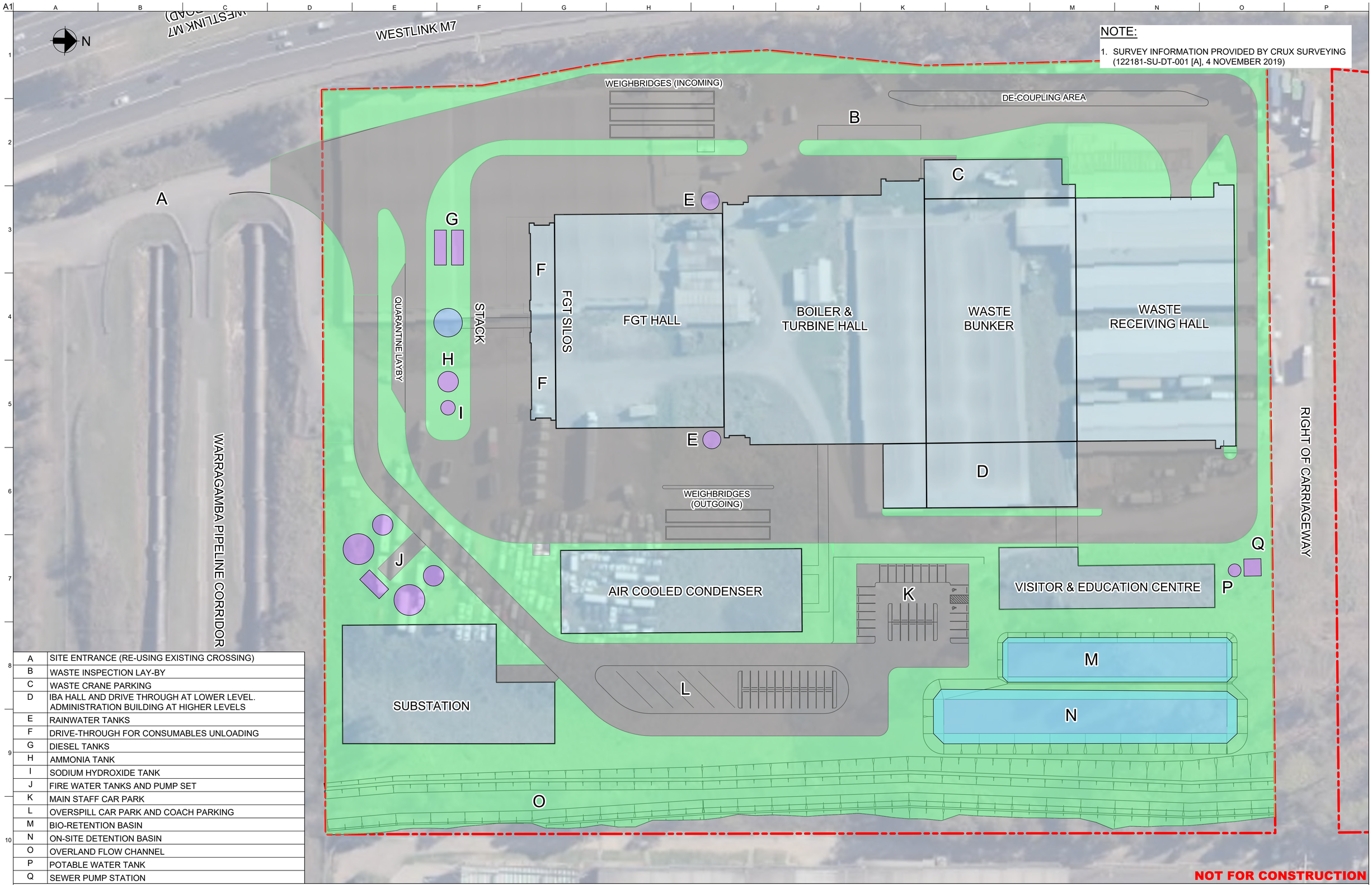
Appendix C

Site Layout



NOTE:

