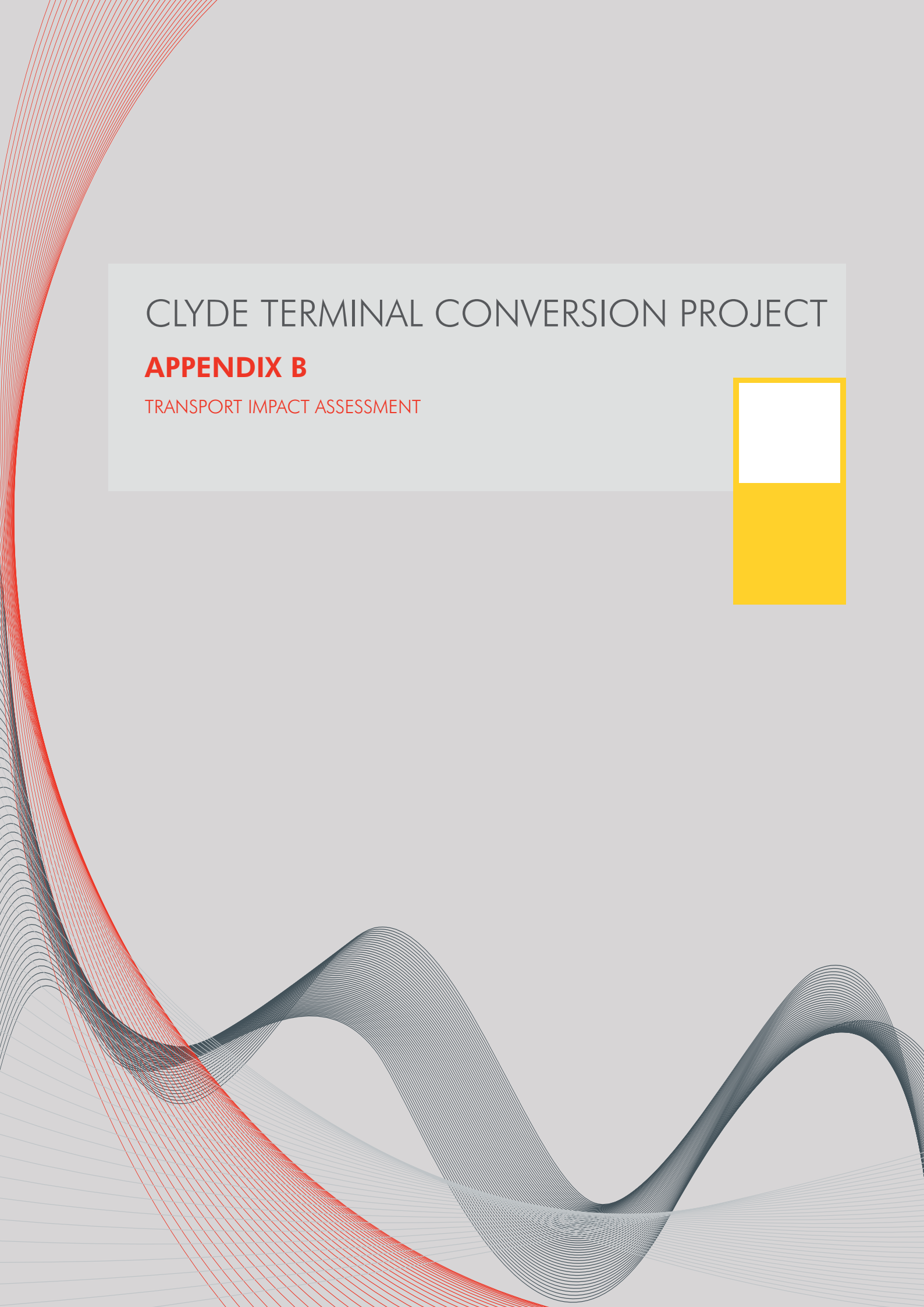
CLYDE TERMINAL CONVERSION PROJECT

APPENDIX B

TRANSPORT IMPACT ASSESSMENT



Clyde Terminal Conversion Project
The Shell Company of Australia Ltd
06-Nov-2013

Transport Impact Assessment

Clyde Terminal Conversion Environmental Impact Statement

Transport Impact Assessment

Clyde Terminal Conversion Environmental Impact Statement

Client: The Shell Company of Australia Ltd

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Quality Information

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			Name/Position	Signature
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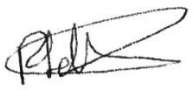
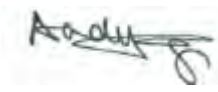
D	17-May-2013	Final following comments	Roger Jeffries Principal Consultant	
E	23-Aug-2013	Final	Andy Yung Principal Transport Planner	
FF	06-Nov-2013	Final - Re-issued following feedback	Roger Jeffries Principal Consultant	

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Executive Summary

The Clyde Terminal conversion is being carried out to consolidate assets and involves the demolition and reconfiguration of a number of assets at the Terminal.

These onsite works and changes to future operations will impact the amount of traffic coming to and from the Clyde Terminal, particularly during the construction and demolition phase. The demolition and construction works would result in temporary increases to light vehicle and heavy vehicle numbers, however, these were deemed unlikely to significantly impact the surrounding road network.

Once the project works are completed there would be a slight reduction in light vehicle movements compared to current operations. Heavy vehicle movements would remain consistent with those of the current operations. These changes are deemed to have negligible impact on the surrounding road network.

Mitigation measures including the development of a CTMP and limiting construction and demolition related heavy vehicles to the nominated work hours where possible are considered sufficient to adequately manage traffic associated with the Project. The Project is not considered likely to result in residual traffic impacts on the surrounding road network.

1.0 Introduction

1.1 Purpose and Scope

AECOM Australia Pty Ltd has been engaged by the Shell Company of Australia Ltd (Shell) to prepare an Environmental Impact Statement (EIS) for works to be carried out at the Clyde Terminal, approximately 15 kilometres west of the Sydney CBD. The works involve the conversion of the former Clyde Refinery for use solely as a finished fuels terminal (the Clyde Terminal), including the removal of redundant infrastructure no longer required for the future operation of the site. This Transport Impact Assessment (TIA) will form part of the EIS required as part of the planning approval process.

The proposed works would result in construction traffic, as all demolition waste materials will be transported by road for appropriate disposal. There will be an overall decrease in operational activity onsite following the proposed works. This document presents an assessment of the impacts of the proposed traffic activity on the surrounding road network. There will be a decrease in operational activity onsite following the proposed works.

This TIA includes:

- An assessment of existing road conditions;
- An evaluation of the impacts associated with construction traffic (resulting from the proposed works); and
- Consideration of measures to mitigate traffic impacts, if required.

1.2 Structure of Report

This report is structured as follows:

Section 2.0 outlines relevant local and regional planning policy documents.

Section 3.0 describes existing transport conditions in the area surrounding the site.

Section 4.0 considers other proposed developments in the Camellia area and their potential impact on the surrounding road network.

Section 5.0 provides a description of the project in terms of construction and operation phases.

Section 6.0 assesses trip generation, distribution and impacts on the road network (during each phase).

Section 7.0 summarises the report and sets out the study conclusions.

2.0 Transport Policy Context

2.1 State Policy

2.1.1 Metropolitan Strategy

In 2005, the NSW Government released Sydney's Metropolitan Strategy – City of Cities: A Plan for Sydney's Future, to support growth while balancing social and environmental impacts over 25 years. In 2010, that strategy was updated and integrated with the Metropolitan Transport Plan to deliver a new 25 year Metropolitan Plan for Sydney 2036.

The Metropolitan Plan integrates land use, urban and funded-transport planning together for the first time, providing a framework for sustainable growth and development across the city to 2036. It will also meet the targets in the updated NSW State Plan – notably in integrated transport and land use planning.