1. SURVEY INFORMATION PROVIDED BY CRUX SURVEYING (122181-SU-DT-001 [A], 4 NOVEMBER 2019)

A	SITE ENTRANCE (RE-USING EXISTING CROSSING)
B	WASTE INSPECTION LAY-BY
C	WASTE CRANE PARKING
D	IBA HALL AND DRIVE THROUGH AT LOWER LEVEL. ADMINISTRATION BUILDING AT HIGHER LEVELS
E	RAINWATER TANKS
F	DRIVE-THROUGH FOR CONSUMABLES UNLOADING
G	DIESEL TANKS
H	AMMONIA TANK
I	SODIUM HYDROXIDE TANK
J	FIRE WATER TANKS AND PUMP SET
K	MAIN STAFF CAR PARK
L	OVERSPILL CAR PARK AND COACH PARKING
M	BIO-RETENTION BASIN
N	ON-SITE DETENTION BASIN
O	OVERLAND FLOW CHANNEL
P	POTABLE WATER TANK
Q	SEWER PUMP STATION

NOT FOR CONSTRUCTION

Scales

Filename (Full Drawing No)
WSERRC-ARU-SYD-CICW-DRG-0020
Design Model Version

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd
A	29/06/20	HNA	AC	EM
	FOR APPROVAL			
0	22/05/20	HNA	AC	EM
	FOR PLANNING APPROVAL			

Client: CLEANAWAY WESTERN SYDNEY ENERGY & RESOURCE RECOVERY CENTRE / MACQUARIE

Engineering Certification (CEng)
Name: .....
Signature: ..... Date: .....

Job Title
WESTERN SYDNEY ENERGY AND RESOURCE RECOVERY CENTRE

Scale at A1 1:500m

Discipline Civil

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CONSULT AUSTRALIA Member Firm
Arup Pty Ltd
ABN 18 000 966 165