2.1.2 NSW State Plan

The NSW 2021 State Plan is a 10-year plan to guide the State government's policy and budget decision making and, in conjunction with the NSW Budget, to deliver on community priorities. The plan will drive the agenda for change in NSW to:

- Restore economic growth;
- Return quality health, transport, education, justice and community services, putting customer service at the heart of service design;
- Build infrastructure that drives our economy and improves people's lives;
- Strengthen our local environments, devolve decision making and return planning powers to the community; and
- Restore accountability and transparency to government, and give the community a say in decisions affecting their lives.

2.1.3 North West Subregional Strategy

The North West Subregional Strategy is an intermediate step to translating the Metropolitan Strategy to a local level, recognising that some issues extend beyond local government boundaries and require a subregional approach. The Subregional Strategy acts as a broad framework for the long term development of the area, guiding Government investment and linking local and state planning issues. The Strategy aims to:

- Provide a forum for councils to allocate the local distribution of housing and employment capacity targets based on the principles of the Metropolitan Strategy, and to work together on complementary future directions especially in centres crossing local government area (LGA) boundaries;
- Provide for balanced growth among LGAs to build upon regional strengths and bolster opportunities;
- Identify the future role of Strategic Centres and Corridors, as well as Towns, Villages and Neighbourhood Centres in relation to the overall structure of the metropolitan area;
- Focus coordinated State agency involvement and asset management with respect to Strategic Centres and corridors including providing a basis for the prioritisation of investment; and
- Assist planning for investment in regional facilities, within and between subregions.

2.2 Local Policy

2.2.1 Parramatta Local Environmental Plan and Development Control Plan

The Parramatta Local Environmental Plan (LEP) and Development Control Plan (DCP) set out the zoning, land use and development regulations for the Parramatta Local Government Area. The subject site is zoned IN3 Heavy Industrial in the Parramatta LEP 2011, which permits development for the purposes of a heavy industrial storage establishment (i.e. as a liquid fuels depot) with consent. Demolition of any building works lying within the Parramatta Local Government Area is also permissible with development consent.

3.0 Existing Conditions

3.1 Existing Site

Shell's Clyde Terminal is located at 9 Devon Street, Rosehill in the Camellia Industrial estate, approximately 15 kilometres west of Sydney CBD. The site comprises the former Clyde Refinery, which was used for the receipt and refining of Crude Oil up to 5 October 2012. The site continues to be used for the receipt and storage of imported finished product from the Gore Bay terminal via a 19km pipeline. Since the cessation of refining activities the site has been known as the Clyde Terminal, and continues to operate on parts of Lot 1, DP 109739, Lot 1 DP 383675, Lot 101 DP 809340, and Lot 2 DP 224288 which are owned by Shell. As per Shell's environmental protection licence (EPL) 570, the Clyde Terminal's operations also take place on a small parcel of land adjoining Parramatta River (Lot 1 DP 534905) that is leased by Shell from Roads and Maritime Services. However this parcel of land is not being considered as part of the current EIS.

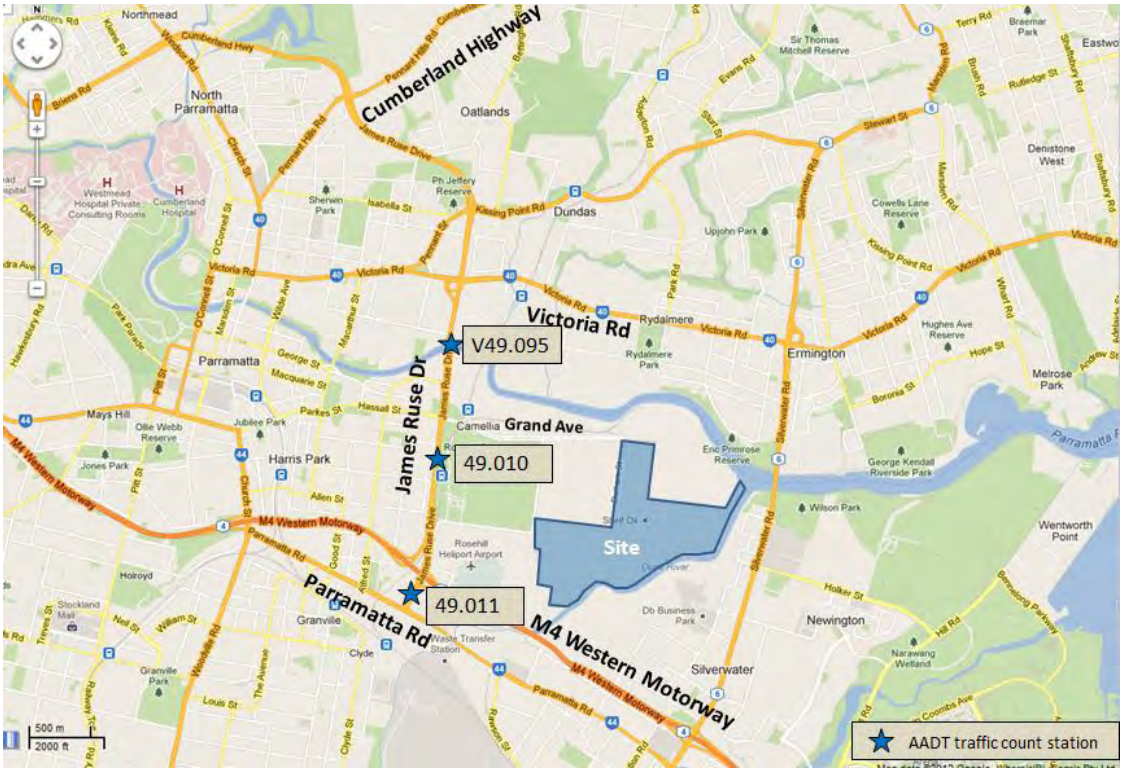
The former Clyde Refinery had approximately 475 employees and contractors, and processed around 30 million barrels of Crude Oil and other feeds each year. Major products that have been produced at the refinery until recently are: Gasoline, Automotive Gas Oil (Diesel), Jet fuel, Bitumen, and LPG (as a refining by-product). The current Clyde Terminal continues to receive, store, blend and distribute finished fuels only, and also continues to operate 24 hours a day, 7 days a week.

3.2 Surrounding Road Network

The site has established vehicular connections to nearby arterial roads and the Sydney motorway network. The principal collector road for the Shell Clyde Terminal site is Grand Avenue, which also provides access for the surrounding Camellia Industrial estate onto Hassall Street and onward to Parkes Street heading west to the Parramatta CBD. Grand Avenue also provides access onto James Ruse Drive, the main arterial road in the surrounding area which provides connectivity south to the M4 Western motorway and Parramatta Road, and north over the Parramatta River to Victoria Road and onward to the Cumberland Highway.

A second site access to Parramatta Road is also available, which is accessed south along Unwin Street, Kay Street and Wentworth Street. This second access allows traffic to access Parramatta Road without using James Ruse Drive.

Figure 1 Site Location



Source: Google 2012

3.3 Existing Traffic Conditions

3.3.1 Strategic Road Network

Devon Street

Devon Street is a local road running east-west adjacent to the northern site boundary, connecting to both Colquhoun Street and Durham Street. It is a two-lane road with a posted speed limit of 50km/h.

Durham Street

Durham Street provides the main access to the Clyde Terminal, which is located approximately halfway between Grand Avenue and Devon Street. Durham Street is a two-lane local road with a posted speed limit of 50km/h.

Colquhoun Street

Colquhoun Street provides access to the site at its southern end, and connects to Grand Avenue to the north which provides connectivity from the site to the surrounding road network. Colquhoun Street is a two-lane local road with a speed limit of 50km/h.

Unwin Street / Kay Street

Unwin Street and Kay Street are local roads which provide access from Colquhoun Street to Wentworth Street, which is part of the route which allows secondary access to Parramatta Road from the site. They are two lane roads with a posted speed limit of 50km/h.

Wentworth Street

Wentworth Street links Kay Street to Parramatta Road. It is a two lane road with a posted speed limit of 50km/h.

Grand Avenue

Grand Avenue is the collector road serving the local roads which access the site. It is a two-lane divided road with a large central median, and a posted speed limit of 60km/h.

Hassall Street

Grand Avenue continues as Hassall Street to the west of James Ruse Drive, and provides a connection west to Parkes Street and onward to the Parramatta CBD. It is a four-lane collector road with a posted speed limit of 60km/h.

James Ruse Drive

James Ruse Drive is the major arterial road providing access from Grand Avenue to important arterial routes and the motorway network. It provides connectivity south to the M4 Western and Parramatta Road, and north to Victoria Road and the Cumberland Highway. In the vicinity of the site, it is a six-lane road with a posted speed limit of 70km/h.

Parramatta Road

Parramatta Road is an arterial road which acts as a secondary east-west route to the M4 Western Motorway. It is a four lane road with a posted speed limit of 60km/h.

M4 Western Motorway

The M4 Western Motorway is the major highway route providing an east-west link between the foothills of the Blue Mountains and Strathfield, and can be accessed via an interchange with James Ruse Drive. It is a six-lane motorway with a variable speed limit system in place, but would normally operate at 100km/h.

Victoria Road

Victoria Road provides a major connection east toward Ryde and other arterial roads such as Lane Cove Road, which connects to other parts of Sydney. It is a four-lane road with a posted speed limit of 60 km/h.

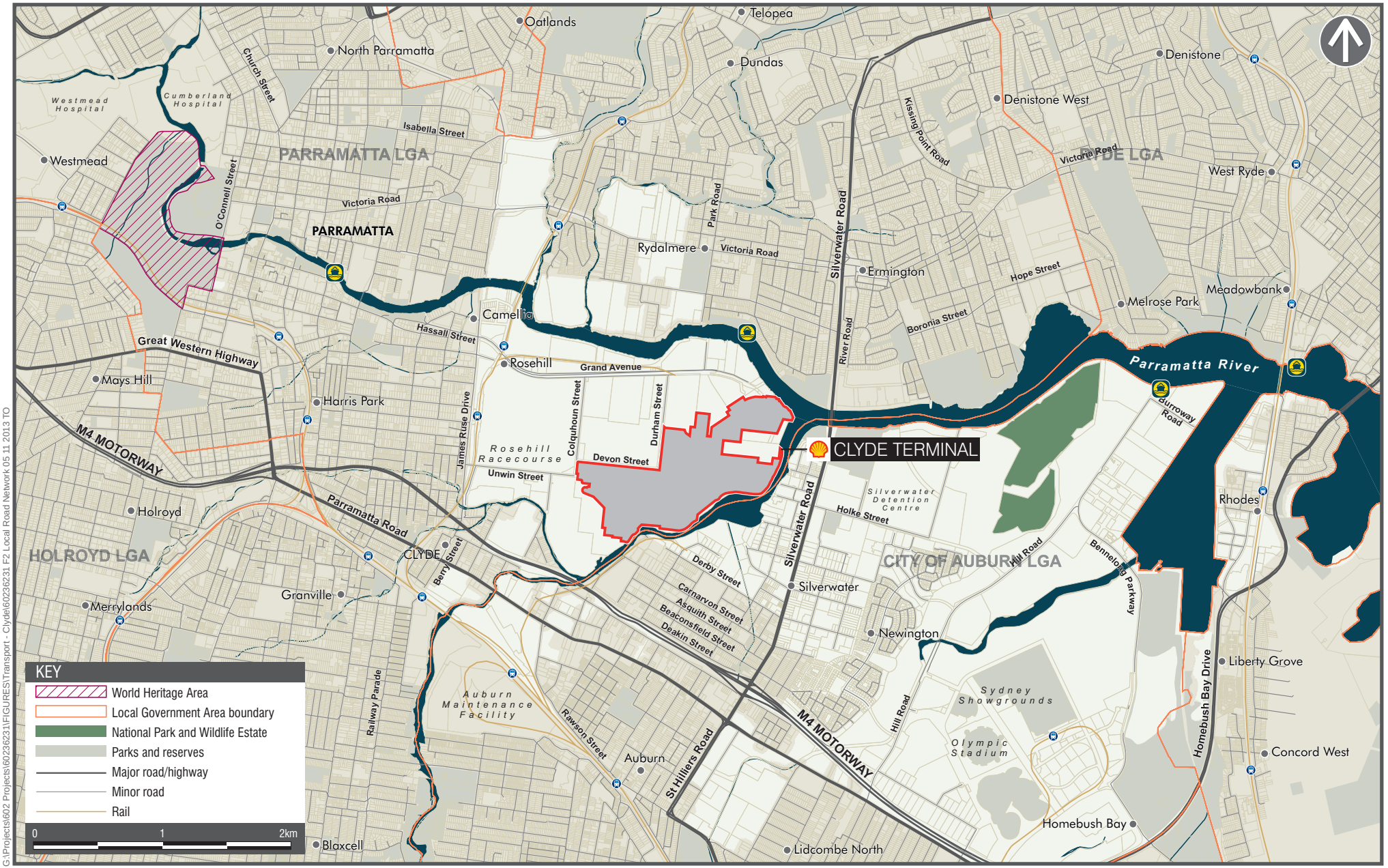
Cumberland Highway

The Cumberland Highway provides an important connection to Sydney's North West and upper North Shore toward the F3. It a four-lane road with a posted speed limit of 60 km/h.

3.3.2 Local Road Network

The local road network is shown in **Figure 2**. Durham Street provides access into the site from Grand Avenue, with Devon Street also running adjacent to the site along the northern boundary. Grand Avenue is the principal collector road which feeds onto James Ruse Drive to the west, providing access to the wider road network. The main access to the Terminal is at Shell Gate Four, located on Durham Street between Grand Avenue and Devon Street.

A second access to the site from Parramatta Road is available via Wentworth Street, Kay Street and Unwin Street. The use of this route enables access to the site without using James Rouse Drive or Grand Avenue.



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AECOM

LOCAL ROAD NETWORK

Clyde Terminal Conversion Project
Environmental Impact Statement

FIGURE 2

3.3.3 Daily Traffic Volumes

Average daily traffic volumes in the vicinity of the site have been assessed using available Annual Average Daily Traffic (AADT) data provided by RMS. Three vehicle counting stations are located along James Ruse Drive, as shown in **Figure 1**. A summary of traffic volumes recorded at these stations over the past nine years is presented in **Table 1**, with the latest available AADT data from 2005.

Following analysis of the AADT data it is evident that traffic growth in the vicinity of the site is low, ranging from 0.1-1.2% over the nine years to 2005.

Table 1 Annual Average Daily Traffic (AADT) on the Adjacent Road Network

Station Number	Station Location	AADT Volumes - Year				Annual Growth Rate (1996 – 2005)
		1996	1999	2002	2005	
49.010	James Ruse Drive south of Hope Street	57,992	63,098	62,988	64,666	1.2%
49.011	James Ruse Drive north of Parramatta Road	31,899	31,981	32,478	32,171	0.1%
V49.095	James Ruse Drive north of River Road (bridge over Parramatta River)	60,242	63,009	63,346	64,085	0.7%

Source: RMS Annual Average Daily Traffic Data (AADT) 2005 Sydney Regional Volume 1