Drawing Title
PROPOSED SITE PLAN

Drawing Status
Issue for Approval

Job No	Drawing No	Issue
264039-00	ARU-SYD-CICW-DRG-0020	A

Do not scale

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Appendix D

SIDRA Modelling results

MOVEMENT SUMMARY

Site: 101 [Future (Gazcorp Interim 2021) 16:00-17:00]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 119 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Wallgrove Rd (S)												
1	L2	54	14.0	0.073	26.3	LOS B	1.8	14.0	0.61	0.70	0.61	40.8
2	T1	1184	14.0	0.863	32.5	LOS C	40.7	319.3	0.89	0.85	0.95	39.1
3	R2	2	58.0	0.032	67.6	LOS E	0.1	1.3	0.97	0.62	0.97	27.4
Approach		1240	14.1	0.863	32.3	LOS C	40.7	319.3	0.88	0.84	0.93	39.1
East: Austral Bricks Access												
4	L2	6	100.0	0.279	55.9	LOS D	2.2	23.8	0.92	0.75	0.92	30.4
5	T1	1	0.0	0.279	49.8	LOS D	2.2	23.8	0.92	0.75	0.92	31.6
6	R2	34	58.0	0.279	56.0	LOS D	2.2	23.8	0.92	0.75	0.92	30.4
Approach		41	63.0	0.279	55.9	LOS D	2.2	23.8	0.92	0.75	0.92	30.5
North: Wallgrove Rd (N)												
7	L2	8	32.0	0.011	22.4	LOS B	0.2	2.2	0.53	0.64	0.53	42.3
8	T1	1069	14.0	0.858	29.4	LOS C	36.3	284.9	0.82	0.79	0.88	40.4
9	R2	99	14.0	0.775	70.4	LOS E	6.2	48.7	1.00	0.87	1.24	27.3
Approach		1177	14.1	0.858	32.8	LOS C	36.3	284.9	0.84	0.79	0.91	38.8
West: Gazcorp access												
10	L2	312	14.0	0.864	54.5	LOS D	29.7	232.9	1.00	0.95	1.16	31.1
11	T1	1	0.0	0.864	48.8	LOS D	29.7	232.9	1.00	0.95	1.16	31.7
12	R2	167	14.0	0.864	54.6	LOS D	29.7	232.9	1.00	0.95	1.16	31.2
Approach		480	14.0	0.864	54.5	LOS D	29.7	232.9	1.00	0.95	1.16	31.1
All Vehicles		2938	14.8	0.864	36.5	LOS C	40.7	319.3	0.88	0.84	0.96	37.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P11	South Stage 1	53	53.8	LOS E	0.2	0.2	0.95	0.95
P12	South Stage 2	53	53.8	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	2	53.7	LOS E	0.0	0.0	0.95	0.95
P3	North Full Crossing	53	53.8	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	53.8	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		213	53.8	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Future (Gazcorp Interim 2021) 08:00-09:00]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 142 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Wallgrove Rd (S)												
1	L2	167	14.0	0.271	40.3	LOS C	8.1	63.2	0.75	0.78	0.75	36.8
2	T1	1007	14.0	0.924	52.5	LOS D	47.8	375.0	0.94	0.94	1.07	34.8
3	R2	27	58.0	0.493	85.9	LOS F	2.0	21.4	1.00	0.73	1.02	23.1
Approach		1202	15.0	0.924	51.6	LOS D	47.8	375.0	0.91	0.91	1.02	34.7
East: Austral Bricks Access												
4	L2	11	100.0	0.203	70.4	LOS E	1.7	18.9	0.94	0.73	0.94	27.1
5	T1	1	0.0	0.203	64.3	LOS E	1.7	18.9	0.94	0.73	0.94	28.1
6	R2	14	58.0	0.203	70.5	LOS F	1.7	18.9	0.94	0.73	0.94	27.2
Approach		25	73.1	0.203	70.3	LOS E	1.7	18.9	0.94	0.73	0.94	27.2
North: Wallgrove Rd (N)												
7	L2	28	32.0	0.028	14.7	LOS B	0.6	5.6	0.35	0.66	0.35	46.3
8	T1	1305	14.0	0.820	11.1	LOS A	27.8	218.1	0.53	0.49	0.53	57.7
9	R2	312	14.0	0.925	76.6	LOS F	23.4	183.2	0.85	0.95	1.21	26.9
Approach		1645	14.3	0.925	23.6	LOS B	27.8	218.1	0.59	0.58	0.66	47.2
West: Gazcorp access												
10	L2	99	14.0	0.681	70.0	LOS E	10.5	82.2	1.00	0.84	1.04	27.5
11	T1	1	0.0	0.681	64.3	LOS E	10.5	82.2	1.00	0.84	1.04	28.0
12	R2	54	14.0	0.681	70.1	LOS E	10.5	82.2	1.00	0.84	1.04	27.6
Approach		154	13.9	0.681	70.0	LOS E	10.5	82.2	1.00	0.84	1.04	27.5
All Vehicles		3026	15.1	0.925	37.4	LOS C	47.8	375.0	0.74	0.72	0.82	39.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P11	South Stage 1	53	65.3	LOS F	0.2	0.2	0.96	0.96
P12	South Stage 2	53	65.3	LOS F	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	65.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	65.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	65.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		263	65.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Future (Gazcorp Interim 2021) + WSERRC CON 08:00-09:00]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 142 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Wallgrove Rd (S)												
1	L2	167	10.0	0.264	40.1	LOS C	8.0	61.1	0.74	0.78	0.74	37.4
2	T1	1007	14.0	0.923	52.4	LOS D	47.7	374.1	0.94	0.94	1.06	34.9
3	R2	27	58.0	0.493	85.9	LOS F	2.0	21.4	1.00	0.73	1.02	23.1
Approach		1202	14.4	0.923	51.4	LOS D	47.7	374.1	0.91	0.91	1.02	34.8
East: Austral Bricks Access												
4	L2	11	100.0	0.292	72.5	LOS F	2.3	25.5	0.96	0.74	0.96	26.7
5	T1	1	0.0	0.292	66.4	LOS E	2.3	25.5	0.96	0.74	0.96	27.6
6	R2	22	60.1	0.292	72.6	LOS F	2.3	25.5	0.96	0.74	0.96	26.7
Approach		34	70.7	0.292	72.4	LOS F	2.3	25.5	0.96	0.74	0.96	26.8
North: Wallgrove Rd (N)												
7	L2	156	10.0	0.133	15.1	LOS B	3.7	28.4	0.38	0.70	0.38	50.2