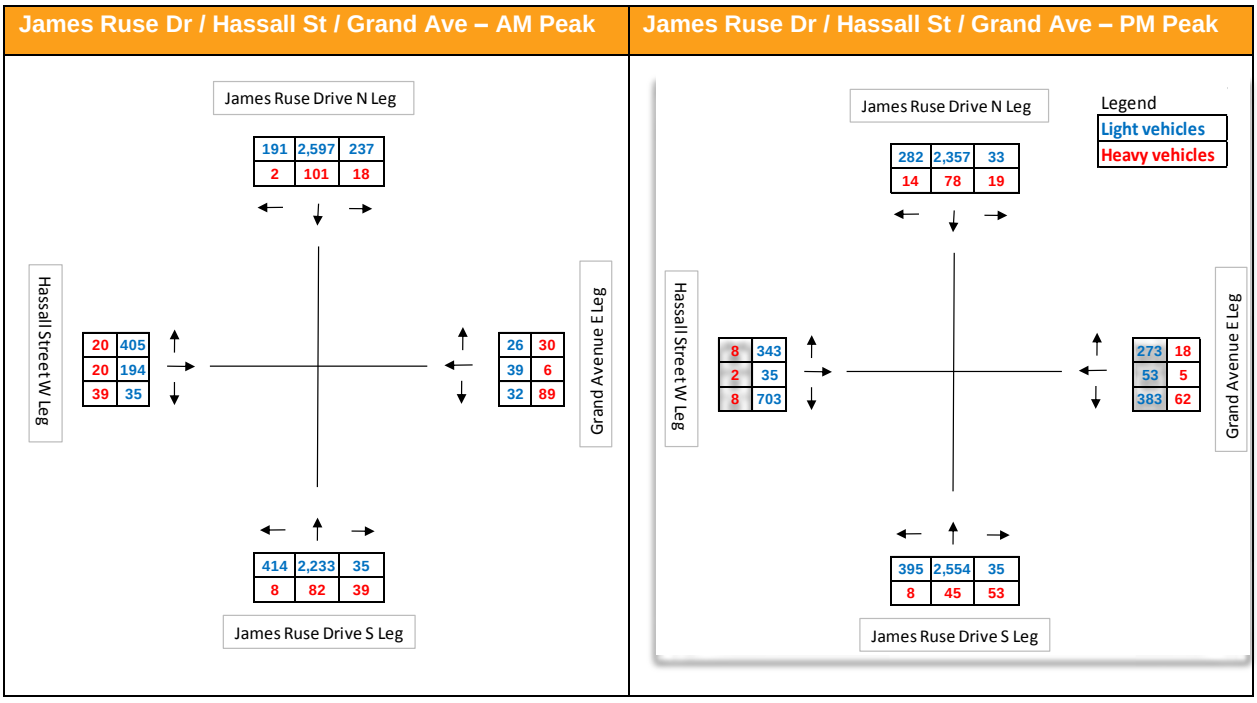
3.3.4 Peak Hour Traffic Volumes

To provide a better understanding of peak hour traffic conditions, classified intersection count data has been obtained by AECOM from the TIA of an integrated recycling park at Grand Avenue, Camellia, prepared in 2011 by Traffix Traffic and Transport Planners. Data for the following intersections is available:

- James Ruse Drive / Grand Avenue / Hassall Street;
- James Ruse Drive / Berry Street / Parramatta Road; and
- Grand Avenue / Grand Avenue North.

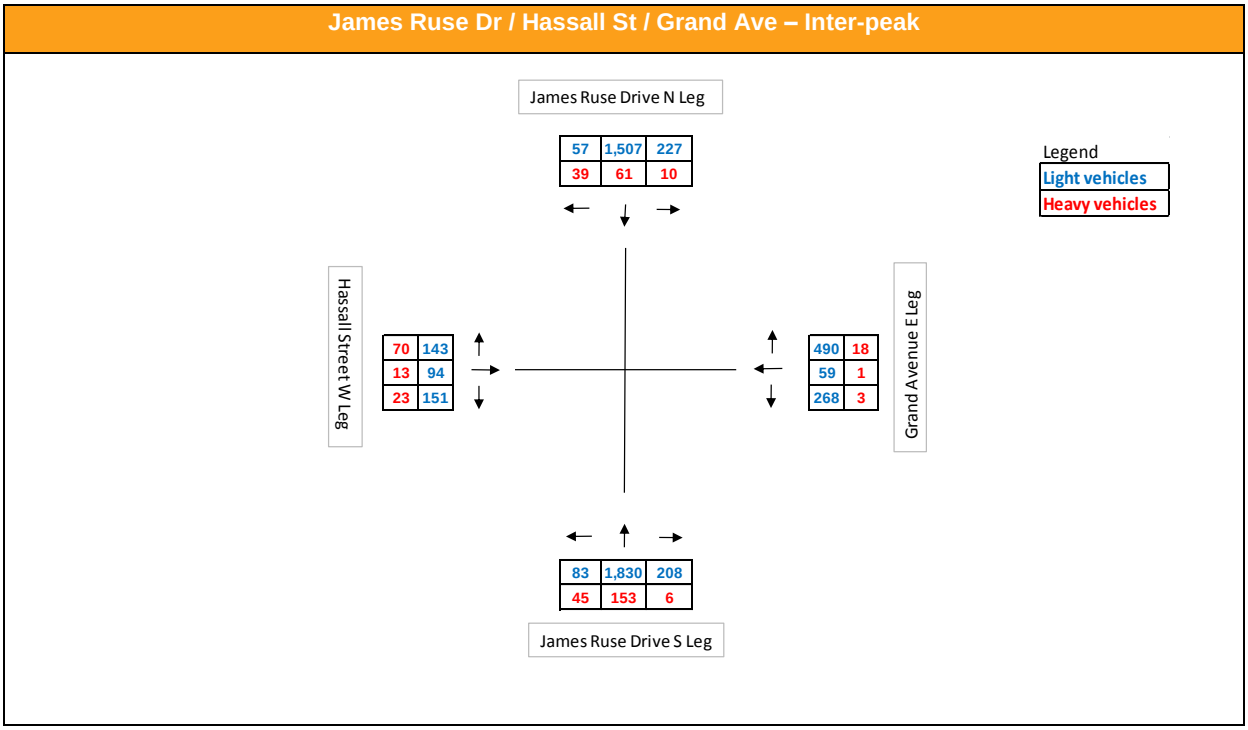
For James Ruse Drive / Grand Avenue / Hassall Street, data was collected for two hours in the AM (7-9am) and PM (4-6pm) peaks, shown in **Figure 3**, and two hours during the day (1.30-3.30pm) during the inter-peak period, as shown in **Figure 4**. Data for two hours in the PM peak (4-6pm) was collected for James Ruse Drive / Berry Street / Parramatta Road, as illustrated in **Figure 5**, and Grand Avenue / Grand Avenue North, as illustrated in **Figure 6**. It is noted that at the time of these traffic counts, the former Clyde Refinery was still in operation and the workforce onsite was substantially larger, with approximately 280 personnel onsite at any one time (refer to **Table 4**).

Figure 3 Traffic Volumes on James Ruse Dr/Hassall St / Grand Ave Recorded in 2011 – AM and PM peaks



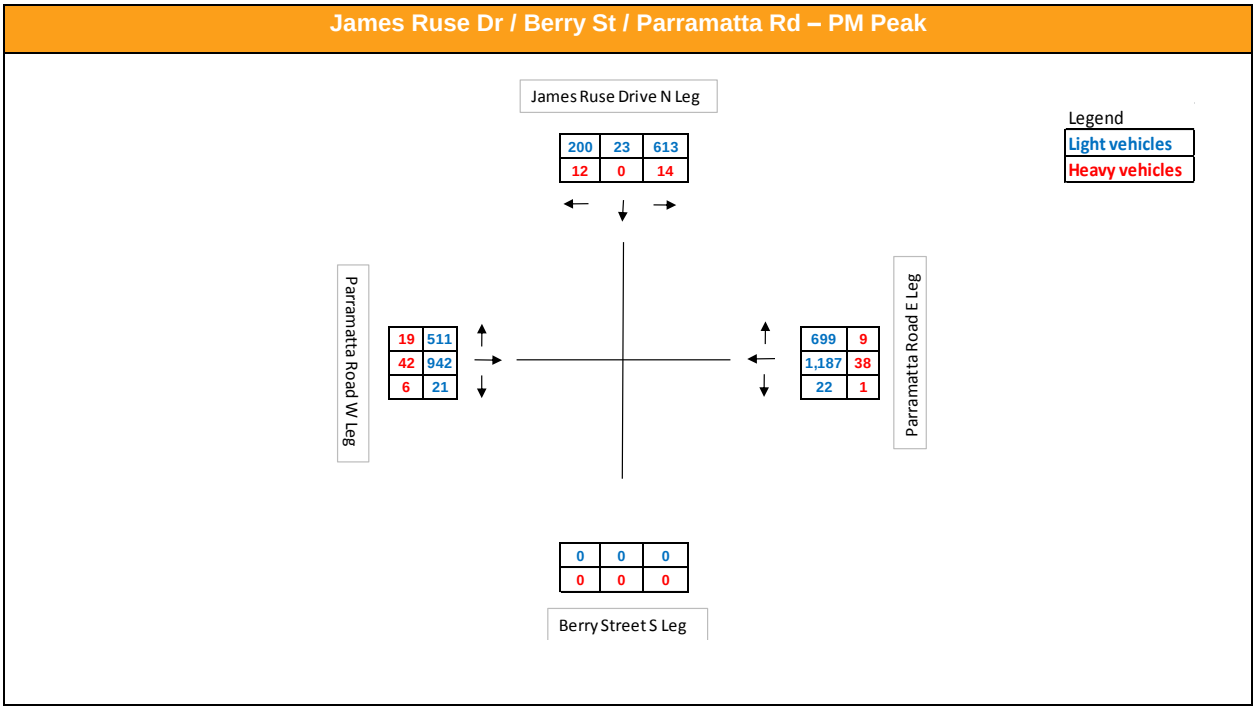
Source: AECOM from Traffix Traffic and Transport Planners, 2011