8	T1	1305	14.0	0.821	11.1	LOS A	27.9	218.8	0.53	0.49	0.53	57.7
9	R2	312	14.0	0.926	76.8	LOS F	23.4	183.4	0.85	0.95	1.22	26.8
Approach		1773	13.6	0.926	23.0	LOS B	27.9	218.8	0.58	0.59	0.64	47.4
West: Gazcorp access												
10	L2	99	14.0	0.682	70.0	LOS E	10.5	82.3	1.00	0.84	1.04	27.5
11	T1	1	0.0	0.682	64.3	LOS E	10.5	82.3	1.00	0.84	1.04	28.0
12	R2	54	14.0	0.682	70.1	LOS E	10.5	82.3	1.00	0.84	1.04	27.6
Approach		154	13.9	0.682	70.0	LOS E	10.5	82.3	1.00	0.84	1.04	27.5
All Vehicles		3162	14.6	0.926	36.6	LOS C	47.7	374.1	0.73	0.72	0.81	40.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P11	South Stage 1	53	65.3	LOS F	0.2	0.2	0.96	0.96
P12	South Stage 2	53	65.3	LOS F	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	65.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	65.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	65.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		263	65.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Future (Gazcorp Interim 2021) + WSERRC OP 16:00-17:00]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 119 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Wallgrove Rd (S)												
1	L2	54	14.0	0.073	26.3	LOS B	1.8	14.0	0.61	0.70	0.61	40.8
2	T1	1184	14.0	0.863	32.5	LOS C	40.7	319.3	0.89	0.85	0.95	39.1
3	R2	2	58.0	0.032	67.6	LOS E	0.1	1.3	0.97	0.62	0.97	27.4
Approach		1240	14.1	0.863	32.3	LOS C	40.7	319.3	0.88	0.84	0.93	39.1
East: Austral Bricks Access												
4	L2	6	100.0	0.397	57.2	LOS E	3.1	33.5	0.94	0.77	0.94	30.1
5	T1	1	0.0	0.397	51.1	LOS D	3.1	33.5	0.94	0.77	0.94	31.2
6	R2	49	58.0	0.397	57.3	LOS E	3.1	33.5	0.94	0.77	0.94	30.1
Approach		57	61.6	0.397	57.2	LOS E	3.1	33.5	0.94	0.77	0.94	30.1
North: Wallgrove Rd (N)												
7	L2	11	11.2	0.013	22.1	LOS B	0.3	2.3	0.53	0.65	0.53	42.9
8	T1	1069	14.0	0.858	29.4	LOS C	36.3	284.9	0.82	0.79	0.88	40.4
9	R2	99	14.0	0.775	70.4	LOS E	6.2	48.7	1.00	0.87	1.24	27.3
Approach		1179	14.0	0.858	32.8	LOS C	36.3	284.9	0.84	0.79	0.91	38.8
West: Gazcorp access												
10	L2	312	14.0	0.864	54.6	LOS D	29.7	233.0	1.00	0.96	1.16	31.1
11	T1	1	0.0	0.864	48.9	LOS D	29.7	233.0	1.00	0.96	1.16	31.7
12	R2	167	14.0	0.864	54.6	LOS D	29.7	233.0	1.00	0.96	1.16	31.2
Approach		480	14.0	0.864	54.6	LOS D	29.7	233.0	1.00	0.96	1.16	31.1
All Vehicles		2956	14.9	0.864	36.6	LOS C	40.7	319.3	0.88	0.84	0.96	37.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P11	South Stage 1	53	53.8	LOS E	0.2	0.2	0.95	0.95
P12	South Stage 2	53	53.8	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	2	53.7	LOS E	0.0	0.0	0.95	0.95
P3	North Full Crossing	53	53.8	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	53.8	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		213	53.8	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Future (Gazcorp Interim 2021) + WSERRC OP 08:00-09:00]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 142 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Wallgrove Rd (S)												
1	L2	167	14.0	0.271	40.3	LOS C	8.1	63.2	0.75	0.78	0.75	36.8
2	T1	1007	14.0	0.924	52.5	LOS D	47.8	375.0	0.94	0.94	1.07	34.8
3	R2	27	58.0	0.493	85.9	LOS F	2.0	21.4	1.00	0.73	1.02	23.1
Approach		1202	15.0	0.924	51.6	LOS D	47.8	375.0	0.91	0.91	1.02	34.7
East: Austral Bricks Access												
4	L2	11	100.0	0.218	70.5	LOS F	1.8	18.9	0.95	0.73	0.95	27.1
5	T1	1	0.0	0.218	64.4	LOS E	1.8	18.9	0.95	0.73	0.95	28.0
6	R2	16	35.0	0.218	70.4	LOS E	1.8	18.9	0.95	0.73	0.95	27.4
Approach		27	58.7	0.218	70.3	LOS E	1.8	18.9	0.95	0.73	0.95	27.3
North: Wallgrove Rd (N)												
7	L2	46	4.7	0.038	14.4	LOS A	1.0	7.5	0.35	0.67	0.35	51.8
8	T1	1305	14.0	0.820	11.1	LOS A	27.8	218.1	0.53	0.49	0.53	57.7
9	R2	312	14.0	0.925	76.7	LOS F	23.4	183.3	0.85	0.95	1.22	26.9
Approach		1663	13.7	0.925	23.5	LOS B	27.8	218.1	0.59	0.58	0.66	47.3
West: Gazcorp access												
10	L2	99	14.0	0.681	70.0	LOS E	10.5	82.2	1.00	0.84	1.04	27.5
11	T1	1	0.0	0.681	64.3	LOS E	10.5	82.2	1.00	0.84	1.04	28.0
12	R2	54	14.0	0.681	70.1	LOS E	10.5	82.2	1.00	0.84	1.04	27.6
Approach		154	13.9	0.681	70.0	LOS E	10.5	82.2	1.00	0.84	1.04	27.5
All Vehicles		3046	14.6	0.925	37.3	LOS C	47.8	375.0	0.74	0.72	0.82	39.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P11	South Stage 1	53	65.3	LOS F	0.2	0.2	0.96	0.96
P12	South Stage 2	53	65.3	LOS F	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	65.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	65.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	65.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		263	65.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Future (Gazcorp Interim 2021) WSERRC CON 16:00-17:00]