Figure 4 Traffic Volumes on James Ruse Dr/Hassall St/Grand Ave Recorded in 2011 – Inter-peak period



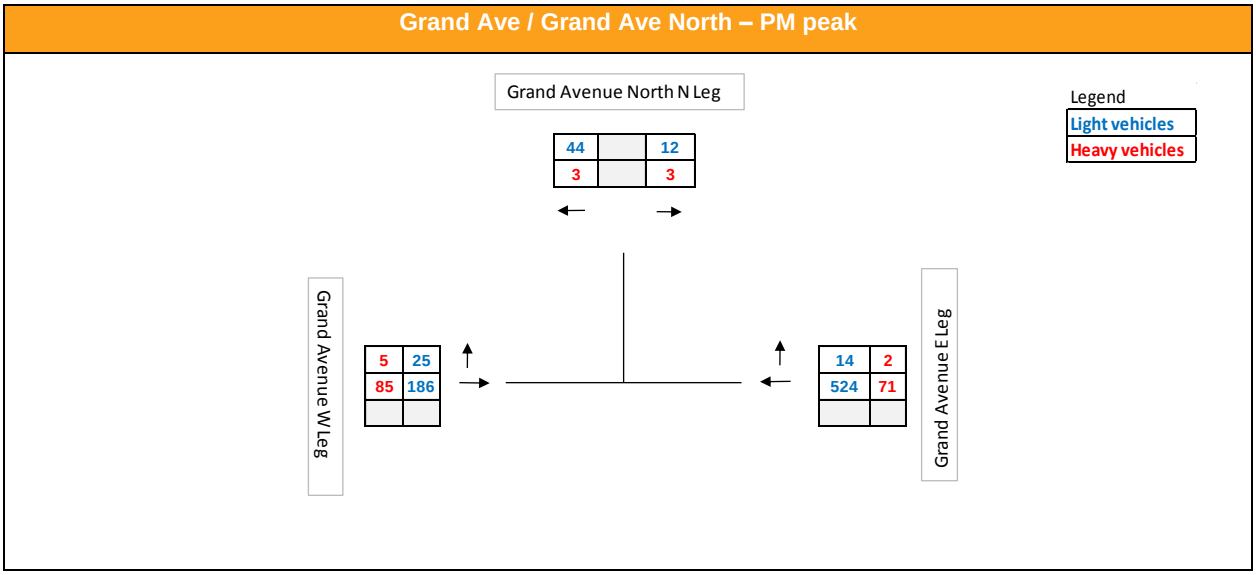
Source: AECOM from Traffix Traffic and Transport Planners, 2011

Figure 5 Traffic Volumes on James Ruse Dr/Berry St/Parramatta Rd Recorded in 2011



Source: AECOM from Traffix Traffic and Transport Planners, 2011

Figure 6 Traffic Volumes on Grand Ave/Grand Ave North Recorded in 2011



Source: AECOM from Traffix Traffic and Transport Planners, 2011

3.3.5 Operational Performance

The performance of the three intersections have been evaluated using SIDRA Intersection 5.1, a computer based modelling package designed for calculating isolated intersection performance. The intersections modelled are:

- James Ruse Drive / Hassall Street / Grand Avenue (west of the site);
- James Ruse Drive / Berry Street / Parramatta Road (south west of the site); and
- Grand Avenue / Grand Avenue North (west of the site, prior to James Ruse Drive intersection).

The main performance indicators for SIDRA 5.1 include:

- Degree of Saturation (DoS) – a measure of the ratio between traffic volumes and capacity of the intersection is used to measure the performance of isolated intersections:
  - As DoS approaches 1.0, both queue length and delays increase rapidly;
  - Satisfactory operations usually occur with a DoS range between 0.7-0.8 or below;
- Average Delay – duration, in seconds, of the average vehicle waiting at an intersection; and
- Level of Service (LoS) – a measure of the overall performance of the intersection.

This is explained further in **Table 2**.

The current intersection layouts are provided in **Figure 7** to **Figure 9**.

Table 2 Performance Criteria for Intersections

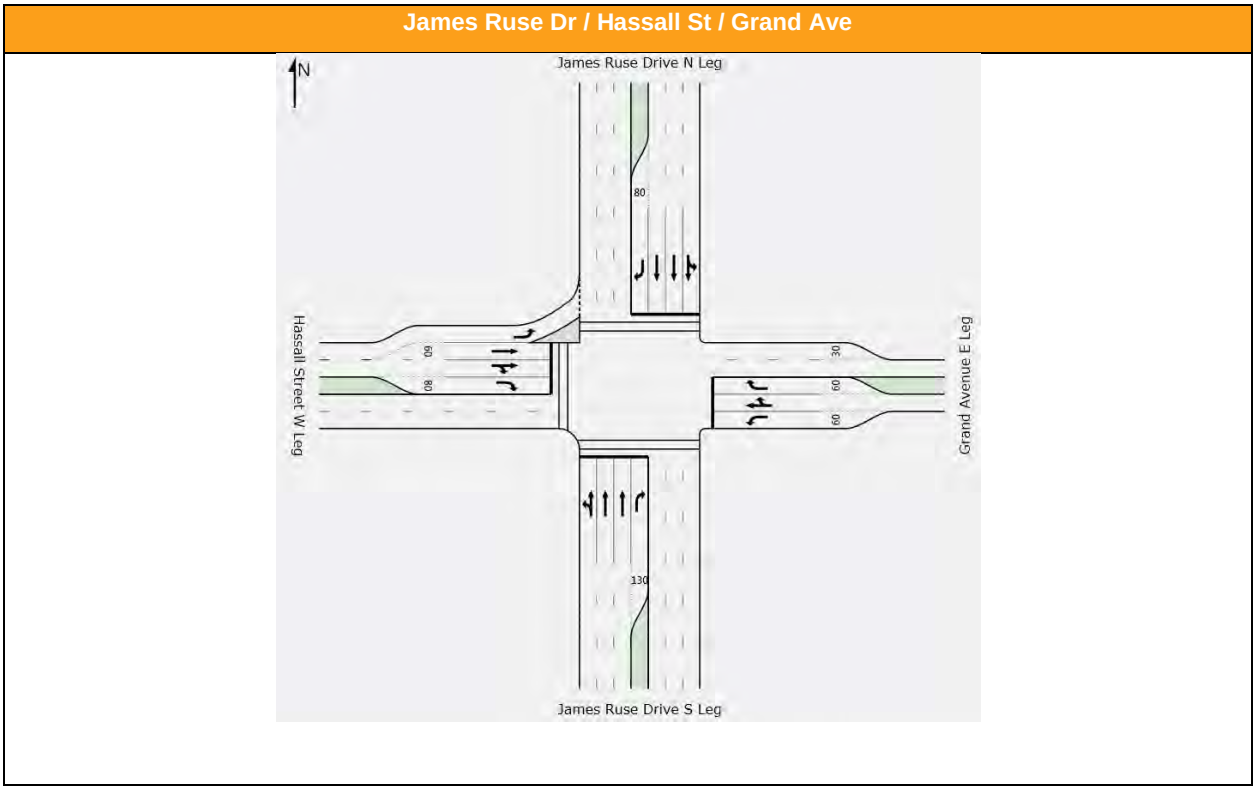
Level of Service	Average Delay (secs/veh)	Traffic Signals, Roundabouts	Give Way and Stop Signs
A	Less than 14	Good Operation	Good Operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity; at signals incidents will cause excessive delays	At capacity; requires other control mode
F	>70	Roundabouts require other control mode	At capacity; requires other control mode