New Site
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 119 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Wallgrove Rd (S)												
1	L2	54	14.0	0.073	26.3	LOS B	1.8	14.0	0.61	0.70	0.61	40.8
2	T1	1184	14.0	0.863	32.5	LOS C	40.7	319.3	0.89	0.85	0.95	39.1
3	R2	2	58.0	0.032	67.6	LOS E	0.1	1.3	0.97	0.62	0.97	27.4
Approach		1240	14.1	0.863	32.3	LOS C	40.7	319.3	0.88	0.84	0.93	39.1
East: Austral Bricks Access												
4	L2	6	100.0	0.831	69.5	LOS E	9.4	71.6	1.00	0.96	1.31	27.3
5	T1	1	0.0	0.831	63.4	LOS E	9.4	71.6	1.00	0.96	1.31	28.2
6	R2	137	6.2	0.831	69.0	LOS E	9.4	71.6	1.00	0.96	1.31	27.9
Approach		144	10.2	0.831	69.0	LOS E	9.4	71.6	1.00	0.96	1.31	27.9
North: Wallgrove Rd (N)												
7	L2	17	56.3	0.026	22.9	LOS B	0.5	5.2	0.54	0.66	0.54	41.6
8	T1	1069	14.0	0.858	29.4	LOS C	36.3	284.9	0.82	0.79	0.88	40.4
9	R2	99	14.0	0.775	70.4	LOS E	6.2	48.7	1.00	0.87	1.24	27.3
Approach		1185	14.6	0.858	32.7	LOS C	36.3	284.9	0.83	0.79	0.91	38.8
West: Gazcorp access												
10	L2	312	14.0	0.864	54.7	LOS D	29.8	233.2	1.00	0.96	1.16	31.0
11	T1	1	0.0	0.864	48.9	LOS D	29.8	233.2	1.00	0.96	1.16	31.7
12	R2	167	14.0	0.864	54.7	LOS D	29.8	233.2	1.00	0.96	1.16	31.2
Approach		480	14.0	0.864	54.7	LOS D	29.8	233.2	1.00	0.96	1.16	31.1
All Vehicles		3049	14.1	0.864	37.7	LOS C	40.7	319.3	0.89	0.85	0.98	36.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P11	South Stage 1	53	53.8	LOS E	0.2	0.2	0.95	0.95
P12	South Stage 2	53	53.8	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	2	53.7	LOS E	0.0	0.0	0.95	0.95
P3	North Full Crossing	53	53.8	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	53.8	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		213	53.8	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Future (Interim 2021) OP 08:00-09:00]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Austral Bricks Road												
5	T1	11	14.0	0.006	0.0	LOS A	0.0	0.0	0.04	0.06	0.04	58.5
6	R2	1	0.0	0.006	5.7	LOS A	0.0	0.0	0.04	0.06	0.04	55.3
Approach		12	12.7	0.006	0.5	NA	0.0	0.0	0.04	0.06	0.04	58.1
North: SIte Access												
7	L2	1	0.0	0.003	5.7	LOS A	0.0	0.1	0.17	0.55	0.17	49.5
9	R2	2	100.0	0.003	6.6	LOS A	0.0	0.1	0.17	0.55	0.17	21.8
Approach		3	66.7	0.003	6.4	LOS A	0.0	0.1	0.17	0.55	0.17	31.2
West: Austral Bricks Road												
10	L2	18	88.2	0.047	3.8	LOS A	0.0	0.0	0.00	0.13	0.00	33.4
11	T1	56	14.0	0.047	0.0	LOS A	0.0	0.0	0.00	0.13	0.00	59.6
Approach		74	32.0	0.047	0.9	NA	0.0	0.0	0.00	0.13	0.00	53.2
All Vehicles		88	30.7	0.047	1.1	NA	0.0	0.1	0.01	0.13	0.01	52.7

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

MOVEMENT SUMMARY

Site: 101 [Future (Interim 2021) OP 17:00-18:00]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Austral Bricks Road												
5	T1	6	14.0	0.004	0.0	LOS A	0.0	0.0	0.02	0.09	0.02	57.9
6	R2	1	0.0	0.004	5.5	LOS A	0.0	0.0	0.02	0.09	0.02	54.9
Approach		7	12.0	0.004	0.8	NA	0.0	0.0	0.02	0.09	0.02	57.4
North: SIte Access												
7	L2	1	0.0	0.015	5.6	LOS A	0.0	0.4	0.07	0.57	0.07	49.9
9	R2	16	33.3	0.015	5.9	LOS A	0.0	0.4	0.07	0.57	0.07	22.1
Approach		17	31.3	0.015	5.9	LOS A	0.0	0.4	0.07	0.57	0.07	23.9
West: Austral Bricks Road												
10	L2	7	71.4	0.012	3.9	LOS A	0.0	0.0	0.00	0.22	0.00	35.2
11	T1	11	14.0	0.012	0.0	LOS A	0.0	0.0	0.00	0.22	0.00	58.4
Approach		18	37.6	0.012	1.6	NA	0.0	0.0	0.00	0.22	0.00	49.2
All Vehicles		42	30.6	0.015	3.2	NA	0.0	0.4	0.03	0.34	0.03	37.8

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

MOVEMENT SUMMARY

Site: 101 [Future (Interim 2021) CON 08:00-09:00]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Austral Bricks Road												
5	T1	11	14.0	0.007	0.1	LOS A	0.0	0.1	0.06	0.06	0.06	58.2
6	R2	1	0.0	0.007	6.0	LOS A	0.0	0.1	0.06	0.06	0.06	55.2
Approach		12	12.7	0.007	0.6	NA	0.0	0.1	0.06	0.06	0.06	57.9
North: SIte Access												
7	L2	1	0.0	0.012	5.7	LOS A	0.0	0.5	0.23	0.58	0.23	49.1
9	R2	8	100.0	0.012	7.1	LOS A	0.0	0.5	0.23	0.58	0.23	21.6
Approach		9	88.9	0.012	7.0	LOS A	0.0	0.5	0.23	0.58	0.23	24.7
West: Austral Bricks Road												
10	L2	127	14.9	0.107	3.9	LOS A	0.0	0.0	0.00	0.39	0.00	43.1
11	T1	56	14.0	0.107	0.0	LOS A	0.0	0.0	0.00	0.39	0.00	54.7
Approach		183	14.6	0.107	2.7	NA	0.0	0.0	0.00	0.39	0.00	47.5
All Vehicles		204	17.9	0.107	2.8	NA	0.0	0.5	0.01	0.38	0.01	46.4

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

MOVEMENT SUMMARY

Site: 101 [Future (Interim 2021) CON 17:00-18:00]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Austral Bricks Road												
5	T1	6	14.0	0.004	0.0	LOS A	0.0	0.0	0.03	0.09	0.03	57.9
6	R2	1	0.0	0.004	5.5	LOS A	0.0	0.0	0.03	0.09	0.03	54.9
Approach		7	12.0	0.004	0.8	NA	0.0	0.0	0.03	0.09	0.03	57.3
North: SIte Access												
7	L2	1	0.0	0.083	5.6	LOS A	0.3	1.9	0.08	0.58	0.08	49.9
9	R2	103	0.0	0.083	5.5	LOS A	0.3	1.9	0.08	0.58	0.08	22.4
Approach		104	0.0	0.083	5.5	LOS A	0.3	1.9	0.08	0.58	0.08	22.7
West: Austral Bricks Road												
10	L2	8	100.0	0.014	3.9	LOS A	0.0	0.0	0.00	0.33	0.00	37.3
11	T1	11	14.0	0.014	0.0	LOS A	0.0	0.0	0.00	0.33	0.00	56.2
Approach		19	52.2	0.014	2.4	NA	0.0	0.0	0.00	0.33	0.00	48.5
All Vehicles		131	8.3	0.083	4.7	NA	0.3	1.9	0.06	0.51	0.06	26.9

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