Table 3 Intersection Performance

Intersection	Peak period	Level of Service	Degree of Saturation	Average Delay (sec)	95% Back of Queue (m)
James Ruse Drive / Hassall Street / Grand Avenue	AM	F	1.221	201	1263
	Interpeak	F	1.000	76	439
	PM	F	1.347	288	1423
James Ruse Drive / Berry Street / Parramatta Road	PM	C	0.807	33	153
Grand Avenue / Grand Avenue North	PM	B	0.329	1	3

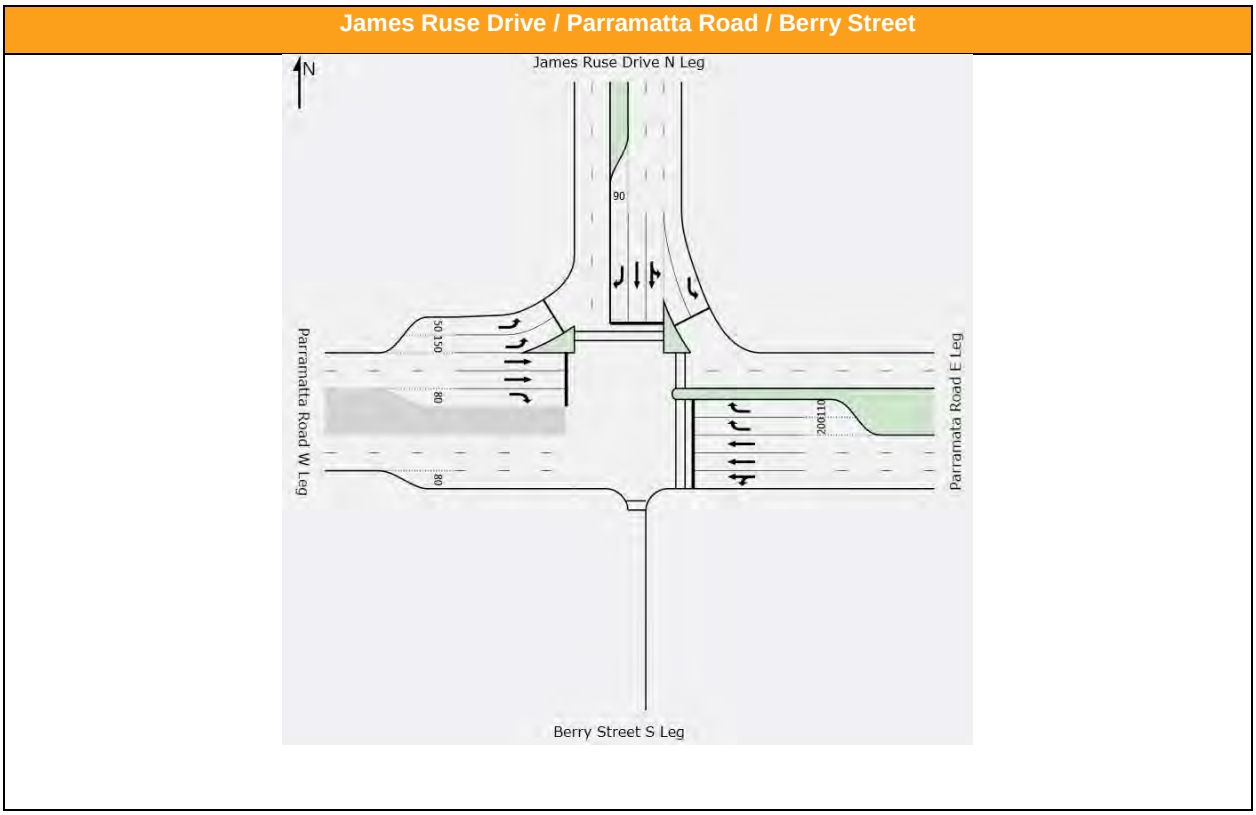
As indicated in **Table 3**, the SIDRA analysis undertaken on each of the intersections, the intersection of James Ruse Drive / Hassall Street / Grand Avenue shows a low level of service, high degree of saturation resulting in long wait times and queue lengths. This is particularly relevant during both the AM and PM peak.

Figure 7 Intersection Layout – James Ruse Drive/Hassall Street/Grand Avenue



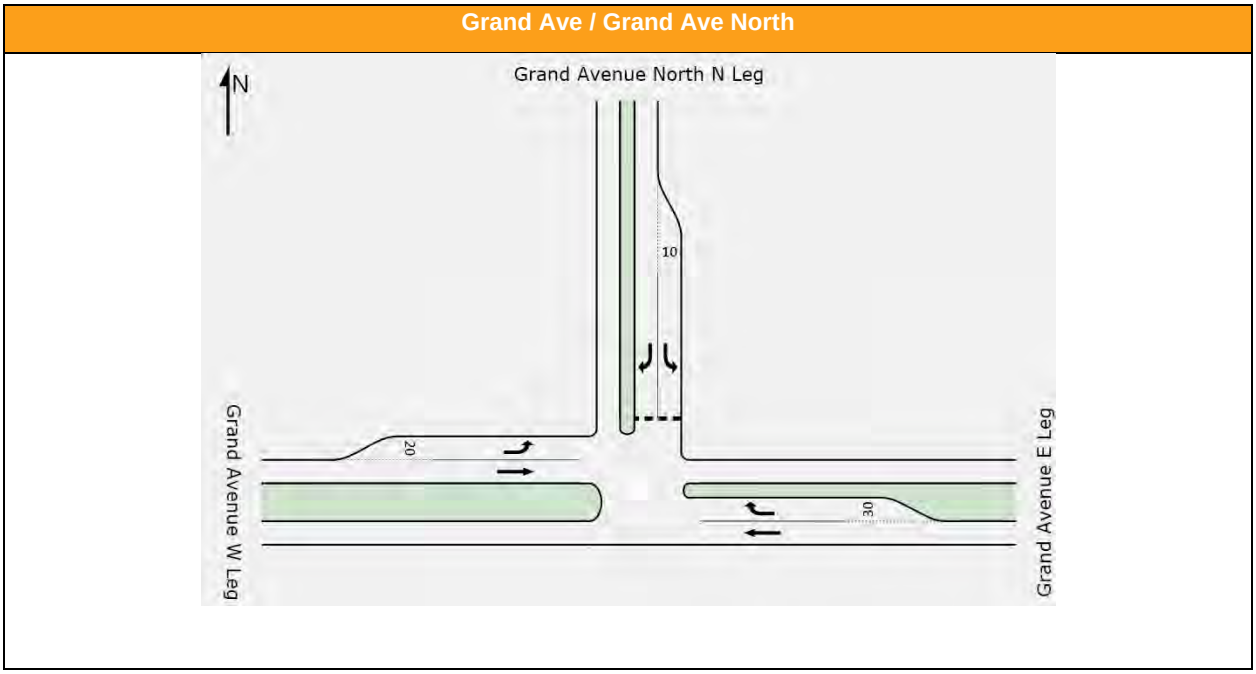
Source: AECOM

Figure 8 Intersection Layout – James Ruse Drive/Parramatta Road/Berry Street



Source: AECOM

Figure 9 Intersection Layout – Grand Avenue/Grand Avenue North



Source: AECOM

4.0 Surrounding Proposed Development

4.1 Camellia Recycling Centre

Veolia Environmental Services is proposing to develop a Materials Recycling Facility capable of processing up to 150,000 tonnes per annum of non-putrescible waste at 37 Grand Avenue, Camellia, approximately 300 metres east of the intersection of Grand Avenue and Durham Street. An Environmental Impact Statement has been prepared by CH2MHILL for this State Significant Development application (SSD-4964) (CH2MHILL, 2013). This includes a Traffic Impact Assessment undertaken by Halcrow (Halcrow, 2012). This Environmental Impact Statement is currently on public exhibition.

These reports explain that the site currently supports around 11 truck movements per day, or around one departure and arrival per hour. In addition, around 15 staff car trips are undertaken per day, with around 15 movements occurring before 6:00am, and around 15 movements occurring after 3:30pm. The main access to the northern boundary of this site is from Grand Avenue via James Ruse Drive. The main access to the southern boundary of this site is from Parramatta Road via Rosehill Gardens Racecourse (CH2MHILL, 2013; Halcrow, 2012).

The construction of the Camellia Recycling Centre would take place over around nine months. The volumes of traffic generated during these construction activities are expected to be similar to those experienced at the site currently, and it is not expected that these construction works would significantly impact on the surrounding road network (CH2MHILL, 2013; Halcrow, 2012).

The Camellia Recycling Centre would operate 24 hours a day, seven days a week. Waste would therefore generally be received and distributed from the site with an even distribution over the 24 hour period. The key exception to this is predicted to be the delivery of non-transfer trailer wastes between 4:00am and 12:00pm. A total of nine trips would occur on the surrounding road network during the morning peak hour (i.e. around one vehicle every six to seven minutes). An additional two trips would occur each hour during the evening peak period (i.e. around one vehicle every 30 minutes).

An additional 16 car parking spaces would also be constructed as part of the Camellia Recycling Centre development, to complement the existing 30 car parking spaces at the site (CH2MHILL, 2013; Halcrow, 2012).

As a result, the Camellia Recycling Centre would not, in combination with the current proposal, create significant traffic related impacts. The increase of nine trips in the morning peak hour and two trips in the evening peak hour is a very small percentage of the total traffic volume of surrounding intersections. Compared to the existing peak hour traffic volumes of the two closest affected intersections (James Ruse Drive with Grand Avenue and Parramatta Road with Wentworth Street), the additional nine trucks during the morning peak represents around 0.13 per cent and 0.24 per cent of the total intersection peak hours at these intersections (CH2MHILL, 2013; Halcrow, 2012).

5.0 Proposed Works

5.1 Nature of Development

Shell ceased refining activities at the Clyde Terminal on 5 October 2012. Since this time Shell's Gore Bay Terminal has continued to act as an import terminal receiving and transferring only refined products rather than the previous mix of Crude Oil and refined petroleum products, and the now Clyde Terminal has continued to receive, store, blend and distribute finished petroleum products only. The cessation of the receipt and refining of Crude Oil provided Shell with the opportunity to remove now redundant infrastructure and assets at both the Clyde Terminal and the Gore Bay Terminal. The removal of these assets and the improvement to the remaining infrastructure would enable Shell to operate both sites more efficiently and with improved safety and environmental measures. The current application relates to the conversion of the Clyde Terminal only, and the modification of the existing Gore Bay Terminal is subject to a separate development application.

The proposed Project would comprise:

- Demolition of redundant tanks and other infrastructure; and
- Upgrades and improvements to site infrastructure.

The key components of the conversion of the Project Area would comprise:

- Demolition of the existing Clyde Terminal processing units and other redundant infrastructure at the Project Area. Existing storage tanks to be retained would be reallocated into final grades of finished petroleum products. Storage tanks surplus to the ongoing operation of the Clyde Terminal would be demolished. This would reduce the capacity and quantity of storage for petroleum fuels at the Clyde Terminal from 638 ML to 264 ML of fuels;
- Conversion of part of the existing Clyde Terminal assets to more efficiently receive, blend, store and distribute solely imported finished petroleum products. These products would continue to be supplied from the Clyde Terminal to Shell's existing Parramatta Terminal (which lies adjacent to the Clyde Terminal), and directly via existing pipelines from the Clyde Terminal to Sydney Airport and Newcastle.

The proposed Project would also include:

- Geodesmic domes would be installed over Jet fuel storage Tanks 34, 35 and 42, located in Tankfarm B2. These geodesmic domes would be designed so as to retain the majority of potential odours and emissions emitted from these Jet fuel storage tanks;
- Upgrades to tank instrumentation and tank control systems to enable remote and automated control;
- Upgrades to tank bunds where necessary;
- Reduction of the gas storage capacity of the Clyde Terminal from 10,851 cubic metres (m^3) to 1,550 m^3 metres to accommodate the continued receipt (by road tanker) and storage of Butane. Butane would continue to be blended with winter grades of Gasoline;
- Upgrades to the electrical supply, control and safeguarding systems;
- Increased automation of terminal systems;
- Installation of equipment to provide improved product quality segregation;
- Revised drainage and water treatment to suit reduced operations;
- Changes to the current fire system to provide articulated foam deployment and fire response for the converted Clyde Terminal arrangement;
- Revised internal facility pumping and piping arrangements;
- Associated works to increase the efficiency and effectiveness of the Clyde Terminal and to facilitate safe and efficient operations, such as lighting, safety shutdown systems, control room facilities and amenity upgrades; and
- An overall reduction in the operational footprint of the Clyde Terminal.

The Project would only involve minimal excavation activities, including grading works surrounding existing tankfarms, and foundation works for new substations and firewater tanks. No other sub-surface disturbance is anticipated as part of the Project.

The Clyde Terminal would remain operational as a receipt (from the Gore Bay Terminal), storage and distribution facility for finished petroleum products during the proposed works. Once the Project is executed and implemented, the Clyde Terminal would continue to receive, store and distribute finished petroleum products.

The eastern section of the Clyde Terminal is proposed to be modified to contain the finished product tanks required for continuing terminal operations. Products stored will include Unleaded Petrol 91, 95 and 98, Jet A1 fuel and Automotive Gas Oil (AGO) and the site will continue to store Butane for blending with Gasoline. The current Gore Bay – Clyde pipeline would continue to be used to transfer product.

It is expected that the conversion works would be undertaken progressively and would be completed within five to 10 years after the grant of development consent.

6.0 Impact of Proposed Works

6.1 Construction Hours, Workforce and Traffic Movements

Hours of construction and demolition will be 07:00 to 19:00, Monday to Friday and 08:00 to 13:00, Saturday.

A breakdown of onsite workforce numbers by project phase is summarised in **Table 4** below. As shown **Table 4**, employee numbers would increase to 68 employees for the duration of the Project and would then return to the same as for current operations (i.e. 27 employees) once the works are completed. The additional employees during the project would be located onsite to assist with and oversee the works.

The number of contractors would increase substantially to 198 once the demolition and construction works are underway. Contractor numbers would be reduced to 10 once the works are completed.

It is noted that these numbers reflect the number of employees that may be onsite in a given day and do not reflect the total number of staff employed by Shell (e.g. there are five shifts, only two of them would commute to Clyde in a given day).

Journey to Work (JTW) data for the Clyde peninsula industrial precinct (Travel Zone 1720) from the 2006 Census indicated that 85% of trips to work are taken by car. This data is gathered on the day of the census and reflects the typical mode of transport for all people travelling to work to the Clyde peninsula on this day. This data was used to estimate light vehicle movements associated with the Project.

Table 4 Clyde Past, Current and Future Onsite Personnel and Light Traffic Movements per Given Day

Phase	Employees Onsite	Contractors Onsite	Total Onsite	Estimated Light Vehicle Trips per day (% change from current)
Previous Operations when refinery was still operational	190	90	**280**	**238 (+595%)**
Current Operations	27	20	**47**	**40**
The Project			**198**	**169 (+423%)**
Concurrent operations	27	20	47	
Project staff	41	10	51	
Demolition	0	30	30	
Construction	0	70	70	
Operation upon completion of the Project	27	10	**37**	**32 (-20%)**

6.2 Light Vehicle Movements

Light vehicle trips to the Clyde Terminal have been estimated for previous, current and future operations in addition to the construction and demolition phase of the Project (refer to **Table 5**) as follows:

- Previous operations (i.e. when refinery remained operational): approximately 238 light vehicle trips per day;
- Current operations: approximately 40 light vehicle trips per day;
- Demolition and construction: 169 light vehicle trips per day; and
- Operation once the Project works are completed: approximately 32 light vehicle trips per day.

Since the cessation of refining at the Clyde Terminal, the number of light vehicles commuting to the Clyde Terminal has decreased to approximately 40 light vehicle trips per day compared to the previous 238 light vehicle trips per day (refer to **Table 5**). The construction and demolition works would require approximately 169 light vehicle trips to the Clyde Terminal to accommodate the additional workforce. Once the works are completed, the number of light vehicle trips would be approximately 32 per day, which is approximately 20% fewer than the current number.

6.3 Delivery, Service and Heavy Vehicle Movements

At present there are approximately 257 heavy vehicles accessing the site in each direction per day, including fuel tankers, waste truck, deliveries and courier vehicles. This includes 250 heavy vehicles accessing the adjacent Parramatta Road Terminal and seven heavy vehicles accessing the Clyde Terminal. It is not anticipated that there will be any oversized loads during the demolition or construction phases of the project, as all material will be cut to fit standard sized transportation. If oversized vehicles are required during the project, the necessary permits will be obtained.

A breakdown of heavy service and delivery vehicle numbers by project phase is summarised in **Table 5**.

The demolition phase would see the addition of 16 heavy vehicles in each direction to transport waste materials[1]. The construction phase would require approximately one heavy vehicle trip per day to deliver construction materials and initially to mobilise construction plant and equipment.

Once the construction and demolition works are completed, the continuing operation of the converted Clyde Terminal would see a similar number of heavy vehicle trips to those currently experienced. Increases in volume driven by NSW market growth is not expected to significantly increase traffic associated with the Clyde Terminal in the foreseeable future. This growth will have a limited impact on the volume of truck movements originating from the Parramatta Terminal. Until 2016, current estimates of market-based fuel volume growth sees Gasoline demand to remain fairly static, diesel fuel growth of approximately four percent and Jet fuel growth of approximately four percent. The vast majority of Jet fuel is transferred to Sydney Airport via pipeline so does not impact on traffic patterns, whereas Gasoline and Diesel fuel is largely transported from the adjoining Parramatta Terminal by road tankers. Accordingly, the road tanker movements from Parramatta terminal would be expected to grow by approximately two percent until 2016.

Table 5 Clyde Terminal Heavy, Service and Delivery Vehicle Movements

Stage	Fuel tankers	Waste trucks	Deliveries	Courier	Total (% change from current)
Previous Operations (i.e. when refinery was operational)	249	2	2	12	**265 (+3%)**
Current Operations	250	1	3	3	**257**
During the Project					**277** ***(+8%)***

[1] Shell, 2012

Stage	Fuel tankers	Waste trucks	Deliveries	Courier	Total (% change from current)
Operations	250	1	3	6	260
Demolition		16	0	0	16
Construction		0	1	0	1
Final configuration (Operation phase)	250	1	3	3	**257**

6.4 Traffic Distribution

Deliveries to and from the Clyde site for construction and demolition activities will be contained in the Sydney Metropolitan Area[2]. Fuel tankers will also continue to use the strategic road network to transport fuel within and outside the metropolitan area. The main access to the Clyde Terminal is located on Durham Street, which connects to Grand Avenue and subsequently James Ruse Drive. The majority of truck traffic transporting materials to and from the Clyde site will then travel along James Ruse Drive to the M4 Western Motorway, which provides access to the Sydney motorway network.

6.5 Impact of Construction and Demolition Traffic

Subject to development consent, demolition activities are anticipated to commence within six to 12 months of the grant of development consent, and would be undertaken progressively over five to 10 years. Construction activities are due to begin within six to 12 months of the grant of development consent, and would take approximately three years to complete. Demolition and construction activities would therefore occur concurrently, in addition to the ongoing operations of the Clyde Terminal.

During this period, there would be up to approximately 169 light vehicle trips to the Clyde Terminal, representing an increase of approximately 129 light vehicle trips compared to the current 40 light vehicle trips (i.e. a 423% increase) (refer to **Table 5**). Although this number represents a significant increase on the current number of light vehicle trips, it would represent fewer light vehicle trips compared to those during the previous refining operations at the site which occurred prior to 5 October 2012 (refer to **Table 5**). Light vehicles would be parked within the Clyde Terminal which already has sufficient car parking allocations to accommodate these additional vehicles. For these reasons, it is considered that the temporary increase in light vehicle numbers during the construction and demolition period would not significantly impact the surrounding road network.

During the construction and demolition period, the overall number of delivery, service and heavy vehicle movements is predicted to be approximately 277 trips per day, which represents an increase of approximately 20 heavy vehicle trips compared to the current 257 heavy vehicle trips (i.e. an 8% increase) (refer to **Table 5**). The impact of demolition and construction heavy vehicle traffic on the surrounding road network is considered to be negligible due to the low levels of traffic generated by the works. The number of fuel tankers accessing the Parramatta Terminal would remain consistent with current operations throughout the duration of the Project and would continue to do so once the terminal modification works have been completed.

As discussed in **Section 4.1**, there will be no significant cumulative impact of the construction and demolition traffic generated by both this site and surrounding developments on the surrounding road network. . This is due to the minimal increase in truck movements transporting materials to and from the site, as well as the overall reduction in staff and operating capacity at the site once the proposed works are completed, and the negligible change in movements from other developments.

[2] Shell, 2012

6.6 Construction Traffic Management Plan (CTMP)

The Transport Impact Assessment prepared by AECOM has concluded that the project would not create significant impacts on the surrounding road network. However, it is nevertheless recommended that:

- A Construction Traffic Management Plan (CTMP) be prepared prior to the works commencing where vehicular traffic will be minimised during peak hour traffic periods where practical to do so.
- Arrangements will be made to have construction vehicles parked on the Clyde site, limiting the numbers of vehicle sparked in surrounding streets.

Demolition and construction activities are anticipated to be undertaken from 7am to 6pm, Monday to Friday, and from 8am to 1pm on Saturday. Some traffic associated with demolition and construction activities may arrive at the Project Area outside of these designated times to avoid adding to peak hour congestion where possible.

A construction traffic management plan should be prepared at a later date by the contractor undertaking the work.

6.7 Access and Parking

Access provisions will remain unchanged for the demolition, construction and future operation stages, as site accesses are already designed to accommodate heavy articulated vehicle movements. The demand for parking will decrease as the project stages are completed, therefore there won't be a need for additional parking as there is adequate parking onsite.

7.0 Summary and Conclusions

The Clyde Terminal conversion is being carried out to consolidate assets and involves the demolition and reconfiguration of a number of assets at the Terminal.

These onsite works and changes to future operations will impact the amount of traffic coming to and from the Clyde Terminal (discussed in **Section 6.0**).

The demolition and construction works would result in temporary increases to light vehicle and heavy vehicle numbers, however, these were deemed unlikely to significantly impact the surrounding road network. Once the project works are completed there would be a slight reduction in light vehicle movements compared to current operations. Heavy vehicle movements would remain consistent with those of the current operations. These changes are deemed to have negligible impact on the surrounding road network.

Mitigation measures including the development of a CTMP and limiting construction and demolition related heavy vehicles to the nominated work hours are considered sufficient to adequately manage traffic associated with the Project. The Project is not considered likely to result in residual traffic impacts on the surrounding road network.

8.0 Reference List

CH2MHILL, 2013. *Camellia Recycling Centre Environmental Impact Statement*.

Halcrow, 2012. *Proposed Recycling Centre at 37 Grand Avenue, Camellia: Traffic Impact Assessment Prepared for Veolia Environmental Services*.

Technical Report No 6, Traffic Impact Assessment, Proposed Integrated Recycling Park, Camellia, Traffix Traffic and Transport Planners, August 2011.

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